WEST OAKLAND SPECIFIC PLAN

DRAFT ENVIRONMENTAL IMPACT REPORT

SCH #2012102047

LEAD AGENCY: CITY OF OAKLAND

JANUARY 2014

This material is based upon work supported by the FHWA under TDG II P-21, Cooperative Agreement No. DTF61-11-H00001.

LAMPHIER-GREGORY

WEST OAKLAND SPECIFIC PLAN

DRAFT ENVIRONMENTAL IMPACT REPORT

SCH #2012102047

Prepared for the City of Oakland by:

Lamphier-Gregory
in association with:

JRDV Urban International
Kittleson & Associates
Hausrath Economics Group
Redwood Consulting

JANUARY 2014

CITY OF OAKLAND

250 FRANK H. OGAWA PLAZA, SUITE 3315 • OAKLAND, CALIFORNIA 94612-2032

Department of Planning and Building
Strategic Planning Division

(510) 238-3941
FAX 510) 238-6538
TDD (510) 839-6451

NOTICE OF AVAILABILITY / RELEASE OF DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR) FOR THE WEST OAKLAND SPECIFIC PLAN AND NOTICE OF PUBLIC HEARINGS ON DEIR AND SPECIFIC PLAN

TO: All Interested Parties

SUBJECT: Notice of Availability/Release of DEIR for the West Oakland Specific Plan, and Notice of Public Hearings on the same.

REVIEW/COMMENT PERIOD: January 29, 2014 through March 17, 2014

CASE NO.: ER12-0018, GP14-010, RZ14-011, ZS14-012, ZT14-013, (CEQA State Clearing House Number 2012102047)

PROJECT SPONSOR: City of Oakland

PROJECT LOCATION: The nearly 3 square mile (approximately 1,900-acre) West Oakland Planning Area ("Plan Area") encompasses the area generally bounded by Interstate 580 (I-580) to the north, I-980 to the east and I-880 to the west, plus two additional areas that are "gateways" to West Oakland: the industrial area south of I-880 centered on 3rd Street, and the Oakland portion of the East Bay Bridge Shopping Center north of I-580 adjacent to Emeryville.

PROJECT DESCRIPTION: The West Oakland Specific Plan will be a planning document that provides a vision and planning framework for future growth and development within the Plan Area. The Plan is intended to provide comprehensive, consistent and multi-faceted strategies for development and redevelopment of vacant and/or underutilized properties in West Oakland. Toward that end, this Specific Plan establishes a land use and development framework, identifies needed transportation and infrastructure improvements, and recommends strategies needed to develop those parcels.

The Specific Plan is designed as a roadmap for reducing blight, attracting new industry, maintaining and supporting existing compatible businesses and industry, promoting smart growth and Transit-Oriented Development (TOD) that serves a range of incomes, encouraging mass transit and creating living wage jobs for West Oakland residents. The Specific Plan requires General Plan and Planning Code amendments (text and map changes) along with Design Guidelines to achieve the Plan goals.

For more information on the project, including draft documents, please visit the project website at: www.oaklandnet.com/r/wosp

ENVIRONMENTAL REVIEW: A Notice of Preparation (NOP) of an EIR was issued by the City of Oakland's Department of Planning and Building on October 22, 2012. A Draft Environmental Impact Report (DEIR) has now been prepared for the project under the requirements of the California Environmental Quality Act (CEQA), pursuant to Public Resources Code Section 21000 et seq. The DEIR analyzes potentially significant environmental impacts in all environmental categories/topics; and identifies significant unavoidable environmental impacts related to: Aesthetics, Air Quality; Cultural and Historic Resources; Greenhouse Gases Emissions; Hazards and Hazardous Materials; Land Use and Planning; Noise; Population, Housing and Employment; Public Services and Recreation; Transportation, Circulation and Parking; Utilities and Service Systems; Other Less-than-Significant Effects.

The City of Oakland's Department of Planning and Building is hereby releasing this DEIR, finding it to be accurate and complete and ready for public review. **Starting on Wednesday, January 29, 2014**, copies of the DEIR and Specific Plan will be available for review or distribution to interested parties at no charge at the Department of Planning and Building, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612, Monday through Friday, 8:30 a.m. to 5:00 p.m. Additional copies are available for review at the Oakland Public Library, Social Science and Documents, 125 14th Street, Oakland CA 94612. The DEIR may also be reviewed at the City's "Current Environmental Review Documents" webpage: http://www2.oaklandnet.com/Government/o/PBN/OurServices/Application/DOWD009157 and the Specific Plan may be reviewed on the project website: www.oaklandnet.com/r/wosp

THE CITY HAS SCHEDULED 1 COMMUNITY MEETING AND 2 PUBLIC HEARINGS ON THE DEIR AND SPECIFIC PLAN:

COMMUNITY MEETING

Thursday, February 6, 2014, 6:00 p.m. – 8:00 p.m.
West Oakland Senior Center — 1724 Adeline Street, Oakland
Refreshments Served

LANDMARKS PRESERVATION ADVISORY BOARD
PUBLIC HEARING

Monday, February 10, 2014, 6:00 p.m.
Oakland City Hall, Hearing Room 1, One Frank H. Ogawa Plaza, Oakland, CA 94612

CITY PLANNING COMMISSION
PUBLIC HEARING

Wednesday, February 24, 2014, 6:00 p.m.
Oakland City Hall, Council Chambers, One Frank H. Ogawa Plaza, Oakland, CA 94612

Members of the public are welcome to attend these hearings and provide comments on the West Oakland DEIR and Specific Plan. Comments on the DEIR should focus on whether the DEIR is sufficient in discussing possible impacts to the physical environment, ways in which potential adverse effects may be avoided or minimized through mitigation measures, and alternatives to the Specific Plan in light of the EIR's purpose to provide useful and accurate information about such factors. Comments may be made at the public hearings described above or in writing. Please address all written comments to Ulla-Britt Jonsson, City of Oakland Strategic Planning Division, 250 Frank H. Ogawa Plaza, Suite 3315. Oakland, California 94612; (510) 238-3322 (phone); (510) 238-6538 (fax); or e-mailed to ujonsson@oaklandnet.com. Comments on the DEIR and Specific Plan **must be received no later than 4:00 p.m. on March 17, 2014**.

After all comments have been received, a Final EIR will be prepared and the Planning Commission will consider certification of the EIR and rendering a decision on the Specific Plan at a public hearing, date yet to be determined. Public notice will be provided in advance of future hearings, in accordance with applicable legal requirements. All comments received will be considered by the City prior to finalizing the EIR and taking any further action pertaining to this EIR. If you challenge the environmental document or other actions pertaining to this Project in court, **you may be limited to raising only those issues raised at the public hearings described above or in written correspondence received by 4:00 pm on March 17, 2014**. For further information please contact Ulla-Britt Jonsson at (510) 238-3322 or via email to ujonsson@oaklandnet.com.

Scott Miller

Scott Miller
Environmental Review Officer

January 29, 2014

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2012102047

Project Title: Draft EIR for West Oakland Specific Plan

Lead Agency: City of Oakland, Strategic Planning Division — Contact Person: Ulla-Britt Jonsson, Planner II
Mailing Address: 250 Frank H. Ogawa Plaza, Suite 3315 — Phone: (510) 238-3322
City: Oakland, CA — Zip: 94612 — County: Alameda

Project Location: County: Alameda — City/Nearest Community: Oakland
Cross Streets: bounded by Interstate 580 (I-580) to the north, I-980 to the east and I-880 to the west — Zip Code: 94608
Lat. / Long.: ____° ____′ ____″ N/ ____° ____′ ____″ W — Total Acres: 1,900
Assessor's Parcel No.: Various — Section: ____ Twp.: ____ Range: ____ Base: ____
Within 2 Miles: State Hwy #: I-980, I-880, I-580, I-80 — Waterways: Oakland Estuary, San Francisco Bay, Sausal Creek
Airports: None — Railways: Various
Schools: McClymonds High School, Ralph J. Bunche High School, Street Academy, Lowell Middle School, Hoover Elementary School, Lafayette Elementary School, Martin Luther King, Jr. Elementary School, Prescott Elementary School, now known as Preparatory Literary Academy of Cultural Excellence (PLACE) Prescott, Cole Middle School, Oakland Charter High School, KIPP Bridge Charter School, Oakland School of the Arts, and the American Indian Public Charter School II, Laney College

Document Type:

CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☒ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ____ Other ____
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other ____

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☒ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other ____

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational ____
☐ Recreational ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☒ Other: Various

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☐ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☒ Coastal Zone
☒ Drainage/Absorption
☒ Economic/Jobs
☐ Fiscal
☒ Flood Plain/Flooding
☐ Forest Land/Fire Hazard
☒ Geologic/Seismic
☐ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☒ Schools/Universities
☐ Septic Systems
☒ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☐ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☐ Wetland/Riparian
☐ Wildlife
☒ Growth Inducing
☒ Land Use
☒ Cumulative Effects
☐ Other ____

Present Land Use/Zoning/General Plan Designation:

Neighborhood Center, Mixed Housing Type, Institutional, Urban Open Space, Urban Residential, Business Mix, Community Commercial, Housing and Business Mix, Regional Commercial, Light Industry 1 (Estuary Plan Area).
RM-1, RM-2, RM-3, RM-4, RM-4/C, RU-1, RU-2, RU-3, RU-5, OS-(LP), OS-(NP), OS-(AMP), OS-(AF), OS-(CP), CC-1, CC-2, CC-3, C-40, HBX-2, CR-1, M-30, IG, CIX-1, S-4, S-7, S-S-15, S-19, S-20, Wood Street.

Project Description: *(please use a separate page if necessary)*

The West Oakland Specific Plan will be a planning document that provides a vision and planning framework for future growth and development within the Plan Area. The Plan is intended to provide comprehensive, consistent and multi-faceted strategies for development and redevelopment of vacant and/or underutilized properties in West Oakland. Toward that end, this Specific Plan establishes a land use and development framework, identifies needed transportation and infrastructure improvements, and recommends strategies needed to develop those parcels.

The Specific Plan is designed as a roadmap for reducing blight, attracting new industry, maintaining and supporting existing compatible businesses and industry, promoting smart growth and Transit-Oriented Development (TOD) that serves a range of incomes, encouraging mass transit and creating living wage jobs for West Oakland residents. The Specific Plan requires General Plan and Planning Code amendments (text and map changes) along with Design Guidelines to achieve the Plan goals.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X".
If you have already sent your document to the agency please denote that with an "S".

Mark	Agency	Mark	Agency
	Air Resources Board		Office of Emergency Services
	Boating & Waterways, Department of	X	Office of Historic Preservation
X	California Highway Patrol		Office of Public School Construction
	CalFire		Parks & Recreation
X	Caltrans District # 4		Pesticide Regulation, Department of
	Caltrans Division of Aeronautics		Public Utilities Commission
	Caltrans Planning (Headquarters)	X	Regional WQCB # SF Bay Region
	Central Valley Flood Protection Board		Resources Agency
	Coachella Valley Mountains Conservancy	X	S.F. Bay Conservation & Development Commission
X	Coastal Commission		San Gabriel & Lower L.A. Rivers and Mtns Conservancy
	Colorado River Board		San Joaquin River Conservancy
	Conservation, Department of		Santa Monica Mountains Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of		SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
X	Fish & Game Region # 3		Tahoe Regional Planning Agency
	Food & Agriculture, Department of		Toxic Substances Control, Department of
	General Services, Department of		Water Resources, Department of
	Health Services, Department of		
X	Housing & Community Development		Other ______
	Integrated Waste Management Board		Other ______
X	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date January 29, 2014 | Ending Date March 17, 2014

Lead Agency (Complete if applicable):

Consulting Firm: JRDV Urban/Lamphier-Gregory	Applicant: City of Oakland
Address: 1615 Broadway, 6th Floor	Address: 250 Frank H. Ogawa Plaza
City/State/Zip: Oakland, CA 94612	City/State/Zip: Oakland, CA 94612
Contact: Scott Gregory	Contact: Ulla-Britt Jonsson
Phone: (510) 535-6690	Phone: (510) 238-3322

Signature of Lead Agency Representative: ____________ **Date:** January 28,2014

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

West Oakland Specific Plan, Draft EIR

Table of Contents

List of Tables and Figures

Table Number **Page**

Figure Number **Page**

Appendices

(Appendices are included on a Compact Disk in the back cover of the Draft EIR document.)

1

Introduction

This Draft Environmental Impact Report (Draft EIR) has been prepared by the City of Oakland in accordance with the California Environmental Quality Act (CEQA)[1] and associated CEQA Guidelines[2] to describe the potential environmental consequences of the proposed West Oakland Specific Plan. This Draft EIR is intended to serve as an informational document for use by public agency decision makers and the public in their consideration of the proposed Specific Plan.

Proposed Project

The City of Oakland is proposing to adopt the West Oakland Specific Plan (i.e., the Project), which sets forth a transformative new vision for redevelopment of key Opportunity Areas and Opportunity Sites in West Oakland with new employment uses, housing and retail.

Planning Area and Subareas

Planning Area

The nearly 3 square mile (approximately 1,900-acre) Planning Area encompasses West Oakland, the area bounded by Interstate 580 (I-580) to the north, I-980 to the east and I-880 to the west, plus two additional areas that are "gateways" to West Oakland: the industrial area south of I-880 centered on 3rd Street, and the Oakland portion of the East BayBridge Shopping Center north of I-580 adjacent to Emeryville.

Opportunity Areas

Within the Planning Area, the Specific Plan identifies four "Opportunity Areas" targeted for growth. Development facilitated by the Specific Plan would occur in these Opportunity Areas, which contain vacant and underutilized properties and older facilities that no longer meet current standards and market conditions, and thus have the most potential for change.

- Opportunity Area 1: Mandela/West Grand (354 gross acres, including public right-of-way)
- Opportunity Area 2: 7th Street (98 acres)
- Opportunity Area 3: 3rd Street (103 acres)

---

1 The California Environmental Quality Act (CEQA) is codified in section 21000, et seq., of the California Public Resources Code

2 The CEQA Guidelines are set forth in sections 15000 through 15387 of the California Code of Regulations, Title 14, Chapter 3

- Opportunity Area 4: San Pablo Avenue (52 acres)

Because of their size and the differing land use development and planning strategies, the Mandela/West Grand Avenue, 7th Street and San Pablo Avenue Opportunity Areas are further divided into subareas.

Opportunity Sites

Within the four Opportunity Areas, growth facilitated by the Specific Plan is most likely to occur on 37 specifically identified Opportunity Sites. Opportunity Sites are individual parcels or groups of commercial and/or industrial parcels that are strategically located, and are vacant, underutilized, blighted or contain uses that conflict with nearby residential neighborhoods. The Opportunity Sites are expected to serve as catalysts in that their development will encourage development of other properties in the surrounding Opportunity Area and can make direct positive contributions to the community.

Enhancement Areas

The predominantly residential neighborhoods of West Oakland that lie outside the Opportunity Areas are referred to as "Enhancement Areas" in the Specific Plan. These areas are not in need of transformational change, but rather conservation and enhancement of their existing strengths. Enhancement Areas include residential neighborhoods outside the Opportunity Areas, and many existing commercial and industrial parcels that are already developed with compatible, economically viable and job-generating uses. A key tenet of the Specific Plan is to retain, enhance, and improve these Enhancement Areas.

Land Use and Development

To fully realize the development potential of the Specific Plan Area and provide greater clarity and predictability for development, the Specific Plan recommends a set of land use overlays that indicate the type of development that should occur at specific locations in West Oakland. These new land use types are intended as overlays to the existing General Plan designations, providing more specific and targeted land use policy. These land use overlays identify strategically distinct employment uses and building types, reflecting differences in business functions performed, business ages and sizes, and expected amenity levels. These land use overlays supplement, rather than replace the current General Plan and zoning land uses.

The Specific Plan would retain the existing General Plan and zoning designations and associated development standards throughout the Planning Area except in limited locations where the Plan proposes changing the General Plan land use designations and/or rezoning to better achieve the overall objectives of the Plan.

The Specific Plan provides for up to approximately 5,090 net new housing units and 4.03 million square feet of net new non-residential building space within the Planning Area. All of this growth would occur within the Opportunity Areas. This development would result in an estimated 11,136 new residents and 14,850 new jobs. Although development facilitated by the Specific Plan would occur incrementally over many years, this EIR conservatively assumes that all of this projected growth would occur by 2035.

Scope of the EIR

The City of Oakland has determined that an Environmental Impact Report (EIR) is the required CEQA environmental review document for the proposed project. The City circulated a Notice of Preparation (NOP) on October 22, 2012 (see **Appendix 1A**). The public comment period on the scope of the EIR lasted from October 24 through November 21, 2012. The NOP was sent to responsible agencies, organizations and interested individuals, and to the State Clearinghouse.

A scoping session was held on November 5, 2012 before the City Landmarks Preservation Advisory Board, and a second scoping session was held on November 14, 2012 before the City Planning Commission. Both written and oral comments received by the City on the NOP and scoping sessions were taken into account during the preparation of this EIR. The written comments received are included in **Appendix 1B**.

The following environmental topics are addressed in this EIR:

Chapter 4.1: Aesthetics, Shadow and Wind

Chapter 4.2: Air Quality

Chapter 4.3: Cultural and Historic Resources

Chapter 4.4: Greenhouse Gas Emissions

Chapter 4.5: Hazards and Hazardous Materials

Chapter 4.6: Land Use and Planning

Chapter 4.7: Noise

Chapter 4.8: Population, Housing and Employment

Chapter 4.9: Public Services and Recreation

Chapter 4.10: Transportation, Circulation and Parking

Chapter 4.11: Utilities and Service Systems

Chapter 4.12: Other Less-than-Significant Effects

Level of Analysis

The degree of specificity in an EIR corresponds to the degree of specificity in the underlying activity described in the EIR. As CEQA specifies, a Program EIR is appropriate for a Specific Plan, under which there will be future development proposals that are 1) related geographically, 2) logical parts in a chain of contemplated actions, 3) connected as part of a continuing program, and 4) carried out under the same authorizing statute or regulatory authority and have similar environmental impacts that can be mitigated in similar ways (CEQA Guidelines Section 15168). For some site-specific purposes, a program-level environmental document may provide sufficient detail to enable an agency to make informed site-specific decisions within the program. This approach would allow agencies the ability to consider program-wide mitigation measures and cumulative impacts that might be slighted in a case-by-case analysis approach, and to carry out an entire program without having to prepare additional site-specific environmental documents. In other cases, the formulation of site-specific issues is unknown until subsequent design occurs leading to the preparation of later project-level environmental documentation. Preparation of a program-level document simplifies the task of preparing subsequent project-level environmental documents for future projects under the Specific Plan for which the details are currently unknown. This EIR presents an analysis of the environmental impacts of adoption and implementation of the Specific Plan. Specifically, it evaluates the physical and land use changes from potential development that could occur with adoption and implementation of the Specific Plan.

Further, where feasible, and where an adequate level of detail is available such that the potential environmental effects may be understood and analyzed, this EIR provides a project-level analysis to eliminate or minimize the need for subsequent CEQA review of projects that could occur under the Specific Plan. Although not required under CEQA, some “project-level” impacts of reasonably foreseeable level of build-out of the Specific Plan are discussed to the extent that such impacts are known. The West Oakland Specific Plan includes physical development plans for certain Opportunity Areas and Opportunity sites, and it provides a prescribed development envelope in terms of density and intensity, height and bulk, and location of specific anticipated future development and public infrastructure and transportation improvements. Where specific details are not available, the analysis of potential physical environmental impacts is based on reasonable assumptions about future development that could occur in the Plan Area. The assumed future development is described in Chapter 3: Project Description. Pursuant to CEQA Guidelines Sections 15162-15164, 15168, 15183 and 15183.5, future program- and project-level environmental analyses may be tiered from this EIR.

The City intends to use the streamlining/tiering provisions of CEQA to the maximum feasible extent, so that future environmental review of specific projects are expeditiously undertaken without the need for repetition and redundancy, as provided in CEQA Guidelines section 15152 and elsewhere. Specifically, pursuant to CEQA Guidelines Section 15183, streamlined environmental review is allowed for projects that are consistent with the development density established by zoning, community plan, specific plan, or general plan policies for which an EIR was certified, unless such a project would have environmental impacts peculiar/unique to the project or the project site. Likewise, Public Resources Code section 21094.5 and CEQA Guidelines Section15183.3 also provides for streamlining of certain qualified, infill projects. In addition, CEQA Guidelines Sections 15162-15164 allow for the preparation of a Subsequent (Mitigated) Negative Declaration, Supplemental or Subsequent EIR, and/or Addendum, respectively, to a certified EIR when certain conditions are satisfied. Moreover, California Government Code section 65457 and CEQA Guidelines section 15182 provide that once an EIR is certified and a specific plan adopted, any residential development project, including any subdivision or zoning change that implements and is consistent with the specific plan is generally exempt from additional CEQA review under certain circumstances. The above are merely examples of possible streamlining/tiering mechanisms that the City may pursue and in no way limit future environmental review of specific projects.

CEQA requires the analysis of potential adverse effects of a project on the environment. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. However, this EIR nevertheless analyzes potential effects of “the environment on the project” in order to provide information to the public and decision-makers. Where a potential significant effect of the environment on the project is identified, the document, as appropriate, identifies City Standard Conditions of Approval and/or project-specific non-CEQA recommendations to address these issues.

Report Organization

The EIR is organized into the following chapters:

- *Chapter 1 – Introduction*: Discusses the overall EIR purpose; provides a summary of the proposed Specific Plan; describes the EIR scope; and summarizes the organization of the EIR.
- *Chapter 2 – Summary*: Provides a summary of the significant environmental impacts that would result from implementation of the proposed Specific Plan, and describes Standard Conditions of Approval and recommended mitigation measures that would avoid or reduce significant impacts.

- *Chapter 3 – Project Description*: Provides a description of the Specific Plan objectives, Planning Area, project background and history, Specific Plan proposals, and required approval process.
- *Chapter 4 – Setting, Impacts, Standard Conditions of Approval, and Mitigation Measures*: Describes the following for each environmental topic: existing physical setting, applicable regulatory setting including relevant City of Oakland Standard Conditions of Approval; thresholds of significance; potential environmental impacts and their level of significance; Standard Conditions of Approval relied upon to ensure significant impacts would not occur; mitigation measures recommended when necessary to mitigate identified impacts; and resulting level of significance following implementation of mitigation measures, when necessary. Cumulative impacts are also discussed in each topic section.

  Potential impacts are identified by level of significance, as follows:

  - (**No Impact**) – no environmental effects
  - (**LTS**) - less-than-significant impact
  - (**LTS with SCA**) – less than significant impacts with implementation of City of Oakland Standard Conditions of Approval/Uniformly Applied Development Standards
  - (**LTS with MM**) – less than significant impacts with implementation of mitigation measures recommended in this EIR
  - (**SU**) - significant and unavoidable impact

  The significance level is identified for each impact before and after implementation of recommended mitigation measure(s), where necessary.
- *Chapter 5 – Alternatives*: Evaluates a reasonable range of alternatives to the proposed Specific Plan and identifies an environmentally superior alternative.
- *Chapter 6 – CEQA-Required Assessment Conclusions*: Provides the required analysis of growth-inducing impacts, significant irreversible changes, effects found not to be significant and significant unavoidable impacts.
- *Chapter 7 – Report Preparation*: Identifies preparers of the EIR, references used, and the persons and organizations contacted.
- *Appendices*: The appendices contain the NOP and written comments submitted on the NOP, as well as other technical studies and reports relied upon in the EIR.

Public Review

This Draft EIR is available for public review and comment during the period identified on the Notice of Release/Availability of a Draft EIR accompanying this document. This Draft EIR and all supporting technical documents and referenced documents are available for public review at the offices of the City of Oakland Department of Planning, Building and Neighborhood Preservation, located at 250 Frank H. Ogawa Plaza, Suite 3115, Oakland, under Case ER #120018.

During the public review period, written comments on the Draft EIR may be submitted to the City of Oakland Department of Planning, Building and Neighborhood Preservation at the address indicated on the notice. Oral comments on the Draft EIR may be stated at the public hearing which shall be held as indicated on the notice.

Following the public review and comment period, the City will prepare responses to comments received on the environmental analysis in this Draft EIR. The responses and any other revisions to the Draft EIR will be prepared as a Response to Comments document. The Draft EIR and its appendices, together with the Response to Comments document will constitute the Final EIR for the proposed Specific Plan.

EIR Purpose and Intended Use

Adoption of the Specific Plan

Under CEQA, the City of Oakland is the designated Lead Agency for the proposed West Oakland Specific Plan (the "Project").[3] As the Lead Agency, the City intends that this EIR serve as the CEQA environmental documentation for consideration of the Project by City decision-makers, the public, and other responsible agencies and trustee agencies.[4] This EIR is intended to serve as a public information and disclosure document for use by governmental agencies and the public to identify and evaluate potential environmental consequences of the proposed Specific Plan, to evaluate and recommend mitigation measures that would substantially lessen or eliminate adverse impacts, and to examine a range of feasible alternatives to the proposed Specific Plan. The information contained in this EIR is subject to review and consideration by the City of Oakland, prior to the City's decision to approve, reject or modify the proposed Specific Plan. In accordance with CEOA Guidelines Section 15146 (Degree of Specificity), such impacts and mitigations are discussed in this EIR to the level of detail necessary to allow reasoned decisions about the Project.

The City must ultimately certify that it has reviewed and considered the information in the EIR and that the EIR has been completed in conformity with the requirements of CEQA before making any decision on the proposed Specific Plan. This EIR identifies significant effects that would result from the proposed Specific Plan. Pursuant to CEQA Guidelines Section 15091, the City cannot approve the Specific Plan unless it makes one or more of the following findings:

- That changes or alterations have been required in, or incorporated into the Specific Plan which avoid or substantially lessen the significant environmental effects as identified in the EIR,
- That such changes or alterations are within the responsibility and jurisdiction of another public agency (not the City of Oakland), and that such changes have been adopted by such other public agency, or can and should be adopted by such other agency.
- Specified economic, legal, social, technological or other considerations make infeasible the mitigation measures or alternatives identified in the EIR.

---

3 CEQA Guidelines section 15367 defines the "Lead Agency" as the public agency that has the principal responsibility for carrying out or approving a project. The City of Oakland is the Lead Agency for the proposed West Oakland Specific Plan, ultimately responsible for adopting the Plan and all associated approvals.

4 Under the CEQA Guidelines, the term "Responsible Agency" includes all public agencies, other than the Lead Agency, that have discretionary approval power over aspects of the project for which the Lead Agency has prepared an EIR. Under the CEQA Guidelines, the term "trustee agency" means a state agency having jurisdiction by law over natural resources affected by the project that are held in trust by the people of California, such as the Department of Fish and Game.

Subsequent General Plan and Zoning Actions

For the most part, the West Oakland Specific Plan retains existing General Plan and zoning designations for properties throughout the Planning Area, while providing a more specific development program for specific sites. In certain locations, the Specific Plan proposes to allow limited and carefully selected industrial sites to be converted to new residential development. Criteria by which such residential infill may be allowed include sites within already established residential patterns, sites with established buffers between less compatible industrial neighbors, and sites with immediate proximity to parks and other residential amenities. In order to enable the conversion of these selected sites to residential use, General Plan amendments and rezoning are necessary. Additionally, the Specific Plan proposes other General Plan amendments and re-zonings intended to further the following purposes of the Specific Plan:

- to establish new overlay zones which provide additional land use regulations applicable to individual areas within the current business and industrial CIX-1 zoning district;
- to update the zoning of those properties that are currently zoned M-30 and IG, which are older City zoning designations not previously modified or updated during the City-wide zoning update process, to the CIX-1 zone with applicable overlays;
- to recognize the business and industrial nature of those properties at the most northerly end of Mandela Parkway by recommending changes to the General Plan land use designations and zoning for these sites;
- to clarify the boundaries between the 'Business Mix' and the 'Housing and Business Mix' land use designations throughout the Planning Area by better defining the boundary between these two land use designations;
- to better emphasize the desired commercial nature of the Planning Area's important commercial corridors, primarily along 7th Street and San Pablo Avenue,
- to increase in the maximum allowed building height at the West Oakland BART station TOD and to provide a more effective and substantial transition in building heights nearest to the South Prescott neighborhood, and
- to accurately reflect the open space intention for a number of City-owned open space parcels.

This EIR provides the environmental review necessary for City decision-makers to consider these General Plan amendments and re-zoning actions, as identified in the following **Table 1-1**.

Table 1-1: Proposed General Plan Amendments and Re-Zonings

Site		Existing General Plan Designation	Proposed General Plan Designation	Existing Zoning	Proposed Zoning
A	Northeast Mandela	Business Mix	Housing and Business Mix	OS (LP)/S-4	HBX-2
B	Northeast Mandela	Housing and Business Mix	Business Mix	HBX-2	CIX-1/S-19
C	Northeast Mandela Parkway			OS (LP)/S-4	CIX-1
D	Union Plaza Park and Fitzgerald Park	Housing and Business Mix	Urban Open Space	HBX-2	OS/AMP
E	St. Andrews Plaza	Urban Residential	Urban Open Space	RU-5	OS/AMP
F	Ettie Street – 1	Business Mix	Housing and Business Mix	CIX-1	HBX-2
G	West of I880 between 32nd and 35th	General Industrial/Transportation	Business Mix	IG	CIX-1/S-19
H	Chestnut Street and 24th	Mixed Housing Type Residential	Housing and Business Mix	RM-4	HBX-2
I	San Pablo Avenue at 28th Street Site			CC-3	CC-2
J	West Grand at San Pablo	Urban Residential	Community Commercial	RU-5	CC-2
K	Chestnut/Adeline and Ettie Street			CIX-1	CIX-1/S-19
L	Chestnut/Adeline	Business Mix	Housing and Business Mix	CIX-1/S-19	HBX-2
M	West Grand at San Pablo Mini-Park	Community Commercial	Urban Open Space	CC-2	OS-AMP
N	Roadway Site	Business Mix	Housing and Business Mix	CIX-1/S-19	HBX-2
O	San Pablo at West Grand Avenue	Mixed Housing Type Residential	Community Commercial	RM-4/C	CC-2
P	Small Triangle Site	Community Commercial	Mixed-Housing Type Residential	CC-2	RM-4/C/S-20
Q	Prescott-Oakland Point	Business Mix	Mixed Housing Type Residential	RM-2	HBX-2
R	Phoenix Iron Works Site	Business Mix	Housing and Business Mix	CIX-1	HBX-2
S	Coca Cola Bottling/Mayway Site	Business Mix	Urban Residential	CIX-1	HBX-2
T	7th Street/BART parking	Neighborhood Center Mixed Use	Community Commercial		

Table 1-1: Proposed General Plan Amendments and Re-Zonings

Site		Existing General Plan Designation	Proposed General Plan Designation	Existing Zoning	Proposed Zoning
U	7th Street within the 3rd Street Opportunity Area	Business Mix	Community Commercial	CIX-1/S-19	CC-3
V	7th Street between Chestnut and Peralta	Neighborhood Center Mixed Use	Community Commercial	S-15	CC-2
W	Lewis Street	Mixed Housing Type Residential	Housing and Business Mix	RM-2	HBX-2
X	Southern edge of Interstate 880	Community Commercial	Business Mix	S-15	CIX-1
Y	3rd Street – Estuary Policy Plan			M-30	CIX-1
Z	3rd Street Industrial	General Industry/Transportation	Business Mix	IG	CIX-1
ZA	3rd Street – Estuary Policy Plan			M-30	CIX-1
ZB	Block bounded by Brush, Plan Boundary, 4th and 5th			C-40	CIX-1
AA	San Pablo between 32nd and 35th	Mixed Housing Type Residential	Urban Residential		
AB	San Pablo between 27th and 32nd	Mixed Housing Type Residential	Community Commercial		
AC	Peralta and Hannah	Business Mix	Housing and Business Mix		
AD	Mandela Parkway	Business Mix	Urban Open Space		
AE	San Pablo between 24th and 27th	Mixed Housing Type Residential	Urban Residential		
AF	Market and W Grand	Mixed Housing Type Residential	Community Commercial		
AG	Mandela Parkway	Business Mix	Urban Open Space		
AH	Linden and W Grand	Community Commercial	Mixed Housing Type Residential		
AI	Mandela Parkway	Business Mix	Urban Open Space		
AJ	Mandela Parkway and 12th Street	Urban Open Space	Business Mix		
AK	Mandela Parkway	Business Mix	Urban Open Space		
AL	7th St between Peralta and Wood	Mixed Housing Type Residential	Community Commercial		
AM	Frontage Road and 7th Street	Business Mix	Housing and Business Mix		

Individual Projects

This EIR will also intended to be used as the first-tier, and perhaps only, environmental review document necessary for a variety of private development projects and public improvement projects carried out in furtherance of the West Oakland Specific Plan.

Residential Projects Pursuant to the Specific Plan

CEQA Guidelines Section 15182 specifically provides that where a public agency has prepared an EIR on a Specific Plan, no additional EIR or Negative Declaration need be prepared for a residential project undertaken pursuant to and in conformity to that Specific Plan, provided that limitations requiring supplemental or subsequent environmental review pursuant to Sections 15162 or 15163 have not occurred. The use of this EIR for subsequent residential projects may apply to any or all of the approximately 5,000 net new housing units undertaken pursuant to the West Oakland Specific Plan, but in particular to the following new residential projects specifically identified in the Plan:

- Each of the residential projects described above as needing a General Plan amendment or re-zoning.
- New housing units located at the West Oakland BART Station transit-oriented development (TOD) site.
- Residential development projects within the 7th Street and San Pablo Avenue Opportunity Areas as specifically described in the Specific Plan.

Projects Consistent with a Community Plan, General Plan or Zoning

CEQA Guidelines Section 15183 specifically mandates that projects which are consistent with the development density established by existing zoning, community plan or general plan policies for which an EIR was certified shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site. This streamlines the review of such projects, which could include discretionary approvals by the City and/or other agencies, and reduces the need to prepare repetitive environmental studies.

This EIR is intended to provide for the streamlined environmental review necessary for subsequent consideration of project-level approvals necessary for the following individual project types:

- commercial, industrial and business-type development projects consistent with the intensities and types of uses fully contemplated in the Specific Plan
- improvements to public infrastructure systems (i.e., water, sewer and storm drains, electrical and power utilities, etc.)
- improvements to the public roadway and transportation systems, including roadway and sidewalk repairs and improvements, new bike lanes, and other similar transportation improvements specifically contemplated in the Specific Plan
- development of public parks and open space, or private and semi-public open spaces (i.e., community gardens, etc.) as specifically contemplated in the Specific Plan

When considering the applicability of these streamlining provisions under CEQA, the City of Oakland shall consider whether such subsequent project may have impacts which are peculiar to the project or its site, whether the project may result in impacts which were not fully analyzed in this EIR, or which may result in impacts which are more severe than have been identified in this EIR. Should any of these factors apply to consideration of such streamlined projects, more detailed project-level review may be required to assess such project-specific environmental effects.

Other Agencies

Some development under the Specific Plan may require review and approval by other public and quasi-public agencies and jurisdictions that have purview over specific actions. These agencies may also consider this EIR in their reviews and decision-making processes. Other agencies and their jurisdictional permits and approvals may include but are not limited to the following:

- **San Francisco Bay Regional Water Quality Control Board** (RWQCB) **- a**cceptance of a Notice of Intent (NOI) to obtain coverage under the General Construction Activity Storm Water Permit (General Construction Permit), and Notice of Termination after construction is complete. Granting of required clearances to confirm that all applicable standards, regulations, and conditions for all previous contamination at the site have been met.
- **Bay Area Air Quality Management District** (BAAQMD) - compliance with BAAQMD Regulation 2, Rule 1 (General Requirements) for all portable construction equipment subject to that rule. Compliance with BAAQMD Regulation 11, Rule 2, which regulates the demolition and renovation of buildings and structures which may contain asbestos, and the milling and manufacturing of specific materials which are known to contain asbestos.
- **East Bay Municipal Utility District** (EBMUD) - approval of new service requests and new water meter installations. The project meets the threshold for a required assessment of water supply, pursuant to Sections 10910-10915 (SB-610) of the California Water Code. EBMUD completed this assessment in January 2013, finding that the water demands for the West Oakland Specific Plan are accounted for in EBMUD's 2010 Urban Water Management Plan.
- **Alameda County Flood Control and Water Conservation District** (ACFCWD) - enforcement of the Stormwater Quality Management Plan and Best Management Practices (BMPs) included in Alameda Countywide Clean Water Program's Stormwater Pollution Prevention Permit (SWPPP). This would be done in conjunction with the City of Oakland, one of 18 co-permittees.
- **Alameda County Department of Environmental Health** (ACDEH) – review and acceptance of an updated Hazardous Materials Management Plan and Inventory (HMMP) and the Hazardous Materials Business Plan (HMBP).
- **California Department of Toxic Substances Control** (DTSC) - ensure compliance with State regulations for the generation, transportation, treatment, storage, and disposal of hazardous waste.
- **California Department of Transportation** (Caltrans) - review and approval of plans, specifications, and estimates (including any equipment or facility upgrades) for modifications to intersections under the jurisdiction of Caltrans.

2

Executive Summary

Project Overview

Site Location

The West Oakland Specific Plan Planning Area (Planning Area) is located in the heart of the East San Francisco Bay Area, near the hub of the Bay Area's freeway system and regional transit system (see **Figure 1-1**). The West Oakland BART station is located in the southern portion of the Planning Area, and the MacArthur BART station is located approximately one-quarter mile northeast of the Planning Area. The Planning Area is generally bounded by Interstate 580 (I-580) to the north, I-980 to the east and I-880 to the west.

Figure 1-2 illustrates the Project location and the Planning Area boundaries. The Planning Area comprises approximately 2.18 square miles or approximately 1,900 acres, subdivided into 6,340 parcels. It has a current population of approximately 25,000 people, and contains employment opportunities for more than 15,000 current employees.

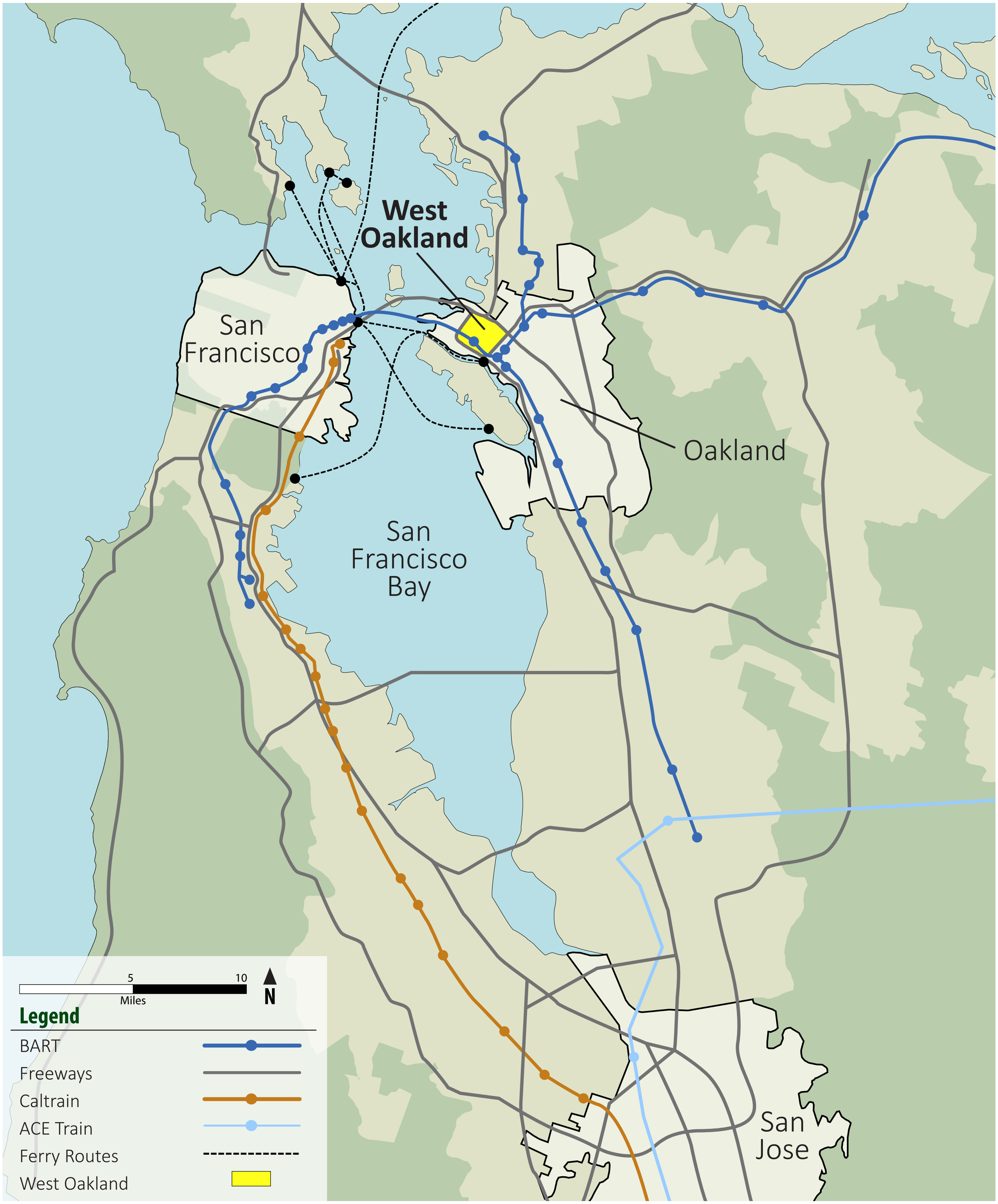
Key Components of the Project

Opportunity Areas, Opportunity Sites and Enhancement Areas

Within West Oakland, the Specific Plan identifies four "Opportunity Areas' targeted for growth and development. Development facilitated by the Specific Plan would occur in these Opportunity Areas, which contain vacant and underutilized properties, and older buildings that no longer meet current standards and market conditions. These are the areas identified as having the most potential for change. The following Opportunity Areas are shown on Figure 1-2:

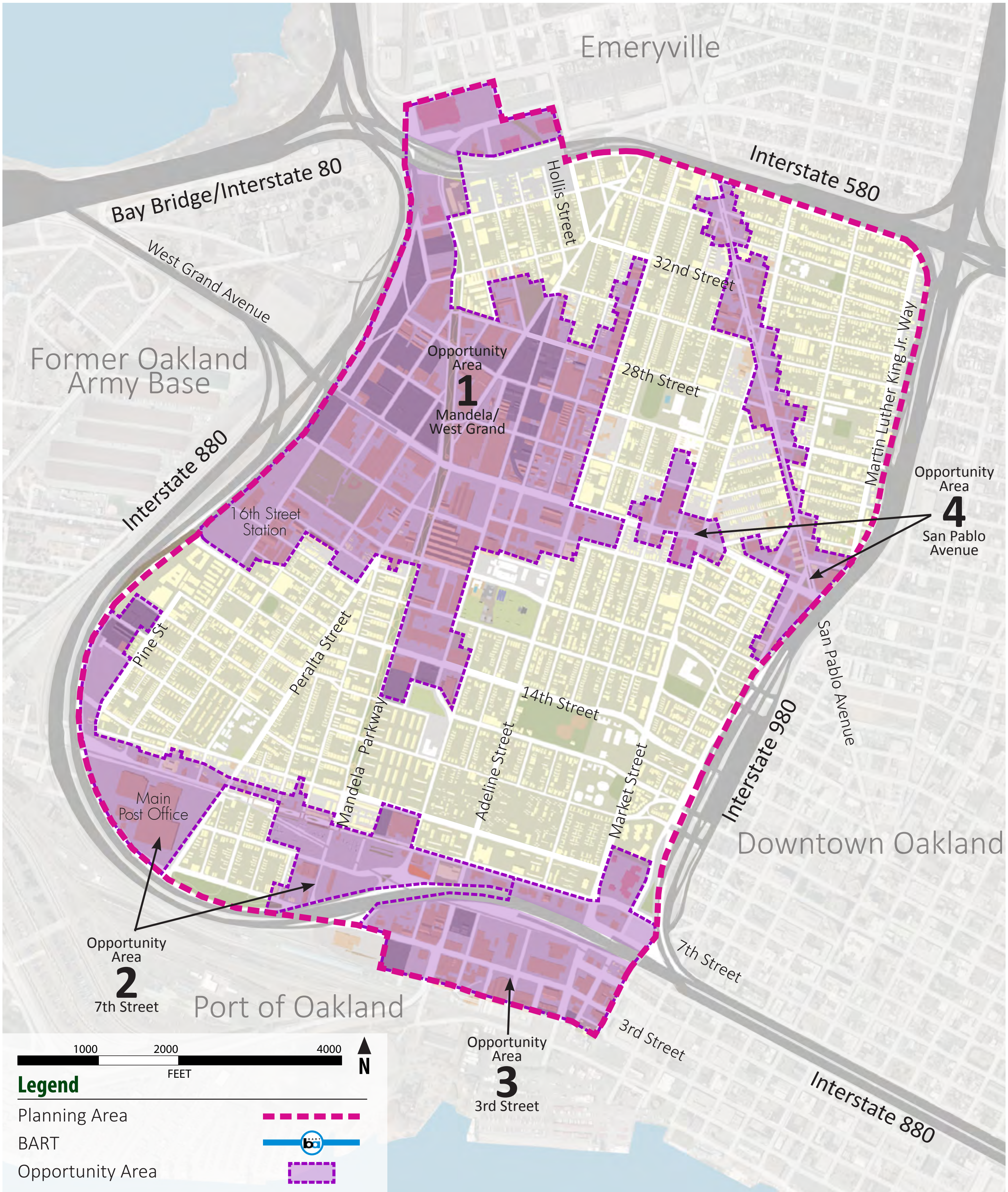
- Opportunity Area 1: Mandela/West Grand (354 gross acres, or 243 net acres not including public right-of-way and other public open space)
- Opportunity Area 2: 7th Street (95 gross acres, 65 net acres)
- Opportunity Area 3: 3rd Street (103 gross acres, 68 acres net acres), and
- Opportunity Area 4: San Pablo Avenue (52 gross acres, and 37 net acres)

Within the four Opportunity Areas, new growth and development facilitated by the Specific Plan is most likely to occur on 37 specifically identified Opportunity Sites.



Source: JRDV Intl.

Figure 2-1
Regional Location



Source: JRDV Intl.

Figure 2-2
West Oakland Planning Area & Opportunity Areas

The predominantly residential neighborhoods of West Oakland that lie outside the Opportunity Areas are referred to as "Enhancement Areas". These areas are not in need of transformational change; but rather conservation and enhancement of their existing strengths. Enhancement Areas include residential neighborhoods outside the Opportunity Areas, and many existing commercial and industrial parcels that are already developed with compatible, economically viable and job-generating uses. A key tenet of the Specific Plan is to retain, enhance, and improve these Enhancement Areas.

Development Vision

The "vision" expressed in the proposed West Oakland Specific Plan is to provide a set of comprehensive and multi-faceted strategies for development and redevelopment of vacant and/or underutilized commercial and industrial properties. It establishes a land use and development framework, identifies needed transportation and infrastructure improvements, and recommends implementation strategies needed to develop those parcels. The Plan is also intended as a marketing tool for attracting developers to key sites and for encouraging new, targeted economic development.

- The Specific Plan seeks to promote high density development near the West Oakland BART station, consistent with prior planning strategies.
- It encourages residential and neighborhood-serving commercial establishments on major corridors such as San Pablo Avenue.
- It seeks to direct industrial and more intensive commercial activities to locations closer to the Port of Oakland and away from residential areas as a means of protecting and enhancing West Oakland's residential neighborhoods.
- Additionally, the Plan encourages an enhanced multi-modal transportation system to better link residents and businesses.

The Specific Plan seeks to achieve its vision this through a variety of actions, specifically including the creation of distinct land use overlays to provide detailed guidance for future development of key parcels throughout the Specific Plan area.

Specific Plan Land Use and Development Proposal

The Specific Plan's land use and development proposals are organized and divided into specific proposals for each of the Opportunity Areas as indicated in the Plan. Within each Opportunity Area, the Specific Plan highlights detailed plans and proposals for each of the individual Opportunity Sites.

Opportunity Area 1: Mandela/West Grand

The Mandela/West Grand Opportunity Area is envisioned as continuing to be the major business and employment center for West Oakland and the region. This Specific Plan encourages a mix of business activities and development types, with a range of jobs at varying skill and education levels. The intent of this Plan is to retain and expand existing commercial and compatible urban manufacturing, construction and light industrial businesses that have well-paid blue collar and green collar jobs, while attracting new industries such as the life sciences, information technology and clean-tech businesses. Development would likely initially occur as lower-intensity development and with reuse of existing buildings and then evolving into higher intensity business development over time.

Opportunity Area 2: 7th Street

The vision for the 7th Street Opportunity Area includes new, high-density transit-oriented development (TOD) on vacant sites and parking lots surrounding the West Oakland BART Station. Plazas and open spaces would contribute to a secure and pleasant pedestrian experience. New medium density housing with ground floor commercial uses is recommended further west on 7th Street, as a transition from the West Oakland BART Station TOD to the surrounding lower-density neighborhoods. The 7th Street corridor is envisioned as the neighborhood focus, with neighborhood-serving commercial establishments. The Plan prioritizes commercial uses that enliven the street and can help to revitalize 7th Street as a celebration of West Oakland's cultural history of music, art and entertainment.

Opportunity Area 3: 3rd Street

The 3rd Street Opportunity Area (also known as the Acorn Industrial Area), is located generally south of I-880 and between Union and Castro Streets. This Opportunity Area is somewhat isolated from much of the rest of West Oakland by the I-880 freeway and elevated BART tracks. The vision for the 3rd Street Opportunity Area is that it will continue to support industrial and business activities and jobs, capitalizing on its proximity to downtown Oakland, Jack London Square, the Port of Oakland and its access to the regional freeway network. This Opportunity Area is expected to emerge as a more vibrant and vital business and employment center over time, focusing on manufacturing and light industrial uses that benefit from adjacency to the Port, as well as commercial uses that enliven the area during the day and night. Commercial, dining and entertainment uses are encouraged as infill enhancements in the attractive, older warehouse buildings.

Opportunity Area 4: San Pablo Avenue

Opportunity Area 4 is defined as the San Pablo Avenue corridor from approximately I-580 to West Grand Avenue, and along West Grand to Market Street. The San Pablo Avenue corridor is envisioned as a transformed major commercial corridor connecting West Oakland to Downtown and to Emeryville, Berkeley and beyond, lined with active ground-floor commercial uses and mixed-use residential development. Consistent with existing City of Oakland policies regarding development of major commercial corridors, the land use and development strategy for the San Pablo Avenue Opportunity Area is for infill mixed-use development with multi-family residential activities over ground-floor commercial. Enhanced streetscapes and increased commercial uses would activate the street, increase pedestrian activity and enliven the neighborhood.

Public Agency Approvals

Implementation of the Specific Plan would require the following City actions:

- Certification of the Environmental Impact Report (Final EIR) for the proposed Specific Plan;
- Adoption of the Specific Plan;
- Approval of several General Plan amendments and re-zonings

The City of Oakland also intends to use this EIR as the first-tier, and perhaps only environmental review document necessary for a variety of discretionary decisions related to private development projects and public improvement projects carried out in furtherance of the West Oakland Specific Plan. The use of this EIR for subsequent residential projects may apply to any or all of the approximately 5,000 net new housing units undertaken pursuant to the West Oakland Specific Plan. Use of this EIR may also apply to subsequent consideration of all commercial, industrial and business-type development projects consistent with the intensities and types of uses fully contemplated in the Specific Plan; improvements to public infrastructure systems; improvements to the public roadway and transportation systems; and development of public parks and open space, or private and semi-public open spaces

When considering the applicability of these streamlining provisions under CEQA, the City of Oakland shall consider whether such subsequent project may have impacts which are peculiar to the project or its site, whether the project may result in impacts which were not fully analyzed in this EIR, or which may result in impacts which are more severe than have been identified in this EIR. Should any of these factors apply to consideration of such streamlined projects, more detailed project-level review may be required to assess such project-specific environmental effects.

Summary of Impacts and Mitigation Measures

The following **Table 2-1**: Summary of Impacts and Mitigation Measures provides a summary of potential environmental impacts, applicable Standard Conditions of Approval, recommended mitigation measures, and the resulting level of significance after implementation of all mitigation measures. For a more complete discussion of potential impacts and recommended mitigation measures, please refer to the specific discussions in the respective individual chapters of this Draft EIR.

Additionally, Table 2-1 provides a summary of the potential effects of the environment on individual development projects pursuant to the Specific Plan, in order to provide this information to the public and decision-makers. Where a potential significant effect of the environment on the project is identified, City Standard Conditions of Approval and/or project-specific, non-CEQA recommendations are also identified in this table to address these issues.

Significant and Unavoidable Impacts

For purposes of this EIR, the following impacts are considered significant and unavoidable.

Air Quality

- **Air-3: Odor Impacts**. Development in accordance with the Specific Plan could expose a substantial number of new people to existing and new objectionable odors. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. This EIR nevertheless analyzes potential effects of the environment on the project (i.e. siting new receptors near existing and potential new odor sources) in order to provide information to the public and decision-makers.
- **Impact Air-5**: During construction, individual development projects pursuant to the Specific Plan will generate regional ozone precursor emissions from construction equipment exhaust. For most individual development projects, construction emissions will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval. However, larger individual construction projects could generate emissions of criteria air pollutants that would exceed the City's thresholds of significance.
- **Impact Air-7**: Once buildout of the Specific Plan is complete and all of the expected new development is fully occupied, new development pursuant to the Specific Plan will generate emissions of criteria pollutants (ROG, NO_x PM_{10} and $PM_{2.5}$) as a result of increased motor vehicle traffic and area source emissions. Traffic emissions combined with anticipated area source emissions would generate levels of criteria air pollutants that would exceed the City's project-level thresholds of significance.

- **Impact Air-9:** Development pursuant to the West Oakland Specific Plan would include new light industrial, custom manufacturing and other similar land uses, as well as the introduction of new diesel generators that could emit toxic emissions resulting in (a) a cancer risk level greater than 10 in one million, (b) a chronic or acute hazard index greater than 1.0, or (c) an increase of annual average PM2.5 concentration of greater than 0.3 micrograms per cubic meter; or under cumulative conditions, resulting in a) a cancer risk level greater than 100 in a million, b) a chronic or acute hazard index greater than 10.0, or c) annual average PM2.5 of greater than 0.8 micrograms per cubic meter.
- **Air-10**: Certain future development projects in accordance with the West Oakland Specific Plan could result in new sensitive receptors exposed to existing levels of toxic air contaminants (TACs) or concentrations of PM2.5 that could result in increased cancer risk or other health hazards. CEQA requires the analysis of potential adverse effects of a project on the environment. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. However, this EIR nevertheless analyzes potential effects of the environment on the project (i.e. siting new receptors near existing TAC sources) in order to provide information to the public and decision-makers.

Greenhouse Gas Emissions

- **Impact GHG-3:** It is possible that on an individual basis, certain development project envisioned and enabled under the Specific Plan could exceed, on an individual and project-by-project basis, the project-level GHG threshold. Under the City's required SCAs, individual development projects exceeding project-level screening criteria are required to undergo project-specific GHG emissions forecasts and, as appropriate, implement project-specific GHG reduction plans with the goal of increasing energy efficiency and reducing GHG emissions to the greatest extent feasible below both applicable numeric City of Oakland CEQA Thresholds. However, not until these tiered projects are proposed and evaluated can the efficacy of each individual project's design characteristics, applicable SCAs and other City policies (particularly SCA F) in reducing GHG emissions to below relevant thresholds be determined.

Traffic and Transportation

- **Impact Trans-1** (Existing plus Project) **and -3** (Cumulative plus Project) **at Hollis and 40th Street**: The addition of traffic generated by the full development of the proposed Project to both Existing conditions and Cumulative 2035 conditions would cause PM peak hour southbound left turn 95th percentile queue length at the signalized intersection of Hollis and 40th Street (#1) located in Emeryville to exceed the available queue storage. Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed.
- **Impact Trans-2** (Existing plus Project) **and -4** (Cumulative plus Project) **at San Pablo Avenue and 40th Street**: The addition of traffic generated by the full development of the proposed Project to both Existing Conditions and Cumulative 2035 Conditions would cause PM peak hour traffic operations at the signalized intersection of San Pablo Avenue and 40th Street (#2) located in Emeryville to degrade from LOS D to LOS E under Existing plus Project conditions. Additionally, the eastbound left and northbound left turn 95th percentile queue length would exceed the available queue storage in the AM peak hour. Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed.

- **Impact Trans-5** (Cumulative plus Project) **at Mandela Parkway and West Grand Avenue:** The addition of traffic generated by the full development of the Specific Plan under Cumulative 2035 conditions would degrade operation from LOS D to LOS F in the AM peak hour, and from LOS E to LOS F in the PM peak hour at the signalized intersection at Mandela Parkway and West Grand Avenue (#7) located outside the Downtown Area and would increase the volume-to-capacity ratio beyond the threshold of significance. The recommended mitigation measures would encroach into Memorial Park and the street medians, and the provision of four westbound lanes would preclude planned installation of a bicycle facility on West Grand Avenue which is a City priority (Resolution 84197, Nov 2012). Therefore, these additional improvements are not recommended.

Recommended Conditions of Approval

Although not required by CEQA, certain "recommendations" are included in this EIR, and also summarized in Table 2-1. These recommendations are not necessary to address or mitigate any significant environmental impacts of the Project under CEQA, but are recommended by City staff to address effects of the Project. These recommendations will be considered by decision makers during the course of Project review and may be imposed as Project-Specific Conditions of Approval.

It is not yet known which of these recommendations may be implemented and if so whether it would be as part of the Project or independent of the Project. The environmental consequences of each recommendation have been considered and none of the recommendations would result in any significant impacts under CEQA.

Alternatives

Chapter 5 presents an analysis of a range of reasonable alternatives to the Project. The following alternatives were analyzed:

- Alternative 1: No Project
- Alternative 2: Reduced Project
- Alternative 3: Commercial and Jobs-Focused Alternative
- Alternative #4: Maximum Theoretical Buildout Alternative

Alternative 1: No Project would be the environmentally superior alternative due to its substantially lower expectation of population growth and new job opportunities as compared to the Project and other alternatives. Alternative 2, the Reduced Project would be considered environmentally superior in the absence of the No Project alternative because it, too, would substantially lower expectations of population growth and new job opportunities as compared to the Project or Alternative #3, resulting in fewer vehicle trips. However, the Reduced Alternative would also not achieve as many of the basic Project objectives as would the Project or Alternative #3.

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Aesthetics		
Impact Aesth-1: There are no officially designated public scenic vistas within or near the Planning Area. No scenic vistas or view corridors would be substantially obstructed or degraded by development in accordance with the Specific Plan.	None needed	LTS
Impact Aesth-2: Development and public realm improvements in accordance with the Specific Plan would not substantially damage scenic resources, including trees or historic buildings, but rather would improve the quality of views of the Planning Area from the I-580 scenic highway.	None needed	LTS
Impact Aesth-3: Development and public realm improvements in accordance with the Specific Plan would not substantially degrade the existing visual character or quality of any sites and their surroundings, but would substantially improve the existing visual character and quality of the Planning Area. Infill development and redevelopment would repair the existing inconsistent urban fabric where such inconsistencies exist, and result in a more unified and coherent development character. The proposed land use patterns and development types, and focusing change in the Opportunity Areas while preserving established residential neighborhoods, would provide sensitive transitions to existing development, reinforce the character of residential and non-residential areas, and harmonize existing incompatibilities. Gateway and streetscape improvements, and development of new activity nodes, would	None needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
improve visual quality and reinforce community identity.		
Impact Aesth-4: Development facilitated by the Specific Plan would create new sources of light and glare, but these new sources would be consistent with typical light and glare conditions. Subsequent individual projects would not substantially and adversely affect day or nighttime views in the area.	None needed New light would be required to meet the lighting power allowances for the applicable lighting zone for newly installed outdoor lighting equipment required by Title 24, Parts 1 and 6, Building Energy Efficiency Standards. SCA 39, Lighting Plan	LTS with SCA
Impact Aesth-5: The Project would not cast shadows that substantially impairs the function of a building using passive solar heat collection, solar collectors for hot water heating, or photovoltaic solar collectors; cast shadow that substantially impairs the beneficial use of any public or quasi-public park, lawn, garden, or open space; or cast shadow on an historic resource such that the shadow would materially impair the resource's historic significance.	None required	LTS
Impact Aesth-6: The Project does propose changes to any of those existing General Plan policies or zoning or building regulations, and would not cause a fundamental conflict with those policies and regulations in the General Plan, Planning Code and Uniform Building Code, that address the provision of adequate light related to appropriate uses.	None required	No Impact
Impact Aesth-7: The Planning Area does not lie within the area identified by the City as requiring modeling for evaluation of wind impacts. Therefore, the wind impacts of the Specific Plan would be less than significant.	None required	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Air Quality		
Plan Level **Impact Air-1**: Development facilitated by the proposed Specific Plan would not fundamentally conflict with the Bay Area 2010 CAP because the projected rate of increase in vehicle miles travelled and vehicle trips would be less than the projected rate of increase in population.	None needed	LTS
Impact Air-2: Implementation of the West Oakland Specific Plan would not fundamentally conflict with the CAP because the Specific Plan demonstrates reasonable efforts to implement control measures contained in the CAP.	None needed	LTS
Impact Air-3: Odor Impacts. Development in accordance with the Specific Plan could expose a substantial number of new people to existing and new objectionable odors. This EIR analyzes potential effects of the environment on the project (i.e. siting new receptors near existing sources of odors) in order to provide information to the public and decision-makers.	No feasible Plan policies or mitigation measures	**Significant and Unavoidable**
Project Level **Impact Air-4:** During construction, individual development projects pursuant to the Specific Plan will generate fugitive dust from demolition, grading, hauling and construction activities.	Supplemental SCA A: Construction-Related Air Pollution Controls for Dust and Equipment Emissions	LTS with SCAs
Impact Air-5: During construction, individual	Supplemental SCA A: Construction-Related Air Pollution Controls for Dust and Equipment	Conservatively

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
development projects pursuant to the Specific Plan will generate regional ozone precursor emissions and regional particulate matter emissions from construction equipment exhaust. For most individual development projects, construction emissions will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval. However, larger individual construction projects could generate emissions of criteria air pollutants that would exceed the City's thresholds of significance.	Emissions	considered to be **Significant and Unavoidable** on a project-by-project basis
Impact Air-6: During construction, individual development projects pursuant to the Specific Plan will generate construction-related toxic air contaminant (TAC) emissions from fuel-combusting construction equipment and mobile sources that could exceed thresholds for cancer risk, chronic health index, acute health index or annual average PM2.5 concentration levels.	SCA 40: Asbestos Removal in Structures Supplemental SCA A: Construction-Related Air Pollution Controls for Dust and Equipment Emissions	LTS with SCAs
Impact Air-7: Once buildout of the Specific Plan is complete and all of the expected new development is fully occupied, new development pursuant to the Specific Plan will generate emissions of criteria pollutants (ROG, NOx PM10 and PM2.5) as a result of increased motor vehicle traffic and area source emissions. Traffic emissions combined with anticipated area source emissions would generate levels of criteria air pollutants that would exceed the City's project-level thresholds of significance.	SCA 24: Parking and Traffic Management Plan	**Significant and Unavoidable**
Impact Air-8: The Specific Plan would not	none needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
exposure sensitive uses and would not generate emissions leading to significant concentrations of CO that would violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation.		
Impact Air-9: Development pursuant to the West Oakland Specific Plan would include new light industrial, custom manufacturing and other similar land uses, as well as the introduction of new diesel generators that could emit toxic emissions.	Supplemental SCA B: Exposure to Air Pollution (Toxic Air Contaminants) BAAQMD Regulation 2, Rule 5 **Mitigation Measure AIR-9: Risk Reduction Plan**. Applicants for projects that would include backup generators shall prepare and submit to the City, a Risk Reduction Plan for City review and approval. The applicant shall implement the approved plan. This Plan shall reduce cumulative localized cancer risks to the maximum feasible extent. The Risk Reduction Plan may contain, but is not limited to the following strategies: a. Demonstration using screening analysis or a health risk assessment that project sources, when combined with local cancer risks from cumulative sources with 1,000 feet would be less than 100 in one million. b. Installation of non-diesel fueled generators. c. Installation of diesel generators with an EPA-certified Tier 4 engine or Engines that are retrofitted with an ARB Level 3 Verified Diesel Emissions Control Strategy.	**Significant and Unavoidable**
Air-10: Certain future development projects could result in new sensitive receptors exposed to existing levels of toxic air contaminants (TACs) or concentrations of PM2.5 that could result in increased cancer risk or other health hazards. CEQA requires the analysis of potential adverse effects of a project on the environment. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. However, this EIR nevertheless analyzes potential effects of the environment on the project (i.e. siting new receptors near existing TAC sources) in order to provide information to the public and decision-	Supplemental SCA B: Exposure to Air Pollution (Toxic Air Contaminants)	LTS with SCAs for DPM exposure Conservatively **Significant and Unavoidable** for gaseous TACs

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
makers.		
Cultural Resources		
Impact CR-1: There are about a dozen Local Register properties within the Opportunity Areas. The Specific Plan does not propose demolition of any of these properties to allow for new development, and requires that any changes to these properties adhere to the Secretary of the Interior's Standards for the Treatment of Historic Properties. Implementation of the Specific Plan would not cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5.	SCA 57: Vibrations Adjacent to Historic Structures SCA 56: Compliance with Policy 3.7 of the Historic Preservation Element - Property Relocation Rather than Demolition (relocation in such a manner that the resource retains its eligibility for listing on the National Register would likely not be feasible for most of the Local Register properties located within the West Oakland Opportunity Areas given their size, design and materials, and the importance of their location and setting) No additional mitigation measures needed	LTS
Impact CR-2: Development in accordance with the Specific Plan could cause a substantial adverse change in the significance of an archaeological resource or destroy a unique paleontological resource or site or unique geologic feature.)	SCA E: Archaeological Resources – Sensitive Sites, SCA 52, Archaeological Resources, SCA 53, Human Remains, and SCA 54, Paleontological Resources	LTS
Greenhouse Gas Emissions		
Impact GHG-1: Development facilitated by the Specific Plan would allow for the construction and operation of land uses that would produce greenhouse gas emissions. The level of emissions is expected to exceed the project-level threshold of 1,100 annual tons of MTCO2e, but would not exceed the project-level efficiency threshold of 4.6 MTCO2e of annual emissions per service population nor would it exceed the Plan-level threshold of 6.6 MTCOC2e annually per	None needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
service population. Development facilitated by the proposed Specific Plan would thus not be expected to generate greenhouse gas emissions at levels that would result, in the aggregate, in significant or cumulatively considerable GHG emissions.		
Impact GHG-2: The Specific Plan does not conflict with applicable plans, policies and regulations adopted for the purpose of reducing GHG emissions. The West Oakland Specific Plan would not be in conflict with current plans or policies the policies adopted for the purpose of reducing GHG emissions.	None needed - The Plan would not exceed the numeric thresholds at either the Plan or Project level. The West Oakland Specific Plan also includes several policy-based design features that would be effective in reducing GHG emissions on an area-wide basis. Future development pursuant to the West Oakland Specific Plan would comply with the applicable requirements of the City's recently approved Energy and Climate Action Plan (ECAP).	LTS
Impact GHG-3: New industrial and commercial growth facilitated by the Specific Plan could introduce new stationary sources of greenhouse gases. It is possible that on an individual basis, certain development project envisioned and enabled under the Specific Plan could exceed, on an individual and project-by-project basis, the project-level GHG threshold.	SCA Traf-1: Parking and Transportation Demand Management SCA Util-1: Waste Reduction and Recycling Several SCAs Regarding Landscape Requirements and Tree Replacement Several SCAs Regarding Stormwater Management SCA F: Greenhouse Gas (GHG) Reduction Plan	Until such projects are proposed and evaluated, the efficacy of any measures in reducing GHG emissions below relevant thresholds cannot be determined with certainly. Conservatively considered **Significant and Unavoidable**.
Impact GHG-4: Portions of West Oakland would be subject to flooding due to predicted sea level rise associated with global climate change. With increased flooding potential in the future, development in accordance with the Specific Plan could place people, structures and other improvements in these areas at an increased risk of injury or loss from flooding.	Safety measures built into the policies of the Safety Element of the General Plan SCAs related to construction within 100-year flood zones SCA 84: Regulatory Permits and Authorizations, which would require compliance with BCDC in addition to other applicable requirements of regulatory agencies. Bay Plan and Oakland's ECAP actions to participate in the preparation of a regional climate adaption strategy.	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Hazards and Hazardous Materials		
Impact Haz-1: The Planning Area contains numerous sites which are included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Continued occupancy and use or future development of these hazardous materials sites in accordance with the Specific Plan could create a significant hazard to the public or the environment.	Required implementation of the following City of Oakland Standard Conditions of Approval and required compliance with local, state and federal regulations for treatment, remediation or disposal of contaminated soil or groundwater SCA 61: Site Review by the Fire Services Division Fire Prevention Bureau Hazardous Materials Unit SCA 62: Phase I and/or Phase II Reports SCA 63: Lead-Based Paint/Coatings, Asbestos, or PCB Occurrence Assessment SCA 64: Environmental Site Assessment Reports Remediation SCA 65: Lead-Based Paint Remediation SCA 66: Other Materials Classified as Hazardous Waste SCA 67: Health and Safety Plan per Assessment SCA 68: Best Management Practices for Soil and Groundwater Hazards SCA 69: Radon or Vapor Intrusion from Soil or Groundwater Sources	LTS with SCAs
Impact Haz-2: Asbestos or lead based paint present within older structures in the Planning Area could be released into the environment during demolition or construction activities, which could result in soil contamination or pose a health risk to construction workers or future occupants.	SCA 41: Asbestos Removal in Structures SCA 63: Lead-Based Paint/Coatings, Asbestos, or PCB Occurrence Assessment SCA 65: Lead-Based Paint Remediation Plus required compliance with all other applicable federal, state and local laws, regulations, standards and oversight currently in place	LTS with SCAs
Impact Haz-3: Development allowed by the Specific Plan could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	SCA 35: Best Management Practices SCA 67: Health and Safety Plan per Assessment SCA 68: Best Management Practices for Soil and Groundwater Contamination SCA 74: Hazardous Materials Business Plan As well as required compliance with all other applicable federal, state and local hazardous materials laws, regulations, standards and oversight currently in place	LTS with SCAs

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Impact Haz-4: All schools within the Planning Area are located within ¼ mile of an existing permitted hazardous materials use or an identified environmental case. The Specific Plan could facilitate the addition of new businesses that emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of a school.	SCA 74: Hazardous Materials Business Plan As well as required compliance with all other applicable federal, state and local hazardous materials laws, regulations, standards and oversight currently in place	LTS with SCAs
Impact Haz-5: The Planning Area is not located within an airport land use plan area or within two miles of a public airport or public use airport, or near a private airstrip.	None needed	No Impact
Impact Haz-6: Many of the development Opportunity Sites under the proposed Specific Plan are located along these streets identified as Emergency Evacuation Routes, potentially interfering with an emergency response plan or emergency evacuation plan	SCA 33, Construction Traffic and Parking	LTS with SCAs
Impact Haz-7: The Planning Area is located in an urbanized part of Oakland, within a non-Very High Fire Hazard Severity Zone as mapped by the California Department of Forestry and Fire Protection, and well outside of the City's Fire Prevention and Assessment District boundary.	None needed	No Impact
Land Use		
Impact LU-1: The proposed West Oakland Specific Plan would not disrupt or divide the physical arrangement of the West Oakland community or any surrounding community, but rather would improve certain existing	None needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
conditions that currently divide the community.		
Impact LU-2: The West Oakland Specific Plan would not result in a fundamental conflict between adjacent or nearby land uses, but rather would result in a gradual improvement in compatibility between residential and other types of land uses.	None needed	LTS
Impact LU-3: The Specific Plan would not fundamentally conflict with any applicable land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect and result in a physical change in the environment.	None needed	LTS
Impact LU-4: There is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the Planning Area. The Specific Plan would not conflict with any applicable habitat conservation plan or natural community conservation plan.	None needed	No Impact
Noise		
Impact Noise-1: Construction activities related to the Specific Plan, including pile drilling and other extreme noise generating construction activities would temporarily increase noise levels in the vicinity of individual project sites.	SCA 28: Days/Hours of Construction Operation SCA 29: Noise Control SCA 30: Noise Complaint Procedures, and SCA 39: Pile Driving and Other Extreme Noise Generators	LTS with SCAs
Impact Noise-2: Ongoing operational noise generated by stationary sources could generate noise in violation of the City of Oakland Noise Ordinance regarding	SCA 32: Operational Noise – General (Ongoing) Section 17.120 of the Oakland Planning Code Section 8.18 of the Oakland Municipal Code.	LTS with SCAs

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
operational noise.		
Impact Noise-3: New development pursuant to the Specific Plan would not generate traffic noise resulting in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the Plan.	None needed	LTS
Impact Noise-4: Construction activities could generate excessive ground-borne vibration during the construction period.	SCA 38: Vibration SCA 57: Vibrations Adjacent to Historic Structures SCA 28: Days/Hours of Construction Operation SCA 29: Noise Control SCA 30: Noise Complaint Procedures, and SCA 39: Pile Driving and Other Extreme Noise Generators	LTS with SCAs
Impact Noise-5: Development in accordance with the Specific Plan may generate operational ground-borne vibration at levels that would be perceptible beyond the property boundary, which would violate City of Oakland standards for operational vibration.	Compliance with Section 17.120.060 of the Oakland Planning Code	LTS with SCAs
Noise-6: The Planning Area is located more than two miles outside of the Oakland International Airport 65 dBA Ldn/CNEL noise contour, which the Federal Aviation Administration regards as a significance threshold for noise-sensitive land uses. Therefore, the impacts of the Specific Plan related to airport noise would be less than significant.	None needed	LTS
Noise-7: The occupants of new residential and other noise-sensitive development facilitated by the Specific Plan could be exposed to community noise in conflict with the Land	SCA 31: Interior Noise SCA 38: Vibration	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Use Compatibility Guidelines of the Oakland General Plan, and to interior noise exceeding California Noise Insulation Standards. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. However, this EIR nevertheless analyzes potential effects of the environment on the project (i.e. siting new receptors near existing noise sources) in order to provide information to the public and decision-makers.		
Population and Housing		
Impact PHE-1: The Specific Plan build-out projections are consistent with ABAG projections of household and employment growth. Potential induced growth, if any, outside the Opportunity Areas due to infrastructure improvements, enhanced development potential on adjacent land, or increased economic activity, would occur as already contemplated in and consistent with adopted plans and the environmental documents prepared for those plans. Therefore, the growth facilitated or induced by the Specific Plan would not represent growth for which adequate planning has not occurred, and the growth inducement impacts of the Specific Plan would be less than significant.	None needed	LTS
Impact PHE-2: The potential loss of a small number of housing units and associated displacement of people as a result of development facilitated by the Specific Plan would be offset by the large number of new units proposed by the Specific Plan, by new	None needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
units proposed by the 2007-2014 Housing Element, and by existing housing in Oakland. The environmental impacts of proposed new housing are analyzed in this EIR and in the 2007-2014 Housing Element EIR.		
Public Services and Recreation		
Impact PSR-1: Development under the Specific Plan would result in an increase in OFD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios.	SCA 4, Conformance with other Requirements, requires building plans for development projects to be submitted to the OFD for review and approval. SCA 61, Site Review by the Fire Services Division, SCA 71, Fire Safety Phasing Plan, SCA 73, Fire Safety	LTS with SCAs
Impact PSR-2: Development under the Specific Plan would result in an increase in OPD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios.	The Specific Plan may reduce crime by incorporating crime prevention through environmental design (CEPTD) principles and up-to-date security features and technology in new development.	LTS
Impact PSR-3: Development in accordance with the Specific Plan would generate additional students attending the Oakland Unified School District (OUSD) incrementally through 2035 or longer. Therefore, the impact of the Specific Plan related to schools would be less than significant. (LTS)	The OUSD collects school impact fees from residential and non-residential development. Under California Government Code Sections 65995, 65996(a) and 65996(b), payment of these fees is deemed to be full and complete mitigation.	LTS with SCAs
Impact PSR-4: Development under the Specific Plan would generate a need for additional parkland, adding to the existing deficiency of parkland acreage, and would increase the use of existing parks and recreational facilities. No new public parks or recreational facilities are proposed as part of the Specific Plan. The increased demand	None needed Parks and recreational facilities may be required as part of new development projects. On-site useable open space or recreational facilities in new residential developments may offset some of the park need. Parkland, recreational facilities and recreational trail links are proposed within and adjacent to the Planning Area as part of the planned Gateway Park.	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
would occur incrementally over the 25-year timeframe of the Specific Plan. The Specific Plan would not be expected to increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities may occur or be accelerated.		
Traffic		
Existing Plus Project		
Impact Trans-1: The addition of traffic generated by the full development of the Specific Plan would cause PM peak hour southbound left turn 95th percentile queue length at the signalized intersection of Hollis and 40th Street (#1) located in Emeryville to exceed the available queue storage.	**Mitigation Measure Trans-1**: Implement the following measure at Hollis and 40th Street (#1): a) Extend the southbound left turn lane queue storage to 175 feet. To implement this measure, the City shall work with the City of Emeryville to determine the feasibility of the mitigation measure and enter into an agreement to fund the necessary improvement to alleviate the queue storage issue at this location. Individual project applicants shall fund the cost of preparing and implementing the above measures.	Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed. **Significant and Unavoidable**
Impact Trans-2: The addition of traffic generated by the full development of the Specific Plan would cause PM peak hour traffic operations at the signalized intersection of San Pablo Avenue and 40th Street (#2) located in Emeryville to degrade from LOS D to LOS E under Existing plus Project conditions. Additionally, the eastbound left and northbound left turn 95th percentile queue length would exceed the available queue storage in the AM peak hour.	**Mitigation Measure Trans-2**: Implement the following measure at San Pablo Avenue and 40th Street intersection (#2): a) Add an additional eastbound left turn lane b) Optimize signal timing parameters (i.e., adjust the allocation of green time for each intersection approach) To implement this measure, the City shall work with the City of Emeryville to determine the feasibility of the mitigation measure and enter into an agreement to determine a fair-share portion of fund the necessary improvements to alleviate congestion at this location. Individual project applicants shall fund the cost of implementing the above measures.	Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed. **Significant and**

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
		Unavoidable
Year 2035 Cumulative Intersection Impacts		
Impact Trans-3: The addition of traffic generated by the full development of the Specific Plan would contribute to LOS F operations at the signalized intersection of Hollis Street and 40th Street (#1) located in Emeryville and would increase the average delay by more than four seconds.	**Mitigation Measure Trans-3**: Implement the following measure at Hollis Street and 40th Street intersection (#1): a) Increase the actuated cycle length. b) Extend the westbound left turn queue storage to 425 feet c) Extend the southbound queue storage to 175 feet To implement this measure, the City shall work with the City of Emeryville to determine the feasibility of the mitigation measure and enter into an agreement to fund the necessary improvement to alleviate congestion at this location. The funding would be collected from the developers of properties in the West Oakland Specific Plan area and would be used to implement mitigation measures to improve intersection operations	Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed. **Significant and Unavoidable**
Impact Trans-4: The addition of traffic generated by the full development of the Specific Plan would contribute to an increase in the eastbound left turn 95th percentile queue in the both peak hours that would exceed the available queue storage at the signalized intersection of San Pablo Avenue and 40th Street (#2) located in Emeryville.	**Mitigation Measure Trans-3**: Implement the following measure at San Pablo Avenue and 40th Street intersection (#2): a) Optimize signal timing parameters (i.e., adjust the allocation of green time for each intersection approach) Mitigation is projected to be required by the completion of the project. To implement this measure, the City shall work with the City of Emeryville to determine the feasibility of the mitigation measure and enter into an agreement to fund the necessary improvement to alleviate congestion at this location. The funding would be collected from the developers of properties in the West Oakland Specific Plan area and would be used to implement mitigation measures to improve intersection operations	Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed. **Significant and Unavoidable**
Impact Trans-5: The addition of traffic generated by the full development of the Specific Plan would degrade AM peak hour operation from LOS D to LOS F in the A peak hour, and from LOS E to LOS F in the PM peak hour at the signalized intersection of	None feasible The following improvements would be needed to improve the operation at West Grand Avenue at Mandela Parkway to LOS C in the AM peak hour and LOS D in the PM peak hour, but are in conflict with the City's plans and policies for roadways in the area:: b) Retain three existing westbound through lanes by terminating the proposed road diet	These improvements would encroach into Memorial Park and medians. Furthermore, the provision of four westbound lanes would

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
West Grand Avenue at Mandela Parkway (#7) located outside the Downtown Area, and would increase the volume-to-capacity ratio beyond the threshold of significance.	before the intersection and add an exclusive right-turn channelization c) Add an additional eastbound left-turn lane to provide two left-turn and two through lanes d) Modify the traffic signal timing	preclude planned installation of bicycle facility on West Grand Avenue, which is a City Council priority (Resolution 84197, Nov 2012). Therefore, these additional improvements are not recommended. **Significant and Unavoidable**
Impact Trans-6: The addition of traffic generated by the full development of the Specific Plan would degrade the PM peak hour operations from LOS E to LOS F at the signalized intersection of Broadway and West Grand Avenue (#13) located within the Downtown Area.	**Mitigation Measure Trans-6**: Implement the following measure at Broadway and West Grand Avenue (#13): a) Modify the traffic signal to provide protected/permitted signal phasing for the northbound left-turn movement To implement this measure, individual project applicants shall submit Plans, Specifications, and Estimates (PS&E) to modify the intersection to the City of Oakland for review and approval. All elements shall be designed to City standards in effect at the time of construction and all new or upgraded signals shall include these enhancements. All other facilities supporting vehicle travel and alternative modes through the intersection shall be brought up to both City standards and ADA standards (according to Federal and State Access Board guidelines) at the time of construction. Individual project applicants shall fund the cost of preparing and implementing the above measures. However, if the City adopts a transportation fee program prior to implementation of this mitigation measure, the individual project applicants shall have the option to pay the applicable fee in lieu of implementing this mitigation measure and payment of the fee shall mitigate this impact to less than significant.	LTS with MM
Impact Trans-7: The addition of traffic generated by the full development of the Specific Plan would degrade PM peak hour operation from LOS B to LOS E at the intersection of Adeline Street and 18th Street (#15) located outside the Downtown Area.	**Mitigation Measure Trans 7**: Implement the following measures at the Adeline Street and 18th Street (#15) intersection: a) Retain the existing traffic signal control at the intersection and upgrade it to an actuated signal rather than converting to a single-lane roundabout as proposed as a part of the project To implement this measure, the individual project applicants shall submit Plans, Specifications, and Estimates (PS&E) to modify the intersection to the City of Oakland for review and approval.	LTS with MM

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
	All elements shall be designed to City standards in effect at the time of construction and all new or upgraded signals shall include these enhancements. All other facilities supporting vehicle travel and alternative modes through the intersection shall be brought up to both City standards and ADA standards (according to Federal and State Access Board guidelines) at the time of construction. Individual project applicants shall fund the cost of preparing and implementing the above measures. However, if the City adopts a transportation fee program prior to implementation of this mitigation measure, individual project applicants shall have the option to pay the applicable fee in lieu of implementing this mitigation measure and payment of the fee shall mitigate this impact to less than significant.	
Impact Trans-8: The addition of traffic generated by the full development of the Specific Plan would degrade the PM peak hour operation from LOS D to LOS F at the signalized intersection of Adeline Street and 5th Street (#24) located outside the Downtown Area.	**Mitigation Measure Trans-8**: Implement the following measure at Adeline Street and 5th Street (#24): a) Modify the traffic signal to remove split phasing and provide protected permitted left turn phasing for the northbound and southbound left-turn movements To implement this measure, individual project applicants shall submit Plans, Specifications, and Estimates (PS&E) to modify the intersection to the City of Oakland for review and approval. All elements shall be designed to City standards in effect at the time of construction and all new or upgraded signals shall include these enhancements. All other facilities supporting vehicle travel and alternative modes through the intersection shall be brought up to both City standards and ADA standards (according to Federal and State Access Board guidelines) at the time of construction. Individual project applicants shall fund the cost of preparing and implementing the above measures. However, if the City adopts a transportation fee program prior to implementation of this mitigation measure, individual project applicants shall have the option to pay the applicable fee in lieu of implementing this mitigation measure and payment of the fee shall mitigate this impact to less than significant.	LTS with MM
Impact Trans-9: For a roadway segment of the Congestion Management Program (CMP) Network, the Specific Plan would not cause (a) the LOS to degrade from LOS E or better to LOS F or (b) the V/C ratio to increase 0.03 or more for a roadway segment that would operate at LOS F without the Project.	None needed	LTS
Impact Trans-10: The Specific Plan would	None needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
increase travel times for AC Transit buses along West Grand Avenue, but the travel time increase would be offset by support of the transit systems and safety and convenience of pedestrian, bicycle and transit users.		
Impact Trans-11: The Specific Plan would not directly or indirectly cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard due to a new or existing physical design feature or incompatible uses.	None needed	LTS
Impact Trans-12: The Specific Plan would not directly or indirectly result in a permanent substantial decrease in pedestrian safety	None needed	LTS
Impact Trans-13: The proposed Project would not directly or indirectly result in a permanent substantial decrease in bus rider safety	None needed	LTS
Impact Trans-14: The proposed Project would not directly or indirectly result in a permanent substantial decrease in bicyclist safety	none needed	LTS
Impact Trans-15: The proposed Project would not fundamentally conflict with adopted City policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment.	none needed	LTS
Impact Trans-16: The proposed Project would result in a substantial, though temporary adverse effect on the circulation system during construction of the Project.	SCA Trans-2: Construction Traffic and Parking	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Trans-17: With the increase in travel demand associated with the Project and the high load factors on several existing bus routes, AC Transit bus service could be delayed, and enhancements might be required.	None identified	non-CEQA Impact, LTS
The Project would cause an increase in the 95th percentile queue length of 25 feet or more under Existing plus Project conditions, and the queue would exceed the available storage length at the following intersections: • San Pablo Avenue & 40th Street (#2) • I-980 off-ramps & 27th Street #3(• I-980 on-ramp & 27th Street (#4) • Market Street & West Grand Avenue (#9) • San Pablo Avenue & West Grand Avenue (#10) • Martin Luther King Jr. Way & West Grand Avenue (#11) • Northgate Avenue & West Grand Avenue (#12) • Broadway & West Grand Avenue (#13) • Frontage Road & 7th Street (#19) • Market Street & 7th Street (#22) • Adeline & 5th (#24)	None identified	Non-CEQA Impact, LTS
Utilities and Service Systems		
Impact Util-1: Future development in accordance with the Specific Plan would consist of redevelopment of previously developed properties so there would be limited change in impervious surface area and stormwater runoff. Development facilitated by	SCA 75: Stormwater Pollution Prevention Plan SCA 80: Post-construction Stormwater Pollution Prevention Plan SCA 91: Stormwater and Sewer **Recommendation Util-1a**: As the area improves, underground storm drain lines should be added to several of the Opportunity Areas' street sections where such lines do not exist.	LTS with SCAs

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
the Specific Plan would not result in an increase in stormwater runoff	Additional storm drainage structures, including conduit, would be a way to address both ponding and adequate conveyance of storm runoff.	
Impact Util-2: The WSA prepared by EBMUD for the Specific Plan concluded that EBMUD has sufficient water supplies to meet current water demand and future water demand through 2035, including the increased water demand associated with the Specific Plan, during normal, single dry, and multiple dry years. Construction of needed water system improvements would typically occur within existing public rights-of-way and construction period traffic, noise, air quality, water quality and other potential impacts would be mitigated through the City's standard construction mitigation practices.	None needed **Recommendation Util-2a:** Because many of the parcels within West Oakland's industrial areas are very large, there are several streets that have no public water main. For projects that create a new parcel which fronts a street that does not have a water main, a new public water main constructed at the developer's expense will likely be required. **Recommendation Util-2b**: EBMUD block maps indicate that many of the lines in the area are cast iron and were installed in the 30's. These pipes have likely experienced significant corrosion and should be replaced. **Recommendation Util-2c**: Service to new development would likely require reassessment and upsizing of conduits, especially if the pipe length is greater than 1,000 feet to the nearest transmission line.	LTS
Impact Util-3: With the City's sub-basin allocation system, construction of needed sewer system improvements pursuant to SCA 91, Stormwater and Sewer, payment of improvement and hook-up fees, the wastewater collection and treatment system would have adequate capacity to serve future development in accordance with the Specific Plan.	SCA 91: Stormwater and Sewer **Recommendation Util-3a**: Underground utility improvements should be installed prior to final streetscape improvements to prevent damage and the need for patching such improvements during trenching operations. **Recommendation Util-3b**: Properties to be redeveloped and/or reused should abandon existing sewer laterals and install new laterals, and verify that there are no cross-connections from the downspouts to the sewer lateral. This would result in much lower I/I flow into the main sewer lines.	LTS with SCAs
Impact Util-4: The Altamont Landfill and Vasco Road Landfill have sufficient permitted capacity to accommodate the solid waste disposal needs of future development under the Specific Plan. The Specific Plan would not violate applicable federal, state, and local statutes and regulations related to solid waste.	SCA 36: Waste Reduction and Recycling	LTS with SCAs
Impact Util-5: Pacific Gas & Electric Company (PG&E) has indicated that there is ample	None needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
capacity to handle projected demand with its current system. Therefore, development under the Specific Plan would not cause a violation of regulations relating to energy standards nor result in a determination by PG&E that it does not have adequate capacity to serve the project, or result in construction or expansion of energy facilities, construction of which could cause significant environmental effects.		
Other Less than Significant Effects		
Impact Ag-1: Future development pursuant to or consistent with the Specific Plan would not 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.	None needed	No Impact
Impact Ag -2: Future development pursuant to or consistent with the Specific Plan would not conflict with existing zoning for agricultural use, or with a Williamson Act contract.	None needed	No Impact
Impact Ag-3: Future development pursuant to or consistent with the Specific Plan would not conflict with existing zoning for, or cause rezoning of forest land, and would not result in the loss of forest land or conversion of forest land to non-forest use or timberland zoned Timberland Production.	None needed	No Impact
Impact Ag-4: The Specific Plan would not involve any changes in the existing environment which, due to their location or	None needed	No Impact

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.		
Impact Bio-1: Future development pursuant to the Specific Plan would not have a substantial direct adverse effect 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 Game or U.S. Fish and Wildlife Service. However, tree removal, building demolition, and other construction activities can cause disturbance, noise, or loss of habitat for resident or migratory birds and mammals, including special-status species potentially occurring within the Planning Area.	SCA 44, Tree Removal During Breeding Season, and SCA D, Bird Collision Reduction	LTS with SCAs
Impact Bio-2: Future development pursuant to the Specific Plan would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.	None needed	LTS
Impact Bio-3: Future development pursuant to or consistent with the Specific Plan would not 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.	None needed	No Impact
Impact Bio-4: Future demolition and	SCA 44, Tree Removal During Breeding Season	LTS with SCAs

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
construction activities associated with development pursuant to the Specific Plan would not substantially interfere 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, but could temporarily reduce nesting opportunities for resident and migratory bird species that are protected by the federal Migratory Bird Treaty Act or California Fish and Game Code Sections 3503, 3503.5, and 3800, could also eliminate bat roosts and, if construction were to occur during the maternal roosting season, young bats incapable of flight could be destroyed.	The Migratory Bird Treaty Act California Fish and Game Code Sections 3503, 3503.5, and 3800	
Impact Bio-5: Future development pursuant to or consistent with the Specific Plan may require the removal of trees that are protected by the City of Oakland Tree Protection Ordinance.	SCA 45, Tree Removal Permit SCA 46, Tree Replacement Plantings, and SCA 47, Tree Protection During Construction	LTS with SCAs
Impact Bio-6: Future development pursuant to or consistent with the Specific Plan would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan	None needed	LTS
Impact Geo-1: There are no Alquist-Priolo Earthquake Fault Zones and no known earthquake fault traces within the Planning Area. Future development in accordance with the Specific Plan would not expose people or structures to substantial adverse effects, including the risk of loss, injury or death, as a	None needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
result of the surface rupture of a known earthquake fault.		
Impact Geo-2: Future development pursuant to the Specific Plan could expose people or structures to substantial adverse effects, including the risk of loss, injury or death, due to strong seismic ground shaking and seismic-related ground failure, including liquefaction.	SCA 60, Geotechnical Report	LTS with SCAs
Impact Geo-3: Future development in accordance with the Specific Plan would not expose people or structures to substantial adverse effects, including the risk of loss, injury or death, as a result of landslides.	None needed	LTS
Impact Geo-4: Grading and excavations associated with future development pursuant to or consistent with the Specific Plan could result in the loss of topsoil through erosion.	SCA 34: Erosion and Sedimentation Control SCA 55: Erosion and Sedimentation Control Plan SCA 75/76: Erosion, Sedimentation, and Debris Control Measures	LTS with SCAs
Impact Geo-5: Portions of the Planning Area are underlain by unstable geologic conditions and soils, and potentially wells, pits, tank vaults or unmarked sewer lines, creating substantial risks to life or property. Future development pursuant to or consistent with the Specific Plan could expose people or structures to substantial adverse effects.	SCA 58, Soils Report, and SCA 60, Geotechnical Report	LTS with SCAs
Impact Geo-6: All properties within the Planning Area are connected to the City of Oakland sanitary sewer system. The Specific Plan would have no impact related to the capacity of local soils to adequately supporting the use of septic tanks or alternative wastewater disposal systems.	None needed	No Impact

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Impact Hydro-1: Future development in accordance with the Specific Plan would not be subject to waste discharge requirements and would not violate any water quality standards or waste discharge requirements.	Required compliance with applicable NPDES permits, which also serve as Waste Discharge Requirements (WDRs), including: • the Municipal NPDES permit for stormwater discharges (Alameda Countywide NPDES Municipal Stormwater Permit Water Quality Order No.R2-2003-0021, NPDES No. CAS0029831); • the Construction General Permit for construction activities associated with land disturbance of more than one acre (WDRs) for Discharges of Storm Water Associated with Construction Activity Water Quality (Order No.99-08-DWQ, NPDES No. CAS000002); • individual NPDES permits/WDRs for discharges that do not fall under the above categories; • discharges from the municipal wastewater treatment facilities (e.g., Waste Discharge Requirements for the East Bay Municipal Utility District, Special District No. 1 Wet Weather Facilities (Alameda and Contra Costa Counties Water Quality Order No.R2-2009-0004, NPDES N0. CA0038440); US HUD/Oakland City of Housing Authority NPDES No. CA0038512); • as well as Industrial General Permits.	LTS with SCAs
Impact Hydro-2: Future redevelopment of existing developed properties and future development of vacant properties in West Oakland pursuant to or consistent with the Specific Plan would not 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 proposed uses for which permits have been granted.	None needed	LTS
Impact Hydro-3: Grading and excavations associated with future development pursuant to or consistent with the Specific Plan could	SCA 75: Stormwater Pollution Prevention Plan	LTS with SCAs

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
expose underlying soils to erosion or siltation, leading to downstream sedimentation in stormwater runoff. However, with required implementation of City of Oakland Standard Conditions of Approval, impacts related to siltation would be reduced to less than significant levels.		
Impact Hydro-4: Operational activities such as increased vehicular use, landscaping maintenance and industrial operations could potentially introduce pollutants into stormwater runoff, resulting in degradation of downstream water quality. New development pursuant to the Specific Plan could create or contribute substantial runoff which would exceed the capacity of existing or planned stormwater drainage systems, create or contribute substantial runoff which would be an additional source of polluted runoff, or otherwise substantially degrade water quality.	SCA 80: Post-Construction Stormwater Management Plan SCA 81: Maintenance Agreement for Stormwater Treatment Measures	LTS with SCAs
Impact Hydro-5: The Specific Plan does not propose any changes to the existing drainage pattern within the Planning Area. All drainage and stormwater runoff is conveyed via underground pipes and conduits to pumping plants, which discharge runoff into the Bay. There are no surface water features or open drainage systems which would be altered, or where an increase in captured runoff may adversely affect the capacity of such features.	None needed	LTS
Impact Hydro-6: No portion of the Planning Area is located within a 100-year or 500-year flood hazard area, as mapped on the National Flood Insurance Program Flood Insurance Rate Maps. Development in accordance with the	None needed	LTS

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Specific Plan would not place housing within a 100-year flood hazard area.		
Impact Hydro-7: The portion of the Planning Area north of I-580 is located within the Temescal Lake dam failure inundation area and could be subject to flooding in the event of a catastrophic failure of the dam. The Specific Plan does not propose any land use changes or improvements to the area north of I-580, and would not affect established emergency procedures for the evacuation and control of populated areas below Temescal Lake dam. Therefore, the Specific Plan would not expose people or structures to a substantial risk of loss, injury or death involving flooding due to dam failure inundation.	None needed	LTS
Impact Hydro-8: The Planning Area is not subject to risk from a seiche or landslides. However, the western portion of the Specific Plan, generally west of Mandela Parkway, is subject to tsunami inundation. The Alaska Tsunami Warning Center, State Warning System and OES emergency alert system, including the outdoor warning sirens in West Oakland, would provide early notification of an advancing tsunami allowing evacuation of people, although there could be property damage due to inundation.	None needed	LTS
Impact Min-1: Future development pursuant to or consistent with the Specific Plan would not 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.	None needed	No Impact

Table 2-1: Summary of Project Impacts, Standard Conditions of Approval, Mitigation Measures and Residual Impacts: West Oakland Specific Plan

Potential Environmental Impacts	Mitigation Measures / Standard Conditions of Approval (SCA)	Resulting Level of Significance
Impact Min-2: Future development pursuant to or consistent with the Specific Plan would not 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.	None needed	No Impact

3

Project Description

Introduction

The City of Oakland received a Transportation Investment Generating Economic Recovery (TIGER) grant from the U.S. Department of Transportation to prepare a Specific Plan and its associated EIR to guide development and revitalization in West Oakland.

The proposed West Oakland Specific Plan provides comprehensive and multi-faceted strategies for development and redevelopment, of vacant and/or underutilized commercial and industrial properties in West Oakland. It establishes a land use and development framework, identifies needed transportation and infrastructure improvements, and recommends implementation strategies needed to develop those parcels. The Plan is also a marketing tool for attracting developers to key sites and for encouraging new, targeted economic development.

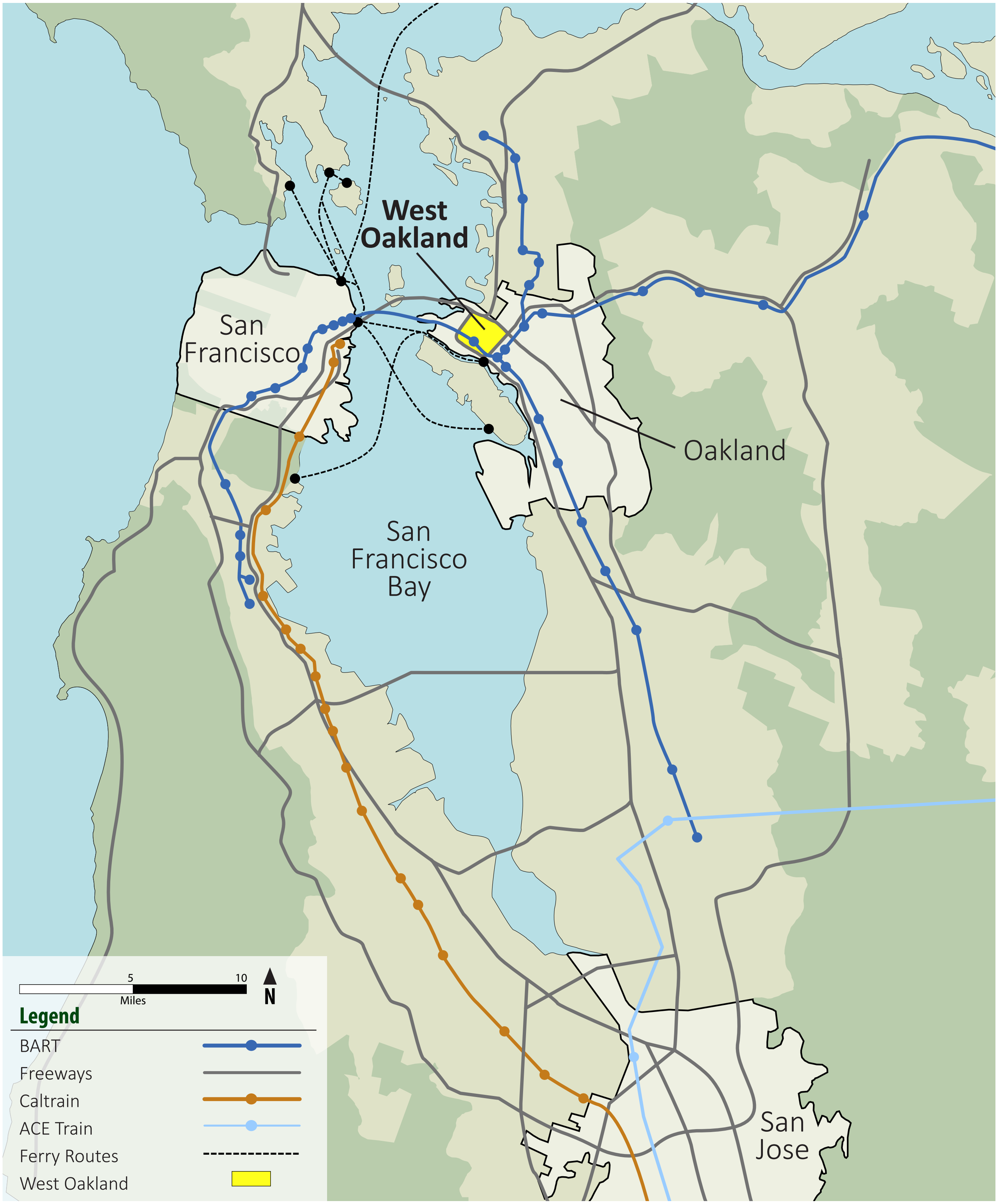
This chapter describes the proposed West Oakland Specific Plan or "project" addressed in this EIR. As required by the CEQA Guidelines, this project description is presented in sufficient detail to the extent needed for evaluation of environmental impacts. In accordance with Section 15124 (Project Description) of the CEQA Guidelines, this chapter describes:

- the location, characteristics and boundaries of the Planning Area;
- Specific Plan background and history;
- basic objectives of the Specific Plan;
- vision, development framework, development standards and guidelines, goals and policies, plan proposals, and implementation program included in the Specific Plan;
- development assumptions and time frame used throughout this EIR; and
- approvals required to adopt the Specific Plan.

Project Location, Characteristics and Boundaries

Location

The West Oakland Specific Plan Planning Area (Planning Area) is located in the heart of the East San Francisco Bay Area, near the hub of the Bay Area's freeway system and regional transit system (see **Figure 3-1**). The West Oakland BART station is located in the southern portion of the Planning Area, and the MacArthur BART station is located approximately one-quarter mile northeast of the Planning Area. The Planning Area is generally bounded by Interstate 580 (I-580) to the north, I-980 to the east and I-880 to the west. **Figure 3-2** illustrates the Project location and the Planning Area boundaries.



Source: JRDV Intl.

Figure 3-1
Regional Location

Source: JRDV Intl.

Figure 3-2
West Oakland Planning Area Location

Planning Area Characteristics and Boundaries

The Planning Area comprises approximately 2.18 square miles or approximately 1,900 acres, subdivided into 6,340 parcels. It has a current population of approximately 25,000 people, and contains employment opportunities for more than 15,000 current employees.

Existing Land Use

Residential uses occupy approximately 60 percent of the land in West Oakland, generally concentrated in the northern, eastern and southwestern portions of the area.

Industrial, commercial and truck-related uses occupy about 23 percent of the land area. Industrial uses are concentrated primarily around Mandela Parkway and West Grand Avenue and in the vicinity of 3rd Street. Commercial activities primarily occur at the northern end of the Planning Area near Emeryville, along San Pablo Avenue, at the eastern end of West Grand Avenue, on Market Street and on 7th Street.

Government/institutional and utilities uses occupy the remaining 17 percent of the Planning Area. Lands devoted to government, institutional and utilities uses include properties owned by Caltrans, Union Pacific Railroad, U.S. Postal Service, Bay Area Rapid Transit District (BART), East Bay Municipal Utility District (EBMUD), Oakland Unified School District, Oakland Housing Authority, and City of Oakland.

Existing land use in the Planning Area is illustrated on **Figure 3-3**.

Planning Area Boundaries

Surrounding the Planning Area is a mix of land uses:

- To the north, north of I-580 is the East Bay Bridge Shopping Center and other residential, light industrial, office and public uses in Emeryville.
- To the northwest are the East Bay Municipal Utility District (EBMUD) Main Wastewater Treatment Plant, the I-80/I-580/I-880 interchange, and eastern terminus of the San Francisco-Oakland Bay Bridge and the bridge toll plaza.
- To the east, east of I-980, are the Pill Hill and Uptown neighborhoods, Downtown Oakland, City Center, Old Oakland and the 19th Street and 12th Street BART Stations.
- To the southeast are the waterfront Jack London District and Jack London Square.
- Interstate 880, the Union Pacific Railroad and the Burlington Northern and Santa Fe (BNSF) Railroad are located along the southern and western boundaries of the Planning Area. The Port of Oakland and the former Oakland Army Base, currently leased for interim transportation, industrial and commercial uses until it is redeveloped as a Port Logistics Center, are to the south and west of the Planning Area.

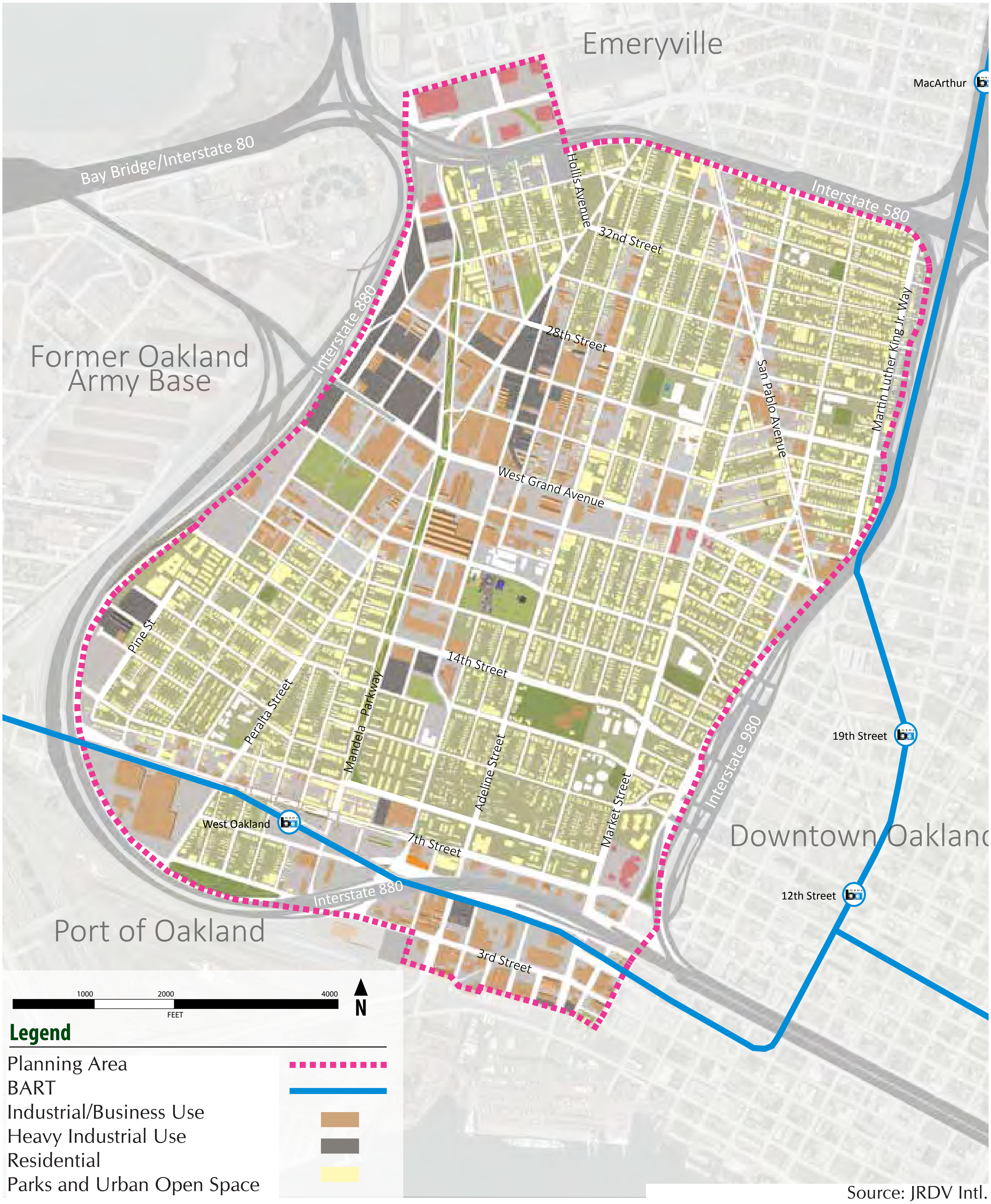


Figure 3-3
Existing Land Use in the Planning Area

Planning Subareas

Opportunity Areas

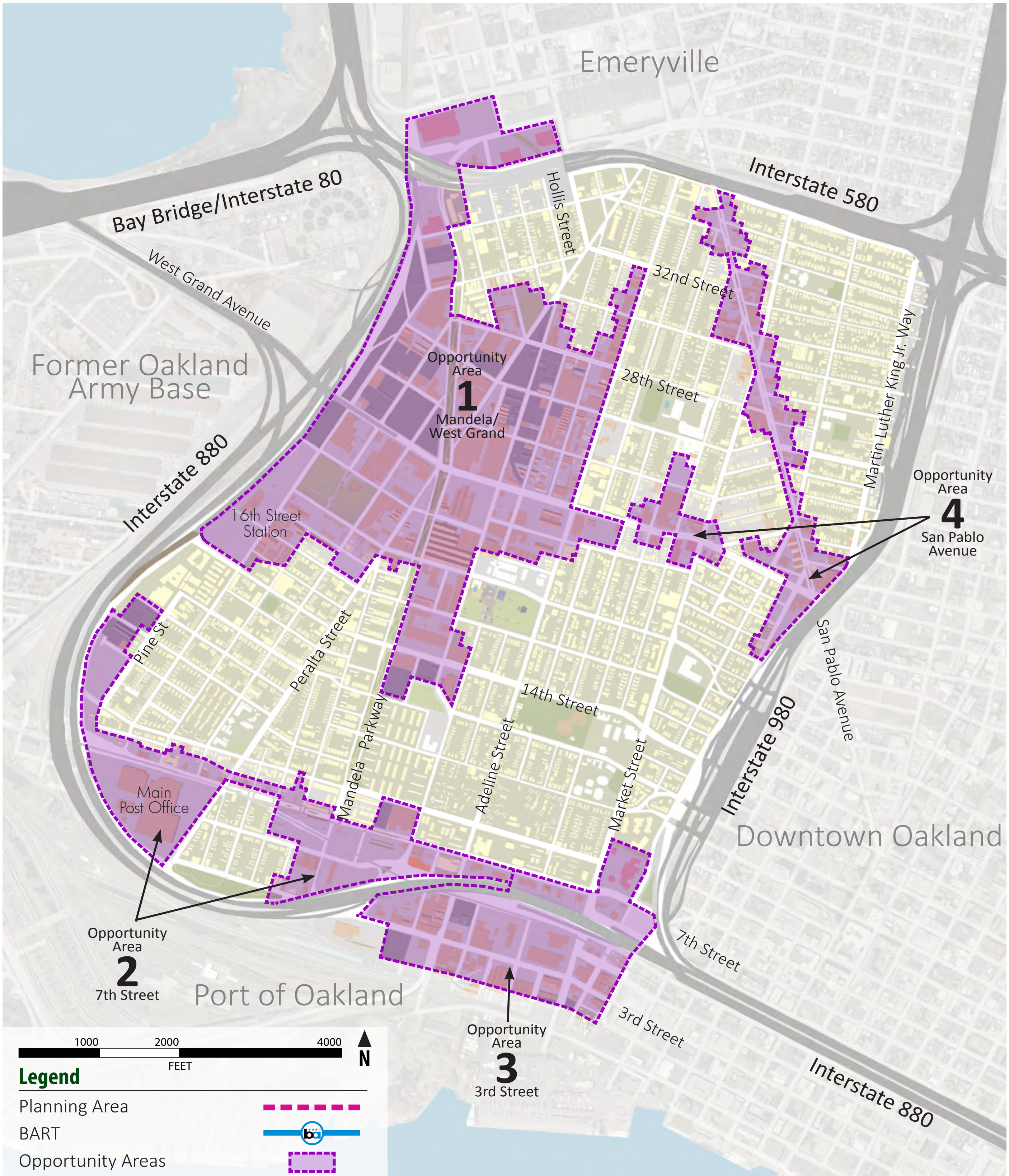
Within West Oakland, the Specific Plan identifies four "Opportunity Areas' targeted for growth and development. Development facilitated by the Specific Plan would occur in these Opportunity Areas, which contain vacant and underutilized properties, and older buildings that no longer meet current standards and market conditions. These are the areas identified as having the most potential for change. The following Opportunity Areas are shown on **Figure 3-4**:

- Opportunity Area 1: Mandela/West Grand (354 gross acres, or 243 net acres not including public right-of-way and other public open space)
- Opportunity Area 2: 7th Street (95 gross acres, 65 net acres)
- Opportunity Area 3: 3rd Street (103 gross acres, 68 acres net acres), and
- Opportunity Area 4: San Pablo Avenue (52 gross acres, and 37 net acres)

Because of their size and the differing land use development and planning strategies envisioned under the Specific Plan, the Mandela/West Grand Avenue, 7th Street and San Pablo Avenue Opportunity Areas are further divided into subareas, as shown on Figure 3-4.

Opportunity Sites

Within the four Opportunity Areas, new growth and development facilitated by the Specific Plan is most likely to occur on 37 specifically identified Opportunity Sites. These Opportunity Sites are also illustrated on **Figure 3-5** and listed on **Table 3-1** below. Development and redevelopment of the Opportunity Sites is expected to occur because these sites are individual parcels or groups of commercial and/or industrial parcels that are strategically located, and are vacant, underutilized, blighted or contain uses that conflict with nearby residential neighborhoods. The Opportunity Sites are expected to serve as catalysts in that their development will encourage development of other properties in the surrounding Opportunity Area and can make direct positive contributions to the community.



Source: JRDV Intl.

Figure 3-4
West Oakland Specific Plan - Opportunity Areas

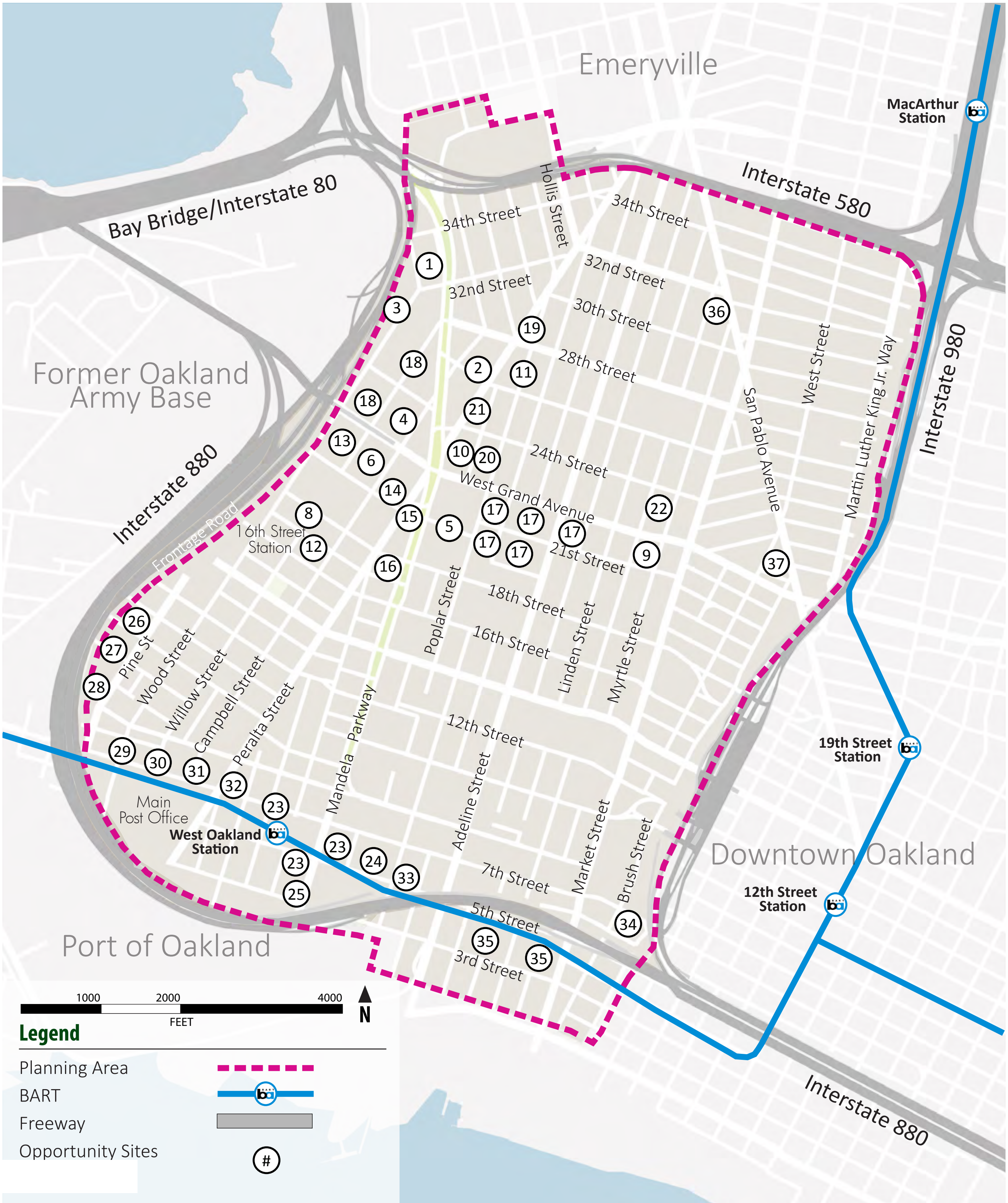


Figure 3-5
West Oakland Specific Plan - Opportunity Sites

Source: JRDV Intl.

Table 3-1: Opportunity Sites

Site #	Assessor's Parcel Number(s)	Address/Location/Descriptor	Area (acres)
1	7-059-900	1650 32nd Street	1.22
2	7-586-2	2601 Peralta Street	1.70
3		Upper Wood Street	5.37
4	7-576-1-11 and -15	2240 Wood Street (West Grand / Campbell)	3.54
5	5-402-4-2, --5-2 and -6; 5-419-1-4; 420-1-3 and -5	Pacific Pipe / American Steel	12.63
6	7-571-3-1	1699 West Grand Avenue	4.75
8	7-562-1; 7-563-1	Roadway Express	4.32
9	5-411-1-4; 5-411-2-5	West Grand Avenue / Market Street	1.89
10	5-422-2-3	2300 Peralta Street (Mandela / Peralta / West Grand)	3.18
11	5-449-1-1	2701 Poplar (Custom Alloy Scrap Sales – CASS)	2.84
12	7-559-1-2; 7-559-4	Half block at Willow / Campbell / 17th Street	0.98
13	7-572-1-1; 7-572-1-2, 7-572-2-1, -2, -4 and -5	1700 Willow (Wood / Willow / W. Grand / 20th Street)	4.77
14	7-570-2	2001 Peralta (portion of block at Campbell / 20th / Peralta)	0.87
15	5-421-2-2; 5-421-3	Triangle – (Mandela / Peralta / 20th Street)	0.81
16	5-399-1-3	North portion of block (Mandela / Peralta / 20th Street)	0.88
17	7-572-2-4	Poplar to Linden, West Grand to 20th Street	13.02
18	7-576-1-12 and -14; 7-575-1, -2-3, -2-5, -4, -3-3; 7-579-4, -1-7, -1-8, -1-10, -2-2; 7-580-3-1, -5, -2-2, -1-1	West Grand to 32nd, Campbell to Wood	17.79
19	5-460-1, -2 and -6-2	Triangle (Peralta / Poplar / 28th Street)	0.76
20	5-423-1-1	Kirkham to Poplar, West Grand to 24th Street	3.48
21	5-441-1 and -2	Triangle - (Peralta / Kirkham / 24th Street)	1.40
22	5-490-13-4; 5-430-17-2	West Grand / Filbert / Myrtle / 24th Street	2.92
23	4-49-1, -2-1, -2, -3 and -4; 4-51-18-2; 4-69-1, -2-1, -2-2, -3 and -4; 4-73-1, -2, -3, -4, -5, -6 and -7; 4-77-3	West Oakland BART Transit Village	9.44
24	18-390-10-7	West Oakland Alliance Development	3.95
25	4-73-10-2; 4-73-9	EPA Site	0.92
26	6-29-3-2; 6-29-4-3	10th to 11th, Pine to Frontage	2.94
27	6-49-25 and -26	9th to 10th, Pine to Frontage	1.62
28	6-47-1	Phoenix Iron Works	5.49
29	6-19-8; 6-19-28-2	7th and Wood	0.42
30	6-19-22	7th and Willow	0.25

31	6-17-17, -18, -19, -20, -21 and -22	7th and Campbell	0.73
32	4-97-13, -14 and -15	7th and Peralta	0.17
33		South half block between Union and Magnolia	0.69
34	1-221-14-1	Brush and Castro	1.36
35	4-3-2	425 Market	2.67
36	5-467-1, -2-1 and -2-3	North portion of block, Filbert / 30th / San Pablo	0.91
37	3-21-10; 3-25-3; 3-25-5-1	San Pablo / W. Grand / 23rd / Brush	

Enhancement Areas

The predominantly residential neighborhoods of West Oakland that lie outside the Opportunity Areas are referred to as “Enhancement Areas” in the Specific Plan. These areas are not in need of transformational change; but rather conservation and enhancement of their existing strengths. Enhancement Areas include residential neighborhoods outside the Opportunity Areas, and many existing commercial and industrial parcels that are already developed with compatible, economically viable and job-generating uses. A key tenet of the Specific Plan is to retain, enhance, and improve these Enhancement Areas.

Background and History

Previous Planning Efforts

West Oakland has been the subject of much study and planning efforts over many decades. Some of these previous planning efforts have resulted in long-lasting and positive outcomes for the community, such as the replacement of the Cypress freeway with the landscaped Mandela Parkway, and the current redevelopment of the historic Southern Pacific depot and surrounding new housing units. Other previously prepared plans have not come to fruition with tangible community improvements as yet, but have been important steps toward creating a consensus of what West Oakland could and should become.

At least thirty six planning documents have been prepared for West Oakland over the past two decades. Several prior documents, in particular, contain strongly articulated, consistent and currently relevant goals for the future development of West Oakland. These previous documents include:

- *West Oakland Visions & Strategies* (1994),
- *Seventh Street/McClymonds Corridor Neighborhood Improvement Initiative* (1999),
- *West Oakland Transit Village Action Report* (2001),
- *Neighborhood Knowledge for Change*, West Oakland Environmental Indicators Project (2002),
- *Redevelopment Plan for the West Oakland Redevelopment Project Area* (2003), and
- *West Oakland 2000*, and
- *Acorn/Prescott Transportation Plan*.

These previous West Oakland plans have been used as a starting point for identifying community goals. The primary goals from these previous documents have been consolidated into general categories pertinent to current West Oakland issues, and carried forward under this current planning effort.

Community Outreach and Public Participation

Steering and Technical Advisory Committees

Development of the West Oakland Specific Plan has benefitted immensely from the guidance of a 14-member Steering Committee comprised of volunteers representing West Oakland community organizations, residential neighborhoods and businesses. The Steering Committee has provided guidance regarding key community issues and concerns, and has made recommendations on strategies and actions that should be considered.

The strategies and actions contained in this Plan have also been vetted through a 21-member Technical Advisory Committee (TAC) made up of public agency representatives and advocacy groups.

Community Workshop Process

The planning process has included a very robust public outreach effort highlighted by five Community Workshops, where ideas were shared with the general public, additional public input and suggestions were solicited, and community consensus achieved through a facilitated public process. Approximately one hundred West Oakland residents and other stakeholders attended each workshop.

The City has hosted the following community workshops to solicit public input toward preparation of the Specific Plan:

- The first workshop was held on Tuesday, September 13, 2011, at the West Oakland Senior Center at 1724 Adeline Street.
- The second workshop was held on Thursday, November 3, 2011, 6:00 - 8:00 p.m., at the West Oakland Senior Center at 1724 Adeline Street.
- The third workshop was held on Tuesday, January 31, 2012, 6:00 - 8:00 p.m., at the West Oakland Senior Center at 1724 Adeline Street.
- The fourth workshop was held on May 5, 2012, 10:00 a.m. - 1:00 p.m., Cypress Mandela Training Center, 2229 Poplar Street.
- The fifth workshop was held on June 12, 2012, 6:00 - 8:00 p.m., at St. Vincent DePaul Community Center, 2272 San Pablo Avenue.

Additional Outreach and Community Involvement

Staff and the consultant team made numerous presentations from fall 2011 to the present to community groups, neighborhood organizations, committees, and also business groups, among others, and received comments that were considered as part of the Plan.

Project Goals and Objectives

CEQA Guidelines Section 15124(b) requires the EIR to describe the basic objectives of the project. These objectives are derived from two primary sources: the grant funding objectives of the US Department of Transportation (US DOT) and the City of Oakland, and the community-based objectives forming the detailed recommendations of the Specific Plan. Those objectives include but are not limited to those listed below.

TIGER Grant Objectives

The City of Oakland received a Transportation Investment Generating Economic Recovery (TIGER) grant from the US Department of Transportation to develop a comprehensive plan for 1,800 acres in two adjacent areas:

At the Oakland Army Base, the grant fund objective is to develop an Infrastructure Master Plan and associated Environmental Impact Report (EIR) to direct needed utility and roadway improvements as a means of facilitating development of the former military property.

Within the adjacent West Oakland Specific Plan area, the grant fund objectives are to prepare a Specific Plan and EIR to guide future development, including:

- developing underutilized and blighted land,
- facilitating development in West Oakland, including identifying strategies for transit-oriented development at the West Oakland BART Station, and
- creating better linkages of transportation choices with new housing and employment options.

Community-Based Goals and Objectives

The comments received at public workshops, other community involvement efforts, and from the Steering Committee have been formulated as goals and objectives of the Specific Plan. These goals and objectives have been identified as the most important issues related to growth, development and change to those participating community members. These goals and objectives have also been vetted through the Technical Advisory Committee. The resulting goals and objectives are the “drivers” of the West Oakland Specific Plan’s detailed recommendations. All of the strategies and implementation actions of the Specific Plan are intended to relate back to the following overall community-based goals and objectives:

- Augment West Oakland’s development capabilities by enhancing the linkages between future Army Base uses and development in West Oakland, focusing on both these areas’ economic synergies as well as physical connections.
- Encourage the growth of additional jobs and services with opportunities and training available to both existing and future residents.
- Determine the most desirable and beneficial land uses for specific areas within West Oakland, recognizing that different areas have differing needs, opportunities and constraints, and assets.
- Attract quality, compatible residential, commercial and industrial development while preserving existing established residential neighborhoods.
- Support existing investment in the area and enhance existing assets.
- Support commercial, mixed-use and transit-oriented land uses in West Oakland, particularly in collaboration with the Bay Area Rapid Transit (BART) District for transit-oriented development at the West Oakland BART Station.
- Lessen existing land use conflicts and ensure avoidance of future conflicts between residential neighborhoods and non-residential uses.

- Enhance transportation resources throughout West Oakland and between West Oakland and adjoining areas.
- Further the physical and economic revitalization of West Oakland.
- Correspond with regional development issues in accordance with the district's Priority Development Area designation through SB 375 and AB 32.
- Minimize the potential for displacement of existing residents as new residents are accommodated.

Project Vision, Plan Framework and Specific Plan Proposals

Development Vision

The "vision" expressed in the proposed West Oakland Specific Plan is to provide a set of comprehensive and multi-faceted strategies for development and redevelopment of vacant and/or underutilized commercial and industrial properties. It establishes a land use and development framework, identifies needed transportation and infrastructure improvements, and recommends implementation strategies needed to develop those parcels. The Plan is also a marketing tool for attracting developers to key sites and for encouraging new, targeted economic development.

With very limited exceptions, the Specific Plan does not change the existing Oakland General Plan land use designations or the applicable zoning throughout West Oakland, and the Plan is intended to generally adhere to the City's Overall Industrial Land Use Policy to retain current industrial zoning districts. As such, the Specific Plan seeks to promote high density development near the West Oakland BART station, consistent with prior planning strategies. It encourages residential and neighborhood-serving commercial establishments on major corridors such as San Pablo Avenue. It seeks to direct industrial and more intensive commercial activities to locations closer to the Port of Oakland and away from residential areas as a means of protecting and enhancing West Oakland's residential neighborhoods. Additionally, the Plan encourages an enhanced multi-modal transportation system to better link residents and businesses.

Plan Framework

Pursuant to state planning law, the components of the Specific Plan include:

- Text and diagrams showing the distribution, location and extent of all land uses;
- Proposed distribution, location, extent and intensity of major components of public and private transportation, sewage, water, drainage, solid waste disposal, energy and other essential facilities needed to support the land uses;
- Standards and guidelines for development, and standards for the conservation, development and utilization of natural resources, where applicable;
- Program of implementation measures including regulations, programs, public works projects and financing measures; and
- A statement of the Specific Plan's relationship to the General Plan.

The Specific Plan seeks to achieve its vision this through a variety of actions, specifically including the creation of distinct land use overlays to provide detailed guidance for future development of key parcels throughout the Specific Plan area.

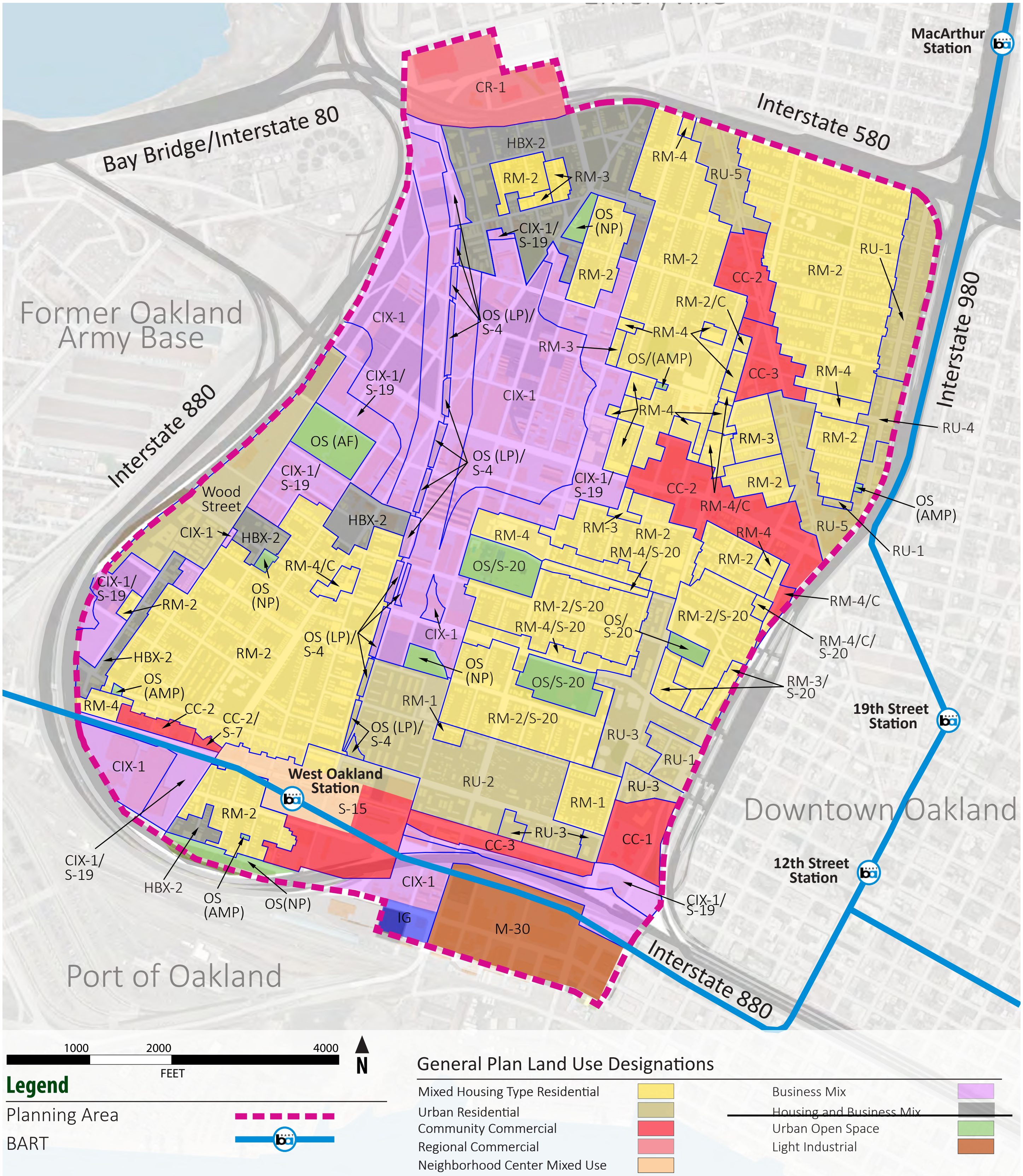
Commercial / Industrial Areas

Much of the non-residential land within the Opportunity Areas identified in the Specific Plan has a current General Plan designation of "Business Mix" as shown in **Figure 3-6**, and is correspondingly zoned as Commercial Industrial Mix (CIX-1) as shown in **Figure 3-7**. These land use and zoning categories are specifically intended to "create, preserve, and enhance the industrial areas of West Oakland that are appropriate for a wide variety of commercial and industrial establishments", and to "accommodate existing industries and provide flexibility to anticipate new technologies". These land uses are also supported by the City of Oakland's Overall Industrial Land Use Policy, which is specifically intended to protect the remaining industrial lands in Oakland, recognizing that industrial land is a scarce resource, and that preservation of industrial land is vital to the future economic growth of the city. However, these current General Plan land use and zoning designations allow such a broad range of allowable uses, building intensities and development characteristics that there is no discernible or specific "vision" of the highest and best land uses for specific areas. This broad range of allowed uses may also raise property owner expectations beyond what the current market can support, thereby discouraging investment and slowing development as owners hold out for higher value projects. Currently, design review is not required in West Oakland's industrial areas, which can lead to new industrial and business development that is not designed to be compatible with its neighbors, particularly when these neighbors are residential areas.

While allowing flexibility, the Specific Plan provides a more specific and definitive land use direction for the business areas of West Oakland, and provides greater clarity and predictability for property owners and developers, neighboring activities, and the community at large. The Specific Plan provides land use policy direction for the Opportunity Areas by identifying a set of new policy-based land use overlays. These land use overlays identify strategically distinct employment uses and building types, reflecting differences in business functions performed, business ages and sizes, and expected amenity levels. These land use overlays supplement, rather than replace the current General Plan and zoning land uses.

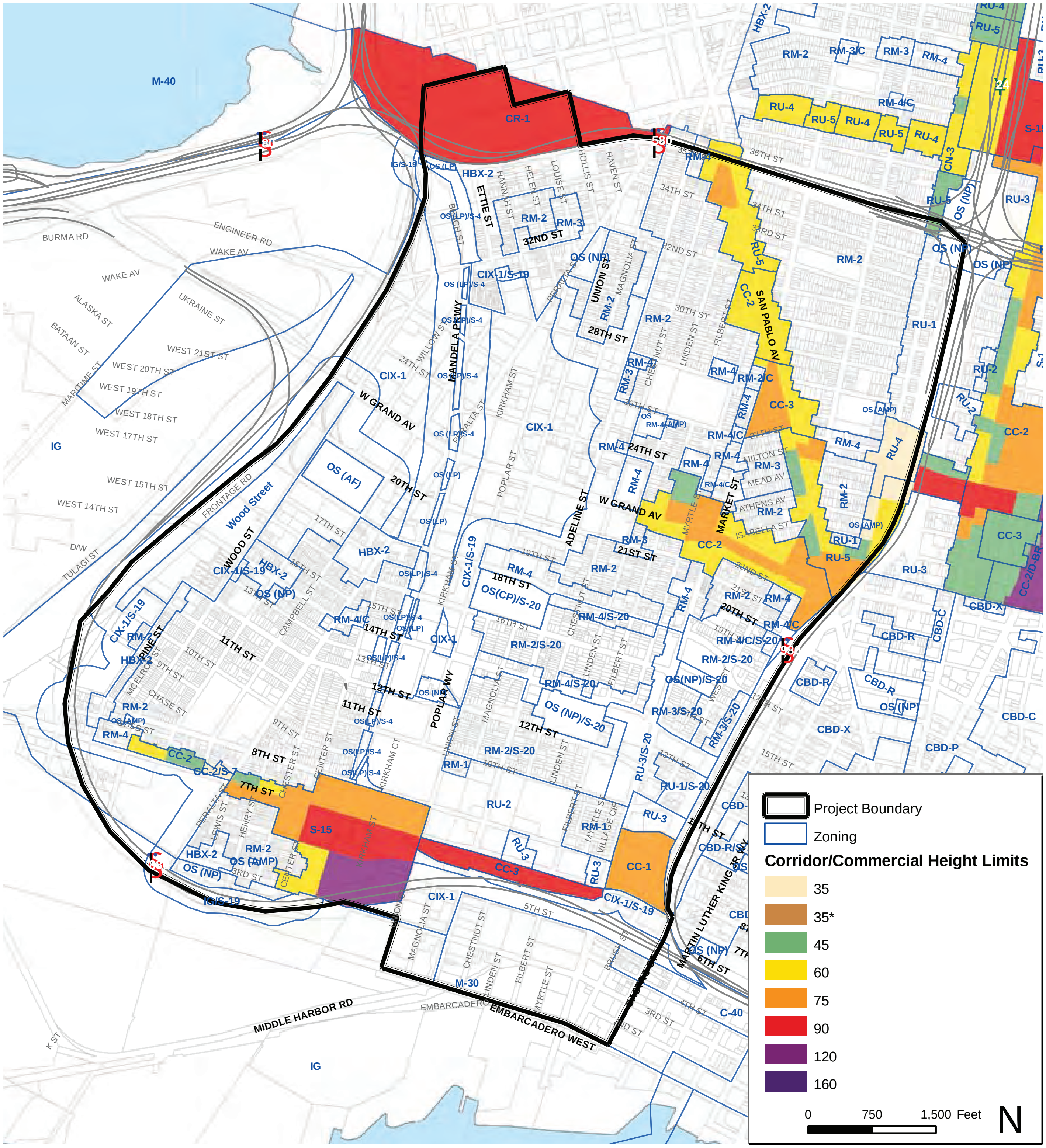
Industrial Land Use Overlays

Most of West Oakland's industrial areas, particularly the areas within the Mandela/Grand and 3rd Street opportunity Areas, are currently zoned Commercial/Industrial Mix (CIX-1). The CIX-1 zone was developed for areas such as West Oakland that are designated Business Mix in the General Plan. The CIX-1 zone is intended to preserve the industrial areas of West Oakland for a wide range of commercial and industrial establishments, accommodating existing older industries and providing flexibility for new technologies. The CIX-1 zone allows a broad range of custom and light manufacturing, light industrial, warehouse, research and development, clean/green industries, and service commercial uses. A conditional use permit is currently required for the establishment or expansion of general manufacturing, construction operations, and automotive repair uses within 300 feet of a residential zone. The CIX-1 zone sets strict limits on recycling and truck-intensive uses. Truck-intensive uses are limited to areas further than 600 feet away from a residential zone and also require a conditional use permit. Large-scale commercial and retail uses are limited to sites with direct access to the regional transportation system. The CIX-1 zone allows work/live uses under special conditions. Residential uses are prohibited in the CIX-1 zone.



Source: City of Oakland General Plan

Figure 3-6
General Plan Land Use Designations, West Oakland



Source: City of Oakland Zoning Map

An important implementation strategy underlying this Specific Plan is the establishment of new overlay zones which provide additional land use regulations applicable to individual areas within the current CIX-1 zone. These overlay zones and additional regulations include the following:

- **Design Review**. City administrative design review procedures are to be required for all new development within the CIX-1 zone. Design review is not currently required for commercial and industrial facilities under existing CIX-1 regulations, but is considered necessary to implement the Design Guidelines included as part of this Plan.
- **Business Enhancement Overlay**. The purpose of the Business Enhancement land use overlay is to facilitate more intensive use of existing buildings and facilities which remain structurally sound and economically viable, thereby lowering vacancies and increasing utilization. The Business Enhancement land use overlay would modify the current CIX-1 zone with the following additional regulatory requirements:
  - Pursuant to the required Design Review procedure (see above), new development projects proposing to demolish an existing non-blighted building within the Business Enhancement overlay would be required to demonstrate that; a) it is economically, functionally, architecturally, or structurally infeasible to reuse the existing structure; b) that the existing structure has no reasonable use or cannot generate a reasonable economic return, and that the development replacing it will provide such use or generate such return; or c) that the existing structure constitutes a hazard and is economically infeasible to rehabilitate on its present site.
  - Further restricting freight/truck terminal, truck yard, and primary waste collection center uses as being not permitted; and
  - Lowering the permitted floor-area ratio (FAR) from the current ratio of 4:1, to a new ratio of 2:1.

  Of the 270 net acres of property currently zoned for businesses and industrial uses, 133 acres (approximately 50%) are proposed under this Specific Plan as having a Business Enhancement land use overlay, suggesting the retention and greater utilization of nearly 5.2 million square feet of existing building space.
- **Low Intensity Business Overlay** .The purpose of the Low Intensity Business land use overlay is to identify those sites within West Oakland's business-oriented Opportunity Areas where new business and light industrial development should occur, generally in similar scale and character as the surrounding industrial and business area. Generally, these sites are vacant or underutilized lots, or properties which contain structures so heavily blighted or compromised as to be a hazard or a detriment to the economic development of surrounding properties. Frequently, these sites also have a legacy of soil and groundwater contamination, in need of clean-up and remediation. The current CIX-1 zoning district permits a wide range of land use types, and conditional use permits are required only for more heavy industrial types of uses, effectively streamlining the permitting process for new economic development activities. The Low Intensity Business land use overlay would modify the current CIX-1 zone by the following regulatory changes:
  - Add the expansion or introduction of new primary truck and freight operations, and recycling and waste operations, to the list of prohibited uses in West Oakland's CIX-1 zone.
  - Lowering the permitted floor-area ratio (FAR) from the current ratio of 4:1, to a new ratio of 2:1.
  - Increasing the area for which a conditional use permit is required prior to establishment or expansion of building materials, auto repair, surface parking, and general manufacturing and construction operations, from 300 feet to 600 feet from any residential zone.

Nearly all of the properties with the Low Intensity Business land use overlay are located either within the Mandela/West Grand and 3rd Street Opportunity Areas, or within a small industrial portion of the 7th Street Opportunity Areas. Of the 270 net acres of property currently zoned for businesses and industrial uses, 48 acres (approximately 18%) are proposed under this Specific Plan as having a CIX Low Intensity overlay, capable of accommodating as much as nearly 1.18 million square feet of new building space.

- **High Intensity Business Overlay**. The purpose of the High Intensity Business land use overlay is to identify appropriate sites where particularly strong locational advantages make possible the attraction of higher intensity commercial and light industrial land uses and development types. This land use overlay specifies preferred locations for more intensively developed (i.e., mid-rise building heights, densely developed, likely served by structured parking) development opportunity sites, more likely to be developed in the mid-term or later. This High Intensity overlay would encourage buildings with more interior improvements and amenities, and more costly structured parking, generally supported by businesses with greater rent-paying abilities. The High Intensity Business land use overlay would modify the current CIX-1 zone with the following additional regulatory requirements:
    - Pursuant to the Design Review requirement for all new projects located in the CIX-1 zoning districts, the design review process would be used to consider the quality of individual site plans and architecture of future high intensity developments.
    - Further restricting freight/truck terminal, truck yard, and primary waste collection center uses as being not permitted; and
    - Adding conditional use permit requirements for a number of currently permitted uses to limit permanent establishment of the types of uses that are not major job producers, which generate substantial truck traffic, and which have the propensity to result in air and noise pollution within the adjacent neighborhoods, and that would preclude the more desired higher intensity uses. Uses not considered appropriate for these High Intensity overlay sites include auto repair and service, gas stations, storage and distribution, outdoor storage, personal and mini-storage, freight terminals, truck yards, truck sales, truck repair, and recycling and collection centers; and
    - Requiring application and approval of a Planned Unit Development (PUD) permit prior to issuance of any building permits for all CIX High Intensity overlay sites of 60,000 square feet or greater.

    Of the 270 net acres of property currently zoned for businesses and industrial uses, 66 acres (approximately 25%) are proposed under this Specific Plan as having a High Intensity Business overlay. These sites are expected to be able to accommodate as much as 4.68 million square feet of new building space.

- **Large Format Retail Overlay**. The Large Format Retail land use overlay is applied to properties in the most northwestern portion of the Mandela/West Grand Opportunity Area. The currently applicable CIX-1 zoning already permits most types of large format retail land uses. However, the list of permitted land uses under the current CIX-1 zone is so large as to permit a wide array of other business and industrial land use types as well. The purpose of the Large Format Retail overlay is limited to providing land use direction as to the desired (or preferred) land use types within this overlay, but does not preclude other permitted CIX-1 land uses, other than as described below.

- The Design Review process should be used to consider the quality of individual buildings and site plans, and the extent to which the design helps to integrate the upper Mandela Parkway area into a cohesive retail environment;
- Further restricting freight/truck terminal, truck yard, and primary waste collection center uses as being not permitted; and
- Adding conditional use permit requirements for a number of currently permitted uses to limit permanent establishment of the types of uses that are not major job producers, which generate substantial truck traffic, and which have the potential to result in air and noise pollution within the adjacent neighborhoods, and that would preclude the more desired large format retail types of uses.

M-30 Rezoning

Situated within the southernmost portion of the Planning Area within the 3rd Street Opportunity Area is approximately 38 acres of properties generally characterized by light industrial uses. These properties are currently zoned M-30, which is an older City zoning designation that was not modified or updated during the City-wide zoning update process.

- The current zoning for this area is Business Mix General Industrial (M-30) whereas the Specific Plan proposes to re-zone this are to Commercial Industrial Mix (CIX-1) with the applicable overlay designations.

IG Rezoning

This site is comprised of two city blocks (approximately 5 acres) bound by 3rd Street to the north, Union Street to the west, existing rail right-of-way to the south, and Adeline Street to the east.

- The current General Plan land use designation for this area is General Industry/Transportation (a zoning district typically associated with the Port and its operations) The Specific Plan proposes to amend the General Plan to change this site's land use designation to Business Mix.
- The current zoning for this area is General Industrial (IG) whereas the Specific Plan proposes to re-zone this area to Commercial Industrial Mix (CIX-1).

  The rezoning for this area would retain all of the original CIX-1 zoning districts' permitted and conditionally permitted land uses on those properties within the 3rd Street Opportunity Area so as not to restrict freight/truck terminals, truck yards, and primary waste collection centers.

Business Industrial Areas

The Specific Plan recognize the business and industrial nature of those properties at the most northerly end of Mandela Parkway by recommending changes to the General Plan land use designations and zoning for these sites.

- **Site B: Northeast Mandela** Situated within the northern half of the Mandela Grand Opportunity Area are three sites located along Mandela Parkway that are bound by the above-grade MacArthur Freeway (580) right-of-way to the north, Mandela Parkway to the west, 34th Street to the south, and a portion of Ettie Street to the east (Site B). The proposed General Plan and Zoning amendments to this site are influenced by an S-19 zoning overlay that creates a 300 foot buffer to separate the Commercial Industrial Mix (CIX-1) zone from the Mixed Housing Type Residential (RM-2) Zone.

- The current General Plan land use designation for this site is Housing and Business Mix, whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Business Mix.
- The current zoning for this area is Housing and Business Mix (HBX-2), whereas the Specific Plan proposes to re-zone this are to Commercial Industrial Mix, with a Health and Safety Protection Overlay Zone (CIX-1/S-19).

- **Site C: Northeast Mandela Parkway**. Situated within the northern half of the Mandela/ Grand Opportunity Area are three sites located along the Mandela Parkway. Site C is the largest of the three sites and its geography is defined by two sections connected by a narrow stretch of right-of-way along Mandela Parkway. The northern section of Site C is bound by the above-grade MacArthur Freeway (580) right-of-way to the north, existing above-grade Cypress Freeway right-of-way to the west, 34th Street to the south and Mandela Parkway to the east. The southern section of Site C is bound by 34th Street to the north, Beach Street to the west, 32nd Street to the south, and Mandela Parkway to the east. Both of these sections of Site C are currently vacant land, with the southern section including all of Beach Street's right-of-way within the site.
    - The current zoning for this area is Open Space/Linear Park (OS (LP)/S-4), whereas the Specific Plan proposes to re-zone this are to Commercial Industrial Mix (CIX-1).
- **Site U (southern edge of Interstate 880)**. Located along the southern edge of Interstate 880 is a narrow stretch of land that, while physically situated south of the Interstate 880 right-of-way, contains the same zoning and General Plan land use designation as parcels located north of the Interstate 880 right-of-way. Bringing the zoning and General Plan land use designation of Site U into conformity with the existing zoning and land use (Commercial Industrial) could allow for additional development on the site.
    - The current General Plan land use designation for this site is Community Commercial whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Business Mix.
    - The current zoning for this area is Transit Oriented Development (S-15) whereas the Specific Plan proposes to re-zone this are to Commercial Industrial Mix (CIX-1).

Housing and Business Mix

To clarify the boundaries between the 'Business Mix' and the 'Housing and Business Mix' land use designations throughout the Planning Area, the Specific Plan seeks to establish a better defined boundary between these two land use designations.

- **Site A: Northeast Mandela**. Situated within the northern half of the Mandela/ Grand Opportunity Area are three sites located along Mandela Parkway. Site A is a linear stretch of land located within a single parcel, along the eastern edge of Mandela Parkway. This parcel, currently a surface parking lot, exists as the remnants of the former Cypress Freeway right-of-way. The site is bound by 34th Street to the north, Mandela Parkway to the west, and 32nd Street to the south.
    - The current General Plan land use designation for this site is Business Mix whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Housing and Business Mix.
    - The current zoning for this area is Open Space/Linear Park (OS (LP)/S-4), whereas the Specific Plan proposes to re-zone this are to Housing and Business Mix (HBX-2).

Emphasizing Commercial Use along Important Corridors

To better emphasize the desired commercial nature of the Planning Area's important commercial corridors, a number of General Plan and zoning changes are recommended to better signify the retail focus of these corridors and emphasizes the commercial nature of future development to a greater extent.

- **San Pablo Avenue at 28th Street Site**. Located along the San Pablo Avenue Corridor, this site is in an area generally characterized by commercial uses, with a mixture of vacant lots and single story structures that are primarily neighborhood-serving retail. Site H is bound by the intersection of 30th Street, San Pablo Avenue, and Market Street to the north, Market Street to the west, 27th Street to the south, and San Pablo Avenue to the east.
  - The current zoning for this site is Community Commercial (CC-3) whereas the Specific Plan proposes to re-zone this site to Community Commercial (CC-2).
- **Site I: West Grand at San Pablo**. Site I is a triangle-shaped area bound by San Pablo Avenue to the east, West Street to the north, 23rd Street to the west, and Brush Street to the south, and is located approximately one block east of West Grand Avenue. While there are several existing structures on a handful of the parcels, there are also underutilized parcels (a few of which are vacant, underdeveloped parcels) scattered throughout the site. The most notable underutilized parcel is situated at the prominent southeast corner of the site facing San Pablo Avenue, Brush Street, and 23rd Street.
  - The current General Plan land use designation for this site is Urban Residential whereas the Specific Plan proposes to amend the General Plan to change a portion of the site's land use designation to Community Commercial, similar to the General Plan land use designation on the west side of 23rd Street towards West Grand Avenue. The proposed change in General Plan land use designation is targeted at the underutilized parcel located at the southeast corner of the site, facing San Pablo Avenue, Brush Street, and 23rd Street.
  - The current zoning for this site is Urban Residential (RU-5) whereas the Specific Plan proposes to re-zone this site to Community Commercial (CC-2).
- **Site O: San Pablo at West Grand Avenue**. Situated within the eastern edge of the Plan Area is the rectangle-shaped Site O, located south of the intersection of San Pablo Avenue at West Grand Avenue. This area is characterized by a mixture of residential, commercial, and light industrial type land uses, bound by 22nd Street to the north, West Street to the west, 20th Street to the south, and Brush Street to the east.
  - The current General Plan land use designation for this site is Mixed Housing Type Residential whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Community Commercial.
  - The current zoning for this area is Mixed Housing Type Residential with a Commercial overlay (RM-4/C), whereas the Specific Plan proposes to re-zone this are to Community Commercial (CC-2).
- **Site P: Small Triangle Site**. Situated along within the eastern edge of the Plan Area is the very small, triangle-shaped Site P, located south of the intersection of San Pablo Avenue at West Grand Avenue. This site is currently vacant land and is bound by 20th Street to the north, Brush Street to the west, approximately 19th Street to the south and the 18th Street off-ramp (Interstate 980) to the east.

  - The current General Plan land use designation for this site is Community Commercial whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Mixed-Housing Type Residential.
  - The current zoning for this area is Community Commercial (CC-2), whereas the Specific Plan proposes to re-zone this are to Mixed-Housing Type Residential with both a Commercial and Historic Preservation District Overlay (RM-4/C/S-20).
- **Site S: 7th Street**. Positioned within the 7th Street Opportunity Area are three large blocks that line the southern edge of 7th Street. These blocks constitute Site S, and are bound by 7th Street to the north, Chester Street to the west, 5th Street to the south, and Kirkham Street to the east. Currently, all three blocks serve as surface parking lots while the West Oakland BART station itself is situated within the center of the middle block.
  - The current General Plan land use designation for this site is Neighborhood Center Mixed Use whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Community Commercial.
- **Site T (7th Street within the 3rd Street Opportunity Area)** .Situated within the northern portion of the 3rd Street Opportunity Area and the eastern portion of the 7th Street Opportunity Area is a linear stretch of land located just north of Interstate 880. Site T is comprised of multiple parcels and is generally bound by 7th Street to the north, Union Street to the west, Interstate 880 to the south, and Interstate 980 to the east. The land use characteristics for this area are generally light industrial.
  - The current General Plan land use designation for this site is Business Mix whereas the Specific Plan proposes d to amend the General Plan to change the site's land use designation to Community Commercial.
  - The current zoning for this area is Commercial Industrial Mix with a Health and Safety Overlay Zone (CIX-1/S-19), whereas the Specific Plan proposes d to re-zone this area to Community Commercial (CC-3).

Residential Mix Areas

Much of the residential land within the Specific Plan's Opportunity Areas has a current General Plan land use designation of "Mixed Housing Type Residential" (as also shown in Figure 3-6, and is correspondingly zoned either Mixed Housing Type Residential (RM), or Housing Business Mix (HBX), as seen on Figure 3-7. These General Plan and zoning categories are primarily used in the older established neighborhoods of Oakland with a mix of single-family, townhomes and small, multi-unit buildings along with small-scale, neighborhood-serving businesses. Existing policies and regulations are specifically intended to create, maintain and enhance these residential areas.

The area surrounding the West Oakland BART station is zoned Transit Oriented Development (S-15). Existing policies and regulations applicable to this area are intended to create, preserve and enhance areas served by multiple nodes of transportation and to feature high-density residential, commercial, and mixed-use developments to encourage concentrated development. It encourages a pedestrian environment near the transit station with a mixture of residential, civic, commercial and light industrial activities, and amenities.

The Specific Plan retains the existing General Plan and zoning designations for these mixed residential areas, but supplements them with a more specific mixed-use development program for specific sites. It also proposes to allow limited and carefully selected industrial sites to be converted to new residential development. Criteria by which such residential infill may be allowed include sites within already established residential patterns, sites with established buffers between less compatible industrial neighbors, and sites with immediate proximity to parks and other residential amenities.

General Plan Amendments and/or Re-Zonings

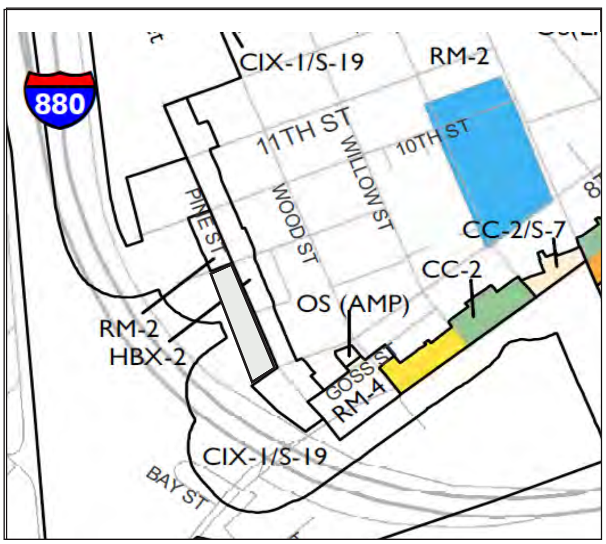
Implementation of this Specific Plan includes amending the General Plan land use designation, and changing the zoning designation of several specific sites. Implementation of these land use and zoning changes would result in changing the allowed character of development at these sites. Each of these proposed General Plan and zoning changes will help to establish more identifiable borders between the established residential neighborhoods, and the industrial and intensive commercial business areas; prevent new land use incompatibilities that might adversely affect existing neighborhoods; and restore neighborhoods at the residential/ industrial interface. These sites are described below and are illustrated in

- **Phoenix Iron Works Site** (Opportunity Site #28). This approximately 5.5-acre site is located in Opportunity Area #2 on the west side of Pine Street between Shorey Street and 9th Street. The current use on this site consists of storage of large pipes. This site was acquired through eminent domain by the State transportation agency upon the re-routing of the Cypress Freeway, now I-880. It is a long-vacant property, due to the extent of its contamination from a prior heavy industrial use and State ownership complications and is owned by the California Department of Transportation. To the north, Pine Street between 9th Street and 10th Street contains low density residential uses as well as commercial and industrial facilities; to the south are a single family home and a church; and immediately across Pine Street to the east is a low density historic residential neighborhood ("Oakland Point"/ Prescott).
    - The current General Plan land use designation for this site is Business Mix, whereas the Specific Plan proposes to amend the General Plan to change the land use designation of the portion of this site fronting onto Pine Street to Housing and Business Mix, similar to the General Plan land use designations across Pine Street to the east.
    - The current zoning for this site is Commercial/Industrial Mix (CIX-1), whereas the Specific Plan proposes to re-zone the portion of this site fronting onto Pine Street Housing/Business Mix (HBX-2).

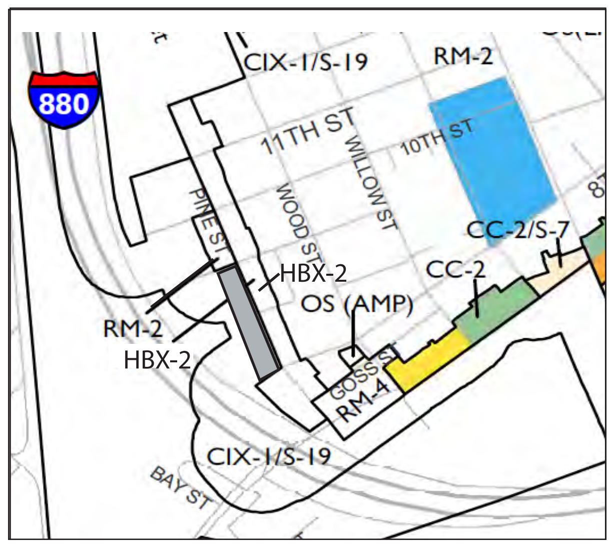
    Implementation of this General Plan amendment and re-zoning would enable commercial light industrial and/or residential mixed-use along the Pine Street frontage, similar in density and massing to surrounding residences, with new low intensity business and light industrial uses behind as a buffer from the I-880 freeway, providing direct egress to Frontage Road for such businesses (see **Figure 3-8**).
- **Roadway Site** (Opportunity Sites #6, #8 and #12). This site consists of four acres (two blocks) bounded by 17th Street, 18th Street, Wood Street and Campbell Street, the adjacent south block face on 17th Street between Willow Street and Campbell Street, and each of the blocks along Wood Street between Raimondi Park and 15th Street (see **Figure 3-9**). The site is located immediately south of Raimondi Park and east of the historic Southern Pacific Railroad Station. The site currently contains a trans-loading facility for trucking, warehouses and truck parking. To the east is a mixed residential and industrial area, and to the south and north (across the Park) are continuing industrial uses and the residential Prescott/Oakland Point neighborhood extending to 7th Street.

Existing General Plan Land Use Designation -
Business Mix

Proposed General Plan Amendment to
Housing andBusiness Mix

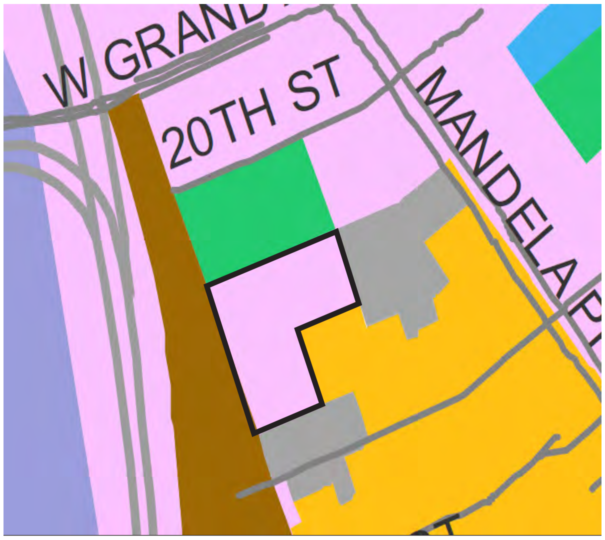


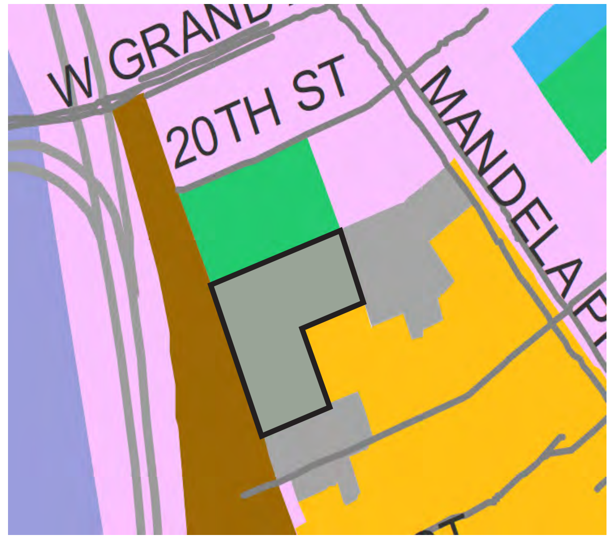
Existing Zoning, CIX-1/S-19



Proposed Re-Zone to HBX-2

Figure 3-8
Proposed General Plan Amendment and Re-Zoning, Phoenix Iron Works Site (Opportunity Site 28)





Existing General Plan Land Use Designation - Mixed Housing Type Residential

Proposed General Plan Amendment to Housing and Business Mix

Existing Zoning, CIX-1/S-19

Proposed Re-Zone to HBX-2

Figure 3-9
Proposed General Plan Amendment and Re-Zoning, Roadway Site (Opportunity Sites 8 and 12)

  - The current General Plan land use designation for this site is Mixed Housing Type, (although also shown as Business Mix on the General Plan land Use Diagram), whereas the Specific Plan proposes to amend the General Plan to change its land use designation to Housing and Business Mix, similar to the General Plan land use designations to the east along 17th and 18th Street.
  - The current zoning for this site is Commercial/Industrial Mix (CIX-1), whereas the Specific Plan proposes to re-zone this site to Housing/Business Mix (HBX-2).

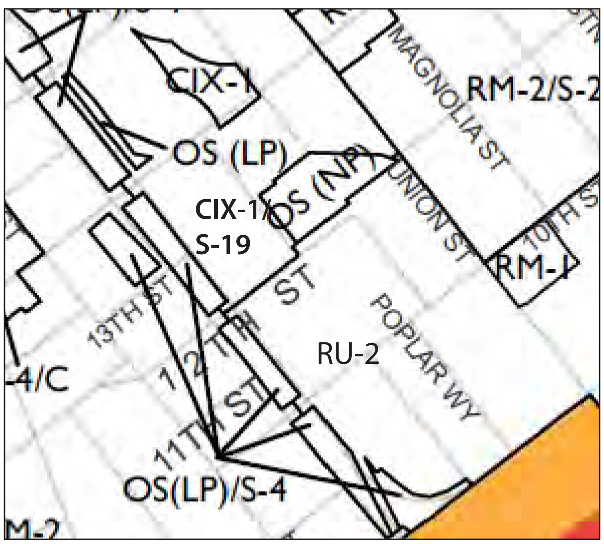
    Implementation of this General Plan amendment and re-zoning would enable new compatible commercial development on a campus-like scale invigorating the area with daytime weekday as well as weekend activity, and or mixed use with upper story residential and live/work infill compatible in scale with adjacent residential uses and fronting onto Raimondi Park. Commercial uses would spur on additional Wood Street entitled development, while residential and live/work use would be consistent with the adjacent residential neighborhood to the east, Raimondi Park adjacent to the north, and the Wood Street Project and historic Southern Pacific Railroad Station to the west (see **Figure 3-9**).

- **Coca Cola Bottling/Mayway Site** (Opportunity Site #38). This site is located at the northeast corner of the Mandela Parkway/12th Street intersection. The northerly portion of the site currently contains a medicinal herb international wholesale business (offices, test kitchen and warehouse) with ancillary truck parking. The site is immediately south of an 8-acre former dairy production site, now newly re-constructed and occupied by 8-10 commercial-industrial businesses. It is next to a recycler and major food production company (historic Nabisco plant) and across Mandela from the Oakland Fire Station 3 and small local commercial enterprises. The site is located immediately west of Wade Johnson Park and north of the Oakland Housing Authority's Peralta Villa residential neighborhood, which occupies the blocks from 12th Street to 8th Street and Mandela Parkway to Poplar Street.
  - The current General Plan land use designation for this site is Business Mix, whereas the Specific Plan proposes to amend the General Plan to change its land use designation to Housing and Business Mix.
  - The current zoning for this site is Commercial/Industrial Mix (CIX-1), whereas the Specific Plan proposes to re-zone this site to Housing/Business Mix (HBX-2). Implementation of this General Plan amendment and re-zoning would enable reuse of the site for new residences and live/work units, compatible with the adjacent residential uses to the south and the public park to the west (see **Figure 3-10**).

- **Prescott-Oakland Point Neighborhood**. Located within the southwestern corner of the Prescott-Oakland Point Neighborhood is Site N, a site bound by 12th Street to the north, Pine Street to the west, 11th Street to the south, and Wood Street to east.
  - The current General Plan land use designation for this site is Business Mix, whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Mixed Housing Type Residential.
  - The current zoning for this area is Mixed Housing Type Residential (RM-2), whereas the Specific Plan proposes to re-zone this area to Housing and Business Mix (HBX-2).

Existing General Plan Land Use Designation - Business Mix

Proposed General Plan Amendment to Housing and Business Mix



Existing Zoning, CIX-1/S-19

Proposed Re-zone to HBX-2

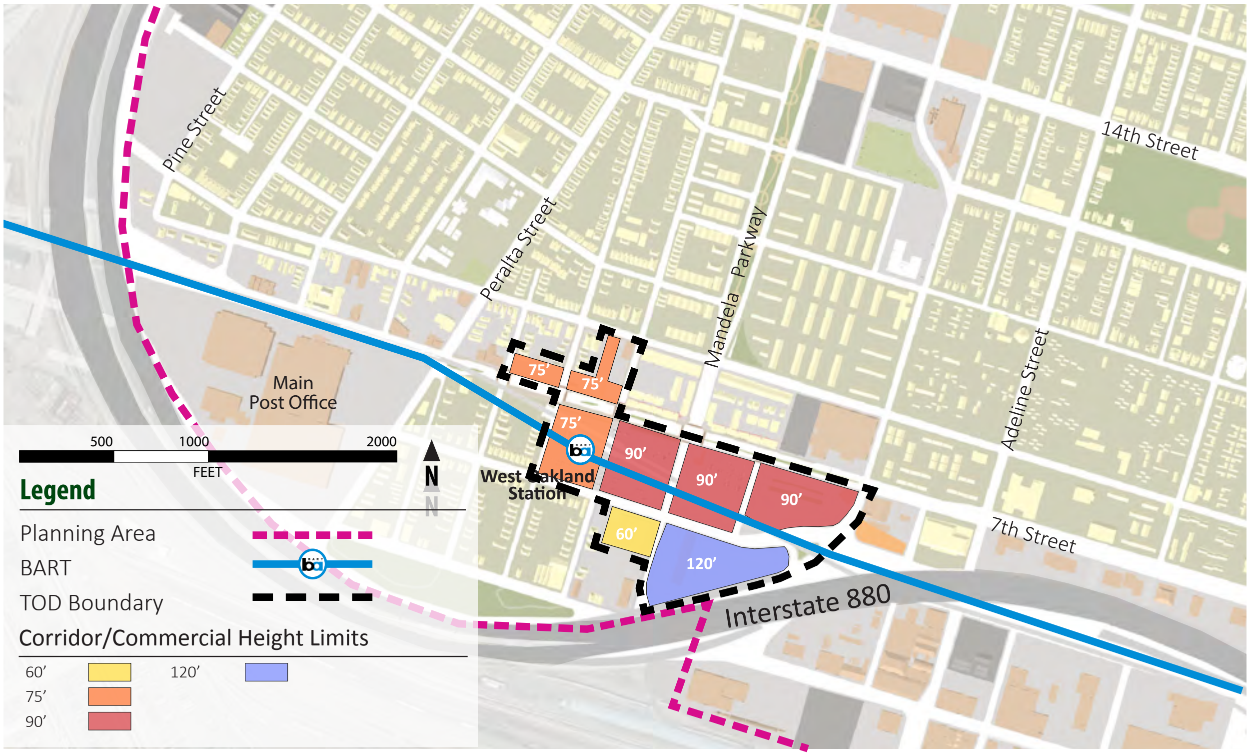
Figure 3-10
Proposed General Plan Amendment and Re-Zoning, Coca Cola Bottling/Mayway Site

- **Ettie Street**. Situated within the northern-half of the Mandela Grand Opportunity Area are Sites F and G. Site F is bound by 32nd Street to the north, Ettie Street to the west, 28th Street to the south, and Hannah Street to the east. Site G is a triangular site bound generally by 32nd Street to the north, Hannah Street to the west, and Peralta Street to the east. The existing land use characteristics are a mix of residential and light industrial use.
  - The current General Plan land use designation for both Sites is Business Mix, whereas the Specific Plan proposes to amend the General Plan to change these sites' land use designation to Housing and Business Mix.
  - The current zoning for Site F is Commercial Industrial Mix (CIX-1), whereas the Specific Plan proposes to re-zone the entire site to Housing and Business Mix (HBX-2). Site G is already comparably zoned HBX-2.
- **Chestnut/Adeline**. Located just outside the southeastern edge of the Mandela/ Grand Opportunity Area are two city blocks bound by 26th Street to the north, Adeline Street to the west, West Grand Avenue to the south, and Chestnut Street to the east. The area to the east of Chestnut Street is characterized by residential land uses, whereas the area to the west of Adeline Street is characterized by a mixture of housing and business uses.
  - The current General Plan land use designation for Site K is Business Mix, whereas the Specific Plan proposes to amend the General Plan to change this site's land use designation to Housing and Business Mix.

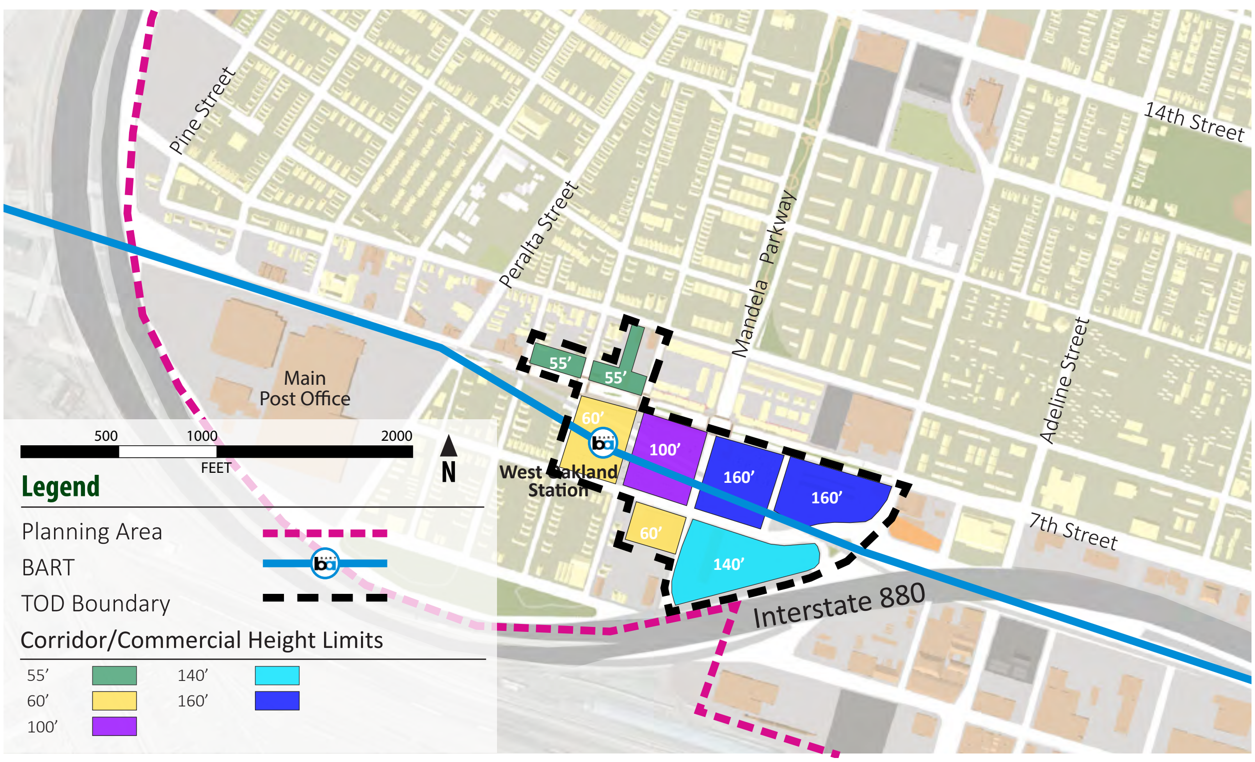
    The current zoning for Site K is Commercial Industrial Mix, with a Health and Safety Protection Overlay Zone (CIX-1/S-19), whereas the Specific Plan proposes to re-zone this are to Housing and Business Mix (HBX-2).
- **Chestnut/Adeline and Ettie Street Safety Buffer**. Site J is an area where the S-19 overlay zone needs to be added to reflect the required 300 foot Health and Safety Protection buffer from the adjacent new HBX zone at Sites F, G and K.
  - The current zoning for this area is Commercial Industrial Mix, whereas the Specific Plan proposes to re-zone this are to Commercial Industrial Mix, with a Health and Safety Protection Overlay Zone (CIX-1/S-19).

West Oakland TOD Zoning Change

Implementation of this Specific Plan includes amending Commercial Corridor Height Limits established under current zoning regulations that are specifically applicable to the S-15 West Oakland BART Station TOD zone. To make full use of the opportunity presented by the West Oakland BART Station TOD (which is uniquely served transit) to create a vibrant higher density mixed-use transit village, implementation of this Specific Plan includes an increase in the maximum allowed building height from the existing height limits of 120 feet (which is currently applicable to parcels adjacent to the I-880 freeway) to allow building heights of up to 160 feet along 7th Street and east of Union Street, 140 feet along 7th Street and east of Union Street, and 140 feet on those parcels adjacent to the I-880 freeway. The Plan would also provide a more effective and substantial transition in building heights nearest to the South Prescott neighborhood, with buildings nearest to this neighborhood as low as 2-stories (see **Figure 3-11**).



Existing Zoning, Maximum Building Heights



Proposed Maximum Building Heights

Figure 3-11
Proposed Zoning Height Limit Change, West Oakland BART Station TOD (Opportunity Sites 23, 24 and 25)

No changes are proposed to the maximum allowed building heights elsewhere in the Planning Area.

Urban Open Spaces

There are a number of City-owned open space parcels within the Planning Area that currently have General Plan land use designations and/or zoning that does not accurately reflect the open space use and intention for these properties, as described below:

- **Site D: Union Plaza Park and Fitzgerald Park**. Located within the Clawson Neighborhood near the northern edge of the Mandela Grand Opportunity Area are two triangle-shaped parcels situated where two street grids intersect. These two Site D parcels, which anchor the middle of the intersection of 34th Street, Peralta Street, and Haven Street, currently function as two neighborhood-serving parks (Union Plaza Park and Fitzgerald Park).
  - The current General Plan land use designation for these two parcels is Housing and Business Mix whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Urban Open Space.
  - The current zoning for these two parcels is Housing and Business Mix (HBX-2), whereas the Specific Plan proposes to re-zone the parcels as Open Space/Active Mini-Park (OS/AMP).
- **Site E: St. Andrews Plaza**. Situated within the northern half of the San Pablo Opportunity Area is a triangle-shaped parcel situated where two street grids intersect. The Site E parcel is located along San Pablo Avenue, where 32nd Street and Filbert Street meet, and currently functions as neighborhood-serving mini-park.
  - The current General Plan land use designation for this parcel is Urban Residential whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Urban Open Space.
  - The current zoning for this parcel is Urban Residential (RU-5), whereas the Specific Plan proposes to re-zone this parcel as Open Space/Active Mini-Park (OS/AMP).
- **Site L: West Grand Avenue at San Pablo Avenue Mini-Park Site.** This mini-park is located on a small, triangle-shaped site bound by San Pablo Avenue to the east, West Street to Brush Street to the west, and West Grand Avenue to the south.
  - The current General Plan land use designation for this site is Community Commercial whereas the Specific Plan proposes to amend the General Plan to change the site's land use designation to Urban Open Space.
  - The current zoning for this site is Community Commercial (CC-2), whereas the Specific Plan proposes to re-zone this area to Open Space/Active Mini-Park (OS-AMP).

Specific Plan Land Use and Development Proposal

The Specific Plan's land use and development proposals (reflecting the proposed physical changes to the environment) are organized and divided into specific proposals for each of the Opportunity Areas as indicated in the Plan. Further, within each Opportunity Area the Specific Plan highlights detailed plans and proposals for each of the individual Opportunity Sites contained within the respective Opportunity Areas.

Opportunity Area 1: Mandela/West Grand

The Mandela/West Grand Opportunity Area is envisioned as continuing to be the major business and employment center for West Oakland and the region. This Specific Plan encourages a mix of business activities and development types, with a range of jobs at varying skill and education levels. The intent of this Plan is to retain and expand existing commercial and compatible urban manufacturing, construction and light industrial businesses that have well-paid blue collar and green collar jobs, while attracting new industries such as the life sciences, information technology and clean-tech businesses previously described in Chapter 6 of this Plan. Development would likely initially occur as lower-intensity development and with reuse of existing buildings and then evolving into higher intensity business development over time.

The vision for the Mandela/West Grand Opportunity Area takes advantage of the anticipated relocation of current recycling activities to the former Oakland Army Base. The Plan also encourages relocation of other recycling operations, heavy truck-dependent uses and other older heavy industries. The resulting greater land availability and other improvements should attract more low-intensity light industrial and business mix development and eventually new mid-rise, more intense development.

In the mid-term, improvements to the area should encourage and attract a mix of business development, laying the groundwork for potential future higher intensity business and institutional type development. Growth is eventually expected to include new R&D and life sciences uses in mid-rise development sites at key locations such as at the intersection of Mandela Parkway and West Grand Avenue, and larger format destination retail stores as an extension of the cluster of East Bay Bridge Shopping Center, IKEA and Bay Street Emeryville.

The Specific Plan also recommends that new residential and live/work development be allowed at selected sites in the Mandela/West Grand Opportunity Area adjacent to existing residential areas and open space resources such as Raimondi Park and Wade Johnson Park, where there are established buffers between these sites and less compatible industrial and business uses.

Conceptual, schematic plans are provided on **Figures 3-12, 3-13, 3-14 and 3-15** for each of the four separate subareas within this Opportunity Area, illustrating preferred densities, building massing and other physical characteristics of prospective developments. **Table 3-2** provides a summary of changes in land use, employment and population expected within the Mandela/West Grand Opportunity Area.

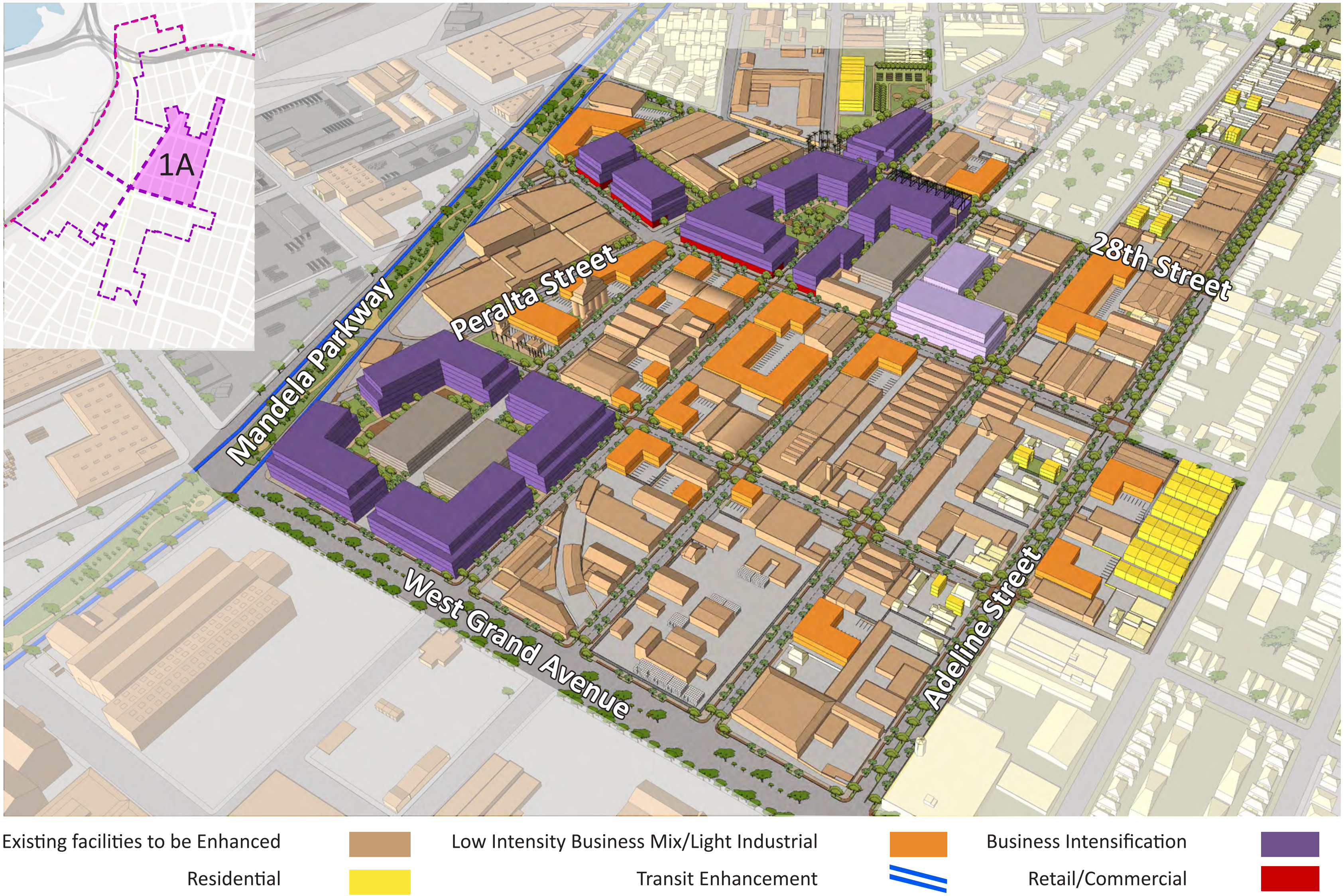


Figure 3-12
Future Development Scenario, Mandela / West Grand Avenue
Opportunity Area 1A - Northeast

Source: JRDV Intnl.

Figure 3-13
Future Development Scenario, Mandela / West Grand Avenue
Opportunity Area 1B - Southeast

Source: JRDV Intnl.

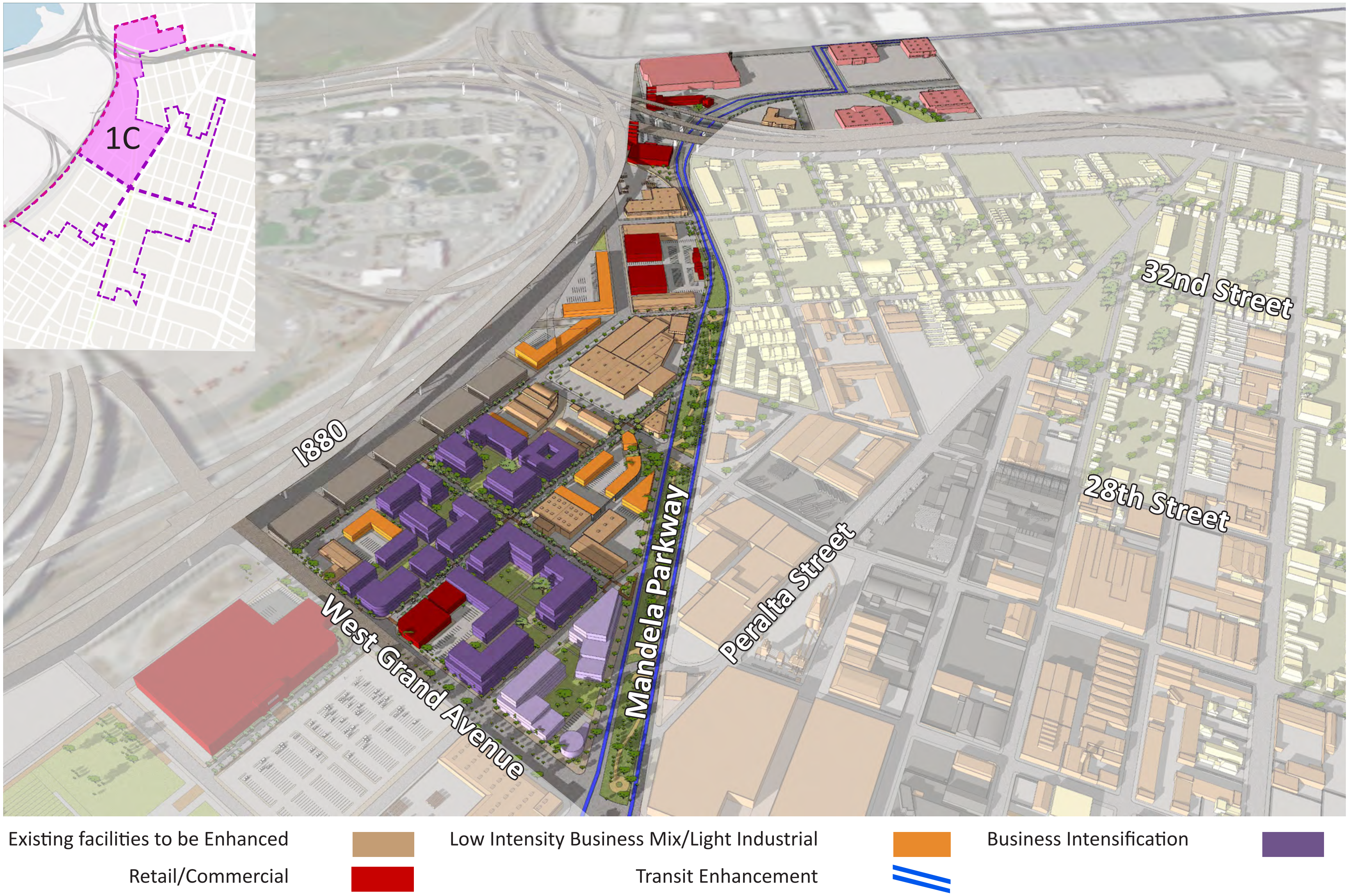


Figure 3-14
Future Development Scenario, Mandela / West Grand Avenue
Opportunity Area 1C - Northwest

Source: JRDV Intnl.

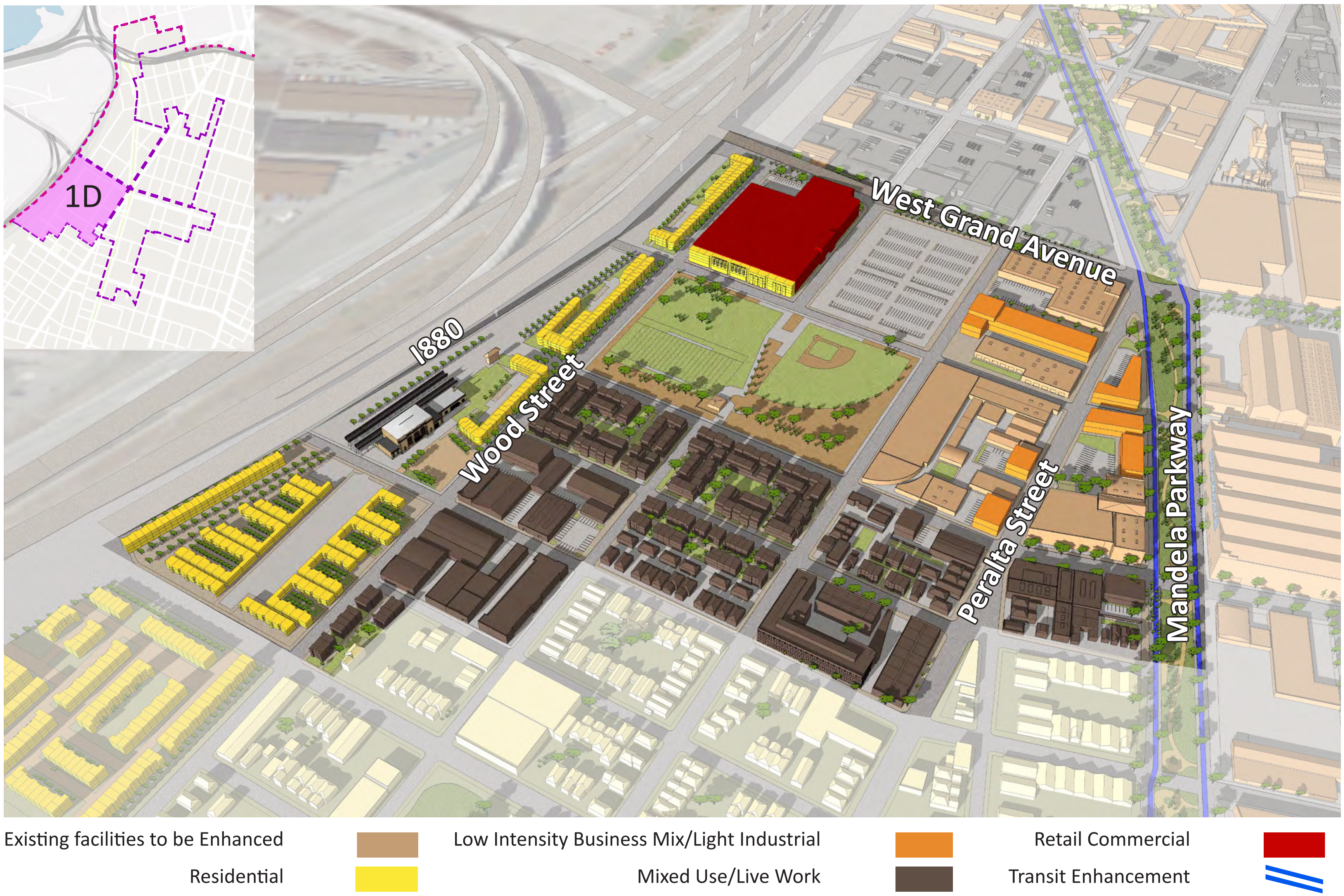


Figure 3-15
Future Development Scenario, Mandela / West Grand Avenue
Opportunity Area 1D - Southwest

Source: JRDV Intnl.

Table 3-2: Development Buildout Assumptions, Mandela/West Grand Opportunity Area

	Land Area (net acres)	Building Area (sq. ft.)	Jobs	Housing Units	Pop.
Industrial/Business					
Existing	175	4,000,000	4,940		
Buildout Assumptions					
Vacant Lots, Surface Parking, Blighted & Underutilized Buildings, and Businesses Choosing to Relocate	-104	-1,700,000	-570		
Existing Industrial and Business Buildings More Intensively Used	71	2,300,000	4,370		
New Low-Intensity (Low-Rise) Industrial and Business Space	+29	+640,000	+1,410		
New High-Intensity (Mid-Rise) Buildings	+55	+4,080,000	+9,600		
Buildout, Total	155	7,020,000	15,380		
Net Change	**-20**	**+3,020,000**	**+10,440**		
Commercial/Retail					
Existing	22	300,000	500		
Buildout Assumptions					
Existing Retail, retained	22	300,000	500		
New Commercial/Retail	+14	+305,000	+670		
Buildout, Total	36	605,000	1,170		
Net Change	**+14**	**+305,000**	**+670**		
Residential					
Existing	19			110	259
Buildout Assumptions					
New Residential Conversions	+6			+359	718
Infill and Approved Single-Family and Townhome				+90	180
Infill and Approved Multi-Family				+731	1,465
Buildout, Total	25			1,290	2,622
Net Change	**+6**			**+1,180**	**+2,362**
Open Space	27				
Existing	**243**	**4,300,000**	**5,440**	**110**	**259**
Total	**243**	**7,625,000**	**16,550**	**1,290**	**2,622**
Net Change	**0**	**+3,325,000**	**+11,110**	**+1,180**	**+2,362**

Opportunity Area 2: 7th Street

The vision for the 7th Street Opportunity Area includes transit-oriented development (TOD) on vacant sites and parking lots around the West Oakland BART Station. A new BART parking garage is envisioned next to the freeway. The parking garage would act as a buffer for residential uses planned near the freeway. Plazas and open spaces would contribute to a secure and pleasant pedestrian experience. This EIR provides an analysis of two different design options for buildout of the West Oakland BART station TOD:

- Under the first option, the TOD would be primarily high-density residential development above mostly ground-floor neighborhood-serving retail and custom manufacturing /industrial arts/ artist exhibition space. This option would provide for development of approximately 2,300 new dwelling units and approximately 85,000 square feet of non-residential ground floor building space.
- Under the second option, the TOD would include higher-density housing, but also commercial office and government/institutional office space around the core of the BART Station and atop the new parking garage. This option would provide for development of 1,325 new dwelling units and approximately 675,000 square feet of new commercial building space. The analysis of this option is presented in the Commercial/Jobs Focused Alternative (see Chapter 5).

Medium density, podium-style housing with ground floor commercial uses is recommended further west on 7th Street, as a transition from the West Oakland BART Station TOD to the surrounding lower-density neighborhoods.

7th Street is envisioned as the neighborhood focus, with neighborhood-serving commercial establishments. The Plan prioritizes commercial uses that enliven the street and can help to revitalize 7th Street as a celebration of West Oakland's cultural history of music, art and entertainment.

Building design, construction, and ongoing operation and maintenance requirements will address the issues of air contaminants and noise from the freeway, and noise from BART trains. The land use and development strategy for the 7th Street Opportunity Area includes transit-oriented development (TOD) of higher-density housing with ground floor neighborhood-serving retail on vacant sites and current surface parking lots around the West Oakland BART Station. A new BART parking garage is envisioned next to the freeway to replace existing surface parking lost due to new development, which would also serve to buffer new residential uses from the adjacent freeway.

Building design, construction, and ongoing operation and maintenance requirements address the issues of air contaminants and noise from the freeway, and noise from BART trains. Strategies are included in the Plan for reducing BART train noise through improved maintenance and potential noise barriers. Environmental improvements are also envisioned with remediation of known contaminated sites in this area, potentially including innovative biological remediation strategies.

Conceptual, schematic plans are provided on **Figures 3-16 and 3-17** for each of the three separate subareas within the 7th Street Opportunity Area, illustrating preferred densities, building massing and other physical characteristics of prospective developments. **Table 3-3** provides a summary of changes in land use, employment and population expected within the 7th Street Opportunity Area.

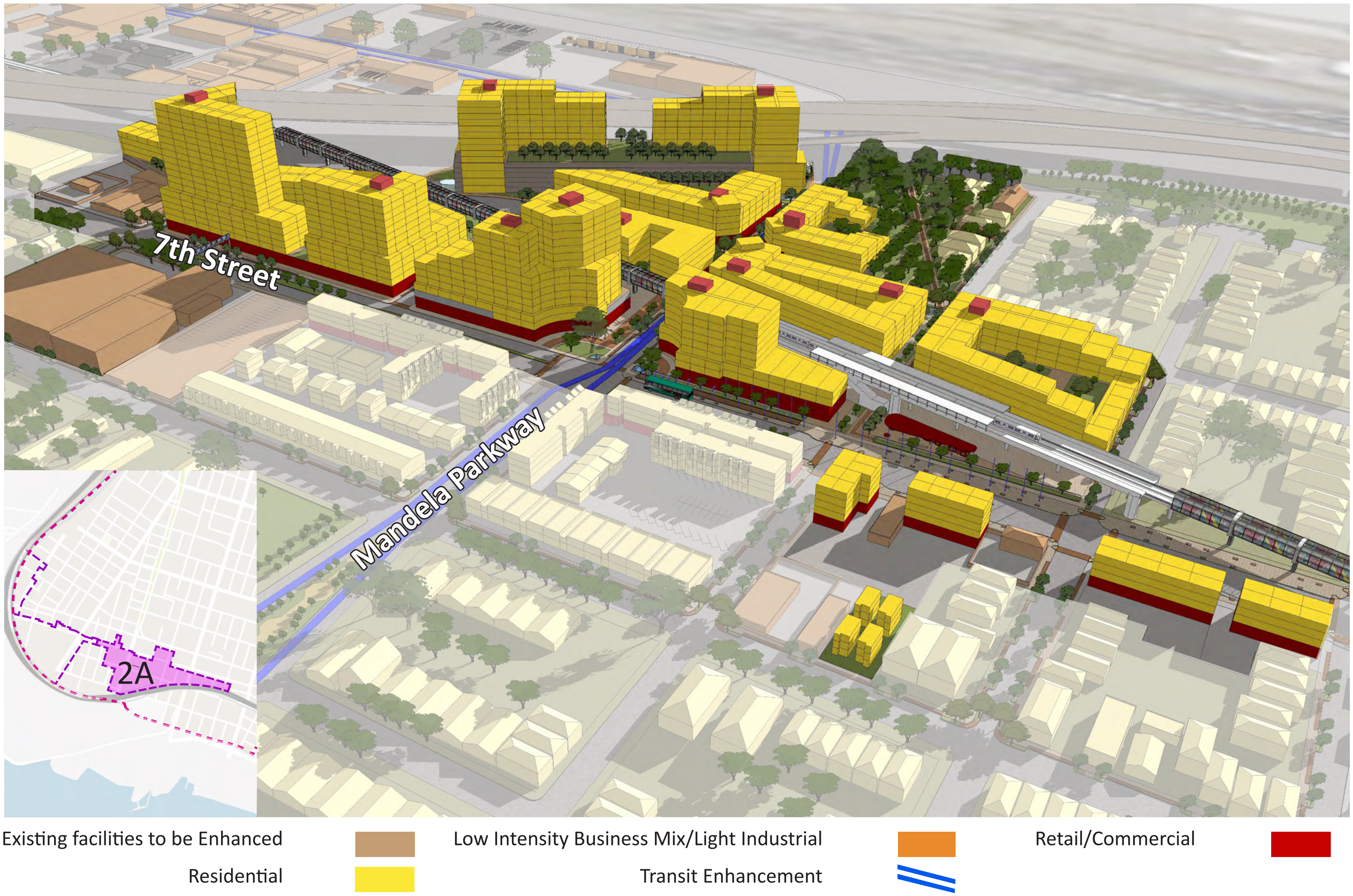


Figure 3-16
Future Development Scenario, 7th Street
Opportunity Area 2A - West Oakland TOD

Source: JRDV Intnl.

Figure 3-17
Future Development Scenario, 7th Street Opportunity Area 2B and 2C

Source: JRDV Intl.

Table 3-3: Development Buildout Assumptions, 7th Street Opportunity Area

	Land Area (net acres)	Building Area (sq. ft.)	Jobs	Housing Units	Pop.
Industrial/Business					
Existing (includes BART Station, Surface Parking, Post Office)	58	1,790,000	1,870		
Buildout Assumptions					
Surface Parking and Underutilized Buildings Removed	-35.5	-300,000	-50		
Existing Industrial and Business Buildings More Intensively Used	22.5	1,490,000	+270		
New Low-Intensity (Low-Rise) Industrial and Business Space	+7	+170,000	+380		
Buildout, Total	29.5	1,660,000	2,470		
Net Change	**-28.5**	**-130,000**	**+600**		
Mixed Use – Comm./Res.					
Existing	6	5,000	10	35	85
Buildout Assumptions					
BART TOD	+24	0 to +670,000	0 to +1,675	+1,325 to +2,308	+3,054 to +5,320
Mixed Use Infill	+1	+85,000	+210	+356	+818
Buildout, Total	31	90,000 to 760,000	220 – 1,895	1,716 to 2,699	3,957 to 6,223
Net Change	**+25**	**+85,000 to +750,000**	**+210 to +1,885**	**+1,681 to +2,664**	**+3,872 to +6,138**
Residential					
Existing	1			50	119
Buildout Assumptions					
New Residential Conversions	+3.5			+70	+150
Infill and Approved Single-Family and Townhome				+20	+50
Buildout, Total	4.5			140	319
Net Change	**+3.5**			**+90**	**+200**
Total, Existing	**65**	**1,795,000**	**1,880**	**85**	**204**
Total at Buildout	**65**	**1,750,000 to 2,420,000**	**2,690 to 4,365**	**1,856 to 2,839**	**4,276 to 6,542**
Net Change	**0**	**-45,000 to +630,000**	**+810 to +2,485**	**+1,771 to 2,754**	**+4,072 to +6,338**

Opportunity Area 3: 3rd Street

The 3rd Street Opportunity Area (also known as the Acorn Industrial Area), is located generally south of I-880 and between Union and Castro Streets. This Opportunity Area is somewhat isolated from much of the rest of West Oakland by the I-880 freeway and elevated BART tracks, which form its northerly and westerly borders, and by the main line of the Union Pacific railroad tracks to the south, which separates this area from the Port. Several through streets including Adeline and Market Streets and Martin Luther King Jr. Way, provide convenient connections from this Opportunity Area to the adjacent Port of Oakland, the Howard Terminal and to the large Schnitzer Steel recycling facility to the south. Due to these convenient road connections to the Port, this Opportunity Area has developed over its long history as primarily an industrial area, providing industrial services and uses that benefit from their immediate adjacency to the Port. There are no residential uses within this Opportunity Area. This Opportunity Area includes both large modern tilt-up concrete buildings and late 19th-century brick industrial buildings, and many in between. Prominent among the older buildings are the National Register-eligible group of Del Monte Cannery and Label Plant and Standard Underground Cable buildings on three blocks between Myrtle and Chestnut Streets south of 3rd Street. This Opportunity Area has been and continues to be a traditional industrial area, containing recycling operations, large-scale laundry services, truck service and repair, printing shops and storage. Newer uses (prominently including Linden Street Brewery, Nellie's Soul Food, Linden Street Dance Studios, and others) have begun to adaptively reuse the older industrial spaces in this Opportunity Area for a wider mix of business and service-type uses.

The vision for the 3rd Street Opportunity Area is that it will continue to support industrial and business activities and jobs, capitalizing on its proximity to downtown Oakland, Jack London Square, the Port of Oakland and its access to the regional freeway network. This Opportunity Area is expected to emerge as a more vibrant and vital business and employment center over time, focusing on manufacturing and light industrial uses that benefit from adjacency to the Port, as well as commercial uses that enliven the area during the day and night. Commercial, dining and entertainment uses are encouraged as infill enhancements in the attractive, older warehouse buildings. New business opportunities would reflect the existing mix of light industrial, service commercial, food and beverage production and distribution, and construction-related businesses, as well as small professional offices, import/export, communications, computer services, publishing and printing, photo/audio services, and small R&D activities. Residential development in this area would continue to be prohibited.

A conceptual, schematic plan for this subarea is provided on **Figure 3-18**, illustrating preferred densities, building massing and other physical characteristics of prospective developments. **Table 3-4** provides a summary of changes in land use, employment and population expected within the 3rd Street Opportunity Area.

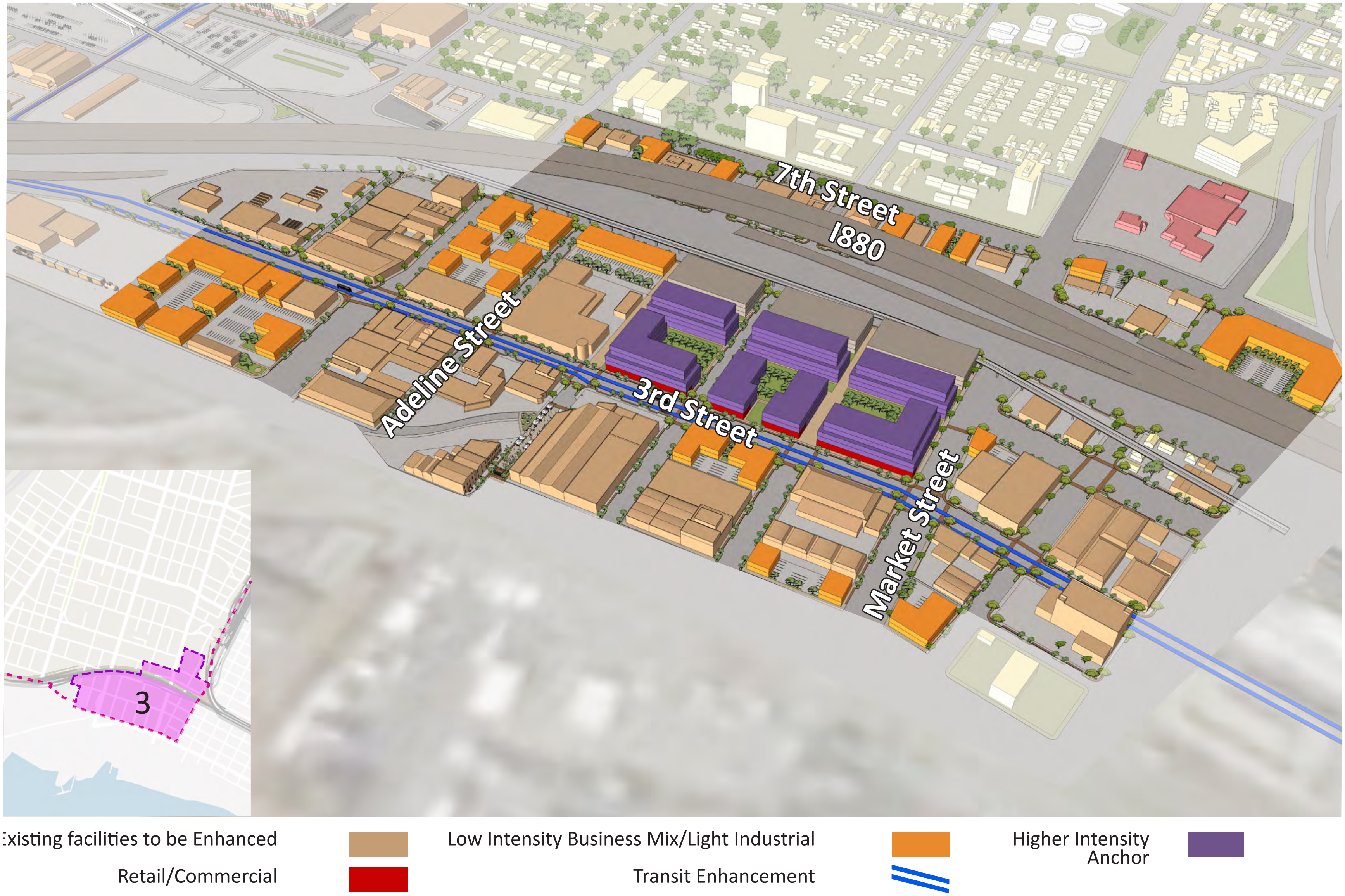


Figure 3-18
Future Development Scenario, 3rd Street Opportunity Area

Source: JRDV Intnl.

Table 3-4: Development Buildout Assumptions, 3rd Street Opportunity Area

	Land Area (net acres)	Building Area (sq. ft.)	Jobs	Housing Units	Pop.
Industrial/Business					
Existing	60	1,040,000	1,690		
Buildout Assumptions					
Vacant Lots, Surface Parking, Blighted & Underutilized Buildings, and Businesses Choosing to Relocate	-24	-240,000	-130		
Existing Industrial and Business Buildings More Intensively Used	36	800,000	1,560		
New Low-Intensity (Low-Rise) Industrial and Business Space	+13	+300,000	+670		
New High-Intensity (Mid-Rise) Buildings	+11	+600,000	+1,410		
Buildout, Total	*60*	*1,700,000*	*3,640*		
Net Change	**0**	**+660,000**	**+1,9500**		
Commercial/Retail					
Existing	8	50,000	80		
Buildout Assumptions					
New Commercial/Retail Infill		+15,000	+40		
Buildout, Total	*8*	*65,000*	*120*		
Net Change	**0**	**+15,000**	**+40**		
Total, Existing	**68**	**1,090,000**	**1,770**	**0**	**0**
Total at Buildout	**68**	**1,765,000**	**3,760**	**0**	**0**
Net Change	**0**	**+675,000**	**+1,990**	**0**	**0**

Opportunity Area 4: San Pablo Avenue

Opportunity Area 4 is defined as the San Pablo Avenue corridor from approximately I-580 to West Grand Avenue, and along West Grand to Market Street. San Pablo Avenue is a major transit corridor, a “main street” of the East Bay, connecting the cities of Richmond and San Pablo, through Berkeley and Emeryville, to downtown Oakland. San Pablo Avenue is one of the most significant traffic and transit corridors within the East Bay and has historically had a very main street character. Low rise mixed-use buildings currently line both sides of the street, giving it a distinctive Main Street character. Through West Oakland, this main street corridor today includes numerous vacant and underutilized lots and empty storefronts. Due to the volume of traffic and diagonal nature of the street pattern+, San Pablo Avenue actually divides the adjacent McClymonds and Hoover/Foster neighborhoods, rather than serving as a uniting neighborhood focus.

The San Pablo Avenue corridor is envisioned as a transformed major commercial corridor connecting West Oakland to Downtown and to Emeryville, Berkeley and beyond, lined with active ground-floor commercial uses and mixed-use residential development. Consistent with existing City of Oakland policies regarding development of major commercial corridors, the land use and development strategy for the San Pablo Avenue Opportunity Area is for infill mixed-use development with multi-family residential activities over ground-floor commercial. Enhanced streetscapes and increased commercial uses would activate the street, increase pedestrian activity and enliven the neighborhood.

The block of West Grand Avenue between Myrtle Street and Market Street would be developed with a mix of uses, potentially anchored by a grocery store on West Grand Avenue at Myrtle Street, with medium-density residential, street front retail and mixed use developments. This Plan encourages revitalization of the existing commercial center on the south side of West Grand Avenue in a manner designed to make full and best use of the site and fit in with the surrounding neighborhood.

Conceptual, schematic plans are provided on **Figures 3-19 and 3-20** for two of the subareas within the San Pablo Avenue Opportunity Area, illustrating preferred densities, building massing and other physical characteristics of prospective developments. **Table 3-5** provides a summary of changes in land use, employment and population expected within the San Pablo Avenue Opportunity Area.

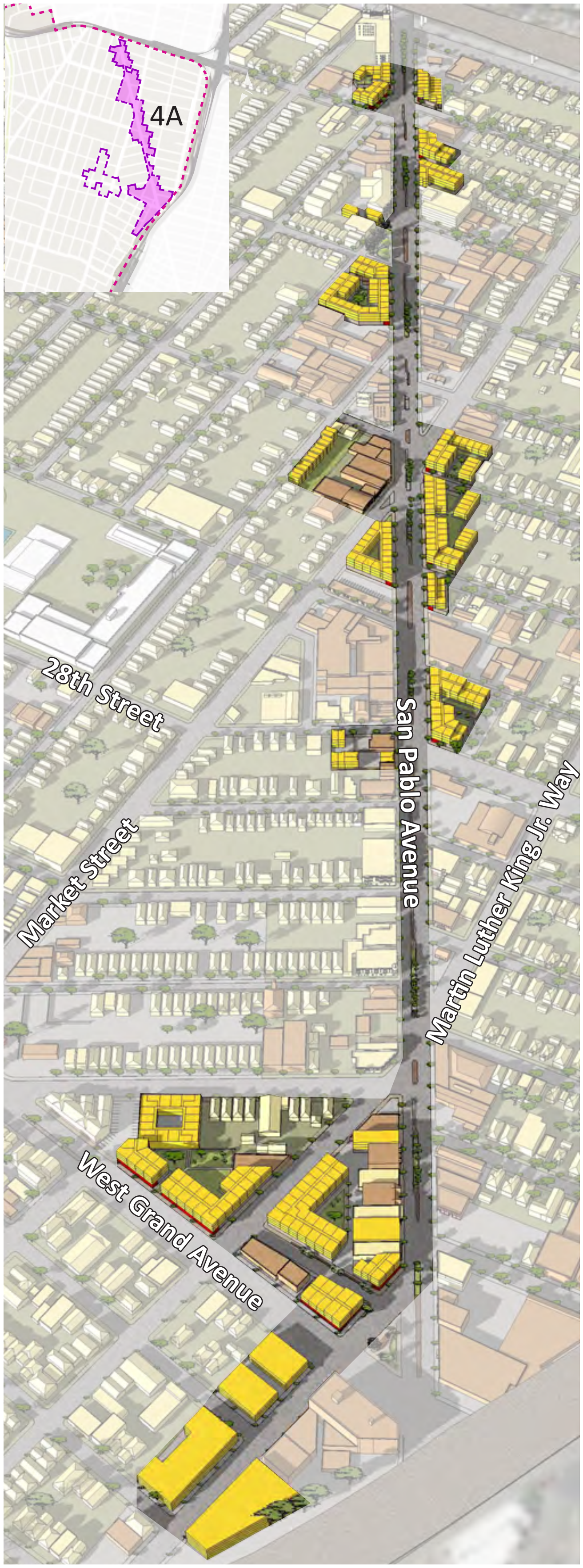


Figure 3-19
Future Development Scenario, San Pablo Avenue Opportunity Area 4A

Source: JRDV Intl.

Existing facilities to be Enhanced

Residential

Low Intensity Business Mix/Light Industrial

Retail/Commercial

Figure 3-20
Future Development Scenario, San Pablo Opportunity Area 4B - Market and West Grand

Source: JRDV Intnl.

Table 3-5: Development Buildout Assumptions, San Pablo Avenue Opportunity Area

	Land Area (net acres)	Building Area (sq. ft.)	Jobs	Housing Units	Pop.
Commercial/Retail					
Existing	5	90,000	80		
Buildout Assumptions					
Underutilized Buildings Removed	-5	-90,000	-40		
New Commercial/Retail	+5	80,000	200		
Buildout, Total	*5*	*80,000*	*240*		
Net Change	**0**	**-10,000**	**+160**		
Mixed Use – Comm./Res.					
Existing	30	700,000	600	30	70
Buildout Assumptions					
Existing Commercial Space More Intensively Used			590		
Mixed Use Infill		85,000	230	1,000	2,157
Buildout, Total		*785,000*	*1,420*	*1,030*	*2,227*
Net Change		**+85,000**	**+820**	***1,000***	***2,157***
Residential					
Existing	2			40	96
Buildout Assumptions					
Infill and Approved Single-Family and Townhome				65	130
Buildout, Total				*105*	*226*
Net Change				**65**	**130**
Total, Existing	**37**	**790,000**	**680**	**70**	**166**
Total at Buildout	**37**	**865,000**	**1,660**	**1,135**	**2,453**
Net Change	**0**	**+75,000**	**+980**	**+1,065**	**+2,287**

Specific Plan Area Development Assumptions and Time Frame

Reasonably Foreseeably Maximum Development

The Project analyzed in this EIR is the amount of development that can be reasonably expected to occur in the Planning Area over the next 25 years. The amount of both residential and employment growth included under this reasonably foreseeable scenario is generally consistent with current Association of Bay Area Government (ABAG) projections for West Oakland, is consistent with the market projections of demand for new housing opportunities and employment growth potential as assessed for the Specific Plan, and it consistent with the urban design assumptions and development scenarios as presented in the Specific Plan. This development potential is the reasonably foreseeable maximum development that would occur within the Planning Area during the life of the proposed Plan and is the level of development envisioned by the proposed Plan.

The reasonably foreseeable maximum development that is the basis of this EIR analysis and described as buildout of the Plan is different from the theoretical maximum development potential in the Planning Area. A theoretical maximum buildout is the amount of development that would be permitted by full buildout (under maximum floor-area ration [FAR] and residential densities) under the revised General Plan and Planning Code regulations, and is substantially greater (especially in regard to non-residential building space) than the reasonably foreseeable buildout of the Plan. It is important to note that the maximum development potential under the Specific Plan is actually lower than a maximum theoretical buildout under the current General Plan and zoning because the proposed Specific Plan recommends lowering certain, currently applicable FARs in the industrial areas of West Oakland.

In addition to the reasonably foreseeable maximum development described above, the Specific Plan includes two options for buildout of the West Oakland BART station TOD.

- Under the option whereby the TOD would be primarily a high-density residential development above mostly ground-floor commercial, the Specific Plan would provide for a total increase of up to approximately 5,000 new dwelling units accommodating an increased population of approximately 11,000 people; and approximately 4.03 million square feet of new business, industrial and commercial building space, providing nearly 15,000 new jobs.
- Under the option whereby the TOD would include a large component of commercial/office development, the Specific Pan would provide for a total increase of approximately 4,000 new dwelling units accommodating an increased population of approximately 8,720 people; and slightly more than 4.7 million square feet of new business, industrial and commercial building space providing more than 16,500 new jobs.

Whereas this buildout is anticipated to occur over an extended period of time with incremental increases in new housing and job opportunities, the buildout assumptions included in the Specific Plan are assumed, for purposes of CEQA review, by year 2035.

The overall Land Use Diagram illustrating the various Specific Plan land use overlays is shown on **Figure 3-21** for the entire Planning Area. **Table 3-6** provides a summary of land uses, employment and population changes expected within the Planning Area at buildout (year 2035).

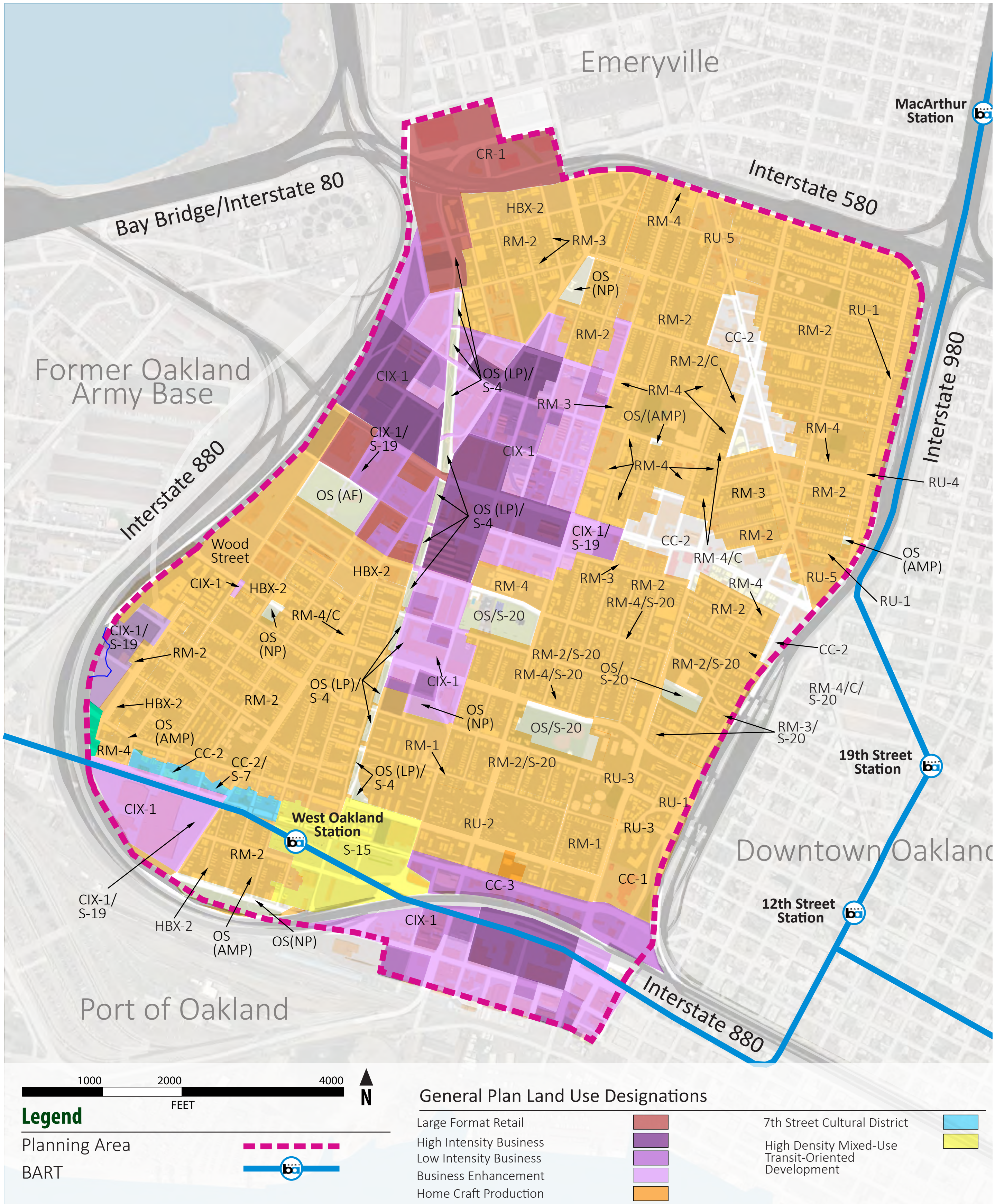


Figure 3-21
Specific Plan Land Use Overlay Diagram

Source: JRDV Intl.

Table 3-6: Development Buildout Assumptions, All West Oakland Opportunity Areas

	Land Area (net acres)	Building Area (sq. ft.)	Jobs	Housing Units	Pop.
Business/Industrial/Institutional					
Existing	293	6,830,000	8,500		
Buildout	244.5	10,380,000	21,490		
Net Change	**-48.5**	**+3,550,000**	**+12,990**		
Commercial/Retail					
Existing	35	440,000	660		
Buildout	49	750,000	1,530		
Net Change	**+14**	**+310,000**	**+870**		
Mixed Use – Comm./Res.					
Existing	36	705,000	610	65	155
Buildout (with Res.-Based TOD)	61	875,000	1,640	3,729	8,450
Buildout (with Comm./Office TOD)	61	1,545,000	3,315	2,746	6,184
Net Change (with Res.-Based TOD)	**+25**	**+170,000**	**+1,030**	**+3,664**	**+8,295**
Net Change (with Comm./Office TOD)	**+25**	**+845,000**	**+2,705**	**+2,681**	**+6,029**
Residential					
Existing	22			200	474
Buildout, Total	31.5			1,535	3,176
Net Change	**+9.5**			**+1,335**	**+2,693**
Open Space	**27**				
Total, Existing	413	7,975,000	9,770	265	629
Total, at Buildout (with Residential TOD)	413	12,005,000	24,660	5,264	11,617
Total at Buildout (with Comm./Office TOD)	413	12,675.000	26,335	4,281	9,351
Net Change (with Res.-Based TOD)	0	**4,030,000**	**14,890**	**4,999**	**10,988**
Net Change (with Comm./Office TOD)	0	**4,705,000**	**16,565**	**4,016**	**8,722**

Area-Wide Transportation and Infrastructure Improvements

The Specific Plan also calls for necessary public and private investments in multimodal transportation systems and infrastructure systems necessary to support and sustain new development.

Complete Streets

The Plan specifically calls for the provision of a network of “complete streets” throughout West Oakland, [1]serving not only the automobile capacities but also providing an interconnected system of bicycle paths and lanes, pedestrian improvements and streetscape amenities, as well as transit improvements intended to better facilitate use of transit choices in west Oakland and to better connect West Oakland to downtown, Jack London Square, the Oakland Army Base and other surrounding areas. As part of the complete streets strategy, the Plan proposes traffic calming strategies including travel lane reductions and round-a-bouts where adequate traffic capacity can be maintained, particularly at the following locations (see **Figure 3-22**):

- Reduce the number of travel lanes on West Grand Avenue from the existing six travel lanes to four travel lanes, between West Street and Mandela Parkway, while retaining retain bike lanes and passage for transit.
- Reduce the number of travel lanes on Adeline Street between 3rd Avenue and 36th Avenue from the existing four travel lanes to two travel lanes with a center turn lane.
- Reduce the number of travel lanes on 12th Street between Market Street and Mandela Parkway, from the existing four travel lanes to two travel lanes with a center turn lane.
- Reduce the number of travel lanes on 14th Street between Market Street and Mandela Parkway, from the existing four travel lanes to two travel lanes with a center turn lane.
- Reduce the number of travel lanes on 8th Street between Market Street and Mandela Parkway, from the existing four travel lanes to two travel lanes with a center turn lane.
- Roundabouts or other features should be considered at the following intersections to calm traffic and enhance the streetscape as a gateway or landmark feature at Adeline Street at 12th, 14th and 18th Streets; and at Peralta Street at 18th and 28th Streets

[1] Complete Streets (sometimes known as livable streets) describes a comprehensive, integrated transportation network, with roadways designed and operated to enable safe, attractive, and comfortable access and travel for all users, including: pedestrians, bicyclists, persons with disabilities, seniors, children, motorists, movers of commercial goods, operators of public transportation, public transportation users of all abilities, and emergency responders.

Figure 3-22
Specific Plan Complete Streets Proposal for Travel Lane Reductions

Source: Kittleson, JRDV Intl.

Enhanced Transit

West Oakland is currently well served by regional transit, with four BART stations located within a maximum 2-mile radius of each other; the AC Transit bus service provides local connections from the BART stations to most West Oakland destinations and service from residential areas in West Oakland to the BART stations; and the Emeryville shuttle system provides near-by transit service to and from a major regional shopping and entertainment district. However, the current local-serving transit service generally operates along linear routes which enter and exit West Oakland on their way to and from other destinations. The Specific Plan recommends the creation of a new enhanced transit "loop" that interconnects West Oakland to the BART stations, the former Oakland Army Base, downtown Oakland, Emeryville, the East Bay regional medical center, and to Jack London Square. This enhanced local transit service is envisioned as a loop, or circle with the following route:

- Beginning at the West Oakland BART Station, the transit loop would travel up Mandela Parkway with frequent stops at major employment centers along the way;
- At upper Mandela, the transit loop would connect to the Emeryville transit service and to major Emeryville employment and retail/entertainment centers (e.g., Pixar, Bay Street, etc.);
- From Emeryville, the loop would travel eastward to connect with the MacArthur BART station and continue on to Broadway and the regional medical centers at "Pill Hill";
- At Broadway, the loop would travel south connecting to the 19th Street and 12th Street/City Center BART stations and downtown Oakland; continuing south to Jack London Square at 3rd Street;
- At 3rd Street the loop would turn back to the west, connecting through the 3rd Street Opportunity Area, under the I-880 freeway, and back to the West Oakland BART station.
- A separate but coupled transit loop could be added over time to utilize West Grand Avenue, Broadway, 14th Street and Pine Street to interconnect the 16th Street Train Station area, the Mandela/Grand Opportunity Area and downtown Oakland.
- A third coupled loop could also be added over time to utilize Mandela Parkway, 7th Street, Maritime Street and West Grand Avenue to better connect West Oakland to the Army Base.

This enhanced transit service would operate as a continuous or semi-continuous loop around and through major West Oakland and surrounding destinations (see **Figure 3-23)**.

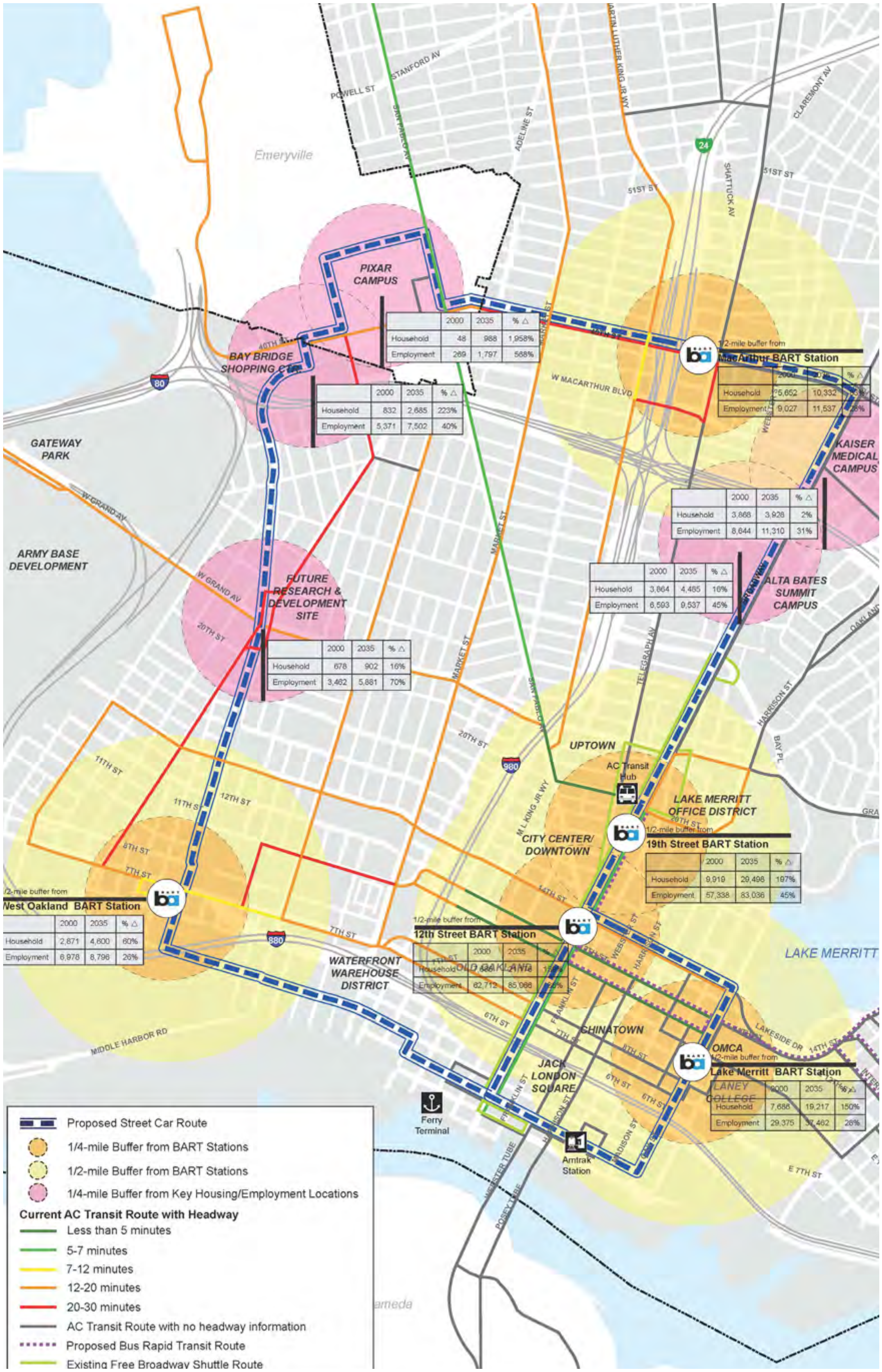


Figure 3-23
Proposed Enhanced Transit Loop (i.e., the "O")

Source: JRDV Intl.

Other Infrastructure

The Specific Plan also calls for necessary public and private investments in other infrastructure systems, such as potable water, sanitary sewer, storm drainage, electrical and broadband cable, that are needed to attract and support the types of new development envisioned under the Plan (see Figure 3-24).

Approvals Required to Adopt and Implement the Specific Plan

Implementation of the Specific Plan would require the following City actions:

- Certification of the Environmental Impact Report (Final EIR) for the proposed Specific Plan;
- Adoption of the Specific Plan; and
- Approval of General Plan amendments and re-zonings, as specifically defined below in **Table 3-7** and as shown on **Figure 3-25**.

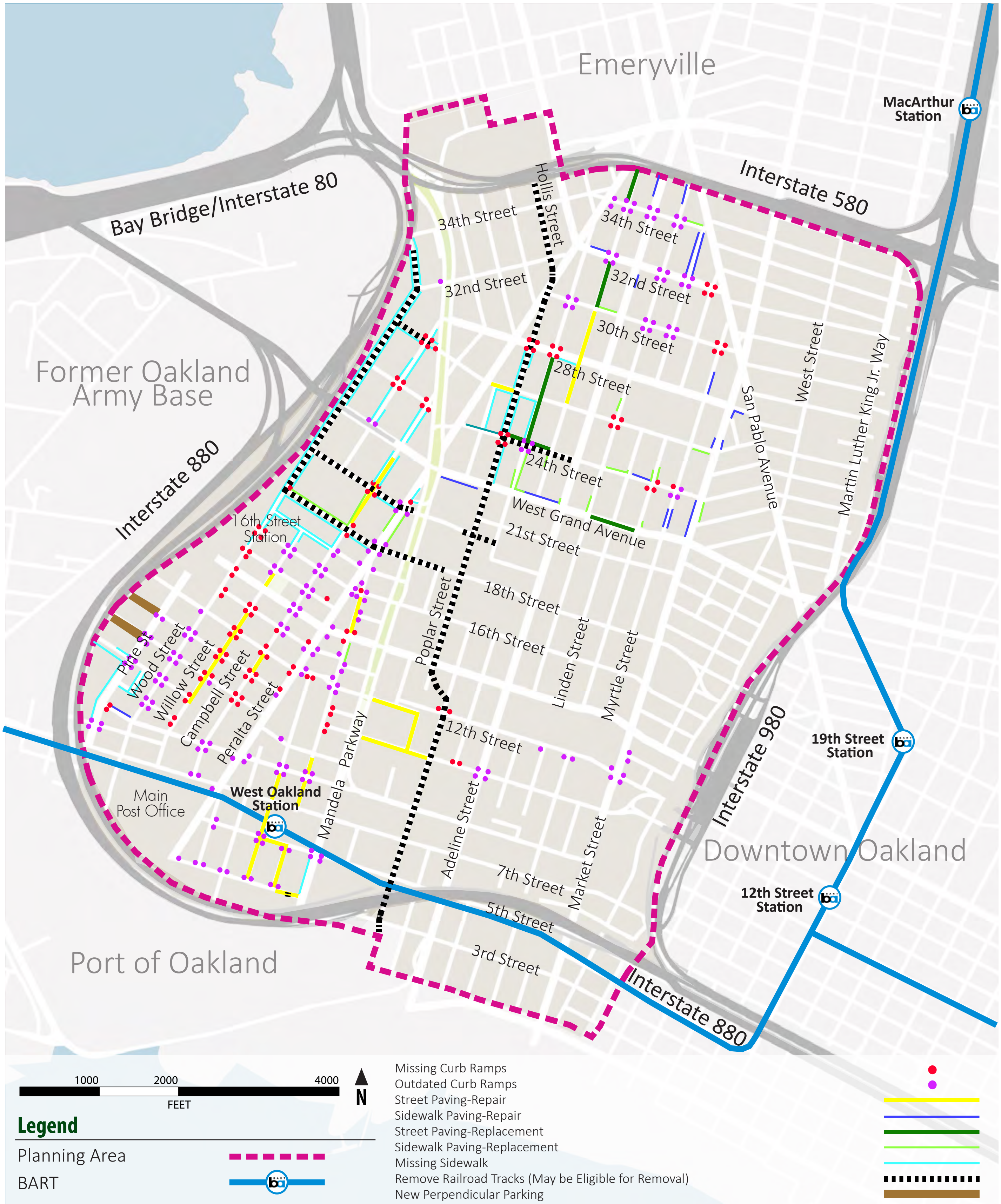


Figure 3-24
Proposed Infrastructure Improvements

Source: JRDV Intl.

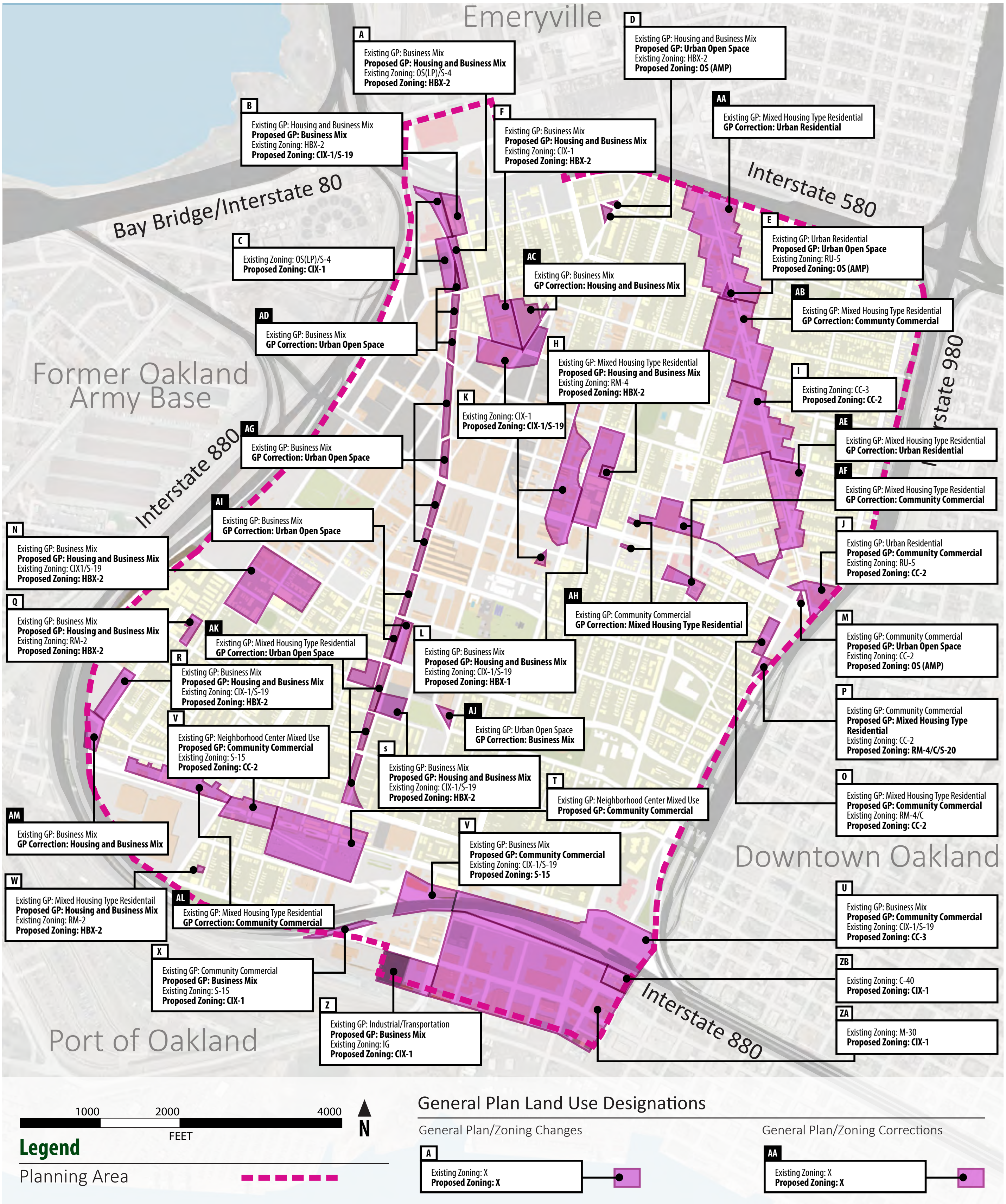


Figure 3-25
Other Clarifying General Plan and Zoning Changes

Table 3-7: Proposed General Plan Amendments and Re-Zonings

Site		Existing General Plan Designation	Proposed General Plan Designation	Existing Zoning	Proposed Zoning
A	Northeast Mandela	Business Mix	Housing and Business Mix	OS (LP)/S-4	HBX-2
B	Northeast Mandela	Housing and Business Mix	Business Mix	HBX-2	CIX-1/S-19
C	Northeast Mandela Parkway			OS (LP)/S-4	CIX-1
D	Union Plaza Park and Fitzgerald Park	Housing and Business Mix	Urban Open Space	HBX-2	OS/AMP
E	St. Andrews Plaza	Urban Residential	Urban Open Space	RU-5	OS/AMP
F	Ettie Street – 1	Business Mix	Housing and Business Mix	CIX-1	HBX-2
G	West of I880 between 32nd and 35th	General Industrial/Transportation	Business Mix	IG	CIX-1/S-19
H	Chestnut Street and 24th	Mixed Housing Type Residential	Housing and Business Mix	RM-4	HBX-2
I	San Pablo Avenue at 28th Street Site			CC-3	CC-2
J	West Grand at San Pablo	Urban Residential	Community Commercial	RU-5	CC-2
K	Chestnut/Adeline and Ettie Street			CIX-1	CIX-1/S-19
L	Chestnut/Adeline	Business Mix	Housing and Business Mix	CIX-1/S-19	HBX-2
M	West Grand at San Pablo Mini-Park	Community Commercial	Urban Open Space	CC-2	OS-AMP
N	Roadway Site	Business Mix	Housing and Business Mix	CIX-1/S-19	HBX-2
O	San Pablo at West Grand Avenue	Mixed Housing Type Residential	Community Commercial	RM-4/C	CC-2
P	Small Triangle Site	Community Commercial	Mixed-Housing Type Residential	CC-2	RM-4/C/S-20
Q	Prescott-Oakland Point	Business Mix	Mixed Housing Type Residential	RM-2	HBX-2
R	Phoenix Iron Works Site	Business Mix	Housing and Business Mix	CIX-1	HBX-2
S	Coca Cola Bottling/Mayway Site	Business Mix	Urban Residential	CIX-1	HBX-2
T	7th Street/BART parking	Neighborhood Center Mixed Use	Community Commercial		
U	7th Street within the 3rd Street Opportunity Area	Business Mix	Community Commercial	CIX-1/S-19	CC-3

Table 3-7: Proposed General Plan Amendments and Re-Zonings

Site		Existing General Plan Designation	Proposed General Plan Designation	Existing Zoning	Proposed Zoning
V	7th Street between Chestnut and Peralta	Neighborhood Center Mixed Use	Community Commercial	S-15	CC-2
W	Lewis Street	Mixed Housing Type Residential	Housing and Business Mix	RM-2	HBX-2
X	Southern edge of Interstate 880	Community Commercial	Business Mix	S-15	CIX-1
Y	3rd Street – Estuary Policy Plan			M-30	CIX-1
Z	3rd Street Industrial	General Industry/Transportation	Business Mix	IG	CIX-1
ZA	3rd Street – Estuary Policy Plan			M-30	CIX-1
ZB	Block bounded by Brush, Plan Boundary, 4th and 5th			C-40	CIX-1
AA	San Pablo between 32nd and 35th	Mixed Housing Type Residential	Urban Residential		
AB	San Pablo between 27th and 32nd	Mixed Housing Type Residential	Community Commercial		
AC	Peralta and Hannah	Business Mix	Housing and Business Mix		
AD	Mandela Parkway	Business Mix	Urban Open Space		
AE	San Pablo between 24th and 27th	Mixed Housing Type Residential	Urban Residential		
AF	Market and W Grand	Mixed Housing Type Residential	Community Commercial		
AG	Mandela Parkway	Business Mix	Urban Open Space		
AH	Linden and W Grand	Community Commercial	Mixed Housing Type Residential		
AI	Mandela Parkway	Business Mix	Urban Open Space		
AJ	Mandela Parkway and 12th Street	Urban Open Space	Business Mix		
AK	Mandela Parkway	Business Mix	Urban Open Space		
AL	7th St between Peralta and Wood	Mixed Housing Type Residential	Community Commercial		
AM	Frontage Road and 7th Street	Business Mix	Housing and Business Mix		

4

Setting, Impacts and Mitigation Measures

This chapter contains an analysis of the environmental topics relevant to the Specific Plan, and constitutes the major portion of this Draft EIR. Sections 4.1 through 4.12 describe the existing physical and regulatory settings relevant to the Specific Plan for each environmental topic analyzed in this EIR, the potential impacts that could result from implementation of the Specific Plan, city policies and Standard Conditions of Approval that would minimize those potential impacts, and mitigation measures if necessary to avoid or reduce identified significant impacts.

The following provides an overview of the scope of the analysis included in this chapter, the organization of the sections and the methods for determining what impacts are significant, including the use of the City's Standard Conditions of Approval.

Environmental Topics Evaluated in this EIR

The following environmental topics are evaluated in this EIR:

- Aesthetics, shadow and wind
- Agriculture and forest resources
- Air quality
- Biological resources
- Cultural and historic resources
- Geology and soils
- Greenhouse gas emissions/climate change
- Hazards and hazardous materials
- Hydrology and water quality
- Land use and planning
- Mineral resources
- Noise
- Population, housing and employment
- Public services and recreation
- Transportation
- Utilities and service systems

It is anticipated that implementation of the Specific Plan will not have significant environmental impacts on agriculture and forest resources, biological resources; geology and soils, and mineral resources. Nevertheless, these environmental factors are analyzed in the EIR.

Format of Topic Sections

Each environmental topic section includes three main subsections: (1) Physical Setting; (2) Regulatory Setting; and (3) Impacts, Standard Conditions of Approval and Mitigation Measures. Significant impacts are identified together with corresponding mitigation measures. The following notations are provided after each impact and mitigation measure, indicating the significance of the impact without and with mitigation.

- **No Impact-** No noticeable adverse effect on the environmental would occur
- **LTS** = Less than Significant
- **LTS with SCA** = Less than Significant with implementation of uniformly applied development standards or Standard Conditions of Approval
- **LTS with MM** = Less than Significant with implementation of mitigation measures as recommended in this EIR
- **SU** = Significant and Unavoidable

These notations indicate the significance of the impact with and without mitigation.

Determination of Significance

Under CEQA, a significant effect is defined as a substantial or potentially substantial adverse change in the physical environment. Each of the following impact evaluations is prefaced by criteria of significance which are the thresholds for determining whether an impact is significant. The criteria of significance used in this EIR are derived from the City of Oakland's CEQA Thresholds/Criteria of Significance. The Thresholds are offered as guidance in preparing environmental review documents. The City requires use of these Thresholds unless there is something unique about the project location which would indicate the need to address thresholds of another agency as well, or other unique factors that would warrant the use of different or additional thresholds. The Thresholds are intended to implement and supplement provisions in the CEQA Guidelines for determining the significance of environmental effects, including Sections 15064, 15064.5, 15065, 15382 and Appendix G, and form the basis of the City's Initial Study and Environmental Review Checklist.

The Thresholds are intended to be used in conjunction with the City's Uniformly Applied Development Standards and Conditions of Approval (see discussion below), which are incorporated into projects as Conditions of Approval regardless of the determination regarding a project's environmental impacts.

CEQA requires the analysis of potential adverse effects of the project on the environment. Potential effects of the environment on the project are legally not required to be analyzed or mitigated under CEQA. However, this document nevertheless analyzes potential effects of the environment on the project in order to provide information to the public and City decision-makers. Where a potential significant effect of the environment on the project is identified, the document, as appropriate, identifies Standard Conditions of Approval and/or project-specific non-CEQA recommendations to address these issues (see discussion below).

Uniformly Applied Development Standards Imposed as Standard Conditions of Approval

The City's Thresholds are intended to be used in conjunction with the City's Uniformly Applied Development Standards and Conditions of Approval. These Uniformly Applied Development Standards and Conditions of Approval (referred to in the EIR as Standard Conditions of Approval or SCA) are incorporated into projects as conditions of approval regardless of the determination of a project's environmental impacts. As applicable, the Standard Conditions of Approval are adopted as requirements of an individual project when it is approved by the City and are designed to, and will, avoid or substantially reduce a project's environmental effects.

In reviewing project applications, the City determines which Standard Conditions of Approval apply based upon the zoning district, community plan, and the type(s) of permit(s)/approvals(s) required for the project. Depending on the specific characteristics of the project type and/or project site, the City will determine which Standard Conditions of Approval apply to a specific project; for example, Standard Conditions of Approval related to creek protection permits will only be applied to projects on creek side properties. Because these Standard Conditions of Approval are mandatory City requirements imposed on a Citywide basis, the impact analysis assumes that these will be imposed and implemented by the project. If a Standard Condition of Approval would reduce a potentially significant impact to less than significant, the impact will be determined to be less than significant and no mitigation is imposed.

The Standard Conditions of Approval incorporate development policies and standards from various adopted plans, policies, and ordinances (such as the Oakland Planning and Municipal Codes, Oakland Creek Protection, Stormwater Water Management and Discharge Control Ordinance, Oakland Tree Protection Ordinance, Oakland Grading Regulations, National Pollutant Discharge Elimination System (NPDES) permit requirements, Housing Element-related mitigation measures, Green Building Ordinance, historic/Landmark status, California Building Code, and Uniform Fire Code, among others), which have been found to substantially mitigate environmental effects. Where there are peculiar circumstances associated with a project or project site that will result in significant environmental impacts despite implementation of the Standard Conditions of Approval, the City will determine whether there are feasible mitigation measures to reduce the impact to less-than-significant levels.

Cumulative Analysis Context

CEQA defines cumulative as "two or more individual effects which, when considered together, are considerable, or which can compound or increase other environmental impacts." Section 15130 of the CEQA Guidelines requires that an EIR evaluate potential environmental impacts when the project's incremental effect is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual 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. These impacts can result from a combination of the proposed project together with other projects causing related impacts. "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects."

The methodology used for assessing cumulative impacts typically varies depending on the specific topic being analyzed. For example, the geographic and temporal (time-related) parameters related to a cumulative analysis of air quality impacts are not necessarily the same as those for a cumulative analysis of noise or aesthetic impacts. This is because the geographic area that relates to air quality is much larger and regional in character than the geographic area that could be impacted by potential noise or aesthetic impacts from a proposed project and other cumulative projects/growth. The noise and aesthetic cumulative impacts inherently are more localized than air quality and transportation impacts which are more regional in nature. Accordingly, the parameters of the respective cumulative analyses in this document are determined by the degree to which impacts from this Project are likely to occur in combination with other development projects.

Forecast-Based Cumulative Growth

Since 2000, the City of Oakland has developed and maintained a cumulative growth scenario and land use database primarily for use in cumulative transportation analyses for Oakland EIRs. Oakland's growth scenario is developed using a forecast-based approach (i.e., an approach based on regional forecasts of economic activity and demographic trends). The Association of Bay Area Government's (ABAG) projections provide the citywide and regional economic and demographic inputs. The scenario also incorporates extensive local information and input regarding the locations for growth and change within the City including past, present, existing, pending and reasonably foreseeable future development in the area surrounding the Project site. The latter provide specificity about growth and development in Oakland for use in allocating growth to subareas and traffic analysis zones (TAZs) within the City. Transportation analyses using the Alameda County Transportation Commission (ACTC) travel demand model require inputs at the TAZ level. The scenario also includes existing development conditions within the baseline and growth projections for adjacent jurisdictions. The forecast-based approach for defining the cumulative growth scenario is used as a basis for cumulative analysis of transportation and transportation-related noise, air quality and greenhouse gas emissions impacts.

List-Based Cumulative Development

For other cumulative topics analyzed in this EIR which have a closer geographic cumulative context, a "list method" of past, present and reasonably foreseeable future projects, based on the City's latest list of Major Development Projects, is used. The list-based approach uses the City's list of Major Development Projects as of the date of circulation of the Notice of Preparation of this EIR. Listed projects located within the West Oakland Specific Plan Planning Area are presented in **Table 4-1**. A list of other closely related past, present and reasonably foreseeable probable future projects located outside but near West Oakland include the following:

- 2012 Oakland Army Base Project: At the former Oakland Army Base, a new state of the art Trade and Logistics Center, with warehouse and distribution facilities to support cargo logistics, and associated roadway, railroad and infrastructure improvements are approved and pending construction. The 2012 Project includes up to approximately 2.5 million square feet of warehouse/distribution and maritime-related logistics uses and 175,000 square feet of office/R&D. Approximately 20 to 24 acres north of Grand Avenue for 407,160 square feet of indoor recycling facilities are to be located in the North Gateway area. The City's 15 acres of BCDC-required ancillary maritime support (AMS) use in the City-owned portion of the OARB is to be provided in three different locations within the former OARB. As part of a truck parking facility there would be fueling services which would include biodiesel. The BCDC-required 15 acres of AMS for the Port are now being provided in the 2012 Project as truck parking. Up to nine billboards are to be located to the north of West Burma Road, along Grand Avenue and along I-880.
- Other Port Maritime Improvements: As discussed and analyzed in the 2002 *OARB Redevelopment Plan EIR*, the Port proposes to implement a number of additional projects that are considered as part of the cumulative analysis. These include increasing Port-wide marine cargo throughput to 4.05 million TEUs; replacing existing Outer Harbor Berths 21, 20, 10, 9, and 8 with "New Berth 21", including reconfiguring a portion of the Outer Harbor shoreline and excavation and fill to create

about 29 acres of new land for a marine terminal; and expanding and realigning maritime facilities to achieve cargo throughput efficiencies by adjusting boundaries and consolidating property within marine terminals in response to tenant demand.

- Gateway Park: As discussed in the 2002 OARB Redevelopment Plan EIR, an approximately 19-acre area along the south side of the Bay Bridge touchdown is being planned as a regional park. Known as "Gateway Park", the park is currently being planned by the Gateway Park Working Group, a consortium of agencies including the Bay Area Toll Authority (BATA), Caltrans, BCDC, the California Transportation Commission (CTC), EBRPD, City of Oakland, Port of Oakland, EBMUD and ABAG's Bay Trail Project. Beyond the previously contemplated waterfront park at the foot of the new east span of the Bay Bridge, current planning concepts include trails, a boardwalk, a Bay-walk, a transportation museum and surrounding green area, monumental public art, bridge artifacts, a children's play area, active recreation areas, and connections to West Oakland, Emeryville, the Bay Trail, and pedestrian and bicycle access on the new east span of the Bay Bridge.
- Bay Bridge Toll Plaza: Caltrans proposes to replace and reconstruct the existing maintenance facilities located at the San Francisco Oakland Bay Bridge Toll Plaza area in Oakland. The existing Maintenance Complex is located in two separate areas of the Toll Plaza. The Toll/Electrical Sub Shop and the Toll Operation Building are located in the median of the toll plaza area. The remainder of the complex consists of a series of buildings, structures, and installations located south of the eastbound lanes of I-80 in the toll plaza area and north of Burma Road and the Port of Oakland.
- San Francisco/Oakland Bay Bridge Seismic Safety Project: The San Francisco/Oakland Bay Bridge Seismic Safety Project includes construction of a new two-mile-long east span for the Bay Bridge. This project includes construction of bridge piers within San Francisco Bay and Oakland mudflats, and construction of the bridge above the Bay. Five stormwater detention ponds would be constructed beneath the MacArthur Maze. Construction of this project is expected to be complete by 2014.
- Other Recreation Facilities: Additional planned recreational facilities in the West Oakland vicinity include parts of the San Francisco Bay Trail. The preferred alignment for the San Francisco Bay Trail is adjacent to the northern property boundary of EBMUD's MWWTP, and completion of this segment of the trail will help complete the trail that will connect all nine Bay Area counties.
- Other Specific Plans. The City of Oakland has three other Specific Plan planning efforts underway:
- The Broadway Valdez District Specific Plan preferred land use concept envisions a retail core in the Valdez Triangle with a mix of housing and office uses in the approximately 96-acre area around Broadway, which is generally bounded by Interstate-580 to the north, Grand Avenue to the south, Webster Street and Valley Street to the west, and Harrison Street, Bay Place, 27th Street, Richmond Avenue, and Brook Street to the east; an NOP for the Specific Plan EIR was issued on April 30, 2012.
- The Lake Merritt Station Area Plan preferred land use plan envisions a mix of transit-oriented retail, housing and office uses to take advantage of the transit-rich Plan area generally bounded by I-880 to the south, 14th Street to the north, Broadway to the west and 5th Avenue to the east; an NOP for the Specific Plan EIR was issued on March 1, 2012.
- Other Approved Projects: the City has approved a number of additional projects within the general vicinity that include:
- *MacArthur BART Transit Village*. This project is located on 7 acres bounded by Telegraph Avenue, 40th Street, MacArthur Boulevard and State Route 24. It includes 624 residential units and 42,500 square feet retail commercial space, and is under construction.

- *Oak to Ninth Mixed Use.* This 64.2-acre waterfront site bounded by Fallon Street, Embarcadero Road, 10th Avenue, and the Oakland Estuary has been approved for 3,100 residential units, 200,000 square feet commercial space, 3,950 structured parking spaces, 29.9 acres of public open space, 2 renovated marinas with 170 boat slips, and wetlands restoration.
- *Jack London Square Redevelopment.* This approved project includes 1.2 million square feet of retail, commercial and office (1,700-seat movie theater, 250-room hotel, supermarkets, restaurants and offices), much of which is complete and other elements under construction.

Table 4-1
Cumulative Development Projects within the West Oakland Specific Plan Planning Area

Project Name	Location	Description	Status
California Hotel	3501 San Pablo Avenue	Conversion of the existing studio and affordable units and ground floor commercial space into 137 affordable apartments	Approved
Cathedral Gardens	2126 Martin Luther King Jr. Way, 616 and 620 21st Street	100 affordable housing units, rehabilitation of the Rectory building	Approved
1614 Campbell Street	1614 Campbell Street	92 live/work units conversion	Approved
3250 Hollis Street	3250 Hollis Street	46 live/work units, 74 residential units	Approved
Hollis 34	3241 Hollis (entire block of 007-0620)	124 live/work units	Approved
Emerald Parc	2400 Filbert Street	55 townhomes	Approved
Red Star	1396 5th Street	119 affordable senior units, 3,300 square feet commercial space	Under Re-construction
2501 Chestnut Street	2501 Chestnut Street	50 live/work units	Approved
3884 Martin Luther King Jr. Way	3884 Martin Luther King Jr. Way	40 residential units	Approved
2847 Peralta Street	2847 Peralta Street	76 dwelling units, 24 live/work units	Approved
Mandela Grand Mixed Use Project	13.3 acres bounded by Mandela Parkway, West Grand Avenue, Poplar Street and 18th Street	1,577 residential units, 26,000 square feet commercial space	Approved
Mandela Transit Village	1357 5th Street	120 residential units, 38,500 square feet commercial	Approved
Ettie Street/Mandela Parkway	116 E. 14th Street	92-units of affordable senior housing	Approved
Mandela Gateway Townhomes	1431 8th Street	14 condominiums	Completed
Mandela Gateway Gardens	1431 7th Street	200 residential units and 15,000 square feet of retail space	Completed
Wood Street (formerly Central Station) Mixed Use Project	West Oakland Station site, 16th and Wood Streets	1,557 residential units (including 186 live/work units), 13,000 square feet commercial space, 1.39 acres public open space, 2.82 acres private open space,	Approved, partially completed

	rehabilitation of historic train station

Source: City of Oakland – Active Major Development Projects, July 2012; Lamphier-Gregory 2012.

The cumulative discussions that are contained within each environmental topic area explain the geographic scope of the area affected by each cumulative effect, and draw on the information in the cumulative growth scenario consistent with the defined geographic area.

4.1

Aesthetics, Shadow and Wind

This chapter evaluates the potential aesthetics, shadow and wind impacts of the proposed Specific Plan. It describes existing conditions in and around West Oakland and evaluates the impacts and mitigation needs that development envisioned by the Specific Plan would have with respect to visual character and quality, scenic vistas, scenic highways, light and glare, shadow and wind.

Physical Setting

Visual Character and Quality

Overall Visual Character

West Oakland has a distinct visual character strongly influenced by its historic residential neighborhoods, heavy industrial areas and a mixing of the two. West Oakland is also characterized by a significant amount of vacant and underutilized land distributed throughout the area. The visual character of large parts of West Oakland has been affected by social and economic conditions, including the decline in manufacturing and resulting vacant buildings; the loss of retail trade to the suburbs and resulting empty storefronts and underutilized commercial land; and urban problems such as blight and graffiti. Those areas that have retained high visual quality tend to be those removed from industrial areas with consistent or unique architecture, or proximity to a landmark or focal point.

West Oakland's rich history, culture, and notable architectural resources also strongly influence its visual character, exemplified by the historic beaux-arts style 16th Street Station, built in 1911. Besides landmark buildings, there are extensive residential neighborhoods that retain their historical character. 7th Street was a prosperous commercial district and a destination for Jazz artists, with music and performance venues. The San Pablo Avenue corridor includes notable historic commercial and mixed-use buildings in brick and wood. West Oakland has historically been a regional focal point for the African-American community. From a history of disenfranchisement, a strong sense of neighborhood identity has developed around community activism. A thriving industrial arts sector, a sustainability/food security/urban farming movement, and an "arts-adjacent" alternative lifestyle community are a new and growing influence on the visual character of the formerly industrial parts of West Oakland.

West Grand Avenue, 7th Street, Mandela Parkway, San Pablo Avenue, Peralta Street, Martin Luther King Jr. Way, Market Street and Adeline Street are primary transportation and activity corridors in West Oakland. Segments of these corridors lack streetscape improvements that create a safe and comfortable pedestrian environment, and that safely balance multiple modes of travel, including public transit and bicycles. Sidewalk widths and conditions vary widely, from 15 feet on some blocks to non-existent on others. The shifting street grid pattern has in some areas created a number of small, angular unbuildable parcels, as well as intersections with large "leftover" paved areas. Overhead utilities are typical, with power poles creating obstacles and unsightly conditions. A number of areas lack adequate street lighting. Street furniture is generally lacking, although in some locations such as in the Prescott Neighborhood, wooden planters, benches and tables have been provided. Bus stops commonly lack shelters, benches and trash receptacles. Many of the streets also experience illegal dumping and graffiti, which detract from visual quality.

The realignment of I-880 following the 1989 Loma Prieta earthquake allowed the creation of Mandela Parkway, a landscaped, tree-lined parkway and arboretum that extends 18 blocks, from 8th Street to 32nd Street. The City has also initiated other streetscape improvement projects on 7th Street, Martin Luther King Jr. Way, and Peralta Street. The 7th Street Concept and Urban Design Plan provides widened sidewalks, corner bulb-outs, planted medians, lighting, street furniture, street trees, bicycle lanes, reduced traffic lanes, and a roundabout at the 7th Street/Wood Street intersection. The project also includes art features, a gateway element, "dancing" lights, and sidewalk medallions as part of a Blues Walk of Fame. Phase I of the project has been completed from Peralta Street to Union Street. A Martin Luther King Jr. Way and Peralta Street Streetscape Master Plan are being prepared for those streets.

The City of Oakland General Plan identifies the West Oakland BART Station as a visual landmark. Other readily identifiable structures in West Oakland include the elevated BART tracks, 16th Street Station, the U.S. Postal Service mail distribution center and garage, Jack London Gateway Center, and the California Hotel. The I-580, I-880 and I-980 freeways form strong edges to the community. The City of Oakland General Plan identifies the I-580 and I-880 entrances to the city as major gateways. The West Grand Avenue exit from the I-880 freeway is an important gateway into West Oakland. The I-980 overpass over West Grand Avenue is a gateway to and from West Oakland and the Downtown.

Mandela/ West Grand Opportunity Area

The visual character of Subarea 1A, northeast of the Mandela Parkway and West Grand Avenue intersection, reflects this subarea's smaller parcels and historic industrial building stock, including a number of cases of adaptive reuse of former industrial buildings, and numerous tin buildings built in the 1940s and 1950s. The large Iron Mountain Storage building at the corner of Mandela/Grand has large blank walls which tend to dominate the views at this prominent corner. The open yard concrete batch plant still in operation on Peralta Street maintains the former heavy industrial character of the neighborhood. There are many vacant lots and open yards, and very few single family homes, most of them concentrated along Adeline Street at the eastern edge of the subarea.

The visual character of Subarea1B, southeast of the Mandela Parkway/West Grand Avenue intersection, is influenced by some of the most architecturally notable industrial buildings in West Oakland, the Nabisco, American Steel, Pacific Pipe Company, Carnation and Mayway buildings. The Nabisco building is particularly architecturally distinct, with an ornate design and a scale that is compatible with adjacent residential uses.

The visual character of Subarea1C, the northwest of the intersection, is characterized by large open yard logistics and trucking businesses. There are many instances of adaptive reuse of older facilities, such as the architecturally significant International Harvester building. There are also many shed-type buildings, such as Pacific Supply. There is a large vacant area at the western border of the subarea next to I-880.

The visual character of Subarea 1D, southwest of the Mandela Parkway/West Grand Avenue intersection, is a mix of newer and older development. Newer development includes initial phases of the large Wood Street Project, a collection of medium-density residential podium buildings, and Raimondi Park with its well-used lighted sports fields. 16th Street Station, a National Historic Landmark, is planned to be rehabilitated as part of future phases of the approved Wood Street Project. Large vacant properties border this Subarea next to I-880.

7th Street Opportunity Area

The visual character of Subarea 2A, immediately surrounding the West Oakland BART Station, is dominated by the BART Station, the elevated BART tracks and several larger vacant parcels on the south side of 7th Street, remaining from the demolition of the former Cypress Freeway. The BART station provides a visual transition between the South Prescott neighborhood and the industrial area east of the station.

The visual character of Subarea 2B is focused on the 7th Street corridor, once a thriving neighborhood commercial district with musical venues served by streetcars, and now dominated by the overhead BART tracks and the large-scale U.S. Post Office facility and garage. On the north side of the street are remaining one-and two-story historical buildings. The BART piers sit in a raised median that divides four lanes of traffic. The Post Office frontage is planted with trees. The 7th Street Concept and Urban Design Plan Streetscape improvements and newer residential developments have begun to transform the area.

The visual character of Subarea 2C reflects the placement of industrial buildings on large parcels and a large vacant lot on Pine Street near historically significant homes. This area feels isolated by the adjacent freeway, 7th Street interchange and sound wall.

3rd Street Opportunity Area

The visual character of the 3rd Street Opportunity Area reflects its original industrial architectural character, with tilt-up concrete warehouses and notable brick buildings, some reused for emerging small businesses, such as the Linden Street Brewery. The character of this Opportunity Area is also strongly influenced by its adjacency to the Port of Oakland and truck routes.

San Pablo Avenue Opportunity Area

The visual character of the San Pablo Avenue Opportunity Area still reflects its historical development as a “main street” with a series of activity nodes linked by streetcar, but much of the area is now auto-oriented, with mostly one and two story buildings interspersed with parking lots, vacant land and storage yards.

Scenic Vistas

A scenic vista is a location that offers a high quality, harmonious, and visually interesting view. There are no officially designated scenic vistas within the Planning Area. The City of Oakland General Plan’s Open Space, Conservation and Recreation (OSCAR) Element calls for protection of views, particularly views of the East Bay hills from the flatlands; views of Downtown and Lake Merritt; views of the shoreline; and panoramic views from Skyline Boulevard/Grizzly Peak Road, and other hillside locations.

Scenic vistas from within the Planning Area are limited by the flat terrain and existing development, but the Oakland hills provide a prominent visual backdrop and orienting feature for West Oakland. Portions of the East Bay hills are visible from various public vantage points within the Planning Area. Some public vantage points have views of taller buildings in Downtown and the cranes at the Port of Oakland. The East Bay hills have views over the Planning Area to San Francisco Bay.

Scenic Highways

According to the City of Oakland General Plan’s Scenic Highways Element, scenic routes are “distinctively attractive roadways that traverse the City and the visual corridors which surround them.”

Current and future scenic routes may include officially designated State scenic highways, municipally designated City roadways or informally recognized local scenic byways.[1]

Interstate 580 (the MacArthur Freeway) extends 12.4 miles through Oakland, from the San Leandro city limits to the San Francisco-Oakland Bay Bridge. The entire length of I-580 within Oakland is identified as a designated scenic route in the City of Oakland General Plan Scenic Highways Element. I-980 is identified as a route that could be considered for possible future designation. The segment of I-580 from the San Leandro city limit to State Route 24 (post miles 34.5 to 45.1) is also an officially designated State scenic highway. Scenic Corridor Element policies related to I-580 in the vicinity of the Planning Area address the prohibition of off-premise advertising signs, the undergrounding of overhead utilities, view obstruction, continuing the ban on truck traffic, and the aesthetic quality of new development visible from the freeway.[2] The segment of I-580 within and adjacent to the Planning Area is elevated, allowing views of the Planning Area and views across the Planning Area to the Downtown and the Port of Oakland. The historic California Hotel with its distinctive steel truss roof sign is visible close to the freeway at San Pablo Avenue.

Light and Glare

Existing sources of nighttime light in and around the Planning Area include those common to urban areas, including street and freeway lights, parking lot lighting, building lighting, illuminated signs, vehicle headlamps and interior lighting visible through windows. Visible light sources and stray lighting from some industrial buildings and yards is incompatible with adjacent residential uses. Inadequate street lighting in some locations makes these areas feel unsafe.

Existing sources of glare include reflection of sunlight and artificial light off of windows, buildings and other surfaces in the day, and glare from inadequately shielded and improperly directed light sources at night.

Shadow

The effects of shading by one structure upon another structure or space can be either positive or negative depending upon site-specific circumstances. Perceived adverse effects of shadow may include loss of natural light, including natural light for passive or active solar energy applications, or loss of desired warming during cool weather. Factors influencing the perceived impact of shadow can include building placement; the height, bulk and setback of structures; the time of year; the duration of shading in a day; weather; landscaping; and the sensitivity of adjacent land uses to loss of sunlight.

Shadows cast by structures vary in length and direction throughout the day and from season to season. The longest shadows are cast during the winter months, when the sun is lowest on the horizon; the shortest shadows are cast during the summer months. Shadows are longer in the early morning and late afternoon. Shadow lengths increase during the low sun or winter season and are longest on December 21-22, the winter solstice. The winter solstice, therefore, represents the "worst-case" shadow condition and the time when the potential for loss of access to sunlight due to an adjacent structure is greatest. Shadow lengths are shortest on June 21-22, the summer solstice. Shadow lengths fall midway between the summer and winter extremes on March 20-21 and September 22-23, the spring and fall equinoxes, respectively.

---

[1] City of Oakland, City of Oakland General Plan Scenic Highways Element, September 1974, p. 1.

[2] City of Oakland, City of Oakland General Plan Scenic Highways Element, September 1974, pp. 25 and 26

Shadows are cast to the west by objects during the morning hours when the sun is coming up on the horizon in the east. During late morning and early afternoon, the shadows of objects move northerly and by late afternoon they are cast easterly as the sun moves across the sky from east to west.

Land uses are generally considered shadow-sensitive when sunlight is important to function, physical comfort, or the conduct of commerce. Shadow-sensitive land uses and features of concern as identified by the City's CEQA Thresholds of Significance include any public or quasi-public park, lawn, garden, or open space; shadow-sensitive significant historic resource; and solar collectors or buildings using passive solar heat collection.

Existing shadow conditions within the Planning Area are typical of shadow conditions in developed urban environments.

Wind

West Oakland lies within a climatological sub-region of the San Francisco Bay Area where the marine air that travels through the Golden Gate and across San Francisco Bay is a dominant weather factor. The Oakland-Berkeley Hills cause the westerly flow of marine air to split off to the north and south of Oakland; this phenomenon tends to diminish wind speeds in Oakland. Wind flow is generally from the west, and average wind speeds vary from season to season with the strongest average winds occurring during summer and the lightest average winds during winter. Together, the west, north-northwest and south-southeast winds are the most frequent winds that exceed 25 miles per hour (mph).

Wind conditions within the City result from the interaction of the approaching wind with the physical features of the environment: buildings, topography and landscape. Buildings much taller than surrounding structures intercept winds that might otherwise flow overhead, and bring those winds down the vertical face of the building to ground level, where they create ground-level wind and turbulence. These redirected winds can be incompatible with the intended uses of nearby ground-level spaces.

Ground-level wind acceleration near buildings is controlled by exposure, massing, and orientation. Exposure is a measure of the extent that the building extends above surrounding structures and into the wind stream. A building that is surrounded by taller structures is not likely to cause adverse wind acceleration at ground level, while even a small building can cause wind problems if it is freestanding and exposed. Massing is important in determining wind impact because it controls how much wind is intercepted by the structure and whether building generated wind acceleration occurs above ground or at ground level. Orientation determines how much wind is intercepted by the structure, a factor that directly determines wind acceleration. In general, buildings that are oriented with their long axis across the prevailing wind direction will have a greater impact on ground-level winds than a building oriented with its long axis along the prevailing wind direction.

Regulatory Setting

State of California

California Scenic Highway Program

The California Scenic Highway Program protects scenic highway corridors from changes that would diminish the aesthetic value of lands adjacent to identified scenic highways. "Officially Designated State Scenic Highways" must have a scenic corridor protection program, or its equivalent adopted by the local jurisdiction, to preserve the scenic quality of the corridor and address land use, development density, earthmoving, landscaping, building design, and outdoor advertising, including billboards, within the corridor. Within Oakland, I-580 from the San Leandro city limit to State Route 24 (post miles 34.5 to 45.1) is an officially designated State scenic highway. There are no officially designated or eligible State scenic highways within or immediately adjacent to the Planning Area.

California Solar Shade Control Act

Under the California Solar Shade Control Act (Public Resource Code Sections 25980-25986), no property owner shall allow a tree or shrub to be placed or to grow so as to cast a shadow greater than 10 percent at any one time between the hours of 10 a.m. and 2 p.m. over an existing solar collector used for water heating, space heating or cooling, or power generation on an adjacent property. These limitations apply to the placement of new trees or shrubs, and do not apply to trees and shrubs that already cast a shadow upon that solar collector. The location of a new solar collector is required to comply with local building and setback regulations, but must be setback not less than five feet from the property line, and must be no less than 10 feet above the ground.[3]

Title 24 Outdoor Lighting Zones

In 2001, the California Legislature passed a bill requiring the California Energy Commission (CEC) to adopt energy-efficient standards for outdoor lighting for both the public and private sector. In November 2003, the CEC adopted changes to the Building Energy Efficiency Standards within Title 24. The standards specify outdoor lighting requirements for residential and non-residential development. The intent of these standards is to improve the quality of outdoor lighting and reduce the impacts of light pollution, light trespass and glare. The standards regulate lighting characteristics, such as maximum power and brightness, shielding, and use of sensor controls to turn lighting on and off. Different State lighting standards have been established for four lighting zone classifications. Based on population figures in the 2000 Census, areas can be designated by this State specification system as LZ1 (dark), LZ2 (low), LZ3 (medium), or LZ4 (high). Lighting standards for dark and rural areas are stricter for example, to provide appropriate protection from new sources of light pollution and light trespass. According to the U.S. Census Bureau, the entire Planning Area is defined as an urban area and is therefore designated as LZ3 per the CEC classification standards.[4]

City of Oakland

General Plan

Land Use and Transportation Element

The following City of Oakland General Plan Land use and Transportation Element policies are relevant to the aesthetics, shadow and wind impacts of the proposed Specific Plan:

> *Policy W3.4: Preserving Views and Vistas.* Buildings and facilities should respect scenic viewsheds and enhance opportunities for visual access of the waterfront and its activities.

---

3 California Codes, Public Resource Code Sections 25980-25986. The California Public Resources Code can be found at http://www.leginfo.ca.gov/calaw.html.

4 http://www.energy.ca.gov /title24/2008standards/outdoorlighting

Policy T6.2: Improving Streetscapes. The City should make major efforts to improve the visual quality of streetscapes. Design of the streetscape, particularly in neighborhoods and commercial centers, should be pedestrian-oriented and include lighting, directional signs, trees, benches, and other support facilities.

Policy N1.5: Designing Commercial Development. Commercial development should be designed in a manner that is sensitive to surrounding residential uses.

Policy I/C4.3: Reducing Billboards. Billboards should be reduced or eliminated in commercial and residential areas in Oakland neighborhoods through mechanisms that minimize or do not require the expenditure of city funds.

Policy N1.8: Making Compatible Development. The height and bulk of commercial development in "Neighborhood Mixed-Use Center" and "Community Commercial" areas should be compatible with that which is allowed for residential development.

Policy T6.5: Protecting Scenic Routes. The City should protect and encourage enhancement of the distinctive character of scenic routes within the City, through prohibition of billboards, design review, and other means.

Policy N9.5: Marking Significant Sites. Identify locations of interest and historic significance by markers, signs, public art, landscape, installations, or by other means.

Policy N8.2: Making Compatible Interfaces between Densities. The height of development in urban residential and other higher density residential areas should step down as it nears lower density residential areas to minimize conflicts at the interface between the different types of development.

Open Space, Conservation and Recreation Element

The Open Space, Conservation and Recreation Element (OSCAR) promotes the preservation and good design of open space, and the protection of natural resources to improve aesthetic quality in Oakland. The following OSCAR policies are relevant to the aesthetics, shadow and wind impacts of the proposed Specific Plan:

Action OS-3.6.1: Landscape Screening Along Freeways. Require retention of existing landscape screening as a condition of development approval for any property adjacent to Highway 13, Highway 580, or Highway 24.

Policy OS-2.1: Protection of Park Open Space: Manage Oakland's urban parks to protect and enhance their open space character while accommodating a wide range of outdoor activities.

Policy OS-2.2: Schoolyard Enhancement: Enhance the availability and usefulness of Oakland's schoolyards and athletic fields as open space resources by (a) working with the Oakland Unified School District to make schoolyards and school athletic fields available to the public during non-school hours; (b) softening the harsh appearance of schoolyards by varying paving materials, landscaping, and restoring elements of the natural landscape, and (c) encouraging private schools, including church schools, to improve the visual appearance of asphalt yard areas.

Policy OS-4.4: Elimination of Blighted Vacant Lots. Discourage property owners from allowing vacant land to become a source of neighborhood blight, particularly in residential areas with large numbers of vacant lots.

Policy OS-9.3: Gateway Improvements. Enhance neighborhood and city identity by maintaining or creating gateways. Maintain view corridors and enhance the sense of arrival at the major entrances to the city, including freeways, BART lines, and the airport entry. Use public art, landscaping, and signage to create stronger City and neighborhood gateways.

Objective OS-10: Scenic Resources. Protect scenic views and improve visual quality.

Policy OS-10.1: View Protection. Protect the character of existing scenic views in Oakland, paying particular attention to: (a) views of the Oakland Hills from the flatlands; (b) views of downtown and Lake Merritt; (c) views of the shoreline; and (d) panoramic views from Skyline Boulevard, Grizzly Peak Road, and other hillside locations.

Policy OS-10.2: Minimizing Adverse Visual Impacts. Encourage site planning for new development which minimizes adverse visual impacts and takes advantage of opportunities for new vistas and scenic enhancement.

Policy OS-10.3: Underutilized Visual Resources. Enhance Oakland's underutilized visual resources, including the waterfront, creeks, San Leandro Bay, architecturally significant buildings or landmarks, and major thoroughfares.

Objective OS-11: Civic Open Spaces. To maintain and develop plazas, pocket parks, pedestrian walkways, and rooftop gardens in Oakland's major activity centers, and enhance the appearance of these and other public spaces with landscaping and art.

Policy OS-11.2: New Civic Open Space. Create new civic open spaces at BART Stations, in neighborhood commercial areas, on parking garages, and in other areas where high-intensity redevelopment is proposed.

Policy OS-11.3: Public Art Requirements. Continue to require public art as a part of new public buildings or facilities. Consider expanding the requirement or creating voluntary incentives to private buildings with substantial public spaces.

Action OS-11.3.1: Expanded Private Role in Providing Public Art. Study possible approaches to expanding the private sector's role in the city's public art program. Options should include development incentives (density bonuses) and an in-lieu fee based on square footage for major downtown development.

Policy OS-11.4: Siting Public Art. Site public art with sensitivity to its surroundings. Locate public art in a manner which does not reduce useable open space in City parks or impede recreational activities.

Objective OS-12: Street Trees. "Green" Oakland's residential neighborhoods and commercial areas with street trees.

Policy OS-12.1: Street Tree Selection. Incorporate a broad and varied range of tree species which is reflected on a city-maintained list of approved trees. Street tree selection should respond to the general environmental conditions at the planting site, including climate and micro-climate, soil types, topography, existing tree planting, maintenance of adequate distance between street trees and other features, the character of existing development, and the size and context of the tree planting area.

Action OS-12.1.1: Adoption of Street Tree Plan. Formally adopt a City of Oakland Street Tree Plan which addresses species selection for major streets and neighborhoods and contains criteria for tree planting, maintenance, and removal within the Plan, include a new procedure for implementing, amending, and updating the Plan, including changes to tree selection.

Action OS-12.1.2: Priorities for Planting. Identify streets and neighborhoods with the highest priority for street trees and establish a planting program targeting these areas.

Policy CO-7.4: Discourage the removal of large trees on already developed sites unless removal is required for biological, public safety, or public works reasons.

Scenic Highways Element

The Scenic Highways Element seeks to protect and enhance the distinctive character of scenic routes within the City. I-580 is identified as a designated scenic route in the Scenic Highways Element. Interstate 980 is identified as a route that could be considered for possible future designation. The following Scenic Highways Element policies are relevant to the aesthetics impacts of the proposed Specific Plan:

General Policies:

- Overhead utilities should be undergrounded along all freeways, scenic routes, and major streets. Programs should be developed to increase the present rate of undergrounding existing overhead utilities.
- Billboards should be prohibited and other signs should be controlled along freeways and parkways.

Specific Policies Related to MacArthur Freeway:

- The signs within the scenic corridors that are visible from the freeway should be for identification purposes only; no advertising should be permitted.
- Visual intrusions within the scenic corridor should be removed, converted buffered or screened from the motorist's view.
- Panoramic vistas and interesting views now available to the motorist should not be obliterated by new structures.
- New construction within the scenic corridor should demonstrate architectural merit and a harmonious relationship with the surrounding landscape.
- The ban of truck traffic on the MacArthur Freeway should continue indefinitely.

Oakland Municipal Code

The following provisions of the Oakland Municipal Code are relevant to the aesthetics impacts of the proposed Specific Plan:

Title 8: Health and Safety

Chapter 8.10: Graffiti. This chapter is to protect public and private property from acts of defacement by graffiti.

Chapter 8.24: Property Blight. This chapter requires a level of maintenance of residential, commercial, and industrial property that will protect and preserve the livability, appearance, and social and economic stability of the City.

Title 12: Streets, Sidewalks and Public Places

Chapter 12.32: Street Trees. This chapter outlines the provisions for protecting street trees. No new development shall make any tree or shrub improvement, or destroy, deface, or mutilate any tree or shrub along a public street without having first obtained a written permit from the City of Oakland Director of Parks and Recreation.

Chapter 12.36: Protected Trees. It is the interest of the City of Oakland and the community to protect and preserve trees by regulating their removal; to prevent unnecessary tree loss and minimize environmental damage from improper tree removal; to encourage appropriate tree replacement plantings; to effectively enforce tree preservation regulations; and to promote the appreciation and understanding of trees.

Title 17: Planning

Under the Planning Code, every zone within the City requires that new residential developments are subject to a design review process. No Local Register Property, residential facility, mixed-use development, telecommunications facility, sign, or other associated structure shall be constructed, established, or altered in exterior appearance unless the plans have been approved pursuant to the design review procedure in Chapter 17.136. Title 17 also outlines sign limitations, height restrictions, usable open space requirements, and minimum yards for residential developments located in each zone.

Chapter 17.124: Landscaping and Screening Standards. This chapter prescribes standards for development and maintenance of planting, fences, and walls; for the conservation and protection of property; and through improvements of the appearance of individual properties, neighborhoods, and the City.

Chapter 17.136: Design Review Procedure. In accordance with Chapter 17.136 of the Oakland Planning Code, future individual development projects within the Planning Area would be subject to Design review. Design review considers the visible features of a project and the project's relationship to its physical surroundings. Although independent of CEQA and the EIR process, design review is focused on ensuring quality design, and on avoiding potentially adverse aesthetic effects. Projects are evaluated based on site, landscaping, height, bulk, arrangement, texture, materials, colors, appurtenances, potential shadowing effects on adjacent properties, and other characteristics.

Standard Conditions of Approval

The City's Standard Conditions of Approval relevant to this aesthetics, shadow and wind are listed below. These Standard Conditions of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area when it is approved by the City and would ensure that significant impacts would not occur.

> **SCA 39: Lighting Plan**. *Prior to the issuance of an electrical or building permit*. The proposed lighting fixtures shall be adequately shielded to a point below the light bulb and reflector and that prevent unnecessary glare onto adjacent properties. Plans shall be submitted to the Planning and Zoning Division and the Electrical Services Division of the Public Works Agency for review and approval. All lighting shall be architecturally integrated into the site.
>
> **SCA 44: Tree Removal Permit**. *Prior to issuance of a demolition, grading, or building permit*. Prior to removal of any protected trees, per the Protected Tree Ordinance, located on the project site or in the public right-of-way adjacent to the project, the project applicant must secure a tree removal permit from the Tree Division of the Public Works Agency, and abide by the conditions of that permit.
>
> **SCA 45: Tree Replacement Plantings**. *Prior to issuance of a final inspection of the building permit*. Replacement plantings shall be required for erosion control, groundwater replenishment, visual

screening and wildlife habitat, and in order to prevent excessive loss of shade, in accordance with the following criteria:

a. No tree replacement shall be required for the removal of nonnative species, for the removal of trees which is required for the benefit of remaining trees, or where insufficient planting area exists for a mature tree of the species being considered.

b. Replacement tree species shall consist of Sequoia sempervirens (Coast Redwood), Quercus agrifolia (Coast Live Oak), Arbutus menziesii (Madrone), Aesculus californica (California Buckeye) or Umbellularia californica (California Bay Laurel) or other tree species acceptable to the Tree Services Division.

c. Replacement trees shall be at least of twenty-four (24) inch box size, unless a smaller size is recommended by the arborist, except that three fifteen (15) gallon size trees may be substituted for each twenty-four (24) inch box size tree where appropriate.

d. Minimum planting areas must be available on site as follows:

   i. For Sequoia sempervirens, three hundred fifteen square feet per tree;

   ii. For all other species listed in #2 above, seven hundred (700) square feet per tree.

e. In the event that replacement trees are required but cannot be planted due to site constraints, an in lieu fee as determined by the master fee schedule of the city may be substituted for required replacement plantings, with all such revenues applied toward tree planting in city parks, streets and medians.

f. Plantings shall be installed prior to the issuance of a final inspection of the building permit, subject to seasonal constraints, and shall be maintained by the project applicant until established. The Tree Reviewer of the Tree Division of the Public Works Agency may require a landscape plan showing the replacement planting and the method of irrigation. Any replacement planting which fails to become established within one year of planting shall be replanted at the project applicant's expense.

SCA 46: Tree Protection During Construction. *Prior to issuance of a demolition, grading, or building permit*. Adequate protection shall be provided during the construction period for any trees which are to remain standing, including the following, plus any recommendations of an arborist:

a. Before the start of any clearing, excavation, construction or other work on the site, every protected tree deemed to be potentially endangered by said site work shall be securely fenced off at a distance from the base of the tree to be determined by the City Tree Reviewer. Such fences shall remain in place for duration of all such work. All trees to be removed shall be clearly marked. A scheme shall be established for the removal and disposal of logs, brush, earth and other debris which will avoid injury to any protected tree.

b. Where proposed development or other site work is to encroach upon the protected perimeter of any protected tree, special measures shall be incorporated to allow the roots to breathe and obtain water and nutrients. Any excavation, cutting, filing, or compaction of the existing ground surface within the protected perimeter shall be minimized. No change in existing ground level shall occur within a distance to be determined by the City Tree Reviewer from the base of any protected tree at any time. No burning or use of equipment with an open flame shall occur near or within the protected perimeter of any protected tree.

c. No storage or dumping of oil, gas, chemicals, or other substances that may be harmful to trees shall occur within the distance to be determined by the Tree Reviewer from the base of any protected trees, or any other location on the site from which such substances might enter the protected perimeter. No heavy construction equipment or construction materials shall be operated or stored within a distance from the base of any protected trees to be determined by the tree reviewer. Wires, ropes, or other devices shall not be attached to any protected tree, except as needed for support of the tree. No sign, other than a tag showing the botanical classification, shall be attached to any protected tree.

d. Periodically during construction, the leaves of protected trees shall be thoroughly sprayed with water to prevent buildup of dust and other pollution that would inhibit leaf transpiration.

e. If any damage to a protected tree should occur during or as a result of work on the site, the project applicant shall immediately notify the Public Works Agency of such damage. If, in the professional opinion of the Tree Reviewer, such tree cannot be preserved in a healthy state, the Tree Reviewer shall require replacement of any tree removed with another tree or trees on the same site deemed adequate by the Tree Reviewer to compensate for the loss of the tree that is removed.

f. All debris created as a result of any tree removal work shall be removed by the project applicant from the property within two weeks of debris creation, and such debris shall be properly disposed of by the project applicant in accordance with all applicable laws, ordinances, and regulations.

Impacts, Standard Conditions of Approval and Mitigation Measures

Significance Criteria

According to the City's Thresholds of Significance, the Specific Plan would have a significant impact related to aesthetics, shadow and wind if it would:

1. Have a substantial adverse effect on a public scenic vista[5];
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings, located within a state or locally designated scenic highway;
3. Substantially degrade the existing visual character or quality of the site and its surroundings;
4. Create a new source of substantial light or glare which would substantially and adversely affect day or nighttime views in the area;
5. Introduce landscape that would now or in the future cast substantial shadows on existing solar collectors (in conflict with California Public Resource Code sections 25980-25986);
6. Cast shadow that substantially impairs the function of a building using passive solar heat collection, solar collectors for hot water heating, or photovoltaic solar collectors;
7. Cast shadow that substantially impairs the beneficial use of any public or quasi-public park, lawn, garden, or open space;
8. Cast shadow on an historic resource, as defined by CEQA Guidelines section 15064.5(a), such that the shadow would materially impair the resource's historic significance by materially altering those physical characteristics of the resource that convey its historical significance and that justify its inclusion on or eligibility for listing in the National Register of Historic Places, California Register of Historical Resources, Local Register of historical resources, or a historical resource survey form (DPR Form 523) with a rating of 1-5;

[5] Only impacts to scenic views enjoyed by members of the public generally (but not private views) are potentially significant.

9. Require an exception (variance) to the policies and regulations in the General Plan, Planning Code, or Uniform Building Code, and the exception causes a fundamental conflict with policies and regulations in the General Plan, Planning Code, and Uniform Building Code addressing the provision of adequate light related to appropriate uses; or
10. Create winds that exceed 36 mph for more than one hour during daylight hours during the year.[6]

Scenic Vistas

Impact Aesth-1: There are no officially designated public scenic vistas within or near the Planning Area. No scenic vistas or view corridors would be substantially obstructed, degraded or adversely affected by development in accordance with the Specific Plan. The impacts of the Specific Plan on scenic vistas would therefore be less than significant. (**LTS**)

A project would have an impact on a scenic vista if it would obstruct views or introduce visual elements that would dominate or upset the textures, colors, lines, or overall visual quality of the view. Private scenic vistas as seen from individual private homes are not protected under the City of Oakland General Plan and are not an environmental issue requiring analysis in accordance with CEQA.

There are no officially designated scenic vistas within the Planning Area. The low elevation, flat terrain, and existing development within the Planning Area limit views. Some public vantage points within the Planning Area have limited views of Downtown Oakland, the East Bay hills or cranes at the Port of Oakland. Public views of the Planning Area and public views through the area to Downtown Oakland, the Port of Oakland or the East Bay hills are available primarily from the surrounding elevated freeways and the West Grand Avenue gateway, the elevated BART line, and the East Bay hills and neighborhoods at higher elevations to the west.

Infill development and redevelopment of vacant and blighted properties and facilities, improvements to streetscapes and the public realm, and new landscaping and street trees would improve the quality of views of the Planning Area from public vantage points. Focusing new development within the Opportunity Areas and preserving established neighborhoods would avoid substantial obstruction of limited views of Downtown Oakland and the East Bay hills from public vantage points within the adjacent residential neighborhoods.

Throughout most of West Oakland, no changes in the maximum allowed building heights is proposed as part of the Specific Plan, with the exception of the West Oakland BART Station TOD site. The currently effective building heights proscribed under current zoning that are applicable to the West Oakland BART Station TOD area allow for a maximum building height of 120 feet nearest to I-880, stepping down to 90 feet along 7th Street, and between 60 and 75 feet nearest to the adjacent South Prescott neighborhood. Under these current height limits, new buildings would likely be bulky and block-shaped with 60-foot to

---

[6] The wind analysis only needs to be done if the project's height is 100 feet or greater (measured to the roof) and one of the following conditions exist: (a) the project is located adjacent to a substantial water body (i.e., Oakland Estuary, Lake Merritt or San Francisco Bay); or (b) the project is located in Downtown. Downtown is defined in the Land Use and Transportation Element of the General Plan (page 67) as the area generally bounded by West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland Estuary to the south and I-980/Brush Street to the west. The wind analysis must consider the project's contribution to wind impacts to on- and off-site public and private spaces. Only impacts to public spaces (on- and off-site) and off-site private spaces are considered CEQA impacts. Although impacts to on-site private spaces are considered a planning-related non-CEQA issue, such potential impacts still must be analyzed.

75-foot street walls at the exterior perimeters. The Specific Plan proposes amending the current Zoning Code's height limits to provide for a more precisely defined urban form. At the West Oakland BART Station TOD, the Specific Plan proposes an increase in the maximum allowed building height from the existing height limits of 120 feet (which is currently applicable to parcels adjacent to the I-880 freeway) to allow building heights of up to 160 feet along 7th Street and east of Union Street, 140 feet along 7th Street and east of Union Street, and 140 feet on those parcels adjacent to the I-880 freeway. The Plan would also provide a more effective and substantial transition in building heights nearest to the South Prescott neighborhood, with buildings nearest to this neighborhood as low as 2-stories. These proposed taller building heights would not be expected to block views of Downtown Oakland or the East Bay hills from most public vantage point in and around the Planning Area, or from the I-580 and I-880 gateways to the city identified in the General Plan. The proposed intensity of new development elsewhere throughout West Oakland would generally not exceed a maximum of five stories in height.

The hills to the west have often spectacular views over the Planning Area to San Francisco Bay. Given the elevation of the Planning Area relative to these vantage points, as well as the expansiveness of views from these locations, development under the Specific Plan would not substantially obstruct or degrade these scenic vistas.

No scenic vistas or view corridors would be substantially obstructed or degraded by future development in accordance with the Specific Plan. The impacts of the Specific Plan on scenic vistas would therefore be less than significant.

Mitigation Measures

None needed

Scenic Highways

Impact Aesth-2: Development and public realm improvements in accordance with the Specific Plan would not substantially damage scenic resources, including trees or historic buildings, but rather would improve the quality of views of the Planning Area from the I-580 scenic highway. The impacts of the Specific Plan related to scenic highways would be less than significant. (**LTS**)

Interstate 580 is identified as a designated scenic route in the City of Oakland General Plan Scenic Highways Element and I-980 is identified as a route that could be considered for possible future designation. The segment of I-580 within and adjacent to the Planning Area is elevated (as is the northern portion of I-980 and the entire length of I-880). The elevated freeway affords occasional views of the Planning Area and views across the Planning Area to Downtown Oakland, the Port of Oakland or the East Bay hills.

Infill development and redevelopment of vacant and blighted properties and facilities, improvements to streetscapes and the public realm, and new landscaping and street trees would improve the quality of views of the Planning Area from the I-580 scenic route. The City of Oakland Tree Protection Ordinance and SCA 45, *Tree Removal Permit*, SCA 46, *Tree Replacement Plantings* and SCA 47, *Tree Protection During Construction* require any project that involves the removal of any tree protected by the Tree Protection Ordinance to first obtain a permit from the City and comply with any conditions of the permit, including replacement plantings and protection of remaining trees during construction. The Specific Plan would encourage the preservation, rehabilitation, adaptive reuse and showcasing of historic buildings within Planning Area.

No changes in maximum allowed building heights are proposed as part of the Specific Plan. New development would generally not exceed a maximum of five stories in height, except at the 7th Street BART Station TOD, where the Plan proposes buildings up to the maximum height allowed by current zoning (75 feet along the north side of 7th Street and adjacent to the south Prescott neighborhood, stepping up to 90 feet at the BART station and along the south side of 7th Street, and 120 feet near the freeway). These proposed building heights at these locations would not be expected to block views of Downtown Oakland, the Port of Oakland or the East Bay hills from most public vantage point in and around the Planning Area, or from the I-580 and I-880 gateways to the city identified in the General Plan.

Development and public realm improvements in accordance with the Specific Plan would not substantially damage scenic resources, including trees or historic buildings, but rather would improve the quality of views of the Planning Area from the I-580 scenic route. The impacts of the Specific Plan related to scenic highways would be less than significant.

Mitigation Measures

None needed

Visual Character or Quality

Impact Aesth-3: Development and public realm improvements in accordance with the Specific Plan would not substantially degrade the existing visual character or quality of any sites and their surroundings, but would substantially improve the existing visual character and quality of the Planning Area. Infill development and redevelopment would repair the existing inconsistent urban fabric where such inconsistencies exist, and result in a more unified and coherent development character. The proposed land use patterns and development types, and focusing change in the Opportunity Areas while preserving established residential neighborhoods, would provide sensitive transitions to existing development, reinforce the character of residential and non-residential areas, and harmonize existing incompatibilities. Gateway and streetscape improvements, and development of new activity nodes, would improve visual quality and reinforce community identity. The impacts of the Specific Plan on visual character and quality would be less than significant. (**LTS**)

The Project would not degrade, but rather would substantially improve the existing visual character and quality of the Planning Area. Implementation of the proposed Specific Plan would promote a more appealing and coherent visual character in the Planning Area. Community revitalization and development in accordance with the Specific Plan would occur as infill development on vacant land and intensification of underutilized parcels, primarily within industrial areas, along commercial corridors and around the West Oakland BART Station. The Specific Plan would harmonize existing incompatible industrial uses within residential and mixed-use areas. Infill development would result in more compatible land use patterns and a more unified visual character. Artist’s renderings illustrating the intended character and quality of planned new development are shown on the following **Figures 4.1-1 through 4.1-6**.

Existing

Proposed

Source: JRDV Urban International

Figure 4.1-1
Atrist's Rendering, Mandela at 26th Street

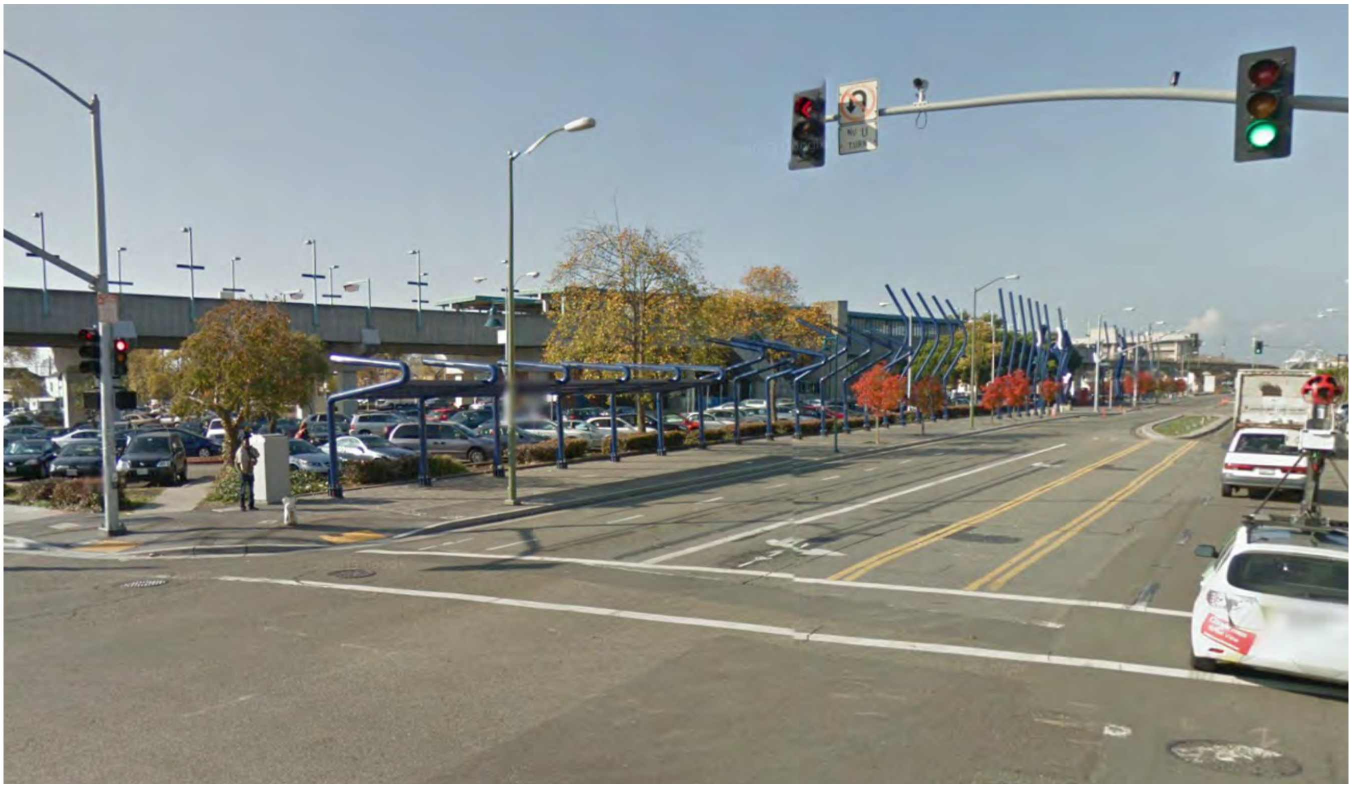
Existing

Proposed

Source: JRDV Urban International

Figure 4.1-2
Atrist's Rendering, 7th Street Corridor

West Oakland Specific Plan, Draft EIR



Existing

Proposed

Source: JRDV Urban International

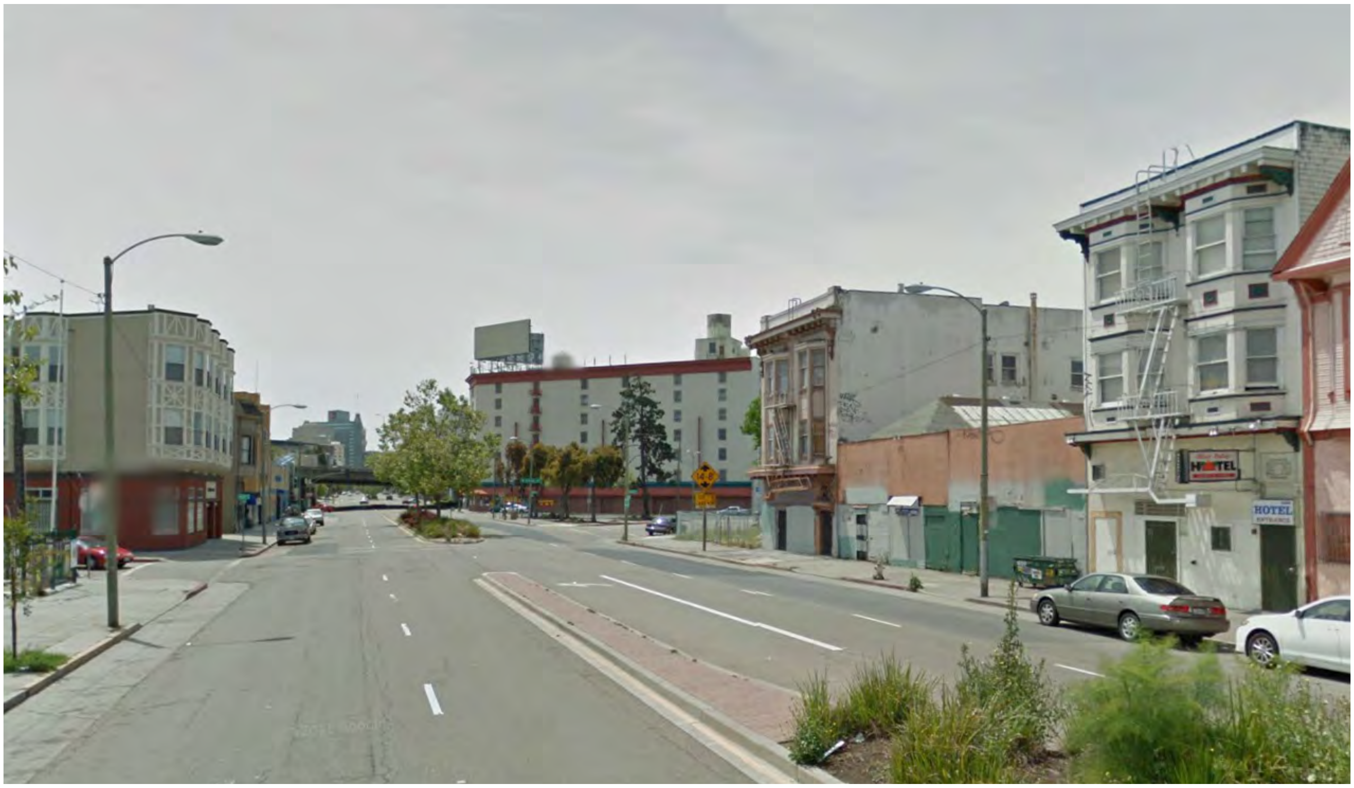
Figure 4.1-3
Atrist's Rendering, West Oakland BART Station

Existing

Proposed

Source: JRDV Urban International

Figure 4.1-4
Atrist's Rendering, 3rd Street Area



Existing

Proposed

Source: JRDV Urban International

Figure 4.1-5
Atrist's Rendering, San Pablo Avenue

Gateway and streetscape improvements, and development of new activity nodes, would reinforce West Oakland's unique sense of place. The Specific Plan would encourage the creation of distinct gateways and improve the visual quality beneath freeway overpasses at key entries into the community, which would enhance community character and identity. Streetscape improvements encouraged by the Specific Plan, including lane reductions, repairing sidewalks, improving landscaping, displaying public art, marking local historical and cultural sites, increasing public seating and planting trees, would enhance the appearance of corridors. The Plan proposal for a neighborhood activity node at the West Grand Avenue/Market Street intersection with a new grocery store and neighborhood-serving retail, and at the West Oakland BART Station, would also reinforce community identity. The Specific Plan would facilitate development of taller buildings concentrated at the West Oakland BART Station area, and thus promote a more discernible and distinctive community form and skyline.

Infill development on vacant land, and intensification and redevelopment of underutilized properties would repair the existing inconsistent urban fabric where such inconsistencies exist, and result in a more unified and coherent development character. The proposed development types and streetscape improvements would ultimately improve the visual quality and character of the Planning Area and enhance views from adjacent residential neighborhoods, travel corridors, and other nearby vantage points. By focusing change within the Opportunity Areas while preserving and enhancing existing established residential neighborhoods outside the Opportunity Areas, the character of historic residential neighborhoods would be preserved.

Infill development and redevelopment of vacant and blighted properties and facilities, improvements to streetscapes and the public realm, and new landscaping and street trees would improve the visual quality of Planning Area as seen from the I-580 scenic route and the I-80 and I-880 gateways to Oakland identified in the General Plan.

The Specific Plan would result in an overall more coherent and compatible visual character within and surrounding the Opportunity Areas and improved visual quality throughout the Planning Area. The Specific Plan policies for land use patterns and development types would provide for sensitive transitions to existing development. The impact of the Specific Plan on visual character and quality would therefore be less than significant.

Mitigation Measures

None needed

Light and Glare

Impact Aesth-4: Development facilitated by the Specific Plan would create new sources of light and glare, but these new sources would be consistent with typical light and glare conditions. Subsequent individual projects would not substantially and adversely affect day or nighttime views in the area. New light would be required to meet the lighting power allowances for the applicable lighting zone for newly installed outdoor lighting equipment required by Title 24, Parts 1 and 6, Building Energy Efficiency Standards. Subsequent individual projects would also be required to implement SCA 39, *Lighting Plan*. With required adherence to Title 24 lighting power allowances and implementation of SCA 39, light and glare impacts would be less than significant. (**LTS with SCA**)

Development facilitated by the Project would result in additional lighting and increased light emanating from within the Planning Area. New sources of light would be installed as part of new buildings and site improvements to illuminate entries, parking areas, sidewalks and open spaces, for safety and security, and to highlight architectural features. New lighting would be consistent with typical light and glare conditions for residential and non-residential uses and would not create new sources of substantial light or glare which would substantially and adversely affect nighttime views in the area. There are already numerous sources of light and glare associated with existing development in West Oakland and the surrounding vicinity. The Specific Plan would encourage replacement of existing incompatible heavy industrial and transportation uses and associated lighting with uses more compatible with surrounding residential neighborhoods.

Individual projects would be required to meet the lighting power allowances for the applicable lighting zone for newly installed outdoor lighting equipment, as required by Title 24, Parts 1 and 6, Building Energy Efficiency Standards. Individual projects would also be required to implement SCA 39, *Lighting Plan*. Final lighting design plans must be submitted to the Planning and Zoning Division and the Electrical Services Division of the Public Works Agency for their review and approval.

With required adherence to Title 24 lighting power allowances and implementation of SCA 39, light and glare impacts would be less than significant.

Mitigation Measures

None needed

Shadow

Impact Aesth-5: The project would not cast shadows that substantially impairs the function of a building using passive solar heat collection, solar collectors for hot water heating, or photovoltaic solar collectors; cast shadow that substantially impairs the beneficial use of any public or quasi-public park, lawn, garden, or open space; or cast shadow on an historic resource such that the shadow would materially impair the resource's historic significance. The shadow impacts of the Specific Plan would be less than significant. (**LTS**)

Computer modeling of shadow impacts conducted for this Specific Plan shows that, on December 21 when shadow lengths are longest, development under the Plan would shadow only a limited portion of five of the West Oakland parks for a limited duration. No shadows would be cast on the 23 other parks, open spaces and school grounds in the Planning Area. With evaluation of shadows as part of the City's standard design review and environmental review of development applications, development allowed by the Specific Plan would not introduce landscaping that would cast substantial shadows on solar collectors or passive solar heating. None of the nine significant historic resources within the Opportunity Areas contains a light-sensitive feature and development under the Specific Plan would not cast substantial shadows on any of these historic resources.

The shadow impacts of development under the Project were analyzed at a project level using computer three-dimensional modeling. The computer modeling was conducted for the city by JRDV Architects using Google SketchUp software. The assumed building placement, height and massing of development for each Opportunity Site is based on the development assumptions identified in Chapter 3, Project Description. Based on the City's shadow impact Thresholds of Significance, shadows were simulated for 9:00 a.m., 12:00 p.m., and 3:00 p.m. for the Spring Equinox, Fall Equinox and Winter Solstice. The modeling results for the overall Planning Area for 9:00 a.m. and 3:00 p.m. on December 21, the Winter Solstice, are presented in **Appendix 4.1**. These times represent the "worst-case" shadow conditions, when shadow lengths are longest and the potential for loss of access to sunlight due to an adjacent structure is greatest.

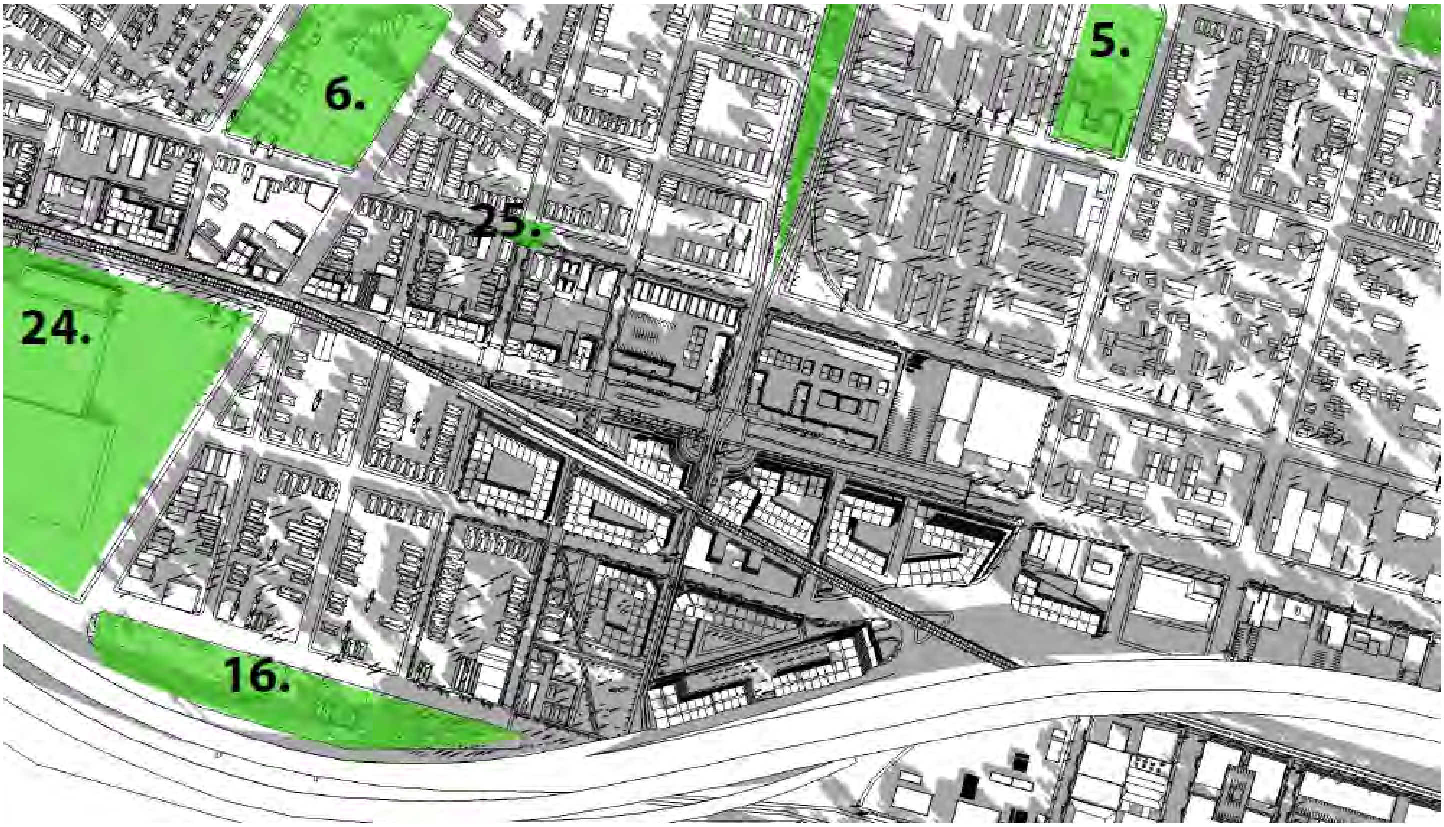
Development under the Specific Plan could potentially cast shadows on shadow-sensitive land uses and features of concern. Shadow-sensitive land uses and features, as identified by the City's CEQA Thresholds of Significance, include any public or quasi-public park, lawn, garden, or open space; shadow-sensitive significant historic resource; and solar collectors or buildings using passive solar heat collection. The shadow impacts on each of these shadow-sensitive land use and features is summarized below.

Public Parks or Open Space

There are 28 public or quasi-public parks, lawns, gardens, open spaces or school grounds within the Planning Area that were considered for potential shadow impacts. About half of the public parks or open spaces within the Planning Area are located within or near an Opportunity Area. Three of these facilities (Cypress Freeway Memorial Park, Raimondi Park, and Wood Street Pocket Park) are located within the Mandela/West Grand Opportunity Area and three (25th Street Park, Brush Street Park, and St. Andrew's Plaza) are located within the San Pablo Avenue area. There are no public parks or open spaces within the 7th Street Opportunity Area or 3rd Street opportunity Area. An additional three parks (Poplar Park, South Prescott Park, and Wade Johnson Park) are located adjacent to an Opportunity Area.

The shadow modeling results for these nine parks for December 21, which represents the "worst case" shadow conditions when shadow lengths are longest, are summarized in **Table 4.1-1** and illustrated in **Figures 4.1-7**. Development under the Specific Plan would cast no shadows on Poplar Park, South Prescott Park, Wade Johnson Park, or Wood Street Pocket Park. Development under the Specific Plan would shadow the eastern edge of 25th Street Park at 9:00 a.m. and the southern edge of Raimondi Park at 3:00 p.m., and the eastern third of Brush Street Park and St. Andrew's Plaza at 3:00 p.m. Shadow impacts would be less at 12:00 p.m. on December 21; at 9:00 a.m., 12:00 p.m., and 3:00 p.m. on the Spring Equinox, Fall Equinox and Summer Solstice; and on all other days of the year. The tallest of the Specific Plan's proposed buildings would occur at the West Oakland ABRT Station TOD development area, where building heights would be a maximum of 160 feet tall. As shown on **Figure 4.1-7,** these tall buildings would not cast shadows that would adversely affect any public parks or open space resources.

Development under the Specific Plan would not cast shadows on any of the other public parks, open spaces or school grounds within the Planning Area. Considering the limited area and duration of shadowing, development under the Specific Plan would not cast shadows that would substantially impair the beneficial use of any public or quasi-public park, lawn, garden, or open space.



December 21, 9:00 AM

December 21, 3:00 PM

Source: JRDV Urban International

Figure 4.1-7
Shadow Impacts, Winter Solstice - at Proposed West Oakland BART Station TOD

Table 4.1-1: Shadow Impacts on Public Parks and Open Spaces

Public Park or Open Space	December 21, 9:00 a.m.	December 21, 3:00 p.m.
25th Street Park	Project shadows eastern edge.	No Project shadows.
Brush Street Park	No Project shadows.	Project shadows eastern third.
Cypress Freeway Memorial Park	2 of 18 blocks shadowed by campus development near West Grand Ave.	1 of 18 blocks shadowed by campus development near West Grand Ave.
Poplar Park	No Project shadows.	No Project shadows.
Raimondi Park	No Project shadows.	Project shadows southern edge.
South Prescott Park	No Project shadows.	No Project shadows.
St. Andrew's Plaza	No Project shadows.	Project shadows eastern third.
Wade Johnson Park	No Project shadows.	No Project shadows.
Wood Street Pocket Park	No Project shadows. Half shadowed by Wood Street Project.	No Project shadows. Completely shadowed by Wood Street Project.

Solar Collectors or Passive Solar Heating

Development facilitated by the Specific Plan could potentially cast shadows on solar collectors or the passive solar design of neighboring buildings. The City's Standard Conditions of Approval do not specifically address shadow impacts. However, as part of the standard design review required for each individual development application in the City, potential impacts of proposed new landscaping on shadow-sensitive land uses and features of concern are routinely analyzed by City staff, and design changes are requested of applicants to avoid such impacts, prior to approval of any project. The City tracks the locations of solar collectors through its permit tracking system, which are issued an "SE" permit through the Building Services Division. The regular design review criteria in the Planning Code include a finding "that the proposed design will protect, preserve, or enhance desirable neighborhood characteristics;" this finding is used by Planning staff to evaluate potential shadow impacts, including through shadow studies. With evaluation of shadows as part of the City's standard design review of development applications, development allowed by the Specific Plan would not introduce landscaping that would cast shadows on existing solar collectors or cast shadows that substantially impair the function of a building using passive solar heat collection, solar collectors for hot water heating, or photovoltaic solar collectors. Therefore, the shadow impacts of the Specific Plan on solar collectors or passive solar heating would be less than significant.

Significant Historic Resources

There are nine properties within the Mandela/West Grand, 7th Street and 3rd Street Opportunity Areas that are considered significant historic resources as defined by CEQA Guidelines section 15064.5(a), which are listed below. The San Pablo Avenue Opportunity Area contains no significant historic resources.

- 1600 7th Street, Flynn (Edward) Saloon – McAllister Plumbing
- 1620-24 7th Street, Site of the former Lincoln Theater
- 1632-42 7th Street, Arcadia Hotel – Isaacs & Schwartz block
- 1600-14 Campbell Street, Oakland Warehouse Company – GE Mazda Lamp Works

- 100-50 Linden Street, California Packing Corporation – Del Monte cannery
- 1340 Mandela Parkway, Coca-Cola Company Bottling Plant
- 101 Myrtle Street, California Packing Corporation – Label Plant
- 2401-49 Peralta Street, Merco Nordstrom Valve Company factory
- 1405 Wood Street, Southern Pacific 16th Street Station

None of these resources contains a light-sensitive feature, the shadowing of which would materially impair the resource's historic significance. The shadow modeling results indicate that development of surrounding properties in accordance with the Specific Plan would not cast shadows on these historic resources. Therefore, development allowed by the Specific Plan would not cast shadow on a historic resource such that the shadow would materially impair the resource's historic significance, and the shadow impacts of the Specific Plan on significant historic resources would be less than significant.

Mitigation Measures

None needed

Adequate Lighting

Impact Aesth-6: The Project does propose changes to any of those existing General Plan policies or zoning or building regulations, and would not cause a fundamental conflict with those policies and regulations in the General Plan, Planning Code and Uniform Building Code, that address the provision of adequate light related to appropriate uses. The impacts of the Specific Plan related to consistency with policies and regulations addressing the provision of adequate light related to appropriate uses would be less than significant. (**LTS**)

Existing policies and regulations addressing the provision of adequate light related to appropriate uses would continue to apply to subsequent development projects within the Planning Area. Future individual development projects within the Planning Area would also be subject to design review in accordance with Chapter 17.136 of the Oakland Planning Code. The Specific Plan would not cause a fundamental conflict with policies and regulations in the General Plan, Planning Code, and Uniform Building Code addressing the provision of adequate light related to appropriate uses. Therefore, the impacts of the Specific Plan related to consistency with policies and regulations addressing the provision of adequate light related to appropriate uses would be less than significant.

Mitigation Measures

None needed

Wind

Impact Aesth-7: The Planning Area does not lie within the area identified by the City as requiring modeling for evaluation of wind impacts. Therefore, the wind impacts of the Specific Plan would be less than significant. (**LTS**)

The City of Oakland requires wind modeling for proposed structures that are 100 feet or greater (measured to the roof) and one of the following conditions exist: (a) the project is located adjacent to a substantial water body (i.e., Oakland Estuary, Lake Merritt or San Francisco Bay); or (b) the project is located in Downtown. Downtown is defined in the Land Use and Transportation Element of the General Plan as the area generally bounded by West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland Estuary to the south and I-980/Brush Street to the west.

The Planning Area does not lie within the area requiring modeling for evaluation of wind impacts. With the exception of the West Oakland BART Station TOD, new development would generally not exceed 100 feet. Although higher density development near the West Oakland BART Station could reach as high as 160 feet in certain locations, the TOD site is not adjacent to the Oakland Estuary, Lake Merritt or San Francisco Bay, nor is it located in Downtown. Therefore, the wind impacts of the Specific Plan would be less than significant.

Mitigation Measures

None needed

Cumulative Aesthetic, Shadow and Wind Impacts

Cumulative Impact Aesth-8: Cumulative development would change the visual character of developed areas toward a less industrial and more intensive, urban character. The policies of the Specific Plan and other existing plans, regulations and guidelines, including Design Review and the City's Standard Conditions of Approval, would adequately address visual quality. Cumulative development would not substantially obstruct scenic vistas from or degrade the visual character of the I-80 and I-880 gateways or the I-580 scenic route. With required adherence to Title 24 lighting power allowances and implementation of SCA 40, *Lighting Plan*, cumulative light and glare impacts would be less than significant. The Planning Area does not lie within the area requiring modeling for evaluation of wind impacts and thus would not result in a considerable contribution to any significant cumulative impacts related to wind. Cumulative aesthetics, shadow and wind impacts would be less than significant. (**LTS**)

Cumulative development would change the visual character of developed areas toward a less industrial and more intensive, urban character. The policies of the Specific Plan and other existing plans, regulations and guidelines, including Design Review and the City's Standard Conditions of Approval, would adequately address localized visual quality and compatibility. In addition, the Specific Plan would be expected to result in beneficial impacts or less-than-significant impacts with respect to visual character and quality, scenic vistas, scenic highways, light and glare, and shadows.

Development facilitated by the Specific Plan, together with other reasonably foreseeable development, notably the 2012 Oakland Army Base Project[7], would alter the visual character of the I-80 and I-880 gateways to Oakland, and affect views from the I-580 scenic route and elevated segments of I-880. In the 2012 Oakland Army Base Project Initial Study/Addendum, the City concluded that the project level and cumulative aesthetic impacts of the 2012 Oakland Army Base Project would be less than significant.[8] With the exception of the West Oakland BART Station transit village, new development would generally not exceed a maximum of five stories in height and thus would not be expected to block views of

---

7 The 2012 Oakland Army Base Project would provide a new state-of-the-art Trade and Logistics Center, with warehouse and distribution facilities to support cargo logistics, and associated roadway, railroad and infrastructure improvements. The 2012 Oakland Army Base Project would also include nine new LED or back lit billboards along I-80 and I-880.

8 City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012, pp. 82-118.

Downtown Oakland, the Port of Oakland or the East Bay hills. No scenic vistas or view corridors would be substantially obstructed or degraded by development allowed by the Specific Plan. Therefore, cumulative development would not substantially obstruct scenic vistas from or degrade the visual character of the I-80 and I-880 gateways or the I-580 scenic route.

Development facilitated by the Specific Plan, together with other reasonably foreseeable development, would cause an incremental change in the character of scenic vistas of urban areas and San Francisco Bay from the East Bay hills and neighborhoods at higher elevations to the east toward a more developed character. However, given the expansiveness of these views and the small amount of additional development relative to the existing amount of urban development in these views, this change would not have a substantial effect on scenic vistas.

Cumulative development would generally increase nighttime lighting; however, with required adherence to Title 24 lighting power allowances and implementation of SCA 40, *Lighting Plan*, cumulative light and glare impacts would be less than significant.

The Planning Area does not lie within the area requiring modeling for evaluation of wind impacts and thus would not result in a considerable contribution to any significant cumulative impacts related to wind.

Mitigation Measures

None needed

4.2

Air Quality

This chapter describes existing air quality, identifies potential air quality impacts of the Specific Plan, discusses the effects of air quality on the Specific Plan and recommends mitigation measures to reduce or eliminate potentially significant air quality impacts where possible and appropriate. This analysis has been prepared using methodologies and assumptions from the May, 2012 Bay Area Air Quality Management District's (BAAQMD) California Environmental Quality Act Air Quality Guidelines (CEQA Guidelines).

The analysis of greenhouse gas emissions and global climate change is presented in Chapter 4.4: Greenhouse Gas Emissions. Impacts associated with the potential release of asbestos during demolition and construction activities are discussed in Chapter 4.5 Hazards and Hazardous Materials.

Physical Setting

This section describes the regional and local topography and climate that influence air quality, air pollutants of concern, relevant air quality standards, current air quality and attainment status, and existing air pollution sources and sensitive receptors in and around the Planning Area.

Regional Air Quality

The Planning Area is located within the City of Oakland, which is located in the San Francisco Bay Area Air Basin (SFBAAB), a large, shallow air basin ringed by hills that taper into a number of sheltered valleys around the perimeter. Two primary atmospheric outlets exist. One is through the Golden Gate Strait, a direct outlet to the Pacific Ocean. The second outlet extends to the northeast, along the west delta region of the Sacramento and San Joaquin Rivers.

The City of Oakland is within the jurisdiction of the BAAQMD. Air quality conditions in the SFBAAB have improved significantly since BAAQMD was created in 1955. Ambient concentrations of air pollutants and the number of days during which the region exceeds air quality standards have fallen dramatically. Exceedance of air quality standards occurs primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons.

Ozone levels, measured by peak concentrations and the number of days over the State 1-hour standard, have declined substantially as a result of aggressive programs by the BAAQMD and other regional, State and Federal agencies. The reduction of peak concentrations represents progress in improving public health; however, the Bay Area still exceeds the State standard for 1-hour ozone.

Levels of particulate matter (PM_{10} and $PM_{2.5}$) in the Bay Area have exceeded State standards at least two times per year during the past three years. The Bay Area is considered a non-attainment area for PM_{10} and $PM_{2.5}$ relative to the State standard, and unclassified for the federal standards.

No exceedance of the State or federal carbon monoxide (CO) standards has been recorded at any of the region's monitoring stations since 1991. The Bay Area is currently considered a maintenance area for State and federal CO standards.

The BAAQMD's 2009 Ozone Attainment Plan (OAP) contains district-wide control measures to reduce ozone precursor emissions (e.g., ROG and NO_x) and particulate matter. Ozone, in particular, results from the reaction of organic gases (ROG) and nitrogen oxide (NO_x) in the atmosphere. To reduce ozone, its precursors (ROG and NO_x) are regulated. The State standards for these pollutants are at least as stringent as the national standards.

Toxic air contaminants (TACs) are not criteria pollutants, but are associated with health-related effects and have appreciable concentrations in the Bay Area. The US Environmental protection Agency (EPA) and the California Air Resources Board (ARB) have identified over 800 substances that are emitted into the air that may affect human health. Some of these substances are considered to be carcinogens, while others are known to have other adverse health effects. As part of ongoing efforts to identify and assess potential health risks to the public, BAAQMD has collected and compiled air toxic emissions data from industrial and commercial sources of air pollution throughout the Bay Area. Monitoring data and emissions inventory of toxic air contaminants helps the BAAQMD determine health risk to Bay Area residents. The 2003 emissions inventory shows that emissions of many TACs are decreasing in the Bay Area.

Ambient monitoring concentrations of TACs indicates that pollutants emitted primarily from motor vehicles (1,3-butadiene and benzene) account for slightly over one-half of the average calculated cancer risk from ambient air in the Bay Area.[1] 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 one million. However, this risk does not include the risk resulting from exposure to diesel particulate matter or other compounds not monitored. Although not specifically monitored, recent studies indicate that exposure to diesel particulate matter may contribute significantly to cancer risk (approximately 500 – 700 in one million) that is greater than all other measured TACs combined.[2]

Local Climate and Air Quality

Air quality is a function of both local climate and local sources of air pollution. The amount of a given air pollutant in the atmosphere is determined by the amount of pollutant released and the atmosphere's ability to transport and/or dilute that pollutant. The major determinants of transport and dilution are wind, atmospheric stability, terrain, and for photochemical pollutants, sunshine.

The City of Oakland is located in the Northern Alameda and Western Contra Costa subregion of the SFBAAB. This climatological subregion stretches from Richmond to San Leandro. Its western boundary is defined by the Bay, and its eastern boundary by the Oakland-Berkeley Hills. The Oakland-Berkeley Hills have a ridge line height of approximately 1,500 feet, a significant barrier to air flow. The most densely populated area of the subregion lies in a strip of land between the Bay and the lower hills.

In this area, marine air traveling through the Golden Gate, as well as across San Francisco and through the San Bruno Gap, is a dominant weather factor. The Oakland-Berkeley Hills cause the westerly flow of air to split off to the north and south of Oakland, which causes diminished wind speeds. The prevailing winds for most of this subregion are from the west.

[1] BAAQMD, 2007, Toxic Air Contaminant Control Program Annual Report 2003 Volume 1, August.

[2] Ibid.

Temperatures in this subregion have a narrow range due to the proximity of the moderating marine air. Maximum temperatures in summer average in the mid-70s, with minimums in the mid-50s. Winter highs are in the mid- to high-50s, with lows in the low- to mid-40s.

This subregion contains a variety of industrial air pollution sources. Some industries are quite close to residential areas. The subregion is also traversed by frequently congested freeways. Traffic and congestion, and the motor vehicle emissions they generate, are increasing.

Air Quality Issues – Criteria Pollutants

Air pollutant emissions within the Bay Area are generated by stationary, area-wide and mobile sources. Stationary sources are usually associated with specific large manufacturing and industrial facilities. Examples include fossil-fuel power plants or large industrial boilers. Area sources emit small amounts of pollutants individually, but there are often many of them, and the sum of their emissions amounts to a large total quantity. Examples of area sources include residential and commercial water heaters, painting/coating operations, power lawn mower use, farming, and consumer products such as barbeque lighter fluid and hair spray. Mobile sources include on-road motor vehicles, aircraft, ships, trains, and self-propelled construction equipment. Air pollutants can also be generated by natural sources such as wild fires. A description of the criteria air pollutants, their sources and their health effects follows.

Ozone

Ozone (smog) is a pungent, colorless gas that is not emitted directly into the atmosphere, but is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides (NOx). Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and that can cause substantial damage to vegetation and other materials. Elevated ozone concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, elderly, and young children. Ozone levels peak during the late spring, summer and early fall months.

Carbon Monoxide

CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. CO passes through the lungs into the bloodstream, where it interferes with the transfer of oxygen to body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

Nitrogen Oxides

Nitrogen dioxide (NO2), a reddish-brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NOx. NOx is a primary component of the photochemical smog reaction. Nitrogen oxides also contribute to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition. NO2 is an air quality pollutant of concern because it acts as a respiratory irritant, decreases lung function and may reduce resistance to infection.

Reactive Organic Gases

Reactive organic gases (ROG) are formed from combustion of fuels and evaporation of organic solvents. Consequently, ROG accumulates in the atmosphere much quicker during the winter when sunlight is limited and photochemical reactions are slower. ROG is an ozone precursor and a prime component of the photochemical reaction that forms ozone; however, ROG is not considered a criteria pollutant on its own.

Particulate Matter

Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles are those that are larger than 2.5 microns but smaller than 10 microns, or PM10. PM2.5 refers to fine suspended particulate matter with an aerodynamic diameter of 2.5 microns or less that is not readily filtered out by the lungs. Nitrates, sulfates, dust, and combustion particulates are major components of PM10 and PM2.5. These small particles can be directly emitted into the atmosphere as by-products of fuel combustion, through abrasion, such as tire or brake lining wear, or through fugitive dust (wind or mechanical erosion of soil). They can also be formed in the atmosphere through chemical reactions. Particulates may transport carcinogens and other toxic compounds that adhere to the particle surfaces, and can enter the human body through the lungs.

Sulfur Dioxide

Sulfur dioxide (SO2) is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO2 levels in the region. SO2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight.

Lead

Lead is a metal found in the natural environment, as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. In the past, mobile sources were the main contributor to ambient lead concentrations in the air. With the phase-out of lead in gasoline, other stationary sources, such as metal processing, are currently the primary source of lead emissions. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Ambient Air Quality Standards

The federal and State governments have established ambient air quality standards. These standards are intended to protect the health of individuals most sensitive to a given pollutant's effects. The latest of these pollutant standards are listed in **Table 4.2-1** below. The Bay Area's Attainment Status is shown in **Table 4.2-2**, while the known health effects are listed in **Table 4.2-3**.

Table 4.2-1: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	National Standard
Ozone	1 Hour	0.09 ppm	---
	8 Hour	0.070 ppm	0.075 ppm
Carbon Monoxide	1 Hour	20 ppm	35 ppm
	8 Hour	9.0 ppm	9 ppm
Nitrogen Dioxide	1 Hour	0.18 ppm	---
	Annual	0.03 ppm	0.053 ppm
Sulfur Dioxide	24 Hour	0.04 ppm	0.14 ppm
	Annual	---	0.030 ppm
Particulates	24 Hour	50 ug/m3	150 ug/m3
< 10 microns	Annual	20 ug/m3	---
Particulates	24 Hour	---	35 ug/m3
< 2.5 microns	Annual	12 ug/m3	15 ug/m3

Concentrations: ppm = parts per million ug/m3 = micrograms per cubic meter

Source: Bay Area Air Quality Management District, Bay Area Pollution Summary – 2008.

Table 4.2-2: Regional Attainment Status

Pollutant	Federal Status	State Status
Ozone (O3) – 1-Hour Standard	applicable	Non-attainment
Ozone (O3) – 8-Hour Standard	Non-attainment	Non-attainment
Suspended Particulate Matter (PM10) – Annual Mean		Non-attainment
Suspended Particulate Matter (PM10) – 24 Hour	Unclassified	Non-attainment
Suspended Particulate Matter (PM2.5) – Annual Mean	Attainment	Non-attainment
Suspended Particulate Matter (PM2.5) – 24 Hour	Non-attainment	not applicable
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (No2)	Attainment	Attainment
Sulfur Dioxide (SO2)	Attainment	Attainment

Source: BAAQMD, ARB.

Table 4.2-3: Health Effects of Air Pollutants

Pollutant	Health Effects	Examples of Sources
Suspended Particulate Matter(PM 2.5 and PM 10)	Reduced lung function Aggravation of the effects of gaseous pollutants Aggravation of respiratory and cardio respiratory diseases Increased cough and chest discomfort Soiling Reduced visibility	Stationary combustion of solid fuels Construction activities Industrial processes Atmospheric chemical reactions
Ozone (O3)	Breathing difficulties Lung damage	Formed by chemical reactions of air pollutants in the presence of sunlight; common sources are motor vehicles, industries, and consumer products
Carbon Monoxide (CO)	Chest pain in heart patients Headaches, nausea Reduced mental alertness Death at very high levels	Any source that burns fuel such as cars, trucks, construction and farming equipment, and residential heaters and stoves
Lead (Pb)	Organ damage Neurological and reproductive disorders High blood pressure	Metals processing Fuel combustion Waste disposal
Nitrogen Dioxide (NO2)	Lung damage	See carbon monoxide sources
Toxic Air Contaminants	Cancer Chronic eye, lung, or skin irritation Neurological and reproductive disorders	Cars and trucks, especially diesels Industrial sources such as chrome platers Neighborhood businesses such as dry cleaners and service stations Building materials and products

Source: ARB and EPA, 2005

Measurements of ambient concentrations of the criteria pollutants are used by the U.S. EPA and California ARB to assess and classify the air quality of each regional air basin, county, or, in some cases, a specific urbanized area. The classification is determined by comparing actual monitoring data with national and State standards. If a pollutant concentration in an area is lower than the standard, the area is classified as being in “attainment” for that pollutant. If the pollutant concentration exceeds the standard, the area is classified as a “nonattainment” area. If there are not enough data available to determine whether the standard is exceeded in an area, the area is designated “unclassified.”

BAAQMD monitors criteria air pollutant concentrations at a number of monitoring stations throughout the Bay Area. The air quality in the Bay Area, including Oakland, has generally improved over the past 20 years, as motor vehicles have become cleaner, agricultural and residential burning has been curtailed, and consumer products containing ROG have been reformulated or replaced.

The U.S. EPA and the California ARB use different standards for determining whether the Bay Area is an attainment area. Under national standards, the Bay Area was designated as a marginal nonattainment area for ozone in 2004. The regional is expected to also be considered as nonattainment when the U.S. EPA issues a final attainment designation based on the new 0.75 ppm 8-hour ozone standard, which is expected mid-2012. The Bay Area is designated nonattainment for PM2.5. The Bay Area is in attainment or designated as unclassified for all other pollutants under national standards.

Under State standards, the Bay Area is designated as a nonattainment area for all standards for ozone, PM10, and PM2.5 and an attainment area for all other pollutants. Review of ozone and particulate matter data for the monitoring stations in West Oakland and Oakland (9925 International Blvd.) shows that only one standard was exceeded from 2008 through 2010, which was the State annual standard for PM10 in 2008. Air Quality monitoring data is reported in **Table 4.2-4**.

Table 4.2-4: Ambient Air Quality Monitoring Data from the West Oakland Monitoring Station

Pollutant	Standard	Days Standard Exceeded		
		2008	2009	2010
Carbon Monoxide	Federal 1 Hour	0	0	0
	State 1 Hour	0	0	0
	Federal 8 Hour	0	0	0
	State 8 Hour	0	0	0
Ozone	State 1-Hour	0	0	0
	Federal 8-Hour	0	0	0
	State 8-Hour	0	0	0
PM10	Federal 24-Hour	0	0	0
	State 24-Hour	0	0	0
	Federal Annual Arithmetic Average	No	No	ND
	State Annual Arithmetic Average	Yes	No	ND
PM 2.5	Federal 24-Hour	0	ND	ND
	Federal Annual Arithmetic Average	No	ND	ND
	State Annual Arithmetic Average	No	ND	ND
Nitrogen Dioxide	All standards	0	0	0
Sulfur Dioxide	All standards	0	0	0

ND = No data. There was insufficient (or no) data to determine the value.

Source: California ARB, 2012.

Air Quality Issues - Toxic Air Contaminants

TACs are a regulatory designation that includes a diverse group of air pollutants which adversely affect human health. The health effects of TACs can result from either acute or chronic exposure. Many types of cancer are associated with chronic TAC exposures, but TAC exposures can also cause other adverse health effects. Consequently, the BAAQMD has established both a cancer and a non-cancer health risk threshold to evaluate TAC emissions.

Significant sources of TACs in the environment include industrial processes such as petroleum refining, chemical manufacturing, electric utilities, metal mining/refining and chrome plating; and commercial operations, gasoline stations, dry cleaners and buildings with boilers and/or emergency generators. Mobile sources are gasoline and diesel-powered vehicles of all types. The California ARB listed 10 compounds that pose the greatest known health risk in California. Based primarily on ambient air quality data, these are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel particulate matter (DPM). [3]

Diesel Particulate Matter

In 1998, the ARB identified diesel engine particulate matter as a toxic air contaminant (TAC). Facilities that may have substantial diesel exhaust emissions include truck stops; warehouse/distribution centers; large commercial or industrial facilities; high volume transit centers; schools with high volume of bus traffic; high volume highways or high volume arterial/roadways with high levels of diesel traffic. Diesel particulate matter (DPM) is found in engine exhaust and consists of a mixture of gases and fine particles (smoke or soot) that can penetrate deeply into the lungs where it can contribute to a range of health problems. Diesel exhaust is a complex mixture that includes hundreds of individual constituents and is identified by the State of California as a known carcinogen. However, under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole.[4]Determining how hazardous a substance is depends on many factors, including the amount of the substance in the air, how it enters the body, how long the exposure lasts, and what organs in the body are affected. One major way these substances enter the body is through inhalation of either gases or particulates. While many gases are harmful, very small particles penetrate deep into the lungs, contributing to a range of health problems. Exhaust from diesel engines is a major source of these airborne particles. California's Office of Environmental Health Hazard Assessment (OEHHA) has determined that long-term exposure to diesel exhaust particulates poses the highest cancer risk of any TAC it has evaluated.

Based on receptor modeling techniques, the California ARB estimated the background DPM health risk in the Bay Area in 2000 to be approximately 500 cancer cases per million people. This reflects a drop of approximately 36 percent from estimates for 1990.[5]

Public Health Concerns

As described above, increased cancer risk is associated with long-term exposure to certain criteria pollutants and toxic air contaminants, while short-term exposure can cause or aggravate chronic respiratory disease such as asthma, bronchitis, and emphysema.

Sensitive Receptors

For purposes of air quality and public health and safety, sensitive receptors are generally defined as land uses with population concentrations that would be particularly susceptible to disturbance from dust and

---

[3] California ARB, 2009. The 2009 California Almanac of Emissions and Air Quality. Sacramento, CA.

[4] California Environmental Protection Agency, 1998. Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998 meeting. Office of Environmental Health Hazard Assessment

[5] California ARB, 2009, op. cit.

air pollutant concentrations, or other disruptions associated with project construction and/or operation. The reasons for greater than average sensitivity include pre-existing health problems, proximity to emissions sources, or duration of exposure to air pollutants. Schools, hospitals and convalescent homes are considered to be relatively sensitive to poor air quality because children, the elderly and the infirm are more susceptible to respiratory disease and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, with associated greater exposure to ambient air quality. Recreational uses are also considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with recreation places a high demand on the human respiratory system.

Background Concentrations of TAC

Both the BAAQMD and the California Air Resources Board (CARB) operate TAC monitoring networks in the San Francisco Bay Area. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air, and therefore tend to produce the most significant risk. The ARB operates a monitoring station at 9925 International Boulevard, the nearest station to West Oakland. The BAAQMD operates ambient TAC monitoring stations at Davie Stadium at 198 Oak Road (Oakland) and at Filbert Street (West Oakland). Each of these stations monitors levels of continuous PM2.5 as a proxy for diesel emissions. Pollutant monitoring results for the years 2009 through 2012 are shown in **Table 4.2-5.**

As indicated in the monitoring results from the CARB monitoring station on International Boulevard, the federal 24-hour PM2.5 standard of 35 micrograms/cubic meter (µg/m3) was exceeded three times in 2009, was not exceed in 2010, and was again exceeded three times in 2001. Year 2012 data is not yet available. As also indicated in this table are the annual average (annual arithmetic mean) concentrations of PM2.5 at each of the two BAAQMD monitoring station sites. Although there are federal and state standards for PM2.5 annual arithmetic mean concentrations (15µg/m3, and 12µg/m3 respectively), it is unclear whether the monitoring methods used at these stations during the reporting year are appropriately direct comparisons to those standards.

Table 4.2-5: PM2.5 (Diesel PM) Monitoring Data

	2012	2011	2010	2009
Days Exceeding Federal Standard (35 ug/m3) 1	N/A	3	0	3
Measured Annual Average Concentration Levels (ug/m3) 2	Annual Avg.	Annual Avg.	Annual Avg.	Annual Avg.
Oakland Station (Davie Stadium)	10	10	8	10
West Oakland Station (Filbert Street)	7	10	9	11

Notes:

Data from ARB Monitoring Station on International Blvd., source: http://www.arb.ca.gov/adam/select8/sc8display.php

BAAQMD CARE Program

Under the Community Air Risk Evaluation (CARE) program, BAAQMD began identifying areas with high TAC emissions and sensitive populations that could be affected by such emissions, and using this information to establish policies and programs to reduce TAC emissions and exposures. During Phase I of CARE, BAAQMD developed a preliminary Bay-Area-wide TAC emissions inventory (for the Year 2000) and compiled demographic and health statistics data to identify sensitive populations. Five TACs (DPM, 1,3-butadiene, benzene, hexavalent chromium, and formaldehyde) were estimated to be responsible for about 97 percent of the Bay Area's cumulative cancer risk, and DPM alone accounts for about 80 percent of this cancer risk. Major sources of DPM include on-road and off-road heavy-duty diesel trucks and construction equipment. The highest DPM emissions occur in the urban core areas of eastern San Francisco, western Alameda, and northwestern Santa Clara Counties.

TACs do not have ambient air quality standards, but are regulated by the BAAQMD 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 where human health exposure to toxic substances is estimated, and considered together with information regarding the toxic potency of the substances, to provide quantitative estimates of health risks.

California Air Resources Board's West Oakland Health Risk Assessment

In March 2008, the California ARB working in cooperation with the Port of Oakland, Union Pacific (UP) Railroad, and the BAAQMD completed a study designed to help understand the potential health impacts from DPM emissions on residents of the West Oakland community. Key findings of the California ARB report were:

- DPM ambient concentrations in West Oakland are estimated to be nearly three times the background DPM concentrations averaged over the entire Bay Area.
- The estimated lifetime potential cancer risk for residents of West Oakland from exposure to all DPM emissions included in the study was estimated to be about 1,200 excess cancers per million. This estimate assumes residents are exposed to the estimated 2005 outdoor DPM levels continuously for 70 years. By way of comparison, the corresponding background risk from DPM emissions over the entire Bay Area was estimated to be 480 excess cancer cases per million, the corresponding background risk from emissions of all air toxics species in the Bay Area is 660 per million and the expected cancer rate from all causes, including smoking, is about 200,000 to 250,000 per million, according to the California ARB study.
- Of the total West Oakland DPM exposure risk noted above (1,186 per million from all sources), emissions from Port seaport operations contribute approximately16 percent (192 per million), Union Pacific rail yard sources contribute 4 percent (43 per million) and other sources in and around West Oakland contribute the remaining 80 percent (951 per million).
- At the time of the 2008 report, California ARB projections of future DPM emissions indicate that emissions and associated health risk would be reduced in West Oakland by about 80 percent by 2020, reflecting reductions achieved by State and federal regulations.

ARB compiled a baseline emissions inventory representing emission sources as of 2005. Port of Oakland emission inventories were developed by Environ International Corporation (Environ) for the Port of Oakland and reviewed by ARB and BAAQMD staff. Union Pacific rail yard activity emission inventories were developed by Union Pacific and reviewed by ARB staff. All other emission source inventories were developed by ARB, Port, and BAAQMD staff. **Table 4.2-6** provides a summary of the emissions estimates by source and by category. As shown in Table 4.2-6, the emissions of diesel PM from Port-related activities were estimated to be approximately 265 tons per year, 11 tons per year for the Union Pacific rail yard activities, and about 570 tons per year for the other sources. All combined, ARB estimates that there were approximately 845 tons of diesel PM emissions in 2005 from these combined activities.

Table 4.2-6: Modeled 2005 and 2020 Diesel PM Emissions for West Oakland (Diesel PM Emissions Tons/Year)

	Port of Oakland		Union Pacific Rail Yard		Other Sources		Combined	
	2005	2020	2005	2020	2005	2020	2005	2020
Ocean-going Vessels	209	66	-		218	57	428	123
Cargo Handling Equipment	21	4.3	2.2	1.1	4.3	1	27	6.3
Heavy-duty Diesel Trucks	20	6.3	1.9	0.6	90	15	112	21
Commercial Harbor Craft	13	3.6	-		238	84	251	87
Locomotives	2.0	1.4	3.9	2.8	1.3	5	7.2	9.4
Total	265	82	11	4.5	568	162	845	248

Source: California ARB, Diesel Particulate Matter Health Risk Assessment for the West Oakland Community, 2008, Table 3

This emission inventory from the ARB “Diesel Particulate Matter Health Risk Assessment for the West Oakland Community” represents the most comprehensive inventory of diesel PM emissions in the West Oakland area that had been prepared to date. The inventory was compiled from ARB developed category-specific emissions inventory models, and additional data where necessary to allocate emissions spatially within the modeling domain. The inventory was reviewed by several groups within ARB, and by the BAAQMD and the Port. Overall, there was general agreement that the inventory represented the best information available on each category of emissions source, and the magnitude of emissions in the modeling domain.

One of the goals of the ARB’s Health Risk Assessment was to estimate future health risks associated with emissions from the Port of Oakland, the Union Pacific rail yard, and other emissions sources. Evaluating the potential health impacts in future years required the use of emission inventories for future years based on projected future growth, and the impact of current and pending State and federal regulations on each emissions source. In general, the growth assumptions were consistent with assumptions used in the Goods Movement Emission Reduction Plan approved by the ARB in 2006, and represent an increase of about 4% to 5% per year for each category. Even with such substantial growth, emissions were expected to decrease in the future. Decreases are expected to result from regulations that the ARB and the federal government have already adopted, such as ARB’s Port Drayage Truck regulation requiring the clean-up of all trucks that service California’s Ports. ARB also assumed new regulations which require ocean-going ships to use cleaner fuels, and those which require the clean-up of private on-road heavy duty trucks. With the adoption of ARB’s Port Drayage Truck Regulation and the proposed Private Fleet Regulation, every truck operating in West Oakland will be required to meet new, more stringent emissions standards.

Using this approach, emissions were forecasted to several years, including 2020. As can be seen in **Table 4.2-6**, even with projected growth, diesel emissions were forecast to decline over time due to implementation of regulations that have been adopted or are planned to be adopted. Overall, the combined emissions are expected to decrease by about 50% in 2010and by as much as 70%in 2020, relative to emissions levels in 2005.

Regulatory Setting

The Federal Clean Air Act (FCAA) governs air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulation under the California Clean Air Act (CCAA). At the federal level, the U.S. Environmental Protection Agency (EPA) administers the FCAA. The CCAA is administered by ARB at the State level, and by the Air Quality Management Districts at the regional and local levels. The BAAQMD regulates air quality at the regional level.

Federal

The federal government is continually updating and revising air quality regulations. The United States Environmental Protection Agency (U.S. EPA) is responsible for setting and enforcing the National Ambient Air Quality Standards (NAAQS) for atmospheric pollutants. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships and certain locomotives.

As part of its enforcement responsibilities, the U.S. EPA requires each State with federal nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the national standards. The SIP must integrate federal, State, and local plan components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the SIP.

Federal Clean Air Act (FCAA)

The 1970 FCAA authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The FCAA Amendments of 1990 (FCAAA) changed deadlines for attaining national standards, as well as remedial actions required of areas of the nation that exceed the standards. Under the FCAAA, State and local agencies in areas that exceed the national standards are required to develop State Implementation Plans (SIPs) to demonstrate how they will achieve the national standards for O3 by specified dates. The FCAAA requires that projects receiving federal funds demonstrate conformity to the approved SIP and local air quality attainment plan for the region. Conformity with the SIP requirements also satisfies the FCAAA requirements.

Title III of the federal Clean Air Act Amendments required the U.S. EPA to promulgate national emissions standards for certain Toxic Air Contaminants (TACs). At first, the U.S. EPA developed technology-based emission standards designed to produce the maximum emission reduction achievable, generally referred to as Maximum Achievable Control Technology (MACT) standards. Then the U.S. EPA developed health risk-based emissions standards necessary to address risks remaining after implementation of MACT. Consequently, performance criteria were established to limit mobile source emissions of certain TACs, including benzene, formaldehyde, and 1,3-butadiene.

Notable changes in federal air quality regulations that would affect the build out of the West Oakland Specific Plan include cleaner fuel standards (e.g., ultra-low sulfur diesel), diesel engine emission limits, and more stringent ozone, SO2 and PM2.5 standards.

U.S. Environmental Protection Agency

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the FCAA, as amended in 1970, 1977 and 1990.

The FCAA required EPA to establish primary and secondary national AAQS. The FCAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The FCAAA added requirements for states with non-attainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA has responsibility to review all state SIPs to determine conformation to the mandates of the FCAAA and determine if implementation will achieve air quality goals. If the EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the non-attainment area that imposes additional control measures. Failure to submit an appropriate SIP or to implement the plan within the mandated timeframe may result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

State

Like the U.S. EPA, the California Air Resources Board (ARB) is continually updating and revising regulations. The California ARB, a part of the California EPA, is responsible for the coordination and administration of both federal and State air pollution control programs within California. In this capacity, California ARB conducts research, sets California Ambient Air Quality Standards, compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the SIP. The California ARB establishes emissions standards for motor vehicles sold in California, consumer products (e.g., hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

California Clean Air Act

In 1988, the CCAA required that all air districts in the State endeavor to achieve and maintain California ambient air quality standards for CO, O3, SO2 and NO2 by the earliest practical date. The CCAA provides districts with new 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 district plan is to achieve a 5 percent annual reduction, averaged over consecutive three-year periods, in district-wide emissions of each non-attainment pollutant or its precursors. Additional physical or economic development within the region would tend to impede the emissions reduction goals of the CCAA. Generally, the State standards for these pollutants are more stringent than the national standards.

California Air Resources Board

The ARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California, and for implementing the CCAA. The CCAA requires that all air districts in California endeavor to achieve and maintain California ambient air quality standards by the earliest practical date. The act specifies that districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources, and provides districts with the authority to regulate indirect sources.

ARB is primarily responsible for developing and implementing air pollution control plans to achieve and maintain the National Ambient Air Quality Standards (NAAQS). The ARB has primary responsibility for statewide pollution sources and produces a major part of the SIP. Local air districts are still relied upon to provide additional strategies for sources under their jurisdiction. The ARB combines this data and submits the completed SIP to EPA.

Other ARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control and air quality management districts), establishing California Ambient Air Quality Standards (CAAQS), which in many cases are more stringent than the NAAQS, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, and off-road vehicles.

California ARB conducts research, sets California Ambient Air Quality Standards, compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the SIP. The California ARB establishes emissions standards for motor vehicles sold in California, consumer products (e.g., hairspray, aerosol paints, and barbecue lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

California regulates TACs primarily through the Tanner Air Toxics Act (AB 1807) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588). AB 1807 sets procedures for the designation of TACs and control measures for sources that emit particular TACs. If there is a safe emission threshold for a substance, the control measure must reduce exposure below that threshold. If there is no safe threshold, the measure must require all feasible control measures to minimize emissions. To date, none of the TACs identified under AB 1807 has a safe threshold. AB 2588 requires all facilities emitting TACs above specified levels to prepare emission inventories and risk assessments (the latter, if TAC emissions are found to be significant), and then to notify the public of the any significant risk and implement necessary reduction measures.

In 2000, the California ARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled engines and vehicles. The goal of the Plan is to reduce diesel PM emissions and the associated health risk by 75 percent in 2010 and 85 percent by 2020 relative to year 2000 levels. Since 2002, ARB adopted several TAC control measures and established more stringent emission standards for various on-road vehicles and off-road diesel equipment, especially equipment and fuel related to seaports, in an effort to meet its goals. Over time, the replacement of older vehicles is expected to result in a vehicle fleet that emits substantially less of the associated TACs (i.e., diesel particulate matter (DPM), benzene, and 1,3-butadiene). Adopted regulations are also expected to reduce formaldehyde emissions from cars and light-duty trucks.

Air Quality and Land Use Handbook

The ARB has developed an Air Quality and Land Use Handbook, 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.[6] The ARB handbook recommends that planning agencies

[6] California Air Resources Board, 2005, Air Quality and Land Use Handbook: A Community Health Perspective, April.

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 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.
- 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 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.

California Green Building Standards Code (CALGreen)

CALGreen is the green building code specific to the state of California, adopted in January 2010 and effective as of January 2011 for residential and non-residential new construction projects. This code aims to improve safety, health and general welfare of the public in California by reducing the negative impacts of construction and buildings on the environment and encouraging sustainable construction practices. Through the promotion of sustainable planning and design, energy efficiency, water efficiency and conversion, material conversion and resources efficiency and environmental quality, CALGreen aims to support a high standard for green buildings in California and lower the overall impacts that buildings pose on the environment. The code is composed of mandatory measures that must be implemented by local jurisdictions as well as voluntary measures called Tiers.

Regional

Bay Area Air Quality Management District

BAAQMD is the primary agency responsible for assuring that the NAAQS and CAAQS are attained and maintained in the Bay Area. BAAQMD's jurisdiction includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara counties, and the southern portions of Solano and Sonoma counties. The Air District's responsibilities in improving air quality in the region include: preparing plans for attaining and maintaining air quality standards; adopting and enforcing rules and regulations; issuing permits for stationary sources of air pollutants; inspecting stationary sources and responding to citizen complaints; monitoring air quality and meteorological conditions; awarding grants to reduce mobile emissions; implementing public outreach campaigns; and assisting local governments in addressing climate change.

The BAAQMD attains and maintains air quality conditions in the San Francisco Bay Area Air Basin (SFBAAB) through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. The BAAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the FCAA, FCAAA, and the CCAA.

In 2003, the California Legislature passed Senate Bill 656 (SB 656) to reduce public exposure to PM10 and PM2.5. SB 656 required the California ARB, in consultation with local air districts, to develop and adopt, by January 1, 2005, a list of the most readily available, feasible, and cost-effective control measures to reduce PM10 and PM2.5. In November 2005, BAAQMD adopted a Particulate Matter Implementation Strategy focusing on those measures most applicable and cost effective for the Bay Area.

BAAQMD is directly responsible for reducing emissions from stationary sources and for assuring that State controls on mobile sources are effectively implemented. It has responded to this requirement by preparing a sequence of Ozone Attainment Plans and Clean Air Plans that comply with the federal Clean Air Act and the California Clean Air Act to accommodate growth, reduce the pollutant levels in the Bay Area, meet federal and State ambient air quality standards, and minimize the fiscal impact that pollution control measures have on the local economy. The Ozone Attainment Plans are prepared to address the federal ozone standard and the Clean Air Plans are prepared to address the State ozone standard.

Although BAAQMD is responsible for regional air quality planning efforts, it does not have direct authority over plans formulated by other local agencies or governments, or over new development projects within the Bay Area.

Bay Area Clean Air Plan

The BAAQMD prepares plans to attain ambient air quality standards in the San Francisco Bay Area Air Basin. The BAAQMD prepares the Clean Air Plan (CAP) in coordination with the Metropolitan Transportation Commission and the Association of Bay Area Governments (ABAG). With respect to applicable air quality plans, the BAAQMD has adopted the 2010 Clean Air Plan to address multiple pollutants in a single integrated plan. The purpose of the 2010 Clean Air Plan is to:

- Update the Bay Area 2005 Ozone Strategy in accordance with the requirements of the CCAA to implement “all feasible measures” to reduce ozone;
- Consider the impacts of ozone control measures on particulate matter (PM), air toxics, and greenhouse gases in a single, integrated plan;
- Review progress on improving air quality in recent years;
- Establish emission control measures to be adopted or implemented in the 2009-2012 timeframe.

Similarly, the BAAQMD prepared the 2010 Clean Air Plan to address non-attainment of the CAAQS.

BAAQMD CEQA Guidelines

On June 2, 2010 the BAAQMD adopted Thresholds of Significance for use in determining the significance of projects’ environmental effects under the California Environmental Quality Act, and published CEQA Guidelines for consideration by lead agencies. In addition to thresholds of significance for greenhouse gas (GHG) emissions, the thresholds lowered the previous (1999) threshold of significance for annual emissions of reactive organic gases (ROG), nitrogen oxides (NOx) and particulate matter exhaust (PM10), and set a standard for smaller particulates (PM2.5) and fugitive dust.

On March 5, 2012 the Alameda County Superior Court issued a judgment finding that the Air District had failed to comply with CEQA when it adopted the thresholds. The court did not determine whether the Thresholds were valid on the merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering the District to set aside the thresholds and cease dissemination of them until the Air District had complied with CEQA. In view of the court's order, lead agencies will need to determine appropriate air quality thresholds of significance based on substantial evidence in the record. Lead agencies may rely on the Air District's updated CEQA Guidelines (updated May 2012) for assistance in calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures.

New Source Review

The BAAQMD's New Source Review regulations predominantly apply to non-attainment pollutants. The purpose of the New Source Review rule is to provide for the review of new and modified sources and provide mechanisms, including the use of best available control technology for both criteria and toxic air pollutants, and emissions offsets by which authorities to construct such sources could be granted. The New Source Review regulations also include Prevention of Significant Deterioration (PSD) rules for attainment pollutants. PSD rules are designed to ensure that the emission sources will not cause or interfere with the attainment or maintenance of ambient air quality standards.

With respect to the construction phase of the proposed Plan, applicable BAAQMD regulations would relate to portable equipment (e.g., Portland concrete batch plants, and gasoline- or diesel-powered engines used for power generation, pumps, compressors, pile drivers, and cranes), architectural coatings, and paving materials. Equipment used during project construction would be subject to the requirements of BAAQMD Regulation 2 (Permits), Rule 1 (General Requirements) with respect to portable equipment unless exempt under Rule 2-1-105 (Exemption, Registered Statewide Portable Equipment); BAAQMD Regulation 8 (Organic Compounds), Rule 3 (Architectural Coatings); and BAAQMD Regulation 8 (Organic Compounds), Rule 15 (Emulsified and Liquid Asphalts). With respect to the operational phase of the proposed Plan, BAAQMD Regulation 2, Permits would apply to new or modified stationary sources proposed in the Planning Area.

City of Oakland

General Plan

The Oakland General includes several policies related to air quality.

Land Use and Transportation Element (LUTE). The LUTE of the Oakland General Plan contains the following policies that address issues related to air quality:

> Objective T2: Provide mixed use, Transit-Oriented Development that encourages public transit use and increases pedestrian and bicycle trips at major transportation nodes.
>
> Policy T.2.1: Encouraging Transit-Oriented Development. Transit-Oriented Development should be encouraged at existing or proposed transit nodes, defined by the convergence of two or more modes of public transit such as BART, bus, shuttle service, light rail or electric trolley, ferry, and inter-city or commuter rail.
>
> Policy T.2.2: Guiding Transit-Oriented Development. Transit-Oriented Developments should be pedestrian-oriented, encourage night and day time use, provide the neighborhood with needed

goods and services, contain a mix of land uses, and be designed to be compatible with the character of surrounding neighborhoods.

Policy T2.5: Linking Transportation Activities. Link transportation facilities and infrastructure improvements to recreational uses, job centers, commercial nodes, and social services (i.e., hospitals, parks, or community centers).

Policy T3.2: Promoting Strategies to Address Congestion. The city should promote and participate in both local and regional strategies to manage traffic supply and demand where unacceptable levels of service exist or are forecast to exist.

Policy T3.5: Including Bikeways and Pedestrian Walks. The City should include bikeways and pedestrian ways in the planning of new, reconstructed, or realigned streets, wherever possible.

Policy T3.6: Encouraging Transit. The City should encourage and promote use of public transit in Oakland by expediting the movement of and access to transit vehicles on designated "transit streets" as shown on the Transportation Plan.

Policy T3.7: Resolving Transportation Conflicts. The city, in constructing and maintaining its transportation infrastructure, shall resolve any conflicts between public transit and single occupant vehicles in favor of the transportation mode that has the potential to provide the greatest mobility and access for people, rather than vehicles, giving due consideration to the environment, public safety, economic development, health, and social equity impacts.

Policy T4.1: Incorporating Design Features for Alternative Travel. The City will require new development, rebuilding, or retrofit to incorporate design features in their projects that encourage use of alternative modes of transportation such as transit, bicycling, and walking.

Policy T4.2: Creating Transportation Incentives. Through cooperation with other agencies, the City should create incentives to encourage travelers to use alternative transportation options.

Policy T4.3: Reducing Waiting Times. The City should encourage transit operators to reduce waiting times for users by coordinating schedules and maintaining intervals of fifteen (15) minutes or less between buses during daytime periods.

Policy T4.4: Developing Light Rail or Electric Trolley. The City supports the development of light rail or trolley bus along Regional Transit streets in high travel demand on corridors.

Policy T4.5: Preparing a Bicycle and Pedestrian Master Plan. The City should prepare, adopt, and implement a Bicycle and Pedestrian Master Plan as a part of the Transportation Element of [the] General Plan.

Policy T4.6: Making Transportation Accessible for Everyone. Alternative modes of transportation should be accessible for all of Oakland's population. Including the elderly, disable, and disadvantaged.

Policy T4.7: Reusing Abandoned Rail Lines. Where rail lines (including sidings and spurs) are to be abandoned, first consideration should be given to acquiring the line for transportation and recreational uses, such as bikeways, footpaths, or public transit.

Policy T6.1: Posting Maximum Speeds. Collector streets shall be posted at a maximum speed (usually a maximum speed of 25 miles per hour), except where a lower speed is dictated by safety and allowable by law.

Policy T6.2: Improving Streetscapes. The City should make major efforts to improve the visual quality of streetscapes. Design of the streetscape, particularly in neighborhoods and commercial centers, should be pedestrian-oriented and include lighting, directional signs, trees, benches and other support facilities.

Policy T6.3: Making the Waterfront Accessible. The waterfront should be made accessible to the pedestrians and bicyclists in Oakland's neighborhoods.

Policy D3.2: Incorporating Parking Facilities. New parking facilities for cars and bicycles should be incorporated into the design of any project in a manner that encourages and promotes safe pedestrian activity.

Policy D10.6: Creating Infill Housing. Infill housing that respects surrounding development and the streetscape should be encouraged in the downtown to strengthen or create distinct districts.

Policy D11.1: Promoting Mixed-Use Development. Mixed use developments should be encouraged in the downtown for such purposes as to promote its diverse character, provide for needed goods and services, support local art and culture, and give incentive to reuse existing vacant or underutilized structures.

Policy N3.2: Encouraging Infill Development. In order to facilitate the construction of needed housing units, infill development that is consistent with the General Plan should take place throughout the City of Oakland.

Policy W12.4: Higher residential densities should be permitted in appropriate areas along the estuary where design and development intensity allows for the preservation of public views, vistas, open space, and waterfront access. Access to transportation corridors and transit should be promoted.

The LUTE also accounts for the air quality considerations of land use compatibility decisions with an objective to minimize land use compatibility conflicts (Objective I/C4) including the following policies:

Policy I/C4.1: Protecting Existing Activities. Existing industrial, residential, and commercial activities and areas which are consistent with long term land use plans for the City should be protected from the intrusion of potentially incompatible land uses.

Policy I/C4.2: Minimizing Nuisances. The potential for new or existing industrial or commercial uses, including seaport and airport activities, to create nuisance impacts on surrounding residential land uses should be minimized through appropriate siting and efficient implementation and enforcement of environmental and development controls. Where residential development would be located above commercial uses, parking garages, or any other uses with a potential to generate odors, the odor-generating use should be properly vented (e.g., located on rooftops) and designed (e.g., equipped with afterburners) so as to minimize the potential for nuisance odor problems.

Open Space, Conservation and Recreation Element. The City of Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element includes the following policies related to air quality:

Policy CO-12.1: Promote land use patterns and densities which help improve regional air quality conditions. The City supports efforts of the responsible public agencies to reduce air pollution.

Policy CO-12.2: Coordinated Transportation Systems. Maintain a coordinated bus, rail, and ferry transit system which provides efficient service to major destinations and promotes alternatives to the single passenger auto.

Policy CO-12.3: Transportation Systems Management. Expand existing transportation systems management and transportation demand management strategies which reduce congestion, vehicle idling, and travel in single passenger autos.

Policy CO-12.4: Require that development projects be designed in a manner which reduces potential adverse air quality impacts.

Policy CO-12.5: Use of Best Available Control Technology. Require new industry to use best available control technology to remove pollutants, including filtering, washing, or electrostatic treatment of emissions.

Policy CO-12.6: Control of Dust Emissions. Require construction, demolition, and grading practices which minimize dust emissions. These practices are currently required by the City and include the following:

- Avoiding earth moving and other major dust generating activities on windy days.
- Sprinkling unpaved construction areas with water during excavation, using reclaimed water where feasible (watering can reduce construction-related dust by 50 percent).
- Covering stockpiled sand, soil, and other particulates with a tarp to avoid blowing dust.
- Covering trucks hauling dirt and debris to reduce spills. If spills do occur, they should be swept up promptly before materials become airborne.
- Preparing a comprehensive dust control program for major construction in populated areas or adjacent to sensitive uses like hospitals and schools.
- Operating construction and earth-moving equipment, including trucks, to minimize exhaust emissions.

Policy CO-12.7: Regional Air Quality Planning. Coordinate local air quality planning efforts with other agencies, including adjoining cities and counties and the public agencies responsible for monitoring and improving air quality. Cooperate with regional agencies such as the BAAQMD, the MTC, the ABAG, and the Alameda County Congestion Management Agency in developing and implementing regional air quality strategies. Continue to work with BAAQMD and the California Air Resources Board in enforcing the provisions of the California and Federal Clean Air Acts, including the monitoring of air pollutants on a regular and on-going basis.

City of Oakland Municipal Code

Per the City of Oakland Municipal Code, Title 15 Buildings and Construction, Chapter 15.36 Demolition Permits, 15.36.100 Dust Control Measures.

"Best Management Practices" shall be used throughout all phases of work, including suspension of work, to alleviate or prevent fugitive dust nuisance and the discharge of smoke or any other air contaminants into the atmosphere in such quantity as will violate any city or regional air pollution control rules, regulations, ordinances, or statutes. Water or dust palliatives or combinations of both shall be applied continuously and in sufficient quantity during the performance of work and at other times as required. Dust nuisance shall also be abated by cleaning and sweeping or other means as necessary. A dust control plan may be required as condition of permit issuance or at other times as may be deemed necessary to assure compliance with this section. Failure to control effectively or abate fugitive dust nuisance or the discharge of smoke or any other air contaminants into the atmosphere may result in suspension or revocation of the permit, in addition to any other applicable enforcement actions or remedies. (Ord. 12152 § 1, 1999).

Green Building Ordinance

The Green Building Ordinance was adopted by the City of Oakland in 2005, in conjunction with the Sustainable Communities Initiative of 1998, in order to maintain high standards of green development and new construction throughout the City. This ordinance requires green performance in major civic projects and provides policies to assist private development projects in improving green performance.

In October of 2010, the city adopted the Green Building Ordinance for Private Development Projects. The ordinance affects a wide range of projects from new construction of single- and multi-family residential as well as non-residential projects, additions and alterations, modifications or demolition of historic resources, construction of affordable housing and mixed-use projects, as well as projects requiring a landscape plan. Projects that are affected based on defined thresholds in the ordinance include:

- Residential and non-residential new construction, additions and alterations;
- Removal of a historic resource and new construction;
- Historic residential and non-residential additions and alterations;
- Mixed use construction; and
- Construction requiring a landscape plan.

Certain types of projects are required to receive certification through a non-governmental green rating agency, including:

- All new residential construction and residential additions or alterations over 1,000 square feet, certified through Built It Green's GreenPoint Rated program.
- All new non-residential construction and non-residential additions or alterations.

In addition to Oakland's local Green Building Ordinance, the state of California recently adopted the new Green Building Code known as CALGreen (described above). Both the City's local ordinance and CALGreen are now in effect.

Standard Conditions of Approval

The City's Standard Conditions of Approval relevant to this environmental topic are listed below. These Standard Conditions of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area when it is approved by the City and would ensure that significant impacts would not occur.

Supplemental SCA A: Construction-Related Air Pollution Controls for Dust and Equipment Emissions (Ongoing throughout demolition, grading, and/or construction). During construction, the project applicant shall require the construction contractor to implement all of the following applicable measures recommended by the Bay Area Air Quality Management District (BAAQMD):

BASIC (Applies to ALL construction sites)

a. Water all exposed surfaces of active construction areas at least twice daily (using reclaimed water if possible). Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

b. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).

c. All visible mud or dirt track-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.

d. Pave all roadways, driveways, sidewalks, etc. as soon as feasible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

e. Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).

f. Limit vehicle speeds on unpaved roads to 15 miles per hour.

g. Idling times shall be minimized either by shutting equipment off when not is use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations. Clear signage to this effect shall be provided for construction workers at all access points.

h. All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

i. Post a publicly visible sign that includes the contractor's name and telephone number to contact regarding dust complaints. When contacted, the contractor shall respond and take corrective action within 48 hours. The telephone numbers of contacts at the City and the BAAQMD shall also be visible. This information may be posted on other required on-site signage.

ENHANCED: All "Basic" controls listed above plus the following controls if the project involves:

- i. 114 or more single-family dwelling units;
- ii. 240 or more multi-family units;
- iii. Nonresidential uses that exceed the applicable screening size listed in the Bay Area Air Quality Management District's CEQA Guidelines;
- iv. Demolition permit;
- v. Simultaneous occurrence of more than two construction phases (e.g., grading and building construction occurring simultaneously);
- vi. Extensive site preparation (i.e., the construction site is four acres or more in size); or
- vii. Extensive soil transport (i.e., 10,000 or more cubic yards of soil import/export).

j. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.

k. All excavation, grading, and demolition activities shall be suspended when average wind speeds exceed 20 mph.

l. Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

m. Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more).

n. Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress.

o. Install appropriate wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of the construction site to minimize wind-blown dust. Wind breaks must have a maximum 50 percent air porosity.

p. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.

q. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.

r. All trucks and equipment, including tires, shall be washed off prior to leaving the site.

s. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.

t. Minimize the idling time of diesel-powered construction equipment to two minutes.

u. The project applicant shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project wide fleet-average 20 percent NOx reduction and 45 percent particulate matter (PM) reduction compared to the most recent California Air Resources Board (CARB) fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as they become available.

v. Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., BAAQMD Regulation 8, Rule 3: Architectural Coatings).

w. All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for emission reductions of NOx and PM.

x. Off-road heavy diesel engines shall meet the CARB's most recent certification standard.

The following condition applies to all projects that meet ALL of the following criteria:

1. The project involves either of the following sensitive land uses:
   - New residential facilities or new dwelling units; or
   - New or expanded schools, daycare centers, parks, nursing homes, or medical facilities; and
2. The project is located within 1,000' of one or more of the following sources of air pollution:
   - Freeway;
   - Roadway with significant traffic (at least 10,000 vehicles/day);
   - Rail line (except BART) with over 30 trains per day;
   - Distribution center that accommodates more than 100 trucks per day, more than 40 trucks with operating Transportation Refrigeration Units (TRU) per day, or where the TRU unit operations exceed 300 hours per week;
   - Major rail or truck yard (such as the Union Pacific rail yard adjacent to the Port of Oakland);
   - Ferry terminal;
   - Port of Oakland; or
   - Stationary pollutant source requiring a permit from BAAQMD (such as a diesel generator); and
3. The project exceeds the health risk screening criteria after a screening analysis is conducted in accordance with the Bay Area Air Quality Management (BAAQMD) CEQA Guidelines.]

SCA B: Exposure to Air Pollution (Toxic Air Contaminants)

a. Health Risk Reduction Measures. Requirement: The project applicant shall incorporate appropriate measures into the project design in order to reduce the potential health risk due to exposure to toxic air contaminants. The project applicant shall choose one of the following methods:

   i. The project applicant shall retain a qualified air quality consultant to prepare a Health Risk Assessment (HRA) in accordance with the California Air Resources Board (CARB) and the Office of Environmental Health and Hazard Assessment requirements to determine the health risk of exposure of project residents/occupants/users to air pollutants. The HRA shall be submitted to the City for review and approval. If the HRA concludes that the health risk is at or below acceptable levels, then health risk reduction measures are not required. If the HRA concludes the health risk exceeds acceptable levels, health risk reduction measures shall be identified to reduce the health risk to acceptable levels. Identified risk reduction measures shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City.

   ii. The project applicant shall incorporate the following health risk reduction measures into the project. These features shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City:

      - Installation of air filtration to reduce cancer risks and Particulate Matter (PM) exposure for residents, and other sensitive populations, in the project that are in close proximity to sources of air pollution. Air filter devices shall be rated MERV-13 or higher. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.
      - Phasing of residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible.
      - The project shall be designed to locate sensitive receptors as far away as feasible from the source(s) of air pollution. Operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall not be located immediately adjacent to a loading dock or where trucks concentrate to deliver goods, if feasible.
      - Sensitive receptors shall not be located on the ground floor, if feasible.
      - Planting trees and/or vegetation between sensitive receptors and pollution source, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (Pinus nigra var. maritima), Cypress (X Cupressocyparis leylandii), Hybrid popular (Populus deltoids X trichocarpa), and Redwood (Sequoia sempervirens).
      - Within the project site, sensitive receptors shall be located as far away from truck activity areas, such as loading docks and delivery areas, as feasible.
      - Within the project site, existing and new diesel generators shall meet CARB's Tier 4 emission standards, if feasible.
      - Within the project site, emissions from diesel trucks shall be reduced through implementing the following measures, if feasible:
         - Installing electrical hook-ups for diesel trucks at loading docks.
         - Requiring trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards.

- Requiring truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels.
- Prohibiting trucks from idling for more than two minutes.
- Establishing truck routes to avoid sensitive receptors in the project. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented.

When Required: Prior to approval of construction-related permit

Initial Approval: Planning and Zoning Division

Monitoring/Inspection: Building Services Division

b. Maintenance of Health Risk Reduction Measures - Requirement: The project applicant shall maintain, repair, and/or replace installed health risk reduction measures, including but not limited to the HVAC system (if applicable), on an ongoing and as-needed basis. Prior to occupancy, the project applicant shall prepare and then distribute to the building manager/operator an operation and maintenance manual for the HVAC system and filter including the maintenance and replacement schedule for the filter.

When Required: Ongoing

Initial Approval Authority: N/A

Monitoring/Inspection/Enforcement: Building Services Division

SCA 40: Asbestos Removal in Structures (*Prior to issuance of a demolition permit*). These Development Standards apply to projects with Asbestos in Structures. If asbestos-containing materials (ACM) are found to be present in building materials to be removed, demolition and disposal, the project applicant shall submit specifications signed by a certified asbestos consultant for the removal, encapsulation, or enclosure of the identified ACM in accordance with all applicable laws and regulations, including but not necessarily limited to: California Code of Regulations, Title 8; Business and Professions Code; Division 3; California Health & Safety Code 25915-25919.7; and Bay Area Air Quality Management District, Regulation 11, Rule 2, as may be amended.

SCA 24: Parking and Transportation Demand Management (*Prior to issuance of a final inspection of the building permit*). These development standards apply to ALL projects involving 50 or more new residential units or 50,000 sq. ft. or more of new non-residential space. The applicant shall submit for review and approval by the Planning and Zoning Division a Transportation Demand Management (TDM) plan containing strategies to reduce on-site parking demand and single occupancy vehicle travel. The applicant shall implement the approved TDM plan. The TDM shall include strategies to increase bicycle, pedestrian, transit, and carpools/vanpool use. All four modes of travel shall be considered. Strategies to consider include the following:

a. Inclusion of additional bicycle parking, shower, and locker facilities that exceed the requirement

b. Construction of bike lanes per the Bicycle Master Plan; Priority Bikeway Projects

c. Signage and striping onsite to encourage bike safety

d. Installation of safety elements per the Pedestrian Master Plan (such as cross walk striping, curb ramps, count down signals, bulb outs, etc.) to encourage convenient crossing at arterials

e. Installation of amenities such as lighting, street trees, trash receptacles per the Pedestrian Master Plan and any applicable streetscape plan.

f. Direct transit sales or subsidized transit passes

g. Guaranteed ride home program

h. Pre-tax commuter benefits (checks)

i. On-site car-sharing program (such as City Car Share, Zip Car, etc.)

j. On-site carpooling program

k. Distribution of information concerning alternative transportation options

l. Parking spaces sold/leased separately

m. Parking management strategies; including attendant/valet parking and shared parking spaces

Port of Oakland Maritime Air Quality Policy, Maritime Air Quality Improvement Plan, and Comprehensive Truck Management Program

On March 18, 2008, the Port's Board of Port Commissioners approved a Maritime Air Quality Policy Statement. The air quality policy sets a goal of an 85 percent reduction from 2005 to 2020 in neighboring- community cancer health risks related to exposure to diesel particulate matter emissions from the Port's maritime operations through all practicable and feasible means. In April of 2009, the Port adopted its Maritime Air Quality Improvement Plan (MAQIP) which includes air quality goals and policies that cover all seaport-related development and operations at the Port. It specifically includes initiatives, programs and projects for achieving a reduction in DPM and criteria pollutants through targeted emission reductions and enforcement of regulations.

Subsequently on June 16, 2009, the Board adopted the Maritime Comprehensive Truck Management Program (CTMP), a MAQIP program. The CTMP was developed to comprehensively address security, air quality, business and operations, and community issues related to trucking operations at the Port's maritime facilities. CTMP measures to reduce diesel particulate matter emissions include enacting a ban on older, more-polluting trucks (2009), providing grants for diesel exhaust retrofits (2009-2010), and supporting initiatives to reduce idling (on-going).

Impacts and Mitigation Measures

Significance Criteria

CEQA requires the analysis of potential adverse effects of the project on the environment. Potential effects of the environment on the project are legally not required to be analyzed or mitigated under CEQA. However, this document nevertheless analyzes potential effects of the environment on the project in order to provide information to the public and decision-makers. Where a potential significant effect of the environment on the project is identified, the document, as appropriate, identifies City Standard Conditions of Approval and/or project-specific non-CEQA recommendations to address these issues."

The Project would have a significant impact on the environment if it would: [7]

Plan-Level Impacts

1. Fundamentally conflict with the Bay Area Clean Air Plan (CAP) because the projected rate of increase in vehicle miles traveled (VMT) or vehicle trips is greater than the projected rate of increase in population;

[7] The West Oakland Specific Plan is a long-term planning document that would modify land uses within the Plan Area. As such, the analysis included in this Chapter of the EIR evaluates air quality impacts, primarily based on "plan-level" thresholds. However, "project-level" effects are also discussed.

2. Fundamentally conflict with the CAP because the plan does not demonstrate reasonable efforts to implement control measures contained in the CAP; or
3. Not identify existing and planned sources of odors with policies to reduce potential odor impacts.

Project-Level Impacts

Except for impacts related to Toxic Air Contaminants (TACs) (threshold 8) and odors (threshold 9), air quality impacts are, by their nature, cumulative impacts because one project by itself cannot generate air pollution that would violate regional air quality standards. Thresholds 5 through 7 pertain to a project's contribution to cumulative impacts but are labeled "Project-Level Impacts" here to be consistent with the terminology used by BAAQMD.

4. During project construction result in average daily emissions of 54 pounds per day of ROG, NOx, or PM2.5 or 82 pounds per day of PM10;
5. During project operation result in average daily emissions of 54 pounds per day of ROG, NOx, or PM2.5 or 82 pounds per day of PM10; or result in maximum annual emissions of 10 tons per year of ROG, NOx, or PM2.5 or 15 tons per year of PM10;
6. Contribute to carbon monoxide (CO) concentrations exceeding the California Ambient Air Quality Standards (CAAQS) of nine parts per million (ppm) averaged over eight hours and 20 ppm for one hour [NOTE: Pursuant to BAAQMD CEQA Guidelines, localized CO concentrations should be estimated for projects in which (a) project-generated traffic would conflict with an applicable congestion management program established by the county congestion management agency or (b) project-generated traffic would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour (or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited, such as tunnels, parking garages, bridge underpasses, natural or urban street canyons, and below-grade roadways). In Oakland, only the MacArthur Maze portion of Interstate 580 exceeds the 44,000 vehicles per hour screening criteria.];

Non-CEQA Considerations:

7. Not include special overlay zones containing goals, policies, and objectives to minimize potential Toxic Air Contaminant (TAC) impacts in areas located (a) near existing and planned sources of TACs and (b) within 500 feet of freeways and high-volume roadways containing 100,000 or more average daily vehicle trips; or
8. During either project construction or project operation expose persons by siting a new source or a new sensitive receptor to substantial levels of Toxic Air Contaminants (TACs) resulting in (a) a cancer risk level greater than 10 in one million, (b) a non-cancer risk (chronic or acute) hazard index greater than 1.0, or (c) an increase of annual average PM2.5 of greater than 0.3 micrograms per cubic meter [NOTE: Pursuant to the BAAQMD CEQA Guidelines, when siting new TAC sources consider receptors located within 1,000 feet, and when siting new sensitive receptors consider TAC sources located within 1,000 feet including, but not limited to, stationary sources, freeways, major roadways (10,000 or greater vehicles per day), truck distribution centers, ports, and rail lines. For this threshold, sensitive receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers.] or;
9. Frequently and for a substantial duration, create or expose sensitive receptors to substantial objectionable odors affecting a substantial number of people [NOTE: For this threshold, sensitive

receptors include residential uses, schools, daycare centers, nursing homes, and medical centers (but not parks)].

10. During either project operation or project construction expose persons, by siting a new source or a new sensitive receptor, to substantial levels of TACs resulting in (a) a cancer risk level greater than 100 in a million, (b) a non-cancer risk (chronic or acute) hazard index greater than 10.0, or (c) annual average PM2.5 of greater than 0.8 micrograms per cubic meter [NOTE: The cumulative analysis should consider the combined risk from all existing and reasonably foreseeable future sources].

Methodology

Plan Level Assessment

Characterizing operational impacts of a Plan depends on consistency with the most recently adopted CAP. To determine consistency with the CAP, the proposed Plan must incorporate current air quality plan control measures as appropriate to the Plan Area, and the rate of increase in vehicle miles travelled (VMTs) or vehicle trips within the Plan Area (either measure may be used) must be less than the rate of increase in population within the Plan Area. To determine whether growth in the West Oakland Plan Area would conflict with regional growth expectations set forth in the CAP, this air quality analysis summarizes the potential changes in transportation demand and population in the West Oakland Planning Area. Existing VMT, vehicle trips, and population in the Plan Area were compared to forecasts for these same factors under full implementation of the West Oakland Specific Plan.

Project-Level Assessment

As noted above in “Project-Level impacts,” thresholds determine if individual project would generate significant levels of construction-period and operational period criteria pollutants and/or toxic air contaminants, and if significant localized carbon monoxide (CO) impacts would occur from new development. The analysis below uses these thresholds to determine if new development pursuant to the Plan may result in significant project-level impacts in order to provide more information about potential air quality-related impacts and to provide CEQA clearance for future projects that are consistent with the Plan and this EIR, pursuant to CEQA Guidelines sections 15183, 15162 through 15164, and 15168.

Non-CEQA Assessment

The BAAQMD guidelines recommend that a proposed General Plan or other area plans include recommendations for special overlay zones to be established around existing and proposed toxic air contaminant sources to protect sensitive populations. The most conservative project-level threshold for siting a new receptor, such as residential units, is to create a ‘Zone of Influence’ of 1,000 feet from a source of air quality risk or hazards. Many locations within the West Oakland Planning Area are within 1,000 feet of a freeway or active rail lines that are sources of TAC and potential air quality risk or hazards. This EIR includes a non-CEQA based disclosure and discussion of these effects of the existing ambient environment on subsequent development pursuant to the Plan.

Plan Level Impacts

CAP Consistency: Increased Vehicle Miles Travelled versus Increased Population

Impact Air-1: Development facilitated by the proposed Specific Plan would not fundamentally conflict with the Bay Area 2010 CAP because the projected rate of increase in vehicle miles travelled and vehicle trips would be less than the projected rate of increase in population. (**LTS**)

While the Specific Plan itself would not result in any direct physical changes, future development facilitated by the West Oakland Specific Plan would include new residential, industrial, commercial, and other land uses. Future foreseeable development would add new residential housing units as well as increased development of other land uses that would increase West Oakland employment. Demolition, construction, and operation or occupancy of this future development would result in increased mobile and area source emissions from individual projects. Future development within the Planning Area would be subject to the City's Standard Conditions of Approval, thereby minimizing the emissions and air quality impacts related to the development of individual projects.

Characterizing the air quality impacts of the West Oakland Specific Plan depends on a comparison of growth expectations under the CAP. The BAAQMD recommends that proposed plans be evaluated to determine if growth foreseeable under that plan would result in projected increases in VMT or vehicle trips (either measure may be used) is less than or equal to its projected population increase. If so, then the plan would be considered to have a less-than-significant impact on criteria air pollutants and precursor emissions.

The Specific Plan's allowable increase in Plan Area growth would not conflict with regional growth expectations set forth in the CAP. The potential changes in transportation demand as expressed through vehicles miles travelled (VMT) would not outpace population growth in the Plan Area. Growth in Plan Area emissions would be within the projections of the CAP because growth within the Plan Area would occur under policies encouraging use of transit, alternative transportation modes, and sustainable development patterns, which reduce transportation demand. **Table 4.2-7**summarizesthe existing VMTs and vehicle trips resulting from current land uses in the West Oakland Plan Area and the VMTs and vehicle trips resulting from future development facilitated by the Specific Plan.

Table 4.2-7: Transportation Demand and Population Added with Foreseeable Growth

	Attributable to Existing Land Uses in Plan Area	Added by Foreseeable Growth Pursuant to Plan	Rate of Increase
Vehicle Miles Traveled			
AM Peak [1]	31,766	33,069	
PM Peak [2]	38,679	39,642	**103%**
Daily [3]	352,075	363,000	**103%**
Vehicle Trips (PM Peak Hour) [4]			
Trips from Plan Area:	3,847	3,853	
Trips to Plan Area:	2,914	2,190	
Trips within Plan Area	+263	+655	
Total PM Peak Trips	7,025	6,698	**95%**
Population [5]			
Residents	640	11,136	
Employees	+9,770	+14,850	
Total	**10,410**	**25,986**	**250%**

Notes:

1 and 2: VMTs for AM and PM peak period provided by Kittleson, 3/7/13 and are consistent with the Traffic chapter of this EIR

3. Daily VMTs derived from the average of the AM and PM peak VMTs provided by Kittleson, times a factor of 10 to derive daily

4. All trip generation numbers presented are "worst-case" PM peak hour trips provided by Kittleson and are consistent with the Traffic chapter of this EIR

5. Population and employment numbers as presented in Chapter 4.8: Population and Employment of this EIR

Lamphier-Gregory, 2013.

As shown in Table 4.2-7, the projected population increase (combined residents and employees) in West Oakland that is attributable to new growth and development pursuant to the Specific Plan represents a growth rate of approximately 250%. This projected population growth rate greatly exceeds the projected increase in both PM peak and daily vehicles miles travelled (VMTs) which are 102% and 103%, respectively and also substantially exceeds the projected increase in PM peak hour vehicle trips (at about a 95% increase). Based on these comparisons, the Specific Plan is consistent with the CAP; the projected increase in VMTs and vehicle trips would grow at a lesser rate than the West Oakland Plan Area's service population. This means that the rate of projected growth in the Plan Area would be consistent with the CAP, and this impact would be less than significant.

Mitigation Measures

None needed

CAP Consistency: Implementation of Control Measures

Impact Air-2: Implementation of the West Oakland Specific Plan would not fundamentally conflict with the CAP because the Specific Plan demonstrates reasonable efforts to implement control measures contained in the CAP. (**LTS**)

CAP Overview

On September 15, 2010, the Air District (BAAQMD) Board of Directors adopted the final Bay Area 2010 Clean Air Plan (CAP) and certified the Final Environmental Impact Report on the CAP. The 2010 CAP serves to update the Bay Area Ozone Plan in compliance with the requirements of Chapter 10 of the California Health & Safety Code. In addition, the 2010 CAP provides an integrated, multi-pollutant strategy to improve air quality, protect public health, and protect the climate. As indicated in the Executive Summary to the 2010 Clean Air Plan;[8]

> "The Bay Area 2010 Clean Air Plan (CAP) provides a comprehensive plan to improve Bay Area air quality and protect public health. The 2010 CAP has been prepared in close collaboration with the Air District's regional agency partners, and has been informed by extensive outreach to the public and interested stakeholders. The CAP defines a control strategy that the Air District and its partners will implement to: (1) reduce emissions and decrease ambient concentrations of harmful pollutants; (2) safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily impacted by air pollution; and (3) reduce greenhouse gas (GHG) emissions to protect the climate.
>
> The Bay Area was recently designated as non-attainment for the national 24-hour fine particulate matter (PM2.5) standard, and will be required to prepare a PM2.5 State Implementation Plan (SIP) pursuant to federal air quality guidelines by December 2012. The 2010 CAP is not a SIP document and does not respond to federal requirements for PM2.5 or ozone planning. However, in anticipation of future PM2.5 planning requirements, the CAP control strategy also aims to reduce PM emissions and concentrations. In addition, U.S. EPA is currently reevaluating national ozone standards, and is likely to tighten those standards in the near future. The control measures in the CAP will also help in the Bay Area's continuing effort to attain national ozone standards.
>
> In addition to updating the Bay Area's state ozone plan, the 2010 CAP will also serve as a multi-pollutant plan to protect public health and the climate. This effort to develop its first-ever multi-pollutant air quality plan is a voluntary initiative by the Air District. The Air District believes that an integrated and comprehensive approach to planning is critical to respond to air quality and climate protection challenges in the years ahead. In its dual roles as an update to our state ozone plan and a multi-pollutant plan, the 2010 CAP addresses four categories of pollutants:
>
> - Ground-level ozone and its key precursors, ROG and NOx;
> - Particulate matter: primary PM2.5, as well as precursors to secondary PM2.5;
> - Air toxics; and
> - Greenhouse gases.

---

[8] Accessed at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Plans/2010%20Clean%20Air%20Plan/Executive%20Summary%20of%20Bay%20Area%202010%20CAP.ashx

> The major purpose for developing a multi-pollutant plan is to achieve the greatest possible public health benefit by reducing emissions, ambient concentrations, and public exposure across the four categories of air pollutants addressed in the 2010 CAP. In developing the CAP control strategy, the Air District has attempted to maximize co-benefits, while at the same time minimizing any potential trade-offs among pollutants.
>
> The 2010 CAP control strategy includes revised, updated, and new measures in the three traditional control measure categories: Stationary Source Measures, Mobile Source Measures, and Transportation Control Measures. In addition, the CAP identifies two new categories of control measures: Land Use and Local Impact Measures, and Energy and Climate Measures. The control strategy proposes a total of 55 control measures, including 18 Stationary Source Measures, 10 Mobile Source Measures;17 Transportation Control Measures; 6 Land Use and Local Impact Measures; and 4 Energy and Climate Measures."

Stationary Source Measures

Stationary Source Measures (SSMs) are measures that the Air District adopts and enforces pursuant to its authority to control emissions from stationary sources of air pollution such as manufacturing facilities, refineries, dry cleaners, auto body shops, gas stations, etc. A total of 18 SSMs are proposed in the 2010 CAP control strategy to enhance the Air District's regulatory program and ensure that the Bay Area remains in the forefront in controlling emissions from stationary sources. The proposed SSMs will provide reductions in emissions of ozone precursors, direct PM and PM precursors, air toxics, and greenhouse gases.

The West Oakland Specific Plan would not fundamentally conflict with the CAP's Stationary Source Measures. All new development pursuant to the Specific Plan, including new industrial and commercial uses, would be required to comply with all measures that the Air District adopts and enforces to control emissions from stationary sources of air pollution.

Mobile Source Measures

Mobile Source Measures (MSMs) are measures that reduce emissions by accelerating the replacement of older, dirtier vehicles and equipment through programs such as the Air District's Vehicle Buy-Back and Smoking Vehicle Programs, and promoting advanced technology vehicles that reduce emissions of criteria pollutants and/or greenhouse gases. Since CARB is responsible for establishing statewide motor vehicle emissions standards and fuel specifications, implementation of the 10 MSMs relies heavily upon incentive programs, such as the Carl Moyer Program and the Transportation Fund for Clean Air, to achieve voluntary emission reductions in advance of, or in addition to, CARB requirements.

The West Oakland Specific Plan would not fundamentally conflict with the CAP's Mobile Source Measures. The Specific Plan does not contain any policies or strategies that would be contrary to incentive programs to achieve voluntary emission reductions from mobile sources.

Transportation Control Measures

Transportation Control Measures (TCMs) are strategies to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions. The draft Control Strategy includes 17 TCMs to improve transit service; encourage walking, bicycling, and transit use; improve efficiency of the regional transit and roadway systems; support focused growth; and develop and implement pricing strategies. The TCMs are organized into five categories:

- improving transit services

- improving system efficiency
- encouraging sustainable travel behavior
- supporting focused growth, and
- implementing pricing strategies.

New TCMs have been added to emphasize the importance of smart driving and the need to reduce high-speed driving; encourage parking policies that will help to reduce motor vehicle travel; and advocate that the Air District and its regional agency partners join forces to develop a regional transportation pricing strategy.

The West Oakland Specific Plan would not fundamentally conflict with, but instead would support the CAP's transportation control strategies. The Specific Plan strongly advocates for, and includes a step-by-step process (including a strategy to identify potential funding sources) for enhanced transit service within West Oakland. The Specific Plan also includes strategies for improving the efficiency of the existing transit system and to make it more convenient and accessible. The Specific Plan also promotes focused urban infill development within West Oakland, and specifically at the transit-oriented development site at the West Oakland BART station.

Land Use Measures

Land Use and Local Impacts Measures (LUMs) are a new category of measures designed to promote mixed use, compact development to reduce motor vehicle travel and emissions; and to ensure that we plan for focused growth in a way that protects people from exposure to air pollution from stationary and mobile sources of emissions. Building on the Air District's CARE program and Clean Air Communities Initiative, this component of the Control Strategy puts a special emphasis on the need to monitor and reduce population exposure to hazardous pollutants in communities that are most heavily impacted by emissions. The measures in this category draw upon the full range of tools available to the Air District, including rulemaking, notably development of a new indirect source review rule; revised CEQA guidelines and enhanced CEQA review by the Air District; working with local jurisdictions to encourage and assist them in developing Community Risk Reduction Plans to reduce population exposure to air toxics and PM; providing incentives to reduce emissions from heavy duty diesel equipment; targeted enforcement of CARB diesel control rules; land use guidance; and enhanced air quality monitoring.

The West Oakland Specific Plan would not fundamentally conflict with, but instead would support the CAP's land use measures. The Specific Plan strongly advocates for focused urban infill development within West Oakland, and specifically at the transit-oriented development site at the West Oakland BART station. The West Oakland BART station TOD is intended as a model of mixed use, compact development to reduce motor vehicle travel and emissions.

In some cases, CARB makes recommendations for specific buffer zones around certain types of TAC emitters of particular concern, as is the case for dry cleaners (500 feet) and chrome platers (1,000 feet). The BAAQMD Guidelines recommend special overlay zones containing goals, policies, and objectives to minimize potential TAC impacts in areas located within 1,000 feet of existing and planned TAC sources. As discussed in Impact AIR-5, residential development areas within the Plan Area are within areas of concern from the TAC emissions from one or more stationary TAC sources, from high volumes of vehicle traffic on I-880, I980 and I-580, and from rail yards, trucking distribution facilities or major port activities.

While the Specific Plan would result in an increase in the population exposure to hazardous pollutants within a community that is heavily impacted by TAC emissions (primarily form truck traffic on the I-880 freeway), both the Plan and this EIR include mitigation measures to substantially reduce this exposure in new development projects. The City's SCA B, Exposure to Air Pollution (Toxic Air Contaminants), would apply to residential development located near sources of PM2.5 and DPM and within 1,000 feet of stationary and mobile sources of TACs. In accordance with the BAAQMD Guidelines, when a residential development project is proposed within 1,000 feet of a stationary TAC source, the potential health risk to the project residents would be evaluated using the BAAQMD's recommended screening criteria. If the project were to exceed the screening criteria a project-specific HRA would be prepared to quantify the project-specific health risk; this requirement is incorporated in SCA B. Adoption and development under the Specific Plan would be required to implement any project-specific recommendations to reduce the potential health risk.

Recommendations may include having the future project applicant install, operate and maintain a central heating and ventilation (HV) system or other air take system in the building or in each individual residential unit, that meets or exceeds an efficiency standard of MERV 13; using HEPA filters; or using ASHRAE 85% supply filters. Therefore, SCA B functions as an overlay zone with specific requirements to reduce exposure to TACs and reduce related TAC impacts. Because SCA B would be incorporated as part of the Specific Plan, adopted as a condition of approval, and required, as applicable, of the development under the Specific Plan, the impact would be less-than-significant.

The Specific Plan also supports other on-going efforts by the City, the Port of Oakland and others to reduce TAC emissions currently affecting the broader West Oakland community.

Energy and Climate Measures

Energy and Climate Measures (ECMs) are a new category of measures designed to reduce ambient concentrations of criteria pollutants, reduce emissions of CO2, and protect our climate by:

- Promoting energy conservation and energy efficiency in homes, schools, and commercial and industrial buildings;
- Promoting renewable forms of energy production, such as solar panels and solar thermal;
- Reducing "urban heat island" effects by increasing reflectivity of roofs and parking lots, in order to decrease energy consumption by air conditioning, reduce evaporative emissions from motor vehicles, and help offset temperature increases associated with global warming; and
- Promoting the planting of (low-VOC emitting) trees in order to reduce biogenic emissions from trees, lower air temperatures, provide shading to reduce energy use, and absorb CO2 and other air pollutants.

The West Oakland Specific Plan would not fundamentally conflict with the CAP's energy and climate measures. All new development pursuant to the Specific Plan would be required to comply with City of Oakland Standard Conditions of Approval which seeks to reduce energy use in new development projects. Strategies included in the Specific Plan also support voluntary employer-based trip reduction programs, improve bicycle access and facilities, improve arterial traffic management, improve pedestrian access and facilities, and promote traffic calming measures

Conclusions

In summary, the West Oakland Specific Plan would not interfere with implementation of Clean Air Plan control measures.

Mitigation Measures

None needed

Odors

Air-3: Odor Impacts. Development in accordance with the Specific Plan could expose a substantial number of new people to existing and new objectionable odors. (**SU**)

Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. This EIR nevertheless analyzes potential effects of the environment on the project (i.e. siting new receptors near existing and potential new odor sources) in order to provide information to the public and decision-makers. Where a potential significant effect of the environment on the project is identified, the document, as appropriate, identifies City Standard Conditions of Approval and/or project-specific recommendations to address these issues.

EBMUD Wastewater Treatment Plan Odors

The East Bay Municipal Utility District (EBMUD) Main Wastewater Treatment Plant (WWTP) is located west of West Oakland, within a triangular area formed by Grand Avenue and the I-80, I-580, and I-880 freeways. Odors from the WWTP are usually caused by gases produced when organic matter decomposes. The most typical odor is hydrogen sulfide. Weather conditions that persist along the coast during summer are primarily a northwest air flow and negligible precipitation. A low pressure area over the interior of California, caused by heating near the surface, helps to draw the northwesterly flow on-shore over the Bay Area for much of the summer. These onshore winds, or sea breezes, turn westerly as the flow enters through the Golden Gate. As a result of this weather pattern, summer breeze conditions tend to carry air from over the EBMUD WWTP across West Oakland, carrying odors in the air along.

According to the West Oakland Redevelopment Plan EIR, there had been no odor complaints filed for this facility over the period from 1999-2002. BAAQMD public records for the last five years indicate that five odor complaints related to the MWWTP facility were received and three were confirmed by BAAQMD. According to EMBUD documents, the District received no complaints in 2004, 4 complaints in 2005, up to 36 complaints in 2006 and as many as 62 logged odor complaints in 2007. The increase in odor complaints was likely due to several factors, including residential development along the WWTP's eastern fence line (i.e., West End Commons condominiums), and the addition of a processing facility and receiving station, also near the WWTP's eastern fence line.

In 2006, EBMUD constructed a new grit removal facility, significantly reducing odors from this part of the treatment process. In July 2007, EBMUD removed the facilities causing most of the odors along the plant’s eastern fence line, which is nearest local businesses and residents. EBMUD has also added new equipment designed to collect and treat foul air from different parts of the plant using air filters (activated carbon and bio-filters). Additionally, in 2008 EBMUD completed a comprehensive, facility-wide Odor Control Master Plan to help evaluate current odor control practices and to plan future odor control improvements at the plant. The Odor Control Plan was developed based on an intensive plant-wide odor sampling effort in 2008, and includes phased implementation of additional near-term and long-term improvements to upgrade and improve the odor control systems at the plant.

The 2011 EIR for EBMUDs’ Main Wastewater Treatment Plant Land Use Master Plan found that the Master Plan project would upgrade odor control facilities to address community concerns and respond to regulatory requirements, and expected that project would reduce odors and have beneficial impacts to the community and air quality. The potential for odors was also addressed through an EBMUD EIR mitigation measure requiring that all short- and long-term EBMUD Land Use Master Plan projects be reviewed for odor potential during the design phase, and that operational and design odor control measures be incorporated into the project to minimize off-site odor impacts and ensure compliance with BAAQMD air permit fence line monitoring limits. [9]

Despite these measures, odors from the EBMUD WWTP are unlikely to be fully prevented. Additionally, since a large portion of the West Oakland Planning Area is within the BAAQMD-recommended two mile buffer zone of the EBMUD Waste Treatment Facility, the Specific Plan would expose a substantial number of new people to existing objectionable odors.

Other Existing Odor Sources

All new Opportunity Sites and Opportunity Areas identified in the Specific Plan are located less than 1 mile from a potential odor source such as a food processing facility, painting/coating operations, or green waste/recycling facilities. As indicated in the Housing Element EIR, nearly the entire City of Oakland, and all of the West Oakland Specific Plan area, could be exposed to nuisance odor impacts due to potentially incompatible land uses. The City's Housing Element EIR concluded that odor sources currently present in all high density areas of the City could potentially expose future residences to substantial and frequent odors.

New Sources

Mixed use development in accordance with the Specific Plan could result in new food service uses (e.g., restaurants), painting facilities, coffee roasters, or dry cleaning facilities in close proximity or in the same building as residential or other odor-sensitive uses. Food service uses can generate odors as a result of cooking processes and waste disposal. Char broilers, deep fryers, and ovens tend to produce food odors that can be considered offensive to some people, and food waste can putrefy if not properly managed. The Specific Plan area contains numerous auto service uses, including auto body shops with paint spraying operations. Although controlled by BAAQMD permits and regulations, these types of uses can produce solvent type odors that may be objectionable. Without proper controls or setbacks, there is a potential for land use conflicts that could result in odor complaints.

Recommendations

Discretionary approvals within the Specific Plan area for food service (e.g., restaurants, coffee roasters) or other odor generating uses located in close proximity to or in the same building as residential or other odor sensitive should consider the following recommendations to reduce odors and potential conflicts and complaints:

- for restaurant or cooking uses, use of such devices as integral grease filtration or grease removal systems, baffle filters, electrostatic precipitators, water cooling/cleaning units, disposable pleated or bag filters, activated carbon filters, oxidizing pellet beds, and catalytic conversion, as well as proper packaging and frequency of food waste disposal, and exhaust stack and vent location with adequate consideration of nearby receptors; and
- for new residential dwellings within 300 feet of existing paint spraying operations (e.g. , auto body shops), cleaning operations (e.g. , dry cleaners), or other uses with the potential to cause odors, identification and adequate disclosure of potential odor impacts in notices to prospective buyers or tenants.

---

[9] EBMUD, Draft Environmental Impact Report, Main Wastewater Treatment Plant Land Use Master Plan, February 2011.

Resulting Level of Significance

There are no feasible plan policies or mitigation measures identified for reducing the impact of siting sensitive receptors near odor sources except for increasing the distance between the receptor and the source. New residential development is proposed under the West Oakland Specific Plan within the recommended odor buffer of numerous existing sources. Therefore, implementation of the Plan is assumed to result in a **significant and unavoidable** expose of future residences to substantial and frequent odor impacts.

Project-Level Impacts

Construction Period Fugitive Dust

Impact Air-4: During construction, individual development projects pursuant to the Specific Plan will generate fugitive dust from demolition, grading, hauling and construction activities. Fugitive dust will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval. (**LTS with SCA**)

Project-related construction activities including demolition, site preparation, earthmoving and general construction activities would generate short-term emissions of fugitive dust. Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM_{10} and $PM_{2.5}$ concentrations may be adversely affected on a temporary and intermittent basis. In addition, the fugitive dust generated by construction would include larger particles that would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts.

Standard Conditions of Approval

The City of Oakland considers implementation of effective and comprehensive dust control measures (Best Management Practices) recommended by the BAAQMD as the threshold of significance for fugitive dust emissions (both PM_{10} and $PM_{2.5}$); if a project complies with specified dust control measures, it would not result in a significant impact related to construction period dust emissions. In order to be protective of the health of nearby residences as well as to reduce dust emissions that could affect regional air quality, all future development pursuant to the Specific Plan is required to implement BAAQMD recommended construction period dust control measures pursuant to the City's Standard Conditions of Approval, and to comply with the requirements found under the City Municipal Code (Section 15.36.100; Dust Control Measures). These measures include both "Basic" and "Enhanced" measures for the Project since the Project meets several of the criteria for enhanced measures. The City's Standard Conditions of Approval Supplemental SCA A is consistent with both the "Basic" and "Enhanced" measures recommended by the BAAQMD.

Furthermore, to reduce the potential for asbestos-laden dust emissions, the Project is required to implement SCA 40 which requires certified asbestos removal, encapsulation, or enclosure of any identified asbestos containing materials in accordance with all applicable laws and regulations, including but not necessarily limited to those of the California Code of Regulations, the California Health & Safety Code and the Bay Area Air Quality Management District's regulations and rules.

Resulting Level of Significance

Implementation of these standard conditions of approval would ensure that the impact of construction-period fugitive dust remains at a less than significant level.

Construction Period Criteria Emissions

Impact Air-5: During construction, individual development projects pursuant to the Specific Plan will generate regional ozone precursor emissions and regional particulate matter emissions from construction equipment exhaust. For most individual development projects, construction emissions will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval. However, larger individual construction projects could generate emissions of criteria air pollutants that would exceed the City's thresholds of significance. (**conservatively estimated as SU**)

Construction activities at individual development sites pursuant to the Specific Plan will include demolition, site preparation, earthmoving and general construction activities which will generate short-term emissions of criteria pollutants, including suspended and inhalable particulate matter and equipment exhaust emissions. Emissions generated from these activities will include particulate matter that are 10 microns or less in diameter (PM_{10}) and particles that are less than 2.5 microns in diameter ($PM_{2.5}$), combustion emissions of criteria pollutants (ROG, NO_x, CO, SO_x and PM_{10}) from operation of construction equipment and from worker vehicles, and evaporative emissions (ROG) from asphalt paving and architectural coating applications. Together, these emissions are known as criteria pollutants.

The City's significance thresholds consider construction emissions, even though temporary, to result in a significant impact if daily maximum emissions of construction-related criteria air pollutants or precursors would exceed 54 pounds per day of ROG, NO_x and $PM_{2.5}$, or 82 pounds per day of PM_{10} (with the PM values linked to construction exhaust emissions only, exclusive of fugitive dust).

Quantification of construction-period emissions has not been conducted because of the high number of variables needed to accurately model emissions, and the unknown nature of these variables. For example, each individual development project will be constructed pursuant to its own unique construction schedule, some individual projects will include demolition and debris hauling whereas other projects will not, the extent of excavation will vary widely between projects, and the types of architectural coatings and paving requirements will vary between each development site. Furthermore, because the threshold of significance is based on pounds per day of construction emissions, it is unknown how many constructions projects may be occurring simultaneously on any given day.

Standard Conditions of Approval

All future development projects pursuant to the Specific Plan would be subject to basic construction control measures through implementation of the City's Standard Conditions of Approval Supplemental **SCA A**, including but not limited to:

- Minimize the idling time of diesel-powered construction equipment to two minutes;
- Demonstrating that the off-road equipment to be used in the construction project would achieve a project wide fleet-average 20 percent NOx reduction and 45 percent particulate matter (PM) reduction compared to the most recent California Air Resources Board (CARB) fleet average;

- Ensuring that all construction equipment, diesel trucks, and generators are equipped with Best Available Control Technology for emission reductions of NOx and PM, and that off-road heavy diesel engines shall meet the CARB's most recent certification standard; and
- Using low volatile organic compound coatings that are more stringent than local requirements (i.e., BAAQMD Regulation 8, Rule 3: Architectural Coatings).

These standard conditions of approval will be incorporated as requirements of each individual project, and will reduce construction-period emissions over emission levels that would otherwise occur. However, depending upon the size of each individual construction project, the precise equipment used during the construction phase, and a wide range of other meteorological criteria, individual development project could exceed the City's thresholds of significance for construction-period emissions on a project-by-project basis.

Without modeling each individual development project pursuant to the Specific Plan, it is not possible to assess whether its construction emissions would exceed the City threshold. However, BAAQMD screening criteria indicates that if all of the following criteria are met, an individual construction project would be unlikely to result in a significant impact from criteria air pollutant and precursor emissions:

- The project does not exceed the following sizes:
  - 114 single-family homes, 240 units in a mid-rise apartment, or 252 units in a high-rise apartment or condo;
  - 277,000 square feet of commercial retail or office space,
  - 259,000 square feet or 540 employees within a light- or heavy- industrial building of industrial park.
- All Basic construction mitigation measures would be included in the project design and implemented during construction pursuant to Supplemental SCA A; and
- Construction-related activities would not include any of the following: a) demolition; b) simultaneous occurrence of more than two construction phases; c) simultaneous construction of more than one land use type (not applicable to high density infill development); d) extensive site preparation for grading, cut/fill, or earth movement); or e) extensive material transport (e.g., greater than 10,000 cubic yards of soil import/export) requiring a considerable amount of haul truck activity.

However, those construction projects that cannot meet these criteria may result in construction-period emissions exceeding City threshold levels for individual project-level effects.

Mitigation Measures

No additional measures are identified

Resulting Level of Significance

Large construction projects are likely to occur pursuant to the Specific Plan, and implementation of SCAs may not be fully capable of reducing criteria pollutants during construction. In particular, it cannot reliably be assumed that ROG emissions from application of architectural coatings would be reduced to 54 pounds per day or less. Therefore, this impact is conservatively considered to be **significant and unavoidable**.

Construction-Period TAC Emissions

Impact Air-6: During construction, individual development projects pursuant to the Specific Plan will generate construction-related toxic air contaminant (TAC) emissions from fuel-combusting construction equipment and mobile sources that could exceed thresholds for cancer risk, chronic health index, acute health index or annual average PM2.5 concentration levels. These construction-related TAC emissions will be reduced to a less than significant level with implementation of required City of Oakland Standard Conditions of Approval (**LTS with SCA**).

Construction activities at individual development sites pursuant to the Specific Plan may generate construction-related toxic air contaminant (TAC) emissions from fuel-combusting construction equipment and mobile sources. Project construction activities would produce DPM and PM2.5 emissions due to exhaust emissions from equipment such as loaders, backhoes, and cranes, as well as haul truck trips. These emissions could result in elevated concentrations of DPM and $PM_{2.5}$ at nearby receptors (both new and existing residences).

Sensitive receptors in proximity to these emissions (generally within 200 meters) could be subject to increased cancer risk, chronic health problems and acute health risk. The potential health risk associated with each construction site is dependent upon a number of factors including ambient concentrations, hourly concentrations based in intake factors, cancer potency factors, and chronic and acute reference exposure levels. Due to the variable nature of construction activity, the generation of TAC emissions in most cases would be temporary, especially considering the short amount of time such equipment is typically within an influential distance that would result in the exposure of sensitive receptors to substantial concentrations.

Current models and methodologies for conducting health risk assessments are associated with longer-term exposure periods of 9, 40, and 70 years, which do not correlate well with the temporary and highly variable nature of construction activities. This results in difficulties with producing accurate estimates of increased health risk. The specificity of detail necessary to conduct a health risk assessment is not available at the Plan stage.

Standard Conditions of Approval

Notwithstanding this lack of detail, SCA A would implement construction-related Best Management Practices to substantially reduce construction-related impacts to a **less-than-significant level**.

Operational-Related Criteria Air Pollutants

Impact Air-7: Once buildout of the Specific Plan is complete and all of the expected new development is fully occupied, new development pursuant to the Specific Plan will generate emissions of criteria pollutants (ROG, NO_x PM_{10} and $PM_{2.5}$) as a result of increased motor vehicle traffic and area source emissions. Traffic emissions combined with anticipated area source emissions would generate levels of criteria air pollutants that would exceed the City's project-level thresholds of significance. (**SU**)

The City's project-level thresholds of significance consider operational emission to result in a significant impact if the additional maximum operational emissions of criteria air pollutants would exceed 54 pounds per day or 10 tons per year of ROG, NO_x and $PM_{2.5}$, and/or 82 pounds per day or 15 tons per year of PM_{10}.

The URBEMIS computer program was used to calculate both the existing baseline criteria pollutant emissions generated by operation of existing uses within the Specific Plan's Opportunity Areas, and the criteria pollutant emissions generated by operations pursuant to buildout of the Specific Plan. For both of these scenarios, location factors related to the Project site have been included into the analysis. These factors include West Oakland's location in a higher-density urban environment with a broad mix of surrounding uses, the high degree of available transit, and the extent of sidewalks and bike paths provided within the Planning Area. The URBEMIS output sheets are included as **Appendix 4.2A**.

The maximum daily and total annual emissions of criteria pollutants (ROG, NO_x, PM_{10} and $PM_{2.5}$) generated at buildout of the Specific Plan operations are shown below in **Table 4.2-8**. From these projected future emissions, the current "baseline" emissions from existing uses within the Opportunity Areas of the Plan have been subtracted out, resulting in a net increase in criteria pollutants associated with buildout of the West Oakland Specific Plan. These net new increases in criteria pollutants are then compared to the City's significance thresholds to determine significance.

Table 4.2-8: Project Operational Emission Estimates at Buildout (assumed to be year 2035)

	Reactive Organic Gases	Nitrogen Oxides	PM_{10} (total)	$PM_{2.5}$ (total)
Daily Emissions (lbs/day)				
Operations (Vehicle Emissions)	354	277	2,006	380
Area Source Emissions	369	52	0.1	0.1
Total Regional Emissions	723	330	2,006	380
Less Baseline (Existing Operational Emissions)	-466	-486	-973	-186
Net Additional Area/Operational Emissions	257	-156	1,003	364
Significance Threshold	54	54	82	54
Exceed?	**Yes**	No	**Yes**	**Yes**
Annual Emissions (tons/yr)				
Operations (Vehicle Emissions)	98	12	18	17
Area Source Emissions	65	59	366	69
Total Regional Emissions	163	71	384	86
Less Baseline (Existing Operational Emissions)	-87	-102	-179	-35
Net Additional Area/Operational Emissions	76	-31	205	51
Significance Threshold	10	10	15	10
Exceed?	**Yes**	No	**Yes**	**Yes**

Source: Lamphier-Gregory, 2013

Emission factors are expected to decrease in the future owing to anticipated changes in federal and state regulations (including fuel standards), as well as increasing turnover of the regional vehicle fleet to more efficient, less polluting equipment. As can be seen in this table, even with decreased emission factors, Specific Plan-related emissions would exceed the City's project-level thresholds of significance for ROG, PM_{10} and $PM_{2.5}$.

The Specific Plan represents an overall development strategy for West Oakland that is comprised of numerous individual projects being developed over an extended period of time, is not one individual project. Therefore, comparison of the Specific Plan's buildout to these project-level thresholds provides a conservative impact assessment. However, in aggregate, buildout of the entire development plan as envisioned under the Specific Plan would result in the total operational emissions presented in Table 4.2-8 above.

Each individual development project as envisioned under the Specific Plan will incrementally contribute to this overall total. Without modeling each individual development project pursuant to the Specific Plan, it is not possible to assess whether any one individual project pursuant to the Plan would exceed the City threshold on its own. However, an individual subsequent project pursuant to the Specific Plan would be unlikely to result in a significant impact due to the generation of criteria air pollutants and ozone precursor emissions if the subsequent project does not exceed the following sizes:

- 325 single-family homes, 494 units in a mid-rise apartment, or 510 units in a high-rise apartment or condo;
- between 42,000 and 100,000 square feet of retail commercial space,
- 346,000 square feet of general office space, or
- 540,000 square feet or 1,250 employees within a light-industrial building.

However, it is likely that certain individual projects pursuant to the Specific Plan may exceed these screening level size limitations. The impact of individual development projects pursuant to this Plan, as well as the aggregate of all development assumed pursuant to the Specific Plan, is conservatively considered to generate criteria air pollutants and ozone precursor emissions at a level that would be significant.

Standard Conditions of Approval

The City's Standard Condition of Approval **SCA 24**: **Parking and Traffic Management Plan** applies to all subsequent development projects involving 50 or more new residential units or 50,000 square feet or more of new non-residential space. This condition requires individual development projects to prepare and implement a Transportation Demand Management Plan capable of reducing single-occupant vehicle use at the site through a variety of strategies including enhancement and promotion of transit and other alternative modes of travel. Implementation of this Standard Condition of Approval would reduce criteria air pollutants and ozone precursor emissions from subsequent development projects, but may or may not be fully effective in reducing emissions to below threshold levels.

Mitigation Measures

None available

Resulting Level of Significance

Individual development projects, as well as the aggregate of all development assumed pursuant to the Specific Plan, is conservatively considered to generate criteria air pollutants and ozone precursor emissions at a level that would be **significant and unavoidable**.

Carbon Monoxide Concentrations

Impact Air-8: The Specific Plan would not exposure sensitive uses and would not generate emissions leading to significant concentrations of CO that would violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation. (**LTS**)

Regional ambient air quality monitoring data demonstrate that CO concentrations are well below federal and state standards, despite long-term upward trends in regional VMT. The potential for localized increases in air pollutant concentrations from increased traffic has been greatly reduced in recent years due to improvements in motor vehicle exhaust controls since the early 1990s and the use of oxygenated fuels.

While regional violations are no longer a concern in the area, emissions from land use development and the associated traffic at congested intersections can, under certain circumstances, cause a localized build-up of carbon monoxide concentrations. Preliminary screening indicates less than significant localized CO concentrations occur at intersections affected by fewer than 24,000 vehicles per hour.[10] Traffic modeling conducted for this EIR indicates that study intersections with the highest traffic volumes would not experience 24,000 vehicles per peak hour under 2035 scenarios with or without implementation of the Specific Plan. Because traffic levels are below screening levels, it can be concluded that the impact of the Specific Plan in relation to localized CO impacts would be less than significant.

Mitigation Measures

None required

Operational Toxic Air Emissions

Impact Air-9: Development pursuant to the West Oakland Specific Plan would include new light industrial, custom manufacturing and other similar land uses, as well as the introduction of new diesel generators that could emit toxic emissions. resulting in (a) a cancer risk level greater than 10 in one million, (b) a chronic or acute hazard index greater than 1.0, or (c) an increase of annual average PM2.5 concentration of greater than 0.3 micrograms per cubic meter; or under cumulative conditions, resulting in a) a cancer risk level greater than 100 in a million, b) a chronic or acute hazard index greater than 10.0, or c) annual average PM2.5 of greater than 0.8 micrograms per cubic meter. (**Conservatively Significant and Unavoidable**)

Adoption and development under the Specific Plan includes a variety of land use types including residential, retail and industrial uses. While there are no specific stationary sources of air pollution proposed, subsequent industrial land uses and/or other land uses requiring diesel (or back-up diesel) generators could be developed throughout each of the Opportunity Areas within the Plan Area.

Any such new potential stationary source of TACs within the West Oakland Planning Area would be subject to BAAQMD rules and regulations. BAAQMD Regulation 2, Rule 5 requires that new stationary sources meet applicable BAAQMD risk evaluation requirements to ensure that health risks associated with TAC emissions would be acceptable. Sources of air pollutant emissions complying with applicable BAAQMD permit requirements generally would not be considered to have an individual significant air quality impact. Stationary sources that are exempt from BAAQMD permit requirements due to low

---

[10] BAAQMD, 2011

emissions would also be considered to not have a significant air quality impact. Per its Policy and Procedure Manual, the BAAQMD would deny an Authority to Construct or would deny a Permit to Operate any new or modified source of TACs that exceeds a cancer risk of 10 in one million or a chronic or acute hazard index of 1.0.

Notwithstanding the permit restrictions of the BAAQMD, the potential exists for multiple new sources of TAC emissions to be developed within a single concentrated portion of the Plan Area. Given the existing elevated cancer risk contributions from existing localized sources in the Plan Area, the potential exists for multiple new sources, each with a cancer risk less than 10 in one million, to cumulatively increase cancer risks to greater than 100 in one million.

Standard Conditions of Approval

SCA B will be implemented for all new residential development within the Plan Area that could be exposed to locally generated risks greater than 100 in a million. However, this SCA does not apply to projects that may introduce new sources of TAC emissions that could impact existing or new receptors. Therefore, new project sources could result in a significant cumulative risk generation impact.

Mitigation Measures

Mitigation Measure AIR-9: Risk Reduction Plan. Applicants for projects that would include backup generators shall prepare and submit to the City, a Risk Reduction Plan for City review and approval. The applicant shall implement the approved plan. This Plan shall reduce cumulative localized cancer risks to the maximum feasible extent. The Risk Reduction Plan may contain, but is not limited to the following strategies:

a) Demonstration using screening analysis or a health risk assessment that project sources, when combined with local cancer risks from cumulative sources with 1,000 feet would be less than 100 in one million.

b) Installation of non-diesel fueled generators.

c) Installation of diesel generators with an EPA-certified Tier 4 engine or Engines that are retrofitted with an ARB Level 3 Verified Diesel Emissions Control Strategy.

Resulting Level of Significance after Mitigation

Clean diesel generators and other strategies of the Risk Reduction Plan would substantially reduce potential cancer risks associated with DPM. While the residual risk for a given emission source would be less than 10 in one million, the degree to which multiple sources, if concentrated on one area, would maintain cumulative risks to below 100 in one million cannot be assured. While SCA B would apply to new residential development, the impacts to existing receptors could potentially remain and with no options other than controlling the source or mitigating the receptor, this impact is conservatively identified as **significant and unavoidable**.

Exposure to Toxic Air Contaminants and $PM_{2.5}$

Air-10: Certain future development projects in accordance with the West Oakland Specific Plan (as specified below) could result in new sensitive receptors exposed to existing levels of toxic air contaminants (TACs) or concentrations of $PM_{2.5}$ that could result in increased cancer risk or other health hazards. (**SU**)

CEQA requires the analysis of potential adverse effects of a project on the environment. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. However, this EIR nevertheless analyzes potential effects of the environment on the project (i.e. siting new receptors near existing TAC sources) in order to provide information to the public and decision-makers. Where a potential significant effect of the environment on the project is identified, the document, as appropriate, identifies City Standard Conditions of Approval and/or project-specific recommendations to address these issues.

Thresholds used in this analysis consider the level of exposure of sensitive receptors to air pollutant levels that result in an unacceptable cancer risk or hazard. For cancer risk, which is a concern with diesel particulate matter and other mobile-source TACs, the thresholds considers an increased risk of contracting cancer that is 10 in one million chances or greater to be significant for a single source, and exposure to annual $PM_{2.5}$ concentrations that exceed 0.3 micrograms per cubic meter (ug/m3) to be significant.

The Specific Plan would facilitate the development of new land uses that serve sensitive receptors[11] in locations near freeways and other sources of TACs and/or $PM_{2.5}$. Screening modeling indicates that new sensitive receptors (residential uses) are proposed pursuant to the West Oakland Specific Plan at several locations with the potential to result in health risks to future residents due to nearby sources of toxic air contaminants (TACs) and concentrations of $PM_{2.5}$. Potential increased health risks have been identified at five specific locations as indicated in **Table 4.2-9**. Of the five locations, four sites are adjacent to the I-880 freeway and one site (at 12th and Mandela) is adjacent to a diesel engine located at a City of Oakland Environmental Services site and various industrial engines located at the California Cereal Products site. Each of these sites have increased cancer risk and increased health risks due to $PM_{2.5}$ concentrations except the site at 12th and Mandela, which would has an increased cancer risk due to toxic air contaminants (TACs) from stationary source, as shown in Table 4.2-9 below.

[11] Land uses that serve sensitive receptors include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential buildings. Sensitive receptors are children, people over 65 years of age and individuals that suffer from respiratory illnesses.

Table 4.2-9: Potential Areas of Concern for Toxic Air Contaminant and $PM_{2.5}$ Exposure

Area of Concern	Source	Increased Cancer Risk	Increased Health Risk from $PM_{2.5}$ Concentration
West Oakland BART TOD	I-880 Freeway	yes	yes
7th Street Corridor	I-880 Freeway, other stationary sources	yes	no
Phoenix Iron Works Site	I-880 Freeway, other stationary sources	yes	yes
Roadway Site	I-880 Freeway	yes	yes
12th and Mandela Site	City of Oakland Environmental Services, 1diesel engine at 14th& Mandela Parkway,	yes	no
	and California Cereal Products, various industrial sources at1267 14th Street1	no	yes

Source BAAQMD, DRAFT Report: Toxic Air Contaminants and PM2.5 Screening Analysis for the West Oakland Specific Plan

1. California Cereal Products sources: grain unloading and storage, grain cleaning and drying, milling systems, boiler engines, grain toaster/cooker, fluidizing cereal dryer, coated products dryer, and a Buhler OTW dryer.

West Oakland BART Station TOD

The West Oakland BART Station TOD site is located on several parcels immediately surrounding the West Oakland BART Station. The TOD development envisioned under the Specific Plan would include new residential development in tall, high density buildings that would step down in height from the I-880 freeway to the surrounding neighborhoods. This TOD is projected to contain as many as 2,300 new residential units, housing a population of as much as 5,320 people. Several parcels within the TOD development site are located immediately adjacent to the freeway, and other parcels along 7th Street are located approximately 500 feet from the freeway at their nearest point and slightly more than 1,000 feet from the freeway at their furthest point. Residential uses nearest to the freeway would be located atop a multi-story parking garage, and residential uses furthest from the freeway would be developed above ground floor retail and commercial space along 7th Street. High to medium-density residential use is consistent with the General Plan and zoning for these sites. Detailed designs for the West Oakland BART TOD project are not currently available or proposed.

According to the BAAQMD's Stationary Source Risk & Hazard Analysis Tool (Google Earth, Alameda County May 2012 data set),[12] each of these parcels are subject to emissions from the I-880 freeway that are indicated to result in a risk of contracting cancer. The level of this risk varies with distance from the freeway. New residential development located as near as 25 to 50 feet from the freeway at a height of 20 feet is indicated as subjecting future new residents to a risk of contracting cancer that is greater than 100 in one million. At 500 feet from the freeway, this risk is reduced to approximately 32 in one million, and at distances of as much as 1,000 feet at this location, the cancer risk is still as great as approximately 18 in one million. Each of these risk factors exceeds the threshold level of 10 in one million. Similarly, each of the parcels within the proposed TOD development site is subject to $PM_{2.5}$ concentrations that

[12] This tool contains cancer risk and $PM_{2.5}$ concentration at 6 feet (ground level) and 20 feet (2nd story and above) at various distances from highways.

exceed the threshold of 0.3 ug/m^3. $PM_{2.5}$ concentrations, at a height of 20 feet, are indicated to be greater than 0.35 ug/m^3 at a distance of 200 feet from the freeway, and greater than 0.60 ug/m^3 at a distance of between 25 and 50 feet from the freeway. Both the cancer risk and the $PM_{2.5}$ concentrations at the West Oakland BART Station TOD site exceed threshold levels.

7th Street Mixed-Use Development

There are several locations along 7th Street between Mandela Parkway and Wood Street where additional new sensitive receptors (new housing development above ground floor retail) are proposed pursuant to the Specific Plan. Closer to Mandela, these mixed-use developments would be approximately 1,000 feet from the freeway. Nearer to Wood Street, these new uses would be as near as 600 feet from the freeway. Mixed use residential development with residential use above ground floor commercial space is consistent with the General Plan and zoning for these sites. The BAAQMD Stationary Source Risk & Hazard Analysis Tool indicates that these residential mixed use development sites are subject to emissions from the I-880 freeway, where cancer risk is projected to be approximately 18 in one million at 1,000 feet from the freeway, and approximately 32 in one million at 500 feet from the freeway. These parcels are also subject to $PM_{2.5}$ concentrations, but at levels of between 0.1 and 0.2 ug/m^3 at distances of between 1,000 feet and 500 feet. At these concentrations, the $PM_{2.5}$ threshold level would not be exceeded. Additionally, these residential mixed use development sites are located within 1,000 feet from known stationary source emissions associated with the US Postal Service vehicle maintenance facility located at 1675 7th Street. Stationary source emissions from this facility would be additive to the cancer and health risk associated with freeway emissions at these locations.

Phoenix Iron Works Site

New single-family and/or attached residential use is proposed pursuant to the Specific Plan on the westerly side of Wood Street between 8th Street and 9th Street, approximately 300 to 400 feet from the I-880 freeway. Residential development at this location is not currently consistent with the General Plan and zoning for this site, and a General Plan amendment and re-zoning would be required to permit new residential uses. The BAAQMD Stationary Source Risk & Hazard Analysis Tool indicates that this proposed new residential site is subject to emissions from the I-880 freeway that would result in a risk of contracting cancer that is approximately 22 to 28 in one million (at 300 to 400 feet, respectively). These risk factors exceed the threshold level of 10 in one million. $PM_{2.5}$ concentrations at this site would not exceed 0.3 ug/m^3, as this threshold concentration is limited to an area within approximately 100 feet from the freeway at this location. Additionally, this proposed residential site is located within 1,000 feet from known stationary source emissions associated with the California Waste Solutions' 10th Street facility located at 1820 10th Street. Stationary source emissions from this facility would be additive to the cancer risk associated with freeway emissions at this site.

Roadway Site

New residential use is also proposed pursuant to the Specific Plan at the parcels known as the Roadway site, generally located between 17th and 18th Streets and between Wood Street and Campbell Street, immediately across from Raimondi Park. This site is approximately 600 feet from the I-880 freeway at its nearest point and approximately 1,400 feet from the freeway at its furthest point. Residential development at this location is not currently consistent with the General Plan and zoning for this site, and a General Plan amendment and re-zoning would be required to permit new residential uses. According to the BAAQMD's Stationary Source Risk & Hazard Analysis Tool, this proposed residential site is subject to emissions from the I-880 freeway that are indicated to result in a risk of contracting cancer that is greater than 25 in one million at 600 feet, and would be greater than 18 in one million at 1,000 feet from the freeway. These risk factors exceed the threshold level of 10 in one million. $PM_{2.5}$ concentrations at this site would not exceed the 0.3 ug/m^3 threshold level, as this concentration level is limited to an area within approximately 100 feet from the freeway at this location.

12th and Mandela Site

New residential use is also proposed pursuant to the Specific Plan on the corner parcel at 12th and Mandela Parkway, across from the existing Peralta Villa residential neighborhood. Residential development at this location is not currently consistent with the General Plan and zoning for this site, and a General Plan amendment and re-zoning would be required to permit new residential uses. This site is not located in proximity to the I-880, I-980 or I-580 freeway, and emissions from the freeway would not have a significantly adverse effect. However, this site is located with 1,000 feet from known stationary source emissions from the City of Oakland Environmental Services Division's diesel generator, located at 14th and Mandela Parkway and from known stationary source emissions from various industrial sources associated with the California Cereal Products facilities at 1267 14th Street. These stationary sources could result in air quality emissions exceeding threshold levels.

Upper San Pablo Avenue

New residential uses are proposed pursuant to the Specific Plan along the San Pablo Avenue corridor, primarily as new mixed residential and commercial buildings. Such mixed residential use is consistent with the General Plan and zoning for this corridor. No sites along this corridor are located in proximity to the I-880, I-980 or I-580 freeway such that emissions from the freeway would have a significantly adverse effect. Based on the BAAQMD Stationary Source Risk & Hazard Analysis Tool, the risk of contracting cancer greater than 10 in one million is limited to an area of approximately 200 feet from the freeway at this location. $PM_{2.5}$ concentrations exceeding the 0.3 ug/m^3 threshold is limited to an area within approximately 75 feet from the freeway. No new sensitive receptors are proposed at locations this close to the freeway along San Pablo Avenue, nor are such uses proposed within 1,000 feet of known stationary sources at the existing ARCO and Shell gas stations near San Pablo Avenue and I-580.

Neither San Pablo Avenue nor any other surface roadways within the Specific Plan's planning area or its proximity present increased health risks, because the annual average daily travel volumes on these roadways are not high enough to create unsafe levels of TACs or $PM_{2.5}$ concentrations.

Other Considerations

The BAAQMD Stationary Source Risk & Hazard Analysis Tool used in this screening level analysis may not identify all of the air quality health risks associated with all sources within or nearby the Specific Plan area. The Port of Oakland, the former Oakland Army Base and the Union Pacific rail yard impact air quality within West Oakland, and these sources are not fully accounted for in the analysis tool. The combined cancer risks and $PM_{2.5}$ concentrations from I-880, the Port of Oakland, the former Oakland Army Base and the Union Pacific rail yard on existing and future sensitive receptors in West Oakland could be greater than any one source alone. In addition, sources that are not stationary, such as trucks idling at loading docks or temporary emissions from construction activities are also not reflected in this analysis. Further evaluation of such sources may be necessary on a project-specific basis pursuant to subsequent development projects.

Dry cleaners and emergency generators are located within West Oakland, but specific emissions or exposure information for these sources is not readily available. According to the CARB, dry cleaners may pose a significant cancer risk at distances of up to 300 feet. CARB regulations will phase out the use of perchloroethylene by 2023, which would avoid future exposure. There are a number of emergency generators within or near West Oakland. However, BAAQMD and CARB regulations restrict operation of emergency generator engines to 50 hours or less per year for testing or routine maintenance. Emergency generators are estimated to pose a potentially significant cancer risk at distances of up to 100 feet.

Standard Conditions of Approval

Future development of residential use throughout the West Oakland Specific Plan area, particularly new residential development that may ultimately be proposed on those sites identified above, will be required to implement all City of Oakland Standard Conditions of Approval. Pursuant to Supplemental SCA B, applicants for future qualifying development projects may either incorporate health risk reduction measures into the project at that project's initiation, or may conduct site-specific health risk assessments using air quality dispersion modeling methodologies and screening thresholds recommended by the BAAQMD to demonstrate that, despite their location within the screening setback distances, modeled site-specific exposures would be less-than-significant. If detailed modeling does not demonstrate that exposure levels would be less-than-significant, then the project applicant shall incorporate the following health risk reduction measures into the project. These features shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City:

- Installation of air filtration to reduce cancer risks and Particulate Matter (PM) exposure for residents, and other sensitive populations, in the project that are in close proximity to sources of air pollution. Air filter devices shall be rated MERV-13 or higher. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.
- Phasing of residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible.
- The project shall be designed to locate sensitive receptors as far away as feasible from the source(s) of air pollution. Operable windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall not be located immediately adjacent to a loading dock or where trucks concentrate to deliver goods, if feasible.
- Sensitive receptors shall not be located on the ground floor, if feasible.
- Planting trees and/or vegetation between sensitive receptors and pollution source, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (Pinus nigra var. maritima), Cypress (X Cupressocyparis leylandii), Hybrid popular (Populus deltoids X trichocarpa), and Redwood (Sequoia sempervirens).
- Within the project site, sensitive receptors shall be located as far away from truck activity areas, such as loading docks and delivery areas, as feasible.
- Within the project site, existing and new diesel generators shall meet CARB's Tier 4 emission standards, if feasible.
- Within the project site, emissions from diesel trucks shall be reduced through implementing the following measures, if feasible:
  - Installing electrical hook-ups for diesel trucks at loading docks.
  - Requiring trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards.

- Requiring truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels.
- Prohibiting trucks from idling for more than two minutes.
- Establishing truck routes to avoid sensitive receptors in the project. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented.

SCA B would implement the recommendations of both the California Air Resources Board (CARB) and the BAAQMD by requiring qualifying projects to prepare an HRA or incorporate project design features that reduce potential health risk due to exposure to TACs. Such design features (ranging from site layout considerations, landscaping, and interior air filtration systems) can improve interior air quality for sensitive receptors such that attendant health risks of DPM exposure can be reduced to an acceptable level. Qualifying projects are those that involve sensitive land uses, are located within 1,000 feet of a TAC source, and exceed the health risk screening criteria after a screening analysis is conducted in accordance with the BAAQMD CEQA Guidelines.

Distance is an important but not necessarily conclusive factor examined in the HRA to determine whether building residents would be exposed to excessive levels of TACs (both for DPM-borne and gaseous TACs) Other factors that must be taken into account include building orientation, intervening development, and wind patterns of proposed new development. The potential health risk would be determined by taking all of these factors into account and would quantify the project-specific health risk. The project would be required by SCA B to implement feasible measures that would reduce the potential health risk. These measures may include, but are not limited to site planning considerations, installation and use of air filtration systems, and inoperable windows in certain locations. Air filter devices shall be rated MERV-13 or higher. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required.

Resulting Level of Significance

Compliance with SCA B would reduce each site's exposure to DPM through the installation of air filtration systems (with 85 percent filtration efficiency) or other equivalent measures to reduce indoor DPM to acceptable levels. Impacts related to DPM-borne TACs would be **less than significant**, since SCA policies are sufficient to reduce the risk to acceptable levels.

However, for TACs originating from gaseous sources, implementation of SCA B cannot with certainty reduce risks to an acceptable level. While the site planning and filtration methods can capture/screen out airborne particulate matter, these methods do not reduce risks from gaseous TACs. There are no known feasible technologies or site planning considerations that have been shown to reduce risks of gaseous TACs. Therefore, impacts related to gaseous TACs would be **significant and unavoidable**, since SCA requirements are not sufficient to reduce the risk to acceptable levels.

Other Recommendations

In addition to the City of Oakland Standard Conditions of Approval cited above, the following recommendations could further reduce the exposure of new sensitive receptors to sources of TACs and $PM_{2.5}$:

Buffer Zones

According to the BAAQMD Stationary Source Risk & Hazard Analysis Tool used in this screening level analysis, future development intended for occupancy by sensitive receptors should be located at approximately 1,000 feet from the edge of the I-880 freeway, and approximately 200 feet from I-580 within the West Oakland planning area. Site-specific modeling of future development projects proposed within these distances may provide better, more site-specific data as a basis upon which this buffer distance may be reconsidered and reduced. Implementation of this buffer recommendation would effectively reduce the cancer risks and exposure to $PM_{2.5}$ concentrations of new sensitive receptors to levels of less than significant.

Implementation of such buffers would effectively reduce the cancer risks and exposure to $PM_{2.5}$ concentrations of new sensitive receptors, and would be capable of reducing this impact to below BAAQMD threshold levels. However, this buffer recommendation would also substantially change the Specific Plan's proposed land use map to avoid the siting of new sensitive receptors within these setback areas and would drastically change the Specific Plan's proposed land uses by precluding new transit-oriented and infill residential development. The proposed residential development at the West Oakland BART Station TOD and new infill residential development along 7th Street would be precluded by this buffer, even though such new use is currently permitted and encouraged under current General Plan policies and zoning regulations. Additionally, each of the Specific Plan's proposed new re-zonings at the Phoenix Iron Works site and the Roadway site would also be precluded under this buffer recommendation. The buffer recommendation would be inconsistent with the basic objectives of the Specific Plan to provide additional housing along the 7th Street corridor and near the BART Station in order to generate additional vitality and foot traffic, ridership for transit, and social and business activity.

Delayed Development Implementation

Consider Plan implementation phasing that delays occupancy of units with highest health risk exposure, so that source emission regulations and vehicle fleet turnover that will result in lower emissions may take greater effect and thereby lower exposure levels. Since vehicle and engine emission rates will decrease in the future, projects developed later in the buildout timeframe would have less exposure. [13]

Delayed development may be capable of reducing the cancer risks and exposure to $PM_{2.5}$ concentrations of new sensitive receptors over time, but implementation of this recommendation is uncertain and cannot, with certainty, reduce this impact below BAAQMD threshold levels. Implementation of the delayed development recommendation would also preclude near-term development of the West Oakland BART Station TOD, as well as many of the other residential development sites pursuant to the Specific Plan and would introduce substantial uncertainty into the development process pursuant to the Specific Plan.

Other Best Management Practices

In addition to the City's Standard Conditions of Approval (Supplemental SCA B and C), consider requiring future individual discretionary development projects on those sites which would place new sensitive

---

[13] For example, the BAAQMD estimates that delaying development near highways and major roadways until 2029 can reduce cancer risk by up to 23 percent due to implementation of CARB's truck regulations for retrofitting/replacing diesel engines.

receptors in areas subject to cancer risks and exposure to $PM_{2.5}$ concentrations to incorporate the following additional (i.e., in addition to the SCAs) Best Management Practices (BMPs) for air quality:

a) Air filtration units shall be installed to achieve BAAQMD effectiveness performance standards in removing $PM_{2.5}$ from indoor air. The system effectiveness requirement shall be determined during final design when the exact level of exposure is known, based on proximity to emission sources. According to recent BAAQMD recommendations, air filtration systems rated MERV 16 or higher protect sensitive receptors from toxic air containments and $PM_{2.5}$ concentrations while inside a building. This measure is effective for reducing exposure from TACs and $PM_{2.5}$ emissions from diesel engines, highways and roadways.

a) When locating sensitive receptors near at-grade highways, prohibit uses that serve sensitive receptors on the first floor of buildings. $PM_{2.5}$ concentrations generally decrease with elevation.

b) Where appropriate, install passive electrostatic filtering systems, especially those with low air velocities (i.e., 1 mph).

c) Require re-routing of nearby heavy-duty truck routes, and enforce illegal parking and/or idling restrictions on heavy-duty trucks in the vicinity.

While the site planning and filtration methods noted within these additional BMPs would further capture and screen out airborne particulate matter, these methods do not reduce risks form gaseous TACs and the additional BMP recommendations would not be capable of reducing this impact to a less than significant level.

Cumulative Air Quality Impacts

The geographic context considered for cumulative air quality impacts is the regional San Francisco Bay Area Air Basin, which is considered a nonattainment area for both State and federal ambient air quality standards for ozone and particulate matter. Cumulative air quality impacts are evaluated based on both consistency of the Plan with local and regional air quality plans (i.e., the City General Plan and the CAP), and a quantification of subsequent project-related air quality impacts.

A Plan level or project-level impact is also considered to be cumulatively significant, resulting in significant adverse impacts to the region's air quality conditions. Additional analysis to assess cumulative impacts is unnecessary.

Consistency with the CAP

As indicated in the discussion above, development facilitated by the Specific Plan would result in less than significant impacts regarding consistency with the CAP regarding growth in VMT and with regard to adequate transportation control measures. Because there is no significant impact for the Plan, there is no significant cumulative impact related to criteria pollutants. The Housing Element EIR analyzed criteria air pollutants and precursors based on consistency with the current Clean Air Plan, and also found these cumulative impacts to be less than significant. (**LTS**)

Odors

The analysis in the City of Oakland's Housing Element EIR found that all locations within the Housing Element Plan Area are less than one mile from a potential odor source, such as food processing facilities, painting/coating operations, or green waste/recycling facilities. The Housing Element EIR presents a reasonable estimation of all the odor sources within the City of Oakland, based upon business tax records, and it shows buffer zones around the identified sources based on BAAQMD recommendations. Nearly the entire City of Oakland, and all of the Housing Element Plan Area, could be exposed to nuisance odor impacts due to potentially incompatible land uses. The Housing Element EIR analyzed this impact and concluded that odor sources present in all high density areas of the City of Oakland could potentially expose residences to substantial/frequent odor. Similar to the conclusions of the Housing Element EIR, the conclusions of this EIR is that cumulative odor effects are significant and unavoidable at the plan- and project-level of analyses. (**SU**)

Construction Emissions

Fugitive dust from all cumulative construction projects will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval (**LTS with SCAs**). Larger individual construction projects could generate cumulative emissions of criteria air pollutants that would exceed the City's thresholds of significance, even with implementation of required City of Oakland Standard Conditions of Approval. This could also occur under concurrent construction of multiple, smaller projects in the vicinity, where these impacts would be cumulatively considerable (**SU**). With implementation of required City of Oakland Standard Conditions of Approval, toxic emissions from cumulative construction projects are not expected to exceed thresholds for cancer risk, chronic health index, acute health index or annual average PM2.5 concentration levels (**LTS with SCAs**).

Operational Emissions of Criteria Pollutants

Once buildout of the Specific Plan is complete and all of the expected new development is fully occupied, new development pursuant to the Specific Plan will generate emissions of criteria pollutants as a result of increased motor vehicle traffic and area source emissions. Traffic emissions combined with anticipated area source emissions would generate levels of criteria air pollutants that would exceed the City's project-level thresholds of significance, and such impacts would also be considered cumulatively considerable (**SU**).

Carbon Monoxide Concentrations

Since the Specific Plan would not expose sensitive uses and would not generate emissions leading to significant concentrations of CO that would violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation, there is no significant cumulative impact related to CO emissions (**LTS**).

Operational Toxic Air Emissions

Development pursuant to the West Oakland Specific Plan would include new light industrial, custom manufacturing and other similar land uses that could emit toxic emissions. Existing regulatory requirements would ensure that such emissions would not individually exceed established acceptable standards, but may contribute to cumulatively considerable effects (**SU**).

Exposure to Toxic Air Contaminants

Similar to the Housing Element EIR conclusions, this EIR concludes that implementation of the recommendations of a project-specific health risk assessment (as required by SCAs) would reduce local toxic air contaminant exposures to acceptable levels for diesel particulate matter (DPM) from cumulative stationary and mobile sources, resulting in less than significant cumulative impacts (**LTS with SCAs**). However, this EIR's conclusion (similar to the 2010 Housing Element EIR conclusion) is that implementation of the recommendations of a project-specific health risk assessment pursuant to SCA B may not reduce local toxic air contaminant exposures to acceptable levels for gaseous TACs, and that the residual air pollution risk and hazard could have significant unavoidable cumulative impacts (**SU**).

4.3

Cultural and Historic Resources

This chapter evaluates the cultural and historic resources impacts of the proposed Specific Plan. It describes the history of West Oakland, existing cultural and historic resources in and around West Oakland and evaluates the impacts and mitigation needs that development envisioned by the Specific Plan would have with respect to historic, archaeological and paleontological resources. Shadow impacts on historic resources are discussed in Chapter 4.1, Aesthetics, Shadow and Wind.

Cultural and Historic Setting

A brief overview of the history and development of the City of Oakland is contained in the City of Oakland General Plan Historic Preservation Element, and is hereby incorporated by reference.[1] The City Planning Department's Oakland Cultural Heritage Survey (OCHS) project[2] has prepared extensive neighborhood histories, thematic context statements, and individual property and district documentation that can be consulted for further information. The following discussion of the West Oakland's history is adapted in part from the Historic Preservation Element and the OCHS.

Prehistoric Setting

West Oakland was a biologically rich alluvial plain and estuarine environment between the East Bay Hills and San Francisco Bay. The natural marshland biotic communities along the edges of bays and channels were the principal source for subsistence and other activities during the prehistory of the San Francisco Bay region. Early surveys of archaeological sites in the Bay region were conducted between 1906 and 1908 by Stanford (and, later, UC Berkeley) archaeologist N.C. Nelson. Such surveys yielded the initial documentation of nearly 425 "earth mounds and shell heaps" along the littoral zone of the Bay. From these beginnings, the most notable sites in the Bay region were excavated scientifically, like the Emeryville shell mound (CA-ALA-309), the Ellis Landing Site (CA-CCO-295) in Richmond, and the Fernandez Site (CA-CCO-259) in Rodeo Valley. These dense midden[3] sites, such as CA-ALA-309, have been radiocarbon dated to be 2,310 ± 220 years old, but other evidence from around the Bay suggests that human occupation in the region began earlier, at least by around 5,000 B.C. These very early sites, from the Paleoindian Period (c. 10,000 to 6,000 B.C.) and a subsequent unnamed period (c. 6,000 to

---

1 City of Oakland General Plan Historic Preservation Element;1994, as amended 1998; pp. 1-2 through 1-9.

2 The citywide Oakland Cultural Heritage Survey (OCHS) has given at least a preliminary rating to every visible building in Oakland. The reconnaissance survey provides estimates of building age and historical or architectural interest. The intensive survey also includes detailed research and evaluation for many specific buildings and neighborhoods.

3 A midden is a mound of domestic refuse generally containing culturally darkened soils, shells and animal bones, as well as other indices of past human life and habitation. Middens mark the site of an indigenous settlement, and may contain human burials related to that settlement.

2,500 B.C.), are not well documented in the Bay Area, as they are believed to exist under alluvial deposits that have reshaped the bayshore since the end of the Pleistocene.

The Windmiller Pattern (c. 2,500 B.C. to 1,500 B.C.) is characterized by relatively sparse, small sites situated on small knolls above seasonal floodplains on valley floors. The people inhabiting the Bay Area at this time may have migrated from outside California, taking advantage of the seasonal resources afforded by rivers and marshes.

Beginning around 2,000 B.C., the bayshore and marsh-adapted peoples representing the so-called Berkeley Pattern appeared in the archaeological record. This pattern (c. 2,000 B.C. to A.D. 300) reflected a change in socioeconomic complexity and settlement patterns from earlier adaptations. This artifact pattern was represented by minimally-shaped cobble mortars and pestles, dart and atlatl hunting technology, and a well-developed bone carving industry. Given the size of these settlements, it is probable that the populations were denser and more sedentary, yet continued to exploit a diverse resource base from woodland to grassland and marshland, to bayshore and riverine resources throughout the San Francisco Bay Area. Many of the Berkeley Pattern traits diffused throughout the region and spread to the interior areas of central California during this time period. The late prehistoric period, appearing in the archaeological record as the Augustine Pattern (c. A.D. 1000 until European contact), shows substantial population growth, increased trade and social exchange networks, increased ceremonial activity, and more intensive use of acorns as a staple food in addition to fish, shellfish, and a wide variety of hunted animals and gathered plant resources. Technological changes are shown in the adoption of the bow and arrow for hunting, and use of bone awls for basketry manufacture. The people of this period were the ancestors of the groups encountered by the first Spanish explorers.

Native American Period

West Oakland lies within the region occupied at the time of historic contact by the Ohlone or Costanoan group of Native Americans. Although the term Costanoan is derived from the Spanish word Costaños, or "coast people", its application as a means of identifying this population is based in linguistics. The Costanoans spoke a language now considered one of the major subdivisions of the Miwok-Costanoan, which belonged to the Utian family within the Penutian language stock. Costanoan actually designates a family of eight languages spoken by tribal groups occupying the area from the Pacific Coast to the Diablo Range, and from San Francisco to Point Sur. Modern descendants of the Costanoan prefer to be known as Ohlone. The name Ohlone is derived from the Oljón tribal group that occupied the San Gregorio watershed in San Mateo County. The two terms (Costanoan and Ohlone) are used interchangeably in much of the ethnographic literature.

On the basis of linguistic evidence, it has been suggested that the ancestors of the Ohlone arrived in the San Francisco Bay area about 500 A.D., having moved south and west from the Sacramento-San Joaquin Delta region. The ancestral Ohlone displaced speakers of a Hokan language, and were probably the producers of the artifact assemblages that constitute the Augustine Pattern described. Although linguistically linked as a "family," the eight Costanoan languages actually comprised a continuum in which neighboring groups could probably understand each other. However, beyond neighborhood boundaries, each group's language was unrecognizable to the other. Each of the eight language groups was subdivided into smaller village complexes or tribal groups. The tribal groups were independent political entities, each occupying specific territories defined by physiographic features. Each tribal group controlled access to the natural resources of the territories. Although each tribal group had one or more permanent villages, their territory contained numerous smaller campsites used as needed during a seasonal round of resource exploitation.

The arrival of the Spanish in the San Francisco Bay Area in 1775 led to a rapid and significant reduction in native California populations. Diseases, declining birth rates, and the effects of the mission system served to eradicate aboriginal life ways. Brought into the missions, the surviving Ohlone, along with former neighboring groups of Esselen, Yokuts, and Miwok were transformed from hunters and gatherers into agricultural laborers. With abandonment of the mission system and the Mexican takeover in the 1840s, numerous ranchos were established. Generally, the few Indians who remained were then forced by necessity to work on the ranchos. Today, descendants of the Ohlone live throughout the Bay Area. Several of these Ohlone groups (e.g., Muwekma and Amah) have banded together as modern tribelets to seek Federal recognition. Many Ohlone (both individuals and groups) are active in reviving and preserving elements of their traditional culture such as dance, basketry, and song.

Early Settlements

The lands that eventually became Oakland were part of a Spanish land grant given to Luis Maria Peralta in 1820, divided among his four sons in 1842. Most of what is now East Oakland was given to Antonio Peralta, and most of what is now North and West Oakland was given to Vicente Peralta. In 1850 a group of Yankee squatters, from the gold fields via San Francisco, landed on the Estuary west of what became Lake Merritt, hired a surveyor, laid out a town plat with their landing at the foot of Broadway, and proceeded to sell lots. The original street grid only ran west as far as Market Street and north to 14th Street, though the town that was incorporated in 1852 as Oakland extended west from the future Lake Merritt to the Bay and north to about 22nd Street.

The Planning Area encompasses approximately the west third of the original town (from the Estuary to West Grand Avenue), most of the area north from there to the annexation line of 1872 (roughly I-580) and several blocks north to 40th Street were part of the Annex of 1897 and are generally considered part of the North Oakland neighborhood of Temescal. The buildings in the area still reflect its early history, especially in the residential neighborhoods which retain remarkably intact period character. In the Prescott and South Prescott neighborhoods over half the buildings were constructed in the 1880s or earlier, while in the Clawson, McClymonds, Bunche, and Hoover-Foster neighborhoods well over half the buildings are pre-1910.

Early Oakland’s development was shaped by its topography and travel patterns. The Original Town occupied a de facto peninsula, surrounded by the Lake Merritt tidal slough, the San Antonio Estuary and its marshy shores, the Bay west of Pine and Cedar Streets, and a wedge-shaped northern marsh that extended from about 16th Street north to 28th Street and beyond, and at its widest came inland as far as Adeline Street. The west part of town was isolated from the Broadway area by a slough that came north as far as 7th Street in the area around Union and Cypress Streets.

The original 1850 settlement at the foot of Broadway was sited at the one point where solid ground met the estuary. The estuary in its natural state provided only a shallow, marshy, muddy channel for water transportation to San Francisco (“the Creek Route”). The search for a better route soon led Oakland entrepreneurs west to Oakland Point, the future outer end of 7th Street. After at least one false start, in 1862-63 a half-mile railroad pier was built out over the shallow bay floor to water navigable enough for passenger transportation and small-scale local shipping. The local railroad connected West Oakland to the Broadway area and the early settlement of San Antonio in East Oakland. When the transcontinental railroad arrived in 1869, making West Oakland its land terminus, the wharf was extended out 2 miles to accommodate large ferries continuing on to San Francisco. Beginning in 1874, dredging of the Oakland estuary became a continuing project of the Army Corps of Engineers. With dredging of the harbor came use of the dredged material to fill its shores, progressively changing West Oakland's topography.

From this geographic background follows most of what exists on the land in West Oakland today. On a modern land use map, industrial areas mark almost exactly the outline of the old West Oakland marsh, while residential areas spread west and north from downtown and from the West Oakland rail yards on the historic dry land. Industrial development in the area is more or less the inverse of residential: a few pre-1906 plants directly along the water or the tracks, more numerous and more dispersed plants built in the 1910s and 20s, and the remaining historic marsh area built out in and after the 1940s. It is notable that most of West Oakland, both residential and industrial, is first-generation development.

The Railroad Era: Prescott & South Prescott

Oakland fought hard and successfully to become the western terminus of the transcontinental railroad. The local railroad in 1863 made West Oakland a viable commuter residence district; the transcontinental railroad in 1869 gave it a powerful economic base. By the early 1870s enormous Central Pacific yards were located at Oakland Point, west of Peralta Street and south of the 1st Street tracks (the 1874 Car Paint Shop still survives from this complex). Gradually expanding over the marsh, the yards were headquarters for most of the railroad's Northern California maintenance, construction, and shipbuilding operations. In the Prescott neighborhoods the railroad employed as many as half the working residents, in a wide range of jobs from car cleaner to engineer to paymaster. Residential development to accommodate these workers in the neighborhoods near the yards was so rapid and dense that the area was solidly built up by the end of the 1870s. Memoirs of West Oakland, such as one in the October 1950 West of Market Boys' Journal, regularly claim that "Everyone at the Point, be he laborer, mechanic, business or professional man were all neighbors. No class lines were drawn. No poverty, no bread lines, and few wealthy people. Wages were not large, hours of work rather long, but everyone was satisfied and happy."

The houses at Oakland Point (today's Prescott and South Prescott) are consistent with this characterization of economic diversity, smaller and larger versions of fairly standard Italianate, Stick, and Queen Anne designs, on uniform sized lots, no shacks and no mansions. The Point's biggest developer, John Ziegenbein, active from the early 1870s to 1889 building almost 300 houses, was hailed as a benefactor of working people because he sold his houses on the installment plan and built in a variety of sizes and prices. Oakland Point was an economically mixed neighborhood; owners of local industries such as Henry Dalton of the foundry at 10th and Cedar, Ira Martin Wentworth of the boot and shoe factory near the 16th Street station, and John Ziegenbein himself lived in the neighborhood side by side with railroad workers and local artisans and entrepreneurs and employees of all levels. South Prescott, "below" the 7th Street tracks, was economically somewhat less mixed, a neighborhood of very modest but nevertheless largely owner-occupied or neighbor-owned cottages. Both these neighborhoods survive remarkably intact and are considered potential historic districts.

West Oakland was also an ethnically mixed neighborhood from the beginning. The railroad yards and local parish church at the Point began with a reputation as an Irish enclave, but there were strong Scandinavian, German, and African-American presences from the beginning. From around the turn of the century large numbers of Italian, Portuguese, and Eastern European residents appeared in the neighborhood, many of them recent immigrants or San Francisco earthquake refugees, at first living together in groups of lodgers while working as laborers. By the late 1910s and 1920s many of these new immigrants had become property owners in the district, and increasingly had occupations like factory worker, driver, and a whole range of food-related jobs, reflecting the increasing amount and diversity of industry in West Oakland and in Oakland as a whole.

Oakland Point was connected with central Oakland by the local rail line along 7th Street, with stations at Wood, Center, Adeline, and Market Streets. The entire length of west 7th Street became a major commercial, lodging, and entertainment center which survives today only in fragments (the Arcadia Hotel, the Lincoln Theater, the Brotherhood of Sleeping Car Headquarters, Esther's Orbit Room). Peralta, 8th, and 14th Streets also became significant transit streets with commercial nodes. The area around 14th, Peralta, and Center exhibits this history with a former car barn, the former Peralta Theater, and the flatiron Center Junction Cash Grocery. Corner stores, some still operating, are also scattered through the Prescott neighborhoods.

Along the Northern Railway tracks on the western shore (now the east edge of the Army Base), a narrow industrial strip developed from the earliest years: salt water baths at the end of 7th Street, the 1880s Dalton Foundry and Standard Oil's 1889 warehouse at 9th and Cedar, Lew Hing's Pacific Coast Cannery north of 11th and Pine from 1905, the 1884 Wentworth Boot and Shoe Co. and California Door Co. on the blocks immediately south of the railroad station at 16th and Wood Streets. Opposite the station a small commercial district of saloons and restaurants probably served local factory workers as much as railroad people or travelers; when the elaborate new station was built in 1910-13, a few new hotels and stores were added and still exist to convey the area's history.

Garden Suburb: De Fremery/Ralph Bunche/Oak Center

Another very early settler in West Oakland, by 1860 or soon after, was Dutch banker and farmer James DeFremery, whose house still stands at 16th and Adeline Streets (a city landmark in the Oak Center district), backed up against the innermost extension of the marsh. The residential neighborhood surrounding the DeFremery property developed somewhat later and at a more leisurely rate than Oakland Point, and generally belonged more to the economic sphere of downtown and San Francisco. Houses and lots were generally larger, and were more often developed individually as suburban custom homes. This neighborhood is divided between the present Project Area (Ralph Bunche – historically the Barstow Tract and Curtis & Williams Tract) and the Oak Center Redevelopment Area to the south.

The DeFremery family sold the house and its immediate surroundings to the city as a park in 1906, but much of the marshland to the west remained in their hands until the 1940s when it was sold for industrial development. Southwest of the DeFremerys, on the blocks around 14th and Cypress, Contra Costa Laundry was another early purchaser of open land. It became a major employer of West Oakland residents in the 19th century, an industry somewhat anomalously bordering what developed as a residential neighborhood. In the 20th century the laundry and its vicinity became the site of the Shredded Wheat, Carnation, and Coca Cola plants.

Northwest Oakland: Watts Tract/Clawson

For many years an undeveloped, mostly marshy area separated the 16th Street station and its neighboring businesses from the next stop north, Watts Station. William Watts settled in the 1850s on 158 acres between 28th and 38th Streets, from Chestnut Street to the bay, where he farmed and operated a tannery. When he arrived he was far outside Oakland on the long distance country road of San Pablo Avenue. Almost a generation later the railroad came, and in the 1870s he subdivided the land for sale. The area from the Charter Line of 1854 (22nd Street) to the Corporation Line (36th Street and extension) was annexed in 1872, the north end having by that time partly adopted the Emeryville street grid (Harlan, Haven, the streets west of Peralta to today's Ettie Street). Today this northern section west of San Pablo Avenue is known as the Clawson neighborhood, historically the Watts Tract and Peralta Homestead Tract.

The northern Watts Tract area developed fairly early, in a semi-rural way, with many houses from the 1870s and 1880s. It lay at the junction of radiating long distance roads and within easy reach of Emeryville's early ironworks, stockyards, and racetrack which employed many of the residents. Judson

Manufacturing, later Judson Steel, founded in 1882, was a major employer. There was also, from the 1880s, a community of Scandinavian seafarers in the west part of the neighborhood around Ettie Street. The Watts Tract neighborhoods grew through residential infill in the 1900s and 1910s and early industrial incursions in the 1920s. To at least the 1890s, this area was somewhat isolated from central Oakland and the rest of West Oakland by the marsh and minimal transit connections, which reinforced its rural character, its development of self-sufficient neighborhood institutions (e.g., the North Oakland Free Reading Room at 3401 Adeline Street), and its relation to the Emeryville economy.

Streetcar Suburbs: Hoover/MacArthur/McClymonds

In the early 1890s, part of a nationwide technological revolution, electric street railways spread rapidly all over Oakland and its suburbs, joining outlying towns into one large city (there were major annexations in 1891, 1897, and 1909) and promoting residential development all along the lines. The 1906 earthquake accelerated development, as many San Francisco refugees decided to stay in Oakland. This history is evident in the concentrations of Queen Anne and Colonial cottages in the Clawson and McClymonds neighborhoods and in the substantial Colonial Revival and Craftsman houses and flats that line Martin Luther King Way (formerly Grove Street), West Street, and their cross streets all the way across North Oakland and into Berkeley, filling in around the scattered Victorian horsecar-era homes. Occasional commercial nodes and apartment buildings mark the transit stops. The Grove Street electric car line in 1889 was the first in Oakland, only a year after the world’s first. Clusters of matching houses in these northern neighborhoods reflect the activity of local developers including F.T. Malley, Joseph Simpson, C.M. MacGregor, and the Realty Syndicate. The neighborhood has a distinguished cultural history with early residents including labor leader C.L. Dellums, historian Delilah Beasley, and photographer Anne Brigman.

Later Industrial Development

The northwest marsh began to be developed in the 1920s in part because of advances in building technology, in part because truck transportation made it feasible to locate industry and warehousing away from railroad lines, and in part because of fill resulting from Outer Harbor development. By the mid-1930s some of the prominent industrial landmarks north of 16th and west of Cypress were already in existence - the brick warehouses at 18th and Campbell, Pacific Coast Aggregates and Merco Nordstrom Valve Co. at 24th and Peralta, and the Gantz warehouse at 32nd and Wood - though much of the area was still vacant, grass and mudflats. In 1941 the Army took over the entire Outer Harbor, and filled the area between Maritime Street and the tracks, finally land-locking the West Oakland marsh. The vacant blocks quickly filled with war-related industry (mostly metals and heavy machinery) and temporary housing for defense workers. A postwar building boom completed this northern industrial area’s development with another dozen plants, still centered on heavy industrial uses (metals, construction materials, motor freight).

Later Evolution of Residential West Oakland

As early as 1915 Werner Hegemann's city plan for Oakland captioned a map of “dwellings built in Oakland in 1914” with the remark that “West Oakland has become to a considerable degree industrial and few homes of any kind are being erected.” The lack of new construction also simply meant that as a residential neighborhood West Oakland was fully built up: a look at Oakland Point or any of the other West Oakland residential neighborhoods shows that there was virtually no room for new construction of houses. But the reputation of the neighborhood was changing. The construction of the Shredded Wheat plant at 14th and Union in 1915 was said to mark the end of today’s Oak Center-Ralph Bunche as a desirable residence district, and those who could afford it and found the changes in the old neighborhoods objectionable were beginning to move to the new tracts of bungalows and larger houses which developed in the lower hills in the building boom that followed the 1906 earthquake. West Oakland went on to another notable role as “the Ellis Island of the East Bay” and “a place to start from” that is only now beginning to be appreciated by historians.

When the city was zoned for the first time in the early 1930s, West Oakland (everything west of Market except a small residential core south and east of DeFremery Park that is today’s Oak Center) looked like a suitable site for industry to the city's planners. Not much industry ever actually replaced houses except on the fringes, but maintenance, morale, and property values suffered. In 1936-38, City and WPA studies were undertaken toward siting a federal low-rent housing project in Oakland. Two West Oakland sites, Peralta Villa just east of Cypress, and Campbell Village in the heart of Oakland Point, were selected for redevelopment, over the protests of citizens who insisted that they had a healthy neighborhood of sound, owner-occupied houses, strong neighborhood spirit, and a large African-American community whom the authorities were suspected of targeting for removal. By the time the projects were completed the U.S. was in World War II and both sites were converted to defense worker housing. The Moore and Bethlehem shipyards along the estuary, which had kept alive since World War I by manufacturing structural steel, mobilized to far beyond their 1914-18 size. To staff these industries, labor recruiters brought large numbers of both white and black workers from the South. Oakland’s African-American population more than quintupled during the war years, and many of the newcomers settled in the established community in West Oakland.

In the mid-1950s industrially zoned, largely minority West Oakland was cut in half by a major public works project, the Cypress Freeway. In the following decades, several more housing projects were built in West Oakland: the Acorn and neighboring projects south of Oak Center, Westwood Gardens in Prescott, and Chestnut Court in McClymonds. Between 1969 and 1972 the new main Post Office and West Oakland BART Station destroyed the 7th Street commercial strip and the entire Gibbons Tract west of South Prescott. In 1989 the Loma Prieta earthquake damaged many of the area's historic buildings, brought down the Cypress Freeway, and prompted a new look at West Oakland.

Physical Setting

A records search was conducted by the California Historical Resources Information System (CHRIS) Northwest Information Center (NWIC) at Sonoma State University in Rohnert Park (File No. 12-0390). The records search, which encompassed the Planning Area and a radius of 0.5 miles, was conducted to determine whether known cultural resources had been recorded within or adjacent to the Planning Area and to assess the likelihood of unrecorded cultural resources based on historical references and the distribution of nearby sites. The records search included review of pertinent NWIC base maps that reference cultural resources records and reports, historic period maps, and literature for Alameda County, as well as the State Office of Historic Preservation Historic Property Directory (OHP HPD)[4] which lists numerous addresses within the Planning Area. There is record of 59 historic architectural and archaeological studies that cover approximately 50 percent of the Planning Area, generally concentrated in the western portion of the Planning Area, west of Poplar Street.[5]

---

4 The OHP HPD includes listings of the California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and the National Register of Historic Places.

5 California Historical Resources Information System Northwest Information Center, NWIC File No.: 12-0390, Record Search Results for the Proposed West Oakland Specific Plan, City of Oakland, CA, November 15, 2012.

Historical Resources Definition

Oakland Cultural Heritage Survey

The Oakland Cultural Heritage Survey (OCHS) is the City Planning Department's comprehensive citywide inventory of historic buildings and districts. Since 1979, the OCHS has created and maintained an inventory of historic resources throughout the City, providing a basis for many of the policies in the Historic Preservation Element. Every property in Oakland has at least a preliminary rating and estimated construction date from Reconnaissance Surveys conducted in 1985-1986 and 1996-1997. These preliminary surveys are intended to be confirmed or modified over time by the OCHS Intensive Surveys. Inclusion of a property in the Survey has no direct regulatory effect; however, the ratings provide guidance to city staff and property owners in design review, code compliance, and similar ongoing city activities. The Intensive Survey formal evaluation is based on the following criteria:

- *Visual Quality/Design:* Evaluation of exterior design, interior design, materials and construction, style or type, supporting elements, feelings of association, and importance of designer.
- *History/Association:* Association of person or organization, the importance of any event, association with patterns of history, and the age of the building.
- *Context:* Continuity and familiarity of the building within the city, neighborhood, or district.
- *Integrity and Reversibility:* Evaluation of the building's condition, its exterior and interior alterations, and any structural removals.

Survey ratings describe both the individual building and its neighborhood context. The OCHS rates individual properties using a five-tier rating system:

- *"A" - Highest importance:* Of exceptional historical or architectural value, outstanding example, clearly eligible for the National Register of Historic Places (National Register).
- *"B" - Major importance:* Major historical or architectural value, fine example, probably eligible for the National Register.
- *"C" - Secondary importance:* Superior or visually important example, very early, or otherwise noteworthy; these properties "warrant limited recognition" but generally do not appear individually eligible for the National Register (although they may contribute to a district).
- *"D" - Minor importance:* Typical or representative example of a type, style, convention, or historical pattern. Many "D" and lower-rated properties are Potential Designated Historic Properties (PDHPs), either because they have higher contingency ratings or because they contribute or potentially contribute to a district.
- *"E"- of no particular interest -* Not representative of any important pattern and visually undistinguished. May have higher contingency rating.
- *"F" or "*"* - not rated because recent or totally modernized. Some of these also have higher contingency ratings.

This letter rating is termed the Individual Property Rating of a building. Properties with conditions or circumstances that could change substantially in the future are assigned both an "existing" and a "contingency" rating. The existing rating (UPPER CASE letter) describes the property under its present condition, while the contingency rating (lower case letter, if any), describes it under possible future circumstances, e.g., when older, with new information, or if restored.

Individual properties are also given a Multiple Property Rating (1, 2, or 3) based on an assessment of the significance of the area in which the property is located. Properties within an Area of Primary Importance (API: areas that appear eligible for the National Register) are rated "1," those located in an Area of Secondary Importance (ASI: likely not eligible for the National Register) are rated "2," and those outside an identified district are rated "3." For properties in districts, a plus (+), minus (-), or asterisk (*) symbol indicates respectively whether the property contributes to the API or ASI, does not contribute, or potentially contributes.

APIs are historically or visually cohesive areas or property groupings that usually contain a high proportion of individual properties with ratings of "C" or higher and appear eligible for the National Register, either as a district or as a historically-related complex. At least two-thirds of the properties must be contributors to the API, reflecting the API's principal historical or architectural themes, and must not have undergone major alterations. APIs and their contributors are included on the Local Register.

ASIs are similar to APIs; however, remodeled buildings that are potential contributors to the ASI are counted for purposes of the two-thirds threshold as well as contributors. ASIs do not appear eligible for the National Register, usually because they are less intact or less unique than APIs.

West Oakland includes Oakland's oldest and most historic neighborhoods, and as such has been intensively studied by the OCHS. Each of the buildings in West Oakland has been researched, evaluated, and documented in files that include photographs, construction date, survey rating, and background information on early builders, owners, and occupants. About 1,500 of the most significant buildings and districts were documented on State Historic Resources Inventory forms, which were filed with the State Office of Historic Preservation (OHP). The discussion of historic architectural resources in this chapter is based primarily on these OCHS surveys.

Historic Properties Considered Significant for Environmental Review under CEQA

In the City of Oakland, a historical resource under CEQA is defined by the City's CEQA Thresholds of Significance Guidelines as a resource that meets any of the following criteria:

1. A resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (California Register)[6];
2. A resource included in Oakland's Local Register of Historical Resources (defined below), unless the preponderance of evidence demonstrates that it is not historically or culturally significant;
3. A resource identified as significant (e.g., status code 1–5) in a historical resource survey recorded on Department of Parks and Recreation Form (DPR) 523, unless the preponderance of evidence demonstrates that it is not historically or culturally significant;
4. Any object, building, structure, site, area, place, record, or manuscript which the Oakland City Council determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the determination is supported by substantial evidence in light of the whole record. Generally, a resource is considered "historically significant" if it meets the criteria for listing on the California Register of Historical Resources CEQA Guidelines section 15064.5; or

[6] Properties on or determined eligible for the National Register are considered to be "listed" on the California Register.

5. A resource that is determined by the City Council to be historically or culturally significant even though it does not meet the other four criteria listed here.

This is the minimum set of historic properties given consideration during CEQA environmental review, and meets the requirements of CEQA for lead agencies to consider the effects of proposed actions on historic resources.

Definition of Local Register Properties

The City of Oakland General Plan Historic Preservation Element Policy 3.8 provides the following definition of the City of Oakland's Local Register of Historical Resources (Local Register). Properties meeting this definition are considered significant historic resources for purposes of environmental review under CEQA:

- All Designated Historic Properties (Landmarks, Heritage Properties, Study List properties, Preservation Districts, and S-7 and S-20 Preservation Combining Zone properties); and
- Those Potential Designated Historic Properties (PDHPs) that have an existing rating of "A" or "B," or are located within an Area of Primary Importance (API). An API is a district that appears eligible for the National Register.

Designated Historic Properties

The Oakland Planning Code provides for five types of historic property designations: Landmarks, S-7 and S-20 Preservation Combining Zones (historic districts), Preservation Study List, and Heritage Properties. It also establishes the Landmarks Preservation Advisory Board (Landmarks Board) to oversee these properties.

- Oakland Landmarks (per Section 17.07.030(p) of the Planning Code). Properties designated as Oakland Landmarks are those having "special character or special historical, cultural, educational, architectural, aesthetic or environmental interest or value." This definition is more specifically interpreted in the Landmark Board's "Guidelines for Determination of Landmark Eligibility." Designation is through a three-step application process requiring public hearings and approval by the Landmarks Board, Planning Commission, and City Council. Landmarks are protected by Landmarks Board review of exterior alterations, and demolition of landmarks can be delayed by up to 240 days.
- Preservation Study List, Heritage Properties and Preservation Districts (per Section 17.102.060 of the Planning Code). The Preservation Study List, used in the first three decades of the Landmarks Board's existence, was defined as "a list of facilities under serious study for possible landmark designation or for other appropriate preservation action." The Landmarks Board, the Planning Commission, or the Planning Director could add properties to the list while it was active. A Heritage Property is defined in the Historic Preservation Element of the General Plan as "properties which definitively warrant preservation but which are not Landmarks or Preservation Districts." Properties are eligible for nomination if they have at least an existing or contingency "C" (secondary) rating or could contribute to a preservation district. Heritage Property can be considered a less exclusive form of Landmark designation, and is often used when property owners are entering into Mills Act contracts. Policy 2.5 of the Historic Preservation Element creates the Heritage Property designation. This designation is available to any properties with an OCHS Intensive Survey rating of "A," "B," or "C" (or an "A" or "B" rating from a Reconnaissance Survey), or which contribute to any area meeting the Preservation District eligibility guidelines. The Planning Director can postpone demolition of a

Study List/Heritage Property for up to 120 days, during which time Landmark or other preservation district designations may occur or other means to preserve the property are investigated.

- S-7 and S-20 Preservation Combining Zone (per Sections 17.84 and 17.100B of the Planning Code). The S-7 and S-20 Preservation Combining Zones are the City's historic preservation zoning districts. Areas eligible for S-7 designation are those having "special importance due to historical association, basic architectural merit, or the embodiment of a style or special type of construction, or other special character, interest, or value." The S-20 zone is similar to the S-7 preservation combining zone, but is designed for larger areas, often with a large number of residential properties that may not be individually eligible for landmark designation but which as a whole constitute a historic district.

Potential Designated Historic Properties - PDHPs

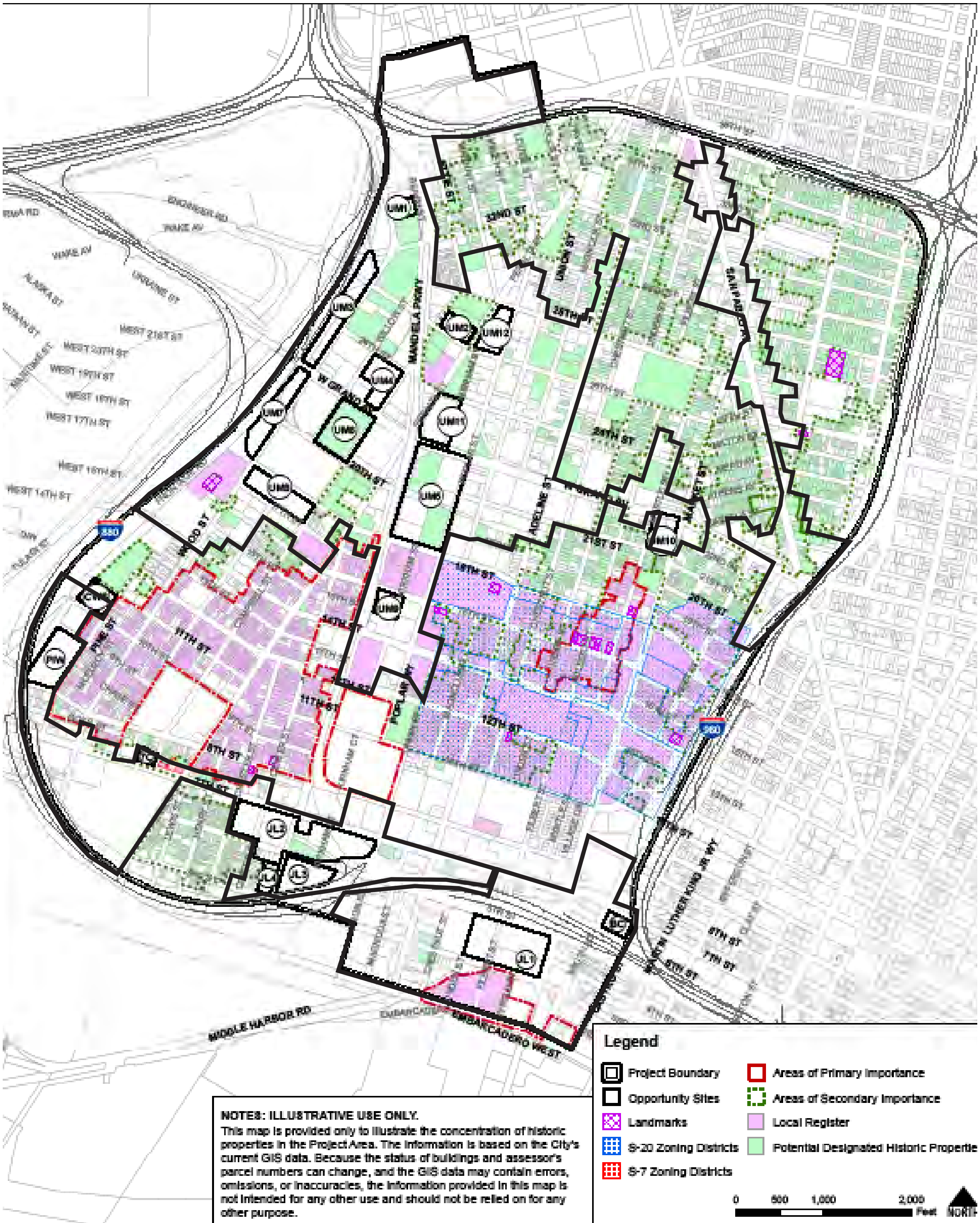
Under Policy 1.2 of the Historic Preservation Element, Potential Designated Historic Properties (PDHPs) are any properties that have an OCHS rating of at least a contingency "C," or that contribute or potentially contribute to a primary or secondary district. These properties "warrant consideration for possible preservation." PDHPs are a large group - approximately one-fifth to one-quarter of all buildings in Oakland. They are intended to be numerous enough to "significantly influence the City's character." The inclusion of contingency-rated properties as PDHPs is intended to highlight their value as restoration opportunities. District contributors or potential contributors are classified as PDHPs to promote preservation of Oakland's distinctive neighborhoods.

While most PDHPs do not appear obviously eligible for the National Register or California Register and therefore (in the absence of Heritage Property designation or some other formal action) do not meet the CEQA definition of "historic resources," they are recognized and protected under the Historic Preservation Element for their contribution to the Oakland environment. Chapter 5 of the Historic Preservation Element contains policies and actions for the protection and enhancement of PDHPs.

Historic Properties within West Oakland

There are many different programs and categories for recognizing historic value, at national, state, and local levels. It is important to recognize that categories often overlap and are always somewhat fluid. Properties can lose or regain integrity, new information may come to light about any individual property or an entire context,, younger properties may become "historic" with the passage of time, or a "fair argument" may indicate that a property should be considered significant.

There are approximately 1,421 Local Register properties within the West Oakland Planning Area, as illustrated in **Figure 4.3-1**. Of this total, the 32 designated historic properties and properties rated of the highest importance (National Register properties, Landmarks, Heritage Properties, Study List properties, S-7 Preservation Combining Zone properties, and PDHPs with an existing rating of "A") within West Oakland are identified in **Table 4.3-1**. Other Local Register properties (the 800-plus properties in the Oakland Point API, the 600-plus S-20 Preservation Combining Zone properties in the Oak Center district, and PDHPs with an existing rating of "B") are too numerous to individually list.



Source: City of Oakland, Strategic Planning
July 2011

Figure 4.3-1
Historic Resources within the West Oakland Planning Area

TABLE 4.3-1
NATIONAL REGISTER PROPERTIES, LANDMARKS, HERITAGE PROPERTIES, STUDY LIST PROPERTIES, S-7 HISTORIC ZONING PROPERTIES AND PDHPS WITH AN EXISTING RATING OF "A" WITHIN WEST OAKLAND[1]

Address	Historic Name	APN	Local Designation	OCHS Rating	Date Built	API / ASI
1485-87 8th Street	Western Market – Father Divine's Peace Mission (Liberty Hall)	004 007900100	Landmark National Register	A1+	1877	Oakland Point API
3501 San Pablo Avenue	California Hotel	005 047900201	National Register	B+a3	1929-30	-
1601 Wood Street/ 1798 16th Street	Southern Pacific 16th Street Station	018 031001301	Landmark, National Register-eligible	-	-	-
1450-54 8th Street	Samm (Jacob) – Dalton (Henry) house	004 008100800	Landmark	Cb-1+	1877-78	Oakland Point API
1782 8th Street	Berry (E. W.) – Shorey (Wm. & Julia) house	006 003505300	Landmark/ Heritage	B-a1+	1872-73	Oakland Point API
1079-81 12th Street	Cordes (H. C.) – Hoover (Herbert) house	004 001500200	Landmark	B+2+	1892-93	Oak Center Neighborhood ASI
766-78 14th Street	Metcalf (Victor H.) house	003 007703505	Landmark	Cb+3	1909	-
954 16th Street	Holland (Daniel) – Canning (James & Mary) house	005 038500800	Landmark	A1+	1878-79	Oak Center Historic API
970-72 16th Street	Gladding (Charles) – Chickering (Wm.) house	005 038500902	Landmark	B-1+	1879-80	Oak Center Historic API
974 16th Street	Reed (George W.) – Henshaw (Edward) house	005 038501000	Landmark	B+1+	1879-80	Oak Center Historic API
1004-06 16th S Street	Quinn (Wm. H.) – Moran (James T.) house	005 038601000	Landmark	C1+	1872-73	Oak Center Historic API
1014 16th Street	Campbell (Robert A.) – Masino (A.) house	005 038601100	Landmark	A1+	1883-84	Oak Center Historic API
918 18th Street	Willcutt (Joseph) house	005 041001900	Landmark	B+1+	1889	Oak Center Historic API
730 29th Street	Oakland Laundry Co.	009 069607100	Landmark	B+3		-
1651 Adeline Street	DeFremery (Mary) – Grant (James) house	004 003501000	Landmark	A2+	1888-89	Oak Center Neighborhood ASI
1529-31 Union Street	Davison (Seymour & Lucinda) house	005 037600201	Landmark	B+a2+	1884	DeFremery Neighborhood

TABLE 4.3-1
NATIONAL REGISTER PROPERTIES, LANDMARKS, HERITAGE PROPERTIES, STUDY LIST PROPERTIES, S-7 HISTORIC ZONING PROPERTIES AND PDHPS WITH AN EXISTING RATING OF "A" WITHIN WEST OAKLAND[1]

Address	Historic Name	APN	Local Designation	OCHS Rating	Date Built	API / ASI
2624 West Street	St. Augustine's Mission	009 068102500	Landmark	B+2+	1920	Herbert Hoover School Neighborhood
1716 7th Street	Brotherhood of Sleeping Car Porters Headquarters	006 001902300	Landmark-eligible	B*2+	1889-90	7th Street Commercial
1611-17 & 1619 5th Street	Davidson-Patterson buildings	004 010700100 004 010700200	Study List	B*1+	1887-88	South Prescott
1522 8th Street	Wedgewood (Chas.) – Michel (August) house	004 009301100	Study List	C1+	1878-79	Oakland Point API
1561 8th Street	Lincoln (Harry) – Williams (Katherine) house	004 009700100	Study List	B-1+	1878-79	Oakland Point API
1267 14th Street	Nabisco plant		Study List	B+a3	1915-16	
661 27th Street	Union French Bakery	009 068104101	Study List	C2+	1911-12	Herbert Hoover School Neighborhood
1909 Market Street	St. Andrew's Roman Catholic Church	005 041001601	Study List	B+3	1908-09	-
1717 Myrtle Street	Pearson (John Winfield & Allie M.) house	005 038500300	Study List	Cb+1+	1884-85	Oak Center Historic API
1600 7th Street	Flynn (Edward) Saloon – McAllister Plumbing	006 000301800	S-7 zoning	Ec2*	1885-86	-
1620-24 7th Street	Site of the former Lincoln Theater	006 000302000	S-7 zoning	-	-	-
1632-42 7th Street	Arcadia Hotel – Isaacs & Schwartz block	006 000302100	S-7 zoning	Db-2+	1906-07	-
3401-07 Adeline Street	Boman Building – North Oakland Reading Room	005 047701500	PDHP	A2+	1891	Clawson Neighborhood ASI
100-50 Linden Street	California Packing Corp. – Del Monte cannery	004 002300700	PDHP	A1+	1923	Southern Pacific Railroad Industrial API
920 Peralta Street	St. Joseph's Institute – St. Patrick's Convent	004 009102100	PDHP	A1+	1912	Oakland Point API
1340 Mandela Parkway	Coca-Cola Company Bottling Plant	004 005902501	S-20 zoning	Cb+3	1939-40	-

TABLE 4.3-1
NATIONAL REGISTER PROPERTIES, LANDMARKS, HERITAGE PROPERTIES, STUDY LIST PROPERTIES, S-7 HISTORIC ZONING PROPERTIES AND PDHPS WITH AN EXISTING RATING OF "A" WITHIN WEST OAKLAND[1]

Address	Historic Name	APN	Local Designation	OCHS Rating	Date Built	API / ASI

Source: Oakland Cultural Heritage Survey; Lamphier-Gregory.

[1] Local Register properties (or properties considered significant for purposes of environmental review under CEQA) within the Planning Area include those identified in this table, as well as S-20 Preservation Combining Zone properties, PDHPs with an existing rating of "B", and properties within an API.

Within West Oakland, the following areas and properties are considered to be historic resources under CEQA:

- three **Areas of Primary Importance** (APIs) containing a total of approximately 831 contributing properties – 721 separate properties within the 840-property Oakland Point API, 84 contributing properties within the 117-property Oak Center API, and four contributing properties within the Southern Pacific Railroad Industrial API

Oakland Point API

The Oakland Point API is an area of about 47 city blocks bounded on the south by the 7th Street commercial strip, on the east by Mandela Parkway, and on the west and north by the industrial areas of the former West Oakland marsh. The Oakland Point API is one of the largest and most intact Victorian neighborhoods in Oakland, with approximately 721 contributors out of about 840 properties, the majority from the 1870s and 1880s. Predominant architectural styles are Italianate, Stick and Queen Anne, intermingled with Colonial, shingle, Craftsman, 19th century vernacular (minimally Greek revival/Italianate), and slightly Gothic.

The Oakland Point API has been formally determined eligible for the National Register under Criterion C, Architecture, and Criterion A, Patterns of History. As Architecture, it is a large and remarkably intact 19th century residential neighborhood containing distinguished individual buildings and groups, and a solid background of typical working peoples' houses of the 1860s through 1900s. It is historically significant in the areas of Exploration/Settlement as one of Oakland's oldest neighborhoods and one which sheds light on early development and house building practices; Transportation for its close association with the railroads that prompted the neighborhood's growth and employed many of its residents; and Ethnic Heritage: European and Black, as a neighborhood whose predominant character changed over the years from Irish, to Italian and Slavic, to Black, and was both a renowned melting pot and a cradle of ethnic self-help movements and institutions. Its significance is local and its period of significance as an architectural district is from 1866 – the earliest extant building in the district – to about 1910, when the post-Earthquake building boom completed the area's physical development.

Oak Center API

The Oak Center API is a Survey-identified area of about 117 buildings (84 contributors). It is generally located between 14th and 20th Streets, and Linden and Myrtle Streets, at the heart of the larger Oak Center neighborhood. Most of it is within the locally-designated Oak Center S-20 district, a well-preserved Victorian residential neighborhood, with industries on the former marsh at the west edge and several large parks and school sites scattered through the neighborhood. The neighborhood has many outstanding examples of Italianate, Stick, Queen Anne, Colonial, and Shingle architecture, and many houses still have historic fences, trees, retaining walls, and outbuildings.

With improved ferry service and arrival of the transcontinental railroad in 1869, West Oakland developed rapidly. While Oakland Point (the Prescott neighborhood) developed as a largely working class neighborhood associated with the railroad yards, Oak Center had a larger representation of middle class downtown professionals and San Francisco commuters. It represents Oakland's prosperous garden suburbs of the late 19th century. The S-20 district, the former Oak Center Redevelopment Area, has additional 20th century significance as the area where redevelopment was tamed into rehabilitation.

Southern Pacific Railroad Industrial API

The Southern Pacific Industrial API is a group of industrial buildings along the 1st Street Southern Pacific Railroad tracks from Castro Street to Chestnut Street. Contributing buildings within this API include 95 Linden Street, Standard Underground Cable Company (currently occupied by Linden Street Brewery); 101 Linden Street, California Packing Corporation – Del Monte Cannery; and 101 Myrtle Street, California Packing Corporation label plant.

- 2 properties listed on the **National Register of Historic Places** – California Hotel at 3501 San Pablo Avenue; and Liberty Hall (Western Market – Father Divine's Peace Mission) at 1485-87 8th Street. Additionally, the Mazda Lamp Works at 1600 Campbell Street is currently pursuing designation in conjunction with a Federal Investment Tax Credit project.
- 15 City of Oakland **Landmarks**/Heritage Properties
- 8 P**reservation Study List** properties
- 3 properties within the **S-7 Preservation Combining Zone** (1600-42 block of 7th Street)
- 634 properties within the S-20 Preservation Combining Zone (the Oak Center neighborhood)
- 3 PDHPs with an existing **OCHS rating of "A"**

There are also 59 PDHPs with an existing rating of "B", most of which are also included within the three Areas of Primary Importance or the Oak Center S-20 Preservation Combining Zone.

By the 2035 anticipated build-out timeframe of the Specific Plan, new information or new contexts may be discovered, altered properties may be restored, or properties that may not have been 50 years old at the time they were last surveyed may become potentially eligible for listing in the California Register or the Local Register, and therefore could at that time be considered significant historical resources for purposes of environmental review under CEQA.

Historic Properties within West Oakland Specific Plan Opportunity Areas

As is evident from Figure 4.3-1, the great majority of the Local Register properties within the Planning Area are located in the residential neighborhoods of West Oakland. About a dozen Local Register properties are located within the Opportunity Areas. The Southern Pacific Railroad Industrial API, including its three contributing buildings is entirely located within the 3rd Street Opportunity Area.

Mandela/West Grand Opportunity Area

Southern Pacific 16th Street Station (City Landmark, determined eligible for the National Register)

The Southern Pacific 16th Street Station, located at 1601 Wood/1798 16th Street, was built in 1910-12 and is an outstanding example of a Beaux Arts depot. The station area contains five related elements: main hall, baggage wing, elevated track structure, signal tower and plaza. The main hall is a high one story rectangular plan with side wings. It has a modillion cornice with balustrade, hip roof, monumental entry, and three giant arched windows. Exterior walls are brick clad with terra cotta and the roof is tiled. The foundation is concrete and the structure is steel frame with unreinforced masonry infill. The building has a granite base and ornamental metal sash. The interiors are also notable, with clear ceiling spans of over 40 feet. The baggage wing was the center of activities for the Pullman Porters and Red Caps who figure so significantly in the cultural history of the station and the community. The two-level steel elevated track structure is the remaining piece of the elevated tracks and passenger platform for the Red Car suburban electric trains, which provided a transfer point for passengers to and from the long haul trains, which operated at grade. The signal tower is a 3-story structure located to the north of the station. The plaza is the three-quarter acre parcel east of the main hall fronting Wood Street and 16th Street. In its heyday, the station served as the west coast home of the Brotherhood of Sleeping Car Porters (BSCP), which organized the first African American labor union and played a significant role in the U.S. civil rights movement. The building remains closed since suffering damage in the 1989 Loma Prieta Earthquake, but is proposed to be rehabilitated as part of the previously approved Wood Street Project.

Oakland Warehouse Co – GE Mazda Lamp Works (National Register listing and certified tax credit project in progress)

The Oakland Warehouse Co – GE Mazda Lamp Works at 1600-14 Campbell Street occupies the entire block bounded by Campbell, Peralta, 16th, and 17th Streets. Its main buildings are an L-shaped 3-story brick building fronting on Campbell and 16th Streets, a one-story brick warehouse on Peralta, and a two-story wooden building along 17th Street. A railroad spur track runs between the Peralta Street warehouse and the rest of the complex. The middle of the block is open, and occupied by a steel tank tower (1945) and other accessory structures. The Oakland Mazda Lamp Works was part of the West Oakland marsh area which was little developed in the 19th century, but became increasingly important as an industrial area after the Southern Pacific 16th Street Station was expanded in 1910-12. The lamp works is one of the earliest industrial buildings surviving in that area, and easily the most distinguished and intact. It joined Southern Pacific, Judson Steel, and Contra Costa Laundry as a major employer of West Oakland's largely immigrant working-class population. The Oakland Mazda Lamp Works has been determined eligible for the National Register under Criterion C, architecture, as a fine example of an early 20th century industrial plant, and under Criterion A, patterns of history (commerce), as a major West Coast branch of a large national firm, General Electric, and an important industry in West Oakland, illustrating local patterns of development and employment.

Coca-Cola Company Bottling Plant

The Coca-Cola Company Bottling Plant at 1340 Cypress Street was one of many large modern food-processing factories built in Oakland in the 1920s and 1930s. At this particular corner are located the former plants of three such national firms – Coca-Cola, Nabisco, and Carnation. Incorporating numerous functions within one building, the original Coca-Cola structure included a two-story office at the corner; a two-story bottling room behind it on Mandela Parkway; one-story workshops and storage spaces along 14th and Kirkham Streets; and a warehouse and distributing room at the rear. The large yard at the rear was subsequently built over by an expansion of the plant. Built in 1940, the roughly rectangular one- and two-story corner building is made of reinforced concrete and brick, finished in stucco cement, with a steel truss roof and wire glass skylights. The building is a representative example of a Streamlined Moderne bottling plant. Corners are rounded; there is horizontal fluting along the parapet and over the windows, and a narrow, two-story projecting entry bay with round corners on 14th Street. The windows form horizontal bands on both floors along the street frontages. Originally there were large display windows along Mandela Parkway, showing off the shiny bottling machinery as it filled, capped and cased an endless stream of Cokes, and conveying a gesture of friendliness to the adjoining residential neighborhood, but most of these openings have been blocked up (a significant loss of integrity). The visibility of this process was a distinctive feature of this and most Coca-Cola bottling plants of this period.

Merco Nordstrom Valve Company Factory (Determined eligible for the National Register)

The Merco Nordstrom Valve Company Factory 2401-49 Peralta Street is the main building of a former industrial complex occupying the entire block. The building is an outstanding and unusual example of the decorative brick style of the 1920s applied to a factory building. Few factories in Oakland are this elaborate, and few examples of this style, most commonly applied to store buildings, are on this large a scale. The polychrome brick frieze, decorated pilasters, cast concrete accents, stepped parapet and tall center tower, and the rhythm of pilasters and bays repeated over a 400-foot long building, create an outstanding presence along Peralta Street and express the flair and confidence of the firm that occupied the plant. The building was built in 1926-29 for a company started in 1918 by Swedish-born Sven J. Nordstrom, inventor of the lubricated plug valve, with financing provided by the Merrill Company (Merco), a San Francisco Mining and metallurgical firm. By the late 1920s, Merco Nordstrom Valve Company was "one of the world's largest manufacturers of gas regulators and of lubricated plug valves for gas, oil and water systems" primarily for use on petroleum and natural gas lines.

7th Street Opportunity Area

7th Street S-7 Preservation Combining Zone (one block; expansion proposed)

This block represents the best surviving fragment of historic 7th Street, West Oakland's legendary commercial street of the 19th and early 20th centuries. The block consists of three parcels on the north side of 7th Street from Peralta Street on the east to Campbell Street on the west. The Flynn saloon/McAllister plumbing shop building anchors the Peralta corner. The vacant middle parcel at 1620-24 7th Street is the site of the Lincoln Theater and its attached storefronts. At 1632-42, the Campbell Street corner is the Mission Revival-style Arcadia Hotel. The histories of these properties embody the important themes of 7th Street – railroad-related businesses and lodgings, entertainment, and the ethnic and economic evolution of the neighborhood.

When the small S-7 district was designated, Landmarks Board and Planning Commission directed the applicants to pursue an expanded district designation to include other 7th Street resources. Any and all surviving early commercial buildings along 7th Street west of Mandela Parkway should be considered potential parts of this district. The district is recorded in the State Historic Resources Inventory as an ASI.

One 7th Street commercial building, the Brotherhood of Sleeping Car Porters headquarters at 1716 7th Street, built in 1889-90 and occupied by C.L. Dellums' union from about 1934 to 1978, has been formally nominated and determined eligible for City Landmark status.

Flynn Saloon – McAllister Plumbing

The Flynn saloon/McAllister plumbing shop building is a joined pair of two-story late 19th century wood frame commercial buildings, with one-story additions between, behind, and to the west. The earliest part, at the corner, was built in 1885-86. It opened as a saloon and was later occupied by a plumbing shop. It has tall wood-sash windows with segmental-arched tops grouped in twos and threes, ground-floor storefronts, and a wide flat molded cornice with a wide plain frieze at the top of the parapet. The two-story section to the west, a few years newer, is generally similar to the corner section. The one-story sections, fairly basic early 20th century commercial vernacular structures, were built after 1902. All the storefronts have been altered over the years but generally retain at least the outlines of transoms and recessed entries. The building occupies the west end of the 1600-1642 block of 7th Street.

Site of the Lincoln Theater

The vacant lot at 1620-28 7th Street was the site of the Lincoln Theater. Built in 1919, the theater had a unique Arts and Crafts façade with peaked and stepped parapets, deep three-dimensional stucco trim, a wide arched entry, and colorful tile frieze and pilasters. The auditorium extended diagonally into the middle of the odd-shaped lot, and a small semi-detached store and flat building occupied the west corner of the lot, sharing the main façade. The Lincoln had a stage and offered live shows along with films. As the neighborhood theater, it was an anchor of the commercial district and a social and entertainment center, as well as a visual landmark. The Lincoln was one of the many theaters that closed in the late 1950s with the coming of television. In 1961 it became the Damscus Missionary Baptist Church, by 1970 it was vacant, and it later suffered neglect, earthquake and fire damage. The roof and sides collapsed in early 2003, and the façade was demolished as a hazard.

Arcadia Hotel – Isaacs & Schwartz Block

The Arcadia Hotel at 1632-42 7th Street was built in 1906-07, and is a two-story wood frame 26-room hotel with ground-floor storefronts along the 7th Street facade. It is Mission Revival in style, with tiled pent roofs on closely spaced brackets, shaped parapets, and two overhanging rectangular bays, a shallow center one and a square corner tower. Exterior walls are stucco, with stucco quoins and crests on the bays and three-dimensional window trim.

Brotherhood of Sleeping Car Porters Headquarters (nominated and determined eligible for City Landmark status)

The building at 1716-18 7th Street, constructed in 1889-90, is a two-story Stick/Queen Anne commercial building, significant as a remnant of Victorian commercial development along 7th Street, and as the Pacific Coast headquarters for over 40 years of the International Brotherhood of Sleeping Car Porters. The International Brotherhood of Sleeping Car Porters was the first all-black labor union chartered by the AF of L and organized in Oakland by Dad Moore and C.L. Dellums. From 1934 to about 1978, the Brotherhood's Oakland division headquarters, from which emanated historical union and civil rights activities, was located in the upstairs portion of the 1716 7th Street building, upstairs from the Dellums' pool hall at 1718 7th Street. The present condition of the building, with the false-front mansard resting on tall brackets as the only original ornament remaining, makes this building's National Register eligibility doubtful.

<u>3rd Street Opportunity Area</u>

Individual buildings located within the 3rd Street Opportunity Areas' Southern Pacific Railroad Industrial Landscape District are described in more detail below.

California Packing Corporation, Del Monte Cannery

The California Packing Corporation – Del Monte cannery at 110 Linden Street occupies the block between the tracks of the Southern Pacific Railroad (1st Street) and the Western Pacific Railroad (3rd Street) between Filbert and Linden Streets, within the Southern Pacific Railroad Industrial

API. The property consists of four connected structures and is rectangular in shape, except for an angled northwest corner to conform to the curve of a rail spur. Architecturally, it is characteristic of industrial buildings of its time and place, in its vigorously utilitarian design, in the way it evolved and accreted over the years, and in its vocabulary of structure and materials – brick, concrete, steel sash, parapets, monitor roofs, and loading platforms. It is also a particularly striking example of its kind, with its chamfered corner, over-scaled parapets, and forceful juxtapositions emphasizing the different sections of the building. The property was occupied from 1891 by the Oakland Preserving Company. In the 1890s, the Oakland Preserving Company originated the Del Monte trademark, alluding to the local Del Monte Hotel. The Oakland Preserving Company in this period was reshaping the industry and was extremely important both locally and statewide. The California Packing Corporation was formed in 1916 by the merger of the Oakland Preserving Company and several other large western canning companies. The assimilation of a local cannery was typical of the way the California Packing Corporation developed in its early years. The new company was organized so that it controlled producing areas, processing plants, marketing and distributing systems. It was one of the earliest food canning companies organized as a modern corporation, possibly the first with a national advertising campaign for a recognized national brand – Del Monte. "Cal Pack" very rapidly became the largest fruit and vegetable canning company in America.

California Packing Corporation, Label Plant

The California Packing Corporation label printing plant at 101 Myrtle Street faces the Southern Pacific Railroad tracks between Filbert Street and Myrtle Street, within the Southern Pacific Railroad Industrial API. This building is part of a larger California Packing Corporation complex with the cannery on the next block west. The label plant building is in two main parts, a one-story label-printing plant on the west and a three-story warehouse on the east, with post-1950 additions on the north side (away from the tracks). The buildings are reinforced concrete "daylight" factories" with monitor roofs. Their facades are minimally ornamental grids of concrete framing with large steel-sash industrial windows. The words "California Packing Corporation" and "Label Dep't" are cast into the first and second floor friezes. Concrete platforms extend along the railroad track frontage. As a specialized label printing plant built in 1917, a year after the formation of the company, this was one of the first buildings built specifically for the California Packing Corporation and one reflecting one of the basic innovations of the new company – the presentation of a nationally recognized brand name (Del Monte) through the unified graphic design on its labels.

Standard Underground Cable Company building, 101 Linden Street

The building at 101 Linden Street is smaller, but visually similar to the California Packing Corporation label printing plant at 101 Myrtle Street. The 101 Linden Street building had its beginnings at the turn of the century when the Standard Underground Cable Co. began to make cables for the new industries of telephones and electric power. In 1918, a two-story brick building was added to the original structure. The cable company relocated its factory to Emeryville in 1928, and the building saw a wide variety of uses after that time., The building was rehabilitated to its current use in the mid-1990's and now houses offices, an art gallery and the Linden Street Brewery.

Dalziel Warehouse

A fourth contributor to the Southern Pacific Railroad Industrial Landscape District is the Dalziel Warehouse located just outside of the 3rd Street Opportunity Area, at 737 2nd Street/40 Embarcadero. This building marks the east end of the District.

San Pablo Avenue Opportunity Area

Within the precise boundaries of the San Pablo Avenue Opportunity Area, there are no historic resources. However, the boundaries of this Opportunity Area form an irregular pattern of parcels along San Pablo Avenue, and just outside of the Opportunity Area boundaries are several historic buildings, most prominently including the California Hotel at the north end of San Pablo Avenue (a National Register building), and the Willowbrook Creamery at about the mid-point along the corridor at 2515 San Pablo Avenue (which has an OCHS rating of B+a2+).

TABLE 4.3-2 LOCAL REGISTER PROPERTIES WITHIN THE OPPORTUNITY AREAS

Address	Historic Name	APN	Local Designation	OCHS Rating	Year Built	API / ASI
Mandela/West Grand Opportunity Area						
1600-14 Campbell Street	Oakland Warehouse Co – GE Mazda Lamp Works	007 056000102	Study List	B+a3	1910	-
1340 Mandela Parkway	Coca-Cola Company Bottling Plant	004 005902501	S20 zoning	Cb+3	1939-40	-
2401-49 Peralta Street	Merco Nordstrom Valve Co. factory	007 057800106	PDHP	B+2+	1926-27	Peralta & 26th Industrial ASI
1601 Wood Street/1798 16th Street	Southern Pacific 16th Street Station	018 031001301	Landmark	A1+	1910-12	-
7th Street Opportunity Area						
1600 7th Street	Flynn (Edward) Saloon – McAllister Plumbing	006 000301800	S7 zoning	Ec2*	1885-86	-
1620-24 7th Street	Site of the former Lincoln Theater	006 000302000	S7 zoning	-	-	-
1632-42 7th Street	Arcadia Hotel – Isaacs & Schwartz block	006 000302100	S7 zoning	Db-2+	1906-07	-
1716-18 7th Street	Intl. Brotherhood of Sleeping Car Porters	006 001902300	nominated Landmark	Da2*	1889	
3rd Street Opportunity Area						
100-50 Linden Street	California Packing Corp. – Del Monte cannery	004 002300700		A1+	1923	Southern Pacific Railroad Industrial API
101 Linden Street	Standard Underground Cable Co.			B*1+	1899	Southern Pacific Railroad Industrial API
101 Myrtle Street	California Packing Corp. – Label Plant	004 000100501		B-1+	1917	Southern Pacific Railroad Industrial API

Source: Oakland Cultural Heritage Survey; Lamphier-Gregory.

Historic Properties in West Oakland Not Considered Significant under CEQA

Additionally, there are approximately 2,530 PDHPs – the most inclusive definition of "historic" in the Preservation Element of the Oakland General Plan - with existing ratings lower than "A" or "B" and 13 Areas of Secondary Importance (ASIs) within the Planning Area, including the following ASIs shown on the map, Figure 4.3-1:

- 7th Street Commercial
- 11th and West Street
- 16th St. Southern Pacific Commercial
- 18th and Campbell Brick Warehouse
- 19th and Adeline Streets
- 22nd Street, Brush-West
- 1400 block of Chestnut
- 1700 block of 14th Street
- Barstow Tract
- Clawson Neighborhood
- Curtis and Williams Tract
- DeFremery Neighborhood
- Haven-Harlan-34th Street
- Herbert Hoover School Neighborhood
- McClymonds Neighborhood
- Mead-Market-Milton Street
- Minerva Todd Sweeney
- Oak Center Neighborhood
- Pacific Coast Canning Co.
- Peralta & 17th Streets
- Peralta & 26th Industrial
- South Prescott
- San Pablo Avenue Commercial
- West Clawson (Watts Tract)
- West Oakland Marsh
- West Street

A number of these ASIs, and PDHPs with an existing rating lower than "A" or "B", are located within the Opportunity Areas and on Opportunity Sites of the West Oakland Specific Plan. The ASIs are areas and building groups with a coherent and intact period character that distinguishes them as districts. They do not appear obviously eligible for the National Register because they are not clearly "first, last, best, or only" but they could be eligible for local designation and might in some cases qualify for National Register listing with a persuasive application. Many properties with individually minor ratings are PDHPs because of their role as contributors or potential contributors to districts, reflecting the importance of distinctive neighborhoods in Oakland's overall character. These areas and properties were found by the OCHS surveys to appear not obviously eligible for the National Register, are not Local Register properties, and therefore are not treated as historic resources for purposes of environmental review under CEQA. Nevertheless, they are locally important resources that merit consideration for preservation, rehabilitation and reuse.

Archaeological Resources

Prehistoric Archaeological Resources

The NWIC records search revealed three recorded prehistoric archaeological resources within the Planning Area:

- P-01-000038 (CA-ALA-17),
- P-01-010509 (CA-ALA-604), and
- P-01-010881

Each of these prehistoric archaeological resources is Native American habitation sites.[7] CA-ALA-17 is reported in the vicinity of 7th Street and Adeline Street, but its exact location is unknown.

The Emeryville Shell Mound (California State Historical Landmark No. 335), a once-massive archaeological shell midden deposit, is located immediately to the north of the Planning Area.

Native American resources in this part of Alameda County have been found close to the former margins of the bay and associated estuaries and marshlands, near sources of fresh water, and near other productive resource environments. The Planning Area encompasses the former margin of the bay and its associated marshlands and wetlands. To the east was the estuary that predated Lake Merritt. To the north were broad alluvial fans formed by perennial streams. The Planning Area also contains relatively stable Holocene-age terrestrial landforms, as well as Middle Holocene-age buried land surfaces that have a significant potential of containing buried archaeological deposits that show no signs on the surface. Given these environmental factors, there is a high potential of identifying unrecorded Native American resources, especially buried archaeological deposits, within the Planning Area.[8]

Historic-Era Archaeological Resources

The NWIC records search revealed 21 recorded historic archaeological resources within the Planning Area. Twenty of these recorded archaeological resources represent historic-era residential remains

---

[7] California Historical Resources Information System Northwest Information Center, NWIC File No.: 12-0390, Record Search Results for the Proposed West Oakland Specific Plan, City of Oakland, CA, November 15, 2012.

[8] California Historical Resources Information System Northwest Information Center, NWIC File No.: 12-0390, Record Search Results for the Proposed West Oakland Specific Plan, City of Oakland, CA, November 15, 2012.

located throughout a city block (P-01-000017, P-01-000018, P-01-000019, P-01-000020, P-01-000021, P-01-000243, P-01-000244, P-01-000245, P-01-000256, P-01-000257, P-01-000258, P-01-000259, P-01-000260, P-01-001764, P-01-001788, P-01-001789, P-01-001790, P-01-010521, P-01-010522, and P-01-010919 [CA-ALA-631H]).

A separate historic-era archaeological site (P-01-010490 [CA-ALA-602H]) is a discrete deposit of historic-era refuse.[9]

The history and development of West Oakland has been inseparably linked with the history of the Bay Area and the nation since the early 1850s. Previous archaeological investigations conducted for various projects along the I-880 corridor recovered significant historic-era archaeological materials. Review of historical literature and maps also indicates a high potential of identifying unrecorded historic period archaeological resources in the Planning Area.

Paleontological Resources

Paleontological resources are the fossilized remains of plants and animals, including vertebrates (animals with backbones), invertebrates (e.g., starfish, clams, ammonites, and marine coral), and fossils of microscopic plants and animals (microfossils). The age and abundance of fossils depend on the location, topographic setting, and particular geologic formation in which they are found. Fossil discoveries not only provide a historic record of past plant and animal life, but may assist geologists in dating rock formations. Often, fossil discoveries constrain the known time period and geographic range of flora or fauna.

On a regional scale, fossilized plants, animals and microorganisms are prevalent throughout the East Bay. Many of the hills in the East Bay are made up of sedimentary bedrock that is known to contain a wide range of fossils, including radiolaria, mollusks, diatoms, foraminifera, and non-marine vertebrates. In addition, even geologically young fluvial deposits have been known to contain freshwater mollusks and extinct late-Pleistocene vertebrate fossils. Several paleontological finds, including the remains of mammoths, bisons, bears, and others have been discovered in Oakland. Fossils may be encountered wherever there are broad, deep cuts into bedrock.

West Oakland overlies geologic units that have low to moderate paleontological sensitivity. The ground surface in the Planning Area consists of geologically recent deposits of mud and silt associated with the present-day estuary (Bay Mud). This Bay Mud overlies Merritt Sand, which is composed of Pleistocene-age deposits of wind-blown sand as much as 50 feet thick. Generally, these types of geologic deposits do not preserve significant vertebrate fossils. While the Bay Mud may preserve a variety of recent marine invertebrate fossils (mollusks, clams, foraminifera, microorganisms, etc.), such fossils are likely to exist in other Bay Mud deposits all around the Bay Area and would not be considered significant or unique. Deeper deposits of older Quaternary Alluvium may underlie the Merritt Sands in portions of West Oakland; these formations would have the highest likelihood of containing significant fossil resources.

The University of California, Museum of Paleontology (UCMP) maintains the world's largest database of fossil discoveries and collections, with thousands of records for the East Bay. A search of the database by location and age (Quaternary) revealed 72 Pleistocene-age localities and 47 Recent (Holocene) localities within Alameda County. Localities within Berkeley and Oakland in the vicinity of the Planning Area report at least 30 vertebrate fossils from a variety of now-extinct Pleistocene mammals. These

[9] California Historical Resources Information System Northwest Information Center, NWIC File No.: 12-0390, Record Search Results for the Proposed West Oakland Specific Plan, City of Oakland, CA, November 15, 2012.

were identified during deep excavations for the roadway tunnels connecting the island of Alameda to the mainland, and for deepening the Berkeley Marina. Fourteen invertebrate fossils of Quaternary age were reported from various locations in Oakland, three of which were found in or around Lake Merritt. One plant fossil was also reported in Oakland, although a more specific location could not be determined. Whether or not these fossils were found within the specific geologic units underlying the Planning Area was not able to be determined from the information in the UCMP database.

Regulatory Setting

As stated earlier, there are many different programs and categories for recognizing historic value, at national, state, and local levels. The major programs that apply to West Oakland are detailed below.

National

National Historic Preservation Act

The National Historic Preservation Act of 1966 as amended (NHPA) addresses those concerns pertinent to the effect of federal actions on cultural resources (16 USC § 470 et seq.). The NHPA sets forth the federal government's policy on historic preservation, including establishing the National Register of Historic Places (National Register).

National Register of Historic Places

The National Register is the nation's official list of districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, engineering, and culture. To be listed on the National Register, a property must be shown to be "significant" at the local, state, or national level under one or more of the following criteria (36 CFR 60.4). Eligible resources are those:

- That are associated with events that have made a significant contribution to the broad patterns of our history (Criterion A - Event);
- That are associated with the lives of persons significant in our past (Criterion B - Person);
- That embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C - Design/Construction); or
- That has yielded, or may be likely to yield, information important in prehistory or history (Criterion D - Information Potential).

The property must also possess historic "integrity." Integrity is defined as "the ability of a property to convey its significance." The National Register criteria recognize seven qualities that define integrity: location, design, setting, materials, workmanship, feeling, and association.

- *"Location"* refers to the place where the historic property was originally constructed or situated.
- *"Design"* is the combination of architectural elements that create the form, structure and style of the property.
- *"Setting"* is the physical environment surrounding a historic resource.
- *"Materials"* are the original physical components that were combined during a particular period in time and in a particular pattern to form the historic resource.

- *"Workmanship"* is the physical evidence of the building crafts and skills of a particular culture during a given period.
- *"Feeling"* is a property's expression of the aesthetic or historic sense of a particular period of time.
- *"Association"* is the direct link between an important historic event or person and a cultural resource.

Special considerations apply to moved or reconstructed properties, cemeteries, religious or commemorative properties, and properties achieving significance within the past 50 years. As indicated in Section 101(d)(6)(A) of the NHPA, properties of traditional religious and cultural importance to an Indian Tribe are eligible for inclusion in the National Register. The National Register eligibility criteria and considerations are used as a standard in other programs such as the California Register of Historic Resources and many local evaluation and designation systems, including Oakland's.

Section 106 of the NHPA requires review by the Advisory Council on Historic Preservation and/or State Historic Preservation Officer (SHPO) of any federal actions (including federally funded grants or loans) that may adversely affect properties listed on, eligible for, or potentially eligible for the National Register. Listing is normally initiated by an application to the State Historical Resources Commission. Determinations of eligibility usually take place as part of federally related project reviews. Properties officially determined eligible for the National Register have the same protections and the same standing in environmental review as those properties that have already been listed; however, only listed properties may qualify for a 20 percent federal investment tax credit.

National Historic Landmarks

National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. National Historic Landmarks are given special protection by Section 110(f) of the NHPA.

California

California Environmental Quality Act

CEQA requires lead agencies in California to consider the effects of proposed actions on historic resources, defined as those resources meeting the criteria for listing on the California Register of Historic Resources (California Register). This definition of "historic resources" includes buildings, structures, objects, sites, and districts determined to be eligible for or listed on the California Register, the National Register, or a local register of historic resources. A lead agency may also determine a resource to be significant for purposes of CEQA. Section 15064.5 of CEQA assigns special importance to human remains and specifies procedures to be followed when Native American remains are discovered.

California Register of Historical Resources

The California Register is an authoritative guide to the state's cultural resources, and provides the standards by which properties are considered significant for CEQA purposes. The California Register program encourages public recognition and protection of resources of architectural, historical, archaeological and cultural significance, identifies historical resources for state and local planning purposes, determines eligibility for state historic preservation grant funding and affords certain protections under CEQA. The California Register includes resources listed in or formally determined eligible for listing in the National Register; California State Landmarks; and California Points of Historical Interest. The State Office of Historic Preservation (OHP) maintains a list of historical resources by county in their Directory of Properties in the Historic Property Data File. A building or structure identified in OHP's Directory with a rating of 1 or 2 (on or determined eligible for the National Register) is considered to be "listed" on the California Register.

Properties of local significance that have been designated under a local preservation ordinance (e.g., local landmarks), or that have been identified in a local historical resources inventory may also be eligible for listing in the California Register and are presumed to be significant resources for purposes of CEQA.

In order for a resource to meet the criteria for listing in the California Register, it must satisfy all of the following three provisions:

1. It meets one or more of the following four criteria of significance (PRC 5024.1[c] and CEQA Guidelines 15064.5):
   - the resource "is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;"
   - the resource "is associated with the lives of persons important in our past;"
   - the resource "embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values;" or
   - the resource "has yielded, or may be likely to yield information important in prehistory or history" (this criterion applies primarily to archaeological sites).
2. The resource retains historic integrity; and
3. It is fifty years old or older (except where it can be demonstrated that sufficient time has passed to understand the historical importance of the resource).

California State Historical Landmarks

California Historical Landmarks are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. The specific standards now in use were first applied in the designation of Landmark #770. California Historical Landmarks #770 and above are automatically listed in the California Register.

Local Plans and Policies

City of Oakland General Plan Historic Preservation Element

The Historic Preservation Element of the General Plan sets forth goals, objectives, policies, and actions for historic preservation in the City. The Historic Preservation Element creates a wide-reaching, multifaceted "Historic Preservation Strategy" that addresses a wide variety of properties and is intended to help revitalize Oakland's districts and neighborhoods. Guiding the Historic Preservation Element are two broad, ambitious goals:

Goal 1*:* To use historic preservation to foster the economic vitality and quality of life in Oakland by:

1. Stressing the positive community attributes expressed by well-maintained older properties;

2. Maintaining and enhancing throughout the City the historic character, distinct charm, and special sense of place provided by older properties;
3. Establishing and retaining positive continuity with the past thereby promoting pride, a sense of stability and progress, and positive feelings for the future;
4. Stabilizing neighborhoods, enhancing property values, conserving housing stock, increasing public and private economic and financial benefits, and promoting tourist trade and interest through preservation and quality maintenance of significant older properties;
5. Preserving and encouraging a city of varied architectural styles and environmental character reflecting the distinct phases of Oakland's cultural, social, ethnic, economic, political, and architectural history; and
6. Enriching the quality of human life in its educational, spiritual, social, and cultural dimensions through continued exposure to tangible reminders of the past.

Goal 2*:* To preserve, protect, enhance, perpetuate, use, and prevent the unnecessary destruction or impairment of properties or physical features of special character or special historic, cultural, educational, architectural or aesthetic interest or value.

The chapters of the Historic Preservation Element address identification, designation, preservation in ongoing city activities, and education and information. The Historic Preservation Element sets out a graduated system of ratings and designations based on the OCHS information and implemented in the Oakland Planning Code. Incentives and regulations for historic properties are similarly graduated based on the relative importance of the property.

The following Historic Preservation Element objectives and policies are particularly relevant to the cultural and historic resources of the Specific Plan. Some of the actions related to these policies have already been completed, while others are ongoing.

> *Objective 1: Identifying Properties Potentially Warranting Preservation.* Policies and actions related to this Objective describe the OCHS rating system, inventory goals and guidelines, and define the various types of Designated Historic Properties as well as PDHPs.
>
> *Objective 2: Preservation Incentives and Regulations for Designated Historic Properties.* This objective directs the City to develop a system of preservation incentives and regulations for specially designated significant older properties which (i) enhances economic feasibility for preservation; (ii) provides a predictable and appropriate level of protection, based on each property's importance; (iii) reasonably balances preservation with other concerns; and (iv) operates efficiently, avoiding unnecessary regulatory procedures and review periods.
>
> *Policy 2.1:* The City will use a combination of incentives and regulations to encourage preservation of significant older properties and areas which have been designated as Landmarks, Preservation Districts, or Heritage Properties. The regulations will be applied according to the importance of each property, with the more important properties having stronger regulations. Policy 2.1 is a general policy which is expressed more specifically in this chapter's other policies and their related actions.
>
> *Policy 2.6:* This policy recommends Preservation Incentives for Landmarks and Preservation District properties, including several financial incentives (e.g., Mills Act contracts, conservation easements, development assistance from historic preservation grants or historical rehabilitation bonds, fee waivers or reductions for City permits), use of the State Historical Building Code to provide more flexible construction standards, a broader range of permitted or conditionally

permitted uses, and transferable development rights. Heritage Properties and compatible new development on vacant noncontributing parcels of a Preservation District are eligible for some of the same incentives.

Objective 3: Historic Preservation and Ongoing City Activities. This objective seeks to establish administrative procedures and criteria to promote preservation of significant older properties as a routine part of City-sponsored or assisted projects, programs and regulatory activities.

Policy 3.1: Avoid or minimize adverse historic preservation impacts related to discretionary City actions. Policy 3.1 states that the City will make all reasonable efforts to avoid or minimize adverse effects on the Character-Defining Elements of existing or Potential Designated Historic Properties which could result from private or public projects requiring discretionary City actions. Policy 3.1 is a general policy which is expressed more specifically in this Chapter's other policies and their related actions.

Policy 3.2: To the extent consistent with other Oakland General Plan objectives, the City will ensure that all City-owned or controlled properties will, in fact, be preserved. All City-owned or controlled properties which may be eligible for Landmark or Heritage Property designation or as contributors to a Preservation District will be considered for such a designation. Related actions set out the steps for designation (3.2.1) and recommend a formal historic preservation management procedure for City-owned properties (3.2.2).

Policy 3.3: To the extent consistent with other General Plan goals, policies and objectives, as a condition for providing financial assistance to projects involving existing or Potential Designated Historic Properties, the City will require that complete application be made for such properties to receive the highest local designation for which they are eligible prior to issuance of a building permit for the project, or a transfer of title (for City-owned or controlled properties), whichever comes first.

Policy 3.4: City Acquisition for Historic Preservation Where Necessary. Policy 3.4 states that, where all other means of preservation have been exhausted, the City will consider acquiring, by eminent domain if necessary, existing or Potential Designated Historic Properties, or portions thereof, in order to preserve them. Such acquisition may be in fee, as conservation easements, or a combination thereof. This policy proposes limited acquisition powers for extremely important properties in dire situations. Related actions direct the City to develop procedures and criteria for City acquisition of historic properties, including acquisition by eminent domain.

Policy 3.5: Historic Preservation and Discretionary Permit Approvals. This policy establishes design review findings for alterations and demolitions of Heritage Properties and PDHPs. This policy applies to both publicly and privately sponsored projects. Related actions include the development of appropriate design guidelines and standard conditions of approval for such projects.

*Policy 3.6: Hist*oric Preservation and City-Sponsored or Assisted Projects. This policy recommends that City-sponsored or assisted projects involving an existing or Potential Designated Historic Property "be selected and designed to avoid adverse effects and to promote preservation and enhancement." The Secretary of the Interior's Standards for the Treatment of Historic Properties are used as one criterion for avoiding adverse effects. This policy extends the protections applied to federally related projects under Section 106 of the NHPA to "non-Federally funded City projects and to City projects that involve existing or Potential Designated Historic Properties that are not on or eligible for the National Register." Related actions direct the City to develop or modify evaluation and selection procedures that appropriately balance historic preservation with other priorities.

Policy 3.7: As a condition of approval for all discretionary projects involving demolition of existing or Potential Designated Historic Properties, the City will normally require that reasonable efforts be made to relocate the properties to an acceptable site. Actions associated with this policy include preparation of relocation procedures and design guidelines, investigation of assistance programs, and review of permit regulations for both City-sponsored or assisted projects and discretionary permit approvals.

Policy 3.8: Definition of “Local Register of Historic Resources” and historic preservation “Significant Effects” for environmental review purposes. This policy defines the minimum set of historical resources that require consideration in environmental review and declares that complete demolition of a historic resource cannot normally be mitigated to a level of insignificance. Measures appropriate to mitigate significant effects to a Historical Resource may include one or more of the following measures depending on the extent of the proposed addition or alterations:

- Modification of the project design to avoid adversely affecting the character defining elements of the property.
- Relocation of the affected Historical Resource to a location consistent with its historical or architectural character.

If the above measures are not feasible, then other measures may be considered including, but not limited to the following:

- Modification of the project design to include restoration of the remaining historic character of the property.
- Modification of the project design to incorporate or replicate elements of the building's original architectural design.
- Salvage and preservation of significant features and materials of the structure in a local museum or within the new project.
- Measures to protect the Historical Resource from effects of on-site or other construction activities.
- Documentation in a Historic American Buildings Survey report or other appropriate format: photographs, oral history, video, etc.
- Placement of a plaque, commemorative, marker, or artistic or interpretive display on the site providing information on the historical significance of the resource.
- Contribution to a Facade Improvement Fund, the Historic Preservation Revolving Loan Fund, the Oakland Cultural Heritage Survey, or other program appropriate to the character of the resource.

Policy 3.9: Consistency of zoning with existing or eligible preservation districts. This policy recommends including a historic preservation component in areawide and specific plans.

Policy 3.10: Historic preservation in response to earthquakes, fires or other emergencies.

Policy 3.11: Historic preservation and seismic retrofit and other building safety programs. Policies 3.10 and 3.11 direct that retrofit and repair be carried out in a manner that minimizes adverse effects on character-defining elements.

Policy 3.12: Historic preservation and substandard or public nuisance properties. This policy states that, before requiring vacation or demolition, the City will take all reasonable actions to repair or rehabilitate existing or Potential Designated Historic Properties which have been determined to be substandard or public nuisances under the Oakland Dangerous Buildings Code, the Oakland Housing Code, the Blight Ordinance, the Earthquake Repair Ordinance, or any other City code or ordinance. In cases where such properties are already vacant or an immediate hazard, such repair or rehabilitation will occur expeditiously to prevent future deterioration or to abate the immediate hazard.

Policy 3.13: Security of vacant properties. Policies 3.12 and 3.13 recommend an extensive program for dealing with substandard and nuisance properties, including repair rather than demolition, earlier intervention, repair with liens, property acquisition and transfer, financial assistance, and improved security of vacant properties.

Policy 3.14: Promotes commercial revitalization programs and California Main Street projects with a specific focus on preserving and enhancing designated and potential designated historic commercial properties and districts.

Objective 4: Archaeological Resources. This objective seeks to develop databases identifying existing and potential archaeological sites and adopt procedures for protecting significant archaeological resources. Related policies and actions describe the measures the City will take to protect significant archaeological resources during ground-disturbing activities associated with discretionary projects.

Objective 5: Information and Education. This objective seeks to provide and encourage informational and educational programs to enhance public and City staff appreciation of older properties and increase the level of technical knowledge. Associated policies and actions promote research and information dissemination programs; public recognition of historic properties and preservation efforts through plaques, certificates, walking tours and guidebooks; City-sponsored design assistance, rehabilitation training and apprenticeship programs, rehabilitation publications, and a preservation-related design and construction bookstore; public school curricula emphasizing Oakland's history and architectural heritage; and improved City records management.

City of Oakland Planning Code

In addition to providing definitions of the four types of Designated Historic Properties, the Planning Code contains specific regulations for projects meeting certain criteria.

17.136.060 Review by Landmarks Board in Certain Cases

This regulation states that whenever an application is for regular design review in the S-7 zone, or on a designated Landmark site, the Director of City Planning shall refer the proposal to the Landmarks Board for its recommendations. Referral to the Landmarks Board may be appropriate, at the discretion of the Director of City Planning, for projects involving regular design review in the S-20 zone, or when a proposed addition or alteration will have a significant effect on the property's character defining elements that are visible from a street or other public area.

17.136.070 Special Regulations for Designated Landmarks

This chapter includes regulations specific to the designation and preservation of Landmarks, including requirements that alterations and new construction may not adversely affect the exterior features of the Landmark, or the special character, interest, or value of the landmark or its setting. All projects involving Landmarks should conform, if possible, with the Design Guidelines for Landmarks and Preservation Districts as adopted by the City Planning Commission and/or the Secretary of the Interior's Standards for the Treatment of Historic Properties. The Director of the City Planning Commission is given the authority to decide whether or not project proposals conform to these regulations. The regulations also stipulate that the owner, lessee, or other person in actual charge of a designated Landmark has a duty to maintain the property and keep it in good condition.

17.136.075 Regulations for Demolition or Removal of Designated Historic Properties and Potentially Designated Historic Properties

This chapter codifies regulations for approval of demolition or removal permits. With the exception of structures declared to be a public nuisance by the Building Official or City Council, Regular Design Review of the demolition or removal of a Designated Historic Property or PDHP shall only be approved after the Regular Design Review of a replacement project at the subject site has been approved; however, demolition of nuisance structures must still undergo Regular Design Review for demolition. Regular Design Review approval for the demolition or removal of any Local Register property that is not in an S-7 or S-20 zone or API may be granted only if the proposal conforms to the general design review criteria, all other applicable design review criteria, and additional criteria set forth in the chapter.

Approval of a demolition or removal permit for a contributing property in an S-7 or S-20 zone or an API is subject to similar criteria, while permit approval criteria for noncontributing Preservation District properties and PDHPs are less restrictive. The Director of City Planning may postpone issuance of a demolition permit for up to 120 days (from the date of permit application) following Design Review approval.

Different findings are required for the demolition of three categories of historic structures:

- Category I includes any Landmark; Heritage Property; property rated "A" or "B" by the Oakland Cultural Heritage Survey; or Preservation Study List Property. This category excludes any property that falls into Category II.
- Category II includes properties in an S-7 or S-20 zone or an Area of Primary Importance. Any buildings, including those that do not contribute to the historic quality of the district, fall into this category.
- Category III includes properties rated "C" by the OCHS or contributors to an Area of Secondary Importance. This category excludes any property that falls into Category II.

As stated in the Planning Code, all demolition findings must be prepared by an independent third party consultant or be peer-reviewed.

Although not specifically stated as such in the Planning Code or other local regulations, historic signage on private property is subject to protection because any building improvements (including signage changes) are required to go through a Planning process that includes OCHS review where appropriate.

City of Oakland Municipal Code Article III – Green Building Compliance Standards (Section 18.02.100)

This regulation requires all buildings or projects to comply with the requirements of the California Building Energy Efficiency Standards (Title 24, Part 6) of the California Building Code. This regulation requires any new construction project resulting in removal of a historic resource, one- and two-family additions and alterations of historic resources that exceed 1,000 square feet of floor area, multi-family additions and alternations of historic resources, non-residential additions and alterations of historic resources between 5,000 and 25,000 square feet of floor area, non-residential additions and alterations of a historic resource over 25,000 square feet of floor area, or non-residential additions and alterations not meeting the Major Alteration definition and over 25,000 square feet of floor area, are required to consult with a Historic Preservation Planner, seek LEED and Green Building certification, in addition to other specific requirements.

Standard Conditions of Approval

The City's Standard Conditions of Approval relevant to cultural and historic resources are listed below. These Standard Conditions of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area when it is approved by the City and would avoid or reduce significant cultural resources impacts. The Standard Conditions and Approval are incorporated and required as part of development in accordance with the Specific Plan, so they are not listed as mitigation measures. Where there are impacts associated with development in accordance with the Specific Plan that would result in significant environmental impacts despite implementation of the Standard Conditions of Approval, additional mitigation measures are recommended.

SCA 52: Archaeological Resources: *Ongoing throughout demolition, grading, and/or construction.* Pursuant to CEQA Guidelines section 15064.5 (f), "provisions for historical or unique archaeological resources accidentally discovered during construction" should be instituted.

a. Therefore, in the event that any prehistoric or historic subsurface cultural resources are discovered during ground disturbing activities, all work within 50 feet of the resources shall be halted and the project applicant and/or lead agency shall consult with a qualified archaeologist or paleontologist to assess the significance of the find. If any find is determined to be significant, representatives of the project proponent and/or lead agency and the qualified archaeologist would meet to determine the appropriate avoidance measures or other appropriate measure, with the ultimate determination to be made by the City of Oakland. All significant cultural materials recovered shall be subject to scientific analysis, professional museum curation, and a report prepared by the qualified archaeologist according to current professional standards.

b. In considering any suggested measure proposed by the consulting archaeologist in order to mitigate impacts to historical resources or unique archaeological resources, the project applicant shall determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is unnecessary or infeasible, other appropriate measures (e.g., data recovery) shall be instituted. Work may proceed on other parts of the project site while measures for historical resources or unique archaeological resources are carried out.

c. Should an archaeological artifact or feature be discovered on-site during project construction, all activities within a 50-foot radius of the find would be halted until the findings can be fully investigated by a qualified archaeologist to evaluate the find and assess the significance of the find according to the CEQA definition of a historical or unique archaeological resource. If the deposit is determined to be significant, the project applicant and the qualified archaeologist shall meet to determine the appropriate avoidance measures or other appropriate measure, subject to approval by the City of Oakland, which shall assure implementation of appropriate measures recommended by the archaeologist. Should archaeologically-significant materials be recovered, the qualified archaeologist shall recommend appropriate analysis and treatment, and shall prepare a report on the findings for submittal to the Northwest Information Center.

SCA E: Archaeological Resources – Sensitive Areas (*Prior to issuance of a demolition, grading, or building permit*). The project applicant shall implement either Provision A (Intensive Pre-Construction Study) or Provision D (Construction ALERT Sheet). However, if in either case a high potential presence of historic-period archaeological resources on the project site is indicated, or a potential resource is discovered, the project applicant shall also implement all of the following provisions:

a. Provision B (Construction-Period Monitoring),

b. Provision C (Avoidance and/or Find Recovery), and

c. Provision D (to establish a Construction ALERT Sheet if the Intensive Pre-Construction Study was originally implemented per Provision A, or to update and provide more specificity to the initial Construction ALERT Sheet if a Construction Alert Sheet was originally implemented per Provision D).

Provisions A through Provisions D are detailed as follows:

d. Provision A: Intensive Pre-Construction Study - The project applicant, upon approval from the City Planning and Zoning Division, may choose to complete a site-specific, intensive archaeological resources study prior to soil-disturbing activities occurring on the project site. The purpose of the site-specific, intensive archaeological resources study is to identify early the potential presence of history-period archaeological resources on the project site. If that approach is selected, the study shall be conducted by a qualified archaeologist approved by the City Planning and Zoning Division. If prepared, at a minimum, the study shall include:

    i. An intensive cultural resources study of the project site, including subsurface presence/absence studies, of the project site. Field studies conducted by the approved archaeologist(s) may include, but are not limited to, auguring and other common methods used to identify the presence of archaeological resources;

    ii. A report disseminating the results of this research;

    iii. Recommendations for any additional measures that could be necessary to mitigate any adverse impacts to recorded and/or inadvertently discovered cultural resources.

    iv. If the results of the study indicate a high potential presence of historic-period archaeological resources on the project site, or a potential resource is discovered, the project applicant shall hire a qualified archaeologist to monitor any ground disturbing activities on the project site during construction (see Provision B, Construction-Period Monitoring, below), implement avoidance and/or find recovery measures (see Provision C, Avoidance and/or Find Recovery, below), and prepare an ALERT Sheet that details what could potentially be found at the project site (see Provision D, Construction ALERT Sheet, below).

e. Provision B: Construction-Period Monitoring - Archaeological monitoring would include briefing construction personnel about the type of artifacts that may be present (as referenced in the ALERT Sheet, require per Provision D, Construction ALERT Sheet, below) and the procedures to follow if any are encountered, field recording and sampling in accordance with the Secretary of Interior's Standards and Guidelines for Archaeological Documentation, notifying the appropriate officials if human remains or cultural resources are discovered, or preparing a report to document negative findings after construction is completed. If a significant archaeological resource is discovered during the monitoring activities, adherence to Provision C, Avoidance and/or Find Recovery, discussed below), would be required to reduce the impact to less than significant. The project applicant shall hire a qualified archaeologist to monitor all ground-disturbing activities on the project site throughout construction.

f. Provision C: Avoidance and/or Find Recovery - If a significant archaeological resource is present that could be adversely impacted by the proposed project, the project applicant of the specific project site shall either:

   i. Stop work and redesign the proposed project to avoid any adverse impacts on significant archaeological resource(s); or,

   ii. If avoidance is determined infeasible by the City, design and implement an Archaeological Research Design and Treatment Plan (ARDTP). The project applicant shall hire a qualified archaeologist who shall prepare a draft ARDTP that shall be submitted to the City Planning and Zoning Division for review and approval. The ARDTP is required to identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain. The ARDTP shall identify the scientific/historic research questions applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. The ARDTP shall include the analysis and specify the curation and storage methods. Data recovery, in general, shall be limited to the portions of the archaeological resource that could be impacted by the proposed project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practical. The project applicant shall implement the ARDTP. Because the intent of the ARDTP is to save as much of the archaeological resource as possible, including moving the resource, if feasible, preparation and implementation of the ARDTP would reduce the potential adverse impact to less than significant.

g. Provision D: Construction ALERT Sheet - The project applicant, upon approval from the City Planning and Zoning Division, may choose to prepare a construction ALERT sheet prior to soil-disturbing activities occurring on the project site, instead of conducting site-specific, intensive archaeological resources pursuant to Provision A, above. The project applicant shall submit for review and approval by the City prior to subsurface construction activity an "ALERT" sheet prepared by a qualified archaeologist with visuals that depict each type of artifact that could be encountered on the project site. Training by the qualified archaeologist shall be provided to the project's prime contractor; any project subcontractor firms (including demolition, excavation, grading, foundation, and pile driving); and/or utilities firm involved in soil-disturbing activities within the project site.

   i. The ALERT sheet shall state, in addition to the basic archaeological resource protection measures contained in other standard conditions of approval, that in the event of discovery of the following cultural materials, all work must be stopped in the area and the City's Environmental Review Officer contacted to evaluate the find: concentrations of shellfish remains; evidence of fire (ashes, charcoal, burnt earth, fire-cracked rocks); concentrations of bones; recognizable Native American artifacts (arrowheads, shell beads, stone mortars [bowls], humanly shaped rock); building foundation remains; trash pits, privies (outhouse holes); floor remains; wells; concentrations of bottles, broken dishes, shoes, buttons, cut animal bones, hardware, household items, barrels, etc.; thick layers of burned building debris (charcoal, nails, fused glass, burned plaster, burned dishes); wood structural remains (building, ship, wharf); clay roof/floor tiles; stone walls or footings; or gravestones.

   ii. Prior to any soil-disturbing activities, each contractor shall be responsible for ensuring that the ALERT sheet is circulated to all field personnel, including machine operators, field crew, pile drivers, and supervisory personnel.

iii. If the project applicant chooses to implement Provision D, Construction ALERT Sheet, and a potential resource is discovered on the project site during ground disturbing activities during construction, the project applicant shall hire a qualified archaeologist to monitor any ground disturbing activities on the project site during construction (see Provision B, Construction-Period Monitoring, above), implement avoidance and/or find recovery measures (see Provision C, Avoidance and/or Find Recovery, above), and prepare an updated ALERT Sheet that addresses the potential resource(s) and other possible resources based on the discovered find found on the project site.

SCA 53: Human Remains. *Ongoing throughout demolition, grading, and/or construction.* In the event that human skeletal remains are uncovered at the project site during construction or ground-breaking activities, all work shall immediately halt and the Alameda County Coroner shall be contacted to evaluate the remains, and following the procedures and protocols pursuant to Section 15064.5 (e)(1) of the CEQA Guidelines. If the County Coroner determines that the remains are Native American, the City shall contact the California Native American Heritage Commission (NAHC), pursuant to subdivision (c) of Section 7050.5 of the Health and Safety Code, and all excavation and site preparation activities shall cease within a 50-foot radius of the find until appropriate arrangements are made. If the agencies determine that avoidance is not feasible, then an alternative plan shall be prepared with specific steps and timeframe required to resume construction activities. Monitoring, data recovery, determination of significance and avoidance measures (if applicable) shall be completed expeditiously.

SCA 54: Paleontological Resources. *Ongoing throughout demolition, grading, and/or construction.* In the event of an unanticipated discovery of a paleontological resource during construction, excavations within 50 feet of the find shall be temporarily halted or diverted until the discovery is examined by a qualified paleontologist (per Society of Vertebrate Paleontology standards (SVP 1995,1996)). The qualified paleontologist shall document the discovery as needed, evaluate the potential resource, and assess the significance of the find. The paleontologist shall notify the appropriate agencies to determine procedures that would be followed before construction is allowed to resume at the location of the find. If the City determines that avoidance is not feasible, the paleontologist shall prepare an excavation plan for mitigating the effect of the project on the qualities that make the resource important, and such plan shall be implemented. The plan shall be submitted to the City for review and approval.

SCA 56: Compliance with Policy 3.7 of the Historic Preservation Element (Property Relocation Rather than Demolition). *Prior to issuance of a demolition permit.*

The project applicant shall make a good faith effort to relocate the building to a site acceptable to the Planning and Zoning Division and the Oakland Cultural Heritage Survey. Good faith efforts include, at a minimum, the following:

a. Advertising the availability of the building by: (1) posting of large visible signs (such as banners, at a minimum of 3’x 6’ size or larger) at the site; (2) placement of advertisements in Bay Area news media acceptable to the City ;and (3) contacting neighborhood associations and for-profit and not-for-profit housing and preservation organizations;

b. Maintaining a log of all the good faith efforts and submitting that along with photos of the subject building showing the large signs (banners) to the Planning and Zoning Division;

c. Maintaining the signs and advertising in place for a minimum of 90 days; and

d. Making the building available at no or nominal cost (the amount to be reviewed by the Oakland Cultural Heritage Survey) until removal is necessary for construction of a replacement project, but in no case for less than a period of 90 days after such advertisement.

SCA 57: Vibrations Adjacent Historic Structures. *Prior to issuance of a demolition, grading or building permit.* The project applicant shall retain a structural engineer or other appropriate professional to determine threshold levels of vibration and cracking that could damage the adjacent historic structures at the California College of the Arts and design means and methods of construction that shall be utilized to not exceed the thresholds.

Impacts and Mitigation Measures

Significance Criteria

According to the City's Thresholds of Significance, the Specific Plan would have a significant impact related to cultural and historic resources if it would:

1. Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines §15064.5. Specifically a "substantial adverse change" includes physical demolition, destruction, relocation, or alteration of a resource or its immediate surroundings such that the significance of the historical resource would be "materially impaired." The significance of an historical resource is "materially impaired" when a project demolishes or materially alters, in an adverse manner, those physical characteristics of the resource that convey its historical significance and that justify its inclusion on, or eligibility for inclusion on an historical resource list (including the California Register of Historical Resources, the National Register of Historical Resources, Local Register, or historical resources survey form (DPR Form 523) with a rating of 1-5;
2. Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines §15064.5;
3. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
4. Disturb any human remains, including those interred outside of formal cemeteries.

For purposes of this section, a historical resource is one that meets the City's definitions listed above. The fact that a resource is not listed in or formally determined to be eligible for listing in the National Register, California Register, or a local register of historical resources, or not deemed significant pursuant to criteria set forth in subdivision (g) of Section 5024.1 of the Public Resources Code (PRC), shall not preclude the City from determining that the resource may be a historical resource for purposes of this EIR.

Historic Resources

Impact CR-1: There are about a dozen Local Register properties within the Opportunity Areas. The Specific Plan does not propose demolition of any of these properties to allow for new development, and requires that any changes to these properties adhere to the Secretary of the Interior's Standards for the Treatment of Historic Properties. With compliance with existing SCAs and regulations protecting historical resources, implementation of the Specific Plan would not cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5, and the impacts of the Specific Plan on historic resources would be less than significant. **(LTS with SCAs)**

The great majority of the Local Register properties within the Planning Area are located outside the Opportunity Areas, in the residential neighborhoods of West Oakland. No changes that could affect Local Register properties are being proposed by the Specific Plan outside the Opportunity Areas.

The Local Register properties in the Mandela/West Grand, 7th Street and 3rd Street Opportunity Areas are shown in **Table 4.3-2** and described below. The Southern Pacific Railroad Industrial API is entirely located within the 3rd Street Opportunity Area, and the San Pablo Avenue Opportunity Area contains no Local Register properties.

By the 2035 anticipated build-out of the Specific Plan, new information or new contexts may be discovered, altered properties may have been restored, or properties that may not have been 50 years old at the time they were last surveyed may become potentially eligible for listing in the California Register or the Local Register, and therefore could at that time be considered historical resources under CEQA. If it is later determined that demolition or substantial alteration of historically-significant resources would occur for development in the Planning Area, the impact of such development would need to be considered under a subsequent CEQA analysis.

Mandela/West Grand Opportunity Area

1600-14 Campbell Street, Oakland Warehouse Company – GE Mazda Lamp Works

Work is in progress (spring 2013) on reuse of the existing vacant buildings for medium density residential uses as a federal preservation tax credit project that adheres to the Secretary's Standards. The Plan anticipates compatible lower-density residential infill development on the remainder of the property, in a manner that would not cause a substantial adverse change in the significance of this historical resource.

1340 Mandela Parkway, Coca-Cola Company Bottling Plant

The former Coca-Cola Company Bottling Plant property (now partially occupied by Mayway Corporation) is among the sites proposed to be rezoned to allow mixed housing and business use. The Plan proposes retaining and reusing the 1940s building on the northern portion of the site, which is the most significant section of the historic resource, in a manner that adheres to the Secretary's Standards (see **Figure 4.3-2**). The remainder of the property might be redeveloped for new Low Intensity Business Mix/Light Industrial uses in the middle portion, and new medium-density residential uses on the southern portion of the property. New development would be required to maintain the integrity and continued eligibility of the 1940s plant. Therefore, the Plan would not cause a substantial adverse change in the significance of this historical resource.

2401-49 Peralta Street, Merco-Nordstrom Valve Company Factory

The Specific Plan does not propose redevelopment of this site with new buildings, but instead requires the existing building be retained and reused for compatible light industrial or business mix uses, in a manner that adheres to the Secretary's Standards (see **Figure 4.3-3**). The Plan would not cause a substantial adverse change in the significance of this historical resource.

1600-14 Campbell Street, Oakland Warehouse Company – GE Mazda Lamp Works

Proposed adaptive reuse for housing

1340 Mandela Parkway, Coca-Cola Company Bottling Plant

Proposed redevelopment of southerly portion of the site for housing, and preservation of the historic northerly portion of the site

Source: JRDV Intl.

Figure 4.3-2
Disposition of Historic Resources, Mandela/Grand Opportunity Area

I 2401-49 Peralta Street, Merco Nordstrom Valve Company Factory

Building to be retained and reused for compatible light industrial or business mix uses

1405 Wood Street, Southern Pacific 16th Street Station

Rehabilitation of the historic train station

Source: JRDV Intl.

Figure 4.3-3
Disposition of Historic Resources, Mandela/Grand Opportunity Area, 3 and 4 of 4

1601 Wood Street/1798 16th Street, Southern Pacific 16th Street Station

The Specific Plan does not propose any new development or make development recommendations that would directly affect the Southern Pacific 16th Street Station (see also Figure 4.3-3). Instead, the Plan recognizes the ongoing implementation of the previously approved and partially constructed Wood Street Project, which includes the rehabilitation of the historic train station.

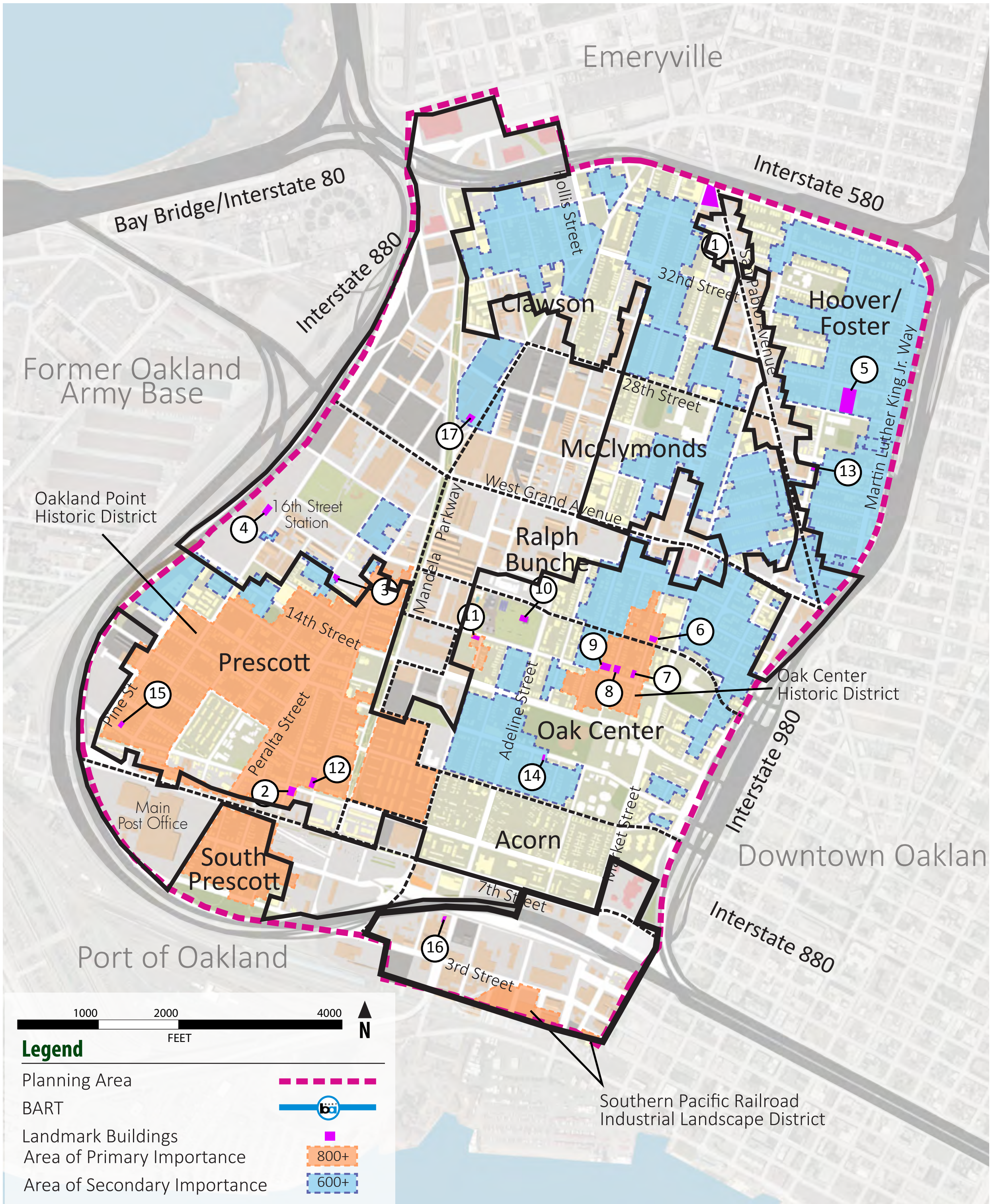
The conditions of approval of the Wood Street Project require the preparation of a Reuse Plan and contain specific requirements related to the five elements of the station area: main hall, baggage wing, elevated track structure, signal tower and plaza. The Reuse Plan completed in 2006 addresses the need for a viable, financially self-sustaining use for this severely deteriorated and architecturally specialized civic structure that will be set within the new Wood Street Project residential community. The Reuse Plan identifies four design options; the option pursued will depend on the specific requirements of future reuse proposals and the capacity of the proposing party. All four options assume rehabilitation of the main hall and baggage claim building; stabilization and exterior renovation of the signal tower; and development of the three-quarter acre parcel to the east of the train station as publicly accessible open space, with flexibility to serve as an outdoor extension of the main hall, event parking, and a public plaza. The four options differ with respect to retention or alteration of the elevated track structure: removal of the majority of the track structure, retention of the full track structure, enclosure of the full track structure, or a new building in place of the track structure.

The proposed rehabilitation of the historic train station underwent prior environmental review under CEQA as part of the Wood Street Project.[10] The Specific Plan would not change the conditions of approval of the Wood Street Project or the Reuse Plan completed in 2006. Therefore, the Specific Plan would not cause a substantial adverse change in the significance of this historical resource.

Oakland Point API

Where the Mandela/West Grand Opportunity Area abuts the Oakland Point API, infill residential development at compatible scales and continued use of existing industrial/commercial buildings is proposed. The southwest corner of Mandela Parkway and 18th Street, at the northeast tip of the district, is the only portion of Mandela/West Grand Opportunity Area that actually overlaps with the Oakland Point API (see **Figure 4.3-4**). New development of Low Intensity Business Mix/Light Industrial uses is proposed on a T-shaped parcel with industrial uses on 18th Street (not in the district) that extends south to 17th Street in the middle of a residential block of the Oakland Point District. With consideration of local context as part of Design Review, proposed new development in and adjacent to the Oakland Point API should not cause substantial adverse effect on the API or individual historical resources within the API.

[10] City of Oakland, *Wood Street Project Final Environmental Impact Report*, February 2005.



Source: City of Oakland, Strategic Planning
July 2011

Figure 4.3-4
Comparison of Areas of Historic Importance and West Oakland Opportunity Areas

7th Street Opportunity Area

7th Street S-7 District: 1600-16 7th Street, Flynn (Edward) Saloon – McAllister Plumbing; 1620-24 7th Street, Site of the Former Lincoln Theater; 1632-42 7th Street, Arcadia Hotel – Isaacs & Schwartz Block

The 7th Street Opportunity Area contains the S-7 Preservation Combining Zone, three properties on the 1600 block of 7th Street, which comprise the strongest remaining fragment of the historic 7th Street commercial area. The Specific Plan proposes continued use of the two remaining historic structures at each end of this block (Flynn (Edward) Saloon – McAllister Plumbing and Arcadia Hotel – Isaacs & Schwartz Block. The Plan requires that any changes to these buildings follow the Secretary Standards. The Specific Plan proposes medium-density infill residential development on the mid-block site of the former Lincoln Theater (see **Figure 4.3-5**). Development on this site would be subject to Design Review and referral to the Landmarks Board, per the S-7 Preservation Combining Zone regulations. Therefore, the Plan would not cause a substantial adverse change in the significance of these historical resources.

When the small S-7 district was designated, Landmarks Board and Planning Commission directed the applicants to pursue an expanded district designation to include other 7th Street resources. Any and all surviving early commercial buildings along 7th Street west of Mandela Parkway should be considered potential parts of this district. The district is recorded in the State Historic Resources Inventory as an ASI.

One 7th Street commercial building, the Brotherhood of Sleeping Car Porters headquarters at 1716 7th Street, built in 1889-90 and occupied by C.L. Dellums' union from about 1934 to 1978, has been formally nominated and determined eligible for City Landmark status.

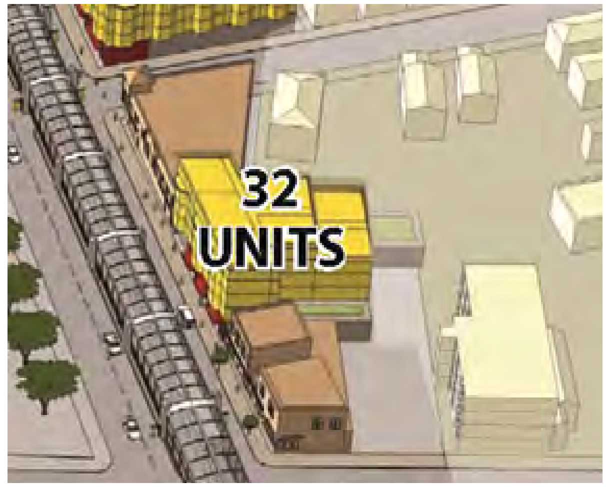
Oakland Point API

The Oakland Point API's setting contributes to its significance at its south end, where it adjoins the fragments of the 7th Street commercial district. Elsewhere the surroundings are not contributing, since the boundaries are drawn where the 19th century residential character of the district ends. Proposed new mixed-use buildings along the north side of 7th Street would generally be three and four stories of housing over ground floor retail or parking, similar in scale to the existing Mandela Gateway project. Proposed new three-story flats along Pine Street would be similar in scale to existing housing on that street. At the height and massing proposed, and with consideration of local context as part of Design Review of subsequent individual development projects, proposed new development adjacent to the Oakland Point API would not cause a substantial adverse change in the significance of the this API or of individual historical resources within the API.

3rd Street Opportunity Area

Southern Pacific Railroad Industrial API

The 3rd Street Opportunity Area contains the entire Southern Pacific Industrial Landscape API. In the 3rd Street Opportunity Area, the Specific Plan proposes reuse of existing facilities and new Low Intensity Business Mix/Light Industrial development within and adjacent to the Southern Pacific Railroad Industrial API, and Higher Intensity Anchor Campus development adjacent to the API (see **Figure 4.3-5**). At the height and massing proposed, and with consideration of local context as part of Design Review of subsequent individual development projects, new development and reuse of existing buildings on other properties within and adjacent to the Southern Pacific Railroad Industrial API would not cause a substantial adverse change in the significance of this API.



Three adjoining Local Register properties on the 1600 block of 7th Street, which comprise the remaining historic 7th Street commercial area

Continued use of the two remaining historic structures at each end of this block and medium-density infill residential development on the mid-block site of the former Lincoln Theater.

100-50 Linden Street (California Packing Corporation – Del Monte Cannery), 101 Myrtle Street (California Packing Corporation – Label Plant), and 101 Linden Street (Standard Underground Cable Co.)

Reuse of the existing buildings and new construction would adhere to the Secretary of the Interior Standards

Source: JRDV Intl.

Figure 4.3-5
Plans for Historic Buildings, 7th Street and 3rd Street Opportunity Areas

100-50 Linden Street, California Packing Corporation-Del Monte Cannery; 101 Myrtle Street, California Packing Corporation Label Plant; 101 Linden Street, Standard Underground Cable Co.

The Southern Pacific Industrial Landscape API includes a cluster of three industrial structures occupying the blocks between the ends of Filbert Street and Chestnut Street: the California Packing Corporation-Del Monte Cannery and the California Packing Corporation Label Plant, and 101 Linden Street, the Standard Underground Cable building currently occupied by Linden Street Brewery. The Specific Plan proposes that these structures be retained and continue to be used for offices and small manufacturing (e.g., the Linden Street Brewery), and also encourages new compatible commercial uses that would enliven the area day and night. The Plan also proposes new Low Intensity Business Mix/Light Industrial development on the northern portion of the California Packing Corporation Label Plant site (now parking). Reuse of the existing buildings and new construction would adhere to the Secretary's Standards. The Plan would not cause a substantial adverse change in the significance of these historical resources.

San Pablo Avenue Opportunity Area

California Hotel

The California Hotel, which is listed on the National Register, immediately adjoins the Opportunity Area at 3501 San Pablo Avenue. The Specific Plan proposes medium density residential development on the adjacent vacant site at the northwest corner of San Pablo Avenue and 34th Street. At the height and massing proposed, and with consideration of local context as part of Design Review of subsequent individual development projects, proposed new development adjacent to the California Hotel would not cause a substantial adverse change in the significance of this historical resource.

Effects on Historic Resources Not Considered Significant Under CEQA

The Specific Plan's Opportunity Areas also contain a number of ASIs, and many PDHPs with existing ratings lower than "A" or "B". These properties were found by the OCHS surveys not to appear obviously eligible for the National Register, are not Local Register properties, and therefore their demolition or alteration might not be considered a significant impact under CEQA. Nevertheless, the policies of the Specific Plan, and existing City policies and regulations listed in the Regulatory Setting section above, would continue to encourage the retention and reuse of these properties in a manner that retains their historic character.

The Specific Plan proposes transit-oriented development (TOD) of up to approximately 2,500 new units of higher-density housing on vacant sites and parking lots around the West Oakland BART Station, next to the South Prescott ASI. The OCHS identified a South Prescott API of 111 properties, surrounded by another 38 properties making a larger, less intact ASI In 1990 SHPO and the Federal Highway Administration found South Prescott ineligible for the National Register, in the environmental review for the I-880 freeway replacement that now skirts the South Prescott district. Nevertheless, the historic and architectural character of South Prescott is an important community asset. There are four individual Local Register properties in South Prescott (all with "B" ratings, two on Preservation Study List), and the district is an obvious candidate for S-20 district designation.

The Specific Plan proposes that the height and massing of new buildings provide a transition to the South Prescott neighborhood, with building heights of two to three stories on Chester Street stepping up to four stories over a parking podium on 5th Street, and taller buildings further east. The former AMCO Chemical site and the parking lot, large vacant lot, and small vacant lot occupying the block at 1400 3rd Street currently serve as an open space/bio-remediation buffer due to ongoing remediation activities at these sites. New development in the northeast corner of the AMCO block would step up from two stories closer to existing homes to four stories further away. At the height and massing proposed, and with consideration of local context as part of Design Review of subsequent individual development projects, proposed new development at the eastern edge of the South Prescott ASI would not be expected to result in a significant adverse change in the character of this district or its individual resources or on its potential eligibility for the National Register, or S-20 status, should it be reevaluated or designated in the future.

Standard Conditions of Approval

SCA 57, *Vibrations Adjacent to Historic Structures,* would reduce potential construction period vibration impacts on historic resources to a less-than-significant level. Implementation of the City's Standard Condition of Approval SCA 56, *Compliance with Policy 3.7 of the Historic Preservation Element (Property Relocation Rather than Demolition)* would not be expected to apply, as no historic resources are proposed for demolition under the Specific Plan.

Mitigation Measures

None needed

Archaeological Resources, Paleontological Resources and Human Remains

Impact CR-2: Development in accordance with the Specific Plan could cause a substantial adverse change in the significance of an archaeological resource or destroy a unique paleontological resource or site or unique geologic feature. However, with required implementation of the City's Standard Conditions of Approval, impacts on archaeological resources, paleontological resources and human remains would be less than significant. **(LTS with SCA)**

The Planning Area is located at the margins of the historic San Francisco Bay shoreline and near the locations of former intermittent and perennial watercourses, where there is a moderate to high potential for the presence of unrecorded Native American resources, especially buried resources. Based on review of historical literature and maps, and the results of previous archaeological investigations, there is also a moderate to high potential for the presence of unrecorded historic-period archaeological resources within the Planning Area. Development in accordance with the Specific Plan could disrupt, alter or eliminate recorded or unrecorded prehistoric or historic-period archaeological resources, potentially including Native American remains, or paleontological resources.

Standard Conditions of Approval

Given the high potential for the presence of unrecorded Native American resources and moderate to high potential for the presence of unrecorded historic-period archaeological resources, new development that involves excavation within the Planning Area would be subject to SCA E, *Archaeological Resources – Sensitive Sites*. This Standard Condition of Approval requires additional intensive pre-construction surveys or a construction ALERT sheet and training of construction contractors, construction period monitoring, and avoidance and recovery measures.

In the event of an unanticipated discovery of prehistoric or historic-period archaeological resources or unique paleontological resources during development within the Planning Area, SCA 52, *Archaeological Resources,* SCA 53, *Human Remains*, and SCA 54, *Paleontological Resources* require that excavations within 50 feet of the find be temporarily halted or diverted until the discovery is examined by a qualified archaeologist or paleontologist, documented and evaluated for significance, and procedures established to consider avoidance of the resource or preparation of an excavation plan if avoidance is unfeasible.

With required implementation of SCA E, *Archaeological Resources – Sensitive Sites*, SCA 52, *Archaeological Resources,* SCA 53, *Human Remains*, and SCA 54, *Paleontological Resources*, impacts on archaeological resources, paleontological resources and human remains would be less than significant.

Mitigation Measures

None needed

Cumulative Cultural and Historic Resources Impacts

Cumulative Impact CR-3: Cumulative development could cause a substantial adverse change in a historic resource or archaeological resource, or destroy a unique paleontological resource or site or unique geologic feature, which would be a significant cumulative impact. The Specific Plan would avoid significant impacts on the Local Register properties within the Opportunity Areas by requiring that any changes to Local Register properties adhere to the Secretary of the Interior's Standards for the Treatment of Historic Properties. SCA 57, *Vibrations Adjacent to Historic Structures,* would reduce potential construction period vibration impacts on historic resources to a less-than-significant level. With required implementation of SCA E, *Archaeological Resources – Sensitive Sites*, SCA 52, *Archaeological Resources,* SCA 53, *Human Remains*, and SCA 54, *Paleontological Resources*, the impacts of the Specific Plan on archaeological resources, paleontological resources and human remains would be less than significant. Because the impacts of the Specific Plan would be less than significant, the Specific Plan contribution to significant cumulative impacts on cultural resources would also be less than significant. **(LTS with SCA)**

The great majority of Local Register properties within the Planning Area are located outside the Opportunity Areas, where no changes are proposed. The Specific Plan would avoid significant impacts on Local Register properties within the Opportunity Areas because the Plan does not propose demolition of any historic resources, and requires that any changes or modifications to Local Register properties adhere to the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Because new information or new contexts may be discovered, altered properties may have been restored, or properties that may not have been 50 years old at the time they were last surveyed may become potentially eligible for listing in the California Register or the Local Register by the time buildout of the Plan is completed, there could be additional historical resources not considered at the time of preparation of this EIR. If it is later determined that demolition or substantial alteration of historically-significant resources would occur for development in the Planning Area, the impact of such development would need to be considered under a subsequent CEQA analysis.

Standard Conditions of Approval

With required implementation of SCA E, *Archaeological Resources – Sensitive Sites*, SCA 52, *Archaeological Resources,* SCA 53, *Human Remains* and SCA 54, *Paleontological Resources*, the impacts of the Specific Plan, and thus the Specific Plan contribution to significant cumulative impacts on archaeological resources, paleontological resources and human remains, would be less than significant.

SCA 57, *Vibrations Adjacent to Historic Structures,* would reduce potential construction period vibration impacts on historic resources to a less-than-significant level. Implementation of SCA 56, *Property Relocation Rather than Demolition*, would reduce impacts on historic resources.

Because the impacts of the Specific Plan would be less than significant, the Specific Plan contribution to significant cumulative impacts on cultural resources would also be less than significant.

Mitigation Measures

None needed

4.4

Greenhouse Gas Emissions

There has been significant recent advancement in scientific understanding of the relationship between certain air pollutant emissions and trend-line changes in climatic conditions that have national and even global ramifications. New information about greenhouse gas (GHG) emissions and their potential effects on global climate change, as well as new public environmental policy, have emerged and become more formalized. Recognizing that climate change is an environmental issue now warranting review under CEQA, this EIR provides a thorough assessment of the Specific Plan's contribution to GHG emissions and its effects on climate change.

This section provides an overview of climate change and greenhouse gases, a summary of existing greenhouse gas emissions in Oakland and the region, the regulatory framework, and an analysis of impacts on climate change and greenhouse gases that would result from implementation of the proposed plan.

Physical Setting

There is a general scientific consensus that global climate change is occurring, caused in whole or in part by increased GHG emissions that keep the Earth's surface warm by trapping heat in the Earth's atmosphere,[1] in much the same way as glass traps heat in a greenhouse. While many studies show evidence of warming over the last century and predict future global warming, the precise causes of such warming and its potential effects are far less certain.[2] While the greenhouse effect is responsible for maintaining a habitable climate on Earth, human activity has caused increased concentrations of these gases in the atmosphere, contributing to an increase in global temperatures and alteration of climatic conditions.

The U.S. Environmental Protection Agency (U.S. EPA) has recently concluded that scientists know with virtual certainty that:

- Human activities are changing the composition of Earth's atmosphere. Increasing levels of greenhouse gases like carbon dioxide (CO_2) in the atmosphere since pre-industrial times are well-documented and understood.
- The atmospheric buildup of CO_2 and other greenhouse gases is largely the result of human activities such as the burning of fossil fuels.

---

1 U.S. Environmental Protection Agency, Global Warming – Climate: Uncertainties (web page), January 2000, http://yosemite.epa.gov/oar/globalwarming.nsf/content/ClimateUncertainties.html#likely, accessed July 24, 2007.

2 "Global climate change" is a broad term used to describe any worldwide, long-term change in the earth's climate. "Global warming" is more specific and refers to a general increase in temperatures across the earth, although it can cause other climatic changes, such as a shift in the frequency and intensity of weather events and even cooler temperatures in certain areas, even though the world, on average, is warmer.

- A warming trend of approximately 0.7° to 1.5° F occurred during the 20th century. Warming occurred in both the northern and southern hemispheres, and over the oceans.
- The major greenhouse gases emitted by human activities remain in the atmosphere for periods ranging from decades to centuries. It is therefore virtually certain that atmospheric concentrations of greenhouse gases will continue to rise over the next few decades. Increasing greenhouse gas concentrations tend to warm the planet."[3]

At the same time, there is much uncertainty concerning the magnitude and rate of the warming. Specifically, the U.S. EPA notes that "important scientific questions remain about how much warming will occur; how fast it will occur; and how the warming will affect the rest of the climate system, including precipitation patterns and storms. Answering these questions will require advances in scientific knowledge in a number of areas:

- Improving understanding of natural climatic variations, changes in the sun's energy, land-use changes, the warming or cooling effects of pollutant aerosols, and the impacts of changing humidity and cloud cover.
- Determining the relative contribution to climate change of human activities and natural causes.
- Projecting future greenhouse emissions and how the climate system will respond within a narrow range.
- Improving understanding of the potential for rapid or abrupt climate change."[4]

Greenhouse Gases

Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are the principal GHGs, and when concentrations of these gases exceed the natural concentrations in the atmosphere, the greenhouse effect may be enhanced. CO_2, CH_4, and N_2O occur naturally, but are also generated through human activity. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. Other human-generated GHGs, which have much higher heat-absorption potential than CO_2, include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6), which are byproducts of certain industrial processes.[5]

Potential Effects of Human Activity on GHG Emissions

Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO_2 emissions (and thus substantial increases in atmospheric concentrations). In 1994, atmospheric CO_2 concentrations were found to have increased by nearly 30 percent above pre-industrial (circa 1860) concentrations.

The effect each GHG has on climate change is measured as a combination of the volume of its emissions, and its global warming potential (GWP),[6] and is expressed as a function of how much warming would be

---

3 U.S. EPA, 2000, op. cit.

4 Ibid.

5 CalEPA, 2006b. *Final 2006 Climate Action Team Report to the Governor and Legislature.* Sacramento, CA. April 3.

6 The potential of a gas or aerosol to trap heat in the atmosphere

caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO_2 equivalents (CO_2e).

Global Emissions

Worldwide emissions of GHGs in 2004 were 30 billion tons of CO_2e per year[7] (including both ongoing emissions from industrial and agricultural sources, but excluding emissions from land-use changes).

U.S. Emissions

In 2004, the United States emitted about 8 billion tons of CO_2e or about 25 tons/year/person. Of the four major sectors nationwide - residential, commercial, industrial and transportation - transportation accounts for the highest fraction of GHG emissions (approximately 35 to 40 percent); these emissions are entirely generated from direct fossil fuel combustion.[8]

State of California Emissions

In 2004, California emitted approximately 550 million tons of CO_2e, or about 6 percent of the U.S. emissions. This large number is due primarily to the sheer size of California compared to other states. By contrast, California has one of the fourth lowest per capita GHG emission rates in the country, due to the success of its energy-efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise.[9] Another factor that has reduced California's fuel use and GHG emissions is its mild climate compared to that of many other states.

The California EPA Climate Action Team stated in its March 2006 report that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO_2 equivalence) were as follows:

- Carbon dioxide (CO_2) accounted for 83.3 percent;
- Methane (CH_4) accounted for 6.4 percent;
- Nitrous oxide (N_2O) accounted for 6.8 percent; and
- Fluorinated gases (HFCs, PFC, and SF_6) accounted for 3.5 percent.[10]

The California Energy Commission found that transportation is the source of approximately 41 percent of the State's GHG emissions, followed by electricity generation (both in-state and out-of-state) at 23 percent, and industrial sources at 20 percent. Agriculture and forestry is the source of approximately 8.3 percent, as is the source categorized as "other," which includes residential and commercial activities.[11]

---

7 United Nations Framework Convention on Climate Change (UNFCCC), *Sum of Annex I and Non-Annex I Countries Without Counting Land-Use, Land-Use Change and Forestry (LULUCF). Predefined Queries: GHG total without LULUCF* (Annex I Parties). Bonn, Germany, http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php, accessed May 2, 2007.

8 U.S. EPA, 2000, op. cit.

9 California Energy Commission (CEC), Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 - Final Staff Report, publication # CEC-600-2006-013-SF, Sacramento, CA, December 22, 2006; and January 23, 2007 update to that report.

10 Cal EPA, 2006b, op. cit.

11 California Energy Commission (CEC), 2007, op. cit.

Bay Area Emissions

BAAQMD most recently updated the GHG emissions inventory in 2010 using a base year of 2007.[12] In the Bay Area, fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of the Bay Area's GHG emissions, accounting for 36.41 percent of the Bay Area's 95.8 million tons of GHG emissions in 2007. Industrial and commercial sources were the second largest contributors of GHG emissions with about 36.40 percent of total emissions. Domestic sources (e.g., home water heaters, furnaces, etc.) account for about 7 percent of the Bay Area's GHG emissions, and energy production accounted for 15.9 percent. Off-road equipment and agriculture make us the remainder with approximately 3 percent and 1.2 percent of the total Bay Area 2007 GHG emissions, respectively.

Oakland Emissions

In June 2006 the City of Oakland, along with 10 other local governments in Alameda County, committed to becoming a member of Local Governments for Sustainability (ICLEI) and participating in the Alameda County Climate Protection Project. In December 2006, the City of Oakland completed their Baseline Greenhouse Gas Emissions Inventory Report to determine the community-wide levels of GHG emissions that the City of Oakland emitted in its base year, 2005.

Subsequently, the City of Oakland has completed a Draft Energy and Climate Action Plan, which includes an updated analysis of community-wide emissions in the Appendix. As shown in **Table 4.4-1**, Oakland emitted approximately 3 million metric tons of CO2e in 2005 from all focus area sources and highway transportation sources. Of these emissions, more than half were from transportation (59 percent). 37 percent of emissions were from building energy use, and the remaining 4 percent was from landfilled solid waste.

[12] BAAQMD. *Source Inventory of Bay Area Greenhouse Gas Emissions.* February 2010.

Table 4.4-1
Oakland Estimated Community-wide GHG Emissions, 2005

GHG Emission Source	Metric Tons of Carbon Dioxide Equivalent (CO_2e)	Percent of Total
Non-Highway Transportation	759,883	22%
Highway Transportation	1,006,911	29%
Mobile Sources (Port of Oakland)	211,910	6%
Commercial/Industrial Electricity	320,212	9%
Commercial/Industrial Natural Gas	285,365	8%
Residential Electricity	150,105	4%
Residential Natural Gas	346,339	10%
Other Stationary Sources	226,900	7%
Landfill Methane from Solid Waste	126,361	4%
Total	3,433,986	100%

Source: City of Oakland, Garrett Fitzgerald, Sustainability Coordinator.

Note: Individual percentages do not sum to total due to rounding.

Construction and Development Emissions

The construction and operation of developments, such as the proposed Project, cause GHG emissions. Operational phase GHG emissions result from energy use associated with heating, lighting and powering buildings (typically through natural gas and electricity consumption in Oakland), pumping and processing water, as well as fuel used for transportation and decomposition of waste associated with building occupants. New development can also create GHG emissions in its construction and demolition phases including the use of fuels in construction equipment, creation and decomposition of building materials, vegetation clearing, natural gas usage, electrical usage (since electricity generation by conventional means is a major contributor to GHG emissions, discussed below), and transportation.

However, it is important to acknowledge that new development does not necessarily create entirely new GHG emissions, since most of the persons who will visit or occupy new development will come from other locations where they were already causing such GHG emissions. Further, as discussed above, it has not been demonstrated that new GHG emissions caused by a local development project can affect global climate change, or that a project's net increase in GHG emissions, if any, when coupled with other activities in the region, would be cumulatively considerable.

Draft Energy and Climate Action Plan

The City has drafted an Energy and Climate Action Plan to identify, evaluate and prioritize opportunities to reduce energy consumption and GHG emissions in its own government operations and throughout the Oakland community. On July 7, 2009, the Oakland City Council directed staff to develop the draft Oakland Energy and Climate Action Plan using a preliminary planning GHG reduction target equivalent to 36 percent below 2005 GHG emissions by 2020 and 80 percent below 2005 levels by 2050, as well as annual benchmarks for meeting the target. The City has numerous plans and policies to help reduce GHG, including the Zero Waste Strategic Plan and Green Building Ordinance. In addition, the state of

California recently adopted the new Green Building Code known as CALGreen—both the City's local ordinance and CALGreen are now in effect. Oakland's Zero Waste Goal is to cut the City's current waste disposal to 40,000 tons per year—approximately a 90-percent reduction. This will require double the waste disposal reduction that Oakland has achieved over the past 15 years. Progress toward the Zero Waste Goal will be measured by the tons of annual waste landfilled, with key milestones at five-year intervals between now and 2020.

Potential Effects of Human Activity on Global Climate Change

Globally, climate change has the potential to impact numerous environmental resources through anticipated, though uncertain, impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2°C (0.36°F) per decade is projected, and there are identifiable signs that global warming is taking place, including substantial loss of ice in the Arctic.[13]

However, the understanding of GHG emissions, particulate matter, and aerosols on global climate trends remains uncertain. In addition to uncertainties about the extent to which human activity rather than solar or volcanic activity is responsible for increasing warming, there is also evidence that some human activity has cooling, rather than warming, effects, as discussed in detail in numerous publications by the International Panel on Climate Change (IPCC), namely "Climate Change 2001, The Scientific Basis"(2001).[14]

Acknowledging uncertainties regarding the rate at which anthropogenic greenhouse gas emissions would continue to increase (based upon various factors under human control, such as future population growth and the locations of that growth; the amount, type, and locations of economic development; the amount, type, and locations of technological advancement; adoption of alternative energy sources; legislative and public initiatives to curb emissions; and public awareness and acceptance of methods for reducing emissions), and the impact of such emissions on climate change, the IPCC devised a set of six "emission scenarios" which utilize various assumptions about the rates of economic development, population growth, and technological advancement over the course of the next century.[15] These emission scenarios are paired with various climate sensitivity models to attempt to account for the range of uncertainties that affect climate change projections. The wide range of temperature, precipitation, and similar projections yielded by these scenarios and models reveal the magnitude of uncertainty presently limiting climate scientists' ability to project long-range climate change (as previously discussed).

The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects, according to the IPCC[16]:

- Snow cover is projected to contract, with permafrost areas sustaining thawing;

[13] International Panel on Climate Change (IPCC) Special Report on Emissions Scenarios, 2000, www.grida.no/climate/ipcc/emission/002.htm, accessed July 24, 2007.

[14] The IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme to assess scientific, technical and socio-economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation.

[15] IPCC, 2000, op. cit.

[16] Ibid.

- Sea ice is projected to shrink in both the Arctic and Antarctic;
- Hot extremes, heat waves, and heavy precipitation events are likely to increase in frequency;
- Future tropical cyclones (typhoons and hurricanes) will likely become more intense;
- Non-tropical storm tracks are projected to move poleward, with consequent changes in wind, precipitation, and temperature patterns. Increases in the amount of precipitation are very likely in high-latitudes, while decreases are likely in most subtropical regions; and
- Warming is expected to be greatest over land and at most high northern latitudes, and least over the Southern Ocean and parts of the North Atlantic Ocean.

Potential secondary effects from global warming include global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

Potential Effects of Climate Change on State of California

According to the California Air Resources Board (ARB), some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years.[17] Several recent studies have attempted to explore the possible negative consequences that climate change, left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts. In addition, projecting regional impacts of climate change and variability relies on large-scale scenarios of changing climate parameters, using information that is typically at too general a scale to make accurate regional assessments.[18]

Below is a summary of some of the potential effects reported in an array of studies that could be experienced in California as a result of global warming and climate change:

Air Quality

Higher temperatures, conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. For other pollutants, the effects of climate change and/or weather are less well studied, and even less well understood.[19] If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires. Additionally,

[17] California Air Resources Board (ARB), 2006c. Public Workshop to Discuss Establishing the 1990 Emissions Level and the California 2020 Limit and Developing Regulations to Require Reporting of Greenhouse Gas Emissions, Sacramento, CA. December 1.

[18] Kiparsky, M. and P.H. Gleick, 2003. *Climate Change and California Water Resources: A Survey and Summary of the Literature*. Oakland, CA: Pacific Institute for Studies in Development. July 2003

[19] U.S. EPA, 2007, op. cit.

severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the State.[20]

Water Supply

Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. For example, models that predict drier conditions (i.e., parallel climate model (PCM)) suggest decreased reservoir inflows and storage and decreased river flows relative to current conditions. By comparison, models that predict wetter conditions (i.e., HadCM2) project increased reservoir inflows and storage, and increased river flows.[21]

A July 2006 technical report prepared by the California Department of Water Resources (DWR) addresses the State Water Project (SWP), the Central Valley Project, and the Sacramento-San Joaquin Delta. Although the report projects that "[c]limate change will likely have a significant effect on California's future water resources . . . [and] future water demand," it also reports that "much uncertainty about future water demand [remains], especially [for] those aspects of future demand that will be directly affected by climate change and warming. While climate change is expected to continue through at least the end of this century, the magnitude and, in some cases, the nature of future changes is uncertain. This uncertainty serves to complicate the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood."[22] DWR adds that "[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future."[23] Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows.[24] Water purveyors, such as the East Bay Municipal Utilities District (EBMUD), are required by state law to prepare Urban Water Management Plans (UWMPs) (discussed below, under Regulatory Context for Greenhouse Gas Emissions and Climate Change) that consider climatic variations and corresponding impacts on long-term water supplies.[25] DWR has published a 2005 SWP Delivery Reliability Report, which presents information from computer simulations of the SWP operations based on historical data over a 73-year period (1922–1994). The DWR notes that the results of those model studies "represent the best available assessment of the delivery capability of the SWP." In addition, the DWR is continuing to update its studies and analysis of water supplies. EBMUD would incorporate this information from DWR in its update of its current UWMP 2005 (required every five years per the California Water Code), and information from the UWMP can be incorporated into Water Supply Assessments (WSAs) and Water Verifications prepared for certain development projects in accordance with Cal. Water Code Section 10910, et. seq. and Cal. Government Code Section 66473.7, et. seq.

---

[20] California Climate Change Center (CCCC), 2006. Our Changing Climate: Assessing the Risks to California, CEC-500-2006-077, Sacramento, CA. July.

[21] Brekke, L.D., et al, 2004. "Climate Change Impacts Uncertainty for Water Resources in the San Joaquin River Basin, California." Journal of the American Water Resources Association. 40(2): 149–164. Malden, MA, Blackwell Synergy for AWRA.

[22] California Department of Water Resources (DWR), 2006. Progress on Incorporating Climate Change into Management of California Water Resources, Sacramento, CA. July.

[23] Ibid.

[24] Kiparsky 2003, op. cit; DWR, 2005, op. cit.; Cayan, D., et al, 2006. Scenarios of Climate Change in California: An Overview (White Paper, CEC-500-2005-203-SF), Sacramento, CA. February.

[25] California Water Code, Section 10631(c).

Hydrology

As discussed above, climate change could potentially affect the following: the amount of snowfall, rainfall and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. Sea level rise can be a product of global warming through two main processes -- expansion of sea water as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could also jeopardize California's water supply. In particular, saltwater intrusion would threaten the quality and reliability of the state's major fresh water supply that is pumped from the southern portion of the Sacramento/San Joaquin River Delta. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events.

Agriculture

California has a $30 billion agricultural industry that produces half the country's fruits and vegetables. The California Climate Change Center (CCCC) notes that higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase, crop-yield could be threatened by a less reliable water supply, and greater ozone pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year that certain crops, such as wine grapes, bloom or ripen, and thus affect their quality.[26]

Ecosystems and Wildlife

Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. In 2004, the Pew Center on Global Climate Change released a report examining the possible impacts of climate change on ecosystems and wildlife.[27] The report outlines four major ways in which it is thought that climate change could affect plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes such as carbon cycling and storage.

Regulatory Context

Global climate change is addressed through the efforts of various federal, state, regional and local government agencies as well as national and international scientific and governmental conventions and programs. These agencies work jointly, as well as individually to understand and regulate the effects of greenhouse gas emissions and resulting climate change through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies, conventions and programs focused on global climate change are discussed below.

[26] California Climate Change Center (CCCC), 2006, op. cit.

[27] Parmesan, C. and H. Galbraith, *Observed Impacts of Global Climate Change in the U.S.*, Arlington, VA: Pew Center on Global Climate Change, November 2004.

International and Federal

Kyoto Protocol

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008–2012. It should be noted that although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the United States is not bound by the Protocol's commitments.

Copenhagen Summit

The 2009 United Nations Climate Change Conference (Copenhagen Summit) was held in Denmark in December 2009. The conference included the 15 Conference of the Parties to the United Nations Framework Convention on Climate Change, and the fifth meeting of the Parties to the Kyoto Protocol. A framework for climate change mitigation beyond 2012 was to be agreed there. The Copenhagen Accord was drafted by the U.S., China, India, Brazil, and South Africa on December 18, 2009 and judged to be a "meaningful agreement" by the United Stated government. It was "taken note of" but not "adopted" in a debate of all the participating countries the next day. The document recognized that climate change is one of the greatest challenges of the present day and that actions should be taken to keep any temperature increases to below 2 degrees C. The document is not legally binding and does not contain any legally binding commitments for reducing CO2 emissions.

Climate Change Technology Program

The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program (CCTP) is a multi-agency research and development coordination effort (which is led by the Secretaries of Energy and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative.[28]

U.S. Environmental Protection Agency

To date, the U.S. EPA has not regulated GHGs under the Clean Air Act (discussed above) based on its assertion in *Massachusetts et. al. v. EPA et. al*[29] that the "Clean Air Act does not authorize it to issue mandatory regulations to address global climate change and that it would be unwise to regulate GHG emissions because a causal link between GHGs and the increase in global surface air temperatures has not been unequivocally established." However, in the same case from 2007 (*Massachusetts v. EPA*), the U.S. Supreme Court held that the U.S. EPA can, and should, consider regulating motor-vehicle GHG emissions.

In December of 2009, the U.S. EPA issued an "endangerment" finding about carbon dioxide and other greenhouse gases. The endangerment finding classified six greenhouse gases as pollutants that threaten

---

[28] Climate Change Technology Program (CCTP), About the U.S. Climate Change Technology Program (web page), Washington, D.C., last updated April 2006, http://www.climatetechnology.gov/about/index.htm, accessed July 24, 2007.

[29] U.S. Supreme Court, Massachusetts et. al. v. EPA et. al (No. 05-1120, 415F 3d 50), April 2, 2007.

health: carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, per-fluorocarbons and sulfur hexafluoride. These findings could potentially enable the EPA to make rules restricting greenhouse gas emissions under the Clean Air Act, but to date no such rules have been enacted. However, this action was a prerequisite for implementing greenhouse gas emissions standards. Current efforts include issuing greenhouse gas emission standards for new motor vehicles, developing and implementing renewable fuel standard program regulations, proposing carbon pollution standards for new power plans, and setting greenhouse gas emissions thresholds to define when permits are required for new and existing industrial facilities under the Clean Air Act, and establishing a greenhouse gas reporting program.

State of California

Assembly Bill (AB) 1493

On July 1, 2002, the California Assembly passed Assembly Bill (AB) 1493 (signed into law on July 22, 2002), requiring the ARB to "adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." The regulations were to be adopted by January 1, 2005, and apply to 2009 and later model-year vehicles. In September 2004, ARB responded by adopting "CO_2-equivalent fleet average emission" standards. The standards will be phased in from 2009 to 2016, reducing emissions by 22 percent in the "near term" (2009–2012) and 30 percent in the "mid-term" (2013–2016), as compared to 2002 fleets.

Executive Order (EO) S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order (EO) S-3-05, establishing statewide GHG emission reduction targets. This EO provides that by 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent below 1990 levels. The Secretary of the California Environmental Protection Agency (CalEPA) is charged with coordinating oversight of efforts to meet these targets and formed the Climate Action Team (CAT) to carry out the EO.

California Assembly Bill 32 (AB 32)

On August 31, 2006, the California Assembly passed Bill 32 (AB 32) (signed into law on September 27, 2006), the California Global Warming Solutions Act of 2006. AB 32 commits California to reduce GHG emissions to 1990 levels by 2020 and establishes a multi-year regulatory process under the jurisdiction of the ARB to establish regulations to achieve these goals. The regulations shall require monitoring and annual reporting of GHG emissions from selected sectors or categories of emitters of GHGs.

On December 11, 2008, ARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which functions as a roadmap of ARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. The Scoping Plan contains the main strategies California will implement to reduce CO_2e emissions to meet AB 32 targets. The 2020 emissions baseline used in the 2008 Scoping Plan is 596 million metric tons (MMT) CO2e. This estimate of statewide 2020 emissions was developed using pre-recession 2007 data and reflects GHG emissions expected to occur in the absence of any reduction measures in 2010. ARB re-evaluated the baseline in light of the economic downturn and updated the projected 2020 emissions to 545 MMT CO_2e. Two reduction measures (Pavley I and the Renewables Portfolio Standard of 20 percent by 2020) not previously included in the 2008 Scoping Plan baseline were incorporated into the updated baseline, further reducing the 2020 statewide emissions projection to 507 MMT CO_2e. The updated forecast of 507 MMT CO_2e is referred to as the AB 32 2020 baseline. Reduction of an estimated 80 MMTCO_2e are necessary to reduce statewide emissions to the AB 32 target of 427 MMT CO_2e by 2020.

The Scoping Plan also includes recommended measures that were developed to reduce greenhouse gas emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures, shown below in Table 4.6-2 by sector, also put the state on a path to meet the long-term 2050 goal of reducing California's greenhouse gas emissions to 80 percent below 1990 levels.

Table 4.4-2
AB 32 Scoping Plan GHG Reduction Actions by Sector

Measure No.	Measure Description	GHG Reductions (Annual Million Metric Tons CO_2e)
Transportation		
T-1	Pavley I and II – Light Duty Vehicle Greenhouse Gas Standards	31.7
T-2	Low Carbon Fuel Standard (Discrete Early Action)	15.0
T-3[1]	Regional Transportation-Related Greenhouse Gas Targets	5.0
T-4	Vehicle Efficiency Measures	4.5
T-5	Ship Electrification at Ports (Discrete Early Action)	0.2
T-6	Goods Movement Efficiency Measures. -Ship Electrification at Ports, System-Wide Efficiency Improvements	3.5
T-7	Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	0.93
T-8	Medium- and Heavy-Duty Vehicle Hybridization	0.5
T-9	High Speed Rail	1.0
Electricity and Natural Gas		
E-1	Energy Efficiency (32,000 GWh of Reduced Demand) - Increased Utility Energy Efficiency Programs, More Stringent Building & Appliance Standards, Additional Efficiency and Conservation Programs	15.2
E-2	Increase Combined Heat and Power Use by 30,000 GWh (Net reductions include avoided transmission line loss)	6.7
E-3	Renewables Portfolio Standard (33% by 2020)	21.3
E-4	Million Solar Roofs (including California Solar Initiative, New Solar Homes Partnership and solar programs of publicly owned utilities) Target of 3000 MW Total Installation by 2020	2.1
CR-1	Energy Efficiency (800 Million Therms Reduced Consumptions) - Utility Energy Efficiency Programs, Building and Appliance Standards, Additional Efficiency and Conservation Programs	4.3
CR-2	Solar Water Heating (AB 1470 goal)	0.1
Green Buildings		
GB-1	Green Buildings	26.0
Water		
W-1	Water Use Efficiency	1.4†
W-2	Water Recycling	0.3†
W-3	Water System Energy Efficiency	2.0†
W-4	Reuse Urban Runoff	0.2†
W-5	Increase Renewable Energy Production	0.9†
W-6	Public Goods Charge (Water)	TBD†

Industry		
I-1	Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	TBD
I-2	Oil and Gas Extraction GHG Emission Reduction	0.2
I-3	GHG Leak Reduction from Oil and Gas Transmission	0.9
I-4	Refinery Flare Recovery Process Improvements	0.3
I-5	Removal of Methane Exemption from Existing Refinery Regulations	0.01

[1]The Scoping Plan identified 5.0 MMT CO2e as a placeholder for what could be achieved by the Sustainable Communities and Climate Protection Act of 2008 (SB 375) through sustainable regional transportation and local land use planning. The SB 375 Staff Report identifies 3.0 MMT CO2e, which is the aggregate from the regional passenger vehicle GHG reduction targets established for the 18 Metropolitan Planning Organizations approved in 2010.

[†]GHG emission reduction estimates are not included in calculating the total reductions needed to meet the 2020 target

While ARB has identified a GHG reduction target of 15 percent for local governments themselves, it has not yet determined what amount of GHG emissions reductions it recommends from local government land use decisions. However, the Scoping Plan does state that successful implementation of the plan relies on local governments land use planning and urban growth decisions because local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions. ARB further acknowledges that decisions on how land is used will have large effects on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors.

The Scoping Plan identified 5.0 MMT CO_2e as a placeholder for what could be achieved by the Sustainable Communities and Climate Protection Act of 2008 (SB 375) through sustainable regional transportation and local land use planning. The SB 375 Staff Report identifies 3.0 MMT CO_2e, which is the aggregate from the regional passenger vehicle GHG reduction targets established for the 18 Metropolitan Planning Organizations approved in 2010.

California Senate Bill 97 (SB 97)

SB 97, signed by governor of California 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 Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the California Resources Agency by July 1,2009 guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA. The California Resources Agency was required to certify and adopt these guidelines by January 1, 2010. Amendments to the CEQA Guidelines pursuant to SB 97 were adopted in March 2010.

Amendments to the CEQA Guidelines

Amendments to the CEQA Guidelines pursuant to SB 97 became effective on March 18, 2010. Among the changes included in these recent CEQA Guidelines amendments are guidance for determining the significance of impacts from greenhouse gas emissions (CEQA Guidelines §15064.4). These guidelines indicate that "The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency . . . A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project." A lead agency shall have discretion to determine, in the context of a particular project, whether to use a model or other methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use, or whether to rely on a qualitative analysis or performance based standard.

These Guidelines also indicate that a lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:

- "The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

In determining thresholds of significance, § 15064.7 indicates that "Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence. When adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence."

Finally, in considering mitigation measures related to greenhouse gas emissions, § 15126.4 indicates that "lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions. Measures to mitigate the significant effects of greenhouse gas emissions may include, among others:

- Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;
- Reductions in emissions resulting from a project through implementation of project features, project design, or other measures;
- Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions; and
- Measures that sequester greenhouse gases;
- In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions."

California Senate Bill 375 (SB 375)

Governor Schwarzenegger signed SB 375 into law in September 2008 (Chapter 728, Statutes of 2008). The legislation aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) that will prescribe land use allocation in the MPO's regional transportation plan. ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects will not be eligible for funding programmed after January 1, 2012.

This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 years for local governments located in an MPO that meets certain requirements. City or County land use policies (e.g., General Plans) are not required to be consistent with the RTP including associated SCSs or APSs. Qualified projects consistent with an approved SCS or APS and categorized as "transit priority projects" would receive incentives under new provisions of CEQA.

California Green Building Standards Code (CALGreen)

The California Green Building Standards Code (CALGreen) supplements the California Building Standards Code (Title 24) and requires all new buildings in the state to incorporate energy saving features. New standards include the following:

- Water efficiency: New buildings must demonstrate at least a 20 percent reduction in water use over typical baseline conditions.
- Construction waste: At least 50 percent of construction waste must be recycled, reused, or otherwise diverted from landfilling.
- Interior finishes: Interior finishes such as paints, carpet, vinyl flooring, particle board, and other similar materials must be low-pollutant emitting.
- Landscape irrigation: In non-residential buildings, separate water meters must be provided for a building's indoor and outdoor water use. Large landscape projects must use moisture-sensing irrigation systems to limit unnecessary watering.
- Mandatory inspections of energy systems: In non-residential buildings over 10,000 square feet mandatory inspections of energy systems (e.g., heat furnace, air conditioner and mechanical equipment) are required to ensure that such systems are working at their maximum capacity and according to their design efficiencies.

California Urban Water Management Planning Act

The California Urban Water Management Planning Act requires various water purveyors throughout the State of California (such as EBMUD) to prepare UWMPs, which assess the purveyor's water supplies and demands over a 20-year horizon (California Water Code, Section 10631 *et seq*.). As required by that statute, UWMPs are updated by the purveyors every five years. As discussed above, this is relevant to global climate change which may affect future water supplies in California, as conditions may become drier or wetter, affecting reservoir inflows and storage and increased river flows.[30]

---

[30] Brekke, 2004, op. cit.

Regional

Bay Area Air Quality Management District (BAAQMD)

CEQA Air Quality Guidelines and Thresholds of Significance

In 2010, the BAAQMD's Board of Directors adopted the CEQA Air Quality Guidelines and Thresholds of Significance (BAAQMD, Revised 2011) as an effort to assist lead agencies in evaluating air quality impacts of projects and plans proposed in the San Francisco Bay Area Air Basin. In response to a legal challenge, the BAAQMD no longer recommends the thresholds be used as a generally applicable measure of significant impacts.[31]

However, the BAAQMD CEQA Air Quality Guidelines include recommendations for analysis procedures and an Appendix D (Threshold of Significance Justification); the BAAQMD also prepared detailed documentation for CEQA thresholds prior to its 2010 adoption of the guidelines (BAAQMD, 2010). The City of Oakland Planning, Building, and Neighborhood Preservation Department as lead agency used this documentation as evidence in developing thresholds of significance for criteria air pollutants and community risk and hazards. The preparers of this EIR have reviewed the evidence used to formulate the BAAQMD CEQA Guidelines including BAAQMD's May 2010 staff report recommending the adoption of the thresholds and its attachments, and conclude that substantial evidence supports the continued use of BAAQMD's 2010 thresholds of significance as thresholds of significance for air quality and greenhouse gas impacts in this EIR.

BAAQMD Climate Protection Program

BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHGs and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts.

Bay Area 2010 Clean Air Plan

The Bay Area 2010 Clean Air Plan (CAP) provides policy recommendations for achieving greenhouse gas emission reductions through transportation control measures (TCMs) and land use measures (LUMs). Major stationary sources of GHG are within the jurisdiction of the BAAQMD, and as of 2012, BAAQMD is developing rules for permitting new and modified stationary sources of GHG. See Section 4.1, Air Quality, for a discussion of how the CAP relates to the Specific Plan.

[31] The BAAQMD describes the status of its CEQA Guidelines at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQAGuidelines.aspx. The May 2010 staff report can also be found here.

City of Oakland

Oakland Energy and Climate Action Plan

In 2009, the City Council directed staff to develop an Energy and Climate Action Plan (ECAP) using a preliminary planning GHG reduction target equivalent to 36% below 2005 GHG emissions by 2020 and 80 percent below 2005 levels by 2050, with annual benchmarks for meeting the target. Based on Oakland's baseline 2005 GHG inventory, totaling approximately 3 million metric tons of CO2e emissions and current forecasts of business-as-usual emissions growth, reducing GHG emissions by the equivalent of 36% below 2005 levels by 2020 will require taking actions that cumulatively add up to approximately 1.1 million metric tons of CO2e reductions. On December 4, 2012, the City Council adopted the ECAP which evaluates and prioritizes opportunities to reduce energy consumption and GHG emissions in its own government operations and throughout the community.

The ECAP also includes a set of actions aimed at increasing local resilience and helping Oakland adapt to the projected impacts of climate change. In addition, Oakland is participating in the regional Adapting to Rising Tides (ART) project, led by the San Francisco Bay Conservation Development Commission (BCDC) and the National Oceanic and Atmospheric Administration (NOAA). The ART project, which began in late 2010, was created to advance regional understanding of how sea level rise and other climate change impacts will affect the Bay Area and to begin to explore adaptation strategies that may benefit Oakland and the region.

Other City of Oakland Programs and Policies

The City of Oakland has supported and adopted a number of programs and policies designed to reduce GHG emissions and continue Oakland's progress toward becoming a model sustainable city. Other relevant programs and policies include:

- Sustainable Oakland Program. Oakland's sustainability efforts are coordinated through the Sustainable Oakland program, a product of the Oakland Sustainability Community Development Initiative (SDI) created in 1998 (Ordinance 74678 C.M.S.).
- Green Economy, Business and Jobs / Green Business – The Alameda County Green Business Program offers technical assistance and incentives to businesses and agencies wishing to go beyond basic regulatory requirements. Additionally, the City implemented a Socially Responsible Business Task Force, which created a checklist designed to measure the relative level of social and environmental responsibility of firms nominated to receive major financial assistance from the City.
- Downtown Housing – The 10K Downtown Housing Initiative has a goal of attracting 10,000 new residents to downtown Oakland by encouraging the development of 6,000 market-rate housing units. This effort is consistent with Smart Growth principles.
- Waste Reduction and Recycling – The City of Oakland has implemented a residential recycling program increasing collection of yard trimmings and food waste. This program has increased total yard trimming collections by 46 percent compared to 2004, and recycling tonnage by 37 percent. The City has also adopted Construction and Demolition Recycling requirements, described above.
- Polystyrene Foam Ban Ordinance - In June 2006, the Oakland City Council passed the Green Food Service Ware Ordinance (Ordinance 14727, effective as of January 1, 2007), which prohibits the use of polystyrene foam disposable food service ware and requires, when cost neutral, the use of biodegradable or compostable disposable food service ware by food vendors and City facilities.

- Zero Waste Resolution - In March 2006, the Oakland City Council adopted a Zero Waste Goal by 2020 Resolution (Resolution 79774 C.M.S.), and commissioned the creation of a Zero Waste Strategic Plan to achieve the goal.
- Stormwater Management - Provision C.3 of the NPDES permit is the section of the permit containing stormwater pollution management requirements for new development and redevelopment projects. Among other things, Provision C.3 requires that certain new development and redevelopment projects incorporate post-construction stormwater pollution management measures, including stormwater treatment measures, stormwater site design measures, and source control measures, to reduce stormwater pollution after the construction of the project. These requirements are in addition to standard stormwater-related best management practices (BMPs) required during construction.
- Healthy Food Systems - The Mayor's office, working with graduate students from the University of California, developed a resolution authorizing an initial food systems assessment study. The study, authorized by the City Council on January 17, 2006 through Resolution No. 79680 C.M.S., examines current trends in Oakland's food system and recommends programs and policies that promote a sustainable food system for Oakland. One of the goals of the Healthy Food Systems program is the utilization and support of local agriculture as a potential means to reduce the truck miles necessary to distribute food locally, thereby reducing their contribution to GHG emissions.
- Community Gardens and Farmer's Markets - Community gardening locations include Arroyo Viejo, Bella Vista, Bushrod, Golden Gate, Lakeside Horticultural Center, Marston Campbell, Temescal, and Verdese Carter. Weekly Farmer's Markets locations include (among others) the Jack London Square, Old Oakland, Grand Lake, Mandela, Montclair, and Temescal districts. Both efforts promote and facilitate the principal of growing and purchasing locally, which effects reductions in truck and vehicle use and GHG emissions.

General Plan

Land Use and Transportation Element

The City of Oakland General Plan Land Use and Transportation Element (LUTE), which includes the Pedestrian Master Plan and the Bicycle Master Plan, includes the following policies related to GHG emissions and climate change:

> *Policy T.2.1:* Transit-oriented development should be encouraged at existing or proposed transit nodes, defined by the convergence of two or more modes of public transit such as BART, bus, shuttle service, light rail or electric trolley, ferry, and inter-city or commuter rail.
>
> *Policy T.2.2:* Transit-oriented developments should be pedestrian-oriented, encourage night and day time use, provide the neighborhood with needed goods and services, contain a mix of land uses, and be designed to be compatible with the character of surrounding neighborhoods.
>
> *Policy T3.5:* The City should include bikeways and pedestrian ways in the planning of new, reconstructed, or realigned streets, wherever possible.
>
> *Policy T3.6:* The City should encourage and promote use of public transit in Oakland by expediting the movement of and access to transit vehicles on designated "transit streets" as shown on the Transportation Plan.
>
> *Policy T4.2:* Through cooperation with other agencies, the City should create incentives to encourage travelers to use alternative transportation options.

Policy N3.2: In order to facilitate the construction of needed housing units, infill development that is consistent with the General Plan should take place throughout the City of Oakland.

Policy T4.5: The City should prepare, adopt, and implement a Bicycle and Pedestrian Master Plan as a part of the Transportation Element of [the] General Plan.

Open Space, Conservation and Recreation Element

The Open Space, Conservation and Recreation Element (OSCAR) includes the following policies related to GHG emissions and climate change. These policies encourage the provision of open space, which contains vegetation that reduces solar heat gain and absorbs CO_2; encourage stormwater management, which relates to potential increases in the frequency of storms and flooding; and encourage energy efficiency and alternative energy sources.

Policy OS-1.1: Conserve existing City and Regional Parks characterized by steep slopes, large groundwater recharge areas, native plant and animal communities, extreme fire hazards, or similar conditions.

Policy OS-2.1: Manage Oakland's urban parks to protect and enhance their open space character while accommodating a wide range of outdoor recreational activities.

Policy CO-5.3: Employ a broad range of strategies, compatible with the Alameda Countywide Clean Water Program. See Policy CO-12.1 under OSCAR policies that address general air quality.

*Policy CO-12.1:*Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development, mixed use development, and office development with ground floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (d) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis.

Policy CO-12.3: Expand existing transportation systems management and transportation demand management strategies which reduce congestion, vehicle idling, and travel in single passenger autos. See Policy CO-12.4 under OSCAR policies that address general air quality.

Policy CO-12.4: Require that development projects be designed in a manner which reduces potential adverse air quality impacts. This may include: (a) the use of vegetation and landscaping to absorb carbon monoxide and to buffer sensitive receptors; (b) the use of low-polluting energy sources and energy conservation measures; and (c) designs which encourage transit use and facilitate bicycle and pedestrian travel.

Policy CO-12.5: Require new industry to use best available control technology to remove pollutants, including filtering, washing, or electrostatic treatment of emissions.

Policy CO-13.2: Support public information campaigns, energy audits, the use of energy-saving appliances and vehicles, and other efforts which help Oakland residents, businesses, and City operations become more energy efficient.

Policy CO-13.3: Encourage the use of energy-efficient construction and building materials. Encourage site plans for new development which maximize energy efficiency.

Policy CO-13.4: Accommodate the development and use of alternative energy resources, including solar energy and technologies which convert waste or industrial byproducts to energy, provided that such activities are compatible with surrounding land uses and regional air and water quality requirements.

Historic Preservation Element

A Historic Preservation Element policy relevant to climate change encourages the reuse of existing building resources (and building materials), which could reduce the amount of waste disposed of in landfills (a source of methane, a particularly potent GHG), and avoid the need to manufacture and transport new building materials and to transport waste materials to disposal sites.[32]

Safety Element

The Safety Element includes the following policies related to GHG emissions and climate change. These policies are related potential increases in the frequency of storms and flooding caused by climate change.

Policy FL-1: Enforce and update local ordinances and comply with regional orders that would reduce the risk of storm-induced flooding.

Policy FL-2: Continue or strengthen city programs that seek to minimize the storm-induced flooding hazard.

Policy FL-3: Prioritize the reduction of the wildfire hazard, with an emphasis on prevention wildfires.

Green Building (OMC Chapter 18.02)

The Green Building Ordinance was adopted by the City of Oakland in 2005, in conjunction with the Sustainable Communities Initiative of 1998, in order to maintain high standards of green development and new construction throughout the City. This ordinance requires green performance in major civic projects and provides policies to assist private development projects in improving green performance.

In October of 2010, the city adopted the Green Building Ordinance for Private Development Projects. The ordinance affects a wide range of projects from new construction of single- and multi-family residential as well as non-residential projects, additions and alterations, modifications or demolition of historic resources, construction of affordable housing and mixed-use projects, as well as projects requiring a landscape plan. Projects that are affected based on defined thresholds in the ordinance include:

- Residential and non-residential new construction, additions, and alterations;
- Removal of an historic resource and new construction;
- Historic residential and non-residential additions and alterations;
- Mixed use construction; and
- Construction requiring a landscape plan.

[32] U.S. EPA, 2006a. General Information on the Link Between Solid Waste and Greenhouse Gas Emissions (web page), October, http://www.epa.gov/climatechange/wycd/waste/generalinfo.html, accessed August 10, 2007.

Certain types of projects are required to receive certification through a non-governmental green rating agency, including:

- All new residential construction and residential additions or alterations over 1,000 square feet, certified through Build It Green's GreenPoint Rated program; and
- All new non-residential construction and non-residential additions or alterations.

In addition to Oakland's local Green Building Ordinance, the State of California recently adopted the new Green Building Code known as CALGreen (described above). Both the City's local ordinance and CALGreen are now in effect.

Construction and Demolition Waste Reduction and Recycling

Chapter 15.34, Construction and Demolition Debris Waste Reduction and Recycling Requirements of the Oakland Municipal Code requires non-residential and apartment house demolition and new construction projects, and alterations with a valuation of $50,000 or more, to recycle 100 percent of all asphalt and concrete materials and 65 percent of all other materials.

Zero Waste Resolution

In March 2006, the Oakland City Council adopted a Zero Waste Goal by 2020 Resolution (Resolution 79774 C.M.S.), and commissioned the creation of a Zero Waste Strategic Plan to achieve the goal.

Community Gardens and Farmer's Markets

Community Garden locations include Arroyo Viejo, Bella Vista, Bushrod, Golden Gate, Lakeside Horticultural Center, Marston Campbell, Temescal, and Verdese Carter. Weekly Farmer's Market locations include the Jack London Square, Old Oakland, Grand Lake, Mandela, and Temescal districts. Both efforts promote and facilitate the principal of growing and purchasing locally, which reduces truck and vehicle use, and GHG emissions.

Uniformly Applied Development Standards Imposed as Standard Conditions of Approval

The City's Standard Conditions of Approval relevant to GHG emissions are identified below. These Standard Conditions of Approval would be adopted as requirements of subsequent individual development projects pursuant to the Specific Plan, if and when such projects are approved by the City to help ensure that no significant GHG emissions impacts occur.

The following SCA GHG-1 below would apply to subsequent projects pursuant to the Specific Plan under any of the following scenarios:

- **Scenario A**: Projects which (a) involve a land use development (i.e., a project that does not require a permit from the Bay Area Air Quality Management District (BAAQMD) to operate), (b) exceed the greenhouse gas (GHG) emissions screening criteria contained in the BAAQMD CEQA Guidelines,[33]

[33] For residential development projects, refer to the City's 2007-2014 Housing Element EIR screening criteria. The Housing Element EIR's analysis showed that residential development projects of less than 172 units would not result in a significant climate change impact and, therefore, no project-specific GHG analysis is required for such projects. Under an alternative approach in the Housing Element EIR, the analysis found that **ANY** residential development project (including those containing 172 or more units) would not result in a significant climate change impact and that no project-specific GHG analysis would be required. For residential projects containing 172 or more units, please consult with City Planning staff and the City Attorney's office on

AND (c) after a GHG analysis is prepared would produce total GHG emissions of more than 1,100 metric tons of CO_2e annually AND more than 4.6 metric tons of CO_2e per service population annually (with "service population" defined as the total number of employees and residents of the project).

- **Scenario B**: Projects which (a) involve a land use development, (b) exceed the GHG emissions screening criteria contained in the BAAQMD CEQA Guidelines,[34] (c) after a GHG analysis is prepared would exceed at least one of the BAAQMD Thresholds of Significance (more than 1,100 metric tons of CO_2e annually OR more than 4.6 metric tons of CO_2e per service population annually), AND (d) are considered to be "Very Large Projects."[35]
- **Scenario C**: Projects which (a) involve a stationary source of GHG (i.e., a project that requires a permit from BAAQMD to operate) AND (b) after a GHG analysis is prepared would produce total GHG emissions of more than 10,000 metric tons of CO_2e annually.

SCA F: Greenhouse Gas (GHG) Reduction Plan. (*Prior to issuance of a construction-related permit and ongoing as specified*). The project applicant shall retain a qualified air quality consultant to develop a Greenhouse Gas (GHG) Reduction Plan for City review and approval. The applicant shall implement the approved GHG Reduction Plan.

The goal of the GHG Reduction Plan shall be to increase energy efficiency and reduce GHG emissions to below [INCLUDE IF SCENARIO A OR B] at least one of the Bay Area Quality Management District's (BAAQMD's) CEQA Thresholds of Significance (1,100 metric tons of CO_2e per year or 4.6 metric tons of CO_2e per year per service population) [INCLUDE IF SCENARIO C] the Bay Area Quality Management District's (BAAQMD's) CEQA Thresholds of Significance (10,000 metric tons of CO_2e per year) [INCLUDE IF SCENARIO B] AND to reduce GHG emissions by 36 percent below the project's "adjusted" baseline GHG emissions (as explained below) to help achieve the City's goal of reducing GHG emissions. The GHG Reduction Plan shall include, at a minimum, (a) a detailed GHG emissions inventory for the project under a "business-as-usual" scenario with no consideration of project design features, or other energy efficiencies, (b) an "adjusted" baseline GHG emissions inventory for the project, taking into consideration energy efficiencies included as part of

---

the appropriate GHG review. For nonresidential development projects and mixed-use development projects, the nonresidential component of the project must be compared to the BAAQMD screening criteria and the applicable threshold if the screening criteria are exceeded, independently from any residential component the project.

[34] See footnote #1 above.

[35] A "Very Large Project" is defined as any of the following:

(A) Residential development of more than 500 dwelling units;

(B) Shopping center or business establishment employing more than 1,000 persons or encompassing more than 500,000 square feet of floor space;

(C) Commercial office building employing more than 1,000 persons or encompassing more than 250,000 square feet of floor space;

(D) Hotel/motel development of more than 500 rooms;

(E) Industrial, manufacturing, processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or encompassing more than 650,000 square feet of floor area; or

(F) Any combination of smaller versions of the above that when combined result in equivalent annual GHG emissions as the above.

the project (including the City's Standard Conditions of Approval, proposed mitigation measures, project design features, and other City requirements), (c) a comprehensive set of quantified additional GHG reduction measures available to further reduce GHG emissions beyond the adjusted GHG emissions, and (d) requirements for ongoing monitoring and reporting to demonstrate that the additional GHG reduction measures are being implemented. If the project is to be constructed in phases, the GHG Reduction Plan shall provide GHG emission scenarios by phase.

Specifically**,** the applicant/sponsor shall adhere to the following:

a. ***GHG Reduction Measures Program.*** Prepare and submit to the City Planning Director or his/her designee for review and approval a GHG Reduction Plan that specifies and quantifies GHG reduction measures that the project will implement by phase.

   Potential GHG reduction measures to be considered include, but are not be limited to, measures recommended in BAAQMD's latest CEQA Air Quality Guidelines, the California Air Resources Board Scoping Plan (December 2008, as may be revised), the California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures Document (August 2010, as may be revised), the California Attorney General's website, and Reference Guides on Leadership in Energy and Environmental Design (LEED) published by the U.S. Green Building Council.

   The proposed GHG reduction measures must be reviewed and approved by the City Planning Director or his/her designee. The types of allowable GHG reduction measures include the following (listed in order of City preference): (1) physical design features; (2) operational features; and (3) the payment of fees to fund GHG-reducing programs (i.e., the purchase of "offset carbon credits," pursuant to item "b" below).

   The allowable locations of the GHG reduction measures include the following (listed in order of City preference): (1) the project site; (2) off-site within the City of Oakland; (3) off-site within the San Francisco Bay Area Air Basin; (4) off-site within the State of California; then (5) elsewhere in the United States.

b. ***Offset Carbon Credits Guidelines.*** For GHG reduction measures involving the purchase of offset carbon credits, evidence of the payment/purchase shall be submitted to the City Planning Director or his/her designee for review and approval prior to completion of the project (or prior to completion of the project phase, if the project includes more one phase).

   As with preferred locations for the implementation of all GHG reductions measures, the preference for offset carbon credit purchases include those that can be achieved as follows (listed in order of City preference): (1) within the City of Oakland; (2) within the San Francisco Bay Area Air Basin; (3) within the State of California; then (4) elsewhere in the United States. The cost of offset carbon credit purchases shall be based on current market value at the time purchased and shall be based on the Project's operational emissions estimated in the GHG Reduction Plan or subsequent approved emissions inventory, which may result in emissions that are higher or lower than those estimated in the GHG Reduction Plan.

c. ***Plan Implementation and Documentation.*** For physical GHG reduction measures to be incorporated into the design of the project, the measures shall be included on the drawings submitted for construction-related permits. For operational GHG reduction measures to be incorporated into the project, the measures shall be implemented on an indefinite and ongoing basis beginning at the time of project completion (or at the completion of the project phase for phased projects).

   For physical GHG reduction measures to be incorporated into off-site projects, the measures shall be included on drawings and submitted to the City Planning Director or his/her designee for review and approval and then installed prior to completion of the subject project (or prior to completion of the project phase for phased projects). For operational GHG reduction measures to be incorporated into off-site projects, the measures shall be implemented on an indefinite and ongoing basis beginning at the time of completion of the subject project (or at the completion of the project phase for phased projects).

d. ***Compliance, Monitoring and Reporting.*** Upon City review and approval of the GHG Reduction Plan program by phase, the applicant/sponsor shall satisfy the following requirements for ongoing monitoring and reporting to demonstrate that the additional GHG reduction measures are being implemented. The GHG Reduction Plan requires regular periodic evaluation over the life of the Project (generally estimated to be at least 40 years) to determine how the Plan is achieving required GHG emissions reductions over time, as well as the efficacy of the specific additional GHG reduction measures identified in the Plan.

Implementation of the GHG reduction measures and related requirements shall be ensured through the project applicant/sponsor's compliance with Conditions of Approval adopted for the project. Generally, starting two years after the City issues the first Certificate of Occupancy for the project, the project applicant/sponsor shall prepare each year of the useful life of the project an Annual GHG Emissions Reduction Report (Annual Report), subject to the City Planning Director or his/her designee for review and approval. The Annual Report shall be submitted to an independent reviewer of the City Planning Director's or his/her designee's choosing, to be paid for by the project applicant/sponsor (see *Funding*, below), within two months of the anniversary of the Certificate of Occupancy.

The Annual Report shall summarize the project's implementation of GHG reduction measures over the preceding year, intended upcoming changes, compliance with the conditions of the Plan, and include a brief summary of the previous year's Annual Report results (starting the second year). The Annual Report shall include a comparison of annual project emissions to the baseline emissions reported in the GHG Plan.

The GHG Reduction Plan shall be considered fully attained when project emissions are less than either applicable numeric BAAQMD CEQA Thresholds [INCLUDE IF SCENARIO B] AND GHG emissions are 36 percent below the project's "adjusted" baseline GHG emissions, as confirmed by the City Planning Director or his/her designee through an established monitoring program. Monitoring and reporting activities will continue at the City's discretion, as discussed below.

e. ***Funding.*** Within two months after the Certificate of Occupancy, the project applicant/sponsor shall fund an escrow-type account or endowment fund to be used exclusively for preparation of Annual Reports and review and evaluation by the City Planning Director or his/her designee, or its selected peer reviewers. The escrow-type account shall be initially funded by the project applicant/sponsor in an amount determined by the City Planning Director or his/her designee and shall be replenished by the project applicant/sponsor so that the amount does not fall below an amount determined by the City Planning Director or his/her designee. The mechanism of this account shall be mutually agreed upon by the project applicant/sponsor and the City Planning Director or his/her designee, including the ability of the City to access the funds if the project applicant/sponsor is not complying with the GHG Reduction Plan requirements, and/or to reimburse the City for its monitoring and enforcement costs.

f. ***Corrective Procedure.*** If the third Annual Report, or any report thereafter, indicates that, in spite of the implementation of the GHG Reduction Plan, the project is not achieving the GHG reduction goal, the project applicant/sponsor shall prepare a report for City review and approval, which proposes additional or revised GHG measures to better achieve the GHG emissions reduction goals, including without limitation, a discussion on the feasibility and effectiveness of the menu of other additional measures (Corrective GHG Action Plan). The project applicant/sponsor shall then implement the approved Corrective GHG Action Plan.

If, one year after the Corrective GHG Action Plan is implemented, the required GHG emissions reduction target is still not being achieved, or if the project applicant/owner fails to submit a report at the times described above, or if the reports do not meet City requirements outlined above, the City Planning Director or his/her designee may, in addition to its other remedies, (a) assess the project applicant/sponsor a financial penalty based upon actual percentage reduction in GHG emissions as compared to the percent reduction in GHG emissions established in the GHG Reduction Plan; or (b) refer the matter to the City Planning Commission for scheduling of a compliance hearing to determine whether the project's approvals should be revoked, altered or additional conditions of approval imposed.

The penalty as described in (a) above shall be determined by the City Planning Director or his/her designee and be commensurate with the percentage GHG emissions reduction not achieved (compared to the applicable numeric significance thresholds) or required percentage reduction from the "adjusted" baseline.

In determining whether a financial penalty or other remedy is appropriate, the City shall not impose a penalty if the project applicant/sponsor has made a good faith effort to comply with the GHG Reduction Plan.

The City would only have the ability to impose a monetary penalty after a reasonable cure period and in accordance with the enforcement process outlined in Planning Code Chapter 17.152. If a financial penalty is imposed, such penalty sums shall be used by the City solely toward the implementation of the GHG Reduction Plan.

g. ***Timeline Discretion and Summary*.** The City Planning Director or his/her designee shall have the discretion to reasonably modify the timing of reporting, with reasonable notice and opportunity to comment by the applicant, to coincide with other related monitoring and reporting required for the project.

   i. *Fund Escrow-type Account for City Review*: Certificate of Occupancy plus 2 months

   ii. *Submit Baseline Inventory of "Actual Adjusted Emissions"*: Certificate of Occupancy plus 1 year

   iii. *Submit Annual Report #1*: Certificate of Occupancy plus 2 years

   iv. *Submit Corrective GHG Action Plan* (if needed): Certificate of Occupancy plus 4 years (based on findings of Annual Report #3)

   v. *Post Attainment Annual Reports*: Minimum every 3 years and at the City Planning Director's or his/her designee's reasonable discretion

The SCA below applies to the projects listed below:

Residential:

- New Construction of a One or Two Family Dwelling
- New Construction of a Multi-Family Dwelling (3+ units)
- Additions or Alterations to a One or Two Family Dwelling that is over 1,000 sq. ft. of total floor area
- Construction of or Alteration to Residential Units (any amount) that receive City or Redevelopment Funding (e.g., NOFA projects)

Non-Residential:

- New Construction of Non-Residential Building over 25,000 sq. ft. of total floor area
- Major Alterations (see Green Building Definitions) over 25,000 sq. ft. of total floor area to a Non-Residential Building

SCA H: Compliance with the Green Building Ordinance, OMC Chapter 18.02. (*Prior to issuance of a demolition, grading, or building permit*). The applicant shall comply with the requirements of the

California Green Building Standards (CALGreen) mandatory measures and the applicable requirements of the Green Building Ordinance, OMC Chapter 18.02.

a. The following information shall be submitted to the Building Services Division for review and approval with the application for a building permit:

    i. Documentation showing compliance with Title 24 of the 2008 California Building Energy Efficiency Standards.

    ii. Completed copy of the final green building checklist approved during the review of the Planning and Zoning permit.

    iii. Copy of the Unreasonable Hardship Exemption, if granted, during the review of the Planning and Zoning permit.

    iv. Permit plans that show, in general notes, detailed design drawings, and specifications as necessary, compliance with the items listed in subsection (b) below.

    v. Copy of the signed statement by the Green Building Certifier approved during the review of the Planning and Zoning permit that the project complied with the requirements of the Green Building Ordinance.

    vi. Signed statement by the Green Building Certifier that the project still complies with the requirements of the Green Building Ordinance, unless an Unreasonable Hardship Exemption was granted during the review of the Planning and Zoning permit.

    vii. Other documentation as deemed necessary by the City to demonstrate compliance with the Green Building Ordinance.

b. The set of plans in subsection (a) shall demonstrate compliance with the following:

    i. CALGreen mandatory measures.

    ii. All pre-requisites per the LEED/GreenPoint Rated checklist approved during the review of the Planning and Zoning permit, or, if applicable, all the green building measures approved as part of the Unreasonable Hardship Exemption granted during the review of the Planning and Zoning permit.

    iii. Insert green building point level/certification requirement: (See Green Building Summary Table; for New Construction of Residential or Non-residential projects that remove a Historic Resource (as defined by the Green Building Ordinance) the point level certification requirement is 75 points for residential and LEED Gold for non-residential) per the appropriate checklist approved during the Planning entitlement process.

    iv. All green building points identified on the checklist approved during review of the Planning and Zoning permit, unless a Request for Revision Plan-check application is submitted and approved by the Planning and Zoning Division that shows the previously approved points that will be eliminated or substituted.

    v. The required green building point minimums in the appropriate credit categories.

During construction: The applicant shall comply with the applicable requirements CALGreen and the Green Building Ordinance, Chapter 18.02.

c. The following information shall be submitted to the Building Inspections Division of the Building Services Division for review and approval:

    i. Completed copies of the green building checklists approved during the review of the Planning and Zoning permit and during the review of the building permit.

ii. Signed statement(s) by the Green Building Certifier during all relevant phases of construction that the project complies with the requirements of the Green Building Ordinance.

iii. Other documentation as deemed necessary by the City to demonstrate compliance with the Green Building Ordinance.

d. ***After construction, as specified below.*** Within sixty (60) days of the final inspection of the building permit for the project, the Green Building Certifier shall submit the appropriate documentation to Build It Green/Green Building Certification Institute and attain the minimum certification/point level identified in subsection (a) above. Within one year of the final inspection of the building permit for the project, the applicant shall submit to the Planning and Zoning Division the Certificate from the organization listed above demonstrating certification and compliance with the minimum point/certification level noted above.

e. The SCA below applies to the projects listed below AND that are rated using the Small Commercial or Bay Friendly Basic Landscape Checklists:

i. New Construction of Non-Residential Buildings between 5,000 and 25,000 sq. ft. of total floor area.

ii. Additions/Alterations 5,000 and 25,000 sq. ft. of total floor area to a Non-Residential Building

iii. Additions/Alterations (not meeting the Major Alteration Definition) over 25,000 sq. ft. of total floor area to a Non-Residential Building

iv. Additions/Alterations 5,000 and 25,000 sq. ft. of total floor area to a Historic Non-Residential Building

v. Additions/Alterations (not meeting the Major Alteration Definition) over 25,000 sq. ft. of total floor area to a Historic Non-Residential Building

vi. Construction projects with over 25,000 sq. ft. of total floor area of new construction requiring a landscape plan.

SCA I: Compliance with the Green Building Ordinance, OMC Chapter 18.02, for Building and Landscape Projects Using the StopWaste.Org Small Commercial or Bay Friendly Basic Landscape Checklist.

Prior to issuance of a building permit: The applicant shall comply with the requirements of the California Green Building Standards (CALGreen) mandatory measures and the applicable requirements of the Green Building Ordinance, (OMC Chapter 18.02.) for projects using the StopWaste.Org Small Commercial or Bay Friendly Basic Landscape Checklist.

a. The following information shall be submitted to the Building Services Division for review and approval with application for a Building permit:

i. Documentation showing compliance with the 2008 Title 24, California Building Energy Efficiency Standards.

ii. Completed copy of the green building checklist approved during the review of a Planning and Zoning permit.

iii. Permit plans that show in general notes, detailed design drawings and specifications as necessary compliance with the items listed in subsection (b) below.

iv. Other documentation to prove compliance.

b. The set of plans in subsection (a) shall demonstrate compliance with the following:

i. CALGreen mandatory measures.

ii. All applicable green building measures identified on the StopWaste.Org checklist approved during the review of a Planning and Zoning permit, or submittal of a Request for Revision Plan-check application that shows the previously approved points that will be eliminated or substituted.

During construction: The applicant shall comply with the applicable requirements of CALGreen and Green Building Ordinance, Chapter 18.02 for projects using the StopWaste.Org Small Commercial or Bay Friendly Basic Landscape Checklist.

a. The following information shall be submitted to the Building Inspections Division for review and approval:

   i. Completed copy of the green building checklists approved during review of the Planning and Zoning permit and during the review of the Building permit.

   ii. Other documentation as deemed necessary by the City to demonstrate compliance with the Green Building Ordinance.

SCA A: Construction-Related Air Pollution Controls - Dust and Equipment Emissions. (Ongoing throughout demolition, grading, and/or construction). During construction, the project applicant shall require the construction contractor to implement all of the following applicable measures recommended by the Bay Area Air Quality Management District (BAAQMD):

BASIC (Applies to ALL construction sites)

a. Water all exposed surfaces of active construction areas at least twice daily (using reclaimed water if possible). Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

b. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).

c. All visible mud or dirt track-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.

d. Pave all roadways, driveways, sidewalks, etc. as soon as feasible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

e. Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).

f. Limit vehicle speeds on unpaved roads to 15 miles per hour.

g. Idling times shall be minimized either by shutting equipment off when not is use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations. Clear signage to this effect shall be provided for construction workers at all access points.

h. All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

i. Post a publicly visible sign that includes the contractor's name and telephone number to contact regarding dust complaints. When contacted, the contractor shall respond and take corrective action within 48 hours. The telephone numbers of contacts at the City and the BAAQMD shall also be visible. This information may be posted on other required on-site signage.

ENHANCED: All "Basic" controls listed above plus the following controls if the project involves:

   i. 114 or more single-family dwelling units;

ii. 240 or more multi-family units;

iii. Nonresidential uses that exceed the applicable screening size listed in the Bay Area Air Quality Management District's CEQA Guidelines;

iv. Demolition permit;

v. Simultaneous occurrence of more than two construction phases (e.g., grading and building construction occurring simultaneously);

vi. Extensive site preparation (i.e., the construction site is four acres or more in size); or

vii. Extensive soil transport (i.e., 10,000 or more cubic yards of soil import/export).

j. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.

k. All excavation, grading, and demolition activities shall be suspended when average wind speeds exceed 20 mph.

l. Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

m. Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more).

n. Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress.

o. Install appropriate wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of the construction site to minimize wind blown dust. Wind breaks must have a maximum 50 percent air porosity.

p. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.

q. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.

r. All trucks and equipment, including tires, shall be washed off prior to leaving the site.

s. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.

t. Minimize the idling time of diesel-powered construction equipment to two minutes.

u. The project applicant shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project wide fleet-average 20 percent NOx reduction and 45 percent particulate matter (PM) reduction compared to the most recent California Air Resources Board (CARB) fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as they become available.

v. Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., BAAQMD Regulation 8, Rule 3: Architectural Coatings).

w. All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for emission reductions of NOx and PM.

x. Off-road heavy diesel engines shall meet the CARB's most recent certification standard.SCA Air-1: Construction-Related Air Pollution Controls (Dust and Equipment Emissions).

The City has several other SCAs that aim to reduce post-construction stormwater runoff that could affect the ability to accommodate potentially increased storms and flooding within existing floodplains and infrastructure systems. These SCAs are relevant as climate change can result in increased flooding due to warmer climate (e.g., earlier and greater melting of snowpack) and inadequate infrastructure.

Impacts, Standard Conditions of Approval and Mitigation Measures

Criteria of Significance

The Specific Plan would result in a significant impact related to greenhouse gas emissions if it would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

   Specifically for Project-level impacts:

   a) For a project involving a stationary source,[36] produce total emissions of more than 10,000 metric tons of CO_2e annually.

   b) For a project involving a land use development,[37] produce total emissions of more than 1,100 metric tons of CO_2e annually, and more than 4.6 metric tons of CO_2e per service population[38] annually.[39]

   c) For projects that involve both a stationary source and a land use development, calculate each component separately and compare to the applicable threshold.

   For Plan-level impacts:

   d) Produce emissions of more than 6.6 metric tons of CO_2e per service population annually.

2. Fundamentally conflict with an applicable plan, policy, or regulation adopted for the purposes of reducing greenhouse gas emissions.

3. Expose people or structures to a significant risk of loss, injury or death involving flooding due to predicted sea level rise associated with global climate change.

Methodology for Analysis

The BAAQMD CEQA Guidelines state that the plan-level threshold should only be used in the evaluation of general plans. For other types of plans, such as redevelopment plans and specific plans, the Guidelines state that the project-level thresholds should be used.

---

36 Stationary sources are projects that require a BAAQMD permit to operate.

37 Land use developments are projects that do not require a BAAQMD permit to operate.

38 The service population includes both the residents and the employees of a proposed project.

39 A project's impact would be considered significant if the emissions exceed BOTH the 1,100 metric tons threshold and the 4.6 metric tons threshold. Accordingly, the impact would be considered less than significant if a project's emissions are below EITHER of these thresholds.

This EIR analyzes the quantity of GHG emissions attributable to projected future development within the West Oakland Specific Plan Opportunity Areas, and whether the Specific Plan could conflict with any applicable plan, policy, or regulation related to GHG management. To determine whether future development would be implemented in the most GHG-efficient manner possible, the quantity of GHG emissions can be divided by the population housed and employed by future new development. The service population is an efficiency-based measure that is used to determine the GHG emissions intensity of land use development for a general or area plan. The service population is determined by adding the number of residents to the number of jobs estimated for a given point in time.

Although there is no construction-related GHG threshold, this analysis quantifies and discloses such emissions, to the extent that they can be estimated. Construction emissions are included in the computation of GHG emissions intensity per service population, for informational purposes.

This analysis describes how the Specific Plan would guide local land use planning and urban growth decisions, and whether the foreseeable growth and use of the Specific Plan area would be aligned with land use and transportation planning efforts to achieve GHG reductions.

GHG Emissions

Impact GHG-1: Development facilitated by the Specific Plan would allow for the construction and operation of land uses that would produce greenhouse gas emissions. The level of emissions is expected to exceed the project-level threshold of 1,100 annual tons of $MTCO_2e$, but would not exceed the project-level efficiency threshold of 4.6 $MTCO_2e$ of annual emissions per service population nor would it exceed the Plan-level threshold of 6.6 $MTCOC_2e$ annually per service population. Development facilitated by the proposed Specific Plan would thus not be expected to generate greenhouse gas emissions at levels that would result, in the aggregate, in significant or cumulatively considerable GHG emissions. (**LTS**)

Existing and 2035 Baseline Emissions

Table 4.4-4 shows estimated GHG emissions under current conditions, as well as the GHG emissions projected from current land uses in the West Oakland Opportunity Areas as they would occur in 2035 (without future development as envisioned under the Specific Plan). These projected 2035 GHG emissions are based on a continuation of existing land uses, vehicle trips, and VMTs. As shown in the table, existing GHG emissions under current baseline land use conditions are estimated to be approximately 119,423 metric tons/year ($MTCO_2e$). The existing service population within the Specific Plan's Opportunity Areas is approximately 9,770 employees and 640 residents. Therefore, the effective baseline service population is 10,410 persons, and the resulting annual existing emissions are approximately 11.47 $MTCO_2e$ per service population

Over time, regulatory changes at the state level (Pavley Standards and Low Carbon Fuel Standard) are projected to go into effect, resulting in substantial improvements primarily to vehicle emissions of GHG. To quantify the effects of these regulatory changes, Table 4.4-4 also shows a 2035 Baseline condition, which does not assume any increase in land use or any new land use-based GHG emissions within the West Oakland Specific Plan's Opportunity Areas, but re-calculates GHG emissions from these existing sources assuming regulatory-based GHG emission improvements. As indicated in Table 4.4-4, the 2035 Baseline emission (presented for informational purposes only) is estimated to be 97,151 MTCO2e (an 18% reduction in emissions from the existing baseline) as a result of implementation of these new regulatory controls. These 2035 Baseline annual emissions would represent approximately 9.33 $MTCO_2e$ per service population.

Table 4.4-4: Existing (2013) and Projected 2035 Baseline CO_2e Emissions
(Metric Tons/Year of Co_2e)

	Existing (2013)	2035 Baseline (assuming no land use changes)
Operation Vehicle Emissions	86,359	64,674
Area Source	142	141
Electricity	23,818	23,654
Natural Gas (space and water heating)	2,458	2,185
Water and Wastewater	307	290
Solid Waste	6,338	6,206
Total Baseline CO_2e Emissions	**119,423**	**97,151**
Effective Service Population	10,410	10,410
GHG emissions per service population	**11.47**	**9.33**

Sources:
California Air Resources Board (ARB). 2008. Local Government Operations Protocol, For the quantification and reporting of greenhouse gas emissions inventories, Version 1.0. September 25.
California Climate Action Registry. 2009. General Reporting Protocol, Version 3.1. January. Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf
California Energy Commission. 2006. California Commercial End-Use Survey. Prepared by Itron Inc. Available at: Available at: http://www.energy.ca.gov/ceus/
EBMUD. Energy: Generating Renewable Power. Available at: http://www.ebmud.com/sites/default/files/pdfs/2010_EBMUD_Energy.pdf
Gleick, P.H.; Haasz, D.; Henges-Jeck, C.; Srinivasan, V.; Cushing, K.K.; Mann, A. 2003. Waste Not, Want Not: The Potential for Urban Water Conservation in California. Published by the Pacific Institute

Plan-Related GHG Emissions

Construction/Demolition Emissions

The Specific Plan envisions a substantial increase in the level of development within the Plan's Opportunity Areas. Individual projects developed pursuant to the Specific Plan would result in GHG emissions during demolition and construction phases. These construction-related GHG emissions would contribute to the cumulative effects of climate change.

Individual development projects would contribute to the cumulative effects of climate change by directly or indirectly emitting GHGs during demolition and construction. Using heavy equipment, mobilizing a construction workforce, and transporting construction material and debris are activities that typically entail fossil fuel combustion, which in turn causes emissions of GHGs, especially carbon dioxide, methane, and nitrous oxide. Moreover, demolition of old structures to make way for new construction leads to a release of the carbon stored in building materials. These emissions can enter into the atmosphere during decomposition.

Because adoption of the West Oakland Specific Plan does not include any individual development approvals, construction emissions are based on typical activities that would be expected to occur while building the anticipated increment of foreseeable development in the Plan Area. The estimates assume default construction phasing and equipment activity forecasts produced by the URBEMIS emissions-estimating software, and thus do not reflect implementation of the City's SCAs, which would act to reduce construction emissions.

Construction emissions have been annualized over a 40-year period, as 40 years is the typical life expectancy of a building prior to it being demolished or substantially remodeled in a way that changes its energy efficiency. With the total one-time construction-related GHG emissions (24,500 $MTCO_2e$) annualized over 40 years, construction activity anticipated under the Specific Plan would contribute approximately 612 $MTCO_2e$ emissions each year.

Operational Emissions

Individual projects contribute to the cumulative effects of climate change by directly or indirectly emitting GHGs during their operational phases. Direct operational emissions include GHG emissions from new vehicle trips; area sources (woodstoves, landscaping equipment); and natural gas combusted for space heating or cooking. Indirect emissions include emissions caused by power plants producing electricity; energy required to pump, treat, and convey the water supply and wastewater; and emissions associated with waste removal, disposal, and landfill operations.

Table 4.4-5 shows estimated operational emissions for buildout of the land uses as envisioned under the West Oakland Specific Plan, by year 2035. These projections of future emissions do not include emissions from stationary sources, which are considered separately. These emissions estimates rely on mobile source activity forecasts developed from the Transportation chapter of this EIR, and the area source direct and indirect emissions produced by the URBEMIS emissions-estimating software in year 2035 (see **Appendix 4.2**). As shown, GHG emissions from operations with the West Oakland Specific Plan's Opportunity Areas are estimated to exceed 200,000 $MTCO_2e$ per year by 2035.

The modeling assumes implementation of state regulations regarding the chemical content of vehicle fuels (Pavley Standards, Low Carbon Fuel Standard). These regulations will reduce the GHG emissions potential of fuels, and are a major emissions reductions factor as indicated in the model. Future development facilitated by the Specific Plan will also adhere to the City's Green Building Ordinance, which, in conjunction with the California Green Building Standards Code (CALGreen Code) would have the effect of reducing emissions associated with energy use and water use beyond the default energy consumption levels (Title 24 compliance) as used in the model default assumptions.

Table 4.4-5: Estimated Future 2035 CO_2e Emissions, with Project
(Metric Tons/Year of Co_2e)

	Existing (2013)	2035, with Project Buildout	Net Change
Operation Vehicle Emissions	86,359	133,730	47,371
Area Source	142	2,7798	2,637
Electricity	23,818	41,986	18,168
Natural Gas (space and water heating)	2,458	9,397	6,939
Water and Wastewater	307	995	688
Solid Waste	6,338	14,409	8,071
Annualized Construction Emissions		612	612
Total Baseline CO_2e Emissions	**119,423**	203,910	**84,490**
Effective Service Population	10,410	36,396	26,166
GHG emissions per service population			**3.22**

Sources:
California Air Resources Board (ARB). 2008. Local Government Operations Protocol, For the quantification and reporting of greenhouse gas emissions inventories, Version 1.0. September 25.
California Climate Action Registry. 2009. General Reporting Protocol, Version 3.1. January. Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf
California Energy Commission. 2006. California Commercial End-Use Survey. Prepared by Itron Inc. Available at: Available at: http://www.energy.ca.gov/ceus/
EBMUD. Energy: Generating Renewable Power. Available at: http://www.ebmud.com/sites/default/files/pdfs/2010_EBMUD_Energy.pdf
Gleick, P.H.; Haasz, D.; Henges-Jeck, C.; Srinivasan, V.; Cushing, K.K.; Mann, A. 2003. Waste Not, Want Not: The Potential for Urban Water Conservation in California. Published by the Pacific Institute

Combined Operational and Construction Emissions Compared to Baseline

The net increase in GHG emissions attributable to new development as envisioned under the Specific Plan are represented by the difference between the 2035 emissions forecasted by the model, compared to existing baseline emission levels. As indicated in Table 4.4-5, these net new emissions attributable to the Specific Plan are approximately 84,500 $MTCO_2e$/year by 2035. The estimated GHG emissions from development facilitated by the West Oakland Specific Plan would substantially exceed the total annual project-level threshold of 1,100 $MTCO_2e$:

City thresholds also provide for an efficiency valuation of GHG emissions on a per service population basis. To determine the efficiency valuation, the total GHG emissions are divided by the effective service population of the service area (i.e., the West Oakland Opportunity Areas). This service population is calculated as follows:

- The Specific Plan would allow for the future construction of up to 5,090 net new residential dwelling units, which would be expected to house about 11,136 net new residents.
- The Plan would also facilitate development of approximately 4.03 million square feet of net new industrial and commercial land uses that would provide space for about 14,850 net new employees.
- Thus, the West Oakland Specific Plan would generate a net increase in service population of 26,166.

As indicated in Table 4.4-5, implementation of the Specific Plan would result in a net increase in annual emissions of approximately 84,500 $MTCO_2e$ per year. Dividing these annual emissions at buildout by the calculated service population of 26,166 people results an efficiency of approximately 3.22 $MTCO_2e$ per service population. This indicates that the estimated emissions attributable to the West Oakland Specific Plan would fall below the project-level annual threshold of 4.6 $MTCO_2e$ per service population, and below the Plan-level annual threshold of 6.6 $MTCO_2e$ per service population.

- Therefore, at a Plan-level the West Oakland Specific Plan would not exceed the City's GHG threshold, and would not represent a significant impact.
- On a project-level, the West Oakland Specific Plan would exceed the annual emission threshold of 1,100 $MTCO_2e$ per year, but would not exceed the service population threshold of 4.6 metric tons CO_2e per service population, and therefore its GHG emissions would be less than significant.

Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing GHG Emissions

Impact GHG-2: The Specific Plan does not conflict with applicable plans, policies and regulations adopted for the purpose of reducing GHG emissions. As discussed above with respect to Impact GHG-1, the Plan would not exceed the numeric thresholds at either the Plan or Project level. The West Oakland Specific Plan also includes several policy-based design features that would be effective in reducing GHG emissions on an area-wide basis as individual development projects are incrementally proposed and developed, and future development pursuant to the West Oakland Specific Plan would comply with the applicable requirements of the City's recently approved Energy and Climate Action Plan (ECAP). The West Oakland Specific Plan would not be in conflict with current plans or policies the policies adopted for the purpose of reducing GHG emissions. (**LTS**)

The City's numeric significance thresholds were formulated based on AB 32 reduction strategies. The numeric GHG significance thresholds are intended to serve as interim levels during the implementation of AB 32 and SB 375. Until AB 32 has been fully implemented in terms of adopted regulations, incentives, and programs, and until the Sustainable Communities Strategy or Alternative Planning Strategy required by SB 375 have been adopted or the California Air Resources Board (ARB) adopts a recommended threshold, the City's significance thresholds represent substantial compliance with applicable plans, policies and regulations adopted for the purpose of reducing GHG emissions. Therefore, since the Specific Plan would not exceed the numeric service population thresholds at either the Plan or Project level, the Specific Plan would not conflict with applicable plans, policies and regulations adopted for the purpose of reducing GHG emissions.

Design Features and Strategies Included in the Specific Plan for Reducing GHG

In addition to meeting the numeric threshold, the West Oakland Specific Plan includes several policy-based design features that would be effective in reducing GHG emissions on an area-wide basis as individual development projects are incrementally proposed and developed. These design features and project characteristics help implement reduction strategies identified in AB 32 and the City of Oakland's Energy and Climate Action Plan These design features are discussed below:

- Building Rehabilitation. Certain development facilitated by the Specific Plan would incorporate and support sustainable development goals through the renovation and reuse of existing buildings. The targeted reuse of existing buildings would reduce new construction-related GHG emissions by avoiding demolition and disposal of existing resources or energy to obtain and prepare raw resources for replacement structures.

- Construction Waste: All new development pursuant to the Specific Plan will be required to comply with the City Construction and Waste Reduction Ordinance, and to submit a Construction and Demolition Waste Reduction Plan for review and approval. As a result, construction-related truck traffic, with primarily diesel-fueled engines, would be reduced, and the reuse of concrete, asphalt and other debris will reduce the amount of material introduced to area landfills.
- Transit Oriented Development: According to the City Pedestrian Master Plan, the City of Oakland has the highest walking rate of all cities in the nine-county San Francisco Bay Region. These high pedestrian trips are likely because neighborhoods are densely populated and well served by transit, including BART, AC Transit, Amtrak, and the Alameda Ferry. Development facilitated by the Specific Plan would reduce transportation-related GHG emissions compared to emissions from the same level of development elsewhere in the outer Bay Area.
- Energy Efficiency: Development under the Specific Plan would be required to comply with applicable local, state, and federal regulations related to GHG emissions and energy conservation. In particular, future projects would also be required to meet California Energy Efficiency Standards for Residential and Nonresidential Buildings, and the requirements of pertinent City policies as identified in the City of Oakland *General Plan*, helping to reduce future energy demand as well as reduce contribution to regional GHG emissions. These policies include, but are not limited to Cool Roof Coatings performance; CALGREEN; and the City's Green Building Ordinances.
- Urban Infill near Multiple Transit Modes: New residential development under the proposed Specific Plan would include higher-density housing at the West Oakland BART Station, along the Mandela Parkway and San Pablo Avenue transit corridor, and in other locations served by transit. Infill housing near transit would promote walking and non-vehicular travel to a greater extent than would be the case for similar development in outlying areas without transit availability. In addition, the higher-density development would include a greater number of potential residents that could potentially use alternative modes of travel than in a lower density development. Development in West Oakland would reduce transportation related GHG emissions compared to emissions from comparable development in less central locations. Because transit service is less available, development in those locations would likely result in increased peak-hour vehicle trips of relatively long distances, often in single-occupant vehicles, compared to development in West Oakland.

In addition to the Specific Plan's' design features listed above, the following planning objectives and strategies are particularly related to GHG emissions reductions.

- The Specific Plan encourages innovative reuse of existing buildings, more intensive use of existing facilities, and discourages removal of existing structures for parking.
- The Plan seeks to capture a greater share of local neighborhood retail sales "leakage" by providing for more neighborhood-serving shopping opportunities, developing a full-sized grocery store within the Planning Area, other missing retail uses like a drug store and eateries that serve residents and workers.
- The Specific Plan would locate new housing near transit, create higher-density and mixed-use developments, encourage a safe and pleasant pedestrian environment near transit, provide amenities such as benches, kiosks, lighting, and outdoor cafes, and limit conflicts between vehicles and pedestrians. The Specific Plan would implement the City's long-term vision of a transit-oriented development (TOD) at the West Oakland BART station.

- The Plan would provide a network of "complete streets" with mobility for all travel modes.
- The Specific Plan would encourage walking through a land use and development framework that makes walking convenient and enjoyable, maintaining a complete sidewalk network free of gaps, improving pedestrian crossing safety in areas of high pedestrian activity, and providing direct pedestrian connections between activity centers.
- The Plan would improve the network of bicycle routes through West Oakland and make bicycle riding more safe, secure and convenient.
- The Specific Plan seeks to improve AC Transit bus service – particularly at night and on the weekends. The Plan would improve mobility with an improved community transit service (i.e., a shuttle service or enhanced AC Transit bus service, with the potential for a fixed streetcar service). The transit service would link key employment centers and neighborhood destinations in West Oakland and connect to downtown Oakland, Jack London Square, Emeryville and the West Oakland, 12th Street, 19th Street and MacArthur BART Stations.
- The Specific Plan would ensure an adequate supply of parking to attract and support desired development and uses, while encouraging alternative travel modes and efficient use of parking supply. The Plan encourages a "park-once-and-walk" strategy where multiple destinations within an area can be connected by pedestrian trips.
- The Specific Plan calls for continuing, expanding and improving the Port's diesel truck replacement program.
- The Specific Plan incorporates strategies to promote the environmental health of the community when new development is proposed. The Plan would promote and require energy efficiency throughout all aspects of new development and redevelopment. The Plan would ensure that new development employs sustainable "green" building practices, facilitates access to pedestrian and transit networks, and enhances streetscapes and open spaces.

Compliance with Other City Policies and Regulations

All new development facilitated by the West Oakland Specific Plan will be reviewed for consistency with numerous relevant General Plan policies identified in the Regulatory Setting section of this chapter of the EIR that directly or indirectly result in reduced levels of GHG emissions. The Regulatory Setting section above summarizes relevant policies of the Land Use and Transportation Element and OSCAR that promote compact, transit-oriented development, alternatives to single-occupancy vehicle transportation, energy efficiency in building design and site planning, landscaping, and other measures that would individually and collectively reduce the energy usage of new developments, in turn resulting in reduced GHG emissions relative to development not subject to such policies. All new development facilitated by the West Oakland Specific Plan is also expected to be required to comply with the applicable requirements of the City's recently approved Energy and Climate Action Plan (ECAP), which implements the City of Oakland's GHG reduction target for the year 2020 of 36% below year 2005 levels. The ECAP sets forth a multifaceted approach to GHG reductions, including policies related to land use, transportation, site planning, and related considerations.

Conclusions

The West Oakland Specific Plan would not be in conflict with current plans or policies the policies adopted for the purpose of reducing GHG emissions. Because the GHG emissions of the Specific Plan would be below the numeric service population significance thresholds, and the Plan would comply with applicable plans, policies and regulations adopted for the purpose of reducing GHG emissions. Additionally, the Specific Plan would be consistent with each of the plans, policies and regulations described above, including the 2012 Oakland Energy and Climate Action Plan (ECAP), in reducing GHG emissions as compared to a baseline business-as-usual approach.

New Stationary Sources of GHG Emissions, Individual Development Projects

Impact GHG-3: New industrial and commercial growth facilitated by the Specific Plan could introduce new stationary sources of greenhouse gases. It is possible that on an individual basis, certain development project envisioned and enabled under the Specific Plan could exceed, on an individual and project-by-project basis, the project-level GHG threshold. (**SU**)

Although the overall Specific Plan would have a less than significant impact regarding GHG emissions because of the service population ratio, this conclusion is based on full implementation of all subsequent development as envisioned under the Plan, including its full population and employment growth. There is no certainty that all development envisioned under the Plan will ultimately be implemented, or implemented at the densities envisioned under the Plan. [40]

New industrial and commercial growth facilitated by the Specific Plan could introduce new stationary sources of greenhouse gases. The nature of such future land uses would vary widely in terms of potential stationary source emissions. Potential new stationary sources that could foreseeably occur in the Plan Area include standby power generators, boilers, heaters, or other industrial process sources. It is assumed that development facilitated by the Specific Plan would replace some existing industrial uses (such as certain recycling uses) which would lead to a decrease in area-wide stationary source emissions, but the precise extent of such replacement cannot be determined with certainty.

Future uses that introduce new stationary sources would be subject to BAAQMD review and permitting for new air pollutant and GHG emissions. Any proposed new stationary sources would be subject to a separate GHG threshold of significance (10,000 MTCO2e annually), not the service-population threshold applicable to land development. The BAAQMD has found that stationary source permit applications with emissions above the 10,000 MTCO2e annual threshold account for less than 10 percent of stationary source permit applications reviewed by BAAQMD, but represent 95 percent of GHG emissions from new permits.

Because future industrial growth would be likely to include some new stationary sources, the subsequent growth in stationary source emissions may produce individual-source emissions that singly or collectively exceed 10,000 metric tons of CO2e annually. As a result, industrial land use development in the Plan Area could result in significant levels of stationary source GHG emissions. However, all such potentially new stationary sources would be subject to the BAAQMD's requirement for New Source Review, through which the BAAQMD may impose conditions that would lead to emissions reductions from any new stationary sources that may be proposed.

---

[40] It should be noted that the Housing Element DEIR analyzed the impact of GHG emissions increases and found that developments of 172 residential units or fewer would be considered to have less-than-significant impacts and generally would not require further environmental review with regard to climate change, assuming that 2008 Title 24 standards are met and that the project is generally in conformance with the development patterns identified in the Housing Element Project Design Features.

Standard Conditions of Approval

Each new development project within the West Oakland Specific Plan's Opportunity Areas will be required to assess whether that development project may result in individually significant levels of GHG emissions. Proposed projects exceeding pertinent screening criteria are required to undergo project-specific GHG emissions forecasts and, as appropriate, implement project-specific GHG reduction plans intended to reduce project emissions levels below relevant thresholds. GHG offsets, whether implemented on or off-site, are potentially viable components of an acceptable GHG reduction plan.

The City has also established several other SCAs and policies that would act to reduce project-specific GHG emissions. These other SCA's include:

- SCA Traf-1: Parking and Transportation Demand Management: This SCA requires that projects of a certain type and size submit for review and approval by the City of Oakland Planning and Zoning Division a Transportation Demand Management (TDM) Plan containing strategies to reduce on-site parking demand and single occupancy vehicle (SOV) travel. Generally the TDM Plan could reduce SOV trips for projects located near transit by about 10 to 20 percent, depending on the specific land use. Certain projects facilitated by the West Oakland Specific Plan would be required to prepare a TDM Plan and incorporate the resulting reduced emissions (from reduced vehicle trips) into the project's GHG emissions calculations.
- SCA Util-1: Waste Reduction and Recycling: This SCA requires a project applicant to submit a Construction & Demolition Waste Reduction and Recycling Plan (WRRP) and an Operational Diversion Plan (ODP) for review and approval by the Oakland Public Works Agency. Chapter 15.34 of the Oakland Municipal Code outlines requirements for reducing waste and optimizing construction and demolition (C&D) recycling. Affected projects include all new construction and all demolition. This SCA essentially addresses reduction in construction–related emissions, which the City combines with a project's operational emissions to assess against the significance thresholds for operational emissions, even though construction emissions are not a component of BAAQMD's Guidelines. Therefore, this SCA will contribute to reducing total emissions of development facilitated by the Specific Plan.
- Several SCAs Regarding Landscape Requirements and Tree Replacement: Several SCAs address landscape requirements for frontages of commercial buildings and replacement of trees removed as part of a project. Projects are required to install one tree for every 25 feet of street frontage in cases where sidewalks have adequate width. Additionally SCAs generally require the replacement of native trees removed as part of a project. Together, these SCAs that maintain and increase landscaping and trees create a cooler climate, reduce excessive solar gain, and absorb CO_2e emissions for a contribution to emission reductions, but have no impact on the emissions inventory of development facilitated by the Specific Plan.
- Several SCAs Regarding Stormwater Management: Consistent with regional stormwater management programs and requirements that projects much comply with, the City has several SCAs that aim to reduce post-construction stormwater runoff that could affect the ability to accommodate potentially increased storms and flooding within existing floodplains and infrastructure systems. These SCAs are relevant as climate change can result in increased flooding due to warmer climate (e.g., earlier and greater melting of snowpack) and inadequate infrastructure.

SCA F: Greenhouse Gas (GHG) Reduction Plan

Under the City's required SCAs F: Greenhouse Gas Reduction Plan, individual development projects exceeding project-level screening criteria are required to undergo project-specific GHG emissions forecasts and, as appropriate, implement project-specific GHG reduction plans, with the goal of increasing energy efficiency and reducing GHG emissions to the greatest extent feasible below both applicable numeric City of Oakland CEQA Thresholds (i.e., total emissions and per service population) to help achieve the City's goal of reducing GHG emissions. As individual projects tiering off the Specific Plan occur, their specific design features and GHG reduction measures, including TDM programs, as well as specifics about project types, land use specific travel demand and the availability of transit access will be defined and factored into their GHG Reduction Plan prepared pursuant to SCA F. Not until these tiered projects are proposed and evaluated can the efficacy of each individual project's design characteristics, applicable SCAs and other City policies (particularly SCA F) in reducing GHG emissions to below relevant thresholds be determined.

Mitigation Measures

None feasible - The SCAs and City policies discussed above represent a comprehensive approach to reducing energy usage, fostering more sustainable land use development patterns, and reducing GHG emissions. No other mitigation is considered feasible in addition to those SCAs, policies, and programs mentioned above.

Significance after Mitigation

Conservatively determined to be **Significant and Unavoidable** because it cannot be guaranteed that reductions can be achieved

Flooding Impacts Related to Sea Level Rise

GHG-4: Portions of West Oakland would be subject to flooding due to predicted sea level rise associated with global climate change. With increased flooding potential in the future, development in accordance with the Specific Plan could place people, structures and other improvements in these areas at an increased risk of injury or loss from flooding. **(LTS)**

The impact of flooding related to sea level rise pertains to the impact of an existing/future environmental condition on the Planning Area. CEQA only requires an analysis of impacts pertaining to a project's impact on the environment. The impact of future growth in the West Oakland Planning Area on the environment related to the Project's GHG emissions, the cause of sea level rise, is analyzed and discussed above. Per CEQA, this Draft EIR is not required to analyze or mitigate impacts pertaining to the impact of the environment on the Planning Area. An appellate court specifically identified the effect of sea level rise on a project as an impact of the environment on a project and, therefore, not required to be analyzed under CEQA. However, although not legally required by CEQA, this Draft EIR nevertheless discusses the impact of sea level rise on the Planning Area in the interest of being conservative and providing information to the public and decision-makers. Where a potential significant effect of the environment on the project is identified, City Standard Conditions of Approval and/or project-specific non-CEQA recommendations are identified to address these issues.

Sea Level Rise Predictions

Regional sea level rise predictions for the San Francisco Bay region predict a 16-inch rise in sea level by mid-century and a 55-inch rise by the end of the century. According to San Francisco Bay Conservation and Development Commission (BCDC) maps of shoreline areas vulnerable to sea level rise, portions of the West Oakland Planning Area could be subject to flooding due to predicted sea level rise associated with global climate change (see **Figure 4.4-1**). With increased flooding potential in the future, development in accordance with the Specific Plan could place people, structures and other improvements at an increased risk of injury or loss from flooding.

As part of its Adapting to Rising Tides project, BCDC evaluated the potential impacts and disruptions to essential community services and activities from sea level rise and storm events in West Oakland.[41] The BCDC study analyzed neighborhood vulnerability by assessing the exposure, sensitivity, adaptive capacity, and consequence of disruptions to essential community services caused by flooding related to sea level rise. Critical community facilities include police stations, fire stations, schools, hospitals, long-term care facilities, homeless shelters, food banks, jails, and emergency shelters. Critical facilities also include major components of the community infrastructure, such as the Ettie Street Pump Station. The number of exposed facilities increases as the severity of sea level rise and storm event increases. Communities depend on the continued operation of essential services to reduce the impacts of flood events.

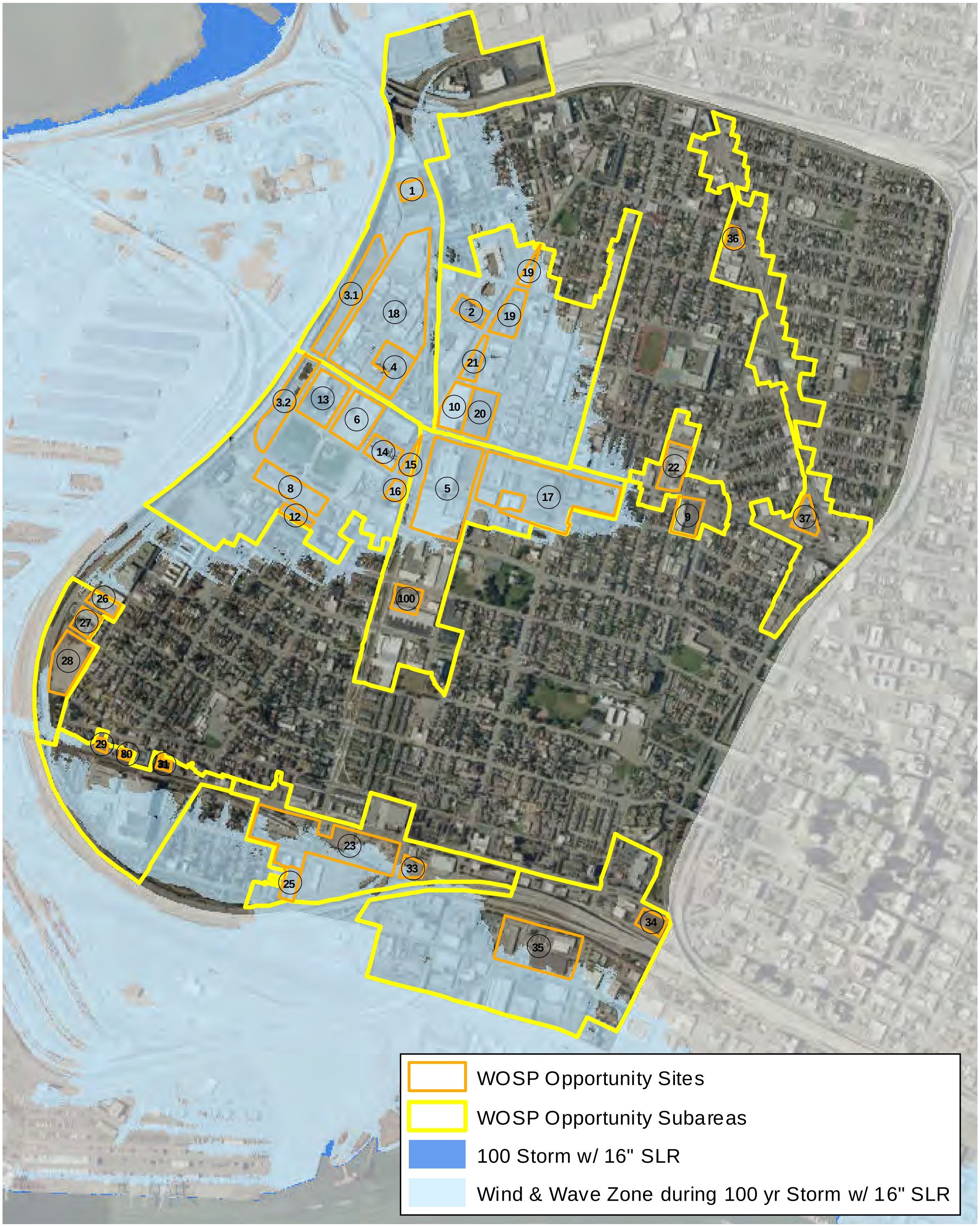
Exposure refers to whether a particular area or a specific facility within the community is subjected to sea level rise and storm events. For the Adapting to Rising Tides project, six scenarios were modeled and mapped to show areas that may potentially become inundated by a rising Bay under 16-inch and 55-inch rises in sea level, with 100-year storm events and wind waves.

According to the most severe scenario studied in the Rising Tides Assessment (a 55-inch rise in sea level accompanied by a severe wind and wave storm event), five existing critical facilities would be exposed to flooding, including one child care facility (Oakland Head Start, at West Grand Avenue Center), one food bank (at the Mount Zion Missionary Baptist Church Community Food Giveaway), two schools (Civicorps Elementary School and Academy, and Bunche Continuation School), and one fire station (Station 3). Fire Station 3 is located at 1445 14th Street at Mandela Parkway, and houses the Oakland Fire Department's specialized hazardous materials incident response personnel, apparatus and equipment.

West Oakland residents are more likely to be renters, have less access to a vehicle, are more non-White, and have less household income than Oakland as a whole, which makes them more vulnerable to flooding impacts and less able to adapt and/or quickly recover from flooding.

---

[41] San Francisco Bay Conservation and Development Commission (BCDC), Adapting to Rising Tides Vulnerability Assessment: Neighborhood of West Oakland, City of Oakland, California.



Source: UC Berkeley School of Public Health

Figure 4.4-1
Susceptibility to 16-Inch Sea Level Rise

Figure 4.4-1 illustrates West Oakland's potential exposure. Flooding would occur primarily in the Mandela/West Grand Opportunity Area near the West Grand Avenue/Mandela Parkway intersection, extending into adjacent residential streets to the east and south. The West Oakland BART Station and surrounding TOD, and the 3rd Street Opportunity Area would also be exposed to flooding. A large number of known hazardous materials release sites in the West Oakland Planning Area could be exposed to flooding or affected by increases in groundwater elevation, including the former Oakland Army Base and the former AMCO Chemical facility.

Policy and Regulatory Responses

Given the potential for sea level rise, it is reasonable to anticipate that FEMA will continue to update its flood hazards mapping over time as necessary to reflect changes in sea levels. Thus, when implemented, the safety measures built into the General Plan policies in the Safety Element, and the SCAs related to construction within 100-year flood zones, and adaptive management measures to sea level rise would reduce these potential impacts to less than significant levels.

Further, although the West Oakland Planning Area is located outside of 100 feet of high tide and therefore outside of BCDC's jurisdiction, as the Bay water rises under the projected 16" and 55" sea level rise scenarios, this boundary would change and portions of the Plan Area would be subject to BCDC's regulatory authority. Should this expanded jurisdiction occur during the life of the Plan, the City's SCA 84, Regulatory Permits and Authorizations, would require compliance with BCDC in addition to other applicable requirements of regulatory agencies.

Furthermore, implicit in the discussion of global warming, greenhouse gas emissions and sea level rise is that it extends beyond specific development projects, a specific plan area, or, indeed, an entire City. As both a local and a regional issue, it must be addressed in that context. The adopted Bay Plan and Oakland's Draft ECAP specifically recognize this, and include actions to participate in the preparation of a regional climate adaption strategy.

4.5

Hazards and Hazardous Materials

This chapter evaluates the potential hazards and hazardous materials impacts of the proposed Specific Plan. It describes existing conditions in and around West Oakland and evaluates the impacts and mitigation needs of development allowed by the Specific Plan.

Physical Setting

Hazardous Materials[1]

West Oakland was one of the first industrial locations in the San Francisco Bay Area, later became a center for defense related industries, and continues to be a major transportation hub and industrial zone. Over the years, many transportation and industrial uses have relocated or closed and many of the industrial properties have been abandoned and left contaminated.

West Oakland today contains a mix of industrial, commercial and residential uses. Industrial uses are often located adjacent to or near residential and other sensitive land uses, such as schools and parks. Many ongoing industrial operations use, store or transport hazardous materials, and there continue to be instances of hazardous materials releases contaminating soil or groundwater, posing a hazard to human health and the environment.

Contamination of soil and groundwater not only poses a hazard to human health and the environment, but also deters redevelopment. Faced with the unknown costs associated with cleanup of contamination and the risks of taking on long-term liability associated with contamination at a property, developers have often preferred development in other areas where there are no contamination concerns. Remediation can be expensive and its cost can exceed the land value, leading landowners to abandon the property in a contaminated condition. Regulatory enforcement and litigation to compel landowners to clean up their property can be time-consuming, often dragging out for years. Even after remediation is completed, the cleanup standards may limit how the property can be redeveloped and reused.

A number of initiatives have been undertaken to promote reuse of these “brownfields” by facilitating cleanup of identified environmental cases, as well as generally encouraging reuse of

---

1 Materials and waste may be considered hazardous if they are poisonous (toxic), can be ignited by open flame (ignitable), corrode other materials (corrosive), or react violently, explode or generate vapors when mixed with water (reactive). The term “hazardous material” is defined in the State Health and Safety Code (Chapter 6.95, Section 25501[o]) as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment. A hazardous waste, for the purpose of this EIR, is any hazardous material that is abandoned, discarded, or recycled, as defined in the State Health and Safety Code (Chapter 6.95, Section 25125).

abandoned, idled, and underutilized properties, whether contaminated or not. The Federal National Priorities List/Superfund program designates funding for high priority sites where public health may be in jeopardy. Federal and State brownfields programs provide grants to support environmental assessment, cleanup, and related job training activities. Also, as surrounding properties are redeveloped and market demand grows, there is greater potential for private capital investment in the cleanup and reuse of contaminated sites.

Environmental Cases (i.e., the "Cortese List")

In California, regulatory databases listing hazardous materials sites provided by numerous federal, state, and local agencies are consolidated in the "Cortese List" pursuant to Government Code Section 65962.5. The Cortese List is located on the California Environmental Protection Agency's (Cal EPA) website and is a compilation of the following lists:

- the list of Hazardous Waste and Substances sites from the California Department of Toxic Substances Control (DTSC) "EnviroStor" database;
- the list of Leaking Underground Storage Tank Sites (LUSTs) from the California Water Resource Control Board's (WRCB) "GeoTracker" database
- the list of solid waste disposal sites identified by WRCB with waste constituents above hazardous waste levels outside the waste management unit
- the list of hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code, identified by DTSC.

Additionally, the Alameda County Department of Environmental Health (ACDEH) maintains a list of site for which it is the administrative agency responsible for coordination and enforcement of local, state, and federal hazardous materials management and environmental protection programs, as recognized by the State of California Department of Toxics Substances Control.

The following discussion of environmental conditions is based on information from environmental regulatory databases maintained by numerous federal, state, and local agencies.[2] This database list has been supplemented by current (2013) research on the internet sites provided through the DTSC EnviroStor database, State Water Resources Control Board's Geotracker database, and the San Francisco Bay Regional Water Quality Control Board (RWQCB) Spills, Leaks, Investigations, and Cleanup database (SLIC) and Alameda County DEH databases. This aggregated list comprises the "Cortese List" of properties within the West Oakland Planning Area.

Federally Maintained Lists

Federal CERCLIS List

The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons. It contains sites which are either proposed for listing as a Superfund site and sites which are in the screening and

2 Environmental Data Resources, Inc., 2011.

assessment phase for possible inclusion on the Superfund list.[3] CERCLIS is an automated inventory of site information for potential or confirmed hazardous waste sites addressed under the Superfund program. Over 46,000 sites have been added to CERCLIS nationally, although most of these sites have been evaluated and do not require further federal Superfund work.

- Federal National Priority List (NPL): The National Priority List is also known as the Superfund, the name given to the environmental program established to address abandoned hazardous waste sites. It is also the name of the fund established by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). This law allows the EPA to clean up contaminated sites and to compel responsible parties to perform cleanups or reimburse the government for EPA cleanups. It involves the steps taken to assess sites, place them on the National Priorities List, and establish and implement appropriate cleanup plans. In addition, the EPA has the authority to conduct removal actions where immediate action needs to be taken; to enforce against potentially responsible parties; to ensure community involvement; involve states; and ensure long-term protectiveness.[4]
- Federal "No Further Remedial Action Planned List (NFRAP): A perceived threat of Superfund liability was associated with many sites no longer of federal Superfund interest. EPA addressed this issue by implementing the CERCLIS archiving effort in early 1995 as part of the Agency's Brownfields Economic Redevelopment Initiative. The CERCLIS archiving effort initiated a means to designate sites in the CERCLIS inventory as "archive." An archive designation means that a site does not require cleanup under the federal Superfund program based on information available at the time of the designation. Additional Superfund assessment work at an archive site may be necessary if site conditions change or if new information warranting further Superfund attention is identified. An archive designation does not necessarily mean a site is free of contamination; rather, it focuses on EPA's cleanup intentions at sites addressed under the federal Superfund program.[5]
- Resource Conservation and Recovery Act (RCRA) Lists: The Resource Conservation and Recovery Act (RCRA) gives the EPA authority to control the generation, transportation, treatment, storage, and disposal of hazardous waste, and to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. Provisions of RCRA focus on waste minimization and phasing out land disposal of hazardous waste as well as corrective action for releases. Some of the other mandates of this law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.
- Corrective Action Activity List (CORRACTS): The RCRA Corrective Action Activity List (CORRACTS) is a list of hazardous materials handlers with RCRA Corrective Action activity, showing which nationally-defined corrective action events have occurred for every handler that has had corrective action activity.

---

3 http://cumulis.epa.gov/supercpad/cursites/srchsites.cfm

4 http://www.epa.gov/superfund/about.htm

5 Accessed at http://www.epa.gov/superfund/programs/reforms/reforms/2-4c.htm

State of California Data Base Lists

Department of Toxic Substances Control (DTSC) ENVIROSTOR List

The ENVIROSTOR list is derived from the DTSC's Site Mitigation and Brownfields Reuse Program's ENVIROSTOR database, and identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database's public web site provides access to detailed information on hazardous waste permitted and corrective action facilities, as well as existing site cleanup information. EnviroStor allows you to search for information on investigation, cleanup, permitting, and/or corrective actions that are planned, being conducted or have been completed under DTSC's oversight.[6]

- DTSC Priority List (RESPONSE): The RESPONSE list identifies confirmed release sites in California where the California Department of Toxic Substances Control (DTSC) is involved in remediation, either as the lead agency or in an oversight capacity. These confirmed release sites are generally high-priority and high potential risk.
- Voluntary Cleanup Sites (VCP): This list contains low-threat level properties with either confirmed or unconfirmed releases of hazardous materials, and where project proponents have request that DTSC oversee investigation and/or cleanup activities, and have agreed to provide coverage for DTSC's costs for investigation and/or cleanup.
- Local Land Records (DEED): The use of recorded land use restrictions is one of the methods the DTSC uses to protect the public from unsafe exposures to hazardous substances and wastes.

State Water Resources Control Board's (SWRCB) GeoTracker List

GeoTracker is the Water Boards' data management system for managing sites that impact groundwater, especially those that require groundwater cleanup (Underground Storage Tanks, Department of Defense, and Site Cleanup Program) as well as permitted facilities such as operating underground storage tanks (USTs) and land disposal sites. GeoTracker records include data from multiple State Water Board programs and other agencies, helping the Water Board, regional Boards and the USEPA to monitor progress of cases throughout the State. GeoTracker provides most of the public record for a site to the public through its Document Manager Module.[7]

- State Leaking Underground Storage Tank List (LUST): The State Water Resources Control Board provides assistance to local agencies enforcing UST requirements. The Leaking Underground Storage Tank Incident reports contain an inventory of reported leaking underground storage tank incidents. The data comes from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

Alameda County Department of Environmental Health Lists

The Alameda County Environmental Health Department (DEH) provides regulatory authority to require property owners and responsible persons to investigate and cleanup petroleum fuel and

[6] http://www.envirostor.dtsc.ca.gov.

[7] http://www.waterboards.ca.gov/water_issues/programs/gama/docs/geotracker_factsheet.pdf

byproducts that have leaked from underground storage tanks. The County may initiate enforcement action when necessary in collaboration with the County District Attorney, the RWQCB or other appropriate enforcement agencies. The County works with both the SWRCB and with the RWQCB to ensure protection of human health and safety and the protection of the environment. County oversight for investigation and cleanup is maintained under the following databases:

- Leaking Underground Fuel Tanks (LUFT): LUFT sites are those sites that have or had leaking underground fuel tanks.
- Spills, Leaks Investigation and Cleanup (SLIC): SLIC sites are those that have had chemical releases that have contaminated soil and/or groundwater.

Cortese List Status

Regulatory databases contain relatively current information about environmental cases involving suspected or confirmed releases of hazardous materials to the subsurface soil or groundwater. The status of each environmental case can be either active (ongoing investigations or remediation), closed (remediation or cleanup completed and approved by the regulatory agency), or unknown. The information and status of identified sites changes as characterization, cleanup and monitoring of contamination occurs. Sites are typically closed once it has been demonstrated that existing or intended site uses combined with the levels of identified contamination present no significant risk to human health or the environment. Regulatory databases are updated frequently and would need to be revisited prior to construction for development facilitated by the Specific Plan.

Environmental Cases in West Oakland

Potential sources of contaminated or hazardous materials within West Oakland include those previous land uses which involved the use of hazardous materials, older buildings which were constructed with materials now identified as being hazardous (i.e., asbestos, lead-based paint, etc.), as well as users of hazardous materials in cases where such uses result in leakage into the ground, including underground storage tanks (USTs) and permitted handling of hazardous wastes.

It's important to note that not all users of hazardous materials result in contamination, as current laws and best practices employed by businesses which use hazardous materials as part of their operations are specifically intended to prevent such contamination. However, sites where soil or groundwater has been affected or is suspected to be affected by a chemical release from past or present land uses (referred to as "environmental cases") are identified on federal, state and local regulatory agency lists, such as the State of California's Cortese list. These lists are developed to document and record site disturbance activities such as removal or repair of an underground storage tank, a spill of hazardous substances, or excavation for construction. The status of each environmental case varies and can be either active (with ongoing investigations or remediation), closed (remediation or clean-up completed and approved by the regulatory agency "No Further Action" documentation), or inactive/unknown (usually indicating that efforts toward remediation have stalled or been suspended). The status of each case changes with time, and new cases are periodically added to the databases. There are also cases of suspected or identified contamination at sites that are not yet entered into regulatory agency lists.

According to current database lists, the majority of reported environmental cases within West Oakland are attributed to leaking underground storage tanks, most of which contain, or used to contain motor oil, gasoline of other similar petroleum products. However, there are also a number of reported cases of more complex and hazardous incidents where toxic chemicals have been spilled or otherwise released into the soils and groundwater, resulting in potential health and safety concerns for residents and employees of the area.

Soil and/or groundwater contamination poses a constraint to redevelopment of affected properties. Federal, state and local regulations prohibit activities such as grading or new development prior to cleanup or remediation at sites where contamination may present hazards to human health or the environment.

Environmental Cases by Opportunity Area

Mandela/West Grand Opportunity Area

There are a total of 123 reported environmental cases within the Mandela/West Grand Opportunity Area. Of that total, there are only 54 sites that currently remain open or unresolved, indicating that 69 sites (or nearly 60% of all reported environmental cases within this Opportunity Area) have been remediated and closed in a manner that meets regulatory agency standards for the protection of environmental health and safety.

- Of the 54 open or unresolved cases in the Mandela/West Grand Opportunity Area, there are only 8 sites identified on the California Department of Toxic Substances Control (DTSC) EnviroStor database as either “active” or inactive and in need of further investigation. These are sites that are either contaminated or believed to be contaminated with some level of toxic substances. The DTSC has issued closure certifications or no further action notice to 29 total cases within this Opportunity Area.
- In addition to the 8 DTSC sites, there are 30 other “open” sites identified on the State Water Resources Control Board’s (SWRCB) GeoTracker database, indicating sites that have had an unauthorized release of pollutants that may adversely affect groundwater and surface water. The majority of these sites are underground petroleum storage tanks suspected of a leak. The RWQCB has issued closure on 52 total cases within this Opportunity Area.
- The Alameda County Department of Environmental Health (ACEH) works with the RWQCB to ensure protection of human health and safety and the protection of the environment, and assumes jurisdiction on certain underground storage tank cases as well as other spills, leaks, investigations and other cleanups. There are 15 total cases identified as being under current ACEH jurisdiction.
- There are 5 closed sites which carry deed restrictions preventing future use of those sites for residential or other more sensitive uses without further remediation efforts.

Figure 4.5-1 shows the location of all currently active environmental cases within the Mandela/West Grand Opportunity Area.

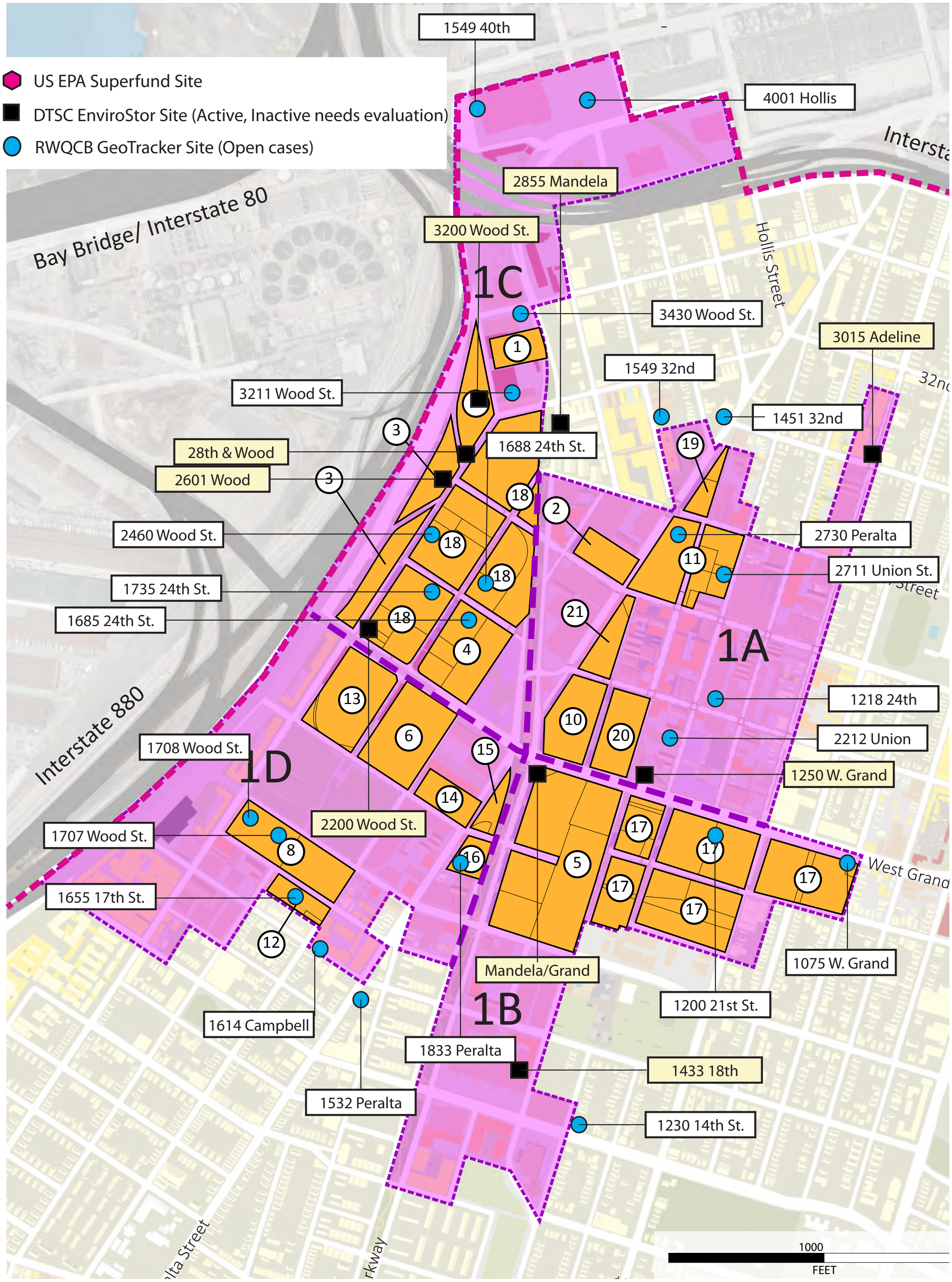


Figure 4.5-1
"Cortese List" Sites, Mandela/Grand Opportunity Area

Sources: US EPA Superfund database; DTSC EnviroStor databases, and RWQCB Geotracker database

Table 4.5-1: Mandela/Grand Opportunity Area – Environmental Cases

	Open Cases	Closed Cases
Federal Environmental Cases	0	8
State and Local Data Bases Cases:		
DTSC EnviroStor Database	8	29
SWRCB GeoTracker Database	30	52
ACEH Cases	15	
	54	88
Total Environmental Cases	123 (Total cases does not equal the sum of database records due to multiple agency jurisdiction over certain sites)	

7th Street Opportunity Area

There are a total of 52 reported environmental cases within the 7th Street Opportunity Area. Of that total, there are only 18 sites that currently remain open or unresolved, indicating that 34 sites (or nearly 65% of all reported environmental cases within this Opportunity Area) have been remediated and closed in a manner that meets regulatory agency standards for the protection of environmental health and safety.

- One major environmental case, the former AMCO Chemical facility at 1414 3rd Street, remains "open" on the US EPA federal list, the DTSC list, the SWRCB list and the local ACEH lists. It is a National Priorities List site, indicating that its potential hazards to human health and the environment remain of national significance.
- Of the other 17 open or unresolved cases in the 7th Street Opportunity Area, there are 7 active or on-going sites identified on the DTSC EnviroStor database that are either contaminated or believed to be contaminated with some level of toxic substances. The DTSC has issued closure certifications or no further action notice to 24 total cases within this Opportunity Area.
- In addition to these 8 federal or DTSC sites, there are 9 other "open" sites identified on the SWRCB GeoTracker database, the majority of which are underground storage tanks suspected of a leak. The RWQCB has issued closure on 10 total cases within this Opportunity Area.
- There are also 3 additional cases identified as being under current ACEH jurisdiction.
- There are 2 sites which carry deed restrictions preventing future use of those sites for residential or other more sensitive uses without further remediation efforts.

Figure 4.5-2 shows the location of all currently active environmental cases within the 7th Street Opportunity Area.

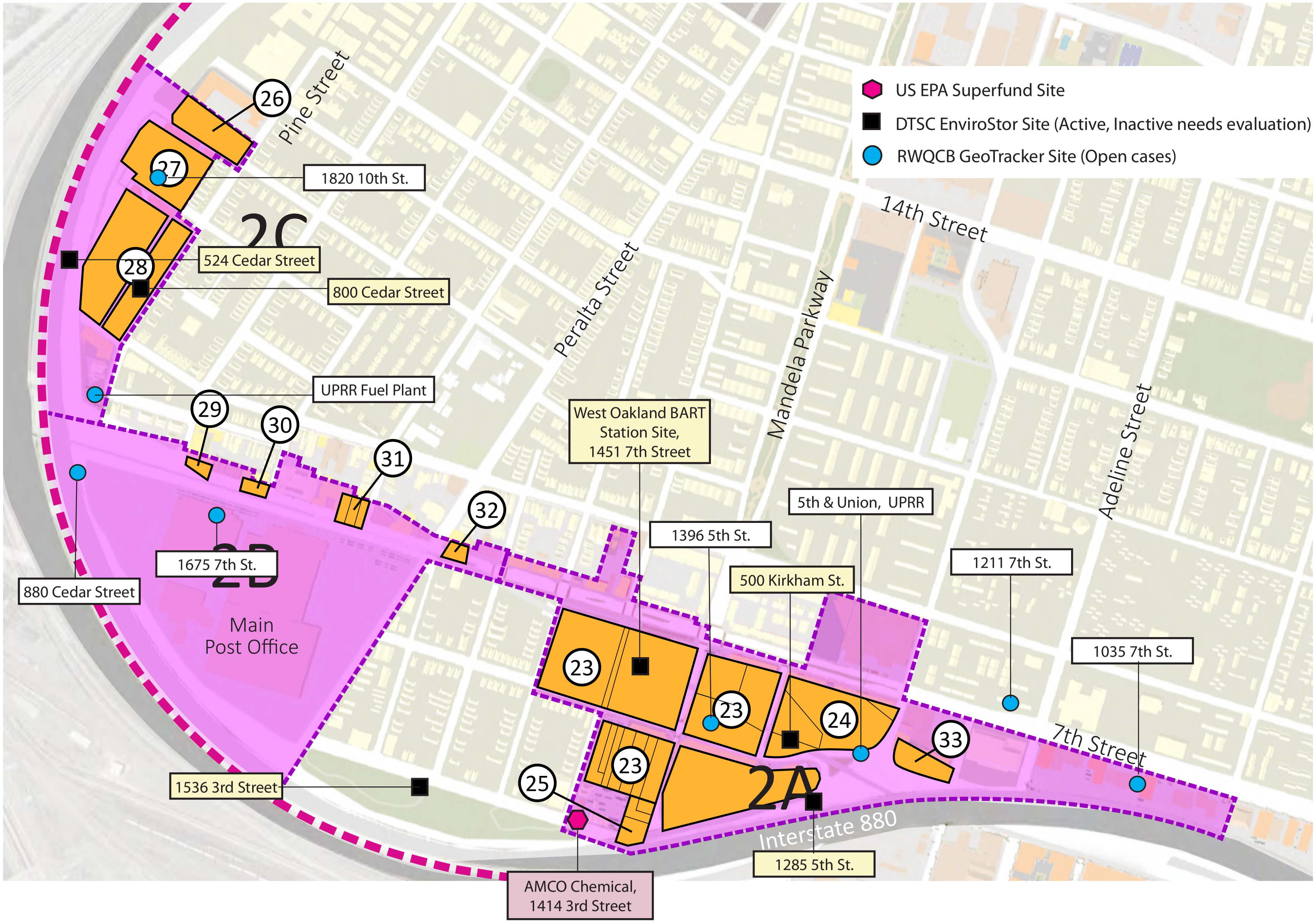


Figure 4.5-2
"Cortese List" Sites, 7th Street Opportunity Area

Sources: US EPA Superfund database; DTSC EnviroStor databases, and RWQCB Geotracker database

Table 4.5-2: 7th Street Opportunity Area – Environmental Cases

	Open Cases	Closed Cases
Federal Environmental Cases	1	5
State and Local Data Bases Cases:		
DTSC EnviroStor Database	7	24
SWRCB GeoTracker Database	10	10
ACEH Cases	3	
	21	39
Total Environmental Cases	52 (Total cases does not equal the sum of database records due to multiple agency jurisdiction over certain sites)	

3rd Street Opportunity Area

There are 31 reported environmental cases within the 3rd Street Opportunity Area. Of that total, there are only 12 sites that currently remain open or unresolved, indicating that 19 sites (or over 60% of all reported environmental cases within this Opportunity Area) have been remediated and closed in a manner that meets regulatory agency standards for the protection of environmental health and safety.

- Of these 31 open or unresolved cases in the 7th Street Opportunity Area, there are only 2 active or on-going sites identified on the DTSC EnviroStor database that are either contaminated or believed to be contaminated with some level of toxic substances. The DTSC has issued closure certifications or no further action notice to 7 total cases within this Opportunity Area.
- In addition to these 2 DTSC sites, there are 10 other “open” sites identified on the SWRCB GeoTracker database, the majority of which are underground storage tanks suspected of a leak. The RWQCB has issued closure on 14 total cases within this Opportunity Area.
- There are no additional cases identified as being only under current ACEH jurisdiction.
- There is 1 site which carries a deed restriction preventing future use of this site for residential or other more sensitive uses without further remediation efforts.

Figure 4.5-3 shows the location of all currently active environmental cases within the 3rd Street Opportunity Area.

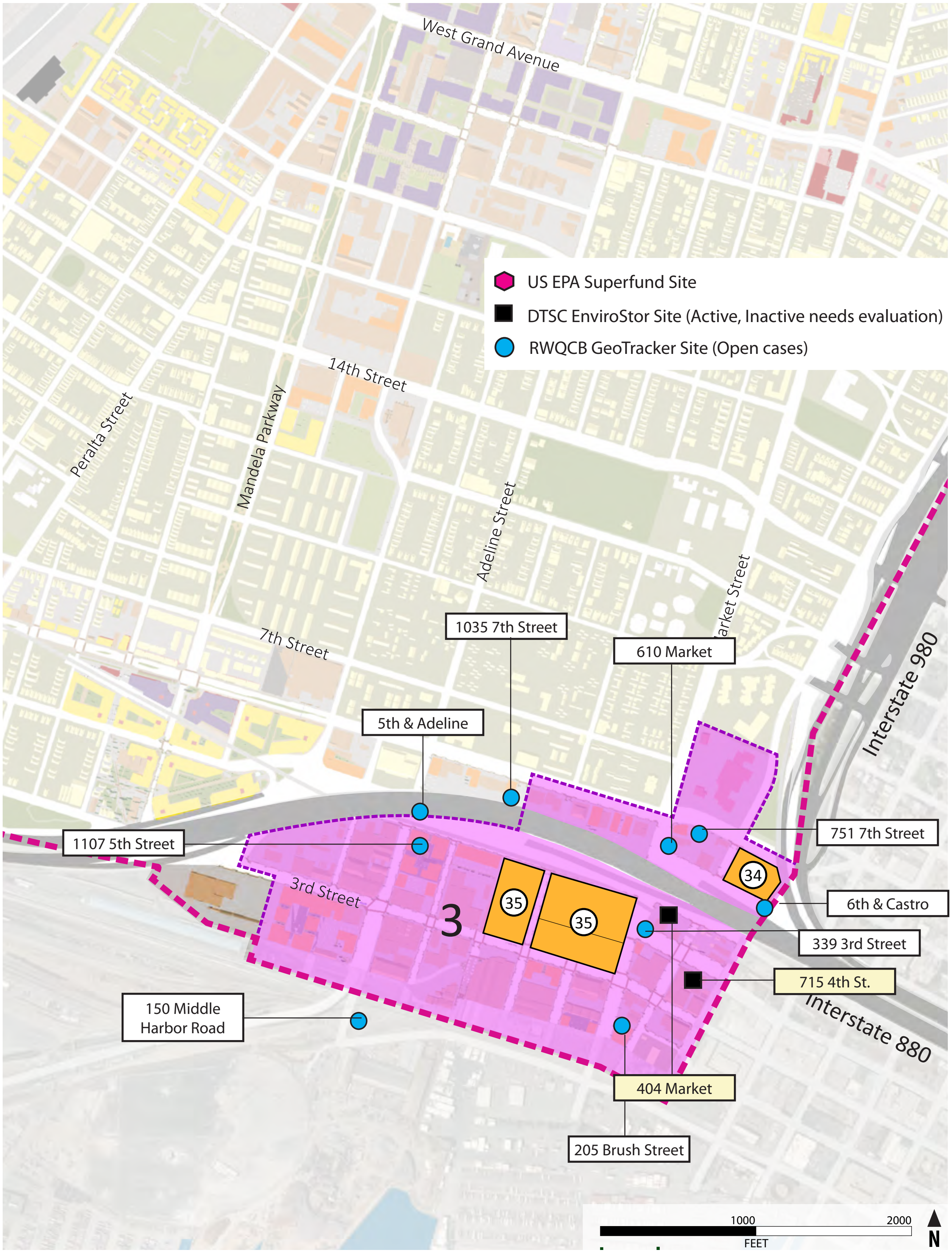


Figure 4.5-3
"Cortese List" Sites, 3rd Street Opportunity Area

Sources: US EPA Superfund database; DTSC EnviroStor databases, and RWQCB Geotracker database

Table 4.5-3: 3rd Street Opportunity Area – Environmental Cases

	Open Cases	Closed Cases
Federal Environmental Cases	0	3
State and Local Data Bases Cases:		
DTSC EnviroStor Database	2	7
SWRCB GeoTracker Database	11	14
ACEH Cases	0	
	13	24
Total Environmental Cases	31 (Total cases does not equal the sum of database records due to multiple agency jurisdiction over certain sites)	

San Pablo Avenue Opportunity Area

There are 29 reported environmental cases within the San Pablo Avenue Opportunity Area. Of that total, there are 13 sites that currently remain open or unresolved, indicating that 16 sites (or over 55% of all reported environmental cases within this Opportunity Area) have been remediated and closed in a manner that meets regulatory agency standards for the protection of environmental health and safety.

- There are no sites reported on federal databases.
- Of the 29 open or unresolved cases in the San Pablo Opportunity Area, there are only 4 active or on-going sites identified on the DTSC EnviroStor database that are either contaminated or believed to be contaminated with some level of toxic substances.
- In addition to these 4 open DTSC sites, there are 7 other “open” sites identified on the SWRCB GeoTracker database, nearly all of which are underground storage tanks suspected of a leak. The RWQCB has issued closure on 17 total cases within this Opportunity Area.
- There are 2 additional current cases identified as being under current ACEH jurisdiction.
- There are no sites which carry deed restrictions preventing future use of those sites for residential or other more sensitive uses.

Figure 4.5-4 shows the location of all currently active environmental cases within the San Pablo Avenue Opportunity Area.

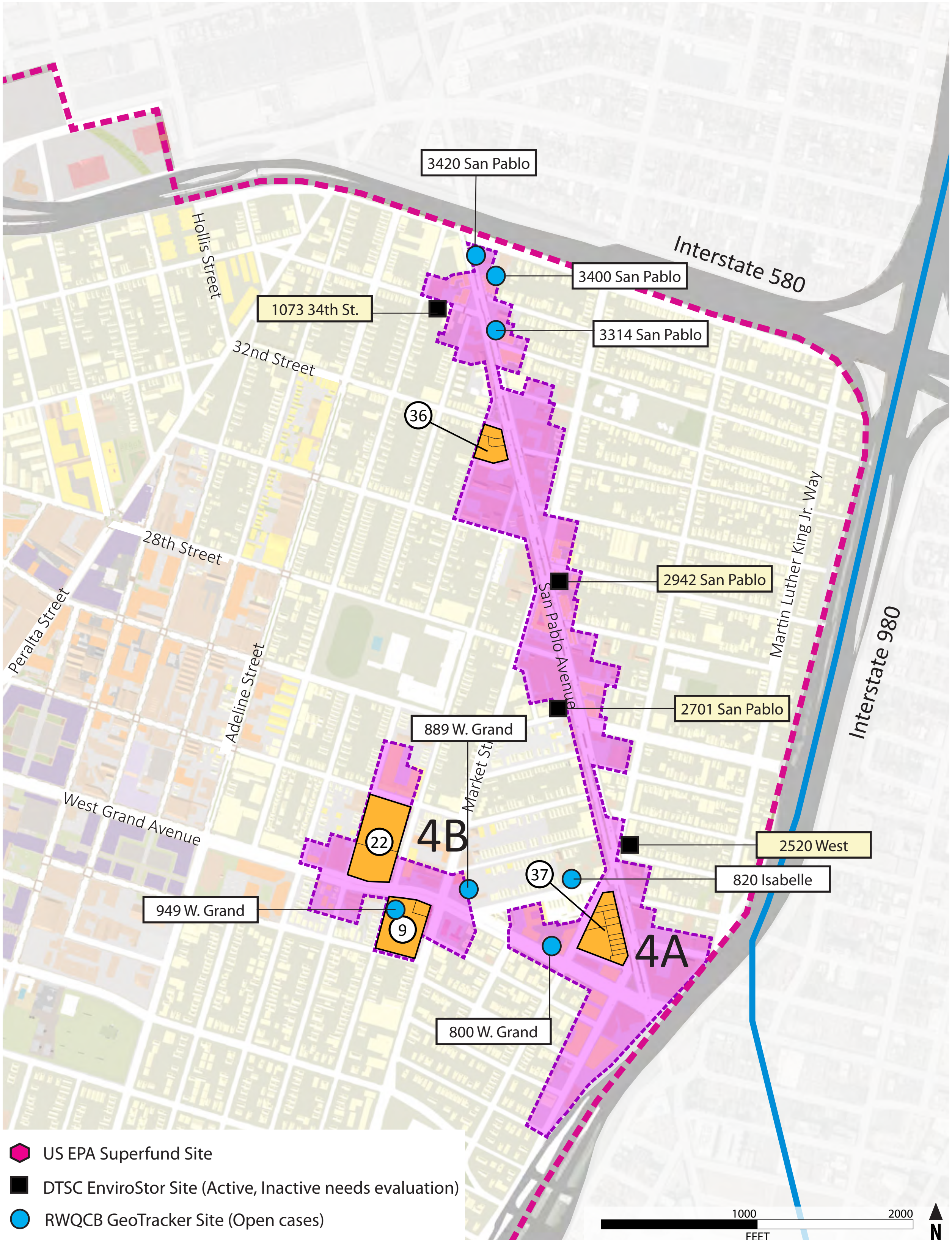


Figure 4.5-4
"Cortese List" Sites, San Pablo Opportunity Area

Sources: US EPA Superfund database; DTSC EnviroStor databases, and RWQCB Geotracker database

Table 4.5-4: San Pablo Avenue Opportunity Area – Environmental Cases

	Open Cases	Closed Cases
Federal Environmental Cases	0	0
State and Local Data Bases Cases:		
DTSC EnviroStor Database	4	0
SWRCB GeoTracker Database	7	17
ACEH Cases	2	
	13	17
Total Environmental Cases	29 (Total cases does not equal the sum of database records due to multiple agency jurisdiction over certain sites)	

Summary

Within the West Oakland Opportunity Areas there are is a total of 123 reported environmental cases. Nearly 65% of these reported cases have been closed by the respective oversight agencies. Of those cases that remain open, remediation efforts are still needed before new development can occur. Within those closed case sites, the level of prior clean-up efforts may vary and may be appropriate only for commercial or industrial use, may have deed restrictions preventing sensitive uses, or may stipulate additional agency oversight should development proposals be considered.

Environmental Cases by Opportunity Sites

As shown in **Table 4.5-5**, 21 of the 37 Opportunity Sites have had reported releases of hazardous materials and many contain multiple environmental cases. The majority of these cases involve LUSTs. Of the 21 Opportunity Sites with environmental cases:

- 15 have currently open cases with site assessment, remediation and/or monitoring underway or needed.
- The environmental cases on the other six Opportunity Sites have all been closed, with remediation completed and approved, or site assessment revealed that conditions pose no significant threat to human health or the environment and no further action is required.
- One of the sites where cases have been closed carries a deed restriction precluding future residential or other sensitive land uses.

Mandela/West Grand Opportunity Sites

Of the 19 Opportunity Sites in the Mandela/West Grand Opportunity Area, 15 have reported hazardous materials releases, and 10 of these 15 sites contain open cases.

3rd Street Opportunity Sites

Of the 2 Opportunity Sites in the 3rd Street Opportunity Area, 1 of these Opportunity Sites has a reported hazardous materials releases but its case has been closed.

San Pablo Opportunity Sites

There are no reported hazardous materials releases on the two Opportunity Sites within the San Pablo Avenue Opportunity Area. Of the 2 Opportunity Sites in the San Pablo Avenue Opportunity Area, 1 of these Opportunity Sites has a reported hazardous materials release, and this case is now closed.

7th Street Opportunity Sites

Of the 11 Opportunity Sites in the 7th Street Opportunity Area, 6 Opportunity Sites have reported hazardous materials releases, and each of these 6 sites remains as open cases. There is one federal National Priorities List (Superfund) site within the Planning Area, the former AMCO Chemical facility, located within the 7th Street Opportunity Area at 1414 3rd Street (Opportunity Site 25), which is discussed separately below.

Former AMCO Chemical Facility[8]

The 7th Street Opportunity Area contains one property on the National Priorities List (NPL) of federal Superfund sites, the former AMCO Chemical facility located at 1414 3rd Street, within the 7th Street Opportunity Area, one block south of the West Oakland BART Station.

From the 1960s to 1989, the site was owned and operated by AMCO as a chemical distribution facility. Concern about environmental conditions arose in 1995 when utility workers encountered strong chemical odors while digging in the area. Preliminary sampling at the site and on 3rd Street indicated the presence of vinyl chloride and other chlorinated solvents in soil, soil gas, and groundwater. In 1997, the EPA began operating a treatment system to remove vinyl chloride-contaminated groundwater and soil vapors but turned it off in 1998 in response to community concern over potential exposure to contaminants from the system's exhaust stack.

A Remedial Investigation and Human Health Risk Assessment were performed to characterize the nature and extent of contamination and health risks to construction workers, employees, and residents. These studies found that the primary continuing source of contamination to groundwater, soil, and soil gas is several feet of light non-aqueous-phase liquid (LNAPL) containing tetrachloroethene (PCE), trichloroethene (TCE), other volatile organic compounds (VOCs), SVOCs, pesticides, and dioxins/furans, floating on groundwater beneath the former AMCO facility. The highest concentrations of contaminants were observed in the central and south-central areas of the former AMCO facility, corresponding with the known locations of former chemical storage units and buried distribution piping. Several contaminants in groundwater currently exceed risk criteria for ingestion; however, groundwater is not currently used nor is it likely to be used in the future as a source of drinking water.

The distributions of contaminants in soil are less centralized and more widespread than in groundwater, suggesting multiple industrial, non-industrial, and non-point sources. Many contaminants in soil at the former AMCO facility and off-facility locations (the parking lot, large vacant lot, and small vacant lot occupying the same block), particularly lead, exceed risk criteria for industrial and residential receptors. The current concrete pavement at the former AMCO

---

[8] United States Environmental Protection Agency, Pacific Southwest, Region 9, Superfund website, http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/db29676ab46e80818825742600743734/ab0657810 4c4a569882571bd00755ed0!OpenDocument, viewed October 16, 2012.

facility and off-facility locations provides a protective layer that isolates on-site workers from the contaminated soil, soil gas, and groundwater underneath. Elevated lead concentrations at levels that posed an immediate risk to residents, particularly children, were detected at several residential properties adjacent to or near the former AMCO facility. A soil removal action to address the lead contamination was performed at all residential parcels occupying the same block as the former AMCO facility.

Sampling of crawl space and ambient air in residences adjacent to and near the AMCO facility indicates that vapor intrusion was occurring in crawl spaces at the homes. None of the VOCs detected exceeds its acute reference concentration, indicating that there is no immediate health threat to residents. As a precautionary measure, mitigation systems including vapor barriers and additional ventilation have been installed in selected homes nearest the site. The source of the VOCs found inside homes is difficult to determine. Risks for the majority of residences sampled are similar to the risks and hazards estimated from background samples collected three blocks upwind of the site and outdoor air samples collected at Prescott Park. This indicates that air quality is poor in the whole area due to other sources of contamination (such as exhaust from freeway traffic, etc.).

Summary by Opportunity Sites

Table 4.5-5 provides more detailed information for each Opportunity Site that contains an environmental case.

Table 4.5-5
Environmental Cases – Opportunity Sites

		Federal Data Base List				DTSC EnviroStor List					
Oppty Site	**Name, Address**	**NPL**	**CERCLIS**	**CORRACTS**	**NFRAP**	**RESPONSE**	**ENVIROSTOR**	**VCP**	**DEED**	**WRCB GeoTracker List**	**County/ SLIC**
<u>Mandela/Grand Opportunity Area</u>											
1	1685 34th Street, TASCO									Closed	
	3211 Wood, General Transport									Open	
2	2601 Peralta Street, CASS						NFA				
	2601 Peralta, Oakland Scavenger									Closed	
3	2233 Wood Street, Army-Navy Distributing Center						NFA				
	2601 Wood Street, Former Hall						Inactive				
	Wood Street & West Grand Avenue, BNSF Wood Street Yard						Certified O&M		X		
4	1735 24th Street, Pacific Supply									Open	
5	Mandela Parkway at Grand, Mandela/Grand,						Inactive	X	X		
6-7	no cases reported										
8	1708 Wood Street,									Open	X

Table 4.5-5
Environmental Cases – Opportunity Sites

		Federal Data Base List				DTSC EnviroStor List					
Oppty Site	**Name, Address**	**NPL**	**CERCLIS**	**CORRACTS**	**NFRAP**	**RESPONSE**	**ENVIROSTOR**	**VCP**	**DEED**	**WRCB GeoTracker List**	**County/ SLIC**
	Roadway Express										
	1707 Wood Street, SP Transportation					X	Refer to RWQCB?				Open
9	905 Grand, Mac Auto									Closed	X
	949 Grand, Burke									Open	X
10	no cases reported										
11	2730 Peralta, CASS									Open	X
12	1655 17th Street, ACME Galvanizing		X								Open
13	no cases reported										
14	2121 Peralta, PG&E									Closed	
15	no cases reported										
16	1833 Peralta, Cadomartori Truck									Open	X
17	1200 21st Street, EBMUD									Open	X
	2130 Adeline, EBMUD									Closed	X
	1075 Grand, EBMUD									Open	
18	2525 Wood, P&B							Certified			

Table 4.5-5
Environmental Cases – Opportunity Sites

		Federal Data Base List				DTSC EnviroStor List					
Oppty Site	Name, Address	NPL	CERCLIS	CORRACTS	NFRAP	RESPONSE	ENVIROSTOR	VCP	DEED	WRCB GeoTracker List	County/ SLIC
	Dismantlers										
	2526 Wood, Elliot Roofing									Closed	X
	2510 Wood, Wood St. Warehouses									Closed	X
	2200 Wood, Lucchesi										Open
	2230 Willow, Crown Zellerbach									Closed	X
	1735 24th Street, Pacific Supply									Open	X
19-20	no cases reported										
21	2400 Peralta, Ctrl Concrete Supply									Closed	X
22	2400 Filbert, Cal West Periodicals									Closed	X
<u>7th Street Opportunity Area</u>											
23	1451 7th Street, BART Station						Refer to Local Agency			Closed	
	1455 7th Street, Eastlake									Open	X
24	1395 7th Street, Truckers Friend										X
	1396 5th Street,										Open

Table 4.5-5
Environmental Cases – Opportunity Sites

		Federal Data Base List				DTSC EnviroStor List					
Oppty Site	**Name, Address**	**NPL**	**CERCLIS**	**CORRACTS**	**NFRAP**	**RESPONSE**	**ENVIROSTOR**	**VCP**	**DEED**	**WRCB GeoTracker List**	**County/ SLIC**
	Red Star Yeast										
	500 Kirkham, J&A Trucking									Open	
	5th& Kirkham, SP Transportation									Open	X
	500 Kirkham, Smilo Chemical									Open	
25	349 Mandela, SF BART					Certified					
	355 Mandela, California Soda						No Further Action				
	1414 3rd Street, AMCO Chemical	X					Active				
26	no cases reported										
27	1832 9th Street, Batavia				X		No Further Action				
28	524 Cedar, Phoenix Iron Works						Open	X		Certified	
	800 Cedar, Phoenix 800						Open				
	Shorey Street, Vacant Auto Repair					X	No Further Action				
	1823 Shorey, B&A Auto Dismantle						Closed	X			

Table 4.5-5
Environmental Cases – Opportunity Sites

		Federal Data Base List				DTSC EnviroStor List					
Oppty Site	**Name, Address**	**NPL**	**CERCLIS**	**CORRACTS**	**NFRAP**	**RESPONSE**	**ENVIROSTOR**	**VCP**	**DEED**	**WRCB GeoTracker List**	**County/ SLIC**
29-32	no cases reported										
33	1225 7th, All Merc. Dismantler									Closed	X
3rd Street Opportunity Area											
34	NA										
35	333 Filbert, East Bay Ford Truck									Closed	X
	333 Market, Marine Terminals									Closed	X
San Pablo Avenue Opportunity Area											
36											
37											

NPL — National Priorities List (i.e., Superfund Sites). The NPL is "the list compiled by EPA of uncontrolled hazardous substance releases in the United States that are priorities for long-term remedial evaluation and response, pursuant to 40 C.F.R. § 300.5 (2001)

CERCLIS — Comprehensive Environmental Response, Compensation and Liability Information System), a database maintained by the US EPA.CERCLIS contains information such as the current status of cleanup efforts, cleanup milestones reached, and amounts of liquid and solid media treated at sites on the National Priorities List (NPL) or under consideration for the NPL.

CORRACTS — Resource Conservation and Recovery Act, Corrective Action Sites (US EPA)

NFRAP — No Further Remedial Action Planned. Determination made by EPA following a preliminary assessment that a site does not pose a significant risk and so requires no further activity under Comprehensive Environmental Response and Liability Act (CERCLA).

RESPONSE — State Response: DTSC's Site Mitigation and Brownfields Reuse Program oversees the cleanup of State Superfund Sites. State Superfund sites are also called State Response Sites or Annual Work plan sites. These are sites with evidence of a hazardous substance release or releases that could pose a significant threat to public health and/or the environment. DTSC issues Orders to responsible parties to compel the cleanup of these sites. Where no responsible parties can be found or where they do not take proper and timely action, the Department may use State funds to undertake the cleanup. If necessary, emergency actions may be taken.

Table 4.5-5
Environmental Cases – Opportunity Sites

		Federal Data Base List				DTSC EnviroStor List					
Oppty Site	**Name, Address**	**NPL**	**CERCLIS**	**CORRACTS**	**NFRAP**	**RESPONSE**	**ENVIROSTOR**	**VCP**	**DEED**	**WRCB GeoTracker List**	**County/ SLIC**

ENVIROSTOR EnviroStor is a search tool for the DTSC that contains information on contaminated sites in California, as well as information on permit documents. EnviroStor's site database contains both a list of contaminated sites as well as lists of facilities that process or transfer toxic waste.

LUST Leaking Underground Storage Tanks, database managed by the SF Regional Water Quality Control Board

VCP Voluntary Cleanup Program. DTSC's Voluntary Cleanup Program allows motivated parties who are able to fund the cleanup, and DTSC's oversight, to move ahead at their own speed to investigate and remediate their sites.

DEED Deed Restricted Site. Sites where DTSC has placed limits or requirements on future use of the property due to varying levels of cleanup possible, practical, or necessary at the site.

County/SLIC Spills, Leaks Investigation and Cleanup. These are sites that have had chemical releases that have contaminated soil and/or groundwater, and which Alameda County Environmental Health (ACEH) provides regulatory oversight for investigation and cleanup.

X: Indicates site is on the identified database list

Open/Inactive: Indicates the lead agency has not determined that all necessary and appropriate steps have been taken to ensure the site is no longer a threat to human health or the environment , and that site characterization, work plan development, remediation or monitoring results are still pending.

Closed/Certified/No Further Action: Indicates the lead agency has determined that all necessary and appropriate steps have been taken to ensure the site is no longer a threat to human health or the environment.

Source: Environmental Data Resources, Inc. 2012; DTSC EnviroStor 2013; SF RWQCB Geotracker, 2013

Hazardous Building Materials

Development facilitated by the Specific Plan would in many cases involve the demolition or substantial rehabilitation of existing structures. Many older buildings within the Planning Area may have been constructed with hazardous building materials, including asbestos, lead-based paint and polychlorinated biphenyls (PCBs), which if disturbed, could present a potential hazard to workers or the public.

Asbestos

Asbestos is a naturally occurring fibrous material that was extensively used as a fireproofing and insulating agent in building construction materials before such uses were banned by the U.S. EPA in the 1970s. Asbestos was commonly used for insulation of heating ducts as well as ceiling and floor tiles to name a few typical types of materials. Contained within the building materials asbestos fibers present no significant health risk but once these tiny fibers are disturbed they become airborne and create potential exposure pathways. The fibers are very small and cannot be seen with the naked eye. Once they are inhaled they can become lodged into the lung potentially causing lung disease or other pulmonary complications.

Lead Based Paint

Prior to a U.S. EPA ban in 1978, lead-based paint was commonly used on interior and exterior surfaces of buildings. Through such disturbances as sanding and scraping activities, renovation work, or gradual wear and tear, old peeling paint or paint dust particulates have been found to contaminate surface soils or cause lead dust to migrate and affect indoor air quality. Exposure to residual lead can cause severe adverse health effects, especially in children.

Polychlorinated Biphenyls (PCBs)

PCBs are organic oils that were formerly used primarily as insulators in many types of electrical equipment including transformers and capacitors. After PCBs were determined to be a carcinogen the mid to late1970s, the U.S. EPA banned PCB use in most new equipment and began a program to phase out certain existing PCB-containing equipment. Fluorescent lighting ballasts manufactured after January 1, 1978, do not contain PCBs and are required to have a label clearly stating that PCBs are not present in the unit.

Hazardous Materials Transport, Use or Disposal

Permitted Hazardous Materials Sites

Permitted users of hazardous materials within the Planning Area are tracked by regulatory agencies and include facilities that have permitted or historic USTs; have registered aboveground storage tanks; have reported releases of hazardous materials to the air, water, or land; generate, transport, store, or dispose of PCBs; manufacture or handle materials regulated under the Toxic Substances Control Act (TSCA);are registered pesticide producing facilities; or conduct dry cleaner-related operations. Permitted uses associated with handling of hazardous wastes includes generators, transporters, and disposal facilities permitted under the federal Resource Conservation and Recovery Act (RCRA) and facilities that have submitted hazardous waste manifests to DTSC. In addition, the City of Oakland maintains an inventory of sites that have filed a Hazardous Materials Business Plan or Risk Management and Prevention Plan, have registered USTs, or have registered as a hazardous waste generator or hazardous waste treatment facility. These sites are categorized by approximate risk to the public.

Environmental databases also record land uses (both current and past) that involve the use of hazardous materials or that handle hazardous wastes. Permitted hazardous materials uses must operate in accordance with current hazardous materials and hazardous waste regulations, and are tracked by regulatory agencies. Permitted hazardous materials uses include facilities that:

- have permitted or historic underground storage tanks (USTs);
- have registered above-ground petroleum storage tanks;
- generate, transport, store, or dispose of polychlorinated biphenyls (PCBs);
- manufacture or handle materials regulated under the Toxic Substances Control Act (TSCA);
- are registered pesticide producing facilities; or
- conduct dry cleaner-related operations;

Permitted uses associated with handling of hazardous wastes include generators, transporters, and disposal facilities permitted under the federal Resource Conservation and Recovery Act (RCRA) and facilities that have submitted hazardous waste manifests to the California Department of Toxic Substances Control (DTSC). In addition, the City of Oakland maintains an inventory of sites that have filed a Hazardous Materials Business Plan or Risk Management and Prevention Plan, have registered USTs, or have registered as a hazardous waste generator or hazardous waste treatment facility. These sites are categorized by approximate risk to the public; sites considered high hazard sites (sites which store acutely hazardous chemicals or hazardous chemicals in high quantities or are sites with an independent operator with on-site contamination or a poor inspection history) are designated P1, sites considered medium hazard sites (such as auto body shops and drycleaners) are designated P2, and sites considered low hazard sites are designated P3.

The use and handling of hazardous materials at permitted sites is subject to strict regulation, and the potential for a release of hazardous materials from these sites is considered low unless there is a documented chemical release. However, permitted sites, even without documented releases, are potential sources of contamination of soil and/or groundwater (compared to sites where there are no hazardous materials) because of accidental spills, incidental leakage or spillage that may have gone undetected.

Within the Planning Area, many sites appear in more than one permitted hazardous materials database. A brief summary of the types of databases where permitted hazardous materials uses are recorded follows.

Federal RCRA Non-CORRACTS List

This listing is derived from the EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by RCRA. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Federal RCRA Generators List

The RCRA Generator List database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste. Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. The small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

UST

The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

AST

The Aboveground Storage Tank database contains registered ASTs. The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

CA FID UST

The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

Drycleaners

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; dry cleaning plants except rugs; carpet and upholstery cleaning; industrial launderers; laundry and garment services.

Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc.

Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromats, cleaning/laundry, wash & dry etc.

Table 4.5-6 shows the number of permitted hazardous materials sites by type within each Opportunity Area. Many of the facilities are permitted for the use of more than one hazardous material. The majority of facilities that transport, use or dispose of hazardous materials are located within the Mandela/West Grand Opportunity Area but there are a number of permitted sites throughout the Opportunity Areas. The great majority of federally-listed hazardous waste generators within the Opportunity Areas are Small Quantity Generators, which generate between 100 kg and 1,000 kg of hazardous waste per month. There are only five federally-listed Large Quantity Generators, which generate over 1,000 kilograms (kg) of hazardous waste or over 1 kg of acutely hazardous waste per month. Most of the USTs and Aboveground Storage Tank (ASTs) within the Opportunity Areas are located within the Mandela/West Grand Opportunity Area. The San Pablo Avenue Opportunity Area contains a concentration of auto-related permitted hazardous materials sites.

Table 4.5-6
Number of Permitted Hazardous Materials Sites by Type

	Mandela/West Grand Opportunity Area	7th Street Opportunity Area	3rd Street Opportunity Area	San Pablo Avenue Opportunity Area
Large Quantity Generators	2	1	2	1
Small Quantity Generators	43	15	11	4
Storage Tanks	62	4	14	10
Dry Cleaners	26	35	10	16
Auto Related	17	14	5	36
TOTAL	166	48	48	69

Source: Environmental Data Resources, Inc. (EDR) 2012; Lamphier-Gregory 2012.

Large Quantity Generators are sites which generate over 1,000 kilograms (kg) of hazardous waste (as defined by the Resource Conservation and Recovery Act – RCRA), or over 1 kg of acutely hazardous waste per month.

Small Quantity Generators generate between 100 kg and 1,000 kg of hazardous waste per month.

Storage Tanks includes registered Underground Storage Tanks (USTs) or Aboveground Storage Tank (ASTs) listed in the State Water Resources Control Board's Hazardous Substance Storage Container Database.

Dry Cleaners include related facilities that have EPA identification numbers, including power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; dry-cleaning plants except rugs; carpet and upholstery cleaning; industrial launderers; and laundry and garment services.

Auto Related is based on an EDR search of selected business directories and listings of potential gas station, service station, and auto repair sites.

Because the use and handling of hazardous materials at permitted sites are subject to strict regulation, the potential for a release of hazardous materials from these sites is considered low unless there is a documented chemical release at that same site. In such cases, the site would be also tracked in the environmental databases as an environmental case. Permitted sites without documented releases are nevertheless potential sources of hazardous materials releases to soil or groundwater (compared to sites where there are no hazardous materials) because of accidental spills, or incidental leakage or spillage that may have gone undetected.

Hazardous Materials Emergency Incidents

Emergency incidents involving hazardous materials can threaten human life, damage property, contaminate the environment, require the evacuation of nearby populations and block off major transportation routes. Potential hazards include accidental releases of toxic substances, industrial fires and explosion of petroleum products and other chemicals.

A 1997 analysis of the number, location, nature and outcome of hazardous materials emergency incidents in Oakland found there was an average of 96 hazardous substances spills reported each year in

Oakland during the period reviewed, of which 17percent occurred in West Oakland.[9] Approximately two events each year resulted in one or more injuries requiring a hospital visit. The most people injured during a single year were 36 in 1994. One release from a plating shop culminated in a fire that resulted in the evacuation of several hundred people. The most commonly spilled substance was a petroleum product, accounting for 41 percent of all spills. Chemicals and unknown materials accounted for 24 percent and 16 percent of the spills, respectively. Other substances spilled include, waste, paint, gas, asbestos, sewage, and radioactive materials. Of the chemical spills reported, 21 involved the release of transformer and PCB containing materials. Other chemicals released include acids and cyanides used by the plating industries, asbestos, drug lab wastes, and chemicals used to make polyurethane foam. Gases involved in accidental gas releases included liquefied petroleum gas, ammonia, and chlorine; ammonia and chlorine are considered acutely toxic gasses. Four releases of radioactive materials were reported; one involved a leaking container of radioactive materials, two involved the theft of radioactive materials, and one involved the illegal dumping of a cylinder commonly used by hospitals to hold radioactive materials. Illegal dumping is the largest reported cause of spills within Oakland. Over 50 percent of the spills were reported by someone other than the responsible party. Other causes of spills include freight accidents, spills, releases from vessels, public observations, human error and equipment failure, traffic accidents, fires, fumes, and buried utilities.

Emergency Response Plan/Emergency Evacuation Plan

Emergency Evacuation Routes

The OES has identified a network of evacuation routes and potential emergency shelters as identified in Figure 2.1 of the General Plan Safety Element.[10] Emergency Evacuation Routes are typically along major thoroughfares. The Emergency Evacuation Routes within West Oakland are 7th Street, 14th Street, 12th Street, 27th Street, 35th Street, Adeline Street, Market Street, Martin Luther King Jr. Boulevard, San Pablo Avenue, and West Grand Avenue. Many of the development Opportunity Sites under the proposed Specific Plan are located along streets identified as Emergency Evacuation Routes.

Office of Emergency Services (OES)

The OES is the certified unified program agency (CUPA) for the City, enforcing federal, State, and local legislation related to hazardous materials.[11] The OES operates the City's Emergency Operations Center (EOC) from which centralized emergency management would be performed during a disaster. The Standardized Emergency Management System (SEMS) is a framework for standardizing emergency-response procedures in California to facilitate the flow of information and resources among agencies in responding to multi-agency emergencies. The City has adopted the SEMS emergency plan along with five other emergency management plans.

---

[9]Neighborhood Information on Chemical Hazards in the Environment (NICHE) Project, 1997, An Analysis of 1,076 Spills in Oakland, California that Were Reported to the Emergency Response Notification System from 1987 to 1996, http://home.earthlink.net/~clearh2orev/ernsweb.html, accessed July 3, 2002. The analysis included only spills reported to the Emergency Response Notification System, a database of spills reported to federal agencies. The analysis did not consider releases reported only to state or local agencies.

[10] City of Oakland, City of Oakland General Plan Safety Element, 2004, Figure 2.1.

[11] City of Oakland, City of Oakland General Plan Safety Element, 2004.

OFD is responsible for on-scene management of hazardous-materials incidents (though public-works staff respond to small-scale spills and complaints about illegal dumping.) Responding fire engines are assisted by OFD's hazardous materials response team, which is dispatched to the scene with a van equipped with specialized apparatus and personal protection equipment from Fire Station 3, located at 1445 14thStreet at Mandela Parkway in West Oakland. The hazmat team includes specialists from the OES, and is able to provide technical expertise in the areas of isolation, identification of chemicals, hazard assessment, containment, mitigation, decontamination and disposal.

Oakland's hazardous materials area plan for emergency response outlines specific procedures for an organized response to hazmat emergencies. The document contains guidelines and instructions on plan activation; fire and police dispatch; immediate response; situation assessment; evacuation, crowd and traffic control, and sheltering; notification to the public, regional, state and federal agencies, and medical facilities; internal and mutual-aid coordination and communication; training, drills and exercises; maintenance of supplies and equipment; and incident critique and follow-up. The plan also lists the specific responsibilities of city departments and county, state, federal and non-governmental agencies that could be expected to play a role in the event of a hazmat incident.

Emergency Alerting and Notification System

In 2002, the Cities of Oakland, Alameda, and San Leandro, and the University of California at Berkeley installed a network of outdoor warning sirens to alert the public in the case of an emergency. The Oakland Office of Emergency Services (OES) has implemented an Emergency Alerting and Notification System, which uses outdoor warning sirens to alert the public in the event of an impending emergency including a toxic release, threat of flooding or mudslides, major fire, secondary problems caused by earthquakes, or other natural or technological disasters. The public is alerted to tune into the local emergency alerting radio station for safety information and instructions if the sirens are activated. There are sirens installed at three locations in West Oakland: the Goss Avenue/Pine Avenue intersection, Poplar Recreation Area, and Lafayette Square.

Citizens of Oakland Respond to Emergencies (CORE)

The OES has developed the Citizens of Oakland Respond to Emergencies (CORE) as a citizen emergency response program to help the Oakland community become more self-sufficient in disaster situations. CORE promotes community awareness and training in emergency response to chemical accidents, natural disasters, and severe weather incidents. The CORE program includes training for home and family preparedness, and forming and linking neighborhood response teams, as well as more advanced training in early response procedures, and fire suppression and prevention. The CORE program includes a hazardous materials and awareness educational program.

Wildland Fires

Wildland fires in Oakland are a concern in the Oakland Hills where wildlands abut residential development and steep terrain slows emergency vehicle access. The City has delineated a Wildfire Prevention Assessment District on Figure 4.1 of the City of Oakland General Plan Safety Element. West Oakland is not located within an area at risk of wildland fires and is not within the City's Wildfire Prevention Assessment District.[12]

[12] City of Oakland, City of Oakland General Plan Safety Element, November 2004, Figure 4.1.

The California Department of Forestry and Fire Protection (CalFIRE) maps areas of significant fire hazard based on fuels, terrain, weather and other relevant factors. These zones, referred to as Fire Hazard Severity Zones, then determine the requirements for special building codes designed to reduce the ignition potential of buildings. The Planning Area is located within a non-Very High Fire Hazard Severity Zone.[13]

Regulatory Setting

The use, storage and disposal of hazardous materials, including management of contaminated soils and groundwater, is regulated by numerous local, State, and federal laws and regulations. The U.S. Environmental Protection Agency (U.S. EPA) is the federal agency that administers hazardous materials and hazardous waste regulations. State agencies include the California Environmental Protection Agency (Cal/EPA), which includes the California Department of Toxic Substances Control (DTSC), the State Water Resources Control Board (State Water Board), the California Air Resources Board (ARB) and other agencies. The San Francisco Bay Regional Water Quality Control Board (Water Board), the Bay Area Air Quality Management District (BAAQMD), Alameda County Department of Environmental Health (ACEH) and Oakland Fire Department (OFD) have jurisdiction on a regional or local level. A description of each agency jurisdiction and involvement in the management of hazardous materials and wastes is provided below. Regulatory and policy-based initiatives that promote reuse of "brownfields" by facilitating cleanup of abandoned, idled, and underutilized properties are identified. Regulations enacted to ensure safe handling of hazardous materials, response to releases of hazardous materials, closure of permitted facilities, and safe handling of hazardous materials near a sensitive receptor are also.

Federal

U.S. Environmental Protection Agency

The U.S. EPA is the federal agency responsible for enforcement and implementation of federal laws and regulations pertaining to hazardous materials and hazardous waste. The federal regulations are primarily codified in Title 40 of the Code of Federal Regulations (40 CFR). The legislation includes the Resource Conservation and Recovery Act of 1976 (RCRA), the Superfund Amendments and Reauthorization Acts of 1986 (SARA), and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The U.S. EPA provides oversight for site investigation and remediation projects, and has developed land disposal restrictions and treatment standards for the disposal of certain hazardous wastes. The U.S. EPA has also developed numerous "brownfields" programs to promote and expedite the cleanup of brownfields while reducing the potential liability to lenders and developers of contaminated properties.

Occupational Safety and Health Administration

Worker health and safety is regulated at the federal level by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). The Federal Occupational Safety and Health Act of 1970 authorizes states (including California) to establish their own safety and health programs with OSHA approval; implementation of worker health and safety in California is regulated by the California

[13] CalFIRE, Alameda County Very High Fire Hazard Severity Zone Map as Recommended by CalFIRE, September 2008. http://frap.cdf.ca.gov/webdata/maps/alameda/fhszl_map.1.pdf

Department of Industrial Relations (DIR). The DIR includes the Division of Occupational Safety and Health (DOSH), which acts to protect workers from safety hazards through its California OSHA (Cal/OSHA) program and provides consultative assistance to employers. California standards for workers dealing with hazardous materials are contained in CCR Title 8 and include practices for all industries (General Industrial Safety Orders), specific practices for construction, and other industries.

State

Department of Toxic Substances Control

The DTSC is authorized by U.S. EPA to enforce and implement federal hazardous materials laws and regulations in California. California regulations pertaining to hazardous materials are equal to or exceed the federal regulation requirements. The DTSC is authorized by the U.S. EPA to regulate the management of hazardous substances including the remediation of sites contaminated by hazardous substances. Most State hazardous materials regulations are contained in Title 22 of the California Code of Regulations. DTSC generally acts as the lead agency for soil and groundwater cleanup projects that affect public health, and establishes cleanup levels for subsurface contamination that are equal to, or more restrictive than, federal levels. DTSC has also developed land disposal restrictions and treatment standards for hazardous waste disposal in California. The DTSC has also developed "brownfield" programs to promote and expedite the cleanup of brownfields.

State Water Resources Control Board

The State Water Board enforces regulations on how to implement underground storage tank (UST) programs. It also allocates monies to eligible parties who request reimbursement of funds to clean up soil and groundwater pollution from UST leaks. The State Water Board also enforces the Porter-Cologne Water Quality Act through its nine regional boards, including the San Francisco Bay Regional Water Quality Control Board, described below.

California Air Resources Board

The ARB is responsible for coordination and oversight of State and local air pollution control programs in California, including implementation of the California Clean Air Act of 1988. ARB has developed State air quality standards, and is responsible for monitoring air quality in conjunction with the local air districts.

AB 440

Prior to the 2011 dissolution of all redevelopment agencies, the Polanco Redevelopment Act authorized a redevelopment agency to take action to require the investigation and cleanup of an identified release of hazardous materials in accordance with applicable state and federal laws, or to perform the cleanup itself with the oversight of applicable regulatory agencies, with cost recovery provisions, if the site owner or operator refuses to do so. The Polanco Act also provided immunity from liability for the contamination under this legislation. With the State's decision to dissolve redevelopment agencies effective February 2012, there had not been an alternative by which the Polanco Act's powers could be transferred to another, or successor agency.

On October 5, 2013 the Governor signed AB 440, giving cities, counties, and some housing authorities the authority to compel cleanup of contaminated properties. Similar to the prior Polanco Act, AB 440 gives municipalities the right to obtain environmental information from property owners, the authority to compel cleanup of properties, cost recovery for cleanup efforts, and immunity from liability during the cleanup process. AB 440 also expands on the previous Polanco Act provisions by applying to properties "with the presence *or perceived presence* (emphasis added) of a release of hazardous material that contributes to the vacancies, abandonment of property, or reduction or lack of property utilization of property."

California Land Environmental Restoration and Reuse Act

The California Land Environmental Restoration and Reuse Act (CLERRA) was enacted in 2001 to promote the restoration and reuse of brownfields sites in California. This act authorizes local regulatory agencies to require property owners to provide information related to potential past or present hazardous material releases at a property and to require a Phase I environmental site assessment if a release is indicated. In the event that a potential release is indicated by the Phase I environmental site assessment, the act requires the California EPA to assign the DTSC, Water Board, or a local agency as the lead oversight regulatory agency for further investigation and remediation of the site. These actions include a preliminary endangerment assessment, additional site investigations, and implementation of remedial action in accordance with an approved Remedial Action Plan (RAP).

Regional

San Francisco Bay Regional Water Quality Control Board

The Planning Area is located within the jurisdiction of the San Francisco Bay Water Board. The Water Board provides for protection of State waters in accordance with the Porter-Cologne Water Quality Act of 1969. The Water Board can act as lead agency to provide oversight for sites where the quality of groundwater or surface waters is threatened, and has authority to require investigations and remedial actions.

Bay Area Air Quality Management District

The BAAQMD has primary responsibility for control of air pollution from sources other than motor vehicles and consumer products (which is the responsibility of U.S. EPA and ARB). BAAQMD is responsible for preparing attainment plans for non-attainment criteria pollutants, control of stationary sources, and the issuing of permits for activities demolition and construction activities involving building materials that contain asbestos (District Regulation 11, Rule 2).

Alameda County Department of Environmental Health and Oakland Fire Department

ACEH and the OFD are the primary agencies responsible for local enforcement of State and federal laws pertaining to hazardous materials management and oversight of hazardous materials investigations and remediation in Alameda County.

Alameda County Hazardous Waste Management Program

Assembly Bill (AB) 2948 requires counties and cities either to adopt a county Hazardous Waste Management Plan as part of their general plan, or enact an ordinance requiring that all applicable zoning subdivision, conditional use permit, and variance decisions be consistent with the county hazardous waste management plan. Once each County had its Hazardous Waste Management Program approved by the State, each city had 180 days to either 1) adopt a City Hazardous Waste Management Plan containing specified elements consistent with the approved County Hazardous Waste Management Program, 2) incorporate the applicable portions of the approved Program, by reference, into the City's

General Plan, or 3) enact an ordinance which requires that all applicable zoning, subdivision, conditional use permits, and variance decisions be consistent with the specified portions of the Program. Alameda County has adopted a Hazardous Waste Management Program that addresses procedures for hazardous materials incidents.

Under the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program, the ACEH is certified by the DTSC to implement the Hazardous Materials Management Plan and Inventory (HMMP); Hazardous Materials Business Plan (HMBP); Risk Management Program (RMP); UST; Spill Prevention, Control and Countermeasure (SPCC) Plan for aboveground storage tanks; hazardous waste generators; and on-site hazardous waste treatment (tiered permit) programs.

City of Oakland

Urban Land Redevelopment Program

The Oakland Urban Land Redevelopment (ULR) Program is a collaborative effort by the City of Oakland and the principal agencies charged with enforcing environmental regulations (DTSC, Water Board and ACDEH) to facilitate the cleanup and redevelopment of contaminated properties in Oakland. The program is coordinated by the City and is specific to Oakland sites. The ULR Program clarifies environmental investigation requirements and established Oakland-specific, risk-based corrective action (RBCA) standards for qualifying sites. RBCA standards are criteria that, when met, adequately address risk posed by contamination to human health.

The ULR Program includes a three-tiered approach to the investigation of sites and identification of RBCA standards. Tier 1 Risk Based Screening Levels (RBSLs) and Tier 2 Site Specific Target Levels (SSTLs) are specified for the protection of human health at sites that meet specific eligibility requirements, where commonly found contaminants are present, and the contaminants are considered to present a relatively low risk. RBSLs and SSTLs are identified for residential and commercial/industrial land uses. These levels are typically lower (more stringent) for residential land uses than for commercial/industrial land uses. For more complicated sites that do not meet the eligibility requirements, a Tier 3 analysis using site-specific information would be required to identify SSTLs for the appropriate land use. RBSLs and SSTLs are based on an acceptable carcinogenic risk of 10^{-5} and non-carcinogenic hazard index of 1.0.

A risk management plan would be prepared to specify containment measures where contaminants would be left at concentrations greater than the most stringent RBSL. These measures would be used to prevent exposure to any hazardous materials left in place and/or institutional controls that would be employed to ensure the future protection of human health. The site would also be included in the City of Oakland Permit Tracking System, and future permit applications for work that might alter the conditions of site closure would undergo special review by the OFD. Implementation of this program is intended to provide assurance that human health and environmental resources will be protected without needlessly delaying future construction and development projects.

Oakland Hazardous Materials Regulation

In accordance with Chapter 6.11 of the California Health and Safety Code (Section 25404, et seq.), the City of Oakland assumed authority and responsibility for the administration and enforcement of the unified hazardous waste and hazardous materials management program within the city. The purpose of this legislation was to simplify environmental reporting by streamlining the number of regulatory agency contacts a facility must maintain and requiring the use of standardized forms and reports. OES is the administering agency for the Certified Uniform Program Agency (CUPA) program in Oakland. The CUPA programs include coordination of the local hazardous waste generator programs, underground and aboveground storage tank management, and investigations of leaking underground storage tank sites. OFD also implements the City of Oakland Hazardous Materials Assessment and Reporting Program, pursuant to City Ordinance No. 12323, which requires notification of hazardous materials storage, use and handling, and an assessment as to whether this storage, use and handling would cause a public health hazard to nearby sensitive receptors including schools, hospitals or other sensitive receptors.

Community Right to Know Laws

In accordance with Community Right to Know laws, businesses that handle specified quantities of hazardous materials prepare a Hazardous Materials Business Plan (HMBP) that details hazardous substance inventories, site layouts, training and monitoring procedures, and emergency response plans. Businesses that handle specified amounts of acutely hazardous materials must implement a Risk Management and Prevention Plan (RMPP). The RMPP must include information on the submitting facility, reference to the facility's business plan, process designation, identification of acutely hazardous materials handled and their quantity, and a general description of processes and principal equipment.

Spill Reporting at a Permitted Facility

In accordance with CUPA regulations, the City also requires facilities to report any actual or potential release of hazardous substances by calling 911 and is required to complete all actions necessary to remedy the effects of an unauthorized release. If the City suspects a release of hazardous materials from a facility they may also inspect the facility and abate a property where contamination is not being managed in compliance with CUPA regulations.

Closure of Facilities under CUPA Program

Facilities that handle hazardous materials or wastes under the CUPA program are required to appropriately close, prepare, and implement a closure plan when hazardous materials handling activities are stopped. The closure plan must ensure that there is no residual threat to public health and safety or the environment from possible release of hazardous materials and/or waste from the unit or facility and require no future monitoring of the site.

Use of Hazardous Substances within ¼ Mile of a Sensitive Receptor

To protect sensitive receptors from public health effects from a release of hazardous substances, the City of Oakland Municipal Code requires a handler of hazardous materials within 1,000 feet of a residence, school, hospital, or other sensitive receptor to make written disclosure of whether it will handle, store, or produce any hazardous substances. The City, at its discretion, may require such a facility to prepare a hazardous materials assessment report and remediation plan (HMARRP) and include public participation in the planning process. The HMARRP must identify hazardous materials used and stored at the property and the suitability of the site; analyze off-site consequences that could occur as a result of a release of hazardous substances (including fire); include a health risk assessment; and identify remedial measures to reduce or eliminate on-site and off-site hazards.

City of Oakland Municipal Code

The City of Oakland Municipal code includes regulations for the handling of hazardous materials in the City. Title 8, Chapter 8.12 of the Oakland Municipal Code adopts the California Health and Safety Code laws (Health and Safety Code Section 25500 et seq.) related to hazardous materials. City Ordinance No. 12323 regarding hazardous materials storage, use and handling reporting requires notification of hazardous materials storage, use and handling, and an assessment as to whether this storage, use and handling would cause a public health hazard to nearby sensitive receptors including schools, hospitals or other sensitive receptors.

City of Oakland Hazardous Materials Release Response Plan Program

The OFD Fire Prevention Bureau Hazardous Materials Release Response Plan Program requires any business that handles more than a threshold quantity of a hazardous material to develop and submit to the OFD a Hazardous Materials Business Plan. The threshold is 30 gallons, 500 pounds or 220 cubic feet of gas. For Extremely Hazardous Substances as listed in 40 CFR, Part 355, Appendix A the reporting quantity is the California threshold or the Federal Threshold Planning Quantity (TPQ) depending on whichever is lower. The Hazardous Materials Business Plan must include and address facility information, inventory of hazardous materials, facility map, emergency response plans and procedures, training, release reporting, underground storage tanks, and hazardous waste treatment/tiered permitting.

City of Oakland General Plan

The following City of Oakland General Plan Safety Element policies are relevant to the hazards and hazardous materials impacts of the Specific Plan.

> *Policy HM-1*: Minimize the potential risks to human and environmental health and safety associated with past and present use, handling, storage and disposal of hazardous materials.
>
> *Policy HM-2*: Reduce the public's exposure to toxic air contaminants through appropriate land use and transportation strategies.
>
> *Policy HM-3*: Seek to prevent industrial and transportation accidents involving hazardous materials and enhance the city's capabilities to respond to such incidents.
>
> *Policy PS-1*: Maintain and enhance the city's capacity to prepare for, mitigate, respond to, and recover from disasters and emergencies.

The following Open Space, Conservation and Recreation (OSCAR) Element policies are relevant to the hazards and hazardous materials impacts of the Specific Plan.

> *Policy CO-1.2*: Soil contamination and hazards. Minimize hazards associated with soil contamination through the appropriate storage and disposal of toxic substances, monitoring of dredging activities, and cleanup of contaminated sites. In this regard, require soil testing for development of any site (or dedication of any parkland or community garden) where contamination is suspected due to prior activities on the site.
>
> *Policy REC-4.2*: Encourage maintenance practices which conserve energy and water, promote recycling and minimize harmful side effects on the environment. Ensure that any application of chemical pesticides and herbicides is managed to avoid pollution of ground and surface waters.

Standard Conditions of Approval

The City's Standard Conditions of Approval relevant to hazards and hazardous materials impacts are listed below. These Standard Conditions of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area when it is approved by the City and would avoid or reduce significant impacts. The Standard Conditions and Approval are incorporated and required as part of development in accordance with the Specific Plan, so they are not listed as mitigation measures.

Where development in accordance with the Specific Plan would result in significant impacts despite implementation of the Standard Conditions of Approval, additional mitigation measures are recommended.

SCA 33: Construction Traffic and Parking. *(Prior to the issuance of a demolition, grading or building permit.)* The project applicant and construction contractor shall meet with appropriate City of Oakland agencies to determine traffic management strategies to reduce, to the maximum extent feasible, traffic congestion and the effects of parking demand by construction workers during construction of this project and other nearby projects that could be simultaneously under construction. The project applicant shall develop a construction management plan for review and approval by the Planning and Zoning Division, the Building Services Division, and the Transportation Services Division. The plan shall include at least the following items and requirements:

a. A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes.

b. Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur.

c. Location of construction staging areas for materials, equipment, and vehicles at an approved location.

d. A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. Planning and Zoning shall be informed who the Manager is prior to the issuance of the first permit issued by Building Services.

e. Provision for accommodation of pedestrian flow.

Major Project Cases:

f. Provision for parking management and spaces for all construction workers to ensure that construction workers do not park in on-street spaces.

g. Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the applicant's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the City Building Inspector and/or photo documentation, at the applicant's expense, before the issuance of a Certificate of Occupancy.

h. Any heavy equipment brought to the construction site shall be transported by truck, where feasible.

i. No materials or equipment shall be stored on the traveled roadway at any time.

j. Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion.

k. All equipment shall be equipped with mufflers.

l. Prior to the end of each work day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on the property, within the public rights-of-way, or properties of adjacent or nearby neighbors.

SCA 35: Hazards Best Management Practices. *(Prior to commencement of demolition, grading, or construction.)* The project applicant and construction contractor shall ensure that Best Management

Practices (BMPs) are implemented as part of construction to minimize the potential negative effects to groundwater and soils. These shall include the following:

a. Follow manufacture's recommendations on use, storage, and disposal of chemical products used in construction;

b. Avoid overtopping construction equipment fuel gas tanks;

c. During routine maintenance of construction equipment, properly contain and remove grease and oils;

d. Properly dispose of discarded containers of fuels and other chemicals.

e. Ensure that construction would not have a significant impact on the environment or pose a substantial health risk to construction workers and the occupants of the proposed development. Soil sampling and chemical analyses of samples shall be performed to determine the extent of potential contamination beneath all UST's, elevator shafts, clarifiers, and subsurface hydraulic lifts when on-site demolition, or construction activities would potentially affect a particular development or building.

f. If soil, groundwater or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums or other hazardous materials or wastes are encountered), the applicant shall cease work in the vicinity of the suspect material, the area shall be secured as necessary, and the applicant shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include notification of regulatory agency(ies) and implementation of the actions described in the City's Standard Conditions of Approval, as necessary, to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented under the oversight of the City or regulatory agency, as appropriate.

SCA 41: Asbestos Removal in Structures. *(Prior to issuance of a demolition permit.)* If asbestos-containing materials (ACM) are found to be present in building materials to be removed, demolition and disposal, the project applicant shall submit specifications signed by a certified asbestos consultant for the removal, encapsulation, or enclosure of the identified ACM in accordance with all applicable laws and regulations, including but not necessarily limited to: California Code of Regulations, Title 8; Business and Professions Code; Division 3; California Health & Safety Code 25915-25919.7; and Bay Area Air Quality Management District, Regulation 11, Rule 2, as may be amended.

SCA 61: Site Review by the Fire Services Division. *(Prior to the issuance of demolition, grading or building permit.)* The project applicant shall submit plans for site review and approval to the Fire Prevention Bureau Hazardous Materials Unit. Property owner may be required to obtain or perform a Phase II hazard assessment.

SCA 62: Phase I and/or Phase II Reports. *(Prior to issuance of a demolition, grading, or building permit.)*Prior to issuance of demolition, grading, or building permits the project applicant shall submit to the Fire Prevention Bureau, Hazardous Materials Unit, a Phase I environmental site assessment report, and a Phase II report if warranted by the Phase I report for the project site. The reports shall make recommendations for remedial action, if appropriate, and should be signed by a Registered Environmental Assessor, Professional Geologist, or Professional Engineer.

SCA 63: Lead-Based Paint/Coatings, Asbestos, or PCB Occurrence Assessment. *(Prior to issuance of any demolition, grading or building permit.)* The project applicant shall submit a comprehensive assessment report to the Fire Prevention Bureau, Hazardous Materials Unit, signed by a qualified environmental professional, documenting the presence or lack thereof of asbestos-containing materials (ACM), lead-based paint, and any other building materials or stored materials classified as hazardous waste by State or federal law.

SCA 64: Environmental Site Assessment Reports Remediation. *(Prior to issuance of a demolition, grading, or building permit.)*If the environmental site assessment reports recommend remedial action, the project applicant shall:

a. Consult with the appropriate local, State, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.

b. Obtain and submit written evidence of approval for any remedial action if required by a local, State, or federal environmental regulatory agency.

c. Submit a copy of all applicable documentation required by local, State, and federal environmental regulatory agencies, including but not limited to: permit applications, Phase I and II environmental site assessments, human health and ecological risk assessments, remedial action plans, risk management plans, soil management plans, and groundwater management plans.

SCA 65: Lead-Based Paint Remediation. *(Prior to issuance of any demolition, grading or building permit.)* If lead-based paint is present, the project applicant shall submit specifications to the Fire Prevention Bureau, Hazardous Materials Unit signed by a certified Lead Supervisor, Project Monitor, or Project Designer for the stabilization and/or removal of the identified lead paint in accordance with all applicable laws and regulations, including but not necessarily limited to: Cal/OSHA's Construction Lead Standard, 8 CCR1532.1 and DHS regulation 17 CCR Sections 35001 through 36100, as may be amended.

SCA 66: **Other Materials Classified as Hazardous Waste**. *(Prior to issuance of any demolition, grading or building permit.)*If other materials classified as hazardous waste by State or federal law are present, the project applicant shall submit written confirmation to Fire Prevention Bureau, Hazardous Materials Unit that all State and federal laws and regulations shall be followed when profiling, handling, treating, transporting and/or disposing of such materials.

SCA 67: Health and Safety Plan per Assessment. *(Prior to issuance of any demolition, grading or building permit.)* If the required lead-based paint/coatings, asbestos, or PCB assessment finds presence of such materials, the project applicant shall create and implement a health and safety plan to protect workers from risks associated with hazardous materials during demolition, renovation of affected structures, and transport and disposal.

SCA 68: Best Management Practices for Soil and Groundwater Hazards. *(Ongoing throughout demolition, grading, and construction activities.)*The project applicant shall implement all of the following Best Management Practices (BMPs) regarding potential soil and groundwater hazards.

a. Soil generated by construction activities shall be stockpiled onsite in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Specific sampling and handling and transport procedures for reuse or disposal shall be in accordance with applicable local, state and federal agencies laws, in particular, the Regional Water Quality Control Board (Water Board) and/or the Alameda County Department of Environmental Health (ACDEH) and policies of the City of Oakland.

b. Groundwater pumped from the subsurface shall be contained onsite in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies of the City of Oakland, the Water Board and/or the ACDEH. Engineering controls shall be utilized, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building (pursuant to the Standard Condition of Approval regarding Radon or Vapor Intrusion from Soil and Groundwater Sources).

c. Prior to issuance of any demolition, grading, or building permit, the applicant shall submit for review and approval by the City of Oakland, written verification that the appropriate federal, state or county oversight authorities, including but not limited to the Water Board and/or the ACDEH, have granted all required clearances and confirmed that the all applicable standards, regulations and conditions for all previous contamination at the site. The applicant also shall provide evidence from the City's Fire Department, Office of Emergency Services, indicating compliance with the Standard Condition of Approval requiring a Site Review by the Fire Services Division pursuant to City Ordinance No. 12323, and compliance with the Standard Condition of Approval requiring a Phase I and/or Phase II Reports.

SCA 69: Radon or Vapor Intrusion from Soil or Groundwater Sources.*(Ongoing.)*The project applicant shall submit documentation to determine whether radon or vapor intrusion from the groundwater and soil is located on-site as part of the Phase I documents. The Phase I analysis shall be submitted to the Fire Prevention Bureau, Hazardous Materials Unit, for review and approval, along with a Phase II report if warranted by the Phase I report for the project site. The reports shall make recommendations for remedial action, if appropriate, and should be signed by a Registered Environmental Assessor, Professional Geologist, or Professional Engineer. Applicant shall implement the approved recommendations.

SCA 74: Hazardous Materials Business Plan.*(Prior to issuance of a business license.)*The project applicant shall submit a Hazardous Materials Business Plan for review and approval by Fire Prevention Bureau, Hazardous Materials Unit. Once approved this plan shall be kept on file with the City and will be updated as applicable. The purpose of the Hazardous Materials Business Plan is to ensure that employees are adequately trained to handle the materials and provides information to the Fire Services Division should emergency response be required. The Hazardous Materials Business Plan shall include the following:

a. The types of hazardous materials or chemicals stored and/or used on site, such as petroleum fuel products, lubricants, solvents, and cleaning fluids.

b. The location of such hazardous materials.

c. An emergency response plan including employee training information

d. A plan that describes the manner in which these materials are handled, transported and disposed.

SCA A: Construction-Related Air Pollution Controls (Dust and Equipment Emissions). *(Ongoing throughout demolition, grading, and/or construction.)*During construction, the project applicant shall require the construction contractor to implement all of the following applicable measures recommended by the Bay Area Air Quality Management District (BAAQMD):

a. Water all exposed surfaces of active construction areas at least twice daily (using reclaimed water if possible). Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever possible.

b. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer).

c. All visible mud or dirt track-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.

d. Pave all roadways, driveways, sidewalks, etc. as soon as feasible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

e. Enclose, cover, water twice daily or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.).

f. Limit vehicle speeds on unpaved roads to 15 miles per hour.

g. Idling times shall be minimized either by shutting equipment off when not is use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations. Clear signage to this effect shall be provided for construction workers at all access points.

h. All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

i. Post a publicly visible sign that includes the contractor's name and telephone number to contact regarding dust complaints. When contacted, the contractor shall respond and take corrective action within 48 hours. The telephone numbers of contacts at the City and BAAQMD shall also be visible. This information may be posted on other required on-site signage.

j. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.

k. All excavation, grading, and demolition activities shall be suspended when average wind speeds exceed 20 mph.

l. Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

m. Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more).

n. Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress.

o. Install appropriate wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of the construction site to minimize wind blown dust. Wind breaks must have a maximum 50 percent air porosity.

p. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.

q. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.

r. All trucks and equipment, including tires, shall be washed off prior to leaving the site.

s. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.

t. Minimize the idling time of diesel-powered construction equipment to two minutes.

u. The project applicant shall develop a plan demonstrating that the off-road equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a project wide fleet-average 20 percent NOx reduction and 45 percent particulate matter (PM) reduction compared to the most recent California Air Resources Board (CARB) fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as they become available.

v. Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., BAAQMD Regulation 8, Rule 3: Architectural Coatings).

w. All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for emission reductions of NOx and PM.

x. Off-road heavy diesel engines shall meet the CARB's most recent certification standard.

Impacts, Standard Conditions of Approval and Mitigation Measures

Significance Criteria

According to the City's Thresholds of Significance, the Specific Plan would have a significant impact related to hazards and hazardous materials if it would:

1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
2. 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;
3. Create a significant hazard to the public through the storage or use of acutely hazardous materials near sensitive receptors [NOTE: Per the BAAQMD CEQA Guidelines, evaluate whether the project would result in persons being within the Emergency Response Planning Guidelines (ERPG) exposure level 2 for acutely hazardous air emissions either by siting a new source or a new sensitive receptor. For this threshold, sensitive receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers];
4. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
5. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 (i.e., the "Cortese List") and, as a result, would create a significant hazard to the public or the environment;
6. Result in less than two emergency access routes for streets exceeding 600 feet in length unless otherwise determined to be acceptable by the Fire Chief, or his/her designee, in specific instances due to climatic, geographic, topographic, or other conditions;
7. Be 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, and would result in a significant safety hazard for people residing or working in the project area;
8. Be located within the vicinity of a private airstrip, and would result in a significant safety hazard for people residing or working in the project area;
9. Fundamentally impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
10. 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.

Hazardous Materials Release Sites

Impact Haz-1: The Planning Area contains numerous sites which are included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Continued occupancy and use or future development of these hazardous materials sites in accordance with the Specific Plan could create a significant hazard to the public or the environment. However, with required implementation of City of Oakland Standard Conditions of Approval and required compliance with local, state and federal regulations for treatment, remediation or disposal of contaminated soil or groundwater, hazards to the public or the environment from hazardous materials sites would be less than significant. **(LTS with SCA)**

The Planning Area, including the Opportunity Sites previously described and shown in Table 4.5-2, contain numerous sites which are included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 (i.e., the Cortese list). The Cortese list identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release, and all solid waste disposal facilities from which there is known migration.

Additional properties within the Planning Area may be placed in environmental agency databases in the future due to the discovery of as yet unknown previous releases or new releases of hazardous substances. Continued use or future development of these hazardous materials release sites in accordance with the Specific Plan could create a significant hazard to the public or the environment.

Environmental Cases at Opportunity Sites Proposed for Residential Use

There are several sites within the West Oakland Planning Area that have historically been used for industrial purposes or are currently in industrial use, but which are now proposed for a change in land use to residential. The City of Oakland's Urban Land Redevelopment Program includes risk-based corrective action standards that are established to adequately address the risk posed by contamination to human health. Residential Risk Based Screening Levels incorporated into the Urban Land Redevelopment Program are more conservative (i.e., more stringent) than screening levels for commercial/industrial use. Previously applied assumptions regarding steps necessary to protect human health may need to be revisited and reassessed based on the proposed new residential use.

Roadway Site

The Roadway sites, located between 17th and 18th Street as well as the fronting parcels on the south side of 17th Street, and between Campbell and Wood Streets, are currently in industrial use but the Specific Plan proposes to designate these sites for future residential use. These properties are identified in the Specific Plan as containing Opportunity Sites #8 and #12. The following reported environmental cases are known to exist within these proposed residential sites, and which must be addressed by future development plans prior to any future residential development.

- 1708 Wood Street (Roadway Express, Case #T0600102107) – Open, Verification Monitoring: A Phase II Environmental Site Assessment prepared for this site in February 2011 identified two UST sand and oil/water separator as recognized environmental conditions on the site. In July 2011, the USTs, the separator and associated piping and materials were removed and impacted soils were excavated and disposed, and verification monitoring of groundwater wells is currently underway. In a letter to Alameda County Department of Health dated March 2012, the environmental engineers in charge of remediation efforts recommended the site be considered for No Further Action status. The current official status of this case remains open pending ACDEH case closure. [14]

- 1655 17th Street (ACME Galvanizing, Case #T10000001503) – Open, Assessment and Interim Remedial Action: This is the southern portion of the Roadway site which is proposed for residential use under the Specific Plan. The state database indicates that lead, acid or another corrosive is a pollutant of concern at this site and indicates that the case has been listed as "Open – Assessment and Remedial Action" since August 2001. This listing suggests that an interim remedial action is occurring at the site, and that additional activities such as site characterization, investigation, risk evaluation, and/or site conceptual model development are occurring.[15]

Coca Cola Bottling/Mayway Site

There are no records of known environmental cases at this site listed on federal, state or regional databases.

Phoenix Iron Works Site

The Phoenix Iron Works site was used for a variety of purposes between 1920 and the present, including auto parts manufacturing, steel and ironworks fabrication, and fireworks manufacturing. The Specific Plan now proposes to allow this site to be used for mixed housing and business uses.

- 800-888 Cedar Street (Phoenix Iron Works, Case # T0600102229) – Open, Site Assessment: Multiple site investigations and remedial activities have been performed at the site since 1990. Analytical data from the prior investigations indicate that isolated areas of the site are impacted by acetone, diesel, gasoline, and other solvent or non-petroleum hydrocarbons; that elevated concentrations of lead are present in shallow soil across the site; and that metals within the groundwater is of potential concern. This site is currently regulated by the DTSC under a Voluntary Cleanup Agreement with Caltrans as amended in 1999. A 2011 Sampling and Analysis Plan prepared for this site describes soil assessment activities that are intended to be conducted during a Phase II Soil Investigation performed for the City of Oakland under a Brownfield Assessment Grant for both hazardous substances and petroleum hydrocarbons. The purpose of the Phase II Soil Investigation is to define the extent of semi-volatile organic compound and petroleum hydrocarbon soil contamination in several areas of the site that were identified in previous investigations; to provide further evaluation of elevated lead concentrations detected in soil; and to evaluate the potential need for remediation or additional evaluation of risk.[16]

---

14 State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600102107

15 State Water Resources Control Board, Geotracker Report. Accessed at:https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000001503

16 Northgate Environmental Management, Inc., *Sampling and Analysis Plan, Phase II Soil Investigation*, prepared for the City of Oakland under EPA Brownfields Assistance Grant Number 2B-00T18101-0, July 14, 2011. Accessed at: http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/9784458756/Phase%20II%20Sampling%20and%20Analysis%20Plan_7-14-11.pdf

West Oakland BART TOD Site

In 1994 the DTSC entered into a Voluntary Cleanup Agreement with Caltrans to conduct Preliminary Endangerment Assessments, removal actions, risk assessment, design review and/or implementation of a Remedial Action Plan (RAP) as required on a site-by-site evaluation for 34 separate properties located along the Cypress Freeway replacement realignment.[17] Each of these properties were identified as being potentially contaminated with hazardous substances and wastes which may require remedial activities prior to and during construction of the freeway and installation of a new EBMUD sewer line. Many of these properties are located in and immediately adjacent to the site now proposed for the West Oakland BART Station TOD. The status of each of key property at the West Oakland BART Station TOD is listed below, along with other environmental cases within the West Oakland BART Station TOD site and vicinity.

- 1225 7th Street (All Mercedes Dismantlers, Case #T0600101163) – Closed: This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of the underground tank has been complete and that the case has been considered closed, based on a Cleanup Action Report, as of June 1997.[18]
- 1390 7th Street (Kelly's Truck Repair, Case # T0600101944) – Closed: This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of the underground tank has been complete and that the case has been considered closed, based on a Cleanup Action Report, as of March 1997.[19]
- 1451 7th Street (West Oakland BART Station, Case #70000133) – Refer to Local Agency: The site includes two parcels currently owned by BART, with the West Oakland BART Station running roughly north–south through the site. The site consists of the parking lots surrounding the station roughly from 5th Street to 7th Street and between Mandela Parkway and Chester Street. The site has been used as a parking lot since 1954. It was the former site of a door and window production facility. Pursuant to a USEPA grant, a Site Investigation Report was prepared for this site to assess whether chemicals of concern have impacted site soils, groundwater and soil vapor.[20] In response to the Site Investigation Report, DTSC has recommended that a supplemental investigation be conducted to further characterize semi-volatile organic compound, polychlorinated biphenyl, arsenic and lead hotspots, with use of the supplemental data and results to develop an appropriate remedial strategy (if warranted) to ensure that the site is suitable for the intended future use.[21]
- 1285 5th Street (Container Freight, Case #01420128) – Inactive, Needs Evaluation: The site is part of the Cypress Freeway Construction Project. Former site uses include a warehouse and distribution facility since 1967. Site activities consisted of unloading cargo from freight trains and transferring to

---

17 DTSC and Caltrans, *Voluntary Cleanup Agreement, Cypress Freeway Reconstruction Project and East Bay Municipal Utility District Sewer Line Realignment*, Oakland and Emeryville, CA, May 10, 1994

18 State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600101163

19 State Water Resources Control Board, Geotracker Report. Accessed at:https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600101944

20 Weiss Associates, *Targeted Site Investigation and Analysis Report for West Oakland Bay Area Rapid Transit Station*, Oakland, California, June 29, 2007

21 DTSC, letter to Alliance for West Oakland Development and SF BART, October 3, 2007. Accessed at : http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/7848157584/WOBS_CL_100307.pdf

trucks. Prior to this use, the site was owned by the Commissary Department of the Southern Pacific Railroad. It is not known what site activities took place when it was owned by the railroad. Potential contaminants of concern at this site include arsenic, chromium, diesel, gasoline, lead, nickel, other insecticides /pesticide fumigants /herbicides, other solvent or non-petroleum hydrocarbon, polychlorinated biphenyls (PCBs), and waste motor/hydraulic/lubricating oil. According to a DTSC final Report of Completion of Remedial Action[22], remedial action completed at this site consisted of management of contaminated soil during Caltrans' Cypress Freeway (1-880) Reconstruction Project. Construction and remedial actions at these sites were governed by the Cypress Replacement Project Feasibility Study/Remedial Action Plan (1995). Contaminated soil was excavated from these sites, most of which was hauled to an appropriate landfill and some of which was reused as fill material. This soil was graded, compacted and covered with clean imported aggregate base, then covered with approximately 4 inches of asphalt. Semi-annual groundwater monitoring and cap inspection and maintenance was required to continue at site. Certification of the remedial actions is listed as pending an Operation and Maintenance agreement and a land use covenant for the site.

- 500 Kirkham Street (Smilo Chemical Company, Case # 01510022) – Inactive, Needs Evaluation: This site is part of the Cypress Freeway Reconstruction Project. The site was formerly known as Smilo Chemical Company, which operated as a chemical repackaging company. It was later used as a truck repair facility in which the facility occupied approximately one third of the site. Previous investigations have identified potential contaminants of concern at this site to include acetone, arsenic, chromium, copper, diesel, gasoline, lead, nickel, other solvent or non-petroleum hydrocarbon, polychlorinated biphenyls (PCBs). This site's case is overseen by DTSC. Pursuant to a Brownfield Assessment Grant issued by the U.S. EPA for the West Oakland Development Area, the City of Oakland is conducting detailed investigations at this site. A Sampling and Analysis Plan, Phase II Soil and Groundwater Investigation Report for 500 Kirkham Street, describes the soil and groundwater assessment activities that are intended to be conducted during a Phase II Soil and Groundwater Investigation by the City of Oakland. The grant covers both petroleum products and hazardous substances. The work will be performed in accordance with procedures outlined in a Quality Assurance Project Plan for the West Oakland Development Area (Northgate Environmental, September 2009). The Quality Assurance Project Plan was prepared to serve as a master document to support site-specific sampling and analysis plans. The purpose of the Phase II Soil and Groundwater Investigation will be to confirm the presence or absence of soil or groundwater contamination at the site; to define potential sources of contamination at the site (whether originating from on-site or off-site sources; to evaluate data collected at the site; to provide professional opinions regarding environmental conditions at the site, potential liabilities associated with the site, and potential impacts to future use of the site; and to evaluate the potential need for remediation or additional evaluation of risk.[23]
- 5th and Kirkham (Southern Pacific Transportation Company, Case #T060010130) – Closed: This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of identified leaking

[22] DTSC Report of Completion of Remedial Action, February 2007. Accessed at: http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/8268796622/DTSC%20Report%20of%20Completion%20of%20RA.pdf

[23] Sampling and Analysis Plan, Phase II Soil and Groundwater Investigation at 500 Kirkham Street

diesel and waste oil has been complete and that the case has been considered closed, based on a Cleanup Action Report, as of October 2012.[24]

- 1396 5th Street – Red Star Yeast, Case #T06019794669 – Open, Remediation: This site was formerly occupied by the Red Star Yeast Company, but all buildings and appurtenant structures have been removed. Soil borings conducted in 2004, 2006 and 2011 encountered a layer of fill material with detected concentrations of cadmium, lead, mercury, and copper at several locations across the site. The metals appear to have been brought to the site with the fill material and do not appear to be related to site activities. The fill material is believed to have been placed at the site sometime between 1862 and 1890.Petroleum hydrocarbons were also detected in site soils and shallow groundwater. Soil excavations were conducted to remove soil with elevated concentrations of metals. Three USTs were discovered during the investigation and soil removal process. The three USTs were removed or closed in place.[25] Alameda County Environmental Health staff has reviewed the Soil Closure Report (August 21, 2012), the Excavation Report (October 15, 2012) and the Underground Storage Tank Removal and Closure Report (November 13, 2012), and have identified several items that require additional information, clarification, or correction before the County is able to adequately evaluate the effectiveness of the soil excavation and UST removals before considering the case for closure.[26]
- 1445 5th Street (Eastlake Associates, Case # T0600100492) – Closed: This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of identified leaking gasoline has been complete and that the case has been considered closed, based on a Cleanup Action Report as of July 1993.[27]
- 349 Mandela Parkway (SF BART, Case #01750021) – Certified: According to a Site Certification Synopsis prepared by DTSC, this 0.3-acre site was formerly used by a beer bottle maker, a soda works, beer depot, wholesale beer and wine warehousing and cold storage, plumbing supplier, clothing and salvage warehouse operation, and more recently by an auto wrecker. Surface and subsurface sampling at the site found elevated concentrations of lead, as well as other metals and organic compounds. Lead was the only chemical identified as a chemical of potential concern. Soil excavation and subsequent offsite disposal has occurred and DTSC determined that all appropriate response actions had been completed, that all acceptable engineering practices were implemented

---

[24] State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600101304

[25] Alameda County Health Care Services Agency, *Draft Fact Sheet - Proposed Soil Cleanup, Red Star Yeast*, April 28, 2011. Accessed at : https://geotracker.waterboards.ca.gov/regulators/deliverable_documents/3402677774/RO2896%2C%20Red%20Star%20Yeast%2C%201396%205th%20Street%2C%20Oakland%20Fact%20Sheet%202011-04-20.pdf

[26] Alameda County Health Care Services Agency Case File Review for SLIC Case RO0002896 and GeoTracker Global ID T06019794669, Red Star Yeast/1396 Fifth Street LLC, Accessed at https://geotracker.waterboards.ca.gov/regulators/deliverable_documents/9375492691/RO2896_DIR_L_2012-12-18.pdf

[27] State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600100492

and that no further removal/remedial action was necessary. The lead contaminated soil was remediated to achieve an unrestricted land use standard.[28]

- 1414 3rd Street (AMCO Chemical Site, Case #01390001) – National Priorities List, Active: The site was occupied by AMCO Chemical Corp. until December 1989. DTSC inspected the site in 1988 and in February 1989 issued a Report of Violation to correct violations related to leakage of hazardous waste from piping and containers; storage of hazardous waste in deteriorated or otherwise corroded conditions; and unlabeled waste containers. The USEPA implemented a removal action in 1997 to address high concentrations of vinyl chloride at or near the AMCO site. A groundwater extraction and treatment system and a soil vapor extraction system were installed to address the vinyl chloride and other contaminants found in shallow groundwater and soils. Operation of this system ceased in July 1998 due to community concerns. USEPA listed the site on the National Priorities List in July 2004. Since then, the U.S. EPA has continued to conducted soil gas, soil and groundwater investigations, and to work towards development of a remediation and reuse plan.[29]

  The Site is located in an industrial neighborhood in transition. Potential future uses in the area include a mix of commercial and residential uses; future use of the facility itself is uncertain. Further, vapor intrusion concerns have led EPA to consider temporary and permanent relocation for residents in homes surrounding the facility as cleanup continues. This creates additional uncertainty related to the uses on the block surrounding the AMCO property as current land uses may change in response to both relocation possibilities and the land use goals of the City of Oakland and neighborhood residents. Based on the Specific Plan's land use assumptions, future land use on the block around the AMCO property is intended to include residential uses and Transit Oriented Development, which may include residential, commercial, office, community institution and open space uses. However, the presence of the AMCO site and its conditions may influence future land use patterns on the block. Permanent or temporary relocation of existing residential units may influence the size and form of TOD development, and long-term cleanup at the site may require phased development of the block.

  Certain site remediation considerations may alter or affect land use choices for this site and its surroundings. Targeted use restrictions may be required on the site to ensure protection of human health and the environment, long-term remedial features may create some constraints on future use although remedial features could be clustered in order to maximize buildable space, and there may be an option to restrict residential use on the ground floor only and allow upper story residential use. EPA's analysis of the site is ongoing, and additional information about the effectiveness of various remediation alternatives may affect the types of land uses allowed at the site. In the interim, during the on-going analysis and planning for remediation of this site, interim use of the site in a manner that is beneficial to the community has been considered. A bamboo forest has been identified as the preferred interim use. Bamboo plantings could visually screen the site and restrict access during cleanup, and could possibly have some value for groundwater

---

[28] DTCS *Site Certification Synopsis*, BART-Mandela Parkway Site at 349 Mandela Parkway, April 2000. Accessed at: http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/9535382926/madela%20site%20certification%20synopsis.pdf

[29] DTSC Envirostor database, accessed at: http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=01390001

cleanup, capping lead contamination in soil, and reducing exposure to freeway related air pollutants.

Standard Conditions of Approval

Future development of residential use throughout the West Oakland Specific Plan area, particularly new residential development that may ultimately be proposed on those sites identified above, will be required to implement all applicable City of Oakland Standard Conditions of Approval.

SCAs 61 through 66, and 69 will require preparation of a Phase I Environmental Site Assessment (ESA) and/or a Phase II ESA. A Phase I ESA typically lists current and past operations, reviews environmental agency databases (including the State Cortese list as indicated above), records site reconnaissance observations, and summarizes potential contamination issues. A Phase I ESA is typically triggered by a title transfer prior to submission of a development application to the City. In the event that a development application for a proposed residential development project allowed by the Specific Plan does not already have a Phase I ESA, one would be required through the City's permit application process.

If the Phase I ESA identifies known or potential contamination issues, including presence on the Cortese list (as indicated for those sites listed above), a Phase II ESA is conducted. A Phase II ESA typically includes collecting soil and/or groundwater samples at the project site and sending the samples to a laboratory for analysis. A Phase II ESA can also entail inspecting existing structures to identify hazardous building materials. A Phase II ESA typically includes recommendations for remediation and/or safe handling of identified contaminants.

SCA 67: *Health and Safety Plan per Assessment*, requires a Health and Safety Plan that conforms to the Phase I ESA or Phase II ESA recommendations to protect construction workers. SCA 68, *Best Management Practices for Soil and Groundwater Hazards,* requires Best Management Practices (BMPs) for handling contaminated soil and groundwater.

In addition to compliance with the City's SCAs 61 through 69, any required treatment, remediation or disposal of contaminated soil or groundwater would be required to comply with any additional local, State and federal regulations. A Remedial Action Plan, Soil Management Plan and Groundwater Management Plan would be required to address issues such as dust suppression, protection of surface waters and storm drainage outfalls, noise attenuation, etc. The BAAQMD may also impose specific requirements to protect ambient air quality from dust, lead, hydrocarbon vapors or other airborne contaminants that may be released during site remediation activities. A Risk Management Plan and a Site Health and Safety Plan in conformance with federal and Cal/OSHA regulations would also be required. These plans would include identification of chemicals of concern, potential hazards, personal protection clothing and devices, and emergency response procedures as well as required fencing, dust control or other site control measures needed during excavation to protect the health and safety of workers and the public. OSHA requirements mandate an initial training course and subsequent annual training. Site-specific training may also be required for some workers. For transportation of hazardous materials for disposal, the remediation contractor would be required to follow state and federal regulations for manifesting the wastes, using licensed waste haulers, and disposing of the materials at a permitted disposal or recycling facility.

With required implementation of SCAs 61 through 69, and required compliance with local, State and federal regulations for treatment, remediation or disposal of contaminated soil or groundwater, the hazard to the public or the environment from hazardous materials sites would be less than significant.

<u>Mitigation Measures</u>

None needed

Environmental Cases at Other Key Opportunity Sites

The Specific Plan identifies two separate sites for future redevelopment of high intensity anchor campuses within the northeast quadrant of the Mandela/West Grand intersection. This first location, mountain Storage, is a 2-block site at the corner of West Grand Avenue and Mandela Parkway, also bounded by 24th Street and Poplar. The second campus location calls for redevelopment of the Oakland Scavenger and Custom Alloy Scrap Sales sites, which is are irregular shaped series of parcels generally bound by 26th Street to 28th Street, and from Peralta Street to Magnolia Street. These locations are identified in the Specific Plan as containing Opportunity Sites #10 and #20 (Mountain Storage), and #2, #11 and #19 (Oakland Scavenger and CASS site). The following reported environmental cases are known to exist within these campus sites, and which must be addressed by future development plans prior to campus development.

Mountain Storage Site

The Mountain Storage site (Opportunity Sites #10 and #20) contain no reported environmental cases.

Oakland Scavenger and CASS Sites

- <u>2601 Peralta Street</u> (CASS, Case #60000373 and #T0600100997) – Case Closed, No Action Required: The CASS operations consist of recycling ferrous and non-ferrous metals. The property at 2601 Peralta is used for scrap metal storage prior to processing. A release to soil and groundwater from four underground storage tanks was documented at the site. The USTs were used for gasoline, diesel and waste oil. The USTs were removed in October of 1988. Soil samples and groundwater samples were collected after removal of the USTs, and remaining contaminants were detected at levels below their respective environmental screening level or preliminary remediation goals, with the exception of gasoline. Site characterization and remediation was completed under the oversight of the County of Alameda Environmental Health Division from 1988 through 1991. In May 1996, the County issued a Remedial Action Completion Certification, and in April 1995, the RWQCB approved a Case Closure report.[30]
- <u>2730 Peralta</u> (CASS, Case #T0600100427)- Open, Site Assessment: Two USTs were removed from the site in April 1990, and several borings and monitoring wells were installed. On site wells have been reported to contain over 3 feet of free product. In 1991, a work plan was submitted and subsequently approved by ACDEH, but there is no documentation of remedial/characterization/monitoring action at the site since 1995. Notices of violation were sent to the responsible party with no response. In June 2012, ACDEH referred the site to the RWQCB for enforcement actions. [31]

---

30 DTSC, *Site Screening Assessment for 2601 Peralta*, June 23, 2006. Accessed at: http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/4671186149/Site%20Screening%20Assessment.pdf

31 State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600100427

- 2711 Union Street (CASS, Case #T06019746121) – Open, Site Assessment: This site is also part of the CASS scrap metal recycling facility. A 1990 limited site investigation found oil and grease and diesel impacts in the soil and groundwater. Monitoring wells were installed in 1996 and 1998 and results from those wells indicated risks for volatilization from groundwater to both onsite and down gradient receptors. A letter dated July 2009 from ACDEH indicates that the groundwater monitoring wells on the site has not been monitored since 1998. The status of this case remains open.[32]

Pacific Pipe/American Steel Site

The Specific Plan identifies an approximately 4-block, "L" shaped area within the Mandela/Grand Opportunity Area as a site for future redevelopment as a series of high intensity anchor campus sites. This location is generally bounded by West Grand Avenue, Mandela Parkway to 18th Street, 18th Street to Poplar, Poplar to 21st Street, 21st to Adeline and Adeline back to West Grand Avenue. It is identified in the Specific Plan as containing Opportunity Sites #5(Pacific Pipe/American Steel) and #17 (EBMUD). The following reported environmental cases are known to exist within these campus sites, and which must be addressed by future development plans for campus development.

- Mandela at West Grand (Case #60000433) – Inactive, Needs Evaluation: This site consists of two blocks used for industrial purposes: the Pacific Pipe block and the American Steel Building block. The Pacific Pipe block is occupied by a steel pipe product manufacturing company with railroad and crane tracks, a three bay warehouse, pipe storage yards, underground storage tanks, and a gasoline service station. The American Steel Building is occupied by several separate companies. This site is currently regulated by the DTSC under a Voluntary Cleanup Agreement to address potential contaminants of concern, including lead, diesel, gasoline, motor oil and cadmium. The case is currently identified as inactive and in need of further evaluation.
- 1901 Poplar (Pacific Pipe Company, Case # T0600101893)- Closed: This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of identified leaking diesel has been complete and that the case has been considered closed, based on a Cleanup Action Report as of October 1995.[33]

East Bay MUD Site

- 1200 21st Street (EBMUD, Case #T0600102115) – Open, Site Assessment: This site is part of a large EBMUD facility with several previous parcels containing environmental issues. In 1994, six USTs were removed from the site. Elevated concentrations of gasoline, oil and grease, and benzene were detected in soil samples. In 1995 and 1996, two additional subsurface investigations were conducted. Based on the analytical data, remedial soil excavation activities were conducted in 1997 during construction of the Adeline Maintenance Center. An additional subsurface investigation was conducted in 2009 to further characterize the extent of petroleum hydrocarbons in soil and groundwater at three areas of concern (a former gas station, a former auto shop, and an existing waste oil tank. Information from this investigation is to be used to interpret the geologic and hydro-geologic characteristics of the water-bearing formation and the nature and distribution of subsurface contamination, for preparation of concentration maps of constituents of concern, and to

---

32 State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T06019746121

33 State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600101893

develop recommendation for monitoring and/or remediation wells or other remediation measures, if warranted.

Upper Wood Street Development Sites

The Specific Plan identifies an approximately 4-block area within the Mandela/Grand Opportunity Area as a site for future redevelopment as a high intensity anchor campus site. This location is generally bounded by West Grand Avenue to 26th Street, between Mandela Parkway and I-880. It is identified in the Specific Plan as containing Opportunity Sites #3, #4 and #18. The following reported environmental cases are known to exist within this campus site, and which must be addressed by future development plans for this campus site.

- Wood Street at West Grand Avenue (BNSF Wood Street Yard, Case #01400017) - Certified O&M - Land Use Restrictions: This site consists of one small (0.03-acre) parcel that was part of an active rail yard from approximately the 1930's through the early 1990's. Portions of the site have been incorporated within the Cypress Freeway Reconstruction Project. Site investigations were conducted in 1994 and 2005, indicating that soils throughout the site have been contaminated by arsenic at concentrations above regional background levels. A Preliminary Environmental Assessment prepared for the site concluded that the site does not pose an immediate potential hazard to public health or the environment because of limited exposure. Exposure to site soils would require excavation of soils and redevelopment in the area is highly unlikely because of current site use as part of the Cypress Freeway Realignment Project. A deed restriction has been recorded to restrict future use of the property.
- 2233 Wood Street (Army-Navy Distributing Center, Case #J09CA0753, 80000374) – No Further Action: This site is a former Army-Navy Distributing Center situated on approximately 3 acres on the west side of Wood Street. Evidence indicates that there were two underground fuel tanks and a warehouse on this site. The site is now partially owned by Caltrans and partially owned by the Burlington Northern Santa Fe Railroad. In May of 1994 Caltrans entered into a Voluntary Cleanup Agreement with DTSC, removed underground tanks, excavated and disposed of contaminated soil, and conducted groundwater monitoring. In November 2007, DTCS agreed to a No Further Action status for this site.[34] This address is also referenced in the DTSC database as LDS Trucking (Case #01420127). Pursuant to a Voluntary Cleanup Program, Caltrans conducted site investigations to document that a solvent source is no longer present in the subsurface soils and substantiating that there is no need for further remediation or monitoring. In July 2008, DTSC finalized and signed a Remedial Action Certification indicating that no further removal or remediation measures were necessary.[35]
- 2200-2222 Wood Street (Lucchesi Property, Case #SLT19795063) – Open, Site Assessment: According to a June 2006 Phase II Subsurface Investigation, a petroleum release occurred on this property at some uncertain time, adversely affecting the groundwater. The Phase II ESA recommended reporting the results of the investigation to the Alameda County Department of Environmental Health and OFD. At this time, no remedial actions have been identified and the case remains open.

---

34 DTSC Envirostor Data Base, Accessed at: http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=80000374

35 DTSC Envirostor Data Base, Accessed at: http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=01420127

- 2230 Willow Street (Crown Zellerbach, Case #T0600101564) – Closed: This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of identified leaking gasoline has been complete and that the case has been considered closed, based on a Cleanup Action Report as of November 1993.[36]

Pacific Pipe Site at 24th Street

- 1685 24th Street (Pacific Pipe Company, Case # T06019758726) – Open, Site Assessment: Seven USTs, including storage for gasoline and waste oil, were removed from this site in 1987. Soil and groundwater investigations revealed concentrations of gasoline, diesel, motor oil and benzene in soil, and benzene in groundwater. The lateral and vertical extent of contamination was un-defined and appears to extend off site. Soil and groundwater investigation were to be submitted in 2008, but the report was not submitted and no further reports documenting work have been received. In April 2012, ACEH requested the site be referred to the San Francisco Bay Regional Water Quality Control Board for enforcement actions.
- 1688 24th Street (Cereske Electric, Case #t0600102219)- Open , Site Assessment: Two underground storage tanks were removed from this site in 1995, and visibly stained soil was observed in the underground pit. Soil samples indicate presence of gasoline and benzene, and groundwater samples indicate presence of benzene. The lateral and vertical extent of contamination was un-defined. Soil and groundwater investigation were to be conducted but the responsible parties are non-responsive. In June 2012, ACEH requested the site be referred to the San Francisco Bay Regional Water Quality Control Board for enforcement actions.
- 1735 24th Street (Pacific Supply, Case #T0600101039) – Open, Site Assessment: An underground storage tank was removed from this site in 1987, and soil and vapor samples conducted at the time indicated the soils were contaminated with gasoline, and that the gasoline may have reached the groundwater. Soil and groundwater investigations were conducted, and quarterly groundwater monitoring was initiated in 1992, including a vapor extraction pilot study. Groundwater sampling has continued up to the present. In January of 2012, the Regional Water Quality Control Board recommended the site be considered for closure, providing a health risk assessment is conducted and determined safe for prescribed activities but case closure by the lead agency (ACDEH) has not occurred.
- 1700 24th Street (C&L Trucking, Case #T0600102253) – Open, Site Assessment: An underground storage tank was removed from this site in 1990. Soil and groundwater samples conducted at the time detected diesel in the soils and groundwater. A monitoring well was installed in 1996. In a February 2001 letter, the ACDEH found the site to be out of compliance with agency directives regarding monitoring and reporting.

3rd Street Development Sites

The Specific Plan identifies an approximately 3-block area within the 3rd Street Opportunity Area as a site for future redevelopment as a high intensity anchor campus site. This location is bounded by 3rd Street to 5th Street, between Market Street and Chestnut Street. It is identified in the Specific Plan as

---

36 State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600101564

Opportunity Site #35. The following reported environmental cases are known to exist within this campus site, and which must be addressed by future development plans for this campus development.

- 333 Market Street (Marine Terminals Corporation, Case #T0600100865) – Closed: This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of identified leaking gasoline has been complete and that the case has been considered closed, based on a Cleanup Action Report as of January 1997.[37]
- 333 Filbert (East Bay Ford Truck Sales, Case #T0600100485) – Closed: This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of identified leaking waste oil / motor / hydraulic / lubricating oils have been complete and that the case has been considered closed, based on a Cleanup Action Report as of July 1994.[38]
- 333 Chestnut Street (Aramark Uniform Services, Case #T0600100079) – Closed*:* This site is listed as a closed Alameda County LUST cleanup site, indicating that removal of identified leaking diesel has been complete and that the case has been considered closed, based on a Cleanup Action Report as of January 2004.[39]

Standard Conditions of Approval

Future development of campus-type business and industrial uses at those Campus sites identified above will be required to implement all applicable City of Oakland Standard Conditions of Approval.

SCAs 61 through 66, and 69 require preparation of a Phase I Environmental Site Assessment (ESA) and/or a Phase II ESA. A Phase I study typically lists current and past operations, reviews environmental agency databases (including the State Cortese list), records site reconnaissance observations, and summarizes potential contamination issues. A Phase I ESA is typically triggered by a title transfer prior to submission of a development application to the City. In the event that a development application for a proposed campus-style development project pursuant to the Specific Plan does not already have a Phase I ESA, one would be required through the City's permit application process.

If the Phase I ESA identifies known or potential contamination issues, including presence on the Cortese list such as those sites indicated above, a Phase II ESA is conducted. A Phase II ESA typically includes collecting soil and/or groundwater samples at the site and sending the samples to a laboratory for analysis. A Phase II can also entail inspecting existing structures to identify hazardous building materials. A Phase II typically includes recommendations for remediation and/or safe handling of identified contaminants.

In those cases where either existing or future Phase II reports do include recommendations for remediation, all necessary environmental investigation requirements and established Oakland-specific, risk-based corrective action standards for proposed industrial/commercial development sites would be established to adequately address the risk posed by contamination to human health, pursuant to the City of Oakland's Urban Land Redevelopment Program. All currently required site characterization

---

[37] State Water Resources Control Board, Geotracker Report. Accessed at: ttps://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600100865

[38] State Water Resources Control Board, Geotracker Report. Accessed at:https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600100485

[39] State Water Resources Control Board, Geotracker Report. Accessed at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600100079

efforts, on-going monitoring and all already required remediation efforts established by the applicable lead agencies, whether current on inactive, would need to be fully implemented. A Risk Management Plan would be required, specifying containment measures where contaminants may be left at concentrations greater than the most stringent screening levels. These measures would be used to prevent exposure to any hazardous materials left in place. Institutional controls may also be employed to ensure the future protection of human health. The site would also be included in the City of Oakland Permit Tracking System, and future permit applications for work that might alter the conditions of site closure would undergo special review by the OFD. Implementation of this program is intended to provide assurance that human health and environmental resources will be protected.

SCA 67,*Health and Safety Plan per Assessment*, requires a Health and Safety Plan that conforms to the Phase I ESA or Phase II ESA recommendations be implemented during site characterization and remediation efforts to protect construction workers. SCA 68, *Best Management Practices for Soil and Groundwater Hazards,* requires Best Management Practices (BMPs) for handling contaminated soil and groundwater.

In addition to compliance with the City's SCAs 61 through 69, any required treatment, remediation or disposal of contaminated soil or groundwater would be required to comply with all local, State and federal regulations. A Remedial Action Plan, Soil Management Plan and Groundwater Management Plan would be required to address issues such as dust suppression, protection of surface waters and storm drainage outfalls, noise attenuation, etc. The BAAQMD may also impose specific requirements to protect ambient air quality from dust, lead, hydrocarbon vapors or other airborne contaminants that may be released during site remediation activities. A Risk Management Plan and a Site Health and Safety Plan in conformance with federal and Cal/OSHA regulations would also be required. These plans would include identification of chemicals of concern, potential hazards, personal protection clothing and devices, and emergency response procedures as well as required fencing, dust control or other site control measures needed during excavation to protect the health and safety of workers and the public. OSHA requirements mandate an initial training course and subsequent annual training. Site-specific training may also be required for some workers. For transportation of hazardous materials for disposal, the remediation contractor would be required to follow state and federal regulations for manifesting the wastes, using licensed waste haulers, and disposing of the materials at a permitted disposal or recycling facility.

With required implementation of SCAs 61 through 69, and required compliance with local, State and federal regulations for treatment, remediation or disposal of contaminated soil or groundwater, the hazard to the public or the environment from hazardous materials at proposed campus development sites would be less than significant.

Mitigation Measures

None needed

Hazardous Building Materials

Impact Haz-2: Asbestos or lead based paint present within older structures in the Planning Area could be released into the environment during demolition or construction activities, which could result in soil contamination or pose a health risk to construction workers or future occupants. However, with required implementation of the City's Standard Conditions of Approval SCAs 41, 63 and 65, and other applicable laws, regulations, standards and oversight currently in place, the potential impact of the Specific Plan related to exposure to hazardous building materials would be less than significant. **(LTS with SCA)**

Existing structures within the Planning Area may contain asbestos-containing insulation, siding, finishes and other asbestos-containing building materials, and, depending on the period when they were constructed, may contain lead based paint. Asbestos or lead-based paint present within older structures could be released into the environment during demolition or construction activities, which could result in soil contamination or pose a health risk to construction workers or future occupants if not managed in accordance with existing laws and regulations.

Standard Conditions of Approval

City of Oakland Standard Conditions of Approval SCAs 41, 63 and 65 would provide for the safe removal and disposal of asbestos and lead-based paint. SCA 41, *Asbestos Removal in Structures*, requires specifications signed by a certified asbestos consultant for the removal, encapsulation, or enclosure of the identified asbestos containing material in accordance with all applicable laws and regulations. SCA 63, *Lead-Based Paint/Coatings, Asbestos, or PCB Occurrence Assessment*, requires submittal of a comprehensive assessment report to the Fire Prevention Bureau, Hazardous Materials Unit, signed by a qualified environmental professional, documenting the presence or lack thereof of asbestos-containing materials, lead-based paint, and any other building materials classified as hazardous waste. SCA 65, *Lead-Based Paint Remediation*, requires submittal of specifications to the Fire Prevention Bureau, Hazardous Materials Unit signed by a certified Lead Supervisor, Project Monitor, or Project Designer for the stabilization and/or removal of the identified lead paint in accordance with all applicable laws and regulations.

In addition to the City's Standard Conditions of Approval, building demolition or rehabilitation activities within the Planning Area would be required to comply with regulations pertaining to the removal and proper disposal of asbestos and lead-based paint. Section 19827.5 of the California Health and Safety Code requires that local agencies not issue demolition or alteration permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations regarding hazardous air pollutants, including asbestos. Individual building demolition and rehabilitation contractors would be required to implement standard federal, State and BAAOMD procedures for asbestos containment and worker safety. The BAAOMD is vested with authority to regulate airborne pollutants through both inspection and law enforcement, and must be notified 10 days in advance of any proposed demolition or abatement work. The demolition or removal of asbestos-containing building materials is subject to the limitations of BAAOMD Regulation 11, Rule 2: Hazardous Materials; Asbestos Demolition, Renovation and Manufacturing, which requires special handling of asbestos containing material (e.g., by keeping materials continuously wetted). The Rule prohibits any visible emissions of asbestos-containing material to outside air. Project applicants would be required to consult with the BAAQMD's Enforcement Division prior to commencing demolition of a building containing asbestos materials. The local office of the State Occupational Safety and Health Administration (OSHA) must also be notified of asbestos abatement to be carried out. OSHA regulates worker exposure to lead based paint during construction through respiratory protection, protective clothing, and hygiene facilities. Lead based paint is considered hazardous if the lead content exceeds 1,000 parts per million. A Cal OSHA certified asbestos and lead based paint contractor would prepare a site-specific asbestos and lead hazard control plan with recommendations for the containment of asbestos or lead-based paint materials during demolition activities, for appropriate disposal methods and locations, and for protective clothing and gear for abatement personnel.

Given the common occurrence of asbestos and lead-based paint contamination in older buildings, the proven and routine methods of abatement required to be implemented through the City's Standard Conditions of Approval, and other applicable laws, regulations, standards and oversight currently in place, the potential impact of the Specific Plan related to exposure to hazardous building materials would be less than significant.

Mitigation Measures

None needed

Hazardous Materials Use, Transport or Disposal

Impact Haz-3: Development allowed by the Specific Plan could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, the potential impact of the Specific Plan related to the routine transport, use, or disposal of hazardous materials would be less than significant.**(LTS with SCA)**

New development allowed by the Specific Plan could involve the use, transport or disposal of hazardous materials which could create a hazard to the public or the environment. New development under the Specific Plan could also expose new residents or workers to hazards from existing use, transport or disposal of hazardous materials within the Planning Area. Construction activities could involve the standard use of gasoline, solvents, diesel fuel, oil and grease, hydraulic fluid, ethylene glycol, welding gases, and paint that are considered hazardous materials. If not properly managed, such routine transport, use, or disposal of hazardous materials, or reasonably foreseeable upset and accident conditions involving hazardous materials, could create a significant hazard to the public or the environment.

The potential for an accidental release of hazardous materials to occur within a residential area is reduced by current truck route designations and prohibitions that limit truck travel to designated truck routes, including the on- and off-ramps at 7th Street, Adeline and Union Streets, and West Grand Avenue.

Standard Conditions of Approval

The risk to human health and the environment from the routine use of hazardous materials would be reduced by required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials regulations, which are codified in Title 8 of the California Code of Regulations (CCR), and their enabling legislation set forth in Chapter 6.95 of the California Health and Safety Code. Projects requiring the use or disposal of hazardous materials would be required to comply with SCA 35, *Best Management Practices,* during construction and would be required to prepare a Hazardous Materials Management Plan (HMMP) and Hazardous Materials Business Plan (HMBP) as required by Alameda County and the City's SCA 74, *Hazardous Materials Business Plan* for operations.

The City of Oakland Office of Emergency Services (OES) is designated as the Certified Unified Program Agency (CUPA) responsible for permitting and overseeing activities that involve underground storage tanks and the handling of hazardous materials in Oakland. The OES requires facilities that handle hazardous materials greater than threshold quantities to prepare a Hazardous Materials Business Plan (HMBP), and facilities that handle acutely hazardous materials are required to prepare a Risk Management and Prevention Plan (RMPP).

Hazardous materials would be stored according to manufacturer's recommendations and according to the specifications within the project-specific HMMP and HMBP. Hazardous materials would be stored in locations according to compatibility and in storage enclosures (i.e., flammable material storage cabinets) or in areas or rooms specially designed, protected, and contained for such storage, in accordance with applicable regulations. Hazardous materials would be handled and used in accordance with applicable regulations by personnel that have been trained in the handling and use of the material and that have received proper hazard communication training. Hazardous materials reporting (i.e., California Hazardous Materials Business Planning, California Proposition 65 notification, and Emergency Planning and Community-Right-to-Know Act reporting) would be completed as required.

Hazardous materials would be transported in accordance with applicable hazardous materials shipping regulations. The California Highway Patrol and the California Department of Transportation (Caltrans) are the primary state agencies with responsibility for enforcing federal and state regulations pertaining to transport of hazardous materials within California. The U.S. Department of Transportation regulates the transport of chemicals and hazardous materials by truck between states. These agencies regulate container types and packaging requirements as well as licensing and training for truck operations, chemical handling and hazardous waste haulers.

The risks of exposure to construction workers and occupants of surrounding properties from the routine use of hazardous materials during construction would be reduced through implementation of the City's Standard Conditions of Approval. SCA 68, *Best Management Practices for Soil and Groundwater Contamination*, requires that Best Management Practices (BMPs) be implemented during construction to avoid potential adverse effects to soils and groundwater. Furthermore, SCA 67, *Health and Safety Plan per Assessment*, requires preparation of a Health and Safety Plan to protect workers from the risks of exposure during demolition and construction activities. In addition to the City's Standard Conditions of Approval, other State and local regulations must also be implemented for any construction project, and are monitored by the State (Cal/OSHA in the workplace or DTSC for hazardous waste) and/or local jurisdictions (OFD and ACEHD).

With required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, the potential impact of the Specific Plan related to the routine transport, use, or disposal of hazardous materials would be less than significant.

Mitigation Measures

None needed

Hazardous Materials Near Schools

Impact Haz-4: All schools within the Planning Area are located within ¼ mile of an existing permitted hazardous materials use or an identified environmental case. The Specific Plan could facilitate the addition of new businesses that emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of a school. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, the potential impact of the Specific Plan related to emission and handling of hazardous materials near schools would be less than significant. **(LTS with SCA)**

All public and charter schools within the Planning Area are located within ¼ mile of an existing permitted hazardous materials use or an identified environmental case. The Specific Plan could facilitate the addition of new businesses that emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

The City has carried out consultation with the school districts regarding the potential impact of the Specific Plan on these schools as required for hazardous materials near schools by CEQA Guidelines Section 15186(b)(1) and (2).

Standard Conditions of Approval

The City's Standard Condition of Approval SCA 74, *Hazardous Materials Business Plan* and *t*he City of Oakland Municipal Code require any facility that handles hazardous or acutely hazardous materials in excess of specified quantities to file a disclosure form, commonly referred to as a Hazardous Materials Business Plan (HMBP). This form must contain information needed for City emergency services to adequately prepare for response to an emergency at that facility. Facilities that handle acutely hazardous materials must also complete a Risk Management and Prevention Plan (RMPP) to assess potential off-site consequences of a release of hazardous materials.

In addition, facilities that handle hazardous materials within ¼ mile of a school, hospital, or residence can be required to complete a Hazardous Materials Assessment Report and Remediation Plan (HMARRP). The HMARRP must identify hazardous materials used at the facility and the suitability of the site, the potential on-site and off-site risks, and remedial measures to be implemented to reduce or eliminate on-site and off-site risks. The HMARRP is subject to review and approval by the City and public review and comment to ensure that potential threats to public health are adequately addressed.

With required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, the potential impact of the Specific Plan related to emission and handling of hazardous materials near schools would be less than significant.

Mitigation Measures

None needed

Airport Hazards

Impact Haz-5: The Planning Area is not located within an airport land use plan area or within two miles of a public airport or public use airport, or near a private airstrip. The Specific Plan would have no impact related to airport hazards. (**No Impact**).

Mitigation Measures

None needed

Interfere with Emergency Response Plan or Emergency Evacuation Plan

Impact Haz-6: With implementation of the City's Standard Condition of Approval SCA 33, *Construction Traffic and Parking*, the requirement to obtain an encroachment permit for work within street rights-of-way, and standard construction period notification requirements to first responders, the impacts related to interference with an emergency response plan or emergency evacuation plan would be less than significant. (**LTS with SCA**)

The Oakland OES has identified a network of evacuation routes and potential emergency shelters.[40]The Emergency Evacuation Routes within West Oakland are 7th Street, 14th Street, 12th Street, 27th Street, 35th Street, Adeline Street, Market Street, Martin Luther King Jr. Boulevard, San Pablo Avenue, and West Grand Avenue. Many of the development Opportunity Sites under the proposed Specific Plan are located along these streets identified as Emergency Evacuation Routes.

Emergency access would be maintained to properties in the surrounding vicinity during construction of development facilitated by the Specific Plan. Any need for traffic lane reductions or street closure due to construction would be short-term, temporary and localized. OFD is the first responder in an emergency. Individual future development projects would be required to obtain an encroachment permit from the City for any proposed changes to or construction period use of street rights-of-way, which would include review by OFD. Standard notification procedures required by the City are designed to ensure that OFD is notified if construction traffic would block any City streets. Specifically, the job site supervisor is required to call the OFD dispatch center any day construction vehicles would partially or completely block a City street during construction. In addition, the City's Standard Condition of Approval SCA 33, *Construction Traffic and Parking*, would require development of a construction management plan, which addresses construction period traffic and parking. As described in Section 4.11, Transportation, Circulation and Parking, traffic from ongoing occupancy and operation of future development in accordance with the Specific Plan would not create unacceptable traffic congestion on evacuation routes.

Mitigation Measures

None needed

Wildland Fires

Impact Haz-7: The Planning Area is located in an urbanized part of Oakland, within a non-Very High Fire Hazard Severity Zone as mapped by the California Department of Forestry and Fire Protection, and well outside of the City's Fire Prevention and Assessment District boundary. The Specific Plan would have no impact related to Wildland fires. (**No Impact**)

The California Department of Forestry and Fire Protection (CalFIRE) maps areas of significant fire hazard based on fuels, terrain, weather and other relevant factors. These zones, referred to as Fire Hazard Severity Zones, then determine the requirements for special building codes designed to reduce the ignition potential of buildings. The Planning Area is located within a non-Very High Fire Hazard Severity Zone. Additionally, the Planning Area is located in an urbanized area of Oakland and, according to Figure 4.1 of the City of Oakland General Plan Safety Element, the area is well outside of the City's Fire

[40] City of Oakland, City of Oakland General Plan Safety Element, 2004, Figure 2.1.

Prevention and Assessment District boundary, which indicates that it is not subject to significant wildfire hazard. The Specific Plan would have no impact related to Wildland fires.

Mitigation Measures

None needed

Cumulative Impacts

Cumulative Impact Haz-8: Cumulative development could create a significant hazard to the public or the environment through the development of existing hazardous materials release sites, through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with other local and State hazardous materials laws, regulations, standards and oversight currently in place, potential cumulative hazards and hazardous materials impacts would be less than significant. (**LTS with SCA**)

Hazards and hazardous materials impacts are generally site-specific and/or have limited mobility. The geographic area considered for potential cumulative hazards and hazardous materials impacts consists of an area within ¼-mile of the Planning Area, and the area along transportation routes used during demolition and construction activities associated with development under the Specific Plan.

Cumulative development could create a significant hazard to the public or the environment through the development of existing hazardous materials release sites, through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Cumulative development would result in additional residential and non-residential development by the year 2035 and may involve the storage, use and disposal of potentially hazardous materials, such as common household cleaners, paints and solvents, pesticides and herbicides for landscaping and pest control, automobile maintenance products, and the like. These materials would typically not be of a type or in sufficient quantities to pose a significant hazard to public health and safety or the environment. Construction activities could potentially reveal as-yet undiscovered contamination or could potentially occur on properties with known contamination that could pose a potential threat to public health and safety or the environment. With required implementation of the City's Standard Conditions of Approval, as well as required compliance with other local and State hazardous materials laws, regulations, standards and oversight currently in place, potential cumulative hazards and hazardous materials impacts would be less than significant.

Mitigation Measures

None needed

4.6

Land Use and Planning

This section describes existing land uses in and around the Planning Area, pertinent City and regional land use policies and regulations, and the potential impacts of the proposed Specific Plan related to the physical division of an established community, fundamental conflicts between land uses, and fundamental conflicts with applicable land use plans and policies adopted for purposes of avoiding or mitigating environmental impacts.

Physical Setting

Surrounding Land Uses

Existing land uses surrounding the Planning Area are described below. Beginning north of the Planning Area and preceding clockwise, the surrounding land uses include the following:

- To the north is the Emeryville portion of the East BayBridge Shopping Center (the shopping center is located partly in Oakland and partly in Emeryville), which contains regional commercial, community commercial and medium-density residential uses. Other residential, light industrial, office and public uses are located further to the north in Emeryville.
- Interstate 580 is located along the northern boundary of the Planning Area. North of I-580 is the Longfellow residential neighborhood around MacArthur Boulevard and 40th Street in North Oakland.
- To the northeast is the MacArthur BART Station, within the median of the State Route 24 freeway. Phase 1 of the MacArthur Transit Village, which will provide 624 new high-density, multifamily housing units, retail space, and a new 478-space BART parking garage, is currently under construction adjacent to the MacArthur BART Station.
- Interstate 980 is located along the eastern boundary of the Planning Area. East of I-980 are the Pill Hill and Uptown neighborhoods, Downtown Oakland, City Center, Old Oakland and the 19th Street and 12th Street BART Stations.
- To the southeast is the waterfront Jack London District with Jack London Square, Amtrak's Oakland Jack London Square Station, and the Oakland Ferry Terminal.
- The Port of Oakland, the fifth busiest port in the United States, lies to the south and west of the Planning Area. Interstate 880, the Union Pacific Railroad and the Burlington Northern and Santa Fe (BNSF) Railroad are located along the southern and western boundary of the Planning Area. The Union Pacific Intermodal Yard lies south of I-880, within the Port. Port shipping terminals line the Oakland Estuary/Inner Harbor Channel further south and the Outer Harbor Channel to the west. The BNSF Intermodal Yard and Middle Harbor Park are to the southwest.
- Interstate 880 is located along the western boundary of the Planning Area. The Union Pacific Railroad and the BNSF Railroad, and the Knight Rail Yard are located underneath and immediately

west of I-880. The former Oakland Army Base (OARB), and former OARB Redevelopment Area, lies west of I-880. The Oakland Base Reuse Authority (OBRA) currently leases space for various transportation, industrial and commercial uses until the former Army Base is redeveloped for its permanent non-military uses. The proposed 2012 Oakland Army Base Project would provide a new state of the art Trade and Logistics Center, with warehouse and distribution facilities to support cargo logistics and associated roadway, railroad and infrastructure improvements.[1]

- To the northwest are the East Bay Municipal Utilities District (EBMUD) Main Wastewater Treatment Plant, the I-80/I-580/I-880 interchange, and the Emeryville Crescent State Marine Reserve on the shore of San Francisco Bay. The eastern terminus of the San Francisco-Oakland Bay Bridge, and the bridge toll plaza and maintenance facilities, lie further to the northwest.

Existing Land Use within the Planning Area[2]

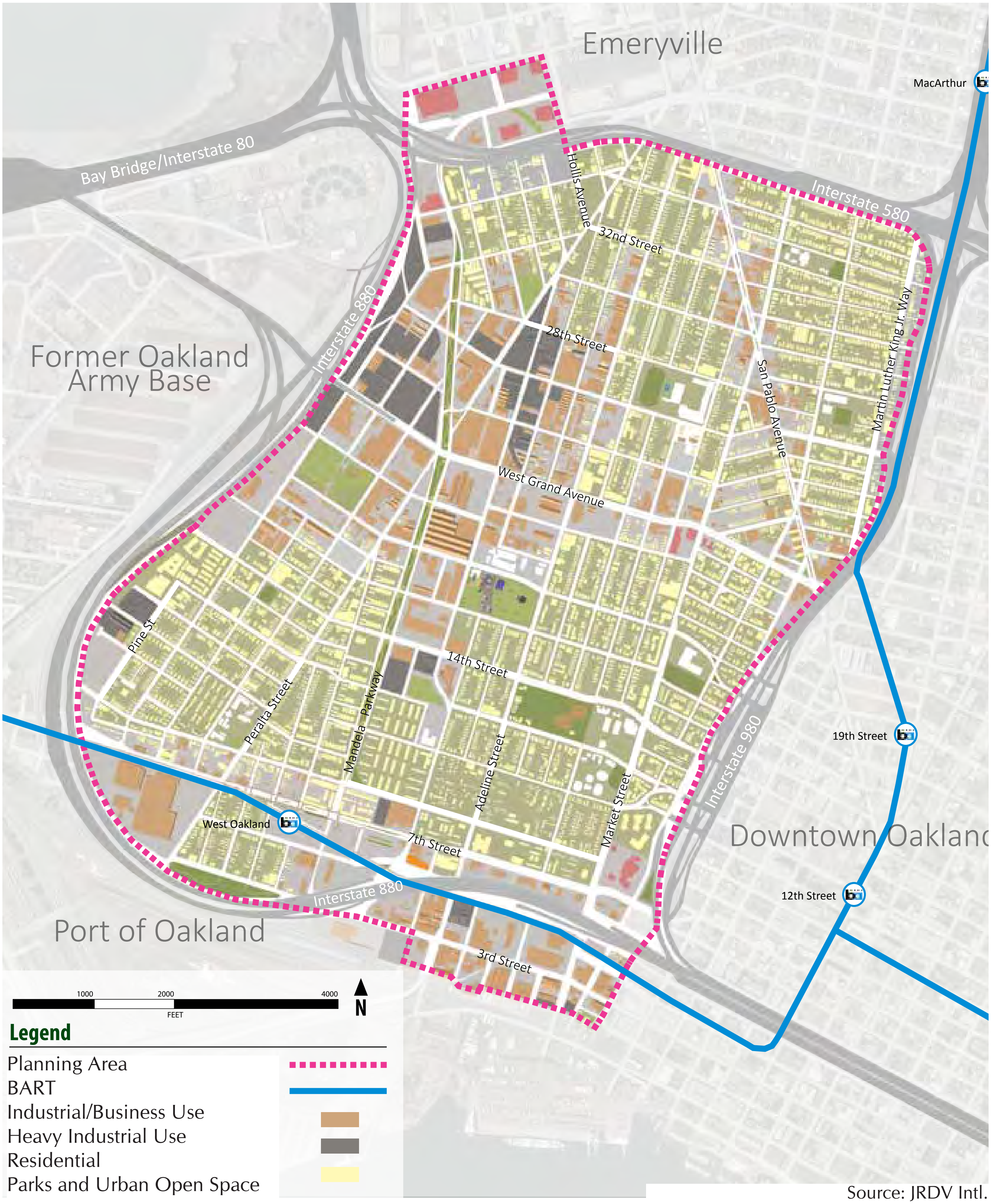
Existing land use in the Planning Area is summarized in **Table 4.6-1** and illustrated in **Figure 4.6-1**. The Planning Area comprises approximately 1,900 acres divided into 6,340 parcels. Residential uses occupy about 59 percent of the land in West Oakland, generally concentrated in the northern, eastern and southwestern portions of the area. Industrial, commercial and auto-related/parking uses occupy about 23 percent of the land area, and government/institutional and utilities uses occupy the remaining 18 percent. The industrial uses are concentrated around Mandela Parkway and West Grand Avenue, and in the vicinity of 3rd Street. Commercial uses primarily occur at the northern end near Emeryville, and along San Pablo Avenue, the eastern end of West Grand Avenue, Market Street and 7th Street. The relatively large amount of land devoted to government, institutional and utilities uses includes land owned by Caltrans, the Union Pacific Railroad, the U.S. Postal Service, BART, EBMUD, the Oakland Unified School District, the Oakland Housing Authority, and the City of Oakland.

Each Opportunity Area is distinguished by a unique mix of existing land uses and business activities, as described below.

---

1 City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012.

2 Existing land use patterns in West Oakland are described by data from the Alameda County Assessor's Office, as available from the City of Oakland, Community and Economic Development Agency in 2011. The County Assessor's Office is the recognized source of comprehensive, parcel-based property data. Data are collected and recorded using a standardized methodology, for the primary purpose of property tax assessment. The Assessor's data are parcel-based and provide information on the number of parcels of land and the square feet of parcel land area devoted to uses of various types (residential, industrial, commercial, etc.). The data do not include the square feet of building space that is located on the land in the area. the City of Oakland, Community and Economic Development Agency in 2011. The County Assessor's Office is the recognized source of comprehensive, parcel-based property data. Data are collected and recorded using a standardized methodology, for the primary purpose of property tax assessment. The Assessor's data are parcel-based and provide information on the number of parcels of land and the square feet of parcel land area devoted to uses of various types (residential, industrial, commercial, etc.). The data do not include the square feet of building space that is located on the land in the area.



Source: JRDV Intl.

Figure 4.6-1
Existing Land Use in the Planning Area

Table 4.6-1: All of West Oakland Existing Land Use

Land Use	West Oakland		Mandela/West Grand Opportunity Area		7th Street Opportunity Area		3rd Street Opportunity Area		San Pablo Avenue Opportunity Area	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Industrial/Warehouse	335.0	17.6	205.8	59.1	15.8	14.0	39.2	61.8	7.6	17.1
Government/Institutional/Utilities[2]	346.2	18.2	89.1	25.6	88.2	77.9	11.6	18.3	3.5	8.1
Auto-Related/Parking[3]	20.5	1.1	2.2	0.6	2.6	2.3	4.5	7.2	5.7	12.9
Commercial[4]	85.7	4.5	35.0	10.0	4.0	3.5	7.6	11.9	9.5	21.6
Residential	1,115.2	58.6	16.4	4.7	2.6	2.3	0.5	0.8	17.8	40.3
N/A[5]	4.8	-	2.4	-	2.1	-	-	-	0.2	-
TOTAL	1,907.4	100.0	350.9	100.0	115.3	100.0	63.4	100.0	44.3	100.0

Source: Alameda County Assessor; City of Oakland; Hausrath Economics Group.

[1] Percent of total excluding parcels with incomplete records (N/A).

[2] Includes land owned by government such as Caltrans, BART, Oakland Unified School District, Oakland Housing Authority, City of Oakland (public parks, community centers), and the U.S. Government (Post Office), by non-profit institutions such as churches, and by public utilities such as EBMUD and railroads.

[3] Auto-related uses besides parking include land for repair garages, dealerships, car washes, and service/fuel stations for autos, trucks, and other vehicles.

[4] Includes land for retail, restaurant, office, hotel/motel, theater, service, and other commercial uses, excluding auto-related commercial shown separately.

[5] Records incomplete; use not identified.

Mandela/West Grand Opportunity Area

The Mandela/West Grand Opportunity Area comprises approximately 243 net acres[3], of which over 175 acres (72 percent) remains in industrial and business use (**Table 4.6-2**). The area historically has been predominantly general industrial, manufacturing, and transportation in use. Over time, many of the larger manufacturing industries have left the area, leaving older structures and facilities, some of which are functionally obsolete or do not meet current building standards and market conditions. Many of the remaining industrial properties are actively used, while others are vacant or underutilized.

The Mandela/West Grand Opportunity Area includes a mix of older and newer types of business activities. There are a number of businesses involved in construction, building materials, and related activities. There also are smaller custom manufacturing and related businesses including those involved with metals/plastics, printing, food products, and clothing/fashion. The area has attracted numerous arts and creative businesses, including larger industrial arts, smaller arts manufacturing, digital arts and media, and film/photo/video services. These businesses are attracted by the affordability and availability of larger industrial spaces. There also are small professional service and related businesses (architects, landscape designers, consultants, and communications), typically in older industrial buildings. The area also includes businesses involved in trucking, maritime port support activities, warehouse, and import/export, because of its central location, and its proximity to the freeway system and the Port of Oakland.

Table 4.6-2: Existing Land Use–Mandela/West Grand Opportunity Area

	Non-Residential			Residential	
	Land Area (acres)	Building Area (sq. ft.)	Employment	Housing Units	Population
Land Use					
Industrial/Business	175	4,000,000	4,940		
Commercial/Retail	22	300,000	500		
sub-total	197	4,300,000	5,440		
Single Family and Townhomes	19			110	259
Multi-family Residential / Housing Mix	0			0	0
sub-total	19			110	259
Open Space	27				
TOTAL	**243**	**4,300,000**	**5,440**	**110**	**259**

3 Net acres is exclusive of public right-of-way and other non-parceled portions of the Planning Area

7th Street Opportunity Area

The 7th Street Opportunity Area comprises about 65 net acres, of which nearly 51 acres (78 percent) is owned by government agencies and utilities, including BART, Caltrans, the Union Pacific Railroad, and the U.S. Postal Service (**Table 4.6-3**). The area includes the BART station, parking lots, vacant parcels left from reconfiguring the I-880 freeway and ramps, and industrial arts uses such as the Crucible (industrial arts). The remnants of the former 7th Street commercial corridor occupy the north side of the street and the large U.S. Postal Service mail sorting facility is on the south side. The Pine Street area contains older industrial sites, recycling, industrial arts activities, as well as vacant Caltrans-owned parcels.

Table 4.6-3: Existing Land Use– 7th Street Opportunity Area

		Non-Residential		Residential	
	Land Area (acres)	Building Area (sq. ft.)	Employment	Housing Units	Population
Existing					
Industrial/Business/Institution (including BART Station, Surface Parking, Post Office)	58	1,790,000	1,870		
sub-total	58	1,790,000	1,870		
Mixed-Use, Comm./Res	6	5,000	10	35	85
Single Family and Townhomes	1			50	119
sub-total	1			85	204
TOTAL	**65**	**1,795,000**	**1,880**	**85**	**204**

3rd Street Opportunity Area

The 3rd Street Opportunity Area comprises 68 net acres, of which 60 acres (88 percent) is industrial and truck service (**Table 4.6-4**). Industrial businesses include food and beverage production, transportation services, and construction-related uses. The area includes attractive older warehouse buildings that have been converted to light industrial and small office/business uses including architects and designers, insurance and financial services, import/export businesses, communications, computer services, consulting, art studios, publishing and printing, and photo/audio services. Commercial uses represent 12 percent of the area, most of it in the Jack London Gateway Shopping Center on Market Street just north of 7th Street. Government uses include the Union Pacific Railroad, BART, and the City of Oakland.

Table 4.6-4: Existing Land Use–3rd Street Opportunity Area

	Non-residential			Residential	
	Land Area (acres)	Building Area (sq. ft.)	Employment	Housing Units	Population
Land Use					
Industrial/Business	60	1,040,000	1,690		
Commercial/Retail	8	50,000	80		
sub-total	68	1,090,000	1,770		
Mixed Use	0	0	0	0	0
sub-total	0	0	0	0	0
Single Family and Townhomes	0			0	0
Multi-family Residential / Housing Mix	0			0	0
sub-total	0	0		0	0
TOTAL	**68**	**1,090,000**	**1,770**	**0**	**0**

San Pablo Avenue Opportunity Area

The San Pablo Avenue Opportunity Area comprises approximately 44 acres, with 40 percent in residential use and 60 percent a mix of commercial, auto-related, industrial/warehouse, and institutional uses (**Table 4.6-5**). San Pablo Avenue is an older commercial corridor containing a number of vacant and underutilized properties. There are a number of auto services, repair and fuel businesses. Other commercial space includes health and social service organizations, eating and drinking places, arts and photography businesses, and several vacant storefronts and parcels. Industrial uses include smaller warehouse space, construction-related businesses, self-storage and hauling services.

Table 4.6-5: Existing Land Use–San Pablo Avenue Opportunity Area

		Non-Residential		Residential	
	Land Area (acres)	Building Area (sq. ft.)	Employment	Housing Units	Population
Existing					
Commercial/Retail	5	90,000	80		
Mixed-Use Comm./Residential	30	700,000	600	30	70
Single Family and Townhomes	2			40	96
TOTAL	**37**	**790,000**	**680**	**70**	**165**

Land Use Designations and Zoning

General Plan Land Use Designations

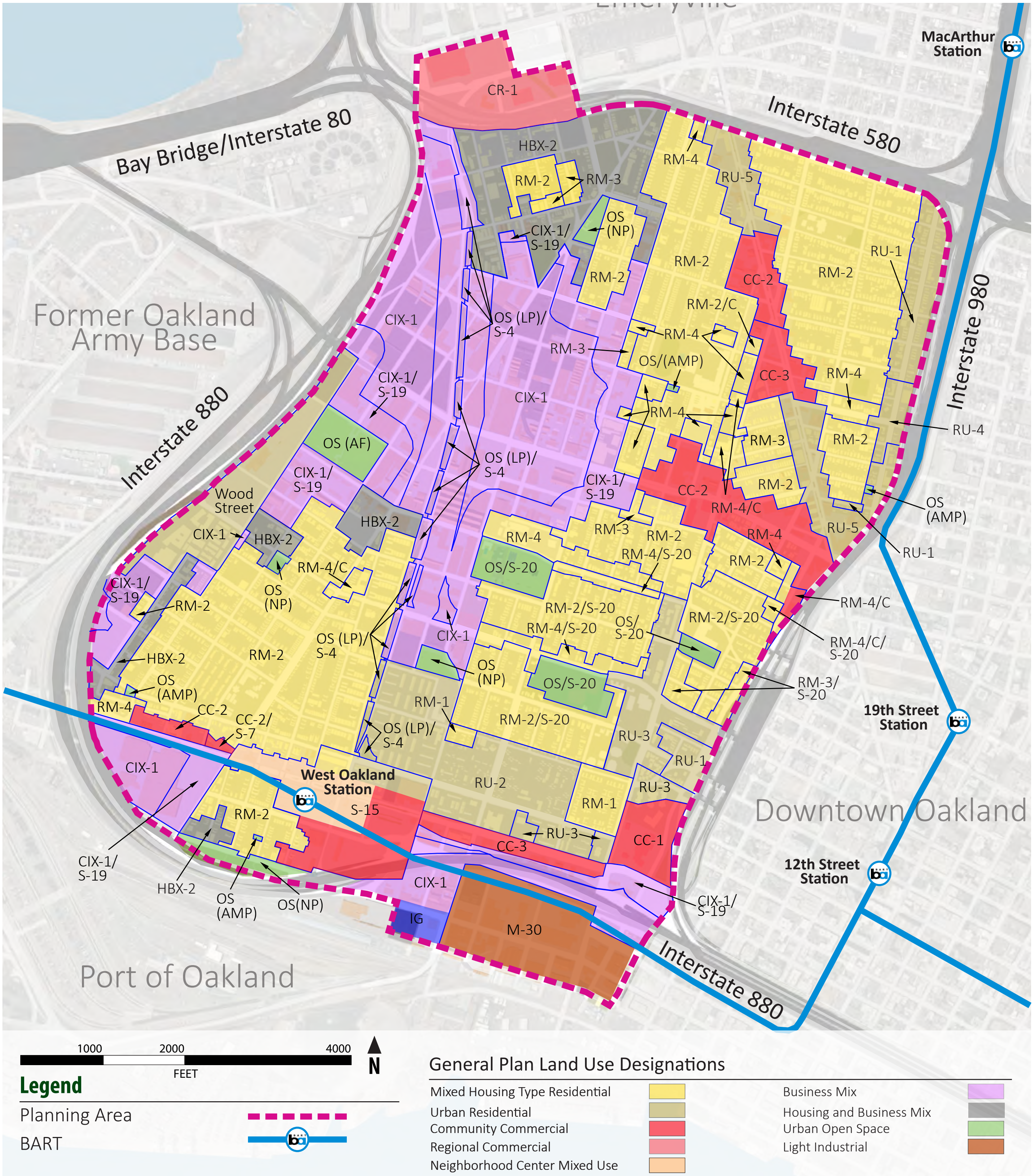
The General Plan Land Use Diagram and land use classifications define the type, location, intensity and density of development allowed throughout the city. The existing General Plan land use designations within the Planning Area are illustrated on **Figure 4.6-2** and described below, and summarized in **Table 4.6-6**.

Business Mix

This land use designation is a flexible "economic development zone" which strives to accommodate older industries and anticipate new technologies, including light industrial, research and development, low impact manufacturing, and commercial operations. It is intended for areas that are appropriate for a wide variety of businesses, and related commercial and industrial establishments while buffering nearby residential districts from the heavier industrial uses. High impact industrial uses including those that have hazardous materials on-site may be allowed provided that they are adequately buffered from residential areas. In some locations, zoning should direct lower intensities to establish campus-like settings; in other locations zoning should allow maximum flexibility. Where higher impact uses are located, buffing strategies will be needed. The maximum FAR is 4.0. This designation is applied to the majority of the Mandela/West Grand and 3rd Street Opportunity Areas, and the Pine Street portion of the 7th Street Opportunity Area.

General Industrial/Transportation

This land use designation allows a wide variety of uses including heavy industrial and manufacturing, transportation, rail yards, maritime terminals, distribution and warehousing, food processing, heavy impact research and development facilities. It is intended for areas where businesses may have the potential for off-site impacts such as noise, light and glare, truck traffic and odors. The maximum FAR is 2.0. This designation is applied to one block in the 3rd Street Opportunity Area adjacent to the Port of Oakland.



Source: City of Oakland General Plan

Figure 4.6-2
Existing General Plan Land Use Designations

Light Industry (Estuary Policy Plan)

The portion of the Planning Area south of 5th Street and east of Adeline Street, comprising the majority of the 3rd Street Opportunity Area, lies within the area covered by the Estuary Policy Plan and is designated Light Industry.[4] The Light Industrial land use designation is intended to maintain light industrial and manufacturing uses that support the adjacent maritime area and Downtown, and that are compatible with the adjacent West Oakland neighborhood. The maximum FAR is 2.0.

Regional Commercial

This land use designation is intended for areas that serve as region-drawing centers of activity. It allows a mix of commercial, office, entertainment, arts, recreation, sports, and visitor serving activities, housing, mixed-use development and other uses of similar character or supportive of regional drawing power. The maximum FAR is 4.0. Maximum residential density is 125 units per gross acre, in a mixed-use project. This designation is applied to the East BayBridge Shopping Center north of I-580.

Community Commercial

This land use designation is intended for areas suitable for a wide variety of larger-scaled retail, business and personal services, and institutional operations along major corridors and in shopping districts. Community Commercial areas can be complemented by the addition of urban residential development and compatible mixed-use development. The maximum FAR is 5.0. The maximum residential density is 125 units per gross acre. This designation is applied to properties along 7th Street from Wood Street to Peralta Street, and 7th Street from the BART station to I-980, on San Pablo Avenue from 27th Street to 32nd Street, and along West Grand Avenue from Linden Street to San Pablo Avenue.

Neighborhood Center

This land use designation allows commercial or mixed uses that are pedestrian-oriented and serve nearby neighborhoods, or urban residential with ground floor commercial. These centers are typically characterized by smaller scale pedestrian-oriented, continuous street frontage with a mix of retail, housing, office, active open space, eating and drinking places, personal and business services, and smaller scale educational, cultural or entertainment uses. Vertical integration of uses, including residential units above street-level commercial space, is encouraged. The maximum floor area ratio (FAR) is 4.0. The maximum residential density is 125 units per gross acre. This designation is applied to 7th Street around the West Oakland BART Station.

Housing and Business Mix

This land use designation recognizes the equal importance of both housing and business, and is intended to guide a transition from heavy industry to low impact light industrial and other businesses that can co-exist compatibly with residential development. Future business development within this designation should be compatible with housing, and residential development should recognize the mixed business nature of the area. The maximum residential density is 30 principal units per gross acre. The maximum FAR is 3.0. This designation is applied to portions of the Prescott and Clawson neighborhoods.

---

4 The Estuary Policy Plan is part of the General Plan and establishes land use designations and policy for the Estuary shoreline, extending from Adeline Street to 66th Avenue, including all lands west of I-880 that are within City or Port of Oakland jurisdiction.

Mixed Housing Type Residential

This land use designation allows development of a mix of single family homes, townhouses, and small multi-unit buildings. It is intended for residential areas typically located along major arterial roads. Development should be primarily residential in character, with live-work types of development, small commercial enterprises, schools, and other small scale, compatible civic uses possible in appropriate locations. Maximum allowable density is 30 principal units per gross acre. Pockets of lower density housing should be preserved through zoning. This designation is applied to the residential neighborhoods that comprise the majority of the Planning Area outside the Opportunity Areas.

Urban Residential

This land use designation allows multi-unit, mid-rise or high-rise residential structures in locations with good access to transportation and other services. Mixed-use buildings with ground floor commercial uses and public facilities of compatible character are also encouraged. Where lower density detached housing adjoins urban residential the zoning should create a transition area between the two. Maximum allowable density is 125 units per gross acre. This designation is applied to higher density residential areas, including the Wood Street Project, Acorn neighborhood, Oakland Housing Authority projects, along Martin Luther King Jr. Way, and along San Pablo Avenue north of 32nd Street to I-580, and south of 27th Street to West Grand Avenue.

Institutional

This land use designation allows educational, cultural, health, and medical uses, with appropriate development standards that address edge conditions adjacent to residential areas. The maximum FAR is 8.0. This designation is applied to schools and other public facilities in the Planning Area.

Urban Open Space

This land use designation applies to the urban parks and open spaces in the Planning Area, including schoolyards.

Table 4.6-6: General Plan Land Use Designations, West Oakland Opportunity Areas (gross acres)[5]

	Mandela/Grand	7th Street	3rd Street	San Pablo	Total
Business Mix	286	43.2	28		137.2
General Industrial/Transportation			53.3		53.3
Light Industry (			8		8
Regional Commercial	27				27
Community Commercial		32.4	14	26.2	72.6
Neighborhood Center		14.3			14.3
Housing and Business Mix	11.5				11.5
Mixed Housing Type Residential		4.4		5.5	9.9
Urban Residential	20	3.2		20.7	43.9
Urban Open Space	9.7				9.7
Total	**354.2**	**97.5**	**103.3**	**52.4**	**607.4**

Zoning Designations

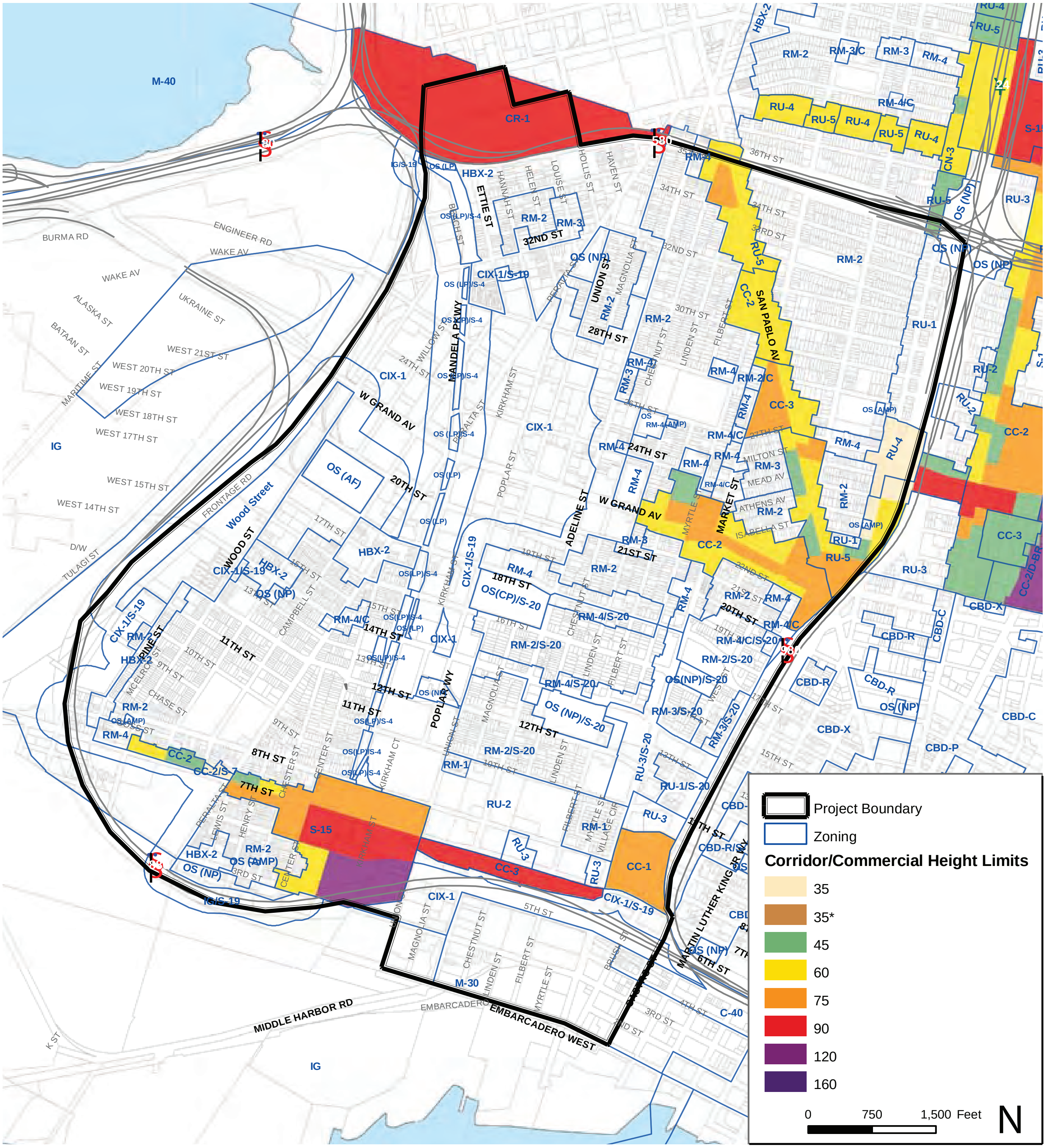
The zoning regulations implement the General Plan land use designations and policies. The zoning designations within the Planning Area are illustrated on **Figure 4.6-3**. The zoning designations that are most relevant to the land use impacts of the Specific Plan are described below, and summarized in **Table 4.6-7**.

CIX-1: Commercial Industrial Mix-1 Zone

The CIX-1 zone was developed specifically for areas of West Oakland that are designated Business Mix in the General Plan. The CIX-1 zone is designed to provide buffering and transitions between industrial and residential zones. The CIX-1 zone is intended to preserve the industrial areas of West Oakland for a wide range of commercial and industrial establishments. The CIX-1 zone is intended to accommodate existing older industries and provide flexibility for new technologies. The CIX-1 zone allows a broad range of custom and light manufacturing, light industrial, warehouse, research and development, clean/green industries, and service commercial uses. A conditional use permit is required for the establishment or expansion of general manufacturing, construction operations, and automotive repair uses within 300 feet of a residential zone. The CIX-1 zone sets strict limits on recycling and truck-intensive uses. Truck-intensive uses are limited to areas further than 600 feet away from a residential zone and require a conditional use permit. Large-scale commercial and retail uses are limited to sites with direct access to the regional transportation system. The CIX-1 zone allows work/live uses under special conditions. Residential uses are prohibited in the CIX-1 zone.

---

5 Gross acres represents total land area inclusive of public right-of-way and other non-parceled properties



Source: City of Oakland Zoning Map

Figure 4.6-3
Current Zoning, West Oakland

IG: General Industrial Zone

The one block in the 3rd Street Opportunity Area adjacent to the Port of Oakland that has a General Plan land use designation of General Industrial/Transportation is zoned IG. The IG zone is intended to accommodate a wide variety of industrial establishments, including those that may have the potential to generate off-site impacts. The IG zone allows heavy industrial and manufacturing uses, transportation facilities, and warehousing and distribution. Heavy industrial uses must meet performance standards, buffering standards, and other health and safety criteria. The IG zone is for areas with good freeway, rail, seaport or airport access. Uses that may inhibit industrial activities are prohibited. Residential uses are not permitted in the IG zone.

M-30: General Industrial Zone

The portion of the Planning Area that is covered by the Estuary Policy Plan (south of 5th Street and east of Adeline Street, comprising the majority of the 3rd Street Opportunity Area) is zoned M-30. The M-30 zone is intended for areas with good freeway, rail, seaport, or airport access. The M-30 zone accommodates light industrial, manufacturing, warehouse and distribution, and commercial uses. Residential uses are not permitted in the M-30 zone.

CC-2 Community Commercial Zone

The blocks along 7th Street between Wood Street and Peralta Street, and on San Pablo Avenue from 29th Street to 32nd Street are zoned CC-2. The CC-2 zone is intended for a wide range of commercial businesses with direct frontage and access along corridors.

CC-3 Community Commercial Zone

The blocks along San Pablo Avenue from 27th Street to 30th Street are zoned CC-3. The CC-3 zone is intended for heavy commercial and service activities.

HBX-2: Housing and Business Mix Commercial Zone

Much of the Clawson neighborhood and selected areas at the northern and western edges of the Prescott neighborhood are zoned HBX-2. The HBX-2 zone provides development standards for areas that have a mix of industrial, certain commercial and medium to high density residential development. The HBX-2 zone recognizes the equal importance of housing and business, allows residential and business activities to compatibly co-exist, provides a transition between industrial areas and residential neighborhoods, encourages development that respects environmental quality and historic patterns of development, and fosters a variety of small, entrepreneurial, and flexible home-based businesses.

S-15: Transit-Oriented Development Zone

The S-15 zone overlays the blocks surrounding the West Oakland BART station and along the south side of 7th Street from Peralta Street to Linden Street. The S-15 zone encourages concentrated development with pedestrian amenities near transit stations. The S-15 zone allows a mix of medium density residential development, civic, commercial, and light industrial activities.

RU-5: Urban Residential Zone

The blocks along San Pablo Avenue north of 32nd Street to I-580 and south of 27th Street to West Grand Avenue are zoned RU-5. The RU-5 zone is intended for multi-unit, mid- and high-rise residential structures with ground floor neighborhood businesses on major corridors.

Combining Zones

S-4: Design Review Combining Zone

The S-4 combining zone applies to areas of special community, historical, or visual significance. The S-4 combining zone is intended to preserve the visual harmony and attractiveness of areas which require special treatment and the consideration of relationships between facilities, and is typically appropriate to areas of special community, historical, or visual significance. In the S-4 combining zone no building, sign, or other facility may be constructed or established, or altered or painted a new color in such a manner as to affect exterior appearance, unless plans for such proposal have been approved pursuant to design review procedures.

S-19: Health and Safety Protection Combining Zone

The S-19 combining zone is intended to control the storage or use of hazardous materials and wastes within 300 feet of a residential, institutional, or open space zoning district. New uses or changes of existing activities that store or use hazardous materials are reviewed by the Fire Department. The Fire Department may limit the location, require containment measures, or limit or prohibit the storage or use of hazardous materials. The Fire Department may also require a Process Hazard Analysis, Risk Management Plan, or Local Hazardous Materials Business Plan.

S-7 and S-20: Preservation Combining Zone

The S-7 and S-20 preservation combining zones are the City's historic preservation zoning districts. Areas eligible for S-7 combining zone are those having "special importance due to historical association, basic architectural merit, or the embodiment of a style or special type of construction, or other special character, interest, or value." The S-20 combining zone is similar to the S-7 combining zone, but is designed for larger areas, often with a large number of residential properties that may not be individually eligible for landmark designation but which, as a whole, constitute a historic district.

Table 4.6-7: Zoning Districts, West Oakland Opportunity Areas (gross and net acres)[6]

	Mandela/Grand		7th Street		3rd Street		San Pablo		Total	
	gross	net	gross	net	gross	net	gross	net	gross	net
CIX-1	268.4	174.7	45	34.5	28	17.8			341.4	227
IG					8	4.6			8	4.6
M-30					53.3	38.5			53.3	38.5
HBX-2	9.4	7	1.5	0.6					10.9	7.6
CR-1	27	21.8							27	21.8
CC-1					10.2	5.1			10.2	5.1
CC-2			3.6	1.8			22.2	19	25.8	20.8
CC-3			5.3	3.8	3.9	2.6	7.4	5.3	16.6	11.7
S-15 (TOD)			37.7	23.7					37.7	23.7
Wood St.	20	12.7							20	12.7
RU-5							20.7	11.5	20.7	11.5
RM-4			2.2	0.8			2	1.5	4.2	2.3
RM-2	2.1	1.5							2.1	1.5
OS	27.2	27.2							27.2	27.2
Total	**355**	**245**	**95.3**	**65.2**	**103.3**	**68.6**	**52.3**	**37.3**	**605**	**416**

Building Height Limits

The maximum commercial corridor building heights allowed by existing zoning are illustrated on the zoning maps. Building height limits are shown for commercial zones and key corridors such as 7th Street, San Pablo Avenue and West Grand Avenue, areas targeted for new development and higher intensity uses that must be made compatible with adjacent lower density residential neighborhoods. Maximum allowed commercial and corridor building heights within the Planning Area range from 35 feet to 120 feet. The tallest maximum building heights of 90 feet and 120 feet are allowed on properties around the West Oakland BART Station, which are intended for higher density transit-oriented residential and mixed-use development. Maximum allowed building heights on the remaining portions of 7th Street, and along San Pablo Avenue and West Grand Avenue are predominantly 60 feet and 75 feet.

Regulatory Setting

Potential conflicts with a general plan and other plans, policies and regulations do not inherently result in a significant effect on the environment within the context of CEQA. CEQA Guidelines Section 15358(b) states that, "effects analyzed under CEQA must be related to a physical change in the environment."

6 Gross acres represents total land area inclusive of public right-of-way and other non-parceled properties, and net excludes public right-of-way and other non-parceled properties

CEQA Guidelines Section 15125(d) further states that an EIR shall discuss any inconsistencies between a proposed project and the applicable general plan in the setting section of the document rather than as an impact. Further, Appendix G (Environmental Checklist Form) of the CEQA Guidelines indicates that a project would result in a significant impact related to land use and planning if it would "fundamentally 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 and resulting in a physical change in the environment*" (emphasis added). Accordingly, this section of the EIR evaluates the consistency of the Specific Plan with applicable plans, policies and regulations. Physical impacts that may result from any conflicts are analyzed in the various impact sections of the EIR.

Regarding a project's consistency with the General Plan in the context of CEQA, the Oakland General Plan states the following:

> *The General Plan contains many policies which may in some cases address different goals, policies and objectives and thus some policies may compete with each other. The Planning Commission and City Council, in deciding whether to approve a proposed project, must decide whether, on balance, the project is consistent (i.e., in general harmony) with the General Plan. The fact that a specific project does not meet all General Plan goals, policies and objectives does not inherently result in a significant effect on the environment within the context of the California Environmental Quality Act (CEQA). (City Council Resolution No. 79312 C.M.S.; adopted June 2005)*

Only officially adopted plans, policies and regulations that are legally in force within the Planning Area are discussed below. Over a number of years, the City and various community groups have prepared a number of other vision plans, strategic plans, development concept plans and studies for West Oakland or particular portions of the Planning Area. These previous plans and studies provided valuable information and direction in the development of the Specific Plan, however, they do not have the force of law in governing land use related actions and are therefore not discussed below.

City of Oakland General Plan, Land Use and Transportation Element

The City of Oakland General Plan comprises the following 10 elements: Land Use and Transportation Element; Bicycle Master Plan; Pedestrian Master Plan; Estuary Policy Plan; Open Space, Conservation, and Recreation Element; Historic Preservation Element; Housing Element; Noise Element; Safety Element; and Scenic Highways Element. The consistency of the Specific Plan with relevant policies of the Land Use and Transportation Element and the Estuary Policy Plan is discussed below. Specific Plan consistency with the other General Plan elements is evaluated in the respective chapters of this EIR.

The Land Use and Transportation Element (LUTE) is the "heart" of the General Plan. The LUTE presents a Strategy Diagram that shows areas of expected growth and change, a Transportation Diagram that lays out the basic transportation network, planned Transportation Improvements to support the growth and change recommended in the Strategy Diagram, and a Land Use Diagram and land use designations that guide the location, types and character of the various land uses throughout the city. The LUTE sets forth a Policy Framework in five focus areas: Industry and Commerce, Transportation and Transit-Oriented Development, Downtown, Waterfront, and Neighborhoods. The LUTE also provides specific direction for several distinct Planning Areas, including West Oakland.

Land Use Strategy

For West Oakland, the LUTE encourages maintaining and enhancing established neighborhood areas, business expansion to take advantage of the I-880 alignment, resolving land use conflicts between business and residents, access to the waterfront, better transportation linkages, and overall improvements to the appearance of the community. The LUTE seeks to resolve land use conflicts through the use of "good neighbor" policies, encourage commercial activity and urban density housing along West Grand Avenue, retain general industrial areas toward the core of the Mandela/West Grand industrial area away from residential areas, develop a transit village at the West Oakland BART Station, and revitalize 7th Street and Jack London Gateway Shopping Center. The LUTE includes direction to support the character of established neighborhoods and guide development of housing with ground floor commercial along major corridors such as San Pablo Avenue, 7th Street, and West Grand Avenue.

Land Use Strategy Consistency

The proposed Specific Plan would be generally consistent with the LUTE. The LUTE targets areas in West Oakland for focused public and private investment. Many of these target areas are encompassed within the Specific Plan Opportunity Areas and Opportunity Sites, including the BART station, 7th Street, Wood Street, Pine Street, San Pablo Avenue, and West Grand Avenue.

The Specific Plan would support the specific LUTE recommendations for West Oakland, including maintaining and enhancing established neighborhood areas, retaining industrial uses toward the core of the Mandela/West Grand industrial area away from residential areas, locating new trucking services away from residential neighborhoods, encouraging business expansion, reducing land use incompatibilities between industrial and residential uses, improving access to the waterfront, better transportation linkages, enhancing the overall appearance of the community, development of housing with ground floor commercial along San Pablo Avenue, 7th Street, and West Grand Avenue, a transit village at the West Oakland BART Station, and revitalizing 7th Street.

Industry and Commerce Policy

The following LUTE Industry and Commerce policies are particularly relevant to the Specific Plan.

> *Policy I/C1.1: Attracting New Business.* The City will strive to attract new businesses to Oakland which have potential economic benefits in terms of jobs and/ or revenue generation. This effort will be coordinated through a citywide economic development strategy /marketing plan which identifies the City's existing economic base, the assets and constraints for future growth, target industries or activities for future attraction, and geographic areas appropriate for future use and development.
>
> *Policy I/C1.2: Retaining Existing Business.* Existing businesses and jobs within Oakland which are consistent with the long-range objectives of this Plan should, whenever possible, be retained.
>
> *Policy I/C1.3: Supporting Economic Development Expansion through Public Investment.* The public investment strategy of the City should support economic development expansion efforts through such means as identifying target "catalyst projects" for investment which will support the employment or revenue base of the city and providing infrastructure improvements to serve key development locations or projects which are consistent with the goals and objectives of this Plan.

Policy 1/C1.4: Investing in Economically Distressed Areas of Oakland. Economic investment, consistent with the City's overall economic strategy, should be encouraged, and, where feasible, should promote viable investment in economically distressed areas of the City.

Policy 1/C1.8: Providing Support Amenities Near Employment Centers. Adequate cultural, social, and support amenities designed to serve the needs of workers in Oakland should be provided within close proximity of employment centers.

Policy I/C1.9: Locating Industrial and Commercial Area Infrastructure. Adequate public infrastructure should be ensured within existing and proposed industrial and commercial areas to retain viable existing uses, improve the marketability of existing vacant or underutilized sites, and encourage future use and development of these areas with activities consistent with the goals of this Plan.

Policy I/C1.10: Coordinating City and Port Economic Development Plans. The City and Port should mutually develop and implement a coordinated plan-of-action to support all airport and port related activities which expand the local or regional employment or revenue base.

Policy I/C1.11: Expanding job Training Opportunities. The City should expand and coordinate job training opportunities for Oakland residents by supporting programs sponsored by the Oakland Unified School District, local community colleges, the Port of Oakland, and other educational institutions or vocational training establishments.

Policy I/C2.1: Pursuing Environmental Clean-Up. The environmental cleanup of contaminated industrial properties should be actively pursued to attract new users in targeted industrial and commercial areas.

Policy I/C2.2: Reusing Abandoned Buildings. The reuse of abandoned industrial buildings by non-traditional activities should be encouraged where the uses are consistent with, and will assist in the attainment of, the goals and objectives of all elements of the Plan.

Policy I/C2.3: Providing Vacant or Buildable Sites. Development in older industrial areas should be encouraged through the provision of an adequate number of vacant or buildable sites designated for future development.

Policy I/C3.1: Locating Commercial Business. Commercial uses, which serve long term retail needs of regional consumers and which primarily offer durable goods, should be located in areas adjacent to the 1-880 freeway or at locations visible or amenable to high volumes of vehicular traffic, and accessible by multiple modes of transportation.

Policy I/C3.2: Enhancing Business Districts. Retain and enhance clusters of similar types of commercial enterprises as the nucleus of distinctive business districts, such as the existing new and used automobile sales and related uses through urban design and business retention efforts.

Policy I/C3.3: Clustering Activity in "Nodes". Retail uses should be focused in "nodes" of activity, characterized by geographic clusters of concentrated commercial activity, along corridors that can be accessed through many modes of transportation.

Policy I/C3.4: Strengthening Vitality. The vitality of existing neighborhood mixed-use and community commercial areas should be strengthened and preserved.

Policy I/C3.5: Promoting Culture, Recreation, and Entertainment. Cultural, recreational and entertainment uses should be promoted within the Downtown, particularly in the vicinity of the Fox and Paramount Theaters, and within the Jack London Square area.

Policy 1/C4.1: Protecting Existing Activities. Existing industrial, residential, and commercial activities and areas which are consistent with long term land use plans for the City should be protected from the intrusion of potentially incompatible land uses.

Policy 1/C4.2: Minimizing Nuisances. The potential for new or existing industrial or commercial uses, including seaport and airport activities, to create nuisance impacts on surrounding residential land uses should be minimized through appropriate siting and efficient implementation and enforcement of environmental and development controls.

Industry and Commerce Policy Consistency

The Specific Plan would be consistent with the policy framework of the Land Use and Transportation Element's Industry and Commerce policies, including attracting new businesses (I/C1.1), retaining existing businesses (I/C1.2), supporting economic development expansion through public investments (I/C 1.3), investing in economically distressed areas of Oakland (I/C1.4), providing support amenities near employment centers (I/C1.8), coordinating City and Port economic development plans (I/C1.10), pursuing environmental cleanup (I/C2.1), reusing abandoned buildings (I/C2.2), enhancing business districts (I/C3.2), clustering activity in nodes (I/C3.3), promoting culture, recreation and entertainment (I/C3.5), and minimizing nuisances (I/C4.2).

Transportation and Transit Policy

The following LUTE Transportation and Transit policies are particularly relevant to the Specific Plan. A more thorough list of applicable transportation and transit polices are included in the Transportation Chapter of this EIR.

Policy T2.2: Guiding Transit-Oriented Development. Transit-oriented developments should be pedestrian oriented, encourage night and day time use, provide the neighborhood with needed goods and services, contain a mix of land uses, and be designed to be compatible with the character of surrounding neighborhoods.

Policy T2.3: Promoting Neighborhood Services. Promote neighborhood-serving commercial development within one-quarter to one-half mile of established transit routes and nodes.

Transportation and Transit Policy Consistency

The Specific Plan would be consistent with the policy framework of the Land Use and Transportation Element's Transportation and Transit policies, including guiding future transit planning, establishing new transit-oriented development and promoting development of neighborhood commercial near transit.

Neighborhood Policy

The following LUTE Neighborhood policies are particularly relevant to the Specific Plan.

Policy N1.1: Concentrating Commercial Development. Commercial development in the neighborhoods should be concentrated in areas that are economically viable and provide opportunities for smaller scale, neighborhood-oriented retail.

Policy N1.4: Locating Large-Scale Commercial Activities. Commercial uses which serve long term retail needs or regional consumers and which primarily offer high volume goods should be located in areas visible or amenable to high volumes of traffic. Traffic generated by large scale commercial developments should be directed to arterial streets and freeways and not adversely affect nearby residential streets.

Policy N1.5: Designing Commercial Development. Commercial development should be designed in a manner that is sensitive to surrounding residential uses.

Policy N1.6: Reviewing Potential Nuisance Activities. The City should closely review any proposed new commercial activities that have the potential to create public nuisance or crime problems, and should monitor those that are existing. These may include isolated commercial or industrial establishments located within residential areas, alcoholic beverage sales activities (excluding restaurants), adult entertainment, or other entertainment activities.

Policy N5.2: Buffering Residential Areas. Residential areas should be buffered and reinforced from conflicting uses through the establishment of performance-based regulations, the removal of non-conforming uses, and other tools.

Policy N5.3: Supporting Live-Work Development. The city should support and encourage residents desiring to live and work at the same location where neither the residential use nor the work occupation adversely affects nearby properties or the character of the surrounding area.

Policy N1.8: Making Compatible Development. The height and bulk of commercial development in "Neighborhood Mixed-Use Center" and "Community Commercial" areas should be compatible with that which is allowed for residential development.

Policy N3.1: Facilitating Housing Construction. Facilitating the construction of housing units should be considered a high priority for the City of Oakland.

Policy N3.2: Encouraging lnfill Development. In order to facilitate the construction of needed housing units, infill development that is consistent with the General Plan should take place throughout the City of Oakland.

Policy N5.1: Environmental Justice. The City is committed to the identification of issues related to the consequences of development on racial, ethnic, and disadvantaged socio-economic groups. The City will encourage active participation of all its communities, and will make efforts to inform and involve groups concerned about environmental justice and representatives of communities most impacted by environmental hazards in the early stages of the planning and development process through notification and two-way communication.

Policy N6.1: Mixing Housing Types. The City will generally be supportive of a mix of projects that provide a variety of housing types, unit sizes, and lot sizes which are available to households with a range of incomes.

Policy N6.2: Increased Home Ownership. Housing developments that increase home ownership opportunities for households of all incomes are desirable.

Policy N8.1: Developing Transit Villages. "Transit Village" areas should consist of attached multi-story development on properties near or adjacent to BART stations or other well-used or high volume transit facilities, such as light rail, train, ferry stations or multiple-bus transfer locations. While residential units should be encouraged as part of any transit village, other uses may be included where they will not negatively affect the residential living environment.

Policy N8.2: Making Compatible Interfaces Between Densities. The height of development in urban residential and other higher density residential areas should step down as it nears lower density residential areas to minimize conflicts at the interface between the different types of development.

Policy N9.1: Recognizing Distinct Neighborhoods. The City should encourage and support the identification of distinct neighborhoods. (Many of these neighborhoods are identified on the Structure Diagram and in the Area View section of the Plan.)

Policy N9.2: Supporting Neighborhood Improvement. The City should be supportive of the efforts of local neighborhood organizations in improving their neighborhoods, by providing information, guidance, and assistance where feasible.

Policy N9.6: Respecting Diversity. The City's diversity in cultures and populations should be respected and built upon.

Policy N10.1: Identifying Neighborhood "Activity Centers". Neighborhood Activity Centers should become identifiable commercial, activity and communication centers for the surrounding neighborhood. The physical design of neighborhood activity centers should support social interaction and attract persons to the area. Some of the attributes that may facilitate this interaction include plazas, pocket parks, outdoor seating on public and private property, ample sidewalk width, street amenities such as trash cans and benches, and attractive landscaping.

Industry and Commerce Policy Consistency

The Specific Plan would be consistent with the policy framework of the Land Use and Transportation Element's Neighborhood policies, including guiding transit-oriented development (T2.2), locating large-scale commercial activities near the freeway and existing regional commercial uses north of I-580 (N1.4), buffering residential areas (N5.2), making compatible development (N1.8), encouraging infill development (N3.2), environmental justice (N5.1), developing transit villages (N8.1), making compatible interfaces between densities (N8.2), recognizing distinct neighborhoods (N9.1), and identifying neighborhood activity centers (N10.1).

In several areas within West Oakland, there is no clearly defined edge between residential and industrial areas. This land use pattern often results in heavy truck traffic with its associated noise and fumes directly affecting residential neighborhoods. The Specific Plan establishes a more clearly defined boundary between these two differing land uses through a limited number of proposed General Plan amendments and zoning changes that change industrial designations to housing and/or housing and business mix to more firmly establish this boundary. These limited changes to the General Plan land use designations and zoning are proposed at the edges of existing residential and industrial areas, where the proposed change in land use designations from industrial to residential land uses would be compatible with adjacent residential neighborhoods and adjacent public parks.

Estuary Policy Plan

The Estuary Policy Plan is part of the General Plan and establishes land use designations and policy for the Estuary shoreline, extending from Adeline Street to 66th Avenue, including all lands west of I-880 that are within City or Port of Oakland jurisdiction, and including portions of the 3rd Street Opportunity Area. The Estuary Policy Plan seeks to enhance the waterfront for the economic benefit of the community and connect the waterfront to the rest of the city. The following Estuary Policy Plan policy is relevant to the environmental impacts of the proposed Specific Plan.

Policy JL-7: Maintain light industrial and warehousing uses west of Martin Luther King, Jr. Boulevard. The Estuary Policy Plan recommends maintaining light industrial activities, including warehousing and distribution uses west of Martin Luther King, Jr. Boulevard, where a concentration of industrial activities exist. Office and retail uses should be encouraged within this area as well, to promote economic diversity. These uses should be carefully screened to ensure that they are compatible with existing industrial activities and with the adjacent West Oakland neighborhood north of the I-880 freeway.

Estuary Policy Plan Consistency

The proposed Specific Plan would be consistent with this policy of the Estuary Policy Plan. The land use and development strategy for the 3rd Street Opportunity Area is for a mix of business activities and development types, including food and beverage production and distribution. Mixed-use commercial, dining and entertainment uses are encouraged in attractive, older warehouse buildings near dead-end streets.

City of Oakland Industrial Land Use Policy

Following adoption of the General Plan Land Use and Transportation Element and the Estuary Policy Plan, the City Council established a citywide Industrial Land Use Policy, finding that industrial land is a scarce resource in Oakland; that conversion of industrial land to residential use should be restricted because of the scarcity, because such changes in use would be a permanent loss of industrial land, and because conversions create land use conflicts for continuing industrial uses nearby; and that the preservation of industrial land is vital to future economic growth. The Industrial Land Use Policy states that all of the identified existing industrial subareas in Oakland are to remain industrial, with limited exceptions for General Plan amendments in specific subareas. The three industrial subareas in West Oakland, which correspond to the Mandela/West Grand Opportunity Area, the 3rd Street Opportunity Area, and the Pine Street portion of the 7th Street subarea, were identified to remain industrial, without amendments.

Industrial Land Use Policy Conflict

The Specific Plan proposes changing the General Plan land use designations and/or rezoning from industrial to residential on a total of approximately 16 acres at the following locations currently subject to the City's Industrial Land Use Policy. Each of these locations is at the edges of established industrial areas where they meet adjacent established residential neighborhoods.

- Phoenix Iron Works Site. This site is located on the west side of Pine Street between 8th Street and 9th Street. The current use on this site consists of storage of large pipes. The Specific Plan proposes to allow this site to become future residential use, compatible in character and scale to the residences opposite Pine Street to the east.
- Roadway Site. This site is located on the two blocks bounded by 17th Street, 18th Street, Wood Street and Campbell Street, and the adjacent south block face on 17th Street between Willow Street and Campbell Street. The current uses on this site include primarily underutilized warehouses and storage uses with associated truck parking. The Specific Plan proposes to allow this site to become future residential use, compatible in character and scale to the surrounding neighborhoods to the south and east.
- Coca Cola Bottling/Mayway Site. This site is located on the northeast corner of the Mandela Parkway/12 Street intersection. The current use on this site is a warehouse with associated

truck parking surrounded on two sides by a tall masonry wall. The Specific Plan proposes to allow this site to become future residential use, compatible in character and scale to the residences to the south within the Peralta Villa residential neighborhood.

- East Side of Adeline Street. These properties are bounded by 26th Street to the north, Adeline Street to the west, West Grand Avenue to the south, and Chestnut Street to the east. The Specific Plan proposes to amend the General Plan to change the land use designation for the two blocks along the east side of Adeline Street north of West Grand from Business Mix to Housing and Business Mix.
- Properties on Ettie Street at 28th Street. The Specific Plan proposes to amend the General Plan to change the land use designation of these properties from Business Mix to Housing and Business Mix.

These proposed General Plan amendments/rezoning of these sites would be in direct conflict with the City's Industrial Land Use Policy, which indicates that these areas are to remain industrial, without amendments. However, even with the proposed change in use to residential on these sites, there would remain an ample supply of industrial land within West Oakland and within the city as a whole to meet existing and projected market demand. Within the remaining industrial areas in West Oakland, the Plan would retain and expand existing compatible urban manufacturing, construction and other light industrial businesses that provide good-paying blue collar and green collar jobs, while attracting new targeted industries that are growing, including life sciences, information and clean-tech uses.

City of Oakland Zoning

The Specific Plan would retain the existing zoning designations and associated development standards throughout most of the Planning Area. However, the range of permitted uses and development standards allowed by existing zoning in West Oakland may too flexible to achieve desired change and revitalization. The Specific Plan would provide more specific direction to the private sector, generally consistent with existing zoning.

The Specific Plan recommends several changes and additions to the City's current zoning regulations, as described below.

Proposed Rezoning from Industrial Use

There are five locations where the Specific Plan proposes rezoning from Commercial Industrial Mix-1 (CIX-1) to Housing and Business Mix Commercial Zone (HBX-2):

- Phoenix Iron Works Site. This site is located on the west Side of Pine Street between Shorey Street and 9th Street. The current zoning for this site is Commercial/Industrial Mix (CIX-1/S-19), whereas the Specific Plan proposes to re-zone this site to Housing/Business Mix (HBX-2).
- Roadway Site. This site is located on the two blocks bounded by 17th Street, 18th Street, Wood Street and Campbell Street, and the adjacent south block face on 17th Street between Willow Street and Campbell Street. The current zoning for this site is Commercial/Industrial Mix (CIX-1/S-19), whereas the Specific Plan proposes to re-zone this site to Housing/Business Mix (HBX-2).
- Coca Cola Bottling/Mayway Site: This site is located on the northeast corner of the Mandela Parkway/12 Street intersection. The current zoning for this site is Commercial/Industrial Mix

(CIX-1/S-19), whereas the Specific Plan proposes to re-zone this site to Housing/Business Mix (HBX-2).

- East Side of Adeline Street. For those properties bounded by 26th Street to the north, Adeline Street to the west, West Grand Avenue to the south, and Chestnut Street to the east, the Specific Plan proposes re-zonings that would make this entire area zones as Housing/Business Mix (HBX-2).
- Properties on Ettie Street at 28th Street. The Specific Plan proposes to changes the zoning designation for these properties from Commercial Industrial Mix (CIX-1) to Housing and Business Mix (HBX-2). The existing S-19 Health and Safety Protection Overlay would be retained for these properties.

These locations are at the edges of the Mandela/West Grand and 7th Street Opportunity Areas, where the proposed change in use from industrial to residential would be compatible with adjacent residential neighborhoods and adjacent public parks. The proposed rezoning would also require a corresponding shift in the S-19 combining zone, which places additional controls on the storage or use of hazardous materials, in order to maintain its 300 foot buffer between industrial and residential uses.

Proposed New Industrial Zoning Overlays

The Specific Plan recommends new land use overlays with new regulations and special purpose districts that apply to selected locations within the Specific Plan Area (see **Figure 4.6-4**). These recommended overlays augment the requirements of the Plan Area's underlying zoning. Four business/industrial overlays are proposed:

- Business Enhancement Overlay
- Low intensity Business Overlay
- High Intensity Business Overlay
- Large Format Retail Overlay

These overlay zones include a number of regulatory changes that would direct new industrial/business development toward the vision established under this Plan, that would continue to provide flexibility and adaptability over time, but which would ensure that the Plan's vision is not precluded by inconsistent development patterns.

- Business Enhancement Overlay. To better encourage the retention, infill and occupancy of existing and viable industrial and business building stock within West Oakland, the Business Enhancement Overlay would apply to approximately 146 acres of industrially zoned lands. This overlay would:
  - add Design Review as a requirement for new additions or major exterior modifications;
  - add demolition permit criteria to projects which propose demolition of existing structures such that economically viable existing building stock is retained;
  - further restrict freight/truck terminal, truck yard, and primary waste collection center uses as being not permitted; and would
  - Lowering the permitted floor-area ratio (FAR) from the current ratio of 4:1, to a new ratio of 2:1.

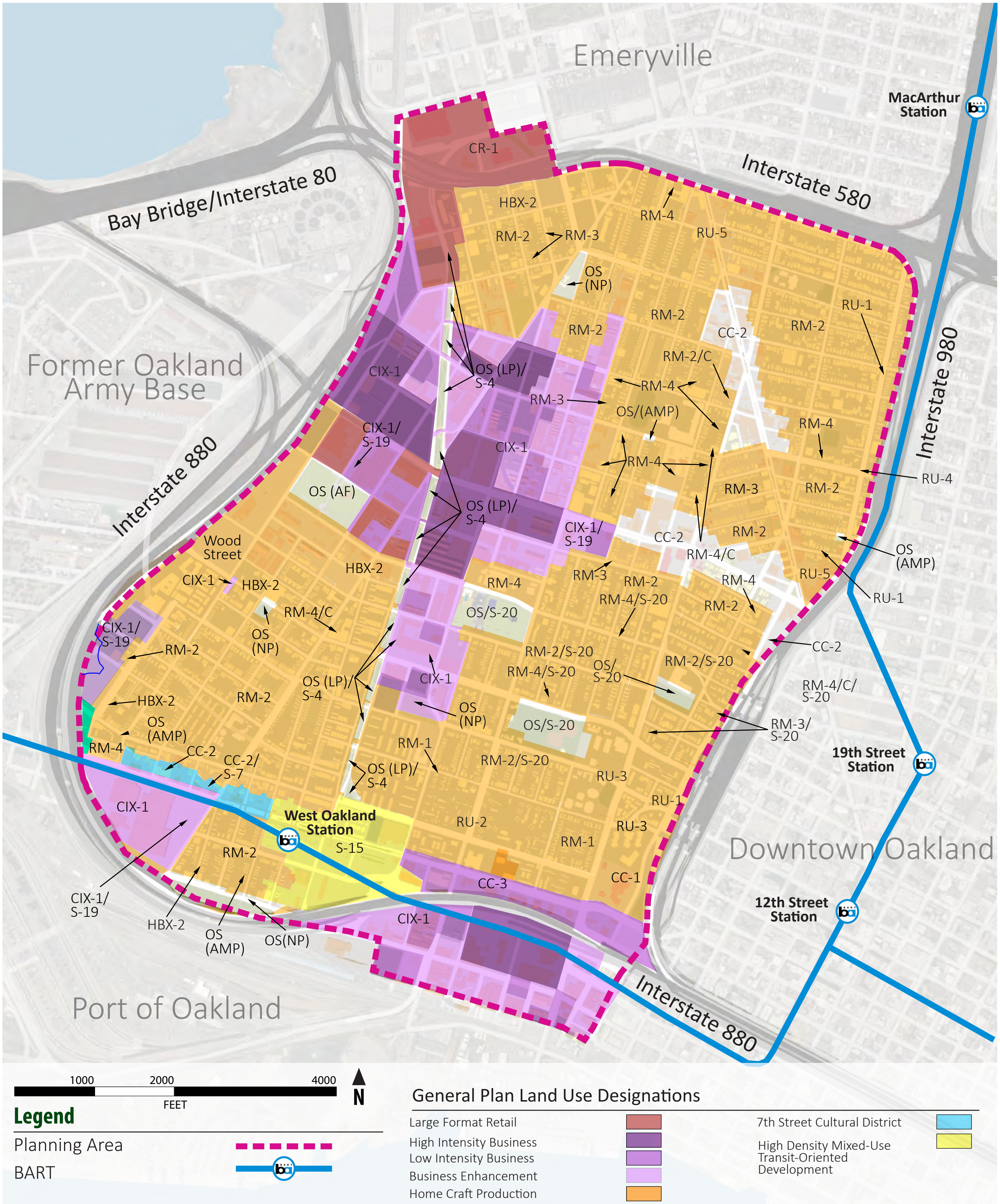


Figure 4.6-4
Specific Plan Land Use Overlay Diagram

Source: JRDV Intl.

- Low Intensity Business Overlay. With limited exceptions as described below, the regulatory intent of the Low Intensity Business land use overlay is to maintain current land use regulations, but to lower the permitted development intensity to match the surrounding industrial character and better protect nearby residential neighborhoods. This overlay would:
  - add Design Review as a requirement within all CIX-1 land use overlay zones;
  - further restricting freight/truck terminal, truck yard, and primary waste collection center uses as being not permitted; and
  - lower the permitted floor-area ratio (FAR) from the current ratio of 4:1, to a new ratio of 2:1.
- High Intensity Business Overlay. To better ensure that certain identified high-profile sites are identified for higher intensity uses, the following regulatory changes are recommended, specific to the High Intensity Business land use overlay:
  - add Design Review to consider the quality of individual site plans and architecture of future higher-intensity developments;
  - further restricting freight/truck terminal, truck yard, and primary waste collection center uses as being not permitted;
  - adding conditional use permit requirements for a number of currently permitted uses to limit permanent establishment of the types of uses that are not major job producers, which generate substantial truck traffic, and which have the propensity to result in air and noise pollution within the adjacent neighborhoods, and that would preclude the more desired higher intensity uses; and
  - require application and approval of a Planned Unit Development (PUD) permits prior to approval of any new building on High Intensity overlay sites of 60,000 square feet or greater.
- Large Format Retail Overlay. The Large Format Retail land use overlay is applied to properties in the most northwestern portion of the Mandela/West Grand Opportunity Area. The currently applicable CIX-1 zoning already permits most types of large format retail land uses. However, the list of permitted land uses under the current CIX-1 zone is so large as to permit a wide array of other business and industrial land use types as well. The purpose of the CIX-1 Large Format Retail overlay is limited to providing land use direction as to the desired (or preferred) land use types within this overlay, but does not preclude other permitted CIX-1 land uses, other than as described below.
  - add Design Review as a requirement, used to consider the quality of individual site plans and extent to which the design helps to integrate the upper Mandela Parkway area into a cohesive retail environment;
  - further restricting freight/truck terminal, truck yard, and primary waste collection center uses as being not permitted; and
  - add Conditional Use Permit (CUP) requirements for a number of currently permitted uses to limit permanent establishment of the types of uses that are not major job producers, which generate substantial truck traffic, and which have the propensity to result in air and noise pollution within the adjacent neighborhoods, and that would preclude the more desired large format retail types of uses.

Updating Older Industrial Zoning Districts

A substantial portion of the 3rd Street Opportunity Area (slightly more that 38 net acres) are currently zoned M-30, and are one of the only places left in the City with this industrial zoning. When the City re-zoned much of the West Oakland business/industrial areas to the current CIX-1 zone, these properties were not rezoned at that time because they are located within the Estuary Policy Plan area, and it was thought that all of the Estuary would be re-zoned at a later time. Additionally, a nearly 5-acre site at the end of Magnolia Street is currently zoned IG, which is a zoning designation which applies only to Port properties throughout the remainder of the City. The Specific Plan proposes to re-zone these two areas to match the intent of the business/industrial areas of West Oakland:

- Re-zone the 38.5 acres of land currently zoned M-30 in the 3rd Street Opportunity Area to CIX-1, with applicable overlay designations.
- Re-zone the approximately 5-acre area currently zoned IG in the 3rd Street Opportunity Area to CIX-1, with applicable overlay designations.

The proposed zoning changes within the Specific Plan area's industrial properties are summarized below in **Table 4.6-8**:

Table 4.6-8: Overlay Zoning, West Oakland Opportunity Areas

Current Zoning (net acres)	Acres
CIX-1	227.0
IG	4.6
M-30	38.5
Total	270.0
Proposed Re-Zoning with Overlays	
Business Enhancement	132.6
Low Intensity	47.7
High Intensity	66.1
Large Format Retail	7.0
	253.4
Residential Conversions	16.6
Total	270.0

Proposed Changes to Building Height Limits

The Specific Plan would retain the existing maximum allowed building heights throughout most of the Planning Area. However, to make full use of the opportunity presented by the West Oakland BART Station, which is uniquely served transit, to create a vibrant higher density residential and mixed-use transit village, the Specific Plan proposes an increase in the maximum allowed building height. The currently effective building heights proscribed under current zoning that are applicable to the West Oakland BART Station area TOD allow for a maximum building height of 120 feet nearest to I-880, stepping down to 90 feet along 7th Street and between 60 and 75 feet nearest to the adjacent South

Prescott neighborhood. Implementation of the Specific Plan includes an increase in the maximum allowed building height to allow building heights of up to 200 feet along 7th Street and east of Union Street, 150 feet along 7th Street and west of Union Street, and 140 feet on those parcels adjacent to the I-880 freeway, but would also provide a more effective and substantial transition in building heights nearest to the South Prescott neighborhood, with buildings nearest to this neighborhood as low as 2-stories. No changes are proposed to the maximum allowed building heights elsewhere in the Planning Area.

Enhancing the Commercial Corridors

Land use regulations for several properties are recommended for change to better emphasize the desired commercial nature of the area:

- Intersection of West Grand Avenue and San Pablo Avenue. Rezone the northeast and northwest quadrants of the San Pablo/Grand intersection from Urban Residential (RU-5) to the Community Commercial (CC-2) zone to signify its retail focus.
- Intersection of 30th Street, San Pablo Avenue, and Market Street to the north, Market Street to the west, 27th Street to the south, and San Pablo Avenue to the east. Rezone this area from Community Commercial (CC-3) to Community Commercial (CC-2).

Although both zoning types permit mixed use development, the CC-3 Zone allows for light industrial activities whereas the CC-2 Zone prohibits industrial activities, allows residential developments, and thus emphasizes commercial characteristics of the Plan Area's major commercial corridors.

Other Conforming Re-zonings

The Specific Plan also proposes several administrative rezoning that clarify and better conform to land use planning policy and regulations, including:

- clarifying the boundaries between Business Mix, and Housing & Business Mix land use designations,
- applying Urban Open Space land use designations and zoning to City-owned parks and medians in Mandela Parkway and at other locations where open space resources exist;
- adjusting the S-19 Health and Safety Protection Combining Zone boundaries, which includes standards intended to promote public health, safety and welfare by ensuring that activities that involve hazardous materials operate in a manner that protects surrounding areas;
- strengthening neighborhood protections by mapping the Mixed Housing Type Residential land use designation at selected sites along Linden Street near West Grand Avenue and at 20th Street/Brush Street;
- reinforcing commercial development opportunities by clarifying the Community Commercial land use designations at West Grand Avenue/Market Street, at San Pablo Avenue/West Grand Avenue and along the 7th Street corridor; and
- increasing opportunities for a mixture of businesses by applying Commercial Industrial zoning (CIX) to several selected smaller sites nearest to the freeways.

A complete illustration of all proposed General Plan amendments and rezonings as proposed under the Specific Plan is shown on **Figure 4.6-5**.

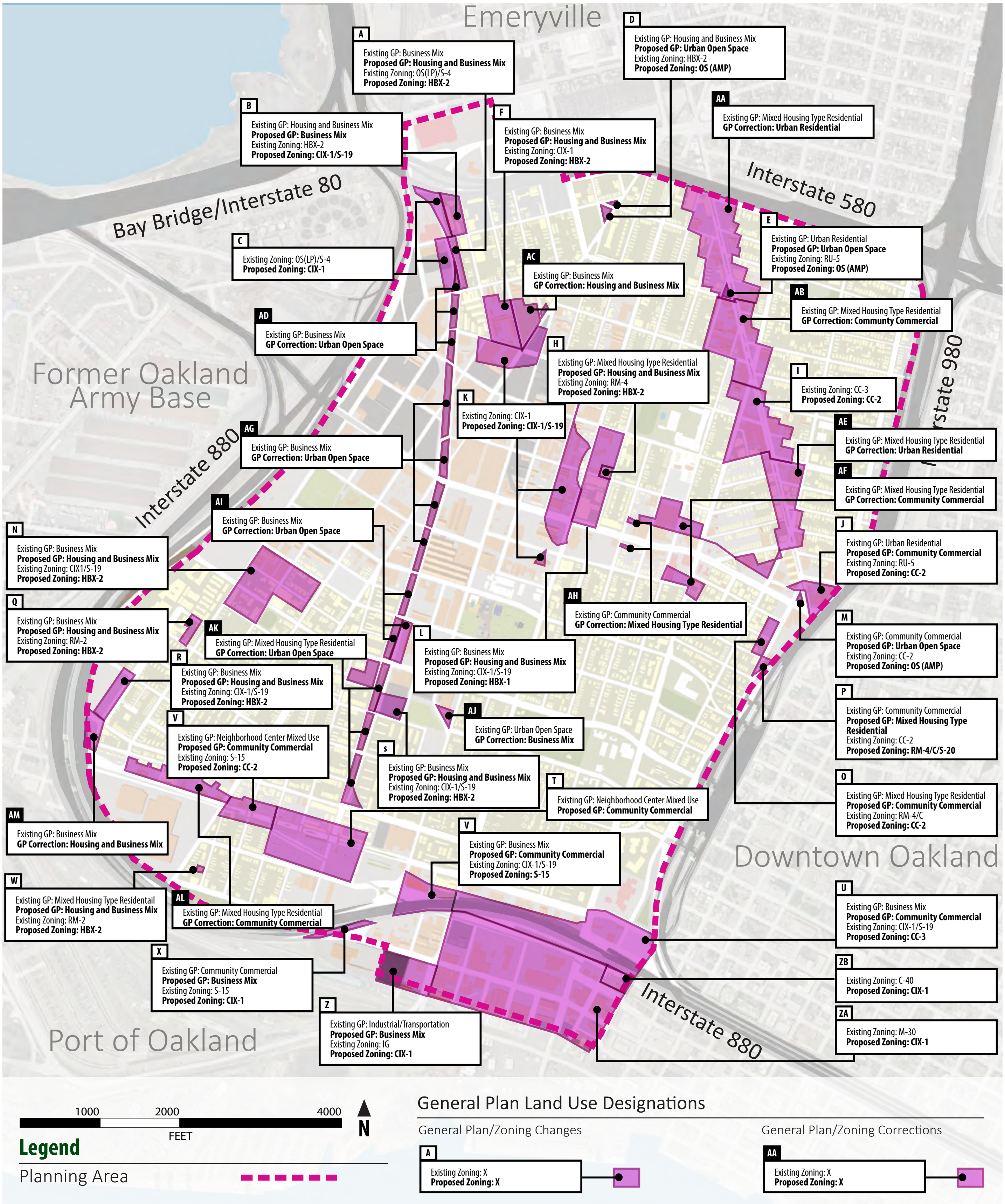


Figure 4.6-5
Proposed General Plan and Zoning Changes

Redevelopment Plans

From its establishment in 1956 until its dissolution in 2012, the Oakland Redevelopment Agency managed numerous projects and programs within eight active Redevelopment Project Areas in the city, including four Project Areas that combined included all of West Oakland.

In 2011, the California legislature approved a budget measure introduced by the Governor (and later validated by the State Supreme Court) that dissolved all Redevelopment Agencies in the state. Oakland's Redevelopment Agency (RDA) has been disbanded, staff redeployed or terminated, and assets have been transferred to the Redevelopment Successor Agency (RSA), which is charged with winding down the responsibilities of the former RDA and administering existing contracts; new contracts and funding related to redevelopment plans are not permitted.

As of February 1, 2012, the City of Oakland Redevelopment Agency ceased to exist. The new Redevelopment Successor Agency, housed within the Office of Neighborhood Investment, was created to wind down and complete the activities of the former Redevelopment Agency.

Although Redevelopment Agencies were eliminated by state legislation in 2011, there was no legislation that eliminated the Redevelopment Project Areas, or the many laws and regulations that had been passed over 40 years affecting Project Areas. The State legislation did not provide a mechanism to address how to handle policies, actions, and responsibilities assigned to the Redevelopment Agency, however. It is uncertain how the many regulations and laws governing redevelopment project areas will be affected following dissolution of the redevelopment agencies and the tax increment financing mechanisms previously charged with implementing those requirements.

The Redevelopment Plans for the four former Redevelopment Project Areas in West Oakland are described below. Redevelopment activities undertaken by the City in accordance with these plans have shaped West Oakland and continue to influence the planning underway today.

- *West Oakland Redevelopment Plan.* The West Oakland Redevelopment Project Area encompassed three sub-areas: Prescott/South Prescott, Clawson/McClymonds/Bunche, and West MacArthur/Hoover. Project Area goals for 2011-2013 included preparing and adopting the West Oakland Specific Plan, planning for transit-oriented development at the West Oakland BART Station, completing the second construction phase of 7th Street streetscape improvements, completing streetscape master plans for Martin Luther King Jr. Way and Peralta Street, adopting a West Oakland Street Tree Master Plan, and completing construction of the West Oakland Teen Center.
- *Oakland Army Base Redevelopment Plan.* In 2000 the City adopted and approved the Oakland Army Base Redevelopment Area Plan, establishing a 1800-acre redevelopment project area that included the former Oakland Army Base (OARB). The Project Area was generally bounded by Wood Street, and the Inner, Middle and Outer Harbors of the Port of Oakland, and was divided into three major sub-districts: the 16th and Wood Sub-District, the Maritime Sub-District and the OARB Sub-District. The OARB Redevelopment Area Plan incorporated the program for the former Army Base that was set forth in the Oakland Army Base Reuse Plan.
- *Oak Center Redevelopment Plan.* The Oak Center Redevelopment Area comprised the area from 10th Street to 18th Street and Brush Street to Mandela Parkway. Established in 1970, the primary objectives of the Oak Center Redevelopment Plan were to preserve the turn-of-the-century Victorian houses and encourage home ownership. The Oak Center Redevelopment Project was completed.
- *ACORN Redevelopment Plan.* Major redevelopment activity in the Acorn Project Area occurred from the 1950s to the 1980s. Traditional neighborhoods were reconfigured to create dense multi-family

rental housing. Major projects included the ACORN Development, Jack London Gateway Shopping Center, Jack London Gateway Senior Housing Project, and the construction of I-980.

Oakland Army Base Reuse Plan

The former Oakland Army Base functioned as a major cargo port and warehousing facility from 1941 until its official closure in 1999. The Oakland Base Reuse Authority directed a planning process for the future reuse of the Army Base that resulted in the Oakland Army Base Reuse Plan (OARB Reuse Plan),7 which contains a conceptual vision and broad policy framework for development of the Army Base. In 2006, approximately 170 acres of the former Army Base were conveyed to the City to comprise the Gateway Development Area, and another 200 acres were transferred to the Port of Oakland. The Port of Oakland determined that the capacity of the Port is constrained by the capacity and performance of the road and rail intermodal connectors, and that the most effective configuration for the Port over the next 15 to 20 years requires an increase in rail yard space. Most recently, the City and the Port have collaboratively established a proposed development for both the City-owned and the Port-owned areas, collectively known as the 2012 Oakland Army Base Project8, which would provide a new state of the art Trade and Logistics Center with warehouse and distribution facilities to support cargo logistics, and associated roadway, railroad and infrastructure improvements.

Consistency Analysis

The proposed Specific Plan would be consistent with the OARB Reuse Plan.

- The OARB Reuse Plan anticipated that the northerly portion of the City Gateway Development Area near the EBMUD Wastewater Treatment Plant would be used for heavier industrial uses. The current 2012 Oakland Army Base Project now envisions relocating certain heavy industrial and truck-intensive recycling uses currently residing in West Oakland to this location. The Specific Plan capitalizes on this relocation of heavy industrial uses to the former Army Base by designating the soon-to-be vacant recycling use sites for development of new employment uses.
- When adopting the OARB Reuse Plan in 2001, the Port amended the Bay Plan and the Seaport Plan to designate 16 acres east of I-880, west of Wood Street and north of West Grand Avenue (within the West Oakland Specific Plan area) as a Port Priority Use area for truck parking. The 2012 Oakland Army Base Project now designates an approximately 15.1-acre truck parking area within the Port Development Area, transferring out of West Oakland the Port's obligation to provide land for truck parking. The Specific Plan capitalizes on this planned relocation of required truck parking area by designating the Port's former 16-acre truck parking site for development of new employment or retail uses, unrelated to Port activities.
- The OARB Reuse Plan anticipated that much of the westerly portion of the former Army Base would be developed as a Gateway Park. Currently, a multi-agency Gateway Park Working Group has proposed that the Port's former truck parking site east of I-880, west of Wood Street and north of West Grand Avenue be used as a parking lot, staging area and the starting point of an elevated bicycle/pedestrian pathway which would take visitors safely across railroad and Port industrial lands to the core area of the Gateway Park.[9] Reuse of this formerly designated truck parking site for

---

[7] City of Oakland, Oakland Army Base Reuse Plan, 2003

[8] City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012.

[9] Gateway Park Working Group, Gateway Park Project Concept Report, September 2012.

development of new employment or retail uses as recommended by the Specific Plan could potentially also accommodate the Working Group's proposed park facilities. However, the Working Group also has preliminary design plans for a Phase 2 expansion of the Gateway Park to include the entire formerly designated truck parking site, as well as additional lands beneath the elevated I-880 freeway and the I-80/I-880/I-580 interchange for active recreation such as basketball, tennis, skating, dog running, demonstration gardens, and an overflow parking lot with 150 parking spaces. The Gateway Park Project Concept Report acknowledges that the level and scale of the amenities in a potential future Phase 2 area is dependent upon the type of development that occurs in the surrounding area. If these properties were to be fully redeveloped with employment or retail uses as contemplated under the Specific Plan, it would likely preclude the Working Group's plans for an expanded portion of the Gateway Park, but would not be inconsistent with the core area of the Gateway Park as originally identified in the OARB Reuse Plan.

Energy and Climate Action Plan

In 2009, the City Council directed staff to develop an Energy and Climate Action Plan (ECAP) using a preliminary planning GHG reduction target equivalent to 36% below 2005 GHG emissions by 2020, with annual benchmarks for meeting the target. Based on Oakland's baseline 2005 GHG inventory, totaling approximately 3 million metric tons of CO2e emissions and current forecasts of business-as-usual emissions growth, reducing GHG emissions by the equivalent of 36% below 2005 levels by 2020 will require taking actions that cumulatively add up to approximately 1.1 million metric tons of CO2e reductions. On December 4, 2012, the City Council adopted the ECAP which evaluates and prioritizes opportunities to reduce energy consumption and GHG emissions in its own government operations and throughout the community.

The ECAP also includes a set of actions aimed at increasing local resilience and helping Oakland adapt to the projected impacts of climate change. In addition, Oakland is participating in the regional Adapting to Rising Tides (ART) project, led by the San Francisco Bay Conservation Development Commission (BCDC) and the National Oceanic and Atmospheric Administration (NOAA). The ART project, which began in late 2010, was created to advance regional understanding of how sea level rise and other climate change impacts will affect the Bay Area and to begin to explore adaptation strategies that may benefit Oakland and the region.

Consistency Analysis

The proposed Specific Plan would be consistent with the ECAP, as explained in Chapter 4.4, Greenhouse Gas Emissions.

Oakland "Transit First" Policy

The City's Public Transit and Alternative Modes ("Transit First") resolution recognizes the importance of striking a balance between economic development opportunities and the mobility needs of those who travel by means other than the private automobile. The policy favors modes of travel that have the potential to provide the greatest mobility for people rather than vehicles.

Consistency Analysis

The Specific Plan's emphasis on transit-oriented development surrounding the West Oakland Bart Station, streetscape plans which include transit design and amenities, and its commitment to enhanced transit opportunities throughout West Oakland is fully consistent with the City's Transit First policy.

San Francisco Bay Plan and Seaport Plan

The McAteer-Petris Act of 1965 established the San Francisco Bay Conservation Development Commission (BCDC) to ". . . prepare an enforceable plan to guide the future protection and use of San Francisco Bay and its shoreline." The San Francisco Bay Plan (Bay Plan) guides BCDC in its protection of the Bay and in its exercise of permit authority over development adjacent to the Bay. The Bay Plan defines five special land use designations called "priority uses" that are appropriate to be located at specific limited shoreline sites. The priority use designations are ports, water-related industry, airports, wildlife refuges, and water-related recreation. If properties are designated a priority use area in the Bay Plan, then those properties are intended to be reserved for that use. In this manner, BCDC exerts limited land use authority in priority use areas through the Bay Plan through its regulatory program.

In recognition of the importance of maritime commerce to the Bay Area, BCDC's San Francisco Bay Area Seaport Plan coordinates planning and development of port terminals in the Bay. The Seaport Plan constitutes the maritime element of the Metropolitan Transportation Commission's (MTC) Regional Transportation Plan, and is incorporated into the Bay Plan. Areas determined to be necessary for future port development are designated as Port Priority Use areas and are reserved for port-related and other uses that will not impede development of the sites for port purposes.

At the time the Oakland Army Base was closed by the U. S. Department of Defense, the entire Army Base was designated a Port Priority Use area. As part of the Army Base closure process, the OARB Reuse Plan recommended that the Port Priority Use designation be removed from the 189 acres transferred to the City of Oakland for development (the City Gateway Development Area). The Port and City each agreed to instead provide 15 acres of additional land specifically for Port ancillary uses related to trucking. The City designated a 15-acre site on the former Army Base for trucking use, and the Port identified approximately 22 acres of land underneath the elevated portion of I-880 and other adjacent, mostly vacant parcels east of the freeway, west of Wood Street and north and south of West Grand Avenue. The parcels east of the freeway are located within the West Oakland Planning Area. In amending the Bay Plan in 2001, BCDC designated the 15 acres identified by the City and the 22 acres identified by the Port as Port Priority Use areas, in addition to retaining the port priority use designation on the 184-acre portion of the Army Base to be conveyed to the Port. In 2007, BCDC removed the Port Priority Use designation from six acres of the 22 acres located east of the freeway, south of West Grand Avenue and north of 17th Street, to allow development of the Wood Street project. The Port Priority Use designation (as well as the agreement for use of this area for trucking and port ancillary uses, i.e., for truck parking and container storage) still applies to the remaining 16 acres located north of West Grand Avenue.

Port Priority Use Inconsistency

The portion of the West Oakland Planning Area with the current Port Priority Use designation is located within the Mandela/West Grand Opportunity Area. This location is identified in the Specific Plan for future development of employment or retail uses unrelated to Port activities. The 2012 Oakland Army Base Project includes an approximately 15.1 acre replacement truck parking area, which would fulfill the Port's obligation to provide land for truck parking. However, until such time as the Bay Plan and Seaport Plan are amended by BCDC to reflect the new 15.1-acre replacement truck parking site, the Specific Plan's proposed use of these properties would be inconsistent with the Bay Plan and Seaport Plan policies that seek to protect Port Priority use areas for directly related Port activities.

West Oakland Community-Based Transportation Plan

The West Oakland Community-Based Transportation Plan (CBTP) is the result of technical analysis and a series of community meetings and surveys conducted in 2005-2006 to identify transportation solutions to improve mobility in West Oakland. The CBTY project team worked closely with the West Oakland Project Area Committee (WOPAC) and numerous West Oakland community organizations. The community-based planning process identified barriers to mobility, problems in reaching grocery stores, schools, jobs, medical services and other key destination, and designed local solutions to these barriers. The Plan recommended 26 projects organized into three tiers according to their funding feasibility.

Consistency Analysis

Most of the projects that remain to be implemented are reflected in the proposed West Oakland Specific Plan. Therefore, the Specific Plan would be consistent with the West Oakland Community-Based Transportation Plan.

Standard Conditions of Approval

The City of Oakland has no Standard Conditions of Approval specific to the potential land use impacts of the Specific Plan.

Impacts, Standard Conditions of Approval and Mitigation Measures

Significance Criteria

According to the City's Thresholds of Significance, the Specific Plan would have a significant impact related to land use and planning if it would:

1. Physically divide an established community;
2. Result in a fundamental conflict between adjacent or nearby land uses;
3. Fundamentally 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 and result in a physical change in the environment; or
4. Fundamentally conflict with any applicable habitat conservation plan or natural community conservation plan

Physically Divide an Established Community

Impact LU-1: The proposed West Oakland Specific Plan would not disrupt or divide the physical arrangement of the West Oakland community or any surrounding community, but rather would improve certain existing conditions that currently divide the community. (**LTS**)

West Oakland is currently subject to many existing conditions that disrupt and divide the community. These conditions include the location of heavy industrial and transportation uses immediately adjacent to residential uses, and the separation of West Oakland from downtown Oakland, the waterfront at Jack London Square, Middle Harbor Park and the rest of the City by freeways that encircle the community.

Large areas of vacant and underutilized properties separate portions of the community into relatively isolated residential neighborhoods. Truck travel through neighborhoods, incomplete sidewalk systems, unsafe and uncomfortable streets, and poor connections to transit, jobs, schools, parks and community facilities impede community connections. West Oakland also lacks a grocery store, drug store and other neighborhood-serving retail, which forces residents to go outside the neighborhood to meet basic retail needs.

Reconstruction of the I-880 Cypress Freeway on its current alignment outside West Oakland neighborhoods and the subsequent redevelopment of the former freeway right-of-way as Mandela Parkway, removed a substantial division previously caused by the original freeway construction. The proposed Specific Plan would reinforce the trend begun by redevelopment of Mandela Parkway by encouraging additional mobility and streetscape improvements, and improved transit service linking West Oakland to adjacent activity centers and neighborhoods. The Specific Plan would also facilitate a transition from heavy industrial and transportation uses to more compatible light industrial, construction, urban manufacturing, clean-tech, digital media, information technology and life science uses. The Plan would encourage rehabilitation and adaptive reuse of existing, often blighted buildings and properties, and the compatible infill development of existing vacant blocks and lots. The Plan targets a number of key former heavy industrial properties next to existing residential neighborhoods for redevelopment with compatible new residential uses. The Specific Plan also encourages improvement of the safety, comfort and appearance of streetscapes and connections under the freeways. The Plan identifies options for BART noise mitigation. The Plan identifies suitable locations for new grocery stores and other neighborhood-serving retail uses, as well as appropriate transit corridor locations for mixed-use development with ground floor retail. Overall, the proposed Specific Plan would not disrupt or divide the physical arrangement of the West Oakland community or any surrounding community.

Mitigation Measures

None required

Land Use Compatibility

Impact LU-2: The West Oakland Specific Plan would not result in a fundamental conflict between adjacent or nearby land uses, but rather would result in a gradual improvement in compatibility between residential and other types of land uses. (**LTS**)

Existing Land Use

As illustrated in **Table 4.6-9**, the existing land uses in West Oakland's Opportunity Areas include the following:

- approximately 328 acres of land accommodating approximately 7.2 million square feet of non-residential building space, providing nearly 15,300 jobs;
- approximately 36 acres of mixed-use development along the 7th Street and San Pablo Avenue corridors, accommodating about 700,000 square feet of building space and about 600 jobs, plus about 65 housing units; and
- approximately 22 acres of residential land with a total of approximately 200 existing housing units; and

- approximately 27 acres of public open space, including 10 acres at Raimondi park, and approximately 17 acres of linear park space within the center median of Mandela Parkway.

Table 4.6-9: Existing Land Use: All West Oakland Opportunity Areas

		Non-Residential		Residential	
	Land Area (net acres)	Building Area (sq. ft.)	Employment	Housing Units	Population
Non-Residential					
Industrial/Business/Institutional	293	6,830,000	14,620		
Commercial/Retail	35	350,000	660		
sub-total	328	7,180,000	15,280		
Mixed Use					
Commercial/Residential	36	705,000	610	65	155
Residential					
Single-family and Townhomes	22			200	215
Open Space	27				
TOTAL	**413**	**7,885,000**	**15,890**	**265**	**628**

Land Use Assumptions at Buildout

Table 4.6-10 provides a summary of changes in land use, employment, and population expected through buildout within this Plan's Opportunity Areas. As indicated in this table, buildout of the West Oakland Opportunity Areas is expected to result in a total of:

- over 293 acres of land accommodating approximately 11 million square feet of non-residential building space and nearly 23,000 jobs;
- approximately 37 acres of mixed-use development along the 7th Street and San Pablo Avenue corridors, accommodating about 875,000 square feet of building space and approximately 1,800 jobs, plus more than 1,400 housing units;
- a 24-acre mixed-use transit-oriented development at the West Oakland BART station, with up to 675,000 square feet of commercial, office and retail development, and/or a range of between 1,325 to 2,308 new housing units; and
- approximately 31.5 acres of residential land with a total of approximately 1,520 housing units.

Table 4.6-10: Development Buildout Assumptions –All West Oakland Opportunity Areas

		Non-Residential		Residential	
	Land Area (net acres)	Building Area (sq. ft.)	Employ-ment	Housing Units	Population
2035 Buildout					
Non-Residential					
Industrial/Business	244.5	10,380,000	21,490		
Commercial/Retail	49	670,000	1370		
sub-total	293.5	11,050,000	22,860		
Mixed Use					
Commercial/Residential	37	875,000	1,800	1,441	3,167
West Oakland BART TOD	24	up to 670,000	up to 1,675	up to 2,308	up to 5,230
sub-total	61	up to 1,545,000	up to 3,475	up to 3,749	up to 8,397
Residential					
Single-family and Townhomes	16.5			430	1,384
Multi-family Residential	15			1,090	2,183
sub-total	31.5			1,520	3,567
Open Space	27				
TOTAL	**413**	**range from 11,925,000 to 12,595,000**	**range from 24,660 to 26,330**	**range from 4,286 to 5,267**	**range from 9,788 to 11,964**

Land Use Changes Resulting from the Plan

This Specific Plan directs and suggests significant transformational growth and change in land use throughout the West Oakland Opportunity Areas. In summary, these land use changes as envisioned under this Plan, as summarized in **Table 4.6-11**, include.

Business/Industrial Changes

- 34 acres of underutilized business and industrial lands are converted to 24 acres of high intensity mixed-use development at the West Oakland BART station, and 10 acres of new residential areas at the industrial/residential boundaries;
- Approximately 136 acres of current industrial/business properties with approximately 2.3 million square feet of existing building space are retained, and new and expanded business occupying this existing space provide up to 5,300 new jobs;
- 49 acres of industrial business properties are redeveloped with approximately 1.1 million square feet of new, low-intensity industrial and business space, providing up to 2,460 new jobs;

- 66 acres of current industrial/business properties are eventually redeveloped in the long-term with nearly 4.7 million square feet of new, high-intensity industrial and business space, providing up to 11,010 new jobs
- 18 acres of current industrial/business properties are redeveloped with approximately 385,000 square feet of new commercial/retail space, providing up to 870 new jobs

Mixed Use Corridor and TOD Changes

- Existing mixed Use areas primarily along the 7th Street and San Pablo Avenue corridors are more intensively developed with new infill development, resulting in approximately 185,000 square feet of new ground-floor commercial space and 590 new jobs, plus 1,356 new upper-floor residential units.
- A new transit-oriented development project is implemented on 24 acres surrounding the West Oakland BART station, resulting in up to 670,000 square feet of new commercial/office/institutional building space and up to 1,675 new jobs, and between 1,325 to 2,308 new housing units.

Residential Changes

- Conversion of a total of approximately 16 acres of business/industrial lands to residential use results in development of a total of 430new housing units;
- Infill development of currently designated residential properties results in the construction of more than 900 new housing units at varying densities.

Table 4.6-11: Buildout Assumptions –Net Change, All West Oakland Opportunity Areas

Net Change					
Non-Residential					
Vacant Lots, Surface Parking, Blighted & Underutilized Buildings, and Businesses Choosing to Relocate	-167	-2,330,000	-790		
Existing Industrial/Business Buildings More Intensively Used	no change - (136)	no change - (2,300,000)	+5,320		
New Low-Intensity (Low-Rise) Industrial and Business Space	+49	+1,110,000	+2,460		
New High-Intensity (Mid-Rise) Buildings	+66	+4,680,000	+11,010		
Existing Retail Buildings Retained	no change – (66)	no change – (300,000)	+270		
New Commercial/Retail	+18	+385,000	+870		
sub-total	-34	+3,845,000	+19,140		
Mixed Use					
Existing Mixed Use Areas More Intensively Developed	no change	+185,000	590	1,356	2,975
New Transit-Oriented Development (BART TOD)	+24	up to +670,000	up to 1,675	range from 1,325 to 2,308	range from 3,054to 5,320
	+24	range from +185,000 to +855,000	range from +590 to +2,265	range from +2,681 to +3,664	range from +6,029 to +8,295
Residential					
New Residential Conversions	+10			+430	868
Infill of Single-Family and Townhomes	no change			+175	360
Infill of Multi-Family Sites	no change			+731	1,465
sub-total	+10			1,336	2,693
TOTAL	**0**	**range from 4,030,000 to 4,700,000**	**range from 19,730 to 21,986**	**range from 4,017 to 5,000**	**range from 7,494 to 10,988**

Land Use Compatibility

Land use compatibility is an important component of the well-being of communities, especially in urban areas where densities are high and a mixture of differing land uses can generate conflicts. Residential and heavy industrial uses are particularly difficult to harmonize. People living close to industries may experience higher levels of noise, pollution and truck traffic, and less visually attractive conditions. Industrial uses can experience greater regulatory controls over their activities and, despite a facility's location in an industrial zone, complaints may force the facility to change or permanently restrict its operations.

The Specific Plan would improve existing land use incompatibilities by facilitating the transition of less compatible heavy industrial and transportation uses to more compatible light industrial and business mix uses. The Plan proposes locating new higher intensity uses near the freeways and away from residential neighborhoods. The higher intensity industrial uses, more intensive campus-style development, potential regional-serving retail uses and parking structures proposed by the Specific Plan would be located near I-880 and the West Grand Avenue ramps, or on 3rd Street, and away from residential areas. Community revitalization and development in accordance with the Specific Plan would occur as infill development on vacant land and intensification of underutilized parcels, primarily within industrial areas, along commercial corridors and around the BART station. The Plan would encourage rehabilitation and adaptive reuse of existing often blighted buildings and properties, and the compatible infill development of existing vacant blocks and lots. Infill development would result in more compatible land use patterns.

Transition of Industrial Use Types

One of the key underlying land use strategies of the West Oakland Specific Plan is to seek a transition of certain heavier industrial uses (such as recycling and heavy truck-intensive uses), to newer light industrial and business mix uses (including new technologies, research and development, low impact manufacturing, and commercial operations). This strategy is consistent with the current General Plan's Business Mix land use designation, which seeks to establish an "economic development zone" striving to accommodate older industries while anticipating new technologies. The West Oakland Specific Plan does not target for removal any specific industry type or individual business.

With few exceptions as described below, the Specific Plan retains current General Plan land use designations and zoning. However, the Specific Plan's CIX-1 land use overlays do provide a more specific land use vision for the area, intended to facilitate a transition in industrial and business land use over time. In particular, the Specific Plan envisions the short-term replacement of two current recycling operations (which have announced their own intentions to relocate to the former Oakland Army Base) with new higher intensity business/industrial uses. Over the longer term, similar transitions and reuse of older, heavier industrial uses is anticipated to occur as a result of market forces, prompted and facilitated by Specific Plan policy.

Building Height Transitions to Lower-Density Residential Neighborhoods

The Specific Plan proposes higher density residential and mixed-use development at the West Oakland BART station and along the 7th Street, San Pablo Avenue and West Grand Avenue corridors, adjacent to existing lower density residential neighborhoods. The building height limits, minimum yards, landscaping, screening and lighting standards of existing zoning, and Design Review of height, bulk, arrangement, shadowing and other characteristics of new development in accordance with Chapter 17.136 of the Oakland Planning Code, would continue to result in sensitive transitions between higher density development to adjacent lower density neighborhoods.

The Specific Plan would retain the existing maximum allowed building heights throughout most of the Planning Area. However, to make full use of the opportunity presented by the West Oakland BART Station, which is uniquely served by transit, to create a vibrant higher density residential and mixed-use transit village, the Specific Plan proposes an increase in the maximum allowed building height from the existing height limits. The Specific Plan includes an increase in the maximum allowed building height from the existing height limits of 120 feet (which is currently applicable to parcels adjacent to the I-880 freeway) to allow building heights of up to 200 feet along 7th Street and east of Union Street, 150 feet along 7th Street and east of Union Street, and 140 feet on those parcels adjacent to the I-880 freeway, but would also provide a more effective and substantial transition in building heights nearest to the South Prescott neighborhood, with buildings nearest to this neighborhood as low as 2-stories. No changes are proposed to the maximum allowed building heights on the remaining portions of 7th Street, or along San Pablo Avenue and West Grand Avenue, where height limits are predominantly 60 feet and 75 feet.

Environmental Compatibility

The Specific Plan proposes the eventual development of many hundreds of new housing units near freeways and other sources of diesel exhaust particulates and other toxic air contaminants (TACs) which pose a significant risk to human health. Housing proposed by the Specific Plan near the freeways, high volume roadways, BART and the railroads would also be exposed to noise levels that may exceed City and state standards for noise compatibility. Additionally, certain new residential land uses proposed by the Specific Plan are located on properties with known previous contamination from prior industrial uses or other sources. The compatibility of new residential development with these environmental conditions is more specifically addressed in Chapter 4.2, Air Quality, Chapter 4.5, Hazards and Hazardous Materials, and Chapter 4.7, Noise, of this EIR.

Mitigation Measures

None required

Conflict with Plans, Policies or Regulations

Impact LU-3: The Specific Plan would not fundamentally conflict with any applicable land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect and result in a physical change in the environment. The impacts of the Specific Plan related to conflict with plans, policies and regulations would be less than significant. (**LTS**)

To the extent that the Plan may potentially conflict with individual general plan and other plan policies and regulations, those conflicts do not result in a significant effect on the environment under CEQA. CEQA Guidelines Section 15358(b) states that, "effects analyzed under CEQA must be related to a physical change in the environment." CEQA Guidelines Section 15125(d) further states that an EIR shall discuss any inconsistencies between a proposed project and the applicable general plan in the setting section of the document rather than as an impact.

As described for each pertinent plan, policy and regulation in the Regulatory Setting section above, the Specific Plan would, on balance, be consistent with applicable plans, policies and regulations. The impacts of the Specific Plan related to conflicts or changes are more fully analyzed in the individual chapters of this EIR.

Mitigation Measures

None required

Habitat and Natural Community Conservation Plans

Impact LU-4: There is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the Planning Area. The Specific Plan would not conflict with any applicable habitat conservation plan or natural community conservation plan. (**No Impact**)

There is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the Planning Area. The Specific Plan would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Mitigation Measures

None required

Cumulative Land Use Impacts

Cumulative Impact LU-5: The Specific Plan would not result in a cumulatively considerable contribution to any potentially significant cumulative land use impacts. The Specific Plan would further the growth and change envisioned by the General Plan. Although the Specific Plan would rezone key parcels from industrial to residential to reduce land use conflicts, on balance, the Plan would be consistent with and strongly support the City's Industrial Land Use Policy, and would not result in a cumulatively considerable contribution to the city-wide loss of industrial land supply. The cumulative land use impacts of the Specific Plan would be less than significant. (**LTS**)

The impacts of the proposed Specific Plan related to the physical division of an established community, conflicts with adjacent or nearby land uses, or conflicts with applicable land use plans, policies or regulations would be less than significant. Therefore, the Specific Plan would not result in a cumulatively considerable contribution to any potentially significant cumulative land use impacts. The Specific Plan would further the growth and change envisioned by the General Plan, the Land Use and Transportation Element policy framework and specific recommendations for West Oakland. Although the Specific Plan would rezone a few key parcels from industrial to residential to reduce land use conflicts, on balance, the proposed Specific Plan would generally be consistent with and would strongly support the Industrial Land Use Policy, and would not result in a cumulatively considerable contribution to any potentially significant cumulative loss of industrial land supply.

Mitigation Measures

None required

4.7

Noise

This chapter evaluates the potential noise impacts of the proposed Specific Plan. It describes existing conditions in and around West Oakland and evaluates the impacts and mitigation needs of development allowed by the Specific Plan.

Physical Setting

Fundamentals of Environmental noise

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Decibels and other technical terms are defined in **Table 4.7-1**.

Human Sensitivity to Noise

Most of the sounds that we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a weighting that reflects the facts that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range. This measurement adjustment is called "A" weighting, and the decibel level so measured is called the A-weighted sound level (dBA).[1] Typical A-weighted levels measured in the environment and in industry are shown in **Table 4.7-2** for different types of noise.

[1] In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve.

Table 4.7-1
Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, Leq	The average A-weighted noise level during the measurement period. The hourly Leq used for this report is denoted as dBA Leq(h).
Lmax, Lmin	The maximum and minimum A-weighted noise level during the measurement period.
L01, L10, L50, L90	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, Ldn or DNL	The equivalent noise level for a continuous 24-hour period with a 10-decibel penalty imposed during nighttime and morning hours. (10:00 pm to 7:00 am).
Community Noise Equivalent Level, CNEL	CNEL is the equivalent noise level for a continuous 24-hour period with a 5-decibel penalty imposed in the evening (7:00 pm to 10:00 pm) and a 10-decibel penalty imposed during nighttime and morning hours (10:00 pm to 7:00 am).
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Harris, Handbook of Acoustical Measurements and Noise Control, 1998.

Table 4.7-2
Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level	Common Indoor Noise Source
	110 dBA	
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Suburban daytime		Active office environment
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
Wilderness area		Broadcast/recording studio
Threshold of human hearing	10dBA	
	0 dBA	

Source: Caltrans, Technical Noise Supplement (TeNS), November 2009.

Note that example noise sources on the right and left line up to approximate noise levels along the scale in the center column.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a combination of noise from distant sources which create a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors L_{01}, L_{10}, L_{50}, and L_{90}, are commonly used. They are the A-weighted noise levels equaled or exceeded during 1, 10, 50, and 90 percent of a stated time period. A single number descriptor called the L_{eq} is also widely used. The L_{eq} is the average A-weighted noise level during a stated period of time.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are more sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, a descriptor, DNL (day/night average sound level), was developed. The DNL divides the 24-hour day into the daytime of 7:00 AM to 10:00 PM and the nighttime of 10:00 PM to 7:00 AM. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The Community Noise Equivalent Level (CNEL) is another 24-hour average that includes both an evening and nighttime weighting.

One way of anticipating a person's subjective reaction to a new noise is to compare the new noise with the existing noise environment to which the person has become adapted, i.e., the so-called "ambient" noise level. With regard to increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this EIR chapter:

- Under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dBA.
- Outside these controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise.
- It is widely accepted that the average healthy ear, however, can barely perceive changes in the noise level of 3 dBA.
- A change in noise level of at least 5 dBA is required before any noticeable change in community response would be expected.
- A 10 dBA increase is subjectively heard as approximately a doubling in loudness, and would almost certainly cause an adverse change in community response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary “point” sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of between 6 dBA for ‘hard sites” and 7.5 dBA for ‘soft sites” per doubling of distance from the source, depending on a number of additional variables such as the topography of the area and environmental conditions (i.e., atmospheric conditions and noise barriers, vegetative or manufactured, etc.). Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dB (per doubling of distance) is normally assumed for soft sites. Widely distributed noise, such as a large industrial facility spread over many acres or a street with moving vehicles (a “line” source), would typically attenuate at a lower rate, approximately 3 to 4.5 dBA each time the distance doubles from the source, also depending on environmental conditions. Noise from large construction sites will exhibit characteristics of both “point” and “line” sources and attenuation will therefore generally range between 4.5 and 7.5 dBA each time the distance doubles (Caltrans, 1998).

Atmospheric effects such as wind and temperature gradients can also influence noise attenuation rates from both line and point sources of noise. Unlike ground attenuation, atmospheric effects are constantly changing and difficult to predict. Trees and vegetation, buildings, and barriers reduce the noise level that would otherwise occur at a given receptor distance. However, for trees or a vegetative strip to have a noticeable effect on noise levels, it must be dense and wide. For example, a stand of trees must be at least 100 feet wide and dense enough to completely obstruct a visual path to the roadway to attenuate traffic noise by 5 dB (Caltrans, 1998).

Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA Ldn with open windows and 65-70 dBA Ldn if the windows are closed.

Typical Noise Levels

Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way.

In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need windows that have special glass with Sound Transmission Class (STC) ratings greater than 30 STC.

Sleep and Speech Interference

The thresholds for speech interference indoors are about45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA Ldn. Typically, the highest steady traffic noise level during the daytime is about equal to the Ldn and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses.

Fundamentals of Groundborne Vibration

People's response to ground vibration has been correlated most effectively with the "vibration velocity" level. Like the noise level, the vibration velocity level is expressed on the decibel scale. Following common practice, the abbreviation "VdB" is used in this document to quantify vibration decibels. Background vibration levels in typical residential areas are usually 50 VdB or lower, well below the threshold of perception for most humans. Perceivable vibration levels inside residences are attributed to the operation of heating and air conditioning systems, door slams, and foot traffic.

Nearby construction activities (in particular, pile driving for taller buildings in certain soil conditions), train operations, and street traffic are some of the most common external sources of perceptible vibration inside residences. **Table 4.7-3** identifies some common sources of vibration, corresponding VdB levels at 50 feet, and associated human perception and potential for structural damage.

Table 4.7-3
Typical Levels of Groundborne Vibration

Human/Structural Response	Velocity Level (VdB)	Typical Events (at 50 feet)
Threshold, minor cosmetic damage	100	Blasting, pile driving, vibratory compaction equipment, heavy tracked vehicles (bulldozers, cranes, drill rigs)
Difficulty with tasks such as reading a video or computer screen	90	Commuter rail, upper range
Residential annoyance, frequent	80	Rapid transit, upper range
Residential annoyance, occasional	75	Commuter rail, typical bus or truck over bump or on rough roads
Residential annoyance, frequent	70	Rapid transit, typical
Approximate human threshold of perception to vibration	70	Buses, trucks and heavy street traffic
	60	Background vibration in residential settings in the absence of activity
Lower limit for equipment ultrasensitive to vibration	50	Background vibration in residential settings in the absence of activity

Existing Noise Environment

Existing Noise Sources

Transportation sources such as automobiles, trucks, and trains are the principal sources of noise in the Planning Area. The primary noise source is traffic on the I-880, I-980 and I-580 freeways, and on local arterial streets including Mandela Parkway, 14th Street, West Grand Avenue, 7th Street, Adeline Street, Peralta Street, Hollis Street, San Pablo Avenue, Market Street, 27th Street and Martin Luther King Jr. Way.

The elevated BART line is a major noise source affecting the southern part of the Planning Area.

The Union Pacific Railroad and BNSF Railroad and their associated railyards and Port of Oakland intermodal facilities that border West Oakland on the south and west are significant noise sources affecting those immediate areas.

Industrial and commercial equipment and operations also contribute to the ambient noise environment in local West Oakland industrial area vicinities. Other sources of noise include traffic helicopters in the morning reporting on freeway traffic and police helicopters at night.

Typical examples of transient noise sources include car horns, car alarms, loud vehicles or motorcycles, emergency sirens, loud music, mechanical equipment, trucks, and people talking or yelling. Many of these transient sources are common in the Planning Area. Although some of these transient sources may be annoying, they do not contribute substantially to the overall ambient noise level in any particular area.

There have been a number of efforts to mitigate traffic noise impacts in West Oakland, in particular noise from trucks associated with the Port of Oakland. Signs direct trucks to prescribed truck routes.

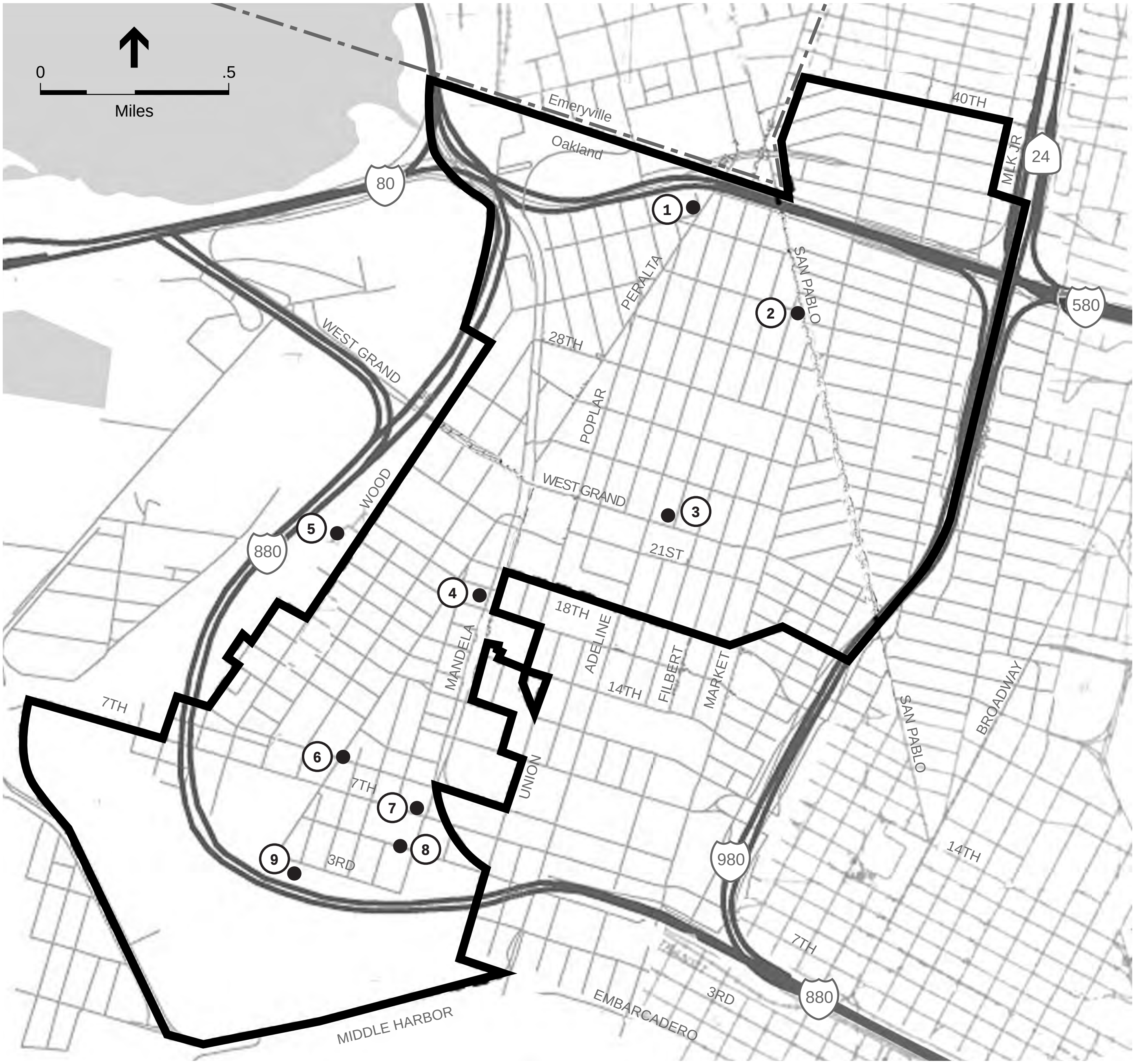
However, trucks still deviate from these prescribed routes and documented traffic counts indicate numerous trucks in mixed industrial and residential parts of West Oakland. Sound walls have been constructed along portions of I-880 adjacent to the Prescott and South Prescott neighborhoods.

Existing Noise Levels

There are numerous sources of noise measurements that have been taken in and around West Oakland over the past several years. Some of these sources are as much as ten years old, while other sources are quite recent. In general, the noise levels measured from each of these sources are compatible to each other, indicating that noise levels have not changes substantially within West Oakland in recent times. A summary of West Oakland noise measurements and results is presented below.

2003 West Oakland Redevelopment Plan EIR

Short-term noise measurements were collected at seven locations within West Oakland (see **Figure 4.7-1**) in 2003 for the West Oakland Redevelopment Plan EIR for purposes of characterizing the existing noise environment. The measured noise levels collected for the West Oakland Redevelopment Plan EIR are presented in **Table 4.7-4**.



Source: City of Oakland, West Oakland Redevelopment Plan EIR, 2003

Figure 4.7-1
West Oakland Redevelopment Plan, Noise Monitoring Locations

Table 4.7-4
West Oakland Noise Levels as Measured for the 2002 West Oakland Redevelopment Plan EIR

Noise Measurement Locations	Measured Noise Level[1] Daytime Leq (dBA)	CNEL (dBA)[2]	Distance to Centerline or Noise Source (feet)
1. I-580 Freeway (at Peralta Street and 34th Street)	66	71	400
2. San Pablo Avenue (at 32nd Street)	66	69	50
3. West Grand Avenue (at Chestnut Street)	68	71	50
4. Mandela Parkway (at 17th Street)	62	64	50
5. 16th Street (west of Wood Street)	64	66	not available
6. Peralta Street (at 8th Street)	66	69	50
7. 7th Street (at Mandela Parkway)	68	72	50
8. Mandela Parkway (at 5th Street at BART parking lot)	70[3]	74	50
9. I-880 Freeway (near 3rd and Lewis Streets)	54	59	400

Source: West Oakland Redevelopment Plan EIR, 2003.

[1] Noise measurements were taken using a Larson-Davis modified 700b meter.

[2] CNEL levels were estimated for Locations 1-4 and 6-8 based on 15-minute noise measurements taken on Tuesday, January 21, 2003, as well as measured 2-5 dBA differences between the daytime Leq and CNEL at other Oakland locations, including Locations 5 and 9. Location 5 is a long-term measurement collected at 16th Street near an elevated segment of I-880 on January 13, 1999. Location 9 is a long-term measurement collected on September 23-25, 1997 at the I-880 Freeway near 3rd and Lewis streets, and there is a sound wall along this section of I-880. It is estimated that CNELs are approximately 5 dBA higher than the daytime Leq where the freeways or port activities influence the noise environment, and 2-3 dBA higher in neighborhoods where there is less nighttime activity.

[3] Noise sources include buses and cars in the BART parking lot, BART trains, and equipment operation in other adjacent industrial uses.

2003 Jack London Square Redevelopment Project EIR[2]

Although not specifically within the West Oakland Planning Area, the Jack London Redevelopment Project EIR conducted noise monitoring of Amtrak and freight trains, as well as traffic circulation on the local roadway network that is nearby to the West Oakland 3rd Street Opportunity Area, and provides relevant noise information from those noise sources.

Amtrak trains operate at speeds of up to 60 miles per hour; however, the trains slow down as they approach the Oakland station. Noise from approaching trains could be as high as 90 dBA at 100 feet (without horn). Sounding of train horns could generate noise levels of up to 95 dBA at 100 feet.

2 Environmental Science Associates, 2003

Noise measurements conducted at the Jack London site indicate that noise from train activity form an important component of the ambient noise environment, in addition to traffic circulation on adjacent roadways and activities associated with the commercial businesses nearby. The noise monitoring conducted for that EIR indicates that noise levels on 3rd Street, west of Franklin, was 67.1 dBA Leq during the PM peak-hour.

2004 Noise Element of the City of Oakland General Plan

Noise measurements conducted for the Noise Element of the City of Oakland General Plan were conducted in all areas of Oakland and were intended to provide representative sampling of the important noise sources and receptors in the City. These measurements were taken in mid-2004, and were considered adequate to characterize noise levels in the vicinity of the measurement locations.

Table 4.7-5
West Oakland Noise Levels as Presented in the 2004 Noise Element

Location	Noise Level (CNEL)	Primary Noise Sources
San Pablo Avenue (at 32nd Street)	69 CNEL	Traffic on San Pablo Ave
West Grand Avenue (at Chestnut St)	71 CNEL	Traffic on West Grand Ave
Mandela Parkway (at 17th Street)	64 CNEL	Traffic on Mandela Parkway
16th Street (West of Wood Street)	66 CNEL	traffic on 16th Street
Peralta Street (at 8th Street)	69 CNEL	Traffic on Peralta Street
7th Street (at Mandela Parkway)	72 CNEL	Traffic on 7th Street , BART

Source; City of Oakland, 2004 Noise Element of the General Plan, technical studies by Illingworth and Rodkin

The 2004 Noise Element also found that industrial noise sources in West Oakland generate noise levels above their surroundings, but none sufficient to affect the overall noise environment.

2009 Housing Element EIR[3]

To verify of the applicability of the General Plan Noise Element noise data, new short-term noise measurements were conducted at selected locations near both the General Plan measurement sites and the Housing Sites selected in the Housing Element. These short-term noise measurements were taken in July of 2009. The 2009 noise measurement conducted in West Oakland was located on 7th Street, west of Mandela Parkway. Results indicate that the average sound level at this location is 68.0 dBA Leq, with a maximum instantaneous sound of 83.8 dBA Lmax representative of traffic along 7th Street and BART train pass-by. In general, the 2009 measurements conducted for the Housing Element found that 2009 noise levels were compatible with values measured for and presented in the 2003 Noise Element at similar locations and exposure circumstances.

---

[3] PBS&J, 2009

Other City of Oakland EIRs at or near BART Stations

According to the Gateway Community Development Project EIR (at the Fruitvale BART station), a typical BART train produces an 85 dBA noise level at a distance of 100 feet from the tracks.[4]

Noise levels are lower in the immediate vicinity of the station due to the slower speeds of approaching and departing trains. At the long-term noise monitoring locations, where noise from BART activity was a prominent component of the ambient noise environment, baseline noise levels were found to be 76 to 79 dBA DNL at distance of between 30 and 120 feet from the elevated tracks.

The Acadia Park Residential Project EIR (near the BART tracks at 98th Avenue and San Leandro Street in East Oakland), found the maximum measured DNL levels to be 82 dBA at approximately 100 feet from the elevated BART tracks.[5]

The MacArthur BART Transit Village EIR conducted an assessment of noise generated by BART train pass-by.[6] The study was prepared in accordance with the U.S. Department of Transportation Federal Transit Administration (FTA) recommended methodology obtained from chapter six of Transit Noise and Vibration Impact Assessment. The calculated train noise level at 50 feet from the BART track centerline was found to be approximately 69 dBA Ldn, including warning horns. Average hourly daytime noise levels from BART trains near the MacArthur BART site can reach 71 dBA Leq at 50 feet (with warning horns), and average hourly nighttime noise levels can reach 69 dBA Leq at 50 feet (with warning horns).

BART Studies

According to BART press release information, when BART train wheels pass over the rails, they cause microscopic ripples to form on the rails' surface. These ripples, called corrugation, change the pitch of the noise BART trains make. According to spokesman Mike Healy, BART has recently run a rail grinding machine at several locations along the BART route, and has found the following improvements:

- Noise levels along ballasted straight track dropped two dB (decibels), from 70 to 68 dB,
- Noise levels at elevated curves dropped 8 dBs, from 80 to 72 dBs

2010 Port of Oakland Health Impact Assessment[7]

A 2010 Health Impact Assessment (HIA) for the Port of Oakland used models to determine how the various sources of noise contribute to noise levels in the West Oakland community. Under existing conditions (year 2005), the study found high levels of noise in West Oakland, particularly near the freeways and rail/BART lines. Their results are generally consistent with noise projections found in the City's Noise Element, which only considered freeway and highways, yet reveals that these sources have the potential for substantially elevated noise along these major roadways (see **Figure 4.7-3**).

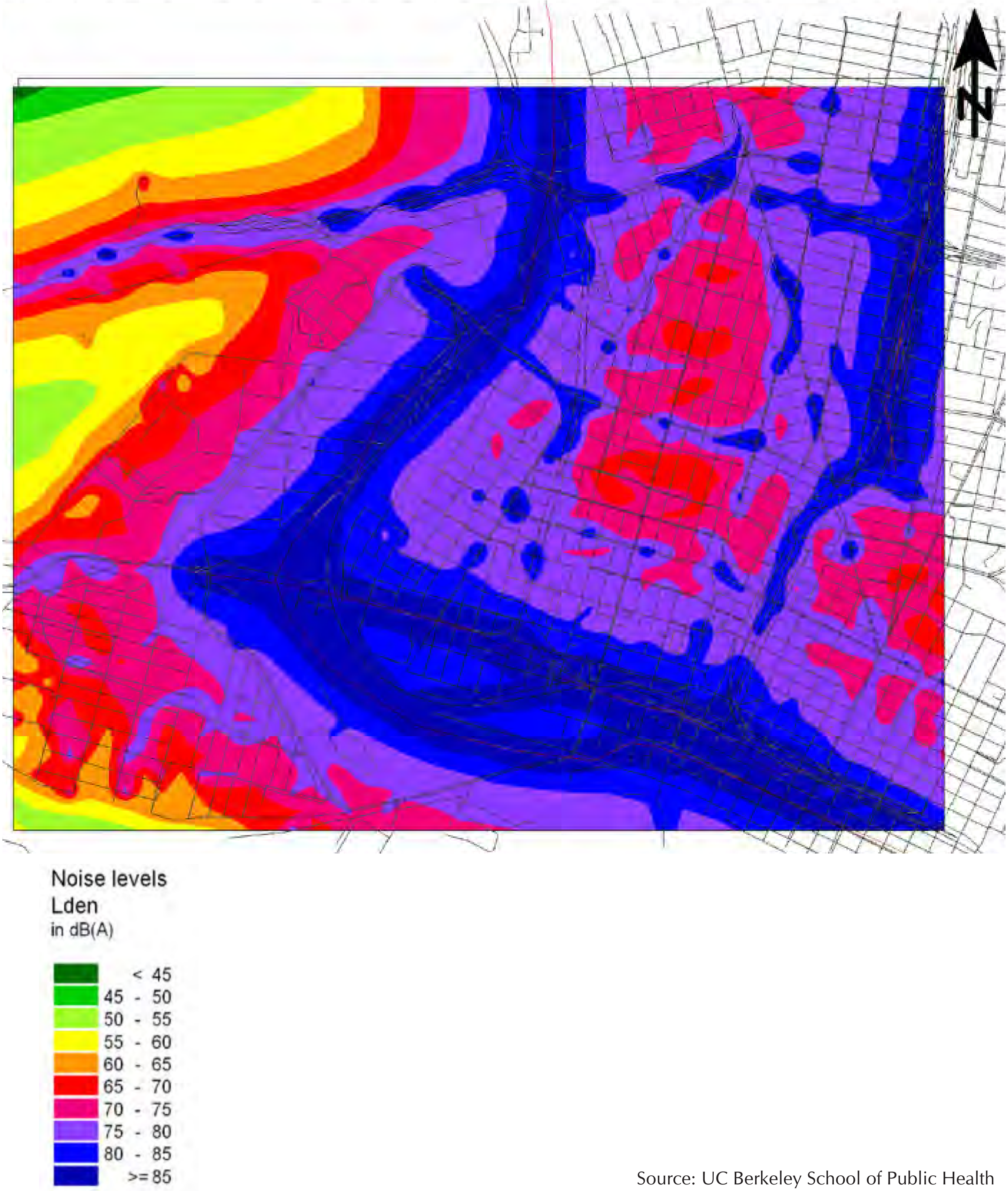
---

[4] City of Oakland, Gateway Community Development Project Draft EIR, ESA, August 2007, with technical studies by Illingworth & Rodkin, 2004

[5] City of Oakland, Acadia Park Residential Project Draft EIR, CirclePoint, July 2005, with technical studies by Charles Salter Associates, March 2005

[6] City of Oakland, MacArthur BART Transit Village Draft EIR, LSA Associates, 2007

[7] Port of Oakland, Health Impact Assessment, conducted by the UC Berkeley Health Impact Group, 2010



Source: UC Berkeley School of Public Health

Figure 4.7-2
Estimate of Future (2020) Noise Conditions

This study also estimated current and future health impacts associated with existing and projected future noise levels. The year 2000 block-level census data was overlain over the noise contours derived from the Noise Element. The numbers of population at the block-level that are exposed to various levels of noise are shown below in **Table 4.7-6**.

Table 4.7-6
West Oakland Population Exposure to Various Noise Levels

dB	Population Exposed	Percent of Total Population
60	247	1%
65	2,110	9%
70	6,169	25%
75	9,696	40%
80	4,707	19%
85+	1,520	6%
Total	24449	

Source: UC Berkeley Health Impact Group (UCBHIG), *Health Impact Assessment of the Port of Oakland*, University of California, Berkeley, CA, March 2010.

Conclusions

In general, the noise levels measured for the 2003 West Oakland Redevelopment Plan EIR are comparable to other, more recent noise measurements taken within West Oakland and at other BART station locations with similar locations and exposure circumstances. The conclusions that can be reached form all of these noise studies indicate that:

- Noise levels are generally highest along the elevated sections of the I-580 and I-880 freeways, with CNEL noise levels estimated at 68 to 71 dBA at 400 feet from both freeway centerlines; freeway noise levels are lower in areas protected by sound walls (less than 60 dBA at 400 feet from the I-880 freeway centerline).
- Noise levels reach in excess of 67 dBA (Leq) during the day in the southeastern portion of the West Oakland BART Station south parking lot. Noise levels at the northern edge of the BART station on 7th Street reach in excess of 68 dBA (Leq) during the day.
- Along major arterial streets such as Mandela Parkway, San Pablo Avenue, 7th Street, and West Grand Avenue daytime noise levels are mostly between 66 to 68 dBA (Leq) and CNEL levels were mostly between 68 and 72 dBA at 50 feet from roadway centerlines.
- In areas away from arterials, freeways, and BART (where there are no adjacent major noise sources), noise levels are generally less than 65 dBA CNEL.

When measured noise levels are compared to City noise and land use compatibility guidelines, they indicate that the existing noise environments near the elevated segments of I-580 and I-880 (unprotected by sound walls) and near the elevated BART tracks and West Oakland BART Station are generally incompatible with residential and other noise-sensitive uses. Noise levels along many major arterial streets generally meet the threshold for conditionally acceptable noise levels for residential uses.

Existing Sensitive Receptors

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, physiological and psychological stress, and hearing loss. Consequently, the noise standards for sensitive land uses (i.e., homes, schools, childcare centers, hospitals, and nursing homes) are more stringent than for those at less sensitive uses.

Health Impacts of Noise

Community noise is associated with a variety of health impacts, including increased annoyance and stress, increased risk of heart attacks, and effects on children's mental health, reading comprehension, and school performance. Noise can make it difficult to fall asleep and maintain sleep, leading to fatigue, impaired endocrine and immune system function, deterioration of performance, reduced attention and motivation, and lowered mental concentration and intellectual capacity. Sleep disorders have an impact on quality of life, and on professional and personal behavior, education, absenteeism, and risk of motor vehicle, work and domestic accidents. Noise exposure induces stress hormones, which are risk factors for cardiovascular disease. Noise affects reading, recall, recognition, and attention, and may affect the cognitive development of children. Moreover, noise disproportionately impacts the health of lower income and minority populations.[8]

A 2010 Health Impact Assessment (HIA) for the Port of Oakland conducted by the UC Berkeley Health Impact Group[9] estimated that the majority of West Oakland residents are exposed to ambient noise levels of 75 dB Ldn. Based on these exposures and established noise-health relationships, the report estimated that currently greater than one in three residents are likely to be highly annoyed by noise, which has considerable bearing on stress and its associated health impacts. The 2010 HIA also estimated that currently 8 myocardial infarction deaths (15 percent of all myocardial infarction deaths) per year may be associated with noise exposure. Approximately one third of residents may be at risk of sleep disturbance. In terms of cognitive impairment, the 2010 HIA estimated that West Oakland residents experience a 29 percent impairment in recall and reading, and a 4 percent impairment in recognition and attention over a typical 60 dB residential environment, which may have considerable consequences on the cognitive development of West Oakland children.

---

[8] UC Berkeley Health Impact Group (UCBHIG), *Health Impact Assessment of the Port of Oakland*, University of California, Berkeley, CA, March 2010.

[9] UC Berkeley Health Impact Group, March 2010.

Regulatory Setting

Federal

Federal Transit Administration Groundborne Vibration Impact Criteria

The Federal Transit Administration (FTA) has developed extensive methodologies and significance criteria for the evaluation of vibration impacts from surface transportation modes. Since the FTA has explained the rationale behind its methodologies and significance criteria, they have applicability to the general assessment of vibration from a variety of sources and not just to those over which the FTA has approval and review authority. The FTA criteria for judging the significance of vibration to sensitive receptors and structures are shown in **Table 4.7-5**, and are based on average vibration levels calculated over a one second period to relate to average, maximum vibration levels experienced by humans. Note that there are criteria for frequent events (more than 70 events per day), occasional events (between 30 and 70 events per day) and infrequent events (less than 30 events per day).

Table 4.7-7
FTA Groundborne Vibration Impact Criteria

Land Use Category	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category I: Buildings where vibration would interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category II: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category III: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

Notes: [1] More than 70 vibration events of the same source per day.
[2] Between 30 and 70 vibration events of the same source per day.
[3] Less than 30 vibration events of the same source per day.
[4] This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research should always require detailed evaluation to define the acceptable vibration levels. Ensuring low vibration levels in a building requires special design of HVAC systems and stiffened floors.

Federal Truck Noise Standards

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under Title 40 Code of Federal Regulations (CFR) Part 205, Subpart B. The federal truck pass-by noise standard is 80 dB at 15 meters from the centerline of the vehicle pathway. These standards are implemented through regulatory controls on truck manufacturers.

State

General Plan Guidelines

The California *General Plan Guidelines 2003* promotes the use of the L_{dn} or CNEL descriptors for evaluating land use and noise compatibility. Identification of a land use as "normally acceptable" implies that the highest noise level in that range is the maximum desirable for existing or conventional construction that does not incorporate any special acoustic treatment. The guidelines also provide an interpretation as to the suitability of various types of land uses with respect to the range of outdoor noise exposure. The objective of the guidelines is to provide the local community with a means of judging the noise environment it deems to be generally acceptable while recognizing the variability in perceptions of environmental noise that exist between communities and within a given community.

California Building Code

Title 25 of the California Code of Regulations codifies requirements for uniform minimum noise insulation performance standards for new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings. Specifically, Title 25 states that interior noise levels attributable to exterior sources shall not exceed 45 dBA CNEL in any habitable room of new multi-family dwellings. Dwellings are to be designed so that interior noise levels would meet this standard for at least ten years from the time of building permit application. Interior noise levels can be reduced using noise-insulating windows and by using sound-isolation materials when constructing walls and ceilings.

State Automobile Noise Standards

The State of California establishes noise limits for vehicles licensed to operate on public roads. State noise standards for on-road motor vehicles are contained in the Motor Vehicle Code. The pass-by standard for heavy trucks is consistent with the federal limit of 80 dB. The pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dB at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanctions on vehicle operators by state and local law enforcement officials.

City of Oakland

General Plan

Land Use and Transportation Element

The following City of Oakland General Plan Land Use and Transportation Element policies are among those relevant to the noise impacts of the Specific Plan.

> *Policy W1.3: Reducing land use conflicts.* Land uses and impacts generated from Port or neighborhood activities should be buffered, protecting adjacent residential areas from the impacts of seaport, airport, or other industrial uses. Appropriate siting of industrial activities, buffering (e.g., landscaping, fencing, transitional uses, etc.), truck traffic management efforts, and other mitigations should be used to minimize the impact of incompatible uses.

> *Policy N3.9: Orienting Residential Development.* Residential developments should be encouraged to face the street and to orient their units to desirable sunlight and views , while avoiding unreasonably blocking sunlight and views for neighboring buildings, respecting the

privacy needs of residents of the development and surrounding properties, providing for sufficient conveniently located onsite open space, and avoiding undue noise exposure.

Policy N5.2: Buffering Residential Areas. Residential areas should be buffered and reinforced from conflicting uses through the establishment of performance-based regulations, the removal of nonconforming uses, and other tools.

Policy N11.4: Alleviating Public Nuisances. The City should strive to alleviate public nuisances and unsafe and illegal activities. Code Enforcement efforts should be given as high a priority as facilitating the development process. Public nuisance regulations should be designed to allow community members to use City codes to facilitate nuisance abatement in their neighborhood.

Noise Element

The Noise Element analyzes and quantifies, to the extent practicable, current and projected noise levels from major noise sources throughout the city. Noise levels for these sources are shown on noise contour maps, which establish the locational relationship between existing and projected land uses and noise sources. The Noise Element also includes land use policies to reduce noise impacts, especially to sensitive receptors, and to implement measures that address existing and foreseeable noise issues. The Noise Element formulates two goals, and associated policies and actions:

Goal 1: To protect Oakland's quality of life and the physical and mental well-being of residents and others in the City by reducing the community's exposure to noise.

Goal 2: To safeguard Oakland's economic welfare by mitigating noise incompatibilities among commercial, industrial and residential land uses.

Policy 1: Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.

Action 1.1:Use the noise-land use compatibility matrix in conjunction with the noise contour maps (especially for roadway traffic) to evaluate the acceptability of residential and other proposed land uses and also the need for any mitigation or abatement measures to achieve the desired degree of acceptability.

Action 1.2: Continue using the City's zoning regulations and permit processes to limit the hours of operation of noise-producing activities which create conflicts with residential uses and to attach noise-abatement requirements to such activities.

Policy 2: Protect the noise environment by controlling the generation of noise by both stationary and mobile noise sources.

Action 2.2: As resources permit, increase enforcement of noise-related complaints and also of vehicle speed limits and of operational noise from cars, trucks and motorcycles.

Policy 3: Reduce the community's exposure to noise by minimizing the noise levels that are *received* by Oakland residents and others in the City. (This policy addresses the *reception* of noise whereas Policy 2 addresses the *generation* of noise.)[10]

---

[10] City of Oakland, Noise Element City of Oakland General Plan, June 2005, pp. 23-25.

Action 3.1: Continue to use the building-permit application process to enforce the California Noise Insulation Standards regulating the maximum allowable interior noise level in new multi-unit buildings.

The Noise Element identifies noise and land use compatibility standards for various land uses, as shown in **Table 4.7-8**.[11] These land use compatibility standards were derived from the California Department of Health Services receiver-based noise-compatibility guidelines matrix. The matrix illustrates the degree of acceptability of exposing specified land uses to a range of ambient noise levels. The matrix is used by the City when considering a proposed project in order to gauge its compatibility with noise levels at the project site.

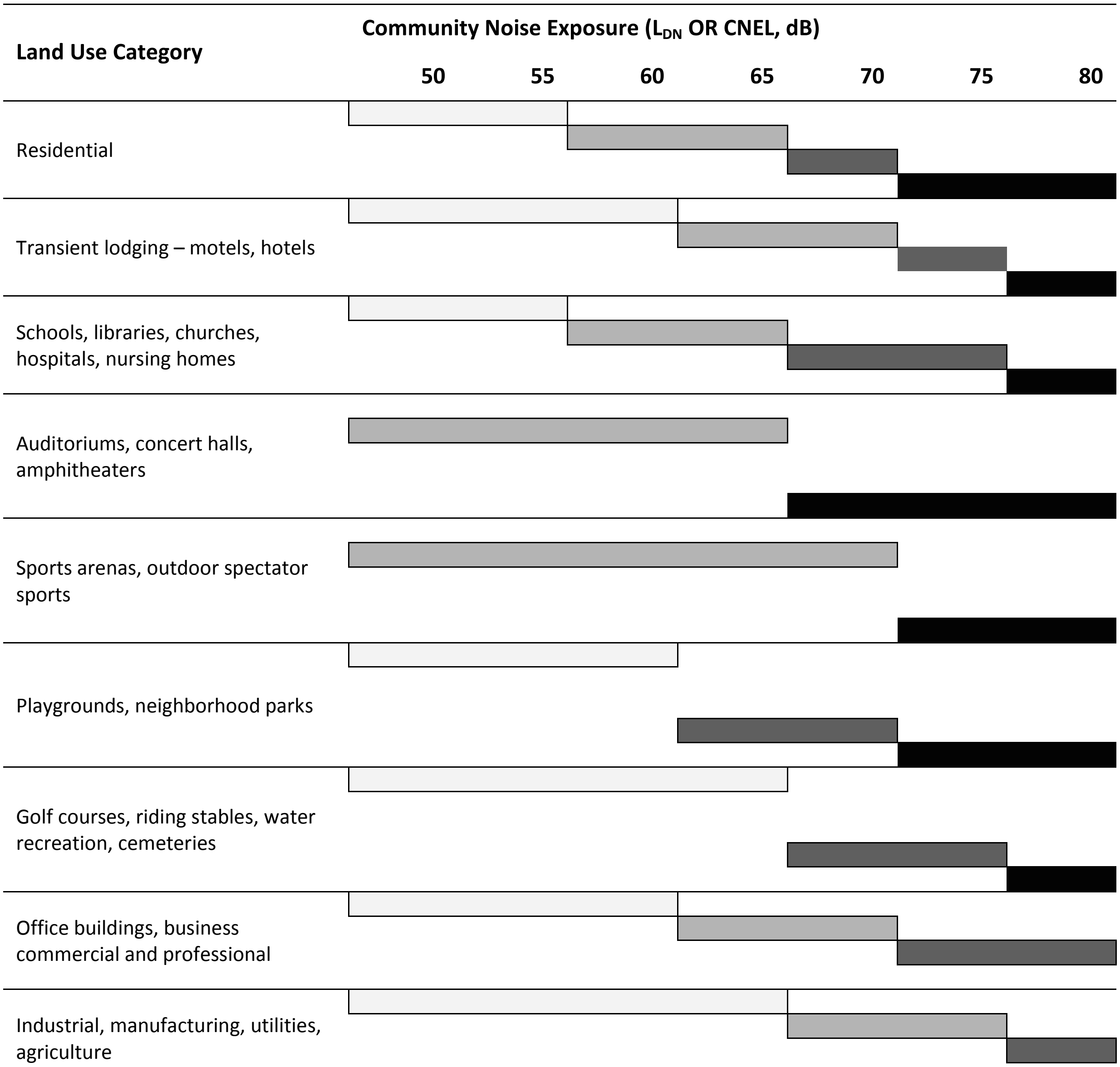
The following are the maximum interior noise levels generally considered acceptable for various common land uses:

- 45 dB: residential, hotels, motels, transient lodging, institutional (churches, hospitals, classrooms, libraries), movie theaters
- 50 dB: professional offices, research and development, auditoria, meeting halls
- 55 dB: retail, banks, restaurants, sports clubs
- 65 dB: manufacturing, warehousing

Taking residential uses as an example, the matrix indicates that an ambient noise level of 60 dB is the threshold of a “normally acceptable” environment for residences. This assumes a maximum interior noise level of 45 dB, plus an average noise mitigation of 15 dB for use of conventional contemporary construction methods and materials. “Conditionally acceptable” areas with higher ambient noise levels would require detailed noise analyses, sound-rated construction methods or materials, mechanical ventilation systems (so that windows may be kept closed), or noise shielding features such as sound walls, street setbacks, and thoughtful site planning and building orientation.

[11] City of Oakland, Noise Element City of Oakland General Plan, June 2005, p. 21.

Table 4.7-8
Land Use Compatibility Guidelines



NA	NORMALLY ACCEPTABLE: Development may occur without an analysis of potential noise impacts *to the proposed development* (though it might still be necessary to analyze noise impacts that the project might have *on its surroundings*).
CA	CONDITIONALLY ACCEPTABLE: Development should be undertaken only after an analysis of noise-reduction requirements is conducted and if necessary noise-mitigating features are included.
NU	NORMALLY UNACCEPTABLE: Development should generally be discouraged; it may be undertaken only if a detailed analysis of the noise-reduction requirements is conducted, and if highly effective noise mitigation features are included.
CU	CLEARLY UNACCEPTABLE: Development should not be undertaken.

Land Use and Transportation Element

Policy I/C4.2: Minimizing nuisances. The potential for new or existing industrial or commercial uses, including seaport and airport activities, to create nuisance impacts on surrounding residential land uses should be minimized through appropriate siting and efficient implementation and enforcement of environmental and development controls (p. 42).

Policy T1.5: Locating truck services. Truck services should be concentrated in areas adjacent to freeways and near the seaport and airport, while ensuring the attractiveness of the environment for visitors, local business, and nearby neighborhoods (p. 51).

Policy T1.6: Designating truck routes. An adequate system of roads connecting port terminals, warehouses, freeways and regional arterials, and other important truck destinations should be designated. This system should rely upon arterial streets away from residential neighborhoods (p. 51). **Figure 4.7-3** illustrates designated truck routes and truck prohibitions in West Oakland.

Policy T1.8: Re-routing and enforcing truck routes. The City should make efforts to re-route traffic away from neighborhoods, wherever possible, and enforce truck route controls (p. 51).

Policy T6.1: Posting maximum speeds. Collector streets shall be posted at the lowest possible speed (usually a maximum speed of 25 miles per hour), except where a lower speed is dictated by safety and allowable by law (p. 60).

Policy D12.3: Locating entertainment activities. Large scale entertainment uses should be encouraged to concentrate in the Jack London Waterfront and within the Broadway corridor area. However, existing large scale facilities in the Downtown should be utilized to the fullest extent possible (p. 73).

Policy D12.4: Locating smaller scale entertainment activities. Small scale entertainment uses, such as small clubs, should be allowed to locate in the Jack London Waterfront area and to be dispersed throughout downtown districts, provided that the City works with area residents and businesses to manage the impacts of such uses (p. 73).

Policy W1.3: Reducing land use conflicts. Land uses and impacts generated from Port or neighborhood activities should be buffered, protecting adjacent residential areas from the impacts of seaport, airport, or other industrial uses. Appropriate siting of industrial activities, buffering (e.g., landscaping, fencing, transitional uses, etc.), truck traffic management efforts, and other mitigations should be used to minimize the impact of incompatible uses (p. 78).

Policy W2.2: Buffering of heavy industrial uses. Appropriate buffering measures for heavy industrial uses and transportation uses on adjacent residential neighborhoods should be developed and implemented (p. 78).

Policy W7.1: Developing lands in the vicinity of the seaport/airport. Outside the seaport and airport, land should be developed with a variety of uses that benefit from the close proximity to the seaport and airport and that enhance the unique characteristics of the seaport and airport. These lands should be developed with uses which can buffer adjacent neighborhoods from impacts related to such activities (p. 88).

Policy N1.4: Locating large-scale commercial activities. Commercial uses which serve long term retail needs or regional consumers and which primarily offer high volume goods should be located in areas visible or amenable to high volumes of traffic. Traffic generated by large scale commercial developments should be directed to arterial streets and freeways and not adversely affect nearby residential streets (p. 104).

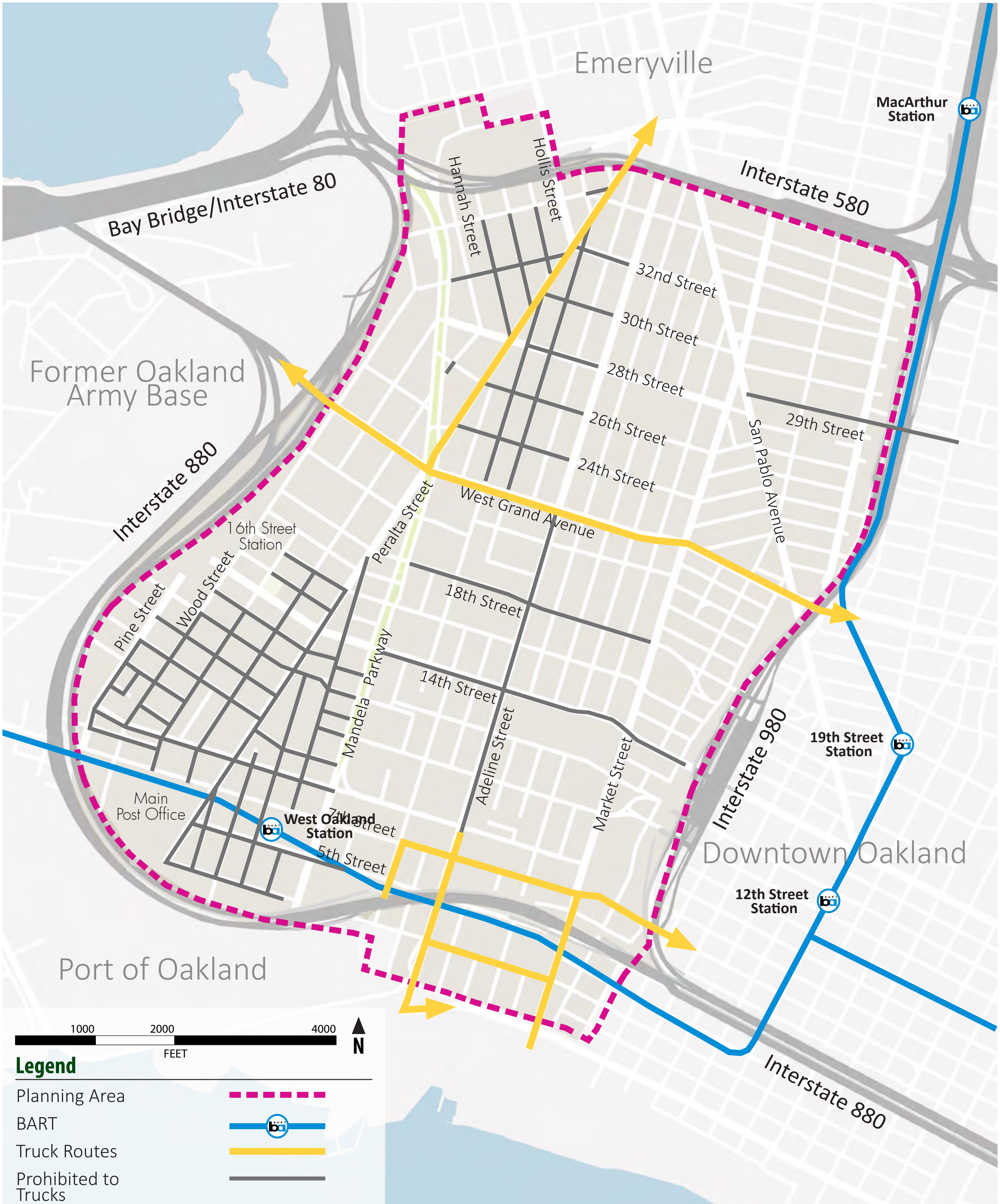


Figure 4.7-3
Truck Routes and Prohibitions

Source: Kittleson & Associates

Policy N1.6: Reviewing potential nuisance activities. The City should closely review any proposed new commercial activities that have the potential to create public nuisance or crime problems, and should monitor those that are existing. These may include isolated commercial or industrial establishments located within residential areas, alcoholic beverage sales activities (excluding restaurants), adult entertainment, or other entertainment activities (p. 104).

Policy N3.9: Orienting residential development. Residential developments should be encouraged to face the street and to orient their units to desirable sunlight and views, while avoiding unreasonably blocking sunlight and views for neighboring buildings, respecting the privacy needs of residents of the development and surrounding properties, providing for sufficient conveniently located on-site open space, and avoiding undue noise exposure (p. 107).

Policy N5.2: Buffering residential areas. Residential areas should be buffered and reinforced from conflicting uses through the establishment of performance-based regulations, the removal of non-conforming uses, and other tools (p. 109).

Policy N11.4: Alleviating Public Nuisances. The City should strive to alleviate public nuisances and unsafe and illegal activities. Code Enforcement efforts should be given as high a priority as facilitating the development process. Public nuisance regulations should be designed to allow community members to use City codes to facilitate nuisance abatement in their neighborhood (p. 114).

Open Space, Conservation and Recreation Element

Policy OS-3.6: Open Space Buffers along Freeways. Maintain existing open space buffers along Oakland's freeways to absorb noise and emissions (p. 2-29).

Action OS-3.6.1: Landscape Screening Along Freeways. Require retention of existing landscape screening as a condition of development approval for any property adjacent to Highway 13, Highway 580 (east of Grand), or Highway 24 (above Broadway). Encourage Caltrans to include landscape screening for any sound wall project in these areas (p. 2-30).

Action Os-3.6.3: Freeway Buffers. Encourage Caltrans to plant and maintain additional landscaping along Oakland's freeways, particularly those stretches of Interstate 880 adjacent to residential neighborhoods and other sensitive receptors (p. 2- 30).

Oakland Noise Ordinance

The City of Oakland regulates noise levels through enforcement of its Noise Ordinance (Chapters 8.18 and 17.120 of the Oakland Municipal Code). Section 8.18.020 states the following:

> "The persistent maintenance or emission of any noise or sound produced by human, animal or mechanical means, between the hours of 9:00 p.m. and 7:00 a.m., which shall disturb the peace or comfort or be injurious to the health of any person, shall constitute a nuisance. Failure to comply with the following provisions shall constitute a nuisance.
>
> a. All construction equipment powered by internal combustion engines shall be properly muffled and maintained.
>
> b. Unnecessary idling of internal combustion engines is prohibited.
>
> c. All stationery noise-generating construction equipment such as tree grinders and air compressors are to be located as far as is practical from existing residences.

d. Quiet construction equipment, particularly air compressors, is to be selected whenever possible.

e. Use of pile drivers and jack hammers shall be prohibited on Sundays and holidays, except for emergencies and as approved in advance by the Building Official."

Section 17.120.050 of the Oakland Planning Code regulates operational noise from stationary sources. **Table 4.7-9**presents the maximum allowable receiving noise standards applicable to long-term exposure for residential and civic land uses, for noise from stationary noise sources (not transportation noise). During construction, noise from a stationary source would be limited by the standards in **Table 4.7-10.**

Table 4.7-9
City of Oakland Operational Noise Standards
at Receiving Property Line (dBA)[1]

Receiving Land Use	**Cumulative No. of Minutes in a 1-Hr Period[2]**	**Maximum Allowable Noise Level (dBA)** Daytime 7 a.m.-10 p.m.	Nighttime 10 p.m.-7 a.m.
Residential and Civic[3]	20 (L_{33})	60	45
	10 ($L_{16.7}$)	65	50
	5 ($L_{8.3}$)	70	55
	1 ($L_{1.7}$)	75	60
	0 (L_{max})	80	65
		Anytime	
Commercial	20 (L_{33})	65	
	10 ($L_{16.7}$)	70	
	5 ($L_{8.3}$)	75	
	1 ($L_{1.7}$)	80	
	0 (L_{max})	85	
Manufacturing, Mining, and Quarrying	20 (L_{33})	70	
	10 ($L_{16.7}$)	75	
	5 ($L_{8.3}$)	80	
	1 ($L_{1.7}$)	85	
	0 (L_{max})	90	

Source: OMC Section 17.120.050.

Notes:

1 These standards are reduced 5 dBA for simple tone noise, noise consisting primarily of speech or music, or recurring impact noise. If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

2 Lx represents the noise level that is exceeded X percent of a given period. L max is the maximum instantaneous noise level.

3 Legal residences, schools and childcare facilities, health care or nursing home, public open space, or similarly sensitive land uses.

Table 4.7-10
City of Oakland Construction Noise Standards at Receiving Property Line (dBA[1]

	Maximum Allowable Noise Level (dBA)	
Receiving Land Use	**Weekdays 7 a.m.-7 p.m.**	**Weekends 9 a.m.-8 p.m.**
	Less than 10 days	
Residential	80	65
Commercial, Industrial	85	70
	More than 10 Days	
Residential	65	55
Commercial, Industrial	70	60

Source: OMC Section 17.120.050.

Notes:

1 If the ambient noise level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

Section 17.120.060 of the Oakland Planning Code regulates vibration, "All activities, except those located within the IG or the M-40 zone, or in the IG or M-30 zone more than four hundred (400) feet from any residential zone boundary, shall be so operated as not to create a vibration which is perceptible without instruments by the average person at or beyond any lot line of the lot containing such activities. Ground vibration caused by motor vehicles, trains, and temporary construction or demolition work is exempted from this standard."

Standard Conditions of Approval

The City's Standard Conditions of Approval relevant to noise impacts are listed below. These Standard Conditions of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area when it is approved by the City and would avoid or reduce significant noise impacts. The Standard Conditions and Approval are incorporated and required as part of development in accordance with the Specific Plan, so they are not listed as mitigation measures. Where there are impacts associated with development in accordance with the Specific Plan that would result in significant environmental impacts despite implementation of the Standard Conditions of Approval, additional mitigation measures are recommended.

SCA 28: Days/Hours of Construction Operation (*Ongoing throughout demolition, grading, and/or construction*). The project applicant shall require construction contractors to limit standard construction activities as follows:

a. Construction activities are limited to between 7:00 AM and 7:00 PM Monday through Friday, except that pile driving and/or other extreme noise generating activities greater than 90 dBA shall be limited to between 8:00 a.m. and 4:00 p.m. Monday through Friday.

b. Any construction activity proposed to occur outside of the standard hours of 7:00 am to 7:00 pm Monday through Friday for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is shortened and such construction activities shall only be allowed with the prior written authorization of the Building Services Division.

c. Construction activity shall not occur on Saturdays, with the following possible exceptions:

    i. Prior to the building being enclosed, requests for Saturday construction for special activities (such as concrete pouring which may require more continuous amounts of time), shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is shortened. Such construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division.

    ii. After the building is enclosed, requests for Saturday construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division, and only then within the interior of the building with the doors and windows closed.

d. No extreme noise generating activities (greater than 90 dBA) shall be allowed on Saturdays, with no exceptions.

e. No construction activity shall take place on Sundays or Federal holidays.

f. Construction activities include but are not limited to: truck idling, moving equipment (including trucks, elevators, etc.) or materials, deliveries, and construction meetings held on-site in a non-enclosed area.

g. Applicant shall use temporary power poles instead of generators where feasible.

SCA 29: Noise Control (*Ongoing throughout demolition, grading, and/or construction*). To reduce noise impacts due to construction, the project applicant shall require construction contractors to implement a site-specific noise reduction program, subject to the Planning and Zoning Division and the Building Services Division review and approval, which includes the following measures:

a. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible).

b. Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.

c. Stationary noise sources shall be located as far from adjacent receptors as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or other measures to the extent feasible.

d. If feasible, the noisiest phases of construction shall be limited to less than 10 days at a time.

SCA 30: Noise Complaint Procedures (*Ongoing throughout demolition, grading, and/or construction*). Prior to the issuance of each building permit, along with the submission of construction documents, the project applicant shall submit to the Building Services Division a list of measures to respond to and track complaints pertaining to construction noise. These measures shall include:

a. A procedure and phone numbers for notifying the Building Services Division staff and Oakland Police Department; (during regular construction hours and off-hours);

b. A sign posted on-site pertaining with permitted construction days and hours and complaint procedures and who to notify in the event of a problem. The sign shall also include a listing of both the City and construction contractor's telephone numbers (during regular construction hours and off-hours);

c. The designation of an on-site construction complaint and enforcement manager for the project;

d. Notification of neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of extreme noise generating activities about the estimated duration of the activity; and

e. A preconstruction meeting shall be held with the job inspectors and the general contractor/on-site project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.

SCA 31: Interior Noise (*Prior to issuance of a building permit* and Certificate of Occupancy). If necessary to comply with the interior noise requirements of the City of Oakland's General Plan Noise Element and achieve an acceptable interior noise level, noise reduction in the form of sound-rated assemblies (i.e., windows, exterior doors, and walls), and/or other appropriate features/measures, shall be incorporated into project building design, based upon recommendations of a qualified acoustical engineer and submitted to the Building Services Division for review and approval prior to issuance of building permit. Final recommendations for sound-rated assemblies, and/or other appropriate features/measures, will depend on the specific building designs and layout of buildings on the site and shall be determined during the design phases. Written confirmation by the acoustical consultant, HVAC or HERS specialist, shall be submitted for City review and approval, prior to Certificate of Occupancy (or equivalent) that:

a. Quality control was exercised during construction to ensure all air-gaps and penetrations of the building shell are controlled and sealed; and

b. Demonstrates compliance with interior noise standards based upon performance testing of a sample unit.

c. Inclusion of a Statement of Disclosure Notice in the CC&R's on the lease or title to all new tenants or owners of the units acknowledging the noise generating activity and the single event noise occurrences. Potential features/measures to reduce interior noise could include, but are not limited to, the following:

    i. Installation of an alternative form of ventilation in all units identified in the acoustical analysis as not being able to meet the interior noise requirements due to adjacency to a noise generating activity, filtration of ambient make-up air in each unit and analysis of ventilation noise if ventilation is included in the recommendations by the acoustical analysis.

    ii. Prohibition of Z-duct construction.

SCA 32: Operational Noise – General *(Ongoing).* Noise levels from the activity, property, or any mechanical equipment on site shall comply with the performance standards of Section 17.120 of the Oakland Planning Code and Section 8.18 of the Oakland Municipal Code. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the Planning and Zoning Division and Building Services.

SCA 38: Vibration. A qualified acoustical consultant shall be retained by the project applicant during the design phase of the project to comment on structural design as it relates to reducing groundborne vibration at the project site. If required in order to reduce groundborne vibration to acceptable levels, the project applicant shall incorporate special building methods to reduce groundborne vibration being transmitted into project structures. The City shall review and approve the recommendations of the acoustical consultant and the plans implementing such recommendations. Applicant shall implement the approved plans. Potential methods include the following:

a. Isolation of foundation and footings using resilient elements such as rubber bearing pads or springs, such as a “spring isolation” system that consists of resilient spring supports that can support the podium or residential foundations. The specific system shall be selected so that it can properly support the structural loads, and provide adequate filtering of ground-borne vibration to the residences above.

b. Trenching, which involves excavating soil between the railway/freeway and the project so that the vibration path is interrupted, thereby reducing the vibration levels before they enter the project’s structures. Since the reduction in vibration level is based on a ratio between trench depth and vibration wavelength, additional measurements shall be conducted to determine the vibration wavelengths affecting the project. Based on the resulting measurement findings, an adequate trench depth and, if required, suitable fill shall be identified (such as foamed styrene packing pellets (i.e., Styrofoam) or low-density polyethylene).

SCA 39: Pile Driving and Other Extreme Noise Generators (*Ongoing throughout demolition, grading, and/or construction*). To further reduce potential pier drilling, pile driving and/or other extreme noise generating construction impacts greater than 90dBA, a set of site-specific noise attenuation measures shall be completed under the supervision of a qualified acoustical consultant. Prior to commencing construction, a plan for such measures shall be submitted for review and approval by the Planning and Zoning Division and the Building Services Division to ensure that maximum feasible noise attenuation will be achieved. This plan shall be based on the final design of the project. A third-party peer review, paid for by the project applicant, may be required to assist the City in evaluating the feasibility and effectiveness of the noise reduction plan submitted by the project applicant. A special inspection deposit is required to ensure compliance with the noise reduction plan. The amount of the deposit shall be determined by the Building Official, and the deposit shall be submitted by the project applicant concurrent with submittal of the noise reduction plan. The noise reduction plan shall include, but not be limited to, an evaluation of the following measures. These attenuation measures shall include as many of the following control strategies as feasible:

a. Erect temporary plywood noise barriers around the construction site, particularly along on sites adjacent to residential buildings;

b. Implement “quiet” pile driving technology (such as pre-drilling of piles, the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions;

c. Utilize noise control blankets on the building structure as the building is erected to reduce noise emission from the site;

d. Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example; and

e. Monitor the effectiveness of noise attenuation measures by taking noise measurements.

SCA 57: Vibrations Adjacent to Historic Structures (*Prior to issuance of a demolition, grading or building permit*). The project applicant shall retain a structural engineer or other appropriate professional to determine threshold levels of vibration and cracking that could damage nearby historic structures, and design means and methods of construction that shall be utilized to not exceed the thresholds. The engineer’s analysis shall be submitted to the City of Oakland for review and approval. The applicant shall implement the approved plan.

Impacts, Standard Conditions of Approval and Mitigation Measures

Significance Criteria

According to the City's Thresholds of Significance, the Specific Plan would have a significant impact related to noise if it would:

1. Generate noise in violation of the City of Oakland Noise Ordinance (Oakland Planning Code section 17.120.050) regarding construction noise, except if an acoustical analysis is performed that identifies recommend measures to reduce potential impacts: During the hours of 7 p.m. to 7 a.m. on weekdays and 8 p.m. to 9 a.m. on weekends and federal holidays, noise levels received by any land use from construction or demolition shall not exceed the applicable nighttime operational noise level standard (see Table 4.7-7);
2. Generate noise in violation of the City of Oakland nuisance standards (Oakland Municipal Code section 8.18.020) regarding persistent construction-related noise;
3. Generate noise in violation of the City of Oakland Noise Ordinance (Oakland Planning Code section 17.120.050) regarding operational noise: (See Table 4.7-9);
4. Generate noise resulting in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or, if under a cumulative scenario where the cumulative increase results in a 5 dBA permanent increase in ambient noise levels in the project vicinity without the project (i.e., the cumulative condition including the project compared to the existing conditions) and a 3 dBA permanent increase is attributable to the project (i.e., the cumulative condition including the project compared to the cumulative baseline condition without the project) [NOTE: Outside of a laboratory, a 3 dBA change is considered a just-perceivable difference. Therefore, 3 dBA is used to determine if the project-related noise increases are cumulative considerable.];
5. Expose persons to interior L_{dn} or CNEL greater than 45 dBA for multi-family dwellings, hotels, motels, dormitories and long-term care facilities (and may be extended by local legislative action to include single-family dwellings) per California Noise Insulation Standards (CCR Part 2, Title 24);
6. Expose the project to community noise in conflict with the land use compatibility guidelines of the Oakland General Plan after incorporation of all applicable Standard Conditions of Approval[12]: (See Table 4.7-8);

---

[12] The evaluation of land use compatibility should consider the following factors: type of noise source; the sensitivity of the noise receptor; the noise reduction likely to be provided by structures; the degree to which the noise source may interfere with speech, sleep or other activities characteristic of the land use; seasonal variations in noise source levels; existing outdoor ambient levels; general societal attitudes towards the noise source; prior history of the noise source; and tonal characteristics of the noise source. To the extent that any of these factors can be evaluated, the measured or computed noise exposure values may be adjusted in order to more accurately assess local sentiments towards acceptable noise exposure.

7. Expose persons to or generate noise levels in excess of applicable standards established by a regulatory agency (e.g., occupational noise standards of the Occupational Safety and Health Administration [OSHA]);
8. During either project construction or project operation expose persons to or generate groundborne vibration that exceeds the criteria established by the Federal Transit Administration (FTA): (See Table 4.7-7);
9. Be located within an airport land use plan and would expose people residing or working in the project area to excessive noise levels; or
10. Be located within the vicinity of a private airstrip, and would expose people residing or working in the project area to excessive noise levels.

Construction Noise

Impact Noise-1: Construction activities related to the Specific Plan, including pile drilling and other extreme noise generating construction activities would temporarily increase noise levels in the vicinity of individual project sites. With implementation of City of Oakland Standard Conditions of Approval, construction noise would not violate the City of Oakland Noise Ordinance or the City of Oakland nuisance standards regarding persistent construction-related noise, and construction noise impacts would be less than significant. (**LTS with SCA)**

Construction activities related to the Specific Plan would temporarily increase noise levels in the vicinity of individual project sites for the duration of construction. There would be variations in construction noise levels on a day-to-day basis depending on the actual activities occurring at the site. Noise levels and potential annoyance also depends upon the number and condition of the equipment, the type of operation, its duration and the time of day, the distance between noise source and receptor, and the presence or absence of barriers between the noise source and receptor. Significant noise impacts do not normally result when standard construction noise control measures are enforced and when the duration of the noise generating construction period (when community noise levels would be elevated) is limited to one construction season, typically one year or less. **Table 4.7-11** presents the typical range of hourly average noise levels generated by different phases of construction measured at a distance of 50 feet.

Table 4.7-11
Typical Noise Level Range at 50 Feet from Construction Sites
(dBA L_{eq})

	Domestic Housing		**Office Building, Hotel, Hospital, School, Public Works**		**Industrial, Parking Garage, Religious Amusement & Recreations, Store, Service Station**		**Public Works Roads & Highways, Sewers, and Trenches**	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

Source: U.S. EPA, Legal Compilation on Noise, Vol. 1, 1973, p. 2-104.
I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

Table 4.7-12 presents typical construction equipment maximum noise levels. The dominant construction equipment noise source is usually a diesel engine without sufficient muffling. Stationary equipment generates noise from one general area and includes items such as pumps, generators, compressors, etc. These types of equipment operate at a constant noise level under normal operation and are classified as non-impact equipment. Stationary equipment such as pile drivers, jackhammers, and pavement breakers, etc., produces variable and sporadic noise levels and often produces impact-type noises. Impact equipment is equipment that generates impulsive noise, where impulsive noise is defined as noise of short duration (generally less than one second), high intensity, abrupt onset, rapid decay, and often rapidly changing spectral composition. For impact equipment, the noise is produced by the impact of a mass on a surface, typically repeating over time. Mobile equipment such as dozers, scrapers, graders, etc., may operate with power applied in a cyclic fashion in which a period of full power is followed by a period of reduced power. Other equipment such as compressors, although generally considered to be stationary when operating, can be readily relocated to another location for the next operation.

Table 4.7-12
Typical Construction Equipment Maximum Noise Levels, Lmax

Type of Equipment	Range of Maximum Sound Levels (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 Feet)
Rock Drills	83-99	96
Jackhammers	75-85	82
Pneumatic Tools	78-88	85
Pumps	68-80	77
Scrapers	83-91	87
Haul Trucks	83-94	88
Electric Saws	66-72	70
Portable Generators	71-87	80
Rollers	75-82	80
Dozers	85-90	88
Tractors	77-82	80
Front-End Loaders	86-90	88
Hydraulic Backhoe	81-90	86
Hydraulic Excavators	81-90	86
Graders	79-89	85
Air Compressors	76-89	85
Trucks	81-87	85

Source: Bolt, Beranek& Newman, Noise Control for Buildings and Manufacturing Plants, 1987.

Noise from construction activity would diminish rapidly with distance from the construction site, generally at a rate of 6 dBA per doubling of distance. For example, a noise level of 86 dBA measured at 50 feet from the noise source would decrease to 80 dBA at 100 feet, and 74 dBA at 200 feet. Depending on the relative distance to noise-sensitive land uses, construction activities associated with construction activity could generate noise levels above the city's Noise Ordinance standard of 65 dBA for residential land uses and Section 8.18 Excessive Noise, Nuisances, of the Municipal Code.

Standard Conditions of Approval

Implementation of SCA 28, *Days/Hours of Construction Operation*, SCA 29, *Noise Control,* SCA 30, *Noise Complaint Procedures,* and SCA 39, *Pile Driving and Other Extreme Noise Generators,* would reduce construction noise levels. SCA 28 provides reasonable regulation of the hours of construction. SCA 29 requires preparation of a Noise Reduction Program to address the design, use, location and shielding of construction vehicles and equipment. SCA 30 requires measures to respond to and track complaints. SCA 39 requires further measures to reduce noise from construction activities, if any, that generates "extreme noise" exceeding 90 dBA. These SCAs are comprehensive in their content and for practical purposes represent all feasible measures available to mitigate construction noise. With implementation of the City of Oakland's Standard Conditions of Approval, construction noise impacts would be less than significant.

Mitigation Measures

None needed

Operational Noise

Impact Noise-2: Ongoing operational noise generated by stationary sources could generate noise in violation of the City of Oakland Noise Ordinance regarding operational noise. However, with required implementation of the City's Standard Conditions of Approval, operational noise impacts would be less than significant. (**LTS with SCA**)

Ongoing operational noise generated by stationary sources, such as every-day industrial and commercial operations, and roof-top mechanical ventilation equipment, could generate noise in violation of the City of Oakland Noise Ordinance (Oakland Planning Code Section 17.120.050) regarding operational noise. Stationary noise sources may include roof-top mechanical equipment typically includes heating, ventilating, air conditioning, and refrigeration equipment. Noise from large roof-mounted equipment typically generates noise levels from 60 to 75 dBA at 50 feet. Assuming the noise levels attenuate at 6 dBA per doubling of distance between the noise source and receptors (the rule of thumb for stationary noise sources), maximum sound levels of about 69 dBA could be experienced at a distance of up to 100 feet.

Standard Conditions of Approval

The City's Standard Condition of Approval SCA 32, *Operational Noise – General (Ongoing),* requires that noise levels from any activity, property, or any mechanical equipment on site comply with the performance standards of Section 17.120 of the Oakland Planning Code and Section 8.18 of the Oakland Municipal Code. Under these Code provisions, the maximum allowable receiving noise recognizes varying degrees of sensitivity associated with different land uses. In other words, the SCA and Section 17.120 set forth different (more stringent) maximum allowable noise levels for residential and civic uses (including parks/open space areas) than for commercial or industrial uses deemed to have lower noise sensitivity. If noise levels exceed the proscribed standards, the SCA stipulates that the activity causing the noise shall be abated until appropriate noise reduction measures have been installed, and compliance verified by the Planning and Zoning Division and Building Services. With required implementation of the City's Standard Condition of Approval SCA 32, operational noise impacts would be less than significant.

Mitigation Measures

None required.

Traffic Noise

Impact Noise-3: New development pursuant to the Specific Plan would not generate traffic noise resulting in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the Plan.(**LTS**)

Increasing volumes of traffic that will result from new growth and development within the West Oakland Specific Plan's Opportunity Areas will result in higher traffic noise along streets within West Oakland. This increased traffic noise will mix with noise from all other existing ambient noise sources (i.e., trains, BART operation, existing freeway noise, etc.).

Based on the City of Oakland's CEQA Thresholds, a project would generate a significant impact if it resulted in a 5 dBA permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Trips associated with development under the Specific Plan would be distributed over the local street network and would affect roadside noise levels. Noise level increases related to increased traffic volumes can be estimated using the logarithmic relationship between changes in the number of noise sources (in this case vehicle sources) and increases in ambient noise volumes.[13]

Traffic Peak hour (evening) intersection turning data from the traffic study were utilized to estimate resulting traffic-generated noise increases on roadway links most affected by Project-related traffic. Noise levels at other times would be lower. The segments analyzed and the results of the traffic (and corresponding noise) increases are shown in **Table 4.7-13** below.

[13] Utilizing the following formula: dBA increase = 10 * log (base 10) of (future volume / existing volume)

Table 4.7-13: Projected Traffic / Noise Increase, Selected Roadway Segments (PM Peak Hour)

Segment	Existing Traffic Volumes (vehicles)	Existing plus Project Traffic Volumes (vehicles)	Estimated Increase in Noise Volumes (dBA)
Mandela Parkway, north of Grand	1,070	2065	2.86
Mandela Parkway, north of 7th Street	623	755	0.83
Adeline, north of Grand	623	648	0.17
Adeline, north of 14th Street	563	690	0.88
Adeline, north of 7th Street	329	461	1.47
Market, north of Grand	414	774	2.72
Market, north of 14th Street	675	1,172	2.40
Market, north of 7th Street	488	962	2.95
Grand, west of Mandela	1,202	2,372	2.95
Grand, west of Adeline	1,242	2,585	3.18
Grand, west of Market	1,308	2,651	3.07
Grand, west of San Pablo	1,255	2,023	2.07
14th, west of Adeline	542	551	0.07
14th Street, east of Adeline	670	672	0.01
7th Street, west of Mandela	645	1,602	3.95
7th Street, west of Adeline	994	1,956	2.94
7th Street, west of Market	1,593	2,598	2.12
7th Street, east of Market	1,177	1,576	1.27
San Pablo Avenue, south of 40th	2,090	2,514	0.80
San Pablo, north of Grand	1,136	1,289	0.55

Source: Kittleson Associates and Lamphier-Gregory

As can be seen in the table above, the greatest increases in traffic and associated traffic noise would occur along the Mandela Parkway, Grand Avenue and 7th Street corridors, where the greatest amount of new development is projected to occur under the Specific Plan. Traffic-related noise volume increases are estimated between 0.01 dBA and 3.95 dBA over existing conditions.

Traffic noise increases over existing levels due to the Project are estimated to remain below Oakland's threshold of 5 dBA and would therefore be less than significant.

Mitigation Measures

None required

Construction Vibration

Impact Noise-4: Construction activities could generate excessive ground-borne vibration during the construction period. With required implementation of the City's Standard Conditions of Approval, construction vibration impacts would be less than significant. (**LTS**)

Ground-borne vibration levels rarely affect human health. Instead, most people consider ground-borne vibration to be an annoyance that may affect concentration or disturb sleep. As shown in Table 4.7-5 in Regulatory Setting above, the human response to vibration levels of 85 VdB are typically acceptable if vibration occurs infrequently. Construction activities can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Ground vibrations from construction activities (other than pile driving) rarely reach the levels that can damage structures, but they can be perceptible in buildings very close to a construction site.

Ground-borne vibration related to human annoyance is generally related to velocity levels expressed in vibration decibels (VdB). Depending on the construction equipment used, ground-borne vibrations can be perceptible within 100 feet of a source. The vibration velocity levels for the typical construction equipment are shown below in **Table 4.7-14**. Construction vibration has the potential to cause structural damage.

The damage thresholds, in terms of peak particle velocity (PPV) indicate that for buildings not extremely sensitive to vibration, a damage threshold of between 0.2 in/sec to 0.5 in/sec would apply depending on the type of building. As shown in Table 4.7-12, vibration levels from construction, including pile driving, would diminish quickly with distance and would be below 0.2 in/sec at a distance of 100 feet. Therefore, most buildings in the project vicinity would be exposed to vibration below the damage criteria. Structural damage from pile driving typically does not occur in buildings more than 50 feet from the location of the activity. However, these vibrations could result in cosmetic or structural damage within 50 feet of a project site and construction area.

Table 4.7-14: Vibration Source Levels for Construction Equipment

	At 25 feet		At 100 feet	
Construction Equipment	**Approximate VdB**	**Peak Particle Velocity (in/sec)**	**Approximate VdB**	**Peak Particle Velocity (in/sec)**
Large Bulldozer	87	0.089	69	0.011
Truck	86	0.076	68	0.010
Jackhammer	79	0.035	61	0.004
Small Bulldozer	58	0.003	40	<0.001
Caisson Drilling	87	0.089	69	0.011
Pile Driver (impact, upper range)	112	1.518	94	0.190
Pile Driver (sonic, upper range)	105	0.734	87	0.092

Source:*TransitNoiseandVibrationImpactAssessment,*Chapter12NoiseandVibrationDuringConstruction, May2006; PBS&J,2008.

Standard Conditions of Approval

All projects in accordance with the Specific Plan would be required to incorporate the City's Standard Conditions of Approval SCA 38, *Vibration*, and SCA 57, *Vibrations Adjacent to Historic Structures*, to address the potential effects of ground-borne vibration. SCA 38 requires a qualified acoustical consultant be retained by the project applicant during the design phase of the project to comment on structural design as it relates to reducing ground-borne vibration at the project site. SCA 57 requires that a project applicant retain a structural engineer or other appropriate professional to determine threshold levels of vibration and cracking that could affect portions of adjacent structures and design means and methods of construction that shall be utilized to avoid potential impacts.

Implementation of the City of Oakland's Standard Conditions of Approval related to construction period noise would also address construction period vibration. Implementation of SCA 28, *Days/Hours of Construction Operation*, SCA 29, *Noise Control,* SCA 30, *Noise Complaint Procedures,* and SCA 39, *Pile Driving and Other Extreme Noise Generators,* would reduce construction noise levels. SCA 28 provides reasonable regulation of the hours of construction. SCA 29 requires preparation of a Noise Reduction Program for the Project that addresses the design, use, location and shielding of construction vehicles and equipment. SCA 30 requires measures to respond to and track complaints. SCA 39 requires further measures to reduce noise from construction activities, if any, generating extreme noise exceeding 90 dBA.

With implementation of the City of Oakland's Standard Conditions of Approval construction vibration impacts would be less than significant.

Mitigation Measures

None required.

Operational Vibration

Impact Noise-5: Development in accordance with the Specific Plan may generate operational ground-borne vibration at levels that would be perceptible beyond the property boundary, which would violate City of Oakland standards for operational vibration. However, compliance with City of

Oakland Standard Conditions of Approval and Section 17.120.060 of the Oakland Planning Code would ensure that operational vibration impacts remain less than significant. (**LTS with SCA**)

SCA 32 Section 17.120.060 of the Oakland Planning Code regulates vibration, requiring that activities shall be so operated as not to create a vibration which is perceptible without instruments by the average person at or beyond any lot line of the lot containing such activities. Ground vibration caused by motor vehicles and temporary construction or demolition work is exempted from this standard. Operational groundborne vibration would be generated by additional vehicular travel on local roadways. The FTA has stated that rubber-tired vehicles do not typically generate perceptible groundborne vibration. Compliance with Section 17.120.060 of the Oakland Planning Code would ensure that operational vibration impacts remain less than significant.

Mitigation Measures

None required.

Cumulative Noise Impacts

Cumulative Impact Noise-6: Traffic-related noise under anticipated future conditions including development under the Specific Plan would increase as area traffic volumes increase. Where future traffic-related noise levels are anticipated to substantially increase (by 5 dBA or more), the contribution from development under the Specific Plan would not be cumulatively considerable (less than 3 dBA to increases over other cumulative traffic noise levels). **(LTS)**

The geographic context for cumulative impacts from localized construction and stationary source noise includes areas immediately surrounding the development sites. For cumulative vehicular noise impacts, the cumulative context is based on the cumulative context for the traffic analysis, which includes past, present and reasonably foreseeable future developments in Oakland and all surrounding cities' General Plans, as well as growth outside of Alameda County as forecast by the Association of Bay Area Governments (ABAG).

Increasing volumes of traffic from both development under the Specific Plan and other cumulative area growth will result in higher traffic noise along streets within West Oakland. Based on the City of Oakland's CEQA Thresholds, a project contribution to cumulative increases would be considered to generate a significant impact if the total future noise level would increase by 5 dBA or more and the project contributes 3dBA or more over levels assumed with other cumulative growth.

Noise level increases related to increases in traffic volume were estimated using the same method as for project-specific traffic-related nose impacts with cumulative Pm Peak Hour traffic volume inputs from the traffic study. Noise levels at other times would be lower. The segments analyzed and the results of the cumulative traffic (and corresponding noise) increases are shown in **Table 4.7-15** below.

Table 4.7-15: Projected Traffic /Noise Increase, Selected Roadway Segments (PM Peak Hour)

	Traffic Volumes (vehicles)				Increase in Noise Volumes (dBA)	
			Cumulative			
Segment	Existing	Project	without Project	plus Project	Cumulative over Existing	Project Portion of Cumulative
Mandela Parkway, north of 7th Street	623	132	1224	1356	3.38	0.44
Adeline, north of Grand	623	25	859	884	1.52	0.12
Adeline, north of 14th Street	563	127	1044	1171	3.18	0.50
Adeline, north of 7th Street	329	132	648	780	3.75	0.81
Market, north of Grand	414	360	352	712	2.35	3.06
Market, north of 14th Street	675	497	787	1284	2.79	2.13
Market, north of 7th Street	488	474	458	932	*	3.09
Grand, west of Mandela	1,202	1170	2303	3473	4.61	1.78
Grand, west of Adeline	1,242	1343	2577	3920	4.99	1.82
Grand, west of Market	1,308	1343	2170	3513	4.29	2.09
Grand, west of San Pablo	1,255	768	2300	3068	3.88	1.25
14th, west of Adeline	542	9	649	658	0.84	0.06
14th Street, east of Adeline	670	2	758	760	0.55	0.01
7th Street, west of Mandela	645	957	703	1660	4.11	3.73
7th Street, west of Adeline	994	962	2506	3468	5.43	1.41
7th Street, west of Market	1,593	1005	2601	3606	3.55	1.42
7th Street, east of Market	1,177	399	2423	2822	3.80	0.66
San Pablo Avenue, south of 40th	2,090	424	3265	3689	2.47	0.53
San Pablo, north of Grand	1,136	153	2078	2231	2.93	0.31

Source: Kittleson Associates and Lamphier-Gregory

Note that, per City of Oakland CEQA thresholds, the project portion of cumulative increases was calculated as the increase from cumulative without project levels to cumulative plus project levels.

* Due to changing traffic patterns, the cumulative traffic volumes are predicted to be slightly lower at this intersection in the future, without development under the Specific Plan. All traffic and traffic-related noise increases at this intersection are attributable to development under the Specific Plan.

As can be seen in the table above, the greatest increases in traffic and associated traffic noise would occur along the Mandela Parkway, Grand Avenue and 7th Street corridors, where the greatest amount of new development is projected to occur under the Specific Plan. Traffic-related noise volume increases are estimated between 0.55 dBA and 5.43 dBA over existing conditions. Only one street section would increase by 5dBA or more under cumulative conditions with Plan development, 7th Street, west of Adeline, so that is the only location with a significant cumulative impact. However, development under the Specific Plan would only contribute an estimated 1.41 dBA to that cumulative increase, which, being less than 3dBA, and so the Plan's contribution is not considered cumulatively considerable according to Oakland's thresholds.

Mitigation Measures

None required

Airport Noise

Noise-8: The Planning Area is located more than two miles outside of the Oakland International Airport 65 dBA Ldn/CNEL noise contour, which the Federal Aviation Administration regards as a significance threshold for noise-sensitive land uses. Therefore, the impacts of the Specific Plan related to airport noise would be less than significant.

Mitigation Measures

None required pursuant to CEQA

Noise Exposure / Land Use Compatibility

Noise-9: The occupants of new residential and other noise-sensitive development facilitated by the Specific Plan could be exposed to community noise in conflict with the Land Use Compatibility Guidelines of the Oakland General Plan, and to interior noise exceeding California Noise Insulation Standards. However, with required implementation of the City's Standard Conditions of Approval, land use compatibility and noise exposure impacts would be reduced to level that are considered acceptable for interior residential areas. (**LTS**)

CEQA requires the analysis of potential adverse effects of a project on the environment. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. However, this EIR nevertheless analyzes the following potential effects of the environment on the project (i.e., ambient noise conditions that could potentially affect new development pursuant to the Specific Plan). This analysis has been prepared to provide information to the public and decision-makers that is relevant to the Project, but is not considered a CEQA threshold impact. City Standard Conditions of Approval and/or project-specific non-CEQA recommendations are also identified to address this issue.

New residential and other noise-sensitive land uses within the Planning Area would be exposed to various existing and anticipated future noise sources, including freeway traffic, BART and railroad operations, and traffic on local arterial roadways. Where projected future exterior noise levels exceed 60 dBA CNEL, interior noise levels may exceed the California Building Code standard of 45 dBA CNEL. Future noise levels throughout much of the West Oakland would exceed 60 dBA CNEL.

7th Street Opportunity Area

Primary noise sources in the 7th Street Opportunity Area include traffic noise on I-880, activity along the BART tracks and at the West Oakland BART station, and vehicular traffic on local roadways. Noise from retail, commercial and business establishments is secondary.

The West Oakland BART Station TOD is proposed to be located immediately adjacent to the West Oakland BART Station and the I-880 freeway. As a transit village, the primary concern for noise exposure is proximity of new residents to noise from the BART train line and station. Associated noise from living next to the BART station potentially includes noise associated with train braking, acceleration, and wheel-track noise, as well as noise associated with train announcements and horns, and associated vehicular traffic for commuter drop-offs, parking and public transport stops (buses, shuttles, etc.). On a typical weekday, as many as 285 northbound and 285 southbound BART trains arrive and depart from this station to other stations in the BART system. A typical BART train produces an instantaneous 85 dBA noise level at a distance of 100 feet from the tracks (Illingworth & Rodkin, 2004). Noise levels are generally lower in the immediate vicinity of the West Oakland Station due to the slower speeds of approaching and departing trains, but still exceed the 65 dBA Land Use Compatibility standard. The site is also adjacent to the I-880 freeway, which has main travel lanes on an elevated structure that is immediately adjacent to the proposed TOD.

Noise levels from BART and the I-880 freeway exceed 70 dBA Leq/CNEL in the vicinity of the BART station and elevated sections of the BART tracks, which would be considered “normally unacceptable” for residential uses, and “conditionally acceptable” for business commercial uses at the TOD site. New residences within the TOD would be subject to Title 24 of the California Code of Regulations, which requires an interior noise standard of 45 dBA DNL in any habitable room, and requires an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard. To meet the interior standard of DNL 45 dBA, a noise level reduction of up nearly 35 dBA would be required from the exterior façades of the buildings facing towards the I-880 freeway and BART tracks and station.

The West Oakland BART TOD would also place noise-sensitive publicly-accessible outdoor uses in a noise environment characterized as “clearly unacceptable” for such uses, as established by the Noise Element of the Oakland General Plan. Oakland’s consideration of General Plan land use compatibility criteria (noise impacts of the environment on the proposed project occupants) considers outdoor noise exposure. While the TOD project (which is not fully designed) is expected to provide a mix of private and common usable open space areas for future residents and tenants, it would also likely include usable open space areas that would be accessible to the public. Given the high ambient noise level at the West Oakland BART TOD site, noise levels at grade-level open space areas could be expected to exceed the maximum allowable receiving noise standards for open space areas, established as up to 70 dBA. To meet this level, outdoor noise level reductions would be required. Noise reduction by as much as 15 dBA could occur with the proposed site design, if buildings are effectively designed to act as noise barriers and break the line of sight (primarily from I-880 and the BART tracks) between the noise sources and publicly-accessible open space.

West Oakland Specific Plan Recommendations and Other Strategies

The West Oakland Specific Plan includes strategies specifically seeking to reduce noise from BART trains. These strategies include:

- Developing an agreement with BART for regularly scheduled rail grinding in the West Oakland area. The agreement should include a monitoring and reporting mechanism similar to actions taken by BART in other parts of its service area.
- Implement a noise baffle structure and/or a completely enclosed noise mitigation “tube” on the BART overhead structure along 7th Street, as shown in the Seventh Street Concept and Urban Design Plan (2004).

Both the rail grinding and the noise baffle/enclosed tube strategies would substantially reduce BART-related noise in the area. However, there is no currently identified source of funding for these strategies and they are not part of any currently proposed implementation project. Accounting for these noise attenuation strategies in the CEQA document would not be consistent with CEQA Guidelines, even though their implementation could potentially result in significant reductions in BART-related noise exposure at both the West Oakland BART TOD, as well as within the surrounding community.

Additionally, BART has recently awarded a contract to Bombardier Transit Corporation to design and construct new train cars. BART and Bombardier engineers have begun a multi-year collaboration to work out the details of the future vehicle design, but BART indicates that it will be requiring the car builder to meet the highest standards in the United States regarding train car noise and noise absorption.

Standard Conditions of Approval

New residential development throughout the West Oakland Opportunity Areas would be required to comply with the city's SCA 31: Interior Noise and SCA 38: Vibration. These standard conditions of approval require the inclusion of design measures to reduce interior noise to acceptable levels within the buildings. With required implementation of the City's Standard Conditions of Approval, land use compatibility impacts would be **less than significant**. Furthermore, implementation of the City's General Plan policies related to land use compatibility, and codes that specify noise standards for commercial and industrial operations would ensure that the noise environment within the Specific Plan's proposed new residential areas, both indoors and outdoors, does not increase in a manner that worsens existing land use compatibility and exposes noise-sensitive land uses to "unacceptable" noise levels.

Mitigation Measures

None required.

4.8

Population, Housing and Employment

This chapter describes the existing conditions and regulatory setting related to population, housing and employment within West Oakland, and related impacts of the Specific Plan.

Physical Setting

Population[1]

Population

Planning area demographics for 1990, 2000 and 2011 are presented in **Table 4.8-1**. As shown, the population of West Oakland grew from approximately 23,400 to 25,250 persons between 1990 and 2011, an increase of 15 percent, faster than the city overall at 11 percent. However, the reported number of households actually declined, so the population growth in West Oakland is a result of larger households.

Race and Ethnicity

West Oakland has been a primarily African American community since the mid-20th Century. However, while African Americans are still the largest racial group, in recent decades the area has become more diverse, and in 2011 African Americans now represent only a slight majority of area residents. While West Oakland still has a higher concentration of African Americans and a lower proportion of Whites and Hispanics than the rest of Oakland, there have been significant shifts in the ethnic composition of area residents over time. The White and Hispanic populations have both increased, both in absolute number and as a portion of West Oakland residents, while the number of African Americans decreased by 25 percent between 1990 (when 18,000 African Americans represented 77 percent of the population) and 2011 (when just over 13,000 African Americans represented 53 percent of the population).

[1] Analysis of current West Oakland population and demographics is primarily based on data from Claritas, a commercial provider of census-based data. The U.S. Census and Census-based sources are widely believed to undercount population and income in communities with a large proportion of minorities and recent immigrants, such as Oakland. Social Compact (a nonprofit, nonpartisan organization formed by business leaders from across the country committed to promoting successful investment in lower-income communities) estimated that the 2000 Census undercounted 3,800 Oakland households and 13,000 residents. The State of California asserted that the 2010 U.S. Census underestimated the state's population by 1.5 million persons. Nevertheless, for this evaluation we use Census-based date sources because they are the most robust sources available.

Households

The reported number of households in West Oakland actually decreased from 8,683 to 8,431 between 1990 and 2011. Part of that decrease is due to the demolition and reconstruction of the Chestnut/Linden and Westwood Gardens public housing projects. The average household size in West Oakland increased between 1990 and 2011 from 2.67 to 2.90 persons per household and the percentage of households with children rose sharply from 40 percent to 60 percent.

Table 4.8-1
West Oakland Demographics (1990, 2000 and 2011)

	1990		2000		2011	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Population	23,397		24,477		25,246	
Race and Ethnicity						
White Alone	1,733	7%	2,682	11%	3,898	15%
Black or African American Alone	18,085	77%	15,796	65%	13,307	53%
American Indian/Alaska Native	113	0%	180	1%	243	1%
Asian or Pacific Islander	2,141	9%	2,353	10%	2,903	11%
Other Race	1,325	6%	3,466	14%	4,894	19%
Hispanic	2,040	9%	3,814	16%	5,595	22%
Non-Hispanic	21,357	91%	20,663	84%	19,651	78%
Households	8,683		8,403		8,431	
Households With Children	3,461	40%	3,499	42%	5,068	60%
Average Household Size	2.67		2.81		2.90	
Median Household Income	$12,306		$22,424		$27,055	
Housing Units	9,866		9,651		10,444	
Owner-occupied Housing Units	1,745	20%	1,751	21%	1,838	22%
Renter-occupied Housing Units	6,938	80%	6,652	79%	6,593	78%

Source: Conley Consulting Group 2011, U.S. Census 1990 and 2000, Claritas 2011.

Note: Note that Claritas boundaries may not be exactly the same as the Census boundaries. To facilitate a direct comparison, for 2000 and 2011 Asian Alone and Native Hawaiian and Other Pacific Islander Alone were combined into the 1990 category Asian or Pacific Islander and all other categories not listed were combined into the 1990 category Other Race.

Income

Two-thirds of West Oakland households have incomes below the federally defined poverty level. West Oakland incomes are significantly lower than the city as a whole. In 2011 median and average household incomes for West Oakland represented less than 60 percent of Oakland's median and average incomes. Given the larger household sizes in West Oakland, per capita incomes are also much lower than average for Oakland.

West Oakland median incomes rose sharply between 1990 and 2000, from $12,306 in 1990 to $22,424 in 2000 (an 82 percent increase) and again to $27,055 by 2011 (just over a 20 percent increase). West Oakland incomes rose faster than for the city as a whole between 1990 and 2000 (50 percent), and about the same as the city between 2000 and 2011 (18 percent).

Housing Tenure

Most households in West Oakland live in rental housing units. At 22 percent, West Oakland's homeownership rate is only about half that of the city (42 percent). The homeownership rate has remained relatively constant from 1990 to 2011 for both West Oakland and the city as a whole. However, West Oakland home ownership rates rose slightly between 1990 and 2011, while citywide ownership rates fell slightly during that time.

There is proportionately more renter versus owner households in West Oakland (which is 78 percent renters) than in the city (which is 58 percent renters). The high proportion of renter households is partially attributed to the high concentration of public and multifamily low income rental units in West Oakland.

Educational Attainment

West Oakland residents have lower average educational attainment compared to the city as a whole. The majority (84 percent) of persons 25 years and older have a high school diploma or less education, in contrast to 66 percent of Oakland residents. Similarly, only 6 percent of West Oakland residents have a college or advanced degree, and the rate is 35 percent for the city as a whole. West Oakland residents are at an educational disadvantage in the highly educated Bay Area.

Table 4.8-2
Educational Attainment

	West Oakland		**Oakland**	
	Number	**Percent**	**Number**	**Percent**
Total Estimated Population 25+	15,475			
No High School Diploma	4,628	30%		23%
High School Diploma	8,301	54%	20,100	43%
Bachelor's Degree	1,675	11%		20%
Advanced Degree	871	6%		15%

Source: Conley Consulting Group 2011; Claritas 2011.

Housing

Housing Inventory

In 2011 West Oakland included an estimated 10,444 housing units, of which only 8,431 are occupied, leaving a high 19.3 percent vacancy rate (see Table 4.8-1). The housing inventory for Oakland is 162,761 housing units with a 6.3 percent vacancy rate, significantly less than West Oakland. Multifamily units represent 65 percent of total West Oakland housing units, 34 percent are single family units (both detached and attached), with the remainder being mobile homes, trailers, etc. West Oakland has a relatively low population density of 9,503 persons per square mile.

Foreclosures

Oakland has been substantially affected by the national foreclosure trend following the 2008 collapse of the housing market. There was a 106 percent increase in foreclosure activity in West Oakland in 2008, compared to a 46 percent increase citywide, with a slight moderation in 2009.

Recent Sales Prices and Rental Rates

Housing Prices

Home sales activity in the West Oakland peaked in 2009, but in part due to foreclosure activity, in 2009 median sales prices declined 30 percent from the 2008 peak. However, unlike other areas of Oakland, the West Oakland housing submarket began to show signs of recovery in 2010, with a significant reduction in the number of home sales in 2009 and a 46 percent increase in the median sales price. In contrast to long term trends, in 2010 median home sales prices were higher in West Oakland than for the city as a whole.

Rental Rates

Rental rates in West Oakland have fluctuated slightly since 2008 but have largely remained constant over the years. Unlike the rapid apartment rent increases projected for the city and the larger region, West Oakland rents remain flat. West Oakland currently serves as a discounted price rental market for former San Franciscans looking for bargains or lower density housing. Although West Oakland has attracted some new market segments to the area (artists, entrepreneurs), these residents are price sensitive and would likely relocate to other lower cost areas rather than remain in West Oakland if rents rise rapidly.

Employment

Labor Force Participation

West Oakland residents are far less likely to be employed or to participate in the labor force than Oakland residents as a whole.[2] In 2011, only 42 percent of West Oakland residents over age 16 were employed in civilian workplaces, compared with 55 percent of similar Oakland residents. Roughly 42 percent of West Oakland adults are reported as not participating in the labor force, compared to only 36 percent of City residents. It is likely that the reported 27 percent unemployment rate underestimates the number of potential job seekers in West Oakland.

---

2 Labor force participation for adults over 16 is defined as persons who are either employed or actively seeking employment. Discouraged workers whose unemployment has persisted past their eligibility for unemployment benefits are classified as not participating in the labor force, regardless of their desire to work, so this measure likely underestimates the number of people who would work if employment opportunities were available.

Employment by Industry

According to the US Census, compared to the City as a whole, there is a higher concentration of jobs in West Oakland in industrial and construction-related industries. Meanwhile, citywide there are more jobs in the educational services and professional, scientific, and technical services sectors.

There is also a difference in earnings between West Oakland jobs and citywide jobs.[3] A bigger proportion of Oakland's workers earned higher wages (defined as having earnings over $3,333 per month) than workers employed in West Oakland. However, the city as whole also had a higher proportion of low earning workers (earning $1,250 or less per month) compared to West Oakland.

Jobs Held by Residents

Few West Oakland residents were employed in the higher paying industrial and construction-related sectors that represent a majority of jobs in West Oakland. Instead, most employed West Oakland residents worked in the service sector, with a small proportion employed in more advanced professional, scientific, and technical service jobs. A bigger proportion of West Oakland residents are employed in the retail sector, while more citywide residents were employed in white-collar professional, scientific, and technical service jobs. This is also reflected in residents' earnings. A larger percentage of West Oakland residents' earnings were at the bottom of the scale ($1,250 or less per month).

Ethnic Composition of West Oakland Job Holders

Whereas the majority of West Oakland residents are African American, in 2009 most people employed in West Oakland were White (61 percent), followed by Latinos, African Americans and Asians. There is a larger difference between the ethnic composition of job holders and residents in West Oakland than for Oakland as a whole.

Jobs/Housing Balance

Regional planning goals seek to improve the local balance between housing and jobs. The overall relationship between jobs and employed residents identifies the extent to which a community enjoys a balanced mix of land uses offering job opportunities to local residents and housing opportunities for workers employed in local jobs. To the degree that a balance can be achieved, greater opportunity for local residents to work close to where they live can be anticipated. A better jobs/housing balance can reduce commuting, traffic congestion, air quality and global warming impacts, the need for costly transportation infrastructure improvements, personal transportation costs, and lost leisure and family time.

It should be noted that while "jobs/housing balance" is the term commonly used, the "jobs/employed resident balance" is the more precise measure of the local ratio of housing to jobs, since housing units (or households), on average, contain more than one employed resident. It is also important to note that a simple numerical balance in the jobs/employed resident ratio does not necessarily indicate that local residents have adequate opportunity to work in their community. Other factors, such as the match between local resident employee skills and the skills required for local jobs, and the match between

[3] The data only distinguish between broad monthly earnings levels, those earning less than $1,250 and those earning more than $3,333.

local job compensation levels and local housing prices, also influence a community's actual jobs/housing relationship.

Jobs/housing balance evolves over time and reflects the role and location of particular areas within the larger regional context. Where a community's jobs/employed resident ratio is higher than the regional ratio, a higher tendency toward in-commuting is indicated; where the ratio is lower than the regional ratio, a higher tendency toward out-commuting is indicated. The mix of who lives in West Oakland and who works in West Oakland and the extent to which these are the same individuals results from a complex set of interactions and decision factors that determine where people choose to live and work, how much they spend for housing, and their travel patterns.

Oakland[4]

Data and projections for Oakland indicate that Oakland has a good balance of jobs and housing, and that it will continue to have a relatively similar number of jobs and employed residents. The total number of jobs in the City (202,570 in 2005) is somewhat higher than the total number of employed residents (175,180 in 2005). In the future, the growth of employed residents of the City (114,440 employed resident growth 2005 to 2035) is anticipated to exceed the growth of jobs in Oakland (83,030 job growth 2005 to 2035), improving the “balance” of jobs and housing over time. By 2035, the number of employed residents is anticipated to be similar to and even exceed the number of jobs in Oakland (ratio of jobs to employed residents of 0.99/1 in 2035).

West Oakland[5]

There were an estimated 11,100 jobs and 8,430 households in West Oakland in 2012, resulting in a jobs/households ratio of 1.32.[6]

Most employed residents of West Oakland commute to jobs located outside of the City (see **Table 4.8-3**). Only 29 percent of people who lived in West Oakland worked at jobs located in Oakland. The majority of residents commuted to jobs in San Francisco and, to a lesser degree, Berkeley. The City of Oakland as a whole has similar commute patterns.

---

[4] U.S. Census; ABAG *Projections 2007*

[5] Conley Consulting group, West Oakland Specific Plan Market Opportunity: Housing, Retail and Arts, Oakland, California, December 2011.

[6] Hausrath Economics Group, December 2012.

Table 4.8-3
Work Destination (2009)

	West Oakland		Oakland	
	Number	**Percent**	**Number**	**Percent**
Total All Jobs	7,569	100%	152,138	100%
Oakland	2,170	29%	43,961	29%
San Francisco	1,588	21%	27,712	18%
Berkeley	669	9%	12,027	8%
San Jose	242	3%	2,365	2%
Emeryville	198	3%	3,256	2%
Fremont	166	2%	-	-
Hayward	146	2%	4,557	3%
San Leandro	122	2%	4,271	3%
Concord	110	1%	-	-
Walnut Creek	93	1%	2,051	1%
All Other Locations	2,065	27%	46,503	31%
Alameda	-	-	3,330	2%
Richmond	-	-	2,105	1%

Source: 2009 U.S. Census LEHD.

Note: Places for which no data is available for a particular geographic area indicates that less than 1% of residents work in that place.

The majority of workers at West Oakland workplaces commuted into the City from other communities, with only approximately a quarter of workers being Oakland residents. The other cities where a significant proportion of West Oakland workers lived include San Francisco, Richmond, and Alameda (**Table 4.8-4**).

Jobs held by West Oakland residents are more diverse in terms of industrial sectors than the jobs located in West Oakland. It is notable that few West Oakland residents were employed in the higher paying industrial and construction-related sectors that represent a majority of jobs in West Oakland. Instead, most employed West Oakland residents worked in the service sector, with a small proportion employed in more advanced professional, scientific, and technical service jobs.

Table 4.8-4
Home Location (2009)

	West Oakland		Oakland	
	Number	**Percent**	**Number**	**Percent**
Total Employment (All Jobs)	10,513	100%	171,522	100%
Oakland	2,546	24%	43,961	26%
San Francisco	804	8%	12,031	7%
Richmond	473	4%	3,901	2%
Alameda	400	4%	5,885	3%
Piedmont	353	3%	-	-
Berkeley	298	3%	5,030	3%
Hayward	269	3%	5,251	3%
San Jose	196	2%	3,651	2%
Walnut Creek	182	2%	-	-
San Leandro	170	2%	6,460	4%
All Other Locations	4,822	46%	78,933	46%
Castro Valley	-	-	3,489	2%
Fremont	-	-	2,930	2%

Source: 2009 U.S. Census LEHD.

Note: Places where less than 1% of workers live are included in All Other Locations and not individually.

Regulatory Setting

Regional

<u>Regional Housing Needs Allocation</u>

In 2007, the State Department of Housing and Community Development (HCD) determined that, at a minimum, the nine Bay Area counties needed to provide 214,500 units between 2007 and 2014 to satisfy regional demand. In 2008, the Association of Bay Area Governments (ABAG) adopted the Final Regional Housing Needs Allocation (RHNA) for the period of 2007 to 2014, which designates housing objectives for different income levels among the jurisdictions within the nine-county Bay Area. Oakland's allocation is 14,629 units, which includes 1,900 units for very low income households, 2,098 units for low income households, 3,142 units for moderate income households, and 7,489 units for above moderate income households. ABAG's determination of the local share of regional housing needs takes into consideration market demand for housing; employment opportunities; availability of suitable sites and public facilities; commuting patterns; type and tenure of housing need; loss of units contained in assisted housing that changed to non-low-income use; and special needs housing requirements.

City of Oakland

General Plan

Housing Element

The City of Oakland General Plan 2007-2014 Housing Element was adopted by the City Council on December 21, 2010. California law requires that each city and county adopt a housing element that includes: an assessment of housing needs; a statement of the community's goals, objectives and policies related to housing; and a five-year schedule of actions to implement the goals and objectives.

The following goals are identified in the Housing Element:

Goal 1: Provide adequate sites suitable for housing for all income groups.

Goal 2: Promote the development of adequate housing for low- and moderate-income households.

Goal 3: Remove constraints to the availability and affordability of housing for all income groups.

Goal 4: Conserve and improve older housing and neighborhoods.

Goal 5: Preserve affordable rental housing.

Goal 6: Promote equal housing opportunity.

Goal 7: Promote sustainable development and smart growth.

Goal 8: Increase public access to information through technology.

As required by State law, the Housing Element discusses the City's "fair share allocation" of regional housing by income group as projected and allocated by ABAG. Under the RHNA, the City must accommodate 14,629 new housing units between January 2007 and June 2014 to meet its "fair share" of the State's housing need. Oakland's allocation is 14,629 units, which includes 1,900 units for very low income households, 2,098 units for low income households, 3,142 units for moderate income households, and 7,489 units for above moderate income households. Since January 1, 2007, 1,128 units have been constructed, satisfying eight percent of the City's RHNA. Based on housing unit construction and approvals since January 1, 2007, the City has already committed to developing 90 percent of the units needed to satisfy the RHNA requirement in the planning period. The remaining 1,426 units required to meet the RHNA allocation of 14,629 units could be accommodated on 185 City-identified opportunity sites. The Housing Element sites could accommodate an estimated 8,672 units, based on current market trends and recent development proposals received by the City. The Housing Element opportunity sites include a number of the West Oakland Opportunity Sites identified in the Specific Plan, specifically within the 7th Street Opportunity Area and San Pablo Avenue Opportunity Area.

Standard Conditions of Approval

There are no City of Oakland Standard Conditions of Approval specific to population, housing and employment.

Impacts, Standard Conditions of Approval and Mitigation Measures

This section describes potential impacts on population, housing and employment within the Planning Area and greater Oakland.

Consideration of Socioeconomic Impacts

Changes in population and housing, in and of themselves, are generally characterized for CEQA purposes as social and economic effects, not physical effects on the environment. CEQA provides that economic or social effects are not considered significant effects on the environment unless the economic or social effects are connected to physical effects.

The State CEQA Guidelines define the parameters under which the consideration of socioeconomic impacts is included in an environmental evaluation. Section 15131(a) of the Guidelines states that; "economic or social effects of a project shall not be treated as significant effects on the environment." An EIR may trace a chain of cause and effect from a proposed decision on a project through anticipated economic or social changes resulting from the project to *physical changes* caused in turn by the economic or social changes [emphasis added]. The intermediate economic or social changes need not be analyzed in any detail greater than necessary to trace the chain of cause and effect. The focus of the analysis shall be on the physical changes." State CEQA Guidelines Section 15131(b) also provides that "economic or social effects of a project may be used to determine the significance of physical changes caused by the project." For example, the level of significance of a physical division of a community from the installation of rail lines could be measured by the social effect on the community.

Significance Criteria

According to the City's Thresholds of Significance, the Specific Plan would have a significant impact related to population and housing if it would:

1. Induce substantial population growth in a manner not contemplated in the General Plan, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extensions of roads or other infrastructure), such that additional infrastructure is required but the impacts of such were not previously considered or analyzed;
2. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere in excess of that contained in the City's Housing Element; or
3. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere in excess of that contained in the City's Housing Element.

Growth Inducement

Impact PHE-1: The Specific Plan build-out projections are consistent with ABAG projections of household and employment growth. Potential induced growth, if any, outside the Opportunity Areas due to infrastructure improvements, enhanced development potential on adjacent land, or increased economic activity, would occur as already contemplated in and consistent with adopted plans and the environmental documents prepared for those plans. Therefore, the growth facilitated or induced by the Specific Plan would not represent growth for which adequate planning has not occurred, and the growth inducement impacts of the Specific Plan would be less than significant. (**LTS**)

Section 21100(b)(5) of CEQA requires that an EIR include information regarding the growth-inducing impacts of the proposed project. CEQA Guidelines section 15126.2(d) states that an EIR shall: "Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing either directly or indirectly, in the surrounding environment. ... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

Amount and Locations of Growth Facilitated by the Specific Plan

The Specific Plan sets forth a specifically defined proposal for growth and revitalization in West Oakland, focusing on key Opportunity Areas and Opportunity Sites. Implementation of the Specific Plan would result in population growth and would foster economic growth, stimulate private investment and increase the community's supply of housing. For CEQA environmental impact assessment purposes, it is assumed in this EIR that the Specific Plan would be fully successful in facilitating economic revitalization of the Planning Area and development of new employment uses and new housing, as well as additional infill development on vacant and underutilized properties throughout the Opportunity Areas, by 2035. The Specific Plan would provide for development of up to approximately 5,090 net new housing units and 4.03 million square feet of net new non-residential space within the Opportunity Areas by 2035. This development would result in an estimated 11,136 net new residents and 14,850 net new jobs by 2035. This population increase would not in itself constitute a significant adverse environmental impact.

Nearly all of the growth facilitated by the Specific Plan would occur in the four Opportunity Areas, which contain numerous vacant and underutilized properties, and older facilities that no longer meet current standards and market conditions, and thus have the most potential for change. Within the four Opportunity Areas, new development is most likely to occur on Opportunity Sites. These Opportunity Sites are individual parcels or groups of parcels which are vacant, underutilized, blighted or which contain uses that conflict with nearby residential neighborhoods. The Opportunity Sites were identified as being available for development based on previous development applications or where the City has consistently sought opportunities to re-make these sites into positive contributors to the community through development outreach. Development of the Opportunity Sites is in turn expected to encourage development of other properties in the surrounding Opportunity Area.

Mandela/West Grand Opportunity Area

In the Mandela/Grand Opportunity Area, the Specific Plan would facilitate growth by retaining and expanding existing compatible urban manufacturing, construction and other light industrial businesses, while attracting new targeted industries that are growing, including life sciences, information and clean-tech uses. Development is likely to initially occur as lower-intensity building types and reuse of existing buildings, with growth eventually including R&D/life sciences, mid-rise campus development at the intersection of Mandela Parkway and West Grand Avenue, and larger format destination retail stores as an extension of the East BayBridge Shopping Center, IKEA and Bay Street Emeryville.

7th Street Opportunity Area

In the 7th Street Opportunity Area, the Specific Plan would primarily facilitate transit-oriented development with high- to medium-density housing with ground floor neighborhood-serving retail on vacant sites around the West Oakland BART Station, and along 7th Street and Pine Street.

3rd Street Opportunity Area

In the 3rd Street Opportunity Area, the Specific Plan would facilitate a redevelopment with a mix of business activities and development types, including food and beverage production and distribution, and mixed-use commercial, dining and entertainment uses. No residential uses are proposed within the 3rd Street Opportunity Area.

San Pablo Avenue Opportunity Area

In the San Pablo Avenue Opportunity Area, growth would occur as infill mixed-use development with housing over ground floor retail uses along San Pablo Avenue, higher density residential uses at the San Pablo Avenue/West Grand Avenue intersection, and neighborhood-serving retail anchored by a grocery store on West Grand Avenue at Market Street.

Comparison of Specific Plan and ABAG Growth Projections

This section compares Specific Plan growth projections to the growth projections developed by ABAG. ABAG periodically produces growth forecasts for public information and for use by other regional agencies, including the Metropolitan Transportation Commission (MTC) and the Bay Area Air Quality Management District (BAAQMD), in making project funding and regulatory decisions. For example, the ABAG projections provide the basis for the MTC Regional Transportation Plan and the BAAQMD regional Ozone Attainment Plan. The ABAG projections are also the basis for the Alameda County Congestion Management Agency (ACCMA) regional traffic model.

The General Plans and development regulations of local jurisdictions are a key basis for the ABAG projections. The forecasts also reflect larger realities like climate change, high energy costs and the aging population, which over the long term, are expected to influence development outcomes. The ABAG projections also reflect the anticipated impact of "smart growth" policies and incentives in shifting development patterns from historical trends toward better jobs-housing balance, cleaner air, lower greenhouse gas (GHG) emissions, increased preservation of open space, and lower housing and travel costs.

Table 4.8-5 presents the number of existing households and the projected number of households at build-out of the Specific Plan in 2035 as compared to ABAG household projections. **Table 4.8-6** presents West Oakland Specific Plan and ABAG employment projections. As shown, the Specific Plan build-out projections are consistent with the ABAG projections of household and employment growth, and would therefore not represent growth for which adequate planning has not occurred.[7]

[7] The ABAG projections for Oakland were allocated to West Oakland based upon the ACCMA regional traffic model traffic analysis zones (TAZs). Projections for the Planning Area are less than for the Planning Area TAZs because three of the TAZs that cover the Planning Area also extend outside the area. The approximate locations of households within these three TAZs was used to develop an "ABAG projection" for the Planning Area. The growth projections for 2035 are the most relevant; the Specific Plan estimates of existing households and jobs do not compare directly to the 2000 or 2005 projections in the ACCMA model because the data in the model were developed prior to, and do not reflect the effect of, the recent economic recession, which is reflected in the existing numbers for the Specific Plan.

Table 4.8-5
Specific Plan Household Projections as Compared to ABAG Projections

	Existing		Change		2035/Buildout	
West Oakland Specific Plan	**Units**	**House-holds**	**Units**	**House-holds**	**Units**	**House-holds**
Opportunity Areas	270	220	+5,090	+4,949	5,360	5,169
Remainder of West Oakland	10,175	8,210	+1,755	+3,221	11,930	11,431
TOTAL, West Oakland	10,445	8,430	+6,845	+8,170	17,290	16,600

ABAG Projections	**2000**	**2005**	**2020**	**2035**
Opportunity Areas	8,020	8,619	12,240	16,510
West Oakland TAZs[1]	8,051	8,653	12,346	16,635
West Oakland Planning Area	8,048	8,644	12,318	16,555

Source: Hausrath Economics Group 2012; Lamphier-Gregory 2012.

[1] The ABAG projections for Oakland were allocated to West Oakland based upon the ACCMA regional traffic model traffic analysis zones (TAZs). Projections for the Planning Area are less than for the Planning Area TAZs because three of the TAZs that cover the Planning Area also extend outside the area. The approximate locations of households within these three TAZs were used to develop an "ABAG projection" for the West Oakland Planning Area.

Implementation of the Specific Plan would require (and the project analyzed in this EIR assumes) General Plan amendments to allow residential development of specific sites currently not planned nor zoned for residential purposes. The potential environmental consequences of these proposed General Plan amendments/zoning changes and their resulting residential development are assessed in the respective individual chapters within this EIR. With the General Plan amendment, the amount of new development allowed under the Specific Plan would not represent an increase over the amount of development allowed under the General Plan.

Table 4.8-6
Specific Plan Employment Projections Compared to ABAG Projections

West Oakland Specific Plan	**Existing**	**Change**	**2035/Buildout**	
Opportunity Areas	9,770	+16,500	24,620	
Remainder of Planning Area	1,330	+2,000	2,380	
TOTAL Planning Area	11,100	+18,500	**27,000**	
ABAG Projections	**2000**	**2005**	**2020**	**2035**
Opportunity Areas	11,354	11,821	17,321	26,679
Planning Area TAZs	12,096	12,638	18,428	28,101
TOTAL Planning Area	11,692	12,140	17,695	27,177

Source: Hausrath Economics Group 2012; Lamphier-Gregory 2012.

[1] The ABAG projections for Oakland were allocated to West Oakland based upon the ACCMA traffic analysis zones (TAZs). Projections for the Planning Area are less than for the Planning Area TAZs because three of the TAZs that cover the Planning Area also extend outside the area. The approximate locations of employment activities within these three TAZs were used to develop an "ABAG projection" for the Planning Area.

Growth within West Oakland under the Specific Plan would generate jobs, personal income, and revenue to the City, to the extent that such growth was attracted to West Oakland from elsewhere in the region and not from elsewhere in Oakland. New uses attracted to the Planning Area would generate increased local demand for goods and services, and additional indirect jobs and personal income through an economic "multiplier effect". The multiplier effect describes the indirect and induced employment and income generated by the Specific Plan. For every new job, other jobs are attracted to the local economy to support that job.

The Specific Plan recommends improvements to streets and water, sewer and storm drainage facilities within the Planning Area, which may in limited cases be designed to also accommodate growth in adjacent areas. Growth in West Oakland in accordance with the Specific Plan may, to a limited extent, increase the potential for development and redevelopment in some surrounding areas both within and outside of the West Oakland Planning Area. Any such potential would be limited by the ability of the market to "absorb" the amount of development allowed by the Specific Plan. Given the types of uses targeted by the Specific Plan, and existing plans for surrounding areas, any potential for such induced growth would likely occur in industrial areas of the Jack London waterfront adjacent to the 3rd Street Opportunity Area, rather than at the former Oakland Army Base or Downtown Oakland.[8] New economic activity and growth outside West Oakland may in turn increase traffic, air quality and noise impacts, and generate demand for housing, public services and utilities, the expansion or new construction of which could cause environmental impacts. This potential indirect growth would occur in accordance with the General Plan and the 2007-2014 Housing Element, and applicable neighborhood plans, specific plans and other plans, which have undergone their own program-level environmental review under CEQA. Potential new development projects may require their own project-level environmental review in accordance with CEQA. The location, timing, nature, extent and severity of the potential environmental impacts of any given project are too speculative to predict or evaluate in this EIR.

[8] Hausrath Economics Group, December 2012.

In summary, the potential environmental impacts of development within West Oakland facilitated by the Specific Plan have been evaluated in this EIR. The Specific Plan build-out projections are consistent with the ABAG projections of household and employment growth. Potential induced growth, if any, outside the Opportunity Areas due to infrastructure improvements, enhanced development potential on adjacent land, or increased economic activity, would occur as already contemplated in and consistent with adopted plans and the environmental documents prepared for those plans. Therefore, growth facilitated or induced by the Specific Plan would not represent growth for which adequate planning has not occurred, and the growth inducement impacts of the Specific Plan would be less than significant.

Mitigation Measures

None needed

Displacement of Housing or People

Impact PHE-2: The potential loss of a small number of housing units and associated displacement of people as a result of development facilitated by the Specific Plan would be offset by the large number of new units proposed by the Specific Plan, by new units proposed by the 2007-2014 Housing Element, and by existing housing in Oakland. The environmental impacts of proposed new housing are analyzed in this EIR and in the 2007-2014 Housing Element EIR. The impacts of the Specific Plan related to the displacement of housing or people would be less than significant. (**LTS**)

Direct Displacement of Housing or People

The Specific Plan would not directly result in the displacement of housing or people. No housing is proposed to be removed or changed to a non-residential use. The Specific Plan does not propose any new development outside the Opportunity Areas, within the existing residential neighborhoods of West Oakland, which are identified in the Plan as "Enhancement Areas". The Plan also proposed retaining the limited number of existing housing units located within the Opportunity Areas.

The Opportunity Areas contain some housing areas built without required permits and which may not conform to current zoning and/or building codes. These include certain residential conversion of formerly underutilized industrial spaces. The precise number of such informal housing units is not known. Redevelopment of the Opportunity Sites and within the Opportunity Areas could result in the demolition and loss of some of these existing informal units and the associated displacement of people.

The potential loss of housing units as a result of development facilitated by the Specific Plan would be offset by the large number of new housing units proposed by the Specific Plan, by the new housing units proposed by the 2007-2014 Housing Element, and by the availability of other (approximately 166,270) housing units in Oakland. The Specific Plan would provide for the development of an estimated 5,090 net new housing units within the Planning Area, including 1,271 net new units within the Mandela/Grand Opportunity Area, 2,574 net new units within the 7th Street Opportunity Area, and 1,065 net new units within the San Pablo Avenue Opportunity Area, as well as allowing new work/live dwellings. In addition to the Specific Plan, the Housing Element provides for the development of the remaining 13,501 units City-wide as required to meet Oakland's fair share of the regional housing need. Over the longer-term, ABAG projections forecast substantial housing growth in Oakland, averaging about 2,000 units per year from 2010 through 2035.

The environmental impacts of new city-wide housing are analyzed at a program level (and at a project level to the extent such impacts can be known) in the 2007-2014 Housing Element EIR. The potential environmental impacts of housing developed within the Planning Area are addressed at a program level within this EIR. The location, timing, nature, extent and severity of the potential environmental impacts of any given new housing development project outside the Planning Area is too speculative to predict or evaluate in this EIR.

Mitigation Measures

None needed

Cumulative Population, Housing and Employment Impacts

Cumulative Impact PHE-3: The Specific Plan build-out projections represent growth facilitated by the Specific Plan. Other reasonably foreseeable development would occur as already contemplated in and consistent with adopted plans and the environmental documents prepared for those plans, and consistent with ABAG projections of household and employment growth. This cumulative population, household and employments growth would not represent growth for which adequate planning has not previously occurred. The potential loss of housing units as a result of cumulative development would be accommodated by existing housing or by new housing units proposed by the Specific Plan and the 2007-2014 Housing Element, the potential environmental impacts of which are evaluated in this EIR and in the Housing Element EIR. Cumulative impacts related to growth inducement, and displacement of people or housing would be less than significant. (**LTS**)

New development facilitated by the Specific Plan, together with other reasonably foreseeable development, would add new residents and new jobs within Oakland by 2035. The Specific Plan build-out projections are consistent with the ABAG projections of household and employment growth. The Specific Plan, together with other reasonably foreseeable projects, would not induce growth for which adequate planning has not occurred.

The 2007-2014 Housing Element includes a total of 1,128 housing units which are already constructed or under construction; 5,005 units with planning approvals; and 7,070 units in stages of pre-development. In addition, a remaining 1,426 units would be accommodated through 2014 on sites identifies as Housing Element “opportunity sites”. A citywide search of 2008 Alameda County property tax records was conducted, and assessor data was inventoried for parcels coded as “vacant,” “parking lots,” or other uses signifying that the property was underutilized. The inventory included sites with minimal structural improvements such as used car lots and open storage areas. Field surveys were also conducted to verify that the parcel was either vacant or underdeveloped. The Housing Element EIR determined that development of 1,426 housing units on the Housing Elements’ identified “opportunity sites” (not the same as West Oakland Specific Plan Opportunity Sites) would not displace existing residences.

However, the 12,075 units throughout the City that are identified in the Housing Element as already approved with entitlements and the units which are in predevelopment could displace existing residences if they are required to demolish existing housing units in order to accommodate new and expanded residential buildings. While a search was not made through the all the applications which were either entitled or in pre-development to determine the possibility of displacement, any displacement that resulted from these other cumulative projects would be subject to relocation assistance, as required by the California Relocation Assistance Law. In the event that relocation is required due to code enforcement activities, condo conversions, or new development, the City has established policies in the Municipal Code to mitigate potential displacement. As such, development under the 2007-2014 Housing Element would necessarily comply with programs designed to assist displaced residents. Given this requirement, any potential displacement of residents or housing would be mitigated to less than significant impacts

In addition, Oakland and surrounding jurisdictions have policies and programs that promote the development and preservation of housing, including affordable housing, and rent control and eviction programs that limit indirect displacement. Cumulative impacts related to growth inducement, and displacement of people or housing would be less than significant.

<u>Mitigation Measures</u>

None needed

Other Non-CEQA Discussion

State CEQA Guidelines Section 15131 states that “[e]conomic or social information may be included in an EIR or may be presented in whatever form the agency desires.”

Employment and jobs-housing balance issues are not considered part of the permanent physical environment, and thus are not environmental issues requiring analysis under CEQA. The City does not have Thresholds of Significance related to employment or jobs-housing balance. However, consideration of these issues may be of interest to the public and decision-makers and are discussed here for information purposes only.

Temporary and Permanent Employment

The Specific Plan would generate an estimated 14,850 direct net new jobs within the Planning Area by 2035, as well as additional temporary construction jobs and indirect jobs, which would be a beneficial impact.

Development facilitated by the Specific Plan would result in new temporary construction jobs and permanent employment opportunities within West Oakland. The Specific Plan would generate an estimated 14,850 direct net new jobs within the Planning Area by 2035 (Table 4.8-6). These jobs would be at varying skill levels, initially good-paying blue collar and green collar jobs in custom and light manufacturing, warehouse, clean/green industrial, and service commercial uses suited to the educational attainment levels of existing West Oakland residents and, increasingly over time, higher paying jobs in life sciences, information technology and clean-tech that require college degrees. Employment generated by the development and economic activity facilitated by the Specific Plan would be a beneficial impact.

<u>Business Displacement</u>

The CEQA Guidelines do not suggest evaluation of business displacement or that displacement of businesses would be a significant impact under CEQA. The issue of business displacement is generally characterized for CEQA purposes as a social and economic effect, not a physical effect on the environment. CEQA provides that economic or social effects are not considered significant effects on the environment unless the economic or social effects are connected to physical effects. Therefore, business displacement is discussed herein for informational purposes only.

The Specific Plan seeks to retain and expand existing compatible urban manufacturing, construction and other light industrial businesses with good-paying blue collar and green collar jobs. However, redevelopment of underutilized properties and older facilities that no longer meet current standards and market conditions may result in the displacement of some existing businesses. The Specific Plan specifically encourages the relocation of incompatible heavy industrial (e.g., recycling operations) and truck intensive uses to new locations, further removed from West Oakland neighborhoods, such as at the former Oakland Army Base or at the western and southern edges of the Planning Area next to the Port of Oakland and the freeway ramps.

The relocation issues for businesses that rent/lease space to be removed for new development would likely focus on locating comparable space at comparable rents, and covering the costs of relocation which can include expenses associated with searching for a new location, moving costs, and costs associated with getting re-established at a new location. Such costs can be particularly difficult for small businesses. Businesses with longer-term leases would receive compensation for early termination of those leases and may be able to address relocation costs in those negotiations.

Businesses that own their properties would attempt to address relocation in the process of selling their properties. The objective for owners would be to try and obtain a sales price for their existing property that would cover the costs of a replacement property and improvements as well as the costs of moving and becoming re-established at a new location. The most difficult for owner-occupants is likely to be finding another property of comparable size and location that is available for purchase. There could be adverse economic implications of relocation for some businesses and business owners, and there could be financial benefits in other cases, depending largely on sales prices for existing properties and ability to find comparable new business facilities and locations. Reuse of these sites could trigger environmental cleanup requirements.

New development proposed by the Specific Plan would provide new location options for many existing businesses that would have to relocate from their existing facilities. New development proposed by the Specific Plan would provide a range of building types that could accommodate a variety of business functions (manufacturing, R&D, office administration, etc.), business ages and sizes (small start-up, mature smaller business, mid-size business), and amenity levels. Development is likely to initially occur as lower-intensity building types and reuse of existing buildings with fewer interior building improvements and amenities that can be supported by businesses with lower rent-paying abilities. Certain subareas within the larger Opportunity Areas are intended to continue to provide development types at lower rents and land prices. The potential environmental impacts of the development of such "replacement" facilities are evaluated at a program level in this EIR, and at a project level for the Opportunity Sites to the extent that such impacts are known.

The City, the Port and the community have long been planning for the provision of facilities at the former Oakland Army Base that could accommodate many of the transportation related and truck intensive businesses that the Specific Plan encourages to relocate away from West Oakland neighborhoods. The potential environmental impacts of the development of these "replacement" facilities have been evaluated in the various environmental evaluations that have been prepared for the reuse of the Army Base in accordance with CEQA, including the 2012 Oakland Army Base Project Initial Study/Addendum.[9] The potential environmental impacts of the development of "replacement" facilities

[9] City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012.

at the western and southern edges of the Planning Area next to the Port of Oakland and the freeway ramps are evaluated in this EIR.

Beyond the Planning Area, the City's General Plan designates areas for industrial uses along the I-880 corridor and San Leandro Street in East Oakland, and there is land along the waterfront that remains in industrial use. There also are location options for lighter industrial uses along the I-880 corridor, and between I-880 and the Estuary. Thus, businesses relocating from the Planning Area may be able to find other locations in Oakland. Although the Specific Plan (as well as the General Plan, Economic Development Strategy, and Industrial Land Use Policy) seeks to retain such businesses in Oakland, there also could be options for relocation outside of Oakland, including locations along the I-880 corridor in San Leandro or Hayward/Union City, and along the I-80 and I-580 corridors in Richmond.

Thus, the possible displacement of existing businesses from the Planning Area would not necessitate construction of replacement facilities in excess of that provided for by the Specific Plan, the environmental impacts of which are analyzed in this EIR, or that anticipated in the City's General Plan.

Impacts related to the displacement of housing or people as a result of the Specific Plan would be less than significant.

Jobs/Housing Balance

The CEQA Guidelines do not suggest evaluation of jobs/housing balance or that a local imbalance in the number of jobs and housing would be a significant impact under CEQA. However, regional planning goals seek to improve the local balance between housing and jobs because a better jobs/housing or jobs/employed resident balance can reduce commuting, traffic congestion, air pollutant and greenhouse gas emissions, the need for costly transportation infrastructure improvements, personal transportation costs, and lost leisure and family time. Therefore, the potential effect of the Specific Plan on jobs/housing balance is discussed here for informational purposes only.

Development facilitated by the Specific Plan would result in more growth in jobs than employed residents, with an estimated 11,136 net new residents and 14,850 net new jobs within West Oakland by 2035. Development facilitated by the Specific Plan is initially expected to accommodate custom and light manufacturing, warehouse, clean/green industrial, and service commercial uses that provide good-paying blue collar and green collar jobs more suited to the educational attainment levels of existing West Oakland residents. As shown in Tables 4.8-5 and 4.8-6, with build-out of the Specific Plan, there would be an estimated total of 27,000 jobs and 16,600 households in West Oakland by 2035, resulting in a jobs/households ratio of 1.63.[10]

[10] Hausrath Economics Group, December 2012.

4.9

Public Services and Recreation

This chapter describes existing conditions and the regulatory setting related to public services and utilities, including police protection, fire protection, schools, and parks and recreation, and the potential environmental impacts of the Specific Plan. Emergency response and emergency evacuation are addressed in Chapter 4.5, Hazards and Hazardous Materials, of this EIR.

Physical Setting

Fire Protection

The Oakland Fire Department (OFD) provides fire protection (prevention and suppression), and local emergency response (rescue, hazardous materials response, and first responder emergency medical services) services to the West Oakland Planning Area and vicinity. The Alameda County Medical Services District contracts with American Medical Response Ambulance Company and OFD to respond to medical emergencies. In addition to firefighting and emergency medical response capabilities, the OFD also has a Hazardous Materials Unit that operates from Station 3 in West Oakland and responds citywide to emergencies involving hazardous materials.[1] The OFD is a part of the State of California Master Mutual Aid agreement where OFD provides mutual aid to other cities and communities throughout the state.[2]

<u>Facilities and Staffing</u>

The OFD is organized into four divisions and three battalions that provide requested fire and emergency medical services. Battalion 2 serves West Oakland and North Oakland.

The OFD operates 25 fire stations. There are two fire stations within the West Oakland Planning Area (see **Figure 4.9-1**):

- Fire Station 3, located at 1445 14th Street at Mandela Parkway. Station 3 is staffed daily by eight firefighters, two of which are paramedics and the remaining emergency response technicians (EMT). Station 3 has an engine and truck for fire suppression, and houses OFD's primary hazardous materials incident response team.
- Fire Station 5, located at 934 34th Street at San Pablo Avenue.[3] Station 5 is staffed daily by four fire fighters (one paramedic and three EMTs) and has one engine, and Station 1 is staffed daily with nine firefighters (two paramedics and seven EMTs) and has one engine and one truck.

---

[1] Oakland Fire Department, Website, http://www.oaklandnet.com/fire/, accessed July 26, 2012.

[2] City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012.

[3] Oakland Fire Department, Map of Oakland California Fire Stations, available online at http://www.ww6or.com/OAKFIRE.HTM, accessed July 26, 2012.

Source: JRDV Intl.

Figure 4.9-1
West Oakland Public Facilities

In addition, Station 1 and Station 15 are located just outside the Planning Area at 1605 Martin Luther King Way, and at 455 27th Street, respectively.

The OFD maintains 24 engine companies with approximately 4 personnel per engine, 4 truck companies with 4 personnel per truck, and 3 truck companies with 5 personnel per truck. Total Operations Division staffing consists of 500 uniformed personnel. The actual number of assigned personnel per station depends on the needs of that station. All personnel are trained as Paramedics or Emergency Medical Technicians.[4] Station 3 is staffed by highly trained hazardous materials specialists and technicians.[5]

Beginning in July 2012, OFD stations will be closed for several consecutive days on a rotating basis, in order to respond to a budgetary shortfall citywide.

Service Demand and Response Times

The OFD Dispatch Center is located in downtown Oakland and is responsible for fire and medical emergency coordination and response. In 2011, the Dispatch Center received approximately 62,659 calls for response of which 81 percent were medical emergencies.[6] The OFD's response time goal is 7 minutes, 90 percent of the time. Currently, the OFD's average citywide response time is 7 minutes, 86 percent of the time.[7]

Police Protection

The Oakland Police Department (OPD) provides police services throughout the city. The Port of Oakland obtains City services, including police protection, through annual payments to the City. The Port also provides private security at its truck parking facility.

Facilities and Staffing

The OPD is headquartered at 455 7th Street in Downtown Oakland. The OPD also operates from the Eastmont Substation at 73rd and Bancroft Avenues.

The OPD has approximately 660 sworn police officers, approximately 297 support staff, and 10 reserve officers.[8] The OPD has reduced its staffing level from last year by approximately 60 sworn police officers and currently anticipates a monthly reduction of 4 sworn police officers until January 2013. After this date, the OPD plans to hire approximately 35 sworn police officers.[9]

The OPD has geographically divided the City into 3 command areas, 57 community policing beats and 35 patrol beats. The beats located within the West Oakland Planning Area are 02X, 02Y, 05X, 05Y, 06X and 07X.[10] Neighborhood service coordinators are civilian employees who serve as a liaison between the community and the Police Department, and work with residents, businesses, schools, and other

---

[4] Oakland Fire Department, Website, http://www.oaklandnet.com/fire/, accessed July 26, 2012.

[5] Oakland, City of, 2009. Oakland Fire Department (OFD), *Special Operations*. Website: www.oaklandnet.com/fire/operations/special_operations.asp, accessed July 26, 2012.

[6] City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012.

[7] Oakland Fire Department, Website, http://www.oaklandnet.com/fire/, accessed July 26, 2012.

[8] City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012.

[9] City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012.

[10] Oakland Police Department, Police Service Areas & Beats, July 26, 2012.

institutions to set priorities and develop strategies to improve public safety and reduce crime. Each neighborhood service coordinator handles multiple patrol beats.

In accordance with a memorandum of understanding between the City and the Port of Oakland, the Port funds 2 full-time OPD officers to enforce truck-related regulations in West Oakland.[11]

In August 2010, OPD released a working draft of its Strategic Plan, which outlines ways in which OPD plans to provide service to the City's residential and employee population, in the context of a high workload and budget constraints. The Strategic Plan identifies several ways to increase the efficiency of OPD through the expansion of partnerships with other law enforcement agencies; the use of more sophisticated intelligence-gathering mechanisms; and upgrading critical Police Department facilities. The Strategic Plan would enable OPD to more effectively serve cumulative development without the immediate need to develop more OPD facilities. The Strategic Plan also includes a facilities master plan that is based on the likely future organizational structure and staffing of the OPD, an inventory of future facility needs, and potential facility configuration, cost estimates, and potential development schedule, including the potential for further decentralization of police operations and facilities.[12]

Service Demand and Response Times

All emergency (911) and non-emergency calls for police services are received through OPD communications center located at 1701 Edgewater Drive. Calls for fire and medical services are routed to the OFD for dispatching. Priorities for responding to police calls are set by a computer-aided dispatch system that may be overridden by dispatchers. Police officers are dispatched from the police communications center by radio and/or laptop computers mounted in police vehicles.

Police response times generally reflect the perceived seriousness of the call. The OPD ranks incoming calls for police services as follows: Priority 1 means imminent danger of death or serious injury, felonies in progress, or serious public health hazards; Priority 2 refers to disputes with potential for violence, misdemeanor crimes in progress, stolen vehicle reports, and similar matters; and Priority 3 calls are reports of incidents that do not present danger to life or property. The City maintains a police response time goal of 5 minutes for Priority 1 calls, between 10 and 15 minutes for Priority 2 calls, and 30 minutes for Priority 3 calls.

Police response times to calls for police services are recorded for the city as a whole; the OPD does not track response times for individual service areas. In 2011, citywide average response times for Priority 1, 2, and 3 calls were 10.4 minutes, 22.8 minutes, and 23.5 minutes, respectively. These response times did not meet City goals.

Crime Rates

There were 1,592 violent crimes, including 252 shootings and 24.5 homicides per 100,000 population in Oakland in 2009. Generally, the more dense neighborhoods between I-880 and I-580, including West Oakland, report higher rates of violent crimes than areas north of I-580.[13]

---

[11] City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012.

[12] Oakland, City of, 2010. Oakland Police Department (OPD). Strategic Plan, Working Draft. August. Website: www2.oaklandnet.com/oakca/groups/police/documents/webcontent/dowd022061.pdf (accessed February 3, 2012).

[13] Oakland Police Department, *Strategic Plan Working Draft*, August 2010.

West Oakland has historically had high crime rates, both violent crimes against persons and property crimes. West Oakland had a much higher murder rate, almost four times higher than the city's and 16 times higher than the state in 2010. Rates of robbery and aggravated assault, the most common violent crimes, were twice as high in West Oakland in 2010 than in the city, and between six and eight times higher than the state. For property crimes (burglary, larceny, vehicle theft, and arson), West Oakland had a rate in 2010 more than 20 percent higher than the city's and 1.5 times higher than the state.[14]

West Oakland's poor reputation for high crime, gangs and drug-related activity are a serious impediment to the quality of life for existing residents and a barrier to attracting new residents and employers to the area. Oakland police officers interviewed for this report state that most violent crimes against people are committed against victims who are themselves involved in criminal activity. Over the past five years, the increased police presence at the request of new area residents has helped reduce crime in certain pockets of West Oakland. However crime remains both a perceptual and actual problem for current and prospective residents. It is unlikely that the vision of the Specific Plan can be realized without significant public safety improvements to the area.[15]

BART Police Department

The BART Police Department is comprised of 296 personnel, of which 206 are sworn peace officers. The BART PD is responsible for securing BART's heavy rail system, parking lots and facilities. Security for the bus system that interfaces with the BART system is handled jointly by the BART PD and local jurisdictions. Criminal investigations for crimes occurring on buses at BART stations are handled by the BART PD. Auto theft and auto burglary continues to be the most frequently occurring crimes addressed by the BART PD.

Schools

The Oakland Unified School District (OUSD) operates the public school system in the City of Oakland. The OUSD administers 77 elementary schools, 19 middle schools, one junior high school, 31 high schools, and two K-12 schools. It is also responsible for three alternative schools, two special education schools, three continuation schools, three community day schools, and one opportunity schools.[16] The District's overall enrollment peaked in 1999 at 55,000, dropped to 39,000 by 2007, and is continuing to decline. Declining enrollment is projected to continue.[17]

The OUSD divides the city into three regional zones to manage resources. The Planning Area is located within Region 1. There are 22 elementary schools, seven middle schools and one K-8 school within

[14] Conley Consulting group, West Oakland Specific Plan Market Opportunity: Housing, Retail and Arts, Oakland, California, December 2011, pp. 53 and 54.

[15] Conley Consulting group, West Oakland Specific Plan Market Opportunity: Housing, Retail and Arts, Oakland, California, December 2011, pp. 55 and 56.

[16] Ed-data, 2010.

[17] Oakland Unified School District (OUSD), *Multi-Year Fiscal Recovery Plan,* 2005; Oakland Unified School District (OUSD), Our Challenges and Goals, available online at: http://publicportal.ousd.k12.ca.us/199410102104342143/site/default.asp?, 2012.

Region 1.[18] OUSD has four elementary schools, two middle schools and one high school in West Oakland (Figure 4.9-1):

- McClymonds High School at 2607 Myrtle Street has approximately 254 students. McClymonds is a highly valued resource in West Oakland since it is the only full-sized public high school in Region 1.
- Ralph Bunche Middle School at 1240 18th Street has approximately 252 students.
- Lowell Middle School at 991 14th Street has approximately 265 students and houses the West Oakland Middle School and Kipp Bridge Charter Academy.
- Hoover Elementary School at 890 Brockhurst Street has approximately 328 students.
- Lafayette Elementary School at 1700 Market Street has approximately 300 students.
- Martin Luther King, Jr. Elementary School at 960 10th Street has approximately 350 students.
- Prescott Elementary School at 920 Campbell Street, now known as Preparatory Literary Academy of Cultural Excellence (PLACE) @ Prescott, had 208 students during the 2010-2011 school year.

Cole Middle School at 1011 Union Street, originally an elementary school, is currently an administrative facility and the headquarters of the OUSD police unit. Foster Elementary School at 2850 West Street is not presently used as a school and contains OUSD administrative functions, and OUSD anticipates planning/design renovation to house a new central kitchen facility and small urban farm.

OUSD charter schools in West Oakland include: Oakland Charter High School (Grades 9-12) located at 345 12th Street, KIPP Bridge Charter School (Grades 5-8) located at 991 14th Street, Oakland School of the Arts (Grades 6-8) located at 530 18th Street, and the American Indian Public Charter School II (Grades 6-8) located at 171 12th Street.

The OUSD has well known financial problems which are in part related to decreased per capita state funding due to poor attendance. West Oakland schools include some of the poorest performing schools in the city. Poor schools are a deterrent to potential new residents with children and a significant problem for existing families. The OUSD recently announced that it plans to close underutilized school sites based on factors that include performance and enrollment trends. Given the current fiscal dilemma of the OUSD, and the low enrollment and past performance of the West Oakland schools, there is a potential that one or more of the schools in West Oakland could be closed in the near future. While West Oakland residents are working to improve area schools, prospective families with children will not view local schools as a motivation to move to the area.

As authorized by California Government Code Sections 65995, 65996(a) and 65996(b), the OUSD collects school impact fees from developers of new residential and non-residential building space. The City imposes this fee through building permits. The impact fee revenue is used together with other district funds (e.g., state grants, general obligation bonds) to complete capital improvements. The amount of the fee is established through the district's Developer Fee Justification Study.

[18] Oakland Unified School District (OUSD), School Sites by Region or Network w/Site Number, available online at: http://publicportal.ousd.k12.ca.us/ousd/lib/ousd/_shared/2010-11SchoolSitesbyRegionasof8.2.10-2.pdf, accessed July 18, 2012.

Parks and Recreation

Parks and recreation services within the City of Oakland are provided by the City of Oakland Office of Parks and Recreation (OPR) and the East Bay Regional Park District (EBRPD). OPR manages the City's parks and recreation centers. The EBRPD, although responsible primarily for acquiring and developing regional parks, open spaces, and regional trails throughout the East Bay, also provides open space and recreational facilities within Oakland's city limits.

City of Oakland Office of Parks and Recreation

OPR parks in West Oakland include Brush Street, Bertha Port, Crescent, Cypress Freeway Memorial, DeFremery, Durant, Fitzgerald, Grove Shafter, Lowell, Marston Campbell, McClymonds, Poplar, Raimondi, South Prescott, Saint Andrews Plaza, Union Plaza, Wade Johnson, Willow Street, Wood Street Pocket Park, and 25th Street (**Figure 4.9-1**). Other nearby parks outside the area also serve West Oakland residents, notably Middle Harbor Park and Portview Park in the Port of Oakland.[19]

OPR also operates several community recreation centers that offer sports, arts and crafts, culture arts and dance, computer labs, drama, mentoring, general learning, and afterschool activities. Recreation centers in West Oakland include DeFremery Recreation Center, West Oakland Senior Center, and Willie Keyes Community Center.[20]

The City of Oakland General Plan establishes a parkland standard of 4 acres per 1,000 residents (for parks that meet the active recreational needs of the community as opposed to passive recreational open space). Oakland provides 1.33 acres of local serving park acreage per 1,000 residents, which falls short of the General Plan parkland standard.[21]

According to the City of Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element, West Oakland has 56.70 acres of parkland, including schoolyards and athletic fields, which equates to 2.43 acres of parkland per 1,000 residents, or 60 percent of the General Plan parkland standard. Despite this deficiency, West Oakland has more parkland than any other flatland neighborhood in Oakland.[22]

East Bay Regional Park District

EBRPD manages over 73,000 acres of parkland in 47 East Bay parks. These parks complement those provided by the City of Oakland by providing larger park areas, more isolated and wild settings, and an emphasis on naturalist activities as opposed to active recreation. EBRPD parks in Oakland include the 271-acre Leona Canyon Regional Open Space Preserve, the 1,220-acre Martin Luther King, Jr. Regional Shoreline Park, the 660-acre Robert Sibley Volcanic Regional Preserve, and the 100-acre Roberts Regional Recreational Area.[23] Five additional parks are located immediately to the east, outside the City limits. There are no EBRPD parks in West Oakland.

---

[19] City of Oakland, Office of Parks and Recreation, website, http://www2.oaklandnet.com/Government/o/opr/s/Parks/index.htm, accessed July 31, 2012.

[20] City of Oakland, Office of Parks and Recreation, website, http://www2.oaklandnet.com/Government/o/opr/s/facility/index.htm, accessed July 31, 2012.

[21] City of Oakland, City of Oakland General Plan Open Space, Conservation and Recreation Element, 1996, page 4-9.

[22] City of Oakland, City of Oakland General Plan Open Space, Conservation and Recreation (OSCAR) Element, 1994, p. 5-6.

[23] Trust for Public Land and Center for Park Excellence, 2010 City Park Facts, 2010.

Proposed Gateway Park

Gateway Park is proposed to be a 225-acre waterfront park at the foot of the east span of the Bay Bridge that builds upon the pedestrian and bicycle access on the new east span of the bridge, and provides a variety of trails, a boardwalk, a baywalk, a transportation museum and surrounding green area, monumental public art, bridge artifacts, a children's play area, active recreation areas, and connections to surrounding communities and other parks and open space. Gateway Park is being planned by the Gateway Park Working Group, an alliance of nine local, regional, and state agencies that includes the City of Oakland and the Port of Oakland.[24]

Development of the entire 225-acre park is proposed to take place in two distinct phases. Phase 1 focuses on the park's western end at the foot of the east span of the Bay Bridge, and is the focus of the planning effort and associated environmental review document currently underway. Phase 1A, identified as a construction priority, proposes a new elevated/bike path adjacent to West Grand Avenue that would take visitors safely over the railroad and Port industrial lands, and connect West Oakland to the park.

Phase 2 consists of The Maze/West Oakland area of the park, which takes advantage of the space beneath the maze of freeways adjacent to West Oakland. It proposes park and recreational improvements beneath and adjacent to the elevated segments of I-880 and the I-80/I-580/I-880 interchange. The Maze/West Oakland area of the park is proposed to provide areas for active recreation, such as basketball, tennis, skating and dog running as well as a wetland garden and dry garden that demonstrate water use and water management strategies. It is also proposed to include an overflow parking lot with 150 parking spaces. The level and scale of the amenities in this area is dependent upon the type of development that occurs in the surrounding area.

The Maze/West Oakland area of the park encompasses Opportunity Site #3 as identified in the West Oakland Specific Plan (16 acres east of I-880, west of Wood Street, and north of West Grand Avenue)/ The Specific Plan identifies this site for development of new employment or retail uses. **Figures 4.9-2** shows the planned Gateway Park improvements within and adjacent to the Planning Area.

San Francisco Bay Trail

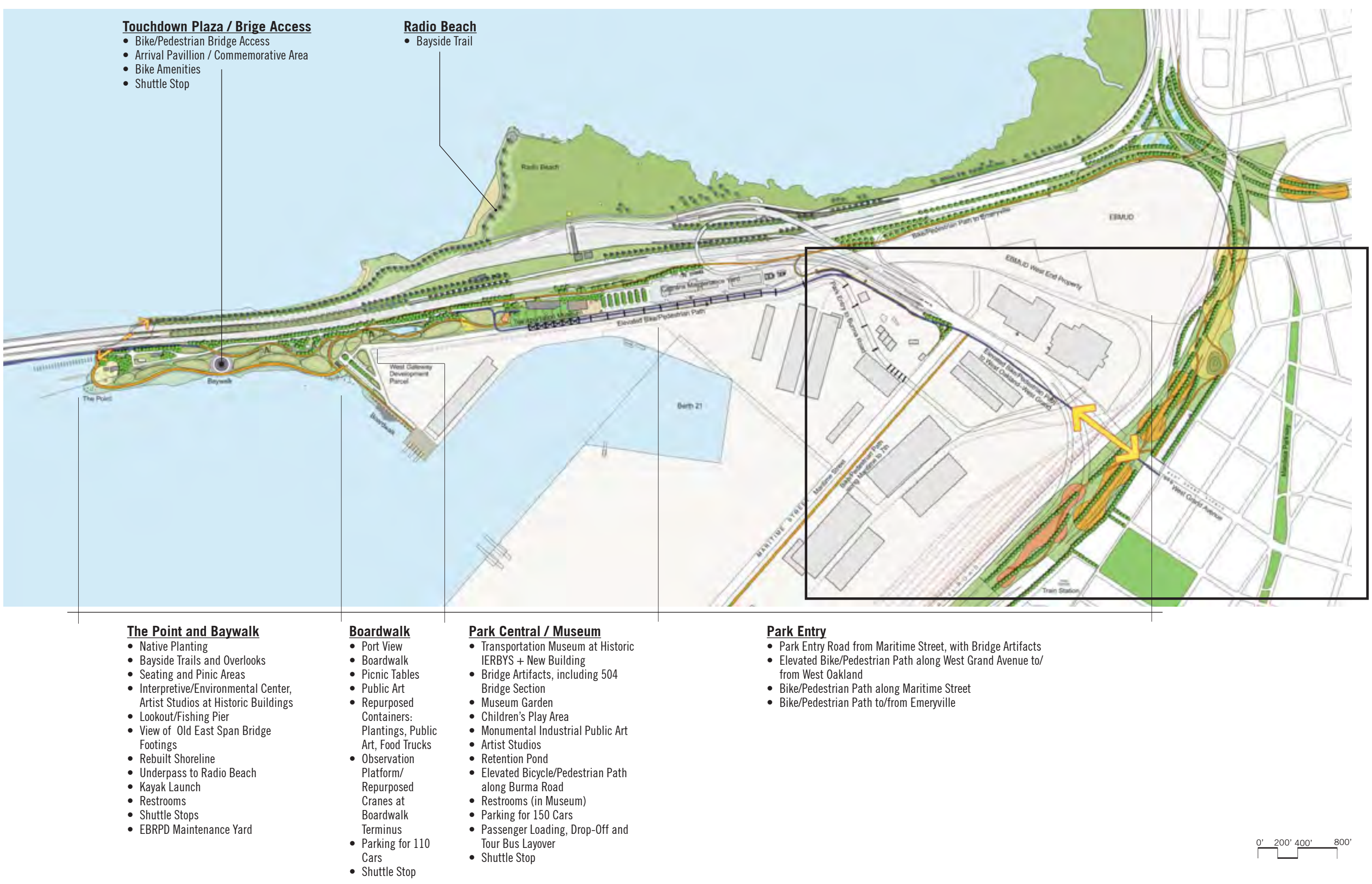
The San Francisco Bay Trail traverses the Planning Area. The main trail extends from Jack London Square to Emeryville via 2nd Street, 3rd Street and Mandela Parkway. Spur trails connect to Middle Harbor Park and Portview Park along 8th Street, 7th Street and Middle Harbor Road.

Urban Farms

There are a growing number of community gardens and urban farms in West Oakland. City Slicker Farms, a non-profit organization based in West Oakland, operates seven Community Market Farms (spaces open to the public), as well as a weekly Farm Stand, a greenhouse, Urban Farming Education programs, and over 100 Backyard Gardens. City Slicker Farms is constructing a new market farm at Fitzgerald Park and Union Plaza in partnership with OPR. City Slicker Farms was also recently awarded a $4 million Proposition 84 grant for a "West Oakland Park and Urban Farm" project, to purchase a vacant lot at 28th Street and Peralta Streets and construct a farm and park there.[25]

[24] Gateway Park Working Group, Gateway Park Project Concept Report, September 2012.

[25] City Slicker Farms, website, http://www.cityslickerfarms.org/, accessed July 31, 2012.



Source: Gateway Park Working Group, with Perkins & Will, June 7, 2012

Figure 4.9.2
Gateway Park Concept, Gateway Park Area Project Study Report

Regulatory Setting

State of California

School Facilities Act of 1986

The California School Facilities Act of 1986 (AB 2926) authorizes entities to levy statutory fees on new residential and commercial/industrial development in order to pay for school facilities. AB 2926 was revised by the passage of AB 1600, which added Section 66000 *et seq.* of the Government Code.

California Government Code Sections 65995, 65996(a) and 65996(b)

The Leroy F. Greene School Facilities Act of 1998, or Senate Bill 50 (SB 50), codified as California Government Code Sections 65995, 65996(a) and 65996(b), authorizes school districts to levy developer fees to finance the construction or reconstruction of school facilities. The California State Legislature has determined that school impact fees shall be the exclusive method of mitigating the school facilities impacts of a project or plan, has set limits on school impact fees, and has determined that payment of school impact fees shall be deemed to provide full and complete school facilities mitigation. SB 50 foreclosed alternative methods such as "Mira" agreements or Mello-Roos districts for collecting the funds necessary to fully mitigate the impacts of new development on schools. SB 50 also prohibits local agencies such as the City of Oakland from denying land use approvals on the basis that school facilities are inadequate.

The State Allocation Board (SAB) maintains Level 1 Fees at $0.47 per square foot of enclosed and covered space in any commercial or industrial development and $2.97 per square foot for residential development.[26] These fees are intended to address the increased educational demands on the school district resulting from new development. Public school districts can, however, impose higher fees than those established by the SAB, provided they meet the conditions outlined by SB 50. Private schools are not eligible for fees collected.

Oakland Unified School District: 2012 School Facility Fee Justification Report[27]

In February of 2013 the Oakland Unified School District (District) adopted a report justifying collection of higher fees, up to the legal maximum fee of $3.20 per square foot of residential development as authorized by Government Code Section 65995 (Level I fees), and the legal maximum fee of $0.51 per square foot of development on all categories of commercial/industrial development (except rental self-storage). The District's justification for collecting the maximum fees on future residential and commercial/industrial development is based, among other matters, on the substantial capital investments needed for classroom facilities, and the need to offset the ongoing capital facility improvements needed to support a Full Service Community School District that future residential and commercial/industrial development in the City is projected to create. The Fee Justification Report includes detailed information regarding the cost of providing school facilities for students generated by future residential and commercial/industrial development in order to justify the collection of fees on

[26] State Allocation Board (SAB) Meeting Actions, 2010 - Developer Fee Adjustment, available online at http://www.cashnet.org/news/article.esiml?id=1368, accessed July 20, 2012.

[27] Public Hearing and Adoption by the Board of Education of Resolution No.1213-0090 - Approving the School Facility Fee Justification Report for Residential, Commercial and Industrial Development Projects

those developments, and explains the relationship between the fees and the developments on which those fees are to be charged.

State Public Park Preservation Act

The primary instrument for protecting and preserving parkland is the State Public Park Preservation Act. Under the Public Resources Code, cities and counties may not acquire any real property that is in use as a public park for any non-park use unless compensation or land, or both, are provided to replace the parkland acquired. This provides for no net loss of parkland and facilities.

California Fire Code

The California Fire Code (Title 24, Part 9 of the California Code of Regulations) establishes regulations to safeguard against hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises. The provisions of the Fire Code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure throughout the State of California. The Fire Code includes regulations regarding fire-resistance-rated construction, fire protection systems such as alarm and sprinkler systems, fire services features such as fire apparatus access roads, means of egress, fire safety during construction and demolition, and wildland-urban interface areas.

Quimby Act

California Government Code Section 66477, Subdivision Map Act, referred to as the Quimby Act, permits local jurisdictions to require the dedication of land and/or the payment of in-lieu fees solely for park and recreation purposes. The dedication of land or in-lieu fees may be required for land or condominium subdivisions. The dedication of land or in-lieu fees is not to exceed the proportionate amount necessary to provide 3 acres of neighborhood and community parkland per 1,000 persons. Dedication requirements may be increased if the existing ratio of parkland per 1,000 persons at the time of adoption of a City's local park land dedication ordinance exceeds that ratio, but may not exceed 5 acres per 1,000 persons. Land dedicated and fees collected pursuant to the Quimby Act may only be used for developing new, or rehabilitating existing park or recreational facilities. The City of Oakland does not have a park land dedication requirement pursuant to the Quimby Act.

City of Oakland

City of Oakland General Plan

The following City of Oakland General Plan Land Use and Transportation Element policies are relevant to the public services impacts of the proposed Specific Plan:

> *Policy N.12.1:* The development of public facilities and staffing of safety-related services, such as fire stations, should be sequenced and timed to provide a balance between land use and population growth, and public services at all times.
>
> *Policy N.12.2:* Adequate public school capacity should be available to meet the needs of Oakland's growing community. The City and the Oakland Unified School District (OUSD) should work together to establish a continuing procedure for coordinating residential and commercial development and exploring the imposition of mutually agreed upon reasonable and feasible strategies to provide for adequate school capacity. The City and OUSD should jointly consider, where feasible and appropriate, funding mechanisms such as assessment districts,

redevelopment Agency funding (AB1290), uses of surplus City-owned land, bond issues, and adjacent or shared use of land or school facilities with recreation, libraries, child care and other public uses.

Policy N.12.5: In its capital improvement and public service programs, the City should give priority to reducing deficiencies in, and disparities between, existing residential areas.

Policy FI-1: Maintain and enhance the City's capacity for emergency response, fire prevention and fire fighting.

The following Open Space, Conservation and Recreation (OSCAR) Element policies are relevant to the parks and recreation impacts of the proposed Specific Plan:

Policy REC-3.1: Use level of service standards of 10 acres of total parkland and 4 acres of local-serving parkland as a means of determining where unmet needs exist and prioritizing future capital investments.

Policy REC-3.3: Consider a range of factors when locating new parks or recreational facilities, including local recreational needs, projected operating and maintenance costs, budgetary constraints, surrounding land uses, citizen wishes, accessibility, the need to protect or enhance a historic resource, and site visibility.

Policy REC-5.2: Safety-Oriented Design. Use a wide range of physical design solutions to improve safety at Oakland's parks, including lighting, signage, landscape design, fencing, vandal-resistant building materials, and emergency response features.

Policy REC-5.3: Law Enforcement. Improve law enforcement of Oakland's parks through a combination of new rangers, reserve officers, neighborhood watch groups, coordination with East Bay Regional Park District rangers, and better communication between enforcement officers and neighborhood residents.

Policy REC-S.4: Civic Responsibility. Promote civic responsibility among residents in the care of Oakland's parks and encourage broad community participation in making parks safer.

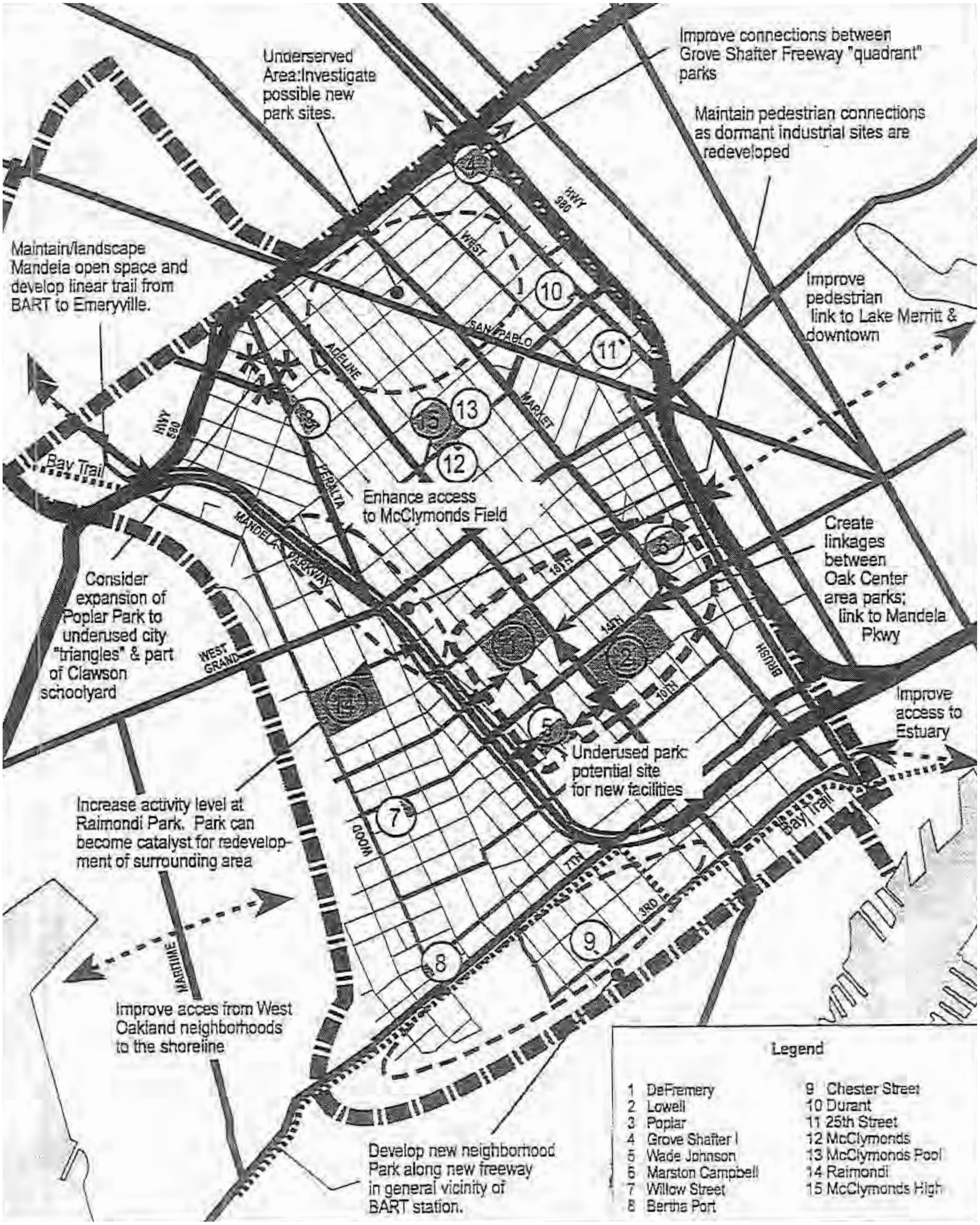
Policy REC-10.2: To the extent permitted by law, require recreational needs created by future growth to be offset by resources contributed by that growth. In other words, require mandatory land dedication for large-scale residential development and establish a park impact fee for smaller-scale residential development projects, including individual new dwelling units. Calculate the dedication or fee requirement based on a standard of 4 acres of local-serving parkland per 1,000 residents.

The OSCAR Element also contains the following principles relevant to the proposed Specific Plan:

- A park should be available within walking distance of every Oakland resident. No person should have to travel too far from home to gain access to recreational services.
- Recreation needs created by new development should be offset by resources contributed by that growth. In other words, new development should pay its fair share to meet the increased demand for parks resulting from that development.

Some of the key OSCAR Element recommendations for West Oakland are shown in **Figure 4.9-3**.[28]

[28] City of Oakland, City of Oakland General Plan Open Space, Conservation and Recreation Element, 1996, pages 5-7 and 5-9.



Source: City of Oakland General Plan - Open Space, Conservation and Recreation Element

Figure 4.9-3
OSCAR Element Recommendations for West Oakland

City of Oakland Violence Prevention Plan

The City's Violence Prevention Plan, first adopted in 1996 and updated in 2003, proposes prevention and intervention efforts that complement traditional policing and the criminal justice system. It is focuses on areas that have been most prone to violent crime, and proposes multi-disciplinary strategies such as providing alternatives for youth, addressing family violence and sexual assault, establishing programs for offenders, reducing access to illegal guns, reducing the impacts of alcohol and drugs, and supporting community-building and problem-solving initiatives.

Standard Conditions of Approval

The City's Standard Conditions of Approval relevant to public services are listed below. These Standard Conditions of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area when it is approved by the City and would avoid or reduce significant impacts related to public services and recreation. The Standard Conditions and Approval are incorporated and required as part of development in accordance with the Specific Plan, so they are not listed as mitigation measures. Where there are impacts associated with development in accordance with the Specific Plan that would result in significant environmental impacts despite implementation of the Standard Conditions of Approval, additional mitigation measures are recommended.

SCA 4: Conformance with other Requirements.

Prior to issuance of a demolition, grading, P-job, or other construction related permit

a. The project applicant shall comply with all other applicable federal, state, regional and/or local laws/codes, requirements, regulations, and guidelines, including but not limited to those imposed by the City's Building Services Division, the City's Fire Marshal, and the City's Public Works Agency. Compliance with other applicable requirements may require changes to the approved use and/or plans. These changes shall be processed in accordance with the procedures contained in SCA 3, Scope of This Approval, Major and Minor Changes.

b. The applicant shall submit approved building plans for project-specific needs related to fire protection to the Fire Services Division for review and approval, including, but not limited to automatic extinguishing systems, water supply improvements and hydrants, fire department access, and vegetation management for preventing fires and soil erosion.

SCA 5: Conformance to Approved Plans; Modification of Conditions or Revocation.

Ongoing

a. Site shall be kept in a blight/nuisance-free condition. Any existing blight or nuisance shall be abated within 60-90 days of approval, unless an earlier date is specified elsewhere.

b. The City of Oakland reserves the right at any time during construction to require certification by a licensed professional that the as-built project conforms to all applicable zoning requirements, including but not limited to approved maximum heights and minimum setbacks. Failure to construct the project in accordance with approved plans may result in remedial reconstruction, permit revocation, permit modification, stop work, permit suspension or other corrective action.

c. Violation of any term, conditions/mitigation measures or project description relating to the Approvals is unlawful, prohibited, and a violation of the Oakland Municipal Code. The City of Oakland reserves the right to initiate civil and/or criminal enforcement and/or abatement proceedings, or after notice and public hearing, to revoke the Approvals or alter these conditions/mitigation measures if it is found that there is violation of any of the conditions/mitigation measures or the provisions of the Planning Code or Municipal Code, or the project operates as or causes a public nuisance. This provision is not intended to, nor does it, limit in any manner whatsoever the ability of the City to take appropriate enforcement actions. The project applicant shall be responsible for paying fees in accordance with the City's Master Fee Schedule for inspections conducted by the City or a City-designated third-party to investigate alleged violations of the Conditions of Approval.

SCA 61: Site Review by the Fire Services Division.

Prior to the issuance of demolition, grading or building permit

The project applicant shall submit plans for site review and approval to the Fire Prevention Bureau Hazardous Materials Unit. Property owner may be required to obtain or perform a Phase II hazard assessment.

SCA 71: Fire Safety Phasing Plan.

Prior to issuance of a demolition, grading, and/or construction and concurrent with any p-job submittal permit

The project applicant shall submit a separate fire safety phasing plan to the Planning and Zoning Division and Fire Services Division for their review and approval. The fire safety plan shall include all of the fire safety features incorporated into the project and the schedule for implementation of the features. Fire Services Division may require changes to the plan or may reject the plan if it does not adequately address fire hazards associated with the project as a whole or the individual phase.

SCA 73: Fire Safety.

Prior to and ongoing throughout demolition, grading, and/or construction

The project applicant and construction contractor will ensure that during project construction, all construction vehicles and equipment will be fitted with spark arrestors to minimize accidental ignition of dry construction debris and surrounding dry vegetation.

Impacts, Standard Conditions of Approval and Mitigation Measures

Significance Criteria

According to the City's Thresholds of Significance, the Specific Plan would have a significant impact related to public services and recreation if it would:

1. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, 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:
    a. Fire protection;
    b. Police protection;
    c. Schools; or
    d. Other public facilities;
2. Increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
3. Include recreational facilities or require the construction or expansion of recreational facilities which might have a substantial adverse physical effect on the environment.

Methodology and Assumptions

This EIR addresses impacts to public services due to projected growth arising from land use changes resulting from the proposed Plan. The analysis considered existing public safety services, schools, and other community facilities, as well as current General Plan policies, City of Oakland SCA, and other applicable regulations. Plan buildout estimates and policies are compared with service levels to identify potential impacts.

Fire Protection

Impact PSR-1: Development under the Specific Plan would result in an increase in OFD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios. Until the timing, location, size and characteristics of any associated facilities expansion needs can be identified, the environmental impacts related to such new facilities would be too speculative for evaluation. If and when any proposal for expanded or new OFD facilities is identified, it may require its own environmental review under CEQA. With implementation of the City's Standard Conditions of Approval, normal development review and permitting procedures, and building and fire code requirements, the impacts of the Specific Plan related to fire protection would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Planning Area. This additional development would result in an estimated 11,136 new residents and 14,850 new jobs in the Planning Area by 2035. This additional development would result in an associated increase in service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios.

Development under the Specific Plan would be subject to the policies, regulations, standards and Standard Conditions of Approval of the City, including appropriate standards for emergency access roads, emergency water supply, and fire preparedness, capacity, and response. SCA 4, *Conformance with other Requirements*, requires building plans for development projects to be submitted to the OFD for review and approval. SCA 61, *Site Review by the Fire Services Division*, and SCA 71, *Fire Safety Phasing Plan,* also require OFD approval to ensure that project site design and fire safety features adequately address fire hazards. SCA 73, *Fire Safety*, requires spark arrestors on construction equipment to reduce the risk of construction-period fires. In addition, new developments may incorporate up-to-date fire protection features and technology (e.g., smoke alarms, interior sprinkling systems). The Specific Plan would also bring additional annual revenue to the City in the form of increased local property taxes and sales taxes that would help offset the increased demand for fire and emergency medical services by funding increases in firefighters, administrative personnel, training, and equipment.

With required implementation of the City's Standard Conditions of Approval, normal development review and permitting procedures, and building and fire code requirements, the impacts of the Specific Plan related to fire protection would be less than significant.

Until any specific facilities expansion needs can be identified in terms of timing, location, size and characteristics, assessment of associated environmental impacts would be too speculative for evaluation. If and when any proposal for expanded or new OFD facilities is identified by the City, it may require its own environmental review under CEQA.

Mitigation Measures

None required

Police Protection

Impact PSR-2: Development under the Specific Plan would result in an increase in OPD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios. Until the timing, location, size and characteristics of any associated facilities expansion needs can be identified, the environmental impacts would be too speculative for evaluation. If and when any proposal for expanded or new OPD facilities is identified, it may require its own environmental review under CEQA. The Specific Plan may reduce crime by incorporating crime prevention through environmental design (CEPTD) principles and up-to-date security features and technology in new development, and by economic growth and revitalization, and increased employment and personal income. The impacts of the Specific Plan related to police protection would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Opportunity Areas. This additional development would result in an estimated 11,136 new residents and 14,850 new jobs in the Planning Area by 2035. This additional population would result in an associated increase in service calls and a commensurate incremental need for additional staffing and equipment to maintain the City's police response time goals.

Development under the Specific Plan would result in an increase in service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios. Until the timing, location, size and characteristics of any associated facilities expansion needs can be identified, the environmental impacts would be too speculative for evaluation. If and when any proposal for expanded or new OPD facilities is identified, it would require its own environmental review under CEQA.

In addition, by revitalizing and activating the Planning Area, the Specific Plan may help reduce crime as more people are brought into the areas on a more constant basis, municipal services and infrastructure are upgraded, and newer developments incorporate crime prevention through environmental design (CEPTD) principles and up-to-date security features and technology. In addition, the potential economic growth and revitalization, and increased employment and personal income resulting from the Specific Plan may serve to reduce crime. The Specific Plan would bring additional annual revenue to the City in the form of increased local property taxes and sales taxes that would help offset the increased demand for police service by funding increases in police personnel, training, and equipment.

The impacts of the Specific Plan related to police protection would be less than significant.

Mitigation Measures

None required

Schools

Impact PSR-3: Development in accordance with the Specific Plan would generate additional students attending the Oakland Unified School District (OUSD) incrementally through 2035 or longer. The OUSD collects school impact fees from residential and non-residential development. Under

California Government Code Sections 65995, 65996(a) and 65996(b), payment of these fees is deemed to be full and complete mitigation. Therefore, the impact of the Specific Plan related to schools would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Opportunity Areas. This additional development would result in an estimated 11,136 new residents and 14,850 new jobs in the Planning Area by 2035. This residential development would generate approximately 718 new elementary school students, 305 middle school students and 370 new high school students (a total of 1,395 students) attending the OUSD.

These new students would be added to district-wide enrollment through 2035 or longer. New students would be distributed among the schools serving OUSD Region 1, thereby reducing substantial enrollment impacts to any one school. Given the declining student enrollment in OUSD schools, the District is likely to have capacity within its existing facilities to accommodate new students generated by projects constructed pursuant to the Specific Plan. If classroom capacity within the specific schools serving the Planning Area were found to be unavailable at the time new students enter the school system, the OUSD could reassign students among schools within the District, expand year-round schooling, add more portable classrooms, transport students to less crowded schools, or find opportunities to more efficiently use existing or abandoned school facilities.

As authorized by California Government Code Sections 65995, 65996(a) and 65996(b), the OUSD collects school impact fees from developers of new residential and non-residential building space. The permitted method for addressing school enrollment increase impacts is limited to the statutory authority of school districts to impose school impact fees. California Government Code Sections 65995, 65996(a) and 65996(b) have preempted and limited the ability of local governments to exercise their police power to mitigate school impacts. A local government may not impose development requirements regarding school facilities in a manner inconsistent with state statutes on the subject. Therefore, under current statutes and case law, payment of the required school impact fees would address the impact of the Specific Plan on school services to the furthest extent permitted by law. School impact fees are collected when building permits are issued.

The courts have held that increased classroom enrollment resulting in school overcrowding is considered a "social" rather than a physical "environmental" impact and is not, in itself, a significant environmental impact requiring mitigation under CEQA (Goleta Union School District vs. Regents of University of California [2d Dist. 1995]). The duty of a lead agency to mitigate school impacts beyond the state-mandated fees arises only where there is a physical environmental impact involved beyond the mere addition of students to a school. Without definitive, detailed information on specific future school district facility expansion plans, such secondary physical environmental impacts would be too speculative to evaluate at this time.

The OUSD collects school impact fees from residential and non-residential development within the Planning Area. Under California Government Code Sections 65995, 65996(a) and 65996(b), payment of these fees is deemed to be full and complete mitigation. Therefore, the impact of the Specific Plan related to schools would be less than significant.

Mitigation Measures

None required

Parks and Recreation

Impact PSR-4: Development under the Specific Plan would generate a need for additional parkland, adding to the existing deficiency of parkland acreage, and would increase the use of existing parks and recreational facilities. No new public parks or recreational facilities are proposed as part of the Specific Plan. The increased demand would occur incrementally over the 25-year timeframe of the Specific Plan. Parks and recreational facilities may be required as part of new development projects and on-site useable open space or recreational facilities in new residential developments may offset some of the need. Parkland, recreational facilities and recreational trail links are proposed within and adjacent to the Planning Area as part of the planned Gateway Park. The Specific Plan would not be expected to increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities may occur or be accelerated. Therefore, the parks and recreation impacts of the updated Specific Plan would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Opportunity Areas. This additional development would result in an estimated 11,136 new residents and 14,850 new jobs in the Planning Area by 2035.

The new residents and workers resulting from the Specific Plan would generate a need for additional parkland and recreational facilities, which would occur incrementally over the timeframe of the Specific Plan. Using the City's adopted standard of 4 acres of active, local-serving parkland per 1,000 persons, this growth and development would generate an increased demand for approximately 44.5 acres of new parkland. The additional demand for parkland would add to the existing deficiency of parkland acreage in West Oakland, which would continue to fall short of the General Plan parkland acreage standard. The additional demand would also increase the use of existing parks or other recreational facilities.

Parks and recreational facilities may be required as part of new development projects. On-site useable open space as required by zoning or recreational facilities in some new residential developments may offset some of the need. The approved Wood Street Mixed Use Project, for example, includes 1.39 acres of public open space and 2.82 acres of private open space. The Specific Plan would also bring additional annual revenue to the City in the form of increased local property taxes and sales taxes that would help fund new or expanded parks and recreational facilities.

No new public parkland or recreational facilities are proposed as part of the Specific Plan. Preliminary plans for the proposed Gateway Park include recreational areas and trail links within and immediately adjacent to the Planning Area. The September 2012 Gateway Park Project Concept Report proposes active recreation areas in the Maze/West Oakland area of the park (the Specific Plan identifies this location for development of employment or retail uses) and a new elevated/bike path adjacent to West Grand Avenue that would connect West Oakland to the core waterfront areas of the park, and to bicycle and pedestrian access on the new East Span of the Bay Bridge. The Concept Report acknowledges that the level and scale of the amenities in this area is dependent upon the type of development that occurs in the surrounding area. With or without the proposed active recreation areas in the Maze/West Oakland area of the planned Gateway Park, the other recreational areas and trail links would make a substantial contribution toward meeting the existing parkland and recreational need in West Oakland as well as the need for additional parkland and recreational facilities caused by the Specific Plan.

Implementation of the Specific Plan goals and policies would also make important contributions to the community's parks and public realm environment. The Specific Plan calls for new private open space areas, landscaped corridors, pedestrian connections, and other enhancements of the public realm. The

Specific Plan policies are intended to ensure that community spaces throughout the Planning Area are designed to be welcoming to pedestrians and are well integrated with their surrounding neighborhoods. Temporary construction period traffic, noise, air quality, water quality, and other potential impacts associated with these public realm improvements are evaluated in this EIR and would be mitigated through the City's Standard Conditions of Approval and other regulations.

Mitigation Measures

None needed

Cumulative Impacts

Impact PSR-1: Cumulative development would contribute to an increase in calls for police and fire service, additional students attending the Oakland Unified School District (OUSD), and a need for additional parkland, and would increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities may occur or be accelerated. Until any specific OFD and OPD facilities expansion needs can be identified in terms of timing, location, size and characteristics, assessment of associated environmental impacts would be too speculative for evaluation. With implementation of the City's Standard Conditions of Approval, normal development review and permitting procedures, and building and fire code requirements, cumulative impacts related to fire protection and police protection would be less than significant. Under California Government Code Sections 65995, 65996(a) and 65996(b), payment of school impact fees is deemed to be full and complete mitigation. Therefore, cumulative impacts related to schools would be less than significant. The cumulative impact on parks and recreational facilities may be significant. However, the increased demand would occur incrementally over the 25-year timeframe of the Specific Plan, on-site useable open space or recreational facilities in new residential developments may offset some of the need, and parkland, recreational facilities and recreational trail links will be provided within and adjacent to the Planning Area as part of the planned Gateway Park. Therefore, the Specific Plan would not be expected to increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities may occur or be accelerated, and the contribution of the Specific Plan to the identified significant cumulative impact on parks and recreational facilities would be less than considerable and thus less than significant. (**LTS**)

West Oakland Planning Area

Development facilitated by the Specific Plan, together with other projected development throughout West Oakland, would result in the development of up to an additional 5,090 housing units within West Oakland Specific Plan Opportunity Areas, and 1,755 new housing units throughout the remainder of West Oakland, for a total of 6,845 new West Oakland housing units. It would also result in the creation of 16,500 new jobs within West Oakland Specific Plan Opportunity Areas, and approximately 2,000 new jobs throughout the remainder of West Oakland, for a total of 18,500 new West Oakland jobs (see Chapter 4.8: Population and Housing).

Fire Protection and Police Protection

Cumulative development throughout West Oakland would contribute to an increase in calls for police and fire service and a commensurate incremental need for additional staffing, equipment and facilities to maintain response time goals and staffing ratios.

Development under the Specific Plan would be subject to the policies, regulations, standards and Standard Conditions of Approval of the City, including appropriate standards for emergency access roads, emergency water supply, and fire preparedness, capacity, and response. New developments may incorporate up-to-date fire protection features and technology (e.g., smoke alarms, interior sprinkling systems). Development would bring additional annual revenue to the City in the form of increased local property taxes and sales taxes that would help offset the increased demand for fire and emergency medical services by funding increases in firefighters, administrative personnel, training, and equipment. In addition, new development would be required to incorporate design features identified in the California Building Code, and the OFD reviews and comments on the design of any project that could affect fire or public safety. New development may reduce crime by incorporating crime prevention through environmental design (CEPTD) principles and up-to-date security features and technology, and by economic growth and revitalization, and increased employment and personal.

Cumulative fire service impacts would also be reduced by mitigation measures applicable to redevelopment of the former Oakland Army Base. Mitigation Measure 4.9-1 of the July 2002 Final Environmental Impact Report of the Oakland Army Base Area Redevelopment Plan would require the City and the Port of Oakland to cooperatively investigate the need for, and if required, fund on a fair-share basis, the development and operation of increased fire fighting and medical emergency response services via fireboat to serve the former Army Base. The City and Port would also be allowed to develop fee formulae to recoup initial investment from future development or tenants, as well as a long-term cost-sharing formula to equitably distribute the cost of continuing operations.[29]

Until any specific facilities expansion needs can be identified in terms of timing, location, size and characteristics, assessment of associated environmental impacts would be too speculative for evaluation. If and when any proposal for expanded or new OFD or OPD facilities is identified by the City, it would require its own environmental review under CEQA.

With implementation of the City's Standard Conditions of Approval, normal development review and permitting procedures, and building and fire code requirements, cumulative impacts related to fire protection and police protection would be less than significant.

Schools

Cumulative development throughout West Oakland would generate additional students attending the Oakland Unified School District (OUSD). The OUSD collects school impact fees from residential and non-residential development. Under California Government Code Sections 65995, 65996(a) and 65996(b), payment of these fees is deemed to be full and complete mitigation. If classroom capacity within the specific schools serving the Planning Area were unavailable at the time new students enter the school system, the OUSD could reassign students, expand year-round schooling, add portable classrooms, transport students to less crowded schools, or more efficiently use existing or abandoned school facilities. The duty of a lead agency to mitigate school impacts beyond the state-mandated fees arises only where there is a physical environmental impact involved beyond the mere addition of students to a school. Without definitive, detailed information on any needed future school district facility expansion plans, such secondary physical environmental impacts would be too speculative to evaluate at this time. Therefore, cumulative impacts related to schools would be less than significant.

[29] City of Oakland, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012, p. 342.

Parks and Recreation

Cumulative development throughout West Oakland would generate a need for additional parkland, adding to the existing deficiency of parkland acreage, and would increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities may occur or be accelerated. The cumulative impact on parks and recreational facilities may be significant. Parkland, recreational facilities and recreational trail links are proposed to be provided within and adjacent to the Planning Area as part of the planned Gateway Park. The Specific Plan also proposes improvements to the public realm environment. Parks and recreational facilities may be required as part of new development projects and on-site useable open space or recreational facilities in new residential developments may offset some of the need. Therefore, the Specific Plan would not be expected to increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities may occur or be accelerated, and the contribution of the Specific Plan to the identified significant cumulative impact on parks and recreational facilities would be less than considerable and thus less than significant.

Findings of the Housing Element Initial Study

The most recent Housing Element update was the subject of an Initial Study of environmental effects, completed in 2009, and a Draft EIR completed in 2010. The findings of this analysis are relevant because they are recent and because they consider housing development on a range of potential development sites including in the Planning Area.

The Housing Element Initial Study determined that the development of the identified housing opportunity sites may result in the need for new or expanded fire, police, school, and park facilities. The construction of new or expanded fire, police, school or park facilities could result in adverse environmental impacts. However, all future development would occur pursuant to General Plan policies, Municipal Code regulations, mitigation measures adopted for the LUTE EIR, and the SCAs that would reduce the potential impact on services to less than significant levels. Moreover, separate CEQA review would be implemented, as needed, for new construction as required by State law, and additional mitigation measures would be imposed to reduce impacts. As such, the Housing Element Initial Study concluded that impacts on public services would be less than significant.

Mitigation Measures

None required

4.10

Transportation & Circulation

This chapter describes the effects of the proposed West Oakland Specific Plan (the Project) on the existing, and future (2035) transportation and circulation system. The analysis of this programmatic EIR analysis focuses on the impacts on key intersections and roadway segments. Future development proposed in the Project area may require supplemental transportation and circulation analysis to assess localized impacts. Figure **4.10-1** illustrates the location of the West Oakland Specific Plan Planning Area (Plan Area) and the local and regional street system. The analysis was conducted in compliance with City of Oakland, City of Emeryville, and Alameda County Transportation Commission (ACTC) guidelines.

Existing Setting

The existing roadway, transit, bicycle and pedestrian components of the transportation system within the study area are described below.

Existing Roadway Network

Regional vehicular access to the site is provided by a freeway system that serves the northwest area of Oakland including Interstate 80 (I-80), Interstate 580 (I-580), Interstate 880 (I-880), Interstate 980 (I-980) and State Route 24 (SR-24). These freeways and other key roadways in the study area are shown in **Figure 4.10-1** and described below.

I-80 is a major transcontinental freeway spanning between California and New Jersey. In the Bay Area, it serves San Francisco and east bay destinations in Alameda, Contra Costa and Solano Counties. I-80 is connected to the West Oakland Plan Area by freeway ramps that terminate at the West Grand Avenue/I-880 Frontage Road intersection. I-80, west of the Plan Area, carries approximately 242,000 vehicles daily to San Francisco.

I-580 is a major east-west freeway connecting the Bay Area and the Central Valley. From the Plan Area, it extends northwest to US 101 in San Rafael in Marin County via a joint segment with I-80 between Emeryville and Richmond. It also extends southeast to Interstate 5 in San Joaquin County south of Tracy through cities as San Leandro, Pleasanton, and Livermore. Access to/from the Plan area is provided via the West Grand Avenue/I-80 ramps, West Street/San Pablo Avenue ramps, and I-980. The City of Oakland has placed a heavy truck (over 4.5 tons) restriction on I-580 between Grand and 106th avenues. I-580 carries approximately 118,000 vehicles daily in the Plan Area vicinity.

I-880 serves west Alameda County and Santa Clara County connecting I-80 in Oakland to Interstate 280 (I-280) in San Jose through cities such as Hayward, Fremont, and Milpitas. In San Jose, it continues as State Route 17 south of the I-280 junction. Access to/from the Plan Area is provided by ramps at 5th, 6th and 7th Streets. I-880 connects to west I-80 at the Bay Bridge Toll Plaza. Interchange ramps connect I-880 to Union, Adeline, and Market streets. A connection to I-80 east is provided at the north end of Frontage Road. I-880 carries approximately 123,000 vehicles daily west of the 7th Street junction.

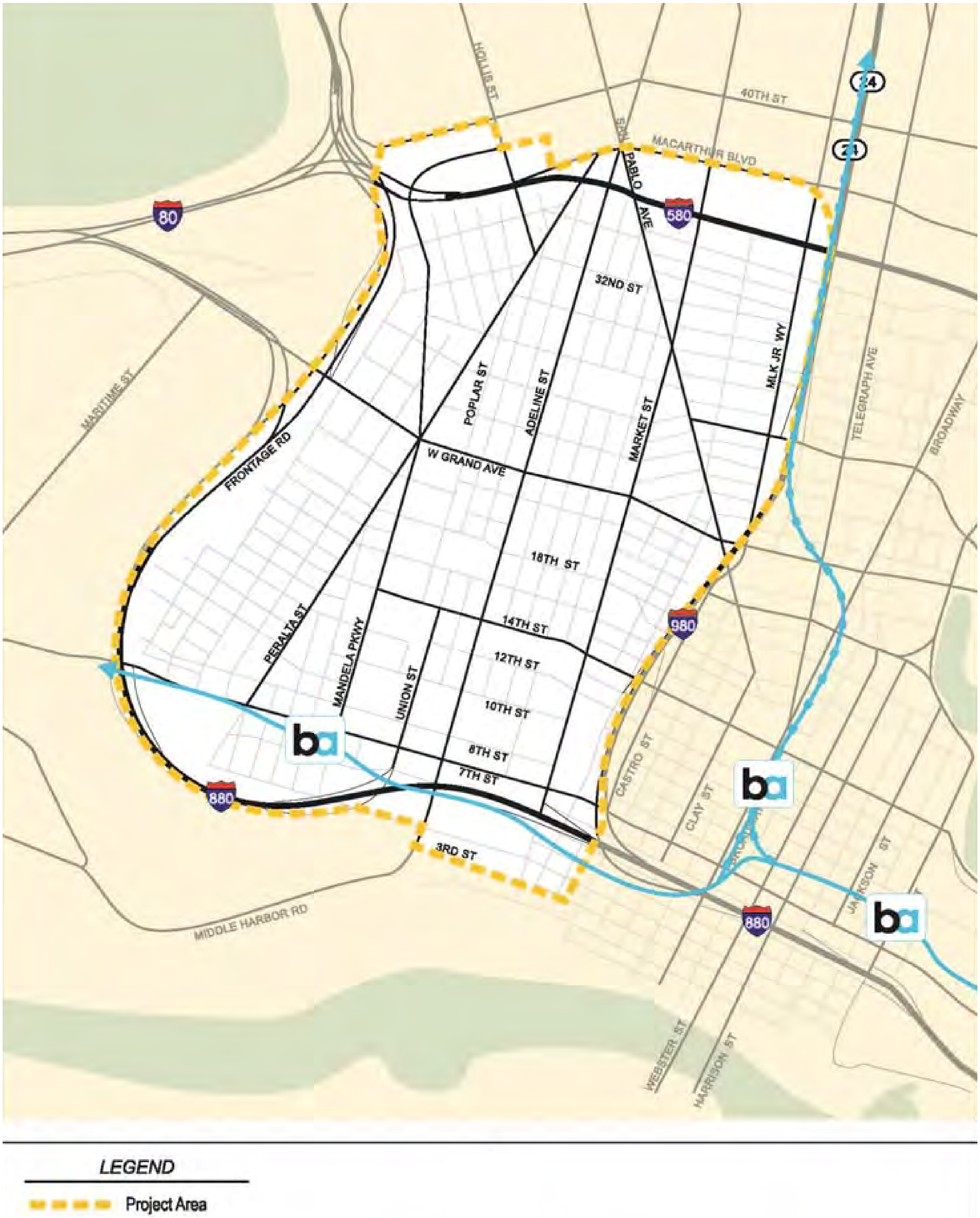


Figure 4.10-1
Local and Regional Street System

Source: Kittleson & Associates

I-980 runs between I-580 and I-880 to the immediate east of the Plan Area. North of I-580, it continues as State Route 24 to Contra Costa County via Caldecott Tunnel. I-980 carries approximately 113,000 vehicles daily just south of I-580.

SR-24 is an eight-lane freeway that connects the East Bay area with central and east Contra Costa County. SR-24 extends from -I980 to I-680 through the Caldecott tunnel and carries approximately 150,000 vehicles daily just west of the Caldecott Tunnel.

7th Street is a four-lane east-west roadway between Parkview Park to the west and Fallon Street in downtown Oakland to the east. East of Fallon Street, it continues as 8th Street. 7th Street operates in a one-way eastbound direction east of Martin Luther King Jr Way and serves local and cross-town traffic for Plan Area traffic. It also provides freeway access to I-880 south.

West Grand Avenue provides access to I-80 to/from the Plan Area. It spans between the I-80 junction/ Maritime Street and Broadway in downtown Oakland, where it continues as Grand Avenue eastward. West Grand Avenue has two travel lanes on each direction with the exception of the segment between Mandela Parkway and Market Street, which has three lanes per direction.

Frontage Road extends between West Grand Avenue and 7th Street along I-880 and serves as the western boundary of the Plan Area. The four-lane, north-south roadway provides access from the Plan area to/from I-80 and I-880.

Mandela Parkway spans between 3rd Street and Hollis Street providing access to Emeryville to the north. It has two travel lanes on each direction between 7th Street and Hollis Street and one lane per direction south of 7th Street. Between 8th and 32nd Streets, a landscaped linear park serves as a wide median island along Mandela Parkway.

Adeline Avenue extends from Shattuck Avenue in Berkeley south through the middle of the Plan area to continue as Middle Harbor Road south of 3rd Street. In the Plan Area, it has two travel lanes per direction.

Market Street is a north-south roadway that spans between Alcatraz Avenue in Berkeley and just south of 1st Street in the Port of Oakland. Landscaped median is provided south of 19th Street and painted median is provided along most of the segment north of Mead Avenue.

Existing Transit Service

Transit service in the Plan Area is provided by Alameda-Contra Costa Transit District (AC Transit) and Bay Area Rapid Transit (BART). These services are described in this section.

AC Transit

AC Transit provides an extensive network of fixed route bus services in Alameda and Contra Costa counties. It also offers Transbay service to destinations in San Francisco, San Mateo and north Santa Clara counties. For the West Oakland area, AC Transit service is comprised of ten transit routes. Seven of these routes are local bus routes, one is an express service to San Francisco, and the final two routes are All-Nighters that operate between about 12:00 AM and 6:00 AM. **Figure 4.10-2** illustrates the AC Transit routes in the Plan Area and **Table 4.10-1** shows the details of each of these routes including their destinations, capacity, and load factor in both directions during both the AM and PM peak period.

Figure 4.10-2
Existing AC Transit Routes

Source: Kittleson & Associates

Table 4.10-1 AC Transit Service Summary

Route	Destinations	Week day Peak Frequency	Vehicle Capacity (Seats)	NB/EB Load Factor		SB/WB Load Factor	
				AM	PM	AM	PM
18	Albany - Montclair	15 min	32	92%	86%	80%	86%
26	Grand Lake Dist - Emeryville	20 min	25	65%	49%	60%	59%
31	Alameda - MacArthur BART	30 min	25	72%	53%	72%	63%
62	Fruitvale - W. Oakland BART	20 min	40	35%	59%	69%	33%
72	Richmond Point - Maxwell Park	30 min	32	63%	73%	84%	62%
72M	Richmond Point - Maxwell Park	30 min	32	66%	80%	97%	59%
88	Berkeley BART - Lake Merritt BART	20 min	40	45%	48%	45%	43%
NL	San Francisco – Eastmont Transit	15-30 min	32	44%	70%	86%	39%
800*	Richmond BART - San Francisco	60 min	40	52%		24%	
802*	Berkeley - Oakland	60 min	40	16%		21%	

* All-nighter bus service, load factor based on transit departures between 1:00 AM and 5:00 AM
AM = Transit departing origins between 7:00 AM and 9:00 AM
PM = Transit departing origins between 4:00 PM and 6:00 PM
Source: AC Transit, December, 2012

The load factor was determined by averaging the maximum load for each trip that had a scheduled departure time from its origin during the AM peak (7-9AM) and the PM peak (4-6PM). For example, if a route had three transit vehicle departures between 7:00 and 9:00 AM and the maximum load was 25, 26, and 27 passengers for these three departures, then the average maximum load was 26 passengers. The load factor percentage was then derived by dividing this value by the capacity of the recommended bus assigned to the route. The capacity information was provided by AC Transit.

As Table 4.10-1 demonstrates, none of the routes with service to West Oakland are currently operating above the available seat capacity. Route 72M is the closest with a load factor of 97 percent for AM transit trips heading SB toward the Maxwell Park area of Oakland. The majority of the remaining routes had load factors between 50 percent and 80 percent.

BART

BART provides the West Oakland area with direct rail transit link to San Francisco and San Mateo counties and the metropolitan areas of Alameda and Contra Costa counties from West Oakland BART station located at the intersection of Mandela Parkway and 7th Street. Weekday service is provided from 4:00 AM to 1:00 AM, while Saturday and Sunday service is provided from 6:00 AM to 1:00 AM, and 8:00 AM to 1:00 AM, respectively. Trains have a typical headway of 15 minutes on weekdays and 20 minutes on Saturday and Sundays.

Existing Pedestrian Network

The City of Oakland's *Pedestrian Master Plan,* adopted in 2002 as a part of the Land Use & Transportation Element of the Oakland General Plan, designates Mandela Parkway, Market Street, and 7th, 8th and 14th Streets in the Plan Area as City Routes, Adeline Avenue and West Street as District Routes, and Wood Street, Campbell Street and 14th (between Wood Street and Campbell Street), 18th, and 28th Streets as Neighborhood Routes. The *Master Plan* provides the following descriptions about these types of routes:

> *"City routes designate streets that are destinations in themselves – places to live, work, shop, socialize and travel. They provide the most direct connections between walking and transit and connect multiple districts in the City."*
>
> *"District routes have a more local function as the location of schools, community centers, and smaller scale shopping. They are often located within a single district and help to define the character of that district."*
>
> *"Neighborhood routes are local streets that connect schools, parks, recreational centers, and libraries. They are places for people to meet and they provide the basis for neighborhood life. They are used for walking to school, walking for exercise, and safe walking at night."*

Existing Bicycle Network

The City of Oakland adopted a *Bicycle Master Plan* in 2007 as a part of the Land Use & Transportation Element of the Oakland General Plan. The Plan set forth an implementation program to improve bicycle connectivity and facilities in Oakland. Since its adoption, the City has installed 18.5 miles of new bikeways (through 2011) and has upgraded another 18.7 miles of facilities. In the Project vicinity, bike lanes (Class 2) are provided on Mandela Parkway, Market Street, 3rd Street, 8th Street, and the portion of 14th Street west of Mandela Parkway. A bike path (Class 1) was installed on 7th Street east of Wood Street. Additional facilities are proposed in West Oakland as shown in **Figure 4.10-3**.

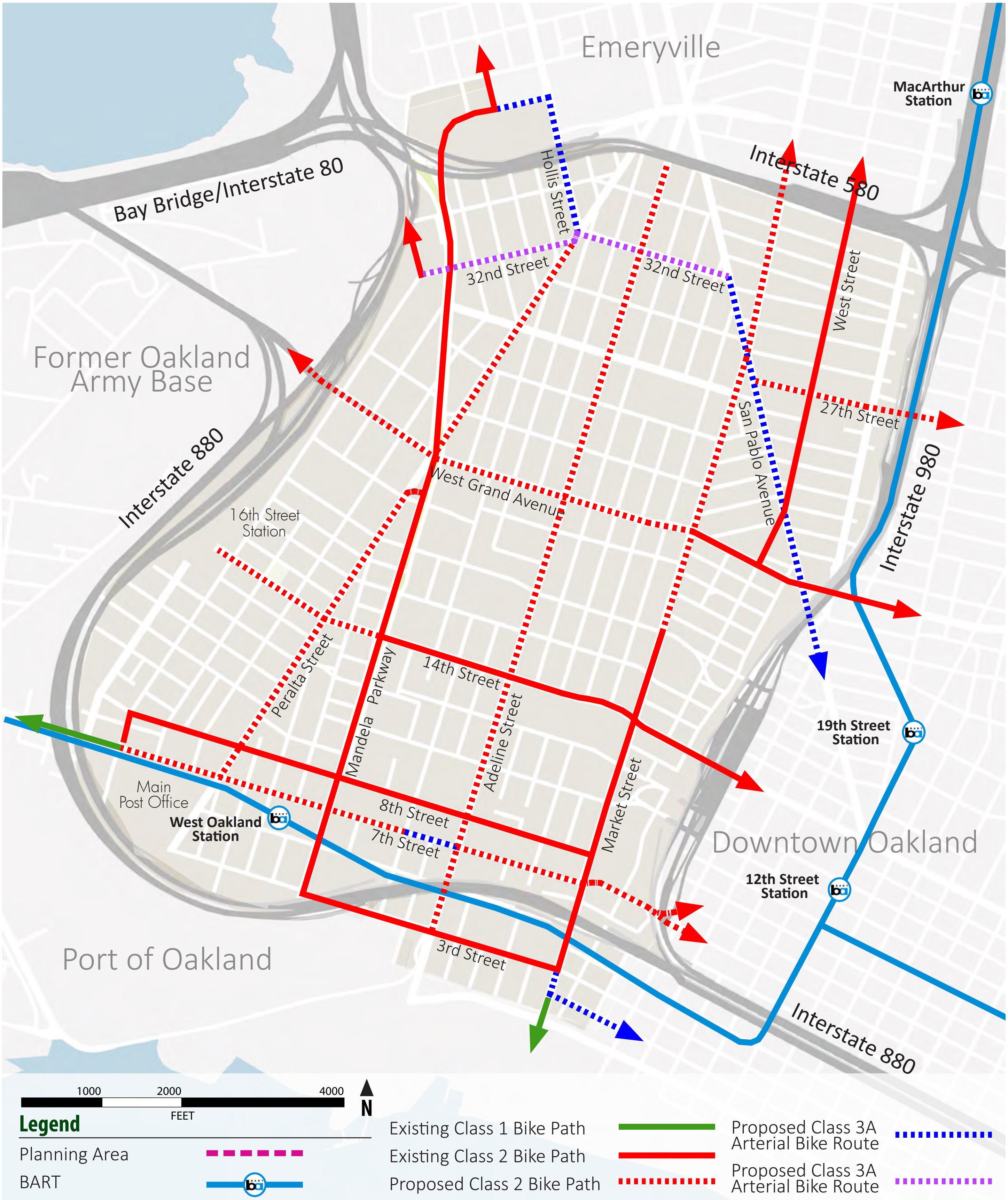


Figure 4.10-3
Bicycle Facilities in West Oakland

Source: Kittleson & Associates

The *Master Plan* provides the following descriptions about three types of bikeways:

> *"Bicycle Paths (Class 1) provide for bicycle travel on a paved right-of-way that is completely separated from the street."*
>
> *"Bicycle Lanes (Class 2) are striped lanes on streets, designated with specific signage and stencils, for the use of bicyclists."*
>
> *"Bicycle Routes (Class 3) designate preferred streets for bicycle travel using lanes shared with motor vehicles."* Arterial Bicycle Routes (Class 3A), Bicycle Boulevards (Class 3B) and Neighborhood Connectors are variations of standard bicycle routes that address issues commonly associated with bicycle routes in Oakland.

Study Locations

A set of intersections, roadway segments, and freeway mainline segments were selected for evaluation based upon anticipated volume and distributional patterns of Project traffic and known locations of operational difficulty. This selection was made in collaboration with the City of Oakland, Public Works Agency staff. Intersections to be included in the study were selected based on those locations which received at least 200 vehicle trips during the peak hours of travel. The study locations are listed below and shown graphically in **Figure 4.10-4.**

Intersections

1. Hollis Street/40th Street^
2. San Pablo Avenue/40th Street^
3. I-980 off-ramp/27th Street*
4. I-980 on-ramp/27th Street*
5. Maritime Street/West Grand Avenue#
6. Frontage Road/West Grand Avenue#
7. Mandela Parkway/West Grand Avenue&
8. Adeline Street/West Grand Avenue~
9. Market Street/West Grand Avenue~
10. San Pablo Avenue/West Grand Avenue*
11. Martin Luther King Jr. Way/West Grand Avenue&
12. Northgate Avenue/West Grand Avenue*
13. Broadway/West Grand Avenue*
14. Harrison Street/West Grand Avenue*
15. Adeline Street/18th Street~
16. Market Street/18th Street~
17. Adeline Street/14th Street~
18. Adeline Street/12th Street~
19. Frontage Road/7th Street#
20. Mandela Parkway/7th Street~
21. Adeline Street/7th Street~
22. Market Street/7th Street~
23. Market Street/5th Street/I-880 off-ramp~
24. Adeline Street/ 5th Street~

Roadway Segments

1. San Pablo Avenue north of 35th Street
2. West Grand Avenue west of I-980
3. West Grand Avenue west of Poplar Street
4. 7th Street west of Market Street
5. 7th Street west of Peralta Street
6. 14th Street west of Market Street
7. 14th Street west of Poplar Street
8. Brush Street south of 11th Street
9. Adeline Street north of West Grand Avenue
10. Martin Luther King Jr. Way north of 27th Avenue

Freeway Mainline Segments

1. I-880 north of 7th Street
2. I-880 south of 7th Street
3. I-880 north of I-980
4. I-880 south of Oak Street
5. I-580 east of I-980/Hwy 24
6. I-580 west of I-980/Hwy 24
7. I-980 south of 27th Avenue

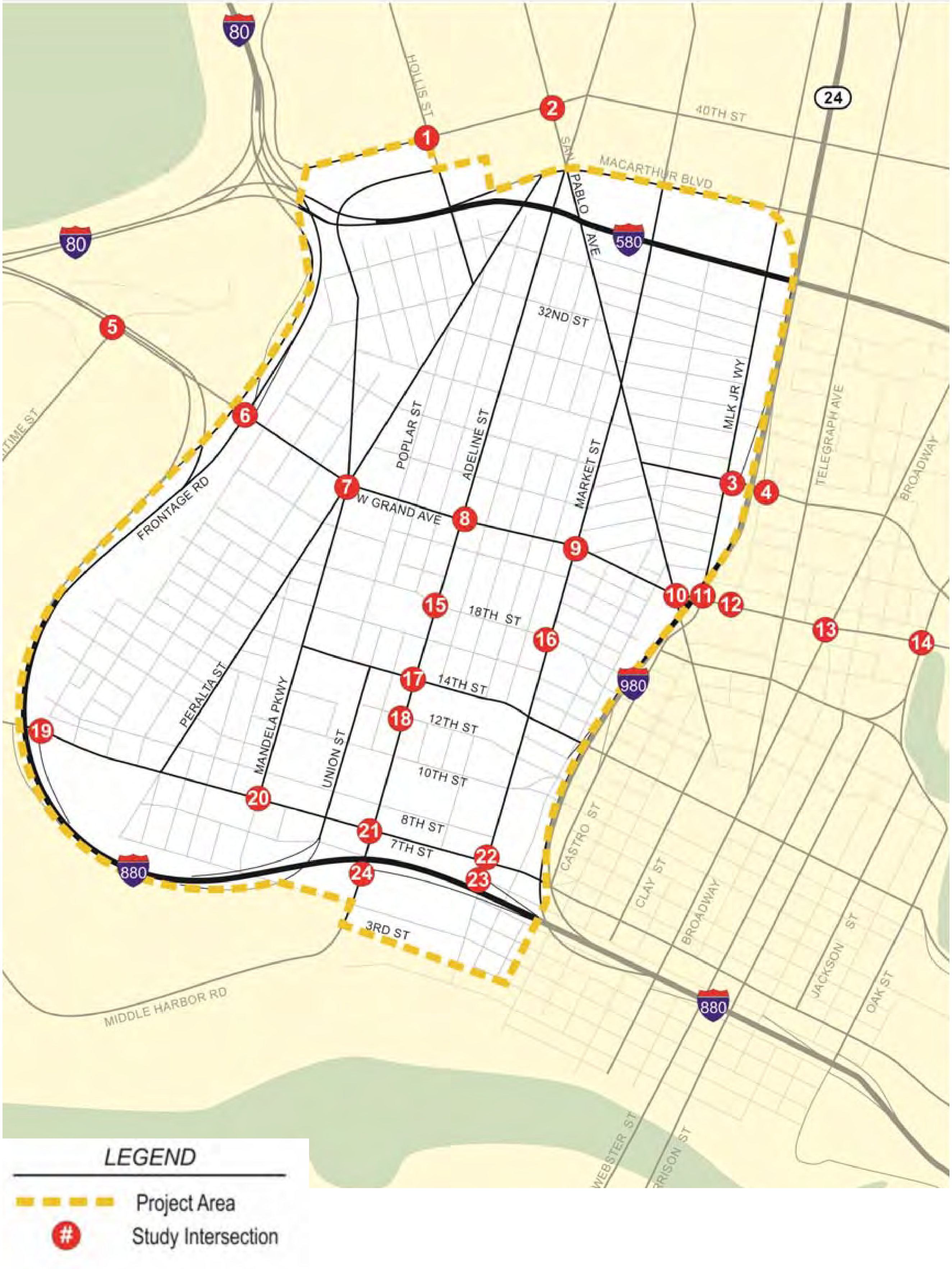


Figure 4.10-4
Study Area Intersection Locations

Source: Kittleson & Associates

Existing Traffic Volumes

Recent peak hour vehicle turning movement volumes, dated between 2008 and 2011, were compiled from a number of sources for the study intersections. Where available, pedestrian and bicycle volumes were also obtained. The data were collected during weekday morning (AM) and afternoon (PM) peak periods with the exception of the two intersections located Emeryville where, instead of AM peak hour data, Saturday (SAT) peak period data were obtained as required for analysis by the City of Emeryville. New vehicle and bicycle turning movement and pedestrian counts were collected during AM (7 am to 9 am) and PM (4 pm to 6 pm) peak periods in November 2012 at locations where recent data are not available. The sources of the counts are denoted by various symbols in the intersection list above:

- *"*" 2008 counts compiled from Emerald View Draft Environmental Impact Report*
- *"#" 2011 counts compiled from Oakland Army Base Draft Environmental Impact Report*
- *"&" 2011 counts compiled from Peralta/Martin Luther King Jr Streetscape Master Plan*
- *"~" New 2012 counts*
- *"^" 2010 counts obtained from City of Emeryville website*

Figure 4.10-5A, B and C shows the intersection vehicle turning movement volumes, and Figure **4.10-6A and B** shows the intersection lane configurations and traffic controls. **Appendix 4.10-A** provides the detailed traffic count data sheets for new counts collected in 2012.

Roadway segment volumes were primarily derived from intersection turning movement volumes of adjacent intersections. A 24-hour machine count was conducted on Adeline Street south of 32nd Street to supplement intersection data. The freeway segment volumes were obtained during November and December 2012 using Caltrans' Performance Measurement System (PeMS). The roadway and freeway segment volumes at the study locations are shown with the level of service summaries in the respective sections below.

Analysis Methodologies and Level of Service Standards

"Levels of service" describe the operating conditions experienced by motorists. Level of service is a qualitative measure of the effect of a number of factors, including speed and travel time, traffic interruptions, freedom to maneuver, driving comfort and convenience. Levels of service are designated "A" through "F" from best to worst, which cover the entire range of traffic operations that might occur. Level of Service (LOS) "A" through "E" generally represents traffic volumes at less than roadway capacity, while LOS "F" represents over capacity and/or forced flow conditions.

Signalized Intersections

Signalized intersection analyses were conducted using the operational methodology outlined in the *Highway Capacity Manual* (Transportation Research Board, Washington, D.C., 2000, Chapters 10 and 16). It was conducted using the Synchro analysis software tool as required by the City. The HCM procedure calculates an average stopped delay per vehicle at a signalized intersection, and assigns a level of service designation based upon the delay. Delay is a complex measure and is dependent upon a number of variables, including the number of vehicles in the traffic stream. It is also dependent on the quality of signal progression, the signal cycle length, and the "green" ratio for each approach or lane group. Table 4.10-2 provides descriptions of the level of service and the corresponding ranges of delays for signalized intersections.

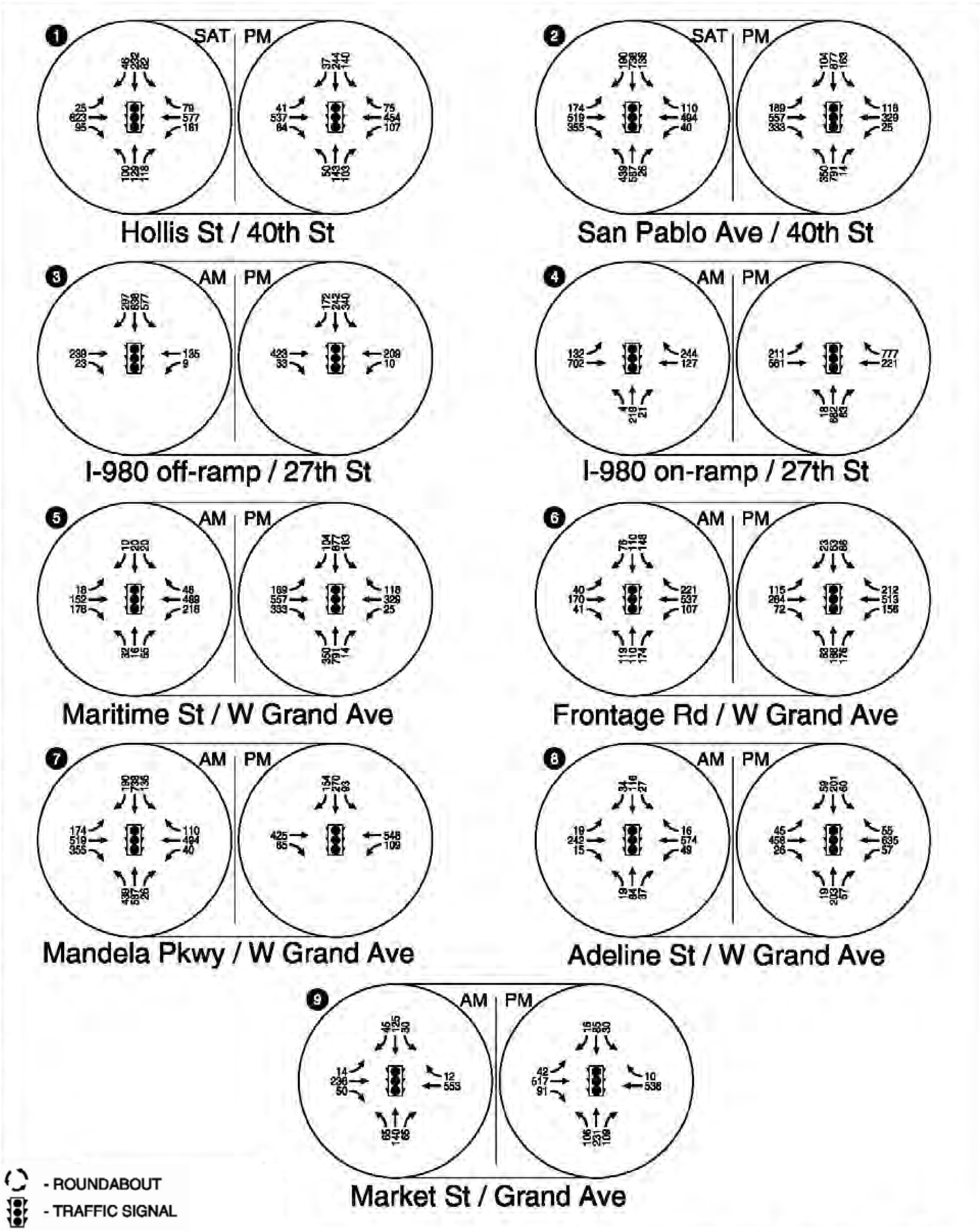


Figure 4.10-5A
Existing Intersection Peak Hour Volumes –
Existing Conditions

Source: Kittleson & Associates

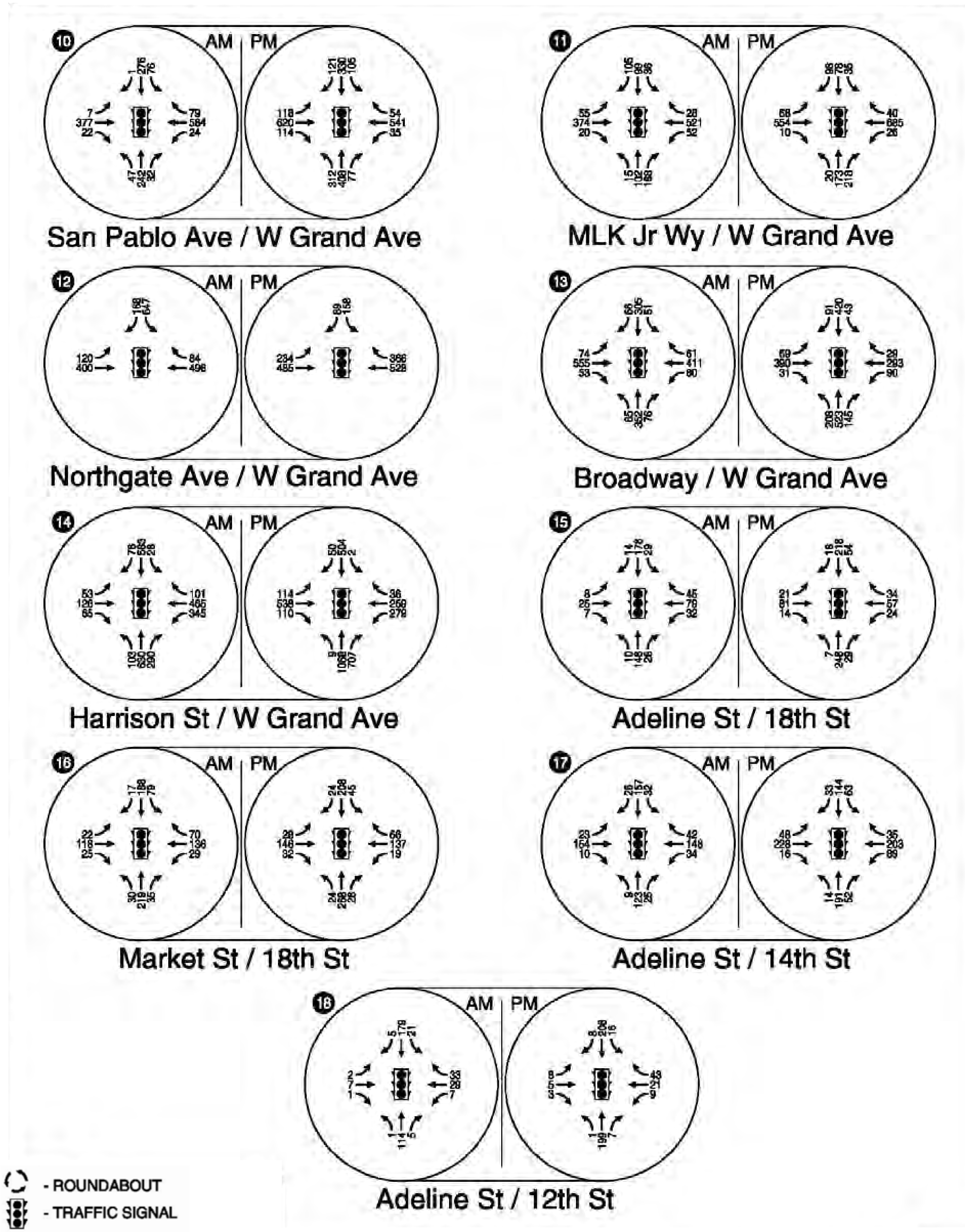


Figure 4.10-5B
Existing Intersection Peak Hour Volumes –
Existing Conditions

Source: Kittleson & Associates

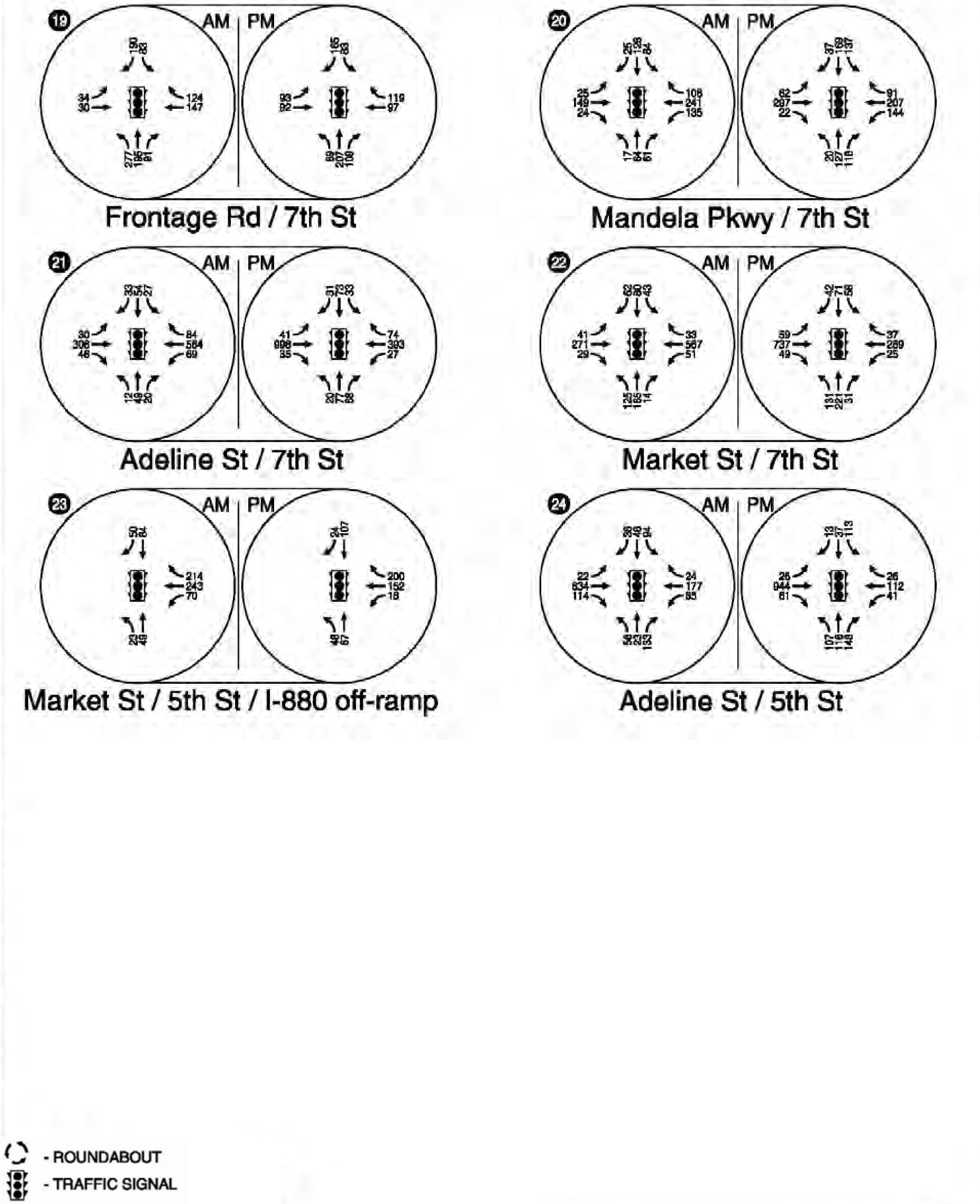


Figure 4.10-5C
Existing Intersection Peak Hour Volumes – Existing Conditions

Source: Kittleson & Associates

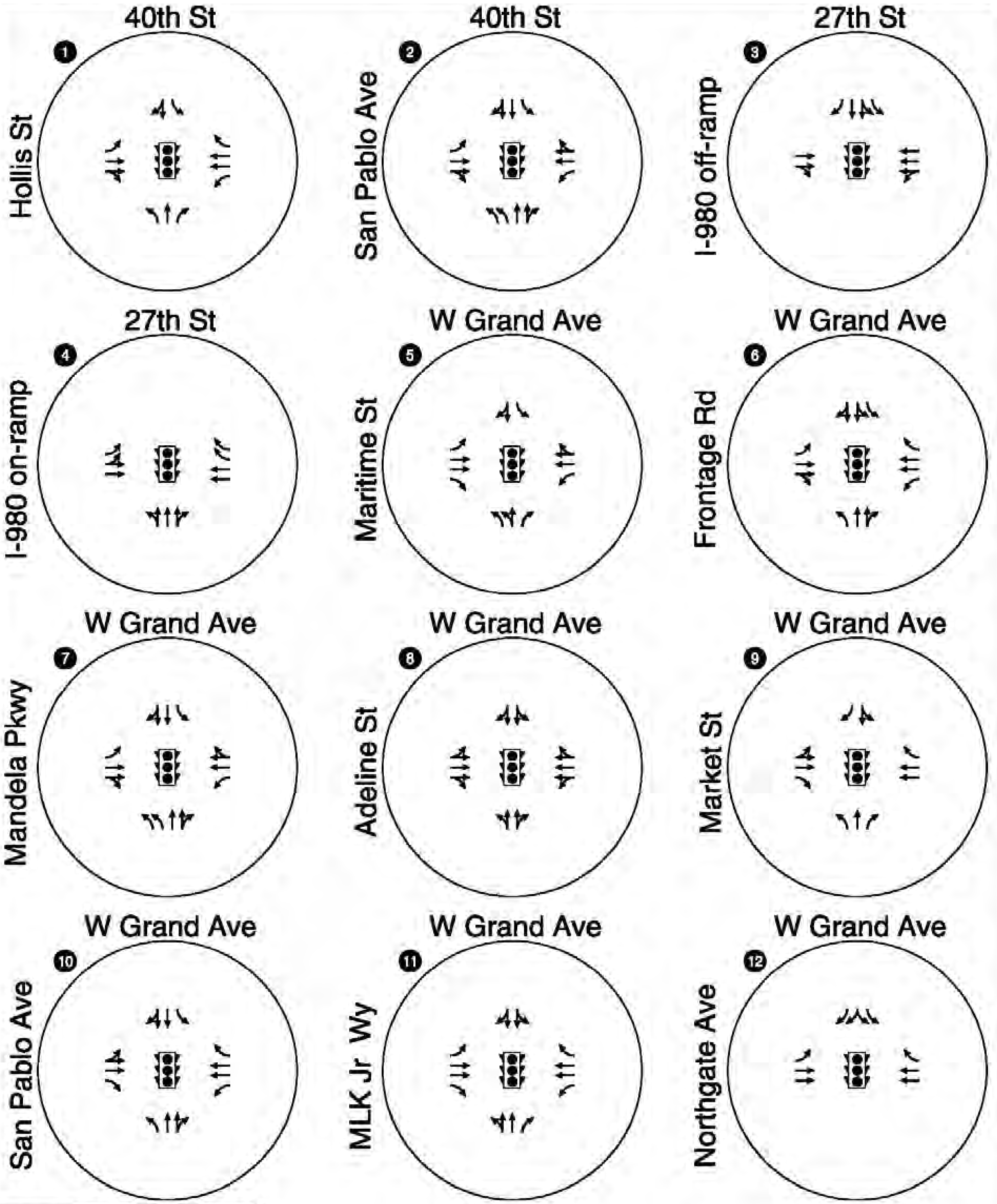


Figure 4.10-6A
Existing Intersection Lane Configurations and Traffic Controls

Source: Kittleson & Associates

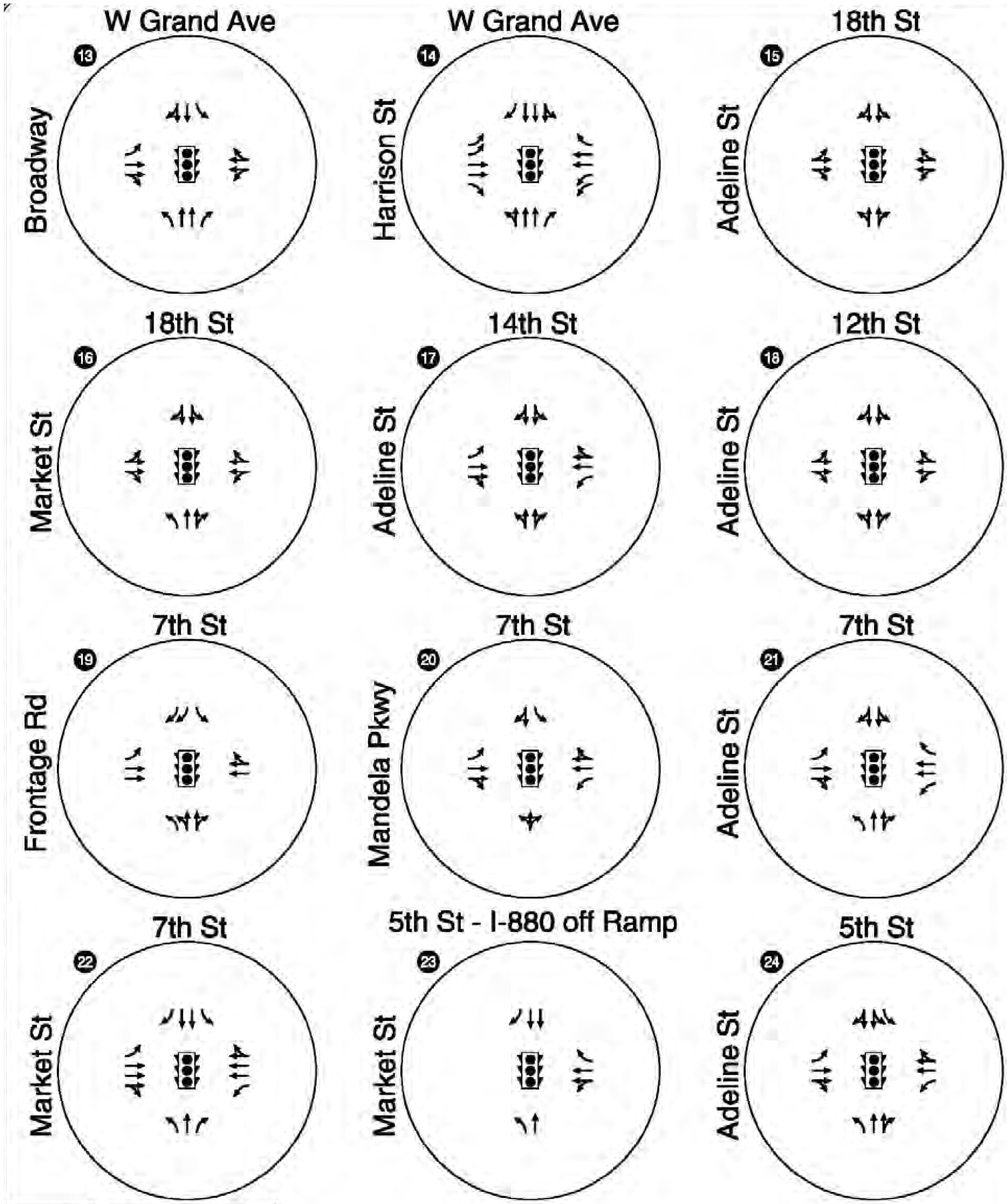


Figure 4.10-6B
Existing Intersection Lane Configurations and Traffic Controls

Source: Kittleson & Associates

Table 4.10-2 Intersection Level of Service Definitions

Level of Service	Description of Traffic Conditions	Average Delay Per Vehicle (Seconds)
A	Free flowing. Most vehicles do not have to stop.	≤10.0
B	Minimal delays. Some vehicles have to stop, although waits are not bothersome.	>10.0 and ≤20.0
C	Acceptable delays. Significant numbers of vehicles have to stop because of steady, high traffic volumes. Still, many pass without stopping.	>20.0 and ≤35.0
D	Tolerable delays. Many vehicles have to stop. Drivers are aware of heavier traffic. Cars may have to wait through more than one red light. Queues begin to form, often on more than one approach.	>35.0 and ≤55.0
E	Significant delays. Cars may have to wait through more than one red light. Long queues form, sometimes on several approaches.	>55.0 and ≤80.0
F	Excessive delays. Intersection is jammed. Many cars have to wait through more than one red light, or more than 60 seconds. Traffic may back up into "up-stream" intersections.	>80.0

Source: Transportation Research Board, 2000. *Highway Capacity Manual*.

Congestion Management Program (CMP) & Metropolitan Transportation System (MTS) Segments

Levels of service for roadway links on the CMP and MTS were analyzed using the Florida Department of Transportation LOS methodology, which provides a planning level analysis based on Highway Capacity Manual 2000 methods. As a planning level analysis, the level of service is based on forecasts of traffic and assumptions for roadway and signalization control conditions, such as facility type (freeway, expressway, and arterial classification), speeds, capacity and number of lanes. The assumption for the number of lanes at each link location was extracted from the model and confirmed through field observations.

Existing Operations

Intersection Operations

Table **4.10-3** summarizes the level-of-service analysis for the study intersections under the weekday AM and PM peak hour under existing traffic conditions. All of the study intersections currently operate at acceptable levels of service during the peak hours. Appendix 4.10-B includes the level-of-service worksheets under existing traffic conditions.

Table 4.10-3 Intersection Level of Service Summary - Existing Conditions

		AM/SAT Peak Hour~		PM Peak Hour	
Study Intersections (All Signalized)		Delay	LOS	Delay (sec)	LOS
1	Hollis Street/40th Street^	27.4	C	26.6	C
2	San Pablo Avenue/40th Street^	43.4	D	44.1	D
3	I-980 off-ramp/27th Street*@	12.1	B	13.7	B
4	I-980 on-ramp/27th Street*@	18.8	B	27.4	C
5	Maritime Street/West Grand Avenue	16.3	B	18.1	B
6	Frontage Road/West Grand Avenue	23.0	C	24.5	C
7	Mandela Parkway/West Grand	5.9	A	7.2	A
8	Adeline Street/West Grand Avenue*	11.2	B	12.9	B
9	Market Street/West Grand Avenue*	14.8	B	14.7	B
10	San Pablo Avenue/West Grand	13.7	B	23.5	C
11	MLK Jr Way/West Grand Avenue*	12.3	B	14.4	B
12	Northgate Avenue/West Grand	22.0	C	16.4	B
13	Broadway/West Grand Avenue*	16.5	B	18.5	B
14	Harrison Street/West Grand Avenue*	25.1	C	22.3	C
15	Adeline Street/18th Street	8.7	A	9.1	A
16	Market Street/18th Street	10.2	B	10.4	B
17	Adeline Street/14th Street*	12.1	B	14.1	B
18	Adeline Street/12th Street	11.9	B	8.4	A
19	Frontage Road/7th Street	20.2	C	19.6	B
20	Mandela Parkway/7th Street*	30.2	C	22.5	C
21	Adeline Street/7th Street*	9.0	A	13.2	B
22	Market Street/7th Street*	18.8	B	15.5	B
23	Market Street/5th Street/I-880 off-	19.9	B	21.4	C
24	Adeline Street/ 5th Street	21.9	C	23.7	C

"*" denotes intersection located in downtown Oakland or that provide direct access to downtown.

"^" denotes intersection located in Emeryville

"@" denotes intersection under Caltrans control

"~" Saturday peak hour results are shown for the two Emeryville locations; AM peak hour results are shown for all other locations

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

Source: Kittelson & Associate, 2013.

Alameda County Transportation Commission Segment Operations

Existing condition monitoring conducted by the Alameda County Transportation Commission (Alameda CTC) for the *2012 Level of Service Monitoring Report on the Congestion Management Program Roadway Network* (January 2013) has revealed a number of freeway segments on the CMP network that operated at LOS F during the PM peak hour including the following segments in the study area:

- I-580 eastbound between I-80 and I-980
- I-80 eastbound between Toll Plaza and I-580 southbound merge
- I-880 northbound between I-880/I-80 split and I-880/I-80 merge

I-580 eastbound between I-80 and I-980 segment is exempt from LOS standard as it already operated at LOS F during the data collection effort in 1991 when the monitoring program initiated. No roadway segment in the study operated at LOS F level.

Regulatory Setting

State and Regional Policies and Regulations

The California Department of Transportation (Caltrans) has jurisdiction over state highways in the Planning Area. Caltrans constructs and maintains all state highways, and sets design standards that are often copied by local government. The Metropolitan Transportation Commission (MTC) is the state-designated metropolitan planning organization for the nine-county San Francisco Bay Area; it has authority for regional planning, distributing and administering federal and state funds for all modes of transportation, and assuring that projects are consistent with the Regional Transportation Plan. California Public Utilities Commission (CPUC) has regulatory oversight authority over a number of design and operational aspects of railroads and at-grade highway crossings in the state.

Caltrans Authority of the State Highway System

Caltrans is the authority for building, maintaining, and operating the State Highway system in California. Their goal is to allow for the safe and efficient use of the state transportation system for all users. Caltrans has set standards for the operational goals of its facilities as it pertains to intersection level of service and freeway level of service. These standards are set forth in the Caltrans Guide for the Preparation of Traffic Impact Studies[1]. This document establishes procedures to uniformly review the operational standards of Caltrans maintained facilities in terms of measures of effectiveness. The Caltrans facilities located within the West Oakland Specific Plan include I-80, I-580, I-880 and I-980, and the associated freeway on-ramps and off-ramps connecting to the City of Oakland street network. Caltrans maintains a target level of service of LOS C for state facilities.

Statewide Transportation Improvement Plan (STIP)

The Statewide Transportation Improvement Plan is a capital improvement program that plans transportation projects related to state facilities in California for the next five years. The program is updated every two years with new construction projects as more funding is provided. The California Transportation Commission approves the fund estimate and then Caltrans and regional planning

[1] Guide for the Preparation of Traffic Impact Studies, Caltrans, December 2002.

agencies submit plans for transportation improvement projects. If the projects are programmed in the STIP, then relevant agencies can begin the implementation process.

California's Complete Streets Law

The Complete Streets Law was signed in as Assembly Bill 1358 and requires that cities include the needs of all users, including bicyclists and pedestrians, when updating local general plans. Caltrans specifically adopted Deputy Directive 64, which addresses the needs of people of all ages and abilities concerning transportation planning. It also recognizes that transportation improvement projects are opportunities to improve safety, access, and mobility for motorists, bicyclists, pedestrians, and transit users. The *Complete Streets Implementation Action Plan*[2] provides an overview of the program.

Regional Transportation Plan (RTP)

MTC has recently updated its Regional Transportation Plan in 2009. The recently adopted plan called *Transportation 2035 Plan for the San Francisco Bay Area*[3] specifies how future transportation spending will occur in the next 25 years. The new plan focuses on providing equal transportation opportunities to all users. One of the major goals of the plan is to provide incentives to cities and counties who promote growth adjacent to transit in urban communities in the Bay Area. Another main goal was to reduce greenhouse gas emissions as it relates to transportation.

Transit-Oriented Development and Complete Streets Policies

MTC adopted Resolution 3434 in July 2005, which discusses its policy on transit-oriented development (TOD) for regional transit expansion projects. The goal of the policy is to improve the cost-benefits of transit expansions by ensuring those transportation agencies, local jurisdictions, and the public work together. The plan will specify corridor-level thresholds to determine minimum residential and commercial development adjacent to transit stations. The plan will also address key issues within TOD's, such as land use changes, access improvements, circulation improvements, and multi-modal design features.

MTC adopted Resolution 3765 in 2006 which states that future projects consider bicycle and pedestrian needs. Associated with this is a Routine Accommodation checklist, which developers must complete at the beginning stages of the project to ensure that all transportation modes have been accommodated for.

Local Policies and Regulations

The Alameda County Transportation Commission (Alameda CTC) coordinates transportation planning efforts throughout Alameda County and programs local, regional, state and federal funding for project implementation. It develops Countywide Transportation Plan (CTP), a long-range policy document that guides transportation funding decisions. The Alameda CTC also acts as the Congestion Management Agency for Alameda County which is legislatively required to develop a Congestion Management Program. The City of Oakland is the primary local agency for determining the future success of the West Oakland community. The City has a General Plan that outlines the goals for future sustainable growth and the City of Oakland Municipal codes enforce the rules and regulations.

---

[2] Complete Streets Implementation Action Plan, Caltrans, February 2010.

[3] Transportation 2035 Plan for the San Francisco Bay Area, MTC, April 2009.

Alameda County Congestion Management Program

The Alameda County Congestion Management Program (CMP) specifically lays out the strategies to implement the Countywide Transportation Plan. The CMP[4] is updated every two years and sets guidelines on level of service standards, analysis of land uses on the transportation network, managing the transportation demand, and developing a seven-year Capital Improvement Program (CIP). The program also develops a travel demand model to assess the future impacts in the Cumulative year.

City of Oakland General Plan

The City of Oakland General Plan looks to address transportation needs as it relates to the expected growth in Oakland in the near future, the travel demand for the high proportion of non-auto population in Oakland, and the effective coordination of transportation related agencies in planning the Oakland network. The Land Use and Transportation Element of the City of Oakland General Plan[5], which also incorporate the City's Bicycle Master Plan and Pedestrian Master Plan, contains objectives and policies that the West Oakland Specific Plan practices. Objectives and policies that the Plan promotes include:

- Objective T2 – Provide mixed use, transit-oriented development that encourages public transit use and increases pedestrian and bicycle trips at major transportation nodes. The West Oakland BART Station is specifically mentioned for potential development to include retail, housing and community services depending on the vision of the community.
- Objective T3 – Provide a hierarchical network of roads that reflects desired land use patterns and strives for acceptable levels of service at intersections. In addition, a certain level of traffic congestions may be desirable in some locations to slow traffic and promote a more bicycle and pedestrian-oriented environment.
- Objective T4 – Increase use of alternative modes of transportation.
- Objective T6 – Make streets safe, pedestrian accessible, and attractive.
- Objective T7 – Reduce air pollutants caused by vehicles.

City of Oakland Bicycle Master Plan

The *City of Oakland Bicycle Master Plan*[6] discusses goals and objectives related to the West Oakland Specific Plan. These include:

Goal 1 – Infrastructure: Develop the physical accommodations, including a network of bikeways and support facilities, to provide for safe and convenient access by bicycle.

- BMP Policy 1A – Bikeway Network: Develop and improve Oakland's bikeway network.
  - BMP Policy 1B – Routine accommodation: Address bicycle safety and access in the design and maintenance of all streets.
  - BMP Policy 1C – Safe Routes to Transit: Improve bicycle access to transit, bicycle parking at transit facilities, and bicycle access on transit vehicles.

---

[4] *Congestion Management Plan 2011*, Alameda CTC, December 2011.

[5] *Land Use and Transportation Element*, City of Oakland, 1998.

[6] *City of Oakland Bicycle Master Plan*, City of Oakland, December 2007.

- Goal 3 – Coordination: Provide a policy framework and implementation plan for the routine accommodation of bicyclists in Oakland's projects and programs.

City of Oakland Pedestrian Master Plan

The *City of Oakland Pedestrian Master Plan*[7] discusses goals and objectives related to the West Oakland Specific Plan. These include:

- Goal 1 – Pedestrian Safety: Create a street environment that strives to ensure pedestrian safety.
  - PMP Policy 1.1 Crossing Safety: Improve pedestrian crossings in areas of high pedestrian activity where safety is an issue.
  - PMP Policy 1.2 Traffic Signals: Use traffic signals and their associated features to improve pedestrian safety at dangerous intersections.
- Goal 2 – Pedestrian Access: Develop an environment throughout the City – prioritizing routes to school and transit – that enables pedestrians to travel safely and freely.
  - PMP Policy 2.1 Route Network: Create and maintain a pedestrian route network that provides direct connections between activity centers.
  - PMP Policy 2.3 Safe Routes to Transit: Implement pedestrian improvements along major AC Transit lines and at BART stations to strengthen connections to transit.

City of Oakland Complete Streets Policy

The City of Oakland Complete Street Policy establishes principles and implementation guidelines to provide safe and convenient pedestrian, bicycle and public transportation travel options in order to protect all road users, reduce environmental impacts, promote healthy living, and advance the well-being of Oakland citizens. The accommodation of all users is a routine component of new construction, reconstruction, retrofit, and maintenance projects subject to exception approved by the Public Works Director.

City of Oakland Municipal Code

The City of Oakland Municipal Code states all the rules and regulation in Title 10 – Vehicles and Traffic. Provisions related to traffic control devices, speed limits, parking, and vision obscurement at intersections are stated in this section. Further, Title 12.02 – Complete Street Design Standards establishes the City's intent to implement complete streets serving all users and modes.

Standard Conditions of Approval and Uniformly Applied Development Standards

The City of Oakland's Standard Conditions of Approval (SCA) are applicable to all development projects within the City regardless of a project's environmental determination, pursuant in part to *CEQA Guidelines* Section 15183. The City's SCA serve to avoid or substantially reduce potentially significant impacts. If the City approves the Project, the following SCA would be adopted as requirements of the Project to help reduce impacts.

SCA TRANS-1: Parking and Transportation Demand Management (For construction: Prior to issuance of first permit related to construction (e.g. demolition, grading, etc.). For operation: Prior to

[7] *City of Oakland Pedestrian Master Plan*, City of Oakland, November 2002.

issuance of a final building permit. Individual project applicants shall pay for and submit for review and approval by the City a Transportation Demand Management (TDM) plan containing strategies to:

a. Reduce the amount of traffic generated by new development and the expansion of existing development, pursuant to the City's police power and necessary in order to protect the public health, safety and welfare.

b. Ensure that expected increases in traffic resulting from growth in employment and housing opportunities in the City of Oakland will be adequately mitigated.

c. Reduce drive-alone commute trips during peak traffic periods by using a combination of services, incentives, and facilities.

d. Promote more efficient use of existing transportation facilities and ensure that new developments are designed in ways to maximize the potential for alternative transportation usage.

e. Establish an ongoing monitoring and enforcement program to ensure that the desired alternative mode use percentages are achieved.

Individual project applicants shall implement the approved TDM plan. The TDM plan shall include strategies to increase pedestrian, bicycle, transit, and carpool/vanpool use. All four modes of travel shall be considered, and parking management and parking reduction strategies should be included. Actions to consider include the following:

a. Inclusion of additional long term and short term bicycle parking that meets the design standards set forth in chapter five of the Bicycle Master Plan, and Bicycle Parking Ordinance, and shower and locker facilities in commercial developments that exceed the requirement.

b. Construction of and/or access to bikeways per the Bicycle Master Plan; construction of priority bikeways, onsite signage and bike lane striping.

c. Installation of safety elements per the Pedestrian Master Plan (such as cross walk striping, curb ramps, countdown signals, bulb outs, etc.) to encourage convenient and safe crossing at arterials.

d. Installation of amenities such as lighting, street trees, trash receptacles per the Pedestrian Master Plan and any applicable streetscape plan.

e. Construction and development of transit stops/shelters, pedestrian access, way finding signage, and lighting around transit stops per transit agency plans or negotiated improvements.

f. Direct onsite sales of transit passes purchased and sold at a bulk group rate (through programs such as AC Transit Easy Pass or a similar program through another transit agency).

g. Employees or residents can be provided with a subsidy, determined by individual project applicants and subject to review by the City, if the employees or residents use transit or commute by other alternative modes.

h. Provision of ongoing contribution to AC Transit service to the area between the development and nearest mass transit station. If that is not available, an ongoing contribution to an existing area shuttle service between the development and nearest mass transit station. The last option is establishment of a new shuttle service between the development and nearest mass transit station may be developed. The contribution required for the service (any option) will be based on the cost of the last option.

i. Guaranteed ride home program for employees, either through 511.org or through separate program.

j. Pre-tax commuter benefits (commuter checks) for employees.

k. Free designated parking spaces for on-site car-sharing program (such as City Car Share, Zip Car, etc.) and/or car-share membership for employees or tenants.

l. On-site carpooling and/or vanpool program that includes preferential (discounted or free) parking for carpools and vanpools.

m. Distribution of information concerning alternative transportation options.

n. Parking spaces sold/leased separately for residential units. Charge employees for parking, or provide a cash incentive or transit pass alternative to a free parking space in commercial properties.

o. Parking management strategies; including attendant/valet parking and shared parking spaces.

p. Requiring tenants to provide opportunities and the ability to work off-site.

q. Allow employees or residents to adjust their work schedule in order to complete the basic work requirement of five eight-hour workdays by adjusting their schedule to reduce vehicle trips to the worksite.

r. Provide or require tenants to provide employees with staggered work hours involving a shift in the set work hours of all employees at the workplace or flexible work hours involving individually determined work hours.

Individual project applicants shall submit an annual compliance report for review and approval by the City. This report will be reviewed either by City staff (or a peer review consultant, chosen by the City and paid for by individual project applicants). If timely reports are not submitted, the reports indicate a failure to achieve the stated policy goals, or the required alternative mode split is still not achieved, staff will work with individual project applicants to find ways to meet their commitments and achieve trip reduction goals. If the issues cannot be resolved, the matter may be referred to the Planning Commission for resolution. Individual project applicants shall be required, as a condition of approval, to reimburse the City for costs incurred in maintaining and enforcing the trip reduction program for the approved Plan.

SCA TRANS-2: Construction Traffic and Parking (*Prior to the issuance of a demolition, grading or building permit).* Individual project applicants and construction contractor shall meet with appropriate City of Oakland agencies to determine traffic management strategies to reduce, to the maximum extent feasible, traffic congestion and the effects of parking demand by construction workers during construction of the Plan and other nearby projects that could be simultaneously under construction. Individual project applicants shall develop a construction management plan. The plan shall be submitted to EBMUD and Caltrans for their review and comment ten (10) business days before submittal to the City. Individual project applicants shall consider in good faith such comments and revise the plan as appropriate. The revised plan shall be submitted for review and approval by the Planning and Zoning Division, the Building Services Division, and the Transportation Services Division. The plan shall include at least the following items and requirements:

a. A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes.

b. Notification procedures for adjacent project sponsors and public safety personnel regarding when major deliveries, detours, and lane closures will occur.

c. Location of construction staging areas for materials, equipment, and vehicles at an approved location.

d. A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. Planning and Zoning shall be informed who the Manager is prior to the issuance of the first permit issued by Building Services.

e. Provision for accommodation of pedestrian flow.

f. Provision for parking management and spaces for all construction workers to ensure that construction workers do not park in on-street spaces.

g. Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the applicant's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the City Building Inspector and/or photo documentation, at the applicant's expense, before the issuance of a Certificate of Occupancy.

h. Any heavy equipment brought to the construction site shall be transported by truck, where feasible.

i. No materials or equipment shall be stored on the traveled roadway at any time.

j. Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion.

k. All equipment shall be equipped with mufflers.

l. Prior to the end of each work day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on the property, within the public rights-of-way, or properties of adjacent or nearby neighbors.

Project Transportation Characteristics

Project Roadway Modifications

The Project includes a number of roadway modifications that entail lane reductions, roundabout and bike lane installations as shown in **Figure 4.10-7.** The travel lanes on several roadways are proposed to be reduced. West Grand Avenue is proposed to be reduced from the existing six travel lanes to four travel lanes between Market Street and Mandela Parkway.

Figure 4.10-7
Specific Plan, Proposed Roadway Improvements

Source: Kittleson & Associates

In addition, the following roadways would be modified from the existing four travel lanes to two travel lanes with center turn lane:

- Adeline Street between 3rd Avenue and 36th Avenue
- 12th Street between Market Street and Mandela Parkway
- 14th Street between Market Street and Mandela Parkway
- 18th Street between Market Street and Mandela Parkway

Roundabouts would be installed at the following intersections:

- Adeline Street at 12th, 14th and 18th Streets
- Peralta Street at 18th and 28th Streets

Bicycle lanes would be installed along the following roadways:

- West Grand Avenue west of Market Street
- Adeline Street between I-580 and 3rd Street

The Project also includes improvements identified in the following plan documents:

- Martin Luther King Jr. Way Streetscape Master Plan
- Peralta Street Streetscape Master Plan
- 7th Street Concept and Urban Design Plan

The Project also includes improvements identified in the following plan documents:

- Martin Luther King Jr. Way Streetscape Master Plan
- Peralta Street Streetscape Master Plan
- 7th Street Concept and Urban Design Plan

Traffic Forecasts

Travel forecasts were prepared using the current version (June 2011) of the Alameda CTC Countywide Travel Demand Model (the Model) which is consistent with Association of Bay Area Governments' (ABAG) Projections 2009, the latest MTC Regional Transportation Plan, and the latest Alameda Countywide Plan. Specifically, future model networks include the fourth bore of the Caldecott Tunnel as well as a number of future projects such as:

1. Oakland Army Base Project
2. Lake Merritt Station Area Plan Project
3. Broadway-Valdez District Specific Plan Project
4. Planned road narrowing projects
5. AC Transit BRT along Telegraph Avenue/Broadway/International Boulevard /E.14th Street
6. E. 18th Street improvements
7. 12th Street Reconstruction
8. Lakeside Drive/Green Street-Lakeside Drive/Harrison Street/20th Street

9. Measure DD Project for 12th Street/10th Street/ 7th Street

The Model's trip generation process computes person trips based on households and population as well as employment. Trips are distributed based on the standard gravity type model and are then split into walk, bike, and auto and transit modes prior to assigning them onto the highway and transit networks.

The model inputs were reviewed against the Project description in the study area for accuracy by comparing them to traffic counts and roadway configurations from recent aerial pictures. Based on a review of the proposed Project, the Model was modified to include additional network details to better represent the roadways in the Plan Area. Modifications to the Model included the addition of 12th Street between Union Street and Market Street and refinements to centroid connectors for TAZ 178 to reflect more accurate loading of traffic in the Plan Area. Minor coding corrections were made to the model speed inputs along Mandela Parkway, Adeline Avenue and Union Street. For the Existing plus Project and Year 2035 plus Project scenarios, modifications were made to reflect road diets along West Grand Avenue, 12th Street, 14th Street, 18th Street and Adeline Street. Model data sets were developed for all analysis scenarios, including:

- Existing No Project
- Existing plus Project
- Year 2035 Cumulative No Project
- Year 2035 Cumulative plus Project

The trip assignment results were extracted for the study intersections and reviewed for growth and accuracy. The Model trip assignment constraining procedure was applied to develop the forecast for future No Project and Future plus Project conditions in order to develop a realistic background traffic forecasts for the future years. For the Future No Project scenario, the increment of the model volumes between Future No Project and Existing No Project runs was added to the counts to develop adjusted Future No Project volumes. For the Future plus Project scenario, the increment of the select zone assignments between Future plus Project and Future No Project conditions was added to the Future No Project volumes. For the Existing plus Project scenario, the increment of the select zone assignments between the Existing plus project and Existing no project runs was added to the counts to develop Existing plus Project volumes. Lastly, the intersection volumes were then manually adjusted using industry standard incremental adjustment with furness balancing technique to minimize the base year model error against counts. The adjustment technique was developed for the Transportation Research Board's NCHRP 255 report titled Highway Traffic Data for Urbanized Area Project Planning and Design (1982).

A summary of AM and PM peak hour trips generated in the Plan Area from the model forecasts are presented in **Table 4.10-4**. It indicates that while the Project would result in a net growth of vehicle trips under Existing Conditions; it would result in a decrease in vehicle trips as compared to projected growth without the Project during both peak hours under Future Conditions.

Table 4.10-4 Vehicle Trip Generation

	Existing Conditions			Year 2035 Conditions		
	No Project	With Project	Difference	No Project	With Project	Difference
AM Peak Hour	5,735	11,272	+5,537	12,256	11,830	-425
PM Peak Hour	7,025	13,723	+6,698	14,725	14,442	-283

Source: Kittelson & Associates, 2013.

Project Impacts and Mitigation Measures

This section presents the Project's potential transportation-related impacts based on applicable significance criteria and mitigation measures necessary to reduce the identified impacts. Impact analysis was performed for Existing conditions and for Year 2035 conditions. The Project is assumed to be fully built-out under both analysis conditions. Specifically, the transportation conditions are assessed for the following scenarios:

- Existing plus Project – Existing conditions with the addition of Specific Plan build-out in the Plan Area including Project roadway modifications described above
- Cumulative (2035) No Project – Future conditions including projected population and employment growth as well as planned transportation system improvements contained in the latest Alameda Countywide travel demand model for Year 2035
- Cumulative (2035) Plus Project – Year 2035 conditions with the addition of Specific Plan build-out in the Plan Area including Project roadway modifications described above

Intersections were not analyzed for Year 2020 condition as planned transportation improvements between 2020 and 2035 are not expected to affect the study findings. In addition, traffic volumes are likely to be higher in 2035 than in 2020. Given both of these conditions, the Cumulative (2035) condition likely represents a worst case scenario for the assessment of transportation impacts. If no impact is identified under Cumulative (2035) condition, it is not likely that an impact would occur in 2020. Further, if an impact is identified in 2035, it is not likely to be worse in 2020. The City regularly maintains traffic signals in its jurisdiction and performs timing adjustments as needed to improve traffic operations.

The impact analysis describes the methodologies used to assess components of the overall transportation system, summarizes the potential Project impacts and recommends mitigation measures that lessen the identified Project's impacts.

Criteria of Significance

The assessment of the Project is based on the City of Oakland's CEQA Thresholds of Significance guidelines or the City of Emeryville's guidelines for intersections located in Emeryville or the City of Alameda guidelines for intersections in the City of Alameda. The Project would result in a significant impact if it would:

Project Impacts

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, specifically:

Traffic Load and Capacity Thresholds for locations within Oakland:

1. At a study, signalized intersection which is located **outside the Downtown** area[8] and that does not provide direct access to Downtown, the project would cause the motor vehicle level of service (LOS) to degrade to worse than LOS D (i.e., LOS E or F) and cause the total intersection average vehicle delay to increase by four (4) or more seconds;
2. At a study, signalized intersection which is located **within the Downtown** area or that provides direct access to Downtown, the project would cause the motor vehicle LOS to degrade to worse than LOS E (i.e., LOS F) and cause the total intersection average vehicle delay to increase by four (4) or more seconds;
3. At a study, signalized intersection **outside the Downtown** area and that does not provide direct access to Downtown where the motor vehicle level of service is LOS E, the project would cause the total intersection average vehicle delay to increase by four (4) or more seconds;
4. At a study, signalized intersection **outside the Downtown** area and that does not provide direct access to Downtown where the motor vehicle level of service is LOS E, the project would cause an increase in the average delay for any of the critical movements of six (6) seconds or more;
5. At a study, signalized intersection for all areas where the level of service is LOS F, the project would cause (a) the overall volume-to-capacity ("V/C") ratio to increase 0.03 or more or (b) the critical movement V/C ratio to increase 0.05 or more;
6. At a study, unsignalized intersection the project would add ten (10) or more vehicles to the critical movement and after project completion satisfy the California Manual on Uniform Traffic Control Devices (MUTCD) peak hour volume traffic signal warrant;
7. For a roadway segment of the Congestion Management Program (CMP) Network, the project would cause (a) the LOS to degrade from LOS E or better to LOS F or (b) the V/C ratio to increase 0.03 or more for a roadway segment that would operate at LOS F without the project;
8. Cause congestion of regional significance on a roadway segment on the Metropolitan Transportation System (MTS) evaluated per the requirements of the Land Use Analysis Program of the CMP;
9. Result in substantially increased travel times for AC Transit buses;

[8] The Downtown area is defined in the Land Use and Transportation Element of the General Plan (page 67) as the area generally bounded by the West Grand Avenue to the north, Lake Merritt and Channel Park to the east, the Oakland Estuary to the south, and I-980/Brush Street to the west. Intersections that provide direct access to downtown are generally defined as principal arterials within two (2) miles of Downtown and minor arterials within one (1) mile of Downtown, provided that the street connects directly to Downtown.

For locations within Emeryville:

10. The addition of project traffic degrades an intersection currently operating at LOS D or better to LOS E or LOS F.
11. The addition of project traffic degrades an intersection currently operating at LOS E to LOS F.
12. The addition of project traffic causes the average vehicle delay to increase by more than four seconds at an intersection operating at LOS E or LOS F.
13. The addition of project traffic results in the 95th percentile vehicle queue exceeding the available vehicle storage; or, at locations where vehicle queues would exceed the available storage space, the project increases the 95th percentile vehicle queue.

Traffic Safety Thresholds

14. Directly or indirectly cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard due to a new or existing physical design feature or incompatible uses;
15. Directly or indirectly result in a permanent substantial decrease in pedestrian safety;
16. Directly or indirectly result in a permanent substantial decrease in bicyclist safety;
17. Directly or indirectly result in a permanent substantial decrease in bus rider safety;
18. Generate substantial multi-modal traffic traveling across at-grade railroad crossings that cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard;

Other Thresholds

19. Fundamentally conflict with adopted City policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment;
20. Result in a substantial, though temporary, adverse effect on the circulation system during construction of the project; or
21. 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.

Cumulative Impacts

22. A project's contribution to cumulative impacts is considered "considerable" (i.e., significant) when the project exceeds at least one of the thresholds listed above in a future year scenario.

Transportation Issues Not Further Analyzed

Air Traffic Patterns

Given the nature of the Project, the proposed West Oakland Specific Plan would not result in a change to air traffic patterns (threshold q).

Intersections within the City of Alameda

The Project will generate trips to and from the City of Alameda that will predominantly use the Webster Street and Posey Tubes, and that will pass through the intersections at Constitution Way/Marina Village Parkway and Webster Street/Atlantic Avenue. Because these intersections are closest to the Webster and Posey Tubes and would experience the highest number of Project trips from the Plan Area, they are indicators of potential Project impacts on City of Alameda intersections.

Existing plus Project

A recent analysis of these two Alameda intersections was conducted as part of the City of Oakland's Lake Merritt Station Area Plan Draft EIR (November 2013). The Lake Merritt project, at full buildout, was projected to add 192 trips entering and leaving the City of Alameda via the Tubes in the AM peak period, and 286 trips entering and leaving the City of Alameda during the PM peak period. Based on these Lake Merritt project traffic volumes, the Lake Merritt Draft EIR found that both the Constitution Way/Marina Village Parkway and the Webster Street/Atlantic Avenue intersections would continue to operate at levels that would not exceed the City of Alameda's threshold of LOS D, and that Lake Merritt project-generated traffic would not result in a significant impact at these locations.

According to the trip distribution patterns for the West Oakland Specific Plan, traffic generated by the West Oakland Plan is projected to add 175 trips entering and leaving the City of Alameda via the Tubes in the AM peak period, and 185 trips entering and leaving the City of Alameda during the PM peak period. Since these traffic volumes are lower during both peak periods than the volumes associated with the Lake Merritt project, and since the Lake Merritt Station Area Plan Draft EIR concluded that its traffic would not result in a significant impact at either the Constitution Way/Marina Village Parkway or the Webster Street/Atlantic Avenue intersections, it is reasonable to conclude that the lower volume of traffic generated by the West Oakland Specific Plan would have an even less significant impact at these intersections. No further analysis of these intersections is considered necessary.

Cumulative Conditions

As described above under Traffic Forecasts, implementation of the West Oakland Specific Plan would result in a slight decrease in total vehicle trips generated from the Plan Area as compared to projected growth within the Plan Area as included in the most current version (June 2011) of the Alameda CTC Countywide Travel Demand Model. Because the Project's contribution of cumulative traffic growth would be less under the Cumulative plus Project scenario than under the Cumulative without Project scenario during both peak hours under Future Conditions, the Project would not result in any significant cumulative traffic increase at distant locations (such as within the City of Alameda), and would not result in any greater cumulative traffic impacts than under the Cumulative without Project scenario.

Traffic Load and Capacity

Existing Plus Project Intersection Operations

Intersection operations were analyzed under Existing plus Project scenario to determine the effect of the full Project in the context of existing roadway network and land use in the surrounding area. The intersection volumes for the Existing plus Project scenario are provided in Appendix 4.10-C. The intersection operations at the study intersections are summarized in **Table 4.10-5** and **Table 4.10-6**.

Table 4.10-5 Intersection LOS Summary
Existing Plus Project Conditions (SAT/AM Peak Hour~)

		Existing		Existing plus Project		After Mitigation	
	Study Intersections	Delay	LOS	Delay	LOS	Delay	LOS
1	Hollis Street/40th Street^	27.4	C	30.3	C	30.3	C
2	San Pablo Avenue/40th Street^	43.4	D	**52.2**	**D**	46.1	D
3	I-980 off-ramp/27th Street*@	11.8	B	13.3	B	13.3	B
4	I-980 on-ramp/27th Street*@	18.3	B	18.8	B	18.8	B
5	Maritime Street/West Grand Avenue	15.7	B	16.4	B	16.4	B
6	Frontage Road/West Grand Avenue	21.6	C	36.1	D	36.1	D
7	Mandela Parkway/West Grand Avenue*	5.7	A	12.1	B	12.1	B
8	Adeline Street/West Grand Avenue*	11.1	B	12.7	B	12.7	B
9	Market Street/West Grand Avenue*	14.5	B	20.3	C	20.3	C
10	San Pablo Avenue/West Grand Avenue*	13.7	B	13.3	B	13.3	B
11	MLK Jr Way/West Grand Avenue*	12.3	B	10.8	B	10.8	B
12	Northgate Avenue/West Grand Avenue*	22.4	C	24.7	C	24.7	C
13	Broadway/West Grand Avenue*	16.2	B	16.1	B	16.1	B
14	Harrison Street/West Grand Avenue*	25.3	C	25.0	C	25.0	C
15	Adeline Street/18th Street#	8.6	A	6.4	A	6.9	A
16	Market Street/18th Street	10.1	B	17.4	B	17.4	B
17	Adeline Street/14th Street#*	12.1	B	6.1	A	6.6	A
18	Adeline Street/12th Street#	11.8	B	4.5	A	4.7	A
19	Frontage Road/7th Street	19.2	B	24.1	C	24.1	C
20	Mandela Parkway/7th Street*	28.7	C	22.4	C	22.4	C
21	Adeline Street/7th Street*	8.8	A	9.0	A	9.0	A
22	Market Street/7th Street*	19.1	B	18.5	B	18.5	B
23	Market Street/5th Street/I-880 off-ramp@	20.0	B	19.9	B	19.9	B
24	Adeline Street/ 5th Street	21.3	C	27.5	C	27.5	C

Table 4.10-5 Intersection LOS Summary
Existing Plus Project Conditions (SAT/AM Peak Hour~)

	Existing		Existing plus Project		After Mitigation	
Study Intersections	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**

Intersection delays are shown in "seconds per vehicle".

All intersections have signalized control with the exception of locations denoted with "#" which are controlled by roundabout under Existing plus Project scenario.

"*" denotes intersection located in downtown Oakland or that provide direct access to downtown.

"^" denotes intersection located in Emeryville

"@" denotes intersection under Caltrans control

"~" Saturday peak hour results are shown for the two Emeryville locations; AM peak hour results are shown for all other locations

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

Table 4.10-6 Intersection LOS Summary
Existing Plus Project Conditions (PM Peak Hour)

		Existing		Existing plus Project		After Mitigation	
	Study Intersections	Delay	LOS	Delay	LOS	Delay	LOS
1	Hollis Street/40th Street^	26.6	C	**27.1**	**C**	27.1	C
2	San Pablo Avenue/40th Street^	44.1	D	**59.1**	**E**	51.0	D
3	I-980 off-ramp/27th Street*@	13.5	B	16.1	B	16.1	B
4	I-980 on-ramp/27th Street*@	25.0	C	57.8	E	57.8	E
5	Maritime Street/West Grand Avenue	16.7	B	18.9	B	18.9	B
6	Frontage Road/West Grand Avenue	22.5	C	32.6	C	32.6	C
7	Mandela Parkway/West Grand Avenue*	6.9	A	38.8	D	38.8	D
8	Adeline Street/West Grand Avenue*	12.6	B	14.4	B	14.4	B
9	Market Street/West Grand Avenue*	14.4	B	27.1	C	27.1	C
10	San Pablo Avenue/West Grand Avenue*	21.1	C	64.7	E	64.7	E
11	MLK Jr Way/West Grand Avenue*	14.2	B	14.9	B	14.9	B
12	Northgate Avenue/West Grand Avenue*	16.1	B	21.6	C	21.6	C
13	Broadway/West Grand Avenue*	19.0	B	18.9	B	18.9	B
14	Harrison Street/West Grand Avenue*	22.8	C	23.8	C	23.8	C
15	Adeline Street/18th Street#	9.0	A	7.6	A	8.5	A
16	Market Street/18th Street	10.3	B	14.8	B	14.8	B
17	Adeline Street/14th Street#*	13.9	B	7.0	A	7.8	A
18	Adeline Street/12th Street#	8.4	A	4.4	A	4.6	A
19	Frontage Road/7th Street	18.9	B	24.0	C	24.0	C
20	Mandela Parkway/7th Street*	24.9	C	21.7	C	21.7	C
21	Adeline Street/7th Street*	12.7	B	16.3	B	16.3	B
22	Market Street/7th Street*	15.2	B	18.2	B	18.2	B
23	Market Street/5th Street/I-880 off-ramp@	21.4	C	21.7	C	21.7	C
24	Adeline Street/ 5th Street	22.5	C	47.6	D	47.6	D

Table 4.10-6 Intersection LOS Summary
Existing Plus Project Conditions (PM Peak Hour)

	Existing		Existing plus Project		After Mitigation	
Study Intersections	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**

Intersection delays are shown in "seconds per vehicle".

All intersections have signalized control with the exception of locations denoted with "#" which are controlled by roundabout under Existing plus Project scenario.

"*" denotes intersection located in downtown Oakland or that provide direct access to downtown.

"^" denotes intersection located in Emeryville

"@" denotes intersection under Caltrans control

"~" Saturday peak hour results are shown for the two Emeryville locations; AM peak hour results are shown for all other locations

BOLD type indicates significant impact due to LOS, V/C, or queue length (Emeryville intersections only) reasons

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

Under the Existing plus Project scenario, the following two intersections would operate below acceptable standards:

- Hollis Street and 40th Street (#1) where the 95th percentile queue would exceed available queue storage in the PM peak hour
- San Pablo Avenue and 40th Street (#2) where the 95th percentile left turn queue would exceed available queue storage in the AM peak hour and the intersection would degrade to LOS E in the PM peak hour

The Project's impacts and potential mitigation measures for the Existing plus Project scenario are discussed below.

Hollis and 40th Street

Impact Trans-1: The addition of traffic generated by the full development of the Specific Plan would cause PM peak hour southbound left turn 95th percentile queue length at the signalized intersection of Hollis and 40th Street (#1) located in Emeryville to exceed the available queue storage. (***SU***)

Mitigation Measures

Mitigation Measure Trans-1: Implement the following measure at Hollis and 40th Street (#1):

a) Extend the southbound left turn lane queue storage to 175 feet.

To implement this measure, the City shall work with the City of Emeryville to determine the feasibility of the mitigation measure and enter into an agreement to fund the necessary improvement to alleviate queue storage issue at this location. Individual project applicants shall fund the cost of implementing the above measures.

Resulting Level of Significance

Upon implementation, the southbound left turn queue would be contained within the queue storage and the impact would be reduced to a level of **less than significant**. No secondary significant impacts would result from implementation of this measure. However, because the intersection is under City of Emeryville's jurisdiction, the timing and implementation of the improvement are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed and the Project impact is conservatively deemed **significant and unavoidable**.

San Pablo Avenue and 40th Street

Impact Trans-2: The addition of traffic generated by the full development of the Specific Plan would cause PM peak hour traffic operations at the signalized intersection of San Pablo Avenue and 40th Street (#2) located in Emeryville to degrade from LOS D to LOS E under Existing plus Project conditions. Additionally, the eastbound left and northbound left turn 95th percentile queue length would exceed the available queue storage in the AM peak hour. (***SU***)

Mitigation Measures

Mitigation Measure Trans-2: Implement the following measure at San Pablo Avenue and 40th Street intersection (#2):

a) Add an additional eastbound left turn lane

b) Optimize signal timing parameters (i.e., adjust the allocation of green time for each intersection approach)

To implement this measure, the City shall work with the City of Emeryville to determine the feasibility of the mitigation measure and enter into an agreement to fund the necessary improvement to alleviate congestion at this location. Individual project applicants shall fund the cost of implementing the above measures.

Resulting Level of Significance

Upon implementation, the intersection would improve to LOS D during the PM peak hour and the 95th percentile queue length of both the eastbound left turn and northbound left turn movements would remain unchanged from No Project conditions. The impact would be reduced to a level of **less than significant**. No secondary significant impacts would result from implementation of this measure. However, because the intersection is under City of Emeryville's jurisdiction, the timing and implementation of the improvement are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed and the Project impact is conservatively deemed **significant and unavoidable**.

Year 2035 Cumulative Intersection Impacts

Intersection operations were analyzed under Year 2035 conditions to determine the effect of the Project in combination with the projected growth in the surrounding community using the methodology described above. The description of future baseline (No Project) and With Project conditions is presented below.

The 2035 No Project intersection turning movement forecasts were developed using methodology described in the Traffic Forecast section of this chapter. The intersection turning movement volumes for the 2035 Cumulative No Project and Cumulative plus Project scenarios are provided in 4.10-C. The intersection operations at the study intersections are summarized in **Table 4.10-7** and **Table 4.10-8.**

Table 4.10-7 Intersection LOS Summary
Year 2035 Cumulative Plus Project Conditions (AM/SAT ~ Peak Hour)

		Cumulative No Project		Cumulative plus Project		After Mitigation	
Study Intersections		Delay	LOS	Delay	LOS	Delay	LOS
1	Hollis Street/40th Street^	247.9	F	**237.3**	**F**	242.9	F
2	San Pablo Avenue/40th Street^	325.0	F	**324.5**	**F**	327.7	F
3	I-980 off-ramp/27th Street*	23.1	C	17.4	B	17.4	B
4	I-980 on-ramp/27th Street*	22.5	C	21.2	C	21.2	C
5	Maritime Street/West Grand Avenue	35.1	D	35.0	C	35.0	C
6	Frontage Road/West Grand Avenue	171.0	F	169.1	F	169.1	F
7	Mandela Parkway/West Grand Avenue*	40.1	D	**130.3**	**F**	**130.3**	**F**
8	Adeline Street/West Grand Avenue*	17.4	B	22.1	C	22.1	C
9	Market Street/West Grand Avenue*	39.9	D	60.4	E	60.4	E
10	San Pablo Avenue/West Grand Avenue*	45.0	D	38.9	D	38.9	D
11	MLK Jr Way/West Grand Avenue*	16.1	B	16.0	B	16.0	B
12	Northgate Avenue/West Grand Avenue*	102.3	F	100.7	F	100.4	F
13	Broadway/West Grand Avenue*	39.6	D	41.9	D	58.9	E
14	Harrison Street/West Grand Avenue*	68.8	E	68.8	E	68.8	E
15	Adeline Street/18th Street#	10.1	B	7.5	A	9.2	A
16	Market Street/18th Street	11.1	B	15.2	B	15.2	B
17	Adeline Street/14th Street#*	13.1	B	6.0	A	6.0	A
18	Adeline Street/12th Street#	14.0	B	4.5	A	4.5	A
19	Frontage Road/7th Street	43.6	D	43.6	D	43.6	D
20	Mandela Parkway/7th Street*	22.9	C	24.1	C	24.1	C
21	Adeline Street/7th Street*	12.8	B	12.6	B	12.6	B
22	Market Street/7th Street*	35.9	D	21.9	C	21.9	C
23	Market Street/5th Street/I-880 off-ramp	19.3	B	19.1	B	19.1	B
24	Adeline Street/ 5th Street	26.4	C	53.4	D	18.4	B

Table 4.10-7 Intersection LOS Summary
Year 2035 Cumulative Plus Project Conditions (AM/SAT ~ Peak Hour)

	Cumulative No Project		Cumulative plus Project		After Mitigation	
Study Intersections	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**

Intersection delays are shown in "seconds per vehicle".

All intersections have signalized control with the exception of locations denoted with "#" which are controlled by roundabout under Existing plus Project scenario.

"*" denotes intersection located in downtown Oakland or that provide direct access to downtown.

"^" denotes intersection located in Emeryville

"@" denotes intersection under Caltrans control

"~" Saturday peak hour results are shown for the two Emeryville locations; AM peak hour results are shown for all other locations

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

BOLD type indicates significant impact due to LOS, V/C, or queue length (Emeryville intersections only) reasons.

Source: Kittelson & Associate, 2013.

Table 4.10-8 Intersection LOS Summary
Year 2035 Cumulative Plus Project Conditions (PM Peak Hour)

		Cumulative No Project		Cumulative plus Project		After Mitigation	
	Study Intersections	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1	Hollis Street/40th Street^	212.8	F	**230.8**	**F**	208.2	F
2	San Pablo Avenue/40th Street^	256.8	F	**250.4**	**F**	249.7	F
3	I-980 off-ramp/27th Street*	18.9	B	18.6	B	18.6	B
4	I-980 on-ramp/27th Street*	73.6	E	73.3	E	73.3	E
5	Maritime Street/West Grand Avenue	52.1	D	52.8	D	52.8	D
6	Frontage Road/West Grand Avenue	142.7	F	134.4	F	134.4	F
7	Mandela Parkway/West Grand Avenue*	72.8	E	**215.2**	**F**	**215.2**	**F**
8	Adeline Street/West Grand Avenue*	25.0	C	62.7	E	62.7	E
9	Market Street/West Grand Avenue*	143.5	F	61.5	E	61.5	E
10	San Pablo Avenue/West Grand Avenue*	292.1	F	270.4	F	270.4	F
11	Martin Luther King Jr Way/West Grand	18.0	B	18.0	B	18.0	B
12	Northgate Avenue/West Grand Avenue*	40.5	D	37.5	D	40.6	D
13	Broadway/West Grand Avenue*	78.7	E	**81.4**	**F**	77.0	E
14	Harrison Street/West Grand Avenue*	54.5	D	52.9	D	52.9	D
15	Adeline Street/18th Street#	12.4	B	**39.4**	**E**	24.8	C
16	Market Street/18th Street	15.4	B	20.9	C	20.9	C
17	Adeline Street/14th Street#*	14.8	B	12.2	B	12.2	B
18	Adeline Street/12th Street#	9.2	A	6.4	A	6.4	A
19	Frontage Road/7th Street	44.6	D	44.7	D	44.7	D
20	Mandela Parkway/7th Street*	30.1	C	37.5	D	37.5	D
21	Adeline Street/7th Street*	25.3	C	26.0	C	26.0	C
22	Market Street/7th Street*	26.9	C	31.5	C	31.5	C
23	Market Street/5th Street/I-880 off-ramp	25.3	C	24.6	C	24.6	C
24	Adeline Street/ 5th Street	35.7	D	**81.0**	**F**	27.1	C

Table 4.10-8 Intersection LOS Summary
Year 2035 Cumulative Plus Project Conditions (PM Peak Hour)

	Cumulative No Project		Cumulative plus Project		After Mitigation	
Study Intersections	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**

Intersection delays are shown in "seconds per vehicle".

All intersections have signalized control with the exception of locations denoted with "#" which are controlled by roundabout under Existing plus Project scenario.

"*" denotes intersection located in downtown Oakland or that provide direct access to downtown.

"^" denotes intersection located in Emeryville

"@" denotes intersection under Caltrans control

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

BOLD type indicates significant impact due to LOS, V/C, or queue length (Emeryville intersections only) reasons.

Source: Kittelson & Associate, 2013.

Under Year 2035 Cumulative No Project scenario, the following 6 intersections would operate below acceptable standards:

- Hollis Street and 40th Street (#1) would operate at LOS F during both peak hours
- San Pablo Avenue and 40th Street (#2) would operate at LOS F during both peak hours
- Frontage Road and West Grand Avenue (#6) would operate at LOS F during both peak hours
- Market Street and West Grand Avenue (#9) would operate at LOS F during the PM peak hour
- San Pablo Avenue and West Grand Avenue (#10) would operate at LOS F during the PM peak hour
- Northgate Avenue and West Grand Avenue (#12) would operate at LOS F in the AM peak hour

With the addition of Project-generated traffic, the average delays at some intersections are lower than those under the Cumulative No Project scenario. There are two main reasons for this occurrence. First, as shown in Table 4.10-6, the number of trips generated in West Oakland is slightly lower under "plus Project" scenario than under "no Project" scenario in Year 2035. The Specific Plan reallocates the projected area of growth concentrating them in certain opportunity areas. As a result, even though the number of total trips generated in West Oakland would remain fairly constant, some areas in or around the opportunity areas would experience more traffic with the implementation of the Project; while other areas would have a projected decline in traffic volumes. Second, the HCM methodology used for this operations analysis is based on average delay per vehicle at the intersection. Therefore, under certain circumstances, the additional of vehicles at a particular movement or movements would allow more traffic to share in the delay resulting in a lower average delay per vehicle.

The substandard operations at the above intersections would continue with the addition of Project-generated traffic except at the intersection of Market Street and West Grand Avenue (#9) where the level of service would be within standard at LOS E in the PM peak hour. At the remaining five intersections, the Project would only result in significant impacts at the two 40th Street locations in

Emeryville (#1 and #2). The Project would not cause the overall volume-to-capacity (v/c) ratio to increase 0.03 or more, or the critical movement v/c ratio to increase 0.05 or more at the West Grand Avenue intersections of Frontage Road (#6), San Pablo Avenue (#10), and Northgate Avenue (#12). Therefore, the Project's impacts at these intersections are not considered to be significant.

Besides the two Emeryville intersections discussed above, the Specific Plan would cause the operations at the following four intersections to deteriorate to unacceptable levels for vehicle traffic in 2035 thereby resulting in significant impacts:

- Mandela Parkway and West Grand Avenue (#7) would degrade from LOS D to LOS F in the AM peak hour and from LOS E to LOS F in the PM peak hour
- Broadway and West Grand Avenue (#13) would degrade from LOS E to LOS F during the PM peak hour
- Adeline Street and 18th Street (#15) would degrade from LOS B to LOS E during the PM peak hour
- Adeline Street and 5th Street (#24) would degrade from LOS D to LOS F during the PM peak hour

The Project's impacts and potential mitigation measures for Year 2035 Cumulative with Project scenario are discussed below.

Hollis Street and 40th Street

Impact Trans-3: The addition of traffic generated by the full development of the Specific Plan would contribute to LOS F operations at the signalized intersection of Hollis Street and 40th Street (#1) located in Emeryville and would increase the average delay by more than four seconds. (***SU***)

Mitigation Measures

Mitigation Measure Trans-3: Implement the following measure at Hollis Street and 40th Street intersection (#1):

a) Extend the westbound left turn queue storage to 425 feet

b) Extend the southbound queue storage to 175 feet

c) Optimize signal timing parameters (i.e., adjust the allocation of green time for each intersection approach)

It is projected that this impact would occur and the mitigation be needed by 2016. To implement this measure, the City shall work with the City of Emeryville to determine the feasibility of the mitigation measure and enter into an agreement to fund the necessary improvement to alleviate congestion at this location. The funding would be collected from the developers of properties in the West Oakland Specific Plan area and would be used to implement mitigation measures to improve intersection operations.

Resulting Level of Significance

Upon implementation, the intersection would continue to operate at LOS F during both peak periods. However, the operations would improve to better than Cumulative No Project condition and the impact would be reduced to a level of less than significant. However, because the intersection is under City of Emeryville's jurisdiction, the timing and implementation of the improvement are not under the City of

Oakland's control. Therefore, the improvement cannot be assured to be completed and the Project impact is conservatively deemed **significant and unavoidable**.

San Pablo Avenue and 40th Street

Impact Trans-4: The addition of traffic generated by the full development of the Specific Plan would contribute to an increase in the eastbound left turn 95th percentile queue in the both peak hours that would exceed the available queue storage at the signalized intersection of San Pablo Avenue and 40th Street (#2) located in Emeryville. (***SU***)

Mitigation Measures

Mitigation Measure Trans-4: Implement the following measure at San Pablo Avenue and 40th Street intersection (#2):

a) Optimize signal timing parameters (i.e., adjust the allocation of green time for each intersection approach)

It is projected that the impact would occur and the mitigation be needed by buildout of the Specific Plan. To implement this measure, the City shall work with the City of Emeryville to determine the feasibility of the mitigation measure and enter into an agreement to fund the necessary improvement to alleviate congestion at this location. The funding would be collected from the developers of properties in the West Oakland Specific Plan area and would be used to implement mitigation measures to improve intersection operations.

Resulting Level of Significance

Upon implementation, the intersection would continue to operate at LOS F during both peak periods. However, the eastbound left turn 95th percentile queue would not be longer than the Cumulative No Project condition and the impact would be reduced to a level of less than significant. However, because the intersection is under City of Emeryville's jurisdiction, the timing and implementation of the improvement are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed and the Project impact is conservatively deemed **significant and unavoidable**.

Mandela Parkway and West Grand Avenue

Impact Trans-5: The addition of traffic generated by the full development of the Specific Plan would degrade the operation from LOS D to LOS F in the AM peak hour and from LOS E to LOS F in the PM peak hour at the signalized intersection of (#7) located outside the Downtown Area and would increase the volume-to-capacity ratio beyond the threshold of significance. (**SU**)

Mitigation Measures

No feasible mitigation measure is identified.

Resulting Level of Significance

The following improvements would be needed to improve the operation to LOS C in the AM peak hour and LOS D in the PM peak hour, but are in conflict with the City's plans and policies for roadways in the area:

a) Retain three existing westbound through lanes by terminating the proposed road diet before the intersection and add an exclusive right-turn channelization

b) Add an additional eastbound left-turn lane to provide two left-turn and two through lanes

c) Add an additional southbound left-turn lane to provide one left-turn, one shared left-through, and one shared through-right lanes

d) Modify the traffic signal timing

These improvements would encroach into Memorial Park and medians. Furthermore, the provision of four westbound lanes would preclude planned installation of bicycle facility on West Grand Avenue, which is a City Council priority (Resolution 84197, Nov 2012). Therefore, all of these improvements are not recommended, and the Project impact remains **significant and unavoidable.**

Broadway and West Grand Avenue

Impact Trans-6: The addition of traffic generated by the full development of the Specific Plan would degrade the PM peak hour operations from LOS E to LOS F at the signalized intersection of Broadway and West Grand Avenue (#13) located within the Downtown Area. (**LTS with MM**)

Mitigation Measures

Mitigation Measure Trans-6: Implement the following measure at Broadway and West Grand Avenue (#13):

a) Modify the traffic signal to provide protected/permitted signal phasing for the northbound left-turn movement

It is projected that the impact would occur and the mitigation be needed by 2028. To implement this measure, individual project applicants shall submit the following to City of Oakland for review and approval:

- Plans, Specifications, and Estimates (PS&E) to modify the intersection. All elements shall be designed to City standards in effect at the time of construction and all new or upgraded signals shall include these enhancements. All other facilities supporting vehicle travel and alternative modes through the intersection shall be brought up to both City standards and ADA standards (according to Federal and State Access Board guidelines) at the time of construction. Current City Standards call for among other items the elements listed below:
    - 2070L Type Controller
    - GPS communication (clock)
    - Accessible pedestrian crosswalks according to Federal and State Access Board guidelines
    - City Standard ADA wheelchair ramps
    - Full actuation (video detection, pedestrian push buttons, bicycle detection)
    - Accessible Pedestrian Signals, audible and tactile according to Federal Access Board guidelines
    - Signal interconnect and communication to City Traffic Management Center for corridors identified in the City's ITS Master Plan
    - Signal timing plans for the signals in the coordination group.

Individual project applicants shall fund the cost of preparing and implementing the above measures. However, if the City adopts a transportation fee program prior to implementation of this mitigation measure, individual project applicants shall have the option to pay the applicable fee in lieu of implementing this mitigation measure and payment of the fee shall mitigate this impact to less than significant.

Resulting Level of Significance

Upon implementation, the intersection would continue to operate at LOS E during the PM peak hour and the impact would be reduced to a level of **less than significant**. No secondary significant impacts would result from implementation of this measure.

Adeline Street and 18th Street

Impact Trans-7: The addition of traffic generated by the full development of the Specific Plan would degrade PM peak hour operation from LOS B to LOS E at the intersection of Adeline Street and 18th Street (#15) located outside the Downtown Area. (**LTS with MM**)

Mitigation Measures

Mitigation Measure Trans-7: Implement the following measures at the Adeline Street and 18th Street (#15) intersection:

a) Retain the existing traffic signal control at the intersection and upgrade it to an actuated signal rather than converting to a single-lane roundabout as proposed as a part of the Project

It is projected that the impact would occur and the mitigation be needed by 2031. To implement this measure, individual project applicants shall submit the following to City of Oakland for review and approval:

- Plans, Specifications, and Estimates (PS&E) to modify the intersection. All elements shall be designed to City standards in effect at the time of construction and all new or upgraded signals shall include these enhancements. All other facilities supporting vehicle travel and alternative modes through the intersection shall be brought up to both City standards and ADA standards (according to Federal and State Access Board guidelines) at the time of construction. Current City Standards call for among other items the elements listed below:
    - 2070L Type Controller
    - GPS communication (clock)
    - Accessible pedestrian crosswalks according to Federal and State Access Board guidelines
    - City Standard ADA wheelchair ramps
    - Full actuation (video detection, pedestrian push buttons, bicycle detection)
    - Accessible Pedestrian Signals, audible and tactile according to Federal Access Board guidelines
    - Signal interconnect and communication to City Traffic Management Center for corridors identified in the City's ITS Master Plan
    - Signal timing plans for the signals in the coordination group.

Individual project applicants shall fund the cost of preparing and implementing the above measures. However, if the City adopts a transportation fee program prior to implementation of this mitigation measure, individual project applicants shall have the option to pay the applicable fee in lieu of implementing this mitigation measure and payment of the fee shall mitigate this impact to less than significant.

Resulting Level of Significance

Upon implementation, the intersection would improve to LOS C during the PM peak hour and the impact would be reduced to a level of **less than significant**. No secondary significant impacts would result from implementation of this measure.

Adeline Street and 5th Street

Impact Trans-8: The addition of traffic generated by the full development of the Specific Plan would degrade the PM peak hour operation from LOS D to LOS F at the signalized intersection of Adeline Street and 5th Street (#24) located outside the Downtown Area. (**LTS with MM**)

Mitigation Measures

Mitigation Measure Trans-8: Implement the following measure at Adeline Street and 5th Street (#24):

a) Modify the traffic signal to remove split phasing and provide protected-permitted left turn phasing for the northbound and southbound left-turn movements

It is projected that the impact would occur and the mitigation be needed upon buildout of the Specific Plan.

City of Oakland for review and approval:

- Plans, Specifications, and Estimates (PS&E) to modify the intersection. All elements shall be designed to City standards in effect at the time of construction and all new or upgraded signals shall include these enhancements. All other facilities supporting vehicle travel and alternative modes through the intersection shall be brought up to both City standards and ADA standards (according to Federal and State Access Board guidelines) at the time of construction. Current City Standards call for among other items the elements listed below:
  - 2070L Type Controller
  - GPS communication (clock)
  - Accessible pedestrian crosswalks according to Federal and State Access Board guidelines
  - City Standard ADA wheelchair ramps
  - Full actuation (video detection, pedestrian push buttons, bicycle detection)
  - Accessible Pedestrian Signals, audible and tactile according to Federal Access Board guidelines
  - Signal interconnect and communication to City Traffic Management Center for corridors identified in the City's ITS Master Plan
  - Signal timing plans for the signals in the coordination group.

Individual project applicants shall fund the cost of preparing and implementing the above measures. However, if the City adopts a transportation fee program prior to implementation of this mitigation measure, individual project applicants shall have the option to pay the applicable fee in lieu of implementing this mitigation measure and payment of the fee shall mitigate this impact to less than significant.

Resulting Level of Significance

Upon implementation, the intersection would improve the operations to LOS C during PM peak hour and the impact would be reduced to a level of **less than significant**. No secondary significant impacts would result from implementation of this measure.

Congestion Management Program (CMP) Network

Impact Trans-9: For a roadway segment of the Congestion Management Program (CMP) Network, the Specific Plan would not cause (a) the LOS to degrade from LOS E or better to LOS F or (b) the V/C ratio to increase 0.03 or more for a roadway segment that would operate at LOS F without the Project. (**LTS**)

Since the Specific Plan has the potential to generate more than 100 peak hour trips, the impacts of the plan on the regional transportation system were assessed using the Alameda County Transportation Commission Countywide Travel Demand Model for year 2020 and 2035 conditions. The impact analysis for roadways includes all MTS roadways and CMP-designated roadways in the Plan Area. This is consistent with the guidelines of the 2011 Congestion Management Program.

The traffic forecasts were based on the current version of the Countywide Model, which uses Association of Bay Area Government's (ABAG) Projections 2009 socio-economic forecasts. The Specific Plan's proposed land use changes were assumed to occur gradually and proportionally with the full impact of the Project to occur by 2035. The resulting socio-economic data for the Specific Plan area was added into the model for the 2020 and 2035 forecasts for all traffic analysis zones within the Plan Area.

For the CMP analysis, traffic estimates were calculated for the Specific Plan using the model and then compared against 2020 and 2035 no-project volumes. The model was used to calculate trip generation, trip distribution, mode choice, and trip assignment of project trips from/to the study area. The results were summarized for roadway systems and potential impacts were identified. Roadway impacts were evaluated at the locations identified by Alameda CTC staff in their comment letter to the Notice of Preparation.

The traffic baseline forecasts for 2020 & 2035 were extracted for the PM peak hour at the required CMP and MTS highway segments from the Countywide Travel Model. The PM peak hour was evaluated in compliance with Alameda CTC CMP requirements. The PM peak hour volumes, volume-to-capacity ratios and level of service for Year 2020 baseline and with Project conditions are presented in Table 4.10-9 and Table 4.10-10. The results for Year 2035 baseline and with Project conditions are presented in Table 4.10-11 and Table 4.10-12.

Under Year 2020 conditions, all studied roadways would operate at LOS E or better with the exception of San Pablo Avenue north of 35th Street, which would operate at LOS F on both directions under both baseline and with Project scenarios. However, the v/c ratios would remain the same between the two scenarios at 1.14 and 1.16 on the northbound and southbound directions, respectively. Therefore, the Project impact *is less-than-significant* under Year 2020 conditions.

Under Year 2035 conditions, two studied segments would operate at LOS F under both baseline and with Project scenarios. The I-880 segment south of Oak Street has a v/c ratio of 1.01 on the northbound direction under both scenarios and the San Pablo Avenue north of 35th Street segment is projected to have v/c ratios of 1.13 and 1.16 on the northbound and southbound directions, respectively, under both scenarios. Since the v/c ratios remain unchanged, the Project impact is *less-than-significant* under Year 2035 conditions.

Mitigation Measures

None required.

Travel Times for AC Transit

Impact Trans-10: The Specific Plan would increase travel times for AC Transit buses along West Grand Avenue. (**LTS**)

The City of Oakland has a general threshold for transit travel time, but no numerical threshold for "substantially increased travel times." This is due to the nature of transit, as discussed in the following points:

- Bus service, in general, is extremely transitory, and can change quite frequently, as is the case with AC Transit's bus network. Existing routes may be eliminated, or new routes may be put in service by the time the Broadway Valdez Development Program is built out.
- Similar to parking, transit service is not part of the physical environment, and can change over time in response to external factors. In fact, AC Transit has generally reduced its bus service over the past few years in response to budget issues.
- Unlike the situation for intersections or roadway facilities, there are no well-established methodologies for characterizing the operations of transit service in relation to travel times. For intersections, clear distinctions are made between intersections that operate at acceptable conditions (e.g., LOS D or better) and those that operate at unacceptable conditions (e.g., LOS E or LOS F), and separate impact thresholds are provided. For bus service, however, there is no well-established LOS equivalent for characterizing transit service in relation to travel times.

A quantitative analysis was performed to determine how the Specific Plan would affect transit travel times for three bus routes serving selected major arterial streets in West Oakland under Existing plus Project conditions. The three AC Transit routes are:

- Route NL runs along West Grand Avenue and operates with headways as low as 19 minutes during the weekday peak periods
- Route 26 runs along Adeline Street and operates with headways as low as 20 minutes during weekday peak periods
- Route 62 which operates with headways as low as 20 minutes during weekday peak periods and runs along 7th Street

Table 4.10-13 shows peak-hour travel times on the corridors that these buses operate. Existing average travel speeds range from about 16 miles per hours along Adeline Street between West Grand Avenue and 7th Street in the AM peak hour to about 22 miles per hour along West Grand Avenue between I-880 Frontage and Market Street in the AM peak hour. With the addition of the Project, the average travel speeds range from about 14 miles per hour along 7th Street between Mandela Parkway and Market

Street in the PM peak hour to about 18 miles per hour along Adeline Street between West Grand Avenue and 7th Street in the PM peak hour and along 7th Street between Market Street and Mandela Parkway in the AM peak hour.

Table 4.10-9 CMP/MTS Segment Evaluation
Year 2020 – PM Peak Hour – No Project Scenario

Segment	NB/EB					SB/WB					Facility Type
	Volume	Capacity	V/C	Lanes	LOS	Volume	Capacity	V/C	Lanes	LOS	
Interstate/State Highways											
I-880 - north of 7th St	3,950	6,200	0.64	3	C	4,299	6,200	0.69	3	C	FWY
I-880 - south of 7th St	4,691	6,200	0.76	3	D	4,813	6,200	0.78	3	D	FWY
I-880 - north of I-980	4,468	6,200	0.72	3	C	4,074	6,200	0.66	3	C	FWY
I-880 - south of Oak St	7,561	8,400	0.90	4	E	7,947	10,580	0.75	5	D	FWY
I-580 - east of I-980	7,611	10,580	0.72	5	C	8,699	10,580	0.82	5	D	FWY
I-580 - west of I-980	7,059	10,580	0.67	5	C	8,442	10,580	0.80	5	D	FWY
I-980 - south of 27th Ave	6,164	10,580	0.58	5	C	4,276	10,580	0.40	5	B	FWY
Arterials											
San Pablo Ave - north of 35th St	2,035	1,780	1.14	2	F	2,062	1,780	1.16	2	F	Class 2
West Grand Ave - west of I-980	1,381	2,670	0.52	3	C	653	2,670	0.24	3	C	Class 2
West Grand Ave - west of Poplar St	1,973	2,670	0.74	3	C	1,099	2,670	0.41	3	C	Class 2
7th St - West of Market St	1,312	2,670	0.49	3	C	872	2,670	0.33	3	C	Class 2
7th St - West of Peralta St	568	1,780	0.32	2	C	304	1,780	0.17	2	C	Class 2
14th St - West of Market St	8	1,780	0.00	2	B	113	1,780	0.06	2	B	Class 2
14th St - West of Poplar St	9	1,780	0.01	2	B	10	1,780	0.01	2	B	Class 2
Brush St - south of 11th St						987	2,670	0.37	3	C	Class 2
Adeline St - north of West Grand Av	4	1,780	0.00	2	B	12	1,780	0.01	2	B	Class 2
MLK Jr Way- north of 27th Ave	61	1,780	0.03	2	B	40	1,780	0.02	2	B	Class 2

Source: Kittelson & Associates

Table 4.10-10 CMP/MTS Segment Evaluation
Year 2020 – PM Peak Hour – with Project scenario

Segment	NB/EB Volume	NB/EB Capacity	NB/EB V/C	NB/EB Lanes	NB/EB LOS	SB/WB Volume	SB/WB Capacity	SB/WB V/C	SB/WB Lanes	SB/WB LOS	Facility Type
Interstate/State Highways											
I-880 - north of 7th St	3,959	6,200	0.64	3	C	4,305	6,200	0.69	3	C	FWY
I-880 - south of 7th St	4,700	6,200	0.76	3	D	4,814	6,200	0.78	3	D	FWY
I-880 - north of I-980	4,469	6,200	0.72	3	C	4,073	6,200	0.66	3	C	FWY
I-880 - south of Oak St	7,569	8,400	0.90	4	E	7,953	10,580	0.75	5	D	FWY
I-580 - east of I-980	7,570	10,580	0.72	5	C	8,674	10,580	0.82	5	D	FWY
I-580 - west of I-980	7,049	10,580	0.67	5	C	8,441	10,580	0.80	5	D	FWY
I-980 - south of 27th Ave	6,151	10,580	0.58	5	C	4,275	10,580	0.40	5	B	FWY
Arterials											
San Pablo Ave - north of 35th St	2,026	1,780	1.14	2	F	2,059	1,780	1.16	2	F	Class 2
West Grand Ave - west of I-980	1,424	2,670	0.53	3	C	672	2,670	0.25	3	C	Class 2
West Grand Ave - west of Poplar St	1,916	2,670	0.72	3	C	1,247	2,670	0.47	3	C	Class 2
7th St - West of Market St	1,326	2,670	0.50	3	C	969	2,670	0.36	3	C	Class 2
7th St - West of Peralta St	540	1,780	0.30	2	C	324	1,780	0.18	2	C	Class 2
14th St - West of Market St	46	1,780	0.03	2	B	79	1,780	0.04	2	B	Class 2
14th St - West of Poplar St	57	1,780	0.03	2	B	16	1,780	0.01	2	B	Class 2
Brush St - south of 11th St						977	2,670	0.37	3	C	Class 2
Adeline St - north of West Grand Av	4	1,780	0.00	2	B	86	1,780	0.05	2	B	Class 2
MLK Jr Way- north of 27th Ave	109	1,780	0.06	2	B	65	1,780	0.04	2	B	Class 2

Source: Kittelson & Associates

Table 4.10-11 CMP/MTS Segment Evaluation
Year 2035 – PM Peak Hour – No Project scenario

Segment	NB/EB					SB/WB					Facility
	Volume	Capacity	V/C	Lanes	LOS	Volume	Capacity	V/C	Lanes	LOS	Type
Interstate/State Highways											
I-880 - north of 7th St	4,276	6,200	0.69	3	C	4,749	6,200	0.77	3	D	FWY
I-880 - south of 7th St	5,394	6,200	0.87	3	D	5,457	6,200	0.88	3	D	FWY
I-880 - north of I-980	4,676	6,200	0.75	3	D	4,093	6,200	0.66	3	C	FWY
I-880 - south of Oak St	8,494	8,400	1.01	4	F	8,845	10,580	0.84	5	D	FWY
I-580 - east of I-980	8,230	10,580	0.78	5	D	9,017	10,580	0.85	5	D	FWY
I-580 - west of I-980	8,342	10,580	0.79	5	D	9,093	10,580	0.86	5	D	FWY
I-980 - south of 27th Ave	6,296	10,580	0.60	5	C	4,702	10,580	0.44	5	B	FWY
Arterials											
San Pablo Ave - north of 35th St	2,020	1,780	1.13	2	F	2,062	1,780	1.16	2	F	Class 2
West Grand Ave - west of I-980	2,565	2,670	0.96	3	E	1,203	2,670	0.45	3	C	Class 2
West Grand Ave - west of Poplar St	2,903	2,670	1.09	3	F	2,025	2,670	0.76	3	C	Class 2
7th St - West of Market St	2,056	2,670	0.77	3	C	2,002	2,670	0.75	3	C	Class 2
7th St - West of Peralta St	1,478	1,780	0.83	2	D	879	1,780	0.49	2	C	Class 2
14th St - West of Market St	50	1,780	0.03	2	B	119	1,780	0.07	2	B	Class 2
14th St - West of Poplar St	23	1,780	0.01	2	B	24	1,780	0.01	2	B	Class 2
Brush St - south of 11th St						1,040	2,670	0.39	3	C	Class 2

Table 4.10-11 CMP/MTS Segment Evaluation
Year 2035 – PM Peak Hour – No Project scenario

Segment	NB/EB					SB/WB					Facility Type
	Volume	Capacity	V/C	Lanes	LOS	Volume	Capacity	V/C	Lanes	LOS	
Adeline St - north of West Grand Av	49	1,780	0.03	2	B	130	1,780	0.07	2	B	Class 2
MLK Jr Way- north of 27th Ave	109	1,780	0.06	2	B	101	1,780	0.06	2	B	Class 2

Source: Kittelson & Associates

Table 4.11-12 CMP/MTS Segment Evaluation
Year 2035 – PM Peak Hour – with Project scenario

Segment	NB/EB Volume	NB/EB Capacity	NB/EB V/C	NB/EB Lanes	NB/EB LOS	SB/WB Volume	SB/WB Capacity	SB/WB V/C	SB/WB Lanes	SB/WB LOS	Facility Type
Interstate/State Highways											
I-880 - north of 7th St	4,293	6,200	0.69	3	C	4,760	6,200	0.77	3	D	FWY
I-880 - south of 7th St	5,412	6,200	0.87	3	D	5,459	6,200	0.88	3	D	FWY
I-880 - north of I-980	4,677	6,200	0.75	3	D	4,089	6,200	0.66	3	C	FWY
I-880 - south of Oak St	8,509	8,400	1.01	4	F	8,857	10,580	0.84	5	D	FWY
I-580 - east of I-980	8,148	10,580	0.77	5	D	8,966	10,580	0.85	5	D	FWY
I-580 - west of I-980	8,322	10,580	0.79	5	D	9,091	10,580	0.86	5	D	FWY
I-980 - south of 27th Ave	6,269	10,580	0.59	5	C	4,700	10,580	0.44	5	B	FWY
Arterials											
San Pablo Ave - north of 35th St	2,003	1,780	1.13	2	F	2,057	1,780	1.16	2	F	Class 2
West Grand Ave - west of I-980	2,652	2,670	0.99	3	E	1,240	2,670	0.46	3	C	Class 2
West Grand Ave - west of Poplar St	2,790	2,670	1.04	3	F	2,320	2,670	0.87	3	D	Class 2
7th St - West of Market St	2,083	2,670	0.78	3	C	2,195	2,670	0.82	3	C	Class 2
7th St - West of Peralta St	1,422	1,780	0.80	2	C	918	1,780	0.52	2	C	Class 2
14th St - West of Market St	126	1,780	0.07	2	B	52	1,780	0.03	2	B	Class 2
14th St - West of Poplar St	119	1,780	0.07	2	B	35	1,780	0.02	2	B	Class 2
Brush St - south of 11th St						1,020	2,670	0.38	3	C	Class 2
Adeline St - north of West Grand Av	49	1,780	0.03	2	B	277	1,780	0.16	2	B	Class 2
MLK Jr Way- north of 27th Ave	204	1,780	0.11	2	B	151	1,780	0.08	2	B	Class 2

Source: Kittelson & Associates

Table 4.10- 13 Travel Times Along AC Transit Corridors

Bus	Direction	Distance	Peak Hour	Existing Travel Time (sec)	Existing Average Speed (mph)	Existing Plus Project Travel Time (sec)	Existing Plus Project Average Speed (mph)
NL	To Eastmont Transit Center	0.91	AM	150.2	21.8	185.7	17.6
	(Along Grand Avenue from I-880 Frontage to Market Street)		PM	153.4	21.4	262.6	12.5
	To San Francisco		AM	151.0	21.7	189.1	17.3
	(Along Grand Avenue from Market Street to I-880 Frontage)		PM	156.5	20.9	201.5	16.3
26	To Grand Lake District	0.84	AM	193.1	15.7	170.1	17.8
	(Along Adeline Street from Grand Avenue to 7th Street)		PM	184.7	16.4	166.7	18.1
	Emeryville Public Market		AM	167.3	18.1	172.3	17.6
	(Along Adeline Street from 7th Street to Grand Avenue)		PM	167.9	18.0	174.9	17.3
62	To Fruitvale BART	0.61	AM	124.2	17.7	128.8	17.0
	(Along 7th Street from Mandela Parkway to Market Street)		PM	136.1	16.1	156.7	14.0
	To West Oakland BART		AM	124.5	17.6	121.4	18.1
	(Along 7th Street from Market Street to Mandela Parkway)		PM	121.9	18.0	136.9	16.0

1. Note: Corridor travel times were calculated using intersection delay and free-flow segment speeds from Synchro 8.0.
2. Source: Kittelson & Associates, 2013.

The Specific Plan would result in improved travel time along Adeline Street in the northbound direction during both peak periods and along 7th Street in the southbound direction during the AM peak hour. Travel time would increase along other corridors and time periods in varying levels. For example, the travel time along 7th Street would increase by just over 4.5 seconds in the eastbound direction during AM peak hour and by 15 seconds in the westbound direction during the PM peak hour. In combination with increased traffic under Specific Plan buildout, the proposed lane reduction along West Grand Avenue consistent with Oakland's complete streets policy would result in delay along West Grand Avenue, particularly at the West Grand Avenue intersections of I-880 Frontage Road and Market Street, which would increase travel times for Route NL, the only AC Transit route along this segment of the West Grand Avenue corridor. Travel speed decreases along West Grand Avenue by almost nine mph in the eastbound direction for the PM peak hour which correspond to an increase of 1 minute 50 seconds in travel time. This represents an almost 42 percent decrease in the travel speed and 71 percent increase in travel time in this segment of West Grand Avenue for Route NL. During the other time periods and directions along West Grand Avenue, Route NL would experience an increase of 35 to 45 seconds in travel time or 25 to 30 percent.

That being said, the Specific Plan includes a transit-oriented element to increase support of the transit systems and lane changes that could result in transit travel time delay are consistent with Oakland's Complete Street Policy intended to increase the safety and convenience of pedestrian, bicycle and public transportation travel options. Additionally, the Specific Plan includes strategies to coordinate with AC Transit to implement transit loops to supplement the connectivity of the largely linear current system.

While the Project may increase some bus travel times, the travel time increase would be offset by support of the transit systems and safety and convenience of pedestrian, bicycle and transit users. If additional strategies outlined in the plan were implemented, this would further contribute to transit connectivity. Therefore, the impact with respect to transit travel time is less than significant.

Mitigation Measures

None required.

Traffic Safety

Impact Trans-11: The Specific Plan would not directly or indirectly cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard due to a new or existing physical design feature or incompatible uses. (***LTS***)

The Specific Plan would not directly or indirectly cause or expose roadway users (e.g., motorists, pedestrians, bus riders, bicyclists) to a permanent and substantial transportation hazard. When specific development is proposed in the Plan Area, the project-level site plan would be reviewed by the City as a part of the entitlement process. All designs would conform to City standards. On the basis of that review and conformance process, the Project would not cause any significant impact.

Mitigation Measures

None required.

Pedestrian Safety

Impact Trans-12: The Specific Plan would not directly or indirectly result in a permanent substantial decrease in pedestrian safety (**LTS**)

Although the Project would not directly or indirectly result in a permanent substantial decrease in pedestrian safety, the West Oakland Specific Plan includes the following strategies and implementation actions to improve pedestrian safety:

- Promote traffic calming strategies such as lane reduction along West Grand Avenue, Adeline Street, 12^{th} Street, 14^{th} Street and 18^{th} Street that would reduce pedestrian exposure to high speed vehicles.
- Develop street improvement such as lights, bulb outs and sidewalks on Mandela Parkway, 8^{th} Street and Wood Streets
- Provide trees and planter strips to increase safety buffers for pedestrians

- Complete sidewalk network free of gaps for pedestrians
- Improve pedestrian crossing safety in areas of high pedestrian activities by methods such as narrowing crossings, providing medians, adding buffers against vehicles, landscaping, enhancing uncontrolled crosswalks and providing pedestrian scale lighting
- Improve pedestrian connectivity and safety around schools and transit corridors

Implementation of some or all of these strategies could substantially enhance pedestrian safety in the Plan Area. When specific development is proposed, the project-level site plan would be reviewed by the City as a part of the entitlement process and the design would conform to City standards.

Mitigation Measures

None required.

Bus Rider Safety

Impact Trans-13: The Specific Plan would not directly or indirectly result in a permanent substantial decrease in bus rider safety (***LTS***)

Although the Specific Plan would not directly or indirectly result in a permanent substantial decrease in bus rider safety, the West Oakland Specific Plan includes the following implementation actions to improve AC Transit bus service:

- Provide optimal bus stop locations at the far-side of intersections. Maintain 1,000-foot transit stop spacing wherever possible. Enhance bus stops with appropriate amenities (shelters, benches, lighting, real-time passenger information, security features) to improve comfort and safety for transit riders.

Implementation of these strategies would enhance bus rider safety in the Plan Area. When specific development is proposed in the Plan Area, the project-level site plan would be reviewed by the City as a part of the entitlement process. Any siting of new stops and/or relocation of existing stops would comply with City and AC Transit standards

Mitigation Measures

None required.

Bicyclist Safety

Impact Trans-14: The Specific Plan would not directly or indirectly result in a permanent substantial decrease in bicyclist safety (***LTS***)

The West Oakland Specific Plan includes the following strategies and implementation actions to improve bicyclist safety:

- Develop and improve West Oakland's bikeway network by implementing proposed bikeway network and improvements identified in various planning documents; providing bike paths, lanes and routes where feasible and through vehicle lane reductions where appropriate; and enhancing bicyclist safety at roadway and railway crossings;
- Make bicycle riding more safe, secure and convenient by enforcing enforcement truck prohibition and traffic laws that protect bicyclists;

- Require development to provide adequate and secure bicycle parking, according or in excess of City Ordinance and standards;

Expand programs such as “expanding Cycles of Change” (a non-profit program which provides safety lessons to low-income students) into West Oakland to increase safety training opportunities. Implementation of these strategies would substantially enhance bicyclist safety in the Plan Area. When specific development is proposed in the Plan Area, the project-level site plan would be reviewed by the City as a part of the entitlement process. All designs would conform to City standards. On the basis of that review and conformance process, the Project would not cause any significant impact.

Mitigation Measures

None required.

Conflicts with City Policies

Impact Trans-15: The Specific Plan would not fundamentally conflict with adopted City policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities adopted for the purpose of avoiding or mitigating an environmental effect and actually result in a physical change in the environment. (***LTS***)

The Specific Plan and the associated mitigation measures are consistent with adopted City policies, plans and programs supporting public transit, bicycle, or pedestrian and would not result in a significant impact.

The Specific Plan would promote the City’s General Plan objectives and policies by facilitating a “complete streets” network to support targeted growth in the Plan Area and to strengthen the West Oakland neighborhood. The Specific Plan would enhance the pedestrian experience by supporting streetscape improvement plans, encouraging completion of the sidewalk network and crossing safety, and encouraging pedestrian connections between activities centers. The Specific Plan also encourages development of West Oakland’s bikeway network and provision of bicycle parking and storage at key locations. The Specific Plan aims to improve AC Transit bus service by working with AC Transit to enhance transit connections with streetcar, light rail, buses or shuttles between West Oakland BART station and Emeryville along Mandela Parkway and 3rd Street and development transit-oriented development that would help achieving the objective of the City’s Public Transit and Other Alternatives to Single-Occupant Vehicles Policy (aka Transit First Policy) (1996) of shifting trips from private vehicles to public transit.

Mitigation Measures

None Required.

Construction Period Effects

Impact Trans-16: The Specific Plan would result in a substantial, though temporary adverse effect on the circulation system during construction. (***LTS, with SCAs***)

The Specific Plan will be implemented over a long period of time in multiple phases. New development under the Specific Plan would require the construction of both new buildings as well as supporting transportation infrastructure such as new paving and infrastructure replacement, sidewalk, median, and curb ramp improvements, lane and crosswalk striping/re-striping, road diets reduction, bike lanes, and a wide array of traffic control devices. Construction of buildings or transportation improvements requires the delivery of materials, the import or export of earth fill materials, as well as travel by construction workers on a daily basis to and from sites, potentially disrupting local traffic flow. Such activities are a temporary but unavoidable part of the construction process. This temporary impact that would last through the construction periods would be mitigated by compliance with the City of Oakland's Standard Conditions of Approval SCA TRANS-2: Construction Traffic and Parking, which requires that a construction management plan be developed and approved by the City. With compliance with SCA TRANS-2, the Project would not cause any significant impact.

Mitigation Measures

None Required

AC Transit Routes

This is the second of two transportation-related topics that are not considered under CEQA but, in consultation with City staff, were assessed in order to inform decision makers and the public.

In order to determine how bus service might be affected by the Specific Plan, the travel demand model was used to obtain the distribution of bus trips to and from the West Oakland area. After the full implementation of the Project, West Oakland is expected to generate roughly 4,500 local bus transit trips during the peak hour. As shown in Table **4.10-14**, eight percent of these trips would be heading south toward destinations such as Fremont and Union City; while 32 percent would head north towards Berkeley and Albany. The remainder of the trips would either stay within West Oakland (4%) or destine for other locations within Oakland or Alameda (56 percent).

Table 4.10-14 Bus Trip Distribution to/from West Oakland

Location	Peak Hour Bus Trips	Percentage
Towards Fremont, Union City, and Hayward	363	8%
Towards Albany, Berkeley, El Cerrito, and Richmond	1,423	32%
Within West Oakland	187	4%
Alameda and the rest of Oakland	2,465	56%

Source: Kittelson & Associates, December 2012

With the increase in travel demand associated with the Project and the high load factors on several existing routes, service enhancement might be required. Table 4.10-15 identifies routes serving the West Oakland area that currently have load factors greater than 80 percent that may require increased service resulting from the growth associated with the Project.

Table 4.10-15 Bus Routes Serving West Oakland with High Load Factors

Route	Direction	Time Period
18	Northbound - Albany	AM & PM
18	Southbound - Montclair	AM & PM
72	Southbound – Maxwell Park	AM
72M	Northbound – Richmond Point	PM
72M	Southbound – Maxwell Park	AM

Source: Kittelson & Associates, December 2012

Intersection Queuing Analysis

Queuing analysis for signalized analysis intersections was performed for the Existing plus Project conditions using the Synchro software. The queuing analysis assessed whether the Project would cause an increase in 95th percentile queue length of 25 feet or more at a study, signalized intersection under Existing plus Project conditions if the queue was over the available storage length without the Project or where Project-generated trips would extend the queue over the available storage length. It also identified locations where the plan causes the 95th percentile queue to spillback into an upstream signalized intersection for the through movement. The findings are summarized below and in **Appendix 4.10-D**.

San Pablo Avenue & 40th Street (#2)

- The Project would cause the eastbound left-turn queue to increase from 220 feet to 271 feet and from 285 feet to 442 feet during the Saturday and PM peak hours, respectively, which would exceed the 255-foot storage length of the turn pocket. Mitigation Measure Trans-1 would reduce the queue length to 125 feet and 149 feet in the AM and PM peak hours, respectively..
- The Project would cause the eastbound through movement to increase from 366 feet to 407 feet and from 466 feet to 622 feet in the AM and PM peak hours, respectively. This would add additional queue length to a movement where the queue already extends into the adjacent upstream intersection (Emery Street & 40th Street) which is approximately 255 feet upstream. Mitigation Measure Trans-1 would increase the queue length to 465 feet in the AM peak hour but decrease the queue to 563 feet in the PM peak hour.
- The Project would cause the southbound through movement to increase from 481 feet to 566 feet and from 438 feet to 483 feet in the AM and PM peak hours, respectively. This would add additional queue length to a movement where the queue already extends into the adjacent upstream intersection (San Pablo Avenue and Park Avenue) which is approximately 390 feet upstream. Mitigation Measure Trans-1 would decrease the queue length to 516 feet in the AM peak hour but increase the queue to 567 feet in the PM peak hour.

I-980 off-ramp & 27th Street (#3)

- The Project would cause the eastbound through movement to increase from 92 feet to 118 feet and from 119 feet to 233 feet in the AM and PM peak hour, respectively. This would cause the queue to spill over into the intersection at Martin Luther King Jr. Way and 27th Street which is about 107 feet upstream.

I-980 on-ramp & 27th Street (#4)

- The Project would cause the eastbound left-turn queue to increase from 226 feet to 487 feet during the PM peak hour, which would exceed the 150-foot storage length of the turn pocket.
- The Project would cause the westbound right-turn queue to increase from 228 feet to 284 feet in the PM peak hour which would exceed the 265-foot storage length.

Market Street & West Grand Avenue (#9)

- The Project would cause the northbound left-turn queue to increase from 65 feet to 322 feet and from 95 to 239 in the AM and PM peak hours, respectively, and to exceed the 104-foot storage length of the turn pocket.

San Pablo Avenue & West Grand Avenue (#10)

- The Project would cause the northbound left-turn queue to increase from 284 feet to 319 feet in the PM peak hour, which exceed the 80-foot storage length of the turn pocket.

Martin Luther King Jr. Way & West Grand Avenue (#11)

- The Project would cause the northbound right-turn queue to increase from 59 feet to 157 feet in the PM peak hour, which exceeds the 50-foot storage length of the turn pocket.

Northgate Avenue & West Grand Avenue (#12)

- The Project would cause the eastbound left-turn queue to increase from 171 feet to 597 feet in the PM peak hour, which exceed the 205-foot storage length of the turn pocket.

Broadway & West Grand Avenue (#13)

- The Project would cause the northbound left-turn queue to increase from 160 feet to 207 feet in the PM peak hour, which exceed the 150-foot storage length of the turn pocket.

Frontage Road & 7th Street (#19)

- The Project would cause the southbound left-turn queue to increase from 88 feet to 233 feet and from 85 feet to 287 feet during the AM and PM peak hours, respectively, and to exceed the 175-foot storage length of the turn pocket.

Market Street & 7th Street (#22)

- The Project would cause the northbound left-turn queue to increase from 79 feet to 282 feet and from 82 feet to 253 feet during the AM and PM peak hours, respectively. This would result in the queue extending into the upstream intersection of Market Street and 5th Street which is approximately 160 feet upstream.

Adeline Street & 5h Street (#24)

- The Project would cause the southbound left-turn queue to increase from 80 feet to 194 feet in the AM peak hour and from 74 feet to 183 feet in the PM peak hour exceeding the 150-foot storage length of the turn pocket.

4.11

Utilities and Service Systems

This chapter describes existing conditions and the regulatory setting related to utilities and service systems, including stormwater drainage and capacity, water, wastewater treatment, solid waste and energy, and the potential environmental impacts of the Specific Plan.

Physical Setting

Stormwater Drainage

The City of Oakland is responsible for the construction and maintenance of the local storm drainage system, while the Alameda County Flood Control and Water Control District (ACFCWCD) constructs, operates, and maintains major trunk lines and flood control facilities in Oakland. Existing stormwater drainage facilities within the Planning Area are shown in **Figure 4.11-1**.

Regional Stormwater Drainage

The City of Oakland is within ACFCWCD Zone 12 (which also includes Emeryville), the largest of the District's zones. Zone 12 has approximately 50 miles of closed conduit, approximately 10 miles of earthen and concrete channels, as well as the existing natural waterways which move stormwater to the San Francisco Bay.

West Oakland is part of a drainage basin that flows to a pump station located at the intersection of Ettie and 34th Streets. While the piping network is a City facility, the pump station itself is owned and operated by ACFCWCD. The pump station was installed by the City of Oakland in 1954 and was taken over by the District in 1997. It includes 6 working pumps capable of pumping just over 500,000 gallons per minute (gpm). There is an additional "jockey" pump that is used to de-water the system for maintenance and to clear summer irrigation run-off. The station is equipped with a back-up generator system, an automatic trash conveyance system to keep debris from affecting the pump propellers, and a supervisory control and data acquisition (SCADA) system through which Alameda County Public Works Agency personnel are immediately contacted in the event that the pump experiences a problem. The station is inspected annually, and all of the pumps within the station have been overhauled within the last 10-years. There has never been flooding in the area as a result of the pump failing.[1]

[1] BKF Engineers, *Industrial District Strategy Support Public Infrastructure Report, Mandela Parkway/3rd Street Corridor Commercial Industrial Zones*, (West Oakland Infrastructure Report), March 2011

Source: JRDV Intl., West Oakland Infrastructure Report, BKF Engineers

Figure 4.11-1
Primary Storm Drainage Facilities, West Oakland Planning Area

Local Storm Drain System

Stormwater runoff within West Oakland is conveyed by gravity through storm drain pipes to the ACFCWCD Ettie Street Pump Station, located at the northern end of Ettie Street near I-580, where the stormwater is lifted and discharged to the Bay. Pipe diameters ranging from 10 inches to over 36 inches in diameter are typical throughout the area. Larger pipes of various shapes (box, circular, elliptical, and egg-shaped) serve as connectors in the east-west direction along several numbered streets, such as 34th, 28th, 24th and 18th Streets, and two north-south connectors, Wood Street and Cypress Street. These larger connectors terminate either at the 96-inch reinforced concrete pipe (RCP) along Ettie Street or at the Ettie Street Pump Station, from where stormwater is lifted up and conveyed to the San Francisco Bay by gravity through a double 6 foot by 10 foot reinforced concrete box culvert and through one pressure line. The flow in the majority of the storm drains follows the natural drainage pattern of the terrain, generally east to west and south to north.

The City's 2006 Storm Drainage Master Plan estimated that over 30 percent of the existing storm drains in the city are in need of repair. It is generally assumed that the storm drain system in any development area is aged and would not be able to handle increased surface runoffs. Proposed development would need to be reviewed for pipe upsizing or rehabilitation, with costs borne by the developer.

The City of Oakland Storm Drainage Master Plan[2] estimates that 30% of the existing storm drainage conduits and all of the storm drainage structures within West Oakland are in need of rehabilitation. The Master Plan also indicates that system capacity upgrades are also needed throughout West Oakland, especially within the commercial and industrial area corresponding to the West Grand/Mandela and 3rd Street Opportunity Areas.

According to the West Oakland Infrastructure Report,[3] streets within the Mandela/Grand and 3rd Street Opportunity Areas are fairly flat and experience extensive ponding of stormwater runoff. With potential surface improvements and higher levels of industrial and residential uses in these areas, the ponding areas could become more problematic. The existing storm drainage system networks leave many individual street sections without a dedicated line. Most of these sections are far too long and flat for run-off to reasonably be conveyed to either end of the street. As the area improves, underground storm drain lines should be added to several of these street sections. Additional storm drainage structures, including conduit, would be a way to mitigate both of these issues.

Water

The East Bay Municipal Utility District (EBMUD) serves all of Oakland, including the Planning Area, with potable water, and also serves portions of the city, including the Planning Area, with recycled water. EBMUD uses its Water Supply Management Program 2040 (WSMP 2040) to assess water supply and demand over a 30-year planning period. The following water supply information was derived primarily from the EBMUD WSMP 2040.

---

2 CH2MHill, *City of Oakland, Storm Drain Master Plan*, 2006

3 BKF Engineers, March 2011

Water Supply

Current Water Supply and Demand

EBMUD obtains approximately 90 percent of its water supply from the Mokelumne River watershed, and transports it through pipe aqueducts to temporary storage reservoirs in the East Bay hills. EBMUD has water rights and facilities to divert up to a daily maximum of 325 million gallons per day (mgd) from the Mokelumne River.[4] However, this allocation may be constrained by the rights of other users of Mokelumne River water, EBMUD's ability to store water, and the amount of Mokelumne River runoff. The remaining 10 percent of EBMUD's water supply originates as runoff from protected watershed lands in the East Bay hills, and is approximately 15 to 25 mgd during normal years, but is reduced to near zero during drought conditions.

Raw (untreated) water from Pardee Reservoir travels approximately 90 miles through the Pardee Tunnel, the Mokelumne Aqueducts, and the Lafayette Aqueducts to East Bay water treatment plants and terminal reservoirs. Water not immediately put through water treatment and distributed is stored in five terminal reservoirs: Briones, Chabot, Lafayette, San Pablo, and Upper San Leandro reservoirs. The five terminal reservoirs regulate the Mokelumne River supply in winter and spring, augment water supply with local runoff, and provide emergency sources of supply during extended drought or in the event of water supply facility outage. Briones, San Pablo and Upper San Leandro reservoirs supply water to EBMUD throughout the year; Chabot and Lafayette reservoirs serve mostly as emergency sources of supply. Seismic upgrades have been performed throughout EBMUD's system, most notably at San Pablo Dam, the largest and most vital of EMBMUD's local water storage reservoirs.

EBMUD's normal year water supply for 2005 was 222 mgd.[5] Water consumption has remained relatively constant in recent years despite continued growth and development within its service area due to increased conservation and use of recycled water. According to the WSMP 2040, the 2010 average daily water demand within EBMUD's service area was estimated to be 251 mgd. Adjusting that number to account for conservation and recycled water program savings results in an adjusted 2010 demand estimate of approximately 216 mgd.[6]

Future Year Water Supply and Demand

The WSMP 2040 includes projections of potable water demands through 2040. These future year water demands were calculated using existing and future demands for various land use categories and future changes in land use as described in the respective general plans of communities within the EBMUD service area. Based on information for residential and non-residential land use categories, EBMUD forecasts that unadjusted water demands would be 304 mgd by 2030, but with conservation measures and recycled water use the adjusted water demand would be approximately 229 mgd. By 2040, unadjusted water demand is projected to be 312 mgd and adjusted demand would be 230 mgd.[7] The WSMP 2040 demand projections were developed before the economic recession which began around

---

[4] EBMUD, *Water Supply Master Plan* 2040, October 2009.

[5] EBMUD, *Water Supply Master Plan 2040,* October 2009.

[6] EBMUD, *Water Supply Master Plan 2040,* October 2009. Table 4-2, p. 4-8.

[7] Ibid.

December 2007. EBMUD now anticipates that demand will increase more slowly than anticipated in the WSMP 2040.[8]

The WSMP 2040 includes a "portfolio" of options, including supplemental water supply sources, conservation, recycling and water rationing, to satisfy water demand through 2040, including during drought years. The "portfolio" strategy is meant to be open and flexible, with different options to be pursued over time, based on which elements of the portfolio are the most feasible for implementation. These portfolio components include:

- Increased water conservation (the WSMP 2040 set a goal of demand reduction through conservation of up to 39 mgd);
- Increased production and use of recycled water (reduction of up to 20 mgd);
- Managed water rationing during years of prolonged drought (a rationing level of 15 percent to allow flexibility to respond to emergencies and unknown factors); and
- Supplemental water supply sources (including Northern California water transfers, the Bayside Groundwater Project, Sacramento Basin and San Joaquin groundwater banking and exchanges, regional desalination projects and reservoir expansions). The recently completed Freeport Regional Water Project will supply 100 mgd for use by EBMUD.

The combination of these water supply options, implemented over time, is expected to satisfy increased demand through 2040, even during multiple drought year conditions.[9]

<u>Water Treatment, Storage and Distribution Facilities</u>

Water Treatment

There are six water treatment plants in the EBMUD water supply and distribution system. Combined, the six plants have a treatment capacity of over 375 mgd. The Orinda Treatment Plant supplies water to portions of Oakland, including the Planning Area. The Orinda Treatment Plant has the largest output of EBMUD's treatment plants with a peak capacity of 200 mgd, and is currently operating at approximately 70 percent of capacity.[10] Water is subject to coagulation, filtration and disinfection prior to being distributed to the public.

Water Distribution System

EBMUD owns and maintains the water distribution mains that provide water service in West Oakland. The water distribution system in Oakland is divided into pressure zones covering approximately 200-foot elevation ranges. Water pressure is generally adequate throughout the city, ranging from 40 to 130 pounds per square inch (psi), but pressure may be reduced in some locations with older water mains if they are not sized based on current standards or have lost capacity due to deterioration.

The Planning Area is located within the EBMUD Central Pressure Zone, which provides water service to customers within an elevation range of 0 to 100 feet, by gravity with a residual water pressure between

---

[8] City of Oakland, *Housing Element of the General Plan Draft EIR*, August 2010, p. 6-3.

[9] EBMUD, *Water Supply Master Plan 2040,* October 2009, p. 6-53.

[10] East Bay Municipal Utility District, *Daily Water Supply Report,* August 5, 2005. Accessed at: www.ebmud.com/water_&_environment/water_supply/daily_reports/default.htm.

40 and 70 psi. Water from the Orinda Treatment Plant is stored in the Central Reservoir and Dunsmuir Reservoir, from where it flows via gravity throughout the EBMUD water distribution system.

Figure 4.11-2 shows existing water facilities in the Planning Area. Only larger transmission mains are shown; there are also many smaller distribution mains and laterals. The Planning Area is served by a network of transmission and distribution lines ranging from 2 inches to 36 inches in diameter. There are two transmission lines with diameters of 36 inches, one runs north on West Street, west on 34th Street, and north again on both Market Street and Hollis Street (two separate mains); the second 36-inch transmission line runs west on 9th Street, north on Market Street, west on 10th Street, and north on Adeline Street, then branching into several smaller transmission lines. Three 24-inch pipes extend through the Planning Area on 34th Street, 14th Street, and 5th Street, continuing into the former Oakland Army Base and the Port of Oakland. Distribution mains are located on every street throughout the Planning Area, typically 6 or 8 inches in diameter.

According to EBMUD staff, because the existing water distribution system within the Opportunity Areas was sized to accommodate the higher water usage of West Oakland's historically heavy industrial and manufacturing uses, the system has more than enough capacity to accommodate mixed-use development under the proposed Specific Plan. In addition, EBMUD monitors the capacity and condition of the system and makes needed upgrades, with costs typically borne by developers. Service to new development would likely require reassessment and upsizing of conduits, especially if the pipe length is greater than 1,000 feet to the nearest transmission line.

Recycled Water

Recycled water has been used by EBMUD since the 1960s. This water is drawn from wastewater treatment plants or untreated water reservoirs and used for landscape irrigation, and industrial and commercial applications. EBMUD projects use of 14 mgd of recycled water by 2020 and 20 mgd by 2040.[11] The potential supply of EBMUD recycled water from its Main Wastewater Treatment Plant in Oakland far exceeds this projected demand. Recycled water therefore provides a stable source of non-potable water not subject to rationing for landscape irrigation and other potential uses.

The Planning Area is located within the area served by the East Bayshore Recycled Water Project. This project provides up to 2.3 mgd of recycled water, from the EBMUD Main Wastewater Treatment Plant to Alameda, Albany, Berkeley, Emeryville and parts of Oakland. Within the Planning, the primary recycled water transmission main is found traversing west from 7th Street then north on Mandela Parkway into Emeryville (and other cities to the north). Smaller distribution pipelines are found on 16th Street and Willow Street.

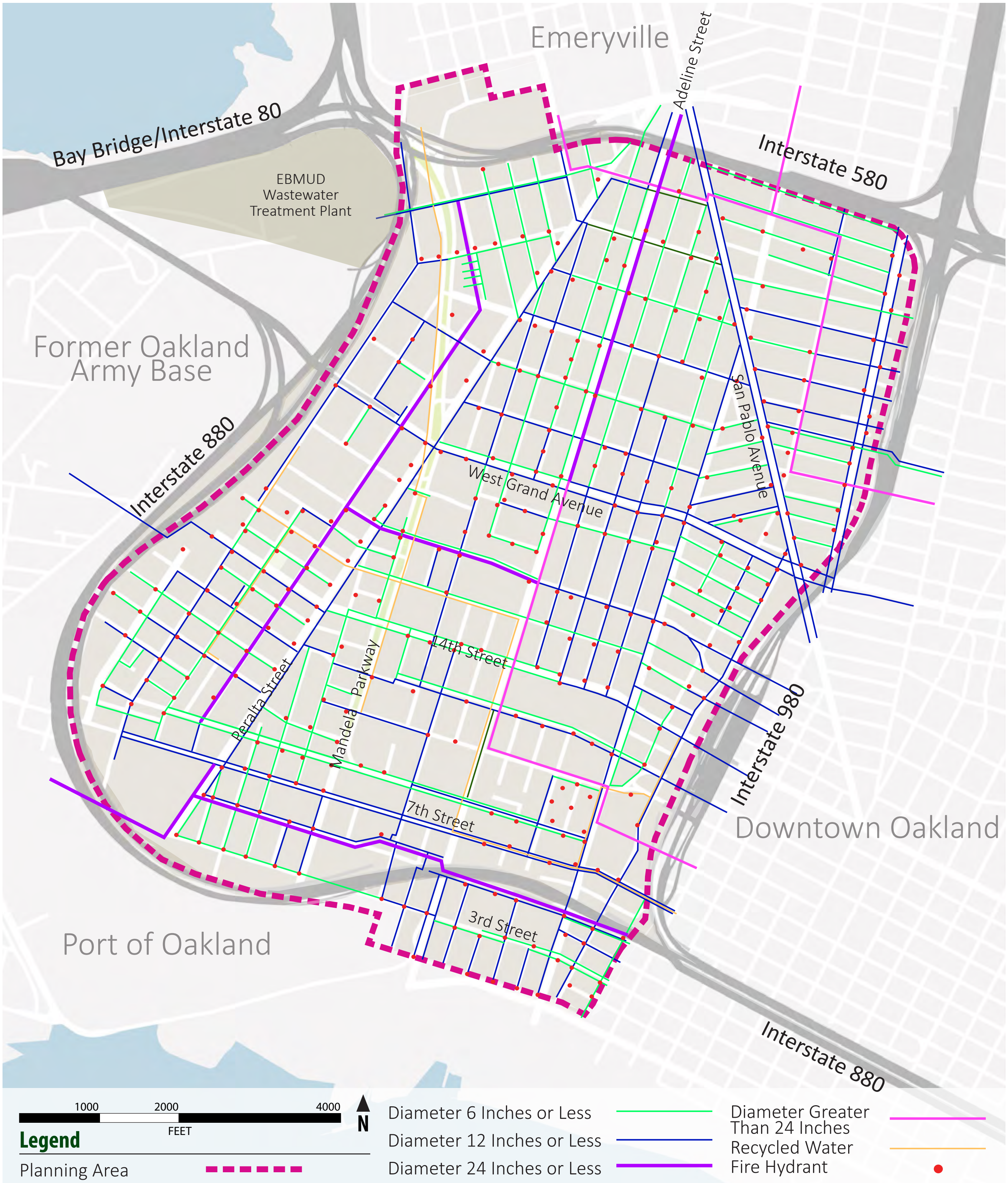
EBMUD considers reuse of pipelines, reservoirs, and other facilities which are no longer needed by other utilities for distributing recycled water to customers. However, they have found that it is more economical to install a separate plumbing system for new projects during initial construction than it is to return at a later date to retrofit for the project.

Fire Flow

The Oakland Fire Department maintains a fire flow standard within the Planning Area of 1,500 gallons per minute (gpm) for a duration of two hours, with a local residual pressure of 65 psi.

---

11 City of Oakland, Oakland General Plan Land Use and Transportation Element Draft Environmental Impact Report State Clearinghouse No. 97062089, 1998, p. III.D-3.



Source: JRDV Intl., West Oakland Infrastructure Report, BKF Engineers

Figure 4.11-2
Primary Water and Reclaimed Water Facilities, West Oakland Planning Area

Wastewater (Sanitary Sewer)

Wastewater service within the Planning Area is provided by the City of Oakland's sewage collection system of mains and laterals, which connects to EBMUD's interceptor system, which transports sewage to EBMUD's Main Wastewater Treatment Plant (MWWTP), located northwest of the Planning Area immediately southwest of the I-80/I-880/I-580 interchange.

City of Oakland Wastewater Collection System

The City of Oakland owns, operates, and maintains a local sanitary sewer collection system covering approximately 48 square miles, and includes over 930 miles of sanitary sewer lines, 31,000 structures and seven pump stations, serving a population of about 400,000 people throughout the City. Many of the lines pre-date 1938.[12]

Sewer system maps for the Planning Area obtained from the City of Oakland (see **Figure 4.11-3**) indicate that the sewer pipes are in poor condition. Many laterals are shown as "plugged" or "abandoned", while for others there is no available data (diameter, flow direction, material, etc.). Where information is available, sewer main pipe diameters range from 8 inches to 18 inches, with larger pipes in the main thoroughfares, such as West Grand Avenue, Peralta Street and San Pablo Avenue.

Sub-Basin Allocation System

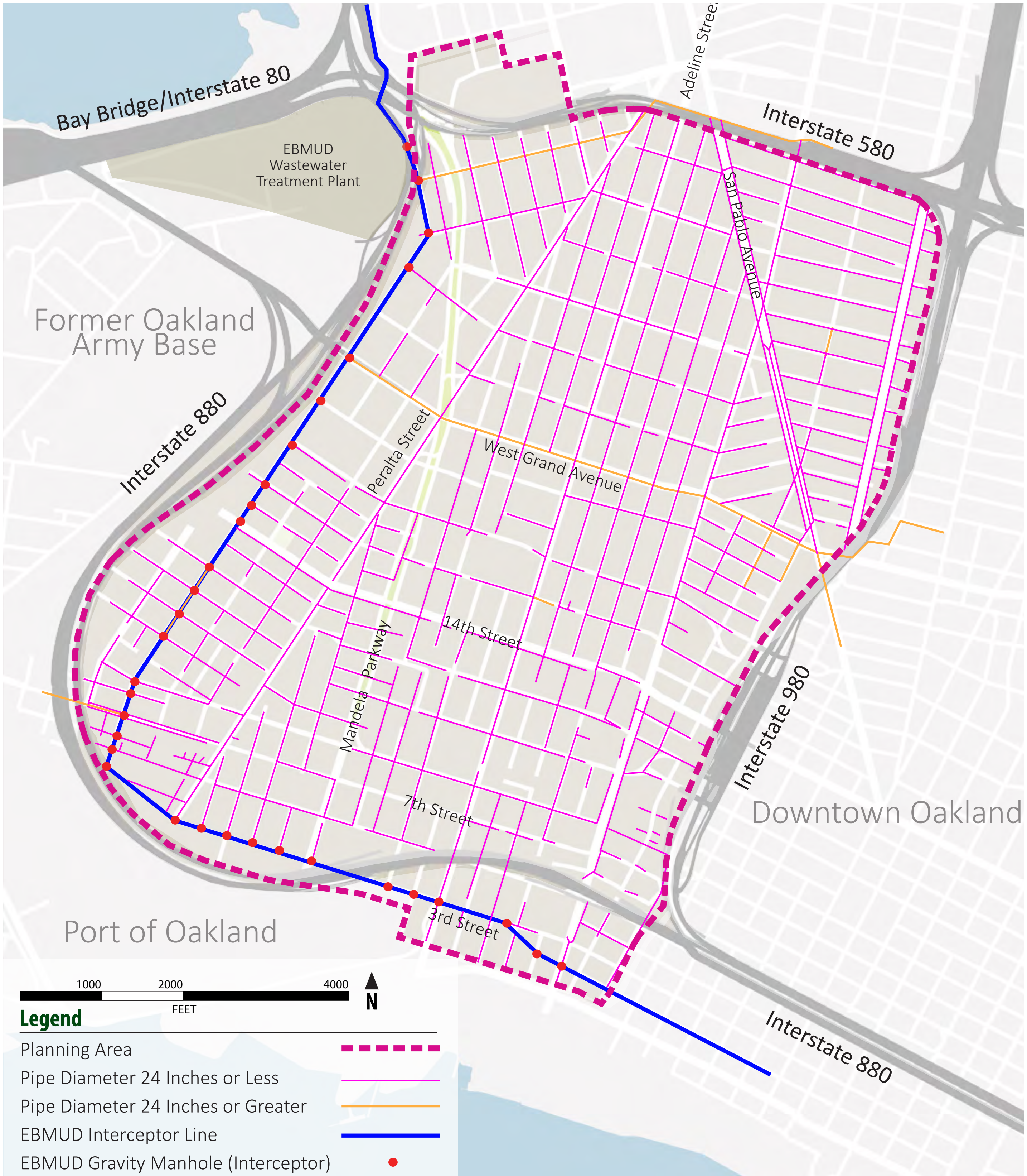
Pursuant to the City's Sanitary Sewer Evaluation System Program, Oakland's sewer collection system is divided into basins and sub-basins. Each numbered sub-basin encompasses a specific physical area and its sewer flows are assigned to a single discharge point from the City's collection system into EBMUD's interceptor lines. Each sub-basin is allocated a certain amount of sewer flow, and flows within a sub-basin normally may not exceed that allocation. Should a sub-basin require more flow than its allocation, allocations may be redirected between adjacent sub-basins. In total, however, flows for the larger sewer basin may not exceed that basin's allocation. Using sub-basin flow data from the Oakland Public Works Department, EBMUD ensures that the capacity of the wastewater transport and treatment system is adequate to serve development. The program allows an approximately 20 percent increase in wastewater flows for each sub-basin to accommodate projected growth. Projected flow increases must stay below the base flow increase allowance for each sub-basin of the system.

All new development or redevelopment projects would require an impact analysis to ensure that the existing sewer system has enough hydraulic capacity to accommodate the proposed development. The City's capacity improvement program is focused only on the trunk system assuming that the local mains comprising the remainder of the system have sufficient capacity. If the net increase in wastewater flow is within the program's projections, then only the local mains serving the development need to be evaluated. If a proposed development's net increase in wastewater flow exceeds the program's projections, both the local and trunk systems, as well as regional facilities, need to be evaluated.

A mitigation fee is assessed on all new development or redevelopment in sub-basins that have a growth rate greater than 20 percent. The City of Oakland Master Fee Schedule authorizes the assessment of the Sewer Mitigation Fee, which is specific to each proposed development based on an engineering analysis and represents the development's proportional share of the cost of improvements needed to accommodate the additional growth within the sub-basin.

---

[12] City of Oakland, Oakland General Plan Land Use and Transportation Element Draft Environmental Impact Report State Clearinghouse No. 97062089, 1998, p. III.D-8.



Source: JRDV Intl., West Oakland Infrastructure Report, BKF Engineers

Figure 4.11-3
Primary Wastewater Facilities, West Oakland Planning Area

Inflow and Infiltration Correction Program

A Sanitary Sewer Evaluation Survey conducted by the City measured average and peak flows from sewer sub-basins throughout the City. Within much of West Oakland, groundwater infiltration and rainfall dependent inflow (collectively referred to as “I/I”) appears to contribute roughly 80% of the total peak wet weather flow. The remaining 20% consists of actual sewage. Much of this system is antiquated and likely constructed with vitrified clay pipe (VCP), making it susceptible to cracking and vulnerable to failure.

The City’s Inflow and Infiltration Correction Program, mandated under the City’s sanitary sewer discharge permit with the Regional Water Quality Control Board, is substantially decreasing the amount of inflow and infiltration into the City’s sewer pipes and increasing the capacity of the collection system. With the completion of this 25-year program, the City's wastewater collection system will have sufficient capacity to accommodate the 20 percent growth anticipated at the time of the initial program study.

Improvements are funded by a sewer service charge fund, which is a fixed fee for single family and apartment dwellings, and water usage-based fee for commercial and industrial users.

<u>EBMUD Interceptor System</u>

The City’s sewage collection system discharges into EBMUD’s sewer interceptor system. The EBMUD sewer interceptor system comprises approximately 29 miles of large diameter pipeline, ranging in size from 9 to 12 feet in diameter. The wastewater system in the Planning Area is part of EBMUD’s Special District No. 1 (SD-1), which treats domestic, commercial, and industrial wastewater for several East Bay cities. Wastewater from the Planning Area is collected into the 42-inch South Interceptor. An EBMUD Wastewater Pumping Station then pumps the wastewater to EBMUD’s Main Wastewater Treatment Plant (MWWTP).

Infiltration of stormwater into the aging sanitary sewer system from misconnections, cracks, and other imperfections in system pipes, joints and manholes can cause a 10-fold increase in the volume of wastewater that reaches EBMUD’s sewer interceptor pipes and the MWWTP. During wet weather when heavy rainfall overwhelms the collection and treatment system, flows have at times exceeded the capacity of the MWWTP, resulting in discharges of untreated wastewater into San Francisco Bay. EBMUD reached a settlement in January 2009 with the Environmental Protection Agency (EPA) and the State Water Resources Control Board to address inadequately treated sewage discharges into San Francisco Bay during large storms. This settlement requires EBMUD to repair leaking private sewer pipes, improve maintenance, and deploy flow meters to identify areas with high wet weather sewage flows and needed repairs. EBMUD uses its interceptor system master plan last updated in 2008 survey and its 1998 Wastewater Pump Stations Master Plan to prioritize rehabilitation projects for inclusion in the District’s Capital Improvement Program (CIP). The City of Oakland’s 25-year Inflow and Infiltration Correction Program also reduces stormwater and helps eliminate wet weather overflows.

EBMUD has two interceptors within the Planning Area: the South Interceptor runs east-west on 3rd Street and the North Interceptor runs along Wood Street and terminates at the MWWTP. The North Interceptor also conveys raw sewage from the South Interceptor, as well as from Pump Station “K” on 7th Street (serving portions of the Port of Oakland).

Wastewater Treatment

The average annual daily flow into the MWWTP is approximately 80 mgd.[13] The MWWTP has an average dry weather flow design capacity of 120 mgd. During peak wet weather events, the MWWTP has a primary treatment capacity of up to 320 mgd and a secondary treatment capacity of 168 mgd. Maximum flow can exceed capacity during storms due to infiltration of stormwater into sanitary sewage pipes. The MWWTP can provide capacity for a short-term hydraulic peak of 415 mgd through operation of an on-site wet weather storage basin, as well as two wet weather treatment facilities (WWF) in Oakland (the San Antonio Creek WWF and the Oakport WWF).[14] EBMUD also operates a water recycling facility at the MWWTP that treats wastewater for non-potable uses. There are no current plans to expand wastewater treatment capacity.

Treated effluent is discharged from the MWWTP to San Francisco Bay south of the Bay Bridge approximately one mile from the East Bay shoreline via a 102-inch diameter deep water outfall pipeline.[15] EBMUD discharges in compliance with conditions of permits granted by the San Francisco Bay Regional Water Quality Control Board (RWQCB) under the NPDES program.

The MWWTP and interceptor system have adequate dry weather capacity to treat wastewater flows from future development. EBMUD's projections for future flows at the MWWTP are based on assumptions about future development within its service area. In areas considered to be fully developed, including Oakland, a 20 percent increase in sanitary flow was assumed.

Solid Waste

Solid waste and yard trimmings within Oakland are collected by Waste Management of Alameda County. These materials are taken to the Davis Street Transfer Station in San Leandro. The Transfer Station, which has a maximum allowable capacity of 5,600 tons of waste per day, received an average of 3,028 tons per day in 2003.[16] The facility can process up to 320 tons per day of concrete, asphalt, dirt, bricks, wood and metal.

In 2009, Oakland disposed of approximately 306,839 tons of solid waste, 264,636 tons of which went to the Altamont Landfill.[17] Most of the remaining solid waste is sent to one of four landfills: Forward Landfill in San Joaquin County; the Keller Canyon Landfill in Contra Costa County, Potrero Hills Landfill in Solano County, and the Vasco Road Landfill in Alameda County.

The Altamont Landfill has a permitted maximum daily disposal of 11,500 tons per day. The landfill comprises approximately 2,170 acres (480 acres permitted landfill area) and has a permitted maximum disposal capacity of 11,150 tons per day and an average input of 7,505 tons per day. The Altamont Landfill is projected to have sufficient capacity to operate until at least 2031, and potential to operate through 2071, depending on waste flows and waste reduction measures.[18] The official closures dates of the Altamont and Vasco Landfills are 2025 and 2019, respectively, as stated on each of their permits.

---

13 East Bay Municipal Utility District, Wastewater Treatment, http://www.ebmud.com/wastewater/treatment/.

14 East Bay Municipal Utilities District, Urban Water Management Plan, 2000, p. 5-30.

15 EBMUD, 2001.

16 Alameda County Waste Management Authority, Alameda County Integrated Waste Management Plan, February 26, 2003.

17 CalRecycle, 2011

18 Ibid.

However, increased diversion rates and the downturn of the economy could result in extended closure dates as new capacity estimates are generated annually. Alameda County's Integrated Waste Management Plan, prepared by the Alameda County Waste Management Authority (ACWMA) pursuant Assembly Bill 939, projects long-term landfill capacity by projecting Alameda County disposal tonnage at the Altamont and Vasco Road Landfills through 2050.[19] The most recent disposal tonnage projections are conservative in that they are based on 2007 actuals and do not account for impacts from economic cycles. According to these projections, Vasco Road Landfill tonnage is assumed to divert to Altamont Landfill in the year 2023. The Altamont Landfill capacity is projected to be reduced to 1,439,630 tons in the year 2049.

The City provides curbside recycling within the Planning Area. Recyclable materials include glass, aluminum and tin, motor oil, cardboard, magazine, newsprint, and plastic. Recyclable materials are delivered to the Davis Street Transfer Station, where they are processed. Construction and demolition debris is normally hauled by contractors or construction companies to asphalt and concrete recycling centers in Oakland or to the Vasco Road Landfill north of Livermore.

AB 939, enacted in 1989, requires the Source Reduction and Recycling Element of each city and county to include an implementation schedule to divert at least 50 percent of solid waste from landfill disposal by the year 2000, and at least 75 percent by 2010. The California Department of Resources Recycling and Recovery (CalRecycle) indicates that the Oakland's diversion rate was 59 percent in 2006.[20] Oakland's per resident disposal target rate is 5.8 pounds per person per day (PPD) and its per employee disposal target rate is 15.3 PPD. In 2008, the most recent year for which data is available, the measured disposal rate was 4.0 PPD for residents and 10.0 PPD for employees, thereby meeting the City's target rates.[21]

Energy

The California Independent System Operator (ISO) is charged with managing the flow of electricity along the State's open market wholesale power grid. The California ISO Energy Demand Forecast (2008 to 2018) estimates that residential, commercial, and industrial sectors represented 85 percent of statewide electricity demand in 2008. Statewide consumption is expected to increase 11.6 percent by 2018, due primarily to growth in the residential and commercial sectors.

The California Energy Commission (CEC) indicates that Alameda County consumed 11,534 gigawatt-hours (GWh) of electricity in 2009, up from 11,097 GWh in 2006.[22] In the PG&E service area, total consumption in 2009 was approximately 108,503 GWh, up from 104,719 GWh in 2006; in 2018, total consumption is estimated to be 119,644 GWh with a peak of approximately 24,600 MW.

The Pacific Gas and Electric Company (PG&E) supplies electricity to approximately 5.1 million electric customers throughout northern and central California, including customers in Oakland. As of 2007, PG&E's electricity was supplied by natural gas power plants (accounting for 47 percent of its power),

---

[19] Alameda County Waste Management Authority (ACWMA), Alameda County Integrated Waste Management Plan, Countywide Element, February 2003 as amended January 2011

[20] Beginning with the 2007 jurisdiction annual reports, diversion rates were no longer measured; only per capita disposal rates are measured to determine whether a jurisdiction's efforts are meeting the intent of AB 939.

[21] California Department of Resources Recycling and Recovery (CalRecycle), Disposal Reporting System, http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/default.aspx, accessed April 29, 2011.

[22] California Energy Commission, 2011

non-emitting nuclear generation (23 percent of the total power), large hydroelectric facilities (13 percent), renewable sources, such as wind, geothermal, biomass, and small hydro power (12 percent), and coal (four percent). The City of Oakland operates three 55 megawatt (MW) fossil fuel plants that supplement PG&E's electricity generation.

Electricity is transported via a grid of high voltage transmission lines to seven main substations in Oakland. These substations contain transformers that "step down" or reduce electricity to lower voltages for distribution. There are three substations just outside of the Planning Area. Electrical power is delivered to West Oakland from PG&E Substation L, which receives 155 kV electrical power and delivers that power via 12-kilovolt (kV) transmission lines. Power is delivered within the Planning Area through both underground and overhead electrical distribution and transmission lines. Gas is mostly distributed underground, with one major transmission line running northerly on Linden Street before turning westerly on 32nd Street.

PG&E staff indicates that there is adequate capacity for planned development. When applications for new services are reviewed, staff may determine whether new circuits would be required. A new development must typically exceed 6 to 8 megawatts (MW) of power demand before exceeding existing system capacity.

Regulatory Setting

Federal

Clean Water Act

The CWA established the basic structure for regulating discharges of pollutants into the waters of the U.S. and gave the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry. The CWA sets water quality standards for all contaminants in surface waters. The statute employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. The Corps has jurisdiction over all waters of the U.S. including, but not limited to, perennial and intermittent streams, lakes, and ponds, as well as wetlands in marshes, wet meadows, and side hill seeps. Under Section 401 of the CWA every applicant for a federal permit or license for any activity which may result in a discharge to a water body must obtain State Water Quality Certification that the proposed activity will comply with state water quality standards.

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program under the CWA controls water pollution by regulating point and non-point sources that discharge pollutants into "waters of the U.S." California has an approved state NPDES program. The USEPA has delegated authority for NPDES permitting to the California State Water Resources Control Board (SWRCB), which has nine regional boards. The San Francisco Bay Regional Water Quality Control Board (RWQCB) regulates water quality in the Project area.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA, 42 USC §§ 300f et seq.) is the primary federal law regulating drinking water quality; it establishes standards intended to protect public health, safety, and welfare. The U.S. Environmental Protection Agency (USEPA) implements the SDWA and delegates its authority to the State of California. The Clean Water Act (CWA, 33 United States Code [USC] §§ 1251 et seq.) is intended to restore and maintain the integrity of the nation's waters, including requirements for states to establish water quality standards to protect designated uses for all waters of the nation. Many aspects of the CWA have been delegated to the State, including the regulation of discharges from private industry and public facilities such as wastewater treatment plants.

The California Department of Health Services (DHS) regulates drinking water, implements the Safe Drinking Water Act and oversees public water systems in California. The State requires that public water systems meet two groups of water quality standards: primary and secondary drinking water standards. Primary drinking water standards, known as Maximum Contaminant Levels (MCLs), are legally enforceable standards that regulate contaminants which could threaten public health. Secondary drinking water standards are used to regulate contaminants that affect the taste, odor, and appearance of water, and are enforceable for new potable water sources.

The California RWQCB, San Francisco Bay Region, has established water quality objectives to define the level of water quality to be maintained for designated beneficial uses. Water designated for uses such as domestic or municipal supply shall not contain concentrations of constituents in excess of the limits specified in Title 22 of the California Code of Regulations.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, Division 7 of the California Water Code, allows the SWRCB to adopt statewide water quality control plans. The purpose of the plans is to establish water quality objectives for specific water bodies. The act also authorizes the NPDES program under the CWA, which establishes water quality requirements for discharges to waters of the state. Most of the implementation of SWRCB's responsibilities is delegated to nine regional boards. The San Francisco Bay RWQCB has established permit requirements for stormwater runoff for the Project area (see Regional Regulatory Setting below).

State Water Resources Control Board

Stormwater discharges from construction activities on one acre or more are regulated by the State Water Resources Control Board (SWRCB) and are subject to the permitting requirements of the NPDES General Permit for Discharges of Stormwater Runoff Associated with Construction Activity (General Construction Permit). The SWRCB established the General Construction Permit program to reduce surface water impacts from construction activities. The proposed Project would be required to comply with the current NPDES permit requirements to control stormwater discharges from the construction site (see Alameda County Regulations below).

The General Construction Permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for construction activities. The SWPPP must be prepared before the construction begins, and in certain cases before demolition begins. The SWPPP must include specifications for best management practices (BMPs) that would be implemented during construction to control degradation of surface water by preventing soil erosion or the discharge of pollutants from the construction area. The SWPPP must also describe measures to prevent or control runoff after construction is complete, and identify procedures for inspecting and maintaining facilities or other elements. Required elements of a SWPPP include:

- Site description addressing the elements and characteristics specific to the site

- Descriptions of BMPs for erosion and sediment controls;
- BMPs for construction waste handling and disposal;
- Implementation of approved local plans;
- Proposed post-construction controls; and
- Non-stormwater management.

Examples of typical construction BMPs include scheduling or limiting activities to certain times of year, installing sediment barriers such as silt fence and fiber rolls, maintaining equipment and vehicles used for construction, tracking controls such as stabilizing entrances to the construction site, and developing and implementing a spill prevention and cleanup plan. Non-stormwater management measures include installing specific discharge controls during certain activities such as paving operations, vehicle and equipment washing and fueling.

California Urban Water Management Planning Act

The California Urban Water Management Planning Act[23] requires that an understanding of urban water demands and efficient use of water are to be actively pursued by water suppliers, including the requirement for every urban water supplier to periodically prepare and adopt an Urban Water Management Plan (UWMP). Each UWMP must describe the supplier's services area; identify and quantify existing and planned water sources; describe the reliability of water supplies; describe opportunities for exchanges or transfers of water; quantify past, current, and projected water use; and describe and evaluate the supplier's water demand management measures. The UWMP must be updated every five years.

California State Senate Bill 7

Enacted in late 2009, Senate Bill 7 (SB 7) requires the State of California as a whole to achieve a 20 percent reduction in urban per capita water use by December 31, 2020. The law also requires the State to make incremental progress towards this goal, namely achieving a 10 percent per capita reduction in urban water use on or before December 31, 2015. To achieve these goals, the law includes a requirement that urban retail water suppliers would not be eligible for state water grants or loans on and after July 1, 2013, unless they demonstrate compliance with the water conservation requirements of the bill.

California State Senate Bill 610

California Senate Bill 610 (SB 610) of 2002 (codified in §10910 through §10915 of the California Water Code) requires local planning agencies to consider whether there are sufficient and reliable water supplies to serve proposed development projects of specified sizes during the application and environmental review processes for such projects. SB 610 requires an assessment of whether available water supplies are sufficient to serve the demand generated by projects, as well as the reasonably foreseeable cumulative demand in the region over the next 20 years under average normal year, single dry year, and multiple dry year conditions.

[23] Division 6, Part 2.6 of the California Water Code.

In accordance with Water Code §10910(a), "Any city or county that determines that a project, as defined in §10912, is subject to the California Environmental Quality Act…shall comply with this part." Under Water Code Section 10912(a) "project" means any of the following:

- a proposed residential development of more than 500 dwelling units;
- a proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- a proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- a proposed hotel or motel, or both, having more than 500 rooms;
- a proposed industrial, manufacturing, or processing plant, or industrial park, planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
- a mixed-use project that includes one or more of the projects specified in this subdivision; or
- a project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling-unit project.

<u>CEQA Guidelines Section 15155</u>

CEQA Guidelines Section 15155 requires a city or county with discretionary land use oversight for a "water demand" project to request a determination from the governing body of the public water system as to whether the projected water demand of that project was accounted for in the most recently adopted urban water management plan, and to request a water supply assessment (WSA). CEQA Guidelines Section 15155 also provides that:

"(d) If a water-demand project has been the subject of a water assessment, no additional water assessment shall be required for subsequent water-demand projects that were included in such larger water-demand project if all of the following criteria are met:

> (1) The entity completing the water assessment had concluded that its water supplies are sufficient to meet the projected water demand associated with the larger water-demand project, in addition to the existing and planned future uses, including, but not limited to, agricultural and industrial uses; and
>
> (2) None of the following changes has occurred since the completion of the water assessment for the larger water-demand project:
>
> - Changes in the larger water-demand project that result in a substantial increase in water demand for the water-demand project.
> - Changes in the circumstances or conditions substantially affecting the ability of the public water system or the water supplying city or county identified in the water assessment to provide a sufficient supply of water for the water demand project.
> - Significant new information becomes available which was not known and could not have been known at the time when the entity had reached the conclusion in subdivision (d)(1).

(e) The city or county lead agency shall include the water assessment, and any water acquisition plan in the EIR, negative declaration, or mitigated negative declaration, or any supplement thereto, prepared for the water-demand project, and may include an evaluation of the water assessment and water acquisition plan information within such environmental document. The city or county lead agency shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If a city or county lead agency determines that water supplies will not be sufficient, the city or county lead agency shall include that determination in its findings for the water-demand project."

Development in accordance with the Specific Plan would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling-unit project. Therefore, pursuant to California Water Code §10910(a)(1) and §10912(a)(3), and CEQA Guidelines Section 15155, a WSA has been prepared for the Specific Plan by EBMUD.

California Recycled Water in Landscaping Act

The Recycled Water in Landscaping Act requires municipalities to adopt ordinances requiring use of recycled water for landscaping uses where recycled water of appropriate quality is made available.

Water Conservation Act of 2009 (SB 7)

The Water Conservation Act of 2009 (Water Code Division 6, Part 2.55) provides the regulatory framework to support a statewide reduction in urban per capita water use of 20 percent by the year 2020. Each urban water supplier is required to determine its existing water use and 2020 target, and report this analysis in the water supplier's UWMP.

California Integrated Waste Management Act

The California Integrated Waste Management Act of 1989, or Assembly Bill (AB) 939, established the Integrated Waste Management Board, required the implementation of integrated waste management plans and also mandated that local jurisdictions divert at least 50 percent of all solid waste generated (from 1990 levels), beginning January 1, 2000, and divert at least 75 percent by 2010. As required by AB 939, the City of Oakland has prepared a Source Reduction and Recycling Element (SRRE) which requires proposed development projects to undergo, as part of the required environmental review, an assessment of project impacts on the City's ability to maintain the mandated 50 percent waste diversion rates. With the passage of SB 1016 in 2006, the Per Capita Disposal Measurement System, only per capita disposal rates are measured to determine if jurisdiction's efforts are meeting the intent of AB 939. AB 939 also established the goal for all California counties to provide at least 15 years of ongoing landfill capacity.

California Solid Waste Reuse and Recycling Access Act of 1991

The California Solid Waste Reuse and Recycling Access Act requires areas to be set aside for collecting and loading recyclable materials in development projects and for local agencies to adopt such an ordinance.

Title 24, California's Energy Efficiency Standards

Title 24, California's Energy Efficiency Standards for Residential and Nonresidential Buildings, details requirements to achieve minimum energy efficiency standards of the State of California. The standards apply to new construction of both residential and nonresidential buildings, and regulate energy consumed for heating, cooling, ventilation, water heating and lighting. Compliance with these standards is verified and enforced through the local building permit process. Buildings constructed after June 30, 1977 must comply with standards identified in Title 24 of the California Code of Regulations. Title 24, established by the California Energy Commission (CEC) in 1978, requires the inclusion of state-of-the-art energy conservation features in building design and construction including the incorporation of specific energy conserving design features, use of non-depletable energy resources, or a demonstration that buildings would comply with a designated energy budget.

California Green Building Standards Code (CALGreen)

CALGreen is a statewide regulatory code for all residential, commercial, hospital, and school buildings, and includes both mandatory and voluntary components that can be adopted by local jurisdictions. CALGreen is intended to encourage more sustainable and environmentally-friendly building practices, require low-pollution emitting substances that cause harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment. The five CALGreen categories include: 1) Planning and Design; 2) Energy Efficiency; 3) Water Efficiency and Conservation; 4) Material Conservation and Resource Efficiency; and 5) Environmental Quality. CALGreen became mandatory on January 1, 2011, for new residential and commercial construction.

San Francisco Bay Regional Water Quality Control Board

The San Francisco Bay Regional Water Quality Control Board (RWQCB) governs many of the regulations associated with utilities, specifically potable water, sanitary sewers, storm drains, and recycled water. RWQCB has the authority to enforce water quality regulations found in the Clean Water Act based on the Porter-Cologne Water Quality Control Act. Wastewater discharges are guided by NPDES (National Pollutant Discharge Elimination System) permits granted by the RWQCB. The city's storm drain outfalls operate under NPDES permits granted by the RWQCB.

Alameda County

Clean Water Program

The Alameda Countywide Clean Water Program (ACCWP) consists of 17 member agencies, including the City of Oakland and the ACFCWCD, that work together to protect creeks, wetlands and the San Francisco Bay. The member agencies have developed performance standards to clarify the requirements of the stormwater pollution prevention program, adopted stormwater management ordinances, conducted extensive education and training programs, and reduced stormwater pollutants from industrial areas and construction sites.

The ACCWP is part of the Municipal Regional Stormwater NPDES Permit (MRP) that was adopted by the Regional Water Quality Control Board (RWQCB) on October 14, 2009. The NPDES permit (Order R2-2009-0074 Permit No. CAS612008) issued by the RWQCB is designed to enable the ACCWP agencies to meet federal Clean Water Act requirements. The permit includes performance standards for new development and construction activities also referred to as Provision C.3 requirements. The C.3 requirements include measures for stormwater treatment in new development and redevelopment projects to address stormwater runoff pollutant discharges. An additional goal is to prevent increases in runoff flows primarily accomplished through implementation of low impact development (LID) techniques. The C.3 provision also requires preparation of a hydrograph modification management plan (HMP) in cases where the changes in the amount and timing of runoff would increase stormwater discharge rates and/or duration and increase the potential for erosion or other significant adverse impacts to beneficial uses.

New development that impacts an area greater than 10,000 square feet would be subject to provision C.3 of the City of Oakland's National Pollutant Discharge Elimination System (NPDES) permit with the State of California, and would therefore need to implement storm water treatment measures under the building permit of any such development. This will, in the aggregate, serve to lower the overall run-off coefficient in the area.

Alameda County Waste Reduction and Recycling Initiative (Measure D)

In addition to AB 939, the 1990 Voter Initiative Measure D (Alameda County Waste Reduction and Recycling Initiative) mandates all cities in Alameda County to divert 75 percent of their solid waste from landfills by the year 2010.

City of Oakland

City of Oakland Water Reuse Ordinance

The City of Oakland adopted the Water Reuse Ordinance in January 2002, which applies to developments meeting all of the following criteria: 1) the site is located within an ordinance-designated Water Reuse Area; 2) the development requires land subdivision of five or more parcels; 3) new water hook-ups from the EBMUD are required; and 4) development includes common or shared areas that will be plumbed.

City of Oakland Sewer Lateral Ordinance

Ordinance No. 13080, adopted in 2011, amends the Oakland Municipal Code and extends the EBMUD Regional Private Sewer Lateral (PSL) Ordinance to apply to lower sewer laterals. EBMUD adopted the Regional PSL Ordinance in February 2010 and subsequently the City Council passed Ordinance No. 13025 C.M.S. in July 2010 adopting the EBMUD Regional PSL Ordinance. However, the ordinance covered only the upper portion of sewer laterals (that portion between the property line and the building). The United States Environmental Protection Agency (U.S. EPA) required Oakland to extend the EBMUD Regional PSL Ordinance to apply to lower laterals. Approval of Ordinance 13080 brought the City into compliance with the U.S. EPA mandate.

City of Oakland Waste Reduction and Recycling Plan

Oakland Municipal Code Chapter 15.34 requires building permit applications for new construction, demolition, or alterations (with a valuation of $50,000 or greater) to be accompanied by an approved Waste Reduction and Recycling Plan (WRRP). The WRRP is required to document the ways that the applicant will reduce the quantity of construction and demolition debris disposed at landfills by 65 percent or more. The City does not approve building permits for projects until the WRRP is approved.

City of Oakland Zero Waste Strategic Plan

The City of Oakland adopted a Zero Waste Goal in March 2004, and developed the Zero Waste Strategic Plan in November 2006. The main strategies outlined in the plan include: 1) expand and improve local and regional recycling and composting; 2) develop and adopt new rules and incentives to reduce waste disposal; 3) preserve land for sustainable development and green industry infrastructure; 4) advocate for manufacturer responsibility for produce waste, ban problem materials; and 5) educate, promote, and advocate a Zero Waste Sustainability Agenda.

City of Oakland General Plan

The City of Oakland General Plan Land Use and Transportation Element includes the following policies related to utilities and infrastructure:

> Policy I/C 1.9: Adequate public infrastructure should be ensured within existing and proposed industrial and commercial areas to retain viable uses, improve the marketability of existing, vacant or underutilized sites, and encourage future use and development of these areas with activities consistent with the goals of the General Plan.
>
> *Policy N.12.4:* Electrical, telephone, and related distribution lines should be undergrounded in commercial and residential areas, except where special local conditions, such as limited visibility of the poles and wires makes this unneeded. They should also be underground in appropriate institutional, industrial, and other areas, and generally along freeways, scenic routes, and heavily traveled streets. Programs should lead systematically toward the eventual undergrounding of all existing lines in such places. Where significant utility extensions are taking place in these areas, such as in new subdivisions, utilities should be installed underground at the start.

City of Oakland Sustainability Programs

The City of Oakland's sustainability programs are administered under the Oakland Sustainability Community Development Initiative, which was created in 1998 under Ordinance 74675 CMS. The City's sustainability programs range from the encouragement of green building practices to the replacement of heavy-duty diesel trucks. Oakland has funded a Phase I feasibility study and a Phase II implementation plan to become a community choice aggregator, which would allow the City to purchase electricity on behalf of its energy users. Potential benefits of becoming an aggregator include increased use of renewable energy sources to meet Oakland's energy needs and a reduction in electricity costs.

City of Oakland Green Building Ordinance and Sustainable Green Building Requirements for Private Development

The City of Oakland adopted a Civic Green Building Ordinance in May 2005, requiring City owned and occupied buildings to meet specific green building standards set by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system. In October 2010, the City adopted mandatory green building standards for private development projects. The intent of the mandatory green building standards is to integrate environmentally sustainable strategies in building construction and landscapes in the City of Oakland.

City of Oakland Energy and Climate Action Plan (ECAP)

The Oakland Energy and Climate Action Plan (ECAP) was adopted by the City Council on December 4, 2012. The purpose of the ECAP is to identify and prioritize actions the City of Oakland can take to reduce energy consumption and greenhouse gas (GHG) emissions associated with Oakland. The ECAP recommends GHG reduction actions and establishes a framework for coordinating implementation, as well as monitoring and reporting on progress.

The primary sources of Oakland's GHG emissions are transportation and land use, building energy use, and material consumption and waste. In July 2009, the Oakland City Council approved a preliminary GHG reduction target for the year 2020 of 36 percent below 2005 levels. The ECAP recommends over 150 actions to be implemented over a ten-year period that would enable the City of Oakland to achieve a 36 percent reduction in GHG. Implementation of renewable energy and energy efficiency measures include measures to reduce vehicle miles traveled annually by 20 percent, electricity consumption by 32 percent and natural gas consumption by 14 percent. These measures include the adoption of a green building ordinance for private development (which was completed in October 2010), the use of property-based financing for alternative energy systems, and advancing the use of transit.

Standard Conditions of Approval

The City's Standard Conditions of Approval relevant to utilities and service systems are listed below. These Standard Conditions of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area when it is approved by the City and would ensure that significant impacts would not occur.

SCA 36: Waste Reduction and Recycling. The project applicant will submit a Construction & Demolition Waste Reduction and Recycling Plan (WRRP) and an Operational Diversion Plan (ODP) for review and approval by the Public Works Agency.

a. Chapter 15.34 of the Oakland Municipal Code outlines requirements for reducing waste and optimizing construction and demolition (C&D) recycling. Affected projects include all new construction, renovations/alterations/modifications with construction values of $50,000 or more (except R-3), and all demolition (including soft demo).The WRRP must specify the methods by which the development will divert C&D debris waste generated by the proposed project from landfill disposal in accordance with current City requirements. Current standards, FAQs, and forms are available at www.oaklandpw.com/Page39.aspx or in the Green Building Resource Center. After approval of the plan, the project applicant shall implement the plan.

a. The ODP will identify how the project complies with the Recycling Space Allocation Ordinance, (Chapter 17.118 of the Oakland Municipal Code), including capacity calculations, and specify the methods by which the development will meet the current diversion of solid waste generated by operation of the proposed project from landfill disposal in accordance with current City requirements. The proposed program shall be implemented and maintained for the duration of the proposed activity or facility. Changes to the plan may be re-submitted to the Environmental Services Division of the Public Works Agency for review and approval. Any incentive programs shall remain fully operational as long as residents and businesses exist at the project site.

SCA 91: Stormwater and Sewer. *Prior to completing the final design for the project's sewer service.* Confirmation of the capacity of the City's surrounding stormwater and sanitary sewer system and state of repair shall be completed by a qualified civil engineer with funding from the project applicant. The project applicant shall be responsible for the necessary stormwater and sanitary sewer infrastructure improvements to accommodate the proposed project. In addition, the applicant shall be required to pay additional fees to improve sanitary sewer infrastructure if required by the Sewer and Stormwater Division. Improvements to the existing sanitary sewer collection system shall specifically include, but are not limited to, mechanisms to control or minimize increases in infiltration/inflow to offset sanitary sewer increases associated with the proposed project. To the maximum extent practicable, the applicant will be required to implement Best Management Practices to reduce the peak stormwater runoff from the project site. Additionally, the project applicant shall be responsible for payment of the required installation or hook-up fees to the affected service providers.

Impacts, Standard Conditions of Approval and Mitigation Measures

Significance Criteria

According to the City's Thresholds of Significance, the Specific Plan would have a significant impact on utilities and services systems if it would:

1. Exceed wastewater treatment requirements of the San Francisco Bay Regional Water Quality Control Board;
2. Require or result in construction of new storm water drainage facilities or expansion of existing facilities, construction of which could cause significant environmental effects;
3. Exceed water supplies available to serve the project from existing entitlements and resources, and require or result in construction of water facilities or expansion of existing facilities, construction of which could cause significant environmental effects;[24]
4. Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new wastewater treatment facilities or expansion of existing facilities, construction of which could cause significant environmental effects;
5. Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and require or result in construction of landfill facilities or expansion of existing facilities, construction of which could cause significant environmental effects;
6. Violate applicable federal, state, and local statutes and regulations related to solid waste;
7. Violate applicable federal, state and local statutes and regulations relating to energy standards;[25] or
8. Result in a determination by the energy provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the providers' existing commitments and require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects.

Stormwater Drainage

Impact Util-1: Future development in accordance with the Specific Plan would consist of redevelopment of previously developed properties so there would be limited change in impervious surface area and stormwater runoff. Because development facilitated by the Specific Plan would not result in an increase in stormwater runoff and with required compliance of individual development projects with SCA 91, *Stormwater and Sewer*, and the Alameda Countywide Clean Water

[24] EBMUD needs to be consulted early and a Water Supply Assessment performed for certain, larger projects (see Appendix D).

[25] See Appendix F of the State CEQA Guidelines for guidance on information related to energy-conservation that must be contained in an EIR.

Program NPDES Permit, the stormwater drainage impacts of the Specific Plan would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Planning Area. Development facilitated by the Specific Plan would involve redevelopment of previously developed properties. Stormwater runoff is determined by a parcel's impervious surface area and not its use or density. While land uses and the density and intensity of development may change with the Specific Plan, there would be limited change from existing conditions in terms of impervious surface area, and the volume, rate or timing of stormwater runoff.

Many of the streets within the West Oakland Opportunity Areas are fairly flat and experience extensive ponding of stormwater runoff. With potential surface improvements and higher levels of industrial and residential uses in the area, the ponding areas could become more problematic. Also, the existing storm drainage system network leaves many individual street sections without a dedicated line. Most of these street sections are far too long and flat for run-off to reasonably be conveyed to either end of the street.

Standard Conditions of Approval

New development that impacts an area greater than 10,000 square feet in size would be subject to Provision C.3 of the City of Oakland's National Pollutant Discharge Elimination System (NPDES) permit with the State of California, and would therefore need to implement storm water treatment measures. This will, in the aggregate, serve to lower the overall run-off coefficient in the area, which could over time serve to make the Storm Drainage Master Plan inherently conservative.

The City's Standard Condition of Approval SCA 91, *Stormwater and Sewer*, requires confirmation of the capacity and state of repair of the stormwater system by a qualified civil engineer. The project applicant would be responsible for needed improvements to offset the demand of the project and pay any additional fees if required by the Sewer and Stormwater Division.

Temporary construction of needed storm drain system improvements would generally occur along existing pipeline alignments and within existing rights-of-way, and would be required to comply with all City of Oakland Standard Conditions of Approval regarding construction noise (SCA Noise-1 and SCA Noise-2), air quality and dust suppression (SCA Air-1 and SCA Air-2), erosion control (SCA Geo-1) and temporary construction traffic controls (SCA Trans-1). These standard Conditions of Approval would ensure that standard construction effects remain less than significant.

Development facilitated by the Specific Plan would not result in an increase stormwater runoff. With required compliance of individual development projects with City Standard Conditions of Approval and the Alameda Countywide Clean Water Program NPDES Permit requirements, the stormwater drainage impacts of the Specific Plan would be less than significant.

Implementation of SCA 91, Stormwater and Sewer, would require that the applicants of future projects under the Specific Plan to construct the necessary stormwater infrastructure improvements, the environmental impacts of which are discussed in this document. Future projects under the Specific Plan also would be required to implement SCA 80, Post-construction Stormwater Pollution Prevention Plan, which requires compliance with Provision C.3 of the Alameda Countywide Clean Water Program and regulates post-construction stormwater runoff; and SCA 75, Stormwater Pollution Prevention Plan (see Section 4.8, Hydrology and Water Quality). Because adoption and development under the Specific Plan would not result in an increase in stormwater runoff, and individual projects would be required to meet the SCA listed above, the adoption and development under the Specific Plan would have a less-than-significant impact on storm drainage facilities.

Mitigation Measures

None needed. However, the following engineers' recommendation is suggested to further reduce impacts to the storm drainage system:[26]

Recommendation Util-1a: As the area improves, underground storm drain lines should be added to several of the Opportunity Areas' street sections where such lines do not exist. Additional storm drainage structures, including conduit, would be a way to address both ponding and adequate conveyance of storm runoff (**see Figure 4.11-4**).

Water

Impact Util-2: The WSA prepared by EBMUD for the Specific Plan concluded that EBMUD has sufficient water supplies to meet current water demand and future water demand through 2035, including the increased water demand associated with the Specific Plan, during normal, single dry, and multiple dry years. Construction of needed water system improvements would typically occur within existing public rights-of-way and construction period traffic, noise, air quality, water quality and other potential impacts would be mitigated through the City's standard construction mitigation practices. Therefore, the water service impacts of the Specific Plan would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Planning Area. This additional development would result in an estimated 11,136 new residents and 14,850 new jobs in the Planning Area by 2035. **Table 4.11-1** presents projected net new water demand with buildout of the Specific Plan. As shown, the net new development under the Specific Plan would result in an estimated increase in water demand from the Planning Area of approximately 3.4 mgd, for a total water demand in 2035 of 4.5 mgd.

Water Supply

The development assumptions that underlie the EBMUD WSMP 2040 included the growth projections of the Oakland General Plan and development facilitated by the proposed Specific Plan. The WSMP 2040 concluded that a combination of existing system reservoirs, conservation measures, and recycled water would meet water demand during wet and normal years. In addition, it formulated a Preferred Portfolio of water management that includes rationing of up to 15 percent, aggressive conservation resulting in 39 mgd by 2040, and recycling water resulting in 20 mgd that would meet demand during drought years. The recently completed Freeport Regional Water Project alone will supply an additional 100 mgd for use by EBMUD. Further, portions of the Planning Area fall within the area served by the East Bayshore recycled water main transmission pipeline, making recycled water available for landscape irrigation, and certain commercial and industrial applications, and potentially reducing potable water demand. CALGreen standards, and City of Oakland Green Building Ordinance, Sustainable Green Building Requirements for Private Development, and Water Efficient Landscape Requirements found in Title 10, Chapter 7 of the Municipal Code would further reduce water demand.

[26] BKF Engineers, 2011

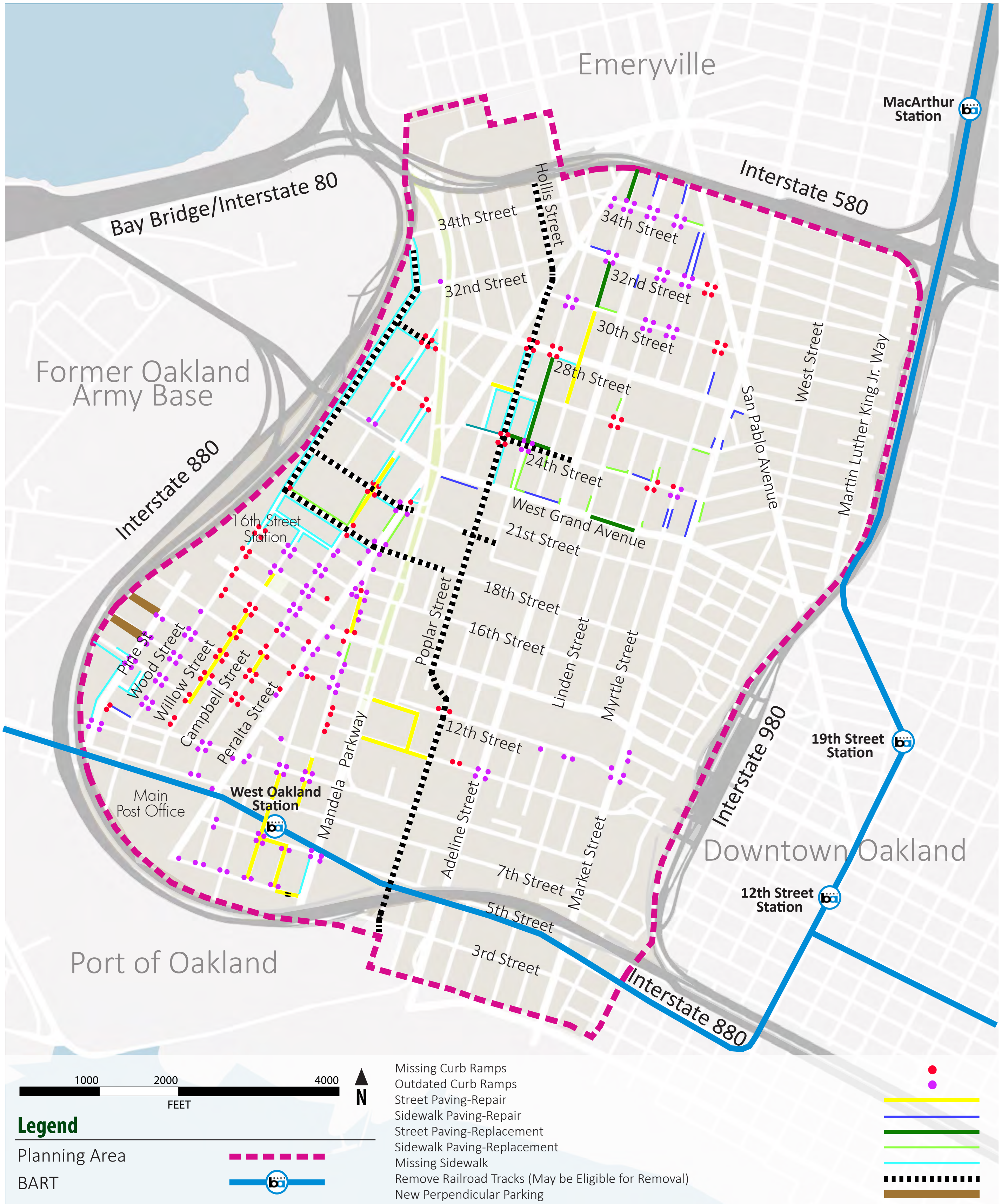


Figure 4.11-4
Proposed Infrastructure Improvements

Source: JRDV Intl.

Table 4.11-1
Estimated Water Demand (gpd[1])

	Mandela/West Grand			7th Street			3rd Street		
Land Use Type	**Existing**	**2035 Build-out**	**Change**	**Existing**	**2035 Build-out**	**Change**	**Existing**	**2035 Build-out**	**Change**
Heavy Industrial	115,000	0	-115,000	23,000	0	-23,000	9,200	0	-9,200
Business Mix/Light Industrial	402,500	264,500	-138,000	194,350	171,350	-23,000	115,000	92,000	-23,000
Low Intensity Business Mix/Light Industrial	0	147,200	147,200	0	39,100	39,100	0	69,000	69,000
High Intensity Campus	0	1,407,600	1,407,600	0	0	0	0	207,000	207,000
Retail	34,500	69,575	35,075	575	10,350	9,775	5,750	7,475	1,725
Single Family and Townhouse	41,800	91,580	49,780	13,300	33,820	20,520	1,900	1,900	0
Multi-Family Residential	0	393,300	393,300	17,250	948,750	931,500	0	0	0
	593,800	2,373,755	1,779,955	248,475	1,203,370	954,895	131,850	377,375	245,525

	San Pablo Avenue			Total Planning Area		
Land Use Type	**Existing**	**2035 Build-out**	**Change**	**Existing**	**2035 Build-out**	**Change**
Heavy Industrial	23,000	0	-23,000	170,200	0	-170,200
Business Mix/Light Industrial	69,000	69,000	0	780,850	596,850	-184,000
Low Intensity Business Mix/Light Industrial	0	14,950	14,950	0	270,250	270,250
High Intensity Campus	0	0	0	0	1,614,600	1,614,600
Retail	10,350	23,000	12,650	51,175	110,400	59,225
Single Family and Townhouse	15,200	39,900	24,700	72,200	167,200	95,000
Multi-Family Residential	10,350	355,350	345,000	27,600	1,697,400	1,669,800
	127,900	502,200	374,300	1,102,025	4,456,700	3,354,675

Source: City of Oakland, *Sanitary Sewer Design Standards*, August 2008; Lamphier-Gregory 2012.

[1]gallons per day. Heavy Industrial = 230 gpd/1,000 sq. ft.; Business Mix/Light Industrial = 115 gpd/1,000 sq. ft.; Low Intensity Business Mix/Light Industrial = 230 gpd/1,000 sq. ft.; High Intensity Campus = 345 gpd/1,000 sq. ft.; Retail = 115 gpd/1,000 sq. ft.; Single Family and Townhouse = 380 gpd/1,000 sq. ft.; Multi-Family Residential = 345 gpd/1,000 sq. ft. Based on City of Oakland *Sanitary Sewer Design Standards* wastewater generation rates and assumes wastewater generation equals 85 percent of water demand.

The Water Supply Assessment (WSA) prepared by EBMUD for the proposed Specific Plan concluded that EBMUD has sufficient water supplies to meet current water demand and future water demand through 2035 within its service area, including the increased water demand associated with the Specific Plan, during normal, single dry, and multiple dry years.[27] Therefore, the impact of the Specific Plan related to water supply would be less than significant.

Normally, pursuant to Sections 10910 through 10915 (SB 610) of the California Water Code, individual future development projects within the Planning Area that meet the threshold for a WSA would prepare such an assessment or request EBMUD to prepare such an assessment. However, CEQA Guidelines Section 15155(d) provides that no additional water assessment shall be required for subsequent water-demand projects that were included in a larger water-demand project (i.e., the WSA prepared by EBMUD for the proposed Specific Plan) if certain specified criteria can be met showing there have been no changes that warrant an additional water assessment.

Water Distribution and Fire Flow

Domestic water is provided to each of the West Oakland Specific Plan's Opportunity Areas by EBMUD. Water is primarily delivered to the Mandela/Grand Opportunity Area through transmission mains in Adeline Street, 18th Street, Campbell/Ettie Street, and 34th Street. Water is primarily delivered to the 3rd Street and 7th Street Opportunity Areas through transmission mains in 4th Street. According to EBMUD staff, because the existing water distribution system within the Opportunity Areas was sized to accommodate the higher water usage of West Oakland's historically heavy industrial and manufacturing uses, the system has more than enough capacity to accommodate mixed-use development under the proposed Specific Plan. In addition, EBMUD monitors the capacity and condition of the system and makes needed upgrades, with costs typically borne by developers.

Within each of the Opportunity Areas there are smaller (generally 4-inch to 8-inch) conveyance lines that carry water beneath the streets. These smaller lines are interconnected to form multiple redundant loops, and they have services that deliver metered flow to each parcel. Many of the smaller conveyance lines are not large enough to meet current fire flow requirements. New developments within parcels that are not fronted by a water line that is at least 8-inches in diameter will likely trigger upsizing of water mains, at developers' expense, to meet current codes. Because water systems are sized primarily to meet fire flow capacity, some replacement of local water lines may be required to serve future, larger developments in the Planning Area. Some locations identified for development are served by inadequately sized lines and future individual development proposals would be required to have fire flow tests performed and potentially to replace and upsize portions of these lines.

Construction of water system improvements to meet the demand of future development under the Specific Plan would typically occur along existing pipeline alignments and within existing public rights-of-way.

Standard Conditions of Approval

Under its normal development review procedure for individual projects, the City would determine the actual fire flow and water system design requirements of each project. The need for any improvements to the existing water supply infrastructure would be determined in consultation with EBMUD upon application for water service, with all costs borne by the project sponsor. Each individual future development project would be required to pay applicable City development and connection fees, pay its

[27] EBMUD WSA 2013.

fair share toward necessary water system facilities to support the proposed development's water infrastructure needs, and submit final project water system design specifications and construction modifications for approval by the Public Works Department.

Temporary construction of needed water system improvements would generally occur along existing pipeline alignments and within existing rights-of-way, and would be required to comply with all City of Oakland Standard Conditions of Approval regarding construction noise (SCA Noise-1 and SCA Noise-2), air quality and dust suppression (SCA Air-1 and SCA Air-2), erosion control (SCA Geo-1) and temporary construction traffic controls (SCA Trans-1). These standard Conditions of Approval would ensure that standard construction effects remain less than significant.

Mitigation Measures

None needed. However, the following engineers' recommendations are suggested to further reduce impacts to the water distribution system (as also shown in Figure 4.11-4):[28]

Recommendation Util-2a: Because many of the parcels within West Oakland's industrial areas are very large, there are several streets that have no public water main. For projects that create a new parcel which fronts a street that does not have a water main, a new public water main constructed at the developer's expense will likely be required.

Recommendation Util-2b: EBMUD block maps indicate that many of the lines in the area are cast iron and were installed in the 30's. These pipes have likely experienced significant corrosion and should be replaced.

Recommendation Util-2c: Service to new development would likely require reassessment and upsizing of conduits, especially if the pipe length is greater than 1,000 feet to the nearest transmission line.

Wastewater

Impact Util-3: With the City's sub-basin allocation system, construction of needed sewer system improvements pursuant to SCA 91, *Stormwater and Sewer*, payment of improvement and hook-up fees, the wastewater collection and treatment system would have adequate capacity to serve future development in accordance with the Specific Plan. With City of Oakland Standard Conditions of Approval related to construction impacts, the construction period impacts of needed sewer improvements would remain less than significant. Therefore, the wastewater service impacts of the Specific Plan would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Planning Area. This additional development would result in an estimated 11,136 new residents and 14,850 new jobs in the Planning Area by 2035, and would generate an increase in wastewater requiring collection and treatment. **Table 4.11-2** presents projected net new wastewater generation with buildout of the Specific Plan. As shown, the current wastewater generation within the Specific Plan's Opportunity Areas is estimated to be nearly 1 mgd, the net new development under the Specific Plan would result in an estimated increase in wastewater generation from the Planning Area in 2035 of approximately 2.9 mgd, for a total wastewater generation of 3.9 mgd.

[28] BKF Engineers, 2011

Table 4.11-2
Estimated Wastewater Generation (gpd[1])

	Mandela/West Grand			7th Street			3rd Street		
Land Use Type	**Existing**	**2035 Build-out**	**Change**	**Existing**	**2035 Build-out**	**Change**	**Existing**	**2035 Build-out**	**Change**
Heavy Industrial	100,000	0	-100,000	20,000	0	-20,000	8,000	0	-8,000
Business Mix/Light Industrial	350,000	230,000	-120,000	169,000	149,000	-20,000	100,000	80,000	-20,000
Low Intensity Business Mix/Light Industrial	0	128,000	128,000	0	34,000	34,000	0	60,000	60,000
High Intensity Campus	0	1,224,000	1,224,000	0	0	0	0	180,000	180,000
Retail	30,000	60,500	30,500	500	9,000	8,500	5,000	6,500	1,500
Single Family and Townhouse	36,348	79,635	43,287	11,565	29,409	17,843	1,652	1,652	0
Multi-Family Residential	0	342,000	342,000	15,000	825,000	810,000	0	0	0
	516,348	2,064,135	1,547,787	216,065	1,046,409	830,343	114,652	328,152	213,500

	San Pablo Avenue			Planning Area		
Land Use Type	**Existing**	**2035 Build-out**	**Change**	**Existing**	**2035 Build-out**	**Change**
Heavy Industrial	20,000	0	-20,000	148,000	0	-148,000
Business Mix/Light Industrial	60,000	60,000	0	679,000	519,000	-160,000
Low Intensity Business Mix/Light Industrial	0	13,000	13,000	0	235,000	235,000
High Intensity Campus	0	0	0	0	1,404,000	1,404,000
Retail	9,000	20,000	11,000	44,500	96,000	51,500
Single Family and Townhouse	13,217	34,696	21,478	62,783	145,391	82,609
Multi-Family Residential	9,000	309,000	300,000	24,000	1,476,000	1,452,000
	111,217	436,696	325,478	958,283	3,875,391	2,917,109

Source: City of Oakland, *Sanitary Sewer Design Standards*, August 2008; Lamphier-Gregory 2012.

[1]gallons per day. Heavy Industrial = 200 gpd/1,000 square feet; Business Mix/Light Industrial = 100 gpd/1,000 square feet; Low Intensity Business Mix/Light Industrial = 200 gpd/1,000 square feet; High Intensity Campus = 300 gpd/1,000 square feet; Retail = 100 gpd/1,000 square feet; Single Family and Townhouse = 330 gpd/1,000 square feet; Multi-Family Residential = 300 gpd/1,000 square feet.

Sewer Sub-Basin Capacity

The City of Oakland uses a numbered sub-basin system and assigns the discharges from each sub-basin a single discharge point from the City's collection system to the EBMUD interceptor system. The City allocates each sub-basin a certain amount of sewer flow that may be discharged to the EBMUD system, and flows within a sub-basin normally may not exceed that allocation. Should a sub-basin require more flow than its allocation, allocation may be redirected between adjacent sub-basins. In this manner, the City ensures the continued adequate capacity of the EBMUD main wastewater treatment plant (MWWTP) and interceptor system. The Specific Plan area is located across several sewer sub-basins, and as new development occurs the City will review the sub-basin allocations to ensure adequate capacity exists to accommodate the proposed sewer discharge flow or to reallocate flows from other adjacent sub-basins.

The City's Sanitary Sewer Infiltration/Inflow Correction Program, funded through property taxes, is making capacity improvements to the city-wide sewer collection system main sewer trunk network to accommodate a 20 percent increase in base flow. Proposed improvements would reduce I/I in the area since the replacement conduits and structures wouldn't be as susceptible to leakage. Once the wastewater conduits are replaced pursuant to the I/I Correction Program, the increased sewage-generation associated with new commercial, industrial and residential development pursuant to the Specific Plan is not expected to result in a significant impact to the conveyance system, due to the offset in reduced I/I. However, continued funding for the I/I program is uncertain and planned improvements in West Oakland may not be fully implemented.

Local Pipeline Improvements

There are several blocks between West Grand, 18th Street, Wood Street and Peralta Street that contain very large parcels. Public sewer lines were not installed in Campbell Street, 20th Street or Willow Street in this area. The large parcels are adequately served by the lines that are there, as only one service is generally required per parcel. New development within these blocks will trigger the need for new public sewers in this small area.[29]

Individual future development projects facilitated by the Specific Plan would be required to show wastewater discharge calculations that confirm the capacity and state of repair of the local City sewer system, and to make any local sewer infrastructure improvements needed to accommodate that project As also shown on Figure 4.11-4). Construction of such sewer system improvements to meet the local demand of future development under the Specific Plan would typically occur along existing pipeline alignments and within existing public rights-of-way.

In addition, all streetscape projects proposed pursuant to the Specific Plan are required to have the sewer main scoped to ascertain the integrity of the sewer main prior to paving work. If the pipe is shown to be in poor condition, the streetscape project must incorporate new or rehabilitated pipes into its scope of work.

Standard Conditions of Approval

SCA 91, *Stormwater and Sewer* requires individual future development projects facilitated by the Specific Plan to show wastewater discharge calculations that confirm the capacity and state of repair of the local City sewer system, and to make any local sewer infrastructure improvements needed to

[29] BKF Engineers, 2011

accommodate that project. Construction of needed sewer improvements would generally occur along existing pipeline alignments and within existing rights-of-way, and would be required to comply with City of Oakland Standard Conditions of Approval regarding construction noise (SCA Noise-1 and SCA Noise-2), air quality and dust suppression (SCA Air-1 and SCA Air-2), erosion control (SCA Geo-1) and temporary construction traffic controls (SCA Trans-1) which would ensure that standard construction effects remain less than significant.

With implementation of City of Oakland Standard Conditions of Approval regarding construction effects, the construction of any sewer infrastructure improvements that may be necessary, the Project's effects on wastewater infrastructure would remain at a level of less than significant. Additionally, each individual future development project would be required to pay development and connection fees, as well as the project's fair share toward needed sewer system facilities.

Mitigation Measures

None needed. However, the following additional engineers' recommendations are suggested to further reduce impacts to the wastewater system:[30]

Recommendation Util-3a: Underground utility improvements should be installed prior to final streetscape improvements to prevent damage and the need for patching such improvements during trenching operations.

Recommendation Util-3b: Properties to be redeveloped and/or reused should abandon existing sewer laterals and install new laterals, and verify that there are no cross-connections from the downspouts to the sewer lateral. This would result in much lower I/I flow into the main sewer lines.

Solid Waste

Impact Util-4: The Altamont Landfill and Vasco Road Landfill have sufficient permitted capacity to accommodate the solid waste disposal needs of future development under the Specific Plan. The Specific Plan would not violate applicable federal, state, and local statutes and regulations related to solid waste. Therefore, the impacts of the Specific Plan related to solid waste and recycling would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Planning Area. This additional development would result in an estimated 11,136 new residents and 14,850 new jobs in the Planning Area by 2035. Demolition and construction activities, and the operation of new development facilitated by the Specific Plan, would generate additional solid waste requiring recycling or disposal.

The Altamont landfill is projected to have sufficient capacity to operate until at least 2031, and potential to operate through 2071, depending on waste flows and waste reduction measures.

Standard Conditions of Approval

Demolition activities would be subject to City of Oakland SCA 36, *Waste Reduction and Recycling*, and Oakland Municipal Code Chapter 15.34. Project applicants would be required to submit a Construction & Demolition Waste Reduction and Recycling Plan (WRRP) and an Operational Diversion Plan (ODP) for

[30] BKF Engineers, 2011

review and approval by the Public Works Department. The City would continue to provide curbside recycling within the Planning Area and would be expected to continue to meet its target diversion rates pursuant to AB 939.

Development under the Specific Plan would not be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs and would not violate applicable federal, state, and local statutes and regulations related to solid waste. Therefore, the impact of development under the Specific Plan on solid waste and recycling would be less than significant.

Mitigation Measures

None needed

Energy

Impact Util-5: Pacific Gas & Electric Company (PG&E) has indicated that there is ample capacity to handle projected demand with its current system. Therefore, development under the Specific Plan would not cause a violation of regulations relating to energy standards nor result in a determination by PG&E that it does not have adequate capacity to serve the project, or result in construction or expansion of energy facilities, construction of which could cause significant environmental effects. The impacts of the Specific Plan related to energy service would be less than significant. (**LTS**)

The Specific Plan would provide for the development of up to an additional 5,090 net new housing units and 4,030,000 square feet of net new non-residential space within the Planning Area. This additional development would result in an estimated 11,136 new residents and 14,850 new jobs in the Planning Area by 2035.

PG&E has indicated that there is ample capacity to handle projected demand with its current system.[31] Therefore, development under the Specific Plan would not cause a violation of applicable federal, State and local statutes and regulations relating to energy standards nor result in a determination by PG&E that it does not have adequate capacity to serve the project's projected demand in addition to the its existing commitments and require or result in construction of new energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects. Therefore, the impact of development under the Specific Plan related to energy service would be less than significant.

Mitigation Measures

None needed

Cumulative Impacts

Cumulative Impact Util-6: Cumulative development would not be expected to require or result in the need for new stormwater drainage, water, wastewater, solid waste or energy facilities or expansion of existing facilities, construction of which could cause significant environmental effects. With City of Oakland Standard Conditions of Approval, the construction period impacts

[31] Redwood Consulting 2012.

of needed utilities improvements would remain less than significant. Therefore, cumulative impacts related to utilities and service systems would be less than significant. (**LTS**)

Development facilitated by the Specific Plan, together with other reasonably foreseeable development, would create additional demand for water, wastewater and solid waste service. The geographic area considered for analysis of cumulative utilities impacts is the service provider's service area.

Storm Drainage

Cumulative development would occur in urbanized areas and primarily involve redevelopment of previously developed properties, so there would be limited change in impervious surface area and stormwater runoff. In addition, with required compliance of individual development projects with SCA 91, *Stormwater and Sewer*, and the Alameda Countywide Clean Water Program NPDES Permit, the stormwater drainage impacts of cumulative development would be less than significant.

New development that impacts an area greater than 10,000 square feet in size would be subject to Provision C.3 of the City of Oakland's National Pollutant Discharge Elimination System (NPDES) permit with the State of California, and would therefore need to implement storm water treatment measures. This will, in the aggregate, serve to lower the overall run-off coefficient in the area, which could over time serve to make the Storm Drainage Master Plan inherently conservative.

Water

EBMUD accounted for the water demands of cumulative development within the current 2009 WSMP 2040, based on the Association of Bay Area Governments (ABAG) *Projections 2005*. The WSMP 2040 concluded that EBMUD has sufficient water supplies to meet current water demand and future water demand through 2035 during normal, single dry, and multiple dry years. Therefore, cumulative impacts related to water service would be less than significant.

Wastewater

The sub-basin allocation system is the method by which EBMUD and the City of Oakland ensure that the City's overall allocation of wastewater collection and treatment capacity is not exceeded. There is sufficient system-wide collection and treatment capacity to serve cumulative development. Should a sub-basin generate more wastewater flows than its allocation, unused allocations may be redirected among sub-basins. The City's Inflow and Infiltration Correction Program allows an approximately 20 percent increase in wastewater flows for each sub-basin to accommodate projected growth. A mitigation fee is assessed on all new development or redevelopment in sub-basins that have a growth rate greater than 20 percent. Therefore, cumulative impacts related to wastewater would be less than significant.

EBMUD Treatment Plan

With cumulative development, the EBMUD Wastewater Treatment Plan will receive an increase in average day sewer flows, and in the concentration of sewage versus other wastewater flows from I/I due to system pip improvements. Ultimately, the higher sewage concentration levels for the greater region might require a higher level of treatment at the EBMUD wastewater treatment plant, near the entrance of the San Francisco-Oakland Bay Bridge. Projects within the area that proposes significant increases in sewer generation would likely, in order to comply with the California Environmental Quality Act (CEQA), be required to analyze their effects of increased demand on the treatment plant.[32]

Solid Waste

Demolition activities would be subject to City of Oakland SCA 36, *Waste Reduction and Recycling*, and Oakland Municipal Code Chapter 15.34 (which requires implementation of a recycling and Waste reduction Plan for construction and demolition activities). Individual project applicants would be required to submit a Construction & Demolition Waste Reduction and Recycling Plan (WRRP) and an Operational Diversion Plan (ODP) for review and approval by the Public Works Department. The City would continue to provide curbside recycling and would be expected to continue to meet its target diversion rates pursuant to AB 939. Therefore, cumulative impacts related to solid waste would be less than significant.

Energy

Cumulative development would increase demand for electricity and natural gas. Pacific Gas & Electric Company (PG&E) has not indicated its inability to accommodate projected growth in Oakland. In addition, individual future development projects would be required to comply with mandatory Title 24 energy efficiency standards for buildings, CALGreen regulations, and City of Oakland Green Building Ordinance requirements and sustainability programs, which would reduce energy consumption in cumulative development. Therefore, cumulative impacts related to energy service would be less than significant.

Construction of needed water, wastewater, stormwater drainage, and energy system improvements would typically occur along existing pipeline alignments and within existing public rights-of-way. Temporary construction period traffic, noise, air quality, water quality and other potential impacts would be mitigated through the City's Standard Conditions of Approval. Therefore, cumulative development would not be expected to require or result in construction of new utilities facilities or expansion of existing facilities, construction of which could cause significant environmental effects, and cumulative impacts related to utilities and service systems would be less than significant.

Housing Element Findings

The City of Oakland Housing Element Update 2007-2014 Initial Study also considered cumulative effects of new population growth on utilities and service systems. Its geographic area considered for the utilities cumulative analysis includes the City of Oakland and other communities within the area of applicable service providers (e.g., EBMUD, ACFCWCD). The increased population and density resulting from the 2007-2014 Housing Element, in conjunction with population and density of past, present, existing, pending and reasonably foreseeable future development in the City, would result in a cumulative increase in the demand for utilities. This cumulative increase is unlikely to cause the need for new or physically altered facilities or infrastructure in order to maintain acceptable service standards or performance objectives.

Infrastructure planned by EBMUD would occur in response to regional needs and regardless of the 2007-2014 Housing Element. Other infrastructure construction beyond Oakland, would be subject to its own environmental review and applicable regulations for biology, water quality, air quality, etc; these requirements would minimize environmental impacts. Nonetheless, cumulative development would

[32] BKF Engineers, 2011

trigger infrastructure expansion that could result in environmental impacts. However, development under the 2007-2014 Housing Element would occur pursuant to General Plan policies, Municipal Code regulations, mitigation measures adopted for the LUTE EIR and the Standard Conditions of Approval that would reduce the potential impact on services to less-than-significant levels. As a result, the contribution of the 2007-2014 Housing Element to potential cumulative impacts would be less than cumulatively considerable.

Development resulting from the 2007-2014 Housing Element would be infill development in built-up areas or redevelopment of existing sites. Compliance with General Plan Policies I/C1.9, T5.1, D4.1, and N7.2 found in the LUTE Element, LUTE EIR Mitigation Measure D.2-2 and Standard Condition of Approval 91 would ensure that impacts to wastewater treatment standards are less than significant. Impacts related to stormwater drainage capacity would be less than significant, and compliance with General Plan Policy CO-1.1, and Actions CO-1.1.1, CO-6.1.2, and CO-5.3.2 in the OSCAR Element, Policy T5.3 from the LUTE Element, and SCA-78 and 80 would further reduce impacts.

Compliance with Policies CO-4.1, CO-4.2, CO-4.3, and CO-4.4 from the OSCAR Element, and Action 7.4.2. from the 2007-2014 Housing Element, along with green building or LEED certification objectives could reduce impacts on potable water demands to less than significant. In terms of supply infrastructure and conveyance facilities, EBMUD manages the regional conveyance system used to transport potable water supplies to each jurisdiction and customers in its service area. EBMUD also manages and maintains all the WTPs; any improvements or expansions are ultimately the responsibility of EBMUD; therefore, impacts to facilities as a result of implementation of the 2007-2014 Housing Element are less than significant. EBMUD demand surveys conducted during preparation of its WSMP 2040 accounted for demands associated with buildout of the 2007-2014 Housing Element along with demands throughout its service area. Moreover, EBMUD has adequate supplies from its diversions on the Mokelumne River coupled with supplies from the FRWP to serve demands under all hydrologic conditions; therefore, cumulative impacts to water supplies are less than significant.

Impacts related to solid waste would be less than significant, and compliance with LUTE EIR Mitigation Measures D.4-1a, D.4-1b, and D.4-1c, and Actions 7.4.3, 7.4.5, and 7.4.6 from the 2007- 2014 Housing Element, as well as Chapter 15.34 of the Municipal Code and SCA-36 would further reduce impacts. There are adequate supplies of gas, and electricity for residential growth planned under the 2007-2014 Housing Element. Furthermore, energy conservation measures under Title 24 and the City's Green Building Guidelines would minimize future energy demand. Impacts related to energy would be less than significant with compliance with various General Plan, Municipal Code requirements, and Standard Conditions of Approval that reduce impacts. Also, compliance with Actions 7.2.1, 7.2.2, and 7.2.3 of the 2007-2014 Housing Element would further reduce impacts.

4.12

Other Less-than-Significant Effects

Section 15128 of the CEQA Guidelines requires that the EIR "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR." The following environmental topics, included in the City's CEQA Thresholds, were found not to be significant.

Agriculture and Forest Resources

Farmland Conversion

Impact Ag-1: Future development pursuant to or consistent with the Specific Plan would not 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. (**No Impact**)

Lands designated by the California Resources Agency as Prime Farmland, Unique Farmland or Farmland of Statewide Importance are considered Farmland for purposes of CEQA. There are no designated Farmlands within the Planning Area. The Planning Area and surrounding areas are developed and are designated as Urban and Built-Up Land.[1]

Mitigation Measures

None needed

Agricultural Zoning or Williamson Act Conflicts

Impact Ag -2: Future development pursuant to or consistent with the Specific Plan would not conflict with existing zoning for agricultural use, or with a Williamson Act contract. (**No Impact**)

The Planning Area is urbanized and not zoned for agricultural use. There are no Williamson Act contracts within the Planning Area or in the vicinity. The Specific Plan would not conflict with existing zoning for agricultural use or any Williamson Act contracts.

[1] California Department of Conservation, Division of Land resource Protection, Contra Costa County Important Farmland 2008, July 2009. The Planning Area is designated Urban and Built Up Land, which is defined as, "…occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures.

Mitigation Measures

None needed

Forest Resources

Impact Ag-3: Future development pursuant to or consistent with the Specific Plan would not conflict with existing zoning for, or cause rezoning of forest land, and would not result in the loss of forest land or conversion of forest land to non-forest use or timberland zoned Timberland Production. (**No Impact**)

The Planning Area and surrounding areas are urbanized and do not contain Farmland or Forest Land.

Mitigation Measures

None needed

Other Changes Affecting Farmland or Forest Resources

Impact Ag-4: The Specific Plan would not involve any 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. (**No Impact**)

The Planning Area and surrounding areas are urbanized and do not contain farmland or forest land.

Mitigation Measures

None needed

Biological Resources

Special-Status Species

Impact Bio-1: Future development pursuant to the Specific Plan would not have a substantial direct adverse effect 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 Game or U.S. Fish and Wildlife Service. However, tree removal, building demolition, and other construction activities can cause disturbance, noise, or loss of habitat for resident or migratory birds and mammals, including special-status species potentially occurring within the Planning Area. (**LTS with SCA**)

Wildlife use within the Planning Area is expected to be relatively low due to the absence of natural habitat, the proximity of streets and development, and the lack of protective cover. Birds (e.g., house sparrow, starling, crow, etc.) and wildlife such as opossums and small rodents typically associated with developed properties would be expected to occur. Special-status species are not expected to occur within the Planning Area because of a lack of suitable habitat, the smaller size and fragmented nature of remaining habitat, prior disturbance, and the current level of human activity. According to the Open Space, Conservation and Recreation Element of the City of Oakland General Plan, there are no special-status species known to occur within the Planning Area.

Based on a search of the California Natural Diversity Database (CNDDB) conducted for this EIR[2], there are a number of special-status animals that may potentially use habitat in the Planning Area, including the peregrine falcon, Cooper's hawk, red-shouldered hawk, red-tailed hawk, pallid bat, silver-haired bat, hoary bat, and big free-tailed bat. Tree removal, building demolition, and other construction activities can cause disturbance, noise, or loss of habitat for resident or migratory birds and mammals, including special-status species potentially occurring within the Planning Area.

Standard Conditions of Approval

The following City Standard Conditions of Approval, SCA 44, *Tree Removal During Breeding Season*, and SCA D, *Bird Collision Reduction*, would be a mandatory requirement of each individual future development project pursuant to the Specific Plan that requires removal of any unprotected tree when it is approved by the City. SCA 44 would require a survey by a qualified biologist to verify the presence or absence of nesting birds before removal of any tree during the breeding season and an appropriately sized buffer around any nest that may be found. SCA D would reduce incidents of bird and bat collisions with new buildings.

SCA 44: Tree Removal During Breeding Season. *(Prior to issuance of a tree removal permit.)* To the extent feasible, removal of any tree and/or other vegetation suitable for nesting of raptors shall not occur during the breeding season of March 15 and August 15.

a. If tree removal must occur during the breeding season, all sites shall be surveyed by a qualified biologist to verify the presence or absence of nesting raptors or other birds. Pre-removal surveys shall be conducted within 15 days prior to start of work from March 15 through May 31, and within 30 days prior to the start of work from June 1 through August 15. The pre-removal surveys shall be submitted to the Planning and Zoning Division and the Tree Services Division of the Public Works Agency.

b. If the survey indicates the potential presences of nesting raptors or other birds, the biologist shall determine an appropriately sized buffer around the nest in which no work will be allowed until the young have successfully fledged. The size of the nest buffer will be determined by the biologist in consultation with the CDFG, and will be based to a large extent on the nesting species and its sensitivity to disturbance. In general, buffer sizes of 200 feet for raptors and 50 feet for other birds should suffice to prevent disturbance to birds nesting in the urban environment, but these buffers may be increased or decreased, as appropriate, depending on the bird species and the level of disturbance anticipated near the nest.

SCA D: Bird Collision Reduction. *(Prior to issuance of a building permit and ongoing.)*

The SCA applies to ALL new construction, including telecommunication towers, which include large uninterrupted expanses of glass that account for more than 40% of any one side of the building's exterior AND at least one of the following: (a) the project is located immediately adjacent to a substantial water body (i.e. Oakland Estuary, San Francisco Bay, Lake Merritt or other substantial lake, reservoir, or wetland); OR (b) the project is located immediately adjacent to a substantial recreation area or park (i.e. Region-Serving Park, Resource Conservation Areas, Community Parks, Neighborhood Parks, and Linear Parks and Special Use Parks and generally over 1 acre in size), which contains substantial vegetation, OR (c) the project includes a substantial vegetated or green roof (roofs with growing medium and plants taking the place of conventional roofing, such asphalt, tile, gravel, or shingles), but excluding container gardens.

The project applicant, or his or her successor, including the building manager or homeowners' association, shall submit plans to the Planning and Zoning Division, for review and approval,

[2] California Natural Diversity Database, Biogeographic Data Branch, Department of Fish and Game, August 8, 2012.

indicating how they intend to reduce potential bird collisions to the maximum feasible extent. The applicant shall implement the approved plan, including all mandatory measures, as well as applicable and specific project Best Management Practice (BMP) strategies to reduce bird strike impacts to the maximum feasible extent.

a. Mandatory measures include all of the following:

   i. Comply with federal aviation safety regulations for large buildings by installing minimum intensity white strobe lighting with three second flash instead of blinking red or rotating lights.

   ii. Minimize the number of and co-locate rooftop-antennas and other rooftop structures.

   iii. Monopole structures or antennas shall not include guy wires.

   iv. Avoid the use of mirrors in landscape design.

   v. Avoid placement of bird-friendly attractants (i.e. landscaped areas, vegetated roofs, water features) near glass.

b. Additional BMP strategies to consider include the following: Make clear or reflective glass visible to birds using visual noise techniques. Examples include:

   i. Use of opaque or transparent glass in window panes instead of reflective glass.

   ii. Uniformly cover the outside clear glass surface with patterns (e.g., dots, decals, images, abstract patterns). Patterns must be separated by a minimum 10 centimeters (cm).

   iii. Apply striping on glass surface. If the striping is less than 2 cm wide it must be applied vertically at a maximum of 10 cm apart (or 1 cm wide strips at 5 cm distance).

   iv. Install paned glass with fenestration patterns with vertical and horizontal mullions of 10 cm or less.

   v. Place decorative grilles or louvers with spacing of 10 cm or less.

   vi. Apply one-way transparent film laminates to outside glass surface to make the window appear opaque on the outside.

   vii. Install internal screens through non-reflective glass (as close to the glass as possible) for birds to perceive windows as solid objects.

   viii. Install windows which have the screen on the outside of the glass.

   ix. Use UV-reflective glass. Most birds can see ultraviolet light, which is invisible to humans.

   x. If it is not possible to apply glass treatments to the entire building, the treatment should be applied to windows at the top of the surrounding tree canopy or the anticipated height of the surrounding vegetation at maturity.

c. Mute reflections in glass. Examples include:

   i. Angle glass panes toward ground or sky so that the reflection is not in a direct line-of-sight (minimum angle of 20 degrees with optimum angle of 40 degrees).

   ii. Awnings, overhangs, and sunshades provide birds a visual indication of a barrier and may reduce image reflections on glass, but do not entirely eliminate reflections.

d. Reduce Light Pollution. Examples include:

i. Turn off all unnecessary interior lights from 11 p.m. to sunrise.

ii. Install motion-sensitive lighting in lobbies, work stations, walkways, and corridors, or any area visible from the exterior and retrofitting operation systems that automatically turn lights off during after-work hours.

iii. Reduce perimeter lighting whenever possible.

e. Institute a building operation and management manual that promotes bird safety. Example text in the manual includes:

i. Donation of discovered dead bird specimens to authorized bird conservation organization or museums to aid in species identification and to benefit scientific study, as per all federal, state and local laws.

ii. Production of educational materials on bird-safe practices for the building occupants.

iii. Asking employees to turn off task lighting at their work stations and draw office blinds or curtains at end of work day.

iv. Schedule nightly maintenance during the day or to conclude before 11 p.m., if possible.

With required implementation of SCA 44, *Tree Removal During Breeding Season*, and SCA D, *Bird Collision Reduction*, the potential impacts of the Specific Plan on special-status species would be less than significant.

Mitigation Measures

None needed

Riparian Habitat and Sensitive Natural Communities

Impact Bio-2: Future development pursuant to the Specific Plan would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or US Fish and Wildlife Service. (**No Impact**)

The State of California recognizes some plant communities as sensitive natural communities if they are uncommon, regionally declining, or vulnerable. Among these communities are riparian habitat, coast live oak forest, freshwater seeps, freshwater marshes, and coastal salt marsh. According to the Open Space, Conservation and Recreation Element of the City of Oakland General Plan, there is no riparian habitat or other sensitive natural community within or adjacent to the Planning Area. The California Natural Diversity Database (CNDDB) tracks communities it believes to be of conservation concern and these communities are typically considered sensitive for the purposes of CEQA analysis. No CNDDB-listed sensitive natural communities occur within the Planning Area.

Mitigation Measures

None needed

Wetlands

Impact Bio-3: Future development pursuant to or consistent with the Specific Plan would not 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. (**No Impact**)

According to the Open Space, Conservation and Recreation Element of the City of Oakland General Plan, there are no wetlands known to occur within the Planning Area. Development in accordance with the Specific Plan would not involve the direct removal or fill of wetlands or indirectly affect the hydrology, soil, vegetation or wildlife of wetlands.

Mitigation Measures

None needed

Wildlife Movement and Breeding Sites

Impact Bio-4: Future demolition and construction activities associated with development pursuant to the Specific Plan would not substantially interfere 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, but could temporarily reduce nesting opportunities for resident and migratory bird species that are protected by the federal Migratory Bird Treaty Act or California Fish and Game Code Sections 3503, 3503.5, and 3800, could also eliminate bat roosts and, if construction were to occur during the maternal roosting season, young bats incapable of flight could be destroyed. (**LTS with SCA**)

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements international treaties between the U.S. and other nations devised to protect migratory birds, any of their parts, eggs and nests from activities such as hunting, pursuing, capturing, killing, selling and shipping, unless expressly authorized in the regulations or by permit. As authorized by the MBTA, the USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits can be found in 50 CFR part 13 General Permit Procedures and 50 CFR part 21 Migratory Bird Permits. The state of California has incorporated the protection of birds of prey in Sections 3800, 3513 and 3503.5 of the California Fish and Game Code.

California Fish and Game Code Sections 3503, 3503.5, and 3800

These sections of the California Fish and Game Code prohibit the "take, possession, or destruction of birds, their nests or eggs." Disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered a "take." Such a take would violate the Migratory Bird Treaty Act. The act is implemented as part of the review process for any required State agency authorization, agreement, or permit.

The Planning Area is limited in its function for wildlife movement due to its extensively developed nature. However, proximity to San Francisco Bay makes the Planning Area accessible to migratory birds. Nesting birds, including raptors, are protected by the CDFG Code Section 3503, which states "It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Passerines (songbirds) and non-passerine land birds are further protected under the federal Migratory Bird Treaty Act.

Construction disturbance during the breeding season could result in the incidental loss of fertile eggs or nestlings, or otherwise lead to nest abandonment. Therefore, the California Fish and Game Code typically recommends preconstruction surveys for nesting birds that could potentially be directly (actual removal of trees/vegetation) or indirectly (noise disturbance) impacted by construction-related activities.

Bats may use vacant buildings, structures and trees within the Planning Area as seasonal or maternal roost. Future development in accordance with the Specific Plan could eliminate bat roosts and, if construction were to occur during the maternal roosting season, young bats incapable of flight could be destroyed.

Standard Conditions of Approval

The following City Standard Condition of Approval, SCA 44, *Tree Removal During Breeding Season*, would be a mandatory requirement of each individual future development project pursuant to the Specific Plan that requires removal of any unprotected tree when it is approved by the City. SCA 44 would require a survey by a qualified biologist to verify the presence or absence of nesting birds before removal any unprotected tree during the breeding season and an appropriately sized buffer around any nest that may be found. With required implementation of SCA 44, the potential impacts of the Specific Plan on nesting birds would be less than significant.

Mitigation Measures

None needed

Conflicts with Local Policies or Ordinances

Impact Bio-5: Future development pursuant to or consistent with the Specific Plan may require the removal of trees that are protected by the City of Oakland Tree Protection Ordinance. (**LTS with SCA**)

City of Oakland Tree Protection Ordinance

Future development in accordance with the Specific Plan may require the removal of trees that are protected by the City of Oakland Tree Protection Ordinance. The City of Oakland Tree Protection Ordinance (Oakland Municipal Code Chapter 12.36) applies to the removal of protected trees under certain circumstances. Factors to be considered in determining significance include the number, type, size, location and condition of the protected trees to be removed or affected by construction and the protected trees to remain, with special consideration given to native trees. Protected trees include the following:

- *Quercus agrifolia* (California or coast live oak) measuring four inches diameter at breast height (dbh) or larger; and
- any other tree measuring nine inches dbh or larger except *Eucalyptus* and *Pinus radiata* (Monterey pine); provided, however, that Monterey pine trees on City property and in development-related situations where more than five Monterey pine trees per acre are proposed to be removed are considered to be Protected trees.

Any project that would involve the removal of any tree or community of trees protected by the Tree Protection Ordinance would be required to first obtain a permit from the City and comply with any conditions of the permit, including replacement plantings and protection of remaining trees during construction.

Standard Conditions of Approval

The following City Standard Conditions of Approval, SCA 45, *Tree Removal Permit*, SCA 46, *Tree Replacement Plantings*, and SCA 47, *Tree Protection During Construction*, would be a mandatory requirement of each individual future development project pursuant to the Specific Plan that requires removal of any tree protected by the Tree Protection Ordinance. SCA 45, 46 and 47 require any project that involves removal of any tree protected to first obtain a permit from the City and comply with any conditions of the permit, including replacement plantings and protection of remaining trees during construction.

SCA 45: Tree Removal Permit. (Prior to issuance of a demolition, grading, or building permit.) Prior to removal of any protected trees, per the Protected Tree Ordinance, located on the project site or in the public right-of-way adjacent to the project, the project applicant must secure a tree removal permit from the Tree Division of the Public Works Agency, and abide by the conditions of that permit.

SCA 46: Tree Replacement Plantings. *Prior to issuance of a final inspection of the building permit.* Replacement plantings shall be required for erosion control, groundwater replenishment, visual screening and wildlife habitat, and in order to prevent excessive loss of shade, in accordance with the following criteria:

a. No tree replacement shall be required for the removal of nonnative species, for the removal of trees which is required for the benefit of remaining trees, or where insufficient planting area exists for a mature tree of the species being considered.

b. Replacement tree species shall consist of Sequoia sempervirens (Coast Redwood), Quercus agrifolia (Coast Live Oak), Arbutus menziesii (Madrone), Aesculus californica (California Buckeye) or Umbellularia californica (California Bay Laurel) or other tree species acceptable to the Tree Services Division.

c. Replacement trees shall be at least of twenty-four (24) inch box size, unless a smaller size is recommended by the arborist, except that three fifteen (15) gallon size trees may be substituted for each twenty-four (24) inch box size tree where appropriate.

d. Minimum planting areas must be available on site as follows:

    i. For Sequoia sempervirens, three hundred fifteen square feet per tree;

    ii. For all other species listed in #2 above, seven hundred (700) square feet per tree.

e. In the event that replacement trees are required but cannot be planted due to site constraints, an in lieu fee as determined by the master fee schedule of the city may be substituted for required replacement plantings, with all such revenues applied toward tree planting in city parks, streets and medians.

f. Plantings shall be installed prior to the issuance of a final inspection of the building permit, subject to seasonal constraints, and shall be maintained by the project applicant until established. The Tree Reviewer of the Tree Division of the Public Works Agency may require a landscape plan showing the replacement planting and the method of irrigation. Any replacement planting which fails to become established within one year of planting shall be replanted at the project applicant's expense.

SCA 47: Tree Protection During Construction. *Prior to issuance of a demolition, grading, or building permit.* Adequate protection shall be provided during the construction period for any trees which are to remain standing, including the following, plus any recommendations of an arborist:

a. Before the start of any clearing, excavation, construction or other work on the site, every protected tree deemed to be potentially endangered by said site work shall be securely fenced off at a distance from the base of the tree to be determined by the City Tree Reviewer. Such fences shall remain in place for duration of all such work. All trees to be removed shall be clearly marked. A scheme shall be established for the removal and disposal of logs, brush, earth and other debris which will avoid injury to any protected tree.

b. Where proposed development or other site work is to encroach upon the protected perimeter of any protected tree, special measures shall be incorporated to allow the roots to breathe and obtain water and nutrients. Any excavation, cutting, filing, or compaction of the existing ground surface within the protected perimeter shall be minimized. No change in existing ground level shall occur within a distance to be determined by the City Tree Reviewer from the base of any protected tree at any time. No burning or use of equipment with an open flame shall occur near or within the protected perimeter of any protected tree.

c. No storage or dumping of oil, gas, chemicals, or other substances that may be harmful to trees shall occur within the distance to be determined by the Tree Reviewer from the base of any protected trees, or any other location on the site from which such substances might enter the protected perimeter. No heavy construction equipment or construction materials shall be operated or stored within a distance from the base of any protected trees to be determined by the tree reviewer. Wires, ropes, or other devices shall not be attached to any protected tree, except as needed for support of the tree. No sign, other than a tag showing the botanical classification, shall be attached to any protected tree.

d. Periodically during construction, the leaves of protected trees shall be thoroughly sprayed with water to prevent buildup of dust and other pollution that would inhibit leaf transpiration.

e. If any damage to a protected tree should occur during or as a result of work on the site, the project applicant shall immediately notify the Public Works Agency of such damage. If, in the professional opinion of the Tree Reviewer, such tree cannot be preserved in a healthy state, the Tree Reviewer shall require replacement of any tree removed with another tree or trees on the same site deemed adequate by the Tree Reviewer to compensate for the loss of the tree that is removed.

f. All debris created as a result of any tree removal work shall be removed by the project applicant from the property within two weeks of debris creation, and such debris shall be properly disposed of by the project applicant in accordance with all applicable laws, ordinances, and regulations.

With required implementation of SCA 45, 46 and 47, the impact of the Specific Plan related to conflicts with local policies or ordinances protecting biological resources would be less than significant.

Mitigation Measures

None needed

Conflicts with Habitat Conservation Plans

Impact Bio-6: Future development pursuant to or consistent with the Specific Plan would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. (**No Impact**)

There is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the Planning Area. The Specific Plan would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Cumulative Biological Impacts

Cumulative Impact Bio-7: Given the number of similar development projects currently in progress, as well as those proposed at this time within the geographic context of this analysis, the incremental contribution of development under the West Oakland Specific Plan towards cumulative biological impacts is not considerable and is considered to be less than cumulatively considerable. (**LTS**)

The geographic area considered for the biological resources cumulative analysis is the City of Oakland. Most natural areas in the City have been completely developed and the hillsides have been graded extensively. However, several sensitive species and a rare vegetation community still exist within the City. As such, development of other past, present, current, pending, and future projects around the City could have a significant cumulative impact on sensitive species and habitat.

Future development pursuant to or consistent with the Specific Plan and all other future projects in the City would be required to comply with local, State, and federal laws and policies and all applicable permitting requirements of the regulatory and oversight agencies intended to address potential impacts on biological resources. New projects would be required to demonstrate that they would not have significant effects on these biological resources, although it is possible that some projects may be approved even though they would have significant, unavoidable impacts on biological resources. As explained in more detail above, biological impacts resulting from implementation of the Specific Plan are considered less than significant. Therefore, given the heavily urbanized context, the effect of the Plan on biological resources in combination with other foreseeable similar projects, would likely be less than significant. Given the number of similar development projects currently in progress, as well as those proposed at this time within the geographic context of this analysis, the incremental contribution of development under the Specific Plan towards cumulative biological impacts is not considerable and is considered to be less than cumulatively considerable.

Geology and Soils

Earthquake Fault Rupture

Impact Geo-1: There are no Alquist-Priolo Earthquake Fault Zones and no known earthquake fault traces within the Planning Area. Future development in accordance with the Specific Plan would not expose people or structures to substantial adverse effects, including the risk of loss, injury or death, as a result of the surface rupture of a known earthquake fault. (**LTS**)

West Oakland is located within the greater San Francisco Bay Area, which is recognized as one of the more seismically active regions of California. Geologic and geomorphic structures within the San

Francisco Bay Area are dominated by the San Andreas Fault, a right-lateral strike-slip fault that extends from the Gulf of California to Cape Mendocino. It forms a portion of the boundary between two independent tectonic plates: the Pacific plate and the North American plate. In the San Francisco Bay Area, movement across this plate boundary is concentrated on the San Andreas Fault. Much of the remainder is distributed across the Calaveras, Hayward, Greenville, Concord Green Valley, and Rodgers Creek fault zones. Together, these faults are referred to as the San Andreas Fault system. Movement along the San Andreas Fault system has been ongoing for about the last 25 million years. The northwest trend of the faults within this fault system is largely responsible for the strong northwest structural orientation of geologic and geomorphic features in the San Francisco Bay Area.

The active Hayward fault is the closest fault to West Oakland, located approximately 3.5 miles to the east along the southwestern base of the East Bay hills, paralleling Highway 13. Some of the other active fault system within approximately 100 kilometers of the Planning Area which could induce strong ground shaking at the project site include the Calaveras, San Andreas, Concord-Green Valley, San Gregorio, Greenville, Rodgers Creek, Napa and Ortigalita fault systems.

Surface rupture is the actual breaking apart of the ground during an earthquake. Surface rupture during earthquakes tends to occur along preexisting faults. Adequate setbacks from these faults would mitigate the effects of future surface rupture events. The Alquist-Priolo Earthquake Fault Zoning Act addresses the hazard of surface fault rupture by requiring the delineation of Earthquake Fault Zones and preventing the construction of buildings used for human occupancy over active faults.

There are no Alquist-Priolo Earthquake Fault Zones and no known earthquake fault traces within the Planning Area. Development in accordance with the Specific Plan would not expose people or structures to substantial adverse effects, including the risk of loss, injury or death, as a result of the surface rupture of a known earthquake fault.

Mitigation Measures

None needed

Seismic Ground Shaking and Ground Failure

Impact Geo-2: Future development pursuant to the Specific Plan could expose people or structures to substantial adverse effects, including the risk of loss, injury or death, due to strong seismic ground shaking and seismic-related ground failure, including liquefaction. However, with required implementation of City of Oakland Standard Conditions of Approval, impacts related to strong seismic ground shaking and seismic-related ground failure would be reduced to levels generally considered by professional engineering geologists as acceptable, or less than significant. (**LTS with SCA**)

The Planning Area is located within the greater San Francisco Bay Area, which is recognized as one of the more seismically active regions of California. The active Hayward fault is the closest fault to West Oakland, located approximately 3.5 miles to the east along the southwestern base of the East Bay hills, paralleling Highway 13. Some of the other active fault system within approximately 100 kilometers of the Planning Area which could induce strong ground shaking at the project site include the Calaveras, San Andreas, Concord-Green Valley, San Gregorio, Greenville, Rodgers Creek, Napa and Ortigalita fault systems.

The U.S. Geological Survey has reported that the overall probability of an earthquake of magnitude 6.7 or greater on the North Hayward segment of the Hayward-Rodgers Creek Fault system before 2030 is approximately 16 percent. A magnitude 7.1 earthquake on the Hayward fault would be expected to generate strong seismic ground shaking throughout West Oakland.

Areas most susceptible to liquefaction-induced damage are underlain by loose, water-saturated, granular sediment within 40 feet of the ground surface. These geological and groundwater conditions are widespread in the San Francisco Bay Area, most notably in alluvial valley floodplains and around the margins of the Bay, including in West Oakland. West Oakland is situated at the edge of the flatlands on the shoreline of San Francisco Bay, on former dune-sand deposits formed by thousands of years of erosion from the East Bay Hills. As shown on **Figure 4.12-1**, the geological base material in the southern portion of West Oakland is known as Merritt sand, dating to the Holocene and Pleistocene eras. The Merritt sand outcrops in three large areas in Oakland and Alameda and is associated with depositions of bay muds resulting from long-term sea-level fluctuations. In the northerly portion of West Oakland (generally north of Grand Avenue) the base geology is comprised of alluvial fan and fluvial deposits of the Holocene area. The western margins of West Oakland near the Bay are comprised of artificial fill, or man-made deposit of various materials and ages. Some areas are compacted and quite firm, but fills made before 1965 (most of the western edge of West Oakland) are not compacted and consist simply of dumped materials.[3] The depth to groundwater in West Oakland ranges from less than five feet to approximately 20 feet.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (Public Resources Code, Chapter 7.8, Section 2690-2699.6) was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. Before a development permit is granted for a site within a Seismic Hazard Zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design.

Cities and counties are required to use the Seismic Hazard Zone Maps in their land use planning and building permit processes. Development permits for most developments designed for human occupancy that are located within a Seismic Hazard Zone cannot be approved until the geologic and soil conditions of the project site are investigated and appropriate mitigation measures, if any, are incorporated into development plans. The Act also requires sellers (and their agents) of real property within a mapped hazard zone to disclose at the time of sale that the property lies within such a zone.

Seismic Hazard Zone

Within West Oakland, the combination of strong earthquake ground shaking, underlying geological material consisting of sand, alluvial and fluvial deposits and artificial fill, and shallow depth to groundwater result in a high potential for liquefaction throughout most of the Planning Area. The California Geological Survey has identified a majority of West Oakland as being located within a Seismic Hazard Zone due to high liquefaction potential (see **Figure 4.12-2**). All of the Opportunity Areas are located within the within the Seismic Hazard Zone, except a small part of the 7th Street Opportunity Area south of 7th Street between Adeline Street and Union Street (includes Opportunity Site 33), and all but the westerly edge the 3rd Street Opportunity Area.

[3] U.S. Geological Survey, Geologic map and map database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California, R.W. Graymer, 2000.

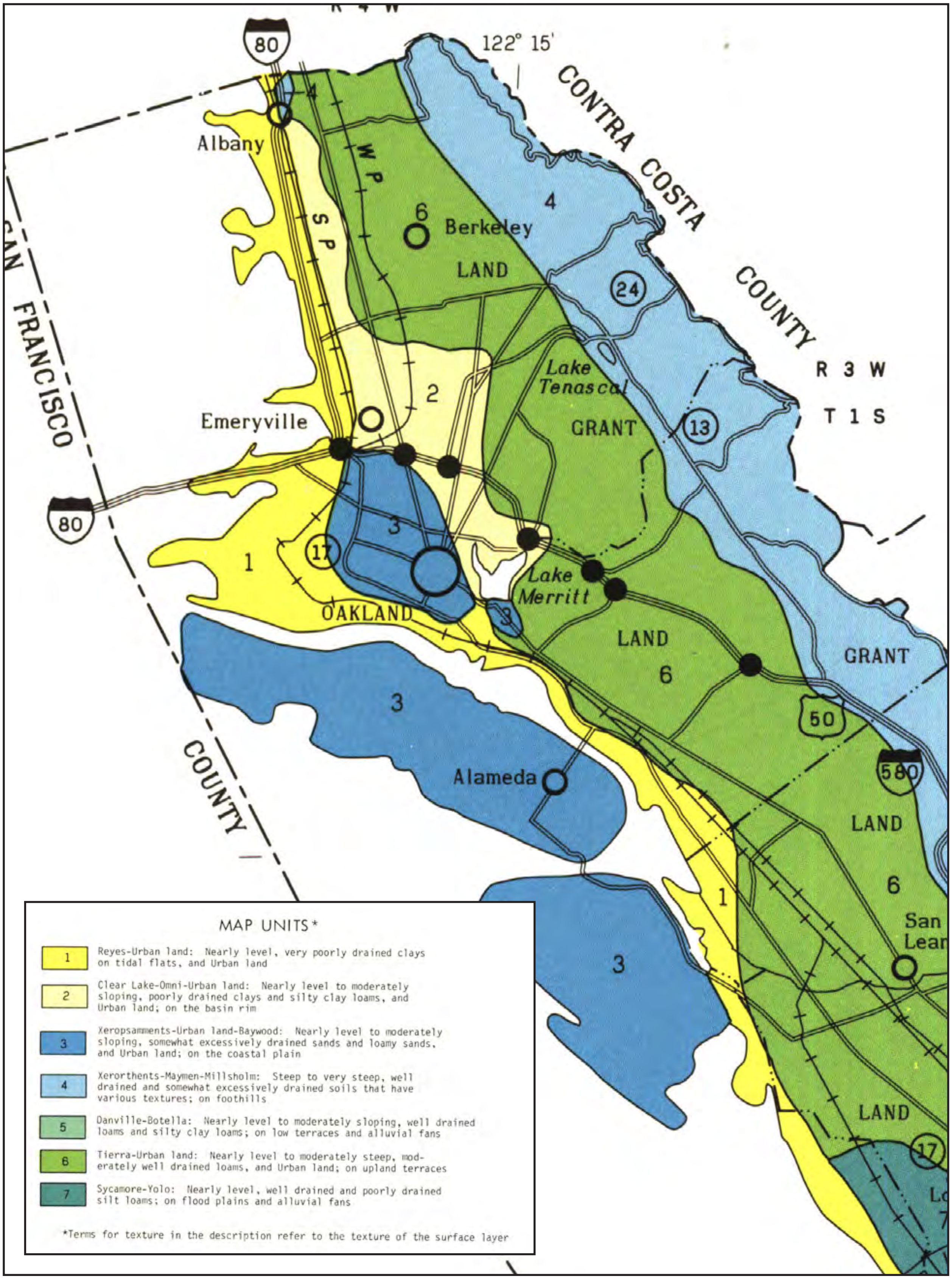


Figure 4-12-1
USGS, General Soils Map, West Oakland

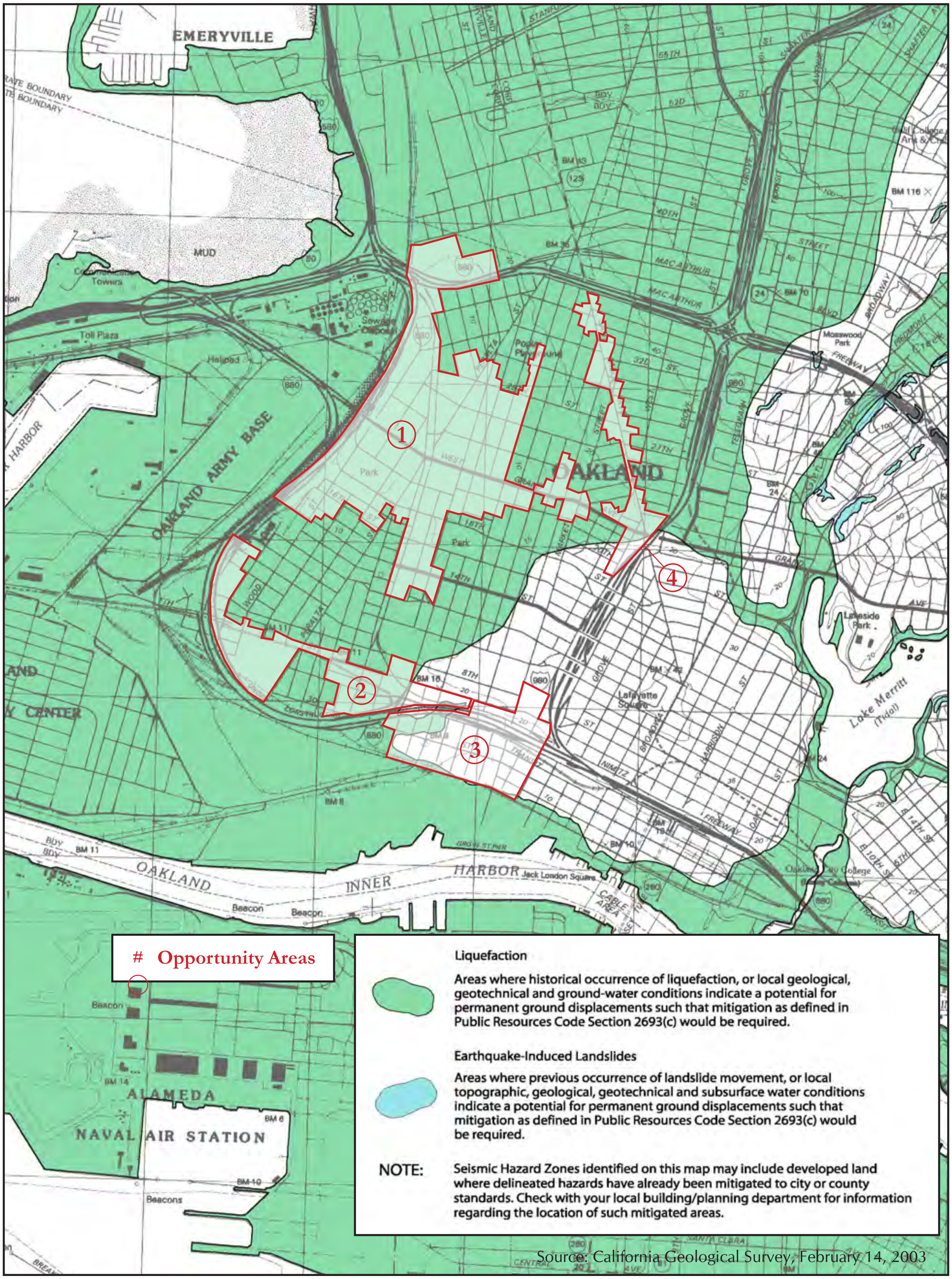


Figure 4.12-2
California Geological Survey, Seismic Hazard Zones

Standard Conditions of Approval

The following City Standard Conditions of Approval, SCA 60, *Geotechnical Report*, would be adopted as a mandatory requirement of each individual future project within the Planning Area that requires an application for a subdivision map and is located within the Seismic Hazard Zone. SCA 60 would require a site-specific, design level liquefaction geotechnical investigation.

> **SCA 60: Geotechnical Report.** *(Required as part of the submittal of a tentative Tract Map or tentative Parcel Map.)*
>
> a. A site-specific, design level, landslide or liquefaction geotechnical investigation for each construction site within the project area shall be required as part of this project and submitted for review and approval by the Building Services Division. Specifically:
>
> b. Each investigation shall include an analysis of expected ground motions at the site from identified faults. The analyses shall be accordance with applicable City ordinances and polices, and consistent with the most recent version of the California Building Code, which requires structural design that can accommodate ground accelerations expected from identified faults.
>
> c. The investigations shall determine final design parameters for the walls, foundations, foundation slabs, surrounding related improvements, and infrastructure (utilities, roadways, parking lots, and sidewalks).
>
> d. The investigations shall be reviewed and approved by a registered geotechnical engineer. All recommendations by the project engineer, geotechnical engineer, shall be included in the final design, as approved by the City of Oakland.
>
> e. The geotechnical report shall include a map prepared by a land surveyor or civil engineer that shows all field work and location of the "No Build" zone. The map shall include a statement that the locations and limitations of the geologic features are accurate representations of said features as they exist on the ground, were placed on this map by the surveyor, the civil engineer or under their supervision, and are accurate to the best of their knowledge.
>
> f. Recommendations that are applicable to foundation design, earthwork, and site preparation that were prepared prior to or during the project's design phase, shall be incorporated in the project.
>
> g. Final seismic considerations for the site shall be submitted to and approved by the City of Oakland Building Services Division prior to commencement of the project.
>
> h. A peer review is required for the Geotechnical Report. Personnel reviewing the geologic report shall approve the report, reject it, or withhold approval pending the submission by the applicant or subdivider of further geologic and engineering studies to more adequately define active fault traces.
>
> i. Tentative Tract or Parcel Map approvals shall require, but not be limited to, approval of the Geotechnical Report.

With required implementation of SCA 60, the impact of the Specific Plan related to seismic ground shaking and seismic-related ground failure due to liquefaction would be less than significant.

Mitigation Measures

None needed

Landslides

Impact Geo-3: Future development in accordance with the Specific Plan would not expose people or structures to substantial adverse effects, including the risk of loss, injury or death, as a result of landslides. (**LTS**)

The Planning Area is flat and far from hillsides, and is not subject to risk from landslides as mapped by the Association of Bay Area Governments, based on data from the U.S. Geological Survey.[4] There would be no impact related to landslides.

Mitigation Measures

None needed

Erosion and Loss of Topsoil

Impact Geo-4: Grading and excavations associated with future development pursuant to or consistent with the Specific Plan could result in the loss of topsoil through erosion. However, with required implementation of City of Oakland Standard Conditions of Approval, impacts related to erosion would be reduced to less than significant levels. (**LTS with SCA**)

The flat topography within the Planning Area would limit the potential for substantial soil erosion, and there are only limited areas within West Oakland where native topsoil has not been covered with impermeable surfaces such as paving and buildings. However, future grading and excavation activities necessary for new construction throughout the Planning Area have the potential to expose underlying soils. Once exposed, these soils could be subject to erosion and sedimentation from stormwater runoff.

Standard Conditions of Approval

The following City Standard Conditions of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area and would require a site-specific erosion and sedimentation control plan.

SCA 34: Erosion and Sedimentation Control [When no grading permit is required.] (*Ongoing throughout demolition grading, and/or construction activities.)* The project applicant shall implement Best Management Practices (BMPs) to reduce erosion, sedimentation, and water quality impacts during construction to the maximum extent practicable. Plans demonstrating the Best Management Practices shall be submitted for review and approval by the Planning and Zoning Division and the Building Services Division. At a minimum, the project applicant shall provide filter materials deemed acceptable to the City at nearby catch basins to prevent any debris and dirt from flowing into the City's storm drain system and creeks.

SCA 55: Erosion and Sedimentation Control Plan [For projects that require a grading permit.] *(Prior to any grading activities.)*

a. The project applicant shall obtain a grading permit if required by the Oakland Grading Regulations pursuant to Section 15.04.780 of the Oakland Municipal Code. The grading permit application shall include an erosion and sedimentation control plan for review and approval by the Building Services Division. The erosion and sedimentation control plan shall include all necessary measures to be taken to prevent excessive stormwater runoff or carrying by stormwater

[4] Association of Bay Area Governments, Hazards Program, Landslide Maps and Information website, viewed on June 22, 2012, http://quake.abag.ca.gov/landslides/

runoff of solid materials on to lands of adjacent property owners, public streets, or to creeks as a result of conditions created by grading operations. The plan shall include, but not be limited to, such measures as short-term erosion control planting, waterproof slope covering, check dams, interceptor ditches, benches, storm drains, dissipation structures, diversion dikes, retarding berms and barriers, devices to trap, store and filter out sediment, and stormwater retention basins. Off-site work by the project applicant may be necessary. The project applicant shall obtain permission or easements necessary for off-site work. There shall be a clear notation that the plan is subject to changes as changing conditions occur. Calculations of anticipated stormwater runoff and sediment volumes shall be included, if required by the Director of Development or designee. The plan shall specify that, after construction is complete, the project applicant shall ensure that the storm drain system shall be inspected and that the project applicant shall clear the system of any debris or sediment.

Ongoing throughout grading and construction activities:

b. The project applicant shall implement the approved erosion and sedimentation plan. No grading shall occur during the wet weather season (October 15 through April 15) unless specifically authorized in writing by the Building Services Division.

SCA 75/76: Erosion, Sedimentation, and Debris Control Measures (Prior to issuance of demolition, grading, or construction-related permit***)***. The project applicant shall submit an erosion and sedimentation control plan for review and approval by the Building Services Division. All work shall incorporate all applicable "Best Management Practices (BMPs) for the construction industry, and as outlined in the Alameda Countywide Clean Water Program pamphlets, including BMP's for dust, erosion and sedimentation abatement per Chapter Section 15.04 of the Oakland Municipal Code. The measures shall include, but are not limited to, the following:

BASIC (Applies to ALL construction sites)

a. On sloped properties, the downhill end of the construction area must be protected with silt fencing (such as sandbags, filter fabric, silt curtains, etc.) and hay bales oriented parallel to the contours of the slope (at a constant elevation) to prevent erosion into the street, gutters, storm drains.

b. In accordance with an approved erosion control plan, the project applicant shall implement mechanical and vegetative measures to reduce erosion and sedimentation, including appropriate seasonal maintenance. One hundred (100) percent degradable erosion control fabric shall be installed on all graded slopes to protect and stabilize the slopes during construction and before permanent vegetation gets established. All graded areas shall be temporarily protected from erosion by seeding with fast growing annual species. All bare slopes must be covered with staked tarps when rain is occurring or is expected.

c. Minimize the removal of natural vegetation or ground cover from the site in order to minimize the potential for erosion and sedimentation problems. Maximize the replanting of the area with native vegetation as soon as possible.

d. Install filter materials acceptable to the Engineering Division at the storm drain inlets nearest to the project site prior to the start of the wet weather season (October 15); site dewatering activities; street washing activities; saw cutting asphalt or concrete; and in order to retain any debris flowing into the City storm drain system. Filter materials shall be maintained and/or replaced as necessary to ensure effectiveness and prevent street flooding.

e. Ensure that concrete/granite supply trucks or concrete/plaster finishing operations do not discharge wash water into the creek, street gutters, or storm drains.

f. Direct and locate tool and equipment cleaning so that wash water does not discharge into the street, gutters, or storm drains.

g. Create a contained and covered area on the site for storage of bags of cement, paints, flammables, oils, fertilizers, pesticides, or any other materials used on the project site that have the potential for being discharged to the storm drain system by the wind or in the event of a material spill. No hazardous waste material shall be stored on site.

h. Gather all construction debris on a regular basis and place them in a dumpster or other container which is emptied or removed on a weekly basis. When appropriate, use tarps on the ground to collect fallen debris or splatters that could contribute to stormwater pollution.

i. Remove all dirt, gravel, refuse, and green waste from the sidewalk, street pavement, and storm drain system adjoining the project site. During wet weather, avoid driving vehicles off paved areas and other outdoor work.

j. Broom sweep the street pavement adjoining the project site on a daily basis. Caked-on mud or dirt shall be scraped from these areas before sweeping. At the end of each workday, the entire site must be cleaned and secured against potential erosion, dumping, or discharge to the street, gutter, storm drains.

k. All erosion and sedimentation control measures implemented during construction activities, as well as construction site and materials management shall be in strict accordance with the control standards listed in the latest edition of the Erosion and Sediment Control Field Manual published by the Regional Water Quality Board (RWQB).

l. All erosion and sedimentation control measures shall be monitored regularly by the project applicant. The City may require erosion and sedimentation control measures to be inspected by a qualified environmental consultant (paid for by the project applicant) during or after rain events. If measures are insufficient to control sedimentation and erosion then the project applicant shall develop and implement additional and more effective measures immediately

These Development Standards apply to ALL projects that create or replace LESS than 10,000 square feet of impervious service or involve construction of one single family home. Exceptions to this standard include the following:

m. Sidewalks, bicycle lanes, trails, bridge accessories, guardrails, and landscape features associated with the street.

n. Routine maintenance and repair of existing impervious surfaces, including roof and pavement resurfacing and road pavement structural section rehabilitation work within the existing pavement footprint; and

o. Reconstruction work within an existing public street right-of-way where both sides of the right-of-way are already developed.

With required implementation of SCA 34 and 55, 75/76, the impact of the Specific Plan related to soil erosion or the loss of topsoil would be less than significant.

Mitigation Measures

None needed

Unstable or Expansive Soil Conditions

Impact Geo-5: Portions of the Planning Area are underlain by unstable geologic conditions and soils, and potentially wells, pits, tank vaults or unmarked sewer lines, creating substantial risks to life or property. Future development pursuant to or consistent with the Specific Plan could expose people or structures to substantial adverse effects. However, with required implementation of

City of Oakland Standard Conditions of Approval, impacts related to unstable soil conditions would be reduced to less than significant levels. (**LTS with SCA**)

The Planning Area is flat, is not subject to landslides, and is not downslope from any nearby existing landslides. However, the majority of the Planning Area is located within a designated Seismic Hazard Zone due to high liquefaction potential, and the western margins of West Oakland near the Bay are comprised of artificial fill, or man-made deposit of various materials and ages. Some areas are compacted and quite firm, but fills made before 1965 (most of the western edge of West Oakland) are not compacted and consist simply of dumped materials. Additionally, future development in accordance with the Specific Plan could 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. Future development in accordance with the Specific Plan in areas underlain by unstable geologic conditions or soils, or expansive soils could expose people or structures to substantial adverse effects.

Standard Conditions of Approval

The City's Standard Conditions of Approval would be adopted as a mandatory requirement of each individual future project within the Planning Area. Conditions of Approval SCA 58, *Soils Report*, and SCA 60, *Geotechnical Report*, would require site-specific, design level liquefaction geotechnical investigations and corrective measures, and site-specific soils reports that identify geologic and soils-related hazards and necessary corrective measures as a mandatory requirement of each individual future project within the Planning Area.

SCA 58: Soils Report. A preliminary soils report for each construction site within the project area shall be required as part of this project and submitted for review and approval by the Building Services Division. The soils reports shall be based, at least in part, on information obtained from on-site testing. Specifically, the minimum contents of the report should include:

a. Logs of borings and/or profiles of test pits and trenches:

b. The minimum number of borings acceptable, when not used in combination with test pits or trenches, shall be two (2), when in the opinion of the Soils Engineer such borings shall be sufficient to establish a soils profile suitable for the design of all the footings, foundations, and retaining structures.

    i. The depth of each boring shall be sufficient to provide adequate design criteria for all proposed structures.

    ii. All boring logs shall be included in the soils report.

c. Test pits and trenches

    i. Test pits and trenches shall be of sufficient length and depth to establish a suitable soils profile for the design of all proposed structures.

    ii. Soils profiles of all test pits and trenches shall be included in the soils report.

d. A plat shall be included which shows the relationship of all the borings, test pits, and trenches to the exterior boundary of the site. The plat shall also show the location of all proposed site improvements. All proposed improvements shall be labeled.

e. Copies of all data generated by the field and/or laboratory testing to determine allowable soil bearing pressures, sheer strength, active and passive pressures, maximum allowable slopes where applicable and any other information which may be required for the proper design of foundations, retaining walls, and other structures to be erected subsequent to or concurrent with work done under the grading permit.

f. Soils Report. A written report shall be submitted which shall include, but is not limited to, the following:

   i. Site description;

   ii. Local and site geology;

   iii. Review of previous field and laboratory investigations for the site;

   iv. Review of information on or in the vicinity of the site on file at the Information Counter, City of Oakland, Office of Planning and Building;

   v. Site stability shall be addressed with particular attention to existing conditions and proposed corrective attention to existing conditions and proposed corrective actions at locations where land stability problems exist;

   vi. Conclusions and recommendations for foundations and retaining structures, resistance to lateral loading, slopes, and specifications, for fills, and pavement design as required;

   vii. Conclusions and recommendations for temporary and permanent erosion control and drainage. If not provided in a separate report they shall be appended to the required soils report;

   viii. All other items which a Soils Engineer deems necessary;

   ix. The signature and registration number of the Civil Engineer preparing the report.

g. The Director of Planning and Building may reject a report that she/he believes is not sufficient. The Director of Planning and Building may refuse to accept a soils report if the certification date of the responsible soils engineer on said document is more than three years old. In this instance, the Director may be require that the old soils report be recertified, that an addendum to the soils report be submitted, or that a new soils report be provided.

The following Development Standards apply to ALL projects that require an application for a Tentative Tract Map or Tentative Parcel Map (not part of this approval) AND are located partially or wholly within the Seismic Hazards Zone. Exceptions include condominium conversions and single family wood or steel frame dwellings not exceeding two stories, when not part of a development of 4 or more dwellings. See Arcview for Seismic Hazards Zone layer.

60. Geotechnical Report (*Required as part of the submittal of a tentative Tract Map or tentative Parcel Map*)

a. A site-specific, design level, Landslide or Liquefaction geotechnical investigation for each construction site within the project area shall be required as part of this project and submitted for review and approval by the Building Services Division. Specifically:

   i. Each investigation shall include an analysis of expected ground motions at the site from identified faults. The analyses shall be accordance with applicable City ordinances and polices, and consistent with the most recent version of the California Building Code, which requires structural design that can accommodate ground accelerations expected from identified faults.

   ii. The investigations shall determine final design parameters for the walls, foundations, foundation slabs, surrounding related improvements, and infrastructure (utilities, roadways, parking lots, and sidewalks).

   iii. The investigations shall be reviewed and approved by a registered geotechnical engineer. All recommendations by the project engineer, geotechnical engineer, shall be included in the final design, as approved by the City of Oakland.

iv. The geotechnical report shall include a map prepared by a land surveyor or civil engineer that shows all field work and location of the "No Build" zone. The map shall include a statement that the locations and limitations of the geologic features are accurate representations of said features as they exist on the ground, were placed on this map by the surveyor, the civil engineer or under their supervision, and are accurate to the best of their knowledge.

v. Recommendations that are applicable to foundation design, earthwork, and site preparation that were prepared prior to or during the project's design phase, shall be incorporated in the project.

vi. Final seismic considerations for the site shall be submitted to and approved by the City of Oakland Building Services Division prior to commencement of the project.

vii. A peer review is required for the Geotechnical Report. Personnel reviewing the geologic report shall approve the report, reject it, or withhold approval pending the submission by the applicant or subdivider of further geologic and engineering studies to more adequately define active fault traces.

b. Tentative Tract or Parcel Map approvals shall require, but not be limited to, approval of the Geotechnical Report.

With required implementation of SCA 58 and 60, the impact of the Specific Plan related to unstable geology or soils, expansive soils, wells, pits, tank vaults or unmarked sewer lines would be less than significant.

Mitigation Measures

None needed

Soils Incapable of Supporting Septic Systems

Impact Geo-6: All properties within the Planning Area are connected to the City of Oakland sanitary sewer system. The Specific Plan would have no impact related to the capacity of local soils to adequately supporting the use of septic tanks or alternative wastewater disposal systems. (**No Impact**)

All properties within the Planning Area are connected to the City of Oakland sanitary sewer system. Wastewater is conveyed to, treated and disposed of at the East Bay Municipal Utilities District wastewater treatment plant. No septic tanks or alternative wastewater disposal systems are necessary or proposed. Therefore, the Specific Plan would have no impact related to the capacity of local soils to adequately supporting the use of septic tanks or alternative wastewater disposal systems.

Mitigation Measures

None needed

Cumulative Geology and Soils Impacts

Cumulative Impact Goe-6: Portions of Oakland are underlain by unstable geology and soil conditions, and cumulative development under these conditions could expose people or structures to substantial adverse effects. However, with required implementation of City of Oakland Standard Conditions of Approval, as well as other applicable local and State laws and regulations, cumulative impacts related to unstable geology and soil conditions would be reduced to less than significant levels. (**LTS**)

Potential cumulative geology and soils impacts do not extend far beyond a project's boundaries since such impacts are typically confined to discrete spatial locations and do not combine to create an extensive cumulative impact. The exception to this generalization would occur where a large geologic feature (e.g., fault zone or massive landslide) might affect an extensive area, or where the development effects from the project could affect the geology of an off-site location.

Cumulative development would continue to expose people and property to seismic hazards and adverse soil conditions. Other development projects in Oakland would be subject to the same Standard Conditions of Approval. Review and permitting of specific development projects would be expected to involve characterization and consideration of site-specific geologic and soils conditions, and implementation of individual project mitigations where needed. All development projects in Oakland would be required to implement City of Oakland Standard Conditions of Approval related to geology and soils hazards. Development projects in Oakland and projects in surrounding communities would also be subject to other applicable local and State laws and regulations. As a result, cumulative impacts related to geology and soils hazards would be less than significant.

Hydrology and Water Quality

Waste Discharge Requirements

Impact Hydro-1: Future development in accordance with the Specific Plan would not be subject to waste discharge requirements and would not violate any water quality standards or waste discharge requirements. (**LTS**)

Future development would involve construction activities, generate stormwater runoff, and increase sewage requiring treatment at the wastewater treatment facility. Therefore, the applicable NPDES permits, which also serve as Waste Discharge Requirements (WDRs), include the Municipal NPDES permit for stormwater discharges (Alameda Countywide NPDES Municipal Stormwater Permit Water Quality Order No.R2-2003-0021, NPDES No. CAS0029831); the Construction General Permit for construction activities associated with land disturbance of more than one acre (WDRs) for Discharges of Storm Water Associated with Construction Activity Water Quality (Order No.99-08-DWQ, NPDES No. CAS000002); individual NPDES permits/WDRs for discharges that do not fall under the above categories; discharges from the municipal wastewater treatment facilities (e.g., Waste Discharge Requirements for the East Bay Municipal Utility District, Special District No. 1 Wet Weather Facilities (Alameda and Contra Costa Counties Water Quality Order No.R2-2009-0004, NPDES N0. CA0038440); US HUD/Oakland City of Housing Authority NPDES No. CA0038512); as well as Industrial General Permits.

Future development is not expected to result in discharge of water supply water requiring compliance with the General Permit for such discharges or an individual WDR/NPDES permit, unless substantial groundwater dewatering is required. Applicable water quality standards are listed in the San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).

Compliance with existing General Plan policies, Municipal Code regulations, Standard Conditions of Approvals, and federal, State, and local regulations would reduce impacts related to waste discharge to a less than significant level.

Mitigation Measures

None needed

Groundwater

Impact Hydro-2: Future redevelopment of existing developed properties and future development of vacant properties in West Oakland pursuant to or consistent with the Specific Plan would not 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 proposed uses for which permits have been granted); . Therefore, the impacts of the Specific Plan on groundwater recharge, the level of the groundwater table, and groundwater supplies would be less than significant. (**LTS**)

The Planning Area is underlain by the East Bay Plain groundwater basin. The San Francisco Regional Water Quality Control Board (RWQCB) has identified groundwater supplies in this basin for municipal, industrial and agricultural water supply. Impacts to the aquifer would occur if actions in accordance with the Specific Plan would result in reduced recharge to the aquifer or increased extraction from the aquifer. However, the East Bay Municipal Utilities District (EBMUD, the major water purveyor for Oakland) relies on surface water supplies. The groundwater basin is currently not being used for municipal water supply.

The amount of water able to infiltrate the aquifer through pervious areas within West Oakland would not substantially decrease as a result of future development because the Planning Area is already largely developed and mostly covered in impervious surface. Redevelopment of existing developed properties with new structures and uses would not substantially change the total area of impervious surfaces and thus would not substantially change groundwater recharge or the groundwater table level, or affect groundwater supplies.

Future redevelopment of existing developed properties and future development of vacant properties in West Oakland pursuant to or consistent with the Specific Plan could potentially even result in an increase in groundwater recharge. All such future projects will be required to comply with the C.3 provisions of the National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permit (see further discussion below), which requires that recharge rates at the site of major development projects shall be at least equivalent to the recharge rate at the site before redevelopment. Additionally, all future development must demonstrate compliance with City of Oakland Storm Drainage Design Guidelines. These Guidelines require a net reduction of 25 percent in the peak stormwater runoff rate from new projects, to the extent possible, in an effort to better address City-wide storm drainage capacity. Individual projects may be able to design an approach to stormwater quantity and quality control that reduces long-term runoff by minimizing impervious cover and maximizing on-site infiltration.

Consequently, impacts to groundwater would be less than significant.

Mitigation Measures

None needed

Construction-Period Water Quality

Impact Hydro-3: Grading and excavations associated with future development pursuant to or consistent with the Specific Plan could expose underlying soils to erosion or siltation, leading to downstream sedimentation in stormwater runoff. However, with required implementation of City of Oakland Standard Conditions of Approval, impacts related to siltation would be reduced to less than significant levels. (**LTS with SCA**)

The flat topography within the Planning Area would limit the potential for substantial soil erosion, and there are only limited areas within West Oakland where native topsoil has not been covered with impermeable surfaces such as paving and buildings. However, site grading and construction activity would expose underlying soils. If left unprotected during construction, such exposed soils could be carried via stormwater runoff into the storm drain system and/or into adjacent surface water, resulting in increased sedimentation.

Potential pollutants associated with construction activities are likely to include minor quantities of paint, solvents, oil and grease, and petroleum hydrocarbons. If such pollutants were allowed to enter into the storm water runoff from the site, they would contribute to the potential degradation of downstream receiving waters.

Standard Conditions of Approval

The following City Standard Condition of Approval would be adopted as a mandatory requirement of each individual future project within the Planning Area.

> **SCA 75: Stormwater Pollution Prevention Plan**. (Prior to and ongoing throughout demolition, grading, and/or construction activities). The project applicant must obtain coverage under the General Construction Activity Storm Water Permit (General Construction Permit) issued by the State Water Resources Control Board (SWRCB). The project applicant must file a notice of intent (NOI) with the SWRCB. The project applicant will be required to prepare a stormwater pollution prevention plan (SWPPP) and submit the plan for review and approval by the Planning and Zoning Division and the Building Services Division. At a minimum, the SWPPP shall include a description of construction materials, practices, and equipment storage and maintenance; a list of pollutants likely to contact stormwater; site-specific erosion and sedimentation control practices; a list of provisions to eliminate or reduce discharge of materials to stormwater; Best Management Practices (BMPs), and an inspection and monitoring program. Prior to the issuance of any construction-related permits, the project applicant shall submit a copy of the SWPPP and evidence of approval of the SWPPP by the SWRCB to the Building Services Division. Implementation of the SWPPP shall start with the commencement of construction and continue through the completion of the project. After construction is completed, the project applicant shall submit a notice of termination to the SWRCB.

Pursuant to SCA 75, *Stormwater Pollution Prevention Plan*, each individual future project within the Planning Area would be required to obtain coverage under the General Construction Activity Storm Water Permit (General Construction Permit) issued by the State Water Resources Control Board (SWRCB). Coverage under this permit requires preparation of a Stormwater Pollution Prevention Plan (SWPPP) for review and approval by the City, and evidence of approval of the SWPPP by the SWRCB. At a minimum, the SWPPP would include a description of construction materials, practices, and equipment storage and maintenance; a list of pollutants likely to contact stormwater; a list of provisions to eliminate or reduce discharge of materials to stormwater; Best Management Practices (BMPs); and an inspection and monitoring program. Implementation of SCA 75 would ensure that potentially significant water quality impacts during construction remain less than significant.

Mitigation Measures

None needed

Post-Construction Water Quality and Stormwater Runoff

Impact Hydro-4: Operational activities such as increased vehicular use, landscaping maintenance and industrial operations could potentially introduce pollutants into stormwater runoff, resulting in degradation of downstream water quality. New development pursuant to the Specific Plan could create or contribute substantial runoff which would exceed the capacity of existing or planned stormwater drainage systems, create or contribute substantial runoff which would be an additional source of polluted runoff, or otherwise substantially degrade water quality. These potential impacts would be reduced to a level of less than significant through implementation of City of Oakland Standard Conditions of Approval. (**LTS with SCA**)

Future development pursuant to or consistent with the Specific Plan could result in increased pollution of stormwater runoff. Potential pollutants may include motor oil and other automotive fluids from spills and leaks, metals from brake pad dust gathered in the parking lots; pesticides, fertilizers and herbicides used in on-site landscaping; air pollutants deposited on roof tops and decomposition of roofing and roof gutter materials and other building materials; trash and excess irrigation water. These pollutants could enter the storm drainage system and eventually contribute to surface water quality degradation.

Standard Conditions of Approval

The following City Standard Condition of Approval would be adopted as mandatory requirements of each individual future project within the Planning Area. These Development Standards apply to ALL projects 1) where the application for a zoning permit was deemed complete on or after February 15, 2005 that create or replace 1 acre or MORE of impervious surface or 2) that the application for a zoning permit was deemed complete on or after August 15, 2006 that create or replace 10,000 square feet or more of impervious surface. Exceptions include the following:

- Sidewalks, bicycle lanes, trails, bridge accessories, guardrails, and landscape features associated with the street.
- Routine maintenance and repair of existing impervious surfaces, including roof and pavement resurfacing and road pavement structural section rehabilitation work within the existing pavement footprint; and
- Reconstruction work within an existing public street right-of-way where both sides of the right-of-way are already developed.

SCA 80: Post-Construction Stormwater Management Plan. (*Prior to issuance of building permit or other construction-related permit.)* The applicant shall comply with the requirements of Provision C.3 of the National Pollutant Discharge Elimination System (NPDES) permit issued to the Alameda Countywide Clean Water Program. The applicant shall submit with the application for a building permit (or other construction-related permit) a completed Stormwater Supplemental Form for the Building Services Division. The project drawings submitted for the building permit (or other construction-related permit) shall contain a stormwater pollution management plan, for review and approval by the City, to limit the discharge of pollutants in stormwater after construction of the project to the maximum extent practicable.

a. The post-construction stormwater pollution management plan shall include and identify the following:

i. All proposed impervious surface on the site;

ii. Anticipated directional flows of on-site stormwater runoff; and

iii. Site design measures to reduce the amount of impervious surface area and directly connected impervious surfaces; and

iv. Source control measures to limit the potential for stormwater pollution; and

v. Stormwater treatment measures to remove pollutants from stormwater runoff.

vi. Hydromodification management measures so that post-project stormwater runoff does not exceed the flow and duration of pre-project runoff, if required under the NPDES permit.

b. The following additional information shall be submitted with the post-construction stormwater pollution management plan:

i. Detailed hydraulic sizing calculations for each stormwater treatment measure proposed; and

ii. Pollutant removal information demonstrating that any proposed manufactured/mechanical (i.e., non-landscape-based) stormwater treatment measure, when not used in combination with a landscape-based treatment measure, is capable of removing the range of pollutants typically removed by landscape-based treatment measures and/or the range of pollutants expected to be generated by the project.

iii. All proposed stormwater treatment measures shall incorporate appropriate planting materials for stormwater treatment (for landscape-based treatment measures) and shall be designed with considerations for vector/mosquito control. Proposed planting materials for all proposed landscape-based stormwater treatment measures shall be included on the landscape and irrigation plan for the project. The applicant is not required to include on-site stormwater treatment measures in the post-construction stormwater pollution management plan if he or she secures approval from Planning and Zoning of a proposal that demonstrates compliance with the requirements of the City's Alternative Compliance Program.

c. *(Prior to final permit inspection.)* The applicant shall implement the approved stormwater pollution management plan.

SCA 81: Maintenance Agreement for Stormwater Treatment Measures. *(Prior to final zoning inspection.)* For projects incorporating stormwater treatment measures, the applicant shall enter into the "Standard City of Oakland Stormwater Treatment Measures Maintenance Agreement," in accordance with Provision C.3.e of the NPDES permit, which provides, in part, for the following:

a. The applicant accepting responsibility for the adequate installation/construction, operation, maintenance, inspection, and reporting of any on-site stormwater treatment measures being incorporated into the project until the responsibility is legally transferred to another entity; and

b. Legal access to the on-site stormwater treatment measures for representatives of the City, the local vector control district, and staff of the Regional Water Quality Control Board, San Francisco Region, for the purpose of verifying the implementation, operation, and maintenance of the on-site stormwater treatment measures and to take corrective action if necessary. The agreement shall be recorded at the County Recorder's Office at the applicant's expense.

Pursuant to SCA 80, *Post-Construction Stormwater Management Plan*, each individual future project within the Planning Area would be required to demonstrate compliance with the requirements of Provision C.3 of the National Pollutant Discharge Elimination System (NPDES). Provision C.3 requires preparation and approval of a Stormwater Pollution Management Plan (SMP) to limit the discharge of pollutants in stormwater after construction, during occupancy and operation of the project, to the maximum extent practicable. The SMP must identify all proposed impervious surfaces and anticipated directional flows of stormwater runoff; design measures to reduce the amount of impervious surface area and directly connected impervious surfaces; source control measures to limit the potential for stormwater pollution; and stormwater treatment measures to remove pollutants from runoff.

Pursuant to SCA 81, *Maintenance Agreement for Stormwater Treatment Measures*, each individual future project within the Planning Area would be required to enter into a maintenance agreement accepting responsibility for the adequate installation or construction, operation, maintenance, inspection and reporting of all stormwater treatment measures incorporated into the project.

With required implementation of SCA 80 and 81, post-construction operational water quality impacts of the Specific Plan pertaining to water quality and runoff would be less than significant.

Mitigation Measures

None needed

Changes to the Drainage System Pattern and Capacity

Impact Hydro-5: The Specific Plan does not propose any changes to the existing drainage pattern within the Planning Area. All drainage and stormwater runoff is conveyed via underground pipes and conduits to pumping plants, which discharge runoff into the Bay. There are no surface water features or open drainage systems which would be altered, or where an increase in captured runoff may adversely affect the capacity of such features. (**No Impact**)

Future development in accordance with the Specific Plan and City actions implementing the Plan would not substantially alter the existing drainage pattern of the area or substantially increase the rate or amount of surface runoff in a manner which would adversely affect drainage patterns or capacity. The Specific Plan does not propose any changes to the existing drainage pattern within the Planning Area.

Future development in accordance with the Specific Plan would be subject to the City's Storm Drainage Design Guidelines, which requires a net reduction of 25 percent in the peak stormwater runoff rate from new projects, to the extent possible, in an effort to better address City-wide storm drainage capacity. The City's storm drainage system and its ability to accommodate potential future increases in storm water runoff are more fully discussed in Section 4.12, Utilities.

The Specific Plan does not propose a substantial alteration to existing drainage patterns, nor would it increase the rate or amount of flow, of a creek, river, or stream in a manner that would result in substantial erosion, siltation, or flooding, both on- and off-site. The Specific Plan does not propose or authorize any new development within the areas where it may conflict with the City of Oakland Creek Protection Ordinance (OMC Chapter 13.16) intended to protect hydrologic resources.

Mitigation Measures

None needed

Flood Hazards

Impact Hydro-6: No portion of the Planning Area is located within a 100-year or 500-year flood hazard area, as mapped on the National Flood Insurance Program Flood Insurance Rate Maps.

Development in accordance with the Specific Plan would not place housing within a 100-year flood hazard area. (**LTS**)

No portion of the Planning Area is located within a 100-year or a 500-year flood hazard area as depicted on the National Flood Insurance Program Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency. All of West Oakland is designated Zone X, which means that it is an area determined to be an area of minimal flood hazard, outside the 0.2 percent annual chance floodplain. For this reason, implementation of the Specific plan would not result in substantial flooding on- or off-site; would not expose people or structures to a substantial risk of loss, injury, or death involving flooding; would not impede or redirect flood flows or place within a 100-year flood hazard area structures which would impede or redirect flood flows; now would it place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Map.

Potential flooding impacts related to sea level rise are addressed in Chapter 4.4, Greenhouse Gas Emissions.

Mitigation Measures

None needed

Dam Failure Inundation

Impact Hydro-7: The portion of the Planning Area north of I-580 is located within the Temescal Lake dam failure inundation area and could be subject to flooding in the event of a catastrophic failure of the dam. The Specific Plan does not propose any land use changes or improvements to the area north of I-580, and would not affect established emergency procedures for the evacuation and control of populated areas below Temescal Lake dam. Therefore, the Specific Plan would not expose people or structures to a substantial risk of loss, injury or death involving flooding due to dam failure inundation. (**LTS**)

The California Office of Emergency Services (CA OES) Dam Failure Inundation Mapping and Emergency Procedure Program establishes emergency procedures for the evacuation and control of populated areas below dams which could be used to save lives and reduce injury in the event of a dam failure. Dam owners submit inundation maps to CA OES for review and approval. Inundation maps represent the best estimate of where water would flow if a dam failed completely and suddenly with a full reservoir. Copies of the approved inundation maps are sent to the city and county emergency services coordinators of affected local jurisdictions, which are required to adopt emergency procedures for the evacuation and control of populated areas below the dams. The portion of the Planning Area north of I-580 is located within the Temescal Lake dam failure inundation area and could be subject to flooding and associated risk of injury and loss of property, in the event of a catastrophic failure of the dam.[5]

The City participates in the CA OES Dam Failure Inundation Mapping and Emergency Procedure Program and has included potential dam failure in its emergency preparedness, response and evacuation programs. The Specific Plan would not alter these City programs, nor would these programs need to be changed to accommodate future development pursuant to or consistent with the Specific Plan. The Specific Plan does not propose any land use changes or improvements to the area north of I-580.

[5] Association of Bay Area Governments, Geographic Information Systems, Hazards Maps, Dam Failure Inundation Areas website, viewed on June 22, 2012, http://www.abag.ca.gov/cgi-bin/pickdamx.pl

Therefore, the potential flooding impacts related to failure of the Temescal Lake dam would be less than significant.

Mitigation Measures

None needed

Seiche, Tsunami and Mudflow

Impact Hydro-8: The Planning Area is not subject to risk from a seiche or landslides. However, the western portion of the Specific Plan, generally west of Mandela Parkway, is subject to tsunami inundation. The Alaska Tsunami Warning Center, State Warning System and OES emergency alert system, including the outdoor warning sirens in West Oakland, would provide early notification of an advancing tsunami allowing evacuation of people, although there could be property damage due to inundation. (**LTS**)

A seiche is a tidal change in an enclosed or semi-enclosed water body caused by sustained high winds or an earthquake. The Planning Area is not located close enough to San Francisco Bay to be affected by a seiche.

Tsunamis are seismically induced sea waves that, upon entering shallow near-shore waters, may reach heights capable of causing widespread damage to coastal areas. The western portion of the Planning Area, generally west of Mandela Parkway, is subject to tsunami inundation, based on maps prepared by the California Emergency Management Agency representing a credible upper bound to inundation from realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides.[6]

The National Weather Service operates the Alaska Tsunami Warning Center in Palmer, Alaska which serves as the regional Tsunami Warning Center for Alaska, British Columbia, Washington, Oregon, and California. This center monitors seismological and tidal stations throughout the Pacific Basin to evaluate whether an earthquake is capable of producing a tsunami and disseminates tsunami warning information. In the event that an earthquake occurred that would be capable of producing a tsunami that could affect West Oakland, the City of Oakland would receive the warning through the State Warning System.

The Oakland Office of Emergency Services (OES) operates a network of outdoor warning sirens to alert the public in the case of an emergency. There are sirens installed at three locations in West Oakland: the Goss Avenue/Pine Avenue intersection, Poplar Recreation Area, and Lafayette Square. The warning sirens would alert the public to tune into the local emergency alerting radio station for safety information and instructions. Police would also canvas the neighborhoods sounding sirens and bullhorns, as well as knocking on doors as needed, to provide emergency instructions. Evacuation centers would be set up if required.

The Alaska Tsunami Warning Center, State Warning System and OES emergency alert system, including the outdoor warning sirens in West Oakland, would provide early notification of an advancing tsunami allowing evacuation of people, although there could be property damage due to inundation. Given the rare occurrence of tsunamis, the distance of West Oakland to the Bay shoreline, and the emergency

[6] Association of Bay Area Governments, Earthquake and Hazards Information, Tsunami Inundation Map for Coastal Evacuation website, viewed on June 22, 2012, http://gis.abag.ca.gov/website/Tsunami/

alert system enabling evacuation of people, potential impacts related to tsunami inundation would be less than significant.

The Planning Area is flat and far from hillsides, and is not subject to risk from landslides as mapped by the Association of Bay Area Governments, based on data from the U.S. Geological Survey.[7]

Mitigation Measures

None needed

Mineral Resources

Loss of Mineral Resources

Impact Min-1: Future development pursuant to or consistent with the Specific Plan would not 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. (**LTS**)

According to the California Department of Conservation Division of Mines and Geology's Aggregate Resource Map,[8] the Planning Area is not currently considered an Aggregate Resource sector. The Leona Quarry was the last mine in Oakland to be identified as a regionally significant source of aggregate resources. Areas with this designation are judged to be of prime importance in meeting future mineral needs in the region, and land use decisions must consider the importance of these resources to the region as a whole, and not just their importance to Oakland. The Leona Quarry has been closed for many years, and there is no other land in Oakland with such a designation.

Mitigation Measures

None needed

Loss of a Mineral Resource Recovery Site

Impact Min-2: Future development pursuant to or consistent with the Specific Plan would not 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. (**No Impact**)

The Planning Area is not designated as a locally important mineral resource recovery site under the City of Oakland General Plan Land Use and Transportation Element or Open Space, Conservation and Recreation Element. Furthermore, Policy CO-3.2 of the Conservation Element prohibits new quarrying activity in Oakland except upon clear and compelling evidence that the benefits will outweigh the resulting environmental, health, safety, aesthetic and quality of life costs.

---

[7] Association of Bay Area Governments, Hazards Program, Landslide Maps and Information website, viewed on June 22, 2012, http://quake.abag.ca.gov/landslides/

[8] http://www.conservation.ca.gov/smgb/reports/Designation/DR%207/Documents/
DR7_SR146_Plate2.60.pdf

Mitigation Measures

None needed

5

Alternatives

Introduction and Overview

CEQA Guidelines require an analysis of a reasonable range of alternatives for any project subject to an EIR. The purpose of the alternatives section is to provide decision-makers and the public with a discussion of alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly. Evaluation of alternatives should present the proposed action and all the alternatives in comparative form to define the issues and provide a clear basis for choice among the options.

CEQA requires that the lead agency adopt mitigation measures or alternatives, where feasible, to substantially lessen or avoid significant environmental impacts that would otherwise occur. Where a lead agency has determined that even after adoption of all feasible mitigation measures, a project as proposed would still result in significant environmental effects that cannot be substantially lessened or avoided, the agency must first determine whether there are any alternatives that are both environmentally superior and feasible. CEQA provides the following guidelines for discussing project alternatives:

- An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation (§15126.6(a)).
- An EIR is not required to consider alternatives which are infeasible (§15126.6(a)).
- The discussion of alternatives shall focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project (§15126.6(b)).
- The range of potential alternatives to the proposed project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects (§15126.6(c)).
- The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis and comparison with the proposed project (§15126.6(d)).

Accomplishing Basic Project Objectives

CEQA requires an analysis of alternatives that would feasibly attain most of the basic objectives of the project.

Community-Based Goals and Objectives

The comments received at public workshops, other community involvement efforts, and from the Steering Committee have been formulated as goals and objectives of the Specific Plan. These goals and objectives have been identified as the most important issues related to growth, development and change to those participating community members. These goals and objectives have also been vetted through the Technical Advisory Committee. The resulting goals and objectives are the "drivers" of the West Oakland Specific Plan's detailed recommendations. All of the strategies and implementation actions of the Specific Plan are intended to relate back to the following overall community-based goals and objectives:

- Augment West Oakland's development capabilities by enhancing the linkages between future Army Base uses and development in West Oakland, focusing on both these areas' economic synergies as well as physical connections.
- Encourage the growth of additional jobs and services with opportunities and training available to both existing and future residents.
- Determine the most desirable and beneficial land uses for specific areas within West Oakland, recognizing that different areas have differing needs, opportunities and constraints, and assets.
- Attract quality, compatible residential, commercial and industrial development while preserving existing established residential neighborhoods.
- Support existing investment in the area and enhance existing assets.
- Support commercial, mixed-use and transit-oriented land uses in West Oakland, particularly in collaboration with the Bay Area Rapid Transit (BART) District for transit-oriented development at the West Oakland BART Station.
- Lessen existing land use conflicts and ensure avoidance of future conflicts between residential neighborhoods and non-residential uses.
- Enhance transportation resources throughout West Oakland and between West Oakland and adjoining areas.
- Further the physical and economic revitalization of West Oakland.
- Correspond with regional development issues in accordance with the district's Priority Development Area designation through SB 375 and AB 32.
- Minimize the potential for displacement of existing residents as new residents are accommodated.

Reducing Significant and Unavoidable Project Impacts

CEQA also requires the identification and analysis of alternatives that would avoid or substantially lessen any of the significant effects of the Project. Of the potential environmental impacts identified in this EIR, only traffic-related effects and non-CEQA related air quality effects are identified as being significant and unavoidable.

Air Quality

Air-3: Development in accordance with the Specific Plan could expose a substantial number of new people to existing and new objectionable odors.

Air-5: During construction, individual development projects will generate regional ozone precursor emissions and regional particulate matter emissions from construction equipment exhaust and will generate construction-related toxic air contaminant (TAC) emissions from fuel-combusting construction equipment and mobile sources. For most individual development projects, construction emissions will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval. However, larger individual construction projects could generate emissions of criteria air pollutants that would exceed the City's thresholds of significance.

Air-7: New development pursuant to the Specific Plan will generate emissions of criteria pollutants (ROG, NO_x PM_{10} and $PM_{2.5}$) as a result of increased motor vehicle traffic and area source emissions. Traffic emissions combined with anticipated area source emissions would generate levels of criteria air pollutants that would exceed the City's project-level thresholds of significance.

Air-9: Development pursuant to the West Oakland Specific Plan would include new light industrial, custom manufacturing and other similar land uses, as well as the introduction of new diesel generators that could emit toxic emissions exceeding the City's project-level thresholds of significance.

Air-10: Certain future development projects in accordance with the West Oakland Specific Plan could result in new sensitive receptors exposed to existing levels of toxic air contaminants (TACs) or concentrations of PM2.5 that could result in increased cancer risk or other health hazards.

Greenhouse Gas Emissions

GHG-2: It is possible that certain development project envisioned and enabled under the Specific Plan could exceed, on an individual and project-by-project basis, the project-level GHG threshold.

Traffic and Transportation

Trans-1 and -7: The addition of traffic generated by the full development of the proposed Project to both Existing conditions and Cumulative 2035 conditions would cause PM peak hour southbound left turn 95th percentile queue length at the signalized intersection of Hollis and 40th Street (#1) located in Emeryville to exceed the available queue storage. Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed.

- **Impact Trans-1 and -3 at San Pablo Avenue and 40th Street**: The addition of traffic generated by the full development of the proposed Project to both Existing Conditions and Cumulative 20135 Conditions would cause PM peak hour traffic operations at the signalized intersection of San Pablo Avenue and 40th Street (#2) located in Emeryville to degrade from LOS D to LOS E under Existing plus Project conditions. Additionally, the eastbound left and northbound left turn 95th percentile queue length would exceed the available queue storage or would contribute to the LOS F operations and increase the average delay by more than four seconds in the AM peak hour. Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed.
- **Impact Trans-2 and -4 at San Pablo Avenue and 40th Street**: The addition of traffic generated by the full development of the proposed Project to both Existing Conditions and Cumulative 20135 Conditions would cause PM peak hour traffic operations at the signalized intersection of San Pablo Avenue and 40th Street (#2) located in Emeryville to degrade from LOS D to LOS E under Existing plus Project conditions. Additionally, the eastbound left and northbound left turn 95th percentile queue length would exceed the available queue storage in the AM peak hour. Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed.

- **Impact Trans-5 at Mandela Parkway and West Grand Avenue:** The addition of traffic generated by the full development of the proposed Project under Cumulative 2035 conditions would degrade AM peak hour operation from LOS E to LOS F at the signalized intersection at Mandela Parkway and West Grand Avenue (#7) located outside the Downtown Area. It would also degrade operation from LOS E to LOS F operations in the PM peak hour and would increase the volume-to-capacity ratio beyond the threshold of significance. The recommended mitigation measures would encroach into Memorial Park and the street medians, and the provision of four westbound lanes would preclude planned installation of a bicycle facility on West Grand Avenue which is a City priority (Resolution 84197, Nov 2012). Therefore, these additional improvements are not recommended.

Conclusions of the Comparative Analysis

Pursuant to CEQA Guidelines, the alternatives evaluated in this EIR were developed with the intent of potentially avoiding or substantially reducing these unavoidable significant impacts. Other than the No Project Alternative, neither of the other alternatives would fully avoid all of the significant and unavoidable impacts identified for the Project.

Alternatives Analyzed

The alternatives analyzed in this EIR are described below. These alternatives are intended to meet the CEQA requirements that an EIR describe the No Project alternative as well as a range of reasonable alternatives to the Project that would feasibly attain most of the basic objectives of the Project, but would avoid or substantially lessen the significant effects of the Project.

Alternative 1: No Project

CEQA Guidelines Section 15126.6(e)(3)(A) states that; “When the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the "no project" alternative will be the continuation of the existing plan, policy or operation into the future. Typically this is a situation where other projects initiated under the existing plan will continue while the new plan is developed. Thus, the projected impacts of the proposed plan or alternative plans would be compared to the impacts that would occur under the existing plan.” Under Alternative 1: No Project, the West Oakland Specific Plan would not be approved, no changes in current General Plan land use designations, zoning or other regulatory measures would occur, and all new development within West Oakland would continue to occur under existing regulations. The pace of new development within West Oakland would be expected to occur at a rate commensurate with building permit activity which has occurred over the past 10 to 15 years.

Alternative 2: Reduced Project

Throughout the time period during which the West Oakland Specific Plan has been developed, the major development concepts for each Opportunity Area have been presented at community workshops and other public venues as both a “mid-range” and a “high intensity” scenario. For purposes of defining the Project, each of the high intensity scenarios for each Opportunity Area has been relied upon, thereby presenting the “worst case” (or greatest development potential) for environmental review. Under Alternative 2: Reduced Project, each of the mid-range development scenarios have been aggregated as one overall development alternative. This Reduced Project alternative explores the extent to which less intense development within West Oakland may result in reduced environmental effects, particularly in regards to traffic, air quality and noise. It is also consistent with the Planning Commission’s direction during the Notice of Preparation of this EIR to examine a less aggressive or less optimistic development scenario over the next 20 to 25 year planning period. Whereas the Specific Plan (the Project) envisions an ultimate buildout that would include up to approximately 5,000 new dwelling units and approximately 4 million square feet of new business, industrial and commercial building space, the Reduced Alternative would accommodate a buildout of approximately 3,400 new dwelling units and approximately 775,000 square feet of new business, industrial and commercial building space.

The Reduced Project Alternative is generally consistent with Association of Bay Area Governments (ABAG) housing projections for the year 2020, and generally consistent with employment projections for a period between year 2020 and 2035.

Alternative 3: Scenario with Commercial and Jobs Emphasis

In written responses to the Notice of Preparation (NOP) for this EIR, it was suggested by numerous commenters that the EIR should consider an alternative to the Project whereby: a) no changes or conversions of industrial lands to residential use would occur, b) commercial or business uses (rather than residential use) would be located in proximity to the freeways, c) the West Oakland BART station TOD would include a mix of uses that would include a substantial component of commercial/institutional office space, and d) retail uses would extend southward from the current West Oakland/Emeryville border to West Grand Avenue.

Alternative 3: Scenario with Commercial and Jobs Emphasis includes a mix of land uses that emphasize the retention of commercial and industrial lands, that provide a greater emphasis on business development over new residential use, and that includes a substantial component of commercial/institutional office space within the West Oakland BART station TOD development plan. Whereas the Specific Plan (the Project) envisions an ultimate buildout of up to approximately 5,000 new dwelling units and approximately 4 million square feet of new business, industrial and commercial building space, Alternative 3 would accommodate a buildout of approximately 3,500 new dwelling units and approximately 4,170,000square feet of new business, industrial and commercial building space, emphasizing a substantial increase of nearly three-quarters of a million square feet of retail and commercial space as compared to the Project.

Alternative 4: Maximum Theoretical Buildout Alternative

Because the Specific Plan's regulations would apply to every parcel within the Plan Area, the Maximum Theoretical Buildout Alternative evaluates the theoretical possibility that every parcel would be built out to the new maximum level permissible under the General Plan and Planning Code regulations as revised through adoption of the Specific Plan. Under the Maximum Theoretical Buildout Alternative, overall development would be substantially greater than the Project's land use development program (roughly 3.3 times as much non-residential development and an approximately 8% increase in residential development as compared to the Project. The likelihood of "maximum buildout" occurring is considered highly unlikely, and is referred to as theoretical.

Summary Comparison

Table 5-1 compares the amount of development and mix of uses proposed by the Project to the five alternatives.

Table 5-1: Comparative Development Summary - Project and Alternatives

	Project	Alternative 1: No Project	Alternative 2: Reduced Project	Alternative 3: Commercial and Jobs Emphasis	Alternative 4: Max. Theoretical Buildout
New Business / Indust. (sq.ft)	3,550,000	0	625,000	2,835,000	11,181,600
New Comm. /Retail (sq.ft.)	310,000	0	0	390,000	2,996,000
New Mixed Use (sq. ft.)	170,000	100,000	150,000	945,000	954,000
Total New Space, Non-Residential	**4,030,000**	**100,000**	**675,000**	**4,170,000**	**15,132,000**
New Jobs	14,890	2,400	6,730	16,146	37,640
New Housing Units	**5,000**	**1,810**	**3,705**	**3,535**	**5,140**
New Population	10,988	3,982	8,200	8,017	11,320

Alternatives Considered but Rejected

"Fully Mitigated" Alternative

CEQA Guidelines, Section 15126.6(c) indicates that the range of potential alternatives to the proposed project shall include those that could feasibly accomplish *most of the basic objectives of the project* (emphasis added) and could avoid or substantially lessen one or more of the significant effects.

As more fully described under the Reduced Alternative, the increased number of vehicle trips associated with substantially less development (both residences and employment opportunities) would still result in significant and unavoidable traffic impacts as well as non-CEQA air quality effects resulting from ambient conditions. The only means of off-setting the increased vehicle trips attributed to new development within West Oakland would be to reduce the total number of vehicle trips by taking an even more aggressive approach to limiting or reducing new growth and development than indicated under the reduced Alternative.

It is possible to describe any number of alternatives that include substantially less residential and/or employment opportunities in West Oakland, but such alternatives would not be capable of encouraging growth in West Oakland jobs and services, attracting quality, compatible residential, commercial and industrial development, supporting commercial, mixed-use and transit-oriented land uses at West Oakland BART Station, or corresponding with the regional growth projections and Priority Development Area designations pursuant to SB 375 and AB 32.

Although such alternatives are physically feasible, there is no alternative that would be capable of reducing or avoiding the significant traffic impacts while still accomplishing these basic Project objectives. For this reason, a "fully mitigated" alternative was eliminated from further consideration in this EIR.

Alternative Site Location

In considering the range of alternatives to be analyzed in an EIR, the CEQA Guidelines state that an alternative site location should be considered when feasible alternative locations are available and the significant effects of the project would be avoided or substantially lessened by putting the project in another location. The West Oakland Specific Plan is specific to the geography of West Oakland. Therefore, this EIR does not consider an off-site alternative.

Overview of Alternatives Analysis

Each of the alternatives is more fully described below, and their potential environmental effects are also disclosed. The environmental effects of each alternative are compared to those of the Project and to existing conditions. As permitted by CEQA (CEQA Guidelines Section 15126.6[d]) the effects of the alternatives are discussed in less detail than the impact discussions of the Project. However, the alternatives analysis is conducted at a sufficient level of detail to provide the public, other public agencies, and City decision-makers adequate information to fully evaluate the alternatives and to enable the City to consider approval of the alternatives without further environmental review. For each of the alternatives, the significance of each impact is compared to City of Oakland thresholds of significance, as indicated in the topic heading (e.g., Aesthetics [LTS]). These significance conclusions assume implementation of Standard Conditions of Approval and/or mitigation measures. The impacts of each alternative are also compared to the impacts of the Project to indicate whether the alternative would: 1) avoid potentially significant impacts of the Project; 2) generally have the same impact as the Project; or 3) result in impacts either greater than or less than the impacts of the Project.

Alternative 1: No Project

CEQA Guidelines Section 15126.6(e) requires that a "no project" alternative be evaluated, along with its impacts. The "no project" alternative must be the *practical result* of non-approval of the project.

Description of Alternative 1: No Project Alternative

For this EIR, the No Project Alternative is defined as an alternative under which new development within West Oakland would occur in a manner fully consistent with existing plans and regulations. The West Oakland Specific Plan would not be approved, and no changes in current General Plan land use designations, zoning or other regulatory measures would occur (i.e., no conversions of industrial lands to residential use and no new land use overlays). The pace of new development within West Oakland would be expected to occur at a rate commensurate with development and building permit activity which has occurred over the past 10 to 15 years.

Residential Development and Growth Rates

According to the US Census, only 713 units, or 71 units per year, were added to the West Oakland housing stock between 1990 and 1999, including several public and affordable housing developments. However, housing development increased substantially between 2000 and 2011, when there were more housing units constructed in West Oakland than during any similar time period prior to World War II.

Growth rates varied substantially during this time period. The beginning of the decade coincided with the expansion period of the national housing bubble and the majority of housing projects built during this period, including those in West Oakland, were successfully absorbed and there was ample financing available to fund both construction and homebuyer mortgages. Beginning in 2008, housing production slowed considerably, demonstrating the rapid and protracted collapse of the housing market. Starting again in 2010, the housing market has begun to return to pre-recession levels. During the time period from 2000 to 2011, at least 1,505 new housing units were constructed (and building permits were issued for an additional 1,662 units which have not yet been built). Although the rate of housing development rose, declined and rose again, the average housing production rate in West Oakland during this time period was 136 new units per year. Of that total, only an estimated 520 market rate units were built in West Oakland.

For purposes of this Alternative, it is assumed that the new housing construction rate will continue at a similar pace as has occurred since year 2000, at approximately 136 units per year through to the year 2035. Over this 22-year period, this would equate to a total of 2,992 total new housing units.

Without a Specific Plan to more precisely guide and direct future new development, it can only be assumed that new residential growth will occur in areas currently zoned for residential use. The precise location of individual future residential development projects is unknown, and dependent upon numerous variables including market conditions, financing availability and other project-specific parameters. For purposes of this analysis it is assumed that, similar to projections included in the Specific Plan, approximately 60% of the total new West Oakland housing units (or 1,810 units) are assumed to be constructed within the West Oakland Opportunity Areas, and the remaining 40% are assumed be constructed throughout West Oakland's Residential Enhancement Areas. Within the West Oakland Opportunity Areas, the total 1,810 new units are assumed to occur primarily as follows:

- a continuation and completion of the remaining approximately 640 approved units in the Wood Street Development project in the Mandela/West Grand Opportunity area,
- partial buildout of the West Oakland BART station TOD, assumed for purposes of this alternative to be approximately 750 units (or 1/3 of the total 2,250 units that could theoretically be achieved under current S-15 zoning regulations), and
- development of 420 units as new infill development and new mixed use projects along the San Pablo Avenue corridor, many of which include approved but as yet un-built projects.

Non-Residential Development and Growth Rates

According to sources cited in the "West Oakland Specific Plan, Equitable Development Strategy Report",[1] total employment in West Oakland was approximately 13,000 employees in 1992, but dropped to approximately 12,000 employees by year 1997. During the period of 1997 through 2007, total employment remained relatively constant at 12,000 employees, but dropped again between 2007 and 2012 to approximately 11,500 total employees. This declining employment rate mirrors the decline in employment in Alameda County as a whole. Contributing to this decline is a significant shift in where people are employed. There were half as many people employed in West Oakland by large businesses in 2012 as there was in 1992. This change represents both a loss in total numbers of employees and an overall shift in employment to smaller businesses. In 2012, small businesses account for a much higher share of total employment in West Oakland than they did in 1997. Despite the decline in total employment, West Oakland has a thriving urban manufacturing sector with a diverse set of businesses ranging from small-batch food production to fashion manufacturing, has a strong concentration of arts-related businesses and is internationally known as a center for the industrial arts, and is a hotspot for

[1] Bay Area Economics, Existing Conditions & Initial Strategic Directions, June 18, 2013

entrepreneurial activity and new business ventures. From 2007 to 2012, 853 new small businesses were founded in West Oakland, representing more than half of current businesses.

Rather than assuming a continuation of the recent decline in total employment in West Oakland, the No Project alternative acknowledges the recent increase in new small business activity, and assumes that small business growth in West Oakland will more than off-set a continued decline in employment at large- to moderate sized West Oakland businesses. According to at least one major source,[2] Oakland-East Bay industrial employment is projected to grow at an annualized rate of 1%. Over a 22-year buildout, a 1% per year growth rate in employment, added to the current 9,770 jobs in West Oakland, would result in a total employment by year 2035 of approximately 12,160 jobs, or an increase of nearly 2,400 jobs. The existing building stock throughout West Oakland's Opportunity Areas provides adequate space to accommodate this amount of employment growth, generally at rates affordable and attractive to small and emerging businesses. For reference, the Specific Plan (i.e., the Project) assumes a growth of as many as 5,320 new employees within existing vacant and/or underutilized buildings. Therefore, the No Project Alternative assumes that no new building space would be required to accommodate projected employment growth. An exception is that the No Project Alternative does assume that approximately 50,000 square feet of new non-residential space would be developed as part of mixed-use developments that are fully consistent with current zoning in the West Oakland BART TOD development area and along the San Pablo Avenue corridor, respectively.

Summary of the Reduced Alternative

Buildout of this alternative is anticipated to occur over an extended period of time with incremental increases in new housing and job opportunities, but final buildout is assumed by year 2035. **Table 5-2** provides a summary of land uses, employment and population changes projected within the Planning Area at buildout of the No Project Alternative.

[2] Principal Real Estate Investors, Oakland Economic Base Analysis, 2012

Table 5-2: Buildout Assumptions, No Project Alternative (all of West Oakland Opportunity Areas)

	Business / Indust. (sq.ft.)	Comm. /Retail (sq.ft.)	Mixed Use (sq. ft.)	Jobs	Housing Units	Pop.
Existing						
Mandela/Grand	4,000,000	300,000	0	5,440	110	259
7th Street	1,790,000	0	5,000	1,880	85	204
3rd Street	1,040,000	50,000	0	1,770	0	0
San Pablo	0	90,000	700,000	680	70	165
Total	**6,830,000**	**440,000**	**705,000**	**9,770**	**265**	**628**
Buildout, No Project Alternative						
Mandela/Grand	4,000,000	300,000	0	7,040	750	1,667
7th Street	1,790,000	0	55,000	1,975	835	1,854
3rd Street	1,040,000	50,000	0	2,380	0	0
San Pablo	0	90,000	750,000	775	490	1,089
Total	**6,830,000**	**440,000**	**805,000**	**12,170**	**2,075**	**4,610**
Net Change, No Project Alternative						
Mandela/Grand	0	0	0	1,600	640	1,408
7th Street	0	0	50,000	95	750	1,650
3rd Street	0	0	0	610	0	0
San Pablo	0	0	50,000	95	420	924
Total	**0**	**0**	**100,000**	**2,400**	**1,810**	**3,982**
Net Change, Project	3,550,000	310,000	170,000	14,890	5,000	10,988
Net Change, Compared to Project	-3,550,000	-310,000	-70,000	-12,490	-3,190	-7,006
Percent of Project	0%	0%	59%	16%	36%	36%

Comparative Environmental Assessment, Alternative #1: No Project Alternative

Aesthetics

There are no officially designated public scenic vistas within or near the West Oakland Planning Area. No scenic vistas or view corridors would be substantially obstructed or degraded by development in accordance with the Reduced Alternative, and the impacts of Alternative 3 on scenic vistas would therefore be less than significant.

Infill development and redevelopment of vacant and blighted properties, improvements to streetscapes and the public realm, and new landscaping and street trees to improve the quality of views throughout West Oakland from public vantage points would not be as extensive and effective under the No Project Alternative as would occur under the Project. New development would not necessarily be focused within the Opportunity Areas. At the West Oakland BART Station TOD, the No Project Alternative would lower building heights as compared to the Project, and would not necessarily provide an effective and substantial transition in building heights nearest to the South Prescott neighborhood as proposed under the Project.

Scenic Highways

New development and public realm improvements under the No Project Alternative would not substantially damage scenic resources, but would not provide as much substantial improvements in the quality of views of the Planning Area from the I-580 scenic highway. The impacts of the No Project Alternative related to scenic highways would be less than significant. (**LTS**)

Visual Character or Quality

New development and public realm improvements in accordance with the No Project Alternative would contribute to improvements in the visual character and quality of their surroundings, but to a lesser extent than as would occur under the Project. Less infill development and redevelopment would occur, therefore providing less repair to the existing inconsistent urban fabric where such inconsistencies exist, and result in a less unified and coherent development character. The No Project Alternative would not provide for the re-zoning of any areas from industrial to residential use, and the existing edge between industrial and residential areas would remain less defined and consistent. The visual character along the industrial/residential edges would continue to remain mixed in character. (**LTS**)

Shadow

The No Project Alternative would not cast shadows that substantially impair the function of a building using passive solar heat collection, solar collectors for hot water heating, or photovoltaic solar collectors; cast shadows that substantially impair the beneficial use of any public or quasi-public park, lawn, garden, or open space; or cast shadows on an historic resource such that the shadow would materially impair the resource's historic significance. The shadow impacts of the No Project Alternative would be less than significant. (LTS)

Adequate Lighting

The No Project Alternative would not cause a fundamental conflict with policies and regulations that address the provision of adequate light related to appropriate uses. (LTS)

Wind

Like the Project, the wind impacts associated with the No Project Alternative would be less than significant. (LTS)

Air Quality

CAP Consistency: VMT Increase

The growth assumptions that underlie the applicable Clean Air Plan are based on a combination of regional growth forecasts derived from ABAG, and the General Plans from each respective jurisdiction. As indicated Chapter 4.8 of this EIR, ABAG projections for year 2035 forecast significant growth in both population and jobs pursuant to the current City of Oakland General Plan. Since the No Project Alternative is defined as no changes to current General Plan land use designations, zoning or other regulatory measures, the ABAG projections underlying the CAP are representative of a No Project scenario. Therefore, the No Project Alternative would not conflict with, but would be consistent with the applicable CAP.

The projection of total vehicle miles travelled (VMTs) under a No Project scenario – a scenario under which growth occurs pursuant to the current General Plan and assuming ABAG projections - actually exceeds the VMTs projected for the Project. The PM peak hour VMTs under the 2035 plus Project scenario are estimated at 80,364 as compared to a PM peak hour projection of VMTs under a 2035 No Project Scenario of 81,370. Thus a No Project Alternative which accommodates growth as projected by ABAG but in a land use configuration consistent with the current General Plan (as opposed to a land use configuration as defined under the Project) would generate more VMTs than does the Project.

CAP Consistency: Implementation of Control Measures

Like the Project, the No Project alternative would not fundamentally conflict with the CAP's air pollution control measures. All new development pursuant to the No Project Alternative, including new industrial and commercial uses, would be required to comply with all measures that the Air District adopts and enforces to control emissions from stationary sources of air pollution. The No Project Alternative would not contain any policies or strategies that would be contrary to incentive programs to achieve voluntary emission reductions from mobile sources. The No Project Alternative would not fundamentally conflict with the CAP's transportation control strategies, even if it does not achieve to the same degree as does the Project, improvements to the efficiency of existing transit systems or the promotion of focused urban infill development. All new development pursuant to the No Project Alternative Plan would be required to comply with City of Oakland's Standard Conditions that seek to reduce energy use in new development projects. In summary, the No Project Alternative would not interfere with implementation of Clean Air Plan control measures.

Odors

Like the Project, new development in accordance with the No Project Alternative would expose a substantial number of people to objectionable ambient odors from the EBMUD WWTP and from food processing facilities, painting/coating operations, and/or green waste and recycling facilities. This impact would be **significant and unavoidable** at the Plan level. New development pursuant to the No Project Alternative could result in development of new odor-generating uses in close proximity to residential or other odor-sensitive uses within mixed-use areas, similar to that as indicated for the Project. Like the Project, this impact would be potentially significant and proper controls or setbacks, as recommended for the Project, would be required.

Construction Period Emissions

Similar to the Project, individual development projects pursuant to the No Project Alternative will generate fugitive dust from demolition, grading, hauling and construction activities, will generate regional ozone precursor emissions and regional particulate matter emissions from construction equipment exhaust, and will generate construction-related toxic air contaminant (TAC) emissions from fuel-combusting construction equipment and mobile sources.

- Fugitive dust will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval, and
- construction-related toxic air contaminant (TAC) emissions will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval, but
- larger individual construction projects could generate emissions of criteria air pollutants that would exceed the City's thresholds of significance and/or that could exceed thresholds for cancer risk, chronic health index, acute health index or annual average PM2.5 concentration levels and are conservatively estimated as **significant and unavoidable**.

Operational-Related Criteria Air Pollutants

Buildout of the No Project Alternative would generate total emissions of criteria pollutants (ROG, PM10 and PM2.5) from increased motor vehicle traffic and area source emissions that would exceed the City's project-level thresholds of significance. Like the Project, individual development projects, as well as the aggregate of all development assumed pursuant to the No Project Alternative is conservatively considered to generate criteria air pollutants and ozone precursor emissions at a level that would be **significant and unavoidable**.

Carbon Monoxide Concentrations

The No Project Alternative would not exposure sensitive uses and would not generate emissions leading to significant concentrations of CO that would violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation. Traffic modeling conducted for this EIR indicates that study intersections with the highest traffic volumes would not experience 24,000 vehicles per peak hour under 2035 scenarios with or without implementation of the Project.

Operational Toxic Air Emissions

Development pursuant to the No Project Alternative would include new light industrial, custom manufacturing and other similar land uses that could emit toxic emissions. The potential exists for multiple new sources of TAC emissions to be developed within a single concentrated portion of the Plan Area. Given the existing elevated cancer risk from existing local and mobile sources in the Plan Area, there is the potential for new multiple sources (even if each new source is individually less than significant) to cumulatively increase toxic air contamination to a **significant and unavoidable** level.

Exposure to Toxic Air Contaminants and PM2.5

Like the Project, certain future development projects in accordance with the No Project Alternative could expose new sensitive receptors to levels of toxic air contaminants (TACs) or concentrations of PM2.5 that could result in an unacceptable increased cancer risk or other health hazards. Pursuant to the current General Plan, the No Project Alternative would facilitate development of new land uses that serve sensitive receptors, specifically near the I-880 freeway at the West Oakland BART station, where there is the potential to result in **significant and unavoidable** health risks to future residents due to nearby sources of toxic air contaminants (TACs) and concentrations of PM2.5. However, the No Project Alternative would not facilitate development of new sensitive receptors at several other locations that are adjacent to the I-880 freeway and which have increased cancer risk and increased health risks due to PM2.5 concentrations, as proposed under the Project. These sites include locations along the 7th Street corridor, the Phoenix Iron Works site, the Roadway site and the site at 12th and Mandela, where the No Project Alternative would not allow new residential development as proposed pursuant to the Project.

Cultural Resources

Historic Resources

The No Project Alternative does not include future demolition of any of the Local Register properties within West Oakland, the great majority of which are located in residential neighborhoods which would experience limited growth and change. Under the No Project Alternative, any future proposed change to an historic property located in West Oakland would be subject to the City's existing Historic Preservation Element (HPE) policies and actions, regulatory requirements, individual CEQA review and standard conditions of approval, to be implemented on a project-by-project basis. These existing Historic Preservation Element policies include using a combination of incentives and regulations to encourage preservation of significant older properties and areas which have been designated as Landmarks, Preservation Districts, or Heritage Properties (HPE Policy 2.1 et. seq.); avoiding or minimize adverse historic preservation impacts related to discretionary City actions (HPE Policy 3.1 et. seq.); ensuring that all City-owned or controlled historic properties will be preserved (HPE Policy 3.2 through 3.4, et. seq.) potentially including City acquisition of historic properties where other means of preservation have been exhausted, establishing Design Review findings for alterations and demolitions of Heritage Properties and PDHPs applicable to both public and privately sponsored projects (HPE Policy 3.5 et. seq.); and requiring reasonable efforts to relocate existing or Potential Designated Historic Properties as a condition of approval for all discretionary projects involving demolition (HPE Policy 3.7 et. seq.).

Individual CEQA review for projects involving historic resources requires consideration of mitigation measures. These measures may include modifying the individual project design to avoid adverse effects on character-defining elements of the property, or relocating the affected historic resource to a location consistent with its historical or architectural character. If the above measures are not feasible, then other measures may be considered, including but not limited to: modifying the project design to include restoration of the remaining historic character of the property or incorporating or replicating elements of the building's original architectural design; salvaging and preserving significant features and materials of the structure in a local museum or within the new project; protecting the historic resource from effects of on-site or other construction activities; appropriately documenting the resource; placing a plaque, commemorative, marker, or artistic or interpretive display on the site; and making a contribution to a Facade Improvement Fund, the Historic Preservation Revolving Loan Fund, the Oakland Cultural Heritage Survey, or other program appropriate to the character of the resource.

Existing regulatory requirements that would be applicable to individual projects pursuant to the No Project Alternative include Design Review referral to the Landmarks Board for project applications located within an S-7 zone or on a designated Landmark site (Planning Code chapter 17.136.060); requirements that alterations and new construction may not adversely affect the exterior features of a Landmark and should conform, if possible, with the Design Guidelines for Landmarks and Preservation Districts and/or the Secretary of the Interior's Standards for the Treatment of Historic Properties (Planning Code chapter 17.136.070); special regulations for demolition or removal of Designated Historic Properties and Potentially Designated Historic Properties (Planning Code chapter 17.136.075); and the requirement that projects resulting in removal of a historic resource, or certain projects resulting in additions and alterations to historic resources must consult with a Historic Preservation Planner and seek LEED and Green Building certification (Planning Code chapter 18.02.100).

With implementation of these policies, actions and regulations (pursuant to individual CEQA review and applied as standard conditions of approval), individual projects pursuant to the No Project Alternative could still result in significant and unavoidable impacts to historic resources, but such impacts will have undergone detailed, project specific review and consideration prior to such effects having occurred.

Archaeological Resources, Paleontological Resources and Human Remains

Subsequent development under the No Project Alternative could cause a substantial adverse change in the significance of an archaeological resource or destroy a unique paleontological resource or site or unique geologic feature. However, each individual development project would be required to implement the City's Standard Conditions of Approval. Given the high potential for the presence of unrecorded Native American resources and moderate to high potential for the presence of unrecorded historic-period archaeological resources, new development that involves excavation would likely be subject to SCA E, Archaeological Resources – Sensitive Sites. This Standard Condition of Approval requires additional intensive pre-construction surveys or construction period monitoring, and avoidance and recovery measures. Additionally, in the event of an unanticipated discovery of prehistoric or historic-period archaeological resources or unique paleontological resources during development within the Planning Area, SCA 52, Archaeological Resources, SCA 53, Human Remains, and SCA 54, Paleontological Resources require that excavations within 50 feet of the find be temporarily halted or diverted until the discovery is examined by a qualified archaeologist or paleontologist, documented and evaluated for significance, and procedures established to consider avoidance of the resource or preparation of an excavation plan if avoidance is unfeasible. With required implementation of these standard conditions of approval, the impacts of future development on archaeological resources, paleontological resources and human remains pursuant to the No Project Alternative would be less than significant.

Greenhouse Gas and Climate Change

GHG Emissions

New development facilitated by the No Project Alternative would allow for the construction and operation of land uses that would produce greenhouse gas emissions. The level of emissions would exceed the project-level threshold of 1,100 annual tons of MTCO2e, but would not exceed the project-level efficiency threshold of 4.6 MTCO2e of annual emissions per service population nor would it exceed the Plan-level threshold of 6.6 MTCOC2e annually per service population. Development facilitated by the proposed Specific Plan would thus not be expected to generate greenhouse gas emissions at levels that would result, in the aggregate, in significant or cumulatively considerable GHG emissions. (LTS)

Hazards and Hazardous Materials

Hazardous Materials Release Sites

The Planning Area contains numerous sites which are included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Continued occupancy and use or future development of these hazardous materials sites under the No Project Alternative (or any alternative) could create a significant hazard to the public or the environment. However, with required implementation of City of Oakland Standard Conditions of Approval and required compliance with local, state and federal regulations for treatment, remediation or disposal of contaminated soil or groundwater, hazards to the public or the environment from hazardous materials sites would be less than significant.

Hazardous Building Materials

Asbestos or lead based paint present within older structures in the Planning Area could be released into the environment during demolition or construction activities, even pursuant to the No Project Alternative, which could result in soil contamination or pose a health risk to construction workers or future occupants. However, with required implementation of the City's Standard Conditions of Approval and other applicable laws, regulations, standards and oversight currently in place, the potential impact related to exposure to hazardous building materials would be less than significant.

Hazardous Materials Use, Transport or Disposal

Even the modest amount of new development envisioned under the No Project Alternative could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, potential impact related to the routine transport, use, or disposal of hazardous materials would be less than significant.

Hazardous Materials near Schools

New businesses that emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste could occur within one-quarter mile of a school under the No Project Alternative. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, the potential impact related to emission and handling of hazardous materials near schools would be less than significant.

Land Use and Planning

Land Use Compatibility

The No Project Alternative would not change or alter current planning policy or regulations applicable to West Oakland pursuant to the current City General Plan and Planning Code. No fundamental conflicts between adjacent or nearby land uses within West Oakland were identified as part of the environmental review of the current General Plan Land Use and Transportation Element or of the nearby Oakland Army Base Redevelopment Plan EIR and Addendum. The No Project Alternative would not include those planning and zoning amendments as proposed by the Project intended to result in a gradual improvement in compatibility between residential, and industrial and business uses, nor would it include the Project's land use strategies which are intended to facilitate the transition of less compatible heavy industrial and transportation uses to more compatible light industrial and business mix use.

Conflict with Plans, Policies or Regulations

The No Project Alternative would not fundamentally conflict with any applicable land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect. By definition, the

No Project Alternative would be fully consistent with all currently applicable plans, policies and regulations, and its impacts would be less than significant.

Habitat and Natural Community Conservation Plans

There is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the Planning Area. The No Project Alternative would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Noise

Construction Noise

The No Project Alternative does not mean that no development would occur under this scenario. Construction activities within West Oakland would still occur, including pile drilling and other extreme noise generating construction activities that would temporarily increase noise levels in the vicinity of individual project sites. Variations in construction noise levels would occur, depending on the equipment used, its duration and the time of day, the distance between noise sources and receptors, and the presence or absence of barriers between the noise source and receptor. However, significant construction-related noise impacts would not result when standard construction noise control measures are enforced and when the duration of the noise generating construction period is limited to one construction season. Implementation of City of Oakland standard conditions of approval (SCA 28: Days/Hours of Construction Operation; SCA 29: Noise Control, SCA 30: Noise Complaint Procedures, and SCA 39: Pile Driving and Other Extreme Noise Generators) would reduce construction noise levels and, for practical purposes, represent all feasible measures available to mitigate construction noise. Implementation of these SCA's on a project-by-project basis would maintain construction noise impacts at a less than significant level.

Operational Noise

Ongoing operational noise generated by new stationary sources (industrial and commercial operations) and roof-top mechanical ventilation equipment could generate noise in violation of the City of Oakland Noise Ordinance. The City's standard condition of approval (SCA 32: Operational Noise - General), requires that noise levels from any activity comply with the performance standards identified in the Planning Code and Municipal Code, and that if noise levels exceed these standards, the activity causing the noise must be abated until appropriate noise reduction measures have been installed. With required implementation of the City's Standard Condition of Approval SCA 32, operational noise impacts of the No Project Alternative would be less than significant.

Traffic Noise

Increased traffic result from new growth and development under the No Project Alternative will result in higher traffic noise along streets within West Oakland, mixing with noise from all other existing ambient noise sources (i.e., trains, BART operation, existing freeway noise, etc.). The number of new vehicle trips associated with the No Project Alternative would be significantly less than the vehicle trips associated with the Project, but the greatest increase in traffic and associated traffic noise would still occur along the Mandela Parkway, Grand Avenue and 7th Street corridors. Since traffic-related noise volumes are estimated to increase by 0.01 dBA to 3.95 dBA under Project conditions, the lower traffic volumes of the No Project Alternative would generate even less traffic noise and would remain below the 5 dBA increase threshold, and therefore less than significant.

Construction and Operational Vibration

New construction activities under the No Project Alternative could generate excessive ground-borne vibration during the construction period, and new commercial and industrial development may generate operational ground-borne vibration at levels that would be perceptible beyond the property boundary. However, with required implementation of the City's Standard Conditions of Approval and compliance with Oakland Planning Code regulations, these potential vibration impacts would be less than significant.

Noise Exposure / Land Use Compatibility

Future occupants of new residential and other noise-sensitive development pursuant to the No Project Alternative could be exposed to community noise in conflict with the Land Use Compatibility Guidelines of the Oakland General Plan, and to interior noise exceeding California Noise Insulation Standards from a variety of noise sources including freeway traffic, BART and railroad operations. However, under the No Project Alternative, no new noise sensitive receivers (i.e., residences) would be developed at either the Phoenix Iron Works Site (Opportunity Site #) or at the Roadway parcels (Opportunity Sites #8, 12 and 13), or elsewhere along the I-880 freeway within the Mandela/Grand Opportunity Area. Furthermore, all new residential development under the No Project Alternative would be required to comply with the city's Standard Conditions of Approval which require design measures capable of reducing interior noise to acceptable levels within buildings. With required implementation of the City's Standard Conditions of Approval, land use compatibility impacts would be less than significant.

West Oakland BART Station TOD

Similar to the analysis conducted for the Project, the No Project Alternative includes development of a West Oakland BART Station TOD. Under the No Project Alternative, buildout of the TOD would occur consistent with currently applicable zoning and height restrictions and is not expected to reach buildout as rapidly as projected with the Specific Plan, so its buildout numbers are lower than as represented under the Project.

Primary noise sources at the West Oakland BART Station TOD site include traffic noise on I-880, rail and passenger activity along the BART tracks and at the West Oakland BART station, and train noise on the nearby train tracks. The primary concern for noise exposure is proximity of new residents to noise from the BART train line and station. A typical BART train produces an instantaneous 85 dBA noise level at a distance of 100 feet from the tracks (Illingworth & Rodkin, 2004). Noise levels are generally lower in the immediate vicinity of the West Oakland Station due to the slower speeds of approaching and departing trains, but still exceed the 65 dBA Land Use Compatibility standard. The site is also adjacent to the I-880 freeway, which has main travel lanes on an elevated structure that is immediately adjacent to the proposed TOD. As indicated for the Project, new residences within the No Project Alternative's TOD would be subject to Title 24 of the California Code of Regulations and would require an acoustical analysis demonstrating how dwelling units are designed to meet interior standards. The TOD project would also place noise-sensitive publicly-accessible outdoor uses in a noise environment characterized as "clearly unacceptable" for such uses. Noise reduction could occur with the site design if buildings are effectively designed to act as noise barriers and break the line of sight between both I-880 and the BART tracks, and any publicly-accessible open space. As with all other new residential development under the No Project Alternative, the TOD project would be required to comply with the city's Standard Conditions of Approval which require design measures capable of reducing interior noise to acceptable levels within buildings. With required implementation of the City's Standard Conditions of Approval, land use compatibility impacts would be less than significant and no mitigation measures would be required pursuant to CEQA.

Airport Noise

The Planning Area is located more than two miles outside of the Oakland International Airport 65 dBA Ldn/CNEL noise contour, which the Federal Aviation Administration regards as a significance threshold for noise-sensitive land uses. Therefore, impacts of aviation noise on any new development, including development pursuant to the No Project Alternative, would be less than significant.

Population, Housing and Employment

Growth Inducement

Build-out of the No Project Alternative would result in less households and employees that are included in ABAG's most recent projections for the area. Any additional induced growth would also occur as already contemplated in, and consistent with, adopted plans and the environmental documents prepared for those plans. Growth facilitated or induced by the No Project Alternative represents growth for which planning has already occurred, and the growth inducement impacts of this Alternative would be less than significant.

Displacement of Housing or People

The No Project Alternative would not directly result in displacement of housing or people. No housing would be removed or changed to a non-residential use and the limited number of existing housing units located within the Specific Plan's Opportunity Areas would be retained. Some housing areas built without required permits and which may not conform to current zoning and/or building codes, including certain residential conversion of formerly underutilized industrial spaces, could be redeveloped with resulting loss of some of these existing informal units and the associated displacement of people. However, like the Project, the potential loss of a small number of housing units and associated displacement of people would be offset by the number of new units built under the No Project Alternative. Impacts of the No Project Alternative related to the displacement of housing or people would be less than significant.

Public Services and Recreation

Fire Protection

New development pursuant to the No Project Alternative would, though to a much lesser extent than the Project, still result in an increase in OFD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios. All new development under this alternative would be subject to the City's Standard Conditions of Approval, normal development review and permitting procedures, and building and fire code requirements. Implementation of these requirements would reduce the impacts of this alternative on fire protection services to a level of less than significant.

Police Protection

New development under the No Project Alternative would result in an increase in OPD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios, though to a lesser degree than would the proposed Project. The impacts of the No Project Alternative related to police protection would be less than significant.

Schools

Development in accordance with the No Project Alternative would generate substantially fewer additional students attending the OUSD schools than would the Project. School impact fees from residential and non-residential development collected pursuant to California Government Code would provide full and complete mitigation for school impacts.

Parks and Recreation

Development pursuant to the No Project Alternative would generate an incremental need for additional parkland, adding to the existing deficiency of parkland acreage in West Oakland, and would increase the use of existing parks and recreational facilities. However, because the No Project Alternative would include substantially less residential development than the Project, its overall demands on parks and recreation services would be reduced as compared to the Project. The No Project Alternative would not increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities would occur, and the impacts of this alternative on parks and recreation services would be less than significant.

Traffic and Transportation

No Project as Identified in this EIR

Under the No Project alternative as defined in this EIR, the amount of new housing and employment-generating uses are projected to be substantially less than as projected to occur under the proposed Project. New employment would occur, but most likely would be accommodated within existing buildings throughout the Planning Area. New housing development would also occur, most of which would be developed within the Residential Enhancement areas as identified under the Specific Plan. Because the amount of new growth and development projected under the No Project Alternative is so small, the traffic impacts of that growth would be substantially less than as projected for the Project. It is unlikely that any of the significant and unavoidable traffic impacts identified under the Project would materialize under this alternative.

No Project as Envisioned under Regional Growth Allocations

ABAG periodically produces growth forecasts for public information and for use by other regional agencies, including the Metropolitan Transportation Commission (MTC). ABAG projections provide the basis for the MTC Regional Transportation Plan and are also the basis for the Alameda County Congestion Management Agency (ACCMA) regional traffic model. The General Plans and development regulations of local jurisdictions are a key basis for the ABAG projections. The forecasts reflect the anticipated impact of “smart growth” policies and incentives in shifting development patterns from historical trends toward better jobs-housing balance, cleaner air, lower greenhouse gas emissions, increased preservation of open space, and lower housing and travel costs. The Specific Plan build-out projections are consistent with the ABAG projections of household and employment growth, and therefore do not represent unexpected growth, even without the proposed Specific Plan. Therefore, it could be concluded that the amount of housing and employment growth as projected for the Project is consistent with (i.e., would occur) with or without the proposed Project.

Assuming that these regional growth projections represent a reasonable and likely projection of new development within West Oakland, with or without the Specific Plan (i.e., under a No Project scenario that accommodates regional projections), then the traffic impacts that are associated with this growth and development are similar to that forecast under the Project. Specific locational differences would be anticipated, given that this regional growth would not occur as forecast under the Specific Plan without the General Plan amendments and zoning changes that are proposed, but the overall trip generation potential of the area would be similar. The significant traffic impacts identified as resulting from the proposed Project would also likely occur under any development scenario that accommodates a similar amount of regional growth.

Alternative 2: Reduced Alternative

CEQA Guidelines Section 15126.6(c) requires that the range of potential alternatives to the proposed Project include alternatives that could feasibly accomplish most of the basic objectives of the Project and could avoid or substantially lessen one or more of the significant effects. This alternative has been developed to consider an alternative capable of achieving most of the Project's major objectives, but which may be able to lessen some of its significant adverse effects, particularly on traffic congestion.

Description of Alternative 2: Reduced Alternative

The Reduced Alternative's land use and development plan is organized by Opportunity Area, similar to that indicated for the Project.

Opportunity Area 1: Mandela/West Grand

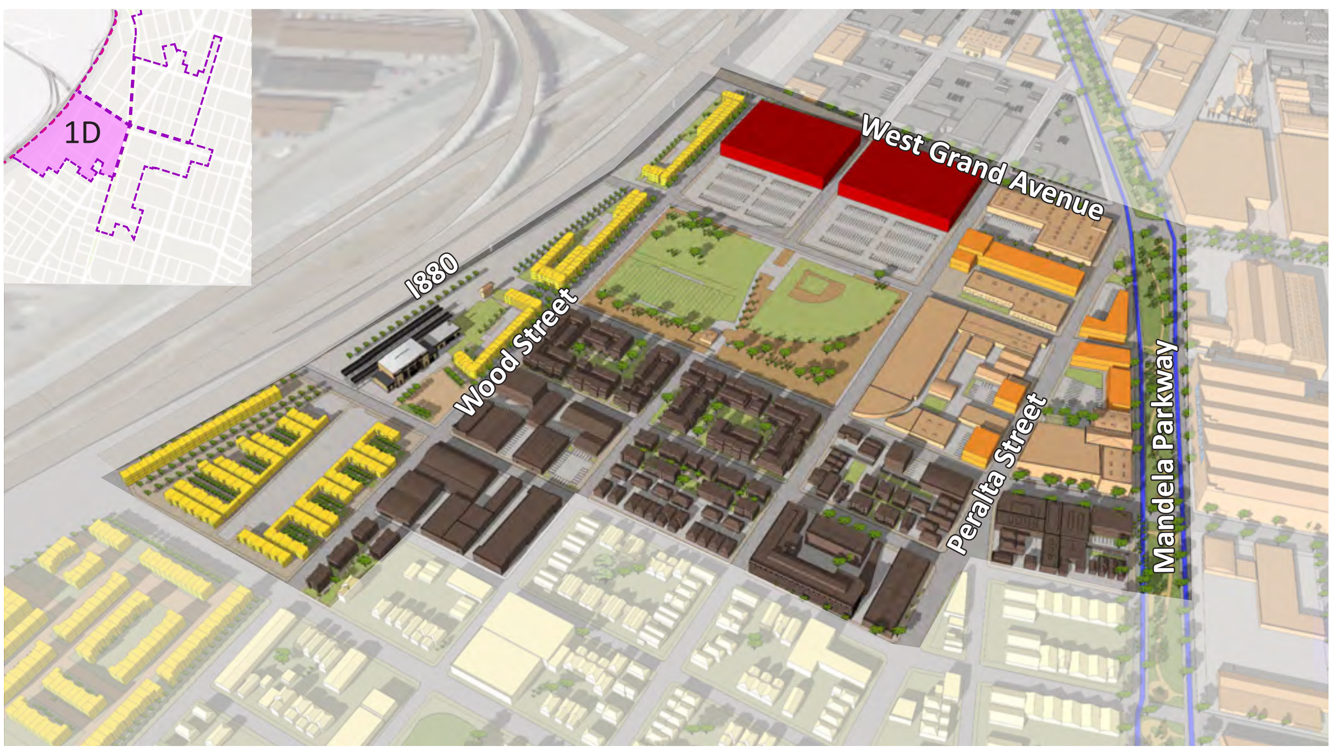
The Mandela/West Grand Opportunity Area would continue to be a business and employment center for West Oakland, including a mix of business activities and development types with a range of jobs at varying skill and education levels. This alternative would retain and expand existing commercial and compatible urban manufacturing, construction and light industrial businesses that have well-paid blue collar and green collar jobs, and would also attract new industries. However, new development would primarily occur as new lower-intensity industrial buildings and with extensive reuse of existing buildings, and would not include higher intensity business development (mid-rise buildings) as envisioned under the Project. Buildout of new non-residential space under the Reduced Alternative would be substantially less than as projected under the Project. New residential and live/work development would occur generally at the same selected sites as proposed pursuant to the Project, including infill of approximately 640 units at the approved Wood Street Development project, approximately 80 units at Mandela Parkway/14th Street, and approximately 390 units of live/work space south of Raimondi Park (where this area would be re-zoned to HBX-2 to permit live/work use).

Conceptual, schematic plans are provided on **Figures 5-1 and 5-2** for each of the four separate subareas within this Opportunity Area, illustrating densities, building massing and other physical characteristics of the Reduced Alternative.

Figure 5-1
Reduced Project Alternative, Mandela/West Grand Opportunity Areas A and B

Source: JRDV Urban International

Existing facilities to be Enhanced | Low Intensity Business Mix/Light Industrial | Retail/Commercial
Transit Enhancement



Existing facilities to be Enhanced | Low Intensity Business Mix/Light Industrial | Retail Commercial
Residential | Mixed Use/Live Work | Transit Enhancement

Figure 5-2
Reduced Project Alternative, Mandela/West Grand Opportunity Areas C and D

West Oakland Specific Plan, Draft EIR

Source: JRDV Urban International

Opportunity Area 2: 7th Street

Under the Reduced Alternative, the 7th Street Opportunity Area would include a transit-oriented development project (TOD) on vacant sites and parking lots around the West Oakland BART Station. A new BART parking garage would be developed next to the freeway, and the TOD would be primarily high- to mid-density residential development above mostly ground-floor neighborhood-serving retail and custom manufacturing /industrial arts/ artist exhibition space. However, this alternative would provide for development of approximately 1,600 housing units at the TOD site (or approximately 70% of the 2,300 units envisioned under the Project). Conceptual, schematic plans are provided on **Figure 5-3** for the Reduced Project's TOD design, illustrating both a residential emphasis and a commercial/office alternative.

Like the Project, new medium density housing with ground floor commercial uses would occur further west on 7th Street as a transition from the West Oakland BART Station TOD to the surrounding lower-density neighborhoods. Like the Project, 7th Street would continue to be planned as the neighborhood focus, with neighborhood-serving commercial establishments that enliven the street.

Opportunity Area 3: 3rd Street

The 3rd Street Opportunity Area would continue to support industrial and business activities and jobs, focusing on manufacturing and light industrial uses that benefit from adjacency to the Port. New business opportunities would reflect the existing mix of light industrial, service commercial, food and beverage production and distribution, and construction-related businesses, as well as small professional offices, import/export, communications, computer services, publishing and printing, photo/audio services, and small R&D activities. However, the amount of new business and industrial development that would occur within the 3rd Street Opportunity area would be approximately one-half of that projected to occur under the Project. Residential development in this area would continue to be prohibited. A conceptual, schematic plan for this subarea is provided on **Figure 5-4**, illustrating densities, building massing and other physical characteristics of this alternative.

Opportunity Area 4: San Pablo Avenue

Under the Reduced Alternative, the San Pablo Avenue Opportunity Area would be developed at the same or similar densities and intensities as envisioned under the Project. The San Pablo Avenue corridor would be transformed as a major commercial corridor lined with active ground-floor commercial uses and mixed-use residential development. Similar to the Project, the block of West Grand Avenue between Myrtle Street and Market Street would be developed with a mix of uses (potentially anchored by a grocery store) with medium-density residential, street front retail and mixed use development.

Key Differences between the Project and the Reduced Alternative

The Reduced Alternative is similar to the Project, but with a few significant differences:

Non-Residential Development:

- Under the Reduced Alternative, there are no properties which have a High Intensity Business land use overlay. All business/industrial properties would either be designated with a Business Enhancement or the Low Intensity Business land use overlay. As such, there would be no mid-rise (4- to 5-story) buildings that would occur in West Oakland's Opportunity Areas, and the mix of prospective use types would be unlikely to include life sciences, information technology or clean-tech businesses that would otherwise be attracted to such building types.

facilities to be Enhanced | Low Intensity Business Mix/Light Industrial | Retail/Commercial

Existing facilities to be Enhanced | Low Intensity Business Mix/Light Industrial | Retail/Commercial (80,00 sq. ft.)

Residential (1325 Units) | Transit Enhancement

Figure 5-3
Reduced Project Alternative, 3rd Street Opportunity Area and West Oakland BART TOD

West Oakland Specific Plan, Draft EIR
Source: JRDV Urban International

- Buildout of non-residential space under the Reduced Alternative would be substantially less than as projected under the Project. The Reduced Alternative would accommodate approximately 775,000 square feet of new non-residential building space providing a total of approximately 6,700 new jobs, as compared to approximately 4 million square feet of new space providing a total of over 14,900 new jobs as envisioned under the Project.

For comparison purposes, the Association of Bay Area Governments' (ABAG) *Projections '09* estimates that West Oakland will contain a total of approximately 18,500 total jobs by year 2020, and approximately 28,100 total jobs by year 2035. Assuming that approximately 2,000 new jobs would be developed in areas of West Oakland not included within an Opportunity Area,[3] the Reduced Alternative would provide space for the number of jobs roughly corresponding to the year 2020 employment projections, whereas the Project would provide space for the number of jobs roughly corresponding to the year 2035 employment projections.

Table 5-3: West Oakland Employment, Reduced Alternative

Existing Jobs	9,770	
New Jobs, Reduced Project	6,730	
Other West Oakland Jobs	2,000	
Total West Oakland Jobs, at Buildout of Reduced Project:	18,500	
ABAG *Projections '09*, Total West Oakland Jobs by Year 2020		18,428
ABAG *Projections '09*, Total West Oakland Jobs by Year 2035		28,108

Residential and Mixed-Use Development

- The Reduced Alternative would result in development of approximately 1,600 new units at the West Oakland BART station TOD. This is approximately 70% of the residential development potential envisioned under the Project (at approximately 2,300 units). The residential development potential at the West Oakland BART station TOD would be lower yet if the TOD project were to include a substantial portion of commercial/office space.
- Residential densities elsewhere throughout the Specific Plan are would also be reduced, providing approximately 100 less units in the Mandela/West Grand Opportunity Area and nearly 200 fewer units in the remainder of the7th Street Opportunity Area.

Buildout of residential units under the Reduced Project Alternative would be approximately two-thirds of that projected under the Project, with a total of approximately 3,400 new housing units as compared to a total of approximately 5,000 new housing units as envisioned under the Project. Assuming that other portions of West Oakland that are not included in an Opportunity Area (i.e., the Residential Enhancement Area) add new housing units at a rate consistent with ABAG projections, the amount of new housing units under the Reduced Alternative would roughly correspond to the number of new housing units as projected by ABAG's *Projections '09* estimates between the years 2025 and 2030,

[3] This assumption is consistent with the geographic location of ABAG's projected new jobs based on Traffic Analysis Zone data as included in the Alameda County Transportation model, and is also consistent with assumptions under the Specific Plan.

whereas the 5,000 new units under the Project more closely corresponds to ABAG's projections for year 2035.

Table 5-4: West Oakland Population Projections, Reduced Alternative

Existing Households, Opportunity Areas	220	
Existing Households, rest of West Oakland	8,210	
New Households, Reduced Project	3,705	
Other new West Oakland Households	3,421	
Total West Oakland Jobs, at Buildout of Reduced Project:	15,550	
ABAG *Projections '09*, Total West Oakland Households by Year 2020		12,318
ABAG *Projections '09*, Total West Oakland Jobs by Year 2035		16,555

Summary of the Reduced Alternative

Buildout of this alternative is anticipated to occur over an extended period of time with incremental increases in new housing and job opportunities, but final buildout is assumed by year 2035. **Table 5-5** provides a summary of land uses, employment and population changes projected within the Planning Area at buildout of the Reduced Alternative.

Table 5-5: Buildout Assumptions, Reduced Alternative (all of West Oakland Opportunity Areas)

	Business / Indust. (sq.ft.)	Comm. /Retail (sq.ft.)	Mixed Use (sq. ft.)	Jobs	Housing Units	Pop.
Existing						
Mandela/Grand	4,000,000	300,000	0	5,440	110	259
7th Street	1,790,000	0	5,000	1,880	85	204
3rd Street	1,040,000	50,000	0	1,770	0	0
San Pablo	0	90,000	700,000	680	70	165
Total	**6,830,000**	**440,000**	**705,000**	**9,770**	**265**	**628**
Buildout, Reduced Alternative						
Mandela/Grand	4,490,000	300,000	0	9,440	1,050	2,342
7th Street	1,590,000	0	80,000	2,530	1,785	3,981
3rd Street	1,375,000	50,000	0	2,830	0	0
San Pablo	0	90,000	775,000	1,700	1,135	2,506
Total	**7,455,000**	**440,000**	**855,000**	**16,500**	**3,970**	**8,828**
Net Change, Reduced Alternative						
Mandela/Grand	490,000	0	0	4,000	940	2,083
7th Street	-200,000	0	75,000	650	1,700	3,777
3rd Street	335,000	0	0	1,060	0	0
San Pablo	0	0	75,000	1,020	1,065	2,341
Total	**625,000**	**0**	**150,000**	**6,730**	**3,705**	**8,201**
Net Change, Project	3,550,000	310,000	170,000	14,890	5,000	10,988
Net Change, Compared to Project	-2,925,000	-310,000	-20,000	-8,160	-1,295	-3,588
Percent of Project	18%	0%	88%	45%	74%	67%

Comparative Environmental Assessment, Alternative #2: Reduced Alternative

Aesthetics

Scenic Vistas

There are no officially designated public scenic vistas within or near the West Oakland Planning Area. No scenic vistas or view corridors would be substantially obstructed or degraded by development in accordance with the Reduced Alternative, and the impacts of the Reduced Alternative on scenic vistas would therefore be less than significant. (**LTS**)

Similar to the Project, infill development and redevelopment of vacant and blighted properties, improvements to streetscapes and the public realm, and new landscaping and street trees would improve the quality of views throughout West Oakland from public vantage points. Focusing new development within the Opportunity Areas and preserving established neighborhoods would avoid substantial obstruction of the limited views of downtown Oakland and the East Bay hills from public vantage points within the adjacent residential neighborhoods. At the West Oakland BART Station TOD, the Reduced Alternative's development would have a substantially reduced height in comparison to the Project. The maximum allowed building heights would remain as per current zoning (120 feet for parcels adjacent to the I-880 freeway and 90 feet along 7th Street from Union to Chester Street) except for those parcels along 7th Street from Chester to Peralta where the building heights would be reduced from 75 feet to 60 feet (on the south) and 55 feet (on the north of 7th Street). The Reduced Alternative would also provide a substantial transition in building heights nearest to the South Prescott neighborhood, with buildings nearest to this neighborhood as low as 2-stories.

Scenic Highways

Similar to the Project, new development and public realm improvements in accordance with the Reduced Alternative would not substantially damage scenic resources, but rather would improve the quality of views of the Planning Area from the I-580 scenic highway. The impacts of the reduced Alternative related to scenic highways would be less than significant. (**LTS**)

Visual Character or Quality

Similar to the Project, new development and public realm improvements in accordance with the Reduced Alternative would not substantially degrade the existing visual character or quality of any sites and their surroundings, but would substantially improve existing visual character and quality of the area. Infill development and redevelopment would repair the existing inconsistent urban fabric where such inconsistencies exist, and result in a more unified and coherent development character. The proposed land use patterns and development types would focus change within the Opportunity Areas while preserving established residential neighborhoods.

The Reduced Alternative would potentially provide lower transitions to existing development, reinforce the existing character of non-residential areas, and harmonize with other existing land uses than would the Project. Under the Reduced Alternative, all new non-residential development would be lower intensity (i.e., typically 1- to 2-story buildings) and similar in scale to most other existing buildings, rather than higher intensity, 4- to 5-story mid-rise structures. The height and scale of these lower intensity buildings would be more similar to the existing building stock than the taller and bigger buildings as proposed under the Project. (**LTS**)

Shadow

Like the Project, the Reduced Alternative would not cast shadows that substantially impair the function of a building using passive solar heat collection, solar collectors for hot water heating, or photovoltaic solar collectors; cast shadows that substantially impair the beneficial use of any public or quasi-public park, lawn, garden, or open space; or cast shadows on an historic resource such that the shadow would materially impair the resource's historic significance. The shadow impacts of the Reduced Alternative would be less than significant. (LTS)

Adequate Lighting

Like the Project, the Reduced Alternative would not change any existing General Plan policies or zoning or building regulations such as to cause a fundamental conflict with policies and regulations that address the provision of adequate light related to appropriate uses. The impacts of the Reduced Alternative related to consistency with policies and regulations addressing the provision of adequate light related to appropriate uses would be less than significant. (LTS)

Wind

Since the West Oakland Planning Area does not lie within the area identified by the City as requiring modeling for evaluation of wind impacts, the wind impacts of the Reduced Alternative would be less than significant. (LTS)

Air Quality

CAP Consistency: VMT Increase

New development facilitated by the Reduced Alternative would not fundamentally conflict with the Bay Area 2010 CAP because the projected rate of increase in vehicle miles travelled and vehicle trips would be less than the projected rate of increase in population. The Reduced Project Alternative's increase in growth (population and employment) would not conflict with regional growth expectations set forth in the CAP, and the potential changes in transportation demand as expressed through vehicles miles travelled (VMT) would not outpace population growth. The projected population increase in West Oakland that is attributable to new growth and development pursuant to the Reduced Alternative (approximately 6,730 new jobs and an added population of 8,200 people) represents a growth rate of approximately 140% over the current 10,398 jobs and residents. The projected increase in PM peak hour vehicles miles travelled (approximately 25,770 VMTs) represents an increase of approximately 67% over the current estimated VMT of 38,659. Based on these comparisons, the Reduced Alternative's projected increase in VMTs would grow at a lesser rate than the service population, and this impact would be less than significant.

CAP Consistency: Implementation of Control Measures

Like the Project, the Reduced Alternative would not fundamentally conflict with the CAP's air pollution control measures. All new development pursuant to the Reduced Alternative, including new industrial and commercial uses, would be required to comply with all measures that the Air District adopts and enforces to control emissions from stationary sources of air pollution. The Reduced Project Alternative would not contain any policies or strategies that would be contrary to incentive programs to achieve voluntary emission reductions from mobile sources. The Reduced Alternative would not fundamentally conflict with the CAP's transportation control strategies, even if it does not achieve to the same degree as does the Project, improvements to the efficiency of existing transit systems or the promotion of focused urban infill development. All new development pursuant to the Reduced Alternative Plan would be required to comply with City of Oakland's Standard Conditions that seek to reduce energy use in new development projects. In summary, the Reduced Project Alternative would not interfere with implementation of Clean Air Plan control measures.

Odors

Like the Project, new development in accordance with the Reduced Alternative would expose a substantial number of people to objectionable ambient odors from the EBMUD WWTP and from food processing facilities, painting/coating operations, and/or green waste and recycling facilities. This impact would be **significant and unavoidable** at the Plan level. New development pursuant to the Reduced Alternative could result in development of new odor-generating uses in close proximity to residential or other odor-sensitive uses within mixed-use areas, similar to that as indicated for the Project. Like the Project, this impact would be potentially significant and proper controls or setbacks, as recommended for the Project, would be required.

Construction Period Emissions

Similar to the Project, individual development projects pursuant to the Reduced Alternative will generate fugitive dust from demolition, grading, hauling and construction activities, will generate regional ozone precursor emissions and regional particulate matter emissions from construction equipment exhaust, and will generate construction-related toxic air contaminant (TAC) emissions from fuel-combusting construction equipment and mobile sources.

- Fugitive dust will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval,
- construction-related toxic air contaminant (TAC) emissions will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval, but
- but larger individual construction projects could generate emissions of criteria air pollutants that would exceed the City's thresholds of significance and/or that could exceed thresholds for cancer risk, chronic health index, acute health index or annual average PM2.5 concentration levels. These emissions are conservatively estimated as **significant and unavoidable**.

Operational-Related Criteria Air Pollutants

Buildout of the Reduced Alternative would generate total emissions of criteria pollutants (ROG, PM10 and PM2.5) from increased motor vehicle traffic and area source emissions that would exceed the City's project-level thresholds of significance. Although motor vehicle traffic and area source emissions would be less under the Reduced Alternative than the Project, individual development projects as well as the aggregate of all development assumed pursuant to the Reduced Alternative is conservatively considered to generate criteria air pollutants and ozone precursor emissions at a level that would be **significant and unavoidable**.

Carbon Monoxide Concentrations

The Reduced Alternative would not exposure sensitive uses and would not generate emissions leading to significant concentrations of CO that would violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation. Traffic modeling conducted for this EIR indicates that study intersections with the highest traffic volumes would not experience 24,000 vehicles per peak hour under 2035 scenarios with implementation of the Project, and the Reduced Alternative would generate fewer vehicle trips than does the Project (see Transportation discussion, below).

Operational Toxic Air Emissions

Development pursuant to the Reduced Alternative would include new light industrial, custom manufacturing and other similar land uses that could emit toxic emissions. The potential exists for multiple new sources of TAC emissions to be developed within a single concentrated portion of the Plan Area. Given the existing elevated cancer risk from existing local and mobile sources in the Plan Area, there is the potential for new multiple sources (even if each new source is individually less than significant) to cumulatively increase toxic air contamination to a **significant and unavoidable** level.

Exposure to Toxic Air Contaminants and PM2.5

Like the Project, certain future development projects in accordance with the Reduced Alternative would expose new sensitive receptors to levels of toxic air contaminants (TACs) or concentrations of PM2.5 that could result in an unacceptable increased cancer risk or other health hazards. The Reduced Alternative would facilitate development of new sensitive-receptor land uses, specifically near the I-880 freeway at the West Oakland BART station, where there is the potential to result in **significant and unavoidable** health risks to future residents due to nearby sources of toxic air contaminants (TACs) and concentrations of PM2.5. Although the number of residents at this location would be less under the Reduced Alternative, this TOD area would still include as many as 2,300 new residential units at this location. Like the Project, the Reduced Alternative would also facilitate development of new sensitive receptors at several other locations that are adjacent to the I-880 freeway and which have increased cancer risk and increased health risks due to PM2.5 concentrations. These sites include locations along the 7th Street corridor, the Phoenix Iron Works site, the Roadway site and the site at 12th and Mandela, where the Reduced Alternative would allow for conversion of these sites to new residential development, although at lower densities than as proposed under the Project.

Cultural Resources

Historic Resources

The Reduced Alternative would not alter or change the manner in which historic resources are proposed to be addressed pursuant to the Specific Plan (the Project). Assumptions regarding the treatment of individual historic resources pursuant to the Project would be similar under the Reduced Alternative. For example:

- At the Oakland Warehouse Company - GE Mazda Lamp Works site (1600-14 Campbell Street), work already in progress will result in reuse of the existing vacant buildings for medium density residential uses pursuant to a Federal Preservation Tax Credit project adhering to the Secretary's Standards.
- At the former Coca-Cola Company Bottling Plant property (1340 Mandela Parkway), the Reduced Alternative would include retaining and reusing the 1940s building on the northern portion of the site in a manner that adheres to the Secretary's Standards, while the remainder of the property might be redeveloped for new Low Intensity Business Mix/Light Industrial uses in the middle portion, and new medium-density residential uses on the southern portion of the property. New development would be required to maintain the integrity and continued eligibility of the 1940s plant.
- At the Merco-Nordstrom Valve Company Factory (2401-49 Peralta Street), the Reduced Alternative envisions the existing building be retained and reused for compatible light industrial or business mix uses in a manner that adheres to the Secretary's Standards, similar to the development as envision under the Project.
- The Reduced Alternative would not directly affect the Southern Pacific 16th Street Station (1601 Wood Street/1798 16th Street). Instead, like the Project, this alternative assumes ongoing implementation of previously approved and partially constructed Wood Street Development project which includes the rehabilitation of the historic train station. That project has already undergone

environmental review, and the Reduced Project would not change any of the conditions of approval of that project.

- Similar to the Project, the Reduced Alternative would result in infill residential development at compatible scales and continued use of existing industrial/commercial buildings where the Mandela/West Grand Opportunity Area abuts the Oakland Point API. With consideration of local context as part of Design Review of subsequent projects, new development in and adjacent to the Oakland Point API would not cause substantial adverse effect on the API or individual historical resources.
- Similar to the Project, the Reduced Alternative would provide for medium-density residential and mixed-use infill development along the 7th Street historic corridor, subject to Design Review, adherence to Secretary of Interior Standards and referral to the Landmarks Board per the existing S-7 Preservation Combining Zone regulations. The Reduced Alternative would not cause a substantial adverse change in the significance of existing historical resources (i.e., the 7th Street S-7 District; the Flynn (Edward) Saloon – McAllister Plumbing at 1600-16 7th Street; the site of the former Lincoln Theater at 1620-24 7th Street; and the Arcadia Hotel – Isaacs & Schwartz Block at 1632-42 7th Street).
- Similar to the proposed Project, the Reduced Alternative would accommodate new three-story flats along Pine Street that would be similar in scale to existing housing. At the height and massing proposed, and with consideration of local context as part of Design Review of subsequent individual development projects, new development adjacent to the Oakland Point API along Pine Street would not cause a substantial adverse change in the significance of the this API or of individual historical resources within the API.
- Similar to the proposed Project, the Reduced Alternative assumes the reuse of existing buildings and new low intensity business/light industrial development within and adjacent to the Southern Pacific Railroad Industrial API. Specifically, the Reduced Alternative indicates that individual historic structures (the California Packing Corporation-Del Monte Cannery at 100-50 Linden Street; the California Packing Corporation Label Plant at 101 Myrtle Street; and the Standard Underground Cable Co. building at 101 Linden Street) would be retained and used for offices and small manufacturing (e.g., the Linden Street Brewery), and new low intensity business/light industrial development on the northern portion of the California Packing Corporation Label Plant site (now parking). Reuse of existing buildings on other properties within and adjacent to the Southern Pacific Railroad Industrial API would not cause a substantial adverse change in the significance of these historical resources.
- As proposed under the Project, the Reduced Alternative would include medium-density residential and/or mixed use development on the vacant site adjacent to the California Hotel at 3501 San Pablo Avenue. At the height and massing contemplated, and with consideration of local context as part of Design Review of subsequent individual development projects, proposed new development adjacent to the California Hotel would not cause a substantial adverse change in the significance of this historical resource.

As is the case under the Project and all alternatives to the Project, any future proposed change to other historic properties pursuant to the Reduced Project would be subject to the City's existing Historic Preservation Element (HPE) policies and actions, regulatory requirements, individual CEQA review and standard conditions of approval, implemented on a project-by-project basis (see more discussion under the No Project Alternative). With implementation of these policies, actions and regulations (pursuant to individual CEQA review and applied as standard conditions of approval), individual projects pursuant to the Reduced Alternative could still result in significant and unavoidable impacts to historic resources, but such impacts will have undergone detailed, project specific review and consideration prior to such effects having occurred.

Archaeological Resources, Paleontological Resources and Human Remains

Similar to the Project, subsequent development under the Reduced Alternative could cause a substantial adverse change in the significance of an archaeological resource or destroy a unique paleontological resource or site or unique geologic feature. However, each individual development project would be required to implement the City's Standard Conditions of Approval. Given the high potential for the presence of unrecorded Native American resources and moderate to high potential for the presence of unrecorded historic-period archaeological resources near the former Bay shoreline, new development that involves excavation in this area would likely be subject to SCA E, Archaeological Resources – Sensitive Sites. This Standard Condition of Approval requires additional intensive pre-construction surveys or construction period monitoring, and avoidance and recovery measures. Additionally, in the event of an unanticipated discovery of prehistoric or historic-period archaeological resources or unique paleontological resources during development within the Planning Area, SCA 52, Archaeological Resources, SCA 53, Human Remains, and SCA 54, Paleontological Resources require that excavations within 50 feet of the find be temporarily halted or diverted until the discovery is examined by a qualified archaeologist or paleontologist, documented and evaluated for significance, and procedures established to consider avoidance of the resource or preparation of an excavation plan if avoidance is unfeasible. With required implementation of these standard conditions of approval, the impacts of future development on archaeological resources, paleontological resources and human remains pursuant to the Reduced Alternative would be less than significant.

Greenhouse Gas and Climate Change

GHG Emissions

New development facilitated by the Reduced Alternative would allow for the construction and operation of land uses that would produce greenhouse gas emissions. The level of emissions would exceed the project-level threshold of 1,100 annual tons of MTCO2e, but would likely not exceed the project-level efficiency threshold of 4.6 MTCO2e of annual emissions per service population nor would it exceed the Plan-level threshold of 6.6 MTCOC2e annually per service population. Development facilitated by the Reduced Project would thus not be expected to generate greenhouse gas emissions at levels that would result, in the aggregate, in significant or cumulatively considerable GHG emissions. (LTS)

Hazards and Hazardous Materials

Hazardous Materials Release Sites

The Planning Area contains numerous sites which are included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Continued occupancy and use or future development of these hazardous materials sites under the Reduced Alternative (or any alternative) could create a significant hazard to the public or the environment. However, with required implementation of City of Oakland Standard Conditions of Approval and required compliance with local, state and federal regulations for treatment, remediation or disposal of contaminated soil or groundwater, hazards to the public or the environment from hazardous materials sites would be less than significant.

Hazardous Building Materials

Asbestos or lead based paint present within older structures in the Planning Area could be released into the environment during demolition or construction activities pursuant to the Reduced Alternative, which could result in soil contamination or pose a health risk to construction workers or future occupants. However, with required implementation of the City's Standard Conditions of Approval and other applicable laws, regulations, standards and oversight currently in place, the potential impact related to exposure to hazardous building materials would be less than significant.

Hazardous Materials Use, Transport or Disposal

The amount of new development envisioned under the Reduced Alternative could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, potential impact related to the routine transport, use, or disposal of hazardous materials would be less than significant.

Hazardous Materials near Schools

New businesses that emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste could occur within one-quarter mile of a school under the Reduced Alternative. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, the potential impact related to emission and handling of hazardous materials near schools would be less than significant.

Land Use and Planning

Land Use Compatibility

The Reduced Alternative would not disrupt or divide the physical arrangement of the West Oakland community or any surrounding community, but instead (similar to the proposed Project) would improve certain existing conditions that physically divide portions of the community. The Reduced Project would encourage additional streetscape improvements and improved transit service linking West Oakland to adjacent activity centers and neighborhoods. The Reduced Project would also facilitate a transition from heavy industrial and transportation uses to more compatible light industrial, construction, urban manufacturing, clean-tech, digital media, information technology and life science uses. The Reduced Alternative would not include the high-intensity business development as envisioned under the Project. Although these high-intensity business and industrial sites as proposed under the Project are not considered incompatible with the existing community, the lower intensity of new development as would occur under a Reduced Alternative would be more similar and compatible with current uses than those higher intensity development sites as proposed under the Project.

The Reduced Alternative would encourage rehabilitation and adaptive reuse of existing, often blighted buildings and properties, and the compatible infill development of existing vacant blocks and lots. It would also target redevelopment of a number of key former heavy industrial properties next to existing residential neighborhoods with compatible new residential uses. Overall, the Reduced Alternative would not disrupt or divide the physical arrangement of the West Oakland community or any surrounding community.

Conflict with Plans, Policies or Regulations

The Reduced Alternative would not fundamentally conflict with any applicable land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect that would result in a physical change in the environment.

Habitat and Natural Community Conservation Plans

There is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the Planning Area. The No Project Alternative would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Noise

Construction Noise

Under the Reduced Alternative construction activities within West Oakland would occur, though less construction than as anticipated under the Project. Implementation of City of Oakland standard conditions of approval (SCA 28: Days/Hours of Construction Operation; SCA 29: Noise Control, SCA 30: Noise Complaint Procedures, and SCA 39: Pile Driving and Other Extreme Noise Generators) would reduce construction noise levels and represent all feasible measures available to mitigate construction noise. Implementation of these SCA's on a project-by-project basis would reduce construction noise impacts to a less than significant level.

Operational Noise

Ongoing operational noise generated by new stationary sources from industrial and commercial operations and from roof-top mechanical ventilation equipment associated with new development under the Reduced Alternative could generate noise in violation of the City of Oakland Noise Ordinance. The City's standard condition of approval (SCA 32: Operational Noise - General), requires that noise levels from any activity comply with the performance standards identified in the Planning Code and Municipal Code, and that if noise levels exceed these standards, the activity causing the noise must be abated until appropriate noise reduction measures have been installed. With required implementation of the City's Standard Condition of Approval SCA 32, operational noise impacts of the Reduced Alternative would be less than significant.

Traffic Noise

Increased traffic result from new growth and development under the Reduced Alternative will result in higher traffic noise along streets within West Oakland, mixing with noise from all other existing ambient noise sources (i.e., trains, BART operation, existing freeway noise, etc.). The number of new vehicle trips throughout West Oakland associated with the Reduced Alternative would be less than the vehicle trips associated with the Project. Since traffic-related noise increases are estimated to be less than significant with the traffic volumes projected for the Project, the lower traffic volumes of the Reduced Alternative would generate even less traffic noise and would remain below the 5 dBA increase threshold, and therefore less than significant.

Construction and Operational Vibration

New construction activities under the Reduced Alternative could generate excessive ground-borne vibration during the construction period, and new commercial and industrial development may generate operational ground-borne vibration at levels that would be perceptible beyond the property boundary. However, with required implementation of the City's Standard Conditions of Approval and compliance with Oakland Planning Code regulations, these potential vibration impacts would be less than significant.

Noise Exposure / Land Use Compatibility

Future occupants of new residential and other noise-sensitive development pursuant to the Reduced Alternative could be exposed to community noise in conflict with the Land Use Compatibility Guidelines of the Oakland General Plan, and to interior noise exceeding California Noise Insulation Standards from a variety of noise sources including freeway traffic, BART and railroad operations. All new residential development under the Reduced Alternative would be required to comply with the city's Standard Conditions of Approval which require design measures capable of reducing interior noise to acceptable levels within buildings. With required implementation of the City's Standard Conditions of Approval, land use compatibility impacts would be less than significant.

West Oakland BART Station TOD

Similar to the analysis conducted for the Project, the Reduced Alternative includes development of a West Oakland BART Station TOD. However, the Reduced Alternative's version of the TOD is less dense (i.e., has fewer residential units) than as projected under the Specific Plan. Noise sources at the West Oakland BART Station TOD site, including traffic noise on I-880, rail and passenger activity along the BART tracks and at the West Oakland BART station, and train noise on the nearby train tracks, would subject new residents to ambient noise levels that would exceed the Land Use Compatibility standards. However, as indicated for the Project, new residences within the Reduced Alternative's version of the TOD would be subject to City of Oakland Standard Conditions of Approval, including compliance with Title 24 of the California Code of Regulations and the obligation to demonstrate how dwelling units would be designed to meet interior noise standards. This alternative's TOD project would also place noise-sensitive outdoor uses in a noise environment characterized as "clearly unacceptable". Noise reduction could occur with the site design if buildings are effectively designed to act as noise barriers and break the line of sight between both I-880 and the BART tracks, and any publicly-accessible open space. With required implementation of the City's Standard Conditions of Approval, land use compatibility impacts would be less than significant and no mitigation measures would be required pursuant to CEQA.

Airport Noise

The Planning Area is located more than two miles outside of the Oakland International Airport 65 dBA Ldn/CNEL noise contour, which the Federal Aviation Administration regards as a significance threshold for noise-sensitive land uses. Therefore, impacts of aviation noise on any new development, including development pursuant to the Reduced Alternative, would be less than significant.

Population, Housing and Employment

Growth Inducement

Build-out of the Reduced Alternative would result in less households and employees than are included in ABAG's most recent projections for the area. Any additional induced growth would also occur as already contemplated in, and consistent with, adopted plans and the environmental documents prepared for those plans. Growth facilitated or induced by the Reduced Alternative represents growth for which adequate planning has already occurred, and the growth inducement impacts of this alternative would be less than significant.

Displacement of Housing or People

The Reduced Alternative would not directly result in displacement of housing or people. No housing would be removed or changed to a non-residential use and the limited number of existing housing units located within the Specific Plan's Opportunity Areas would be retained. Some housing areas built without required permits and which may not conform to current zoning and/or building codes, including certain residential conversion of formerly underutilized industrial spaces, could be redeveloped with resulting loss of some of these existing informal units and the associated displacement of people. However, like the Project, the potential loss of a small number of housing units and associated displacement of people would be offset by the number of new units built under the Reduced Alternative. Impacts of the Reduced Alternative related to the displacement of housing or people would be less than significant.

Public Services and Recreation

Fire Protection

New development pursuant to Reduced Alternative would, like the Project, result in an increase in OFD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios. All new development under this alternative would be subject to the City's Standard Conditions of Approval, normal development review and permitting procedures, and building and fire code requirements. Implementation of these requirements would reduce the impacts of this alternative on fire protection services to a level of less than significant.

Police Protection

New development under the Reduced Alternative would result in an increase in OPD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios. The impacts of the Reduced Alternative related to police protection would be less than significant.

Schools

Development in accordance with Reduced Alternative would generate additional students attending the OUSD schools, but the number of new students would be substantially less than would be generated by the Project. School impact fees from residential and non-residential development collected pursuant to California Government Code would provide full and complete mitigation for school impacts.

Parks and Recreation

Development pursuant to the Reduced Alternative would generate a need for additional parkland, adding to the existing deficiency of parkland acreage in West Oakland, and would increase the use of existing parks and recreational facilities. However, because Reduced Alternative would include substantially less residential development than the Project, its overall demands on parks and recreation services would be reduced as compared to the Project. The reduced Alternative would not increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities would occur, and the impacts of this alternative on parks and recreation services would be less than significant.

Traffic

For comparative purposes, the following analysis of traffic impacts for the Reduced Alternative is conducted under Cumulative (Year 2035) conditions. This scenario represents the "worst case" traffic condition and captures the full extent of potential traffic impacts.

Trip Generation

The Reduced Alternative assumes that residential and employment growth within the West Oakland Specific Plan's Opportunity Areas would occur at a less robust pace through year 2035 than would occur under the Project. However, it also assumes that residential and employment growth elsewhere in West Oakland would occur as predicted under ABAG's latest *Projections '09* estimates.

The Reduced Alternative' cumulative buildout includes 15,400 total households (3,970 within the Specific Plan's Opportunity Areas and 11,440 elsewhere in West Oakland), and approximately 18,500 employees (16,500 within the Specific Plan's Opportunity Areas and 2,000 elsewhere in West Oakland. The difference between the Project and the Reduced Alternative is approximately 1,200 fewer households and nearly 8,500 fewer jobs under the Reduced Alternative than under the Project. As a result, the Reduced Alternative would generate fewer weekday peak hour trips as compared to the Project. As shown in **Table 5-6**, the number of peak hour trips would be reduced as compared to the Project by approximately 2,300 AM peak hour trips and by 2,800 PM peak hour respectively.

Table 5-6: Vehicle Trip Generation Comparison, Reduced Alternative

	Project - Vehicle Trips				**Reduced Alternative - Vehicle Trips**			
	Existing	**Project**	**Other**	**Total**	**Existing**	**Reduced Alternative**	**Other**	**Total**
AM Peak Hour	5,735	5,537	558	11,830	5,735	3,230	558	9,523
Difference, compared to Project:						(-2,307)		
PM Peak Hour	7,025	6,698	720	14,442	7,025	3,890	720	11,643
Difference, compared to Project:						(-2,808)		

Source: Kittelson & Associates, 2013.

Intersection Impacts

A comparison of the intersection level of service for Cumulative No Project, Cumulative plus Project and Cumulative plus Reduced Alternative is presented in **Tables 5-7 and 5-8**. The Reduced Alternative would generate less total traffic than would the Project, and as a result the Cumulative plus Reduced Alternative scenario would result in significant impacts at only four (4) of the six (6) intersections indicated as being affected under Cumulative plus Project conditions. These seven intersections which would be impacted under the Cumulative plus Reduce Alternative scenario include:

- Hollis Street / 40^{th} Street intersection (#1) in both peak hours
- San Pablo Avenue / 40^{th} Street intersection (#2) in the AM peak hour

- Mandela Parkway / West Grand Avenue intersection (#7) in both peak hours
- Adeline Street / 18th Street intersection (#15) in the PM peak hour
- Adeline Street / 5th Street intersection (#24) in the PM peak hour

All four of these intersections would also be significantly impacted under the Project scenario.

Those intersections significantly impacted under the Cumulative plus Project scenario but not adversely affected under the Cumulative plus Reduced Alternative scenario include:

- Broadway / West Grand Avenue (#13)
- Adeline Street / 18th Street intersection (#15) in the AM peak hour

Table 5-7: Intersection LOS Summary, Reduced Alternative at Year 2035 Under Cumulative Conditions – (AM/SAT Peak Hour)

		Cumulative Baseline		Cumulative plus Project		Cumulative plus Reduced Alternative	
Study Intersections		Delay	LOS	Delay	LOS	Delay	LOS
1	Hollis Street/40th Street^	247.9	F	**237.3**	**F**	**212.7**	**F**
2	San Pablo Avenue/40th Street^	325.0	F	**324.5**	**F**	**315.9**	**F**
3	I-980 off-ramp/27th Street*	23.1	C	17.4	B	17.2	B
4	I-980 on-ramp/27th Street*	22.5	C	21.2	C	21.1	C
5	Maritime Street/West Grand Avenue	35.1	D	35.0	C	33.8	C
6	Frontage Road/West Grand Avenue	171.0	F	169.1	F	127.3	F
7	Mandela Parkway/West Grand Avenue*	40.1	D	**130.3**	**F**	**86.6**	**F**
8	Adeline Street/West Grand Avenue*	17.4	B	22.1	C	16.8	B
9	Market Street/West Grand Avenue*	39.9	D	60.4	E	27.5	C
10	San Pablo Avenue/West Grand Avenue*	45.0	D	38.9	D	31.9	C
11	Martin Luther King Jr. Way/West Grand Ave*	16.1	B	16.0	B	14.5	B
12	Northgate Avenue/West Grand Avenue*	102.3	F	100.7	F	81.8	F
13	Broadway/West Grand Avenue*	39.6	D	41.9	D	30.1	C
14	Harrison Street/West Grand Avenue*	68.8	E	68.8	E	65.4	E
15	Adeline Street/18th Street#	10.1	B	7.5	A	5.9	A
16	Market Street/18th Street	11.1	B	15.2	B	10.7	B
17	Adeline Street/14th Street#*	13.1	B	6.0	A	5.4	A

Table 5-7: Intersection LOS Summary, Reduced Alternative at Year 2035 Under Cumulative Conditions – (AM/SAT Peak Hour)

Study Intersections		Cumulative Baseline		Cumulative plus Project		Cumulative plus Reduced Alternative	
		Delay	LOS	Delay	LOS	Delay	LOS
18	Adeline Street/12th Street#	14.0	B	4.5	A	4.2	A
19	Frontage Road/7th Street	43.6	D	43.6	D	39.4	D
20	Mandela Parkway/7th Street*	22.9	C	24.1	C	24.6	C
21	Adeline Street/7th Street*	12.8	B	12.6	B	12.0	B
22	Market Street/7th Street*	35.9	D	21.9	C	19.0	B
23	Market Street/5th Street/I-880 off-ramp	19.3	B	19.1	B	18.9	B
24	Adeline Street/ 5th Street	26.4	C	53.4	D	51.2	D

Intersection delays are shown in “seconds per vehicle”.

All intersections have signalized control with the exception of locations denoted with “#” which are controlled by roundabout under plus Project/Alternative scenarios.

“*” denotes intersection located in downtown Oakland or that provide direct access to downtown.

“^” denotes intersection located in Emeryville

“~” Saturday peak hour results are shown for the two Emeryville locations; AM peak hour results are shown for all other locations

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

BOLD type indicates significant impact.

Source: Kittelson & Associate, 2013.

Table 5-8: Intersection LOS Summary, Reduced Alternative at Year 2035 Cumulative Conditions (PM Peak Hour)

		Cumulative Baseline		Cumulative plus Project		Cumulative plus Reduced Alternative	
Study Intersections		**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
1	Hollis Street/40th Street^	212.8	F	**230.8**	**F**	**178.8**	**F**
2	San Pablo Avenue/40th Street^	256.8	F	**250.4**	**F**	238.8	F
3	I-980 off-ramp/27th Street*	18.9	B	18.6	B	17.9	B
4	I-980 on-ramp/27th Street*	73.6	E	73.3	E	43.8	D
5	Maritime Street/West Grand Avenue	52.1	D	52.8	D	48.5	D
6	Frontage Road/West Grand Avenue	142.7	F	134.4	F	107.2	F
7	Mandela Parkway/West Grand Avenue*	72.8	E	**215.2**	**F**	**158.1**	**F**
8	Adeline Street/West Grand Avenue*	25.0	C	62.7	E	35.5	D
9	Market Street/West Grand Avenue*	143.5	F	61.5	E	41.8	D
10	San Pablo Avenue/West Grand Avenue*	292.1	F	270.4	F	212.3	F
11	Martin Luther King Jr Wy/West Grand Ave*	18.0	B	18.0	B	17.9	B
12	Northgate Avenue/West Grand Avenue*	40.5	D	37.5	D	23.4	C
13	Broadway/West Grand Avenue*	78.7	E	**81.4**	**F**	65.3	E
14	Harrison Street/West Grand Avenue*	54.5	D	52.9	D	50.9	D
15	Adeline Street/18th Street#	12.4	B	**39.4**	**E**	22.1	C
16	Market Street/18th Street	15.4	B	20.9	C	16.6	B
17	Adeline Street/14th Street#*	14.8	B	12.2	B	10.2	B
18	Adeline Street/12th Street#	9.2	A	6.4	A	5.8	A
19	Frontage Road/7th Street	44.6	D	44.7	D	39.3	D
20	Mandela Parkway/7th Street*	30.1	C	37.5	D	24.6	C
21	Adeline Street/7th Street*	25.3	C	26.0	C	22.6	C
22	Market Street/7th Street*	26.9	C	31.5	C	22.8	C
23	Market Street/5th Street/I-880 off-ramp	25.3	C	24.6	C	24.6	C
24	Adeline Street/ 5th Street	35.7	D	**81.0**	**F**	**75.1**	**E**

Table 5-8: Intersection LOS Summary, Reduced Alternative at Year 2035 Cumulative Conditions (PM Peak Hour)

	Cumulative Baseline		Cumulative plus Project		Cumulative plus Reduced Alternative	
Study Intersections	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**

Intersection delays are shown in "seconds per vehicle".

All intersections have signalized control with the exception of locations denoted with "#" which are controlled by roundabout under plus Project/Alternative scenarios.

"*" denotes intersection located in downtown Oakland or that provide direct access to downtown.

"^" denotes intersection located in Emeryville

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

BOLD type indicates significant impact due to LOS, V/C, or queue length (Emeryville intersections only) reasons.

Source: Kittelson & Associate, 2013.

Mitigation Measures

The same mitigation measures recommended for the Cumulative plus Project scenario would also lessen the Cumulative plus Reduced Alternative's traffic impact at the following intersections:

- Implement Mitigation Measure Trans-4 as recommended for the Cumulative plus Project scenario at San Pablo Avenue / 40th Street (Intersection #2).
- Implement Mitigation Measure Trans-5 as recommended for the Cumulative plus Project scenario at Mandela Parkway / West Grand (Intersection #7).
- Implement Mitigation Measure Trans-17 as recommended for the Cumulative plus Project scenario at Adeline Street / 18th Street (Intersection #15).
- Implement Mitigation Measure Trans-8 as recommended for the Cumulative plus Project scenario at Adeline Street / 5th Street (Intersection #24).

Mitigation measures for the remaining intersection adversely affected under the Cumulative plus Reduced Alternative scenario are generally less substantial than those recommended for the Cumulative plus Project scenario:

- At the intersection of Hollis Street / 40th Street (Intersection #1), implement the following improvements:
  a) Extend the southbound queue storage pocket by 60 feet to 175 feet
  b) Optimize signal timing parameters (i.e., adjust the allocation of green time for each intersection approach)

Resulting Level of Significance

With implementation of recommended improvements to the Hollis Street/40th Street intersection (#1) and the San Pablo Avenue/40th Street intersection (#2), the Reduced Alternative's contribution to cumulative impacts at these locations could be reduced to a level of less-than-significant. However, because these intersections are within the City of Emeryville's jurisdiction, the timing and implementation of these improvements are not under the City of Oakland's control and the improvements cannot be assured. Therefore, the Reduced Alternative's cumulative impact at these intersections remains **significant and unavoidable**.

Implementation of identified improvements to the Mandela Parkway/West Grand Avenue intersection (#7) could reduce the Reduced Alternative's cumulative impacts to a level of less-than-significant, but the identified improvements are in conflict with the City's plans and policies. These improvements would encroach into Memorial Park and the medians, and would preclude planned installation of a bicycle facility on West Grand Avenue. Therefore, these improvements are not recommended and impacts at this intersection remain **significant and unavoidable**.

As indicated in Tables 5-9, the Reduced Alternative's contribution to cumulative traffic impacts at intersection would be reduced with implementation of recommended mitigation measures to a level of less than significant.

Table 5-9: Intersection LOS Summary, With Mitigation – Cumulative plus Reduced Alternative at Year 2035

		Cumulative plus Reduced Alternative		After Mitigation		Resulting Level of Significance
Study Intersections		**Delay**	**LOS**	**Delay**	**LOS**	
AM/Sat Peak Hour						
1	Hollis Street/40th Street^	**212.7**	**F**	216.9	F	**another jurisdiction, SU**
2	San Pablo Avenue/40th Street^	**315.9**	**F**	323.1	F	**another jurisdiction, SU**
7	Mandela Parkway/West Grand Avenue*	**86.6**	**F**	25.4	C	**infeasible due to significant secondary effects, SU**
PM Peak Hour						
1	Hollis Street/40th Street^	**178.8**	**F**	127.0	F	**another jurisdiction, SU**
7	Mandela Parkway/West Grand Avenue*	**158.1**	**F**	28.4	C	**infeasible due to significant secondary effects, SU**
24	Adeline Street/ 5th Street	**110.1**	**F**	31.5	C	LTS

Intersection delays are shown in "seconds per vehicle".

All intersections have signalized control

"*" denotes intersection located in downtown Oakland or that provide direct access to downtown.

"^" denotes intersection located in Emeryville

"~" Saturday peak hour results are shown for the two Emeryville locations; AM peak hour results are shown for all other locations

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

BOLD type indicates significant impact.

Source: Kittelson & Associate, 2013.

Alternative 3: Commercial, Office and Jobs Emphasis

CEQA Guidelines Section 15126.6(c) requires that the range of potential alternatives to the proposed Project include alternatives that could feasibly accomplish most of the basic objectives of the Project and could avoid or substantially lessen one or more of the significant effects. This alternative has been developed to consider an alternative capable of achieving most of the Project's major objectives, and which is also able to lessen the extent to which the Project conflicts with current City policy regarding preservation of existing industrially zoned lands, and that would minimize the extent to which new development of sensitive residential receptors would be exposed to poor air quality and noise.

Description of Alternative 3: Commercial, Office and Jobs Emphasis

The land use and development plan for Alternative #3 is organized by Opportunity Area, similar to that indicated for the Project.

Opportunity Area 1: Mandela/West Grand

Similar to the Project, the Mandela/West Grand Opportunity Area would continue to be a business and employment center for West Oakland, including a mix of business activities and development types with a range of jobs at varying skill and education levels. This alternative would retain and expand existing commercial and compatible urban manufacturing, construction and light industrial businesses that have well-paid blue collar and green collar jobs, and would also attract new industries.

New development near the Oakland/Emeryville city limit line along Mandela Parkway near the I-580 overpass would primarily occur as an extension of the Emeryville/Oakland large format retail development (i.e., an extension of the Bay Street/BayBridge Shopping Center/Target area). Buildout of this area (identified in the Project as Subarea 1C of the Mandela/Grand Opportunity Area) would include properties on either side of the overpass providing adequate space for new large-scale retail development, with the area below the underpass providing an opportunity for shared surface parking. New large-scale retail development along the northerly portion of Mandela Parkway would help strengthen connections between West Oakland and the adjacent regional-serving shopping area. Additional new regional-serving retail near the West Grand Avenue ramp (at Opportunity Sites #4, #6 or #13) would create two strong anchor points of retail between 32nd Street and West Grand Avenue. With anchors at either end, Willow Street would emerge as a retail corridor connecting between the two anchor points. A gateway entry, streetscape and pedestrian amenities, and improved roadway sections along Willow would enhance this area as a retail destination. Retail on the southern side of West Grand Avenue would include major improvements for pedestrian and bicycle access under the I-880 ramp, addressing light, openness, and other amenities that would make shoppers feel safe and secure.

New residential and live/work development would only occur as infill of properties currently zoned for residential use, including approximately 640 units at the approved Wood Street Development project, The Project's proposal to rezone several industrially zoned properties to allow for residential use would not occur, but instead these properties would remain as industrial and available for new lower-intensity industrial/business development.

A conceptual, schematic plan for the large format retail development area is provided on **Figures 5-5, i**llustrating densities, building massing and other physical characteristics of the Commercial/Office/Jobs Alternative.

Opportunity Area 2: 7th Street

Similar to the Project, under the Commercial/Office/Jobs Alternative the 7th Street Opportunity Area would continue to include a transit-oriented development (TOD) project on vacant sites and parking lots around the West Oakland BART Station. A new BART parking garage would be developed next to the freeway, and the TOD would include high- to mid-density residential development above mostly ground-floor neighborhood-serving retail and custom manufacturing /industrial arts/ artist exhibition space.

However, this alternative would provide for development of one or more new office buildings at the 7th Street/Mandela Parkway entrance to the TOD, and new office towers placed atop the BART parking garage. Such a large commercial office component of the TOD would provide an ideal location for a public or quasi-public agency, and would ensure that BART ridership is two-directional (riders will be leaving the station for jobs as others are arriving for jobs). Under this alternative, approximately 670,000 square feet of commercial office space would replace approximately 1,000 of the residential units indicated in the Project's description of the residentially-based TOD (1,130 new dwelling units, as compared to over 2,300 new dwelling units under the Project). Conceptual, schematic plans are provided on **Figure 5-6** for the TOD design under the Commercial/Office/Jobs Alternative, illustrating the commercial/office alternative.

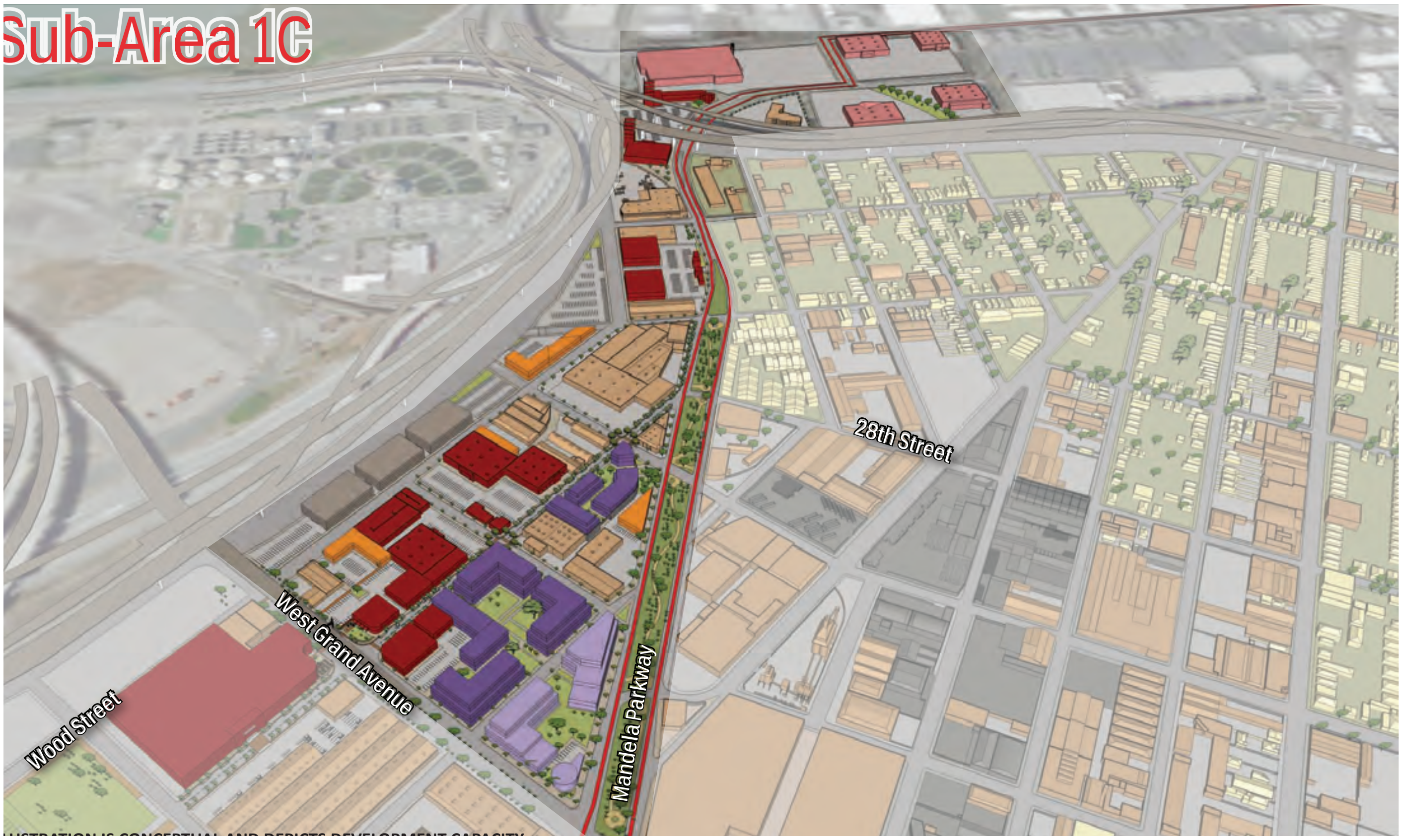
Like the Project, new medium density housing with ground floor commercial uses would occur further west on 7th Street as a transition from the West Oakland BART Station TOD to the surrounding lower-density neighborhoods. Like the Project, 7th Street would continue to be planned as the neighborhood focus, with neighborhood-serving commercial establishments that enliven the street. Similar to the Project, new building design, construction and ongoing operation and maintenance requirements will address the issues of air contaminants and noise from the freeway, and noise from BART trains.

Opportunity Area 3: 3rd Street

Similar to the Project, the 3rd Street Opportunity Area would continue to support industrial and business activities and jobs, focusing on manufacturing and light industrial uses that benefit from adjacency to the Port. New business opportunities would reflect the existing mix of light industrial, service commercial, food and beverage production and distribution, and construction-related businesses, as well as small professional offices, import/export, communications, computer services, publishing and printing, photo/audio services, and small R&D activities. The amount of new business and industrial development that would occur within the 3rd Street Opportunity area would be the same as that projected to occur under the Project. Residential development in this area would continue to be prohibited.

Opportunity Area 4: San Pablo Avenue

Under the Commercial/Retail and Jobs Focus Alternative, the San Pablo Avenue Opportunity Area would be developed at the same or similar densities and intensities as envisioned under the Project. The San Pablo Avenue corridor would be transformed as a major commercial corridor lined with active ground-floor commercial uses and mixed-use residential development. Similar to the Project, the block of West Grand Avenue between Myrtle Street and Market Street would be developed with a mix of uses (potentially anchored by a grocery store) with medium-density residential, street front retail and mixed use development.



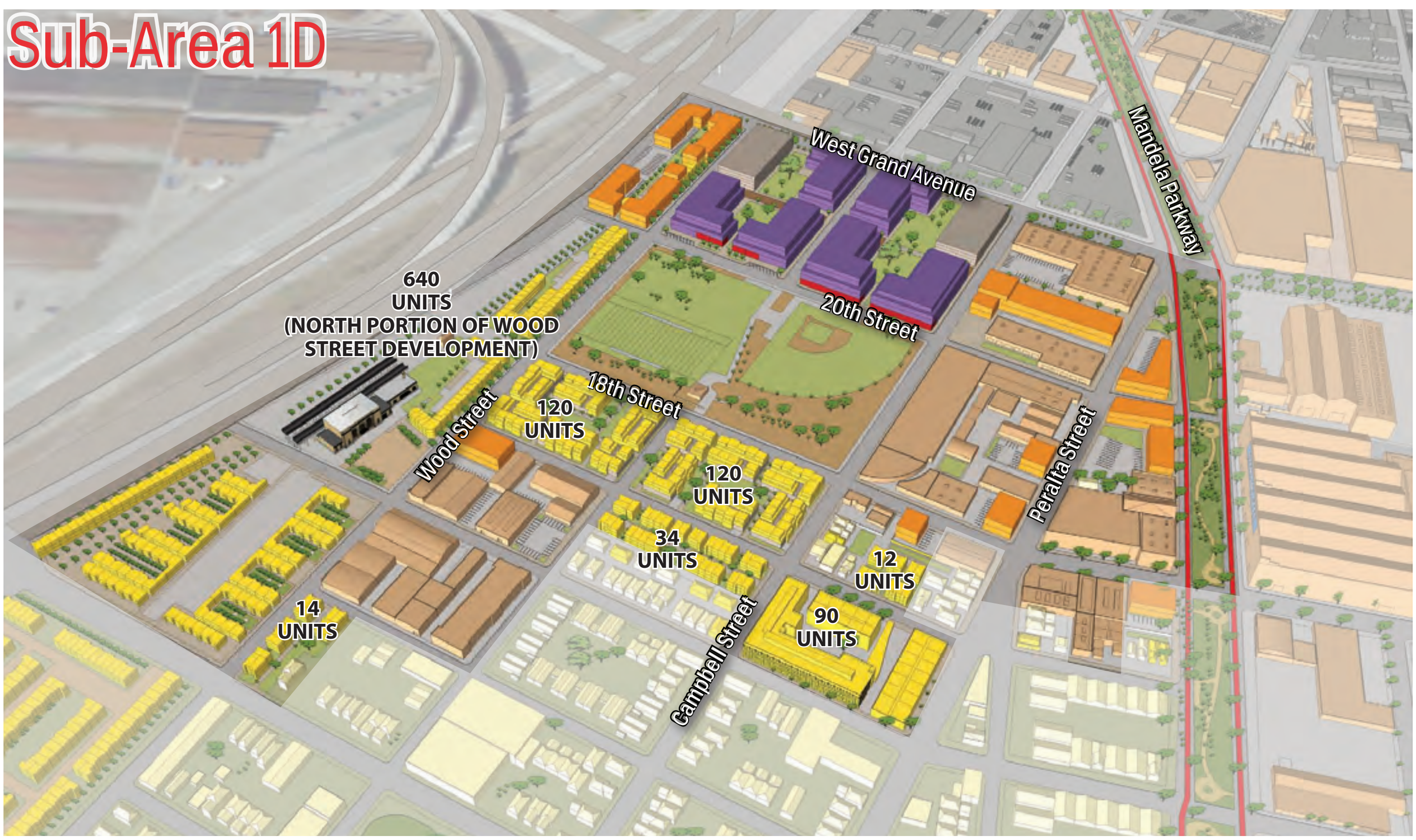


Figure 5-4
Commercial/Jobs Focused Alternative, Mandela/West Grand Opportunity Areas C and D

West Oakland Specific Plan, Draft EIR
Source: JRDV Urban International

Existing facilities to be Enhanced | Low Intensity Business Mix/Light Industrial | Business Intensification (380,000 sq. ft.)
Residential (1875 units) | Transit Enhancement | Retail/Commercial (80,00 sq. ft.)

Figure 5-5
Commercial/Jobs Focused Alternative,
Commercial- Office Use at West Oakland BART TOD

West Oakland Specific Plan, Draft EIR
Source: JRDV Urban International

Key Differences between the Project and the Commercial, Office and Jobs Alternative

Alternative #3 is similar to the Project, but with a few significant differences:

Non-Residential Development:

- Alternative #3 would prioritize new retail development as an extension of that which has occurred near the Oakland/Emeryville city limit line, with new large-format retail along Mandela Parkway near the I-580 overpass, near the West Grand Avenue ramp, and along Willow Street. This area would emerge as a retail corridor connecting between the West Grand and Emeryville, rather than as a higher intensity industrial/business development area as envisioned under the Project.
- The West Oakland BART Station TOD would include a substantial component of commercial office space, intended to better utilize the transit resource of the BART station for two-directional ridership (i.e., transit riders will be leaving the station for jobs elsewhere, as others are arriving for on-site jobs). As envisioned under this Alternative, the TOD would include a large commercial office complex of approximately 380,000 square feet located immediately adjacent to the BART station platform, as well as the potential for an additional 293,000 square feet of commercial office space atop the BART parking garage near the I-800 freeway. New commercial and office space would better establishing this area as an active, 24-hour community as opposed to a residential bedroom community with outbound commuters. Grocery stores, restaurants, night clubs, neighborhood-serving retail shops, food and beverage sales, and professional services, as well as art galleries and "making" places (uses typically viewed under land use regulations as custom manufacturing) would line the ground floor.

Residential and Mixed-Use Development:

- This alternative would result in a reduction of between 533 residential units and up 950 residential units due to developing a substantial component of commercial office space rather than housing at the West Oakland BART station.
- Alternative #3 would not include those residential units envisioned under the Project at several locations where existing industrial zoning is proposed to be converted to enable residential use. These sites, including the Phoenix Iron Works site, the Roadway parcels, as well as sites at 12th and Grand, Eddie Street and Adeline Street, would all remain industrially-zoned. No new residential development would occur at these locations; instead the existing industrial/business uses would remain or new low intensity business development would occur.

Summary of Alternative #3

Buildout of this alternative is anticipated to occur over an extended period of time with incremental increases in new housing and job opportunities, but final buildout is assumed by year 2035. **Table 5-10** provides a summary of land uses, employment and population changes projected within the Planning Area at buildout of the Commercial, Office and jobs Focused Alternative.

Table 5-10: Buildout Assumptions, Alternative #3: Commercial and Jobs Emphasis (all of West Oakland Opportunity Areas)

	Business /Indust. /Inst. (1,000 sq.ft.)	Comm. /Retail (1,000 sq.ft.)	Mixed Use (1,000 sq. ft.)	Jobs	Housing Units	Pop.
Existing						
Mandela/Grand	4,000,000	300,000	0	5,440	110	259
7th Street	1,790,000	0	5,000	1,880	85	204
3rd Street	1,040,000	50,000	0	1,770	0	0
San Pablo	0	90,000	700,000	680	70	165
Total	**6,830,000**	**440,000**	**705,000**	**9,770**	**265**	**628**
Buildout, Alternative #3						
Mandela/Grand	6,305,000	685,000	105,000	16,140	931	2,067
7th Street	1,660,000	0	760,000	4,356	1,774	4,125
3rd Street	1,700,000	65,000	0	3,760	0	0
San Pablo	0	80,000	785,000	1,660	1,095	2,453
Total	**9,665,000**	**830,000**	**1,650,000**	**25,916**	**3,800**	**8,645**
Net Change, Alternative #3						
Mandela/Grand	2,305,000	385,000	105,000	10,700	821	1,808
7th Street	-130,000	0	755,000	2,476	1,689	3,921
3rd Street	660,000	15,000	0	1,990	0	0
San Pablo	0	-10,000	85,000	980	1,025	2,288
Total	**2,835,000**	**390,000**	**945,000**	**16,146**	**3,535**	**8,017**
Project	3,550,000	310,000	170,000	14,890	5,000	10,988
Compared to Project	-715,000	80,000	775,000	1,256	-1,465	-2,971
Percent of Project	80%	126%	556%	108%	71%	73%

Comparative Environmental Assessment, Alternative #3

Aesthetics

Scenic Vistas

There are no officially designated public scenic vistas within or near the West Oakland Planning Area. No scenic vistas or view corridors would be substantially obstructed or degraded by development in accordance with the Reduced Alternative, and the impacts of Alternative 3 on scenic vistas would therefore be less than significant. (**LTS**)

Similar to the Project, infill development and redevelopment of vacant and blighted properties, improvements to streetscapes and the public realm, and new landscaping and street trees would improve the quality of views throughout West Oakland from public vantage points. Focusing new development within the Opportunity Areas and preserving established neighborhoods would avoid substantial obstruction of the limited views of downtown Oakland and the East Bay hills from public vantage points within the adjacent residential neighborhoods. At the West Oakland BART Station TOD, Alternative 3 would have the same or similar building height as compared to the Project, and would also provide a more effective and substantial transition in building heights nearest to the South Prescott neighborhood, with buildings nearest to this neighborhood as low as 2-stories.

Scenic Highways

Similar to the Project, new development and public realm improvements in accordance with the Alternative 3 would not substantially damage scenic resources, but rather would improve the quality of views of the Planning Area from the I-580 scenic highway. The impacts of Alternative 3 related to scenic highways would be less than significant. (**LTS**)

Visual Character or Quality

Similar to the Project, new development and public realm improvements in accordance with Alternative 3 would not substantially degrade the existing visual character or quality of any sites and their surroundings, but would substantially improve existing visual character and quality of the area. Infill development and redevelopment would repair the existing inconsistent urban fabric where such inconsistencies exist, and result in a more unified and coherent development character. The proposed land use patterns and development types would focus change within the Opportunity Areas while preserving established residential neighborhoods.

Alternative 3 would not provide for the re-zoning of any areas from industrial to residential use, and the existing edge between industrial and residential areas would remain less defined and consistent. The visual character along the industrial/residential edges would continue to remain mixed in character. (**LTS**)

Shadow

Like the Project, Alternative 3 would not cast shadows that substantially impair the function of a building using passive solar heat collection, solar collectors for hot water heating, or photovoltaic solar collectors; cast shadows that substantially impair the beneficial use of any public or quasi-public park, lawn, garden, or open space; or cast shadows on an historic resource such that the shadow would materially impair the resource's historic significance. The shadow impacts of Alternative 3 would be less than significant. (LTS)

Adequate Lighting

Like the Project, Alternative 3 would not change any existing General Plan policies or zoning or building regulations such as to cause a fundamental conflict with policies and regulations that address the provision of adequate light related to appropriate uses. The impacts of the Reduced Alternative related to consistency with policies and regulations addressing the provision of adequate light related to appropriate uses would be less than significant. (LTS)

Wind

Since the West Oakland Planning Area does not lie within the area identified by the City as requiring modeling for evaluation of wind impacts, the wind impacts of Alternative 3 would be less than significant. (LTS)

Air Quality

CAP Consistency: VMT Increase

New development facilitated by the Alternative #3 would not fundamentally conflict with the Bay Area 2010 CAP because the projected rate of increase in vehicle miles travelled would be less than the projected rate of increase in population. The Alternative #3's increase in growth (population and employment) would not conflict with regional growth expectations set forth in the CAP, and the potential changes in transportation demand as expressed through vehicles miles travelled (VMT) would not outpace population growth. The projected population increase in West Oakland that is attributable to new growth and development pursuant to Alternative #3 (approximately 16,150 jobs and a population of 8,013 people) represents a growth rate of approximately 230% over the current 10,398 jobs and residents. The projected increase in PM peak hour vehicles miles travelled (approximately 40,420 VMTs) represents an increase of approximately 105% over the current estimated VMT of 38,659. Based on these comparisons, Alternative #3's projected increase in VMTs would grow at a lesser rate than the service population, and this impact would be less than significant.

CAP Consistency: Implementation of Control Measures

Like the Project, Alternative #3 would not fundamentally conflict with the CAP's air pollution control measures. All new development pursuant to the this Alternative, including new industrial and commercial uses, would be required to comply with all measures that the Air District adopts and enforces to control emissions from stationary sources of air pollution. Alternative #3 would not contain any policies or strategies that would be contrary to incentive programs to achieve voluntary emission reductions from mobile sources. This Alternative would not fundamentally conflict with the CAP's transportation control strategies, even if it does not achieve to the same degree as does the Project, improvements to the efficiency of existing transit systems or the promotion of focused urban infill development. All new development pursuant to the Alternative #3 would be required to comply with City of Oakland's Standard Conditions that seek to reduce energy use in new development projects. In summary, Alternative #3 would not interfere with implementation of Clean Air Plan control measures.

Odors

Like the Project, new development in accordance with the No Project Alternative would expose a substantial number of people to objectionable ambient odors from the EBMUD WWTP and from food processing facilities, painting/coating operations, and/or green waste and recycling facilities. This impact would be **significant and unavoidable** at the Plan level. New development pursuant to Alternative #3 could result in development of new odor-generating uses in close proximity to residential or other odor-sensitive uses within mixed-use areas, similar to that as indicated for the Project. Like the Project, this impact would be potentially significant and proper controls or setbacks, as recommended for the Project, would be required.

Construction Period Emissions

Similar to the Project, individual development projects pursuant to Alternative #3 will generate fugitive dust from demolition, grading, hauling and construction activities, will generate regional ozone precursor emissions and regional particulate matter emissions from construction equipment exhaust, and will generate construction-related toxic air contaminant (TAC) emissions from fuel-combusting construction equipment and mobile sources.

- Fugitive dust will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval, an d
- construction-related toxic air contaminant (TAC) emissions will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval, but
- larger individual construction projects could generate emissions of criteria air pollutants that would exceed the City's thresholds of significance and/or that could exceed thresholds for cancer risk, chronic health index, acute health index or annual average PM2.5 concentration levels. These emissions are conservatively estimated as **significant and unavoidable**.

Operational-Related Criteria Air Pollutants

Buildout of Alternative #3 would generate total emissions of criteria pollutants (ROG, PM10 and PM2.5) from increased motor vehicle traffic and area source emissions that would exceed the City's project-level thresholds of significance. Although motor vehicle traffic would be less under Alternative #3 than the Project, individual development projects as well as the aggregate of all development assumed pursuant to this Alternative is conservatively considered to generate criteria air pollutants and ozone precursor emissions at a level that would be **significant and unavoidable**.

Carbon Monoxide Concentrations

Alternative #3 would not exposure sensitive uses and would not generate emissions leading to significant concentrations of CO that would violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation. Traffic modeling conducted for this EIR indicates that study intersections with the highest traffic volumes would not experience 24,000 vehicles per peak hour under 2035 scenarios with implementation of the Project, and Alternative #3 would generate slightly fewer peak hour vehicle trips than does the Project (see Transportation discussion, below).

Operational Toxic Air Emissions

Development pursuant to Alternative #3 would include new light industrial, custom manufacturing and other similar land uses that could emit toxic emissions. The potential exists for multiple new sources of TAC emissions to be developed within a single concentrated portion of the Plan Area. Given the existing elevated cancer risk from existing local and mobile sources in the Plan Area, there is the potential for new multiple sources (even if each new source is individually less than significant) to cumulatively increase toxic air contamination to a **significant and unavoidable** level.

Exposure to Toxic Air Contaminants and PM2.5

Like the Project, certain future development projects in accordance with Alternative #3 would expose new sensitive receptors to levels of toxic air contaminants (TACs) or concentrations of PM2.5 that could result in a **significant and unavoidable** increased cancer risk or other health hazards. Alternative #3 would facilitate development of new sensitive-receptor land uses, specifically near the I-880 freeway at the West Oakland BART station, where there is the potential to result in health risks to future residents due to nearby sources of toxic air contaminants (TACs) and concentrations of PM2.5.

Alternative #3 would replace as many as 950 of the sensitive residential units proposed under the Project at the West Oakland Bart Station site with less-sensitive office-type uses. Furthermore, this Alternative would not facilitate development of new sensitive receptors at several other locations adjacent to the I-880 freeway and which have increased cancer risk and increased health risks due to PM2.5 concentrations. These sites, including locations along the 7th Street corridor, the Phoenix Iron Works site, the Roadway site and the site at 12th and Mandela, would not be proposed for residential conversions (as is proposed under the Project) under this Alternative. Alternative #3 would reduce the exposure of new sensitive receptors to toxic air contaminants as compared to the Project.

Cultural Resources

Historic Resources

Alternative #3 would not alter or change the manner in which the majority of historic resources are proposed to be addressed pursuant to the Specific Plan (the Project). Assumptions regarding the treatment of individual historic resources pursuant to the Project would be similar under Alternative #3 at the Oakland Warehouse Company - GE Mazda Lamp Works site (1600-14 Campbell Street); at the Merco-Nordstrom Valve Company Factory (2401-49 Peralta Street); at and in the vicinity of the Southern Pacific 16th Street Station (1601 Wood Street/1798 16th Street); where new development may abut the Oakland Point API; along the 7th Street historic corridor; within and adjacent to the Southern Pacific Railroad Industrial API; and on the vacant site adjacent to the California Hotel at 3501 San Pablo Avenue. As is the case under the Project, new development under Alternative #3 would not cause a substantial adverse change in the significance of these historic resources.

Under Alternative #3, no new residential use would be permitted on the southern portion of the Coca Cola Bottling Company property (at 1340 Mandela Parkway), but new business/light industrial development would be required to maintain the integrity and continued eligibility of the 1940s plant as is proposed under the Project. Similarly, Alternative #3 would not permit new residential or mixed-use development along Pine Street at the Phoenix Iron Works site. Instead, only new business/light industrial development could be developed, with consideration of the local context as part of Design Review of this site. This change in development types would not cause a substantial adverse change in the significance of the adjacent Oak Point API or of individual historical resources within the API.

As is the case under the Project and all alternatives to the Project, any future proposed change to other historic properties pursuant to Alternative #3 would be subject to the City's existing Historic Preservation Element (HPE) policies and actions, regulatory requirements, individual CEQA review and standard conditions of approval, implemented on a project-by-project basis (see more discussion under the No Project Alternative). With implementation of these policies, actions and regulations (pursuant to individual CEQA review and applied as standard conditions of approval), individual projects pursuant to Alternative #3 could still result in significant and unavoidable impacts to historic resources, but such impacts will have undergone detailed, project specific review and consideration prior to such effects having occurred.

Archaeological Resources, Paleontological Resources and Human Remains

Similar to the Project, subsequent development under Alternative #3 could cause a substantial adverse change in the significance of an archaeological resource or destroy a unique paleontological resource or site or unique geologic feature. However, each individual development project would be required to implement the City's Standard Conditions of Approval. Given the high potential for the presence of unrecorded Native American resources and moderate to high potential for the presence of unrecorded historic-period archaeological resources near the former Bay shoreline, new development that involves excavation in this area would likely be subject to SCA E, Archaeological Resources – Sensitive Sites. This Standard Condition of Approval requires additional intensive pre-construction surveys or construction period monitoring, and avoidance and recovery measures. Additionally, in the event of an unanticipated discovery of prehistoric or historic-period archaeological resources or unique paleontological resources during development within the Planning Area, SCA 52, Archaeological Resources, SCA 53, Human Remains, and SCA 54, Paleontological Resources require that excavations within 50 feet of the find be temporarily halted or diverted until the discovery is examined by a qualified archaeologist or paleontologist, documented and evaluated for significance, and procedures established to consider avoidance of the resource or preparation of an excavation plan if avoidance is unfeasible. With required implementation of these standard conditions of approval, the impacts of future development on archaeological resources, paleontological resources and human remains pursuant to Alternative #3 would be less than significant.

Greenhouse Gas and Climate Change

GHG Emissions

New development facilitated by the Alternative #3 would allow for the construction and operation of land uses that would produce greenhouse gas emissions. The level of emissions would exceed the project-level threshold of 1,100 annual tons of MTCO2e, but would likely not exceed the project-level efficiency threshold of 4.6 MTCO2e of annual emissions per service population nor would it exceed the Plan-level threshold of 6.6 MTCOC2e annually per service population. Development facilitated by Alternative #3 would thus not be expected to generate greenhouse gas emissions at levels that would result, in the aggregate, in significant or cumulatively considerable GHG emissions. (LTS)

Hazards and Hazardous Materials

Hazardous Materials Release Sites

The Planning Area contains numerous sites which are included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. Continued occupancy and use or future development of these hazardous materials sites under Alternative #3 (or any alternative) could create a significant hazard to the public or the environment. However, with required implementation of City of Oakland Standard Conditions of Approval and required compliance with local, state and federal regulations for treatment, remediation or disposal of contaminated soil or groundwater, hazards to the public or the environment from hazardous materials sites would be less than significant.

Hazardous Building Materials

Asbestos or lead based paint present within older structures in the Planning Area could be released into the environment during demolition or construction activities pursuant to Alternative #3, which could result in soil contamination or pose a health risk to construction workers or future occupants. However, with required implementation of the City's Standard Conditions of Approval and other applicable laws, regulations, standards and oversight currently in place, the potential impact related to exposure to hazardous building materials would be less than significant.

Hazardous Materials Use, Transport or Disposal

The amount of new development envisioned under Alternative #3 could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials, or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, potential impact related to the routine transport, use, or disposal of hazardous materials would be less than significant.

Hazardous Materials near Schools

New businesses that emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste could occur within one-quarter mile of a school under Alternative #3. However, with required implementation of the City's Standard Conditions of Approval, as well as required compliance with hazardous materials laws, regulations, standards and oversight currently in place, the potential impact related to emission and handling of hazardous materials near schools would be less than significant.

Land Use and Planning

Land Use Compatibility

Alternative #3 would not would not result in a fundamental conflict between adjacent or nearby land uses, but rather would result in a gradual improvement in compatibility between residential, commercial and business/industrial land uses.

In comparison to the proposed Project, Alternative #3 would reduce the number of sites where new housing units could be developed near freeways and other sources of diesel exhaust particulates and other toxic air contaminants (TACs) which pose a significant risk to human health. Alternative #3 would reduce the number of housing units near the freeway, BART and the railroads at the West Oakland BART station TOD, replacing these housing units with less sensitive commercial/office use. Alternative #3 would also expose fewer new sensitive receptors to freeway and rail noise levels that may exceed City and state standards for noise compatibility than does the proposed Project. Additionally, under Alternative #3, new residential land uses as proposed by the Project would not occur on certain properties with known previous contamination from prior industrial uses or other sources.

Conflict with Plans, Policies or Regulations

Alternative #3 would not include those General Plan amendments and rezoning as proposed under the Project that would be in direct conflict with the City's Industrial Land Use Policy. That Industrial Land Use policy indicates that West Oakland's industrially-zoned lands are to remain industrial, without amendments.

Alternative #3 would not fundamentally conflict with any applicable land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect that would result in a physical change in the environment.

Habitat and Natural Community Conservation Plans

There is no Habitat Conservation Plan, Natural Community Conservation Plan, or other adopted habitat conservation plan applicable to the Planning Area. Alternative #3 would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Noise

Construction Noise

Under Alternative #3, construction activities within West Oakland would occur, though with more focus on industrial/business and commercial development and less residential development than contemplated under the Project. Implementation of City of Oakland standard conditions of approval (SCA 28: Days/Hours of Construction Operation; SCA 29: Noise Control, SCA 30: Noise Complaint Procedures, and SCA 39: Pile Driving and Other Extreme Noise Generators) would reduce construction noise levels and represent all feasible measures available to mitigate construction noise. Implementation of these SCA's on a project-by-project basis would reduce construction noise impacts to a less than significant level.

Operational Noise

Ongoing operational noise generated by new stationary sources from industrial and commercial operations and from roof-top mechanical ventilation equipment associated with new development under Alternative #3 could generate noise in violation of the City of Oakland Noise Ordinance. The City's standard condition of approval (SCA 32: Operational Noise - General), requires that noise levels from any activity comply with the performance standards identified in the Planning Code and Municipal Code, and that if noise levels exceed these standards, the activity causing the noise must be abated until appropriate noise reduction measures have been installed. With required implementation of the City's Standard Condition of Approval SCA 32, operational noise impacts of Alternative #3 would be less than significant.

Alternative #3 would not result in the addition of as many new sensitive receptors (i.e., new residences) as would the Project, nor would it enable the siting of new sensitive receptors in as close proximity to business and industrial uses as does the Project. Although operational noise impacts would be reduced to less than significant levels through implementation of City standard condition of approval, Alternative #3 would result in less operational noise impacts than would the Project

Traffic Noise

Increased traffic result from new growth and development under Alternative #3 will result in higher traffic noise along streets within West Oakland, mixing with noise from all other existing ambient noise sources (i.e., trains, BART operation, existing freeway noise, etc.). The number of new vehicle trips throughout West Oakland associated with Alternative #3 would be marginally less than the vehicle trips associated with the Project. Since traffic-related noise increases are estimated to be less than significant with the traffic volumes projected for the Project, the slightly lower traffic volumes associated with Alternative #3 would generate comparably less traffic noise and would remain below the 5 dBA increase threshold, and therefore less than significant.

Construction and Operational Vibration

New construction activities under Alternative #3 could generate excessive ground-borne vibration during the construction period, and new commercial and industrial development may generate operational ground-borne vibration at levels that would be perceptible beyond the property boundary. However, with required implementation of the City's Standard Conditions of Approval and compliance with Oakland Planning Code regulations, these potential vibration impacts would be less than significant.

Noise Exposure / Land Use Compatibility

Future occupants of new residential and other noise-sensitive development pursuant to the Reduced Alternative could be exposed to community noise in conflict with the Land Use Compatibility Guidelines of the Oakland General Plan, and to interior noise exceeding California Noise Insulation Standards from a variety of noise sources including freeway traffic, BART and railroad operations.

Under Alternative #3, no new noise sensitive receivers (i.e., residences) would be developed at either the Phoenix Iron Works Site (Opportunity Site #) or at the Roadway parcels (Opportunity Sites #8, 12 and 13), or elsewhere along the I-880 freeway within the Mandela/Grand Opportunity Area. Furthermore, all new residential development under Alternative #3 would be required to comply with the city's Standard Conditions of Approval which require design measures capable of reducing interior noise to acceptable levels within buildings. With required implementation of the City's Standard Conditions of Approval, land use compatibility impacts would be less than significant. All new residential development under the Reduced Alternative would be required to comply with the city's Standard Conditions of Approval which require design measures capable of reducing interior noise to acceptable levels within buildings. With required implementation of the City's Standard Conditions of Approval, land use compatibility impacts would be less than significant.

West Oakland BART Station TOD

Similar to the analysis conducted for the Project, Alternative #3 includes development of a West Oakland BART Station TOD. However, TOD as envisioned under Alternative #3 the TOD would include a large commercial office complex of approximately 380,000 square feet located immediately adjacent to the BART station platform, as well as the potential for an additional 293,000 square feet of commercial office space atop the BART parking garage near the I-800 freeway. The commercial/office component to this version of the TOD would reduce the overall number of sensitive receptors exposed to ambient noise sources from traffic noise on I-880, as well as rail and passenger activity along the BART tracks and at the West Oakland BART station (commercial/office use is not considered a sensitive receptor). Additionally, it would place large, non-sensitive land uses as a buffer between these existing noise sources and new residential development, thereby attenuating noise received at the residential units. Depending upon ultimate designs, the Alternative #3 version of the TOD would likely not avoid subjecting new residents to ambient noise levels that would exceed the Land Use Compatibility standards, but would substantially reduce the extent of overall exposure. As indicated for the Project, new residences within Alternative #3's version of the TOD would still be subject to City of Oakland Standard Conditions of Approval, including compliance with Title 24 of the California Code of Regulations and the obligation to demonstrate how dwelling units would be designed to meet interior noise standards. This Alternative's TOD project would also place noise-sensitive outdoor uses in a noise environment characterized as "clearly unacceptable". Noise reduction could occur with the site design if buildings are effectively designed to act as noise barriers and break the line of sight between both I-880 and the BART tracks, and any publicly-accessible open space. With required implementation of the City's Standard Conditions of Approval, land use compatibility impacts would be less than significant and no mitigation measures would be required pursuant to CEQA.

Airport Noise

The Planning Area is located more than two miles outside of the Oakland International Airport 65 dBA Ldn/CNEL noise contour, which the Federal Aviation Administration regards as a significance threshold for noise-sensitive land uses. Therefore, impacts of aviation noise on any new development, including development pursuant to Alternative #3, would be less than significant.

Population, Housing and Employment

Growth Inducement

Build-out of Alternative #3 would result in less households but approximately the same number of employees that are included in ABAG's most recent projections for the area. Any additional induced growth would occur as already contemplated in, and consistent with, adopted plans and the environmental documents prepared for those plans. Growth facilitated or induced by Alternative #3 represents growth for which adequate planning has already occurred and/or which has been reviewed under this EIR, and the growth inducement impacts of this alternative would be less than significant.

Displacement of Housing or People

Alternative #3 would not directly result in displacement of housing or people. No housing would be removed or changed to a non-residential use, and the limited number of existing housing units located within the Specific Plan's Opportunity Areas would be retained. Some housing areas built without required permits and which may not conform to current zoning and/or building codes, including certain residential conversion of formerly underutilized industrial spaces, could be redeveloped with resulting loss of some of these existing informal units and the associated displacement of people. However, like the Project, the potential loss of a small number of housing units and associated displacement of people would be offset by the number of new units built under the Alternative #3. Impacts of Alternative #3 related to the displacement of housing or people would be less than significant.

Public Services and Recreation

Fire Protection

New development pursuant to Alternative #3 would, like the Project, result in an increase in OFD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios. All new development under this alternative would be subject to the City's Standard Conditions of Approval, normal development review and permitting procedures, and building and fire code requirements. Implementation of these requirements would reduce the impacts of this alternative on fire protection services to a level of less than significant.

Police Protection

New development under Alternative #3 would result in an increase in OPD service calls and a commensurate incremental need for additional staffing, equipment and facilities to maintain the City's response time goals and staffing ratios. The impacts of Alternative #3 related to police protection would be less than significant.

Schools

Development in accordance with Alternative #3 would generate additional students attending the OUSD schools, but the number of new students would be substantially less than would be generated by the

Project. School impact fees from residential and non-residential development collected pursuant to California Government Code would provide full and complete mitigation for school impacts.

Parks and Recreation

Development pursuant to Alternative #3 would generate a need for additional parkland, adding to the existing deficiency of parkland acreage in West Oakland, and would increase the use of existing parks and recreational facilities. However, because Alternative #3 would include substantially less residential development than the Project, its overall demands on parks and recreation services would be reduced as compared to the Project. Alternative #3 would not increase the use of existing parks and recreational facilities such that substantial physical deterioration of such facilities would occur, and the impacts of this alternative on parks and recreation services would be less than significant.

Traffic

For comparative purposes, the following analysis of traffic impacts for Alternative #3 is conducted under Cumulative (Year 2035) conditions. This scenario represents the "worst case" traffic condition and captures the full extent of potential traffic impacts.

Trip Generation

Alternative #3 assumes that employment growth within the West Oakland Specific Plan's Opportunity Areas would occur at a more robust rate through Year 2035 than would occur under the Project; while residential growth would occur at a lower rate. It also assumes that residential and employment growth elsewhere in West Oakland would occur as predicted under ABAG's latest *Projections '09* estimates.

Alternative #3's cumulative buildout includes 15,230 total households (3,800 within the Specific Plan's Opportunity Areas and 11,430 elsewhere in West Oakland), and approximately 27,900 employees (25,900 within the Specific Plan's Opportunity Areas and 2,000 elsewhere in West Oakland). The difference between the Project and Alternative #3 is approximately 1,470 fewer households and approximately 1,240 more jobs under Alternative #3 than under the Project. As a result, Alternative #3 would generate fewer weekday peak hour trips as compared to the Project. As shown in **Table 5-11**, the number of peak hour trips would be reduced as compared to the Project by approximately 150 trips during both peak hours.

Table 5-11: Vehicle Trip Generation Comparison, Alternative #3

	Project - Vehicle Trips				Alternative #3 - Vehicle Trips			
	Existing	Project	Other	Total	Existing	Alternative #3	Other	Total
AM Peak Hour	5,735	5,537	558	11,830	5,735	5,394	558	11,687
Difference, compared to Project:						(-143)		
PM Peak Hour	7,025	6,698	720	14,442	7,025	6,540	720	14,285
Difference, compared to Project:						(-158)		

Source: Kittelson & Associates, 2013.

Intersection Impacts

A comparison of the intersection level of service for Cumulative No Project, Cumulative plus Project and Cumulative plus Alternative #3 is presented in **Tables 5-12 and 5-13**. Alternative #3 would generate slightly less total traffic than would the Project, however, its traffic patterns would result in significant impacts at two more intersections than the Project scenario.) All six of the intersections indicated as being affected under Cumulative plus Project conditions would also be significantly impacted under Cumulative plus Alternative #3 including:

- Hollis Street and 40th Street intersection (#1) in both peak hours
- San Pablo Avenue and 40th Street intersection (#2) in both peal hours
- Frontage Road and West Grand Avenue intersection (#6) in the PM peak hour
- Mandela Parkway and West Grand Avenue intersection (#7) in both peak hours
- Adeline Street and West Grand Avenue intersection (#8) in the PM peak hour
- Broadway and West Grand Avenue intersection (#13) in the PM peak hour
- Adeline Street and 18th Street intersection (#15) in the PM peak hour
- Adeline Street and 5th Street intersection (#24) in the PM peak hour

Further, two (2) additional intersections have also been found to result in significant impacts with the implementation of Alternative #3 that would not result in significant impacts under the Project conditions:

- Frontage Road and West Grand Avenue intersection (#6) in the PM peak hour
- Adeline Street and West Grand Avenue intersection (#8) in the PM peak hour

Table 5-12: Intersection LOS Summary, Alternative #3 at Year 2035 Under Cumulative Conditions – (AM/Sat. Peak Hour)

		Cumulative Baseline		Cumulative plus Project		Cumulative plus Alternative #3	
Study Intersections		Delay	LOS	Delay	LOS	Delay	LOS
1	Hollis Street/40th Street^	247.9	F	**237.3**	**F**	**222.3**	**F**
2	San Pablo Avenue/40th Street^	325.0	F	**324.5**	**F**	**320.5**	**F**
3	I-980 off-ramp/27th Street*	23.1	C	17.4	B	17.6	B
4	I-980 on-ramp/27th Street*	22.5	C	21.2	C	21.2	C
5	Maritime Street/West Grand Avenue	35.1	D	35.0	C	34.6	C
6	Frontage Road/West Grand Avenue	171.0	F	169.1	F	156.2	F
7	Mandela Parkway/West Grand Avenue*	40.1	D	**130.3**	**F**	**109.5**	**F**
8	Adeline Street/West Grand Avenue*	17.4	B	22.1	C	21.7	C
9	Market Street/West Grand Avenue*	39.9	D	60.4	E	74.7	E
10	San Pablo Avenue/West Grand Avenue*	45.0	D	38.9	D	38.8	D
11	Martin Luther King Jr. Way/West Grand Ave*	16.1	B	16.0	B	15.8	B
12	Northgate Avenue/West Grand Avenue*	102.3	F	100.7	F	99.6	F
13	Broadway/West Grand Avenue*	39.6	D	41.9	D	42.3	D
14	Harrison Street/West Grand Avenue*	68.8	E	68.8	E	68.8	E
15	Adeline Street/18th Street#	10.1	B	7.5	A	22.6	C
16	Market Street/18th Street	11.1	B	15.2	B	15.0	B
17	Adeline Street/14th Street#*	13.1	B	6.0	A	5.8	A
18	Adeline Street/12th Street#	14.0	B	4.5	A	4.5	A
19	Frontage Road/7th Street	43.6	D	43.6	D	41.2	D
20	Mandela Parkway/7th Street*	22.9	C	24.1	C	24.2	C
21	Adeline Street/7th Street*	12.8	B	12.6	B	12.4	B
22	Market Street/7th Street*	35.9	D	21.9	C	19.8	B
23	Market Street/5th Street/I-880 off-ramp	19.3	B	19.1	B	19.2	B
24	Adeline Street/ 5th Street	26.4	C	53.4	D	53.4	D

Intersection delays are shown in "seconds per vehicle".

All intersections have signalized control with the exception of locations denoted with "#" which are controlled by roundabout under plus

Table 5-12: Intersection LOS Summary, Alternative #3 at Year 2035 Under Cumulative Conditions – (AM/Sat. Peak Hour)

Study Intersections	Cumulative Baseline		Cumulative plus Project		Cumulative plus Alternative #3	
	Delay	LOS	Delay	LOS	Delay	LOS

Project/Alternative scenarios.

"*" denotes intersection located in downtown Oakland or that provide direct access to downtown.

"^" denotes intersection located in Emeryville

"~" Saturday peak hour results are shown for the two Emeryville locations; AM peak hour results are shown for all other locations

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

BOLD type indicates significant impact due to LOS, V/C, or queue length (Emeryville intersections only) reasons

Source: Kittelson & Associate, 2013.

Table 5-13: Intersection LOS Summary, Alternative #3 at Year 2035 Cumulative Conditions (PM Peak Hour)

Study Intersections		Cumulative Baseline		Cumulative plus Project		Cumulative plus Alternative #3	
		Delay	LOS	Delay	LOS	Delay	LOS
1	Hollis Street/40th Street^	212.8	F	**230.8**	**F**	**206.5**	**F**
2	San Pablo Avenue/40th Street^	256.8	F	**250.4**	**F**	**247.1**	**F**
3	I-980 off-ramp/27th Street*	18.9	B	18.6	B	18.8	B
4	I-980 on-ramp/27th Street*	73.6	E	73.3	E	72.0	E
5	Maritime Street/West Grand Avenue	52.1	D	52.8	D	52.0	D
6	Frontage Road/West Grand Avenue	142.7	F	134.4	F	**127.5**	**F**
7	Mandela Parkway/West Grand Avenue*	72.8	E	**215.2**	**F**	**207.5**	**F**
8	Adeline Street/West Grand Avenue*	25.0	C	62.7	E	**82.1**	**F**
9	Market Street/West Grand Avenue*	143.5	F	61.5	E	104.0	F
10	San Pablo Avenue/West Grand Avenue*	292.1	F	270.4	F	262.7	F
11	Martin Luther King Jr Wy/West Grand Ave*	18.0	B	18.0	B	18.4	B
12	Northgate Avenue/West Grand Avenue*	40.5	D	37.5	D	33.2	C
13	Broadway/West Grand Avenue*	78.7	E	**81.4**	**F**	**81.1**	**F**

Table 5-13: Intersection LOS Summary, Alternative #3 at Year 2035 Cumulative Conditions (PM Peak Hour)

Study Intersections		Cumulative Baseline		Cumulative plus Project		Cumulative plus Alternative #3	
		Delay	LOS	Delay	LOS	Delay	LOS
14	Harrison Street/West Grand Avenue*	54.5	D	52.9	D	52.6	D
15	Adeline Street/18th Street#	12.4	B	**39.4**	**E**	**91.9**	**F**
16	Market Street/18th Street	15.4	B	20.9	C	19.0	B
17	Adeline Street/14th Street#*	14.8	B	12.2	B	13.8	B
18	Adeline Street/12th Street#	9.2	A	6.4	A	6.8	A
19	Frontage Road/7th Street	44.6	D	44.7	D	43.0	D
20	Mandela Parkway/7th Street*	30.1	C	37.5	D	30.2	C
21	Adeline Street/7th Street*	25.3	C	26.0	C	24.6	C
22	Market Street/7th Street*	26.9	C	31.5	C	27.8	C
23	Market Street/5th Street/I-880 off-ramp	25.3	C	24.6	C	24.2	C
24	Adeline Street/ 5th Street	35.7	D	**81.0**	**F**	**80.5**	**F**

Intersection delays are shown in “seconds per vehicle”.

All intersections have signalized control with the exception of locations denoted with “#” which are controlled by roundabout under plus Project/Alternative scenarios.

“*” denotes intersection located in downtown Oakland or that provide direct access to downtown.

“^” denotes intersection located in Emeryville

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

BOLD type indicates significant impact due to LOS, V/C, or queue length (Emeryville intersections only) reasons.

Source: Kittelson & Associate, 2013.

Mitigation Measures

The same mitigation measures recommended for the Cumulative plus Project scenario would also lessen the Cumulative plus Alternative #3’s traffic impact at the following intersections:

- Mitigation measures for the intersection of Hollis Street/40th Street (Intersection #1) are less substantial than those recommended for the Cumulative plus Project scenario. The westbound left queue storage would not need to be extended, but the remaining improvements identified under Mitigation Measure Trans-3 (including southbound queue storage extension and signal optimization) would need to be implemented in order to reduce the impact to a less-than-significant level.

- Implement Mitigation Measure Trans-4 as recommended for the Cumulative plus Project scenario at San Pablo Avenue / 40th Street (Intersection #2).
- Implement Mitigation Measure Trans-5 as recommended for the Cumulative plus Project scenario at Mandela Parkway / West Grand (Intersection #7).
- Implement Mitigation Measure Trans-6 as recommended for the Cumulative plus Project scenario at Broadway /West Grand (Intersection #13).
- Implement Mitigation Measure Trans-7 as recommended for the Cumulative plus Project scenario at Adeline Street / 18th Street (Intersection #15).
- Implement Mitigation Measure Trans-8 as recommended for the Cumulative plus Project scenario at Adeline Street / 5th Street (Intersection #24).

For the remaining two intersections, the following mitigation measures are required to reduce the impact of Alternative #3 to less-than-significant:

- At Frontage Road / West Grand Avenue (Intersection #6), implement the following:
    - Convert the exclusive northbound through lane to a left-through share lane to provide one left-turn, one shared left-through, and one through-right turn lanes on the northbound approach.
- At Adeline Street and West Grand Avenue (Intersection #8), implement the following:
    - Modify the traffic signal to provide an actuated controller
    - Optimize cycle length of the traffic signal

Resulting Level of Significance

With implementation of recommended improvements to the Hollis Street/40th Street intersection (#1) and the San Pablo Avenue/40th Street intersection (#2), Alternative #3's contribution to cumulative impacts at these locations could be reduced to a level of less-than-significant. However, because these intersections are within the City of Emeryville's jurisdiction, the timing and implementation of these improvements are not under the City of Oakland's control and the improvements cannot be assured. Therefore, Alternative #3's cumulative impact at these intersections remains **significant and unavoidable**.

Implementation of identified improvements to the Mandela Parkway/West Grand Avenue intersection (#7) could reduce Alternative #3's cumulative impacts to a level of less-than-significant, but the identified improvements are in conflict with the City's plans and policies. These improvements would encroach into Memorial Park and the medians, and would preclude planned installation of a bicycle facility on West Grand Avenue. Therefore, these improvements are not recommended and impacts at this intersection remain **significant and unavoidable**.

As indicated in Tables 5-14, Alternative #3's contribution to cumulative traffic impacts at all other intersections would be reduced with implementation of recommended mitigation measures to a level of less than significant.

Table 5-14: Intersection LOS Summary, With Mitigation – Cumulative plus Alternative #3 at Year 2035

Study Intersections		Cumulative plus Reduced Alternative Delay	Cumulative plus Reduced Alternative LOS	After Mitigation Delay	After Mitigation LOS	Resulting Level of Significance
AM/Sat Peak Hour						
1	Hollis Street/40th Street^	**222.3**	**F**	226.9	F	**another jurisdiction, SU**
2	San Pablo Avenue/40th Street^	**320.5**	**F**	326.2	F	**another jurisdiction, SU**
7	Mandela Parkway/West Grand Avenue*	**109.5**	**F**	29.7	C	**infeasible due to significant secondary effects, SU**
PM Peak Hour						
1	Hollis Street/40th Street^	206.5	F	154.5	F	**another jurisdiction, SU**
2	San Pablo Avenue/40th Street^	247.1	F	246.2	F	**another jurisdiction, SU**
6	Frontage Road/West Grand Avenue*	**127.5**	**F**	128.4	F	LTS
7	Mandela Parkway/West Grand Avenue*	**207.5**	**F**	37.2	D	**infeasible due to significant secondary effects, SU**
8	Adeline Street /West Grand Avenue*	**82.1**	**F**	67.1	E	LTS
13	Broadway /West Grand Avenue*	**81.1**	**F**	76.1	E	LTS
15	Adeline Street/18th Street#	**91.9**	**F**	26.2	C	LTS
24	Adeline Street/ 5th Street	**80.5**	**F**	27.5	C	LTS

Intersection delays are shown in “seconds per vehicle”.

All intersections have signalized control with the exception of locations denoted with “#” which are controlled by roundabout under plus Project/Alternative scenarios.

“*” denotes intersection located in downtown Oakland or that provide direct access to downtown.

“^” denotes intersection located in Emeryville

“~” Saturday peak hour results are shown for the two Emeryville locations; AM peak hour results are shown for all other locations

Intersection delay and LOS were calculated based on a volume-weighted average of the Mandela Parkway two-way couplet intersection.

BOLD type indicates significant impact due to LOS, V/C, or queue length (Emeryville intersections only) reasons.

Source: Kittelson & Associate, 2013.

Alternative 4: Maximum Theoretical Buildout Alternative

Description of Alternative 4: Maximum Theoretical Buildout Alternative

The West Oakland Specific Plan land use program (i.e., the Project)is based on a detailed analysis of available Opportunity Sites, catalyst development in surrounding Opportunity Areas, and the estimated demand for new development in the Plan Area. The amount of new growth and development projected under the West Oakland Specific Plan assumes that development and growth would not occur on all parcels. This is a reasonable assumption insofar as the Plan Area is mostly developed and the disparate, largely private ownership patterns make it highly unlikely that new development and growth would exceed the "reasonably foreseeable" amount set forth in the West Oakland Specific Plan. Thus the West Oakland Specific Plan (the Project) is the basis for analysis of environmental effects.

Although development and growth under the Project would not likely occur on every parcel, the revised land use designations, height limits and zoning regulations adopted with the Plan would in fact apply to all parcels within the Plan Area. Thus, theoretically, every parcel in the Plan Area could be "built out," consistent with the Specific Plan regulations. However, the Specific Plan regulations would not increase the allowable density/intensity on Plan Area parcels relative to existing regulations embodied in the current General Plan and Planning Code, and in fact would serve to reduce the allowable intensity of development throughout West Oakland's industrial areas. However, because the Specific Plan's regulations would apply to every parcel within the Plan Area, the Maximum Theoretical Buildout Alternative 4 evaluates the theoretical possibility that every parcel would be built out to the new maximum level permissible under the General Plan and Planning Code regulations as revised through adoption of the Specific Plan. These buildout assumptions include:

- all 66 acres of property designated with a High Intensity Business overlay are redeveloped at the maximum FAR of 4.0, resulting in approximately 11.5 million square feet of building space,
- all 49 acres of property designated with a Low Intensity Business overlay are redeveloped at the maximum FAR of 2.0, resulting in nearly 4.2 million square feet of building space,
- approximately 136 acres of property containing approximately 2.3 million square feet of space designated with the Business Enhancement overlay are retained and fully occupied,
- 18 acres of property designated with a Large Format Retail overlay are redeveloped at the maximum FAR of 4.0, resulting in approximately 3.1 million square feet of commercial building space,
- approximately 31 acres of property containing approximately 300,000 square feet of existing commercial space are retained and fully occupied,
- the West Oakland BART TOD is developed as proposed under the Project, which represents the maximum residential buildout that can be achieved given the new height limits under the Specific Plan, and
- all other potential new residential sites pursuant to the Specific Plan are redeveloped at the maximum residential density within the HBX-2 zone (1 unit per 930 sf of lot area).

Under the Maximum Theoretical Buildout Alternative, overall development would be substantially greater than the Project's land use development program (roughly 3.3 times as much non-residential development and an approximately 8% increase in residential development as compared to the Project.

This theoretical growth potential is shown in **Table 5-15**. For the reasons stated above, the likelihood of "maximum buildout" occurring is considered so highly unlikely, if not impossible, it is referred to as theoretical.

Table 5-15: Development Buildout Assumptions, Maximum Theoretical Buildout Alternative

	Land Area (net acres)	Building Area (sq. ft.)	Jobs	Housing Units	Pop.
Business/Industrial/Institutional					
Existing	293	6,830,000	8,500		
Buildout	244.5	18,011,600	37,290		
Net Change	**-48.5**	**11,181,600**	**28,790**		
Commercial/Retail					
Existing	35	440,000	660		
Buildout	49	3,436,320	7,010		
Net Change	**+14**	**2,996,320**	**6,350**		
Mixed Use – Comm./Res.					
Existing	36	705,000	610	65	155
Buildout	61	1,659,080	3,110	3,729	8,450
Net Change	**+25**	**954,080**	**2,500**	**+3,664**	**+8,295**
Residential					
Existing	22			200	474
Buildout, Total	31.5			1,674	3,499
Net Change	**+9.5**			**1,474**	**3,025**
Open Space	**27**				
Total, Existing	413	7,975,000	9,770	265	629
Total, at Buildout	413	21,538,840	47,410	5,403	11,949
Net Change	0	**13,563,840**	**37,640**	**5,138**	**11,320**

The Maximum Theoretical Buildout Alternative assumes an increment of growth, particularly in non-residential use, that is substantially greater than the Project and therefore would result in greater environmental effects for nearly every environmental topic considered. Most of the Project's significant and unavoidable (SU) impacts would be substantially increased in intensity under Alternative 4 when compared with the Project.

Comparative Environmental Assessment, Alternative #4

Aesthetics

Similar to adoption and development under the Project, individual developments that would occur under the Maximum Theoretical Buildout Alternative would be required to incorporate all the City's SCAs, as well as adhere to the City's design review process. Development under the Maximum Theoretical Buildout Alternative would be substantially greater than with the Project. However, with adherence to the City's SCA's and design review process, new development likely would continue to have similar, less than significant aesthetic effects as found for the Project.

Overall, the Maximum Theoretical Buildout Alternative would result in the similar, less than significant aesthetics, shadow and wind impacts (at project-level and cumulative) as identified for the Project. However, because the Maximum Theoretical Buildout Alternative assumes an increment of growth substantially greater than the Project, the aesthetic changes in West Oakland would be substantially increased.

Air Quality

Given the substantially greater development and related construction activity that would occur under the Maximum Theoretical Buildout Alternative compared with the Project and the greater increase in residents and workers that would occur in the Plan Area, air quality emissions and the potential for exposing new residents to air pollutants would be greater than that identified for the Project. The Maximum Theoretical Buildout Alternative would result in greater levels of construction, average daily operational, and maximum annual operational emissions when compared with the Project. Therefore:

- the conservatively assumed significant and unavoidable (SU) air quality impact associated with emissions of criteria air pollutants during construction and operations as identified for the Project would continue to be conservatively SU under the Maximum Theoretical Buildout Alternative, since new development would result in emission levels that exceed thresholds;
- under the Maximum Theoretical Buildout Alternative there still would be the potential for multiple new sources of TACs, each with a cancer risk less than 10 in one million, to cumulatively increase cancer risks to greater than 100 in one million. Therefore, the conservative SU air quality impact identified for the Project would continue to be conservatively SU under the Maximum Theoretical Buildout Alternative;
- the Maximum Theoretical Buildout Alternative also would result in similar, same less than significant air quality impacts related to construction period dust and construction period TAC emissions, since all new development pursuant to the Maximum Theoretical Buildout Alternative would be subject to the same SCAs that would apply to the Project.

Overall, the Maximum Theoretical Buildout Alternative would result in similar significant and unavoidable air quality impacts as identified for the Project. Because the Maximum Theoretical Buildout Alternative assumes an increment of growth substantially greater than the Project, these SU impacts related to air quality would be substantially increased under Alternative 4 when compared with the Project.

Cultural Resources

Under the Maximum Theoretical Buildout Alternative, all sites containing existing historic resources within the Plan Area would be redeveloped, and it would be unlikely that such intense development would be able to avoid, adaptively reuse or appropriately relocate all historically significant structures. Therefore, the less than significant historic resource impact identified for the Project (because no demolition of historic resources is proposed or would be necessary to build out the Plan) would instead become a significant and unavoidable impact under the Maximum Theoretical Buildout Alternative.

All other cultural resources impacts under the Maximum Theoretical Buildout Alternative would be similarly less than significant as identified for the Project.

Greenhouse Gases and Climate Change

The increased development and related construction, operations and vehicle trips that would occur under the Maximum Theoretical Buildout Alternative would generate more annual greenhouse gas emissions compared to the Project. However, the Maximum Theoretical Buildout Alternative would result in a larger service population relative to the estimated annual greenhouse gas emissions. As such, the Maximum Theoretical Buildout Alternative would result in GHG emissions on a per service population ratio that falls below the threshold, similar to the conclusions reached for development pursuant to the Project. All applicable SCAs, including SCA F: GHG Reduction Plan still would be incorporated in future developments, as applicable.

As with the West Oakland Specific Plan, the Maximum Theoretical Buildout Alternative would not conflict with any applicable plan, policy or regulation adopted for the purpose of reducing greenhouse gas emissions.

Hazardous Materials

Under the Maximum Theoretical Buildout Alternative, development still would occur in the Plan Area and construction activities involving demolition, soil disturbance and excavation could continue to potentially expose construction workers and residents to potential hazards and hazardous materials as identified for adoption and development under the Project. These potential hazardous materials include asbestos, PCBs, lead-based paint, contents of underground and aboveground storage tanks, and potentially contaminated soil and water. As with the Project, any new construction would incorporate applicable City SCAs, and therefore would result in similar, less-than-significant impacts associated with hazardous materials and hazards even though the extent of exposure would be greater given the increased development that would occur under the Maximum Theoretical Buildout Alternative.

Land Use, Plans and Policies

Under the Maximum Theoretical Buildout Alternative, development still would occur in the Plan Area, but, development would be at a substantially greater scale compared with the Project. All new development would be required to be consistent with the General Plan and Oakland Zoning designations, as amended under the Plan. The increased development would not introduce land uses unlike those identified with in the Specific Plan, or locate these uses in a manner that would adversely affect existing communities or natural resources more than would the Project.

Noise

Given the substantially increased scale of development and related construction activity that would occur under the Maximum Theoretical Buildout Alternative compared with the Project, construction and operational noise impacts would be greater. However, any new construction would be required to comply with applicable City SCAs and would therefore have similar, less-than-significant construction noise impacts as would occur pursuant to the Project.

The Maximum Theoretical Buildout Alternative would result in substantially greater number of new vehicle daily trips as compared with the Project, and could result in new significant traffic noise and cumulative traffic noise impacts.

Population, Housing, and Employment

Under the Maximum Theoretical Buildout Alternative there would be substantially greater development in the Plan Area compared with the Project. As a result, there would be slightly greater total potential population and substantially greater employment under this Alternative. This level of development, if absorbed within West Oakland, would comprise a greater portion of the region's anticipated employment growth within the Plan Area than does the Project. This level of development is greater than the level of employment growth anticipated (but not theoretically possible) under the current General Plan. Therefore, the Maximum Theoretical Buildout Alternative would have new, significant population, housing and employment impacts as compared to the Project.

Public Services and Recreation Facilities

When compared with to the Project, substantially greater population growth and associated generation of new students would occur as a result of development under the Maximum Theoretical Buildout Alternative. The demand for public services, school facilities, and recreation facilities, and the use of such facilities, also would be greater under the Maximum Theoretical Buildout Alternative. Although all new development would be required to be consistent with the General Plan and to incorporate the City's SCAs, the potential remains that new or expanded public services and facilities may be required to maintain acceptable public service standards, given the increased demand associated with the Maximum Theoretical Buildout Alternative. However, future development would incorporate all City SCA's related to construction activity to ensure less than significant effects, therefore, it is not assumed the potential construction of new facilities that could be needed would result in adverse environmental effects.

Transportation and Circulation

The Maximum Theoretical Buildout Alternative would generate between 70% and 114% more traffic than would be generated by the Project. The Maximum Theoretical Buildout Alternative would continue to cause similar significant impacts as identified for the Project. Although specific intersection evaluation was not conducted, since the Maximum Theoretical Buildout Alternative would generate more traffic than the Project, it can be reasonably assumed that it would cause additional significant, and significant and unavoidable impacts not identified for the Project, and would increase the magnitude of the already identified significant and unavoidable impacts of the Project. The Maximum Theoretical Buildout Alternative is expected to have similar effects on non-traffic operation topics such as transportation safety and consistency with adopted policies, plans, or programs supporting alternative transportation, because the Maximum Theoretical Buildout Alternative would continue to provide similar policies as the West Oakland Specific Plan.

Utilities and Service Systems

Under the Maximum Theoretical Buildout Alternative, the demands for utilities and service systems would be greater than with the Project, given the increased development that would occur. There would be a greater demand for water and energy services, and for increased wastewater and solid waste disposal. Therefore, it is possible that construction of new facilities could be needed to accommodate the substantial level of increased development and demand. The level of development and population growth under the Maximum Theoretical Buildout Alternative could result in the need to construct new or expanded utilities, including in particular water or wastewater facilities. All new development would be required to be consistent with the General Plan and to incorporate the City's SCAs, including in those intended to reduce adverse effects of construction activity to less than significant. New development under this alternative would also be required to adhere to all applicable federal, state and local statutes and regulations that would avoid adverse environmental effects related to energy and solid waste service demands.

Environmentally Superior Alternative

CEQA Guidelines require that the EIR identify an environmentally superior alternative (CEQA Guidelines, Section 15126.6), which is the CEQA alternative that reduces or avoids the environmental impacts identified for adoption and development under the Project to the greatest extent. Consideration of the environmentally superior alternative is based on the extent to which each of the CEQA alternatives reduces or avoids the significant and unavoidable impacts identified for the Project. The extent to which an alternative reduces or avoids less-than-significant impacts identified for the Project is also considered, balanced by consideration of the extent to which the impact affects the physical environment.

Summary of Comparative Assessment

No Project: Alternative 1

Under the No Project Alternative, the pace of new development within West Oakland would be expected to occur at a rate commensurate with development and building permit activity which has occurred over the past 10 to 15 years. It assumes that no new building space would be required to accommodate projected employment growth, that only about 100,000 square feet of mixed-use development would occur along prominent roadway corridors, and that residential growth would continue at a pace of approximately 136 units per year through to the year 2035 resulting in a total of approximately 3,000 total new housing units.

As described in the analysis above, the relatively small amount of new development under the No Project Alternative would substantially reduce the magnitude of potential environmental effects as compared to the Project, including a reduction in the frequency and scale of impacts for which the Project would already have less than significant effects, or for which SCAs would be capable of reducing impacts to a less than significant level. No impacts would be greater than those identified for the Project.

The No Project Alternative would also substantially reduce some of the significant and unavoidable impacts identified for the Project, but not necessarily to a level of less than significant. Impacts related to the exposure of sensitive receptors to excessive odors, the emission of construction-period criteria pollutants, the long-term emission of criteria pollutants and toxic air contaminants during operations, and the exposure of new sensitive receptors to gaseous toxic air contaminants would remain significant and unavoidable even though the extent to which these impacts would occur, and/or the number of new sensitive receptors exposed to these effects would be substantially less under this alternative as compared to the Project.

Because the amount of new growth and development projected under the No Project Alternative is so small, the traffic impacts of that growth would be substantially less than as projected for the Project. It is unlikely that any of the significant and unavoidable traffic impacts identified under the Project would materialize under this alternative.

Because it would reduce the extent of significant air quality impacts and would likely avoid many, if not all of the significant traffic impacts as compared to the Project, the No Project is considered environmentally superior to the Project. However, Section 15126.6(e)(2) of the CEQA Guidelines requires that if the No Project Alternative is identified as the environmentally superior alternative, then the EIR shall identify another alternative as the environmentally superior alternative.

Reduced Project: Alternative 2

This Reduced Project Alternative presents a less intense development plan for West Oakland than as envisioned under the Project. It does not include any of the High Intensity Business overlay designations and assumes a much less intensive “mid-range” level of development throughout the Plan Area. Whereas the Project envisions an ultimate buildout of approximately 5,000 new dwelling units, the Reduced Alternative would accommodate a buildout of approximately 3,400 new dwelling units. Similarly, whereas the Project assumes a growth of approximately 4 million square feet of new business, industrial and commercial building space, the Reduced Alternative assumes development of less than 1 million square feet of new building space. This amount of new growth (by year 2035) is generally equivalent to ABAG’s projections for West Oakland by year 2020.

Under the Reduced Alternative, the lesser amount of new development would reduce the magnitude of potential environmental effects across the spectrum of topics analyzed, as compared to the Project. It would further reduce the frequency and scale of impacts for which the Project would already have less than significant effects, and would reduce the extent to which City of Oakland SCAs would be relied upon to reduce impacts to a less than significant level. No impacts would be greater than those identified for the Project.

The Reduced Alternative would also reduce the magnitude of some of the significant and unavoidable impacts identified for the Project, but not necessarily to a level of less than significant. Impacts related to the exposure of sensitive receptors to excessive odors, the emission of construction-period criteria pollutants, the long-term emission of criteria pollutants and toxic air contaminants during operations, and the exposure of new sensitive receptors to gaseous toxic air contaminants would remain significant and unavoidable, even though the extent to which these impacts would occur, and/or the number of new sensitive receptors exposed to these effects would be less under this alternative.

The number of peak hour vehicle trips generated by the Reduced Alternative would be approximately 2,300 AM peak hour trips less than that generated by the Project, and 2,800 PM peak hour trips less than that generated by the Project. Because the Reduced Alternative would generate less total traffic than would the Project, it would result in fewer significant traffic impacts. Of the 7 intersections found to be adversely affected by the Project’s traffic, 4 of these intersections would be adversely affected by the Reduce Alternative.

Because it would lower the extent of environmental impacts overall (even those indicated a being less than significant) as compared to the Project, reduce the extent of significant and unavoidable air quality impacts (even though not to a less than significant level), and would avoid several of the traffic intersection impacts as identified under the Project, the Reduce Project is considered environmentally superior to the Project.

Scenario with Commercial and Jobs Emphasis: Alternative 3

Alternative #3 is different than the Project in that Alternative #3 does not include many of the changes or conversions of industrial lands to mixed-use (which may include residential use) as proposed under the Project. Under Alternative #3, commercial or business uses (rather than residential use) are located in proximity to the freeways; the West Oakland BART station TOD would include a greater mix of uses including a substantially greater component of commercial/institutional office space; and retail uses (rather than high intensity business and industrial uses), would extend southward from the current West Oakland/Emeryville border to West Grand Avenue. Generally, Alternative #3 includes less residential development (3,500 new dwelling units versus 5,000 units) and more non-residential building space (nearly 4.2 million square feet versus 4.0 million square feet) as compared to the Project.

Alternative #3 would result in a generally similar amount of new development as would the Project, and would have a generally similar overall magnitude of potential environmental effects across the spectrum of topics analyzed as compared to the Project. The City of Oakland SCAs would be relied upon to reduce most of these impacts to a less than significant level.

Most strikingly, Alternative #3 would reduce the number of new sensitive receptors exposed to excessive odors and would reduce the number of new sensitive receptors exposed to diesel particulate matter and gaseous toxic air contaminants, especially at the West Oakland BART station TOD and at infill sites near the freeway. It would not substantially reduce the significant and unavoidable air quality effects associated with emissions of construction-period criteria pollutants, or reduce long-term emission of criteria pollutants and toxic air contaminants during operations

The difference between the Project and Alternative #3 is approximately 1,470 fewer households and approximately 1,240 more jobs under Alternative #3 than under the Project. As a result, Alternative #3 would generate approximately 150 fewer weekday peak hour trips as compared to the Project during both the AM and PM peak hours; however, its traffic patterns would result in significant impacts at two more intersections than the Project scenario. Since this Alternative would generate the same significant traffic impacts at the 6 intersections adversely affected by the Project and a 2 additional intersections, it would have slightly greater traffic impacts than does the Project.

Because it would, reduce the number of new sensitive receptors exposed to diesel particulate matter and gaseous toxic air contaminants), but would increase the number of traffic intersection adversely affected by increased traffic, Alternative #3 is considered environmentally balanced as compared to the Project and not environmentally superior to the Reduced Alternative.

Theoretical Maximum Buildout: Alternative #4

The Maximum Theoretical Buildout Alternative's overall development would be substantially greater, roughly 3.3 times as much non-residential development and an approximately 8% increase in residential development, as compared to the Project. Given the substantially greater development and related construction activity that would occur under the Maximum Theoretical Buildout Alternative compared with the Project, and the greater increase in residents and workers that would occur in the Plan Area, the Maximum Theoretical Buildout Alternative would result in greater impacts across the spectrum of issues analyzed in this EIR, would result in greater air quality emissions, would expose more new residents to air pollutants, and would generate more traffic than would the Project. Alternative #4 is not considered environmentally superior to the Project or to any of the other alternatives.

Identification of Environmentally Superior Alternative

In summary, the Reduced Alternative is considered the environmentally superior alternative, as it would avoid and/or substantially reduce impacts to the greatest extent as compared to the Project or to any of the other alternatives.

When considering the merits of the Project as compared to other alternatives, the City will also weigh and assess the degree to which the Project and these alternatives also achieve the basic objectives of the Project, as briefly summarized below:

- augment West Oakland's development capabilities;
- encourage growth of additional jobs and services;
- establish the most desirable and beneficial land uses within West Oakland;
- attract quality, compatible residential, commercial and industrial development while preserving existing established residential neighborhoods;
- support existing investment in the area and enhance existing assets;.
- support commercial, mixed-use and transit-oriented land uses in West Oakland, especially including at the West Oakland BART Station;
- lessen existing land use conflicts and ensure avoidance of future conflicts between residential neighborhoods and non-residential uses;
- enhance transportation resources;
- further the physical and economic revitalization of West Oakland;
- correspond with regional development plans in accordance with West Oakland's Priority Development Area designation; and
- minimize the potential for displacement of existing residents.

6

CEQA Required Assessment Conclusions

This chapter summarizes the EIR findings in terms of the assessment categories required by Section 21100 of the California Environmental Quality Act: growth-inducing impacts; significant irreversible changes; unavoidable significant impacts; cumulative impacts; and effects found not to be significant.

Growth-Inducing Impacts

Section 211 00(b)(5) of CEOA requires that an EIR include information regarding the growth-inducing impacts of the proposed project. CEOA Guidelines section 15126.2(d) states that an EIR shall: "Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing either directly or indirectly, in the surrounding environment. ... It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment." The Specific Plan may foster economic growth, result in population growth, and indirectly result in the construction of additional housing and non-residential development within Oakland and the Bay Area region.

Amount and Locations of Growth Facilitated by the Specific Plan

The Specific Plan sets forth a specifically defined proposal for growth and revitalization in West Oakland, focusing on key Opportunity Areas and Opportunity Sites. Implementation of the Specific Plan would result in population growth and would foster economic growth, stimulate private investment and increase the community's supply of housing. For CEQA environmental impact assessment purposes, it is assumed in this EIR that the Specific Plan would be fully successful in facilitating economic revitalization of the Planning Area and development of new employment uses and new housing on the 37 Opportunity Sites, as well as additional infill development on vacant and underutilized properties throughout the Opportunity Areas, by 2035. As shown on Table 4.8-5, the Specific Plan would provide for development of up to approximately 5,090 net new housing units and 4.03 million square feet of net new non-residential space within the Opportunity Areas by 2035. This development would result in an estimated 11,136 net new residents and 14,850 net new jobs by 2035. This population increase would not in itself constitute a significant adverse environmental impact.

Nearly all of the growth facilitated by the Specific Plan would occur in the four Opportunity Areas, which contain numerous vacant and underutilized properties, and older facilities that no longer meet current standards and market conditions, and thus have the most potential for change. Within the four Opportunity Areas, new development is most likely to occur on the 37 Opportunity Sites. These Opportunity Sites are individual parcels or groups of parcels which are vacant, underutilized, blighted or which contain uses that conflict with nearby residential neighborhoods. The Opportunity Sites were identified by the City as being available for development based on previous development applications or where the City has consistently sought opportunities to re-make these sites into positive contributors to the community through development outreach. Development of the Opportunity Sites is in turn expected to encourage development of other properties in the surrounding Opportunity Area.

Comparison of Specific Plan and ABAG Growth Projections

ABAG periodically produces growth forecasts for public information and for use by other regional agencies, including the Metropolitan Transportation Commission (MTC) and the Bay Area Air Quality Management District (BAAQMD), in making project funding and regulatory decisions. For example, the ABAG projections provide the basis for the MTC Regional Transportation Plan and the BAAQMD regional Ozone Attainment Plan. The ABAG projections are also the basis for the Alameda County Congestion Management Agency (ACCMA) regional traffic model.

The General Plans and development regulations of local jurisdictions are a key basis for the ABAG projections. The forecasts also reflect larger realities like climate change, high energy costs and the aging population, which over the long term, are expected to influence development outcomes. The ABAG projections also reflect the anticipated impact of "smart growth" policies and incentives in shifting development patterns from historical trends toward better jobs-housing balance, cleaner air, lower greenhouse gas (GHG) emissions, increased preservation of open space, and lower housing and travel costs.

The Specific Plan build-out projections are consistent with the ABAG projections of household and employment growth, and would therefore not represent growth for which adequate planning has not occurred.

General Plan Amendments

Implementation of the Specific Plan would require (and the project analyzed in this EIR assumes) General Plan amendments to allow residential development of specific sites currently not planned nor zoned for residential purposes. The potential environmental consequences of these proposed General Plan amendments/zoning changes and their resulting residential development on the subject parcels are assessed in the respective individual chapters within this EIR. With the General Plan amendments, the amount of new development allowed under the Specific Plan would not represent an increase over the amount of development allowed under the General Plan.

Growth Inducement

Growth within West Oakland under the Specific Plan would generate jobs, personal income, and revenue to the City, to the extent that such growth was attracted to West Oakland from elsewhere in the region and not from elsewhere in Oakland. New uses attracted to the Planning Area would generate increased local demand for goods and services, and additional indirect jobs and personal income through an economic "multiplier effect". The multiplier effect describes the indirect and induced employment and income generated by the Specific Plan. For every new job, other jobs are attracted to the local economy to support that job.

The Specific Plan recommends improvements to streets and water, sewer and storm drainage facilities within the Planning Area, which may in limited cases be designed to also accommodate growth in adjacent areas. Growth in West Oakland in accordance with the Specific Plan may, to a limited extent, increase the potential for development and redevelopment in some surrounding areas both within and outside of the West Oakland Planning Area. Any such potential would be limited by the ability of the market to "absorb" the amount of development allowed by the Specific Plan. Given the types of uses targeted by the Specific Plan, and existing plans for surrounding areas, any potential for such induced growth would likely occur in industrial areas of the Jack London waterfront adjacent to the 3rd Street Opportunity Area, rather than at the former Oakland Army Base or Downtown Oakland. New economic activity and growth outside West Oakland may in turn increase traffic, air quality and noise impacts, and generate demand for housing, public services and utilities, the expansion or new construction of which could cause environmental impacts. This potential indirect growth would occur in accordance with the General Plan and the 2007-2014 Housing Element, and applicable neighborhood plans, specific plans and other plans, which have undergone their own program-level environmental review under CEQA. Potential new development projects may require their own project-level environmental review in accordance with CEQA. The location, timing, nature, extent and severity of the potential environmental impacts of any given project are too speculative to predict or evaluate in this EIR.

In summary, the potential environmental impacts of development within West Oakland facilitated by the Specific Plan have been evaluated in this EIR. The Specific Plan build-out projections are consistent with the ABAG projections of household and employment growth. Potential induced growth, if any, outside the Opportunity Areas due to infrastructure improvements, enhanced development potential on adjacent land, or increased economic activity, would occur as already contemplated in and consistent with adopted plans and the environmental documents prepared for those plans. Therefore, growth facilitated or induced by the Specific Plan would not represent growth for which adequate planning has not occurred, and the growth inducement impacts of the Specific Plan would be less than significant.

Significant Irreversible Changes

CEQA Guidelines Section 15126(c) requires that an EIR also discuss "significant irreversible environmental changes which would be caused by the proposed project should it be implemented." These may include current or future uses of non-renewable resources, and secondary or growth-inducing impacts that commit future generations to similar uses. Irreversible commitments of resources should be evaluated to assure that such current consumption is justified. The CEQA Guidelines describe three distinct categories of significant irreversible changes: (1) changes in land use that would commit future generations; (2) irreversible changes from environmental accidents; and (3) consumption of non-renewable resources.

The Specific Plan would commit future generations to an increase in development intensity and changes in land use and visual character within the Planning Area. Given the significant public and private investments in buildings and other improvements associated with these changes, and the anticipated lifetime of these improvements, these changes would not be likely to be reversed or significantly changed for many years to come.

The Specific Plan may also result in the unavoidable irreversible loss of significant historic resources. Development under the Specific Plan would not be expected to involve significant quantities of hazardous materials, nor other potential for environmental accidents. While some new uses in accordance with the Specific Plan would involve the use, transport, storage and disposal of hazardous materials, such activities would comply with existing federal, State and County regulations and standards, and the routine practices of regulatory and oversight agencies, which would reduce the likelihood and severity of environmental accidents which could result in irreversible environmental damage.

Development under the Specific Plan would irreversibly commit construction materials and non-renewable energy resources to the purposes of the projects. These energy resource demands would be used for demolition, construction, transportation of people and goods, heating, ventilation and air conditioning, lighting, and other associated energy needs. Because development facilitated by the Specific Plan would be required to comply with California Code of Regulations Title 24 energy regulations, the Specific Plan would not be expected to use energy in a wasteful, inefficient, or unnecessary manner.

Non-renewable and slowly renewable resources used by projects that implement the Specific Plan would include, but are not limited to, lumber and other forest products; sand and gravel; asphalt; petrochemical construction materials; steel; copper; lead and other metals; water; etc. The impacts of the Specific Plan related to consumption of nonrenewable and slowly renewable resources are considered to be less than significant because these projects would not use unusual amounts of energy or construction materials.

Unavoidable Significant Impacts

CEQA Guidelines section 15126.2(b) requires that the EIR discuss "significant environmental effects which cannot be avoided if the proposed project is implemented." Unavoidable significant impacts are those that could not be reduced to less-than-significant levels by mitigation measures, as part of the project, or other mitigation measures that could be implemented. The Specific Plan would result in the following unavoidable significant impacts:

Air Quality

- **Air-3: Odor Impacts**. Development in accordance with the Specific Plan could expose a substantial number of new people to existing and new objectionable odors. Potential effects of the environment on a project are legally not required to be analyzed or mitigated under CEQA. This EIR nevertheless analyzes potential effects of the environment on the project (i.e. siting new receptors near existing and potential new odor sources) in order to provide information to the public and decision-makers.
- **Impact Air-5**: During construction, individual development projects pursuant to the Specific Plan will generate regional ozone precursor emissions from construction equipment exhaust. For most individual development projects, construction emissions will be effectively reduced to a level of less than significant with implementation of required City of Oakland Standard Conditions of Approval. However, larger individual construction projects could generate emissions of criteria air pollutants that would exceed the City's thresholds of significance.
- **Impact Air-7**: Once buildout of the Specific Plan is complete and all of the expected new development is fully occupied, new development pursuant to the Specific Plan will generate emissions of criteria pollutants (ROG, NO_x PM_{10} and $PM_{2.5}$) as a result of increased motor vehicle traffic and area source emissions. Traffic emissions combined with anticipated area source emissions would generate levels of criteria air pollutants that would exceed the City's project-level thresholds of significance.
- **Impact Air-9:** Development pursuant to the West Oakland Specific Plan would include new light industrial, custom manufacturing and other similar land uses, as well as the introduction of new diesel generators that could emit toxic emissions. resulting in (a) a cancer risk level greater than 10 in one million, (b) a chronic or acute hazard index greater than 1.0, or (c) an increase of annual average PM2.5 concentration of greater than 0.3 micrograms per cubic meter; or under cumulative conditions, resulting in a) a cancer risk level greater than 100 in a million, b) a chronic or acute hazard index greater than 10.0, or c) annual average PM2.5 of greater than 0.8 micrograms per cubic meter.
- **Air-10**: Certain future development projects in accordance with the West Oakland Specific Plan could result in new sensitive receptors exposed to existing levels of toxic air contaminants (TACs) or concentrations of PM2.5 that could result in increased cancer risk or other health hazards. CEQA requires the analysis of potential adverse effects of a project on the environment. Potential effects

of the environment on a project are legally not required to be analyzed or mitigated under CEQA. However, this EIR nevertheless analyzes potential effects of the environment on the project (i.e. siting new receptors near existing TAC sources) in order to provide information to the public and decision-makers.

Greenhouse Gas Emissions

- **Impact GHG-3:** It is possible that on an individual basis, certain development project envisioned and enabled under the Specific Plan could exceed, on an individual and project-by-project basis, the project-level GHG threshold. Under the City's required SCAs, individual development projects exceeding project-level screening criteria are required to undergo project-specific GHG emissions forecasts and, as appropriate, implement project-specific GHG reduction plans with the goal of increasing energy efficiency and reducing GHG emissions to the greatest extent feasible below both applicable numeric City of Oakland CEQA Thresholds. However, not until these tiered projects are proposed and evaluated can the efficacy of each individual project's design characteristics, applicable SCAs and other City policies (particularly SCA F) in reducing GHG emissions to below relevant thresholds be determined.

Traffic and Transportation

- **Impact Trans-1** (Existing plus Project) **and -3** (Cumulative plus Project) **at Hollis and 40th Street**: The addition of traffic generated by the full development of the proposed Project to both Existing conditions and Cumulative 2035 conditions would cause PM peak hour southbound left turn 95th percentile queue length at the signalized intersection of Hollis and 40th Street (#1) located in Emeryville to exceed the available queue storage. Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed.
- **Impact Trans-2** (Existing plus Project) **and -4** (Cumulative plus Project) **at San Pablo Avenue and 40th Street**: The addition of traffic generated by the full development of the proposed Project to both Existing Conditions and Cumulative 20135 Conditions would cause PM peak hour traffic operations at the signalized intersection of San Pablo Avenue and 40th Street (#2) located in Emeryville to degrade from LOS D to LOS E under Existing plus Project conditions. Additionally, the eastbound left and northbound left turn 95th percentile queue length would exceed the available queue storage in the AM peak hour. Because this intersection is within the City of Emeryville's jurisdiction, the timing and implementation of the improvements are not under the City of Oakland's control. Therefore, the improvement cannot be assured to be completed.
- **Impact Trans-5** (Cumulative plus Project) **at Mandela Parkway and West Grand Avenue:** The addition of traffic generated by the full development of the Specific Plan under Cumulative 2035 conditions would degrade operation from LOS D to LOS F in the AM peak hour, and from LOS E to LOS F in the PM peak hour at the signalized intersection at Mandela Parkway and West Grand Avenue (#7) located outside the Downtown Area and would increase the volume-to-capacity ratio beyond the threshold of significance. The recommended mitigation measures would encroach into Memorial Park and the street medians, and the provision of four westbound lanes would preclude planned installation of a bicycle facility on West Grand Avenue which is a City priority (Resolution 84197, Nov 2012). Therefore, these additional improvements are not recommended.

Effects Found Not to be Significant

Section 15128 of the CEQA Guidelines requires that the EIR "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were therefore not discussed in detail in the EIR." All environmental topics are addressed in this EIR, as found in Chapters 4.1 through 4.12.

7

Report Preparation

Report Preparers

City of Oakland

Community and Economic Development Agency

250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Rachel Flynn, Deputy Director, Office of Community and Economic Development
Ed Manasse, Strategic Planning Manager
Elois Thornton, Planner, Project Manager West Oakland Specific Plan
Ulla-Britt Jonsson, Planner
Hui-Chang Li, Office of Neighborhood Investment
Betty Marvin, Planner
Jamie Parks, City of Oakland Transportation Services
Margot Lederer-Prado, City of Oakland – Economic and Workforce Development

Consultant Team

Lamphier-Gregory

Urban Planning & Environmental Analysis
1944 Embarcadero
Oakland, California 94606

Scott Gregory, President and Project Manager
Rebecca Gorton, Senior Planner
Noé Noyola, Associate Planner

JRDV Urban International

Morten Jensen, Principal
Art Clark, Project Manager
Savlan Hauser, Senior Designer
Takafumi Katsuura, Senior Designer
Sean Aung, Designer

Kittleson & Associates (Transportation)

Mark Bowman, Principal
Debbie Yueh, AICP

Hausrath Economics Group (Economics, Population, Employment)

Linda Hausrath, Principal

Conley Consulting Group (Economics)

Denise Conley

Redwood Consulting (Utilities)

Linda DeBolt, Principal

References

Aesthetics

California Codes, Public Resource Code Sections 25980-25986, www.leginfo.ca.gov/calaw.html

California Energy Commission, 2008 Nonresidential Compliance Manual, Outdoor Lighting, 2008 www.energy.ca.gov /title24/2008standards/outdoorlighting

Oakland, City of, Oakland Army Base Project Initial Study/Addendum, May 2012, pp. 82-118

Oakland, City of, General Plan Scenic Highways Element, September 1974

Air Quality

Bay Area Air Quality Management District, Toxic Air Contaminant Control Program Annual Report, Volume 1, August, 2003

Bay Area Air Quality Management District, Bay Area 2010 Clean Air Plan, Executive Summary, 2010, http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Plans/2010%20Clean%20Air%20Plan/Executive%20Summary%20of%20Bay%20Area%202010%20CAP.ashx

Bay Area Air Quality Management District, Bay Area Pollution Summary

California Air Resources Board, Air Quality and Land Use Handbook: A Community Health Perspective, April 2005

California Air Resources Board, The 2009 California Almanac of Emissions and Air Quality, Sacramento, CA, 2009

California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998 meeting

East Bay Municipal Utilities District, Draft Environmental Impact Report, Main Wastewater Treatment Plant Land Use Master Plan, February 2011

Cultural Resources

California Historical Resources Information System Northwest Information Center, NWIC File No.: 12-0390, Record Search Results for the Proposed West Oakland Specific Plan, Oakland, City of, CA, November 15, 2012

Oakland, City of, General Plan Historic Preservation Element, 1994, as amended 1998; p. 1-2 through 1-9

Oakland, City of, Oakland Cultural Heritage Survey

Oakland, City of, Wood Street Project Final Environmental Impact Report, February 2005

Greenhouse Gas Emissions

Bay Area Air Quality Management District, CEQA Guidelines, http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQAGuidelines.aspx

Bay Area Air Quality Management District, Source Inventory of Bay Area Greenhouse Gas Emissions, February 2010

Brekke, L.D., et al, “Climate Change Impacts Uncertainty for Water Resources in the San Joaquin River Basin, California.” Journal of the American Water Resources Association. 40(2): 149–164. Malden, MA, Blackwell Synergy for AWRA, 2004

California Air Resources Board (ARB), Public Workshop to Discuss Establishing the 1990 Emissions Level and the California 2020 Limit and Developing Regulations to Require Reporting of Greenhouse Gas Emissions, Sacramento, CA. December 1, 2006

California Climate Change Center (CCCC), Our Changing Climate: Assessing the Risks to California, CEC-500-2006-077, Sacramento, CA. July 2006

California Department of Water Resources (DWR), Progress on Incorporating Climate Change into Management of California Water Resources, Sacramento, CA, July 2006

California Energy Commission (CEC), Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 - Final Staff Report, publication # CEC-600-2006-013-SF, Sacramento, CA, December 22, 2006; and January 23, 2007 update to that report

California EPA, Final 2006 Climate Action Team Report to the Governor and Legislature, Sacramento, CA. April 2006

California Water Code, Section 10631c

Climate Change Technology Program (CCTP), About the U.S. Climate Change Technology Program (web page), Washington, D.C., April 2006, http://www.climatetechnology.gov/about/index.htm, accessed July 24, 2007

International Panel on Climate Change (IPCC), Special Report on Emissions Scenarios, 2000, www.grida.no/climate/ipcc/emission/002.htm, accessed July 24, 200.

Kiparsky 2003, op. cit; DWR, 2005, op. cit.; Cayan, D., et al, Scenarios of Climate Change in California: An Overview (White Paper, CEC-500-2005-203-SF), Sacramento, CA, February 2006

Kiparsky, M. and P.H. Gleick, Climate Change and California Water Resources: A Survey and Summary of the Literature, Oakland, CA: Pacific Institute for Studies in Development, July 2003

Parmesan, C. and H. Galbraith, Observed Impacts of Global Climate Change in the U.S., Arlington, VA: Pew Center on Global Climate Change, November 2004

San Francisco Bay Conservation and Development Commission (BCDC), Adapting to Rising Tides Vulnerability Assessment: Neighborhood of West Oakland, City of Oakland, California

U.S. Environmental Protection Agency, Global Warming – Climate: Uncertainties (web page), January 2000, http://yosemite.epa.gov/oar/globalwarming.nsf/content/ClimateUncertainties.html#, accessed July 24, 2007

U.S. Environmental Protection Agency, General Information on the Link Between Solid Waste and Greenhouse Gas Emissions (web page), October, 2006 http://www.epa.gov/climatechange/wycd/waste/generalinfo.html, accessed August 10, 2007

U.S. Supreme Court, Massachusetts et. al. v. EPA et. al (No. 05-1120, 415F 3d 50), April 2, 2007

United Nations Framework Convention on Climate Change (UNFCCC), Sum of Annex I and Non-Annex I Countries Without Counting Land-Use, Land-Use Change and Forestry (LULUCF), Predefined Queries: GHG total without LULUCF (Annex I Parties). Bonn, Germany, http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php, accessed May 2, 2007

Hazards and Hazardous Materials

Alameda County Health Care Services, Agency Case File Review for SLIC Case RO0002896 and GeoTracker Global ID T06019794669, Red Star Yeast/1396 Fifth Street LLC, https://geotracker.waterboards.ca.gov/regulators/deliverable_documents/9375492691/RO2896_DIR_L_2012-12-18.pdf

Alameda County Health Care Services Agency, Draft Fact Sheet - Proposed Soil Cleanup, Red Star Yeast, April 28, 2011, https://geotracker.waterboards.ca.gov/regulators/deliverable_documents/3402677774/RO2896%2C%20Red%20Star%20Yeast%2C%201396%205th%20Street%2C%20Oakland%20Fact%20Sheet%202011-04-20.pdf

CalFIRE, Alameda County Very High Fire Hazard Severity Zone Map as Recommended by CalFIRE, September 2008, http://frap.cdf.ca.gov/webdata/maps/alameda/fhszl_map.1.pdf

California Department of Toxic Substances Control, Envirostor Database, http://www.envirostor.dtsc.ca.gov

California Department of Toxic Substances Control, DTSC Report of Completion of Remedial Action, February 2007, http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/8268796622/DTSC%20Report%20of%20Completion%20of%20RA.pdf

California Department of Toxic Substances Control, Screening Assessment for 2601 Peralta, June 23, 2006, http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/4671186149/Site%20Screening%20Assessment.pdf

California Department of Toxic Substances Control, Site Certification Synopsis, BART-Mandela Parkway Site at 349 Mandela Parkway, April 2000, http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/9535382926/madela%20site%20certification%20synopsis.pdf

California Department of Toxic Substances Control Caltrans, Voluntary Cleanup Agreement, Cypress Freeway Reconstruction Project and East Bay Municipal Utility District Sewer Line Realignment, Oakland and Emeryville, CA. May 10, 1994

California State Water Resources Control Board, Geotracker Reports

California Waterboards, Office of Public Affairs Factsheet - Goetracker, April 2010, http://www.waterboards.ca.gov/water_issues/programs/gama/docs/geotracker_factsheet.pdf

California Department of Toxic Substances Control, letter to Alliance for West Oakland Development and SF BART, October 3, 2007, http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/7848157584/WOBS_CL_100307.pdf

Environmental Data Resources, Inc. (EDR), 2012

Environmental Data Resources, Inc., 2011.

Neighborhood Information on Chemical Hazards in the Environment (NICHE) Project, An Analysis of 1,076 Spills in Oakland, California that Were Reported to the Emergency Response Notification System from 1987 to 1996, 1997, http://home.earthlink.net/~clearh2orev/ernsweb.html

Northgate Environmental Management, Inc., Sampling and Analysis Plan, Phase II Soil Investigation, prepared for the City of Oakland under EPA Brownfields Assistance Grant Number 2B-00T18101-0, July 14, 2011, http://www.envirostor.dtsc.ca.gov/regulators/deliverable_documents/9784458756/Phase%20II%20Sampling%20and%20Analysis%20Plan_7-14-11.pdf

Sampling and Analysis Plan, Phase II Soil and Groundwater Investigation at 500 Kirkham Street

Oakland, City of, General Plan Safety Element, 2004

U.S. Environmental Protection Agency, Round 2-4c: Refining CERCLIS, www.epa.gov/superfund/programs/reforms/reforms/2-4c.htm

U.S. Environmental Protection Agency, Superfund Site Information, http://cumulis.epa.gov/supercpad/cursites/srchsites.cfm

U.S. Environmental Protection Agency, Superfund - Basic Information, http://www.epa.gov/superfund/about.htm

U.S. Environmental Protection Agency, Pacific Southwest, Region 9: Superfund, AMCO Chemical, http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/db29676ab46e80818825742600743734/ab06578104c4a569882571bd00755ed0!OpenDocument, accessed October 16, 2012.

Weiss Associates, Targeted Site Investigation and Analysis Report for West Oakland Bay Area Rapid Transit Station, Oakland, California, June 29, 2007

Land Use Plans and Policies

Alameda County Assessor; Oakland, City of; Hausrath Economics Group

Gateway Park Working Group, Gateway Park Project Concept Report, September 2012

Oakland, City of, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012

Oakland, City of, Oakland Army Base Reuse Plan, 2003

Noise

Bolt, Beranek & Newman, Noise Control for Buildings and Manufacturing Plants, 1987

Caltrans, Technical Noise Supplement (TeNS), November 2009

CirclePoint, City of Oakland, Acadia Park Residential Project Draft EIR, July 2005, with technical studies by Charles Salter Associates, March 2005

Environmental Science Associates, Jack London Square Redevelopment Project EIR, 2003

Harris, Handbook of Acoustical Measurements and Noise Control, 1998

Oakland, City of, 2004 Noise Element of the General Plan, technical studies by Illingworth and Rodkin, 2004

Oakland, City of, Gateway Community Development Project Draft EIR, ESA, August 2007, with technical studies by Illingworth & Rodkin, 2004

Oakland, City of, MacArthur BART Transit Village Draft EIR, LSA Associates, 2007

Oakland, City of, Noise Element City of Oakland General Plan, June 2005, pp. 23-25

Oakland, City of, Oakland Municipal Code, Section 17.120.050

Oakland, City of, West Oakland Redevelopment Plan EIR, 2003

PBS&J, 2009 Housing Element EIR, 2009

PBS&J, Transit Noise and Vibration Impact Assessment, Chapter 12, Noise and Vibration During Construction, May 2006

Port of Oakland, Health Impact Assessment, conducted by the UC Berkeley Health Impact Group, 2010

Population, Housing, Employment

Conley Consulting Group, West Oakland Specific Plan Market Opportunity: Housing, Retail and Arts, Oakland, California, December 2011

Hausrath Economics Group, December 2012

Oakland, City of, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012

U.S. Census, ABAG Projections, 2007

Public Services and Recreation

Board of Education of the Oakland Unified School District, Public Hearing and Adoption by the Board of Education of Resolution No.1213-0090 - Approving the School Facility Fee Justification Report for Residential, Commercial and Industrial Development Project

Conley Consulting group, West Oakland Specific Plan Market Opportunity: Housing, Retail and Arts, Oakland, California, December 2011

Ed-data, 2010

Gateway Park Working Group, Gateway Park Project Concept Report, September 2012.

Oakland Fire Department, Map of Oakland California Fire Stations, http://www.ww6or.com/OAKFIRE.HTM, accessed July 26, 2012

Oakland Unified School District (OUSD), Multi-Year Fiscal Recovery Plan, 2005

Oakland Unified School District (OUSD), Our Challenges and Goals, 2012, http://publicportal.ousd.k12.ca.us/199410102104342143/site/default.asp?

Oakland Unified School District (OUSD), School Sites by Region or Network w/Site Number, http://publicportal.ousd.k12.ca.us/ousd/lib/ousd/_shared/2010-11SchoolSitesbyRegionasof8.2.10-2.pdf, accessed July 18, 2012

Oakland, City of, 2012 Oakland Army Base Project Initial Study/Addendum, May 2012

Oakland, City of, General Plan Open Space, Conservation and Recreation (OSCAR) Element, 1994

Oakland, City of, Oakland Fire Department (OFD), Special Operations, 2009, www.oaklandnet.com/fire/operations/special_operations.asp

Oakland, City of, Oakland Fire Department, http://www.oaklandnet.com/fire/

Oakland, City of, Oakland Police Department (OPD), Strategic Plan, Working Draft, August 2010, www.oaklandnet.com/oakca/groups/police/documents/webcontent/dowd022061.pdf

Oakland, City of, Oakland Police Department, Police Service Areas & Beats, July 26, 2012

Oakland, City of, Oakland Police Department, Strategic Plan Working Draft, August 2010

Oakland, City of, Office of Parks and Recreation, website, http://www2.oaklandnet.com/Government/o/opr/s/Parks/index.htm

State Allocation Board (SAB) Meeting Actions, 2010 - Developer Fee Adjustment, http://www.cashnet.org/news/article.esiml?id=1368

Trust for Public Land and Center for Park Excellence, 2010 City Park Facts, 2010

Transportation

Alameda CTC, Congestion Management Plan 2011, December 2011

Caltrans, Guide for the Preparation of Traffic Impact Studies, December 2002

Caltrnas, Complete Streets Implementation Action Plan, February 2010

Kittelson & Associates, Bus Routes Serving West Oakland with High Load Factors, December 2012

Kittelson & Associates, Bus Trip Distribution to/from West Oakland, December 2012

Kittelson & Associates, Intersection Level of Service Summary - Existing Summary, 2013

MTC, Transportation 2035 Plan for the San Francisco Bay Area, April 2009

Oakland, City of, Bicycle Master Plan, December 2007

Oakland, City of, Land Use and Transportation Element, 1998

Oakland, City of, Pedestrian Master Plan, November 2002

Transportation Research Board, Highway Capacity Manual, 2000

Utilities

Alameda County Waste Management Authority (ACWMA), Alameda County Integrated Waste Management Plan, Countywide Element, February 2003 as amended January 2011

BKF Engineers, Industrial District Strategy Support Public Infrastructure Report, Mandela Parkway/3rd Street Corridor Commercial Industrial Zones, (West Oakland Infrastructure Report), March 2011

California Department of Resources Recycling and Recovery (CalRecycle), Disposal Reporting System, April 29, 2011, http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/default.aspx

California Energy Commission, 2011

California Water Code, Division 6, Part 2.6

CH2MHill, City of Oakland, Storm Drain Master Plan, 2006

East Bay Municipal Utilities District, Urban Water Management Plan, 2000

East Bay Municipal Utility District, Daily Water Supply Report, August 5, 2005, www.ebmud.com/water_&_environment/water_supply/daily_reports/default.htm

East Bay Municipal Utility District, Wastewater Treatment, http://www.ebmud.com/wastewater/treatment/

East Bay Municipal Utility District, Water Supply Assessment (WSA), 2013

East Bay Municipal Utility District, Water Supply Master Plan 2040, October 2009

Oakland, City of, Housing Element of the General Plan Draft EIR, August 2010

Oakland, City of, General Plan Land Use and Transportation Element Draft Environmental Impact Report State Clearinghouse No. 97062089, 1998

Oakland, City of, Sanitary Sewer Design Standards, August 2008

Redwood Consulting, 2012

Other Less Than Significant Effects

Association of Bay Area Governments, Geographic Information Systems, Hazards Maps, Dam Failure Inundation Areas website, accessed June 22, 2012, http://www.abag.ca.gov/cgi-bin/pickdamx.pl

Association of Bay Area Governments, Hazards Program, Landslide Maps and Information website, accessed June 22, 2012, http://quake.abag.ca.gov/landslides/

California Department of Fish and Game, California Natural Diversity Database, Biogeographic Data Branch, August 8, 2012

U.S. Geological Survey, Geologic map and map database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California, R.W. Graymer, 2000

Appendix 1-A: Notice of Preparation

CITY OF OAKLAND

DALZIEL BUILDING • 250 FRANK OGAWA PLAZA, SUITE 3315 • OAKLAND, CALIFORNIA 94612-2032

Department of Planning, Building and Neighborhood Preservation
Strategic Planning Division

(510) 238-3941
FAX (510) 238-6538
TTD (510) 238-3254

October 22, 2012

NOTICE OF PREPARATION (NOP) OF A DRAFT ENVIRONMENTAL IMPACT REPORT (EIR) FOR PROPOSED WEST OAKLAND SPECIFIC PLAN

The City of Oakland Department of Planning, Building and Neighborhood Preservation is preparing a Draft Environmental Impact Report (EIR) for the proposed West Oakland Specific Plan ('The Project') as described below, and is requesting comments on the scope and content of the EIR. The EIR will address the potential physical environmental effects for each of the environmental topics outlined in the California Environmental Quality Act (CEQA). The City has **not** prepared an Initial Study and all CEQA topics will be addressed in the EIR.

The City of Oakland is the Lead Agency for the project and is the public agency with the greatest responsibility for approving the Project and carrying it out. This notice is being sent to Responsible Agencies and other interested parties. Responsible Agencies are those public agencies, besides the City of Oakland, that also have a role in approving or carrying out the Project. When the Draft EIR is published, it will be sent to all Responsible Agencies and to others who respond to this NOP or who otherwise indicate that they would like to receive a copy.

Responses to this NOP and any questions or comments should be directed in writing or via email to:

Ulla-Britt Jonsson, Planner II
City of Oakland Strategic Planning Division
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA, 94612
Phone: (510) 238-3322
Fax: (510) 238-4730
E-mail: ujonsson@oaklandnet.com

Comments on the NOP must be received at the above mailing or e-mail address by **5:00 p.m. November 21, 2012**. Please reference **Case Number ER120018** in all correspondence. Comments should focus on discussing possible impacts on the physical environment, ways in which potential adverse effects might be minimized, and alternatives to the project in light of the EIR's purpose to provide useful and accurate information about such factors.

In addition, comments may be provided at the EIR Scoping Meetings to be held before the Oakland Landmarks Preservation Advisory Board and Oakland City Planning Commission:

LANDMARKS PRESERVATION ADVISORY BOARD SCOPING MEETING **November 5, 2012, 6:00 p.m.** **Oakland City Hall** **City Council Chamber** **One Frank H. Ogawa Plaza** **Oakland, CA 94612**	**CITY PLANNING COMMISSION SCOPING MEETING** **November 14, 2012, 6:00 p.m.** **Oakland City Hall** **City Council Chamber** **One Frank H. Ogawa Plaza** **Oakland, CA 94612**

PROJECT TITLE: West Oakland Specific Plan

PROJECT LOCATION: The West Oakland Specific Plan area is generally bounded by Interstate-580 (MacArthur Freeway) to the north, Interstate-980 to the east, and the re-located Interstate-880 (Nimitz Freeway) wrapping around the south and west. See attached Project Description for more information.

PROJECT SPONSOR: The City of Oakland is the Project Sponsor for this planning effort.

EXISTING CONDITIONS: The West Oakland Specific Plan area contains a mix of residential, Industrial, commercial, and institutional uses. See attached Project Description for more information.

PROJECT PURPOSE: The purpose of the West Oakland Specific Plan to provide a comprehensive, consistent and multi-faceted vision for development and redevelopment of vacant and/or underutilized commercial and industrial properties in West Oakland, establish a land use and development framework, identify needed transportation and infrastructure improvements, and recommend implementation strategies. See attached Project Description for more information.

PROJECT DESCRIPTION: The West Oakland Specific Plan will guide future development in West Oakland, including a framework for developing undervalued and blighted land. The Specific Plan will include strategies for transit-oriented development at the West Oakland BART Station, to better link transportation choices with new housing and employment options within the community. See attached Project Description for more information.

PROBABLE ENVIRONMENTAL EFFECTS: It is anticipated that the proposed project may result in potentially significant environmental effects to the following:

- Aesthetics, shadow and wind
- Air quality
- Biological resources

- Cultural and historic resources
- Geology and soils
- Greenhouse gas emissions/climate change
- Hazards and hazardous materials
- Hydrology and water quality
- Land use and planning
- Noise
- Population, housing and employment
- Public services and recreation
- Transportation
- Utilities and service systems

All of the noted environmental factors will be analyzed in the Draft EIR.

The Project has no potential for any impact on the following environmental factors, and, as a result, these environmental factors will not be the subject of study in this Draft EIR: Agriculture and Forestry (there are no agricultural and forest land resources in the Plan area), and Mineral Resources (there are no mineral resources in the Plan area).

The Draft EIR will also examine a reasonable range of alternatives to the Project, including the CEQA-mandated No Project Alternative, and other potential alternatives that may be capable or reducing or avoiding potential environmental effects.

Scott Miller

Scott Miller
Interim Planning and Zoning Director
Environmental Review Officer

File Number ER120018

WEST OAKLAND SPECIFIC PLAN PROJECT DESCRIPTION

INTRODUCTION

The West Oakland Specific Plan will guide future development in West Oakland. The purpose of the proposed West Oakland Specific Plan is to provide comprehensive and multi-faceted strategies for development and redevelopment, of vacant and/or underutilized commercial and industrial properties in West Oakland. It establishes a land use and development framework, identifies needed transportation and infrastructure improvements, and recommends implementation strategies needed to develop those parcels. The Plan is also a marketing tool for attracting developers to key sites and for encouraging new, targeted economic development. The Plan builds on extensive community feedback to meet its goals of:

- Augmenting West Oakland's development capabilities by enhancing the linkages between West Oakland and future Army Base reuse and development, focusing on the economic and physical synergies between these two areas;
- Encouraging the growth of jobs and services, with opportunities and training available to existing and future residents within West Oakland;
- Determining desired land uses for specific areas within West Oakland, recognizing that different areas have differing needs, opportunities, constraints and assets;
- Attracting quality, compatible residential, commercial and industrial development while preserving existing established residential neighborhoods;
- Supporting existing investment in the area and enhancing existing assets;
- Supporting commercial, mixed-use and transit-oriented land use in West Oakland, particularly in collaboration with the Bay Area Rapid Transit (BART) District for transit-oriented development at the West Oakland BART station;
- Lessening existing land-use conflicts and ensuring avoidance of future conflicts between residential neighborhoods and non-residential uses;
- Enhancing transportation resources throughout West Oakland, and between West Oakland and adjoining areas;
- Furthering the physical and economic revitalization of West Oakland;
- Corresponding with regional development issues in accordance with the district's Priority Development Area designation through SB 375; and
- Minimizing the potential for displacement of existing residents as new residents are accommodated.

With very limited exceptions, the Specific Plan retains the existing Oakland General Plan land use designations and applicable zoning in West Oakland, and adheres to the City's Overall Industrial Land Use Policy to retain current industrial zoning districts. It promotes high density development near the West Oakland BART station and identifies a development vision for other major locations throughout the Specific Plan area, encourages residential and neighborhood-serving commercial establishments on major corridors such as San Pablo Avenue, redirects light industrial and more intensive commercial activities to locations closer to the Port of Oakland and away from residential areas, and protects and enhances West Oakland's residential neighborhoods. The Specific Plan also encourages an enhanced multimodal transportation system to better link residents and businesses. It seeks to accomplish this through a variety of actions, including creation of distinct land use overlays to guide future development of key parcels throughout the Specific Plan area.

The Plan will provide an area-wide set of development regulations and requirements, and will cover land use, development density, circulation and infrastructure, financing mechanisms for public improvement, and will have legal authority as a regulatory document.

The components of the Specific Plan will include:

- Text and diagrams showing the distribution, location and extent of all land uses;
- Proposed distribution, location, extent and intensity of major components of public and private transportation, sewage, water, drainage, solid waste disposal, energy and other essential facilities needed to support the land uses;
- Standards and guidelines for development, and standards for the conservation, development and utilization of natural resources, where applicable;
- Program of implementation measures including regulations, programs, public works projects and financing measures; and
- Statement of Specific Plan's relationship to the General Plan.

PROJECT SETTING

The West Oakland Planning Area (Planning Area) is located in the heart of the East San Francisco Bay Area, near the hub of the Bay Area's freeway system and regional transit system. The West Oakland BART station is located in the southern portion of the Planning Area, and the MacArthur BART station is located approximately one-quarter mile northeast of the Planning Area.

The Planning Area is generally bounded by Interstate 580 (I-580) to the north, I-980 to the east and I-880 to the west. **Figure 1** illustrates the Project location and the Planning Area boundaries.

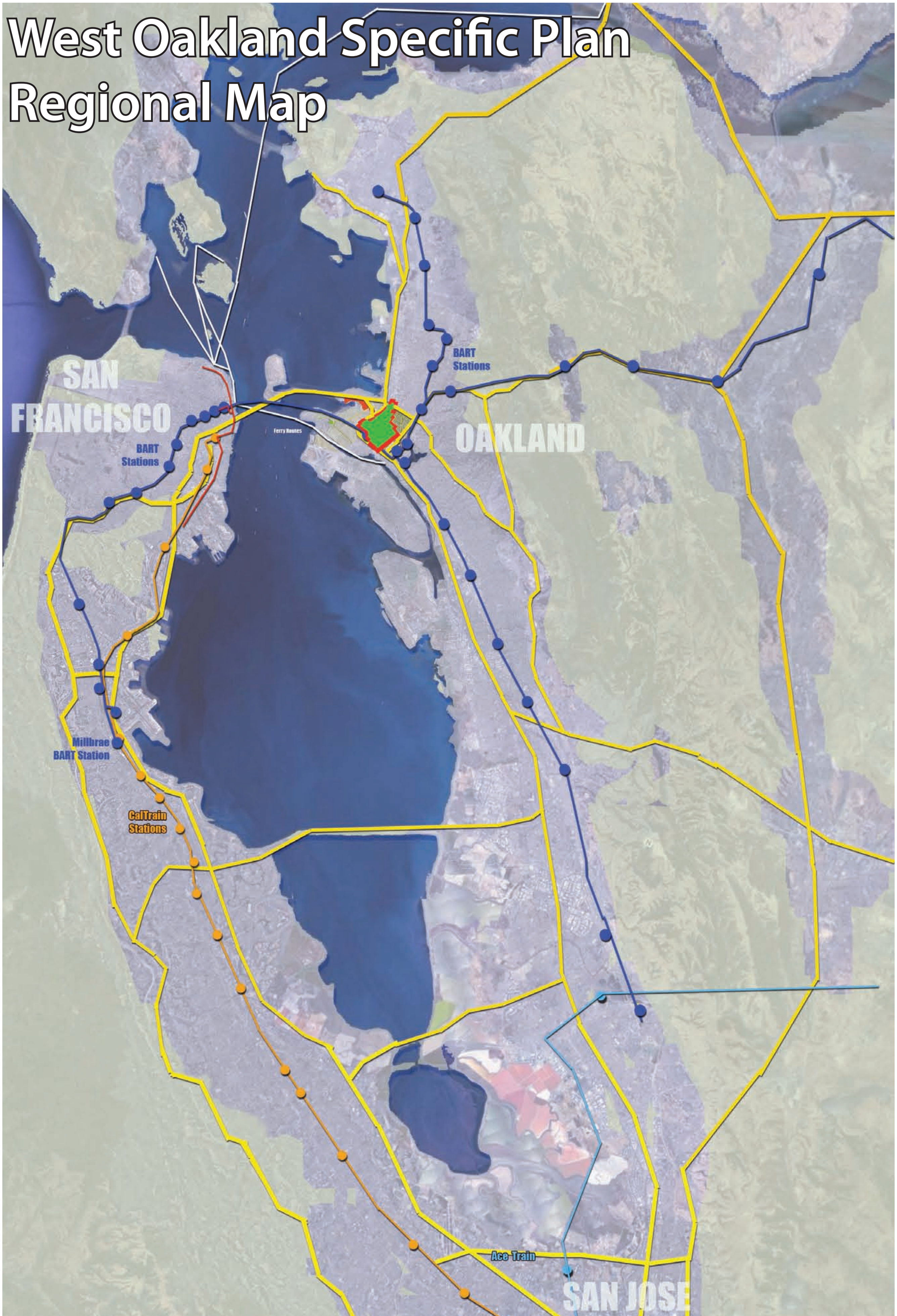

West Oakland Specific Plan
Regional Map
SAN FRANCISCO
BART Stations
Ferry Routes
OAKLAND
Millbrae BART Station
CalTrain Stations
Ace Train
SAN JOSE

FIGURE 1

The Planning Area comprises approximately 2.18 square miles or approximately 1,900 acres, subdivided into 6,340 parcels. It has a current population of approximately 25,000 people, and contains employment opportunities for more than 15,000 current employees.

Residential uses occupy approximately 60 percent of the land in West Oakland, generally concentrated in the northern, eastern and southwestern portions of the area. Industrial, commercial and truck-related uses occupy about 23 percent of the land area, and government/institutional and utilities uses occupy the remaining 17 percent. Industrial uses are concentrated primarily around Mandela Parkway and West Grand Avenue and in the vicinity of 3rd Street. Commercial activities primarily occur at the northern end of the Planning Area near Emeryville, along San Pablo Avenue, at the eastern end of West Grand Avenue, on Market Street and on 7th Street. Lands devoted to government, institutional and utilities uses include properties owned by Caltrans, Union Pacific Railroad, U.S. Postal Service, Bay Area Rapid Transit District (BART), East Bay Municipal Utility District (EBMUD), Oakland Unified School District, Oakland Housing Authority, and City of Oakland. Existing land use in the Planning Area is illustrated on **Figure 2**.

Surrounding the Planning Area is a mix of land uses:

- North of I-580 is the East BayBridge Shopping Center and other residential, light industrial, office and public uses in Emeryville.
- To the northwest are the East Bay Municipal Utility District (EBMUD) Main Wastewater Treatment Plant, the I-80/I-580/I-880 interchange, and eastern terminus of the San Francisco-Oakland Bay Bridge and the bridge toll plaza.
- East of I-980 are the Pill Hill and Uptown neighborhoods, Downtown Oakland, City Center, Old Oakland and the 19th Street and 12th Street BART Stations.
- To the southeast are the waterfront Jack London District and Jack London Square.
- Interstate 880, the Union Pacific Railroad and the Burlington Northern and Santa Fe (BNSF) Railroad are located along the southern and western boundaries of the Planning Area. The Port of Oakland and the former Oakland Army Base, currently leased for interim transportation, industrial and commercial uses until it is redeveloped as a Port Logistics Center, are to the south and west of the Planning Area.

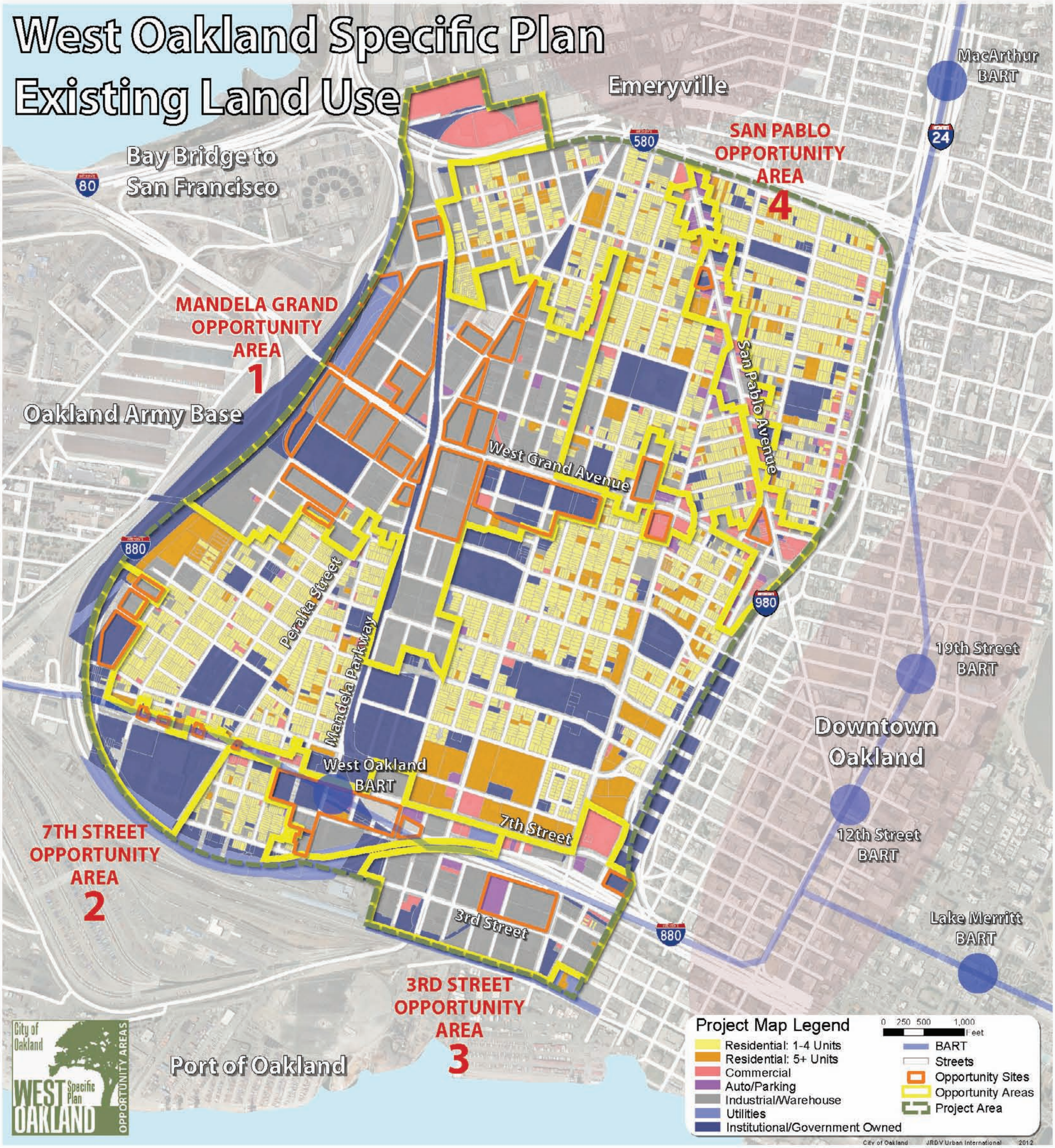

West Oakland Specific Plan
Existing Land Use
Emeryville
MacArthur BART
SAN PABLO OPPORTUNITY AREA
4
580
24
Bay Bridge to San Francisco
80
MANDELA GRAND OPPORTUNITY AREA
1
Oakland Army Base
West Grand Avenue
San Pablo Avenue
880
Peralta Street
Mandela Parkway
980
19th Street BART
Downtown Oakland
West Oakland BART
7th Street
12th Street BART
7TH STREET OPPORTUNITY AREA
2
3rd Street
880
Lake Merritt BART
3RD STREET OPPORTUNITY AREA
3
Port of Oakland
City of Oakland
WEST OAKLAND Specific Plan
OPPORTUNITY AREAS
Project Map Legend
0 250 500 1,000 Feet
Residential: 1-4 Units
Residential: 5+ Units
Commercial
Auto/Parking
Industrial/Warehouse
Utilities
Institutional/Government Owned
BART
Streets
Opportunity Sites
Opportunity Areas
Project Area
City of Oakland JRDV Urban International 2012

FIGURE 2

PLANNING SUBAREAS

Opportunity Areas

The Specific Plan identifies four "Opportunity Areas' targeted for growth. Development facilitated by the Specific Plan would occur in these Opportunity Areas, which contain vacant and underutilized properties and older facilities that no longer meet current standards and market conditions, and thus have the most potential for change. The following Opportunity Areas are shown on **Figure 3.**

- Opportunity Area 1: Mandela/West Grand (239 acres)
- Opportunity Area 2: 7th Street (68 acres)
- Opportunity Area 3: 3rd Street (69 acres)
- Opportunity Area 4: San Pablo Avenue (47 acres)

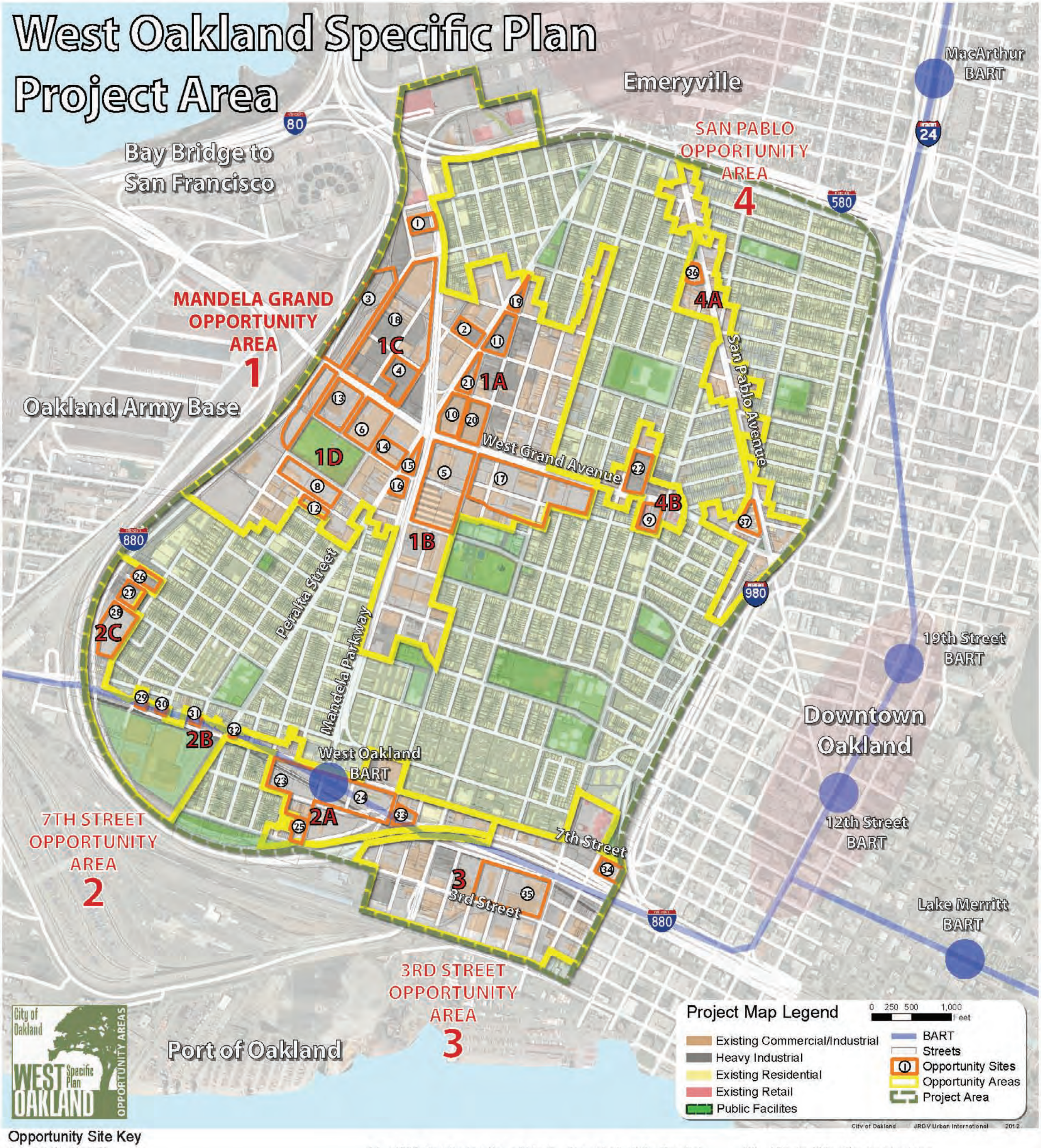
Because of their size and the differing land use development and planning strategies, the Mandela/West Grand Avenue, 7th Street and San Pablo Avenue Opportunity Areas are further divided into subareas, as also shown on Figure 3.

<u>Opportunity Sites</u>

Within the four Opportunity Areas, growth facilitated by the Specific Plan is most likely to occur on 37 specifically identified Opportunity Sites. These Opportunity Sites are also illustrated on Figure 2. Opportunity Sites are individual parcels or groups of commercial and/or industrial parcels that are strategically located, and are vacant, underutilized, blighted or contain uses that conflict with nearby residential neighborhoods. The Opportunity Sites are expected to serve as catalysts in that their development will encourage development of other properties in the surrounding Opportunity Area and can make direct positive contributions to the community.

Enhancement Areas

The predominantly residential neighborhoods of West Oakland that lie outside the Opportunity Areas are referred to as "Enhancement Areas" in the Specific Plan. These areas are not in need of transformational change; but rather preservation and enhancement of their existing strengths. Enhancement Areas include residential neighborhoods outside the Opportunity Areas, and many existing commercial and industrial parcels that are already developed with compatible, economically viable and job-generating uses. A key tenet of the Specific Plan is to retain, enhance, and improve these Enhancement Areas.



Opportunity Site Key

1. 1650 32nd St.
2. 2601 Peralta
3. Upper Wood St.
4. 2240 Wood St. (Grand/Campbell
5. Pacific Pipe/American Steel
6. 1699 West Grand
8. Roadway Express
9. Grand & Market
10. 2300 Peralta (Mandela/Peralta/W.Grand)
11. 2701 Poplar (CASS)
12. Half-block at Willow, Campbell & 17th Street
13. 1700 20th St., (Wood, Willow, W. Grand, 20th Street)
14. 2001 Peralta (portion of block – Campbell, 20th, Peralta)
15. Triangle – Mandela, Peralta, 20th
16. North portion of block – Peralta, Mandela, 20th
17. Poplar to Linden, W. Grand to 20th
18. Grand/32nd, Campbell to Wood
19. Triangle - Peralta, Poplar, 28th
20. Kirkham to Poplar, W. Grand to 24th
21. Triangle - Peralta/Kirkham/24th Street
22. W. Grand/Myrtle/Filbert/24th Street
23. West Oakland Transit Village
24. West Oakland Alliance Development
25. EPA Site
26. 10th to 11th, Pine to Frontage
27. 9th to 10th, Pine to Frontage
28. Phoenix Iron Works
29. 7th & Wood
30. 7th & Willow
31. 7th & Campbell
32. 7th & Peralta
33. South half-block between Union & Magnolia
34. Brush and Castro
35. 425 Market Street
36. North portion of block, Filbert, 32nd, San Pablo
37. San Pablo, W. Grand, 23rd, Brush

FIGURE 3

EXISTING GENERAL PLAN AND ZONING, AND PROPOSED LAND USE OVERLAYS

Commercial / Industrial Areas

Much of the non-residential land within the Opportunity Areas has a current General Plan designation of "Business Mix" and is correspondingly zoned CIX-1 Commercial Industrial Mix 1. These land use and zoning categories are specifically intended to "create, preserve, and enhance the industrial areas of West Oakland that are appropriate for a wide variety of commercial and industrial establishments", and to "accommodate existing industries and provide flexibility to anticipate new technologies". These land uses are also supported by the City of Oakland's Overall Industrial Land Use Policy, which is specifically intended to protect the remaining industrial lands in Oakland, recognizing that industrial land is a scarce resource and that preservation of industrial land is vital to the future economic growth of the city. However, these current General Plan land use and zoning designations allow such a broad range of allowable uses, building intensities and development characteristics that there is no discernible or specific "vision" of the highest and best land uses for specific areas. This broad range of allowed uses may also raise property owner expectations beyond what the current market can support, thereby discouraging investment and slowing development as owners hold out for higher value projects.

While allowing flexibility, the Specific Plan provides more specific and definitive land use direction for these business areas of West Oakland and provides greater clarity and predictability for property owners and developers, neighboring activities, and the community at large. The Specific Plan provides land use policy direction for the Opportunity Areas by identifying a set of new policy-based land use overlays. These land use overlays identify strategically distinct employment uses and building types, reflecting differences in business functions performed, business ages and sizes, and expected amenity levels. These land use overlays supplement, rather than replace the current General Plan and zoning land uses.

Residential Mix Areas

Much of the residential land within the Opportunity Areas has a current General Plan land use designation of "Mixed Housing Type Residential" and is correspondingly zoned either 'Mixed Housing Type Residential' (RM) or 'Housing Business Mix' (HBX). These General Plan and zoning categories are primarily used in the older established neighborhoods of Oakland with a mix of single-family, townhomes and small, multi-unit buildings along with small-scale, neighborhood-serving businesses. Existing policies and regulations are specifically intended to create, maintain and enhance these residential areas. The area surrounding the West Oakland BART station is zoned "S-15: Transit Oriented Development". Existing policies and regulations applicable to this area are intended to create, preserve and enhance areas served by multiple nodes of transportation and to feature high-density residential, commercial, and mixed-use developments to encourage concentrated development. It encourages a pedestrian environment near the transit station with by a mixture of residential, civic, commercial and light industrial activities, and amenities.

The Specific Plan retains the existing General Plan and zoning designations for these mixed residential areas, but supplements them with a more specific mixed-use development program for specific sites. It also proposes to allow limited and carefully selected industrial sites to be converted to new residential development. Criteria by which such residential infill may be allowed include sites within already established residential patterns, sites with established buffers between less compatible industrial neighbors, and sites with immediate proximity to parks and other residential amenities.

Land Use Overlays

To fully realize the development potential of the Specific Plan Area and provide greater clarity and predictability for development, the Specific Plan recommends a set of land use overlays that indicate the type of development that should occur at specific locations in West Oakland. These new land use types are intended as overlays to the existing General Plan designations, providing more specific and targeted land use policy. Nine land use types are recommended: four relating to commercial business and industrial activities, two for retail commercial activities, and three for residential activities.

<u>Business / Industrial Land Use Overlays</u>

Heavy Industrial

The proposed "Heavy Industrial" Land Use Overlay is indicative of many of the more industrial sites within West Oakland that are occupied by such uses as recycling operations, heavy truck-dependent uses, truck parking and other types of loud or pollution-emitting uses. Policy direction inherent in the Specific Plan is to seek alternative sites where many of these heavy industrial land uses may be more appropriate, and to alleviate the adverse effects that these types of uses can have on surrounding neighborhoods. In certain locations, this proposed land use overly also applies to areas with surface parking used for trucks or vehicles. Policy direction of the Plan seeks to replace much of this surface parking with new development, adding structured parking associated with more intense, higher density use.

Business Mix Enhancement

A large number of non-residential facilities throughout the Opportunity Areas are used by industry and other business, but not to their full potential. The purpose of the proposed "Business Mix Enhancement" Land Use Overlay is to retain existing buildings, intensify existing business activities, lower vacancies, and increase utilization. This land use overlay acknowledges the architectural character and historical significance of many existing buildings. This overlay encourages innovative reuse of existing buildings with a focus on incubator space for specific industry groups, adaptable space for artisans and craftspeople, and flexible small spaces where start-up businesses can share facilities and equipment.

Low Intensity Business Mix/Light Industrial

The proposed "Low Intensity Business Mix/Light Industrial" Land Use Overlay is intended to designate sites appropriate to accommodate a broad range of new custom and light manufacturing, light industrial, warehouse, research and development, "green industry", and service commercial uses that provide well-paying blue collar and green collar jobs. This proposed land use overlay provides for infill development with new, lower density industrial buildings with necessary infrastructure and amenities to attract quality tenants and businesses, which can also be supported by businesses seeking lower rents. This overlay would accommodate lower-intensity development of business mix and light industrial uses in new buildings with surface parking. Adaptive re-use of existing, larger and/or significant existing buildings is encouraged, and preservation of historic buildings consistent with existing City policy and regulations is required.

Higher Intensity Campus

The proposed "Higher Intensity Campus" Land Use Overlay is intended where particularly strong locational advantages make possible the attraction of higher intensity land uses and development types. This proposed land use overlay would provide for new development of more intensive campus-type uses, more likely to be developed in the mid-term or later. Higher intensity building types would have more interior improvements and amenities and more costly structured parking, and must be supported by businesses with greater rent-paying abilities. New development would generally be in a campus configuration, with structured parking and ground-floor flex space. The Plan assumes multiple buildings phased-in over time, using undeveloped areas for surface parking in earlier phases but planned for structured parking in later phases. Expected uses include Research & Development activities, life sciences, and information and technology uses.

<u>Retail / Commercial Land Use Overlays</u>

Large Format Retail

The proposed "Large Format Retail" Land Use Overlay is intended to encourage large format destination retail stores in locations with good freeway access serving the larger regional market, while also providing needed goods and services to West Oakland residents.

Neighborhood-Serving Retail

The proposed "Neighborhood-Serving Retail" Land Use Overlay is intended to encourage more neighborhood-serving retail uses.

<u>Residential Land Use Overlays</u>

High Density Residential Transit-Oriented Development (TOD)

The proposed "High Density Residential TOD" Land Use Overlay is intended for development at the West Oakland BART Station transit-oriented development (TOD). Allowed land uses are multi-family residential uses above ground-floor neighborhood-serving retail establishments, or multi-family residential uses over structured parking.

Medium-Density Podium Residential

The proposed "Medium-Density Podium Residential" Land Use Overlay is intended to be compatible with recent residential development on 7th Street and enable a gradual transition in density from the West Oakland BART Station TOD to the surrounding lower-density residential neighborhoods with residential buildings containing commercial flex space at the street level.

Lower Density Residential

The proposed "Lower Density Residential" Land Use Overlay is intended for a limited number of smaller infill sites with established lower-density residential patterns, established buffers from less compatible industrial neighbors, or immediate proximity to parks or other residential amenities. Development would include residential uses over optional street-level commercial flex space.

OPPORTUNITY AREA DEVELOPMENT CAPACITIES

Opportunity Area 1: Mandela/West Grand

The Mandela/West Grand Opportunity Area is envisioned as the major business and employment center for Oakland and the region while serving as an employment center for West Oakland. The Specific Plan encourages a mix of business activities and development types, with a range of jobs at varying skill/education levels. Recognizing that revitalization is a long-term process, the Plan proposes to retain and expand existing compatible urban manufacturing, construction and other light industrial businesses that have well-paying blue collar and green collar jobs, while attracting new targeted industries that are growing, including life sciences, information technology and clean-tech. Development would likely initially occur as lower-intensity development and with reuse of existing buildings.

The future development vision for area takes advantage of the anticipated relocation of the recycling activities currently located on key parcels within this Opportunity Area to the former Oakland Army Base, thereby leaving these parcels available for new development. The Plan also encourages relocation of other heavier industrial uses located in this Opportunity Area, such as additional recycling operations, heavy truck-dependent uses and other older heavy industries. Greater land availability and other improvements to the area should encourage and attract more low-intensity light industrial and business mix development. Growth is eventually expected to include new mid-rise campus development at key locations, such as at the intersection of Mandela Parkway and West Grand Avenue, and larger format destination retail stores as an extension of the East BayBridge Shopping Center, IKEA and Bay Street Emeryville. Additionally, the Specific Plan recommends that residential development be allowed at selected sites, based on these sites' adjacency to existing residential areas, proximity to existing open space such as Raimondi Park and Wade Johnson Park, and established buffers between these sites and less compatible industrial and business uses.

Table 1 provides a summary of changes in land use, employment and population expected within the Mandela/West Grand Opportunity Area.

TABLE 1
DEVELOPMENT POTENTIAL – OPPORTUNITY AREA #1, MANDELA/WEST GRAND

Land Use (acres)	**Existing**	**2035 Buildout**	**Change from Existing**
Heavy Industrial	43	0	-43
Business Mix/Light Industrial	170	86	-85
Low Intensity Bus. Mix/Lt. Ind.		28	28
High Intensity Campus		59	59
Retail	16	31	15
sub-total	*230*	*203*	*-26*
Residential	9	36	26
sub-total	*9*	*36*	*26*
TOTAL	**239**	**239**	**0**
Non-Residential Building Space and Employment			
Heavy Industrial			
Building Area (sq.ft.)	500,000	0	-500,000
Employment	280	0	-280
Business Mix/Light Industrial			
Building Area (sq.ft.)	3,500,00	2,300,000	-1,200,000
Employment	4,660	4,370	-290
Low Intensity Bus. Mix/Lt. Ind			
Building Area (sq.ft.)	0	640,000	640,000
Employment	0	1,410	1,410
High Intensity Campus			
Building Area (sq.ft.)	0	4,080,000	4,080,000
Employment	0	9,600	9,600
Retail			
Building Area (sq.ft.)	300,000	605,000	305,000
Employment	500	1,170	670
Total			
Building Area (sq.ft.)	**4,300,000**	**7,625,000**	**3,325,000**
Employment	**5,440**	**16,550**	**11,110**
Residential Units, Households and Population			
Single Family and Townhome			
Units	110	241	131
Households	89	232	143
Population	259	482	223
Multi-Family Residential			
Units	0	1,140	1,140
Households	0	1,099	1,099
Population	0	2,285	2,285
Total			
Units	**110**	**1,381**	**1,271**
Households	**89**	**1,331**	**1,242**
Population	**259**	**2,767**	**2,508**

Opportunity Area 2: 7th Street

The land use and development strategy for the 7th Street Opportunity Area includes transit-oriented development (TOD) of higher-density housing with ground floor neighborhood-serving retail on vacant sites and current surface parking lots around the West Oakland BART Station. A new BART parking garage is envisioned next to the freeway to replace existing surface parking lost due to new development, which would also serve to buffer new residential uses from the adjacent freeway. Plazas and open spaces would contribute to a secure and pleasant pedestrian experience at the BART Station TOD. Medium density, podium-style housing with ground floor commercial uses is envisioned further west on 7th Street as a transition from the West Oakland BART Station TOD to the surrounding lower-density neighborhoods.

Throughout this Opportunity Area, 7th Street is envisioned as the neighborhood focus, with neighborhood-serving commercial establishments. Emphasis is placed on prioritizing the types of commercial uses that enliven the street and revitalize 7th Street as a celebration of West Oakland's cultural history of music, art and entertainment. Additionally, the future development vision for this area takes advantage of the anticipated relocation of recycling activities, which are currently located on key parcels along Wood Street but are expected to be relocated to the former Oakland Army Base, as well as reuse of the former Phoenix Ironworks site, for additional commercial and residential activities. These new commercial and residential uses could benefit the surrounding neighborhood by reconnecting the residential edge of Wood Street.

Building design, construction, and ongoing operation and maintenance requirements address the issues of air contaminants and noise from the freeway, and noise from BART trains. Strategies are included in the Plan for reducing BART train noise through improved maintenance and potential noise barriers. Environmental improvements are also envisioned with remediation of known contaminated sites in this area, potentially including innovative biological remediation strategies.

Table 2 provides a summary of changes in land use, employment and population expected within the 7th Street Opportunity Area.

TABLE 2
DEVELOPMENT POTENTIAL – OPPORTUNITY AREA #2,7TH STREET

Land Use (acres)	Existing	2035 Buildout	Change from Existing
Heavy Industrial	7	0	-7
Business Mix/Light Industrial	58	38	-19
Low Intensity Bus. Mix/Lt. Ind.		7	7
High Intensity Campus		0	0
Retail	0	1	1
sub-total	*65*	*46*	*-19*
Residential	3	22	19
sub-total	*3*	*22*	*19*
TOTAL	**68**	**68**	**0**
Non-Residential Building Space and Employment			
Heavy Industrial			
Building Area (sq.ft.)	100,000	0	-100,000
Employment	50	0	-50
Business Mix/Light Industrial			
Building Area (sq.ft.)	1,690,000	1,490.000	-200,000
Employment	1,820	2,090	270
Low Intensity Bus. Mix/Lt. Ind			
Building Area (sq.ft.)		170,000	170,000
Employment		380	380
High Intensity Campus			
Building Area (sq.ft.)		0	0
Employment		0	0
Retail			
Building Area (sq.ft.)	5,000	90,000	85,000
Employment	10	220	210
Total			
Building Area (sq.ft.)	**1,795,000**	**1,750,000**	**-45,000**
Employment	**1,880**	**2,690**	**810**
Residential Units, Households and Population			
Single Family and Townhome			
Units	35	89	54
Households	29	86	57
Population	85	206	121
Multi-Family Residential			
Units	50	2,750	2,700
Households	41	2,652	2,611
Population	119	6,336	6,217
Total			
Units	**85**	**2,839**	**2,745**
Households	**70**	**2,738**	**2,668**
Population	**204**	**6,542**	**6,338**

Opportunity Area 3: 3rd Street

The 3rd Street Opportunity Area is currently characterized by commercial, industrial and mixed uses and areas of historic building stock. The Specific Plan envisions that this Opportunity Area will continue to support business activities and jobs, capitalizing on its proximity to Downtown Oakland, the Port of Oakland, the rest of West Oakland and the regional freeway network.

This commercial, wholesale area is expected to emerge as a more vibrant and vital business and employment center, with a variety of globally-oriented logistics businesses focusing on manufacturing and light-industrial uses that benefit from adjacencies to the Port, as well as commercial uses that enliven the area during the day and night. Mixed-use commercial, dining and entertainment uses are encouraged in attractive, older warehouse buildings. New business opportunities would reflect the existing mix of light industrial, service commercial, food and beverage production and distribution, and construction-related businesses, as well as small professional offices, import/export, communications, computer services, publishing and printing, photo/audio services, and small R&D activities. Residential development in this area would continue to be prohibited.

Table 3 provides a summary of changes in land use, employment and population expected within the 3rd Street Opportunity Area.

TABLE 3
DEVELOPMENT POTENTIAL – OPPORTUNITY AREA #3, 3RD STREET

Land Use (acres)	Existing	2035 Buildout	Change from Existing
Heavy Industrial	8	0	-8
Business Mix/Light Industrial	57	41	-17
Low Intensity Bus. Mix/Lt. Ind.		13	13
High Intensity Campus		11	11
Retail	3	3	0
sub-total	*68*	*68*	*0*
Residential	0	0	0
sub-total	*0*	*0*	*0*
TOTAL	**68**	**68**	**0**

Non-Residential Building Space and Employment	Existing	2035 Buildout	Change from Existing
Heavy Industrial			
Building Area (sq.ft.)	40,000	0	-40,000
Employment	20		-20
Business Mix/Light Industrial			
Building Area (sq.ft.)	1,000,000	800,000	-200,000
Employment	1,670	1,520	-150
Low Intensity Bus. Mix/Lt. Ind			
Building Area (sq.ft.)		300,000	300,000
Employment		670	670
High Intensity Campus			
Building Area (sq.ft.)		600,000	600,000
Employment		1,410	1,410
Retail			
Building Area (sq.ft.)	50,000	65,000	15,000
Employment	80	120	40
Total			
Building Area (sq.ft.)	**1,090,000**	**1,765,000**	**675,000**
Employment	**1,770**	**3,720**	**1,950**

Residential Units, Households and Population	Existing	2035 Buildout	Change from Existing
Single Family and Townhome			
Units	5	5	0
Households	4	5	1
Population	12	15	3
Multi-Family Residential			
Units	0	0	0
Households	0	0	0
Population	0	0	0
Total			
Units	**5**	**5**	**0**
Households	**4**	**5**	**1**
Population	**12**	**15**	**3**

Opportunity Area 4: San Pablo Avenue

San Pablo Avenue is a major transit corridor, a "main street" of the East Bay between the MacArthur Maze freeway network at the southern border of Emeryville and West Grand Avenue, but it includes numerous vacant and underutilized lots and open space. This Opportunity Area is one of the most significant corridors within West Oakland. Under the Specific Plan, the San Pablo corridor is envisioned as a transformed major commercial corridor connecting West Oakland to Downtown and to Emeryville, Berkeley and beyond, lined with increased retail uses and mixed-use residential development. Consistent with existing City of Oakland policies regarding development of major commercial corridors, the land use and development strategy for the San Pablo Avenue Opportunity Area is for infill mixed-use development with multi-family residential activities over ground-floor retail uses on San Pablo Avenue. Neighborhood-serving retail uses would be anchored by a grocery store on West Grand Avenue at Myrtle Street. Enhanced streetscapes and increased retail uses would activate the street, increase pedestrian activity and enliven the neighborhood.

The block of West Grand Avenue between Myrtle Street and Market Street, which is also within this Opportunity Area, would be developed with a mix of uses, including medium-density, podium-style residential activities, street front retail, and mixed use developments. The Plan encourages revitalization of the existing commercial center south of West Grand Avenue, and proposes new retail uses (grocery store) on the north side of West Grand Avenue that is designed to make full and best use of the site and fit in with the surrounding neighborhood.

Table 4 provides a summary of changes in land use, employment and population expected within the San Pablo Avenue Opportunity Area.

TABLE 4
DEVELOPMENT POTENTIAL – OPPORTUNITY AREA #4,SAN PABLO AVENUE

Land Use (acres)	Existing	2035 Buildout	Change from Existing
Heavy Industrial	4	0	-4
Business Mix/Light Industrial	33	23	-10
Low Intensity Bus. Mix/Lt. Ind.		2	2
High Intensity Campus		0	
Retail	7	10	3
sub-total	*44*	*36*	*-8*
Residential	3	11	8
sub-total	*3*	*11*	*8*
TOTAL	**47**	**47**	**0**

Non-Residential Building Space and Employment	Existing	2035 Buildout	Change from Existing
Heavy Industrial			
Building Area (sq.ft.)	100,000	0	-100,000
Employment	40		-40
Business Mix/Light Industrial			
Building Area (sq.ft.)	600,000	600,000	0
Employment	550	1,140	0
Low Intensity Bus. Mix/Lt. Ind			
Building Area (sq.ft.)		65,000	65,000
Employment		140	140
High Intensity Campus			
Building Area (sq.ft.)		0	0
Employment			
Retail			
Building Area (sq.ft.)	90,000	200,000	110,000
Employment	90	380	290
Total			
Building Area (sq.ft.)	**790,000**	**865,000**	**75,000**
Employment	**680**	**1,660**	**980**

Residential Units, Households and Population	Existing	2035 Buildout	Change from Existing
Single Family and Townhome			
Units	40	105	65
Households	33	101	68
Population	96	226	130
Multi-Family Residential			
Units	30	1,030	1,000
Households	24	994	970
Population	69	2,226	2,157
Total			
Units	**70**	**1,135**	**1,065**
Households	**57**	**1,095**	**1,038**
Population	**165**	**2,452**	**2,287**

AREA-WIDE TRANSPORTATION AND INFRASTRUCTURE IMPROVEMENTS

The Specific Plan also calls for necessary public and private investments in multimodal transportation systems and infrastructure systems necessary to support and sustain new development. The Plan specifically calls for the provision of a network of "complete streets" throughout West Oakland, serving not only the automobile capacities but also providing an interconnected system of bicycle paths and lanes, pedestrian improvements and streetscape amenities, as well as transit improvements intended to better facilitate use of transit choices in west Oakland and to better connect West Oakland to downtown, the Oakland Army Base and other surrounding areas. Improved transit opportunities throughout West Oakland include improvements in transit service providing greater connections between the West Oakland BART station and existing and new employment centers. The transit improvements are envisioned to include enhanced AC Transit bus service, a possible street car service and other approaches, with direct links to planned pedestrian-and bicycle networks, the Mandela Parkway/West Grand Avenue employment and business center, the shopping and other existing amenities at the Oakland/Emeryville city limit line, downtown Oakland BART stations, and Jack London Square.

The Specific Plan also calls for necessary public and private investments in other infrastructure systems, such as potable water, sanitary sewer, storm drainage, electrical and broadband cable, that are needed to attract and support the types of new development envisioned under the Plan.

SPECIFIC PLAN AREA BUILDOUT DEVELOPMENT POTENTIAL AND TIME FRAME

Table 5 identifies the Specific Plan's ultimate development potential, which is assumed as buildout of the Specific Plan for purposes of the Environmental Impact Report (EIR). The Specific Plan would provide for up to approximately 5,090 new dwelling units accommodating an increased population of approximately 10,970 people, and approximately 4.03 million square feet of new commercial, industrial and campus-style office/R&D building space providing up to 14,850 new jobs within West Oakland. Whereas this buildout is anticipated to occur over an extended period of time with incremental increases in new housing and job opportunities, the buildout assumptions included in the Specific Plan are assumed, for purposes of California Environmental Quality Act (CEQA) review, by year 2035.

The overall Land Use Diagram illustrating the various Specific Plan land use overlays is shown on **Figure 4** for the entire Planning Area. **Table 5** provides a summary of land uses, employment and population changes expected within the Planning Area at buildout (year 2035).

TABLE 5
DEVELOPMENT POTENTIAL – TOTAL PLANNING AREA

	Existing	2035 Buildout	Change from Existing
Land Use (acres)			
Heavy Industrial	62	0	-62
Business Mix/Light Industrial	319	188	-131
Low Intensity Bus. Mix/Lt. Ind.		50	50
High Intensity Campus		70	70
Retail	27	45	18
sub-total	*407*	*353*	*-54*
Residential	16	70	54
sub-total	*16*	*70*	*54*
TOTAL	**423**	**423**	**0**
Non-Residential Building Space and Employment			
Heavy Industrial			
Building Area (sq.ft.)	740,000	0	-740,000
Employment	390	0	-390
Business Mix/Light Industrial			
Building Area (sq.ft.)	6,790,000	5,190,000	-1,600,000
Employment	8,700	9,120	420
Low Intensity Bus. Mix/Lt. Ind			
Building Area (sq.ft.)		1,175,000	1,175,000
Employment		2,600	2,600
High Intensity Campus			
Building Area (sq.ft.)		4,680,000	4,680,000
Employment		11,010	11,010
Retail			
Building Area (sq.ft.)	445,000	960,000	515,000
Employment	680	1,890	1,210
Total			
Building Area (sq.ft.)	**7,975,000**	**12,005,000**	**4,030,000**
Employment	**9,770**	**24,620**	**14,850**
Residential Units, Households and Population			
Single Family and Townhome			
Units	190	440	250
Households	155	424	269
Population	452	929	477
Multi-Family Residential			
Units	80	4,920	4,840
Households	65	4,745	4,680
Population	188	10,847	10,659
Total			
Units	**270**	**5,360**	**5,090**
Households	**220**	**5,169**	**4,949**
Population	**640**	**11,776**	**11,136**

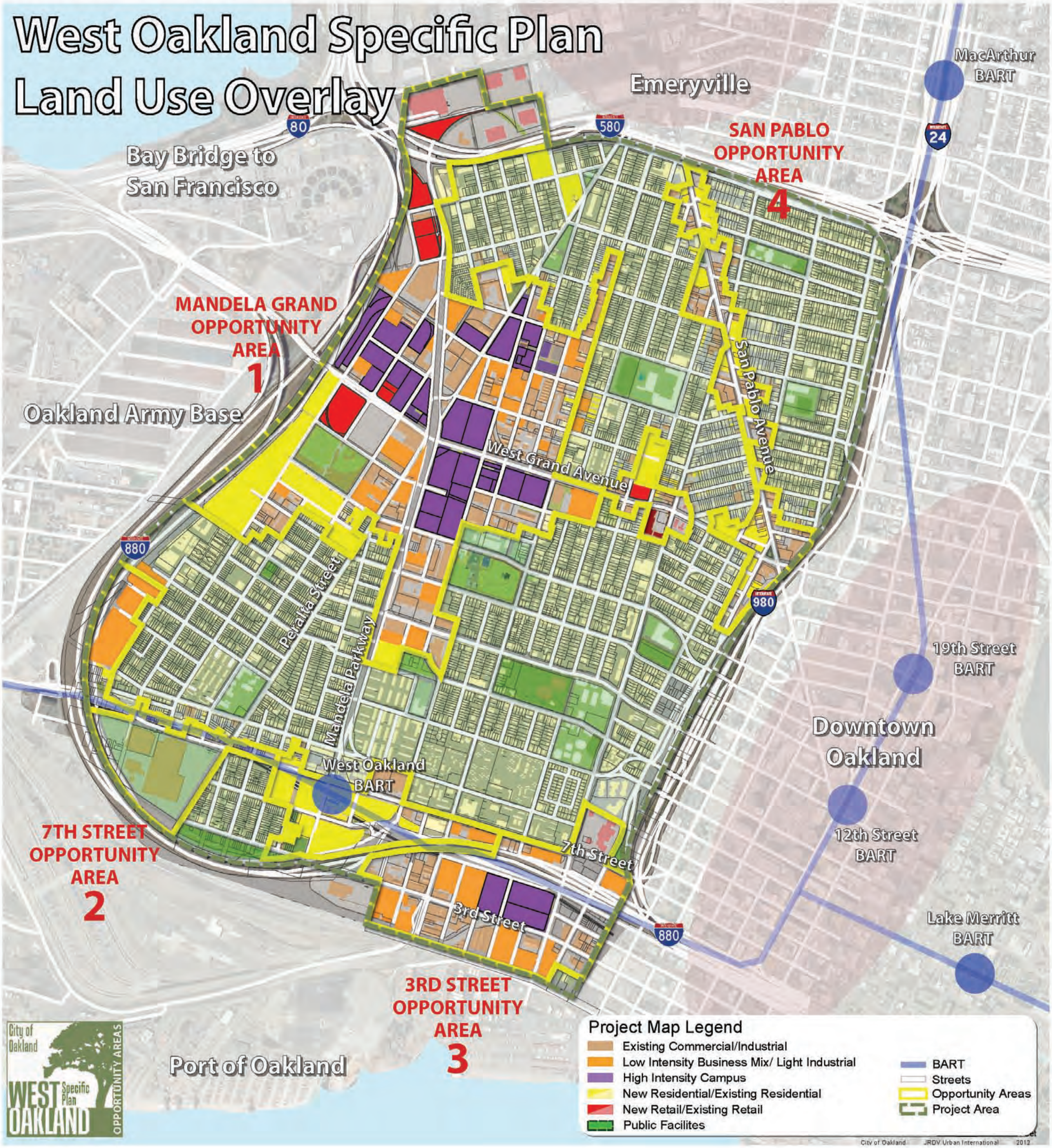

West Oakland Specific Plan
Land Use Overlay
Emeryville
MacArthur BART
80
580
24
Bay Bridge to San Francisco
SAN PABLO OPPORTUNITY AREA
4
MANDELA GRAND OPPORTUNITY AREA
1
Oakland Army Base
West Grand Avenue
San Pablo Avenue
880
Peralta Street
Mandela Parkway
980
19th Street BART
Downtown Oakland
West Oakland BART
12th Street BART
7TH STREET OPPORTUNITY AREA
2
7th Street
3rd Street
880
Lake Merritt BART
3RD STREET OPPORTUNITY AREA
3
Port of Oakland
City of Oakland
WEST OAKLAND Specific Plan
OPPORTUNITY AREAS
Project Map Legend
Existing Commercial/Industrial
Low Intensity Business Mix/ Light Industrial
High Intensity Campus
New Residential/Existing Residential
New Retail/Existing Retail
Public Facilites
BART
Streets
Opportunity Areas
Project Area
City of Oakland
JRDV Urban International
2012

FIGURE 4

ALTERNATIVES

CEQA Guidelines require an analysis of a reasonable range of alternatives for any project subject to an EIR. The purpose of the alternatives section is to provide decision-makers and the public with a discussion of alternatives to the project that are capable of avoiding or substantially lessening any significant effects of the project.

The CEQA-based alternatives anticipated to be analyzed in the EIR are listed below. These alternatives are intended to meet the CEQA requirement that an EIR describe the No Project alternative as well as a range of reasonable alternatives to the Project that would feasibly attain most of the basic objectives of the Project, but would avoid or substantially lessen significant effects. In addition to the identified CEQA alternatives, an additional planning alternative is also anticipated to be analyzed in this EIR. This planning alternative has been developed in response to public comments made during the public participation process conducted throughout the Specific Plan process. It is not specifically intended to reduce or substantially lessen any particular environmental effects of the proposed Project, but instead presents alternative land use concepts for portions of the West Oakland Planning Area.

The anticipated EIR alternatives may include:

- **No Project Alternative** – CEQA Guidelines Section 15126.6(e)(3)(A) states that "If the project is the revision of an existing land use or regulatory plan or policy, the "no project" alternative will be the continuation of the existing plan or policy into the future. Thus, the projected impacts of the proposed plan will be compared to the impacts that would otherwise occur under existing plans."

- **Reduced Project Alternative** – Throughout the Specific Plan process, an alternative to the proposed Specific Plan has been developed and presented, titled the "Mid-Range Plan". This mid-range development alternative represents a less intensive development scenario, with less new residential development and less new non-residential building space. It specifically includes less, if any, of the higher intensity campus style development as proposed in the Plan.

- **Commercial Focused Alternative** – As a non-CEQA alternative, the EIR will also include an analysis of a more retail/commercial focused alternative to the proposed Plan, representing more commercial/office and retail development near the West Oakland BART Station and a greater amount of regional-serving retail in the northerly portion of the Planning Area near Emeryville.

- **Mitigated Alternative** – As required under CEQA, an alternative will be described that is specifically intended to further reduce or avoid potential adverse effects that may be identified as resulting under the proposed Plan. Possible strategies and corresponding land use plans may seek to further address the preservation of historic resources, and minimizing the community's exposure to toxics by way of additional buffers, mitigation and other land use approaches.

Appendix 1-B: Responses to Notice of Preparation

1600 Franklin Street, Oakland, CA 94612

Robert Del Rosario
Director of Service Planning and Development
November 20, 2012

Ulla-Brittt Jonsson, Planner II
City of Oakland Strategic Planning Division
250 Frank Ogawa Plaza, Suite 3315
Oakland, Ca. 94612

Subject: Notice of Preparation of an Environmental Impact Report—West Oakland Specific Plan

Dear Ms. Britt-Jonsson:

Thank you for the opportunity to submit comments on the Notice of Preparation (NOP) of the Draft Environmental Impact Report (EIR) for Proposed West Oakland Specific Plan (WOSP, the Plan). AC Transit is highly motivated to work with the City of Oakland and neighborhood stakeholders to improve the transportation network in West Oakland. We appreciate the time and efforts of city staff and consultants to produce attractive visual aids for the planning process in this complex neighborhood. However, we are concerned that the process thus far has produced little substantive collaboration. We look forward to more productive discussions in the future.

The Notice of Preparation appears inadequate to us, offering few details about the Plan to be evaluated. The NOP describes the plan area and sub-areas and expected build-out of each, but does not propose target or maximum development intensities. The NOP does not detail expected roadway—or transitway—capacity or needs. Neither does the NOP provide any urban design or historic preservation guidance. It is not possible to determine how West Oakland's future buildings, streets, and open spaces would look, feel, or function from the NOP, and thus it is not possible to determine the environmental impacts the Plan would have.

The character of the project is made murkier by the "Plan Summary" (dated October, 2012) which contains the NOP and an additional 38 pages entitled "Specific Plan Goals, Objectives, Strategies, and Actions." This document suggested a range of (sometimes conflicting) actions and policies across the different geographic and issue areas of West Oakland. Neither the NOP nor the Plan Summary provide guidance for prioritizing the conflicting actions or policies. Furthermore, the Plan Summary has not been published as part of the California Environmental Quality Act (CEQA) process. It is not clear what role the Plan Summary and the goals, objectives, strategies, and actions contained therein will play in the formation of the WOSP itself.

Therefore, this letter must perforce focus more on the Plan itself than would otherwise be the case. Below, we try to capture the contents and character of the Plan to make some suggestions about how the EIR should evaluate it.

Plan Area

The Plan Area is approximately 2.18 square miles, roughly bounded by Interstate 880 on the south and west, Interstate 580 on the north, and Interstate 980 on the east. It also incorporates a small area north of 580 at East Baybridge Shopping Center, and south of 880 west of Castro Street. The Plan Area includes approximately 25,000 residents and 15,000 jobs. Relative to the City of Oakland, the Plan Area is approximately 4% of the city's land area, 6% of its population, and 8% of its jobs. West Oakland has long been both one of Oakland's employment centers and one of its reservoirs of affordable housing.

AC Transit

AC Transit is the surface public transit provider for West Oakland. We operate 9 bus lines in the neighborhood forming a grid of north-south and east-west routes approximately ½ mile apart. North-south routes include Martin Luther King, San Pablo, Market, Adeline, and Peralta; East-west routes include 7th St., 10th St., 14th St., and West Grand Ave. Almost every home and business in the West Oakland Plan area is within ¼ mile or less of an AC Transit bus stop. The routes operate from at least 6 a.m. to 10 p.m. Some routes operate longer hours. Frequency of service ranges from every 6.5 minutes to every 30 minutes. Every bus goes to at least one BART station. Some also go to Amtrak or Greyhound.

AC Transit sees the WOSP as an opportunity to work with the City and the community to reinforce and improve this transit network with its strong geographic coverage and generally long hours of operation. As funding becomes available, we would particularly hope to improve frequency on some of the less frequent lines. We see the transit future of West Oakland as built on the improvement, not the repudiation or dismantling, of the existing transit network.

WOSP's effort to bring additional residents and employees to West Oakland can help support transit ridership. Greater numbers of people living and working in an area can generate additional ridership, which can in turn justify additional service. We hope that development under WOSP can stimulate such a "virtuous circle." This can only occur if new residents and workers are integrated into the existing transit system—rather than isolated into separate services—and everyone in West Oakland benefits from the additional resources.

Unfortunately, much of the previous discussion of transit in the West Oakland Specific Plan has focused on a streetcar concept. Staff has produced and distributed materials at public meetings including maps of streetcar alignments and stops, identifying the proposed service as "the O." Presentations have been heavily tilted toward streetcars as the future of transportation in West Oakland. This premature advocacy was developed without the support or input of AC Transit.

AC Transit would caution against misguided assumptions that rail-based modes automatically imply improvements to reliability, frequency, or speed over traditional buses. The key determinant of successful transit operation is not necessarily the mode, but the policies which govern those modes. Dedicated rights-of-way, signal priority, accessible stops—these are the things the City can provide to ensure reliable service by bus or rail. Well lighted stops and stations that convey a sense of security are crucial in a neighborhood which has historically experienced high crime rates. In some cases, this may require the City to think outside the boundaries of the study area. Congestion around the study area will impact services linking the Plan Area to surrounding destinations.

AC Transit would also caution against assuming that streetcars will automatically generate economic development. The Portland Steetcar is often cited in support of this proposition. However, the Portland Streetcar was developed amid a comprehensive ensemble of state, regional, and local policies designed to focus growth in Central Portland and restrict it elsewhere. This comprehensive policy approach does not exist in and around Oakland. In addition, there are numerous streetcar lines in cities across the country which have not generated substantial economic growth.

AC Transit believes that a discussion about transportation should begin with service needs and gaps, not vehicle types. None of this analysis has been done. There has been no modeling or analysis of anticipated future transit ridership, or its origins and destinations. If streetcars are to be advocated purely as economic development tools, it must be shown that this economic development impact can be achieved without damaging transit, and that the impacts cannot be derived from any other more cost-effective investment. The conclusion that a streetcar would be beneficial for West Oakland must be proven, not assumed.

If a streetcar remains a major part of the Plan, then considerable analysis must be done in the EIR. Questions include:

- What would be the impact, on transit, bicycles, and motor vehicles, of putting a streetcar on various streets in West Oakland?
- How would a streetcar affect the availability of funding for other transit?
- How much ridership would a streetcar generate?
- Which modes, in which locations, would be most effective in reducing automobile trips?
- Where would the maintenance yard for a streetcar be located?
- What impacts would that create?

The NOP simply mentions the streetcar concept. We hope that the reduced focus on streetcars in the NOP represents the beginning of a rethinking of how to approach and evaluate West Oakland's transit needs.

Transit Oriented Development
BART staff have repeatedly expressed concerns that the Plan's proposed development around the West Oakland BART station focuses too heavily on residential. They have argued for a broader mix of uses, to provide all-day patronage for local businesses and to avoid the environmental difficulties of building housing adjacent to a freeway. While AC Transit does not believe that large scale commercial uses are always appropriate in BART station areas, in this instance we concur with BART. A broader mix of uses would be more supportive of and efficient for all modes of transit. Commercial uses at West Oakland BART might serve to introduce new sectors and companies to West Oakland, and increase their willingness to go into less familiar areas such as Mandela/Grand.

West Oakland has clearly entered a period of significant change. It will be complex and challenging for the City to appropriately balance the needs and interests of various existing and new residents, businesses, and institutions. In this context, it is critical that the West Oakland Specific Plan and its EIR provide an accurate appraisal of existing conditions and trends, and a fair-minded program of action for the future. If existing resources, in transit and other fields, are disregarded or disassembled, it may be difficult if not impossible to reassemble them. AC Transit looks forward to helping the City navigate the transit and transportation issues of West Oakland.

Thank you for your interest. If you have any questions about this letter, please contact Nathan Landau in Planning and Development at (510) 891-4792 or nlandau@actransit.org.

Yours Truly,

Robert Del Rosario
Director of Service Planning and Marketing

Cc: AC Transit Board of Directors
Dennis Butler
Stephen Newhouse
Nathan Landau

AMERICAN STEEL STUDIOS
A COMMUNITY OF ART, INNOVATION AND INDUSTRY
1296 18th Street, Oakland, CA 94607 510.776.7694
www.americansteelstudios.com info@americansteelstudios.com

20 November, 2012

Dear Ms. Jonsson,

I am writing with regard to the West Oakland Specific Plan, case ER120018.

Over the past decade there has been a continued exodus of artists from San Francisco and other Bay Area locations, particularly those working in the industrial arts. Many of these artists moved to and established studios and businesses in West Oakland in response to the CIX zoning and resources found here that support the nature of their work. This demographic and economic shift has bolstered the existing industrial arts community and has begun to attract industrial artists from around the country and the world, fueling a new Industrial Arts Movement seated in West Oakland. This movement is being documented and celebrated by the global press but remains largely unrecognized locally.

The industrial arts and artists of all genres in West Oakland represent a vibrant and growing sector of the Creative Economy, reminiscent of the Historic West Oakland Cultural District of the 1930's.

I feel the Plan must include criteria for supporting the growth of the resources that the arts represent for West Oakland and allow the virile Industrial Arts Movement to continue to grow. It has already attracted considerable attention from around the world. Investment in these sectors, will support future diversity of economic activity. Ideally, WOSP should support, foster and enhance the existing arts infrastructure, by including specific language that describes the role of the creative economy and the arts in future development plans and activities.

This would include the development of a plan for how the arts sector can be developed in ways that support social equity objectives. Some strategies for achieving this might include:

AMERICAN STEEL STUDIOS
A COMMUNITY OF ART, INNOVATION AND INDUSTRY
1296 18th Street, Oakland, CA 94607 510.776.7694
www.americansteelstudios.com info@americansteelstudios.com

a. Defining geographically the Industrial Arts Corridor and include objectives to foster and enhance it in the WOSP
b. Protecting CIX zoning in the Industrial Arts Corridor
c. Designating a series of permanent sites in West Oakland for rotating and long-term public art installations.
d. Establishing a "Percent for Arts" development program in West Oakland.
e. Developing a "Percent for Social Equity" program in West Oakland.

I believe that these ingredients, combined with the innovators and creatives who already live and work here, West Oakland will find itself in the forefront of a new emerging niche market, which includes diversity in industry, demographics and economy.

Best Regards,

Karen Cusolito
Founder, American Steel Studios, LLC

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

November 21, 2012

Ulla-Britt Jonsson, Planner II
City of Oakland Strategic Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Subject: West Oakland Specific Plan Notice of Preparation of a Draft Environmental Impact Report

Dear Ms. Jonsson:

Bay Area Air Quality Management District (District) staff reviewed your agency's Notice of Preparation (NOP) for the West Oakland Specific Plan (Plan). The City of Oakland (City) is requesting comments on the scope and content of the Draft Environmental Impact Report (DEIR). The City has not prepared an Initial Study and all CEQA topics will be addressed in the DEIR.

The Plan will guide future development in the area generally bounded by Interstates 880 on the west and south; 980 on the east; and 580 on the north. The West Oakland BART station is located in the southern portion of the Plan area, which is approximately 2 square miles subdivided into 6,340 parcels and has a current population of 25,000 residents and 15,000 employees. The Plan area includes a mix of land uses, including residential, commercial, industrial (including diesel truck-related uses), government and institutional uses.

The Plan area is located in a part of the Bay Area with the highest emissions of, and population exposure to, diesel particulate matter. District staff understands the City's interest in further developing West Oakland, but we urge the City to carefully consider the potential for localized exposure to unhealthy air and to plan appropriately.

Air Quality Analysis

1. The DEIR should discuss the District's attainment status for all criteria pollutants and the implications for the region if these standards are not attained or maintained by statutory deadlines; a discussion of the health effects of air pollution (especially on sensitive receptors); and a discussion of greenhouse gas (GHG) emissions and the potential impacts from climate change in the Bay Area. The DEIR should discuss local air quality conditions in West Oakland, especially diesel particulate matter emissions and population exposure.

2. The DEIR should provide a map that clearly identifies the Plan boundary; existing and future planned sensitive receptors (e.g. residencies, schools, day cares, hospitals, and nursing care facilities) and all stationary sources, major roadways, highways, and rail lines within 1,000 feet of the Plan boundary.

939 ELLIS STREET • SAN FRANCISCO CALIFORNIA 94109 • 415.771.6000 • www.baaqmd.gov

3. The District's *CEQA Air Quality Guidelines* (May, 2012) provide guidance on how to evaluate potential construction, operational, and cumulative air quality impacts. A copy can be downloaded from http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx.

4. The DEIR should provide a detailed analysis of the potential effects on local and regional air quality from construction and operations (including permitted and non-permitted stationary and area emissions, and mobile emissions). This analysis should include an estimation of both maximum daily and annual emissions of reactive organic gases (ROG), nitrogen oxides (NOx), greenhouse gases (GHGs), and particulate matter (PM2.5 and PM10) that could result from the proposed land uses. These estimates should be compared to appropriate significance thresholds.

5. The DEIR should evaluate the potential adverse impacts to future residents in the Plan area located in close proximity to new and existing sources of air pollution, including freeways, the Port of Oakland, rail yards, stationary sources and loading docks.

6. The DEIR should identify and evaluate measures to reduce criteria pollutants, toxic air contaminants, and GHGs to mitigate potential impacts. These measures should be incorporated into the Plan such that, when implemented on a project-by-project basis, impacts will be below a level of significance. The District's *CEQA Air Quality Guidelines* can assist in identifying and quantifying these measures.

7. Finally, the District thanks the City for including District staff on the Technical Advisory Committee for this Project. Based on careful consideration of the project, District staff believes that the City's Standard Conditions of Approval, which call for the installation of MERV 13 air filtration in buildings serving sensitive receptors, are not stringent enough for this Plan. Due to the Plan's proximity to Interstate 880, the Port of Oakland, the Union Pacific Rail Yard, and the Oakland Army Base, District staff supports the installation of MERV 16 (a higher removal-efficiency filter) air filtration on all buildings serving sensitive receptors.

District staff is available to assist in addressing these comments. If you have any questions, please contact Alison Kirk, Senior Environmental Planner, at (415) 749-5169.

Sincerely,

for Jean Roggenkamp
Deputy Air Pollution Control Officer

cc: BAAQMD Director Tom Bates
BAAQMD Director Scott Haggerty
BAAQMD Director Jennifer Hosterman
BAAQMD Director Nate Miley

B A R T

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT
300 Lakeside Drive, P.O. Box 12688
Oakland, CA 94604-2688
(510) 464-6000

November 20, 2012

Ulla-Britt Jonsson
City of Oakland Strategic Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Re: NOP of a DEIR for the Proposed West Oakland Specific Plan
Case No. ER120018

Dear Ms. Ulla-Britt:

This letter provides the comments of the San Francisco Bay Area Rapid Transit District ("BART") on the Notice of Preparation ("NOP") for the Draft Environmental Report ("DEIR"), being prepared for the West Oakland Specific Plan ("the Project") by the City of Oakland ("the City"). BART appreciates the opportunity to continue to participate in this process and provides the comments below on the NOP.

BART is very supportive of new infill development projects in downtown Oakland near BART stations. As provided in BART's 2005 Transit-Oriented Development (TOD) Policy, BART believes that by "promoting high quality, more intensive development on and near BART-owned property, [BART] can increase ridership, support long-term system capacity and generate new revenues for transit." To this end, BART looks forward to collaborating with the City to develop a successful Project with substantial benefits for the public.

BART has undertaken a preliminary analysis of station capacity needs for the system, including for the West Oakland BART Station, and we can make this information available to the City. While this analysis evaluates cumulative forecasted ridership growth for 2030 on the BART system and was not intended to provide a project-specific, micro-level analysis for the West Oakland Station, the analysis does indicate that, to ensure public safety and to meet BART's performance standards, the station needs wider train platforms (for both the lower and upper platforms), more vertical circulation (stairways, escalators and elevators), additional fare gates, and potentially additional platform screen doors.

Finally, the Project Description of the West Oakland Specific Plan identifies a number of goals, objectives and strategies that promote pedestrian, bicycle and transit activities while creating a safe, attractive and environmentally sustainable community. We look forward to working with the City to create more robust multi-modal connections to the station.

Again, thank you for the opportunity to comment. We look forward to working with the City of Oakland on this important Project. If you have any questions, please contact my staff Tim Chan at 510.287.4705 or at TChan1@bart.gov.

Sincerely,

Val Joseph Menotti
Planning Department Manager
Bay Area Rapid Transit District

West Oakland Environmental Indicators Project

8 November 2012

To: Scott Miller, Interim Planning and Zoning Director for Oakland
Oakland Planning Commissioners
Oakland City Hall
One Frank Ogawa Plaza,
Oakland, Ca. 94612

From: West Oakland Environmental Indicators Project
1747 14th St.
Oakland, Ca. 94607

Re: Case # ER120018: Comments for Scoping of Environmental Impact Report for West Oakland Specific Plan.

Dear Oakland Planning Commissioners and Mr. Miller,

The current approach to the scoping for the West Oakland Specific Plan (WOSP) Environmental Impact Report (EIR) reflects an inadequate process. Since the process began residents and business leaders have complained about the lack of transparency in this WOSP process. Both residents and Technical Advisory sub-committee members have expressed frustration with the lack of feedback coming from the planners and their failure to show how community concerns are reflected in the Draft WOSP.

A statement in the “Mitigated Alternative” section of the draft overview raises many questions for WOEIP. “Possible strategies and corresponding land use plans may seek to further address the preservation of historic resources, and minimizing the community’s exposure to toxics by way of traditional buffers, mitigation and other land use approaches”? The EIR must explain these issues of “historic resources”, potential “exposure to toxics” generated by planned land uses and the nature of “traditional buffers” to these impacts. To this end, the draft must also describe scenarios for the creation of new buffers between the protected industrial areas and the expanding residential parts of the community.

WOEIP believes every aspect of the EIR needs to acknowledge the legacy of risk exposure in West Oakland brought about by inappropriate zoning in the past. In supporting the expansion of industrial and commercial activities in this already mixed use community, the WOSP EIR must reflect recommendations for health-protective neighborhood design elements including, alternative infrastructure technologies, “built” buffer zones, green recreation spaces and open spaces, as well as, integrated public spaces in commercial and industrial developments to enhance the health of the disadvantaged and underserved traditional residents of this community.

The funding from the Federal government for the project comes from a transportation related source referred to as Transportation Investment Generating Economic Recovery (TIGER II) grants. Some local residents have been told in various public meetings a rail line will be included in the WOSP based on this transportation funding. Current “Scoping” announcements only mention a “possible street car” line transit system being built in the future in West Oakland. If this transit infrastructure is considered a fundamental element of the economic development potential held in the WOSP, the EIR most clearly address the potential benefits and impacts of such a project on business development, residential development, transit rider ship and the potential allocation of future transit dollars away from more traditional and familiar forms of local public transportation. Without such an analysis, we feel that the inclusion of the streetcar line constitutes an excuse for the use of “transportation” planning dollars for this exercise.

With this in mind the following list will give a set of specific requests and recommendations from WOEIP regarding what needs to be adequately addressed in an EIR for the WOSP.

1. A route analysis for any rail lines to be introduced into the project area as stimulus for new development. This analysis should include the potential benefit to the development of existing community resources such as the Mandela Corridor, the Third Street Corridor, the Peralta Street Corridor and in particular, the historic 16th Street Train Station. A permanent infrastructure system like this can not be casually added to this important plan with considering the benefits or harm it might bring to existing resources.

2. The TIGER II grant application declares a goal of the funding is to create planned linkages between the Oakland Army Base development and the West Oakland community in order the enhance the “sustainability” and quality of life for residents. Thus far these linkages appear to limited to extending AC Transit bus routes to the OAB Logistics Center. Given the amount of public funding being applied to the OAB project, and the water, sewer and power infrastructure links to West Oakland inherent in the OAB develop plan, the WOSP must identify resources to modernize the pubic works infrastructure of the neighborhoods east of I-880. Many of these systems are a century old and it is a social justice travesty to make such a massive investment in site preparation for private development while providing no notion of how similar benefit will be provided to the residents and businesses in the other half of the grant planning area. An adequate environmental appraisal and assessment needs to be fully scoped based on what these linkages are predicted to be in the future. There should be an accurate appraisal of both need and potential for power, water and sewer infrastructure, and alternative transportation modalities, including bikeways, greenways and pedestrian paths there may be in the future. The plan and the scope of the EIR should include revitalization of the 16th St. Train Station with transportation links to the OAB and the Broadway Corridor.

3. The draft documents mention a “Commercial Focused Alternative” without adequate definition and dismisses any potential environmental impact of such an alternative scenario. Draft language states that Oakland city staff view this, “as a non-CEQA alternative.” What is a “non-CEQA alternative” and why is it defined so?

4. Significant "unmitigated" impacts need to be accurately and adequately scoped, as well as explained to the community members in easily understood terms.

5. The plan draft fails to define how it will, "while preserving existing established residential neighborhoods" also accomplish, "Lessening existing land-use conflicts and ensuring avoidance of future conflicts between residential neighborhoods and nonresidential uses." These statements need to be adequately defined and described in the alternative scenario plans. They must also be scoped for an adequate EIR analysis.

6. Because a "Key tenet of the Specific Plan is to retain, enhance and improve… Enhancement Areas" the EIR must fully scope ALL of the environmental impacts which will be associated with the proposed developments in any of the Enhancement Areas.

7. Last, but not least, on 5 May 2012 members of WOEIP presented a verbal presentation with an accompanying PowerPoint presentation about Public Health concerns regarding this WOSP. The Oakland City planning staff has not put the presentation onto the city website for the 5 May 2012 public meeting summary. Nor have the specific questions we addressed to staff at the time been acknowledged or answered.

Thank you for your time and consideration to address each of these issues in detail.

Sincerely,

Margaret Gordon, Co-Director
Brian Beveridge, Co-Director
West Oakland Environmental Indicators Project
1747 14th St.
Oakland, Ca. 94607
www.woeip.org
ph. (510) 257-5640

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-6053
FAX (510) 286-5559
TTY 711

Flex your power!
Be energy efficient!

November 16, 2012

ALAGEN255
ALA-24, 580,880, 980
SCH#2012102047

Ms. Ulla-Britt Jonsson
Strategic Planning Division
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Ms. Jonsson:

West Oakland Specific Plan – Notice of Preparation

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the West Oakland Specific Plan. The following comments are based on the Notice of Preparation. As lead agency, the City of Oakland is responsible for all project mitigation, including any needed improvements to State highways. The project's fair share contribution, financing, scheduling, and implementation responsibilities as well as lead agency monitoring should be fully discussed for all proposed mitigation measures and the project's traffic mitigation fees should be specifically identified in the environmental document. Any required roadway improvements should be completed prior to issuance of project occupancy permits. An encroachment permit is required when the project involves work in the State's Right of Way (ROW). Caltrans will not issue an encroachment permit until our concerns are adequately addressed. Therefore, we strongly recommend that the lead agency ensure resolution of the Caltrans' CEQA concerns prior to submittal of the encroachment permit application; see the end of this letter for more information regarding the encroachment permit process.

Non-Vehicular Modes

Within the West Oakland Specific Plan, Caltrans encourages the City of Oakland to locate any needed housing, jobs and neighborhood services near major mass transit nodes, and connect these nodes with streets configured to facilitate walking and biking, as a means of promoting mass transit use and reducing regional vehicle miles traveled and traffic impacts on local and state roadways. The City of Oakland may further promote mass transit use by coordinating with various transit operators for system improvements/changes that will serve the needs of the future population within the proposed plan.

In addition, please analyze secondary impacts on pedestrians and bicyclists that may result from any traffic impact mitigation measures. Describe any pedestrian and bicycle mitigation measures that would in turn be needed as a means of maintaining and improving access to transit facilities and reducing traffic impacts on state highways.

Traffic Impact Study
The environmental document should include an analysis of the impacts of the proposed project on State highway facilities in the vicinity of the project site, in particular, on and off- ramps and mainline operations for State Route 24, Interstate 580, 880 and 980. Please ensure that a Traffic Impact Study (TIS) includes the information detailed below:

1. Information on the plan's traffic impacts in terms of trip generation, distribution, and assignment. The assumptions and methodologies used in compiling this information should be addressed. The study should clearly show the percentage of project trips assigned to State facilities.

2. Current Average Daily Traffic (ADT) and AM and PM peak hour volumes on all significantly affected streets, freeway and State Route segments and intersections.

3. Schematic illustration and level of service (LOS) analysis for the following scenarios: 1) existing, 2) existing plus project, 3) cumulative and 4) cumulative plus project for the roadways and intersections in the project area.

4. Calculation of cumulative traffic volumes should consider all traffic-generating developments, both existing and future, that would affect the State highway facilities being evaluated.

5. The procedures contained in the 2000 update of the Highway Capacity Manual should be used as a guide for the analysis. We also recommend using Caltrans' *Guide for the Preparation of Traffic Impact Studies;* it is available on the following web site:
   www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf

6. Mitigation measures should be identified where plan implementation is expected to have a significant impact. Mitigation measures proposed should be fully discussed, including financing, scheduling, implementation responsibilities, and lead agency monitoring.

7. A discussion of the City's transportation fair-share program, capital improvement plan, and contribution to regional improvements to mitigate impacts from the proposed plan.

We look forward to reviewing the TIS, including Technical Appendices, and environmental document for this project. Please send two copies to the address at the top of this letterhead, marked ATTN: Yatman Kwan, AICP, Mail Stop #10D.

Encroachment Permit
Any work or traffic control within the State ROW requires an encroachment permit that is issued by Caltrans. Traffic-related mitigation measures will be incorporated into the construction plans during the encroachment permit process. See the following website link for more information:
http://www.dot.ca.gov/hq/traffops/developserv/permits/

To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans which clearly indicate State ROW to the address at the top of this letterhead, marked ATTN: David Salladay, Mail Stop #5E.

Should you have any questions regarding this letter, please call Yatman Kwan, AICP of my staff at (510) 622-1670.

Sincerely,

ERIK ALM, AICP
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-6053
FAX (510) 286-5559
TTY 711

Flex your power!
Be energy efficient!

November 16, 2012

ALAGEN255
ALA-24, 580,880, 980
SCH#2012102047

Ms. Ulla-Britt Jonsson
Strategic Planning Division
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Dear Ms. Jonsson:

West Oakland Specific Plan – Notice of Preparation

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the West Oakland Specific Plan. The following comments are based on the Notice of Preparation. As lead agency, the City of Oakland is responsible for all project mitigation, including any needed improvements to State highways. The project's fair share contribution, financing, scheduling, and implementation responsibilities as well as lead agency monitoring should be fully discussed for all proposed mitigation measures and the project's traffic mitigation fees should be specifically identified in the environmental document. Any required roadway improvements should be completed prior to issuance of project occupancy permits. An encroachment permit is required when the project involves work in the State's Right of Way (ROW). Caltrans will not issue an encroachment permit until our concerns are adequately addressed. Therefore, we strongly recommend that the lead agency ensure resolution of the Caltrans' CEQA concerns prior to submittal of the encroachment permit application; see the end of this letter for more information regarding the encroachment permit process.

Non-Vehicular Modes
Within the West Oakland Specific Plan, Caltrans encourages the City of Oakland to locate any needed housing, jobs and neighborhood services near major mass transit nodes, and connect these nodes with streets configured to facilitate walking and biking, as a means of promoting mass transit use and reducing regional vehicle miles traveled and traffic impacts on local and state roadways. The City of Oakland may further promote mass transit use by coordinating with various transit operators for system improvements/changes that will serve the needs of the future population within the proposed plan.

In addition, please analyze secondary impacts on pedestrians and bicyclists that may result from any traffic impact mitigation measures. Describe any pedestrian and bicycle mitigation measures that would in turn be needed as a means of maintaining and improving access to transit facilities and reducing traffic impacts on state highways.

Traffic Impact Study
The environmental document should include an analysis of the impacts of the proposed project on State highway facilities in the vicinity of the project site, in particular, on and off- ramps and mainline operations for State Route 24, Interstate 580, 880 and 980. Please ensure that a Traffic Impact Study (TIS) includes the information detailed below:

1. Information on the plan's traffic impacts in terms of trip generation, distribution, and assignment. The assumptions and methodologies used in compiling this information should be addressed. The study should clearly show the percentage of project trips assigned to State facilities.

2. Current Average Daily Traffic (ADT) and AM and PM peak hour volumes on all significantly affected streets, freeway and State Route segments and intersections.

3. Schematic illustration and level of service (LOS) analysis for the following scenarios: 1) existing, 2) existing plus project, 3) cumulative and 4) cumulative plus project for the roadways and intersections in the project area.

4. Calculation of cumulative traffic volumes should consider all traffic-generating developments, both existing and future, that would affect the State highway facilities being evaluated.

5. The procedures contained in the 2000 update of the Highway Capacity Manual should be used as a guide for the analysis. We also recommend using Caltrans' *Guide for the Preparation of Traffic Impact Studies;* it is available on the following web site:
   www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf

6. Mitigation measures should be identified where plan implementation is expected to have a significant impact. Mitigation measures proposed should be fully discussed, including financing, scheduling, implementation responsibilities, and lead agency monitoring.

7. A discussion of the City's transportation fair-share program, capital improvement plan, and contribution to regional improvements to mitigate impacts from the proposed plan.

We look forward to reviewing the TIS, including Technical Appendices, and environmental document for this project. Please send two copies to the address at the top of this letterhead, marked ATTN: Yatman Kwan, AICP, Mail Stop #10D.

Encroachment Permit
Any work or traffic control within the State ROW requires an encroachment permit that is issued by Caltrans. Traffic-related mitigation measures will be incorporated into the construction plans during the encroachment permit process. See the following website link for more information:
http://www.dot.ca.gov/hq/traffops/developserv/permits/

To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans which clearly indicate State ROW to the address at the top of this letterhead, marked ATTN: David Salladay, Mail Stop #5E.

Should you have any questions regarding this letter, please call Yatman Kwan, AICP of my staff at (510) 622-1670.

Sincerely,

ERIK ALM, AICP
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

CITY OF OAKLAND

CPTED REVIEW PROCESS

Types of Planning Projects for Crime Prevention Through Environmental Design (CPTED) review

Pre-applications and applications for (in alphabetical order)**:**

- 5 or more units
- Alcohol-related
- Commercial and mixed-use properties
- Convenience markets
- Gas stations
- Malls
- Parking garages
- Parking lots
- Parks
- Restaurants
- Schools
- Transitional housing
- ATM Machines
- Other projects deemed to need CPTED review

Counter review and approval for project without Police input:

Use the checklists.

Project taken in <u>without</u> Police input:

1 The Intake or Counter planner fills in the CPTED log on the L:Drive (CPTED folder).
2 The Project Planner fills out the checklist. ”No” checks, and CPTED issues should be a guide for revisions to the project

Process <u>with</u> Police input:

1 The Intake or Counter planner fills in the CPTED review log on the L:Drive.
2 The project planner fills out the CPTED checklist. ”No” checks, and CPTED issues should be a guide for revisions to the project.
3 The project planner emails the PSO (see Community Policing Map and PSO Roster Excel sheet). If no response, then try again and CC the Sergeant (supervisor). If still no response, contact the lieutenant (Junior Commander). Last resort, contact the Area Commander (Captain).

20 Nov 2012

To: Oakland City Planning Commission
Oakland City Hall
250 Frank Ogawa Plaza
Oakland, Cal.

From: Duane De Witt
1747 14th St.
Oakland, Ca. 9607

Re: Case #ER120018 Scope of the Environmental Impact Report for the West Oakland Specific Plan

To whom it may concern:

I have read various documents related to the West Oakland Specific Plan. I believe as currently envisioned, the Environmental Impact Report (EIR) would be inadequate if it does not include these following topics. Please include these topics at a bare minimum for an adequate EIR. Also please reference the attached documents previously submitted to the Metropolitan Transportation Commission (MTC) for the One Bay Area Plan Environmental Impact Report (EIR) as well as the document from the West Oakland Environmental indicators Project (WOEIP) for this EIR.

1. Urban agriculture and the various community gardens and urban farming endeavors in West Oakland.

2. Urban Forestry and the planting and upkeep of the urban greenery and trees in W. Oakland.

3. Alternative transportation modalities as well as bikeways, greenways and pedestrian paths.

4. Linkages to the Oakland Army Base.

5. Health impacts on children of this plan, especially at the educational centers such as schools.

6. Last but not least what about the revitalization of the 16th ST. Train Station with the WOSP?

I will have more to comment upon once I have seen the document available at the public meetings. With this in mind I wish to be certain my written comments will be included in the official records.

Thank you for your time and consideration of this opening comments of mine on this matter.

Sincerely,

Duane De Witt
1747 14th St.
Oakland, Ca. 9607
dewittveteran@yahoo.com

8 November 2012

To: Scott Miller, Interim Planning and Zoning Director for Oakland
Oakland Planning Commissioners
Oakland City Hall
One Frank Ogawa Plaza,
Oakland, Ca. 94612

From: West Oakland Environmental Indicators Project
1747 14th St.
Oakland, Ca. 94607

Re: Case # ER120018: Comments for Scoping of Environmental Impact Report for West Oakland Specific Plan.

Dear Oakland Planning Commissioners and Mr. Miller,

The current approach to the scoping for the West Oakland Specific Plan (WOSP) Environmental Impact Report (EIR) reflects an inadequate process. Since the process began residents and business leaders have complained about the lack of transparency in this WOSP process. Both residents and Technical Advisory sub-committee members have expressed frustration with the lack of feedback coming from the planners and the willingness to show how community concerns are reflected in the Draft WOSP.

Also a statement in the "Mitigated Alternative" raises may questions for WOEIP. What does the following statement actually mean to the community, "Possible strategies and corresponding land use plans may seek to further address the preservation of historic resources, and minimizing the community's exposure to toxics by way of traditional buffers, mitigation and other land use approaches?" Please make sure the EIR explains this in depth with simple language understandable to the general community and laypersons. WOEIP believes every aspect of the EIR needs to acknowledge the legacy of risk exposure and also proposes solutions such as alternative infrastructure, buffer zones, green spaces and open spaces as well as integrated public spaces in commercial and industrial spaces to protect the health of this disadvantaged underserved community.

With this in mind the following list will give a set of specific requests and recommendations from WOEIP regarding what needs to be adequately addressed in an EIR for the WOSP. Specifically because current "Scoping" announcements only mention a "possible street car" line transit system being built in the future in West Oakland. The funding from the Federal government for the project comes from a transportation related source referred to as Transportation Investment Generating Economic Recovery (TIGER II) grants. Some local residents have been told in various public meetings a rail line will be included in the WOSP based on this transportation funding. Therefore this needs to be called out in the EIR and appropriately addressed based on where the line, and its' stops, will be located.

1. Complete route(s) for any and all rail lines to be introduced into the project area for West Oakland before the year 2035. This includes all stops as well as the "No project" alternative. Now is not the time to be coy or non committal about this transportation plan.

2. How will "linkages" with the Oakland Army Base be made and implemented? An adequate environmental appraisal and assessment needs to be fully scoped based on what these linkages are going to be in the future. Through to the year 2035 please. There should be an accurate appraisal of what alternative transportation modalities as well as bikeways, greenways and pedestrian paths there may be in the future. This should include revitalization of the 16th St. Train Station with transportation links in the WOSP.

3. WOEIP seeks an adequate definition and explanation of what the "Commercial Focused Alternative will impact environmentally, while also describing why Oakland city staff view this, "as a non-CEQA alternative." (In Layman's terms please.)

4. Significant "unmitigated" impacts need to be accurately and adequately scoped, as well as explained to the community members in easily understood terms.

5. The plan draft fails to define how it will, "while preserving existing established residential neighborhoods" while also, "Lessening existing land-use conflicts and ensuring avoidance of future conflicts between residential neighborhoods and nonresidential uses." These statements need to be adequately defined, explained, plus reconciled and scoped for an adequate EIR to be produced.

6. Because a "Key tenet of the Specific Plan is to retain, enhance and improve… Enhancement Areas" the EIR must fully scope ALL of the environmental impacts which will be associated with the proposed developments in any of the Enhancement Areas.

7. Last, but not least, on 5 May 2012 members of WOEIP presented a verbal presentation with an accompanying PowerPoint presentation about Public Health concerns regarding this WOSP. The Oakland City planning staff has not put the presentation onto the city website for the 5 May 2012 public meeting summary. Nor have the specific questions we addressed to staff at the time been acknowledged or answered.

While nearly half a billion dollars in public funds in public funds are committed to power, sewer and water infrastructure for the Oakland Army Base portion of this planning grant, no resources have been dedicated or committed to the century old infrastructure in the West Oakland neighborhoods. This is a social justice and environmental justice failure.

Thank you for your time and consideration to address each of these issues in detail.

Sincerely,

Margaret Gordon & Brian Beveridge, Co-Directors
West Oakland Environmental Indicators Project
1747 14th St.
Oakland, Ca. 94607
www.woeip.org ph. (510) 257-5640

10 July 2012

To: Ms. Ashley Nguyen, EIR Project Manager
Metropolitan Transportation Commission
101 Eighth St.
Oakland, Ca. 94607

Re: Comments for the Scoping of the Draft EIR for the Plan Bay Area EIR.

Dear Ms. Nguyen,

Please include these comments in the scoping for the Draft Environmental Impact Report (DEIR) currently being considered for preparation by the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). Please give us a written response acknowledging receipt of these comments.

Enduringly deprived West Oakland appears to have been neglected again by bay area planners with the One Bay Area Plan (OBAP) efforts regarding future transportation planning with a jobs-housing linkage component. Therefore these comments are made regarding the inadequacies of the "scoping" for the Draft Environmental Impact Report (DEIR) currently being considered for preparation by the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

Scoping for the DEIR needs to explore the growth of West Oakland due to Oakland city proposals for increased development in the West Oakland area currently being planned with the West Oakland Specific Plan (WOSP) process. Please do better investigation regarding the environmental impacts of urban growth in West Oakland. The following issues need to be fully investigated to address residents' concerns about the current inadequacy of the scoping for the DEIR for the OBAP.

1. Environmental issues need to be analyzed regarding the impacts of the Oakland Army Base redevelopment into an enlarged rail yard and freight transportation center for the Port of Oakland. This site is immediately next to the community of West Oakland and may have negative environmental impacts from increased train traffic, and freight truck traffic, with the accompanying air and noise pollution increases. Please analyze these developments in the DEIR for the OBAP.

2. Environmental issues associated with increased urban development from the West Oakland Specific Plan proposals need to be included for analysis by the DEIR for OBAP. This is especially true for the environmental impacts associated with the proposed changes to the transportation networks within West Oakland. Please analyze these developments in the DEIR for the OBAP.

3. Alternatives to the proposed Light Rail System (LRS) being planned for West Oakland in the WOSP need to be explored, such as a Bus Rapid Transit (BRT) system. There also needs to be a realistic analysis of what undergrounding the Bay Area Rapid Transit (BART) though West Oakland could do to enhance the local environment. Please analyze these developments in the DEIR for the OBAP.

4. Current scoping is inadequate in regards to the WOSP with its proclaimed linkages to the Oakland Army Base (OAB) and the Port of Oakland in the future. Environmental impacts of NOT having good linkages for workers at the OAB with potential housing in West Oakland would create large environmental health impacts upon local residents. Please investigate these issues deeper and further with explanations to be done with an analysis of these developments in the DEIR for the OBAP.

5. The Port of Oakland is expanding the rail yard for the use of longer trains carrying more freight, perhaps leading to more use of trucks handing freight transport at OAB. Current scoping for the DEIR is not adequate in addressing how these environmental impacts will be monitored and mitigated, if need be, for the health of West Oakland residents. Please analyze these developments in the DEIR for the OBAP.

6. The alternative of a comprehensive transportation connections and linkages plan for the entire West Oakland neighborhood in conjunction with the Oakland Army Base (OAB) redevelopment and Port of Oakland expansion at the OAB needs to be explored and adequately scoped into the DEIR for the OBAP. Please analyze these issues in the DEIR for the OBAP.

With these preliminary comments in mind our organization would be glad to provide more of our expertise and information to your efforts on the DEIR. Please feel free to contact us at your earliest convenience to provide you with more information from a more indepth discussion about the needs for West Oakland with a jobs-housing linkage with any future transportation projects funded by the MTC.

With kind regards,

Margaret Gordon and Brian Beveridge

West Oakland Environmental Indicators Project (WOEIP)
1747 14th St.
Oakland, Ca. 94607
Phone # (510) 257-5640
www.woeip.org

3 Nov 2012

To: Oakland City Landmarks Committee
Oakland City Hall
Frank Ogawa Plaza
Oakland, Cal.

From: Duane De Witt
1747 14th St.
Oakland, Ca. 9607

Re: Scope of the Environmental Impact Report for the West Oakland Specific Plan

To whom it may concern:

I have read various documents related to the West Oakland Specific Plan. I believe as currently envisioned, the Environmental Impact Report (EIR) would be inadequate if it does not include these following topics. Please include these topics at a bare minimum for an adequate EIR.

1. Urban agriculture and the various community gardens and urban farming endeavors in West Oakland.

2. Urban Forestry and the planting and upkeep of the urban greenery and tress in W. Oakland.

3. Alternative transportation modalities as well as bikeways, greenways and pedestrian paths.

4. Linkages to the Oakland Army Base.

5. Health impacts on children of this plan, especially at the educational centers such as schools.

6. Last but not least what about the revitalization of the 16th ST. Train Station with the WOSP?

I will have more to comment upon once I have seen the document available at the public meetings. With this in mind I wish to be certain my written comments will be included in the official records.

Thank you for your time and consideration of this opening comments of mine on this matter.

Sincerely,
Duane D. De Witt

Duane De Witt
1747 14th St.
Oakland, Ca. 9607
dewittveteran@yahoo.com

October 19, 2012

Comments on Draft West Oakland Specific Plan Project Description

Richard Grow, US EPA, Region 9

Our participation in the Technical Advisory Committee (TAC) for the West Oakland Specific Plan (WOSP) is driven primarily by a concern that environmental and public health implications of this long range plan are given due consideration. We understand that one of the key goals of the current document ("West Oakland Specific Plan", as distributed on October 5) is to provide the basis for the Notice of Preparation (NOP) for the upcoming EIR on the Plan to be carried out under CEQA. Below are offered a few specific suggestions regarding the draft document content, but before getting to those it might help to provide some background on our involvement in this area and these issues.

Of particular concern to us are risks and impacts related to exposure to toxics, in this context primarily due to proximity to sources of toxics. This concern was one of the drivers for our partnering with the community since 2005 in convening the West Oakland Toxics reduction Collaborative (WOTRC), which we continue to co-chair under a Partnering Agreement with the West Oakland Environmental Indicators Project and the Alameda County Public Health Department.

Over the past decade our collective understanding of sources of toxic air contaminants has evolved, with the California State Air Resources Board in the forefront, resulting in a much greater emphasis on the role of mobile sources, and in particular those generating diesel pollutants such as freight movement activities. Along those lines, we have also served in an advisory capacity to the Ditching Dirty Diesel Collaborative since 2004. The most recent report from the DDDC pertinent to the WOSP effort is the December, 2011 report, "At a Crossroads in our Region's Health: Freight Transport and the Future of Community Health in the San Francisco Bay Area." In May of this year I raised the relevance of this report with the TAC and subsequently provided TAC coordinators with background information on the study (available at http://pacinst.org/reports/crossroads_for_health/) and potential applicability of its findings and methodologies to the WOSP effort.

We have been particularly interested in this long range land use planning effort for a number of reasons. First, West Oakland is an area widely, even nationally, known for the significance of the environmental justice related issues that play out in this community, as well as for the high capacity of community members and leaders in advocating and engaging these issues. Community members have served and continue to serve on a number of national advisory bodies for the US EPA. This would appear to be a community uniquely qualified in both its understanding of its the issues and its capacity to advocate for those issues. Second, on occasions when environmental justice advocates have pressed EPA to address EJ related impacts of various federal activities, such as issuance of permits under the Clean Air Act, they have often been told by the Agency that the most fundamental driver of their issues are related to land use, and that those issues should be addressed, and could possibly best be addressed, in the local land use planning process. This makes the WOSP process also of interest as an excellent opportunity to observe whether and how such environmental and public health impacts are taken into consideration, in this case in a federally funded local planning effort.

Regarding scheduling – in response to the recent rather compressed schedule for review of this 87 page document, we raised a number of concerns and suggestions aimed at allowing for a more in depth consideration of the draft report. Somewhat emblematically, in our view, was that the last minute scheduling of the TAC meeting conflicted directly with a previously scheduled meeting of the Bay Area Quality Management District's (BAAQMD) task force on Community Air Risk Evaluation (CARE), on which we also participate. Interestingly, the DDDC report mentioned above is based in significant part on studies performed by BAAQMD as part of the CARE project. When we have asked about the source of constraints on the current rather rushed schedule for the WOSP, we have been told the schedule was required under the terms of TIGER grant, specifically the cooperative agreement for that grant between DOT, HUD and the City.

We would like to reiterate here (1) our concern that the potential effects of scheduling constraints in limiting the consideration of community impacts, such as the public health concerns mentioned above, should be minimized as much as possible and (2) our willingness to join a conversation with the federal project officers for the TIGER grant to discuss whether adjustments to the schedule might serve to further improve the quality of the plan.

Specific comments on the draft document

Most of our comments are linked to the goal listed on page 2 of the Project Description: "Lessen existing land use conflicts and ensure avoidance of future conflicts between residential neighborhoods and nonresidential uses." We are pleased to see several references throughout the document making clear that among the conflicts of concern are conflicts related to proximity and exposure to toxic pollutants, as well as addressing those conflicts by way of land use, buffers, mitigation measures and so on. This leads to the following specific suggestions:

1. Land use Objective LU 6, Strategy LU 6-3 (p7-8) should be revised to read: "Reduce conflicts between residential and ~~industrial~~ uses generating substantial pollution.

2. There should be cross-references between land use Objective LU 6, Strategy LU 6-3 and environmental Objective EN 3 (pp 29-32) in both of those objectives. It is EN 3, especially ENV 3-5, that provides specifics as to how to go about meeting Strategy LU- 6-3.

3. Alternatives. Implementation of Strategies ENV 3-5a. and b. imply the need for additional alternatives beyond those currently listed at page 8 of the Project

description document. Both of these strategies describe a need to "prioritize" or "site" particular land uses with regard to minimizing community toxics exposures. It is hard to see how either of these strategies could have any meaning if they are only brought into the process after the basic land uses have already been fixed. The plan should describe, and the EIR assess, at least one scenario (or alternative) demonstrating what application of these principles in practice would look like. The DDDC "Crossroads" study referenced above provides one methodology for addressing these by way of buffers, mitigation and other approaches.

4. Children's health, education and schools. Somewhere in the plan – whether in goals, objectives or strategies - there should be acknowledgement of the need to take into consideration the special vulnerabilities of children to environmental health impacts. The plan also needs to take into account the linkage of residential development to the need for schools to serve the children living in those residences. The interrelationship of children's health and schools further highlights the need to take proximity and exposure to toxics into account in planning future residential development.

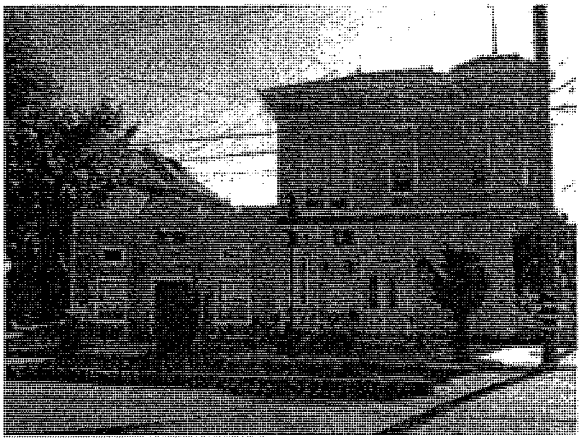
Thank you for the opportunity to comment on this document.

Richard Grow
US EPA
Region 9
(415) 947-4104
Grow.richard@epa.gov

7th STREET NEIGHBORHOOD MEETING

PRESENTATION OF THE WEST OAKLAND SPECIFIC PLAN (WOSP) FOLLOWED BY Q & A

MONDAY, NOVEMBER 19th, 6-7:30 PM



OWH STUDIOS: UNIA BUILDING

1485 8th STREET, OAKLAND

FMI: 510.469.1118

In addition to providing a place of worship, this building is the home of OWH Studios and The Jack London Square Information & Referral Center. The studio trains at-risk youth in television and video production and support. The center provides job, business, and housing information to the West Oakland community.

WOSP Planning Commission Scoping Session, Oakland City Hall
November 14, 2012, 6 PM

Genevieve Wilson, resident
1486 8th Street Unit B
Oakland CA 94607
c 510.469.1118

I join Naomi Schiff in my concern that the plan yet lacks clear priorities and phasing, particularly for Area 2 around the West Oakland BART Station, which is my neighborhood. I am especially concerned about the future of our housing in Area 2. How will suitable housing be preserved, how will new housing be planned and built, and how will housing overall be kept affordable for the working class already living in the area? While the maximum capacities depicted in the plan seem over-ambitious, prudent development will be necessary in order to establish and sustain healthy new businesses that the neighborhood needs, such as a grocery store.

Have housing models that are more communal and thus more cost effective been adequately entertained? For example: my building at 1486 8th is an SRO (Single Room Occupancy) with about ten units. There is a kitchen in the middle and two baths in front and in back. We have laundry on site. One shortcoming is that we have no common area, but one could be established; my building manager even hopes to plant a rooftop garden. But the building is up for sale, so these things are only vision at present. Could not this sort of housing model be replicated on a larger scale? Most of the rest of the world lives this way, sharing space and saving cost. We each pay around $550/month rent, all-inclusive.

Numerically ~~Practically~~ *Can targets by percentage be determined for affordable housing?*

To push further: I know this is bold, but could there even be room for a long-term shelter or some kind of transitional housing in the plan? While at Jack London Square last night I ran into a woman named Denise. She was homeless and in need of a meal, and I was able to help her with some change. She also needed housing, and I was unable to help her. I meet and talk with such individuals on a nearly weekly basis, and I am deeply troubled by the lack of suitable housing opportunities available for them. We are in an incredible crisis. I feel, as does a Berkeley Homeless commissioner, that this is a national disgrace.

└ WSWA's canvassing projects 50-60% unemployed

In closing, I would like to share something from my faith tradition. My background is Christian. I believe in a loving God who has special concern for the poor. I believe that Christ exemplified this love through his life and death on a cross. And I believe that it is through the power of Christ's resurrection that plans like the WOSP can be laid and executed. And so from Psalm 82, verses 3 and 4:

3 *Give justice to the weak and the orphan;*
Maintain the right of the weak and destitute.
4 *Rescue the weak and the needy;*
Deliver them from the hand of the wicked.

Thank you for considering my statement.

[signature]

*There will be a 7th Street neighborhood meeting next Monday, November 19th, from 6-7:30 pm at the UNIA Building at 1485 8th Street. The purpose will be to present the plan and allow residents ample time for Q & A. All are welcome. Please spread the word.

November 21, 2012 Transmitted via Electronic Mail

Ms. Elois Thornton
Mr. Jeff Chew
Ulla-Britt Jonsson
City of Oakland
250 Frank H. Ogawa Plaza
Oakland, CA 94612

Re: Plan for the West Oakland BART Opportunity Area.

Dear WOSP Team:

Thank you again for your continued hard work and dedication. We remain excited at the prospect of a West Oakland Specific Plan (WOSP) that will facilitate investment and revitalization of our community in a way that previous efforts have been unable to do. While the near-horizon redevelopment of the Army Base makes the coming years different in terms of opportunity than the decade before, we believe that a certain amount of structural planning is necessary in order for this Army Base tide to float West Oakland boats in a productive and sustainable manner. The WOSP could provide just this structure.

We have written previously on aspects of the plan that we believe are critically important. WOCA representatives serve on your advisory groups and have done all in their power to provide advice and perspective. This letter sends recommendations regarding an aspect of the WOSP that we have not previously taken up, namely the plan for the West Oakland BART Opportunity Area.

As you may be aware, at our membership meeting on October 25 we hosted a panel of West Oakland industrial artists, with our lunchtime conversation centering on the evolution of this aspect of our community over the course of the last ten years. The work of The Crucible and American Steel Studios is perhaps the most visible, but as you are hopefully well aware, there are many other artisans and craftspeople in West Oakland and many more contemplating a move to our community because of its physical and cultural attributes. Without question, West Oakland is an Arts District. With proper planning and municipal engagement this District can serve as a foundational element for redevelopment – both locally and around the City.

The arts and artisans movement in West Oakland is contemporary, but also ties to the history of our community. In this way, the arts are for everybody, artisans, residents and visitors alike.

A Sub-Area of the WOSP 7th Street Opportunity Area, the West Oakland BART station is a gateway to the West Oakland Arts District. At present, in the places not occupied by domiciles or businesses, the area proximal to the station is a blank canvas. At present, the WOSP anticipates the canvas to ultimately hold a “transit village” mix of office space, service providers and residents. As stated in the Draft WOSP:

The land use and development strategy for the 7th Street Opportunity Area includes transit-oriented development (TOD) of higher-density housing with ground floor neighborhood-serving retail on vacant sites and current surface parking lots around the West Oakland BART station.

We believe it is appropriate to take a step back to examine how this redevelopment scheme can be arranged such that it obviously emphasizes, celebrates and leverages the Industrial Arts and Non-Industrial Arts endeavors, while at the same time honoring the residents, business owners and history of the community. This is our opportunity to create a "center", "a go to plaza area," a meeting and entertainment place / plaza for West Oakland, which is lacking in the current WOSP vision.

Our specific requests/recommendations are as follows:

(1.) The development as contemplated in Figures 11, 21 and 24 of the Draft WOSP seems very dense. Rather than an inviting gateway, the structures as shown almost feel like a barrier. Consideration should be given to the lowering or removal of the these proposed structures shown along 7th Street on either side of Mandela such that the neighborhood is visible from the train. This land would be an ideal location for a open space with sculpture gardens and gathering place for travelers disembarking West Oakland. Representative work would be an invitation to explore what lies in the community beyond.

(2.) The text of the WOSP section describing 7th Street Opportunity Area priorities and opportunities presently uses just half a sentence to describe the art and musical heritage of the 7th Street corridor. It says nothing of the Industrial Arts at all. With all due respect, this section of the plan should present a far more enthusiastic description of the Industrial Arts history and possibilities.

(3.) All the canvas around the train station is depicted as filled by podium-style residential development with ground floor retail. With all due respect, this covers the blank canvas with monochromatic flat paint. We urge the team to return to the drawing board and return with a rendering that is truly striking, a plan that captures the essence of the history and opportunity. A plan that motivates people to actually get off the train at the West Oakland space. Consider performance space both exterior and interior (in a shape other than a space under a residential podium), structures for arts and trades education, exhibition and gallery space. In addition, consider the inclusion of outdoor open space for seasonal performance and gathering opportunity.

The creative and innovative energy that spawns start-ups has already arrived in West Oakland, and we feel West Oakland and the city at large would benefit greatly and long-term from supporting and fostering this activity.

We thank you for your consideration

Sincerely,
/ s /
Norman Hooks, President
West Oakland Commerce Association

cc: Mayor Jean Quan
Councilmember Nancy Nadel
Councilmember-Elect Lynette McElhaney
City Administrator Deanna Santana
Assistant City Administrator Fred Blackwell
Art Clark, JRDV
Morten Jensen, JRDV

Barriers to Economic Development and Retention in West Oakland

Issues discussed at the meeting of 9/11/2012 with Deputy City Administrator Arturo Sanchez

We can't do economic development and retention without resolving the "negative pressures" on the business community such as:

1. An extremely substandard public infrastructure
2. Abandoned rail lines in the middle of the streets (with large impassable potholes)
3. Crime and lack of support from Oakland Police Department
4. Excessive amounts of illegal dumping
5. Massive amounts of graffiti on public and private property
6. Weeds and debris on public and private property
7. Homeless encampments
8. Lack of support from city's Code Compliance Department
9. Lack of immediate removal of hazardous material on public streets and sidewalks

Gmail by Google

Scott Gregory <sgregory@lamphier-gregory.com>

FW: NOP for West Oakland Specific Plan-EPA

1 message

Jonsson, Ulla-Britt <UJonsson@oaklandnet.com> Wed, Nov 21, 2012 at 3:23 PM
To: sgregory@lamphier-gregory.com, art@jrdv.com

One more before the package

Ulla-Britt Jonsson
Planner
City of Oakland Planning, Building & Neighborhood Preservation

250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612
(510)238-3322 ujonsson@oaklandnet.com

Please note: Oakland City offices are closed for Thanksgiving on Thursday and Friday, November 22 and 23, 2012

From: Grow.Richard@epamail.epa.gov [mailto:Grow.Richard@epamail.epa.gov]
Sent: Wednesday, November 21, 2012 3:10 PM
To: Jonsson, Ulla-Britt
Cc: Thornton, Elois
Subject: NOP for West Oakland Specific Plan

Ulla-Britt Jonsson

Regarding your Notice of Preparation for the Draft EIR for the West Oakland Specific Plan, please include the attached comments previously submitted to Art Clark on October 19 as part of the Technical Advisory Committee's consideration of the WOSP. According to the Notice, comments should "focus on discussing possible impacts...ways in which potential adverse impacts might be minimized, and alternatives to the project in light of the EIR's purpose to provide useful and accurate information about such factors," and elsewhere the Notice solicits "public input regarding the type of information and analysis that should be considered in the EIR." In our discussions at the TAC it was not altogether evident how or where TAC members' concerns would fit into the WOSP process, but clearly the EIR process is one place where they should be considered.

As discussed in the October 19 comments, most of my concerns could be seen as coming under the category of the "conflicts" referenced in the 7th goal in the Project description. Of most concern are conflicts related to proximity and exposure to toxic pollutants, and the need to address those conflicts by way of land use, buffers, mitigation measures and so on. Our comments also referenced the December, 2011 report by the Pacific Institute and the Ditching Dirty Diesel Collaborative, “At a Crossroads in our Region’s Health: Freight Transport and the Future of Community Health in the San Francisco Bay Area.” This report provides a methodology for addressing these concerns. While there may be other methodologies that could accomplish the same purposes, our overall comment is that either this methodology or something analogous to it should be applied in assessing and mitigating the environmental and public health effects associated with the WOSP and alternatives.

Regarding alternatives, as also discussed in those comments, Strategies ENV 3-5a. and b. in the Project Description document (provided to the TAC for the October 16 meeting) describe a need to “prioritize” or “site” particular land uses with regard to minimizing community toxics exposures. It is hard to see how either of these strategies could have any meaning if they are only brought into the process after the basic land uses have already been fixed, the implication being a need for additional alternatives beyond those currently under consideration by the TAC. As just one example of a potential "conflict" and demonstrating the need for such assessment, the current document projects a substantial buildout of residential housing along the 880 freeway in Area 2A of the Plan, yet this area has been identified in the "Crossroads" report and in studies by the Bay Area Air Quality Management District (BAAQMD) as an area already substantially affected by high concentrations of freight movement related pollutants. Similar potential conflicts may exist in other areas of the WOSP planning area. The proposed plan should describe, and the EIR assess, at least one scenario (or alternative) demonstrating what application of these principles (prioritization and siting particular land uses to minimize community toxics exposures) in practice would look like.

Finally and more generally, please consider the overall perspective described in the attached two pager on "Health Equity and Housing" which has been under discussion in the broader Bay Area sustainability planning process. In particular the general perspective on land use conflicts articulated in the "Crossroads" report should be considered and addressed in the upcoming EIR process.

Richard Grow
US EPA
Region 9
(415) 947-4104

October 19, 2012 comments:

"Health Equity and Housing"

---

2 attachments

Comments on WOSP 10_19_20.docx
18K

MTC equity one pager RG Sept2012.docx
84K

November 21, 2012 Transmitted via Electronic Mail

Ms. Elois Thornton
Mr. Jeff Chew
Ulla-Britt Jonsson
City of Oakland
250 Frank H. Ogawa Plaza
Oakland, CA 94612

Re: Plan for the West Oakland BART Opportunity Area.

Dear WOSP Team:

Thank you again for your continued hard work and dedication. We remain excited at the prospect of a West Oakland Specific Plan (WOSP) that will facilitate investment and revitalization of our community in a way that previous efforts have been unable to do. While the near-horizon redevelopment of the Army Base makes the coming years different in terms of opportunity than the decade before, we believe that a certain amount of structural planning is necessary in order for this Army Base tide to float West Oakland boats in a productive and sustainable manner. The WOSP could provide just this structure.

We have written previously on aspects of the plan that we believe are critically important. WOCA representatives serve on your advisory groups and have done all in their power to provide advice and perspective. This letter sends recommendations regarding an aspect of the WOSP that we have not previously taken up, namely the plan for the West Oakland BART Opportunity Area.

As you may be aware, at our membership meeting on October 25 we hosted a panel of West Oakland industrial artists, with our lunchtime conversation centering on the evolution of this aspect of our community over the course of the last ten years. The work of The Crucible and American Steel Studios is perhaps the most visible, but as you are hopefully well aware, there are many other artisans and craftspeople in West Oakland and many more contemplating a move to our community because of its physical and cultural attributes. Without question, West Oakland is an Arts District. With proper planning and municipal engagement this District can serve as a foundational element for redevelopment – both locally and around the City.

The arts and artisans movement in West Oakland is contemporary, but also ties to the history of our community. In this way, the arts are for everybody, artisans, residents and visitors alike.

A Sub-Area of the WOSP 7th Street Opportunity Area, the West Oakland BART station is a gateway to the West Oakland Arts District. At present, in the places not occupied by domiciles or businesses, the area proximal to the station is a blank canvas. At present, the WOSP anticipates the canvas to ultimately hold a “transit village” mix of office space, service providers and residents. As stated in the Draft WOSP:

The land use and development strategy for the 7th Street Opportunity Area includes transit-oriented development (TOD) of higher-density housing with ground floor neighborhood-serving retail on vacant sites and current surface parking lots around the West Oakland BART station.

We believe it is appropriate to take a step back to examine how this redevelopment scheme can be arranged such that it obviously emphasizes, celebrates and leverages the Industrial Arts and Non-Industrial Arts endeavors, while at the same time honoring the residents, business owners and history of the community. This is our opportunity to create a “center”, “a go to plaza area,” a meeting and entertainment place / plaza for West Oakland, which is lacking in the current WOSP vision.

Our specific requests/recommendations are as follows:

(1.) The development as contemplated in Figures 11, 21 and 24 of the Draft WOSP seems very dense. Rather than an inviting gateway, the structures as shown almost feel like a barrier. Consideration should be given to the lowering or removal of the these proposed structures shown along 7th Street on either side of Mandela such that the neighborhood is visible from the train. This land would be an ideal location for a open space with sculpture gardens and gathering place for travelers disembarking West Oakland. Representative work would be an invitation to explore what lies in the community beyond.

(2.) The text of the WOSP section describing 7th Street Opportunity Area priorities and opportunities presently uses just half a sentence to describe the art and musical heritage of the 7th Street corridor. It says nothing of the Industrial Arts at all. With all due respect, this section of the plan should present a far more enthusiastic description of the Industrial Arts history and possibilities.

(3.) All the canvas around the train station is depicted as filled by podium-style residential development with ground floor retail. With all due respect, this covers the blank canvas with monochromatic flat paint. We urge the team to return to the drawing board and return with a rendering that is truly striking, a plan that captures the essence of the history and opportunity. A plan that motivates people to actually get off the train at the West Oakland space. Consider performance space both exterior and interior (in a shape other than a space under a residential podium), structures for arts and trades education, exhibition and gallery space. In addition, consider the inclusion of outdoor open space for seasonal performance and gathering opportunity.

The creative and innovative energy that spawns start-ups has already arrived in West Oakland, and we feel West Oakland and the city at large would benefit greatly and long-term from supporting and fostering this activity.

We thank you for your consideration

Sincerely,
/ s /
Norman Hooks, President
West Oakland Commerce Association

cc: Mayor Jean Quan
Councilmember Nancy Nadel
Councilmember-Elect Lynette McElhaney
City Administrator Deanna Santana
Assistant City Administrator Fred Blackwell
Art Clark, JRDV
Morten Jensen, JRDV

Gmail by Google

Scott Gregory <sgregory@lamphier-gregory.com>

FW: Comments for WOSP EIR

1 message

Jonsson, Ulla-Britt <UJonsson@oaklandnet.com> Wed, Nov 21, 2012 at 4:19 PM
To: sgregory@lamphier-gregory.com, Art Clark <Art@jrdv.com>

This one came in after I sent the batch

Ulla-Britt Jonsson
Planner
City of Oakland Planning, Building & Neighborhood Preservation

250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612
(510)238-3322 ujonsson@oaklandnet.com

Please note: Oakland City offices are closed for Thanksgiving on Thursday and Friday, November 22 and 23, 2012

From: Marcus Johnson [mailto:marcus_a_johnson@yahoo.com]
Sent: Wednesday, November 21, 2012 4:19 PM
To: Jonsson, Ulla-Britt
Subject: Comments for WOSP EIR

Please reference: West Oakland Infrastructure Report (2011) for my inputs:

Page 15

Priority 6 – Circulation Projects that improve circulation through the area are assigned a relatively low priority level, partly due to cost, and partly due to the level of further study that would realistically be required prior to their implementation. Projects could include installing a roundabout within the W. Grand Avenue/Mandela Parkway intersection to facilitate smoother traffic flow and reopening the 10th Street barricade.

Page 28 of 43

Mandela Parkway Industrial Zone – Southwest (SubArea 16)

10th St

- Intersection has block cracking on all 4 ways.

- 10th street at high elevation relative to pine st. Heavily sloped from center towards sides.
- North side has angled parking. No curb or gutter, no SW
- Frontage to Pine St, 3 entrances off of 10th for Industrial truck entrances (Recycling).
- SW, curb and gutter on curb return along Frontage. Ends just after turn.
- Recommendation
    - o Replace road cross section. Install sidewalk, rolled curb with gutter, and angled parking sections to maintain existing use.

Pine St

- SW is 5' wide, 1.5' gutter, 6" curb both sides
- Long longitudinal crack and alligator cracking along center, probably some type of joint cracking.
- Between 11th and 12th, road conditions are pretty good.
- Recommendation
- o Slurry seal

11th St (West of Pine St)

- Asphalt is in decent shape
- Few longitudinal and transverse cracks
- No curb, gutter, or sidewalk on either side
- Currently cars park in front of loading bays with "No Parking" markings on bay doors
- Recommendation:
    - o Replace road cross section. New section shall have sidewalk, perpendicular parking, rolled curb and gutter on north side and a standard curb and gutter on south side.

Page 92

We understand that the barricade at 10th Street between Pine Street and the I-880 frontage was installed with the approval of the City of Oakland to restrict truck traffic in the residential neighborhood southwest of the Study Area. The barricade currently isolates the residential neighborhood and forces longer trips to circumvent this blockade. With no other nearby access point, drivers could be encouraged to utilize the private access through the new 14th and Wood Street housing development, setting up potential future conflicts. We recommend that the barricade be removed, and signage be installed restricting through truck traffic.

Page 106-107

i. Mandela Parkway Commercial Industrial Zone

Exhibit VI.9 graphically represents areas where new standards are suggested in the Mandela Parkway area as a potential 10th Street section just west of Pine Street.

Perpendicular parking on one side and parallel on the other will provide sufficient parking to match existing uses. The sidewalks will improve pedestrian circulation and safety, while the new curb and gutters will alleviate stormwater runoff ponding and help to prevent future damage to the pavement.

Gmail by Google

Scott Gregory <sgregory@lamphier-gregory.com>

FW: PC Case ER120018 Comments on the Scoping of the Draft EIR for West Oakland Specific Plan

1 message

Jonsson, Ulla-Britt <UJonsson@oaklandnet.com> Mon, Nov 26, 2012 at 8:35 AM
To: sgregory@lamphier-gregory.com, Scott Gregory <sgregory@lamphier.gregory.com>
Cc: Art Clark <Art@jrdv.com>, "Thornton, Elois" <EAThornton@oaklandnet.com>

Scott,

I'm forwarding this email that came in on the 21st from Margot Lederer-Prado.

I also just realized that I have two email addresses for you. Do you check both? If not, which one?

Ulla-Britt

Ulla-Britt Jonsson
Planner
City of Oakland Planning, Building & Neighborhood Preservation

250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612
(510)238-3322 ujonsson@oaklandnet.com

From: Margot Lederer [mailto:mlederer.prado@gmail.com]
Sent: Wednesday, November 21, 2012 5:00 PM
To: Jonsson, Ulla-Britt
Cc: Thornton, Elois; Chew, Jeff; Gallo, Aliza; Blackwell, Fred
Subject: PC Case ER120018 Comments on the Scoping of the Draft EIR for West Oakland Specific Plan

Dear Ulla, Jeff, Elois, JRDV Team, cc: Fred Blackwell

I am submitting my comments on the Scoping for the West Oakland Specific Plan EIR. My comments will echo some of those delivered by both community and the Planning Commission at the Wed Nov 14th Scoping Session, which I was unable to attend.

I have submitted comments in the past in my role as a Technical Advisory Committee member. My comments below continue to indicate where I feel we have unsatisfactorily addressed essential components or scope of the Plan contents, such that I do not feel it is ready for the EIR preparation stage. I ask that staff delay the EIR preparation to meet further subject area topics, improve on community process (both Steering Committee and TAC) and provide responses publically to comments of the TAC and Committee as well now as Planning Commission, prior to the preparation of the EIR. I feel we have neglected to acknowledge the international power that the Industrial Arts Corridor, as well as substantial businesses (PS Print, California Cereal, Mayway, Auto Chlor, Atthow Fine Art Services, etc) have brought to the area, and could further expand through the support and compatible development scenarios this Plan could propose.

In summary:

PROCESS COMMENTS

1. Lack of Transparency and Good Planning Process. As a member of the TAC I do not feel that the Team has been transparent in the derivation of the Plan Models and proposed Overlays, nor has truly considered the comments of the TAC. Comments on specific opportunity site direction, comments on the need to provide preliminary real estate proformas to justify the Overly Recommendations which imply indirectly or directly Zoning Changes, and the details of the plan that should be incorporated prior to EIR analysis , as made by TAC, have been ignored, and or considered "in silence". The TAC has never received any minutes of the meetings (three-hour sessions) we have attended, nor been privacy to same comments by the Steering Committee. The Public Transparency of the proposed plans are not widely distributed. Key Stakeholders (including both major business operators in West Oakland and Housing Developers) have not been approached for feedback that would make more realistic the Plan Assumptions.

2. Redundancy- the Plan currently reflects much redundancy in the re=phrasing or repetition of the current zoning. In some cases, the interpretation of zoning is not accurate. For instance, the interpretation of the Health & Safety Zone (S-19) is not entirely correct, as hazardous materials are not "prohibited"; rather the Zone mandates the interaction and approval of Oakland Fire Department as the only true authority on their presence relative to health & safety issues. The EIR should not repeat the scope which the 1998 General Plan adoption has already undergone- this is a redundancyt.

3. Transit Oriented Development- I have submitted comments in July directly to the Team, as well as in subsequent TAC meetings about the lack of absorption of the prior (2001- Michael Willis Architects) Oakland Housing Authority- BART- CEDA/City West Oakland Transit Village Plan opportunity detail. The WOSP description does not recognize what is still relevant today, take advantage of the detail in that Study, nor look at present day economics. The City has engaged with housing developers since that time, and even at this time, four stories over podium construction is not viable, let alone the grand assumptions of the Plan as it stands. While "Alternative B" is commercial scenario, it in no way reflects the dynamism of the present arts and innovation community, does not take advantage of the key locational positioning of this Station (receives all East Bay Trains), nor builds on local assets such as the Crucible nor Bruce Beasley studios. Arts is nationally cited as a stimulator of economic development, but this plan neglects to absorb that fact in any way. The allusion to "public art" and " Seventh Street history" is a token effort. Rather, I believe as do some TAC members, that environmentally (due ot brownfields as well as poor air quality conditions/ Port-Amtrak industrial proximity) this station would do well to make best benefit of flexible commercial and custom manufacturing space (arts- and creative technology oriented); take advantage of present market conditions which could put Oakland in a position of building new creative work space (office/ shared co working and R&D flex space) while still accommodating a residential edge on Seventh St which respects the history and in fact enlivens it with current dynamic economic uses such as the Industrial Art Corridor.

4. Mandela Grand- while staff to Economic Development, I support the creation of a campus like environment for the various sectors we are supporting in Oakland, including Clean/Green Tech; Health & Wellness technologies; Scientific and Creative Communication Technologies, I also know that Oakland's best position for these uses, outside of Downtown and Jack London District and Airport Business Park areas, is for them to be combined and in inspiration from creative industrial productivity, Advanced Manufacturing is the current wave which Oakland needs to capture among the regional economic sectors. With its current flexible zoning, restriction of the Mandela Grand intersection to High Density Campus will deter actual development. Rather the EIR process should examine the ability to use the current flexible zoning of CIX-1 and build a range of potential facility types, such as the three story (ground floor commercial-grocery-over two storeis of light industrial) which Brooklyn Navy Yard is in contract for- showing both the worth and value of multi-story industrial commercial development in high priced urban markets as viable.

5. Raimondi Park- As a member of the Economic Development Team and knowing the limited number of owners around Raimondi Park, we have forseen the "campus-like" apptitude of the sites around Raimondi Park as a huge potential for Oakland, During our Cliff Bar Attraction search, the Roadway site was a prime candidate, due to the corporate philosophy and culture which valued open space, physical activation opportunities for its employees at breaks. Furthermore, a single-story campus is a contributor to a "democratic" corporate environment- valued by

many new economy companies, such that the Hierarchy is not obviously designed to deter employee-management interaction. Raimondi Park still presents that vision, even with the acquisition of Horizon Beverage by the EB5 Direct Foreign Investment Program, as it could represent a true destination for any of our "targeted" sectors, such as healthcare/wellness, food & beverage production, and or creative technology and communication industries. I suggest that a Mixed Use Option for Raimondi Park (HBX) be the Alternative A for the EIR- rather than deluting its potential with strictly residential zoning. The Wood Street District already has a number of entitled sites for residential that must be "absorbed".. before we add a lot more residential "entitlements" to the mix.

5. OVERLAYS- I feel that the extra level of overlays does not allow the market to actually develop- a major goal of the plan while steered by the desires of the WOSP Plan community process- Again, real estate proformas are needed as an indespensible part of the Plan prior to EIR preparation to make sure we finally deliver a West Oakland Plan document that is relevant, is implementable and can benefit from baseline CEQA determination as an outcome of the EIR.

6. INFRASTRUCTURE- the WOSP Plan does not acknowledge the single detail infrastructure assessment document conducted in the recent last two years- West Oakland Infrastructure Plan Rather, it includes simple assumptions true of any jurisdiction. The WO Infrastructure Plan does not cover the entire Plan area, it covers all Industrial Areas. As such it provides prioritization and capital expenditure assumptions to guide and focus the core industrial opportunities on Wood Street and surrounding areas, Staff are unable to pursue Federal funding to begin such improvements without the appropriate CEQA vetting, Therefore I ask that WOSP Team adress the EIR specific to the recommendations of the WO Infrastructure Plan, citing them as an Appendix of the Plan itself.

7. Inadequacy of ground knowledge of the environment in West Oakland. I have seen redundancy as mentioned above, in the Seventh Street recommendations. The WO Transit Village Streetscape Plam (Walter Hood Jr Design, 2003) already studied the implementation of a noise barrier around the Bart lines, engagaging BART engineers in the process. Comments by Chris Pattillo of the Planning Commission exposed the lack of true understanding of the WOSP Consultant Team in the actual "vacancy or not" of industrial facilities in West Oakland. (see PC Meeting of Nov 14th). Few if any sites are vacant, unless held so by speculative owners. In the case of Horizon Beverage, the ownership is legally changing, the use of this modern industrial facility is being upheld as one immediately valued for its use as a ecoonomic engine for trade. (see SF Business Times article of 11/18/12).

Therefore the assumptions of the Overlay needs, to be studied by the Plan Environmental Consultant, is clearly acking common knowledge of what is happening on the ground today in West Oakland. In some cases, the Overlays may indeed present "legal takings" conflicts which the City Attorneys will need to provide justification for in light of the recent (2006) industrial CIX zoning adoption, and the adoption of the Industrial Land Policy during the Dellums administration.

In summary, I ask that the EIR preparation be delayed, the Tiger grant be extended, and that staff of the City be allowed to provide a more genuine community process, vet the issues that remain prior to a EIR preparation, and that this "once in a lifetime" conclusive West Oakland Specific Plan be truly reflective of the sophistication, complexity, depth of need, and other issues that are prevalent in the community todya.

Sincerely,

Margot Lederer Prado
Economic Development Specialist,
City of Oakland
mprado@oaklandnet.com
(50) 238-6766

2.

Gmail by Google

Scott Gregory <sgregory@lamphier-gregory.com>

combined NOP comments

1 message

Jonsson, Ulla-Britt <UJonsson@oaklandnet.com> Wed, Nov 21, 2012 at 4:16 PM
To: sgregory@lamphier-gregory.com, Art Clark <Art@jrdv.com>

Dear Scott and Art,

Here are the compiled comments and notes from the two Scoping hearings.

Ulla-Britt
City of Oakland Planning, Building & Neighborhood Preservation

(510)238-3322

Please note: Oakland City offices are closed for Thanksgiving on Thursday and Friday, November 22 and 23, 2012

---------- Forwarded message ----------
From: "mary lake" <xsalmon@att.net>
To: "Jonsson, Ulla-Britt" <UJonsson@oaklandnet.com>
Cc:
Date: Thu, 15 Nov 2012 12:49:56 -0800
Subject: NOP

Thank you for sending a copy of this NOP to read, even though I am a member of WOCAG, because of the meeting times I have recently not been able to attend meetings due to my work.

Overall this looks very good and encourages me to stay in Oakland after retirement, I have been considering other places, due to what I see as a lack of concern, and interested in the Oakland economy, and that would truly be a lost.

Again, thank you
Mary Lake

---------- Forwarded message ----------
From: "Nathan Landau" <NLandau@actransit.org>
To: "Jonsson, Ulla-Britt" <UJonsson@oaklandnet.com>
Cc:
Date: Wed, 21 Nov 2012 12:34:41 -0800
Subject: Comment letter on the WOSP NOP

Ulla, we've prepared a comment letter for AC Transit on the NOP for the West Oakland Specific Plan. It's being reviewed by management. It's possible that it won't reach you by the end of today, but I'm sure we'll be able to get it to you within a few work days, maybe Monday. I hope you'll be able to use it.

Nathan Landau

---------- Forwarded message ----------
From: <Grow.Richard@epamail.epa.gov>
To: "Jonsson, Ulla-Britt" <UJonsson@oaklandnet.com>
Cc: "Thornton, Elois" <EAThornton@oaklandnet.com>
Date: Wed, 21 Nov 2012 15:10:05 -0800
Subject: NOP for West Oakland Specific Plan
Ulla-Britt Jonsson

Regarding your Notice of Preparation for the Draft EIR for the West Oakland Specific Plan, please include the attached comments previously submitted to Art Clark on October 19 as part of the Technical Advisory Committee's consideration of the WOSP. According to the Notice, comments should "focus on discussing possible impacts...ways in which potential adverse impacts might be minimized, and alternatives to the project in light of the EIR's purpose to provide useful and accurate information about such factors," and elsewhere the Notice solicits "public input regarding the type of information and analysis that should be considered in the EIR." In our discussions at the TAC it was not altogether evident how or where TAC members' concerns would fit into the WOSP process, but clearly the EIR process is one place where they should be considered.

As discussed in the October 19 comments, most of my concerns could be seen as coming under the category of the "conflicts" referenced in the 7th goal in the Project description. Of most concern are conflicts related to proximity and exposure to toxic pollutants, and the need to address those conflicts by way of land use, buffers, mitigation measures and so on. Our comments also referenced the December, 2011 report by the Pacific Institute and the Ditching Dirty Diesel Collaborative, "At a Crossroads in our Region's Health: Freight Transport and the Future of Community Health in the San Francisco Bay Area." This report provides a methodology for addressing these concerns. While there may be other methodologies that could accomplish the same purposes, our overall comment is that either this methodology or something analogous to it should be applied in assessing and mitigating the environmental and public health effects associated with the WOSP and alternatives.

Regarding alternatives, as also discussed in those comments, Strategies ENV 3-5a. and b. in the Project Description document (provided to the TAC for the October 16 meeting) describe a need to "prioritize" or "site" particular land uses with regard to minimizing community toxics exposures. It is hard to see how either of these strategies could have any meaning if they are only brought into the process after the basic land uses have already been fixed, the implication being a need for additional alternatives beyond those currently under consideration by the TAC. As just one example of a potential "conflict" and demonstrating the need for such assessment, the current document projects a substantial buildout of residential housing along the 880 freeway in Area 2A of the Plan, yet this area has been identified in the "Crossroads" report and in studies by the Bay Area Air Quality Management District (BAAQMD) as an area already substantially affected by high concentrations of freight movement related pollutants. Similar potential conflicts may exist in other areas of the WOSP planning area. The proposed plan should describe, and the EIR assess, at least one scenario (or alternative) demonstrating what application of these principles (prioritization and siting particular land uses to minimize community toxics exposures) in practice would look like.

Finally and more generally, please consider the overall perspective described in the attached two pager on "Health Equity and Housing" which has been under discussion in the broader Bay Area sustainability planning process. In particular the general perspective on land use conflicts articulated in the "Crossroads" report should be considered and addressed in the upcoming EIR process.

Richard Grow
US EPA
Region 9

(415) 947-4104

October 19, 2012 comments:

"Health Equity and Housing"

---------- Forwarded message ----------
From: "George Burtt" <grant_burtt@earthlink.net>
To: "Jonsson, Ulla-Britt" <UJonsson@oaklandnet.com>
Cc: "Thornton, Elois" <EAThornton@oaklandnet.com>, "Chew, Jeff" <JChew@oaklandnet.com>, "Quan, Jean" <JQuan@oaklandnet.com>, "Nadel, Nancy" <NNadel@oaklandnet.com>, "Lynette McElhaney" <lgm@lynettemcelhaney.com>, "Santana, Deanna" <DJSantana@oaklandnet.com>, "Blackwell, Fred" <FBlackwell@oaklandnet.com>, "Art Clark" <art@jrdv.com>, "Morten Jensen" <morten@jrdv.com>
Date: Wed, 21 Nov 2012 16:10:14 -0800
Subject: Comments on Scoping for the DEIR West Oakland Specific Plan Case Number ER120018

Dear Ms. Jonsson

On behalf of the West Oakland Commerce Association and the West Oakland Industrial Arts Corridor Alliance, we offer the following comments and request for modification of the scoping for the Draft EIR West Oakland Specific Plan (WOSP), Case Number ER120018.

The area in question is a Sub-Area of the WOSP 7th Street Opportunity Area, the West Oakland BART station, as known in the WOSP as Sub- Area 2A.

We ask that the environment scoping for this area consider the following potential future uses:

Retail
Commercial
Work - Live (Traditional under the Oakland Building Code)
Artisan Manufacturing
Residential
Large Group Assembly (both for interior and exterior areas / spaces)

As this is different that what the WOSP is currently contemplating scoping for this area, an explanation of why our request is being made is contained in the attached letter of today, November 21, 2012.

We thank you for your consideration

Happy Thanksgiving from all of us

George Burtt
for the
West Oakland Commerce Association and the West Oakland Industrial Arts Corridor Alliance
510-839-6999

---

23 attachments

Synergy Map.jpeg
121K

Caltrans_20121119_161810.pdf
200K

Duane DeWitt_20121106_132638.pdf
44K

Genevieve Wilson Scoping comments.pdf
174K

George Burtt Scoping comments.pdf
28K

OHA-Nov 13, 2012-WestOakSP.pdf
1112K

Schnitzer West Oakland EIR Comments 11 15 12.pdf
117K

West Oakland Walk Concept Description 08.12 pb.pdf
104K

BART Comments 112012.pdf
50K

WOEIP_20121115.pdf
494K

Brian Beveridge WOEIP 2012-EIR Scoping.pdf.pdf
284K

WOSP LPAB Scoping mtg_rough notes.pdf
93K

rough notes from PC scoping.pdf
17K

BAAQMD.pdf
637K

EPA Richard Grow 10_19_20.pdf
17K

MTC equity one pager RG Sept2012.pdf
62K

Comments on WOSP 10_19_20.docx
18K

MTC equity one pager RG Sept2012.docx
84K

Port of Oakland.pdf

112K

AC Transit.pdf
242K

11_21_12WOSP Letter.doc
26K

ATT446226.htm
1K

George Burtt 11.21.12.pdf
13K

[Draft]

Health Equity and Housing

In recognition that health equity needs to be considered in addressing housing:

The EC recognizes that additional housing production along existing transportation corridors or in close proximity to freight transport infrastructure such as sea ports, airports, freeways, truck routes, rail yards, rail lines, warehouses and distribution centers can result in serious health impacts for nearby residents in disproportionate levels compared to Bay Area residents living further away from these areas.

Placing housing in these areas could also discourage the use of greenhouse gas-reducing transportation improvements and infrastructure (such as pedestrian and bicycle paths) that also improve health and support sustainability.

To address these potential conflicts, the EC recommends that communities consider proximity to transportation corridors and freight transport infrastructure in determining where additional housing production should be located. By systematically considering the health risk posed by toxic air contaminants generated by freight transport infrastructure communities can determine if their housing needs can be met by placing their housing resources outside of high health risk areas.[1]

If sufficient land to meet housing needs are not available outside of high risk areas, communities should identify suitable mitigation measures to be put in place to reduce health risk from freight transport both onsite (e.g. indoor air filters) and/or through the development of a Community Risk Reduction Plan[2] and/or other local planning and permitting mechanisms.

Distributed at Equity Collaborative meeting, September 14, 2012

---

[1] Among the tools and methodologies available for conducting such assessments is "At a Crossroads in Our Region's Health: Freight Transport and the Future of Community health in the San Francisco Bay Area", December 2011, by the Pacific Institute and the Ditching Dirty Diesel Collaborative.

[2] A program by the Bay Area Air Quality Management District; further details available at http://www.baaqmd.gov/Divisions/Planning-and-Research/CARE-Program/Community-Risk-Reduction-Plans.aspx

At a Crossroads in Our Region's Health:
Freight Transport and the Future of Community Health in the San Francisco Bay Area

December 2011

Executive Summary (excerpts)

A recipe for a truly sustainable community must include community health along with quality housing and jobs connected by public transit as key ingredients. Regional plans are afoot in the San Francisco Bay Area to reduce air pollution that contributes to climate change, known as greenhouse gas emissions, by encouraging more compact development in already urbanized areas along transportation corridors. However, this approach to regional development could also pose hazards to community health by putting more residents next to sources of toxic pollution like freeways, rail yards, ports, and distribution centers.

To protect both our climate and the health of future generations, our strategy for creating more sustainable communities in our region must account for and address potential conflicts between existing polluting land uses and proposed developments like new housing. By planning for health, we can create sustainable communities in the San Francisco Bay Area that are as rich in opportunities for a long healthy life as they are for quality jobs, housing, and transit for all residents.

Our report focuses on portions of the region where areas that have been prioritized for future development, or Priority Development Areas, overlap with communities with the highest health risk from toxic air contaminants, referred to as CARE communities. Using mapping and spatial analysis, the report assesses the current and potential conflicts that exist between freight transport-related land uses and sensitive land uses such as housing, schools, parks, and health clinics in these areas.

This report shows that, without proper regional planning, the potential for exacerbating land use conflicts between residential and freight-transport related land uses is significant in the San Francisco Bay Area. Our analysis found that nearly half (42%) of the land being prioritized for development in our region is located in communities with the highest health risk from toxic air contaminants. One-fourth (25%) of the land in Priority Development Areas that intersect with CARE communities is within a distance from freight-related land uses where it is unadvisable to site sensitive land uses like new housing, according to regulatory agencies like the California Air Resources Board.

Our report also outlines steps that regional and local decision-makers can take to better plan for health when making land use and transportation decisions that will affect residents of these communities for generations to come.

[All documents available at: http://pacinst.org/reports/crossroads_for_health/]

OAKLAND HERITAGE ALLIANCE

November 13, 2012 (By electronic transmission)
City Planning Commission
250 Frank H. Ogawa Plaza
Oakland, CA 94612
Subject: Comments on NOP for West Oakland Specific Plan

Dear Planning Commission Members,

We appreciate the opportunity to comment on the NOP for an EIR on the West Oakland Specific Plan

HISTORIC AND CULTURAL RESOURCES
Study how best to use historic industrial and commercial structures, reusing or adapting them. Incorporate study of incentives such as federal tax credits and Mills Act. Consider recommending area-specific enhancements to the Mills Act program, such as raising the limits on the number of properties which may apply in a given year. Review façade improvement program possibilities. Look into programs of public education and resources for residents to do appropriate rehabilitation, particularly in recently-purchased older properties applying for rental conversions. Review enforcement procedures for small projects, so that extant standards can be enforced in the residential areas.

16TH STREET STATION
Include the old train station as a hub or destination, and strengthen the planning for its neighborhood so that it becomes the asset it should be. This is a key historic landmark.

ALTERNATIVES
Please construct useful, robust, viable alternatives for EIR study, and execute them thoroughly. Rather than make the alternatives section a passage of useless boilerplate, spend our scarce resources on variants really worth studying.

We recommend an alternative or overlay which could coordinate with each of the other alternatives, called a historic preservation alternative, and incorporating a high level of adaptive reuse, retention and preservation of historic resources in all use categories--residential, small commercial, large commercial, and industrial structures.

Robust alternatives for study should also cover differing use mixes, particularly near the West Oakland BART station, emphasize preservation of industrial structures of historic value, varying levels of density, heights, or FARs, and alternative transportation options.

INFILL PROJECTS WHICH RESPECT HISTORIC RESOURCES
Describe infill projects in such a way that heights, densities, and building envelopes form compatible transitions to neighborhood context in both residential and industrial areas, using such ideas as angled roofs and stepped-down bulk on edges of infill projects. If you do not already have a copy, please see the attached map of historic resources, a clear city-produced map of historic resources in West Oakland. This map should be incorporated so that it can be used in conjunction with all other site mapping, to show the affected historic and cultural resources.

446 17th Street, Suite 301, Oakland, California 94612 • (510) 763-9218 • info@oaklandheritage.org
Web Site: www.oaklandheritage.org

CAMPUSES
Approach “campus” style development in such a way that it does not build fortresses, that it interacts with the street grids, where open spaces are open to the public, and where the general thrust is toward integrating development into the neighborhoods. “Campuses” should not create holes or gaps in the neighborhood.

TRANSIT
Study transit networks in relation to the army base development and downtown Oakland, not only Emeryville and West Oakland BART. It is as important to travel east and west as it is to travel north and south. Don’t focus on the idea of light rail in preference to other modes.

WHERE ARE SCHOOLS?
In contemplating a great number (ultimately, 12,000 or so) of new residents, please address whether current public school sites would be used, whether closed ones updated and reopened, whether new facilities are required, and what needs are projected.

NEIGHBORHOOD SERVING RETAIL
Review needs and potentials for neighborhood-serving retail uses, including food markets, banking and financial services (other than check-cashing services), and review potential leasing rates to see how locally-owned businesses will be encouraged to survive and to thrive. New structures often present too challenging a leasing structure to encourage small business. Emphasize the reuse of extant retail frontage and study how to improve it for stronger local commercial synergy.

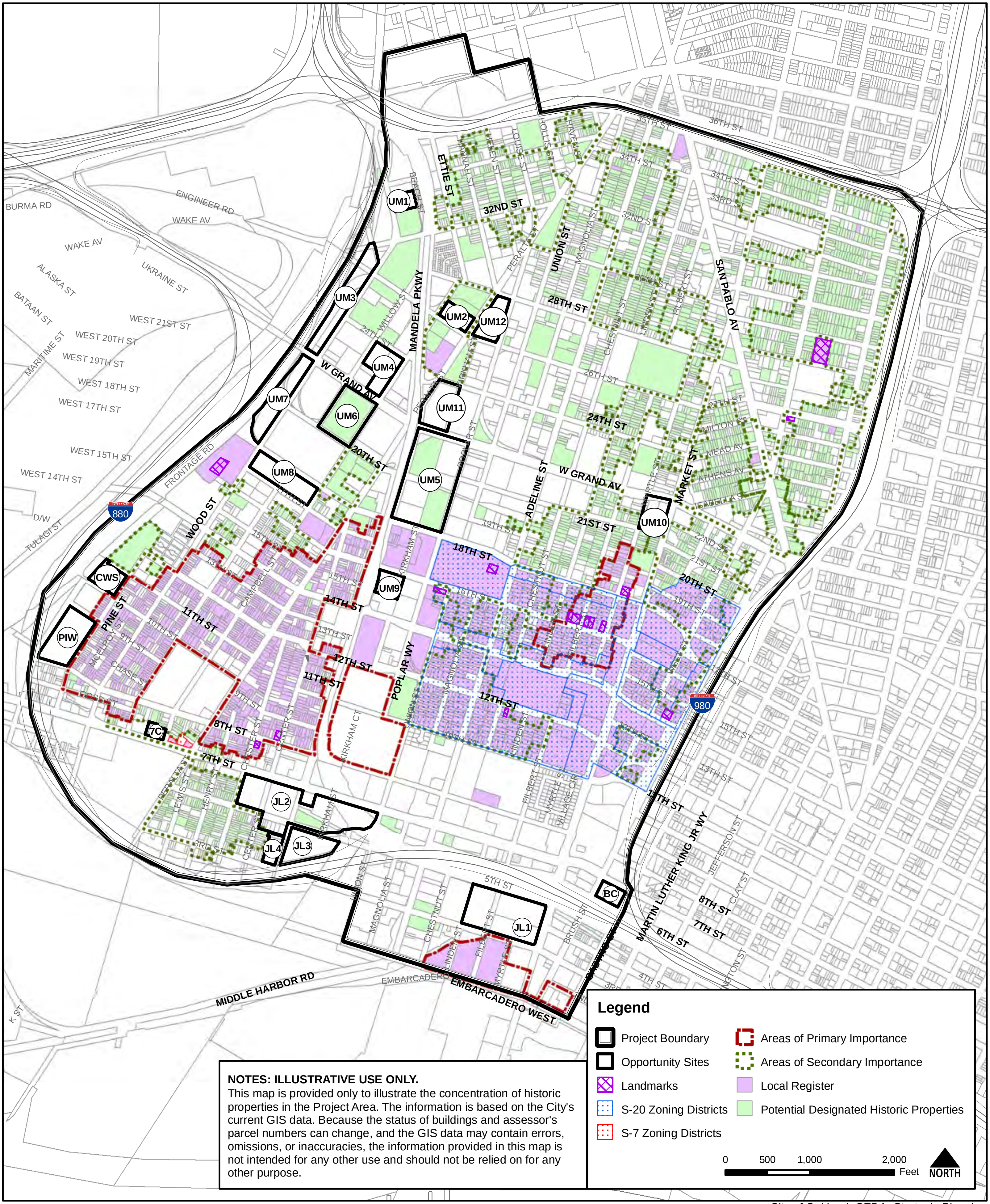
APPENDED MATERIALS:
We are appending a recent planning department map of historic and cultural resources in West Oakland. We are also appending our unofficial notes from the Landmarks Board hearing, as we understand that full minutes will not be available yet. Since the LPAB is supposed to advise the Planning Commission, we hope this will be useful.

Thank you once again for all your efforts and for the opportunity to comment.

Sincerely,

Rachel Force
President

Attachments:
Historic Resources map
Notes from LPAB NOP hearing



NOTES: ILLUSTRATIVE USE ONLY.
This map is provided only to illustrate the concentration of historic properties in the Project Area. The information is based on the City's current GIS data. Because the status of buildings and assessor's parcel numbers can change, and the GIS data may contain errors, omissions, or inaccuracies, the information provided in this map is not intended for any other use and should not be relied on for any other purpose.

City of Oakland, CEDA, Strategic Planning
July 2011

CITY OF OAKLAND

West Oakland Specific Plan

Historic Resources

DRAFT

Notes from landmarks board item on West Oakland Specific Plan NOP, Meeting of November 5, 2012.
(These are unofficial notes but cover most of what was said on this item. Minutes will not be available for at least two weeks, more likely three, so for Planning Commission hearing, these may be useful.)

Staff made a general presentation about the plan.

PUBLIC TESTIMONY:

Naomi Schiff:

What is definition of campus? What is public access? Too many large campuses could stifle neighborhoods. How to knit into community?

Please address alternatives. Consider requesting a Historic Preservation Overlay Alternative that could work with all the other alternatives. Industrial historic buildings, small and large-scale. Some smaller commercial buildings are finding live-work or housing uses, large historic sites may be reusable.

In EIR, address coherent approaches and policy with regard to historic resources.

In goals of project, where is historic preservation? Should be one of the objectives.

City already leaning in this direction somewhat, make it clear and make it policy.

Please prepare robust feasible alternatives.

Dwayne DeWitt:

Clarify dates of hearings.

Project areas: EIR should look at what is currently happening, current cultural resources. Consider such things as:

- Urban agriculture
- Urban forestry (Urban Releaf and another group)

West Oakland and Army Base are next to each other, and they should be linked. Linkages to army base need to be more robust. Transportation? Light rail? History of rail in West Oakland and how it relates to reconfigured transportation patterns.
What about 16th Street Station? Any new light rail line should go to old train station.
Health impacts, children. Where are schools located?

Genevieve Wilson:

Lives near 8th and Chester, New resident
Pupuseria at 7th and Chester: example of small local family run business
Pretty Lady restaurant
16th St Station beautiful building needing rehab
"What is a campus?"

Housing questions: What does putting in housing look like? What form of housing? Is it communal? How is it kept affordable?

Board discussion
Biggs:
Targeting 2035. He will be 65 years old. Most structures in West Oak. more than 100 years old. Hope that economy will strengthen to help historic preservation. What do about crime?

Staffperson Thornton:
Design buildings to be less susceptible to crime.
Require septeb standards
More 24-hours eyes on street
Social equity chapter to be prepared
More jobs

Consultant Art Clark
Design guidelines for campuses.
"Campus" urban campus built to street, active ground floor uses
Large and small existing buildings interspersed, filling in vacant parcels, not isolating
Streetscapes and furniture
More images will be available

Boardmember Garry
Preserving historic resources. Analyze all historic resources in neighborhood. What are character-defining features? Seventh Street. West Oakland is culturally and historically important to the city. Where does that show up? What makes it unique and important? What should be preserved? Recommends handling in guidelines in the recent Central Estuary Plan. Fine Grained approach. Concerned about impact of new large residential on small residential structures. Prevailing heights? Discuss Mills Act and other opportunities. With more jobs and more people in the area, then we should help people who own homes to improve them. Mills Act, and other incentives and help resources. Not just not tearing them down, but helping.
Adaptive re-use discussion should be included, including smaller structures.

Boardmember Goins
No listing of cultural resources in the information packet? West Oakland has a lot of older homes. What percentage of PDHPs?

Staffperson Marvin
Residential neighborhoods shaded purple local register resources- determined eligible, local S20 district of 600 buildings. Oak Center about 2/3 contributing buildings, Oakland Point much denser than that. So. Prescott about 250 buidlings, dense with resources, really intact. On edges, and a little infiltrating industrial areas, also older houses. West Oakland Marsh makes a fairly clear distinction between industrial and residential. Mostly at least ASI level of concentration. Small industrial buildings are more scattered, many

very interesting. Pretty Lady, deco style. Semi-flatiron brick building, old Apex Bedding Factory mostly C-rated, mostly documented through unreinforced masonry survey. Good handle on what is there, mostly in active use. Many look abandoned, but inside there are interesting uses, from aerial dance to precision manufacturing, to mushroom growing. Not much truly abandoned or unvalued.

Boardmember Goins

Address historic areas.
Condition of some houses: not necessarily well fixed up. How can we use opportunity to improve the less good modifications.

Public interested in 7th St. corridor and Central Station. Two areas special attention. Historic overlay makes sense. How can it all be knit together?

Plan talks about using assets of area. Call out historicity of area as an asset, and how it can help catalyze development activity.

Boardmember MacDonald

Representatives on West Oakland Specific Plan. Impressed by enormous undertaking and work. Agrees with comments already made by public. In the plan, state goal for historic and cultural resources in area and that historic industrial buildings should be preserved. Re: campus design. Though consultant said it wasn't to look like Pixar, there was a picture in the presentation showing Pixar. A campus in the West Oakland Specific Plan should not include buildings inaccessible to the public. No barricaded sites, inaccessible. How not to displace current valued uses. Plan for greenscape. Connections with army base. Transportation plan. 16th Street Station? Avoid awkward juxtapositions of large modern buildings up against historic.

Art Clark:

No plan to knock down any extant residential

Boardmember Schulman

Historic overlay idea would be good. Can't see relationships. Shadows and wind impacts on historic resources? No map of historic resources in the packet. Transportation impacts need to be considered with respect to historic fabric, and linkages with downtown. Opp area 3. Likes transit-oriented development, but not too enthusiastic. Not transit, but just a bedroom community? Vertical bedroom suburb. Doesn't fit with area to turn it into bedrooms for people working in SF. West Oakland is a destination. Should really be a true TOD, where some leave, but others come. Area 3 needs mixed-use, perhaps more intensive around Post Office. On edges of opportunity areas 1, 2, 3, explore more intensive higher development, not just 4-5 stories like in Emeryville near San Pablo. We don't want that. We want variation in building heights. Campus: intrinsic to definition is multiple buildings used by single business with employees crossing an open area to reach buildings. Doesn't like silicon valley architectural model. Key element is public right-of-way. Spaces between buildings should be open to public. Public rights of way need to be incorporated into design guidelines. Shorey House, Shorey Street—is there a better way to commemorate Shorey?

Boardmember Andrews

Historic overlay. Building upon historic resources has not been fully addressed. In terms of culture, but also dollars and cents, should be taken seriously. Real understanding of the value of cultural resources to economic development is critical to the implementation of the plan. Piece missing: West Oakland is not a neighborhood. It is about four-five square miles. It is composed of about nine to twelve neighborhoods. If we approach the specific plan without understanding its neighborhoods, will actually not be able to implement a sustainable plan. Despite asking repeatedly, neighborhoods should be clearly articulated and defined. No such map or description. Neighborhoods are dynamic. Two new neighborhoods are Ghost Town and Dirty Thirties. Whether informally acknowledged or mapped are part of this cultural heritage of this part of the city. Just looking at West Oakland for its opportunity sites is to miss the vitality that not only was, but IS there today. Tech, Food, Agricultural, Artistic, Art, and as an arrival point for new settlement. Extant vitality must be considered.

Chair Naruta:

Healing scar of freeways cutting through neighborhood. Provide more shade. Took class at Crucible. Appreciates their providing opportunities to local people. Wonders about building in such ideas. Other incentives beyond Mills Act. Green Building rehab training? Concerned about San Pablo Ave. commercial historic buildings. What is the intent? Pacific Pipe? Needs to be historic preservation alternatives that emphasize smaller scale historic residential and industrial as well as larger industrial.
Archaeological resources have been discovered in two previous local projects; should attend to archaeological resources; others have provided interesting finds. Refer to earlier projects.

Scott Gregory <sgregory@lamphier-gregory.com>

RE: WOSP - A Few More Comments

1 message

Jonsson, Ulla-Britt <UJonsson@oaklandnet.com> Mon, Nov 26, 2012 at 8:41 AM
To: Chris Pattillo <pattillo@pgadesign.com>
Cc: "Thornton, Elois" <EAThornton@oaklandnet.com>, sgregory@lamphier-gregory.com, Scott Gregory <sgregory@lamphier.gregory.com>, Art Clark <Art@jrdv.com>

Hi Chris,

I'm cc'ing the team on this email as it will be helpful to include your comments now.

Ulla-Britt

Ulla-Britt Jonsson
Planner
City of Oakland Planning, Building & Neighborhood Preservation

250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612
(510)238-3322 ujonsson@oaklandnet.com

From: Chris Pattillo [mailto:pattillo@PGAdesign.com]
Sent: Saturday, November 24, 2012 4:41 PM
To: Jonsson, Ulla-Britt
Cc: Thornton, Elois
Subject: WOSP - A Few More Comments

Ulla,

I know I am late with this, so you can ignore these comments now and tell me to resubmit them when the Draft document is given to the Planning Commission for review. I've been schlepping around the material from the TAC meeting you invited me to everywhere I go and reading it when I have had time. Finally have written up these questions/comments.

Chris

1. Add "Campus" to the Glossary and include images of the type of campus that is suitable for West Oakland.

2. Pg. 11 Objective 7th 2-3: wouldn't it be more desirable to develop a strategy to keep the Oakland Main Post Office on 7th Street rather than devote efforts to having a strategy of what to do in case it closes?

3. Pg. 15, T&I 2-1.c – what is meant by "implement the 7th Street Concept and Urban Design Plan" and in a separate document from the Planning Commission packet, Opportunity Area 2: 7th Street, "Revitalize 7th Street as a neighborhood focus and cultural activity center". Acknowledge the portion of the plan that has already been implemented – these comments suggest that nothing has been done when in fact the city has made a recent significant investment in building the Walter Hood design for 7th Street.

4. Pg. 15 T&I 2-3.b – integrate a low impact development stormwater management – don't we already have a policy for this that applies citywide?

5. Starting with Pg. 15 T&I 2-3.b essentially all of the recommendations in the document seem to apply citywide, or should apply citywide. I don't understand why they are included in a "specific" plan??? Shouldn't a specific plan address only things that are unique/specific and not general city policy? Excluding non-specific material would make the WOSP much more concise which would be good because then the reader (potential developer) would quickly understand what is unique and special about this area of the city and what we are trying to accomplish.

6. Pg. 16 T&I 2-3.c. – "landscaping" should be "planting". At least I think that is what the author intended. The same is true for item h.

7. LU7 – will this study include strategies for how we should "enhance linkages" with the Army Base?

8. T&I 1 – complete streets includes the objectives in T&I 2 and T&I 3 – That is what "complete streets" means. One objective for these 3 should suffice.

Chris Pattillo FASLA
President

PGAdesign
LANDSCAPE ARCHITECTS
444 17th Street
Oakland, CA 94612
Direct I 510.550.8855
Main I 510.465.1284
www.PGAdesign.com

PORT OF OAKLAND

Wednesday, November 21, 2012

Ms. Ulla-Britt Jonsson, Planner II
City of Oakland, Strategic Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Subject: **Response to Notice of Preparation (NOP) of Draft Environmental Impact Report (DEIR) for the proposed West Oakland Specific Plan (Case Number ER120018; SCH# 2012102047)**

Dear Ms. Jonsson,

Thank you for providing the Port of Oakland (Port) the opportunity to comment on the Notice of Preparation (NOP) for the West Oakland Specific Plan (Specific Plan) Draft Environmental Impact Report (DEIR). According to the NOP project description, the Specific Plan proposes to guide future development within West Oakland, includes a framework for developing "undervalued and blighted land", provides strategies for transit-oriented development at the West Oakland BART to better link transportation choices with new housing and employment opportunities, and redirects light industrial and more intensive commercial activities to locations closer to the Port and away from residential areas.

The NOP was issued on Monday, October 22, 2012, and written responses and comments are due Wednesday, November 21, 2012.

The Port, with jurisdictional authority over lands adjacent to the Specific Plan area, submits the following comments for your consideration:

Land Use and Planning

- The Specific Plan proposes new residential and office uses adjacent to freeways, rail lines, and an active container port. In addition, the nearby former Oakland Army Base is being developed by both the City of Oakland and the Port of Oakland with a new rail yard and a trade and logistics center. The DEIR should provide an analysis of the compatibility of existing and proposed land uses, specifically the impacts of the elimination of heavy industrial and the conversion of business mix/light industrial to low intensity business mix/light industrial within Opportunity Areas 1, 2, and 3, located near key Port facility ingress/egress points (e.g., Grand Avenue, 7th Street, and Adeline Street).

Air Quality

- The Specific Plan proposes an 18-fold increase in the residential population which in turn increases the number of sensitive receptors (e.g., children, elderly) potentially exposed to substantial pollutant concentrations along adjacent existing freeways, and near rail lines, truck routes, and port activities. The DEIR should analyze the potential air quality impacts to human health and discuss how these impacts would be reduced to below a level of significance.

530 Water Street ■ Jack London Square ■ P.O. Box 2064 ■ Oakland, California 94604-2064
Telephone: (510) 627-1100 ■ Facsimile: (510) 627-1826 ■ Web Page: www.portofoakland.com

Hydrology and Water Quality

- The Specific Plan proposes up to 54 acres of (re)development which could result in adverse impacts to storm water quality and increased contaminants of concern being conveyed to storm water outfalls in Port jurisdiction. The DEIR should include an inventory and analysis of contaminated sites and a discussion of how (re)development impacts to water quality would be reduced to below a level of significance.

Noise

- The Specific Plan proposes 54 acres of (re)development and an 18-fold increase in the residential population which would expose future residents to existing freeway, rail, truck, BART, and port ambient noise levels. The DEIR should analyze the potential noise impacts to human health and discuss how these impacts would be reduced to below a level of significance.

Transportation

- The Specific Plan proposes 54 acres of (re)development and an 18-fold increase in the residential population which would increase congestion on local streets, freeways, and freeway access ramps, plus increase potential conflicts between existing designated truck routes and automobiles, buses, cyclists, and pedestrians. The DEIR should analyze existing and future traffic levels of service (LOS) and multimodal level of service (MMLOS); identify and resolve potential conflicts between designated truck routes and automobiles, buses, cyclist, and pedestrians; assess associated transportation impacts to human health (under Air Quality and Noise) and public safety; and identify funding mechanisms to meet anticipated capital road improvement needs.

The Port appreciates the opportunity to comment on the Specific Plan's proposed scope and potential environmental impacts. We look forward to reviewing the DEIR. If you have any questions regarding these comments, please contact Mr. Jerry Jakubauskas, Port Assistant Environmental Planner, at (510)627-1297 or Ms. Anne Whittington, Environmental Assessment Supervisor, at (510)627-1559.

Sincerely,

Richard Sinkoff
Director of Environmental Programs & Planning

cc: Pamela Kershaw, Director, Commercial Real Estate Division
Mark Erickson, Senior Maritime Project Administrator, Maritime Division
Anne Whittington, Environment Assessment Supervisor, Environmental Programs & Planning Division
Jeff Jones, Environment Compliance Supervisor, Environmental Programs & Planning Division

STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

Notice of Preparation

October 24, 2012

To: Reviewing Agencies

Re: West Oakland Specific Plan
SCH# 2012102047

Attached for your review and comment is the Notice of Preparation (NOP) for the West Oakland Specific Plan draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Ulla-Britt Jonsson
City of Oakland, Strategic Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# 2012102047
Project Title West Oakland Specific Plan
Lead Agency Oakland, City of

Type NOP Notice of Preparation

Description The West Oakland Specific Plan will guide future development in West Oakland. The purpose of the proposed West Oakland Specific Plan is to provide comprehensive and multi-faceted strategies for development and redevelopment of vacant and/or under-utilized commercial and industrial properties in West Oakland. It establishes a land use and development framework, identifies needed transportation and infrastructure improvements, and recommends implementation strategies needed to develop those parcels. The Plan is also a marketing tool for attracting developers to key sites and for encouraging new, targeted economic development.

Lead Agency Contact

Name Ulla-Britt Jonsson
Agency City of Oakland, Strategic Planning Division
Phone (510) 238-3322 **Fax**
email
Address 250 Frank H. Ogawa Plaza, Suite 3315
City Oakland **State** CA **Zip** 94612

Project Location

County Alameda
City Oakland
Region
Cross Streets West Oakland Planning Area, center ~ West Grand Ave, & Mandela Pkwy
Lat / Long
Parcel No. Numerous
Township **Range** **Section** **Base**

Proximity to:

Highways I-580, 880, 980
Airports
Railways BART, others at Port
Waterways SF Bay, Oakland Estuary
Schools
Land Use GPD: Primarily Business Mix and Mixed Housing Type, with several corresponding zoning districts.

Project Issues

Reviewing Agencies California Coastal Commission; Department of Parks and Recreation; San Francisco Bay Conservation and Development Commission; Department of Water Resources; Department of Fish and Game, Region 3; Native American Heritage Commission; Public Utilities Commission; California Highway Patrol; Caltrans, District 4; Air Resources Board, Transportation Projects; Regional Water Quality Control Board, Region 2; Resources Agency

Date Received 10/24/2012 **Start of Review** 10/24/2012 **End of Review** 11/26/2012

NOP Distribution List

County: Alameda

SCH# 2012102047

Resources Agency

- [x] Resources Agency
  Nadell Gayou
- [ ] Dept. of Boating & Waterways
  Nicole Wong
- [x] California Coastal Commission
  Elizabeth A. Fuchs
- [ ] Colorado River Board
  Gerald R. Zimmerman
- [ ] Dept. of Conservation
  Elizabeth Carpenter
- [ ] California Energy Commission
  Eric Knight
- [ ] Cal Fire
  Dan Foster
- [ ] Central Valley Flood Protection Board
  James Herota
- [ ] Office of Historic Preservation
  Ron Parsons
- [x] Dept of Parks & Recreation
  Environmental Stewardship Section
- [ ] California Department of Resources, Recycling & Recovery
  Sue O'Leary
- [x] S.F. Bay Conservation & Dev't. Comm.
  Steve McAdam
- [x] Dept. of Water Resources Resources Agency
  Nadell Gayou

Fish and Game

- [ ] Depart. of Fish & Game
  Scott Flint
  Environmental Services Division
- [ ] Fish & Game Region 1
  Donald Koch
- [ ] Fish & Game Region 1E
  Laurie Harnsberger
- [ ] Fish & Game Region 2
  Jeff Drongesen
- [x] Fish & Game Region 3
  Charles Armor
- [ ] Fish & Game Region 4
  Julie Vance
- [ ] Fish & Game Region 5
  Leslie Newton-Reed
  Habitat Conservation Program
- [ ] Fish & Game Region 6
  Gabrina Gatchel
  Habitat Conservation Program
- [ ] Fish & Game Region 6 I/M
  Brad Henderson
  Inyo/Mono, Habitat Conservation Program
- [ ] Dept. of Fish & Game M
  George Isaac
  Marine Region

Other Departments

- [ ] Food & Agriculture
  Sandra Schubert
  Dept. of Food and Agriculture
- [ ] Depart. of General Services
  Public School Construction
- [ ] Dept. of General Services
  Anna Garbeff
  Environmental Services Section
- [ ] Dept. of Public Health
  Jeffery Worth
  Dept. of Health/Drinking Water
- [ ] Delta Stewardship Council
  Kevan Samsam

Independent Commissions, Boards

- [ ] Delta Protection Commission
  Michael Machado
- [ ] Cal EMA (Emergency Management Agency)
  Dennis Castrillo
- [x] Native American Heritage Comm.
  Debbie Treadway
- [x] Public Utilities Commission
  Leo Wong
- [ ] Santa Monica Bay Restoration
  Guangyu Wang
- [ ] State Lands Commission
  Jennifer Deleong
- [ ] Tahoe Regional Planning Agency (TRPA)
  Cherry Jacques

Business, Trans & Housing

- [ ] Caltrans - Division of Aeronautics
  Philip Crimmins
- [ ] Caltrans - Planning
  Terri Pencovic
- [x] California Highway Patrol
  Suzann Ikeuchi
  Office of Special Projects
- [ ] Housing & Community Development
  CEQA Coordinator
  Housing Policy Division

Dept. of Transportation

- [ ] Caltrans, District 1
  Rex Jackman
- [ ] Caltrans, District 2
  Marcelino Gonzalez
- [ ] Caltrans, District 3
  Gary Arnold
- [x] Caltrans, District 4
  Erik Alm
- [ ] Caltrans, District 5
  David Murray
- [ ] Caltrans, District 6
  Michael Navarro
- [ ] Caltrans, District 7
  Dianna Watson
- [ ] Caltrans, District 8
  Dan Kopulsky
- [ ] Caltrans, District 9
  Gayle Rosander
- [ ] Caltrans, District 10
  Tom Dumas
- [ ] Caltrans, District 11
  Jacob Armstrong
- [ ] Caltrans, District 12
  Marlon Regisford

Cal EPA

Air Resources Board

- [ ] Airport/Energy Projects
  Jim Lerner
- [x] Transportation Projects
  Douglas Ito
- [ ] Industrial Projects
  Mike Tollstrup
- [ ] State Water Resources Control Board
  Regional Programs Unit
  Division of Financial Assistance
- [ ] State Water Resources Control Board
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] State Water Resouces Control Board
  Phil Crader
  Division of Water Rights
- [ ] Dept. of Toxic Substances Control
  CEQA Tracking Center
- [ ] Department of Pesticide Regulation
  CEQA Coordinator

Regional Water Quality Contr Board (RWQCB)

- [ ] RWQCB 1
  Cathleen Hudson
  North Coast Region (1)
- [x] RWQCB 2
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] RWQCB 3
  Central Coast Region (3)
- [ ] RWQCB 4
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] RWQCB 5S
  Central Valley Region (5)
- [ ] RWQCB 5F
  Central Valley Region (5)
  Fresno Branch Office
- [ ] RWQCB 5R
  Central Valley Region (5)
  Redding Branch Office
- [ ] RWQCB 6
  Lahontan Region (6)
- [ ] RWQCB 6V
  Lahontan Region (6)
  Victorville Branch Office
- [ ] RWQCB 7
  Colorado River Basin Region (7)
- [ ] RWQCB 8
  Santa Ana Region (8)
- [ ] RWQCB 9
  San Diego Region (9)

- [ ] Other ____________
- [ ] ____________
  Conservancy

Schnitzer

1101 Embarcadero West (94607) P.O Box 747 Oakland, CA 94604

Phone (510) 444-3919 Fax (510) 444-3370

November 15th, 2012

Ms. Ulla-Britt Jonsson
Strategic Planning Division
City of Oakland
250 Frank Ogawa Plaza, Ste 3315
Oakland, CA 94612

Re: Case Number ER120018

Dear Ms. Jonsson,

As a West Oakland business, we appreciate the opportunity to submit written comments regarding the City of Oakland's Draft Environmental Impact Report (EIR) for the proposed West Oakland Specific Plan (Case Number ER120018).

Schnitzer Steel Industries is global leader in the metals recycling industry and has been collecting, processing, and recycling materials in West Oakland since 1965. The material we collect is shipped through the San Francisco Bay and processed into finished metal products by steel mills all over the world. Founded in Portland, Oregon in 1906 by Sam Schnitzer, as a one-person scrap metal recycler, we have grown to become the 2011 Scrap Company of the Year by American Metal Market. The success of our company could not have been achieved without our Oakland facility, our employees, and support by the City of Oakland.

Over the last five decades, Schnitzer has seen firsthand the challenges facing West Oakland businesses and residents and we are pleased to see the City of Oakland's renewed attention to this area through the proposed West Oakland Specific Plan. Our facility is located just across the railroad tracks from Opportunity Zone 3 and just down the road from Opportunity Zone 2. The enhancement and reutilization of the industrial areas near our facility could significantly benefit our company if done properly and we want to work with you to ensure success in this effort.

As such, we would encourage you to evaluate the potentially transportation and environmental effects of your proposed plan through the Environmental Impact Report. Our suggestions are as follows:

Environmental

Schnitzer's facility lawfully operates under numerous permits regarding air and water quality and is regulated by Bay Area Air Quality Management District, California Air Resource Board, Department of Toxic Substance Control, City of Oakland, Bay Area Regional Water Quality Control Board, and others. With the plan's proposal to expand commercial and residential properties near our facility, we have serious concerns with how these development projects could adversely affect our operations. It is imperative that the EIR looks at the proposed 'buffer' or proximity of commercial/residential/mixed use buildings to traditional industrial businesses. To ensure there is a quality of life for both residents and businesses an appropriate transition zone must be established. We strongly encourage the division to look at the creation of open space or parks between these areas.

Transportation

The drafted plan seeks to meld existing industrial and transportation related business with light industrial, high-tech, and service oriented businesses while also integrating retail/commercial and residential in areas. However, there are a number of existing businesses including Schnitzer that have located to Opportunity Areas 2 and 3 due to the close proximity to the Port of Oakland, Union Pacific Rail, and access to the freeways. Access to these logistics carriers allows for efficient transport of goods with minimal effect on residential areas.

> *Ex. Trucks currently transit through the "3rd Street Opportunity Area" nearly 24 hours a day due to the SSA/Matson port terminal and Schnitzer Steel operations. In addition, there is no alternative access to these facilities beyond entry on Embarcadero West.*

Significant increases in traffic congestion and accidents could result from more private automobiles mixing with industrial tractor-trailers and more occupants in the 'opportunity areas.' As a business that relies heavily on large scale projects, truck access to our facility is imperative to our success. And, as a corporate citizen of the community, safety for all concerned is a priority. We would ask your division to conduct a full audit of any logistical obstacles the proposed plan would create on current businesses.

Schnitzer strongly believes that West Oakland can benefit from a smart approach that melds industrial, commercial, and residential use spaces. The EIR will be the first step in this process and we look forward to working with you and your staff as you move forward on the West Oakland Specific Plan.

We appreciate your consideration of these comments. If you have any additional questions or comments, please contact Jackie Lynn Ray directly at 510-452-8896 or via email at jray@schn.com.

Thank you,

Mr. Bruce Rieser
Southwest Regional Director
Schnitzer Steel Industries, Inc.

Gmail by Google

Scott Gregory <sgregory@lamphier-gregory.com>

FW: Case Number ER120018 West Oakland Specific Plan

1 message

Jonsson, Ulla-Britt <UJonsson@oaklandnet.com> Mon, Nov 5, 2012 at 1:09 PM
To: art@jrdv.com, sgregory@lamphier-gregory.com
Cc: "Thornton, Elois" <EAThornton@oaklandnet.com>

FYI Scott and Art

Dear Ulla-Britt Jonsson:

I'm writing about the WOSP. I'm looking forward to West Oakland streets being repaved! That is my favorite part of the plan.

I am concerned about the "Higher Intensity Campus" Land Use Overlay. The term "campus" makes me afraid the plan intends to wreck the grid in those areas. I want to put on record my total opposition to all permanent street closings. The grid is great for pedestrians. It helps us get from one place to another without going very far out of our way. It makes it easy to know where we are and to find the addresses we are looking for.

For the same reason, I oppose the the development of large format retail. Besides a grocery store, which doesn't necessarily have to take up more than one block, I can't even imagine what large format retail we even need in the Mandela Grand Opportunity Area. Target, Home Depot, Offices Max and Depot, Best Buy and Ikea are all already at 40th street. There's a Bed Bath and Beyond in Jack London Square. What other stores are there? Cabelas? The hunting superstore?

Thanks,

Sonja

What is the West Oakland Walk?

August 2012

The West Oakland Walk is a concept created by Philip Banta in association with Norman Hooks, two architects with long standing design and building experience in Oakland. This is an urban design idea to leverage central City assets into a "social circuit" for walking, biking, organic gardening, exercising, and meeting friends, all the activities that build sustainable communities. It developed from our pro-bono work for Raimondi Park which resulted in major sports field renovations.

The West Oakland Walk knits together the parks and public places of Central and West Oakland by **improving a 4.5 mile loop of existing city streets into an urban greenway** running East – West from Lake Merritt in the center of the City to Central Station at its western edge**.** Between these two points currently exist 23 parks (totaling 110 acres), the civic, commercial, and cultural downtown core of Oakland including many of the City's most historically significant buildings, 4 BART stops, and 7 freeway entrances and exits from the major regional artery that connects Oakland to the broader Bay Area.

West Oakland Walk, copyright 2006 Philip Banta and BETA, Inc.

What are the benefits?

With a simple geometric stroke the West Oakland Walk could: **Re-unite** West and Central Oakland across the 980 Freeway; **Reinforce** the community with an event that celebrates the history and place of each neighborhood it passes through; and **Redefine Oakland** to itself and to the world **as a coherent network of Parks, Places and People**. Few downtown cores are endowed with the particular combination of public park space, public service structures and historical legacies enjoyed by the City of Oakland, and fewer still have them arranged in patterns that can be so easily linked. The parks have been long established; the civic and institutional buildings have been serving the City for decades; the streets that connect these assets exist now. In other words, no significant capital investment or private property condemnation is required for this idea to take shape. The West Oakland Walk is a *found design* that will help transform the way people see and use Oakland. Along this pathway all the elements that make a city great are in place waiting to be laced together.

Philip Banta pbanta@bantadesign.com

West Oakland Environmental Indicators Project

8 November 2012

To: Scott Miller, Interim Planning and Zoning Director for Oakland
Oakland Planning Commissioners
Oakland City Hall
One Frank Ogawa Plaza,
Oakland, Ca. 94612

From: West Oakland Environmental Indicators Project
1747 14th St.
Oakland, Ca. 94607

Re: Case # ER120018: Comments for Scoping of Environmental Impact Report for West Oakland Specific Plan.

Dear Oakland Planning Commissioners and Mr. Miller,

The current approach to the scoping for the West Oakland Specific Plan (WOSP) Environmental Impact Report (EIR) reflects an inadequate process. Since the process began residents and business leaders have complained about the lack of transparency in this WOSP process. Both residents and Technical Advisory sub-committee members have expressed frustration with the lack of feedback coming from the planners and their failure to show how community concerns are reflected in the Draft WOSP.

A statement in the "Mitigated Alternative" section of the draft overview raises many questions for WOEIP. "Possible strategies and corresponding land use plans may seek to further address the preservation of historic resources, and minimizing the community's exposure to toxics by way of traditional buffers, mitigation and other land use approaches"? The EIR must explain these issues of "historic resources", potential "exposure to toxics" generated by planned land uses and the nature of "traditional buffers" to these impacts. To this end, the draft must also describe scenarios for the creation of new buffers between the protected industrial areas and the expanding residential parts of the community.

WOEIP believes every aspect of the EIR needs to acknowledge the legacy of risk exposure in West Oakland brought about by inappropriate zoning in the past. In supporting the expansion of industrial and commercial activities in this already mixed use community, the WOSP EIR must reflect recommendations for health-protective neighborhood design elements including, alternative infrastructure technologies, "built" buffer zones, green recreation spaces and open spaces, as well as, integrated public spaces in commercial and industrial developments to enhance the health of the disadvantaged and underserved traditional residents of this community.

The funding from the Federal government for the project comes from a transportation related source referred to as Transportation Investment Generating Economic Recovery (TIGER II) grants. Some local residents have been told in various public meetings a rail line will be included in the WOSP based on this transportation funding. Current “Scoping” announcements only mention a “possible street car” line transit system being built in the future in West Oakland. If this transit infrastructure is considered a fundamental element of the economic development potential held in the WOSP, the EIR most clearly address the potential benefits and impacts of such a project on business development, residential development, transit rider ship and the potential allocation of future transit dollars away from more traditional and familiar forms of local public transportation. Without such an analysis, we feel that the inclusion of the streetcar line constitutes an excuse for the use of “transportation” planning dollars for this exercise.

With this in mind the following list will give a set of specific requests and recommendations from WOEIP regarding what needs to be adequately addressed in an EIR for the WOSP.

1. A route analysis for any rail lines to be introduced into the project area as stimulus for new development. This analysis should include the potential benefit to the development of existing community resources such as the Mandela Corridor, the Third Street Corridor, the Peralta Street Corridor and in particular, the historic 16th Street Train Station. A permanent infrastructure system like this can not be casually added to this important plan with considering the benefits or harm it might bring to existing resources.

2. The TIGER II grant application declares a goal of the funding is to create planned linkages between the Oakland Army Base development and the West Oakland community in order the enhance the “sustainability” and quality of life for residents. Thus far these linkages appear to limited to extending AC Transit bus routes to the OAB Logistics Center. Given the amount of public funding being applied to the OAB project, and the water, sewer and power infrastructure links to West Oakland inherent in the OAB develop plan, the WOSP must identify resources to modernize the pubic works infrastructure of the neighborhoods east of I-880. Many of these systems are a century old and it is a social justice travesty to make such a massive investment in site preparation for private development while providing no notion of how similar benefit will be provided to the residents and businesses in the other half of the grant planning area. An adequate environmental appraisal and assessment needs to be fully scoped based on what these linkages are predicted to be in the future. There should be an accurate appraisal of both need and potential for power, water and sewer infrastructure, and alternative transportation modalities, including bikeways, greenways and pedestrian paths there may be in the future. The plan and the scope of the EIR should include revitalization of the 16th St. Train Station with transportation links to the OAB and the Broadway Corridor.

3. The draft documents mention a “Commercial Focused Alternative” without adequate definition and dismisses any potential environmental impact of such an alternative scenario. Draft language states that Oakland city staff view this, “as a non-CEQA alternative.” What is a “non-CEQA alternative” and why is it defined so?

4. Significant “unmitigated” impacts need to be accurately and adequately scoped, as well as explained to the community members in easily understood terms.

5. The plan draft fails to define how it will, “while preserving existing established residential neighborhoods” also accomplish, “Lessening existing land-use conflicts and ensuring avoidance of future conflicts between residential neighborhoods and nonresidential uses.” These statements need to be adequately defined and described in the alternative scenario plans. They must also be scoped for an adequate EIR analysis.

6. Because a “Key tenet of the Specific Plan is to retain, enhance and improve… Enhancement Areas” the EIR must fully scope ALL of the environmental impacts which will be associated with the proposed developments in any of the Enhancement Areas.

7. Last, but not least, on 5 May 2012 members of WOEIP presented a verbal presentation with an accompanying PowerPoint presentation about Public Health concerns regarding this WOSP. The Oakland City planning staff has not put the presentation onto the city website for the 5 May 2012 public meeting summary. Nor have the specific questions we addressed to staff at the time been acknowledged or answered.

Thank you for your time and consideration to address each of these issues in detail.

Sincerely,

Margaret Gordon, Co-Director
Brian Beveridge, Co-Director
West Oakland Environmental Indicators Project
1747 14th St.
Oakland, Ca. 94607
www.woeip.org
ph. (510) 257-5640

West Oakland Environmental Indicators Project

8 November 2012

To: Scott Miller, Interim Planning and Zoning Director for Oakland
Oakland Planning Commissioners
Oakland City Hall
One Frank Ogawa Plaza,
Oakland, Ca. 94612

From: West Oakland Environmental Indicators Project
1747 14th St.
Oakland, Ca. 94607

Re: Case # ER120018: Comments for Scoping of Environmental Impact Report for West Oakland Specific Plan.

Dear Oakland Planning Commissioners and Mr. Miller,

The current approach to the scoping for the West Oakland Specific Plan (WOSP) Environmental Impact Report (EIR) reflects an inadequate process. Since the process began residents and business leaders have complained about the lack of transparency in this WOSP process. Both residents and Technical Advisory sub-committee members have expressed frustration with the lack of feedback coming from the planners and their failure to show how community concerns are reflected in the Draft WOSP.

A statement in the "Mitigated Alternative" section of the draft overview raises many questions for WOEIP. "Possible strategies and corresponding land use plans may seek to further address the preservation of historic resources, and minimizing the community's exposure to toxics by way of traditional buffers, mitigation and other land use approaches"? The EIR must explain these issues of "historic resources", potential "exposure to toxics" generated by planned land uses and the nature of "traditional buffers" to these impacts. To this end, the draft must also describe scenarios for the creation of new buffers between the protected industrial areas and the expanding residential parts of the community.

WOEIP believes every aspect of the EIR needs to acknowledge the legacy of risk exposure in West Oakland brought about by inappropriate zoning in the past. In supporting the expansion of industrial and commercial activities in this already mixed use community, the WOSP EIR must reflect recommendations for health-protective neighborhood design elements including, alternative infrastructure technologies, "built" buffer zones, green recreation spaces and open spaces, as well as, integrated public spaces in commercial and industrial developments to enhance the health of the disadvantaged and underserved traditional residents of this community.

The funding from the Federal government for the project comes from a transportation related source referred to as Transportation Investment Generating Economic Recovery (TIGER II) grants. Some local residents have been told in various public meetings a rail line will be included in the WOSP based on this transportation funding. Current "Scoping" announcements only mention a "possible street car" line transit system being built in the future in West Oakland. If this transit infrastructure is considered a fundamental element of the economic development potential held in the WOSP, the EIR most clearly address the potential benefits and impacts of such a project on business development, residential development, transit rider ship and the potential allocation of future transit dollars away from more traditional and familiar forms of local public transportation. Without such an analysis, we feel that the inclusion of the streetcar line constitutes an excuse for the use of "transportation" planning dollars for this exercise.

With this in mind the following list will give a set of specific requests and recommendations from WOEIP regarding what needs to be adequately addressed in an EIR for the WOSP.

1. A route analysis for any rail lines to be introduced into the project area as stimulus for new development. This analysis should include the potential benefit to the development of existing community resources such as the Mandela Corridor, the Third Street Corridor, the Peralta Street Corridor and in particular, the historic 16th Street Train Station. A permanent infrastructure system like this can not be casually added to this important plan with considering the benefits or harm it might bring to existing resources.

2. The TIGER II grant application declares a goal of the funding is to create planned linkages between the Oakland Army Base development and the West Oakland community in order the enhance the "sustainability" and quality of life for residents. Thus far these linkages appear to limited to extending AC Transit bus routes to the OAB Logistics Center. Given the amount of public funding being applied to the OAB project, and the water, sewer and power infrastructure links to West Oakland inherent in the OAB develop plan, the WOSP must identify resources to modernize the pubic works infrastructure of the neighborhoods east of I-880. Many of these systems are a century old and it is a social justice travesty to make such a massive investment in site preparation for private development while providing no notion of how similar benefit will be provided to the residents and businesses in the other half of the grant planning area. An adequate environmental appraisal and assessment needs to be fully scoped based on what these linkages are predicted to be in the future. There should be an accurate appraisal of both need and potential for power, water and sewer infrastructure, and alternative transportation modalities, including bikeways, greenways and pedestrian paths there may be in the future. The plan and the scope of the EIR should include revitalization of the 16th St. Train Station with transportation links to the OAB and the Broadway Corridor.

3. The draft documents mention a "Commercial Focused Alternative" without adequate definition and dismisses any potential environmental impact of such an alternative scenario. Draft language states that Oakland city staff view this, "as a non-CEQA alternative." What is a "non-CEQA alternative" and why is it defined so?

4. Significant "unmitigated" impacts need to be accurately and adequately scoped, as well as explained to the community members in easily understood terms.

5. The plan draft fails to define how it will, "while preserving existing established residential neighborhoods" also accomplish, "Lessening existing land-use conflicts and ensuring avoidance of future conflicts between residential neighborhoods and nonresidential uses." These statements need to be adequately defined and described in the alternative scenario plans. They must also be scoped for an adequate EIR analysis.

6. Because a "Key tenet of the Specific Plan is to retain, enhance and improve… Enhancement Areas" the EIR must fully scope ALL of the environmental impacts which will be associated with the proposed developments in any of the Enhancement Areas.

7. Last, but not least, on 5 May 2012 members of WOEIP presented a verbal presentation with an accompanying PowerPoint presentation about Public Health concerns regarding this WOSP. The Oakland City planning staff has not put the presentation onto the city website for the 5 May 2012 public meeting summary. Nor have the specific questions we addressed to staff at the time been acknowledged or answered.

Thank you for your time and consideration to address each of these issues in detail.

Sincerely,

Margaret Gordon, Co-Director
Brian Beveridge, Co-Director
West Oakland Environmental Indicators Project
1747 14th St.
Oakland, Ca. 94607
www.woeip.org
ph. (510) 257-5640

DRAFT MEETING NOTES
Landmarks Preservation Advisory Board
NOP Scoping Session

November 5, 2012

Items Discussed:

1. Open Forum Speakers
    a. Naomi Schiff
        i. Concerned about campus characteristics.
        ii. More robust and usable plan alternatives needed such as:
            1. Historic Preservation Alternative
            2. Identify and preserve small-scale industrial buildings and large industrial plantations
        iii. Historic preservation should be an objective of the plan
        iv. More complete phasing discussion
    b. Duewayne De Witt
        i. EIR should look at the current culture of West Oakland including: urban agriculture, urban farming and urban forestry.
        ii. Need more robust linkages to Army Base, particularly transportation linkages.
        iii. 16th Street Station should be integral to WOSP along with a train (enhanced transit) linkage.
        iv. Schools and environmental concerns. Mr. DeWitt said that he would submit more substantive comments in writing. (these were scanned and emailed to JRDV)
    c. Genevieve Wilson
        i. Building at 7th & Chester should be preserved.
        ii. Other notable buildings include Pretty Lady, 16th Street Station
        iii. Need a better definition of what is a "campus"?
        iv. Need better understanding of the podium housing prototype; what does it look like, is it communal?
2. Board Member Comments
    a. Thomas Biggs
        i. Most of the housing stock is very old. Over the lifespan of the plan, the area will need to thrive so that residents will be financially able to maintain and improve buildings. Economic development is needed.
        ii. How will the plan address crime? Alcohol, drugs, prostitution are all issues in the area that need improvement.
        iii. Need better understanding of how a "campus" fits in the West Oakland fabric.
    b. Valerie Garry
        i. Need a careful analysis of historic resources
        ii. Character-defining elements are not discussed in the plan
        iii. Where is the discussion of
            1. What's there? What makes it important?

   iv. Identify the "pockets", smaller areas, show them on a map.
   v. Need guidelines that will address where large-scale development abuts residential areas.
   vi. Include Mills Act opportunities to help existing homeowners. Identify other ways to help them.
   vii. Include an analysis of adaptive re-use, what are the opportunities, especially for smaller buildings.
   viii. Refer to the Estuary Plan chapter on Cultural and Historic Resources for good examples. It was a comparably-sized area.

c. John Goins
   i. Include information on Areas of Secondary Importance (ASI's).
   ii. Question to Betty Marvin: what is the percentage of Potential Designated Historic Properties (PDHP's). Answer: majority are in Oak Center, Prescott and South Prescott.
   iii. Include specific discussion on ASI's and design guidelines
   iv. How can the plan address previous unsuccessful modifications to buildings?
   v. The 7th Street corridor and 16th Street Station deserve additional thought and special attention.
   vi. Include a historic overlay to knit opportunity sites and enhancement areas together.

d. Mary MacDonald
   i. Identified herself as the LPAB representative on the WOSP. She had attended a few meetings.
   ii. Impressed by the enormous undertaking by staff and consultants.
   iii. She wants to focus on comments made by the public tonight, and wants them all to be included in the EIR.
   iv. Agrees with Naomi Schiff that plan must include a goal to preserve architectural and cultural resources.
   v. Need to identify historic industrial buildings
   vi. Incorporate a definition of campus. Pixar is shown in presentation, but is not a good example. Campuses should not be inaccessible and barricaded to public.
   vii. Agrees with De Witt; urban farming, forestry, tree planting, greenery should be included.
   viii. Need to improve connections and transportation linkages between West Oakland and downtown.
   ix. Develop an~~d~~ appropriate use for the 16th Street Station.
   x. Protect the property values of the single family dwellings. Ensure new housing is appropriate to design. Consider the proximity of larger buildings to smaller buildings.
   xi. Question to consultant: Are there plans to remove existing housing stock? Answer: No.
   xii. Plan emphasis on business development – not enough on residential.

e. Daniel Schulman
   i. Need to see a historic resources overlay in relation to proposed development. Question: Is Oak Center in ASI?
   ii. The Shorey House will soon become a city landmark. Include in the plan as well as street name designation.
   iii. Identify transportation linkages to downtown and Army Base.
   iv. The Transit Oriented Development should be more than a vertical bedroom community. It should be a place where people arrive and depart throughout the day and include mixed-uses, not all residential.
   v. Would like more variation in building heights along Mandela.

    vi. Campus definition: multiple buildings on one site with common ownership. Public rights of way must be incorporated into the campus.

f. Christopher Andrews

    i. Build on the historic resources of West Oakland. Understand the value of cultural resources (i.e. Temescal and ___) to economic development.
    ii. West Oakland is 4-5 square miles and 9 – 12 neighborhoods. The neighborhoods must be clearly identified and articulated~~.~~ in map.
    iii. The neighborhoods are dynamic; new ones include “Ghost-Town”, and “Dirty 30’s”.
    iv. The neighborhood structure is part of the cultural heritage of arts, foods, tech, and agriculture.
    v. Transportation – West Oakland has always been an arrival point where new groups of people become established.
    vi. Map the following; neighborhoods, cultural and historic resources, and current cultural overlay. Show how they are supported by opportunity site development and people living in West Oakland.

g. Anna Naruta

    i. Where are the alternatives that will include what are is already there?
    ii. Include a map of the ASI and API areas.
    iii. Be specific about how to link downtown and West Oakland at the 980 overpasses.
    iv. What is a campus?
    v. Look at the Crucible as an example of how to engage the community through building design and operation i.e. offering classes available to the public.
    vi. Include Mills Act or similar programs.
    vii. Include Green Building and Green Rehab programs (see my notes. This is something that could be part of the Equity piece).
    viii. Concerned about proposed improvements impact on San Pablo ASI.
    ix. Include Historic Preservation alternatives.
    x. Include archeologically sensitive sites identified on Mandela Parkway.

JRDV URBAN International

The Cathedral Building
Broadway and Telegraph
P.O. Box 70126
Oakland, CA 94612
USA
+1 510 295 4392 T
+1 510 835 1984 F

DRAFT MEETING NOTES
WOSP Consultant Team + City Wrap Up

May 25, 2012

Attendees:
Jeff Chew, Elois Thornton, Betty Marvin, Art Clark, Savlan Hauser, Surlene Grant

TO-DO Items Discussed:

1) Amend Phase 3 Deliverable (Draft Specific Plan)
   a. Opportunity sites 1-37 should be labeled by "nickname" on maps
   b. Ensure all items on Elois "Radar" list are included as chapters or sub-sections of Phase 3, including:
      - Crime Deterrents
      - Port Coordination
      - Public Art
      - Etc.

2) TOD Concerns
      - Reduce density restrictions on individual parcels
      - Alternate Massing towards 7th street
      - Commercial Alternative at Alliance Site

3) Create "Illustrated Dictionary" Addendum
   a. All planning terms should be defined ("catalyst project", "TOD", "mid-rise", "EIR", etc.)
   b. All building types need real photo references to accompany massing images from 3d model. Reference photos needed:
      - Commercial (office) on top of Garage
      - Residential on top of Garage
      - Street Closure/Pedestrianization of Street
      - Mid-rise condos

4) Phase 2- Considered delivered but needs edits
   a. In the future, all edits will be consolidated before sending to JRDV team.
   b. Phase 2 should be far more succinct, a synthesis of report "silos" with less narrative and paraphrasing of each sub consultant's work.
   c. Put City's disclaimer on all material produced.

WOSP LPAB Scoping mtg. notes 11.5.12

Naomi Schiff:

- Generally concerned re campus (large). Should be knit into community. What are the positive and negative characteristics.
- Address alternatives.
- Historic preservation overlay alternative..
- Retain & reuse small and large industrial buildings.
- Change residential.
- Preservation/reuse policy leads to a coherent whole.

Duane:

- Urban agriculture/farming part of cultural makeup.
- Urban forestry as well.
- No linkage with Army Base in this plan-transportation based plan.
- 16^{th} Street Station needs to be part of this, especially routing of rail line (street car?)

Genevieve Wilson:

- Upper Cuts, Pretty Lady, are valuable local businesses, 16^{th} Street Station (historic preservation?). Keep housing affordable.

Goins:

- No ASI's in packet (map?)
- Preserve character defining elements
- Focus on Central Station and 7^{th} Street
- Likes historical overlay, historic resources as assets to build on.

Biggs:

- By 2035 hope WO thrives by then
- Improved economy will support re-use of historic buildings
- WO has crime problem.
- Campus should have built-in security-solution?
  Elois: Using CPTED principles in site and building design will help with crime reduction.
- Liquor stores and parking lots attract crime.

Vice Chair Garry:

- Careful analysis of historical resources.
- What are the character defining features of the neighborhoods. Define what is unique and important. Provide guidelines (go to Estuary report)
- Fear small neighborhoods will get lost. Describe them
- Describe Mills Act opportunities for restoration and preservation
- Adaptive re-use.

Mary MacDonald:

- Impressed by enormous undertaking.

- Plan needs a goal of preserving architectural and historic resources and historic industrial buildings.
- The 16th Street Station needs to be re-used in appropriate way.
- Campus needs to be defined in a way that does not mean in accessible to public or barricaded.
- Residential character needs to be maintained, not the "next Emeryville."
- Urban farming and forestry should be included.
- Plan for tree plantings.
- Link to Army Base.

Dan Schulman:

- Likes variation in building heights
- Campus should include public rights of way.
- Should include POWs.
- Shoey Street name should go with new landmark.
- Wants historic overlay with design guidelines.

Andrews:

- Have attended TAC meetings.
- Build more on historic resources is critical.
- WO is not a neighborhood, but is 9-12 neighborhoods. Articulate and define with a map.
- Ghost Town and Dirty Thirties are new neighborhoods.
- Missing incredible opportunity.
- Missing tech, food, agricultural, transportation, current cultural activities that support vitality of WO.

Naruta:

- Emphasize historic preservation and adaptive re-use.
- Map of ASIs and neighborhoods.
- Connectivity with downtown, heal the scar of freeways.
- Don't encapsulate campus; the Crucible is not sealed off. There classes are offered to the public.
- Mills Act credit or similar programs.
- Green building rehab training for jobs.
- Alternatives to include small scale industrial and residential buildings. Look at Mandela Park and Ride plans, Market Street & 7th Street (couldn't hear clearly here)

Appendix 4.4 URBEMIS Model Outputs and BAAQMD BGM Model Results

4/15/2013 04:56:15 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Users\bruce\AppData\Roaming\Urbemis\Version9a\Projects\West Oakland SP Existing.urb924

Project Name: West Oakland SP Existing

Project Location: Alameda County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	13.00	1.56	7.49	0.02	0.90	0.87	1,913.16

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	73.73	100.87	861.05	0.97	177.61	33.99	97,095.17

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	86.73	102.43	868.54	0.99	178.51	34.86	99,008.33

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.11	1.45	1.06	0.00	0.00	0.00	1,769.22
Hearth	1.57	0.10	5.73	0.02	0.90	0.87	142.68
Landscape	0.06	0.01	0.70	0.00	0.00	0.00	1.26
Consumer Products	2.41						
Architectural Coatings	8.85						
TOTALS (tons/year, unmitigated)	13.00	1.56	7.49	0.02	0.90	0.87	1,913.16

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Apartments mid rise	0.54	0.70	6.10	0.01	1.24	0.24	679.90
Condo/townhouse general	1.54	2.06	17.92	0.02	3.64	0.70	1,998.18
Strip mall	16.67	25.28	210.45	0.24	44.33	8.47	24,080.21
General light industry	53.01	71.01	610.70	0.68	125.16	23.96	68,559.40
General heavy industry	1.97	1.82	15.88	0.02	3.24	0.62	1,777.48
TOTALS (tons/year, unmitigated)	73.73	100.87	861.05	0.97	177.61	33.99	97,095.17

4/15/2013 04:56:15 PM

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2014 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	2.11	5.77	dwelling units	80.00	461.60	3,946.54
Condo/townhouse general	13.89	7.14	dwelling units	190.00	1,356.60	11,598.52
Strip mall		42.94	1000 sq ft	445.00	19,108.30	141,267.66
General light industry		6.97	1000 sq ft	6,790.00	47,326.30	398,724.06
General heavy industry		1.50	1000 sq ft	740.00	1,110.00	10,306.35
					69,362.80	565,843.13

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.4	0.4	99.4	0.2
Light Truck < 3750 lbs	12.3	0.8	97.6	1.6
Light Truck 3751-5750 lbs	19.8	0.5	99.5	0.0
Med Truck 5751-8500 lbs	6.4	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.8	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.3	0.0	15.4	84.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.7	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.9	51.7	48.3	0.0
School Bus	0.0	0.0	0.0	0.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Strip mall				2.0	1.0	97.0
General light industry				50.0	25.0	25.0
General heavy industry				90.0	5.0	5.0

4/15/2013 04:54:01 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: West Oakland SP Buildout

Project Location: Alameda County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	98.40	11.53	119.65	0.33	17.97	17.29	14,805.20

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	64.80	58.76	682.02	1.97	366.11	69.26	199,240.84

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	163.20	70.29	801.67	2.30	384.08	86.55	214,046.04

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.72	9.50	4.93	0.00	0.02	0.02	11,970.97
Hearth	31.09	2.02	113.75	0.33	17.95	17.27	2,832.46
Landscape	0.08	0.01	0.97	0.00	0.00	0.00	1.77
Consumer Products	47.86						
Architectural Coatings	18.65						
TOTALS (tons/year, unmitigated)	98.40	11.53	119.65	0.33	17.97	17.29	14,805.20

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Apartments mid rise	6.20	5.24	61.72	0.18	32.71	6.19	17,871.33
Apartments high rise	5.88	4.92	58.00	0.17	30.74	5.82	16,792.58
Condo/townhouse general	1.47	1.30	15.33	0.04	8.12	1.54	4,437.79
Strip mall	14.71	14.57	165.21	0.48	90.36	17.07	48,866.42
Supermarket	1.90	1.91	21.61	0.06	11.82	2.23	6,392.90
General office building	1.14	1.06	12.25	0.04	6.59	1.25	3,583.62
General light industry	33.50	29.76	347.90	1.00	185.77	35.16	101,296.20

TOTALS (tons/year, unmitigated)	64.80	58.76	682.02	1.97	366.11	69.26	199,240.84

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2035 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	26.35	4.97	dwelling units	2,460.00	12,226.20	104,530.34
Apartments high rise	16.15	4.67	dwelling units	2,460.00	11,488.20	98,220.67
Condo/townhouse general	27.50	6.90	dwelling units	440.00	3,036.00	25,956.89
Strip mall		42.94	1000 sq ft	910.00	39,075.40	288,884.42
Supermarket		102.24	1000 sq ft	50.00	5,112.00	37,793.01
General office building		11.01	1000 sq ft	236.00	2,598.36	21,053.21
General light industry		6.97	1000 sq ft	10,109.00	70,459.73	593,623.20
					143,995.89	1,170,061.74

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.7	0.0	100.0	0.0
Light Truck < 3750 lbs	12.1	0.0	100.0	0.0
Light Truck 3751-5750 lbs	19.8	0.0	100.0	0.0
Med Truck 5751-8500 lbs	6.4	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.8	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.3	0.0	23.1	76.9
Heavy-Heavy Truck 33,001-60,000 lbs	0.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.9	34.5	65.5	0.0
School Bus	0.0	0.0	0.0	0.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Strip mall				2.0	1.0	97.0
Supermarket				2.0	1.0	97.0

4/15/2013 04:54:01 PM

General office building	35.0	17.5	47.5
General light industry	50.0	25.0	25.0

4/15/2013 04:55:47 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: C:\Users\bruce\AppData\Roaming\Urbemis\Version9a\Projects\West Oakland SP Existing.urb924

Project Name: West Oakland SP Existing

Project Location: Alameda County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	62.90	8.05	13.56	0.00	0.04	0.04	9,708.38

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	403.55	478.27	4,650.39	5.52	973.17	186.19	556,996.29

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	466.45	486.32	4,663.95	5.52	973.21	186.23	566,704.67

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.59	7.95	5.83	0.00	0.01	0.01	9,694.34
Hearth - No Summer Emissions							
Landscape	0.61	0.10	7.73	0.00	0.03	0.03	14.04
Consumer Products	13.21						
Architectural Coatings	48.49						
TOTALS (lbs/day, unmitigated)	62.90	8.05	13.56	0.00	0.04	0.04	9,708.38

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Apartments mid rise	3.03	3.33	32.97	0.04	6.79	1.30	3,899.65
Condo/townhouse general	8.50	9.79	96.90	0.11	19.95	3.82	11,460.70
Strip mall	85.70	119.98	1,126.55	1.37	242.89	46.42	138,179.81
General light industry	293.74	336.53	3,307.50	3.90	685.81	131.26	393,261.74
General heavy industry	12.58	8.64	86.47	0.10	17.73	3.39	10,194.39
TOTALS (lbs/day, unmitigated)	403.55	478.27	4,650.39	5.52	973.17	186.19	556,996.29

4/15/2013 04:55:47 PM

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2014 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	2.11	5.77	dwelling units	80.00	461.60	3,946.54
Condo/townhouse general	13.89	7.14	dwelling units	190.00	1,356.60	11,598.52
Strip mall		42.94	1000 sq ft	445.00	19,108.30	141,267.66
General light industry		6.97	1000 sq ft	6,790.00	47,326.30	398,724.06
General heavy industry		1.50	1000 sq ft	740.00	1,110.00	10,306.35
					69,362.80	565,843.13

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.4	0.4	99.4	0.2
Light Truck < 3750 lbs	12.3	0.8	97.6	1.6
Light Truck 3751-5750 lbs	19.8	0.5	99.5	0.0
Med Truck 5751-8500 lbs	6.4	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.8	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.3	0.0	15.4	84.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.7	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.9	51.7	48.3	0.0
School Bus	0.0	0.0	0.0	0.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Strip mall				2.0	1.0	97.0
General light industry				50.0	25.0	25.0
General heavy industry				90.0	5.0	5.0

4/15/2013 04:53:47 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name:

Project Name: West Oakland SP Buildout

Project Location: Alameda County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	369.22	52.22	37.81	0.00	0.14	0.14	65,614.04

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	353.74	277.46	3,705.50	11.34	2,006.11	379.54	1,144,779.77

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	722.96	329.68	3,743.31	11.34	2,006.25	379.68	1,210,393.81

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	3.97	52.08	26.99	0.00	0.10	0.10	65,594.38
Hearth - No Summer Emissions							
Landscape	0.86	0.14	10.82	0.00	0.04	0.04	19.66
Consumer Products	262.23						
Architectural Coatings	102.16						
TOTALS (lbs/day, unmitigated)	369.22	52.22	37.81	0.00	0.14	0.14	65,614.04

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Apartments mid rise	34.86	24.72	335.73	1.02	179.26	33.94	102,664.38
Apartments high rise	33.24	23.23	315.46	0.96	168.43	31.89	96,467.34
Condo/townhouse general	8.09	6.14	83.37	0.25	44.51	8.43	25,493.54
Strip mall	76.49	68.87	892.53	2.78	495.14	93.56	280,858.84
Supermarket	9.78	9.01	116.76	0.36	64.78	12.24	36,743.08
General office building	6.15	4.99	66.59	0.20	36.10	6.83	20,590.79
General light industry	185.13	140.50	1,895.06	5.77	1,017.89	192.65	581,961.80

TOTALS (lbs/day, unmitigated)	353.74	277.46	3,705.50	11.34	2,006.11	379.54	1,144,779.77

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2035 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	26.35	4.97	dwelling units	2,460.00	12,226.20	104,530.34
Apartments high rise	16.15	4.67	dwelling units	2,460.00	11,488.20	98,220.67
Condo/townhouse general	27.50	6.90	dwelling units	440.00	3,036.00	25,956.89
Strip mall		42.94	1000 sq ft	910.00	39,075.40	288,884.42
Supermarket		102.24	1000 sq ft	50.00	5,112.00	37,793.01
General office building		11.01	1000 sq ft	236.00	2,598.36	21,053.21
General light industry		6.97	1000 sq ft	10,109.00	70,459.73	593,623.20
					143,995.89	1,170,061.74

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.7	0.0	100.0	0.0
Light Truck < 3750 lbs	12.1	0.0	100.0	0.0
Light Truck 3751-5750 lbs	19.8	0.0	100.0	0.0
Med Truck 5751-8500 lbs	6.4	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.8	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.3	0.0	23.1	76.9
Heavy-Heavy Truck 33,001-60,000 lbs	0.6	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.9	34.5	65.5	0.0
School Bus	0.0	0.0	0.0	0.0
Motor Home	0.6	0.0	83.3	16.7

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Strip mall				2.0	1.0	97.0
Supermarket				2.0	1.0	97.0

4/15/2013 04:53:47 PM

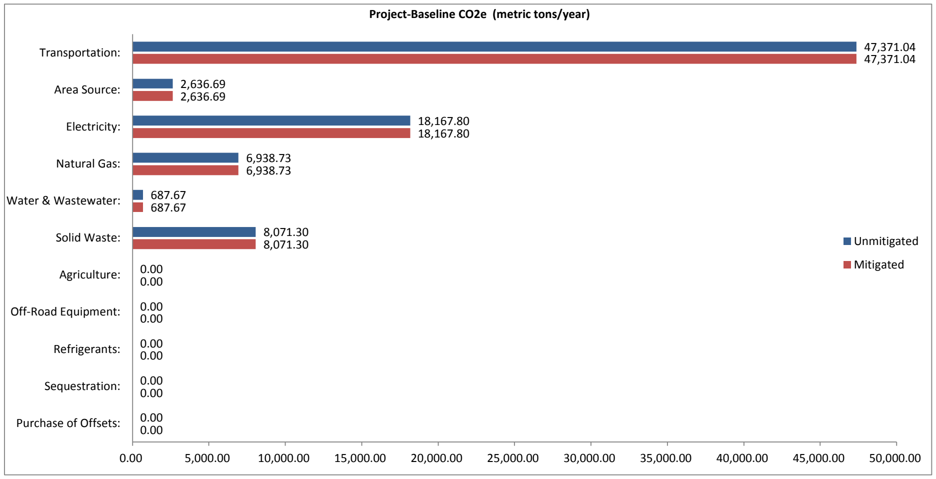
General office building	35.0	17.5	47.5
General light industry	50.0	25.0	25.0

Summary Results

Project Name: West Oakland SP Buildout
Project and Baseline Years: 2035 2014

Results	Unmitigated Project-Baseline CO2e (metric tons/year)	Mitigated Project-Baseline CO2e (metric tons/year)
Transportation:	47,371.04	47,371.04
Area Source:	2,636.69	2,636.69
Electricity:	18,167.80	18,167.80
Natural Gas:	6,938.73	6,938.73
Water & Wastewater:	687.67	687.67
Solid Waste:	8,071.30	8,071.30
Agriculture:	0.00	0.00
Off-Road Equipment:	0.00	0.00
Refrigerants:	0.00	0.00
Sequestration:	N/A	0.00
Purchase of Offsets:	N/A	0.00
Total:	83,873.23	83,873.23

Baseline is currently: **ON**
Baseline Project Name: West Oakland SP Existing
Go to Settings Tab to Turn Off Baseline



Detailed Results

Unmitigated	CO2 (metric tpy)	CH4 (metric tpy)	N2O (metric tpy)	CO2e (metric tpy)	% of Total
Transportation*:				133,730.46	65.78%
Area Source:	2,571.90	9.26	0.04	2,778.87	1.37%
Electricity:	41,918.96	0.35	0.19	41,986.05	20.65%
Natural Gas:	9,373.13	0.88	0.02	9,397.15	4.62%
Water & Wastewater:	993.06	0.01	0.00	994.65	0.49%
Solid Waste:	100.27	681.39	N/A	14,409.44	7.09%
Agriculture:	0.00	0.00	0.00	0.00	0.00%
Off-Road Equipment:	0.00	0.00	0.00	0.00	0.00%
Refrigerants:	N/A	N/A	N/A	0.00	0.00%
Sequestration:	N/A	N/A	N/A	N/A	N/A
Purchase of Offsets:	N/A	N/A	N/A	N/A	N/A
Total:				203,296.63	100.00%

Baseline	CO2 (metric tpy)	CH4 (metric tpy)	N2O (metric tpy)	CO2e (metric tpy)	% of Total
Transportation*:				86,359.43	72.31%
Area Source:	131.67	0.47	0.00	142.19	0.12%
Electricity:	23,780.19	0.20	0.11	23,818.25	19.94%
Natural Gas:	2,452.14	0.23	0.00	2,458.42	2.06%
Water & Wastewater:	306.49	0.00	0.00	306.98	0.26%
Solid Waste:	46.26	299.61	N/A	6,338.14	5.31%
Agriculture:	0.00	0.00	0.00	0.00	0.00%
Off-Road Equipment:	0.00	0.00	0.00	0.00	0.00%
Refrigerants:	N/A	N/A	N/A	0.00	0.00%
Sequestration:	N/A	N/A	N/A	N/A	N/A
Purchase of Offsets:	N/A	N/A	N/A	N/A	N/A
Total:				119,423.40	100.00%

* Several adjustments were made to transportation emissions after they have been imported from URBEMIS.
After importing from URBEMIS, CO2 emissions are converted to metric tons and then adjusted to account for the "Pavley" regulation. Then, CO2 is converted to CO2e by multiplying by 100/95 to account for the contribution of other GHGs (CH4, N2O, and HFCs [from leaking air conditioners]).
Finally, CO2e is adjusted to account for th low carbon fuels rule.

Mitigated	CO2 (metric tpy)	CH4 (metric tpy)	N2O (metric tpy)	CO2e (metric tpy)	% of Total
Transportation*:				133,730.46	65.78%
Area Source:	2,571.90	9.26	0.00	2,778.87	1.37%
Electricity:	41,918.96	0.35	0.19	41,986.05	20.65%
Natural Gas:	9,373.13	0.88	0.02	9,397.15	4.62%
Water & Wastewater:	993.06	0.01	0.00	994.65	0.49%
Solid Waste:	100.27	681.39	N/A	14,409.44	7.09%
Agriculture:	0.00	0.00	0.00	0.00	0.00%
Off-Road Equipment:	0.00	0.00	0.00	0.00	0.00%
Refrigerants:	N/A	N/A	N/A	0.00	0.00%
Sequestration:	N/A	N/A	N/A	0.00	0.00%
Purchase of Offsets:	N/A	N/A	N/A	0.00	0.00%
Total:				203,296.63	100.00%

Mitigation Measures Selected:

Transportation: Go to the following tab: Transp. Detail Mit for a list of the transportation mitigation measures selected (in URBEMIS)

Electricity: The following mitigation measure(s) have been selected to reduce electricity emissions.

Stationary Health Risk Sources within the West Oakland Specific Plan Area

Source: BAAQMD's Stationary Source Risk & Hazard Analysis Tool, Google Earth, Alameda County May 2012 data set

Southwestern Portion of the Plan Area
Between Mandela Parkway, W Grand, 880

a_May_2012_schema:FID	Alameda_May_2012_schema:PlantNo	Alameda_May_2012_schema:Name	Alameda_May_2012_schema:Address	Alameda_May_2012_schema:City	Alameda_May_2012_schema:UTM_East	Alameda_May_2012_schema:UTM_North	Alameda_May_2012_schema:Cancer	Alameda_May_2012_schema:Hazard	Alameda_May_2012_schema:PM25	Alameda_May_2012_schema:Type	Alameda_May_2012_schema:Source
472	20061	Englund Studio	1850 CAMPBELL STREET	Oakland	562200	4185500	No data	No data	No data		
415	G7578	Horizon Beverage Company	1700 20th Street	Oakland	562163	4185748	na	na	na		
462	15739	California Waste Solutions-10St Street	1820 10TH STREET	Oakland	561444	4185109	0	0	10.3		
446	11894	Nautical Engineering Inc	1790 11TH STREET	Oakland	561669	4184973	0	0	0		
68	18297	Verizon Wireless (Bay Bridge East)	107 BURMA ROAD	Oakland	561584	4184588	0.68	0.0003	0.000707	Generator	HRA
412	5202	US Postal Service - Vehicle Maintenance	1675 7TH STREET	Oakland	561681	4184389	32.11	0.011	0.007		
229	G9398	Trucker's Friends, Inc	1395 7th Street	Oakland	562169	4184456	1.631	0.002	na		
429	12943	California Finest Body & Frame	1720 CENTER STREET	Oakland	562291	4185088	0	0	0		
305	14302	City of Oakland Envr Scvs Division	14TH & MANDELA WAY	Oakland	562260	4185100	30.9	0.011	0.007	Generator	
279	G9994	OFD Fire Station #3	1445 14th Street	Oakland	562266	4185111	na	na	na		

Key:
Yellow highlight indicates sources with at least one over-threshold emission level.
Blue shading indicates sources with all or some missing emissions data.

Map of all listed stationary sources in area showing 1000' radius around sources showing above-threshold emissions.

Note: Yellow line included as 1000 foot scale.

Stationary Health Risk Sources within the West Oakland Specific Plan Area

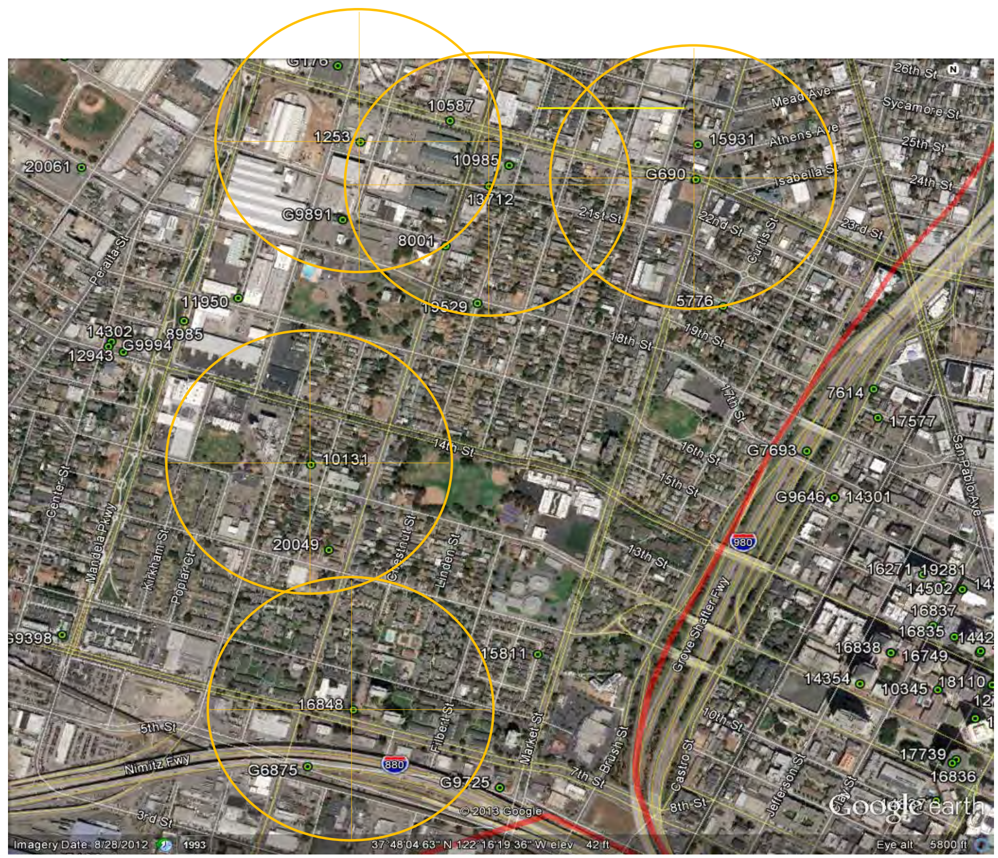
Source: BAAQMD's Stationary Source Risk & Hazard Analysis Tool, Google Earth, Alameda County May 2012 data set

Southeastern Portion of the Plan Area
Between Mandela Parkway, 880, 980, W Grand

a_May_2 012_sche ma:FID	Alameda_ May_201 2_schem a:PlantNo	Alameda_ May_201 2_schem a:Name	Alameda_ May_201 2_schem a:Address	Alameda_ May_201 2_schem a:City	Alameda_ May_201 2_schem a:UTM_E ast	Alameda_ May_201 2_schem a:UTM_N orth	Alameda_ May_201 2_schem a:Cancer	Alameda_ May_201 2_schem a:Hazard	Alameda_ May_201 2_schem a:PM25	Alameda_ May_201 2_schem a:Type	Alameda_ May_201 2_schem a:Source
166	10587	Harry Clewans	1231 24TH STREET	Oakland	562961	4185610	0	0	0		
2116	G690	ARCO Facility #02169 - KULWIN DER KAUR	889 W Grand Avenue	Oakland	563469	4185482	36.457	0.054	na		
739	1253	Central Concrete Supply, A U S Concrete	2400 PERALTA STREET	Oakland	562776	4185561	0	0	37.1		
714	10985	Custom Wood Finishing	2311 ADELINE STREET	Oakland	563084	4185511	0	0	0		
86	13712	East Bay Municipal Utility Dist	1100 21ST STREET	Oakland	563043	4185465	48.27	0.017	0.092		
623	G9891	East Bay Municipal Utility Dist	2144 Poplar Avenue	Oakland	562741	4185387	na	na	na		
137	8001	East Bay Municipal Utility Dist	1200 21ST STREET	Oakland	562954.1	4185330	5.61	0.002	0.001		
617	5776	Harold's Auto Body & Paint Shop	2126 MARKET STREET	Oakland	563527.3	4185199	0	0.001	0		
523	19529	Carlos Body Shop	1960 ADELINE STREET	Oakland	563020.9	4185202	0	0	0		
253	11950	Norman's Body and Repair Shop	1415 18TH STREET	Oakland	562526.9	4185210	0	0	0		
276	8985	Automeka nika Body Shop	1440 17TH STREET	Oakland	562415.5	4185158	0	0	0		
181	10131	California Cereal Products, Inc	1267 14TH STREET	Oakland	562680.1	4184840	0.07	0.001	1.34		
156	20049	New H & L Auto Body,Inc	1221 12TH AVENUE	Oakland	562719	4184650	0	0	0		
2130	15811	Clean Studio	900 MARKET ST, UNIT G	Oakland	563151	4184421	0	0	0		
71	16848	SPRINT	1075 7TH STREET	Oakland	562772	4184294	71.97	0.025	0.127	Generator	
1796	G9725	Market Street Shell #135692	610 Market Street	Oakland	563075	4184123	7.742	0.009	na		

Key:
Yellow highlight indicates sources with at least one over-threshold emission level.
Blue shading indicates sources with all or some missing emissions data.

Map of all listed stationary sources in area showing 1000' radius around sources showing above-threshold emissions.



Note: Yellow line included as 1000 foot scale.

Stationary Health Risk Sources within the West Oakland Specific Plan Area

Source: BAAQMD's Stationary Source Risk & Hazard Analysis Tool, Google Earth, Alameda County May 2012 data set

Northwestern Portion of the Plan Area
Between 880, 580, Peralta, W Grand

a_May_2012_schema:FID	Alameda_May_2012_schema:PlantNo	Alameda_May_2012_schema:Name	Alameda_May_2012_schema:Address	Alameda_May_2012_schema:City	Alameda_May_2012_schema:UTM_East	Alameda_May_2012_schema:UTM_North	Alameda_May_2012_schema:Cancer	Alameda_May_2012_schema:Hazard	Alameda_May_2012_schema:PM25	Alameda_May_2012_schema:Type	Alameda_May_2012_schema:Source
1137	17114	Alameda County Public Works Agency	3455 ETTIE STREET	Oakland	562556	4186752	36.47	0.013	0.008	Generator	
1088	15740	California Waste Solutions - Wood Street	3300 WOOD STREET	Oakland	562432	4186514	0	0	0.149		
1067	18268	Sierra Pacific	3213 WOOD STREET	Oakland	562450	4186481	0	0	21.3		
911	G11913	Clear Channel Outdoor	2857 Hannah Street	Oakland	562747.5	4186411	na	na	na		
914	18373	Ps Print LLC	2861 MANDELA PKWY	Oakland	562544	4186387	0	0	0		
932	12239	Carusso's Restoration	2914 POPLAR STREET	Oakland	562892	4186315	0	0.004	0		
915	17439	Clear Channel Outdoor	2865 HANNAH STREET	Oakland	562786	4186291	0	0	0		
806	17822	Berkeley Repertory Theatre	2526 WOOD STREET	Oakland	562326	4186215	0	0	0		

Key:
Yellow highlight indicates sources with at least one over-threshold emission level.
Blue shading indicates sources with all or some missing emissions data.

Map of all listed stationary sources in area showing 1000' radius around sources showing above-threshold emissions.

Note: Yellow line included as 1000 foot scale.

Stationary Health Risk Sources within the West Oakland Specific Plan Area

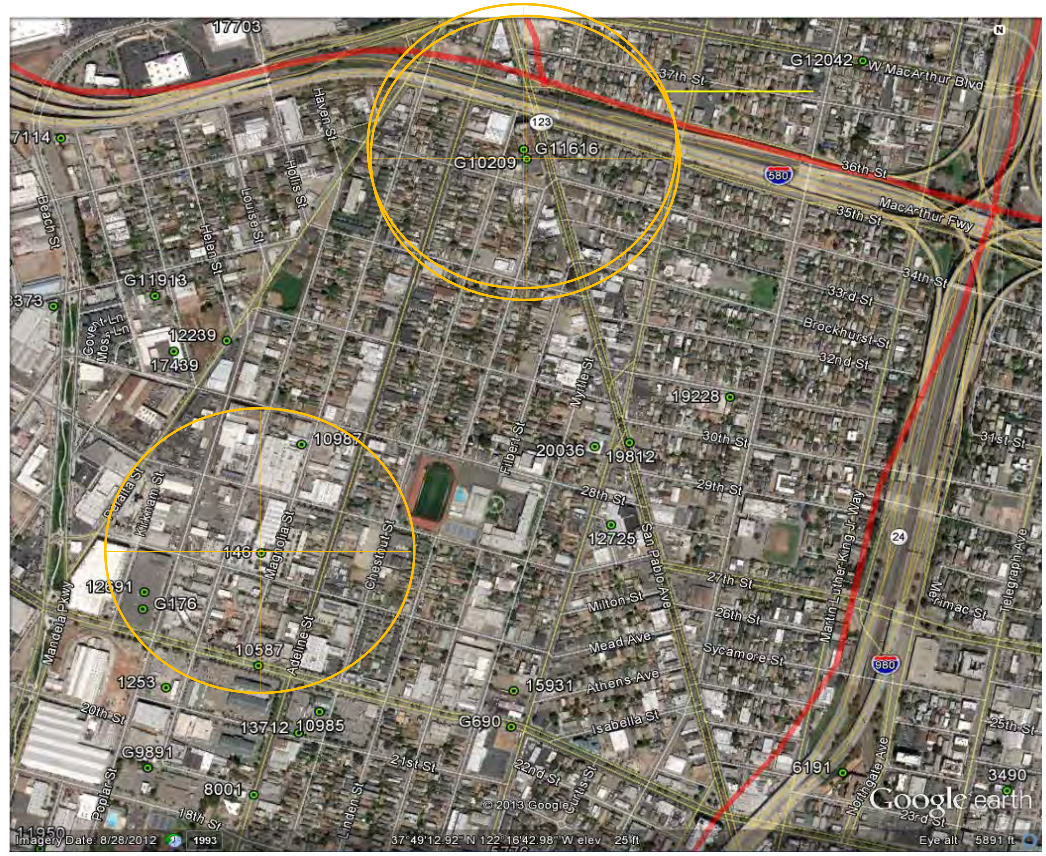
Source: BAAQMD's Stationary Source Risk & Hazard Analysis Tool, Google Earth, Alameda County May 2012 data set

Northeastern Portion of the Plan Area
Between 580, 980, Peralta, W Grand

a_May_2012_schema:FID	Alameda_May_2012_schema:PlantNo	Alameda_May_2012_schema:Name	Alameda_May_2012_schema:Address	Alameda_May_2012_schema:City	Alameda_May_2012_schema:UTM_East	Alameda_May_2012_schema:UTM_North	Alameda_May_2012_schema:Cancer	Alameda_May_2012_schema:Hazard	Alameda_May_2012_schema:PM25	Alameda_May_2012_schema:Type	Alameda_May_2012_schema:Source
1121	G11616	Portola Valley Shell	3420 San Pablo Ave	Oakland	563484	4186732	10.857	0.016	na		
1116	G10209	ARCO Facility #09535 - KRISHAN K GOYAL	3400 San Pablo Ave	Oakland	563490	4186712	29.743	0.044	na		
2077	19228	Engineering/Remediation Resource s Group,	825 31ST STREET	Oakland	563900	4186200	No data	No data	No data		
945	19812	Engineering/Remediation Res Group, Inc	2942ND, 2926 &30TH STREET	Oakland	563700	4186100	No data	No data	No data		
933	20036	Hustead's Collision Center Inc	2915 MARKET STREET	Oakland	563631	4186091	No data	No data	No data		
929	10987	Bolero Co	2905 UNION STREET	Oakland	563043.9	4186091	0	0.001	0		
935	12725	San Pablo Auto Body	2926 SAN PABLO AVE	Oakland	563665	4185922	0	0	0		
867	146	CASS, Inc	2730 PERALTA STREET	Oakland	562965	4185855	1030	0.568	0.726		
703	12691	Berkeley Millwork & Furniture Co	2279 POPLAR STREET	Oakland	562731	4185768	0	0.001	0.003		
682	G176	J & O Tire Center	2236 Poplar Street	Oakland	562728	4185731	4.062	0.006	na		
709	15931	Redline Import - Auto Collision	2300 MARKET STREET, #C	Oakland	563473	4185560	0	0	0		

Key:
Yellow highlight indicates sources with at least one over-threshold emission level.
Blue shading indicates sources with all or some missing emissions data.

Map of all listed stationary sources in area showing 1000' radius around sources showing above-threshold emissions.



Note: Yellow line included as 1000 foot scale.

Stationary Health Risk Sources within the West Oakland Specific Plan Area

Source: BAAQMD's Highway Screening Analysis Tool, Google Earth, Alameda County 6ft and 20ft April 2012 data sets

880 (E to W)

Link 908 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.694	116.372	0.101	0.046
25 ft S	0.526	88.593	0.077	0.038
50 ft S	0.376	63.672	0.055	0.03
75 ft S	0.29	49.303	0.042	0.024
100 ft S	0.233	39.813	0.034	0.021
200 ft S	0.121	21.025	0.018	0.014
300 ft S	0.073	12.886	0.011	0.01
400 ft S	0.049	8.711	0.007	0.009
500 ft S	0.035	6.346	0.005	0.008
750 ft S	0.019	3.439	0.002	0.006
1000 ft S	0.012	2.242	0.001	0.005
10 ft N	1.288	212.97	0.186	0.049
25 ft N	1.028	170.241	0.149	0.038
50 ft N	0.767	127.316	0.111	0.026
75 ft N	0.607	101.018	0.088	0.022
100 ft N	0.498	83.066	0.072	0.02
200 ft N	0.275	46.146	0.04	0.015
300 ft N	0.176	29.775	0.025	0.01
400 ft N	0.123	20.883	0.018	0.009
500 ft N	0.091	15.632	0.013	0.007
750 ft N	0.052	8.958	0.007	0.006
1000 ft N	0.033	5.82	0.005	0.004

Link 908 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.391	65.571	0.057	0.034
25 ft S	0.344	57.739	0.05	0.029
50 ft S	0.278	46.961	0.04	0.025
75 ft S	0.229	38.807	0.033	0.021
100 ft S	0.192	32.619	0.028	0.018
200 ft S	0.107	18.543	0.015	0.013
300 ft S	0.066	11.734	0.01	0.009
400 ft S	0.045	8.079	0.006	0.008
500 ft S	0.033	5.957	0.005	0.007
750 ft S	0.018	3.288	0.002	0.006
1000 ft S	0.011	2.166	0.001	0.005
10 ft N	0.633	104.792	0.091	0.036
25 ft N	0.607	100.346	0.088	0.031
50 ft N	0.537	88.904	0.077	0.021
75 ft N	0.466	77.234	0.067	0.017
100 ft N	0.404	67.086	0.058	0.016
200 ft N	0.245	40.984	0.035	0.013
300 ft N	0.163	27.413	0.023	0.009
400 ft N	0.115	19.605	0.017	0.008
500 ft N	0.087	14.852	0.012	0.007
750 ft N	0.05	8.652	0.007	0.005
1000 ft N	0.032	5.672	0.004	

Link 905 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft N	0.921	157.179	0.136	0.06
25 ft N	0.757	129.643	0.112	0.049
50 ft N	0.589	101.355	0.087	0.036
75 ft N	0.484	83.605	0.072	0.028
100 ft N	0.412	71.383	0.061	0.024
200 ft N	0.261	45.662	0.039	0.018
300 ft N	0.189	33.312	0.028	0.013
400 ft N	0.148	26.157	0.022	0.01
500 ft N	0.121	21.529	0.018	0.009
750 ft N	0.08	14.263	0.012	0.007
1000 ft N	0.057	10.266	0.008	0.005
10 ft S	1.111	179.831	0.159	0.062
25 ft S	0.908	147.326	0.13	0.049
50 ft S	0.704	114.567	0.101	0.039
75 ft S	0.58	94.507	0.083	0.033
100 ft S	0.494	80.696	0.071	0.027
200 ft S	0.311	51.12	0.044	0.015
300 ft S	0.224	36.955	0.032	0.012
400 ft S	0.172	28.586	0.025	0.009
500 ft S	0.139	23.05	0.02	0.008
750 ft S	0.087	14.668	0.012	0.007
1000 ft S	0.06	10.119	0.008	0.005

Link 905 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft N	0.469	79.412	0.069	0.05
25 ft N	0.457	77.715	0.067	0.043
50 ft N	0.418	71.525	0.061	0.033
75 ft N	0.375	64.526	0.055	0.026
100 ft N	0.337	58.178	0.05	0.022
200 ft N	0.234	40.877	0.035	0.017
300 ft N	0.176	30.887	0.026	0.013
400 ft N	0.14	24.693	0.021	0.01
500 ft N	0.116	20.541	0.017	0.008
750 ft N	0.077	13.814	0.011	0.006
1000 ft N	0.056	10.02	0.008	0.005
10 ft S	0.573	92.844	0.082	0.052
25 ft S	0.561	90.888	0.08	0.042
50 ft S	0.513	83.177	0.073	0.035
75 ft S	0.459	74.685	0.065	0.03
100 ft S	0.412	67.072	0.059	0.025
200 ft S	0.283	46.324	0.04	0.013
300 ft S	0.21	34.55	0.03	0.011
400 ft S	0.164	27.152	0.023	0.008
500 ft S	0.133	22.096	0.019	0.007
750 ft S	0.085	14.234	0.012	0.006
1000 ft S	0.058	9.884	0.008	0.005

Link 764 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft N	1.258	207.553	0.182	0.055
25 ft N	1.034	170.975	0.15	0.046
50 ft N	0.81	134.28	0.117	0.038
75 ft N	0.673	111.752	0.098	0.033
100 ft N	0.579	96.278	0.084	0.028
200 ft N	0.381	63.69	0.055	0.018
300 ft N	0.288	48.356	0.042	0.013
400 ft N	0.234	39.32	0.034	0.011
500 ft N	0.198	33.302	0.029	0.009
750 ft N	0.143	24.098	0.021	0.006
1000 ft N	0.111	18.782	0.016	0.006

Link 764 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft N	0.687	113.497	0.099	0.046
25 ft N	0.665	109.913	0.096	0.038
50 ft N	0.607	100.362	0.088	0.033
75 ft N	0.546	90.469	0.079	0.029
100 ft N	0.493	81.75	0.071	0.026
200 ft N	0.351	58.597	0.051	0.017
300 ft N	0.274	45.76	0.04	0.013
400 ft N	0.225	37.735	0.033	0.011
500 ft N	0.192	32.22	0.028	0.009
750 ft N	0.14	23.563	0.02	0.006
1000 ft N	0.109	18.46	0.016	0.005

Link 768 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.73	118.627	0.104	0.041
25 ft S	0.615	99.984	0.088	0.032
50 ft S	0.49	79.81	0.07	0.023
75 ft S	0.41	66.873	0.059	0.019
100 ft S	0.354	57.812	0.051	0.017
200 ft S	0.236	38.583	0.034	0.011
300 ft S	0.179	29.346	0.025	0.008
400 ft S	0.145	23.875	0.021	0.007
500 ft S	0.123	20.242	0.017	0.006

Link 768 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.346	56.871	0.05	0.036
25 ft S	0.354	57.887	0.051	0.029
50 ft S	0.341	55.604	0.049	0.021
75 ft S	0.316	51.517	0.045	0.016
100 ft S	0.29	47.304	0.041	0.015
200 ft S	0.214	34.918	0.03	0.011
300 ft S	0.168	27.509	0.024	0.008
400 ft S	0.139	22.771	0.02	0.007
500 ft S	0.119	19.498	0.017	0.006

Map of Highway Segments

White circles are at the centerpoint of each link and show the modeled distances with the farthest being the 1000' distance

Link numbers are identified for those links near proposed new residential.
Otherwise, link numbers are presented in the tables in counterclockwise order beginning at the intersection of 880 and 980.

Key for tables:
Yellow highlighting for above-threshold values
Orange shading for links near new proposed residential

Individual thresholds are 0.3 PM2.5 and 10 Risk

750 ft S	0.089	14.612	0.012	0.005	750 ft S	0.086	14.258	0.012	0.005
1000 ft S	0.069	11.386	0.01	0.004	1000 ft S	0.068	11.18	0.009	0.004

Link 820 (6ft elevation)					Link 820 (20ft elevation)				
	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft E	0.722	117.965	0.104	0.032	10 ft E	0.323	53.972	0.047	0.029
25 ft E	0.608	99.246	0.087	0.024	25 ft E	0.334	55.336	0.048	0.022
50 ft E	0.483	78.73	0.069	0.019	50 ft E	0.325	53.409	0.047	0.016
75 ft E	0.402	65.533	0.057	0.016	75 ft E	0.302	49.501	0.043	0.014
100 ft E	0.345	56.36	0.049	0.014	100 ft E	0.278	45.421	0.04	0.013
200 ft E	0.226	36.838	0.032	0.01	200 ft E	0.203	33.098	0.029	0.009
300 ft E	0.168	27.338	0.024	0.01	300 ft E	0.157	25.512	0.022	0.009
400 ft E	0.134	21.755	0.019	0.01	400 ft E	0.127	20.683	0.018	0.009
500 ft E	0.111	18.11	0.016	0.009	500 ft E	0.107	17.402	0.015	0.009
750 ft E	0.077	12.442	0.011	0.005	750 ft E	0.075	12.124	0.01	0.005
1000 ft E	0.057	9.211	0.008	0.004	1000 ft E	0.056	9.039	0.008	0.004

580 (W to E)

Link 765 (6ft elevation)					Link 765 (20ft elevation)				
	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.622	49.093	0.062	0.079	10 ft S	0.337	26.449	0.034	0.054
25 ft S	0.445	35.431	0.045	0.064	25 ft S	0.285	22.52	0.028	0.046
50 ft S	0.295	23.736	0.03	0.051	50 ft S	0.216	17.217	0.021	0.039
75 ft S	0.214	17.384	0.021	0.041	75 ft S	0.167	13.492	0.017	0.033
100 ft S	0.163	13.428	0.016	0.036	100 ft S	0.133	10.86	0.013	0.029
200 ft S	0.071	6.084	0.007	0.025	200 ft S	0.062	5.322	0.006	0.021
300 ft S	0.038	3.414	0.004	0.018	300 ft S	0.035	3.096	0.003	0.016
400 ft S	0.024	2.206	0.002	0.016	400 ft S	0.023	2.043	0.002	0.014
500 ft S	0.017	1.566	0.001	0.014	500 ft S	0.016	1.471	0.001	0.013
750 ft S	0.009	0.855	0.001	0.012	750 ft S	0.009	0.818	0	0.011
1000 ft S	0.006	0.559	0	0.009	1000 ft S	0.006	0.541	0	0.009

Link 931 (6ft elevation)					Link 931 (20ft elevation)				
	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.828	60.812	0.083	0.118	10 ft S	0.456	33.221	0.045	0.091
25 ft S	0.626	46.348	0.063	0.08	25 ft S	0.413	30.299	0.041	0.065
50 ft S	0.445	33.238	0.045	0.061	50 ft S	0.338	25.024	0.034	0.047
75 ft S	0.34	25.531	0.034	0.055	75 ft S	0.276	20.585	0.027	0.044
100 ft S	0.269	20.375	0.027	0.05	100 ft S	0.228	17.097	0.023	0.042
200 ft S	0.134	10.332	0.013	0.034	200 ft S	0.121	9.29	0.012	0.03
300 ft S	0.081	6.383	0.008	0.026	300 ft S	0.075	5.899	0.007	0.024
400 ft S	0.054	4.371	0.005	0.019	400 ft S	0.051	4.102	0.005	0.018
500 ft S	0.039	3.197	0.004	0.017	500 ft S	0.037	3.032	0.003	0.016
750 ft S	0.021	1.773	0.002	0.013	750 ft S	0.02	1.708	0.002	0.012
1000 ft S	0.013	1.141	0.001	0.011	1000 ft S	0.013	1.108	0.001	0.011

Link 932 (6ft elevation)					Link 932 (20ft elevation)				
	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.851	61.641	0.085	0.098	10 ft S	0.413	29.745	0.041	0.065
25 ft S	0.64	46.707	0.064	0.072	25 ft S	0.385	27.912	0.038	0.053
50 ft S	0.447	32.855	0.045	0.043	50 ft S	0.32	23.363	0.032	0.033
75 ft S	0.335	24.798	0.033	0.037	75 ft S	0.261	19.198	0.026	0.029
100 ft S	0.261	19.512	0.026	0.034	100 ft S	0.214	15.874	0.021	0.025
200 ft S	0.121	9.236	0.012	0.025	200 ft S	0.108	8.193	0.011	0.022
300 ft S	0.07	5.46	0.007	0.02	300 ft S	0.065	5.011	0.006	0.018
400 ft S	0.046	3.653	0.004	0.017	400 ft S	0.043	3.417	0.004	0.016
500 ft S	0.033	2.631	0.003	0.016	500 ft S	0.031	2.492	0.003	0.014
750 ft S	0.017	1.415	0.001	0.012	750 ft S	0.016	1.364	0.001	0.012
1000 ft S	0.011	0.904	0.001	0.01	1000 ft S	0.01	0.88	0.001	0.009

Link 930 (6ft elevation)					Link 930 (20ft elevation)				
	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.903	69.764	0.088	0.087	10 ft S	0.464	35.662	0.045	0.056
25 ft S	0.69	53.615	0.067	0.072	25 ft S	0.434	33.494	0.042	0.053
50 ft S	0.495	38.77	0.048	0.055	50 ft S	0.366	28.464	0.035	0.045
75 ft S	0.382	30.078	0.037	0.041	75 ft S	0.305	23.887	0.029	0.035
100 ft S	0.307	24.32	0.03	0.03	100 ft S	0.257	20.213	0.025	0.023
200 ft S	0.157	12.646	0.015	0.023	200 ft S	0.141	11.352	0.014	0.019
300 ft S	0.095	7.754	0.009	0.018	300 ft S	0.088	7.167	0.008	0.016
400 ft S	0.064	5.318	0.006	0.015	400 ft S	0.06	4.993	0.006	0.014
500 ft S	0.046	3.89	0.004	0.014	500 ft S	0.044	3.691	0.004	0.013
750 ft S	0.024	2.116	0.002	0.011	750 ft S	0.023	2.04	0.002	0.011
1000 ft S	0.015	1.347	0.001	0.009	1000 ft S	0.015	1.31	0.001	0.009

Link 934 (6ft elevation)					Link 934 (20ft elevation)				
	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.775	60.968	0.076	0.085	10 ft S	0.427	33.268	0.041	0.055
25 ft S	0.59	46.664	0.058	0.07	25 ft S	0.384	30.088	0.037	0.052

50 ft S	0.418	33.368	0.041	0.051	50 ft S	0.311	24.623	0.03	0.041
75 ft S	0.317	25.442	0.031	0.039	75 ft S	0.252	20.1	0.024	0.029
100 ft S	0.249	20.113	0.024	0.034	100 ft S	0.206	16.548	0.02	0.027
200 ft S	0.114	9.47	0.011	0.023	200 ft S	0.101	8.382	0.01	0.02
300 ft S	0.063	5.399	0.006	0.018	300 ft S	0.057	4.93	0.005	0.016
400 ft S	0.039	3.505	0.004	0.015	400 ft S	0.037	3.26	0.003	0.014
500 ft S	0.027	2.469	0.002	0.014	500 ft S	0.026	2.325	0.002	0.013
750 ft S	0.014	1.285	0.001	0.011	750 ft S	0.013	1.233	0.001	0.011
1000 ft S	0.008	0.811	0	0.01	1000 ft S	0.008	0.786	0	0.009

Link 933 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.637	51.033	0.063	0.076
25 ft S	0.458	37.043	0.045	0.061
50 ft S	0.306	25.063	0.03	0.049
75 ft S	0.223	18.463	0.022	0.038
100 ft S	0.171	14.266	0.017	0.033
200 ft S	0.073	6.406	0.007	0.023
300 ft S	0.04	3.574	0.004	0.017
400 ft S	0.025	2.306	0.002	0.015
500 ft S	0.017	1.635	0.001	0.014
750 ft S	0.009	0.891	0.001	0.011
1000 ft S	0.006	0.583	0	0.009

Link 933 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.344	27.329	0.033	0.055
25 ft S	0.294	23.544	0.029	0.041
50 ft S	0.225	18.249	0.022	0.037
75 ft S	0.175	14.389	0.017	0.031
100 ft S	0.14	11.583	0.014	0.026
200 ft S	0.065	5.618	0.006	0.02
300 ft S	0.036	3.247	0.003	0.015
400 ft S	0.023	2.138	0.002	0.014
500 ft S	0.016	1.536	0.001	0.013
750 ft S	0.009	0.854	0	0.01
1000 ft S	0.006	0.564	0	0.008

Link 928 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.836	90.886	0.095	0.1
25 ft S	0.676	73.826	0.077	0.082
50 ft S	0.518	56.835	0.059	0.064
75 ft S	0.421	46.392	0.048	0.051
100 ft S	0.354	39.167	0.04	0.04
200 ft S	0.212	23.738	0.024	0.031
300 ft S	0.147	16.633	0.017	0.025
400 ft S	0.108	12.351	0.012	0.021
500 ft S	0.082	9.564	0.009	0.017
750 ft S	0.049	5.802	0.005	0.014
1000 ft S	0.032	3.86	0.003	0.01

Link 928 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.51	55.464	0.058	0.08
25 ft S	0.466	50.719	0.053	0.071
50 ft S	0.398	43.522	0.045	0.058
75 ft S	0.344	37.712	0.039	0.047
100 ft S	0.3	33.05	0.034	0.037
200 ft S	0.192	21.454	0.022	0.028
300 ft S	0.136	15.439	0.015	0.024
400 ft S	0.102	11.635	0.011	0.02
500 ft S	0.079	9.094	0.009	0.016
750 ft S	0.047	5.588	0.005	0.013
1000 ft S	0.031	3.746	0.003	0.01

Link 938 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.766	82.908	0.087	0.067
25 ft S	0.596	64.964	0.068	0.058
50 ft S	0.433	47.559	0.049	0.049
75 ft S	0.336	37.213	0.038	0.042
100 ft S	0.271	30.218	0.031	0.037
200 ft S	0.139	15.859	0.016	0.025
300 ft S	0.084	9.851	0.01	0.02
400 ft S	0.056	6.671	0.006	0.016
500 ft S	0.039	4.786	0.004	0.014
750 ft S	0.02	2.561	0.002	0.011
1000 ft S	0.013	1.646	0.001	0.01

Link 938 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.412	44.777	0.047	0.052
25 ft S	0.372	40.485	0.042	0.043
50 ft S	0.309	33.897	0.035	0.039
75 ft S	0.259	28.54	0.029	0.035
100 ft S	0.219	24.25	0.025	0.031
200 ft S	0.122	13.847	0.014	0.022
300 ft S	0.076	8.906	0.009	0.018
400 ft S	0.052	6.156	0.006	0.014
500 ft S	0.037	4.477	0.004	0.013
750 ft S	0.02	2.445	0.002	0.011
1000 ft S	0.012	1.589	0.001	0.009

980 (N to S)

Link 937 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.376	52.141	0.048	0.034
25 ft W	0.304	42.528	0.039	0.026
50 ft W	0.232	32.619	0.03	0.022
75 ft W	0.186	26.37	0.024	0.02
100 ft W	0.155	22.042	0.02	0.017
200 ft W	0.089	12.786	0.011	0.013
300 ft W	0.059	8.584	0.007	0.01
400 ft W	0.041	6.079	0.005	0.008
500 ft W	0.03	4.498	0.004	0.007
750 ft W	0.016	2.508	0.002	0.006
1000 ft W	0.01	1.591	0.001	0.005

Link 937 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.194	26.943	0.025	0.025
25 ft W	0.181	25.295	0.023	0.02
50 ft W	0.159	22.361	0.02	0.016
75 ft W	0.139	19.663	0.018	0.015
100 ft W	0.122	17.345	0.016	0.014
200 ft W	0.077	11.122	0.01	0.011
300 ft W	0.053	7.768	0.007	0.009
400 ft W	0.038	5.623	0.005	0.007
500 ft W	0.028	4.219	0.003	0.007
750 ft W	0.016	2.399	0.002	0.005
1000 ft W	0.01	1.538	0.001	0.005

Link 891 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.425	59.011	0.054	0.045
25 ft W	0.353	49.297	0.045	0.036
50 ft W	0.279	39.279	0.036	0.026
75 ft W	0.234	32.98	0.03	0.021
100 ft W	0.202	28.569	0.026	0.018
200 ft W	0.133	19.02	0.017	0.014
300 ft W	0.1	14.391	0.013	0.01
400 ft W	0.08	11.476	0.01	0.009
500 ft W	0.066	9.51	0.008	0.008
750 ft W	0.045	6.587	0.006	0.008

Link 891 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.245	34.159	0.031	0.038
25 ft W	0.232	32.313	0.03	0.032
50 ft W	0.208	29.144	0.027	0.023
75 ft W	0.187	26.286	0.024	0.019
100 ft W	0.169	23.82	0.022	0.017
200 ft W	0.121	17.191	0.015	0.013
300 ft W	0.094	13.401	0.012	0.009
400 ft W	0.075	10.858	0.009	0.009
500 ft W	0.063	9.085	0.008	0.008
750 ft W	0.044	6.374	0.005	0.007

1000 ft W	0.033	4.872	0.004	0.007	1000 ft W	0.032	4.747	0.004	0.007

Link 899 (6ft elevation) | Link 899 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.436	60.306	0.056	0.037	10 ft W	0.219	30.414	0.028	0.025
25 ft W	0.36	50.059	0.046	0.032	25 ft W	0.21	29.272	0.027	0.024
50 ft W	0.281	39.268	0.036	0.027	50 ft W	0.191	26.724	0.024	0.022
75 ft W	0.231	32.372	0.03	0.024	75 ft W	0.172	24.074	0.022	0.02
100 ft W	0.195	27.46	0.025	0.021	100 ft W	0.154	21.611	0.02	0.018
200 ft W	0.117	16.64	0.015	0.013	200 ft W	0.103	14.53	0.013	0.012
300 ft W	0.08	11.479	0.01	0.01	300 ft W	0.073	10.438	0.009	0.009
400 ft W	0.058	8.455	0.007	0.009	400 ft W	0.054	7.861	0.007	0.008
500 ft W	0.045	6.57	0.006	0.007	500 ft W	0.042	6.193	0.005	0.007
750 ft W	0.027	4.067	0.003	0.006	750 ft W	0.026	3.907	0.003	0.005
1000 ft W	0.018	2.782	0.002	0.005	1000 ft W	0.018	2.7	0.002	0.005

Link 911 (6ft elevation) | Link 911 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.206	30.074	0.027	0.017	10 ft W	0.07	10.438	0.009	0.009
25 ft W	0.155	22.919	0.021	0.015	25 ft W	0.067	9.957	0.009	0.009
50 ft W	0.106	15.878	0.014	0.013	50 ft W	0.058	8.737	0.007	0.008
75 ft W	0.078	11.732	0.01	0.012	75 ft W	0.049	7.453	0.006	0.008
100 ft W	0.059	9.048	0.008	0.01	100 ft W	0.041	6.314	0.005	0.007
200 ft W	0.027	4.195	0.003	0.008	200 ft W	0.022	3.481	0.003	0.007
300 ft W	0.015	2.495	0.002	0.006	300 ft W	0.014	2.208	0.001	0.005
400 ft W	0.01	1.68	0.001	0.005	400 ft W	0.009	1.535	0.001	0.004
500 ft W	0.007	1.219	0.001	0.004	500 ft W	0.007	1.135	0.001	0.004
750 ft W	0.004	0.663	0	0.003	750 ft W	0.004	0.634	0	0.003
1000 ft W	0.002	0.425	0	0.002	1000 ft W	0.002	0.411	0	0.002

Link 912 (6ft elevation) | Link 912 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.22	34.999	0.031	0.02	10 ft W	0.107	17.161	0.015	0.013
25 ft W	0.178	28.471	0.025	0.016	25 ft W	0.101	16.231	0.014	0.012
50 ft W	0.135	21.705	0.019	0.012	50 ft W	0.09	14.428	0.012	0.009
75 ft W	0.108	17.434	0.015	0.011	75 ft W	0.079	12.692	0.011	0.008
100 ft W	0.089	14.449	0.012	0.01	100 ft W	0.069	11.154	0.009	0.008
200 ft W	0.049	8.14	0.007	0.006	200 ft W	0.042	7.01	0.006	0.005
300 ft W	0.032	5.352	0.004	0.005	300 ft W	0.029	4.816	0.004	0.005
400 ft W	0.022	3.761	0.003	0.004	400 ft W	0.02	3.469	0.003	0.003
500 ft W	0.016	2.785	0.002	0.004	500 ft W	0.015	2.609	0.002	0.003
750 ft W	0.009	1.571	0.001	0.003	750 ft W	0.008	1.504	0.001	0.003
1000 ft W	0.006	1.036	0	0.002	1000 ft W	0.005	1.002	0	0.002

Link 904 (6ft elevation) | Link 904 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.264	41.525	0.037	0.026	10 ft W	0.135	21.324	0.019	0.018
25 ft W	0.218	34.353	0.03	0.022	25 ft W	0.129	20.359	0.018	0.017
50 ft W	0.169	26.797	0.023	0.018	50 ft W	0.116	18.366	0.016	0.015
75 ft W	0.138	21.92	0.019	0.015	75 ft W	0.103	16.371	0.014	0.013
100 ft W	0.116	18.467	0.016	0.012	100 ft W	0.092	14.58	0.013	0.011
200 ft W	0.069	11.091	0.009	0.008	200 ft W	0.06	9.698	0.008	0.008
300 ft W	0.047	7.651	0.006	0.006	300 ft W	0.043	6.961	0.006	0.005
400 ft W	0.034	5.626	0.004	0.005	400 ft W	0.032	5.231	0.004	0.004
500 ft W	0.026	4.342	0.003	0.004	500 ft W	0.025	4.093	0.003	0.004
750 ft W	0.015	2.622	0.002	0.003	750 ft W	0.015	2.518	0.002	0.003
1000 ft W	0.01	1.762	0.001	0.003	1000 ft W	0.01	1.709	0.001	0.003

Link 909 (6ft elevation) | Link 909 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.232	37.686	0.033	0.017	10 ft W	0.108	17.718	0.015	0.011
25 ft W	0.182	29.735	0.026	0.015	25 ft W	0.1	16.432	0.014	0.01
50 ft W	0.132	21.825	0.019	0.013	50 ft W	0.086	14.179	0.012	0.009
75 ft W	0.102	17.01	0.014	0.011	75 ft W	0.073	12.155	0.01	0.008
100 ft W	0.082	13.741	0.012	0.01	100 ft W	0.062	10.432	0.009	0.008
200 ft W	0.041	6.966	0.006	0.007	200 ft W	0.035	5.929	0.005	0.006
300 ft W	0.024	4.189	0.003	0.006	300 ft W	0.021	3.737	0.003	0.005
400 ft W	0.016	2.773	0.002	0.005	400 ft W	0.014	2.54	0.002	0.004
500 ft W	0.011	1.959	0.001	0.004	500 ft W	0.01	1.825	0.001	0.004
750 ft W	0.005	1.012	0	0.004	750 ft W	0.005	0.965	0	0.003
1000 ft W	0.003	0.632	0	0.003	1000 ft W	0.003	0.61	0	0.003

Link 907 (6ft elevation) | Link 907 (20ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI		PM2.5	Risk	Chron.HI	Acute.HI
10 ft W	0.241	39.779	0.034	0.026	10 ft W	0.131	21.793	0.019	0.018
25 ft W	0.18	30	0.026	0.023	25 ft W	0.115	19.116	0.016	0.016
50 ft W	0.127	21.243	0.018	0.019	50 ft W	0.092	15.414	0.013	0.015
75 ft W	0.096	16.232	0.014	0.017	75 ft W	0.075	12.61	0.01	0.014
100 ft W	0.076	12.914	0.011	0.014	100 ft W	0.062	10.464	0.009	0.012

200 ft W	0.037	6.34	0.005	0.009	200 ft W	0.032	5.546	0.004	0.008
300 ft W	0.022	3.761	0.003	0.007	300 ft W	0.02	3.402	0.002	0.006
400 ft W	0.014	2.518	0.002	0.005	400 ft W	0.013	2.326	0.002	0.005
500 ft W	0.01	1.843	0.001	0.005	500 ft W	0.01	1.726	0.001	0.004
750 ft W	0.006	1.046	0	0.004	750 ft W	0.005	0.999	0	0.004
1000 ft W	0.004	0.703	0	0.003	1000 ft W	0.004	0.678	0	0.003

Appendix 4.5 List of Identified Environmental Cases

Appendix 4.5, Table 1

Oppty Sites	Grand/Mandela Opportunity Area			US EPA Database				DTSC Database				RWQCB Database		DEH Data	
				NPL	CERCLIS	CORRACTS	NFRAP	RESPONSE	ENVIROSTOR	VCP	DEED	GeoTracker	LUST Program	SLIC	County CS
12	ACME Galvanizing Co.	1655	17th Street		X							Open	Cleanup	Open (276)	Open, assess & remed
	Bercovich	1639	18th Street				X		Certified	X	X				
	West Recycler	1405	Wood				X		Refer to RWQCB			Closed	Cleanup		
	Manny Services	1600	Peralta				X								
	Zero Waste Systems	1450	32nd Street				X								
	Chromex Div Lowe Co.	1400	Park				X								
	Electro Coatingss	1401	Park				X								
	Donco Indust	2401	Union				X								
	Grand/Poplar	1250	Grand					X	Active			Open	Cleanup	Open	
	Northwest Venetian	1218	24th Street					X	Certified		X	Open	CLeanup	Open	
	Carnation Dairies	1310	14th Street					X	Refer to Local			Closed	Cleanup	C	X
8	SP Transport	1707	Wood					X	Refer to RWQCB '01			Open	Cleanup	Open, inactive	
	Thomas Short Co	3430	Wood						Certified	X		Closed	X	Open (4)	X (4)
	Sutta Recycling	3401	Wood						Certified	X		Closed	X		X
	Reliance Upholstery	1614	Campbell						Certified	X		Open	Cleanup		
	Giampolini	2847	Peralta						Certified	X	X				X
3	LDS trucking	2233	Wood						Certified	X					
	Oakland Fire Serv Agency	1445	14th Street						Certified	X					
	Alameda Chemical	2668	Hannah						Certified						
	Laher Spring and Elec Car	2419	Magnolia						Certified						
	TKG Storage	2450	Mandela						Certified	X	X				
	Western pacific RR		Union						Certified	X	X				
3	BNSF Yard	Wood	West Grand						Certified		X				
18	P&B Dismantlers	2525	Wood						Certified	X					
	Cal.Electric	3015	Adeline						Inactive			Closed	X		
3	Former Hall	2601	Wood						Inactive						
	Pac Oversea Air	28th	Wood						Inactive						
	Alta Plating & Chem	1433	18th Street						Inactive						
	Mandela Grand	Grand	Mandela						Inactive						
	Mandela Parkway Ext.	32nd	Mandela						Inactive, action reqd	X					
	AT&SF Railroad	3200	Wood						Inactive, need eval	X					
	Nabisco	1267	14th Street						NFA			Closed	X		X (285)
1	General Transport	3211	Wood						NFA	X		Open	X		X
	Willow Park	1368	Willow						NFA	X					
3	Army-Navy Distribution	2233	Wood						NFA						
	Bell Metal Fabric.	2500	Adeline						NFA						
	Shirek	3425	Ettie						No Action			Closed	X		X
2	Custom Alloy Scrap	2601	Peralta						No Action			Closed			X
18	Russ Elliott Roof	2526	Wood						No Action			Closed	X		X (137)
	Commair	1266	14th Street						No action			Closed	X		X (223)
11	Custom Alloy Scrap	2730	Peralta						No Action			Open			X
	Artesian Oil Recovery	2306	Magnolia						No Action						
	BASF	1545	Willow						Refer to RWQCB			Closed	X		X (275)
	Magnolia ST. LLC	1200	32nd Street									Closed	Cleanup	C	X (331)
	Encinal Prop	1310	14th Street									Closed	Cleanup	C	
	Graphite Mill	2500	Kirkham									Closed	Cleanup	C	
	Central Station Land LLC	1401	Wood									Closed	X	C (271)	
18	Wood St. Warehouse	2510	Wood									Closed	X		X
22	Cal West Periodicals	2400	Filbert									Closed	X		X
	Western Seafare	1301	26th Street									Closed	X		X
	Rush Prop	1173	28th Street									Closed	X		X
	Ned Clyde Const	2311	Adeline									Closed	X		X
	Eastshore Lines	2400	Adeline									Closed	X		X
	Aervoe Pac	2528	Adeline									Closed	X		X
	Cal. Electric	3015	Adeline									Closed	X		X
	Kantor's Furn	2525	Mandela									Closed	X		X
	Kalmarac	2792	Cypress									Closed	X		X
	JT Trucking	2818	Cypress									Closed	X		X
	Caltrans Maint.	3465	Ettie									Closed	X		X
	JH Fitzmaurice	2857	Hannah									Closed	X		X
	Residential	2856	Helen									Closed	X		X
	Paciifc Cyrogenics	2311	Magnolia									Closed	X		X
	Blount Intl	2452	Magnolia									Closed	X		X
	CE Toland	2635	Peralta									Closed	X		X

Appendix 4.5, Table 1

Oppty Sites	Grand/Mandela Opportunity Area		US EPA Database				DTSC Database				RWQCB Database		DEH Data	
			NPL	CERCLIS	CORRACTS	NFRAP	RESPONSE	ENVIROSTOR	VCP	DEED	GeoTracker	LUST Program	SLIC	County CS
	Morgan Environ Serv	2433 Poplar									Closed	X		X
	Matheson Mail Transp	2500 Poplar									Closed	X		X
	Lindford Air and Refer	2850 Poplar									Closed	X		X
	Gardiner Mfg	1920 Union									Closed	X		X
	SP Transport	1399 Wood									Closed	X		X
	Utility Truck Bodies	1530 Wood									Closed	X		X
5	Pacific Pipe	1901 Poplar									Closed	X		X
21	Central Concrete Supply	2400 Peralta									Closed	X		X
18	Crown Zellerbach	2230 Willow									Closed	X		X
	Modern Mail	2836 Union									Closed	X		X
	Linford	2650 Magnolia									Closed			X (133)
	Langendorf Bakeries	1000 Grand									Closed	X		X (171)
	Tulloch Const	3428 Ettie									Closed	X		X (2)
	Container Care	1350 16th Street									Closed	X		X (224)
9	Mac Auto Repair	905 Grand									Closed	X		X (262)
1	TASCo	1685 34th Street									Closed	X		
	Marshall Steel Clean	1229 28th Street									Closed	X		
	Oakland, City of	3455 Ettie									Closed	X		
14	PG&E	2121 Peralta									Closed	X		
	Cal Brake & Clutch	2221 Union									Open	Cleanup	Open	X
	Custom Allow Scrap	2711 Union									Open	Cleanup	Open	X (186)
	Little	1201 32nd Street									Open	Cleanup	Open	X (317)
	Linden Lofts	2499 Chestnut									Open	Cleanup	Open	
18	Luccesi	2200 Wood									Open	X		Open, site assess
1	TASCO	3430 Wood									Open	Cleanup		X
	Cereske Elec Cable	1688 24th Street									Open	X		X
	Bay Area Warehouse	4001 Hollis									Open	X		X
	Mandela Truck	1225 Mandela									Open	X		X
	C&L Truck	2460 Wood									Open	X		X
8	Roadway Express	1708 Wood									Open	X		X
18	Pacific Supply	1735 24th Street									Open	X		X
4	Paciifc Pipe	1685 24th Street									Open	X		X
17	EBMUD	1200 21st Street									Open	X		X
	Thompson	1409 12th Street									Open	X		X (284)
16	Cadomartori Truck	1833 Peralta									Open	X		X (291)
	Brooks Auto Serv	1101 28th Street									Open	X		X (306)
	Osagie	1532 Peralta									Open	X		X (333)
	Precision Cast	1549 32nd Street									Open	Cleanup		X (343)
	Atlas Heating	1451 32nd Street									Open	X		X (346)
	Wareham	2855 Mandela									Open	X		X (5)
	MN Warehouse	1549 40th									Open	X		
	Sabek Shell	1230 14th Street									Open	X		
17	EBMUD	1075 Grand									Open	X		
	Grand Refridgerator	2240 Filbert											C	
	Campbell	1614 Campbell											Open	X
	Safeway Ice Cream	2240 Filbert											Open	X
	Apartments	1801 14th Street											Open	
	EZ Rest	2528 Adeline											Open	
17	EBMUD	2130 Adeline												X
	Taylor Roof Struct	1746 13th Street												X
5	Jorgensen Steel	1699 Grand												X
	BP West Coast Prod	889 Grand												X
	Bashland	4015 Hollis												X
	Ransome Co	4030 Hollis												X
	Clark Cramer	2500 Kirkham												X
	Orton & Libitzky	2302 Market												X
	Will's Freight	1700 Grand												X (185)
	Coca-Cola Bottling	1340 Mandela												X (269)
	Franks Tire Serv	1115 21st Street												X (283)

Appendix 4.5, Table 2

Oppty Sites	7th Street Opportunity Area			US EPA Database				DTSC Database				RWQCB Database		DEH Data	
				NPL	CERCLIS	CORRACTS	NFRAP	RESPONSE	EnviroStor	VCP	DEED	GeoTracker	LUST Program	SLIC	County CS
25	AMCO Chemicals	1414	3rd Street	Open					Active, cleanup			Open	X		Open, site assessment
	Gaines Property	1795	11th Street		X			X	Certified						
24	SMILO Chemical CO.	500	Kirkham				X		Inactive, needs eval	X					
27	Batavia Property	1832	9th Street				X		NFA						
	J & J Truck Repair	355	Cypress				X								
	California Soda		Lewis Street				X								
	Empty Lot	528	Lewis Street					X	Certified						
28	Vacant Auto Repair		Shorey					X	NFA						
	Jenkins Auto Wreckers	1778	10th Street						Backlog						
	Church's Chicken	1766	7th Street						Certified	X		Closed	X	Open	X
	USPS Parking Structure	1675	7th Street						Certified	X		Open	Cleanup		X
	Marble Technics West	1035	7th Street						Certified	X		Open	X		X
	Changs Automotve	1009	7th Street						Certified	X					X
23	Bobo's Junkyard	1401	3rd Street						Certified	X	X				
25	BART	349	Mandela						Certified						
28	B&A Auto Dismantlers	1823	Shorey						Certified	X					
	Cal-East Foods	505	Cedar						Certified	X					
	Phoenix 766	766	Cedar						Certified	X					
	SP Railyard		Cypress						Certified		X				
	Cypress - 3rd Street		3rd Street						Certified	X					
	SP 3rd St Lot	1509	3rd Street						Certified	X					
	Smith's Wrecking	1600	3rd Street						Certified	X					
	S. Prescott Park	1000	7th Street						Certified	X					
	Wilfred's Auto	1834	7th Street						Certified	X					
	Old Oakland Firehouse	727	Pine						Certified	X					
28	Phoenix	524	Cedar						Inactive, need eval.	X					
28	Phoenix 800	800	Cedar						Inactive, needs eval	X					
	Container Freight	1285	5th Street						Inactive, needs eval.						X
25	California Soda	355	Mandela						NFA						
	Micronesia Cargo Intl	955	7th Street						NFA	X					
	Radomsky	930	Pine						No Action						
23	BART Station	1451	7th Street						Refer to Local						
	1536 Third	1536	3rd Street						Refer to Local						
24	SP Transport	5th	Kirkham									Closed	X		X
	Kelley's Truck	1390	7th Street									Closed	X		X
	Reliable Handi Car	1520	7th Street									CLosed	X		X
	Armored Transport	1333	8th Street									Closed	X		X
	Gosswood Housing Assoc	1111	Pine									Closed	Cleanup		X
33	All Mercedes Dismantlers	1225	7th Street									Closed	X		X
	PacBell	1075	7th Street									Closed	X		X
	Burke Co	310	Union									Closed	Cleanup		
23	Eastlake	1455	5th Street									Closed	X		X
24	Red Star Yeast	1396	5th Street									Open	Cleanup	Open	Open, site assess
25	Globe Metals	1820	10th Street									Open	Cleanup		Open, inactive
28	Phoenix Iron Works	888	Cedar									Open	X		X
	Everidge Service Co	1211	7th Street									Open	X		X
24	J & J Truck Repair	500	Kirkham									Open	X		
	UPRR	5th	Union									Open	Cleanup		
	UP Railroad	Goss	Pine									Open, Inactive	Cleanup		
	Burke Co the 35	111-1199	Pine											Closed	
	Everidge Service Co	800	Center												X
	Paciifc Cannery Lofts	7th	Mandela												X

Appendix 4.5, Table 3

Oppty Sites	3rd Street Opportunity Area			US EPA Database				DTSC Database				RWQCB Database		DEH Data	
				NPL	CERCLIS	CORRACTS	NFRAP	RESPONSE	EnviroStor	VCP	DEED	GeoTracker	LUST Program	SLIC	County CS
	Francis Plating	751	7th Street		X	X			NFA			Open	Cleanup		
	Safety Kleen	400	Market		X				Active			Open	X		X
	Nor Cal Metal Fabric	1121	3rd Street				X								
	Marble Technics	1035	7th Street						Certified	X		Open	X		X
	Western Pacific		Union						Certified		X				
	Amtrak Maintenance	3rd	Union						Certified	X	X				
	Chang's Auto	1009	7th Street						Certified	X					
	E-D Coat	715	4th Street						Inactive						
	Condor Freight	324	Union						NFA	X		Closed	X		
	Micronesian Cargo	955	7th Street						NFA	X					
	Oakland Warehouse	1221	3rd Street									Closed	X		X
	Pac Bell	1075	7th Street									CLosed	X		X
	Nor Cal Metal Fabric	114	Adeline									Closed	X		X
	Lehar Sales	150	Chestnut									Closed	X		X
	Aramark	330	Chestnut									Closed	X		X
35	East Bay Ford Truck	333	Filbert									Closed	X		X
35	Marine Treminals Corp	333	Market									Closed	X		X
	Markus Supply	632	2nd Street									Closed	X		
	Guarantee Forklift	699	4th Street									Closed	X		
	Greyhound Line	7th	Brush									Closed	X		
	Liquid Carbonic	901	Embarcaderp									Closed	X		
	Sunset Wholesale	105	Embarcaderp									Closed	X		
	Oakland Telecom	229	Castro									Closed	Cleanup		
	Oakland Truck Stop	1107	5th Street									Open			X
	Shell Service Station	610	Market									Open	X		X
	Allen Property	325	MLK									Open	X		
	PG&E Plant	50	MLK									Open	X		
	Caltrans Cypress Proj	5th	Adeline									Open			
	Caltrans	6th	Castro									Open	X		
	O' Hare Co	339	3rd Street									Open	X		
	Port of Oak., CNG Station	205	Brush									Open	Cleanup		

Appendix 4.5, Table 4-4

Oppty Sites	San Pablo Opportunity Area		US EPA Database				DTSC Database				RWQCB Database		DEH Data	
			NPL	CERCLIS	CORRACTS	NFRAP	RESPONSE	EnviroStor	VCP	DEED	GeoTracker	LUST Program	SLIC	County CS
	Former Lane Metal Finish	2942 San Pablo					X	Active					Open	X
	Doug Co Metal	1073 34th Street						Inactive			Closed	X		
	ABC Dry Cleaners	2701 San Pablo						Inactive						
	Chris & George Auto Repair	2520 West						Refer to Local						
	Peerless Stages	2021 Brush									Closed	X		X
	AB Co Waterproofing	3135 Filbert									Closed	X		X
	WSB Electric	3032 Market									Closed	X		X
	Cahon Assoc	3501 San Pablo									Closed	X		X
37	Fyne Building	774 Grand									Closed	X		X
	Tune Up Masters	2901 San Pablo									Closed	X		X
	Cal Auto Repair	2801 San Pablo									Closed	X		X
	Herrington Olson Photo	769 22nd Street									Closed	X		X
	Loomis Armored	936 Brockhurst									Closed	X		X
	Crowley/Kent	3016 Filbert									Closed	X		
	Golden Gate Linen	958 28th Street									Closed	X		
	Continental Color	2201 West									Closed	X		
	Commercial	1000 Grand									Closed	X		
	Mac Auto	905 Grand									Closed	X		
	Chevron	850 Grand									Closed	X		
	Grand Ave Refrigerated	2240 Filbert									Closed	Cleanup		
	Shell	3420 San Pablo									Open	X		X
	Thrifty Oil	3400 San Pablo									Open	X		X
	Auto Service Co	820 Isabella									Open	X		X
	FG Gasoline	3314 San Pablo									Open	X		
	ARCO	889 Grand									Open	X		
	Meaders Cleaners	800 Grand									Open	X		
	Burke	949 Grand									Open	X		
	Sinclair Paint	2040 San Pablo												X
	Oakland Bus Terminal	2103 San Pablo												X

Appendix 4.10 Traffic Appendices

Appendix A: Intersection Data for Selected Intersections

WI LTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 7:00 AM TO 9:00 AM
INTERSECTION: N/S ADELINE STREET
E/W WEST GRAND AVENUE
CITY: OAKLAND

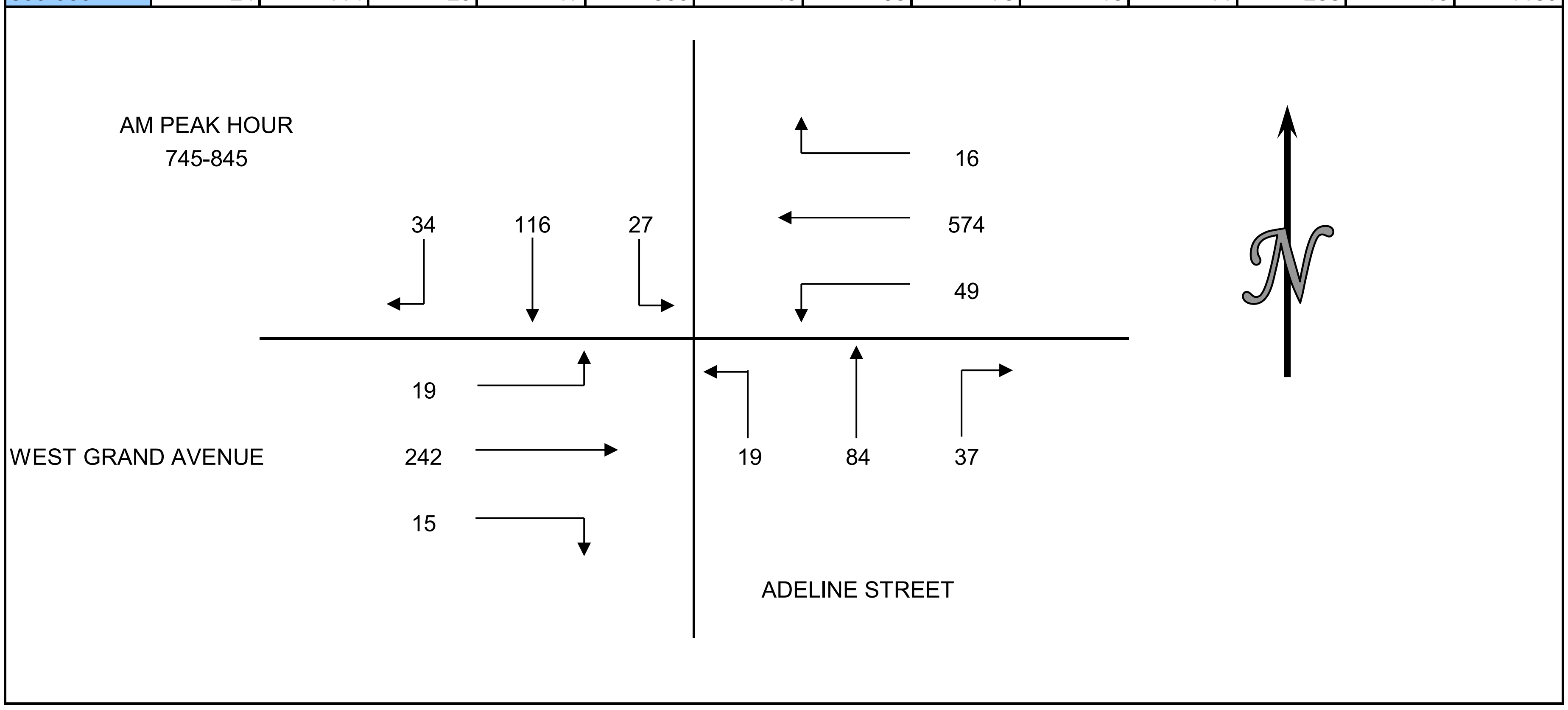
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	5	24	8	4	130	10	4	20	4	5	45	2	261
715-730	6	20	5	5	148	15	6	18	3	7	53	3	289
730-745	8	28	3	8	131	11	6	15	5	4	48	2	269
745-800	13	32	5	4	143	12	8	21	4	8	59	4	313
800-815	10	37	7	3	157	9	9	28	5	3	62	3	333
815-830	6	21	9	5	143	12	11	19	3	2	58	5	294
830-845	5	26	6	4	131	16	9	16	7	2	63	7	292
845-900	3	30	7	5	129	12	6	12	3	4	55	4	270

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	32	104	21	21	552	48	24	74	16	24	205	11	1132
715-815	37	117	20	20	579	47	29	82	17	22	222	12	1204
730-830	37	118	24	20	574	44	34	83	17	17	227	14	1209
745-845	34	116	27	16	574	49	37	84	19	15	242	19	1232
800-900	24	114	29	17	560	49	35	75	18	11	238	19	1189



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S ADELINE STREET
E/W WEST GRAND AVENUE
CITY: OAKLAND

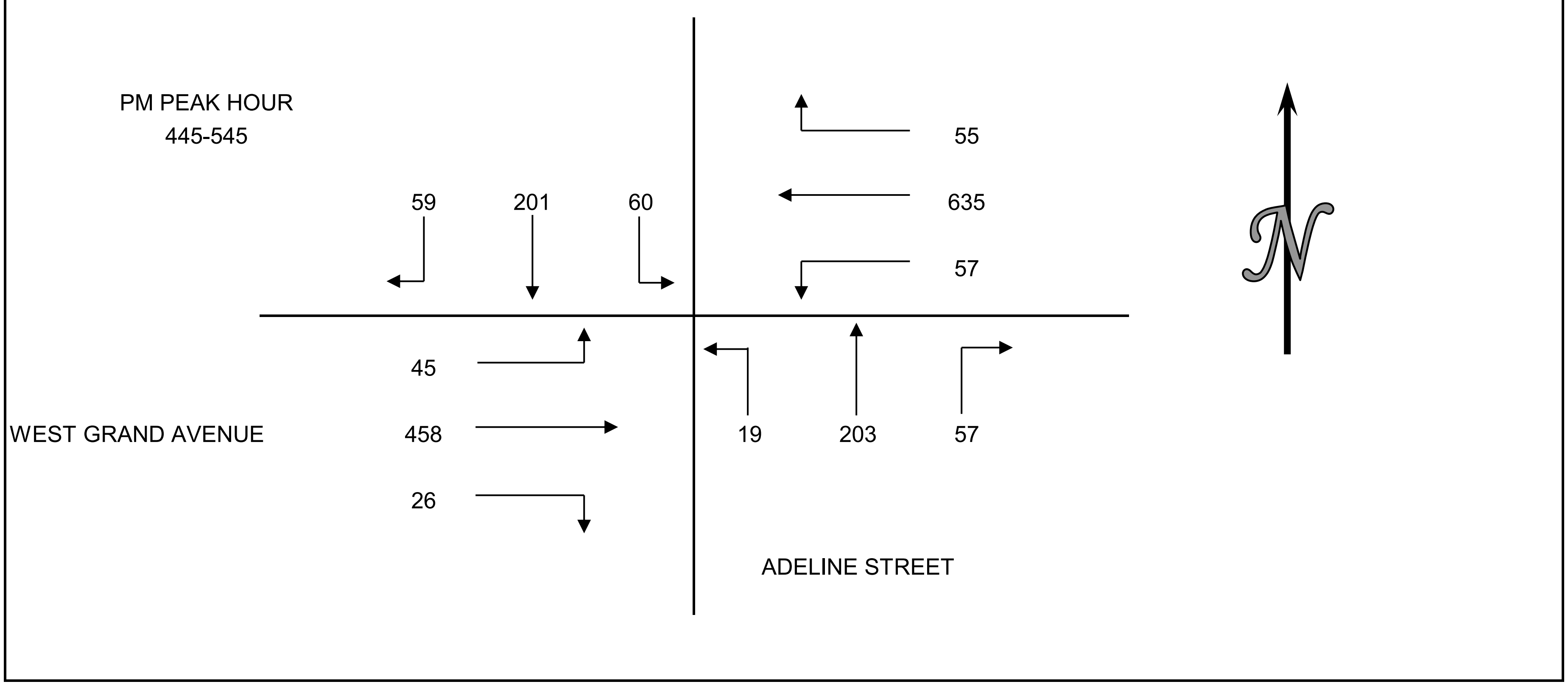
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	25	59	13	13	152	9	17	29	6	13	94	13	443
415-430	20	50	14	9	146	8	19	41	4	14	95	9	429
430-445	13	41	14	10	134	13	19	60	1	8	109	10	432
445-500	17	35	16	10	149	16	21	54	5	6	114	15	458
500-515	15	49	11	15	165	14	10	59	6	11	117	12	484
515-530	13	52	18	16	171	10	14	47	6	3	106	5	461
530-545	14	65	15	14	150	17	12	43	2	6	121	13	472
545-600	11	40	7	9	135	9	4	31	5	6	73	14	344

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	75	185	57	42	581	46	76	184	16	41	412	47	1762
415-515	65	175	55	44	594	51	69	214	16	39	435	46	1803
430-530	58	177	59	51	619	53	64	220	18	28	446	42	1835
445-545	59	201	60	55	635	57	57	203	19	26	458	45	1875
500-600	53	206	51	54	621	50	40	180	19	26	417	44	1761



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT:		KITTLESON AND ASSOCIATES
PROJECT:		WEST OAKLAND SPECIFIC PLAN
DATE:		THURSDAY NOVEMBER 15, 2012
PERIOD:		7:00 AM TO 9:00 AM
INTERSECTION:	N/S	MARKET STREET
	E/W	WEST GRAND AVENUE
CITY:		OAKLAND

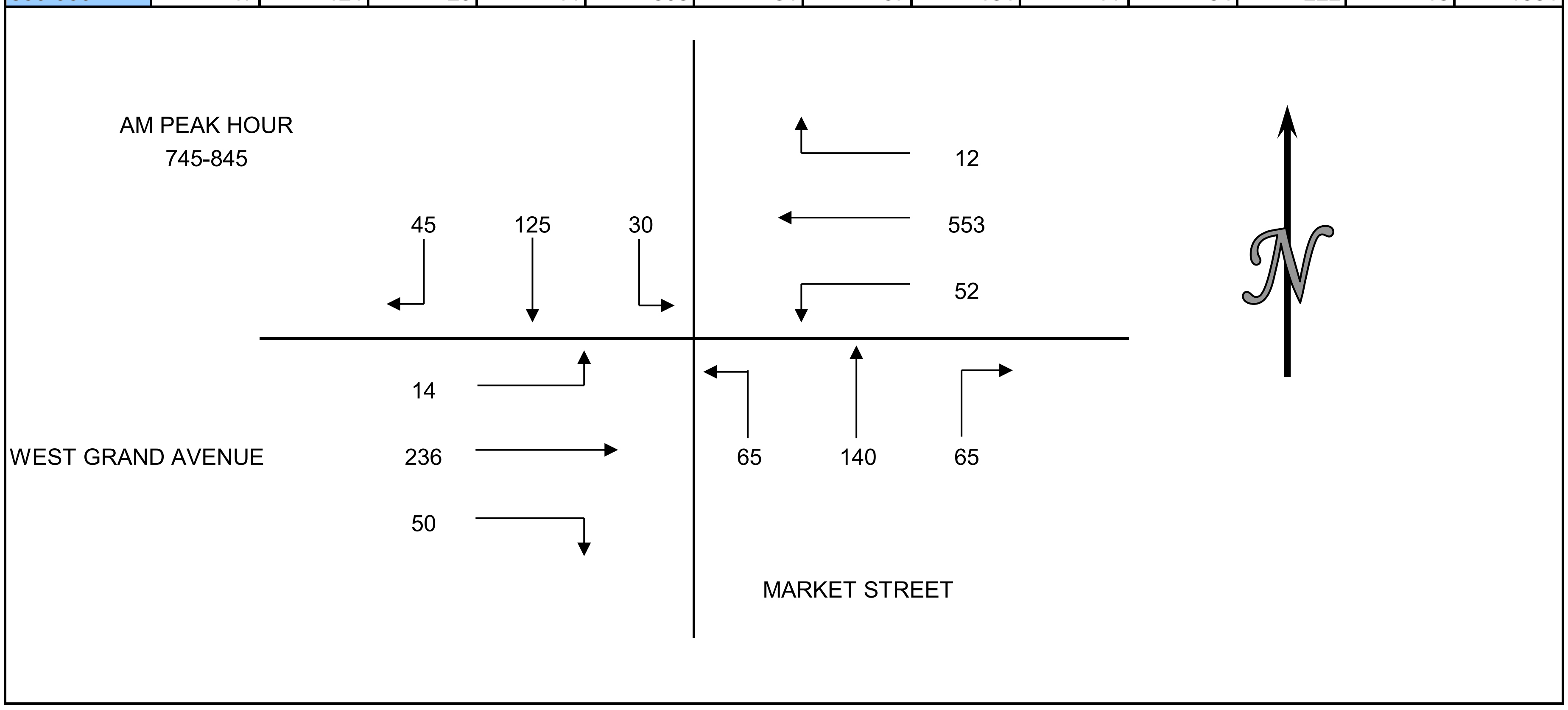
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	12	14	6	3	101	12	9	15	10	6	37	2	227
715-730	11	20	4	4	121	9	9	22	12	10	49	3	274
730-745	8	19	3	3	130	11	14	29	15	7	40	0	279
745-800	10	25	5	2	164	13	13	35	9	8	69	2	355
800-815	15	32	9	3	128	15	18	33	19	17	62	5	356
815-830	9	37	10	4	135	11	13	38	21	10	51	3	342
830-845	11	31	6	3	126	13	21	34	16	15	54	4	334
845-900	12	21	4	1	114	12	15	26	21	12	55	6	299

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	41	78	18	12	516	45	45	101	46	31	195	7	1135
715-815	44	96	21	12	543	48	54	119	55	42	220	10	1264
730-830	42	113	27	12	557	50	58	135	64	42	222	10	1332
745-845	45	125	30	12	553	52	65	140	65	50	236	14	1387
800-900	47	121	29	11	503	51	67	131	77	54	222	18	1331



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S MARKET STREET
E/W WEST GRAND AVENUE
CITY: OAKLAND

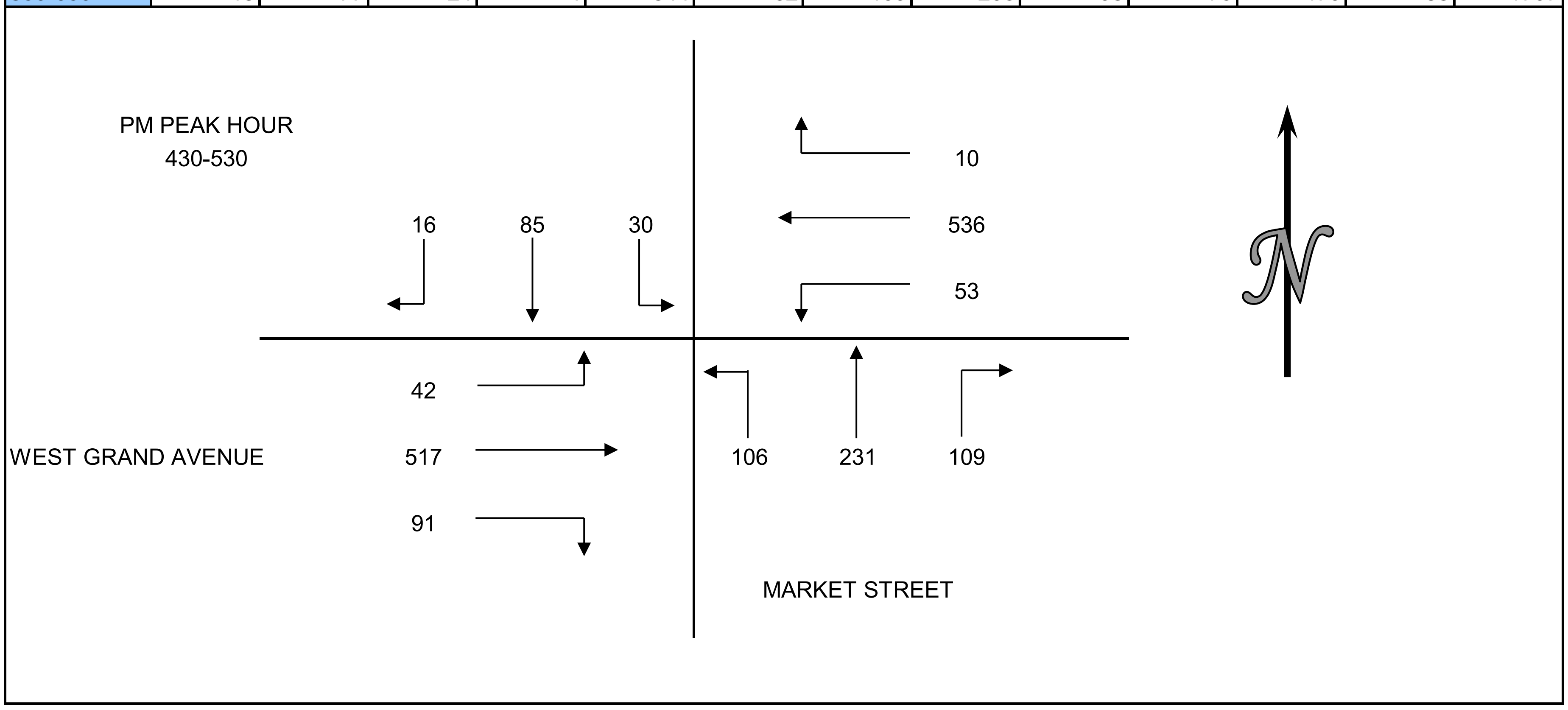
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	5	17	1	7	153	18	20	40	17	17	118	5	418
415-430	8	24	6	6	134	23	23	46	23	13	129	7	442
430-445	4	14	7	6	132	20	20	49	27	26	135	8	448
445-500	3	24	11	2	120	6	32	63	21	24	143	21	470
500-515	3	24	5	1	130	12	27	55	22	18	121	6	424
515-530	6	23	7	1	154	15	30	64	36	23	118	7	484
530-545	4	18	7	2	132	27	24	42	19	16	129	9	429
545-600	0	12	5	0	128	8	28	45	18	13	102	11	370

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	20	79	25	21	539	67	95	198	88	80	525	41	1778
415-515	18	86	29	15	516	61	102	213	93	81	528	42	1784
430-530	16	85	30	10	536	53	109	231	106	91	517	42	1826
445-545	16	89	30	6	536	60	113	224	98	81	511	43	1807
500-600	13	77	24	4	544	62	109	206	95	70	470	33	1707



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 7:00 AM TO 9:00 AM
INTERSECTION: N/S ADELINE STREET
E/W 18TH STREET
CITY: OAKLAND

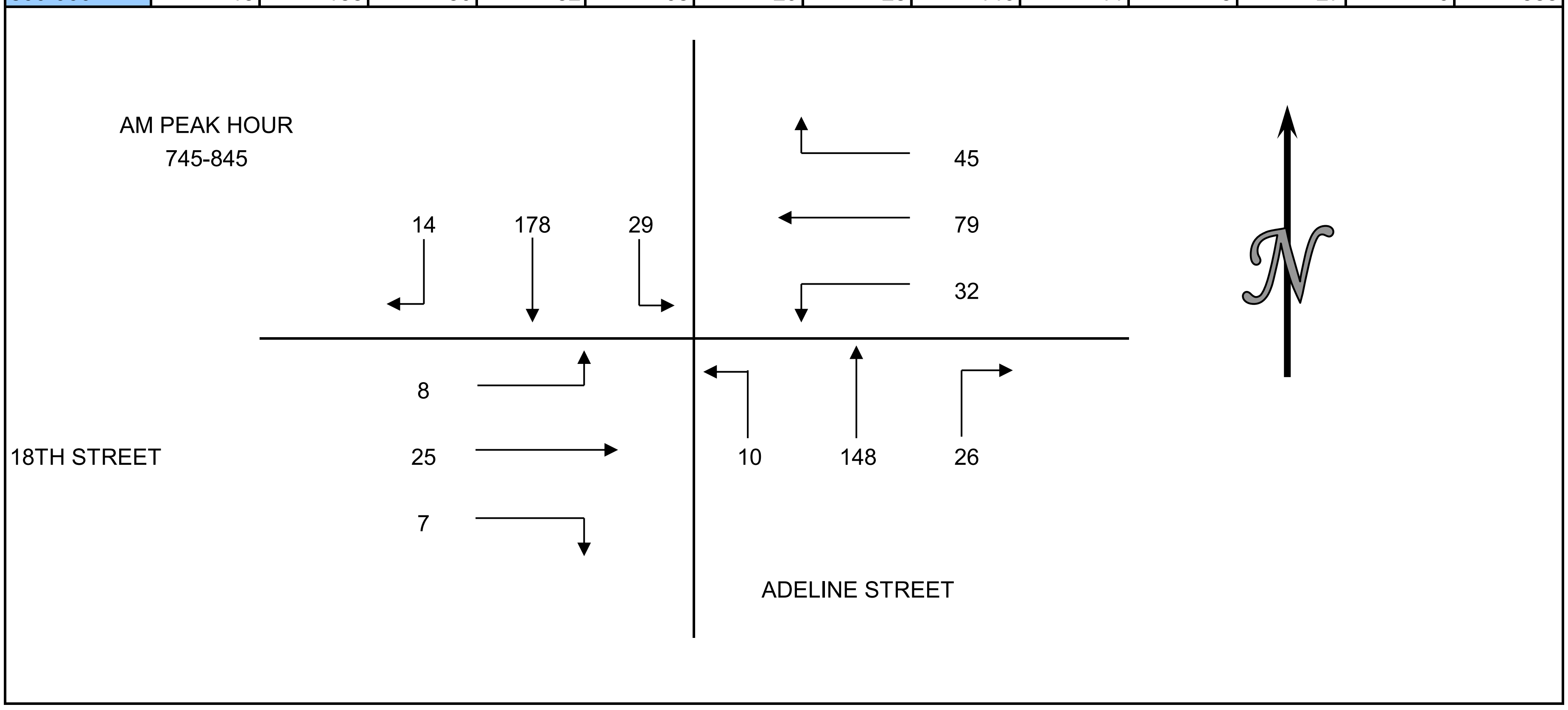
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	0	22	2	14	14	10	3	19	0	0	3	0	87
715-730	3	32	6	7	15	4	4	22	0	0	2	0	95
730-745	3	36	6	8	28	4	2	31	1	0	1	0	120
745-800	3	34	5	17	24	10	8	27	0	2	4	2	136
800-815	2	36	7	9	26	9	11	34	2	2	8	1	147
815-830	4	51	7	9	16	7	3	50	4	1	7	4	163
830-845	5	57	10	10	13	6	4	37	4	2	6	1	155
845-900	4	44	6	4	13	7	10	25	1	0	6	0	120

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	9	124	19	46	81	28	17	99	1	2	10	2	438
715-815	11	138	24	41	93	27	25	114	3	4	15	3	498
730-830	12	157	25	43	94	30	24	142	7	5	20	7	566
745-845	14	178	29	45	79	32	26	148	10	7	25	8	601
800-900	15	188	30	32	68	29	28	146	11	5	27	6	585



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT:		KITTLESON AND ASSOCIATES
PROJECT:		WEST OAKLAND SPECIFIC PLAN
DATE:		THURSDAY NOVEMBER 15, 2012
PERIOD:		4:00 PM TO 6:00 PM
INTERSECTION:	N/S	ADELINE STREET
	E/W	18TH STREET
CITY:		OAKLAND

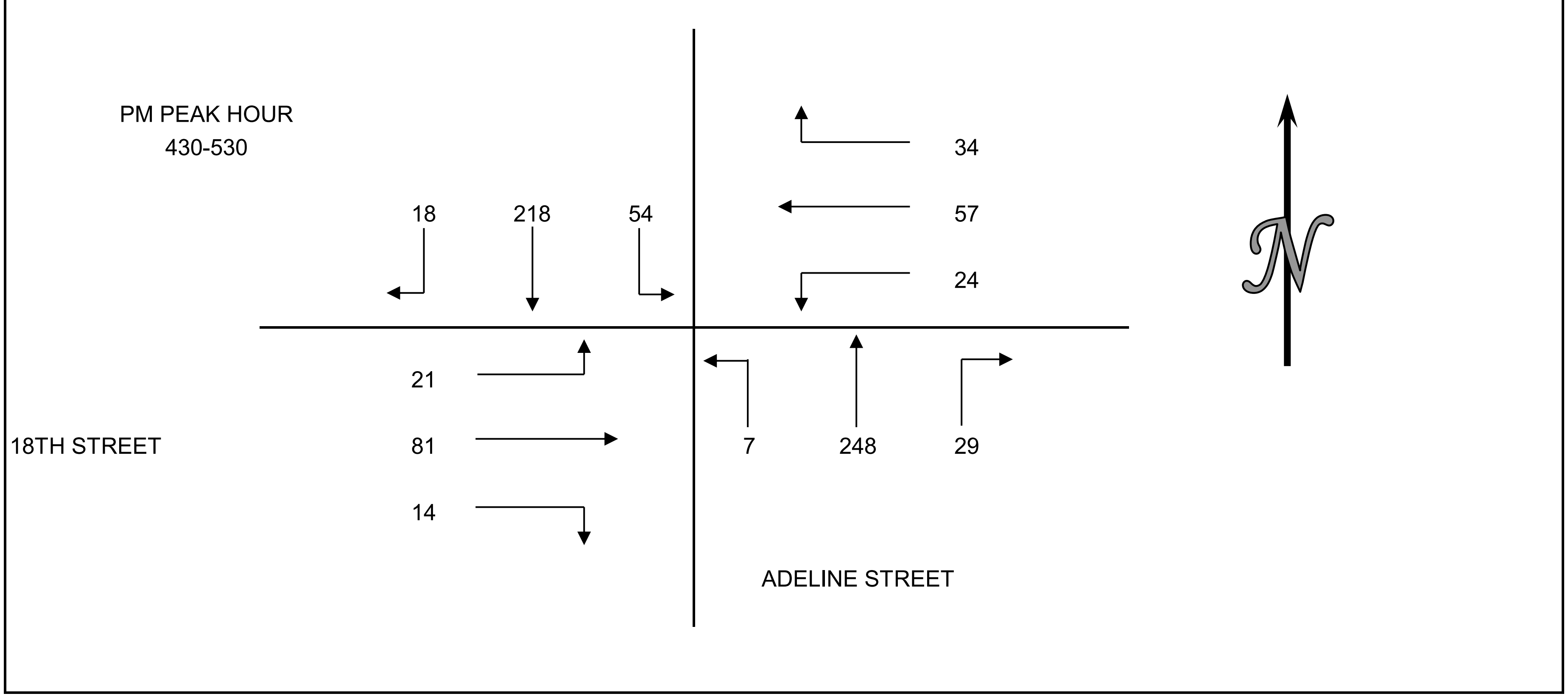
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	1	53	13	9	14	9	4	39	5	3	15	1	166
415-430	5	49	15	7	13	4	8	41	1	3	27	2	175
430-445	6	55	15	4	16	8	5	60	3	2	20	7	201
445-500	3	49	12	13	9	8	11	51	1	3	26	4	190
500-515	4	60	14	7	19	3	5	76	2	2	12	6	210
515-530	5	54	13	10	13	5	8	61	1	7	23	4	204
530-545	2	60	9	8	22	5	6	58	3	2	15	2	192
545-600	3	54	8	9	14	4	5	38	3	2	14	3	157

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	15	206	55	33	52	29	28	191	10	11	88	14	732
415-515	18	213	56	31	57	23	29	228	7	10	85	19	776
430-530	18	218	54	34	57	24	29	248	7	14	81	21	805
445-545	14	223	48	38	63	21	30	246	7	14	76	16	796
500-600	14	228	44	34	68	17	24	233	9	13	64	15	763



WILTEC
Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 7:00 AM TO 9:00 AM
INTERSECTION: N/S MARKET STREET
E/W 18TH STREET
CITY: OAKLAND

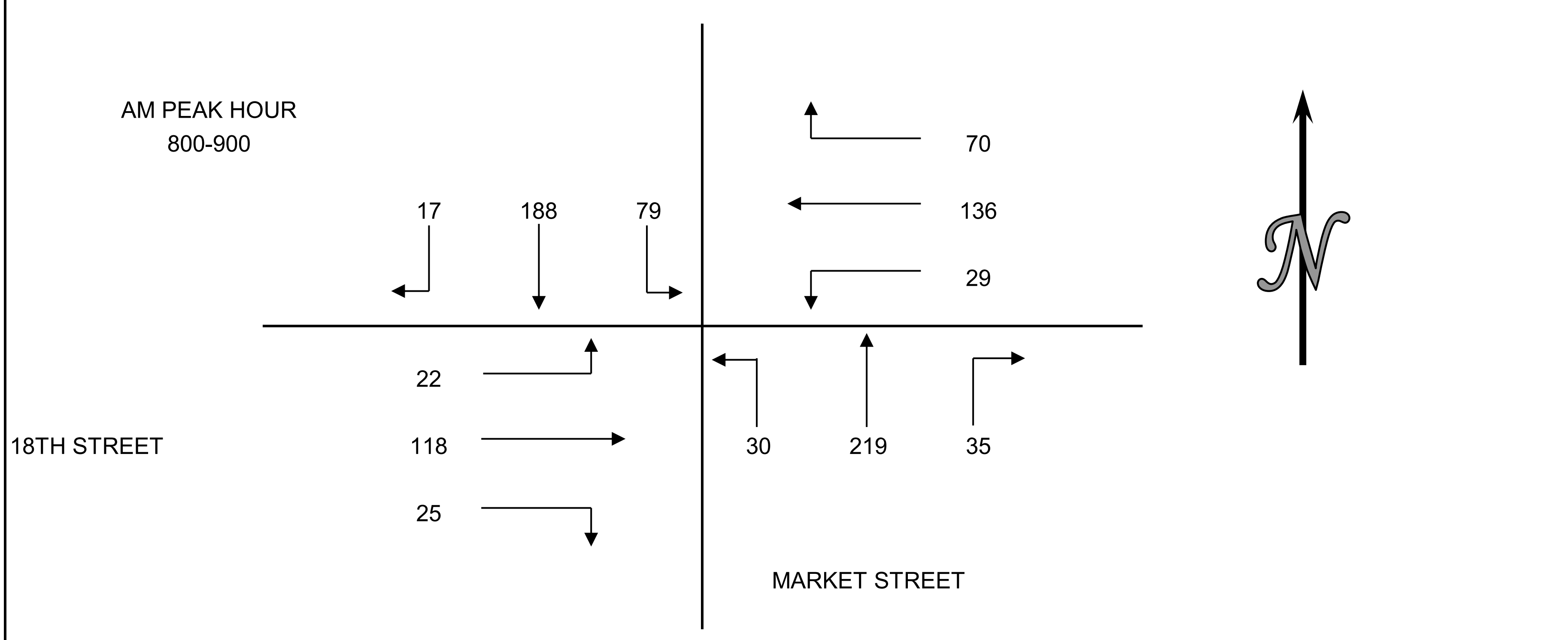
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	3	29	6	16	32	2	5	29	4	1	10	2	139
715-730	4	33	8	19	29	4	2	43	4	3	24	5	178
730-745	2	37	11	9	43	2	3	32	3	1	21	2	166
745-800	3	31	17	11	40	7	3	34	2	7	26	9	190
800-815	6	46	20	19	43	4	5	49	5	7	22	10	236
815-830	2	63	24	17	33	9	8	67	9	10	30	4	276
830-845	5	45	23	20	34	7	17	64	8	0	32	4	259
845-900	4	34	12	14	26	9	5	39	8	8	34	4	197

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	12	130	42	55	144	15	13	138	13	12	81	18	673
715-815	15	147	56	58	155	17	13	158	14	18	93	26	770
730-830	13	177	72	56	159	22	19	182	19	25	99	25	868
745-845	16	185	84	67	150	27	33	214	24	24	110	27	961
800-900	17	188	79	70	136	29	35	219	30	25	118	22	968



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT:		KITTLESON AND ASSOCIATES
PROJECT:		WEST OAKLAND SPECIFIC PLAN
DATE:		THURSDAY NOVEMBER 15, 2012
PERIOD:		4:00 PM TO 6:00 PM
INTERSECTION:	N/S	MARKET STREET
	E/W	18TH STREET
CITY:		OAKLAND

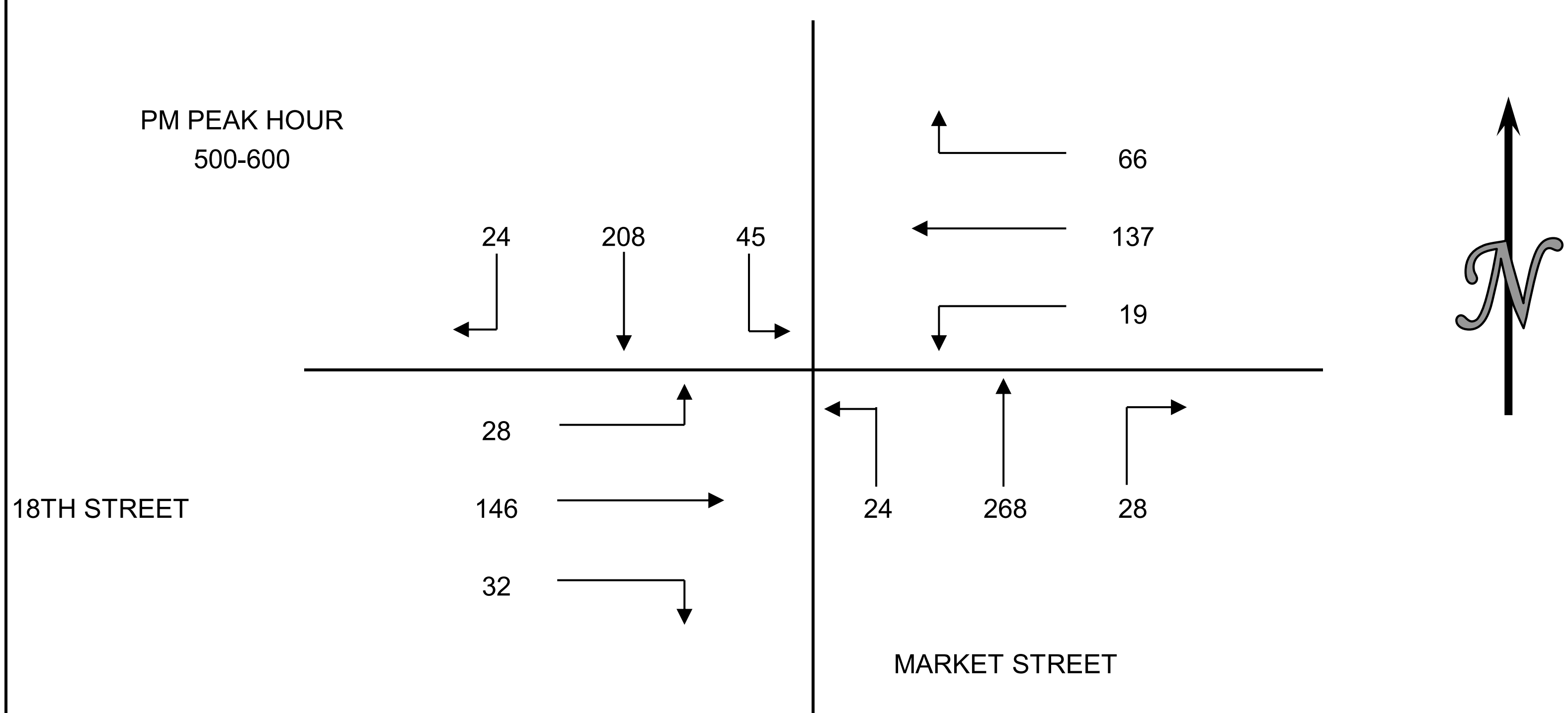
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	11	43	14	13	24	7	6	60	3	5	27	6	219
415-430	8	49	7	8	24	2	6	41	5	6	25	6	187
430-445	6	46	19	13	27	1	8	49	2	1	33	5	210
445-500	4	38	21	18	39	2	13	60	4	5	33	4	241
500-515	4	44	16	23	32	4	8	63	11	13	41	9	268
515-530	7	55	10	12	35	3	9	63	2	3	37	3	239
530-545	9	48	9	12	44	7	7	73	5	6	33	6	259
545-600	4	61	10	19	26	5	4	69	6	10	35	10	259

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	29	176	61	52	114	12	33	210	14	17	118	21	857
415-515	22	177	63	62	122	9	35	213	22	25	132	24	906
430-530	21	183	66	66	133	10	38	235	19	22	144	21	958
445-545	24	185	56	65	150	16	37	259	22	27	144	22	1007
500-600	24	208	45	66	137	19	28	268	24	32	146	28	1025



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 7:00 AM TO 9:00 AM
INTERSECTION: N/S ADELINE STREET
E/W 14TH STREET
CITY: OAKLAND

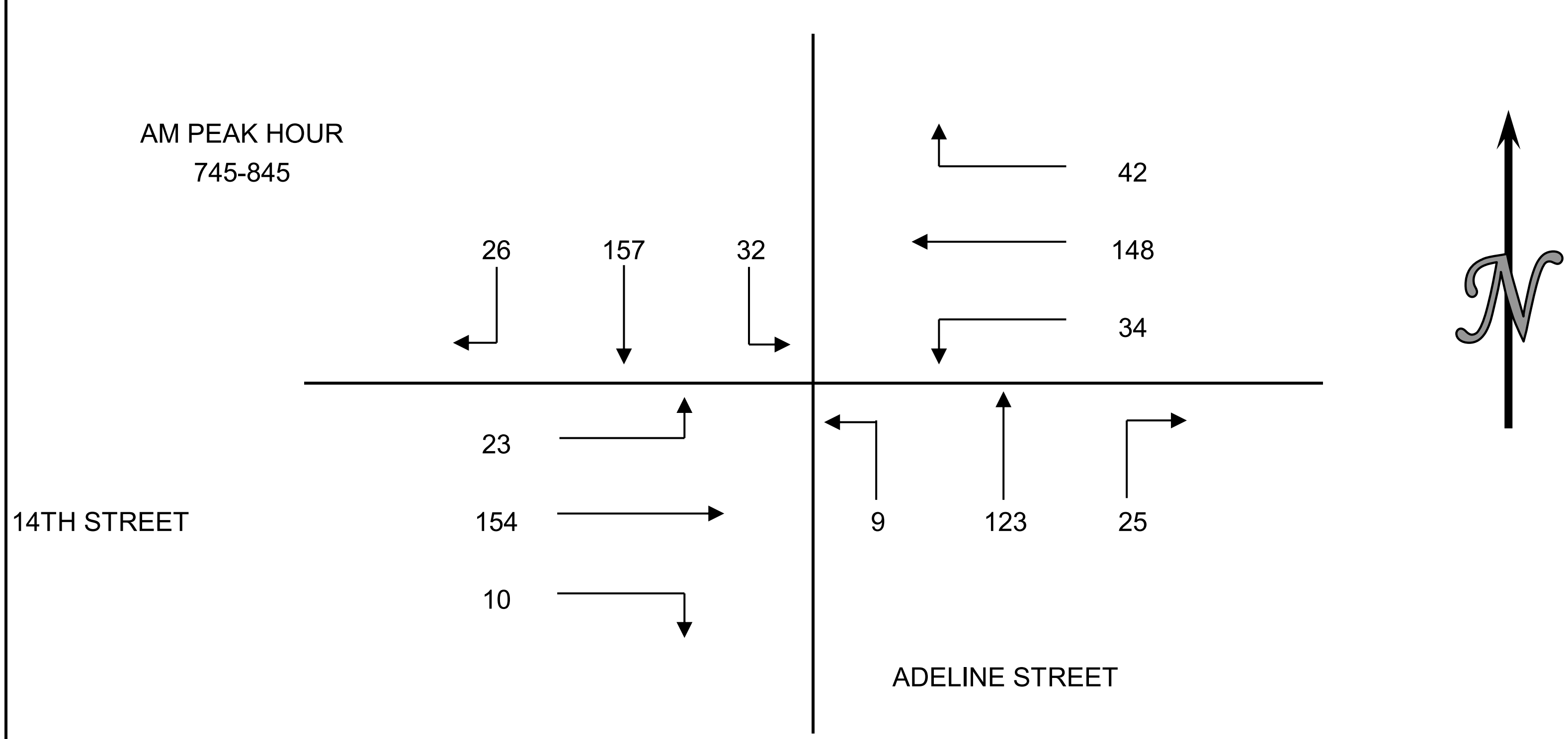
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	4	16	16	4	17	28	14	15	3	3	37	1	158
715-730	2	22	18	11	31	38	15	15	2	2	34	7	197
730-745	7	32	3	7	35	8	16	14	5	2	36	8	173
745-800	3	36	9	9	28	4	8	29	2	3	46	4	181
800-815	6	35	3	7	34	13	5	24	2	1	41	6	177
815-830	10	49	10	17	52	6	4	42	1	4	28	9	232
830-845	7	37	10	9	34	11	8	28	4	2	39	4	193
845-900	5	37	4	9	34	9	9	20	3	1	24	6	161

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	16	106	46	31	111	78	53	73	12	10	153	20	709
715-815	18	125	33	34	128	63	44	82	11	8	157	25	728
730-830	26	152	25	40	149	31	33	109	10	10	151	27	763
745-845	26	157	32	42	148	34	25	123	9	10	154	23	783
800-900	28	158	27	42	154	39	26	114	10	8	132	25	763



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S ADELINE STREET
E/W 14TH STREET
CITY: OAKLAND

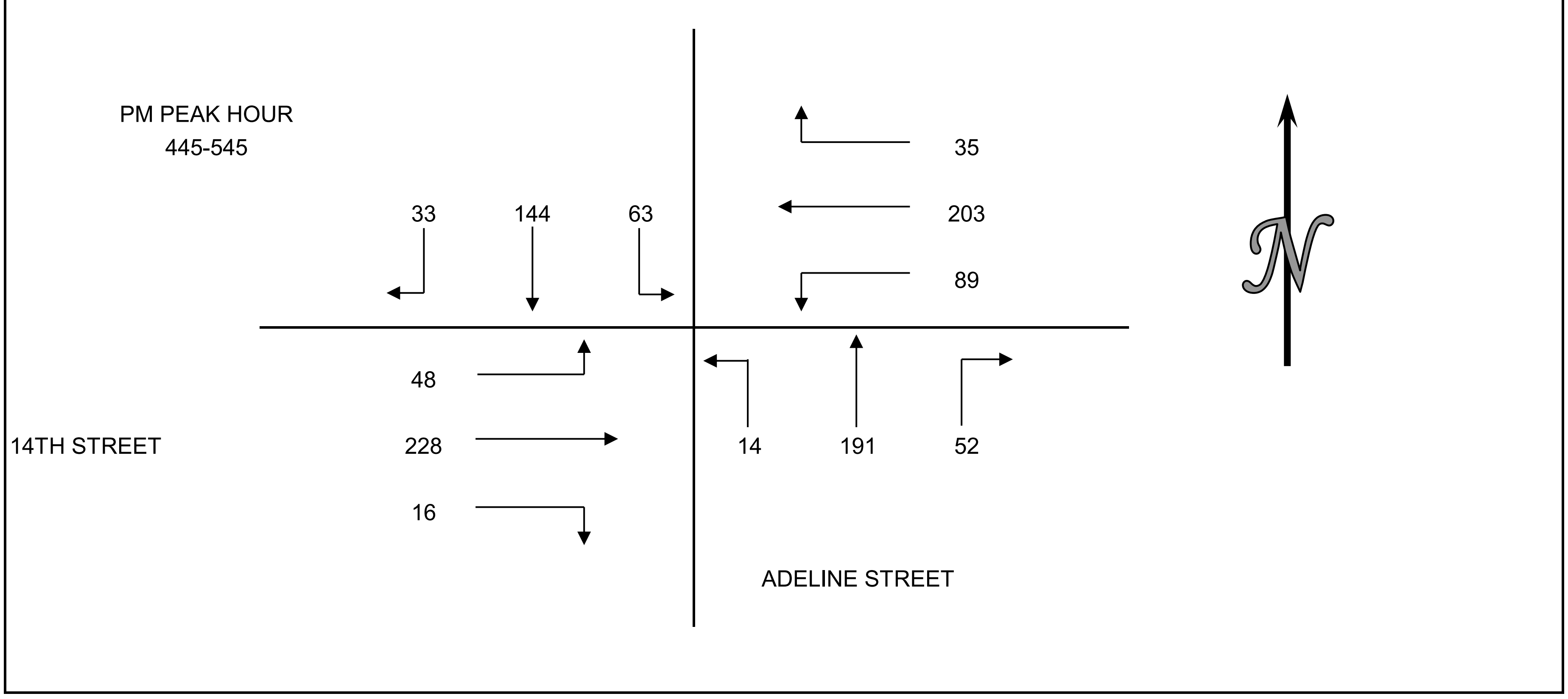
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	8	48	7	5	42	17	9	36	0	3	56	6	237
415-430	7	46	10	10	41	9	7	40	2	2	38	9	221
430-445	8	36	16	7	32	14	10	47	3	0	32	16	221
445-500	9	32	13	12	42	22	17	41	6	4	48	12	258
500-515	9	36	18	12	72	28	20	52	2	3	62	11	325
515-530	7	38	9	4	43	26	9	49	2	7	47	12	253
530-545	8	38	23	7	46	13	6	49	4	2	71	13	280
545-600	4	37	17	10	43	18	13	28	0	0	39	13	222

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	32	162	46	34	157	62	43	164	11	9	174	43	937
415-515	33	150	57	41	187	73	54	180	13	9	180	48	1025
430-530	33	142	56	35	189	90	56	189	13	14	189	51	1057
445-545	33	144	63	35	203	89	52	191	14	16	228	48	1116
500-600	28	149	67	33	204	85	48	178	8	12	219	49	1080



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 7:00 AM TO 9:00 AM
INTERSECTION: N/S ADELINE STREET
E/W 12TH STREET
CITY: OAKLAND

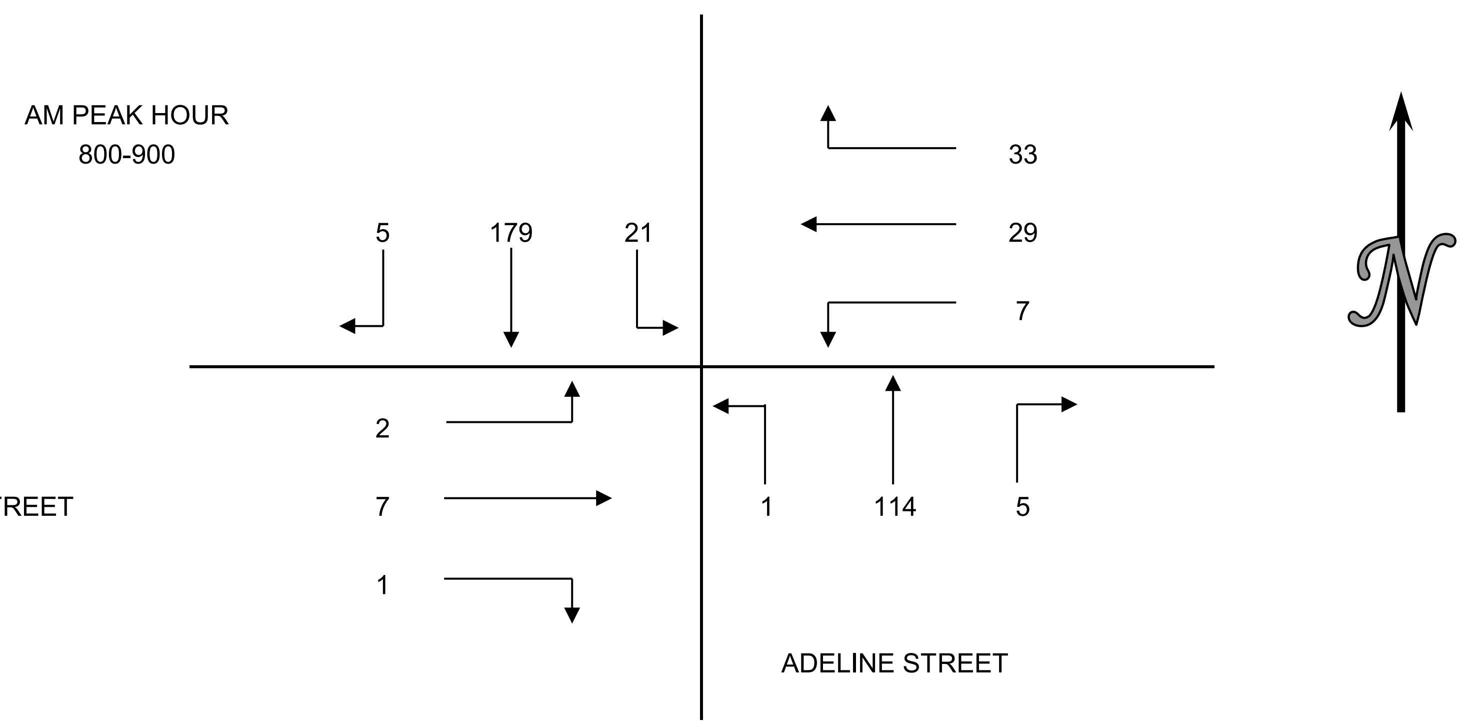
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	1	21	1	11	2	0	0	18	0	0	2	0	56
715-730	0	19	0	15	1	1	0	11	0	0	1	1	49
730-745	0	36	0	13	1	0	2	22	0	0	2	0	76
745-800	1	35	4	5	2	1	0	31	2	1	0	0	82
800-815	0	42	3	3	7	1	1	32	0	0	1	0	90
815-830	2	41	6	9	7	1	2	34	0	1	2	0	105
830-845	2	55	9	13	6	4	0	30	1	0	2	1	123
845-900	1	41	3	8	9	1	2	18	0	0	2	1	86

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	2	111	5	44	6	2	2	82	2	1	5	1	263
715-815	1	132	7	36	11	3	3	96	2	1	4	1	297
730-830	3	154	13	30	17	3	5	119	2	2	5	0	353
745-845	5	173	22	30	22	7	3	127	3	2	5	1	400
800-900	5	179	21	33	29	7	5	114	1	1	7	2	404



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S ADELINE STREET
E/W 12TH STREET
CITY: OAKLAND

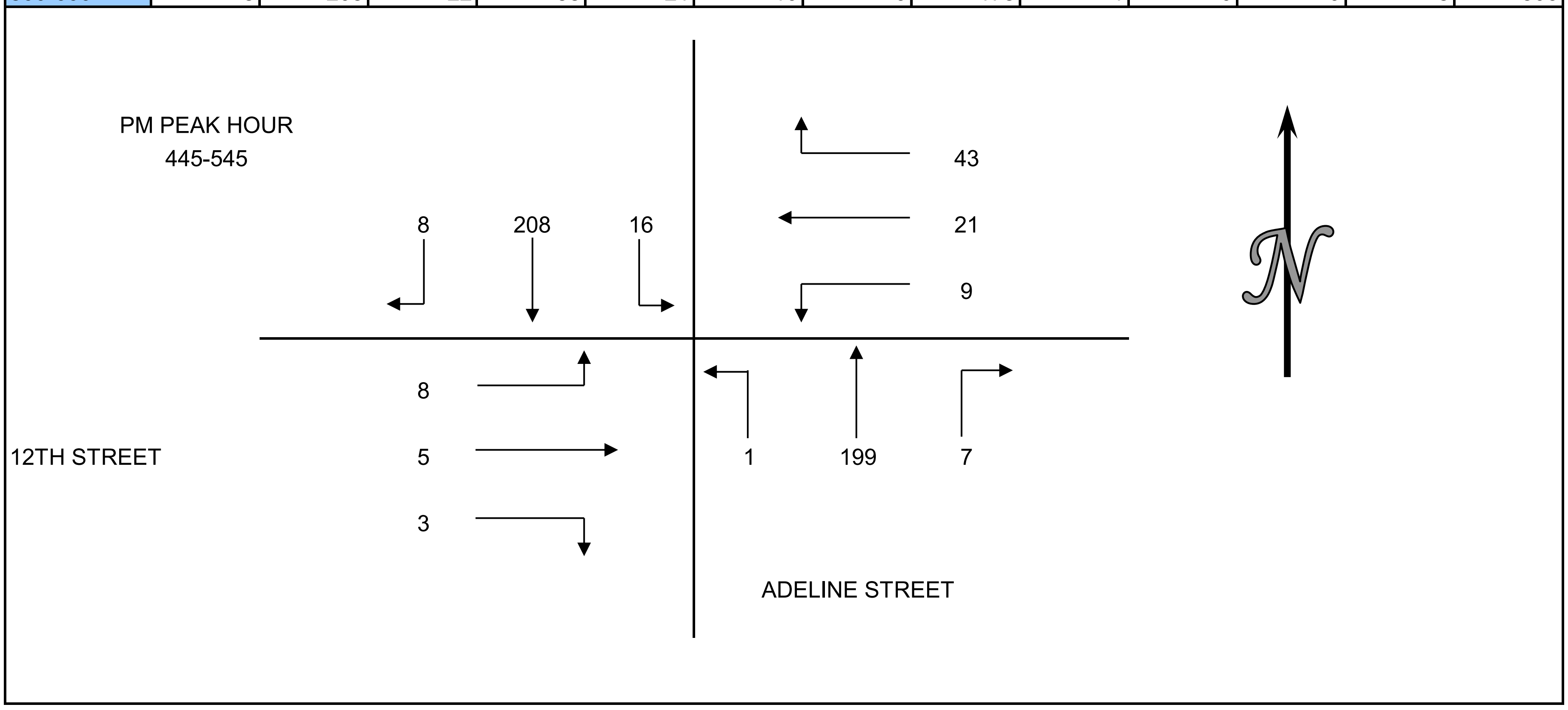
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	3	47	5	5	11	0	2	40	1	0	3	1	118
415-430	1	37	6	7	3	1	1	37	1	0	0	0	94
430-445	2	39	11	11	4	0	1	51	0	0	2	2	123
445-500	2	46	3	12	6	3	1	51	0	3	0	3	130
500-515	2	63	6	12	6	3	2	52	1	0	0	2	149
515-530	1	55	2	7	3	1	2	43	0	0	2	0	116
530-545	3	44	5	12	6	2	2	53	0	0	3	3	133
545-600	2	43	9	7	6	4	0	30	0	0	4	3	108

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	8	169	25	35	24	4	5	179	2	3	5	6	465
415-515	7	185	26	42	19	7	5	191	2	3	2	7	496
430-530	7	203	22	42	19	7	6	197	1	3	4	7	518
445-545	8	208	16	43	21	9	7	199	1	3	5	8	528
500-600	8	205	22	38	21	10	6	178	1	0	9	8	506



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT:		KITTLESON AND ASSOCIATES
PROJECT:		WEST OAKLAND SPECIFIC PLAN
DATE:		THURSDAY NOVEMBER 15, 2012
PERIOD:		7:00 AM TO 9:00 AM
INTERSECTION:	N/S	MANDELA PARKWAY
	E/W	7TH STREET
CITY:		OAKLAND

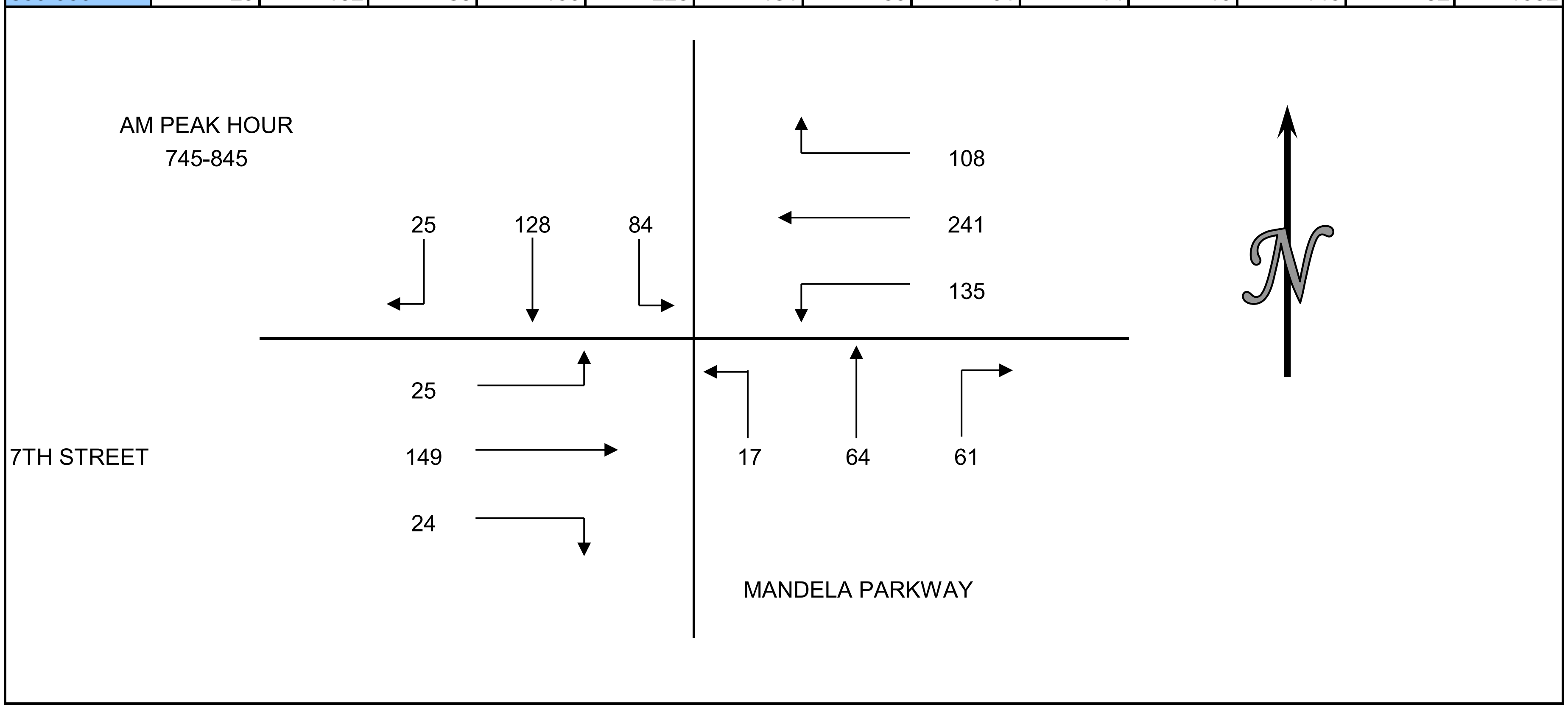
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	8	24	13	10	66	26	12	14	5	6	46	2	232
715-730	5	17	9	5	48	18	11	12	4	2	26	2	159
730-745	7	19	14	17	59	26	8	21	6	7	40	2	226
745-800	2	31	20	21	54	28	13	21	6	7	38	4	245
800-815	6	32	24	35	51	41	10	10	5	7	39	4	264
815-830	7	37	22	30	58	32	16	20	3	5	25	10	265
830-845	10	28	18	22	78	34	22	13	3	5	47	7	287
845-900	6	35	19	13	38	24	12	18	3	2	35	11	216

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	22	91	56	53	227	98	44	68	21	22	150	10	862
715-815	20	99	67	78	212	113	42	64	21	23	143	12	894
730-830	22	119	80	103	222	127	47	72	20	26	142	20	1000
745-845	25	128	84	108	241	135	61	64	17	24	149	25	1061
800-900	29	132	83	100	225	131	60	61	14	19	146	32	1032



WILTEC
Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S MADELA PARKWAY
E/W 7TH STREET
CITY: OAKLAND

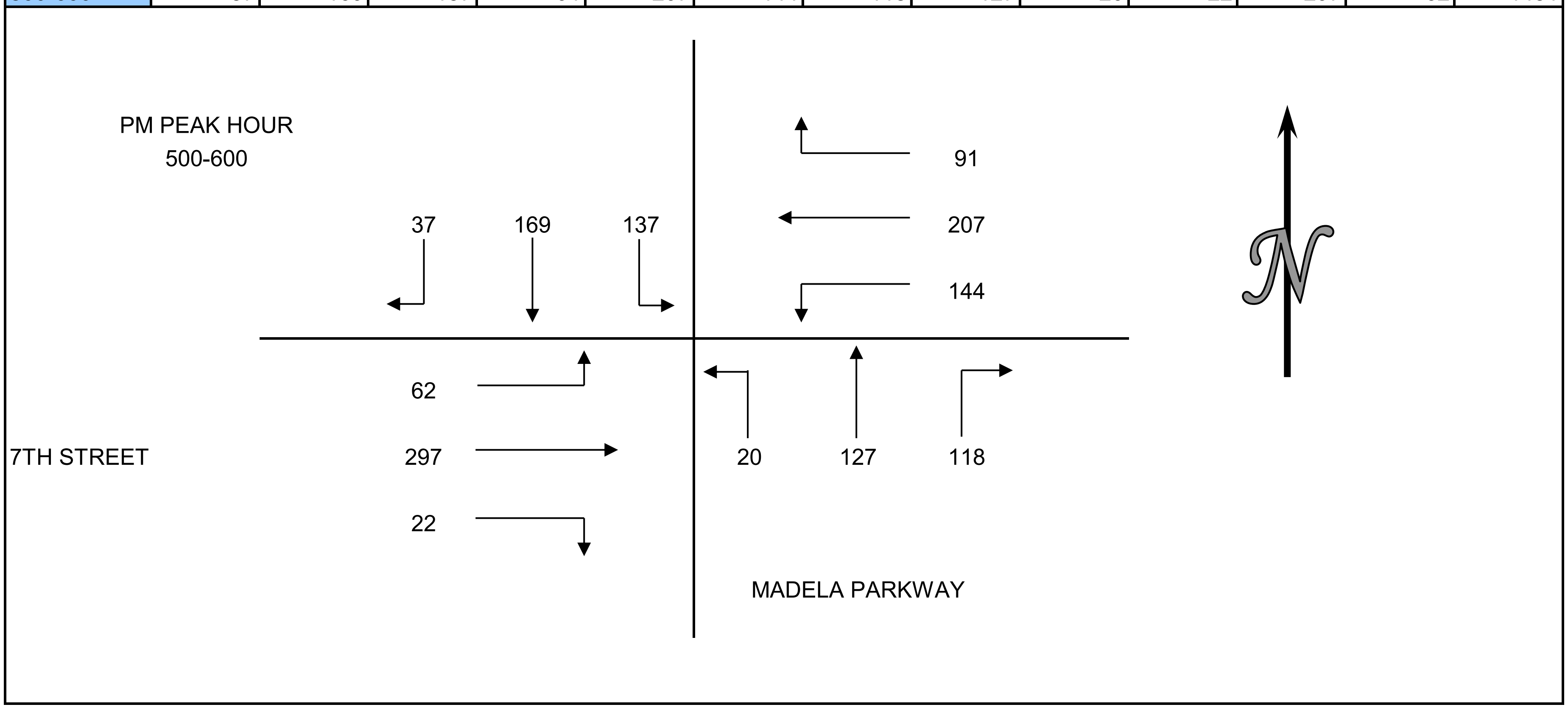
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	12	24	22	23	37	17	20	20	6	4	50	8	243
415-430	7	33	23	13	61	22	26	25	7	9	64	12	302
430-445	11	30	22	22	54	23	23	36	7	7	71	13	319
445-500	7	30	19	18	45	20	16	31	5	2	70	15	278
500-515	13	44	30	30	53	31	29	29	4	4	75	12	354
515-530	6	44	46	24	60	42	37	35	10	8	81	23	416
530-545	9	39	33	19	48	30	24	27	3	5	65	15	317
545-600	9	42	28	18	46	41	28	36	3	5	76	12	344

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	37	117	86	76	197	82	85	112	25	22	255	48	1142
415-515	38	137	94	83	213	96	94	121	23	22	280	52	1253
430-530	37	148	117	94	212	116	105	131	26	21	297	63	1367
445-545	35	157	128	91	206	123	106	122	22	19	291	65	1365
500-600	37	169	137	91	207	144	118	127	20	22	297	62	1431



WI LTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT:		KITTLESON AND ASSOCIATES
PROJECT:		WEST OAKLAND SPECIFIC PLAN
DATE:		THURSDAY NOVEMBER 15, 2012
PERIOD:		7:00 AM TO 9:00 AM
INTERSECTION:	N/S	ADELINE STREET
	E/W	7TH STREET
CITY:		OAKLAND

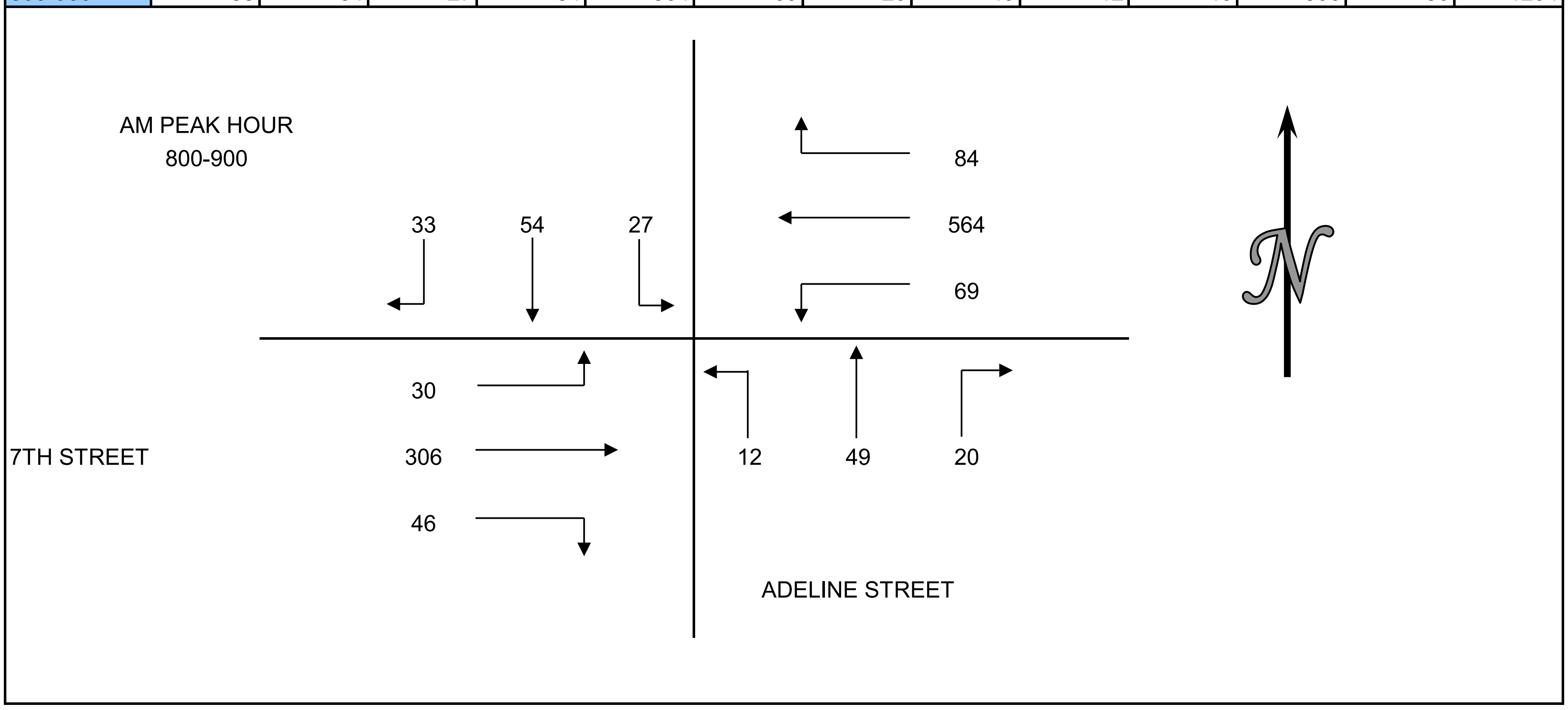
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	3	12	3	8	111	11	5	8	1	13	62	5	242
715-730	8	12	4	11	112	13	2	6	4	14	74	4	264
730-745	7	13	4	15	113	21	0	4	5	14	62	3	261
745-800	6	21	5	13	127	21	0	13	1	21	59	5	292
800-815	5	14	5	27	154	18	3	9	3	12	76	7	333
815-830	14	16	8	22	133	14	4	17	3	6	66	9	312
830-845	4	15	7	22	155	20	6	10	4	15	83	8	349
845-900	10	9	7	13	122	17	7	13	2	13	81	6	300

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	24	58	16	47	463	66	7	31	11	62	257	17	1059
715-815	26	60	18	66	506	73	5	32	13	61	271	19	1150
730-830	32	64	22	77	527	74	7	43	12	53	263	24	1198
745-845	29	66	25	84	569	73	13	49	11	54	284	29	1286
800-900	33	54	27	84	564	69	20	49	12	46	306	30	1294



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S ADELINE STREET
E/W 7TH STREET
CITY: OAKLAND

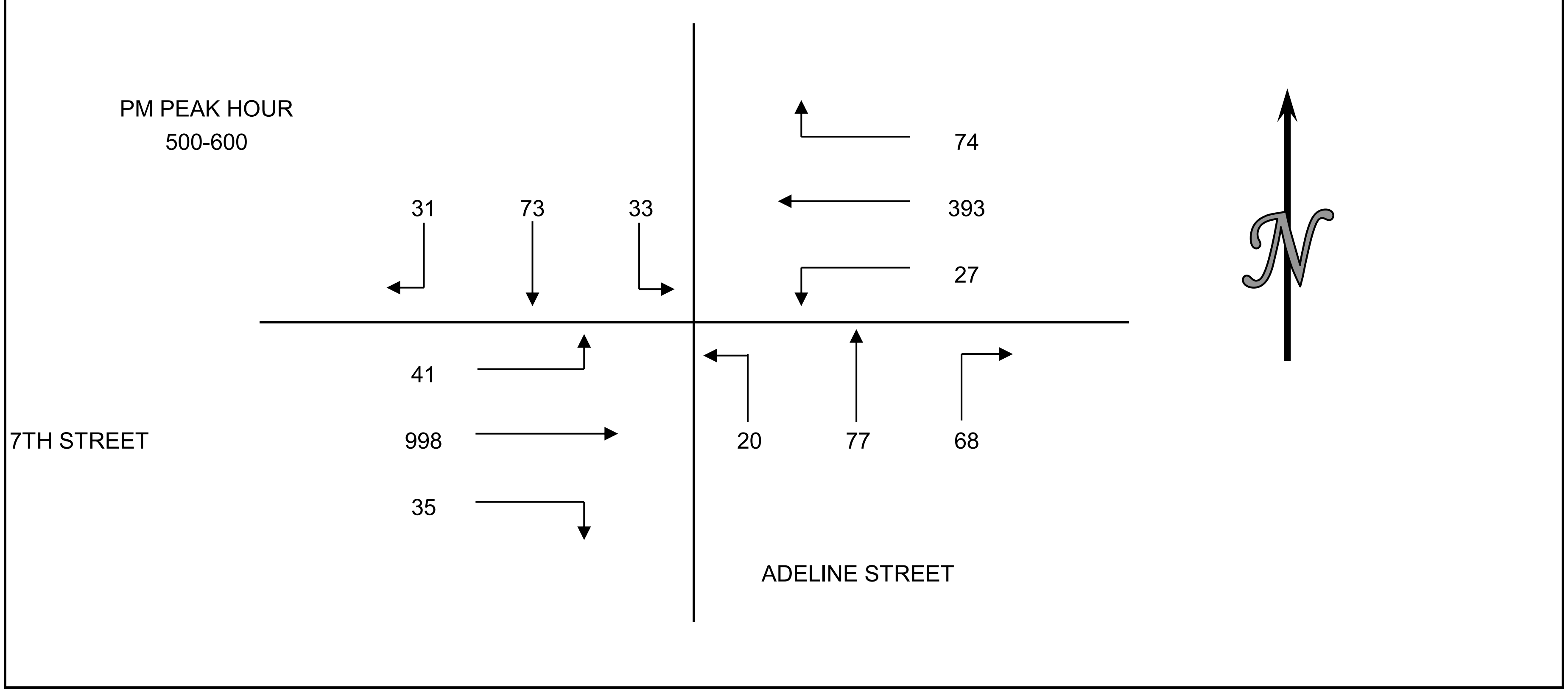
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	5	29	6	12	70	4	8	17	3	9	120	10	293
415-430	8	15	7	16	98	6	10	11	1	8	119	10	309
430-445	18	17	4	12	81	2	15	15	2	14	152	15	347
445-500	2	25	10	6	88	4	13	19	8	18	149	9	351
500-515	7	19	4	31	105	13	18	21	4	10	224	8	464
515-530	9	26	11	18	111	6	24	27	6	7	312	16	573
530-545	7	16	8	19	106	6	12	16	2	11	265	6	474
545-600	8	12	10	6	71	2	14	13	8	7	197	11	359

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	33	86	27	46	337	16	46	62	14	49	540	44	1300
415-515	35	76	25	65	372	25	56	66	15	50	644	42	1471
430-530	36	87	29	67	385	25	70	82	20	49	837	48	1735
445-545	25	86	33	74	410	29	67	83	20	46	950	39	1862
500-600	31	73	33	74	393	27	68	77	20	35	998	41	1870



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 7:00 AM TO 9:00 AM
INTERSECTION: N/S MARKET STREET
E/W 7TH STREET
CITY: OAKLAND

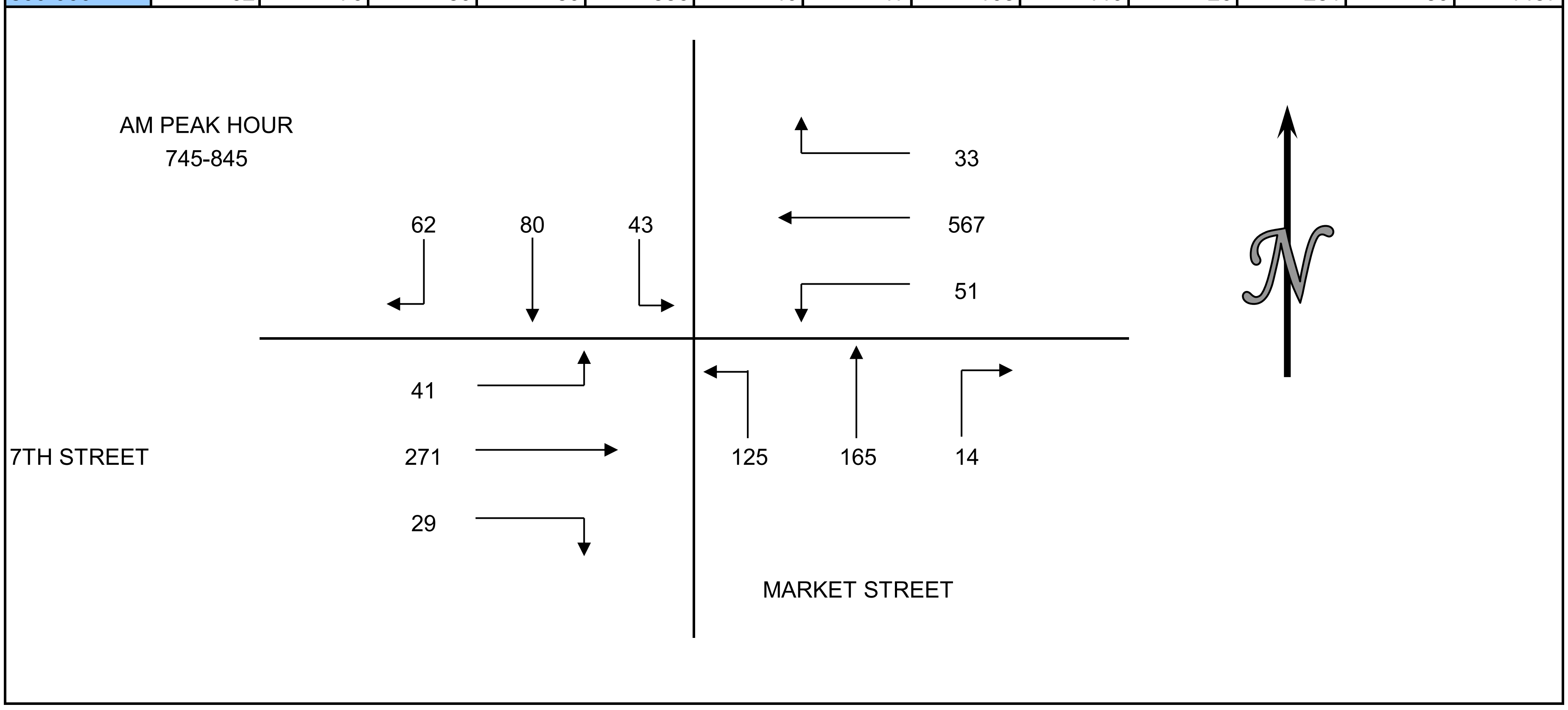
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	2	17	1	2	104	10	1	24	23	3	37	5	229
715-730	5	14	13	1	128	13	4	34	25	6	58	16	317
730-745	23	25	3	1	112	8	0	42	21	8	39	14	296
745-800	14	20	14	3	132	21	2	34	24	10	62	10	346
800-815	8	19	13	11	159	17	6	51	37	6	78	6	411
815-830	18	15	6	8	122	7	4	45	32	6	60	11	334
830-845	22	26	10	11	154	6	2	35	32	7	71	14	390
845-900	14	16	10	9	121	10	5	32	18	7	72	8	322

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	44	76	31	7	476	52	7	134	93	27	196	45	1188
715-815	50	78	43	16	531	59	12	161	107	30	237	46	1370
730-830	63	79	36	23	525	53	12	172	114	30	239	41	1387
745-845	62	80	43	33	567	51	14	165	125	29	271	41	1481
800-900	62	76	39	39	556	40	17	163	119	26	281	39	1457



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S MARKET STREET
E/W 7TH STREET
CITY: OAKLAND

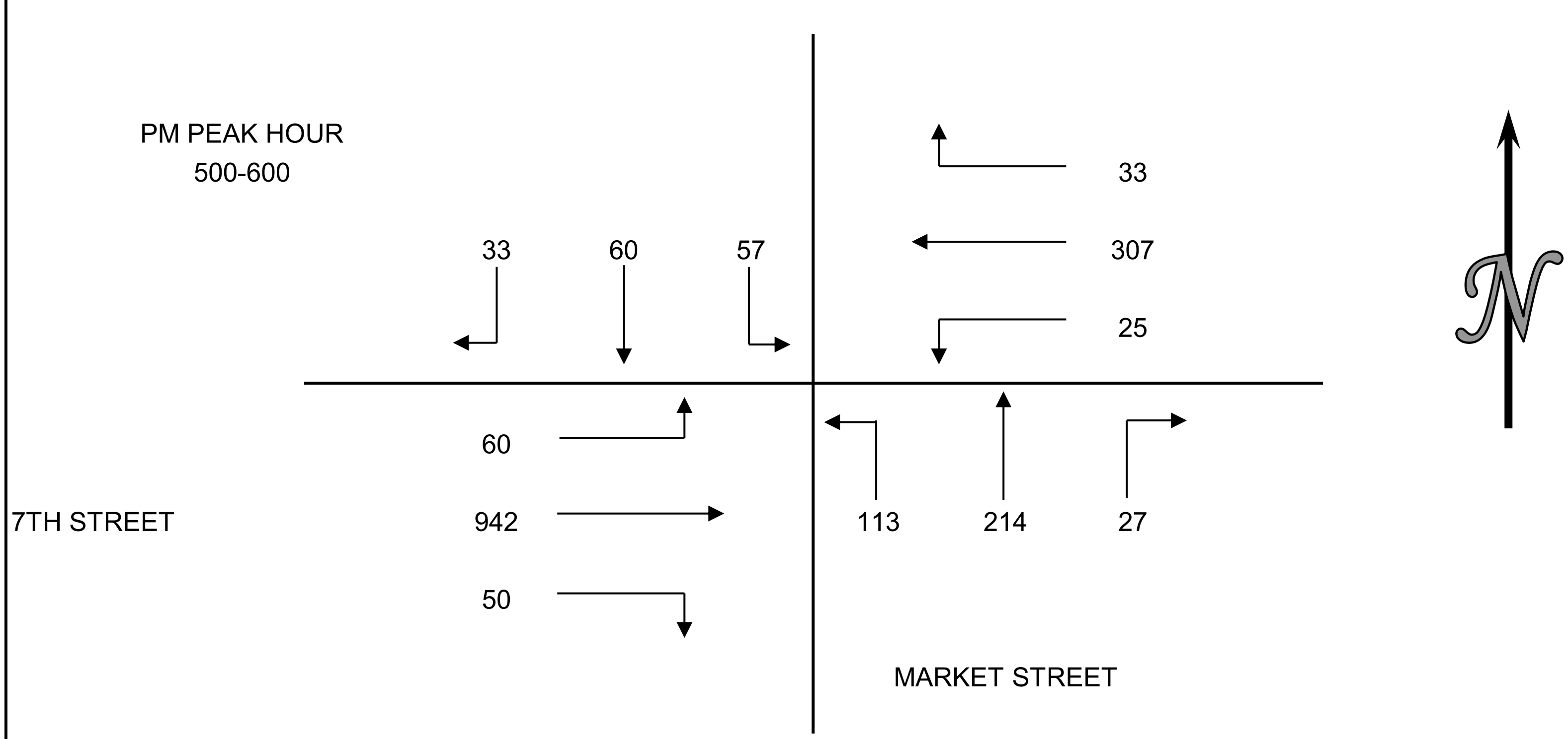
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	15	24	13	7	58	15	10	48	27	12	127	13	369
415-430	4	22	10	5	65	11	6	40	28	13	86	16	306
430-445	11	19	13	10	63	9	7	61	32	11	134	9	379
445-500	13	21	15	6	64	5	5	49	33	12	121	19	363
500-515	16	14	19	13	75	10	10	69	42	14	201	15	498
515-530	2	17	11	8	87	1	9	42	24	12	281	16	510
530-545	8	16	18	7	74	6	5	60	29	11	262	22	518
545-600	7	13	9	5	71	8	3	43	18	13	198	7	395

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	43	86	51	28	250	40	28	198	120	48	468	57	1417
415-515	44	76	57	34	267	35	28	219	135	50	542	59	1546
430-530	42	71	58	37	289	25	31	221	131	49	737	59	1750
445-545	39	68	63	34	300	22	29	220	128	49	865	72	1889
500-600	33	60	57	33	307	25	27	214	113	50	942	60	1921



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 7:00 AM TO 9:00 AM
INTERSECTION: N/S MARKET STREET
E/W 5TH STREET / I-880 OFF-RAMP
CITY: OAKLAND

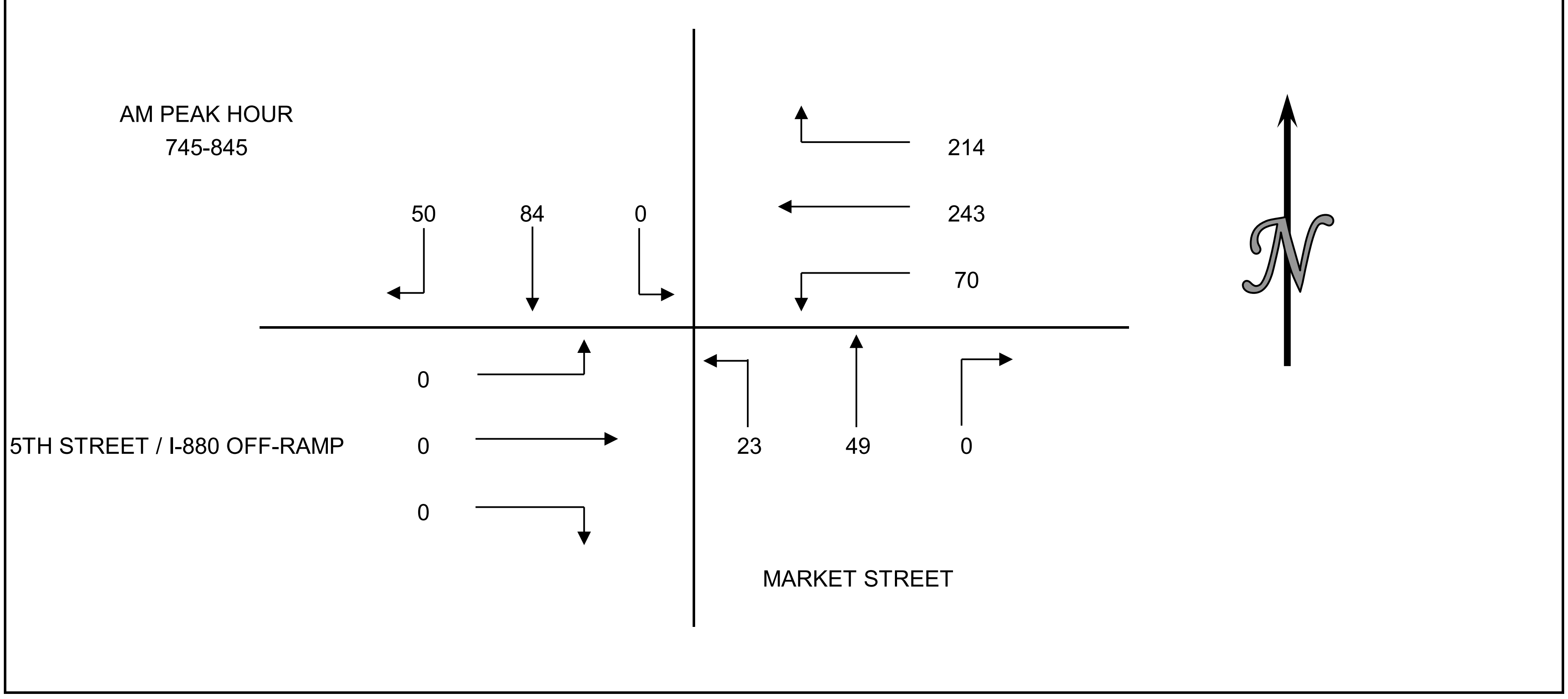
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	8	4	0	34	62	15	0	7	5	0	0	0	135
715-730	10	16	0	41	59	16	0	8	14	0	0	0	164
730-745	6	15	0	41	47	18	0	6	5	0	0	0	138
745-800	19	27	0	49	61	23	0	10	6	0	0	0	195
800-815	15	19	0	65	64	21	0	17	4	0	0	0	205
815-830	4	22	0	63	64	14	0	14	5	0	0	0	186
830-845	12	16	0	37	54	12	0	8	8	0	0	0	147
845-900	14	19	0	27	38	13	0	11	1	0	0	0	123

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	43	62	0	165	229	72	0	31	30	0	0	0	632
715-815	50	77	0	196	231	78	0	41	29	0	0	0	702
730-830	44	83	0	218	236	76	0	47	20	0	0	0	724
745-845	50	84	0	214	243	70	0	49	23	0	0	0	733
800-900	45	76	0	192	220	60	0	50	18	0	0	0	661



WI LTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 7:00 AM TO 9:00 AM
INTERSECTION: N/S MARKET STREET
E/W 5TH STREET (I-880 OFF-RAMP FRONTAGE ROAD)
CITY: OAKLAND

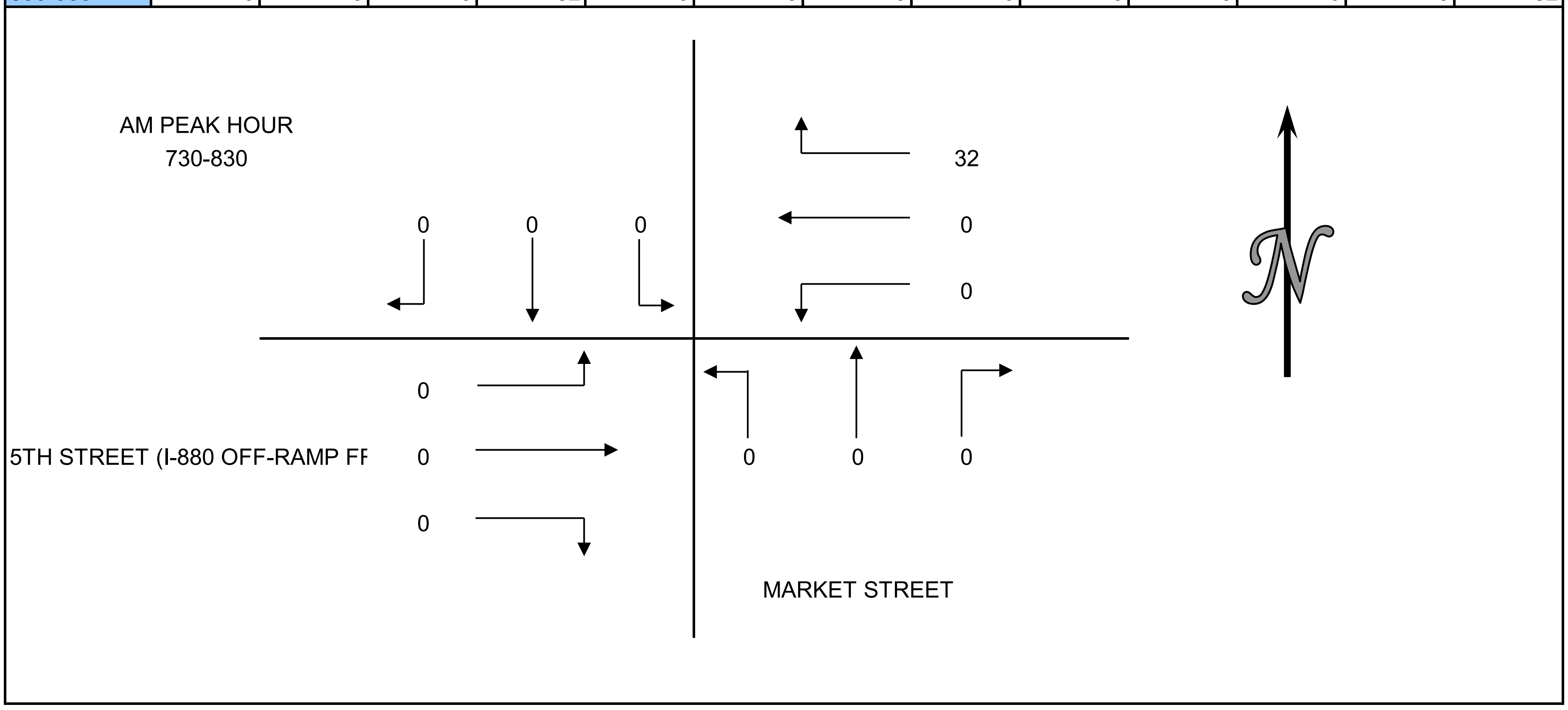
VEHICLE COUNTS

15 MIN COUNTS

	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	5	0	0	0	0	0	0	0	0	5
715-730	0	0	0	3	0	0	0	0	0	0	0	0	3
730-745	0	0	0	5	0	0	0	0	0	0	0	0	5
745-800	0	0	0	6	0	0	0	0	0	0	0	0	6
800-815	0	0	0	9	0	0	0	0	0	0	0	0	9
815-830	0	0	0	12	0	0	0	0	0	0	0	0	12
830-845	0	0	0	5	0	0	0	0	0	0	0	0	5
845-900	0	0	0	6	0	0	0	0	0	0	0	0	6

HOUR TOTALS

	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	19	0	0	0	0	0	0	0	0	19
715-815	0	0	0	23	0	0	0	0	0	0	0	0	23
730-830	0	0	0	32	0	0	0	0	0	0	0	0	32
745-845	0	0	0	32	0	0	0	0	0	0	0	0	32
800-900	0	0	0	32	0	0	0	0	0	0	0	0	32



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: TUESDAY NOVEMBER 28, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S MARKET STREET / I-880 OFF-RAMP
E/W 5TH STREET
CITY: OAKLAND

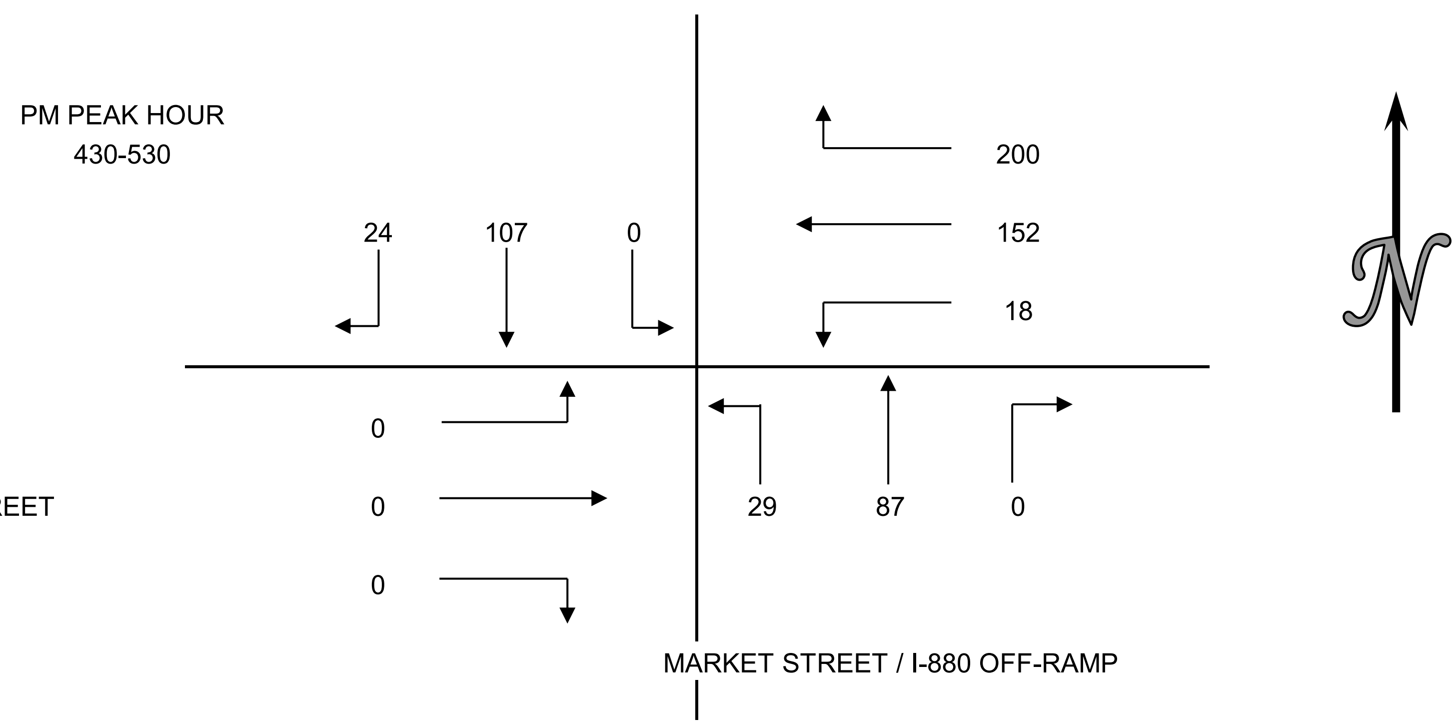
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	8	25	0	21	22	11	0	16	11	0	0	0	114
415-430	6	29	0	34	27	7	0	23	3	0	0	0	129
430-445	6	25	0	53	47	7	0	22	6	0	0	0	166
445-500	7	33	0	46	34	6	0	25	8	0	0	0	159
500-515	5	19	0	45	22	4	0	19	8	0	0	0	122
515-530	6	30	0	56	49	1	0	21	7	0	0	0	170
530-545	2	24	0	44	30	8	0	24	5	0	0	0	137
545-600	5	26	0	32	30	3	0	12	1	0	0	0	109

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	27	112	0	154	130	31	0	86	28	0	0	0	568
415-515	24	106	0	178	130	24	0	89	25	0	0	0	576
430-530	24	107	0	200	152	18	0	87	29	0	0	0	617
445-545	20	106	0	191	135	19	0	89	28	0	0	0	588
500-600	18	99	0	177	131	16	0	76	21	0	0	0	538



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: TUESDAY NOVEMBER 28, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S MARKET STREET / I-880 OFF-RAMP
E/W 5TH STREET
CITY: OAKLAND

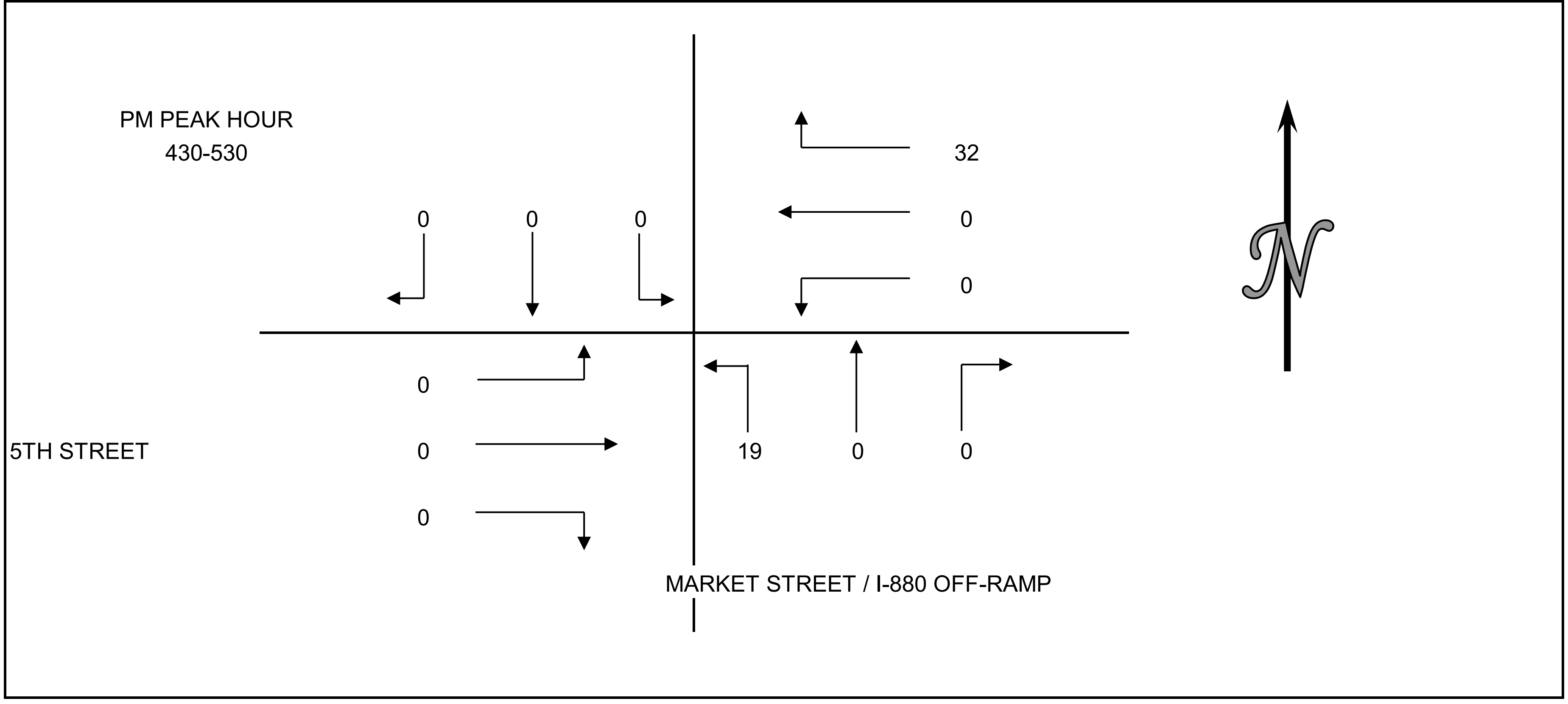
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9U NBUT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	0	0	0	3	0	0	0	0	2	0	0	0	5
415-430	0	0	0	2	0	0	0	0	5	0	0	0	7
430-445	0	0	0	6	0	0	0	0	7	0	0	0	13
445-500	0	0	0	9	0	0	0	0	7	0	0	0	16
500-515	0	0	0	6	0	0	0	0	3	0	0	0	9
515-530	0	0	0	11	0	0	0	0	2	0	0	0	13
530-545	0	0	0	12	0	0	0	0	1	0	0	0	13
545-600	0	0	0	8	0	0	0	0	0	0	0	0	8

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9U NBUT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	0	0	0	20	0	0	0	0	21	0	0	0	41
415-515	0	0	0	23	0	0	0	0	22	0	0	0	45
430-530	0	0	0	32	0	0	0	0	19	0	0	0	51
445-545	0	0	0	38	0	0	0	0	13	0	0	0	51
500-600	0	0	0	37	0	0	0	0	6	0	0	0	43



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT:		KITTLESON AND ASSOCIATES
PROJECT:		WEST OAKLAND SPECIFIC PLAN
DATE:		THURSDAY NOVEMBER 15, 2012
PERIOD:		7:00 AM TO 9:00 AM
INTERSECTION:	N/S	ADELINE STREET
	E/W	5TH STREET
CITY:		OAKLAND

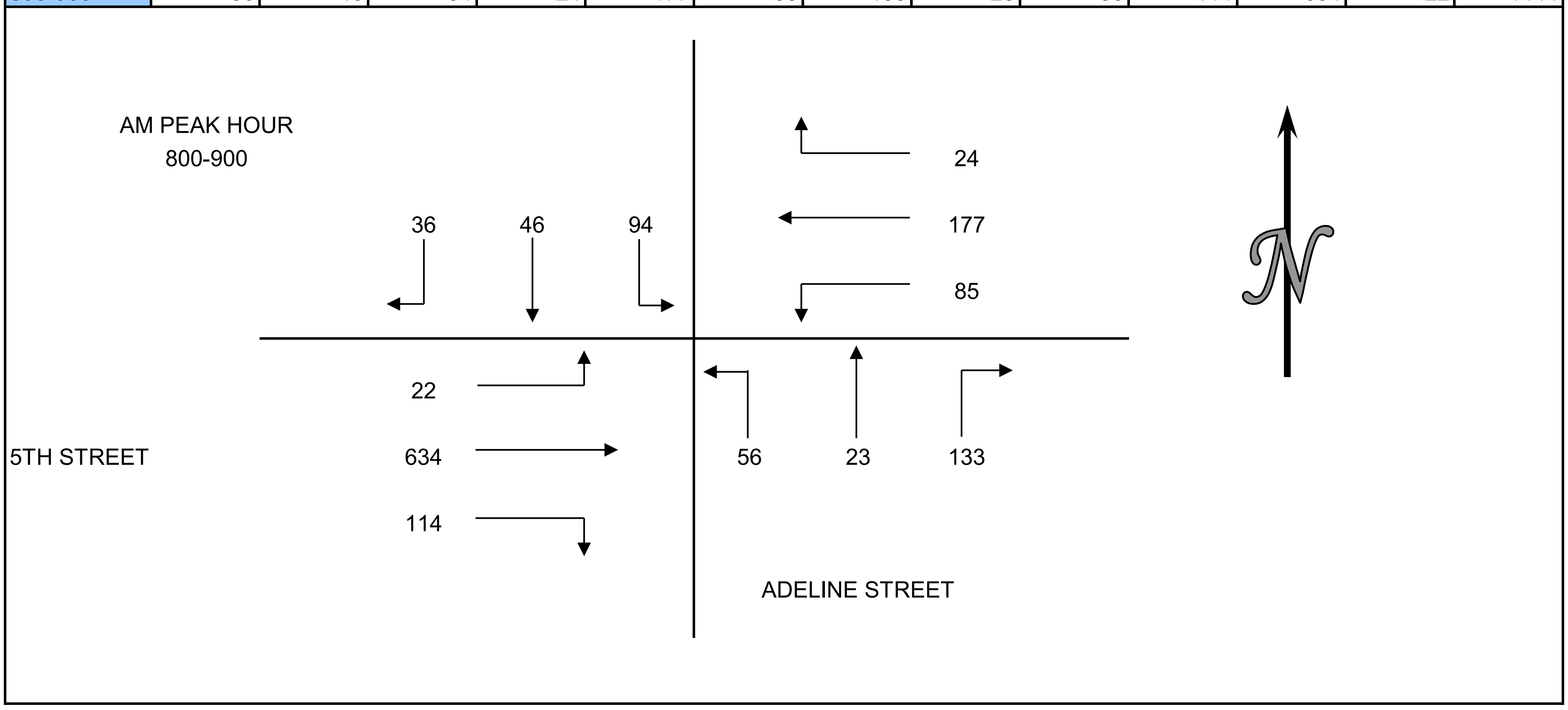
VEHICLE COUNTS

15 MIN COUNTS

	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	24	12	9	29	27	11	3	13	35	94	4	261
715-730	5	9	14	7	25	40	7	1	19	31	137	2	297
730-745	10	21	21	3	38	26	13	5	11	27	139	4	318
745-800	2	22	34	5	43	35	18	2	11	17	117	4	310
800-815	9	13	21	4	49	21	25	4	14	25	155	1	341
815-830	11	12	24	8	40	25	36	6	11	24	160	3	360
830-845	10	13	22	7	48	25	30	5	16	34	148	7	365
845-900	6	8	27	5	40	14	42	8	15	31	171	11	378

HOUR TOTALS

	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	17	76	81	24	135	128	49	11	54	110	487	14	1186
715-815	26	65	90	19	155	122	63	12	55	100	548	11	1266
730-830	32	68	100	20	170	107	92	17	47	93	571	12	1329
745-845	32	60	101	24	180	106	109	17	52	100	580	15	1376
800-900	36	46	94	24	177	85	133	23	56	114	634	22	1444



WILTEC
Phone: (925) 706-9911 Fax: (925) 706-9914 info@wiltecusa.com

INTERSECTION TURNING MOVEMENT COUNT SUMMARY - VEHICLES

CLIENT: KITTLESON AND ASSOCIATES
PROJECT: WEST OAKLAND SPECIFIC PLAN
DATE: THURSDAY NOVEMBER 15, 2012
PERIOD: 4:00 PM TO 6:00 PM
INTERSECTION: N/S ADELINE STREET
E/W 5TH STREET
CITY: OAKLAND

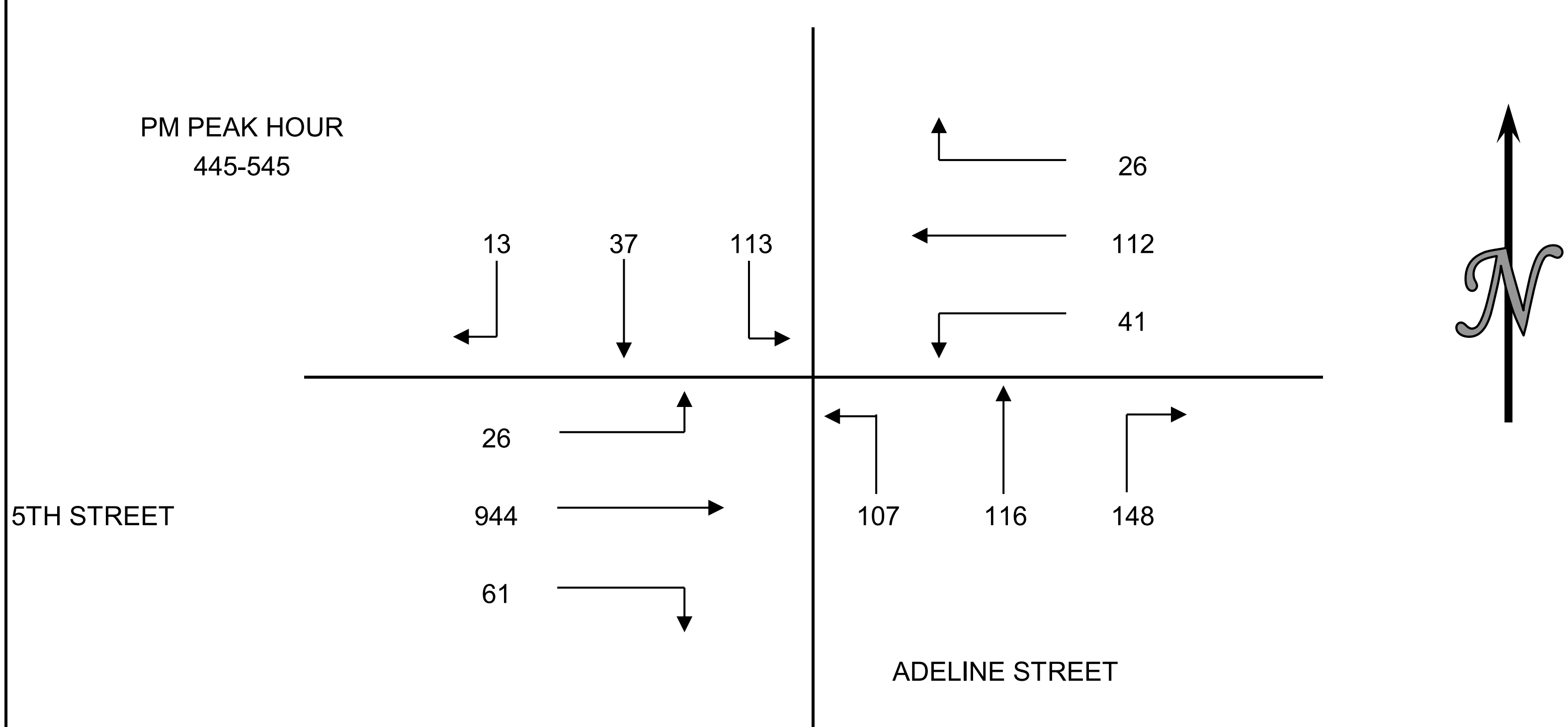
VEHICLE COUNTS

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-415	2	10	40	8	35	15	58	16	19	23	168	3	397
415-430	3	11	27	5	31	10	66	14	25	17	181	2	392
430-445	5	6	27	8	23	14	63	23	30	13	179	5	396
445-500	2	11	35	6	27	10	58	28	22	13	183	3	398
500-515	6	11	26	5	24	19	39	37	38	13	204	6	428
515-530	4	8	22	6	33	7	32	31	27	14	268	10	462
530-545	1	7	30	9	28	5	19	20	20	21	289	7	456
545-600	1	6	16	7	36	8	15	12	8	23	249	9	390

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
400-500	12	38	129	27	116	49	245	81	96	66	711	13	1583
415-515	16	39	115	24	105	53	226	102	115	56	747	16	1614
430-530	17	36	110	25	107	50	192	119	117	53	834	24	1684
445-545	13	37	113	26	112	41	148	116	107	61	944	26	1744
500-600	12	32	94	27	121	39	105	100	93	71	1010	32	1736



Appendix B: Intersection Level of Service Worksheets

Existing AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	623	95	161	577	79	100	129	118	82	232	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	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	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3446		1770	3539	1518	1770	1863	1540	1770	1810	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3446		1770	3539	1518	1770	1863	1540	1770	1810	
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)	27	677	103	175	627	86	109	140	128	89	252	50
RTOR Reduction (vph)	0	19	0	0	0	51	0	0	96	0	12	0
Lane Group Flow (vph)	27	761	0	175	627	35	109	140	32	89	290	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	1.5	18.7		7.0	24.2	24.2	4.0	15.0	15.0	3.1	14.1	
Effective Green, g (s)	1.5	18.7		7.0	24.2	24.2	4.0	15.0	15.0	3.1	14.1	
Actuated g/C Ratio	0.03	0.31		0.12	0.40	0.40	0.07	0.25	0.25	0.05	0.24	
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)	44	1077		207	1432	614	118	467	386	91	426	
v/s Ratio Prot	0.02	c0.22		c0.10	0.18		c0.06	0.08		0.05	c0.16	
v/s Ratio Perm						0.02			0.02			
v/c Ratio	0.61	0.71		0.85	0.44	0.06	0.92	0.30	0.08	0.98	0.68	
Uniform Delay, d1	28.9	18.1		25.9	12.9	10.8	27.7	18.1	17.1	28.3	20.8	
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	22.8	2.1		25.8	0.2	0.0	59.2	0.4	0.1	86.2	4.4	
Delay (s)	51.6	20.3		51.7	13.1	10.9	86.9	18.5	17.2	114.5	25.2	
Level of Service	D	C		D	B	B	F	B	B	F	C	
Approach Delay (s)		21.3			20.5			37.8			45.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	519	355	40	494	110	439	587	26	136	738	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.95		1.00	0.99		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.97		1.00	0.99		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	3161		1770	3391		3433	3506		1770	3369	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3161		1770	3391		3433	3506		1770	3369	
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	564	386	43	537	120	477	638	28	148	802	207
RTOR Reduction (vph)	0	111	0	0	18	0	0	2	0	0	21	0
Lane Group Flow (vph)	189	839	0	43	639	0	477	664	0	148	988	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	14.8	35.3		6.6	27.1		17.4	42.0		13.1	36.7	
Effective Green, g (s)	14.8	35.3		6.6	27.1		17.4	42.0		13.1	36.7	
Actuated g/C Ratio	0.13	0.32		0.06	0.25		0.16	0.38		0.12	0.33	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	238	1014		106	835		543	1338		210	1124	
v/s Ratio Prot	c0.11	c0.27		0.02	0.19		c0.14	0.19		0.08	c0.29	
v/s Ratio Perm												
v/c Ratio	0.79	0.83		0.41	0.77		0.88	0.50		0.70	0.88	
Uniform Delay, d1	46.1	34.5		49.8	38.5		45.3	25.9		46.6	34.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.5	5.5		0.9	3.8		14.5	1.3		9.5	9.9	
Delay (s)	61.6	40.1		50.7	42.3		59.8	27.2		56.1	44.4	
Level of Service	E	D		D	D		E	C		E	D	
Approach Delay (s)		43.7			42.8			40.8			45.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	239	23	9	135	0	0	0	0	577	838	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3479			5062					1610	3369	1550
Flt Permitted		1.00			0.91					0.95	0.99	1.00
Satd. Flow (perm)		3479			4638					1610	3369	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	239	23	9	135	0	0	0	0	577	838	297
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	104
Lane Group Flow (vph)	0	253	0	0	144	0	0	0	0	456	959	193
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		16.0			16.0					52.0	52.0	52.0
Effective Green, g (s)		16.0			16.0					52.0	52.0	52.0
Actuated g/C Ratio		0.20			0.20					0.65	0.65	0.65
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		695			927					1046	2189	1007
v/s Ratio Prot		c0.07										
v/s Ratio Perm					0.03					0.28	0.28	0.12
v/c Ratio		0.36			0.16					0.44	0.44	0.19
Uniform Delay, d1		27.6			26.4					6.8	6.9	5.6
Progression Factor		1.00			1.20					1.00	1.00	1.00
Incremental Delay, d2		1.5			0.4					1.3	0.6	0.4
Delay (s)		29.1			32.1					8.2	7.5	6.0
Level of Service		C			C					A	A	A
Approach Delay (s)		29.1			32.1			0.0			7.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	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)	132	702	0	0	127	244	4	219	21	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.96		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3387			3539	2666		5004				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3238			3539	2666		5004				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	132	702	0	0	127	244	4	219	21	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	198	0	12	0	0	0	0
Lane Group Flow (vph)	119	715	0	0	127	46	0	232	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	18.0	36.5			15.0	15.0		32.5				
Effective Green, g (s)	18.0	36.5			15.0	15.0		32.5				
Actuated g/C Ratio	0.22	0.46			0.19	0.19		0.41				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	362	1510			663	499		2032				
v/s Ratio Prot	0.07	c0.11			0.04							
v/s Ratio Perm		c0.11				0.02		0.05				
v/c Ratio	0.33	0.47			0.19	0.09		0.11				
Uniform Delay, d1	25.9	15.1			27.4	26.9		14.8				
Progression Factor	1.08	0.78			1.00	1.00		1.00				
Incremental Delay, d2	2.2	1.0			0.6	0.4		0.1				
Delay (s)	30.3	12.7			28.0	27.2		14.9				
Level of Service	C	B			C	C		B				
Approach Delay (s)		15.2			27.5			14.9			0.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	48.6%	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)	18	152	178	218	489	48	32	16	65	20	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3284		1243	1250	948	1203	1105	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3284		1243	1250	948	1203	1105	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	18	152	178	218	489	48	32	16	65	20	20	10
RTOR Reduction (vph)	0	0	127	0	5	0	0	0	56	0	9	0
Lane Group Flow (vph)	18	152	51	218	532	0	24	24	9	20	21	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	0.9	16.5	16.5	13.2	28.8		8.2	8.2	8.2	3.6	3.6	
Effective Green, g (s)	0.9	16.5	16.5	13.2	28.8		8.2	8.2	8.2	3.6	3.6	
Actuated g/C Ratio	0.02	0.28	0.28	0.23	0.50		0.14	0.14	0.14	0.06	0.06	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	28	942	399	351	1630		175	176	134	74	68	
v/s Ratio Prot	0.01	0.05		c0.14	c0.16		c0.02	0.02		0.02	c0.02	
v/s Ratio Perm			0.04						0.01			
v/c Ratio	0.64	0.16	0.13	0.62	0.33		0.14	0.14	0.07	0.27	0.30	
Uniform Delay, d1	28.4	15.6	15.4	20.2	8.8		21.8	21.8	21.6	25.9	26.0	
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	36.9	0.1	0.2	2.5	0.1		0.4	0.4	0.2	0.7	0.9	
Delay (s)	65.3	15.7	15.6	22.6	8.9		22.2	22.2	21.8	26.7	26.9	
Level of Service	E	B	B	C	A		C	C	C	C	C	
Approach Delay (s)		18.2			12.9			22.0			26.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	58.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	40.8%	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)	40	170	41	107	537	221	119	110	174	148	110	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.91		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1014	2958		1299	3438	1369	1480	2541		1480	2333	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1014	2958		1299	3438	1369	1480	2541		1480	2333	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	170	41	107	537	221	119	110	174	148	110	76
RTOR Reduction (vph)	0	18	0	0	0	151	0	144	0	0	43	0
Lane Group Flow (vph)	40	193	0	107	537	70	119	140	0	112	179	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	5.4	16.5		9.6	20.7	20.7	11.4	11.4		11.1	11.1	
Effective Green, g (s)	5.4	16.5		9.6	20.7	20.7	11.4	11.4		11.1	11.1	
Actuated g/C Ratio	0.08	0.25		0.15	0.32	0.32	0.18	0.18		0.17	0.17	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	84	749		191	1093	435	259	444		252	397	
v/s Ratio Prot	0.04	0.07		c0.08	c0.16		c0.08	0.06		0.08	c0.08	
v/s Ratio Perm						0.05						
v/c Ratio	0.48	0.26		0.56	0.49	0.16	0.46	0.32		0.44	0.45	
Uniform Delay, d1	28.5	19.4		25.8	17.9	16.0	24.1	23.4		24.2	24.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	0.2		3.7	0.3	0.2	0.9	0.3		0.9	0.6	
Delay (s)	32.7	19.6		29.5	18.3	16.1	25.0	23.7		25.1	24.9	
Level of Service	C	B		C	B	B	C	C		C	C	
Approach Delay (s)		21.7			19.1			24.1			25.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	65.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	48.4%	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)	0	442	64	91	499	0	0	0	0	33	141	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.94	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4894		1765	3343						3179	
Flt Permitted		1.00		0.46	1.00						0.99	
Satd. Flow (perm)		4894		847	3343						3179	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	442	64	91	499	0	0	0	0	33	141	114
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	0	0	79	0
Lane Group Flow (vph)	0	481	0	91	499	0	0	0	0	0	209	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		13.5		13.5	13.5						10.2	
Effective Green, g (s)		13.5		13.5	13.5						10.2	
Actuated g/C Ratio		0.40		0.40	0.40						0.30	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		1960		339	1339						962	
v/s Ratio Prot		0.10			c0.15						c0.07	
v/s Ratio Perm				0.11								
v/c Ratio		0.25		0.27	0.37						0.22	
Uniform Delay, d1		6.7		6.8	7.1						8.8	
Progression Factor		1.00		0.36	0.38						1.00	
Incremental Delay, d2		0.0		0.2	0.1						0.0	
Delay (s)		6.7		2.6	2.8						8.8	
Level of Service		A		A	A						A	
Approach Delay (s)		6.7			2.7			0.0			8.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	41.2%	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)	124	351	0	0	526	50	64	253	34	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.99			0.99				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		5016			5011			3451				
Flt Permitted		0.73			1.00			0.99				
Satd. Flow (perm)		3730			5011			3451				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	351	0	0	526	50	64	253	34	0	0	0
RTOR Reduction (vph)	0	0	0	0	15	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	475	0	0	561	0	0	340	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)		13.5			13.5			10.2				
Effective Green, g (s)		13.5			13.5			10.2				
Actuated g/C Ratio		0.40			0.40			0.30				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		1494			2007			1044				
v/s Ratio Prot					0.11			c0.10				
v/s Ratio Perm		c0.13										
v/c Ratio		0.32			0.28			0.33				
Uniform Delay, d1		6.9			6.8			9.1				
Progression Factor		0.35			1.00			1.00				
Incremental Delay, d2		0.0			0.0			0.1				
Delay (s)		2.5			6.8			9.2				
Level of Service		A			A			A				
Approach Delay (s)		2.5			6.8			9.2			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.8%	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)	19	242	15	49	574	16	19	84	37	27	116	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4934			4869			3349			3388	
Flt Permitted		0.89			0.90			0.91			0.90	
Satd. Flow (perm)		4428			4375			3063			3076	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	19	242	15	49	574	16	19	84	37	27	116	34
RTOR Reduction (vph)	0	6	0	0	3	0	0	26	0	0	24	0
Lane Group Flow (vph)	0	270	0	0	636	0	0	114	0	0	153	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		47.5			47.5			24.0			24.0	
Effective Green, g (s)		47.5			47.5			24.0			24.0	
Actuated g/C Ratio		0.59			0.59			0.30			0.30	
Clearance Time (s)		3.5			3.5			5.0			5.0	
Lane Grp Cap (vph)		2629			2597			918			922	
v/s Ratio Prot												
v/s Ratio Perm		0.06			c0.15			0.04			c0.05	
v/c Ratio		0.10			0.24			0.12			0.17	
Uniform Delay, d1		7.0			7.7			20.4			20.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.2			0.3			0.4	
Delay (s)		7.1			7.9			20.6			21.0	
Level of Service		A			A			C			C	
Approach Delay (s)		7.1			7.9			20.6			21.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	81.5%	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)	14	236	50	52	553	12	65	140	65	30	125	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.95		1.00	0.94	1.00	1.00	0.94		1.00	0.94
Flpb, ped/bikes		1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3432	1490		3244	1493	1650	1845	1488		1837	1497
Flt Permitted		0.92	1.00		0.90	1.00	0.48	1.00	1.00		0.92	1.00
Satd. Flow (perm)		3163	1490		2941	1493	842	1845	1488		1709	1497
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	236	50	52	553	12	65	140	65	30	125	45
RTOR Reduction (vph)	0	0	13	0	0	3	0	0	55	0	0	38
Lane Group Flow (vph)	0	250	37	0	605	9	65	140	10	0	155	7
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)		67.1	67.1		67.1	67.1	13.9	13.9	13.9		13.9	13.9
Effective Green, g (s)		67.1	67.1		67.1	67.1	13.9	13.9	13.9		13.9	13.9
Actuated g/C Ratio		0.75	0.75		0.75	0.75	0.15	0.15	0.15		0.15	0.15
Clearance Time (s)		5.5	5.5		5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		2358	1110		2192	1113	130	284	229		263	231
v/s Ratio Prot								0.08				
v/s Ratio Perm		0.08	0.03		c0.21	0.01	0.08		0.01		c0.09	0.00
v/c Ratio		0.11	0.03		0.28	0.01	0.50	0.49	0.04		0.59	0.03
Uniform Delay, d1		3.2	3.0		3.7	2.9	34.9	34.8	32.4		35.4	32.3
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.1	0.1		0.3	0.0	1.1	0.5	0.0		2.2	0.0
Delay (s)		3.3	3.0		4.0	2.9	36.0	35.3	32.4		37.6	32.3
Level of Service		A	A		A	A	D	D	C		D	C
Approach Delay (s)		3.2			4.0			34.8			36.4	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	97.4%	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)	7	377	22	24	584	79	47	242	32	76	276	1
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3436	1510	1753	3252	1540	1658	3467		1754	3537	
Flt Permitted		0.95	1.00	0.52	1.00	1.00	0.56	1.00		0.57	1.00	
Satd. Flow (perm)		3257	1510	968	3252	1540	983	3467		1048	3537	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	7	377	22	24	584	79	47	242	32	76	276	1
RTOR Reduction (vph)	0	0	7	0	0	24	0	18	0	0	1	0
Lane Group Flow (vph)	0	384	15	24	584	55	47	256	0	76	276	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		58.8	58.8	58.8	58.8	58.8	16.7	16.7		16.7	16.7	
Effective Green, g (s)		58.8	58.8	58.8	58.8	58.8	16.7	16.7		16.7	16.7	
Actuated g/C Ratio		0.69	0.69	0.69	0.69	0.69	0.20	0.20		0.20	0.20	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		2253	1044	669	2249	1065	193	681		205	694	
v/s Ratio Prot					c0.18			0.07			c0.08	
v/s Ratio Perm		0.12	0.01	0.02		0.04	0.05			0.07		
v/c Ratio		0.17	0.01	0.04	0.26	0.05	0.24	0.38		0.37	0.40	
Uniform Delay, d1		4.6	4.1	4.1	4.9	4.2	28.8	29.6		29.6	29.8	
Progression Factor		1.00	1.00	0.53	0.51	0.25	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2	0.0	0.1	0.3	0.1	1.4	0.7		1.5	0.5	
Delay (s)		4.7	4.1	2.3	2.8	1.1	30.2	30.4		31.1	30.3	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		4.7			2.6			30.3			30.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	66.8%	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)	55	374	20	52	521	28	15	102	168	36	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97		1.00	0.93		0.97	
Flpb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1575	3124	1361	1490	3185	1375		3155	1169		2843	
Flt Permitted	0.46	1.00	1.00	0.53	1.00	1.00		0.90	1.00		0.89	
Satd. Flow (perm)	761	3124	1361	830	3185	1375		2853	1169		2554	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	374	20	52	521	28	15	102	168	36	99	105
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	145	0	91	0
Lane Group Flow (vph)	55	374	15	52	521	21	0	117	23	0	149	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	64.9	64.9	64.9	64.9	64.9	64.9		11.6	11.6		11.6	
Effective Green, g (s)	64.9	64.9	64.9	64.9	64.9	64.9		11.6	11.6		11.6	
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.76	0.76		0.14	0.14		0.14	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	581	2385	1039	633	2431	1049		389	159		348	
v/s Ratio Prot		0.12			c0.16							
v/s Ratio Perm	0.07		0.01	0.06		0.02		0.04	0.02		c0.06	
v/c Ratio	0.09	0.16	0.01	0.08	0.21	0.02		0.30	0.14		0.43	
Uniform Delay, d1	2.6	2.7	2.4	2.5	2.8	2.4		33.0	32.3		33.7	
Progression Factor	0.76	0.76	0.71	0.24	0.49	0.07		1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.1	0.0	0.2	0.2	0.0		0.2	0.2		0.3	
Delay (s)	2.3	2.2	1.7	0.9	1.6	0.2		33.2	32.5		34.0	
Level of Service	A	A	A	A	A	A		C	C		C	
Approach Delay (s)		2.2			1.5			32.8			34.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	120	400	496	84	647	168
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3053	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3053	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	400	496	84	647	168
RTOR Reduction (vph)	0	0	0	44	3	110
Lane Group Flow (vph)	120	400	496	40	661	41
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	9.5	53.8	40.3	40.3	23.2	23.2
Effective Green, g (s)	9.5	53.8	40.3	40.3	23.2	23.2
Actuated g/C Ratio	0.11	0.63	0.47	0.47	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	178	1903	1439	636	833	325
v/s Ratio Prot	c0.08	0.13	c0.16		c0.22	
v/s Ratio Perm				0.03		0.03
v/c Ratio	0.67	0.21	0.34	0.06	0.79	0.13
Uniform Delay, d1	36.3	6.6	14.0	12.1	28.7	23.3
Progression Factor	1.11	1.03	1.07	1.10	1.00	1.00
Incremental Delay, d2	7.6	0.2	0.1	0.0	4.9	0.1
Delay (s)	47.9	7.0	15.0	13.3	33.6	23.3
Level of Service	D	A	B	B	C	C
Approach Delay (s)		16.5	14.8		31.7	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.1%	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)	74	555	53	80	411	61	85	352	76	51	305	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	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.91	1.00	0.99	
Flpb, ped/bikes	0.98	1.00			1.00		0.97	1.00	1.00	0.96	1.00	
Frt	1.00	0.99			0.98		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1560	3129			3081		1550	3185	1297	1535	3055	
Flt Permitted	0.44	1.00			0.79		0.39	1.00	1.00	0.42	1.00	
Satd. Flow (perm)	722	3129			2459		643	3185	1297	673	3055	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	555	53	80	411	61	85	352	76	51	305	66
RTOR Reduction (vph)	0	5	0	0	6	0	0	0	61	0	31	0
Lane Group Flow (vph)	74	603	0	0	546	0	85	352	15	51	340	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	60.3	60.3			60.3		16.7	16.7	16.7	16.7	16.7	
Effective Green, g (s)	60.3	60.3			60.3		16.7	16.7	16.7	16.7	16.7	
Actuated g/C Ratio	0.71	0.71			0.71		0.20	0.20	0.20	0.20	0.20	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	512	2219			1744		126	625	254	132	600	
v/s Ratio Prot		0.19						0.11			0.11	
v/s Ratio Perm	0.10				c0.22		c0.13		0.01	0.08		
v/c Ratio	0.14	0.27			0.31		0.67	0.56	0.06	0.39	0.57	
Uniform Delay, d1	4.0	4.4			4.6		31.6	30.9	27.8	29.7	30.9	
Progression Factor	0.81	0.74			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.3			0.0		10.7	0.7	0.0	0.7	0.7	
Delay (s)	3.8	3.6			4.7		42.3	31.6	27.8	30.4	31.6	
Level of Service	A	A			A		D	C	C	C	C	
Approach Delay (s)		3.6			4.7			32.8			31.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.7%	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)	53	126	65	345	465	101	103	630	290	28	583	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4535	1352		4564	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.74	1.00		0.88	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3364	1352		4010	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	126	65	345	465	101	103	630	290	28	583	76
RTOR Reduction (vph)	0	0	43	0	0	53	0	0	200	0	0	53
Lane Group Flow (vph)	53	126	22	345	465	48	0	733	90	0	611	23
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	4.6	30.3	30.3	16.9	42.6	42.6		27.8	27.8		27.8	27.8
Effective Green, g (s)	4.6	30.3	30.3	16.9	42.6	42.6		27.8	27.8		27.8	27.8
Actuated g/C Ratio	0.05	0.34	0.34	0.19	0.47	0.47		0.31	0.31		0.31	0.31
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	157	1061	455	580	1507	639		1039	417		1238	417
v/s Ratio Prot	c0.02	0.04		c0.11	c0.15							
v/s Ratio Perm			0.02			0.04		c0.22	0.07		0.15	0.02
v/c Ratio	0.34	0.12	0.05	0.59	0.31	0.07		0.71	0.21		0.49	0.06
Uniform Delay, d1	41.2	20.6	20.1	33.4	14.6	12.9		27.5	23.0		25.4	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	1.3	0.2	0.2	1.6	0.5	0.2		2.2	0.3		0.3	0.1
Delay (s)	42.5	20.9	20.3	35.1	15.1	13.2		29.7	23.3		25.7	21.9
Level of Service	D	C	C	D	B	B		C	C		C	C
Approach Delay (s)		25.4			22.5			27.9			25.3	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: Adeline Street & 18th Street

10/6/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	25	7	32	79	45	10	148	26	29	178	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.96			0.98			0.99	
Flt Protected		0.99			0.99			1.00			0.99	
Satd. Flow (prot)		3392			3321			3442			3472	
Flt Permitted		0.92			0.91			0.94			0.91	
Satd. Flow (perm)		3136			3044			3246			3183	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	25	7	32	79	45	10	148	26	29	178	14
RTOR Reduction (vph)	0	4	0	0	28	0	0	14	0	0	8	0
Lane Group Flow (vph)	0	36	0	0	128	0	0	170	0	0	213	0
Confl. Peds. (#/hr)	15		10	10		15	15		15	15		15
Confl. Bikes (#/hr)			5			4						9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		20.5			20.5			25.5			25.5	
Effective Green, g (s)		20.5			20.5			25.5			25.5	
Actuated g/C Ratio		0.37			0.37			0.46			0.46	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Lane Grp Cap (vph)		1168			1134			1504			1475	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.04			0.05			c0.07	
v/c Ratio		0.03			0.11			0.11			0.14	
Uniform Delay, d1		10.9			11.3			8.3			8.5	
Progression Factor		1.00			1.00			0.65			1.00	
Incremental Delay, d2		0.0			0.2			0.2			0.2	
Delay (s)		11.0			11.5			5.6			8.7	
Level of Service		B			B			A			A	
Approach Delay (s)		11.0			11.5			5.6			8.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	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)	22	118	25	29	136	70	30	219	35	79	188	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	
Lane Util. Factor		0.95			0.95		1.00	0.95			0.95	
Frpb, ped/bikes		0.99			0.99		1.00	0.99			1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00			0.99	
Frt		0.98			0.96		1.00	0.98			0.99	
Flt Protected		0.99			0.99		0.95	1.00			0.99	
Satd. Flow (prot)		3408			3327		1750	3445			3431	
Flt Permitted		0.89			0.90		0.58	1.00			0.83	
Satd. Flow (perm)		3064			3019		1064	3445			2879	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	118	25	29	136	70	30	219	35	79	188	17
RTOR Reduction (vph)	0	21	0	0	58	0	0	11	0	0	4	0
Lane Group Flow (vph)	0	144	0	0	177	0	30	243	0	0	280	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		9.7			9.7		37.6	37.6			37.6	
Effective Green, g (s)		9.7			9.7		37.6	37.6			37.6	
Actuated g/C Ratio		0.18			0.18		0.68	0.68			0.68	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		2.0			2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)		537			529		723	2342			1957	
v/s Ratio Prot								0.07				
v/s Ratio Perm		0.05			c0.06		0.03				c0.10	
v/c Ratio		0.27			0.34		0.04	0.10			0.14	
Uniform Delay, d1		19.7			20.0		2.9	3.0			3.1	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.1			0.1		0.1	0.1			0.2	
Delay (s)		19.8			20.1		3.0	3.1			3.3	
Level of Service		B			C		A	A			A	
Approach Delay (s)		19.8			20.1			3.1			3.3	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	55.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.7%	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)	23	154	10	34	148	42	9	123	25	32	157	26
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	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1759	3502		1762	3404			3432			3439	
Flt Permitted	0.63	1.00		0.65	1.00			0.94			0.91	
Satd. Flow (perm)	1170	3502		1202	3404			3239			3146	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	23	154	10	34	148	42	9	123	25	32	157	26
RTOR Reduction (vph)	0	6	0	0	24	0	0	14	0	0	15	0
Lane Group Flow (vph)	23	158	0	34	166	0	0	143	0	0	200	0
Confl. Peds. (#/hr)	11		8	8		11	3		15	15		3
Confl. Bikes (#/hr)			11			8			2			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	23.0	23.0		23.0	23.0			24.0			24.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0			24.0			24.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.44			0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	489	1464		502	1423			1413			1372	
v/s Ratio Prot		0.05			c0.05							
v/s Ratio Perm	0.02			0.03				0.04			c0.06	
v/c Ratio	0.05	0.11		0.07	0.12			0.10			0.15	
Uniform Delay, d1	9.5	9.7		9.6	9.8			9.1			9.3	
Progression Factor	1.00	1.00		1.00	1.00			0.76			2.11	
Incremental Delay, d2	0.2	0.1		0.3	0.2			0.1			0.2	
Delay (s)	9.7	9.9		9.8	10.0			7.1			20.0	
Level of Service	A	A		A	A			A			B	
Approach Delay (s)		9.9			9.9			7.1			20.0	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.13		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.3%	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)	2	7	1	7	29	33	1	114	5	21	179	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.93			0.99			1.00	
Flt Protected		0.99			0.99			1.00			0.99	
Satd. Flow (prot)		3444			3246			3513			3505	
Flt Permitted		0.93			0.94			0.95			0.93	
Satd. Flow (perm)		3250			3075			3353			3283	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	7	1	7	29	33	1	114	5	21	179	5
RTOR Reduction (vph)	0	1	0	0	23	0	0	2	0	0	2	0
Lane Group Flow (vph)	0	9	0	0	47	0	0	118	0	0	203	0
Confl. Peds. (#/hr)			9	9			5		11	11		5
Confl. Bikes (#/hr)			2			1			1			4
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		17.5			17.5			30.5			30.5	
Effective Green, g (s)		17.5			17.5			30.5			30.5	
Actuated g/C Ratio		0.32			0.32			0.55			0.55	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1034			978			1859			1820	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.02			0.04			c0.06	
v/c Ratio		0.01			0.05			0.06			0.11	
Uniform Delay, d1		12.8			13.0			5.7			5.8	
Progression Factor		1.00			1.00			1.00			2.52	
Incremental Delay, d2		0.0			0.1			0.1			0.1	
Delay (s)		12.8			13.1			5.7			14.8	
Level of Service		B			B			A			B	
Approach Delay (s)		12.8			13.1			5.7			14.8	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.09		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	46.7%	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)	34	30	0	0	147	124	277	195	91	83	0	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.93		1.00	0.96		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (prot)	1020	3282			2968		1173	2729		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (perm)	1020	3282			2968		1173	2729		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	30	0	0	147	124	277	195	91	83	0	190
RTOR Reduction (vph)	0	0	0	0	98	0	0	25	0	0	0	158
Lane Group Flow (vph)	34	30	0	0	173	0	188	350	0	83	0	32
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	2.7	17.6			11.4		15.1	15.1		9.1		9.1
Effective Green, g (s)	2.7	17.6			11.4		15.1	15.1		9.1		9.1
Actuated g/C Ratio	0.05	0.32			0.21		0.28	0.28		0.17		0.17
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	50	1054			617		323	751		256		325
v/s Ratio Prot	c0.03	0.01			c0.06		c0.16	0.13		c0.05		0.02
v/s Ratio Perm												
v/c Ratio	0.68	0.03			0.28		0.58	0.47		0.32		0.10
Uniform Delay, d1	25.6	12.7			18.2		17.1	16.5		20.1		19.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	26.2	0.0			0.2		2.2	0.3		0.5		0.1
Delay (s)	51.8	12.8			18.4		19.3	16.8		20.7		19.5
Level of Service	D	B			B		B	B		C		B
Approach Delay (s)		33.5			18.4			17.7			19.8	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	47.6%	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)	25	149	24	135	241	108	17	64	61	84	128	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.98		1.00	0.98			0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.98		1.00	0.95			0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3126		1770	3229			1695		1756	1767	
Flt Permitted	0.95	1.00		0.95	1.00			0.92		0.43	1.00	
Satd. Flow (perm)	1770	3126		1770	3229			1562		803	1767	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	25	149	24	135	241	108	17	64	61	84	128	25
RTOR Reduction (vph)	0	9	0	0	32	0	0	31	0	0	8	0
Lane Group Flow (vph)	25	164	0	135	317	0	0	111	0	84	145	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	5.6	64.1		11.9	70.4			13.0		13.0	13.0	
Effective Green, g (s)	5.6	64.1		11.9	70.4			13.0		13.0	13.0	
Actuated g/C Ratio	0.06	0.64		0.12	0.70			0.13		0.13	0.13	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	99	2003		210	2273			203		104	229	
v/s Ratio Prot	c0.01	0.05		c0.08	c0.10						0.08	
v/s Ratio Perm								0.07		c0.10		
v/c Ratio	0.25	0.08		0.64	0.14			0.55		0.81	0.63	
Uniform Delay, d1	45.2	6.8		42.0	4.9			40.7		42.3	41.2	
Progression Factor	1.23	1.36		1.24	0.23			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.0		4.7	0.1			1.6		33.5	4.2	
Delay (s)	56.0	9.3		56.9	1.2			42.3		75.8	45.4	
Level of Service	E	A		E	A			D		E	D	
Approach Delay (s)		15.2			16.8			42.3			56.2	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	58.9%	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)	30	306	46	69	564	84	12	49	20	27	54	33
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	0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00			1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.96			0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.99	
Satd. Flow (prot)	1762	3232		1025	3471	1517	1346	1771			2899	
Flt Permitted	0.42	1.00		0.54	1.00	1.00	0.68	1.00			0.89	
Satd. Flow (perm)	777	3232		582	3471	1517	963	1771			2616	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	306	46	69	564	84	12	49	20	27	54	33
RTOR Reduction (vph)	0	12	0	0	0	30	0	14	0	0	24	0
Lane Group Flow (vph)	30	340	0	69	564	54	12	55	0	0	90	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0			28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0			28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	
Lane Grp Cap (vph)	497	2068		372	2221	970	269	495			732	
v/s Ratio Prot		0.11			c0.16			0.03				
v/s Ratio Perm	0.04			0.12		0.04	0.01				c0.03	
v/c Ratio	0.06	0.16		0.19	0.25	0.06	0.04	0.11			0.12	
Uniform Delay, d1	6.7	7.2		7.4	7.7	6.7	26.2	26.7			26.8	
Progression Factor	0.22	0.14		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.2	0.2		1.1	0.3	0.1	0.3	0.5			0.3	
Delay (s)	1.7	1.2		8.5	8.0	6.8	26.6	27.2			27.2	
Level of Service	A	A		A	A	A	C	C			C	
Approach Delay (s)		1.2			7.9			27.1			27.2	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.0%	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	271	29	51	567	33	125	165	14	43	80	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1578	4090		1752	4571		1760	1810	1541	1749	3539	1246
Flt Permitted	0.34	1.00		0.56	1.00		0.70	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	563	4090		1036	4571		1301	1810	1541	1201	3539	1246
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	41	271	29	51	567	33	125	165	14	43	80	62
RTOR Reduction (vph)	0	22	0	0	12	0	0	0	5	0	0	22
Lane Group Flow (vph)	41	278	0	51	588	0	125	165	9	43	80	40
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	16.9	16.9		16.9	16.9		48.6	48.6	48.6	48.6	48.6	48.6
Effective Green, g (s)	16.9	16.9		16.9	16.9		48.6	48.6	48.6	48.6	48.6	48.6
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.65	0.65	0.65	0.65	0.65	0.65
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	126	921		233	1029		843	1172	998	778	2293	807
v/s Ratio Prot		0.07			c0.13			0.09			0.02	
v/s Ratio Perm	0.07			0.05			c0.10		0.01	0.04		0.03
v/c Ratio	0.33	0.30		0.22	0.57		0.15	0.14	0.01	0.06	0.03	0.05
Uniform Delay, d1	24.3	24.1		23.7	25.8		5.1	5.1	4.7	4.8	4.8	4.8
Progression Factor	1.00	1.00		1.00	1.00		1.24	1.23	1.92	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1		0.2	0.5		0.4	0.2	0.0	0.1	0.0	0.1
Delay (s)	24.8	24.2		23.8	26.3		6.7	6.5	9.0	5.0	4.8	4.9
Level of Service	C	C		C	C		A	A	A	A	A	A
Approach Delay (s)		24.3			26.1			6.7			4.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
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)	0	0	0	70	243	214	23	49	0	0	84	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3499	1562	1770	990			3167	1558
Flt Permitted					0.99	1.00	0.70	1.00			1.00	1.00
Satd. Flow (perm)					3499	1562	1303	990			3167	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	70	243	214	23	49	0	0	84	50
RTOR Reduction (vph)	0	0	0	0	0	173	0	0	0	0	0	16
Lane Group Flow (vph)	0	0	0	0	313	41	23	49	0	0	84	34
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					14.3	14.3	51.2	51.2			51.2	51.2
Effective Green, g (s)					14.3	14.3	51.2	51.2			51.2	51.2
Actuated g/C Ratio					0.19	0.19	0.68	0.68			0.68	0.68
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					667	297	889	675			2162	1063
v/s Ratio Prot								c0.05			0.03	
v/s Ratio Perm					0.09	0.03	0.02					0.02
v/c Ratio					0.47	0.14	0.03	0.07			0.04	0.03
Uniform Delay, d1					27.0	25.2	3.8	4.0			3.9	3.9
Progression Factor					1.00	1.00	1.00	1.00			0.86	0.94
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.0	0.1
Delay (s)					27.2	25.3	3.8	4.0			3.4	3.7
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			26.4			3.9			3.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.16		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	30.1%	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)	22	634	114	85	177	24	56	23	133	94	46	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.87		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1770	3306		1770	3448		1770	1611		1610	2460	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1770	3306		1770	3448		1770	1611		1610	2460	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	634	114	85	177	24	56	23	133	94	46	36
RTOR Reduction (vph)	0	8	0	0	5	0	0	113	0	0	31	0
Lane Group Flow (vph)	22	740	0	85	196	0	56	43	0	59	86	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	2.2	27.0		7.4	32.7		10.9	10.9		11.0	11.0	
Effective Green, g (s)	2.2	27.0		7.4	32.7		10.9	10.9		11.0	11.0	
Actuated g/C Ratio	0.03	0.37		0.10	0.45		0.15	0.15		0.15	0.15	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	53	1234		181	1559		266	242		244	374	
v/s Ratio Prot	0.01	c0.22		c0.05	0.06		c0.03	0.03		c0.04	0.04	
v/s Ratio Perm												
v/c Ratio	0.42	0.60		0.47	0.13		0.21	0.18		0.24	0.23	
Uniform Delay, d1	34.4	18.3		30.6	11.5		26.9	26.8		27.0	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.8		1.4	0.0		0.4	0.4		0.5	0.3	
Delay (s)	36.3	19.1		32.0	11.5		27.4	27.2		27.5	27.3	
Level of Service	D	B		C	B		C	C		C	C	
Approach Delay (s)		19.6			17.6			27.2			27.3	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Existing PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	537	64	107	454	75	50	143	103	140	244	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	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3471		1770	3539	1516	1770	1863	1538	1770	1819	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3471		1770	3539	1516	1770	1863	1538	1770	1819	
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	584	70	116	493	82	54	155	112	152	265	40
RTOR Reduction (vph)	0	15	0	0	0	55	0	0	85	0	9	0
Lane Group Flow (vph)	45	639	0	116	493	27	54	155	27	152	296	0
Confl. Peds. (#/hr)			2			7			7			9
Confl. Bikes (#/hr)			24			10			11			12
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	1.7	15.8		3.5	17.6	17.6	3.0	13.0	13.0	5.0	15.0	
Effective Green, g (s)	1.7	15.8		3.5	17.6	17.6	3.0	13.0	13.0	5.0	15.0	
Actuated g/C Ratio	0.03	0.30		0.07	0.33	0.33	0.06	0.24	0.24	0.09	0.28	
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)	56	1028		116	1168	500	99	454	375	166	511	
v/s Ratio Prot	0.03	c0.18		c0.07	0.14		0.03	0.08		c0.09	c0.16	
v/s Ratio Perm						0.02			0.02			
v/c Ratio	0.80	0.62		1.00	0.42	0.05	0.55	0.34	0.07	0.92	0.58	
Uniform Delay, d1	25.6	16.2		24.9	13.9	12.2	24.5	16.6	15.5	23.9	16.4	
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	55.1	1.2		83.6	0.2	0.0	6.0	0.5	0.1	45.7	1.6	
Delay (s)	80.7	17.4		108.5	14.1	12.2	30.5	17.1	15.6	69.7	18.0	
Level of Service	F	B		F	B	B	C	B	B	E	B	
Approach Delay (s)		21.4			29.7			18.8			35.2	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.7%	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)	189	557	333	25	329	118	350	791	14	163	877	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.96		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3212		1770	3346		3433	3525		1770	3448	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3212		1770	3346		3433	3525		1770	3448	
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)	205	605	362	27	358	128	380	860	15	177	953	113
RTOR Reduction (vph)	0	79	0	0	34	0	0	1	0	0	8	0
Lane Group Flow (vph)	205	888	0	27	452	0	380	874	0	177	1058	0
Confl. Peds. (#/hr)			59			38			53			68
Confl. Bikes (#/hr)			31			2			24			28
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)	14.5	32.6		6.6	24.7		13.9	44.0		13.8	42.9	
Effective Green, g (s)	14.5	32.6		6.6	24.7		13.9	44.0		13.8	42.9	
Actuated g/C Ratio	0.13	0.30		0.06	0.22		0.13	0.40		0.13	0.39	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	233	951		106	751		433	1410		222	1344	
v/s Ratio Prot	c0.12	c0.28		0.02	0.14		c0.11	0.25		0.10	c0.31	
v/s Ratio Perm												
v/c Ratio	0.88	0.93		0.25	0.60		0.88	0.62		0.80	0.79	
Uniform Delay, d1	46.9	37.7		49.4	38.2		47.2	26.3		46.7	29.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.4	15.6		0.5	0.9		17.4	2.1		17.3	4.7	
Delay (s)	75.3	53.2		49.8	39.2		64.6	28.4		64.0	34.3	
Level of Service	E	D		D	D		E	C		E	C	
Approach Delay (s)		57.1			39.7			39.3			38.5	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	88.3%	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	423	33	10	209	0	0	0	0	340	242	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.98	1.00
Satd. Flow (prot)		3489			5070					1610	3327	1540
Flt Permitted		1.00			0.92					0.95	0.98	1.00
Satd. Flow (perm)		3489			4659					1610	3327	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	423	33	10	209	0	0	0	0	340	242	172
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	0	90
Lane Group Flow (vph)	0	449	0	0	219	0	0	0	0	190	392	82
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		30.0			30.0					38.0	38.0	38.0
Effective Green, g (s)		30.0			30.0					38.0	38.0	38.0
Actuated g/C Ratio		0.38			0.38					0.48	0.48	0.48
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1308			1747					764	1580	731
v/s Ratio Prot		c0.13										
v/s Ratio Perm					0.05					c0.12	0.12	0.05
v/c Ratio		0.34			0.13					0.25	0.25	0.11
Uniform Delay, d1		17.9			16.4					12.5	12.5	11.6
Progression Factor		1.00			0.32					1.00	1.00	1.00
Incremental Delay, d2		0.7			0.1					0.8	0.4	0.3
Delay (s)		18.7			5.3					13.3	12.9	12.0
Level of Service		B			A					B	B	B
Approach Delay (s)		18.7			5.3			0.0			12.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.9%	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)	211	561	0	0	221	777	18	682	63	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3384			3539	2704		5004				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3207			3539	2704		5004				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	211	561	0	0	221	777	18	682	63	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	119	0	13	0	0	0	0
Lane Group Flow (vph)	190	582	0	0	221	658	0	750	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	12.0	42.0			26.5	26.5		27.0				
Effective Green, g (s)	12.0	42.0			26.5	26.5		27.0				
Actuated g/C Ratio	0.15	0.52			0.33	0.33		0.34				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	241	1710			1172	895		1688				
v/s Ratio Prot	c0.12	0.05			0.06							
v/s Ratio Perm		0.13				c0.24		0.15				
v/c Ratio	0.79	0.34			0.19	0.74		0.44				
Uniform Delay, d1	32.8	11.0			19.1	23.6		20.7				
Progression Factor	0.97	1.50			1.00	1.00		1.00				
Incremental Delay, d2	21.9	0.5			0.4	5.3		0.8				
Delay (s)	53.7	17.0			19.4	29.0		21.5				
Level of Service	D	B			B	C		C				
Approach Delay (s)		26.1			26.9			21.5			0.0	
Approach LOS		C			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	73.5%	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)	6	224	67	57	528	20	305	22	196	32	10	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3349		1649	1528	1262	1480	1405	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3349		1649	1528	1262	1480	1405	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	6	224	67	57	528	20	305	22	196	32	10	30
RTOR Reduction (vph)	0	0	48	0	2	0	0	0	144	0	28	0
Lane Group Flow (vph)	6	224	19	57	546	0	162	165	52	32	12	0
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	0.8	16.4	16.4	4.9	20.5		14.9	14.9	14.9	3.9	3.9	
Effective Green, g (s)	0.8	16.4	16.4	4.9	20.5		14.9	14.9	14.9	3.9	3.9	
Actuated g/C Ratio	0.01	0.29	0.29	0.09	0.36		0.26	0.26	0.26	0.07	0.07	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	25	959	351	111	1212		434	402	332	101	96	
v/s Ratio Prot	0.00	0.07		c0.04	c0.16		0.10	c0.11		c0.02	0.01	
v/s Ratio Perm			0.02						0.04			
v/c Ratio	0.24	0.23	0.06	0.51	0.45		0.37	0.41	0.16	0.32	0.13	
Uniform Delay, d1	27.6	15.3	14.5	24.7	13.8		17.0	17.2	16.0	25.1	24.7	
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	4.9	0.2	0.1	4.0	0.5		0.7	0.9	0.3	1.8	0.6	
Delay (s)	32.5	15.5	14.6	28.7	14.2		17.8	18.2	16.3	26.9	25.3	
Level of Service	C	B	B	C	B		B	B	B	C	C	
Approach Delay (s)		15.7			15.6			17.3			26.0	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	56.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	47.2%	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)	115	264	72	156	513	212	63	188	176	86	63	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1337	3086		1687	3406	1509	1444	2950		1369	2645	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1337	3086		1687	3406	1509	1444	2950		1369	2645	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	115	264	72	156	513	212	63	188	176	86	63	23
RTOR Reduction (vph)	0	21	0	0	0	147	0	124	0	0	16	0
Lane Group Flow (vph)	115	315	0	156	513	65	63	240	0	58	98	0
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	10.2	18.1		12.7	20.6	20.6	11.1	11.1		8.7	8.7	
Effective Green, g (s)	10.2	18.1		12.7	20.6	20.6	11.1	11.1		8.7	8.7	
Actuated g/C Ratio	0.15	0.27		0.19	0.31	0.31	0.17	0.17		0.13	0.13	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	203	832		319	1045	463	238	488		177	342	
v/s Ratio Prot	c0.09	0.10		0.09	c0.15		0.04	c0.08		c0.04	0.04	
v/s Ratio Perm						0.04						
v/c Ratio	0.57	0.38		0.49	0.49	0.14	0.26	0.49		0.33	0.29	
Uniform Delay, d1	26.4	19.9		24.3	19.0	16.8	24.4	25.4		26.5	26.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	0.3		1.2	0.4	0.1	0.4	0.6		0.8	0.3	
Delay (s)	30.0	20.2		25.5	19.3	17.0	24.9	26.0		27.3	26.7	
Level of Service	C	C		C	B	B	C	C		C	C	
Approach Delay (s)		22.7			19.9			25.8			26.9	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	16.5
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)	0	425	65	109	548	0	0	0	0	93	270	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						1.00	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4848		1763	3312						3287	
Flt Permitted		1.00		0.46	1.00						0.99	
Satd. Flow (perm)		4848		860	3312						3287	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	425	65	109	548	0	0	0	0	93	270	154
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	0	0	62	0
Lane Group Flow (vph)	0	463	0	109	548	0	0	0	0	0	455	0
Confl. Peds. (#/hr)			10	10						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		15.9		15.9	15.9						12.0	
Effective Green, g (s)		15.9		15.9	15.9						12.0	
Actuated g/C Ratio		0.42		0.42	0.42						0.32	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2033		360	1389						1040	
v/s Ratio Prot		0.10			c0.17						c0.14	
v/s Ratio Perm				0.13								
v/c Ratio		0.23		0.30	0.39						0.44	
Uniform Delay, d1		7.1		7.3	7.7						10.3	
Progression Factor		1.00		0.39	0.41						1.00	
Incremental Delay, d2		0.0		0.2	0.1						0.1	
Delay (s)		7.1		3.1	3.2						10.4	
Level of Service		A		A	A						B	
Approach Delay (s)		7.1			3.1			0.0			10.4	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	6.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	46.8%	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)	166	352	0	0	570	80	87	307	119	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			1.00			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.98			0.97				
Flt Protected		0.98			1.00			0.99				
Satd. Flow (prot)		5000			4979			3375				
Flt Permitted		0.71			1.00			0.99				
Satd. Flow (perm)		3584			4979			3375				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	166	352	0	0	570	80	87	307	119	0	0	0
RTOR Reduction (vph)	0	0	0	0	24	0	0	38	0	0	0	0
Lane Group Flow (vph)	0	518	0	0	626	0	0	475	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)		15.9			15.9			12.0				
Effective Green, g (s)		15.9			15.9			12.0				
Actuated g/C Ratio		0.42			0.42			0.32				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		1503			2088			1068				
v/s Ratio Prot					0.13			c0.14				
v/s Ratio Perm		c0.14										
v/c Ratio		0.34			0.30			0.45				
Uniform Delay, d1		7.5			7.3			10.3				
Progression Factor		0.49			1.00			1.00				
Incremental Delay, d2		0.1			0.0			0.1				
Delay (s)		3.7			7.3			10.4				
Level of Service		A			A			B				
Approach Delay (s)		3.7			7.3			10.4			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	52.5%	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)	45	458	26	57	635	55	19	203	57	60	201	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.97	
Flt Protected		1.00			1.00			1.00			0.99	
Satd. Flow (prot)		4938			4798			3391			3370	
Flt Permitted		0.85			0.86			0.92			0.84	
Satd. Flow (perm)		4194			4163			3127			2842	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	458	26	57	635	55	19	203	57	60	201	59
RTOR Reduction (vph)	0	7	0	0	11	0	0	29	0	0	24	0
Lane Group Flow (vph)	0	522	0	0	736	0	0	251	0	0	296	0
Confl. Peds. (#/hr)	6		1	1		6	17		21	21		17
Confl. Bikes (#/hr)			7			11			4			24
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		48.5			48.5			23.0			23.0	
Effective Green, g (s)		48.5			48.5			23.0			23.0	
Actuated g/C Ratio		0.61			0.61			0.29			0.29	
Clearance Time (s)		3.5			3.5			5.0			5.0	
Lane Grp Cap (vph)		2542			2523			899			817	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.18			0.08			c0.10	
v/c Ratio		0.21			0.29			0.28			0.36	
Uniform Delay, d1		7.1			7.5			22.1			22.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.3			0.8			1.2	
Delay (s)		7.3			7.8			22.8			23.9	
Level of Service		A			A			C			C	
Approach Delay (s)		7.3			7.8			22.8			23.9	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	107.3%	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)	42	517	91	53	536	10	106	231	109	30	85	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.96		1.00	0.97	1.00	1.00	0.95		1.00	0.97
Flpb, ped/bikes		1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3463	1500		3266	1543	1673	1827	1508		1833	1536
Flt Permitted		0.88	1.00		0.86	1.00	0.62	1.00	1.00		0.74	1.00
Satd. Flow (perm)		3042	1500		2812	1543	1092	1827	1508		1375	1536
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	42	517	91	53	536	10	106	231	109	30	85	16
RTOR Reduction (vph)	0	0	26	0	0	3	0	0	89	0	0	13
Lane Group Flow (vph)	0	559	65	0	589	7	106	231	20	0	115	3
Confl. Peds. (#/hr)	2		9	9		2	9		19	19		9
Confl. Bikes (#/hr)			21			5			13			7
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)		64.5	64.5		64.5	64.5	16.5	16.5	16.5		16.5	16.5
Effective Green, g (s)		64.5	64.5		64.5	64.5	16.5	16.5	16.5		16.5	16.5
Actuated g/C Ratio		0.72	0.72		0.72	0.72	0.18	0.18	0.18		0.18	0.18
Clearance Time (s)		5.5	5.5		5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		2180	1075		2015	1105	200	334	276		252	281
v/s Ratio Prot								c0.13				
v/s Ratio Perm		0.18	0.04		c0.21	0.00	0.10		0.01		0.08	0.00
v/c Ratio		0.26	0.06		0.29	0.01	0.53	0.69	0.07		0.46	0.01
Uniform Delay, d1		4.4	3.8		4.6	3.6	33.2	34.4	30.4		32.8	30.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.3	0.1		0.4	0.0	1.4	4.9	0.0		0.5	0.0
Delay (s)		4.7	3.9		4.9	3.6	34.6	39.3	30.5		33.2	30.1
Level of Service		A	A		A	A	C	D	C		C	C
Approach Delay (s)		4.6			4.9			36.0			32.8	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	93.3%	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)	118	620	114	35	541	54	312	408	77	105	330	121
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3479	1482	1761	3195	1540	1725	3441		1759	3375	
Flt Permitted		0.75	1.00	0.29	1.00	1.00	0.47	1.00		0.44	1.00	
Satd. Flow (perm)		2613	1482	536	3195	1540	847	3441		820	3375	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	118	620	114	35	541	54	312	408	77	105	330	121
RTOR Reduction (vph)	0	0	62	0	0	29	0	20	0	0	47	0
Lane Group Flow (vph)	0	738	52	35	541	25	312	465	0	105	404	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		39.0	39.0	39.0	39.0	39.0	36.5	36.5		36.5	36.5	
Effective Green, g (s)		39.0	39.0	39.0	39.0	39.0	36.5	36.5		36.5	36.5	
Actuated g/C Ratio		0.46	0.46	0.46	0.46	0.46	0.43	0.43		0.43	0.43	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		1198	679	245	1465	706	363	1477		352	1449	
v/s Ratio Prot					0.17			0.14			0.12	
v/s Ratio Perm		c0.28	0.04	0.07		0.02	c0.37			0.13		
v/c Ratio		0.62	0.08	0.14	0.37	0.04	0.86	0.31		0.30	0.28	
Uniform Delay, d1		17.4	12.9	13.3	15.0	12.7	21.9	16.0		15.9	15.7	
Progression Factor		1.00	1.00	1.44	1.40	2.37	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.4	0.2	1.2	0.7	0.1	19.5	0.3		0.7	0.1	
Delay (s)		19.7	13.1	20.3	21.7	30.1	41.4	16.3		16.5	15.9	
Level of Service		B	B	C	C	C	D	B		B	B	
Approach Delay (s)		18.8			22.3			26.1			16.0	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
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)	68	554	10	26	685	40	20	173	218	35	78	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96		1.00	0.92		0.96	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00		1.00	1.00		0.99	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1578	3154	1366	1573	3065	1374		3157	1144		2806	
Flt Permitted	0.39	1.00	1.00	0.44	1.00	1.00		0.91	1.00		0.87	
Satd. Flow (perm)	641	3154	1366	736	3065	1374		2882	1144		2473	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	68	554	10	26	685	40	20	173	218	35	78	98
RTOR Reduction (vph)	0	0	3	0	0	9	0	0	172	0	83	0
Lane Group Flow (vph)	68	554	7	26	685	31	0	193	46	0	128	0
Confl. Peds. (#/hr)	23		26	26		23	49		40	40		49
Confl. Bikes (#/hr)			13			4			20			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	63.7	63.7	63.7	63.7	63.7	63.7		12.8	12.8		12.8	
Effective Green, g (s)	63.7	63.7	63.7	63.7	63.7	63.7		12.8	12.8		12.8	
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.75	0.75		0.15	0.15		0.15	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	480	2363	1023	551	2296	1029		433	172		372	
v/s Ratio Prot		0.18			c0.22							
v/s Ratio Perm	0.11		0.01	0.04		0.02		c0.07	0.04		0.05	
v/c Ratio	0.14	0.23	0.01	0.05	0.30	0.03		0.45	0.26		0.34	
Uniform Delay, d1	3.0	3.2	2.7	2.8	3.4	2.7		32.9	31.9		32.3	
Progression Factor	2.02	2.23	2.55	0.67	1.40	0.71		1.00	1.00		1.00	
Incremental Delay, d2	0.5	0.2	0.0	0.2	0.3	0.1		0.3	0.3		0.2	
Delay (s)	6.5	7.4	6.8	2.0	5.1	2.0		33.1	32.2		32.5	
Level of Service	A	A	A	A	A	A		C	C		C	
Approach Delay (s)		7.3			4.9			32.7			32.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	234	485	528	366	158	89
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	3033	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	3033	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	234	485	528	366	158	89
RTOR Reduction (vph)	0	0	0	172	8	67
Lane Group Flow (vph)	234	485	528	194	162	10
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	16.6	65.7	45.1	45.1	11.3	11.3
Effective Green, g (s)	16.6	65.7	45.1	45.1	11.3	11.3
Actuated g/C Ratio	0.20	0.77	0.53	0.53	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	307	2391	1626	733	403	161
v/s Ratio Prot	c0.15	0.16	c0.17		c0.05	
v/s Ratio Perm				0.14		0.01
v/c Ratio	0.76	0.20	0.32	0.26	0.40	0.06
Uniform Delay, d1	32.3	2.6	11.3	10.9	33.8	32.2
Progression Factor	1.01	1.48	0.90	1.10	1.00	1.00
Incremental Delay, d2	9.5	0.2	0.0	0.1	0.2	0.1
Delay (s)	42.1	4.0	10.2	12.1	34.0	32.3
Level of Service	D	A	B	B	C	C
Approach Delay (s)		16.4	11.0		33.5	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.8%	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)	69	390	31	90	293	29	208	523	145	43	420	91
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00		1.00	1.00	0.83	1.00	0.99	
Flpb, ped/bikes	0.99	1.00			0.99		0.99	1.00	1.00	0.94	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1569	3129			3082		1571	3185	1180	1498	3072	
Flt Permitted	0.49	1.00			0.78		0.38	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	817	3129			2435		635	3185	1180	592	3072	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	69	390	31	90	293	29	208	523	145	43	420	91
RTOR Reduction (vph)	0	6	0	0	5	0	0	0	91	0	26	0
Lane Group Flow (vph)	69	415	0	0	407	0	208	523	54	43	485	0
Confl. Peds. (#/hr)	27		81	81		27	35		141	141		35
Confl. Bikes (#/hr)			21			15			52			17
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	45.6	45.6			45.6		31.4	31.4	31.4	31.4	31.4	
Effective Green, g (s)	45.6	45.6			45.6		31.4	31.4	31.4	31.4	31.4	
Actuated g/C Ratio	0.54	0.54			0.54		0.37	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	438	1678			1306		234	1176	435	218	1134	
v/s Ratio Prot		0.13						0.16			0.16	
v/s Ratio Perm	0.08				c0.17		c0.33		0.05	0.07		
v/c Ratio	0.16	0.25			0.31		0.89	0.44	0.12	0.20	0.43	
Uniform Delay, d1	10.0	10.5			11.0		25.2	20.2	17.7	18.2	20.1	
Progression Factor	0.73	0.76			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.3			0.0		30.1	0.1	0.0	0.2	0.1	
Delay (s)	8.1	8.3			11.0		55.3	20.3	17.8	18.4	20.2	
Level of Service	A	A			B		E	C	B	B	C	
Approach Delay (s)		8.3			11.0			28.2			20.0	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.9%	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)	114	538	110	279	259	36	9	1068	707	2	504	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3185	1349	3090	3185	1349		4574	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.94	1.00
Satd. Flow (perm)	3090	3185	1349	3090	3185	1349		4276	1391		4285	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	114	538	110	279	259	36	9	1068	707	2	504	50
RTOR Reduction (vph)	0	0	63	0	0	21	0	0	0	0	0	33
Lane Group Flow (vph)	114	538	47	279	259	15	0	1077	707	0	506	17
Confl. Peds. (#/hr)			40			40	40		40	40		40
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	8.9	34.7	34.7	13.5	39.3	39.3		31.8	95.0		31.8	31.8
Effective Green, g (s)	8.9	34.7	34.7	13.5	39.3	39.3		31.8	95.0		31.8	31.8
Actuated g/C Ratio	0.09	0.37	0.37	0.14	0.41	0.41		0.33	1.00		0.33	0.33
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	289	1163	492	439	1317	558		1431	1391		1434	451
v/s Ratio Prot	0.04	0.17		0.09	0.08							
v/s Ratio Perm			0.03			0.01		c0.25	c0.51		0.12	0.01
v/c Ratio	0.39	0.46	0.10	0.64	0.20	0.03		0.75	0.51		0.35	0.04
Uniform Delay, d1	40.5	23.0	19.8	38.4	17.8	16.5		28.1	0.0		23.8	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	0.9	1.3	0.4	3.0	0.3	0.1		2.3	1.3		0.2	0.0
Delay (s)	41.4	24.4	20.2	41.4	18.1	16.6		30.4	1.3		24.0	21.3
Level of Service	D	C	C	D	B	B		C	A		C	C
Approach Delay (s)		26.3			29.4			18.9			23.7	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.7%	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)	21	81	14	24	57	34	7	248	29	54	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.96			0.98			0.99	
Flt Protected		0.99			0.99			1.00			0.99	
Satd. Flow (prot)		3428			3318			3469			3459	
Flt Permitted		0.91			0.90			0.95			0.86	
Satd. Flow (perm)		3147			3022			3293			2997	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	81	14	24	57	34	7	248	29	54	218	18
RTOR Reduction (vph)	0	9	0	0	21	0	0	15	0	0	8	0
Lane Group Flow (vph)	0	107	0	0	94	0	0	269	0	0	282	0
Confl. Peds. (#/hr)	11		12	12		11	26		15	15		26
Confl. Bikes (#/hr)			5			3			8			19
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		23.5			23.5			27.5			27.5	
Effective Green, g (s)		23.5			23.5			27.5			27.5	
Actuated g/C Ratio		0.39			0.39			0.46			0.46	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Lane Grp Cap (vph)		1232			1183			1509			1373	
v/s Ratio Prot												
v/s Ratio Perm		c0.03			0.03			0.08			c0.09	
v/c Ratio		0.09			0.08			0.18			0.21	
Uniform Delay, d1		11.5			11.5			9.6			9.7	
Progression Factor		1.00			1.00			0.59			1.00	
Incremental Delay, d2		0.1			0.1			0.3			0.3	
Delay (s)		11.6			11.6			5.9			10.1	
Level of Service		B			B			A			B	
Approach Delay (s)		11.6			11.6			5.9			10.1	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.15		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	62.5%	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)	28	146	32	19	137	66	24	268	28	45	208	24
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		0.95			0.95		1.00	0.95			0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00			1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00			1.00	
Frt		0.98			0.96		1.00	0.99			0.99	
Flt Protected		0.99			1.00		0.95	1.00			0.99	
Satd. Flow (prot)		3403			3338		1746	3482			3453	
Flt Permitted		0.89			0.92		0.58	1.00			0.88	
Satd. Flow (perm)		3056			3081		1069	3482			3067	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	28	146	32	19	137	66	24	268	28	45	208	24
RTOR Reduction (vph)	0	26	0	0	53	0	0	8	0	0	7	0
Lane Group Flow (vph)	0	180	0	0	169	0	24	288	0	0	270	0
Confl. Peds. (#/hr)	9		61	61		9	43		17	17		43
Confl. Bikes (#/hr)			1			2			9			1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		10.8			10.8		37.5	37.5			37.5	
Effective Green, g (s)		10.8			10.8		37.5	37.5			37.5	
Actuated g/C Ratio		0.19			0.19		0.67	0.67			0.67	
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)		586			591		712	2319			2042	
v/s Ratio Prot								0.08				
v/s Ratio Perm		c0.06			0.05		0.02				c0.09	
v/c Ratio		0.31			0.29		0.03	0.12			0.13	
Uniform Delay, d1		19.5			19.5		3.2	3.4			3.4	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.3			0.3		0.1	0.1			0.1	
Delay (s)		19.8			19.7		3.3	3.5			3.6	
Level of Service		B			B		A	A			A	
Approach Delay (s)		19.8			19.7			3.5			3.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	56.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.0%	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)	48	228	16	89	203	35	14	191	52	63	144	33
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	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1751	3497		1749	3445			3403			3403	
Flt Permitted	0.60	1.00		0.60	1.00			0.94			0.83	
Satd. Flow (perm)	1113	3497		1105	3445			3201			2871	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	228	16	89	203	35	14	191	52	63	144	33
RTOR Reduction (vph)	0	9	0	0	20	0	0	29	0	0	19	0
Lane Group Flow (vph)	48	236	0	89	218	0	0	228	0	0	221	0
Confl. Peds. (#/hr)	21		24	24		21	7		20	20		7
Confl. Bikes (#/hr)			12			10			4			8
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	26.0	26.0		26.0	26.0			26.0			26.0	
Effective Green, g (s)	26.0	26.0		26.0	26.0			26.0			26.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.43			0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	482	1515		478	1492			1387			1244	
v/s Ratio Prot		0.07			0.06							
v/s Ratio Perm	0.04			c0.08				0.07			c0.08	
v/c Ratio	0.10	0.16		0.19	0.15			0.16			0.18	
Uniform Delay, d1	10.1	10.3		10.5	10.3			10.4			10.4	
Progression Factor	1.00	1.00		1.00	1.00			1.29			2.16	
Incremental Delay, d2	0.4	0.2		0.9	0.2			0.3			0.3	
Delay (s)	10.5	10.5		11.3	10.5			13.6			22.8	
Level of Service	B	B		B	B			B			C	
Approach Delay (s)		10.5			10.7			13.6			22.8	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.3%	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)	8	5	3	9	21	43	1	199	7	16	208	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.91			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		3338			3170			3518			3505	
Flt Permitted		0.89			0.94			0.95			0.94	
Satd. Flow (perm)		3062			2992			3359			3295	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	5	3	9	21	43	1	199	7	16	208	8
RTOR Reduction (vph)	0	2	0	0	30	0	0	3	0	0	3	0
Lane Group Flow (vph)	0	14	0	0	43	0	0	204	0	0	229	0
Confl. Peds. (#/hr)	5		4	4		5	10		12	12		10
Confl. Bikes (#/hr)						3			1			7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		18.5			18.5			34.5			34.5	
Effective Green, g (s)		18.5			18.5			34.5			34.5	
Actuated g/C Ratio		0.31			0.31			0.58			0.58	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		944			922			1931			1894	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.01			0.06			c0.07	
v/c Ratio		0.01			0.05			0.11			0.12	
Uniform Delay, d1		14.4			14.6			5.8			5.8	
Progression Factor		1.00			1.00			1.00			1.38	
Incremental Delay, d2		0.0			0.1			0.1			0.1	
Delay (s)		14.4			14.7			5.9			8.2	
Level of Service		B			B			A			A	
Approach Delay (s)		14.4			14.7			5.9			8.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.09		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	50.8%	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)	93	92	0	0	97	119	89	207	109	83	0	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.95		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2624		972	2887		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2624		972	2887		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	93	92	0	0	97	119	89	207	109	83	0	165
RTOR Reduction (vph)	0	0	0	0	95	0	0	53	0	0	0	138
Lane Group Flow (vph)	93	92	0	0	121	0	80	272	0	83	0	27
Confl. Peds. (#/hr)						17						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	7.2	21.6			10.9		10.8	10.8		8.8		8.8
Effective Green, g (s)	7.2	21.6			10.9		10.8	10.8		8.8		8.8
Actuated g/C Ratio	0.13	0.40			0.20		0.20	0.20		0.16		0.16
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	181	1319			527		193	575		252		401
v/s Ratio Prot	c0.07	0.03			c0.05		0.08	c0.09		c0.05		0.01
v/s Ratio Perm												
v/c Ratio	0.51	0.07			0.23		0.41	0.47		0.33		0.07
Uniform Delay, d1	21.9	10.1			18.1		18.9	19.2		20.1		19.2
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	1.0	0.0			0.2		1.1	0.4		0.6		0.1
Delay (s)	22.9	10.1			18.3		20.0	19.6		20.6		19.3
Level of Service	C	B			B		B	B		C		B
Approach Delay (s)		16.5			18.3			19.7			19.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	54.2	Sum of lost time (s)	16.5
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)	62	297	22	144	207	91	20	127	118	137	169	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		0.99	1.00	
Frt	1.00	0.99		1.00	0.95			0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3350		1770	3178			1710		1752	1785	
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.40	1.00	
Satd. Flow (perm)	1770	3350		1770	3178			1663		730	1785	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	297	22	144	207	91	20	127	118	137	169	37
RTOR Reduction (vph)	0	6	0	0	46	0	0	32	0	0	9	0
Lane Group Flow (vph)	62	313	0	144	252	0	0	233	0	137	197	0
Confl. Peds. (#/hr)			49			78	39		15	15		39
Confl. Bikes (#/hr)			12			8			10			24
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	11.9	45.2		11.6	44.9			22.2		22.2	22.2	
Effective Green, g (s)	11.9	45.2		11.6	44.9			22.2		22.2	22.2	
Actuated g/C Ratio	0.13	0.50		0.13	0.50			0.25		0.25	0.25	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	234	1682		228	1585			410		180	440	
v/s Ratio Prot	c0.04	c0.09		c0.08	0.08						0.11	
v/s Ratio Perm								0.14		c0.19		
v/c Ratio	0.26	0.19		0.63	0.16			0.57		0.76	0.45	
Uniform Delay, d1	35.1	12.3		37.2	12.3			29.7		31.4	28.7	
Progression Factor	0.84	0.86		1.27	0.67			1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.0		4.1	0.2			1.1		15.6	0.3	
Delay (s)	29.8	10.5		51.3	8.4			30.8		47.0	29.0	
Level of Service	C	B		D	A			C		D	C	
Approach Delay (s)		13.7			22.4			30.8			36.2	
Approach LOS		B			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	68.8%	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)	41	998	35	27	393	74	20	77	68	33	73	31
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	0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99			1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93			0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.99	
Satd. Flow (prot)	1760	3381		1055	3471	1486	1579	2050			3076	
Flt Permitted	0.51	1.00		0.20	1.00	1.00	0.67	1.00			0.88	
Satd. Flow (perm)	948	3381		227	3471	1486	1105	2050			2732	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	41	998	35	27	393	74	20	77	68	33	73	31
RTOR Reduction (vph)	0	3	0	0	0	33	0	44	0	0	20	0
Lane Group Flow (vph)	41	1030	0	27	393	41	20	101	0	0	117	0
Confl. Peds. (#/hr)	18		4	4		18	4		3	3		4
Confl. Bikes (#/hr)			9			7			9			
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0			28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0			28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35			0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0			4.0	
Lane Grp Cap (vph)	521	1859		124	1909	817	386	717			956	
v/s Ratio Prot		c0.30			0.11			c0.05				
v/s Ratio Perm	0.04			0.12		0.03	0.02				0.04	
v/c Ratio	0.08	0.55		0.22	0.21	0.05	0.05	0.14			0.12	
Uniform Delay, d1	8.5	11.6		9.2	9.1	8.3	17.2	17.8			17.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	0.3	1.2		4.0	0.2	0.1	0.3	0.4			0.3	
Delay (s)	8.8	12.8		13.2	9.4	8.4	17.5	18.2			17.9	
Level of Service	A	B		B	A	A	B	B			B	
Approach Delay (s)		12.7			9.4			18.1			17.9	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.3%	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)	59	737	49	25	289	37	131	221	31	58	71	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		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	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)	1667	4284		1769	4518		1752	1863	1549	1762	3539	1242
Flt Permitted	0.55	1.00		0.31	1.00		0.71	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	960	4284		576	4518		1307	1863	1549	1078	3539	1242
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	59	737	49	25	289	37	131	221	31	58	71	42
RTOR Reduction (vph)	0	9	0	0	19	0	0	0	18	0	0	24
Lane Group Flow (vph)	59	777	0	25	307	0	131	221	13	58	71	18
Confl. Peds. (#/hr)	5		1	1		5			7	7		
Confl. Bikes (#/hr)			9			3			8			
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	39.0	39.0		39.0	39.0		36.5	36.5	36.5	36.5	36.5	36.5
Effective Green, g (s)	39.0	39.0		39.0	39.0		36.5	36.5	36.5	36.5	36.5	36.5
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.43	0.43	0.43	0.43	0.43	0.43
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	440	1965		264	2072		561	799	665	462	1519	533
v/s Ratio Prot		c0.18			0.07			c0.12			0.02	
v/s Ratio Perm	0.06			0.04			0.10		0.01	0.05		0.01
v/c Ratio	0.13	0.40		0.09	0.15		0.23	0.28	0.02	0.13	0.05	0.03
Uniform Delay, d1	13.3	15.2		13.0	13.4		15.4	15.7	14.0	14.6	14.1	14.0
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	0.6	0.6		0.1	0.0		1.0	0.9	0.1	0.6	0.1	0.1
Delay (s)	13.9	15.8		13.1	13.4		16.4	16.6	14.0	15.2	14.2	14.2
Level of Service	B	B		B	B		B	B	B	B	B	B
Approach Delay (s)		15.7			13.3			16.3			14.5	
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	0.34		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	74.2%	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	18	152	200	48	87	0	0	107	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.98	1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00	1.00	0.99	1.00			1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3517	1550	1753	1111			2865	1548
Flt Permitted					0.99	1.00	0.68	1.00			1.00	1.00
Satd. Flow (perm)					3517	1550	1263	1111			2865	1548
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	18	152	200	48	87	0	0	107	24
RTOR Reduction (vph)	0	0	0	0	0	173	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	170	27	48	87	0	0	107	18
Confl. Peds. (#/hr)				10		10	10					10
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					12.3	12.3	68.2	68.2			68.2	68.2
Effective Green, g (s)					12.3	12.3	68.2	68.2			68.2	68.2
Actuated g/C Ratio					0.14	0.14	0.76	0.76			0.76	0.76
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					480	211	957	841			2171	1173
v/s Ratio Prot								c0.08			0.04	
v/s Ratio Perm					0.05	0.02	0.04					0.01
v/c Ratio					0.35	0.13	0.05	0.10			0.05	0.02
Uniform Delay, d1					35.2	34.1	2.7	2.9			2.7	2.7
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.0	0.0
Delay (s)					35.4	34.2	2.8	2.9			2.8	2.7
Level of Service					D	C	A	A			A	A
Approach Delay (s)		0.0			34.8			2.8			2.8	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	46.9%	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)	26	944	61	41	112	26	107	116	148	113	37	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.92		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (prot)	1770	3376		1770	3431		1770	1881		1610	2572	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.97	
Satd. Flow (perm)	1770	3376		1770	3431		1770	1881		1610	2572	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	61	41	112	26	107	116	148	113	37	13
RTOR Reduction (vph)	0	2	0	0	9	0	0	126	0	0	8	0
Lane Group Flow (vph)	26	1003	0	41	129	0	107	138	0	56	99	0
Confl. Peds. (#/hr)						1			2			6
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	2.4	38.8		4.3	41.2		12.4	12.4		10.9	10.9	
Effective Green, g (s)	2.4	38.8		4.3	41.2		12.4	12.4		10.9	10.9	
Actuated g/C Ratio	0.03	0.47		0.05	0.50		0.15	0.15		0.13	0.13	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	51	1589		92	1715		266	283		212	340	
v/s Ratio Prot	0.01	c0.30		c0.02	0.04		0.06	c0.07		0.03	c0.04	
v/s Ratio Perm												
v/c Ratio	0.51	0.63		0.45	0.08		0.40	0.49		0.26	0.29	
Uniform Delay, d1	39.4	16.4		37.9	10.7		31.6	32.1		32.1	32.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.8		2.5	0.0		1.1	1.4		0.7	0.5	
Delay (s)	42.3	17.2		40.4	10.7		32.7	33.5		32.8	32.7	
Level of Service	D	B		D	B		C	C		C	C	
Approach Delay (s)		17.9			17.5			33.3			32.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	82.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Existing + Preferred Project AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	666	97	161	728	83	100	137	119	82	265	64
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3450		1770	3539	1518	1770	1863	1541	1770	1801	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3450		1770	3539	1518	1770	1863	1541	1770	1801	
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)	41	724	105	175	791	90	109	149	129	89	288	70
RTOR Reduction (vph)	0	19	0	0	0	54	0	0	95	0	15	0
Lane Group Flow (vph)	41	810	0	175	791	36	109	149	34	89	343	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	1.5	18.9		7.0	24.4	24.4	4.0	16.1	16.1	3.1	15.2	
Effective Green, g (s)	1.5	18.9		7.0	24.4	24.4	4.0	16.1	16.1	3.1	15.2	
Actuated g/C Ratio	0.02	0.31		0.11	0.40	0.40	0.07	0.26	0.26	0.05	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)	43	1067		202	1413	606	115	490	406	89	448	
v/s Ratio Prot	0.02	c0.23		c0.10	0.22		c0.06	0.08		0.05	c0.19	
v/s Ratio Perm						0.02			0.02			
v/c Ratio	0.95	0.76		0.87	0.56	0.06	0.95	0.30	0.08	1.00	0.77	
Uniform Delay, d1	29.8	19.0		26.6	14.2	11.3	28.4	18.0	16.9	29.0	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	118.5	3.2		29.9	0.5	0.0	66.8	0.4	0.1	95.4	7.6	
Delay (s)	148.3	22.2		56.5	14.7	11.3	95.3	18.4	17.0	124.4	28.9	
Level of Service	F	C		E	B	B	F	B	B	F	C	
Approach Delay (s)		28.1			21.3			39.6			47.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	201	534	358	40	597	110	446	619	26	136	788	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.95		1.00	0.99		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.99		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	3167		1770	3413		3433	3508		1770	3347	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3167		1770	3413		3433	3508		1770	3347	
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	580	389	43	649	120	485	673	28	148	857	257
RTOR Reduction (vph)	0	101	0	0	14	0	0	3	0	0	25	0
Lane Group Flow (vph)	218	868	0	43	755	0	485	698	0	148	1089	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	15.8	37.6		6.6	28.4		17.1	39.7		13.1	34.7	
Effective Green, g (s)	15.8	37.6		6.6	28.4		17.1	39.7		13.1	34.7	
Actuated g/C Ratio	0.14	0.34		0.06	0.26		0.16	0.36		0.12	0.32	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	254	1082		106	881		533	1266		210	1055	
v/s Ratio Prot	c0.12	c0.27		0.02	0.22		c0.14	0.20		0.08	c0.33	
v/s Ratio Perm												
v/c Ratio	0.86	0.80		0.41	0.86		0.91	0.55		0.70	1.03	
Uniform Delay, d1	46.0	32.8		49.8	38.9		45.7	28.0		46.6	37.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.0	4.2		0.9	7.9		19.0	1.7		9.5	36.2	
Delay (s)	69.0	37.1		50.7	46.8		64.7	29.8		56.1	73.9	
Level of Service	E	D		D	D		E	C		E	E	
Approach Delay (s)		42.9			47.0			44.1			71.8	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	52.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	317	23	9	174	0	0	0	0	577	838	764
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3492			5068					1610	3369	1550
Flt Permitted		1.00			0.91					0.95	0.99	1.00
Satd. Flow (perm)		3492			4646					1610	3369	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	317	23	9	174	0	0	0	0	577	838	764
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	0	124
Lane Group Flow (vph)	0	334	0	0	183	0	0	0	0	456	959	640
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		16.0			16.0					52.0	52.0	52.0
Effective Green, g (s)		16.0			16.0					52.0	52.0	52.0
Actuated g/C Ratio		0.20			0.20					0.65	0.65	0.65
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		698			929					1046	2189	1007
v/s Ratio Prot		c0.10										
v/s Ratio Perm					0.04					0.28	0.28	c0.41
v/c Ratio		0.48			0.20					0.44	0.44	0.64
Uniform Delay, d1		28.3			26.6					6.8	6.9	8.4
Progression Factor		1.00			1.20					1.00	1.00	1.00
Incremental Delay, d2		2.3			0.5					1.3	0.6	3.1
Delay (s)		30.6			32.4					8.2	7.5	11.4
Level of Service		C			C					A	A	B
Approach Delay (s)		30.6			32.4			0.0			9.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	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)	199	715	0	0	165	244	4	309	28	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.96		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3386			3539	2666		5009				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3233			3539	2666		5009				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	199	715	0	0	165	244	4	309	28	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	198	0	13	0	0	0	0
Lane Group Flow (vph)	179	735	0	0	165	46	0	328	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	18.0	36.5			15.0	15.0		32.5				
Effective Green, g (s)	18.0	36.5			15.0	15.0		32.5				
Actuated g/C Ratio	0.22	0.46			0.19	0.19		0.41				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	362	1509			663	499		2034				
v/s Ratio Prot	0.11	c0.11			0.05							
v/s Ratio Perm		c0.11				0.02		0.07				
v/c Ratio	0.49	0.49			0.25	0.09		0.16				
Uniform Delay, d1	27.0	15.2			27.7	26.9		15.1				
Progression Factor	0.99	0.75			1.00	1.00		1.00				
Incremental Delay, d2	4.4	1.0			0.9	0.4		0.2				
Delay (s)	31.2	12.5			28.6	27.2		15.3				
Level of Service	C	B			C	C		B				
Approach Delay (s)		16.1			27.8			15.3			0.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	50.8%	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)	18	426	178	224	602	49	32	16	69	20	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3298		1243	1250	947	1203	1105	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3298		1243	1250	947	1203	1105	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	18	426	178	224	602	49	32	16	69	20	20	10
RTOR Reduction (vph)	0	0	118	0	3	0	0	0	61	0	9	0
Lane Group Flow (vph)	18	426	60	224	648	0	24	24	8	20	21	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	0.9	22.2	22.2	15.5	36.8		8.1	8.1	8.1	3.6	3.6	
Effective Green, g (s)	0.9	22.2	22.2	15.5	36.8		8.1	8.1	8.1	3.6	3.6	
Actuated g/C Ratio	0.01	0.34	0.34	0.24	0.56		0.12	0.12	0.12	0.05	0.05	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	24	1115	472	362	1841		152	153	116	65	60	
v/s Ratio Prot	0.01	0.13		c0.15	c0.20		c0.02	0.02		0.02	c0.02	
v/s Ratio Perm			0.04						0.01			
v/c Ratio	0.75	0.38	0.13	0.62	0.35		0.16	0.16	0.07	0.31	0.34	
Uniform Delay, d1	32.4	16.6	15.1	22.6	8.0		25.8	25.8	25.6	30.0	30.0	
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	77.3	0.3	0.1	2.2	0.1		0.5	0.5	0.3	1.0	1.2	
Delay (s)	109.7	16.9	15.3	24.8	8.1		26.3	26.3	25.8	30.9	31.3	
Level of Service	F	B	B	C	A		C	C	C	C	C	
Approach Delay (s)		19.1			12.4			26.0			31.1	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	16.5
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)	40	397	96	138	587	337	187	206	188	498	204	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.93		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1014	2958		1299	3438	1369	1480	2541		1480	2556	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (perm)	1014	2958		1299	3438	1369	1480	2541		1480	2556	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	397	96	138	587	337	187	206	188	498	204	76
RTOR Reduction (vph)	0	19	0	0	0	226	0	117	0	0	9	0
Lane Group Flow (vph)	40	474	0	138	587	111	187	277	0	259	510	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	6.5	23.4		16.1	33.0	33.0	18.0	18.0		26.6	26.6	
Effective Green, g (s)	6.5	23.4		16.1	33.0	33.0	18.0	18.0		26.6	26.6	
Actuated g/C Ratio	0.06	0.23		0.16	0.33	0.33	0.18	0.18		0.26	0.26	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	65	688		207	1127	449	264	454		391	675	
v/s Ratio Prot	0.04	c0.16		c0.11	0.17		c0.13	0.11		0.18	c0.20	
v/s Ratio Perm						0.08						
v/c Ratio	0.62	0.69		0.67	0.52	0.25	0.71	0.61		0.66	0.76	
Uniform Delay, d1	45.8	35.3		39.7	27.4	24.7	38.8	38.1		33.0	34.0	
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	2.9		7.9	0.4	0.3	7.8	2.0		3.8	4.6	
Delay (s)	61.9	38.2		47.6	27.8	25.0	46.6	40.0		36.8	38.6	
Level of Service	E	D		D	C	C	D	D		D	D	
Approach Delay (s)		39.9			29.5			42.1			38.0	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.6	Sum of lost time (s)	16.5
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)	0	966	127	144	665	0	0	0	0	130	200	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4899		1766	3343						3225	
Flt Permitted		1.00		0.23	1.00						0.99	
Satd. Flow (perm)		4899		435	3343						3225	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	966	127	144	665	0	0	0	0	130	200	145
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	73	0
Lane Group Flow (vph)	0	1079	0	144	665	0	0	0	0	0	402	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		42.3		42.3	42.3						16.3	
Effective Green, g (s)		42.3		42.3	42.3						16.3	
Actuated g/C Ratio		0.62		0.62	0.62						0.24	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		3020		268	2061						766	
v/s Ratio Prot		0.22			0.20						c0.12	
v/s Ratio Perm				c0.33								
v/c Ratio		0.36		0.54	0.32						0.52	
Uniform Delay, d1		6.5		7.5	6.3						22.8	
Progression Factor		1.00		0.65	0.55						1.00	
Incremental Delay, d2		0.0		0.9	0.0						0.3	
Delay (s)		6.5		5.8	3.5						23.1	
Level of Service		A		A	A						C	
Approach Delay (s)		6.5			3.9			0.0			23.1	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	98.5%	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)	270	826	0	0	676	353	133	322	113	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.95			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1765	3539			3328			3381				
Flt Permitted	0.24	1.00			1.00			0.99				
Satd. Flow (perm)	440	3539			3328			3381				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	826	0	0	676	353	133	322	113	0	0	0
RTOR Reduction (vph)	0	0	0	0	57	0	0	32	0	0	0	0
Lane Group Flow (vph)	270	826	0	0	972	0	0	536	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	42.3	42.3			42.3			16.3				
Effective Green, g (s)	42.3	42.3			42.3			16.3				
Actuated g/C Ratio	0.62	0.62			0.62			0.24				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	271	2182			2052			803				
v/s Ratio Prot		0.23			0.29			c0.16				
v/s Ratio Perm	c0.61											
v/c Ratio	1.00	0.38			0.47			0.67				
Uniform Delay, d1	13.1	6.6			7.1			23.7				
Progression Factor	0.65	0.38			1.00			1.00				
Incremental Delay, d2	51.9	0.0			0.1			1.6				
Delay (s)	60.5	2.5			7.2			25.3				
Level of Service	E	A			A			C				
Approach Delay (s)		16.8			7.2			25.3			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	98.5%	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)	19	473	38	53	1301	16	36	89	41	28	118	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		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)	1767	3428		1761	3399		1754	1760		1758	1786	
Flt Permitted	0.13	1.00		0.44	1.00		0.65	1.00		0.67	1.00	
Satd. Flow (perm)	250	3428		819	3399		1208	1760		1246	1786	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	19	473	38	53	1301	16	36	89	41	28	118	35
RTOR Reduction (vph)	0	7	0	0	1	0	0	21	0	0	13	0
Lane Group Flow (vph)	19	504	0	53	1316	0	36	109	0	28	140	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Effective Green, g (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30		0.30	0.30	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	148	2035		486	2018		362	528		373	535	
v/s Ratio Prot		0.15			c0.39			0.06			c0.08	
v/s Ratio Perm	0.08			0.06			0.03			0.02		
v/c Ratio	0.13	0.25		0.11	0.65		0.10	0.21		0.08	0.26	
Uniform Delay, d1	7.1	7.7		7.1	10.8		20.2	20.9		20.1	21.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	0.3		0.5	1.7		0.5	0.9		0.4	1.2	
Delay (s)	8.9	8.0		7.5	12.4		20.8	21.8		20.4	22.5	
Level of Service	A	A		A	B		C	C		C	C	
Approach Delay (s)		8.1			12.2			21.6			22.1	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	81.5%	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)	40	388	104	66	825	19	333	172	65	31	160	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3308			3259	1487	1652	1845	1508		1842	1519
Flt Permitted		0.84			0.86	1.00	0.58	1.00	1.00		0.94	1.00
Satd. Flow (perm)		2775			2820	1487	1010	1845	1508		1747	1519
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	388	104	66	825	19	333	172	65	31	160	244
RTOR Reduction (vph)	0	25	0	0	0	7	0	0	40	0	0	81
Lane Group Flow (vph)	0	507	0	0	891	12	333	172	25	0	191	163
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		46.4			46.4	46.4	34.6	34.6	34.6		34.6	34.6
Effective Green, g (s)		46.4			46.4	46.4	34.6	34.6	34.6		34.6	34.6
Actuated g/C Ratio		0.52			0.52	0.52	0.38	0.38	0.38		0.38	0.38
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1430			1453	766	388	709	579		671	583
v/s Ratio Prot								0.09				
v/s Ratio Perm		0.18			c0.32	0.01	c0.33		0.02		0.11	0.11
v/c Ratio		0.35			0.61	0.02	0.86	0.24	0.04		0.28	0.28
Uniform Delay, d1		12.9			15.4	10.6	25.4	18.8	17.3		19.1	19.1
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.7			1.9	0.0	16.3	0.1	0.0		0.1	0.1
Delay (s)		13.6			17.4	10.7	41.8	18.9	17.3		19.2	19.2
Level of Service		B			B	B	D	B	B		B	B
Approach Delay (s)		13.6			17.2			32.1			19.2	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	105.4%	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)	12	510	38	24	866	102	55	301	32	80	293	14
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3436	1510	1756	3252	1540	1658	3480		1756	3511	
Flt Permitted		0.93	1.00	0.45	1.00	1.00	0.53	1.00		0.50	1.00	
Satd. Flow (perm)		3215	1510	833	3252	1540	927	3480		923	3511	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	510	38	24	866	102	55	301	32	80	293	14
RTOR Reduction (vph)	0	0	12	0	0	26	0	14	0	0	6	0
Lane Group Flow (vph)	0	522	26	24	866	76	55	319	0	80	301	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		57.3	57.3	57.3	57.3	57.3	18.2	18.2		18.2	18.2	
Effective Green, g (s)		57.3	57.3	57.3	57.3	57.3	18.2	18.2		18.2	18.2	
Actuated g/C Ratio		0.67	0.67	0.67	0.67	0.67	0.21	0.21		0.21	0.21	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		2167	1017	561	2192	1038	198	745		197	751	
v/s Ratio Prot					c0.27			c0.09			0.09	
v/s Ratio Perm		0.16	0.02	0.03		0.05	0.06			0.09		
v/c Ratio		0.24	0.03	0.04	0.40	0.07	0.28	0.43		0.41	0.40	
Uniform Delay, d1		5.4	4.6	4.6	6.2	4.7	27.9	28.9		28.7	28.7	
Progression Factor		1.00	1.00	1.02	0.72	1.19	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3	0.0	0.1	0.5	0.1	1.6	0.8		1.9	0.5	
Delay (s)		5.7	4.6	4.9	4.9	5.8	29.5	29.7		30.6	29.2	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		5.6			5.0			29.7			29.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	70.9%	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)	55	512	20	52	826	28	15	102	178	36	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97		1.00	0.93		0.97	
Flpb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1582	3124	1361	1495	3185	1375		3155	1169		2843	
Flt Permitted	0.33	1.00	1.00	0.46	1.00	1.00		0.90	1.00		0.89	
Satd. Flow (perm)	550	3124	1361	729	3185	1375		2853	1169		2554	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	512	20	52	826	28	15	102	178	36	99	105
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	154	0	91	0
Lane Group Flow (vph)	55	512	15	52	826	21	0	117	24	0	149	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	64.9	64.9	64.9	64.9	64.9	64.9		11.6	11.6		11.6	
Effective Green, g (s)	64.9	64.9	64.9	64.9	64.9	64.9		11.6	11.6		11.6	
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.76	0.76		0.14	0.14		0.14	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	419	2385	1039	556	2431	1049		389	159		348	
v/s Ratio Prot		0.16			c0.26							
v/s Ratio Perm	0.10		0.01	0.07		0.02		0.04	0.02		c0.06	
v/c Ratio	0.13	0.21	0.01	0.09	0.34	0.02		0.30	0.15		0.43	
Uniform Delay, d1	2.6	2.8	2.4	2.6	3.2	2.4		33.0	32.4		33.7	
Progression Factor	0.87	0.87	0.80	0.65	0.83	0.67		1.00	1.00		1.00	
Incremental Delay, d2	0.6	0.2	0.0	0.3	0.3	0.0		0.2	0.2		0.3	
Delay (s)	2.9	2.7	1.9	1.9	3.0	1.7		33.2	32.5		34.0	
Level of Service	A	A	A	A	A	A		C	C		C	
Approach Delay (s)		2.7			2.9			32.8			34.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
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 (vph)	219	449	798	84	647	172
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3053	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3053	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	219	449	798	84	647	172
RTOR Reduction (vph)	0	0	0	36	3	113
Lane Group Flow (vph)	219	449	798	48	661	42
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	15.6	53.8	34.2	34.2	23.2	23.2
Effective Green, g (s)	15.6	53.8	34.2	34.2	23.2	23.2
Actuated g/C Ratio	0.18	0.63	0.40	0.40	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	292	1903	1221	540	833	325
v/s Ratio Prot	c0.14	0.15	c0.26		c0.22	
v/s Ratio Perm				0.04		0.04
v/c Ratio	0.75	0.24	0.65	0.09	0.79	0.13
Uniform Delay, d1	32.9	6.7	20.6	15.7	28.7	23.3
Progression Factor	1.09	1.17	1.04	0.89	1.00	1.00
Incremental Delay, d2	9.1	0.3	0.9	0.0	4.9	0.1
Delay (s)	44.8	8.2	22.3	14.0	33.6	23.4
Level of Service	D	A	C	B	C	C
Approach Delay (s)		20.2	21.6		31.6	
Approach LOS		C	C		C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	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)	82	586	53	80	661	61	92	352	76	51	305	96
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	0.99	1.00			1.00		0.97	1.00	1.00	0.96	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1571	3131			3113		1552	3185	1298	1535	3011	
Flt Permitted	0.33	1.00			0.82		0.36	1.00	1.00	0.42	1.00	
Satd. Flow (perm)	541	3131			2571		595	3185	1298	680	3011	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	82	586	53	80	661	61	92	352	76	51	305	96
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	61	0	49	0
Lane Group Flow (vph)	82	635	0	0	798	0	92	352	15	51	352	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	59.9	59.9			59.9		17.1	17.1	17.1	17.1	17.1	
Effective Green, g (s)	59.9	59.9			59.9		17.1	17.1	17.1	17.1	17.1	
Actuated g/C Ratio	0.70	0.70			0.70		0.20	0.20	0.20	0.20	0.20	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	381	2206			1811		119	640	261	136	605	
v/s Ratio Prot		0.20						0.11			0.12	
v/s Ratio Perm	0.15				c0.31		c0.15		0.01	0.07		
v/c Ratio	0.22	0.29			0.44		0.77	0.55	0.06	0.38	0.58	
Uniform Delay, d1	4.4	4.6			5.4		32.1	30.5	27.4	29.3	30.7	
Progression Factor	0.93	0.92			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.3			0.1		24.2	0.6	0.0	0.6	0.9	
Delay (s)	5.2	4.6			5.4		56.3	31.1	27.5	30.0	31.6	
Level of Service	A	A			A		E	C	C	C	C	
Approach Delay (s)		4.6			5.4			35.0			31.5	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.8%	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)	55	135	65	345	669	101	130	631	290	28	583	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4526	1352		4564	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72	1.00		0.88	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3303	1352		4002	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	135	65	345	669	101	130	631	290	28	583	83
RTOR Reduction (vph)	0	0	45	0	0	49	0	0	197	0	0	56
Lane Group Flow (vph)	55	135	20	345	669	52	0	761	93	0	611	27
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	5.9	27.4	27.4	18.8	40.3	40.3		28.8	28.8		28.8	28.8
Effective Green, g (s)	5.9	27.4	27.4	18.8	40.3	40.3		28.8	28.8		28.8	28.8
Actuated g/C Ratio	0.07	0.30	0.30	0.21	0.45	0.45		0.32	0.32		0.32	0.32
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	202	960	411	645	1426	605		1056	432		1280	432
v/s Ratio Prot	c0.02	0.04		c0.11	c0.21							
v/s Ratio Perm			0.01			0.04		c0.23	0.07		0.15	0.02
v/c Ratio	0.27	0.14	0.05	0.53	0.47	0.09		0.72	0.21		0.48	0.06
Uniform Delay, d1	40.0	22.7	22.1	31.7	17.4	14.3		27.0	22.3		24.6	21.2
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	0.7	0.3	0.2	0.9	1.1	0.3		2.4	0.3		0.3	0.1
Delay (s)	40.7	23.1	22.3	32.6	18.5	14.6		29.5	22.6		24.8	21.3
Level of Service	D	C	C	C	B	B		C	C		C	C
Approach Delay (s)		26.7			22.5			27.6			24.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: Existing + Proj Pref AM

Adeline & 18th
Existing + Preferred Project AM
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	231	2.0	0.353	6.3	LOS A	2.1	53.0	0.37	0.74	26.8
8	T	176	2.0	0.353	6.3	LOS A	2.1	53.0	0.37	0.46	29.7
18	R	29	2.0	0.353	6.3	LOS A	2.1	53.0	0.37	0.53	29.3
Approach		436	2.0	0.353	6.3	LOS A	2.1	53.0	0.37	0.61	28.0
East: 18th Street (WB)											
1	L	35	2.0	0.284	6.9	LOS A	1.4	34.6	0.57	0.90	26.9
6	T	182	2.0	0.284	6.9	LOS A	1.4	34.6	0.57	0.68	29.5
16	R	45	2.0	0.284	6.9	LOS A	1.4	34.6	0.57	0.73	29.1
Approach		262	2.0	0.284	6.9	LOS A	1.4	34.6	0.57	0.72	29.0
North: Adeline Street (SB)											
7	L	29	2.0	0.280	7.0	LOS A	1.3	33.7	0.58	0.93	26.9
4	T	207	2.0	0.280	7.0	LOS A	1.3	33.7	0.58	0.70	29.4
14	R	14	2.0	0.280	7.0	LOS A	1.3	33.7	0.58	0.75	29.1
Approach		250	2.0	0.280	7.0	LOS A	1.3	33.7	0.58	0.73	29.1
West: 18th Street (EB)											
5	L	8	2.0	0.116	4.4	LOS A	0.5	13.0	0.41	0.85	28.0
2	T	93	2.0	0.116	4.4	LOS A	0.5	13.0	0.41	0.53	31.2
12	R	23	2.0	0.116	4.4	LOS A	0.5	13.0	0.41	0.60	30.8
Approach		124	2.0	0.116	4.4	LOS A	0.5	13.0	0.41	0.57	30.9
All Vehicles		1072	2.0	0.353	6.4	LOS A	2.1	53.0	0.47	0.66	28.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	185	28	29	254	252	30	324	35	129	231	22
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	0.99		1.00	0.99		1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.98	1.00			0.99	
Frt	1.00	0.98		1.00	0.93		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1763	1814		1726	1703		1735	3459			3394	
Flt Permitted	0.19	1.00		0.56	1.00		0.53	1.00			0.74	
Satd. Flow (perm)	359	1814		1022	1703		960	3459			2556	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	185	28	29	254	252	30	324	35	129	231	22
RTOR Reduction (vph)	0	8	0	0	54	0	0	11	0	0	6	0
Lane Group Flow (vph)	22	205	0	29	452	0	30	348	0	0	376	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	20.7	20.7		20.7	20.7		37.2	37.2			37.2	
Effective Green, g (s)	20.7	20.7		20.7	20.7		37.2	37.2			37.2	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.56	0.56			0.56	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	112	569		321	534		541	1952			1442	
v/s Ratio Prot		0.11			c0.27			0.10				
v/s Ratio Perm	0.06			0.03			0.03				c0.15	
v/c Ratio	0.20	0.36		0.09	0.85		0.06	0.18			0.26	
Uniform Delay, d1	16.5	17.5		16.0	21.1		6.5	6.9			7.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.3	0.1		0.0	11.3		0.2	0.2			0.4	
Delay (s)	16.8	17.6		16.0	32.4		6.6	7.1			7.8	
Level of Service	B	B		B	C		A	A			A	
Approach Delay (s)		17.5			31.6			7.1			7.8	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: Existing + Proj Pref AM

Adeline & 14th
Existing + Preferred Project AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	24	2.0	0.373	6.9	LOS A	2.2	54.7	0.47	0.85	26.8
8	T	376	2.0	0.373	6.9	LOS A	2.2	54.7	0.47	0.56	29.6
18	R	25	2.0	0.373	6.9	LOS A	2.2	54.7	0.47	0.62	29.2
Approach		425	2.0	0.373	6.9	LOS A	2.2	54.7	0.47	0.58	29.4
East: 14th Street (WB)											
1	L	34	2.0	0.245	6.4	LOS A	1.1	28.9	0.55	0.90	27.1
6	T	148	2.0	0.245	6.4	LOS A	1.1	28.9	0.55	0.67	29.7
16	R	42	2.0	0.245	6.4	LOS A	1.1	28.9	0.55	0.72	29.4
Approach		224	2.0	0.245	6.4	LOS A	1.1	28.9	0.55	0.71	29.2
North: Adeline Street (SB)											
7	L	32	2.0	0.230	5.2	LOS A	1.1	29.1	0.40	0.84	27.6
4	T	205	2.0	0.230	5.2	LOS A	1.1	29.1	0.40	0.52	30.6
14	R	26	2.0	0.230	5.2	LOS A	1.1	29.1	0.40	0.59	30.2
Approach		263	2.0	0.230	5.2	LOS A	1.1	29.1	0.40	0.57	30.1
West: 14th Street (EB)											
5	L	23	2.0	0.176	5.0	LOS A	0.8	20.7	0.43	0.85	27.7
2	T	154	2.0	0.176	5.0	LOS A	0.8	20.7	0.43	0.55	30.8
12	R	11	2.0	0.176	5.0	LOS A	0.8	20.7	0.43	0.61	30.4
Approach		188	2.0	0.176	5.0	LOS A	0.8	20.7	0.43	0.59	30.4
All Vehicles		1100	2.0	0.373	6.1	LOS A	2.2	54.7	0.46	0.60	29.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Existing + Proj AM

Adeline & 12th
Existing + Preferred Project AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.234	4.6	LOS A	1.3	32.0	0.14	0.90	27.7
8	T	314	2.0	0.234	4.6	LOS A	1.3	32.0	0.14	0.42	31.2
18	R	5	2.0	0.234	4.6	LOS A	1.3	32.0	0.14	0.52	30.5
Approach		320	2.0	0.234	4.6	LOS A	1.3	32.0	0.14	0.42	31.1
East: 12th Street (WB)											
1	L	7	2.0	0.132	4.7	LOS A	0.6	14.8	0.45	0.82	27.8
6	T	29	2.0	0.132	4.7	LOS A	0.6	14.8	0.45	0.56	30.8
16	R	99	2.0	0.132	4.7	LOS A	0.6	14.8	0.45	0.61	30.4
Approach		135	2.0	0.132	4.7	LOS A	0.6	14.8	0.45	0.61	30.3
North: Adeline Street (SB)											
7	L	22	2.0	0.187	4.2	LOS A	0.9	24.1	0.15	0.88	27.9
4	T	227	2.0	0.187	4.2	LOS A	0.9	24.1	0.15	0.41	31.4
14	R	5	2.0	0.187	4.2	LOS A	0.9	24.1	0.15	0.51	30.8
Approach		254	2.0	0.187	4.2	LOS A	0.9	24.1	0.15	0.46	31.1
West: 12th Street (EB)											
5	L	2	2.0	0.009	3.4	LOS A	0.0	1.0	0.37	0.78	28.5
2	T	7	2.0	0.009	3.4	LOS A	0.0	1.0	0.37	0.46	31.9
12	R	1	2.0	0.009	3.4	LOS A	0.0	1.0	0.37	0.52	31.4
Approach		10	2.0	0.009	3.4	LOS A	0.0	1.0	0.37	0.53	31.1
All Vehicles		719	2.0	0.234	4.5	LOS A	1.3	32.0	0.21	0.47	31.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	32	0	0	162	291	277	227	196	216	0	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.90		1.00	0.94		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1020	3282			2821		1173	2763		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1020	3282			2821		1173	2763		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	32	0	0	162	291	277	227	196	216	0	196
RTOR Reduction (vph)	0	0	0	0	241	0	0	100	0	0	0	152
Lane Group Flow (vph)	38	32	0	0	212	0	238	362	0	216	0	44
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	4.6	20.1			12.0		21.1	21.1		15.6		15.6
Effective Green, g (s)	4.6	20.1			12.0		21.1	21.1		15.6		15.6
Actuated g/C Ratio	0.07	0.29			0.17		0.30	0.30		0.22		0.22
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	67	945			484		354	835		344		438
v/s Ratio Prot	c0.04	0.01			c0.08		c0.20	0.13		c0.14		0.02
v/s Ratio Perm												
v/c Ratio	0.57	0.03			0.44		0.67	0.43		0.63		0.10
Uniform Delay, d1	31.6	17.9			25.9		21.3	19.5		24.5		21.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	6.4	0.0			0.5		4.5	0.3		3.1		0.1
Delay (s)	38.0	17.9			26.3		25.8	19.8		27.6		21.6
Level of Service	D	B			C		C	B		C		C
Approach Delay (s)		28.8			26.3			21.9			24.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	61.6%	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)	72	470	24	135	496	171	17	64	61	100	128	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.96			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3189		1770	3265			1698		1756	1697	
Flt Permitted	0.95	1.00		0.95	1.00			0.86		0.46	1.00	
Satd. Flow (perm)	1770	3189		1770	3265			1465		845	1697	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	470	24	135	496	171	17	64	61	100	128	52
RTOR Reduction (vph)	0	3	0	0	28	0	0	31	0	0	17	0
Lane Group Flow (vph)	72	491	0	135	639	0	0	111	0	100	163	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	9.8	63.1		11.9	65.2			14.0		14.0	14.0	
Effective Green, g (s)	9.8	63.1		11.9	65.2			14.0		14.0	14.0	
Actuated g/C Ratio	0.10	0.63		0.12	0.65			0.14		0.14	0.14	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	173	2012		210	2128			205		118	237	
v/s Ratio Prot	c0.04	0.15		c0.08	c0.20						0.10	
v/s Ratio Perm								0.08		c0.12		
v/c Ratio	0.42	0.24		0.64	0.30			0.54		0.85	0.69	
Uniform Delay, d1	42.4	8.0		42.0	7.5			40.0		42.0	40.9	
Progression Factor	1.20	1.32		1.09	0.31			1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.0		4.9	0.4			1.6		38.6	6.4	
Delay (s)	51.5	10.6		50.6	2.7			41.6		80.6	47.4	
Level of Service	D	B		D	A			D		F	D	
Approach Delay (s)		15.8			10.8			41.6			59.2	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
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)	30	620	56	69	839	254	13	54	20	38	65	33
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1761	3268		1024	3471	1492	1346	933		1751	1461	
Flt Permitted	0.30	1.00		0.36	1.00	1.00	0.69	1.00		0.71	1.00	
Satd. Flow (perm)	548	3268		393	3471	1492	977	933		1306	1461	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	620	56	69	839	254	13	54	20	38	65	33
RTOR Reduction (vph)	0	7	0	0	0	91	0	14	0	0	18	0
Lane Group Flow (vph)	30	669	0	69	839	163	13	60	0	38	80	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	4.0	
Lane Grp Cap (vph)	350	2091		251	2221	954	273	261		365	409	
v/s Ratio Prot		0.20			c0.24			c0.06			0.05	
v/s Ratio Perm	0.05			0.18		0.11	0.01			0.03		
v/c Ratio	0.09	0.32		0.27	0.38	0.17	0.05	0.23		0.10	0.20	
Uniform Delay, d1	6.9	8.1		7.9	8.5	7.3	26.3	27.7		26.7	27.4	
Progression Factor	0.39	0.34		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4		2.7	0.5	0.4	0.3	2.1		0.6	1.1	
Delay (s)	3.1	3.1		10.6	9.0	7.7	26.6	29.8		27.3	28.5	
Level of Service	A	A		B	A	A	C	C		C	C	
Approach Delay (s)		3.1			8.8			29.3			28.1	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.0%	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)	137	453	78	51	619	33	381	180	14	47	106	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		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)	1579	4094		1757	4573		1761	1810	1541	1749	3539	1246
Flt Permitted	0.34	1.00		0.42	1.00		0.69	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	564	4094		772	4573		1270	1810	1541	1185	3539	1246
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	137	453	78	51	619	33	381	180	14	47	106	193
RTOR Reduction (vph)	0	42	0	0	10	0	0	0	6	0	0	77
Lane Group Flow (vph)	137	489	0	51	642	0	381	180	8	47	106	116
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.4	22.4		22.4	22.4		43.1	43.1	43.1	43.1	43.1	43.1
Effective Green, g (s)	22.4	22.4		22.4	22.4		43.1	43.1	43.1	43.1	43.1	43.1
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	168	1222		230	1365		729	1040	885	680	2033	716
v/s Ratio Prot		0.12			0.14			0.10			0.03	
v/s Ratio Perm	c0.24			0.07			c0.30		0.01	0.04		0.09
v/c Ratio	0.82	0.40		0.22	0.47		0.52	0.17	0.01	0.07	0.05	0.16
Uniform Delay, d1	24.4	20.9		19.8	21.5		9.7	7.5	6.8	7.1	7.0	7.5
Progression Factor	1.00	1.00		1.00	1.00		1.11	1.15	1.74	1.00	1.00	1.00
Incremental Delay, d2	24.1	0.1		0.2	0.1		2.5	0.3	0.0	0.2	0.0	0.5
Delay (s)	48.5	21.0		19.9	21.6		13.3	9.0	11.9	7.3	7.0	8.0
Level of Service	D	C		B	C		B	A	B	A	A	A
Approach Delay (s)		26.7			21.4			11.9			7.6	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	74.8%	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)	0	0	0	177	243	470	23	52	0	0	161	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3465	1562	1770	990			3167	1557
Flt Permitted					0.98	1.00	0.65	1.00			1.00	1.00
Satd. Flow (perm)					3465	1562	1211	990			3167	1557
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	177	243	470	23	52	0	0	161	50
RTOR Reduction (vph)	0	0	0	0	0	363	0	0	0	0	0	18
Lane Group Flow (vph)	0	0	0	0	420	107	23	52	0	0	161	32
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					17.0	17.0	48.5	48.5			48.5	48.5
Effective Green, g (s)					17.0	17.0	48.5	48.5			48.5	48.5
Actuated g/C Ratio					0.23	0.23	0.65	0.65			0.65	0.65
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					785	354	783	640			2047	1006
v/s Ratio Prot								c0.05			0.05	
v/s Ratio Perm					0.12	0.07	0.02					0.02
v/c Ratio					0.54	0.30	0.03	0.08			0.08	0.03
Uniform Delay, d1					25.5	24.1	4.8	4.9			4.9	4.8
Progression Factor					1.00	1.00	1.00	1.00			0.76	0.83
Incremental Delay, d2					0.4	0.2	0.0	0.0			0.1	0.1
Delay (s)					25.9	24.2	4.8	5.0			3.8	4.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			25.0			4.9			3.9	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	45.3%	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)	22	634	114	85	177	24	56	43	133	168	49	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.89		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3301		1770	3421		1770	873		1770	1217	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3301		1770	3421		1770	873		1770	1217	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	634	114	85	177	24	56	43	133	168	49	36
RTOR Reduction (vph)	0	8	0	0	6	0	0	77	0	0	18	0
Lane Group Flow (vph)	22	740	0	85	195	0	56	99	0	168	67	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	2.3	30.8		8.0	37.0		16.6	16.6		15.2	15.2	
Effective Green, g (s)	2.3	30.8		8.0	37.0		16.6	16.6		15.2	15.2	
Actuated g/C Ratio	0.03	0.36		0.09	0.43		0.19	0.19		0.18	0.18	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	47	1174		163	1461		339	167		310	213	
v/s Ratio Prot	0.01	c0.22		c0.05	0.06		0.03	c0.11		c0.09	0.05	
v/s Ratio Perm												
v/c Ratio	0.47	0.63		0.52	0.13		0.17	0.59		0.54	0.31	
Uniform Delay, d1	41.5	23.2		37.5	15.1		29.2	31.9		32.5	31.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	1.1		2.3	0.0		0.2	5.7		1.9	0.8	
Delay (s)	44.2	24.3		39.8	15.1		29.5	37.6		34.5	32.0	
Level of Service	D	C		D	B		C	D		C	C	
Approach Delay (s)		24.9			22.4			35.7			33.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	86.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Existing + Preferred Project PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑	↱	↰	↱	
Volume (vph)	73	778	67	107	550	85	52	176	104	143	252	56
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3484		1770	3539	1517	1770	1863	1536	1770	1805	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3484		1770	3539	1517	1770	1863	1536	1770	1805	
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)	79	846	73	116	598	92	57	191	113	155	274	61
RTOR Reduction (vph)	0	10	0	0	0	61	0	0	91	0	14	0
Lane Group Flow (vph)	79	909	0	116	598	31	57	191	22	155	321	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.7	17.9		3.6	18.8	18.8	3.2	10.8	10.8	7.6	15.2	
Effective Green, g (s)	2.7	17.9		3.6	18.8	18.8	3.2	10.8	10.8	7.6	15.2	
Actuated g/C Ratio	0.05	0.32		0.06	0.34	0.34	0.06	0.19	0.19	0.14	0.27	
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)	85	1115		113	1190	510	101	359	296	240	490	
v/s Ratio Prot	0.04	c0.26		c0.07	0.17		0.03	0.10		c0.09	c0.18	
v/s Ratio Perm						0.02			0.01			
v/c Ratio	0.93	0.82		1.03	0.50	0.06	0.56	0.53	0.07	0.65	0.66	
Uniform Delay, d1	26.5	17.5		26.1	14.8	12.6	25.7	20.3	18.5	22.9	18.0	
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	73.4	4.7		92.0	0.3	0.1	7.0	1.5	0.1	5.9	3.2	
Delay (s)	99.9	22.2		118.1	15.2	12.6	32.7	21.8	18.6	28.7	21.2	
Level of Service	F	C		F	B	B	C	C	B	C	C	
Approach Delay (s)		28.3			29.7			22.5			23.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	55.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	702	343	25	391	118	361	862	14	163	909	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.97		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3233		1770	3353		3433	3527		1770	3434	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3233		1770	3353		3433	3527		1770	3434	
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)	297	763	373	27	425	128	392	937	15	177	988	142
RTOR Reduction (vph)	0	50	0	0	25	0	0	1	0	0	10	0
Lane Group Flow (vph)	297	1086	0	27	528	0	392	951	0	177	1120	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	14.9	37.5		6.6	29.2		13.0	39.1		13.8	38.9	
Effective Green, g (s)	14.9	37.5		6.6	29.2		13.0	39.1		13.8	38.9	
Actuated g/C Ratio	0.14	0.34		0.06	0.27		0.12	0.36		0.13	0.35	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	239	1102		106	890		405	1253		222	1214	
v/s Ratio Prot	c0.17	c0.34		0.02	0.16		c0.11	0.27		0.10	c0.33	
v/s Ratio Perm												
v/c Ratio	1.24	0.99		0.25	0.59		0.97	0.76		0.80	0.92	
Uniform Delay, d1	47.5	36.0		49.4	35.2		48.3	31.3		46.7	34.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	139.4	23.4		0.5	0.7		35.8	4.3		17.3	12.9	
Delay (s)	187.0	59.4		49.8	35.9		84.1	35.6		64.0	47.0	
Level of Service	F	E		D	D		F	D		E	D	
Approach Delay (s)		85.8			36.6			49.8			49.3	
Approach LOS		F			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	59.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	793	35	10	235	0	0	0	0	340	242	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.98	1.00
Satd. Flow (prot)		3510			5074					1610	3327	1540
Flt Permitted		1.00			0.90					0.95	0.98	1.00
Satd. Flow (perm)		3510			4597					1610	3327	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	793	35	10	235	0	0	0	0	340	242	401
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	211
Lane Group Flow (vph)	0	824	0	0	245	0	0	0	0	190	392	190
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		30.0			30.0					38.0	38.0	38.0
Effective Green, g (s)		30.0			30.0					38.0	38.0	38.0
Actuated g/C Ratio		0.38			0.38					0.48	0.48	0.48
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1316			1723					764	1580	731
v/s Ratio Prot		c0.23										
v/s Ratio Perm					0.05					0.12	0.12	c0.12
v/c Ratio		0.63			0.14					0.25	0.25	0.26
Uniform Delay, d1		20.4			16.5					12.5	12.5	12.6
Progression Factor		1.00			0.31					1.00	1.00	1.00
Incremental Delay, d2		2.3			0.2					0.8	0.4	0.9
Delay (s)		22.7			5.2					13.3	12.9	13.4
Level of Service		C			A					B	B	B
Approach Delay (s)		22.7			5.2			0.0			13.2	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.1%	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)	513	631	0	0	247	777	18	966	78	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	0.99			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3359			3539	2704		5014				
Flt Permitted	0.95	0.77			1.00	1.00		1.00				
Satd. Flow (perm)	1610	2622			3539	2704		5014				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	513	631	0	0	247	777	18	966	78	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	55	0	11	0	0	0	0
Lane Group Flow (vph)	369	775	0	0	247	722	0	1051	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	12.0	42.0			26.5	26.5		27.0				
Effective Green, g (s)	12.0	42.0			26.5	26.5		27.0				
Actuated g/C Ratio	0.15	0.52			0.33	0.33		0.34				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	241	1487			1172	895		1692				
v/s Ratio Prot	c0.23	0.08			0.07							
v/s Ratio Perm		0.20				c0.27		0.21				
v/c Ratio	1.53	0.52			0.21	0.81		0.62				
Uniform Delay, d1	34.0	12.4			19.2	24.4		22.2				
Progression Factor	1.02	2.41			1.00	1.00		1.00				
Incremental Delay, d2	256.5	1.1			0.4	7.7		1.7				
Delay (s)	291.1	31.1			19.6	32.1		23.9				
Level of Service	F	C			B	C		C				
Approach Delay (s)		114.9			29.1			23.9			0.0	
Approach LOS		F			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	57.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	85.3%	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)	6	345	67	66	772	20	305	22	206	33	10	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3375		1649	1528	1244	1480	1405	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3375		1649	1528	1244	1480	1405	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	6	345	67	66	772	20	305	22	206	33	10	30
RTOR Reduction (vph)	0	0	46	0	1	0	0	0	157	0	27	0
Lane Group Flow (vph)	6	345	21	66	791	0	162	165	49	33	13	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	0.9	20.7	20.7	7.6	27.4		15.8	15.8	15.8	5.7	5.7	
Effective Green, g (s)	0.9	20.7	20.7	7.6	27.4		15.8	15.8	15.8	5.7	5.7	
Actuated g/C Ratio	0.01	0.31	0.31	0.11	0.41		0.24	0.24	0.24	0.09	0.09	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	24	1034	379	147	1394		392	364	296	127	120	
v/s Ratio Prot	0.00	0.10		c0.05	c0.23		0.10	c0.11		c0.02	0.01	
v/s Ratio Perm			0.02						0.04			
v/c Ratio	0.25	0.33	0.06	0.45	0.57		0.41	0.45	0.17	0.26	0.10	
Uniform Delay, d1	32.4	17.5	16.0	27.4	14.9		21.3	21.6	20.0	28.3	27.9	
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	5.4	0.3	0.1	2.2	0.8		1.0	1.2	0.4	1.1	0.4	
Delay (s)	37.8	17.8	16.1	29.6	15.7		22.3	22.8	20.4	29.4	28.3	
Level of Service	D	B	B	C	B		C	C	C	C	C	
Approach Delay (s)		17.8			16.7			21.7			28.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	54.3%	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)	115	339	126	194	689	520	139	272	227	240	158	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.93		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1337	3058		1687	3406	1509	1444	2944		1369	2778	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (perm)	1337	3058		1687	3406	1509	1444	2944		1369	2778	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	115	339	126	194	689	520	139	272	227	240	158	23
RTOR Reduction (vph)	0	32	0	0	0	364	0	105	0	0	5	0
Lane Group Flow (vph)	115	433	0	194	689	156	139	394	0	139	277	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	14.4	25.4		16.8	27.8	27.8	18.2	18.2		15.8	15.8	
Effective Green, g (s)	14.4	25.4		16.8	27.8	27.8	18.2	18.2		15.8	15.8	
Actuated g/C Ratio	0.16	0.27		0.18	0.30	0.30	0.20	0.20		0.17	0.17	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	207	837		305	1021	452	283	578		233	473	
v/s Ratio Prot	0.09	0.14		c0.12	c0.20		0.10	c0.13		c0.10	0.10	
v/s Ratio Perm						0.10						
v/c Ratio	0.56	0.52		0.64	0.67	0.35	0.49	0.68		0.60	0.59	
Uniform Delay, d1	36.2	28.5		35.1	28.5	25.3	33.1	34.6		35.5	35.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	0.5		4.3	1.8	0.5	1.0	3.0		3.4	1.5	
Delay (s)	39.4	29.0		39.4	30.3	25.8	34.1	37.6		38.9	37.0	
Level of Service	D	C		D	C	C	C	D		D	D	
Approach Delay (s)		31.1			29.9			36.8			37.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	16.5
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)	0	633	137	179	937	0	0	0	0	452	384	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4811		1762	3312						3278	
Flt Permitted		1.00		0.33	1.00						0.98	
Satd. Flow (perm)		4811		603	3312						3278	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	633	137	179	937	0	0	0	0	452	384	285
RTOR Reduction (vph)	0	38	0	0	0	0	0	0	0	0	40	0
Lane Group Flow (vph)	0	732	0	179	937	0	0	0	0	0	1081	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		42.1		42.1	42.1						31.7	
Effective Green, g (s)		42.1		42.1	42.1						31.7	
Actuated g/C Ratio		0.50		0.50	0.50						0.38	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2416		302	1663						1240	
v/s Ratio Prot		0.15			0.28						c0.33	
v/s Ratio Perm				c0.30								
v/c Ratio		0.30		0.59	0.56						0.87	
Uniform Delay, d1		12.2		14.8	14.5						24.2	
Progression Factor		1.00		0.35	0.34						1.00	
Incremental Delay, d2		0.0		1.5	0.2						6.7	
Delay (s)		12.3		6.6	5.1						30.9	
Level of Service		B		A	A						C	
Approach Delay (s)		12.3			5.3			0.0			30.9	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	119.5%	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)	241	844	0	0	965	298	151	408	214	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.96				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3391			3339				
Flt Permitted	0.12	1.00			1.00			0.99				
Satd. Flow (perm)	221	3539			3391			3339				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	241	844	0	0	965	298	151	408	214	0	0	0
RTOR Reduction (vph)	0	0	0	0	32	0	0	48	0	0	0	0
Lane Group Flow (vph)	241	844	0	0	1231	0	0	725	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	42.1	42.1			42.1			31.7				
Effective Green, g (s)	42.1	42.1			42.1			31.7				
Actuated g/C Ratio	0.50	0.50			0.50			0.38				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	111	1777			1703			1263				
v/s Ratio Prot		0.24			0.36			c0.22				
v/s Ratio Perm	c1.09											
v/c Ratio	2.17	0.47			0.72			0.57				
Uniform Delay, d1	20.8	13.6			16.3			20.7				
Progression Factor	1.07	0.96			1.00			1.00				
Incremental Delay, d2	552.0	0.1			1.3			0.4				
Delay (s)	574.3	13.1			17.6			21.1				
Level of Service	F	B			B			C				
Approach Delay (s)		137.8			17.6			21.1			0.0	
Approach LOS		F			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	60.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	119.5%	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)	47	1377	26	57	1049	56	26	206	57	65	214	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.97		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)	1767	3461		1768	3350		1757	1792		1760	1789	
Flt Permitted	0.20	1.00		0.12	1.00		0.46	1.00		0.47	1.00	
Satd. Flow (perm)	366	3461		221	3350		844	1792		877	1789	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	47	1377	26	57	1049	56	26	206	57	65	214	60
RTOR Reduction (vph)	0	2	0	0	5	0	0	12	0	0	13	0
Lane Group Flow (vph)	47	1401	0	57	1100	0	26	251	0	65	261	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Effective Green, g (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.29	0.29		0.29	0.29	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	221	2098		133	2030		242	515		252	514	
v/s Ratio Prot		c0.40			0.33			0.14			c0.15	
v/s Ratio Perm	0.13			0.26			0.03			0.07		
v/c Ratio	0.21	0.67		0.43	0.54		0.11	0.49		0.26	0.51	
Uniform Delay, d1	7.1	10.4		8.4	9.2		21.0	23.6		21.9	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	1.7		9.8	1.0		0.9	3.3		2.5	3.6	
Delay (s)	9.3	12.1		18.2	10.3		21.8	26.9		24.4	27.3	
Level of Service	A	B		B	B		C	C		C	C	
Approach Delay (s)		12.0			10.7			26.4			26.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	81.8%	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)	97	1145	339	80	687	15	234	290	131	45	178	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			0.99	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3321			3256	1490	1655	1827	1504		1839	1500
Flt Permitted		0.82			0.59	1.00	0.49	1.00	1.00		0.84	1.00
Satd. Flow (perm)		2740			1941	1490	855	1827	1504		1553	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	97	1145	339	80	687	15	234	290	131	45	178	149
RTOR Reduction (vph)	0	24	0	0	0	6	0	0	42	0	0	105
Lane Group Flow (vph)	0	1557	0	0	767	9	234	290	89	0	223	44
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		54.5			54.5	54.5	26.5	26.5	26.5		26.5	26.5
Effective Green, g (s)		54.5			54.5	54.5	26.5	26.5	26.5		26.5	26.5
Actuated g/C Ratio		0.61			0.61	0.61	0.29	0.29	0.29		0.29	0.29
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1659			1175	902	251	537	442		457	441
v/s Ratio Prot								0.16				
v/s Ratio Perm		c0.57			0.40	0.01	c0.27		0.06		0.14	0.03
v/c Ratio		0.94			1.05dl	0.01	0.93	0.54	0.20		0.49	0.10
Uniform Delay, d1		16.2			11.6	7.0	30.9	26.6	23.8		26.2	23.1
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		11.7			2.8	0.0	38.3	0.6	0.1		0.3	0.0
Delay (s)		27.9			14.4	7.1	69.1	27.2	23.9		26.5	23.1
Level of Service		C			B	A	E	C	C		C	C
Approach Delay (s)		27.9			14.3			41.5			25.1	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	123.7%	ICU Level of Service	H
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)	133	1218	177	35	699	75	325	449	77	116	381	135
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3489	1482	1770	3195	1540	1726	3449		1759	3379	
Flt Permitted		0.70	1.00	0.11	1.00	1.00	0.43	1.00		0.42	1.00	
Satd. Flow (perm)		2471	1482	201	3195	1540	778	3449		781	3379	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	133	1218	177	35	699	75	325	449	77	116	381	135
RTOR Reduction (vph)	0	0	68	0	0	42	0	10	0	0	43	0
Lane Group Flow (vph)	0	1351	109	35	699	33	325	516	0	116	473	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		37.1	37.1	37.1	37.1	37.1	38.4	38.4		38.4	38.4	
Effective Green, g (s)		37.1	37.1	37.1	37.1	37.1	38.4	38.4		38.4	38.4	
Actuated g/C Ratio		0.44	0.44	0.44	0.44	0.44	0.45	0.45		0.45	0.45	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		1078	646	87	1394	672	351	1558		352	1526	
v/s Ratio Prot					0.22			0.15			0.14	
v/s Ratio Perm		c0.55	0.07	0.17		0.02	c0.42			0.15		
v/c Ratio		1.25	0.17	0.40	0.50	0.05	0.93	0.33		0.33	0.31	
Uniform Delay, d1		23.9	14.6	16.4	17.3	13.8	22.0	15.0		15.0	14.9	
Progression Factor		1.00	1.00	0.71	0.87	0.69	1.00	1.00		1.00	1.00	
Incremental Delay, d2		121.7	0.6	12.4	1.2	0.1	30.7	0.3		0.8	0.2	
Delay (s)		145.6	15.1	24.1	16.2	9.6	52.7	15.3		15.8	15.0	
Level of Service		F	B	C	B	A	D	B		B	B	
Approach Delay (s)		130.5			15.9			29.6			15.1	
Approach LOS		F			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	64.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	111.1%	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)	68	1161	10	26	864	40	20	173	242	35	78	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1583	3154	1361	1585	3065	1375		3160	1169		2841	
Flt Permitted	0.30	1.00	1.00	0.20	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	492	3154	1361	328	3065	1375		2906	1169		2530	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	68	1161	10	26	864	40	20	173	242	35	78	98
RTOR Reduction (vph)	0	0	3	0	0	10	0	0	25	0	63	0
Lane Group Flow (vph)	68	1161	7	26	864	30	0	193	217	0	148	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	55.3	55.3	55.3	55.3	55.3	55.3		21.2	21.2		21.2	
Effective Green, g (s)	55.3	55.3	55.3	55.3	55.3	55.3		21.2	21.2		21.2	
Actuated g/C Ratio	0.65	0.65	0.65	0.65	0.65	0.65		0.25	0.25		0.25	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	320	2051	885	213	1994	894		724	291		631	
v/s Ratio Prot		c0.37			0.28							
v/s Ratio Perm	0.14		0.00	0.08		0.02		0.07	c0.19		0.06	
v/c Ratio	0.21	0.57	0.01	0.12	0.43	0.03		0.27	0.75		0.23	
Uniform Delay, d1	6.0	8.2	5.2	5.6	7.2	5.3		25.6	29.4		25.4	
Progression Factor	1.34	1.35	1.78	1.15	1.26	1.21		1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.1	0.0	1.0	0.6	0.1		0.1	8.8		0.1	
Delay (s)	8.2	11.2	9.3	7.5	9.7	6.5		25.7	38.2		25.5	
Level of Service	A	B	A	A	A	A		C	D		C	
Approach Delay (s)		11.0			9.5			32.7			25.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: W. Grand Avenue & Northgate Avenue

10/6/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	540	810	703	366	158	94
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	3023	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	3023	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	540	810	703	366	158	94
RTOR Reduction (vph)	0	0	0	227	11	68
Lane Group Flow (vph)	540	810	703	139	163	10
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	36.2	65.7	25.5	25.5	11.3	11.3
Effective Green, g (s)	36.2	65.7	25.5	25.5	11.3	11.3
Actuated g/C Ratio	0.43	0.77	0.30	0.30	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	671	2391	919	414	401	161
v/s Ratio Prot	c0.34	0.26	c0.23		c0.05	
v/s Ratio Perm				0.10		0.01
v/c Ratio	0.80	0.34	0.76	0.34	0.41	0.06
Uniform Delay, d1	21.3	3.0	27.0	23.2	33.8	32.2
Progression Factor	0.95	1.29	1.00	1.26	1.00	1.00
Incremental Delay, d2	5.7	0.3	3.3	0.2	0.2	0.1
Delay (s)	25.9	4.2	30.2	29.3	34.0	32.3
Level of Service	C	A	C	C	C	C
Approach Delay (s)		12.9	29.9		33.5	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	85.0	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	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	653	31	90	378	29	226	523	145	43	420	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	4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	0.98	1.00			1.00		0.98	1.00	1.00	0.97	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	3156			3109		1559	3185	1308	1548	3032	
Flt Permitted	0.43	1.00			0.73		0.38	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	714	3156			2297		622	3185	1308	635	3032	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	113	653	31	90	378	29	226	523	145	43	420	119
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	63	0	35	0
Lane Group Flow (vph)	113	681	0	0	493	0	226	523	82	43	504	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	42.7	42.7			42.7		34.3	34.3	34.3	34.3	34.3	
Effective Green, g (s)	42.7	42.7			42.7		34.3	34.3	34.3	34.3	34.3	
Actuated g/C Ratio	0.50	0.50			0.50		0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	358	1585			1153		250	1285	527	256	1223	
v/s Ratio Prot		c0.22						0.16			0.17	
v/s Ratio Perm	0.16				0.21		c0.36		0.06	0.07		
v/c Ratio	0.32	0.43			0.43		0.90	0.41	0.16	0.17	0.41	
Uniform Delay, d1	12.5	13.4			13.4		23.8	18.1	16.1	16.2	18.1	
Progression Factor	0.94	0.92			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.8			0.1		32.0	0.1	0.1	0.1	0.1	
Delay (s)	14.0	13.1			13.5		55.8	18.2	16.2	16.3	18.2	
Level of Service	B	B			B		E	B	B	B	B	
Approach Delay (s)		13.3			13.5			27.4			18.1	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.8%	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)	139	739	110	279	292	36	22	1068	707	2	505	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1349	3090	3185	1349		4570	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.92	1.00		0.94	1.00
Satd. Flow (perm)	3090	3154	1349	3090	3185	1349		4211	1391		4285	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	139	739	110	279	292	36	22	1068	707	2	505	53
RTOR Reduction (vph)	0	0	57	0	0	21	0	0	0	0	0	35
Lane Group Flow (vph)	139	739	53	279	292	15	0	1090	707	0	507	18
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	9.5	35.7	35.7	12.2	38.4	38.4		32.1	95.0		32.1	32.1
Effective Green, g (s)	9.5	35.7	35.7	12.2	38.4	38.4		32.1	95.0		32.1	32.1
Actuated g/C Ratio	0.10	0.38	0.38	0.13	0.40	0.40		0.34	1.00		0.34	0.34
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	309	1185	506	396	1287	545		1422	1391		1447	455
v/s Ratio Prot	0.04	c0.23		c0.09	0.09							
v/s Ratio Perm			0.04			0.01		c0.26	c0.51		0.12	0.01
v/c Ratio	0.45	0.62	0.10	0.70	0.23	0.03		0.77	0.51		0.35	0.04
Uniform Delay, d1	40.3	24.2	19.3	39.7	18.6	17.0		28.1	0.0		23.6	21.1
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	1.0	2.5	0.4	5.6	0.4	0.1		2.5	1.3		0.1	0.0
Delay (s)	41.3	26.7	19.7	45.3	19.0	17.1		30.6	1.3		23.8	21.1
Level of Service	D	C	B	D	B	B		C	A		C	C
Approach Delay (s)		27.9			31.0			19.1			23.5	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: Existing + Proj Pref PM

Adeline & 18th
Existing + Preferred Project PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	105	2.0	0.430	8.9	LOS A	2.4	60.8	0.64	0.92	25.9
8	T	256	2.0	0.430	8.9	LOS A	2.4	60.8	0.64	0.74	28.1
18	R	36	2.0	0.430	8.9	LOS A	2.4	60.8	0.64	0.78	27.8
Approach		397	2.0	0.430	8.9	LOS A	2.4	60.8	0.64	0.79	27.4
East: 18th Street (WB)											
1	L	33	2.0	0.239	6.1	LOS A	1.1	28.5	0.53	0.88	27.2
6	T	161	2.0	0.239	6.1	LOS A	1.1	28.5	0.53	0.64	29.9
16	R	34	2.0	0.239	6.1	LOS A	1.1	28.5	0.53	0.69	29.6
Approach		228	2.0	0.239	6.1	LOS A	1.1	28.5	0.53	0.68	29.4
North: Adeline Street (SB)											
7	L	56	2.0	0.287	6.3	LOS A	1.4	36.8	0.50	0.86	27.1
4	T	224	2.0	0.287	6.3	LOS A	1.4	36.8	0.50	0.60	29.8
14	R	18	2.0	0.287	6.3	LOS A	1.4	36.8	0.50	0.65	29.5
Approach		298	2.0	0.287	6.3	LOS A	1.4	36.8	0.50	0.65	29.2
West: 18th Street (EB)											
5	L	21	2.0	0.417	8.1	LOS A	2.4	60.2	0.58	0.89	26.4
2	T	337	2.0	0.417	8.1	LOS A	2.4	60.2	0.58	0.66	28.8
12	R	69	2.0	0.417	8.1	LOS A	2.4	60.2	0.58	0.70	28.5
Approach		427	2.0	0.417	8.1	LOS A	2.4	60.2	0.58	0.68	28.6
All Vehicles		1350	2.0	0.430	7.6	LOS A	2.4	60.8	0.57	0.71	28.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	392	41	19	249	83	24	439	28	282	331	25
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		1.00	0.99		1.00	1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		0.99	1.00			0.99	
Frt	1.00	0.99		1.00	0.96		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1759	1828		1743	1782		1746	3490			3385	
Flt Permitted	0.39	1.00		0.25	1.00		0.38	1.00			0.64	
Satd. Flow (perm)	723	1828		465	1782		702	3490			2230	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	392	41	19	249	83	24	439	28	282	331	25
RTOR Reduction (vph)	0	6	0	0	19	0	0	6	0	0	4	0
Lane Group Flow (vph)	45	427	0	19	313	0	24	461	0	0	634	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	20.5	20.5		20.5	20.5		37.2	37.2			37.2	
Effective Green, g (s)	20.5	20.5		20.5	20.5		37.2	37.2			37.2	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.57	0.57			0.57	
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)	225	570		145	556		397	1976			1262	
v/s Ratio Prot		c0.23			0.18			0.13				
v/s Ratio Perm	0.06			0.04			0.03				c0.28	
v/c Ratio	0.20	0.75		0.13	0.56		0.06	0.23			0.50	
Uniform Delay, d1	16.6	20.3		16.2	18.9		6.4	7.1			8.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.4	5.4		0.4	1.3		0.3	0.3			1.4	
Delay (s)	17.0	25.7		16.6	20.2		6.7	7.4			10.1	
Level of Service	B	C		B	C		A	A			B	
Approach Delay (s)		24.9			20.0			7.4			10.1	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: Existing + Proj Pref PM

Adeline & 14th
Existing + Preferred Project PM
Roundabout

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
Movement Performance - Vehicles											
South: Adeline Street (NB)											
3	L	14	2.0	0.368	7.5	LOS A	2.0	49.9	0.57	0.90	26.6
8	T	300	2.0	0.368	7.5	LOS A	2.0	49.9	0.57	0.66	29.1
18	R	52	2.0	0.368	7.5	LOS A	2.0	49.9	0.57	0.71	28.8
Approach		366	2.0	0.368	7.5	LOS A	2.0	49.9	0.57	0.68	29.0
East: 14th Street (WB)											
1	L	89	2.0	0.336	7.2	LOS A	1.7	43.8	0.56	0.87	26.6
6	T	203	2.0	0.336	7.2	LOS A	1.7	43.8	0.56	0.66	29.1
16	R	35	2.0	0.336	7.2	LOS A	1.7	43.8	0.56	0.71	28.8
Approach		327	2.0	0.336	7.2	LOS A	1.7	43.8	0.56	0.72	28.3
North: Adeline Street (SB)											
7	L	63	2.0	0.297	6.4	LOS A	1.5	38.3	0.51	0.86	27.0
4	T	209	2.0	0.297	6.4	LOS A	1.5	38.3	0.51	0.61	29.7
14	R	34	2.0	0.297	6.4	LOS A	1.5	38.3	0.51	0.66	29.3
Approach		306	2.0	0.297	6.4	LOS A	1.5	38.3	0.51	0.66	29.0
West: 14th Street (EB)											
5	L	49	2.0	0.307	6.8	LOS A	1.5	39.1	0.55	0.89	26.9
2	T	230	2.0	0.307	6.8	LOS A	1.5	39.1	0.55	0.65	29.5
12	R	21	2.0	0.307	6.8	LOS A	1.5	39.1	0.55	0.70	29.1
Approach		300	2.0	0.307	6.8	LOS A	1.5	39.1	0.55	0.69	29.0
All Vehicles		1299	2.0	0.368	7.0	LOS A	2.0	49.9	0.55	0.69	28.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Existing + Proj PM

Adeline & 12th
Existing + Preferred Project PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.205	4.4	LOS A	1.1	26.9	0.18	0.89	27.8
8	T	268	2.0	0.205	4.4	LOS A	1.1	26.9	0.18	0.42	31.3
18	R	7	2.0	0.205	4.4	LOS A	1.1	26.9	0.18	0.52	30.7
Approach		276	2.0	0.205	4.4	LOS A	1.1	26.9	0.18	0.43	31.3
East: 12th Street (WB)											
1	L	9	2.0	0.105	4.3	LOS A	0.5	11.7	0.41	0.80	27.9
6	T	21	2.0	0.105	4.3	LOS A	0.5	11.7	0.41	0.52	31.1
16	R	82	2.0	0.105	4.3	LOS A	0.5	11.7	0.41	0.58	30.6
Approach		112	2.0	0.105	4.3	LOS A	0.5	11.7	0.41	0.59	30.5
North: Adeline Street (SB)											
7	L	34	2.0	0.222	4.5	LOS A	1.2	29.9	0.14	0.87	27.7
4	T	261	2.0	0.222	4.5	LOS A	1.2	29.9	0.14	0.41	31.2
14	R	8	2.0	0.222	4.5	LOS A	1.2	29.9	0.14	0.50	30.6
Approach		303	2.0	0.222	4.5	LOS A	1.2	29.9	0.14	0.46	30.7
West: 12th Street (EB)											
5	L	8	2.0	0.015	3.6	LOS A	0.1	1.6	0.40	0.73	28.2
2	T	5	2.0	0.015	3.6	LOS A	0.1	1.6	0.40	0.47	31.5
12	R	3	2.0	0.015	3.6	LOS A	0.1	1.6	0.40	0.53	31.0
Approach		16	2.0	0.015	3.6	LOS A	0.1	1.6	0.40	0.61	29.6
All Vehicles		707	2.0	0.222	4.4	LOS A	1.2	29.9	0.21	0.47	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	97	0	0	155	273	90	222	165	255	0	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.90		1.00	0.94		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2584		972	2858		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2584		972	2858		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	99	97	0	0	155	273	90	222	165	255	0	192
RTOR Reduction (vph)	0	0	0	0	225	0	0	109	0	0	0	138
Lane Group Flow (vph)	99	97	0	0	203	0	81	287	0	255	0	54
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	8.1	23.4			11.8		11.9	11.9		18.8		18.8
Effective Green, g (s)	8.1	23.4			11.8		11.9	11.9		18.8		18.8
Actuated g/C Ratio	0.12	0.35			0.18		0.18	0.18		0.28		0.28
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	165	1155			454		172	506		435		692
v/s Ratio Prot	c0.07	0.03			c0.08		0.08	c0.10		c0.16		0.02
v/s Ratio Perm												
v/c Ratio	0.60	0.08			0.45		0.47	0.57		0.59		0.08
Uniform Delay, d1	28.0	14.7			24.7		24.8	25.2		20.8		17.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.9	0.0			0.5		1.5	1.2		1.7		0.0
Delay (s)	31.8	14.7			25.2		26.3	26.4		22.5		17.8
Level of Service	C	B			C		C	C		C		B
Approach Delay (s)		23.3			25.2			26.4			20.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	59.4%	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)	111	704	22	144	636	151	20	128	132	189	169	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.97			0.94		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3379		1770	3286			1712		1760	1671	
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.50	1.00	
Satd. Flow (perm)	1770	3379		1770	3286			1666		932	1671	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	704	22	144	636	151	20	128	132	189	169	107
RTOR Reduction (vph)	0	3	0	0	34	0	0	29	0	0	21	0
Lane Group Flow (vph)	111	723	0	144	753	0	0	251	0	189	255	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	12.2	32.8		11.1	31.7			35.1		35.1	35.1	
Effective Green, g (s)	12.2	32.8		11.1	31.7			35.1		35.1	35.1	
Actuated g/C Ratio	0.14	0.36		0.12	0.35			0.39		0.39	0.39	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	239	1231		218	1157			649		363	651	
v/s Ratio Prot	0.06	c0.21		0.08	c0.23						0.15	
v/s Ratio Perm								0.15		c0.20		
v/c Ratio	0.46	0.59		0.66	0.65			0.39		0.52	0.39	
Uniform Delay, d1	35.9	23.1		37.7	24.5			19.7		21.0	19.8	
Progression Factor	0.94	0.91		0.96	0.61			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5		5.6	2.8			0.1		0.6	0.1	
Delay (s)	34.4	21.6		42.0	17.7			19.9		21.6	19.9	
Level of Service	C	C		D	B			B		C	B	
Approach Delay (s)		23.3			21.4			19.9			20.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	76.3%	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)	53	1450	54	27	857	124	36	89	68	72	81	42
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1760	3376		1054	3471	1460	1573	1092		1756	1572	
Flt Permitted	0.27	1.00		0.09	1.00	1.00	0.68	1.00		0.63	1.00	
Satd. Flow (perm)	500	3376		101	3471	1460	1123	1092		1173	1572	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	1450	54	27	857	124	36	89	68	72	81	42
RTOR Reduction (vph)	0	3	0	0	0	56	0	18	0	0	23	0
Lane Group Flow (vph)	53	1501	0	27	857	68	36	139	0	72	100	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	275	1856		55	1909	803	393	382		410	550	
v/s Ratio Prot		c0.44			0.25			c0.13			0.06	
v/s Ratio Perm	0.11			0.27		0.05	0.03			0.06		
v/c Ratio	0.19	0.81		0.49	0.45	0.08	0.09	0.37		0.18	0.18	
Uniform Delay, d1	9.1	14.6		11.1	10.8	8.5	17.5	19.4		18.0	18.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	3.9		28.1	0.8	0.2	0.5	2.7		0.9	0.7	
Delay (s)	10.6	18.5		39.2	11.5	8.7	17.9	22.1		18.9	18.8	
Level of Service	B	B		D	B	A	B	C		B	B	
Approach Delay (s)		18.2			11.9			21.3			18.8	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	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)	124	1065	146	25	345	37	356	313	31	73	142	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		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)	1663	4274		1765	4520		1743	1863	1538	1752	3539	1215
Flt Permitted	0.52	1.00		0.16	1.00		0.66	1.00	1.00	0.48	1.00	1.00
Satd. Flow (perm)	905	4274		304	4520		1214	1863	1538	887	3539	1215
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	1065	146	25	345	37	356	313	31	73	142	273
RTOR Reduction (vph)	0	21	0	0	15	0	0	0	15	0	0	156
Lane Group Flow (vph)	124	1190	0	25	367	0	356	313	16	73	142	117
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	39.0	39.0		39.0	39.0		36.5	36.5	36.5	36.5	36.5	36.5
Effective Green, g (s)	39.0	39.0		39.0	39.0		36.5	36.5	36.5	36.5	36.5	36.5
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.43	0.43	0.43	0.43	0.43	0.43
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	415	1961		139	2073		521	799	660	380	1519	521
v/s Ratio Prot		c0.28			0.08			0.17			0.04	
v/s Ratio Perm	0.14			0.08			c0.29		0.01	0.08		0.10
v/c Ratio	0.30	0.61		0.18	0.18		0.68	0.39	0.02	0.19	0.09	0.23
Uniform Delay, d1	14.4	17.3		13.6	13.5		19.6	16.6	14.0	15.1	14.4	15.3
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	1.8	1.4		0.2	0.0		7.1	1.4	0.1	1.1	0.1	1.0
Delay (s)	16.3	18.7		13.8	13.6		26.7	18.1	14.1	16.2	14.5	16.3
Level of Service	B	B		B	B		C	B	B	B	B	B
Approach Delay (s)		18.4			13.6			22.3			15.8	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
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)	0	0	0	56	152	456	48	115	0	0	273	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3491	1561	1770	1111			2865	1558
Flt Permitted					0.99	1.00	0.58	1.00			1.00	1.00
Satd. Flow (perm)					3491	1561	1087	1111			2865	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	56	152	456	48	115	0	0	273	24
RTOR Reduction (vph)	0	0	0	0	0	388	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	208	68	48	115	0	0	273	18
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					13.4	13.4	67.1	67.1			67.1	67.1
Effective Green, g (s)					13.4	13.4	67.1	67.1			67.1	67.1
Actuated g/C Ratio					0.15	0.15	0.75	0.75			0.75	0.75
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					519	232	810	828			2136	1161
v/s Ratio Prot								c0.10			0.10	
v/s Ratio Perm					0.06	0.04	0.04					0.01
v/c Ratio					0.40	0.29	0.06	0.14			0.13	0.02
Uniform Delay, d1					34.7	34.1	3.0	3.2			3.2	2.9
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.2	0.3	0.0	0.0			0.1	0.0
Delay (s)					34.9	34.3	3.1	3.3			3.3	3.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			34.5			3.2			3.3	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	45.9%	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)	26	944	61	41	112	26	107	186	148	153	41	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.93		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	3371		1770	3330		1770	1031		1770	1142	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3371		1770	3330		1770	1031		1770	1142	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	61	41	112	26	107	186	148	153	41	13
RTOR Reduction (vph)	0	3	0	0	12	0	0	16	0	0	9	0
Lane Group Flow (vph)	26	1002	0	41	126	0	107	318	0	153	45	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	4.1	37.9		6.4	40.7		39.3	39.3		15.4	15.4	
Effective Green, g (s)	4.1	37.9		6.4	40.7		39.3	39.3		15.4	15.4	
Actuated g/C Ratio	0.04	0.33		0.06	0.35		0.34	0.34		0.13	0.13	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	63	1110		98	1178		604	352		237	152	
v/s Ratio Prot	0.01	c0.30		c0.02	c0.04		0.06	c0.31		c0.09	0.04	
v/s Ratio Perm												
v/c Ratio	0.41	0.90		0.42	0.11		0.18	0.90		0.65	0.30	
Uniform Delay, d1	54.3	36.8		52.5	24.9		26.5	36.1		47.2	44.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	10.3		2.1	0.0		0.2	25.6		5.9	1.1	
Delay (s)	55.9	47.1		54.6	25.0		26.7	61.7		53.1	46.0	
Level of Service	E	D		D	C		C	E		D	D	
Approach Delay (s)		47.3			31.8			53.2			51.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Existing + Project AM Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	666	97	161	728	83	100	137	119	82	265	64
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3450		1770	3539	1518	1770	1863	1541	1770	1801	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3450		1770	3539	1518	1770	1863	1541	1770	1801	
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)	41	724	105	175	791	90	109	149	129	89	288	70
RTOR Reduction (vph)	0	19	0	0	0	54	0	0	95	0	15	0
Lane Group Flow (vph)	41	810	0	175	791	36	109	149	34	89	343	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	1.5	18.9		7.0	24.4	24.4	4.0	16.1	16.1	3.1	15.2	
Effective Green, g (s)	1.5	18.9		7.0	24.4	24.4	4.0	16.1	16.1	3.1	15.2	
Actuated g/C Ratio	0.02	0.31		0.11	0.40	0.40	0.07	0.26	0.26	0.05	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)	43	1067		202	1413	606	115	490	406	89	448	
v/s Ratio Prot	0.02	c0.23		c0.10	0.22		c0.06	0.08		0.05	c0.19	
v/s Ratio Perm						0.02			0.02			
v/c Ratio	0.95	0.76		0.87	0.56	0.06	0.95	0.30	0.08	1.00	0.77	
Uniform Delay, d1	29.8	19.0		26.6	14.2	11.3	28.4	18.0	16.9	29.0	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	118.5	3.2		29.9	0.5	0.0	66.8	0.4	0.1	95.4	7.6	
Delay (s)	148.3	22.2		56.5	14.7	11.3	95.3	18.4	17.0	124.4	28.9	
Level of Service	F	C		E	B	B	F	B	B	F	C	
Approach Delay (s)		28.1			21.3			39.6			47.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	201	534	358	40	597	110	446	619	26	136	788	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.95		1.00	0.99		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.99		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)	3433	3165		1770	3413		3433	3508		1770	3348	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3165		1770	3413		3433	3508		1770	3348	
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	580	389	43	649	120	485	673	28	148	857	257
RTOR Reduction (vph)	0	102	0	0	14	0	0	2	0	0	26	0
Lane Group Flow (vph)	218	867	0	43	755	0	485	699	0	148	1088	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	10.0	32.6		6.6	29.2		17.4	44.0		13.8	39.4	
Effective Green, g (s)	10.0	32.6		6.6	29.2		17.4	44.0		13.8	39.4	
Actuated g/C Ratio	0.09	0.30		0.06	0.27		0.16	0.40		0.13	0.36	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	312	937		106	905		543	1403		222	1199	
v/s Ratio Prot	c0.06	c0.27		0.02	0.22		c0.14	0.20		0.08	c0.33	
v/s Ratio Perm												
v/c Ratio	0.70	0.93		0.41	0.83		0.89	0.50		0.67	0.91	
Uniform Delay, d1	48.5	37.5		49.8	38.1		45.4	24.7		45.9	33.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.4	14.5		0.9	6.4		16.5	1.3		6.6	11.6	
Delay (s)	54.0	52.0		50.7	44.5		61.9	26.0		52.6	45.1	
Level of Service	D	D		D	D		E	C		D	D	
Approach Delay (s)		52.4			44.8			40.7			46.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	317	23	9	174	0	0	0	0	577	838	764
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3492			5068					1610	3369	1550
Flt Permitted		1.00			0.91					0.95	0.99	1.00
Satd. Flow (perm)		3492			4646					1610	3369	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	317	23	9	174	0	0	0	0	577	838	764
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	0	124
Lane Group Flow (vph)	0	334	0	0	183	0	0	0	0	456	959	640
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		16.0			16.0					52.0	52.0	52.0
Effective Green, g (s)		16.0			16.0					52.0	52.0	52.0
Actuated g/C Ratio		0.20			0.20					0.65	0.65	0.65
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		698			929					1046	2189	1007
v/s Ratio Prot		c0.10										
v/s Ratio Perm					0.04					0.28	0.28	c0.41
v/c Ratio		0.48			0.20					0.44	0.44	0.64
Uniform Delay, d1		28.3			26.6					6.8	6.9	8.4
Progression Factor		1.00			1.20					1.00	1.00	1.00
Incremental Delay, d2		2.3			0.5					1.3	0.6	3.1
Delay (s)		30.6			32.4					8.2	7.5	11.4
Level of Service		C			C					A	A	B
Approach Delay (s)		30.6			32.4			0.0			9.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	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)	199	715	0	0	165	244	4	309	28	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.96		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3386			3539	2666		5009				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3233			3539	2666		5009				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	199	715	0	0	165	244	4	309	28	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	198	0	13	0	0	0	0
Lane Group Flow (vph)	179	735	0	0	165	46	0	328	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	18.0	36.5			15.0	15.0		32.5				
Effective Green, g (s)	18.0	36.5			15.0	15.0		32.5				
Actuated g/C Ratio	0.22	0.46			0.19	0.19		0.41				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	362	1509			663	499		2034				
v/s Ratio Prot	0.11	c0.11			0.05							
v/s Ratio Perm		c0.11				0.02		0.07				
v/c Ratio	0.49	0.49			0.25	0.09		0.16				
Uniform Delay, d1	27.0	15.2			27.7	26.9		15.1				
Progression Factor	0.99	0.75			1.00	1.00		1.00				
Incremental Delay, d2	4.4	1.0			0.9	0.4		0.2				
Delay (s)	31.2	12.5			28.6	27.2		15.3				
Level of Service	C	B			C	C		B				
Approach Delay (s)		16.1			27.8			15.3			0.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	50.8%	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)	18	426	178	224	602	49	32	16	69	20	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3298		1243	1250	947	1203	1105	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3298		1243	1250	947	1203	1105	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	18	426	178	224	602	49	32	16	69	20	20	10
RTOR Reduction (vph)	0	0	118	0	3	0	0	0	61	0	9	0
Lane Group Flow (vph)	18	426	60	224	648	0	24	24	8	20	21	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	0.9	22.2	22.2	15.5	36.8		8.1	8.1	8.1	3.6	3.6	
Effective Green, g (s)	0.9	22.2	22.2	15.5	36.8		8.1	8.1	8.1	3.6	3.6	
Actuated g/C Ratio	0.01	0.34	0.34	0.24	0.56		0.12	0.12	0.12	0.05	0.05	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	24	1115	472	362	1841		152	153	116	65	60	
v/s Ratio Prot	0.01	0.13		c0.15	c0.20		c0.02	0.02		0.02	c0.02	
v/s Ratio Perm			0.04						0.01			
v/c Ratio	0.75	0.38	0.13	0.62	0.35		0.16	0.16	0.07	0.31	0.34	
Uniform Delay, d1	32.4	16.6	15.1	22.6	8.0		25.8	25.8	25.6	30.0	30.0	
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	77.3	0.3	0.1	2.2	0.1		0.5	0.5	0.3	1.0	1.2	
Delay (s)	109.7	16.9	15.3	24.8	8.1		26.3	26.3	25.8	30.9	31.3	
Level of Service	F	B	B	C	A		C	C	C	C	C	
Approach Delay (s)		19.1			12.4			26.0			31.1	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	16.5
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)	40	397	96	138	587	337	187	206	188	498	204	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.93		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1014	2958		1299	3438	1369	1480	2541		1480	2556	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (perm)	1014	2958		1299	3438	1369	1480	2541		1480	2556	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	397	96	138	587	337	187	206	188	498	204	76
RTOR Reduction (vph)	0	19	0	0	0	226	0	117	0	0	9	0
Lane Group Flow (vph)	40	474	0	138	587	111	187	277	0	259	510	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	6.5	23.4		16.1	33.0	33.0	18.0	18.0		26.6	26.6	
Effective Green, g (s)	6.5	23.4		16.1	33.0	33.0	18.0	18.0		26.6	26.6	
Actuated g/C Ratio	0.06	0.23		0.16	0.33	0.33	0.18	0.18		0.26	0.26	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	65	688		207	1127	449	264	454		391	675	
v/s Ratio Prot	0.04	c0.16		c0.11	0.17		c0.13	0.11		0.18	c0.20	
v/s Ratio Perm						0.08						
v/c Ratio	0.62	0.69		0.67	0.52	0.25	0.71	0.61		0.66	0.76	
Uniform Delay, d1	45.8	35.3		39.7	27.4	24.7	38.8	38.1		33.0	34.0	
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	2.9		7.9	0.4	0.3	7.8	2.0		3.8	4.6	
Delay (s)	61.9	38.2		47.6	27.8	25.0	46.6	40.0		36.8	38.6	
Level of Service	E	D		D	C	C	D	D		D	D	
Approach Delay (s)		39.9			29.5			42.1			38.0	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.6	Sum of lost time (s)	16.5
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)	0	966	127	144	665	0	0	0	0	130	200	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.95	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		4899		1766	3343						3225	
Flt Permitted		1.00		0.23	1.00						0.99	
Satd. Flow (perm)		4899		435	3343						3225	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	966	127	144	665	0	0	0	0	130	200	145
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	73	0
Lane Group Flow (vph)	0	1079	0	144	665	0	0	0	0	0	402	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		42.3		42.3	42.3						16.3	
Effective Green, g (s)		42.3		42.3	42.3						16.3	
Actuated g/C Ratio		0.62		0.62	0.62						0.24	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		3020		268	2061						766	
v/s Ratio Prot		0.22			0.20						c0.12	
v/s Ratio Perm				c0.33								
v/c Ratio		0.36		0.54	0.32						0.52	
Uniform Delay, d1		6.5		7.5	6.3						22.8	
Progression Factor		1.00		0.65	0.55						1.00	
Incremental Delay, d2		0.0		0.9	0.0						0.3	
Delay (s)		6.5		5.8	3.5						23.1	
Level of Service		A		A	A						C	
Approach Delay (s)		6.5			3.9			0.0			23.1	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	98.5%	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)	270	826	0	0	676	353	133	322	113	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.95			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1765	3539			3328			3381				
Flt Permitted	0.24	1.00			1.00			0.99				
Satd. Flow (perm)	440	3539			3328			3381				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	826	0	0	676	353	133	322	113	0	0	0
RTOR Reduction (vph)	0	0	0	0	57	0	0	32	0	0	0	0
Lane Group Flow (vph)	270	826	0	0	972	0	0	536	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	42.3	42.3			42.3			16.3				
Effective Green, g (s)	42.3	42.3			42.3			16.3				
Actuated g/C Ratio	0.62	0.62			0.62			0.24				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	271	2182			2052			803				
v/s Ratio Prot		0.23			0.29			c0.16				
v/s Ratio Perm	c0.61											
v/c Ratio	1.00	0.38			0.47			0.67				
Uniform Delay, d1	13.1	6.6			7.1			23.7				
Progression Factor	0.65	0.38			1.00			1.00				
Incremental Delay, d2	51.9	0.0			0.1			1.6				
Delay (s)	60.5	2.5			7.2			25.3				
Level of Service	E	A			A			C				
Approach Delay (s)		16.8			7.2			25.3			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	10.0
Intersection Capacity Utilization	98.5%	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)	19	473	38	53	1301	16	36	89	41	28	118	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		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)	1767	3428		1761	3399		1754	1760		1758	1786	
Flt Permitted	0.13	1.00		0.44	1.00		0.65	1.00		0.67	1.00	
Satd. Flow (perm)	250	3428		819	3399		1208	1760		1246	1786	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	19	473	38	53	1301	16	36	89	41	28	118	35
RTOR Reduction (vph)	0	7	0	0	1	0	0	21	0	0	13	0
Lane Group Flow (vph)	19	504	0	53	1316	0	36	109	0	28	140	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Effective Green, g (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30		0.30	0.30	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	148	2035		486	2018		362	528		373	535	
v/s Ratio Prot		0.15			c0.39			0.06			c0.08	
v/s Ratio Perm	0.08			0.06			0.03			0.02		
v/c Ratio	0.13	0.25		0.11	0.65		0.10	0.21		0.08	0.26	
Uniform Delay, d1	7.1	7.7		7.1	10.8		20.2	20.9		20.1	21.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	0.3		0.5	1.7		0.5	0.9		0.4	1.2	
Delay (s)	8.9	8.0		7.5	12.4		20.8	21.8		20.4	22.5	
Level of Service	A	A		A	B		C	C		C	C	
Approach Delay (s)		8.1			12.2			21.6			22.1	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	81.5%	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)	40	388	104	66	825	19	333	172	65	31	160	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3308			3259	1487	1652	1845	1508		1842	1519
Flt Permitted		0.84			0.86	1.00	0.58	1.00	1.00		0.94	1.00
Satd. Flow (perm)		2775			2820	1487	1010	1845	1508		1747	1519
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	388	104	66	825	19	333	172	65	31	160	244
RTOR Reduction (vph)	0	25	0	0	0	7	0	0	40	0	0	81
Lane Group Flow (vph)	0	507	0	0	891	12	333	172	25	0	191	163
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		46.4			46.4	46.4	34.6	34.6	34.6		34.6	34.6
Effective Green, g (s)		46.4			46.4	46.4	34.6	34.6	34.6		34.6	34.6
Actuated g/C Ratio		0.52			0.52	0.52	0.38	0.38	0.38		0.38	0.38
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1430			1453	766	388	709	579		671	583
v/s Ratio Prot								0.09				
v/s Ratio Perm		0.18			c0.32	0.01	c0.33		0.02		0.11	0.11
v/c Ratio		0.35			0.61	0.02	0.86	0.24	0.04		0.28	0.28
Uniform Delay, d1		12.9			15.4	10.6	25.4	18.8	17.3		19.1	19.1
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		0.7			1.9	0.0	16.3	0.1	0.0		0.1	0.1
Delay (s)		13.6			17.4	10.7	41.8	18.9	17.3		19.2	19.2
Level of Service		B			B	B	D	B	B		B	B
Approach Delay (s)		13.6			17.2			32.1			19.2	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	105.4%	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)	12	510	38	24	866	102	55	301	32	80	293	14
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3436	1510	1756	3252	1540	1658	3480		1756	3511	
Flt Permitted		0.93	1.00	0.45	1.00	1.00	0.53	1.00		0.50	1.00	
Satd. Flow (perm)		3215	1510	833	3252	1540	927	3480		923	3511	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	510	38	24	866	102	55	301	32	80	293	14
RTOR Reduction (vph)	0	0	12	0	0	26	0	14	0	0	6	0
Lane Group Flow (vph)	0	522	26	24	866	76	55	319	0	80	301	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		57.3	57.3	57.3	57.3	57.3	18.2	18.2		18.2	18.2	
Effective Green, g (s)		57.3	57.3	57.3	57.3	57.3	18.2	18.2		18.2	18.2	
Actuated g/C Ratio		0.67	0.67	0.67	0.67	0.67	0.21	0.21		0.21	0.21	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		2167	1017	561	2192	1038	198	745		197	751	
v/s Ratio Prot					c0.27			c0.09			0.09	
v/s Ratio Perm		0.16	0.02	0.03		0.05	0.06			0.09		
v/c Ratio		0.24	0.03	0.04	0.40	0.07	0.28	0.43		0.41	0.40	
Uniform Delay, d1		5.4	4.6	4.6	6.2	4.7	27.9	28.9		28.7	28.7	
Progression Factor		1.00	1.00	1.02	0.72	1.19	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3	0.0	0.1	0.5	0.1	1.6	0.8		1.9	0.5	
Delay (s)		5.7	4.6	4.9	4.9	5.8	29.5	29.7		30.6	29.2	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		5.6			5.0			29.7			29.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	70.9%	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)	55	512	20	52	826	28	15	102	178	36	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.97		1.00	0.93		0.97	
Flpb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1582	3124	1361	1495	3185	1375		3155	1169		2843	
Flt Permitted	0.33	1.00	1.00	0.46	1.00	1.00		0.90	1.00		0.89	
Satd. Flow (perm)	550	3124	1361	729	3185	1375		2853	1169		2554	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	512	20	52	826	28	15	102	178	36	99	105
RTOR Reduction (vph)	0	0	5	0	0	7	0	0	154	0	91	0
Lane Group Flow (vph)	55	512	15	52	826	21	0	117	24	0	149	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	64.9	64.9	64.9	64.9	64.9	64.9		11.6	11.6		11.6	
Effective Green, g (s)	64.9	64.9	64.9	64.9	64.9	64.9		11.6	11.6		11.6	
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.76	0.76		0.14	0.14		0.14	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	419	2385	1039	556	2431	1049		389	159		348	
v/s Ratio Prot		0.16			c0.26							
v/s Ratio Perm	0.10		0.01	0.07		0.02		0.04	0.02		c0.06	
v/c Ratio	0.13	0.21	0.01	0.09	0.34	0.02		0.30	0.15		0.43	
Uniform Delay, d1	2.6	2.8	2.4	2.6	3.2	2.4		33.0	32.4		33.7	
Progression Factor	0.87	0.87	0.80	0.65	0.83	0.67		1.00	1.00		1.00	
Incremental Delay, d2	0.6	0.2	0.0	0.3	0.3	0.0		0.2	0.2		0.3	
Delay (s)	2.9	2.7	1.9	1.9	3.0	1.7		33.2	32.5		34.0	
Level of Service	A	A	A	A	A	A		C	C		C	
Approach Delay (s)		2.7			2.9			32.8			34.0	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
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 (vph)	219	449	798	84	647	172
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3053	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3053	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	219	449	798	84	647	172
RTOR Reduction (vph)	0	0	0	36	3	113
Lane Group Flow (vph)	219	449	798	48	661	42
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	15.6	53.8	34.2	34.2	23.2	23.2
Effective Green, g (s)	15.6	53.8	34.2	34.2	23.2	23.2
Actuated g/C Ratio	0.18	0.63	0.40	0.40	0.27	0.27
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	292	1903	1221	540	833	325
v/s Ratio Prot	c0.14	0.15	c0.26		c0.22	
v/s Ratio Perm				0.04		0.04
v/c Ratio	0.75	0.24	0.65	0.09	0.79	0.13
Uniform Delay, d1	32.9	6.7	20.6	15.7	28.7	23.3
Progression Factor	1.09	1.17	1.04	0.89	1.00	1.00
Incremental Delay, d2	9.1	0.3	0.9	0.0	4.9	0.1
Delay (s)	44.8	8.2	22.3	14.0	33.6	23.4
Level of Service	D	A	C	B	C	C
Approach Delay (s)		20.2	21.6		31.6	
Approach LOS		C	C		C	

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	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)	82	586	53	80	661	61	92	352	76	51	305	96
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	0.99	1.00			1.00		0.97	1.00	1.00	0.96	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1571	3131			3113		1552	3185	1298	1535	3011	
Flt Permitted	0.33	1.00			0.82		0.36	1.00	1.00	0.42	1.00	
Satd. Flow (perm)	541	3131			2571		595	3185	1298	680	3011	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	82	586	53	80	661	61	92	352	76	51	305	96
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	61	0	49	0
Lane Group Flow (vph)	82	635	0	0	798	0	92	352	15	51	352	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	59.9	59.9			59.9		17.1	17.1	17.1	17.1	17.1	
Effective Green, g (s)	59.9	59.9			59.9		17.1	17.1	17.1	17.1	17.1	
Actuated g/C Ratio	0.70	0.70			0.70		0.20	0.20	0.20	0.20	0.20	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	381	2206			1811		119	640	261	136	605	
v/s Ratio Prot		0.20						0.11			0.12	
v/s Ratio Perm	0.15				c0.31		c0.15		0.01	0.07		
v/c Ratio	0.22	0.29			0.44		0.77	0.55	0.06	0.38	0.58	
Uniform Delay, d1	4.4	4.6			5.4		32.1	30.5	27.4	29.3	30.7	
Progression Factor	0.93	0.92			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.3			0.1		24.2	0.6	0.0	0.6	0.9	
Delay (s)	5.2	4.6			5.4		56.3	31.1	27.5	30.0	31.6	
Level of Service	A	A			A		E	C	C	C	C	
Approach Delay (s)		4.6			5.4			35.0			31.5	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.8%	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)	55	135	65	345	669	101	130	631	290	28	583	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4526	1352		4564	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.72	1.00		0.88	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3303	1352		4002	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	135	65	345	669	101	130	631	290	28	583	83
RTOR Reduction (vph)	0	0	45	0	0	49	0	0	197	0	0	56
Lane Group Flow (vph)	55	135	20	345	669	52	0	761	93	0	611	27
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	5.9	27.4	27.4	18.8	40.3	40.3		28.8	28.8		28.8	28.8
Effective Green, g (s)	5.9	27.4	27.4	18.8	40.3	40.3		28.8	28.8		28.8	28.8
Actuated g/C Ratio	0.07	0.30	0.30	0.21	0.45	0.45		0.32	0.32		0.32	0.32
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	202	960	411	645	1426	605		1056	432		1280	432
v/s Ratio Prot	c0.02	0.04		c0.11	c0.21							
v/s Ratio Perm			0.01			0.04		c0.23	0.07		0.15	0.02
v/c Ratio	0.27	0.14	0.05	0.53	0.47	0.09		0.72	0.21		0.48	0.06
Uniform Delay, d1	40.0	22.7	22.1	31.7	17.4	14.3		27.0	22.3		24.6	21.2
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	0.7	0.3	0.2	0.9	1.1	0.3		2.4	0.3		0.3	0.1
Delay (s)	40.7	23.1	22.3	32.6	18.5	14.6		29.5	22.6		24.8	21.3
Level of Service	D	C	C	C	B	B		C	C		C	C
Approach Delay (s)		26.7			22.5			27.6			24.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: Existing + Proj Pref AM

Adeline & 18th
Existing + Preferred Project AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	231	2.0	0.353	6.3	LOS A	2.1	53.0	0.37	0.74	26.8
8	T	176	2.0	0.353	6.3	LOS A	2.1	53.0	0.37	0.46	29.7
18	R	29	2.0	0.353	6.3	LOS A	2.1	53.0	0.37	0.53	29.3
Approach		436	2.0	0.353	6.3	LOS A	2.1	53.0	0.37	0.61	28.0
East: 18th Street (WB)											
1	L	35	2.0	0.284	6.9	LOS A	1.4	34.6	0.57	0.90	26.9
6	T	182	2.0	0.284	6.9	LOS A	1.4	34.6	0.57	0.68	29.5
16	R	45	2.0	0.284	6.9	LOS A	1.4	34.6	0.57	0.73	29.1
Approach		262	2.0	0.284	6.9	LOS A	1.4	34.6	0.57	0.72	29.0
North: Adeline Street (SB)											
7	L	29	2.0	0.280	7.0	LOS A	1.3	33.7	0.58	0.93	26.9
4	T	207	2.0	0.280	7.0	LOS A	1.3	33.7	0.58	0.70	29.4
14	R	14	2.0	0.280	7.0	LOS A	1.3	33.7	0.58	0.75	29.1
Approach		250	2.0	0.280	7.0	LOS A	1.3	33.7	0.58	0.73	29.1
West: 18th Street (EB)											
5	L	8	2.0	0.116	4.4	LOS A	0.5	13.0	0.41	0.85	28.0
2	T	93	2.0	0.116	4.4	LOS A	0.5	13.0	0.41	0.53	31.2
12	R	23	2.0	0.116	4.4	LOS A	0.5	13.0	0.41	0.60	30.8
Approach		124	2.0	0.116	4.4	LOS A	0.5	13.0	0.41	0.57	30.9
All Vehicles		1072	2.0	0.353	6.4	LOS A	2.1	53.0	0.47	0.66	28.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	185	28	29	254	252	30	324	35	129	231	22
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	0.99		1.00	0.99		1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.98	1.00			0.99	
Frt	1.00	0.98		1.00	0.93		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1763	1814		1726	1703		1735	3459			3394	
Flt Permitted	0.19	1.00		0.56	1.00		0.53	1.00			0.74	
Satd. Flow (perm)	359	1814		1022	1703		960	3459			2556	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	185	28	29	254	252	30	324	35	129	231	22
RTOR Reduction (vph)	0	8	0	0	54	0	0	11	0	0	6	0
Lane Group Flow (vph)	22	205	0	29	452	0	30	348	0	0	376	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	20.7	20.7		20.7	20.7		37.2	37.2			37.2	
Effective Green, g (s)	20.7	20.7		20.7	20.7		37.2	37.2			37.2	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.56	0.56			0.56	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	112	569		321	534		541	1952			1442	
v/s Ratio Prot		0.11			c0.27			0.10				
v/s Ratio Perm	0.06			0.03			0.03				c0.15	
v/c Ratio	0.20	0.36		0.09	0.85		0.06	0.18			0.26	
Uniform Delay, d1	16.5	17.5		16.0	21.1		6.5	6.9			7.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.3	0.1		0.0	11.3		0.2	0.2			0.4	
Delay (s)	16.8	17.6		16.0	32.4		6.6	7.1			7.8	
Level of Service	B	B		B	C		A	A			A	
Approach Delay (s)		17.5			31.6			7.1			7.8	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: Existing + Proj Pref AM

Adeline & 14th
Existing + Preferred Project AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	24	2.0	0.373	6.9	LOS A	2.2	54.7	0.47	0.85	26.8
8	T	376	2.0	0.373	6.9	LOS A	2.2	54.7	0.47	0.56	29.6
18	R	25	2.0	0.373	6.9	LOS A	2.2	54.7	0.47	0.62	29.2
Approach		425	2.0	0.373	6.9	LOS A	2.2	54.7	0.47	0.58	29.4
East: 14th Street (WB)											
1	L	34	2.0	0.245	6.4	LOS A	1.1	28.9	0.55	0.90	27.1
6	T	148	2.0	0.245	6.4	LOS A	1.1	28.9	0.55	0.67	29.7
16	R	42	2.0	0.245	6.4	LOS A	1.1	28.9	0.55	0.72	29.4
Approach		224	2.0	0.245	6.4	LOS A	1.1	28.9	0.55	0.71	29.2
North: Adeline Street (SB)											
7	L	32	2.0	0.230	5.2	LOS A	1.1	29.1	0.40	0.84	27.6
4	T	205	2.0	0.230	5.2	LOS A	1.1	29.1	0.40	0.52	30.6
14	R	26	2.0	0.230	5.2	LOS A	1.1	29.1	0.40	0.59	30.2
Approach		263	2.0	0.230	5.2	LOS A	1.1	29.1	0.40	0.57	30.1
West: 14th Street (EB)											
5	L	23	2.0	0.176	5.0	LOS A	0.8	20.7	0.43	0.85	27.7
2	T	154	2.0	0.176	5.0	LOS A	0.8	20.7	0.43	0.55	30.8
12	R	11	2.0	0.176	5.0	LOS A	0.8	20.7	0.43	0.61	30.4
Approach		188	2.0	0.176	5.0	LOS A	0.8	20.7	0.43	0.59	30.4
All Vehicles		1100	2.0	0.373	6.1	LOS A	2.2	54.7	0.46	0.60	29.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Adeline & 12th
Existing + Preferred Project AM
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.234	4.6	LOS A	1.3	32.0	0.14	0.90	27.7
8	T	314	2.0	0.234	4.6	LOS A	1.3	32.0	0.14	0.42	31.2
18	R	5	2.0	0.234	4.6	LOS A	1.3	32.0	0.14	0.52	30.5
Approach		320	2.0	0.234	4.6	LOS A	1.3	32.0	0.14	0.42	31.1
East: 12th Street (WB)											
1	L	7	2.0	0.132	4.7	LOS A	0.6	14.8	0.45	0.82	27.8
6	T	29	2.0	0.132	4.7	LOS A	0.6	14.8	0.45	0.56	30.8
16	R	99	2.0	0.132	4.7	LOS A	0.6	14.8	0.45	0.61	30.4
Approach		135	2.0	0.132	4.7	LOS A	0.6	14.8	0.45	0.61	30.3
North: Adeline Street (SB)											
7	L	22	2.0	0.187	4.2	LOS A	0.9	24.1	0.15	0.88	27.9
4	T	227	2.0	0.187	4.2	LOS A	0.9	24.1	0.15	0.41	31.4
14	R	5	2.0	0.187	4.2	LOS A	0.9	24.1	0.15	0.51	30.8
Approach		254	2.0	0.187	4.2	LOS A	0.9	24.1	0.15	0.46	31.1
West: 12th Street (EB)											
5	L	2	2.0	0.009	3.4	LOS A	0.0	1.0	0.37	0.78	28.5
2	T	7	2.0	0.009	3.4	LOS A	0.0	1.0	0.37	0.46	31.9
12	R	1	2.0	0.009	3.4	LOS A	0.0	1.0	0.37	0.52	31.4
Approach		10	2.0	0.009	3.4	LOS A	0.0	1.0	0.37	0.53	31.1
All Vehicles		719	2.0	0.234	4.5	LOS A	1.3	32.0	0.21	0.47	31.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	32	0	0	162	291	277	227	196	216	0	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.90		1.00	0.94		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1020	3282			2821		1173	2763		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1020	3282			2821		1173	2763		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	32	0	0	162	291	277	227	196	216	0	196
RTOR Reduction (vph)	0	0	0	0	241	0	0	100	0	0	0	152
Lane Group Flow (vph)	38	32	0	0	212	0	238	362	0	216	0	44
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	4.6	20.1			12.0		21.1	21.1		15.6		15.6
Effective Green, g (s)	4.6	20.1			12.0		21.1	21.1		15.6		15.6
Actuated g/C Ratio	0.07	0.29			0.17		0.30	0.30		0.22		0.22
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	67	945			484		354	835		344		438
v/s Ratio Prot	c0.04	0.01			c0.08		c0.20	0.13		c0.14		0.02
v/s Ratio Perm												
v/c Ratio	0.57	0.03			0.44		0.67	0.43		0.63		0.10
Uniform Delay, d1	31.6	17.9			25.9		21.3	19.5		24.5		21.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	6.4	0.0			0.5		4.5	0.3		3.1		0.1
Delay (s)	38.0	17.9			26.3		25.8	19.8		27.6		21.6
Level of Service	D	B			C		C	B		C		C
Approach Delay (s)		28.8			26.3			21.9			24.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	61.6%	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)	72	470	24	135	496	171	17	64	61	100	128	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.96			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3189		1770	3265			1698		1756	1697	
Flt Permitted	0.95	1.00		0.95	1.00			0.86		0.46	1.00	
Satd. Flow (perm)	1770	3189		1770	3265			1465		845	1697	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	470	24	135	496	171	17	64	61	100	128	52
RTOR Reduction (vph)	0	3	0	0	28	0	0	31	0	0	17	0
Lane Group Flow (vph)	72	491	0	135	639	0	0	111	0	100	163	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	9.8	63.1		11.9	65.2			14.0		14.0	14.0	
Effective Green, g (s)	9.8	63.1		11.9	65.2			14.0		14.0	14.0	
Actuated g/C Ratio	0.10	0.63		0.12	0.65			0.14		0.14	0.14	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	173	2012		210	2128			205		118	237	
v/s Ratio Prot	c0.04	0.15		c0.08	c0.20						0.10	
v/s Ratio Perm								0.08		c0.12		
v/c Ratio	0.42	0.24		0.64	0.30			0.54		0.85	0.69	
Uniform Delay, d1	42.4	8.0		42.0	7.5			40.0		42.0	40.9	
Progression Factor	1.20	1.32		1.09	0.31			1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.0		4.9	0.4			1.6		38.6	6.4	
Delay (s)	51.5	10.6		50.6	2.7			41.6		80.6	47.4	
Level of Service	D	B		D	A			D		F	D	
Approach Delay (s)		15.8			10.8			41.6			59.2	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
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)	30	620	56	69	839	254	13	54	20	38	65	33
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.96		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1761	3268		1024	3471	1492	1346	933		1751	1461	
Flt Permitted	0.30	1.00		0.36	1.00	1.00	0.69	1.00		0.71	1.00	
Satd. Flow (perm)	548	3268		393	3471	1492	977	933		1306	1461	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	620	56	69	839	254	13	54	20	38	65	33
RTOR Reduction (vph)	0	7	0	0	0	91	0	14	0	0	18	0
Lane Group Flow (vph)	30	669	0	69	839	163	13	60	0	38	80	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	4.0	
Lane Grp Cap (vph)	350	2091		251	2221	954	273	261		365	409	
v/s Ratio Prot		0.20			c0.24			c0.06			0.05	
v/s Ratio Perm	0.05			0.18		0.11	0.01			0.03		
v/c Ratio	0.09	0.32		0.27	0.38	0.17	0.05	0.23		0.10	0.20	
Uniform Delay, d1	6.9	8.1		7.9	8.5	7.3	26.3	27.7		26.7	27.4	
Progression Factor	0.39	0.34		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4		2.7	0.5	0.4	0.3	2.1		0.6	1.1	
Delay (s)	3.1	3.1		10.6	9.0	7.7	26.6	29.8		27.3	28.5	
Level of Service	A	A		B	A	A	C	C		C	C	
Approach Delay (s)		3.1			8.8			29.3			28.1	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.0%	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)	137	453	78	51	619	33	381	180	14	47	106	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		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)	1579	4094		1757	4573		1761	1810	1541	1749	3539	1246
Flt Permitted	0.34	1.00		0.42	1.00		0.69	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	564	4094		772	4573		1270	1810	1541	1185	3539	1246
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	137	453	78	51	619	33	381	180	14	47	106	193
RTOR Reduction (vph)	0	42	0	0	10	0	0	0	6	0	0	77
Lane Group Flow (vph)	137	489	0	51	642	0	381	180	8	47	106	116
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.4	22.4		22.4	22.4		43.1	43.1	43.1	43.1	43.1	43.1
Effective Green, g (s)	22.4	22.4		22.4	22.4		43.1	43.1	43.1	43.1	43.1	43.1
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	168	1222		230	1365		729	1040	885	680	2033	716
v/s Ratio Prot		0.12			0.14			0.10			0.03	
v/s Ratio Perm	c0.24			0.07			c0.30		0.01	0.04		0.09
v/c Ratio	0.82	0.40		0.22	0.47		0.52	0.17	0.01	0.07	0.05	0.16
Uniform Delay, d1	24.4	20.9		19.8	21.5		9.7	7.5	6.8	7.1	7.0	7.5
Progression Factor	1.00	1.00		1.00	1.00		1.11	1.15	1.74	1.00	1.00	1.00
Incremental Delay, d2	24.1	0.1		0.2	0.1		2.5	0.3	0.0	0.2	0.0	0.5
Delay (s)	48.5	21.0		19.9	21.6		13.3	9.0	11.9	7.3	7.0	8.0
Level of Service	D	C		B	C		B	A	B	A	A	A
Approach Delay (s)		26.7			21.4			11.9			7.6	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	74.8%	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)	0	0	0	177	243	470	23	52	0	0	161	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3465	1562	1770	990			3167	1557
Flt Permitted					0.98	1.00	0.65	1.00			1.00	1.00
Satd. Flow (perm)					3465	1562	1211	990			3167	1557
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	177	243	470	23	52	0	0	161	50
RTOR Reduction (vph)	0	0	0	0	0	363	0	0	0	0	0	18
Lane Group Flow (vph)	0	0	0	0	420	107	23	52	0	0	161	32
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					17.0	17.0	48.5	48.5			48.5	48.5
Effective Green, g (s)					17.0	17.0	48.5	48.5			48.5	48.5
Actuated g/C Ratio					0.23	0.23	0.65	0.65			0.65	0.65
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					785	354	783	640			2047	1006
v/s Ratio Prot								c0.05			0.05	
v/s Ratio Perm					0.12	0.07	0.02					0.02
v/c Ratio					0.54	0.30	0.03	0.08			0.08	0.03
Uniform Delay, d1					25.5	24.1	4.8	4.9			4.9	4.8
Progression Factor					1.00	1.00	1.00	1.00			0.76	0.83
Incremental Delay, d2					0.4	0.2	0.0	0.0			0.1	0.1
Delay (s)					25.9	24.2	4.8	5.0			3.8	4.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			25.0			4.9			3.9	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	45.3%	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)	22	634	114	85	177	24	56	43	133	168	49	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.89		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3301		1770	3421		1770	873		1770	1217	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3301		1770	3421		1770	873		1770	1217	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	634	114	85	177	24	56	43	133	168	49	36
RTOR Reduction (vph)	0	8	0	0	6	0	0	77	0	0	18	0
Lane Group Flow (vph)	22	740	0	85	195	0	56	99	0	168	67	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	2.3	30.8		8.0	37.0		16.6	16.6		15.2	15.2	
Effective Green, g (s)	2.3	30.8		8.0	37.0		16.6	16.6		15.2	15.2	
Actuated g/C Ratio	0.03	0.36		0.09	0.43		0.19	0.19		0.18	0.18	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	47	1174		163	1461		339	167		310	213	
v/s Ratio Prot	0.01	c0.22		c0.05	0.06		0.03	c0.11		c0.09	0.05	
v/s Ratio Perm												
v/c Ratio	0.47	0.63		0.52	0.13		0.17	0.59		0.54	0.31	
Uniform Delay, d1	41.5	23.2		37.5	15.1		29.2	31.9		32.5	31.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	1.1		2.3	0.0		0.2	5.7		1.9	0.8	
Delay (s)	44.2	24.3		39.8	15.1		29.5	37.6		34.5	32.0	
Level of Service	D	C		D	B		C	D		C	C	
Approach Delay (s)		24.9			22.4			35.7			33.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	86.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Existing + Project PM Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	778	67	107	550	85	52	176	104	143	252	56
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3484		1770	3539	1517	1770	1863	1536	1770	1805	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3484		1770	3539	1517	1770	1863	1536	1770	1805	
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)	79	846	73	116	598	92	57	191	113	155	274	61
RTOR Reduction (vph)	0	10	0	0	0	61	0	0	91	0	14	0
Lane Group Flow (vph)	79	909	0	116	598	31	57	191	22	155	321	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.7	17.9		3.6	18.8	18.8	3.2	10.8	10.8	7.6	15.2	
Effective Green, g (s)	2.7	17.9		3.6	18.8	18.8	3.2	10.8	10.8	7.6	15.2	
Actuated g/C Ratio	0.05	0.32		0.06	0.34	0.34	0.06	0.19	0.19	0.14	0.27	
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)	85	1115		113	1190	510	101	359	296	240	490	
v/s Ratio Prot	0.04	c0.26		c0.07	0.17		0.03	0.10		c0.09	c0.18	
v/s Ratio Perm						0.02			0.01			
v/c Ratio	0.93	0.82		1.03	0.50	0.06	0.56	0.53	0.07	0.65	0.66	
Uniform Delay, d1	26.5	17.5		26.1	14.8	12.6	25.7	20.3	18.5	22.9	18.0	
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	73.4	4.7		92.0	0.3	0.1	7.0	1.5	0.1	5.9	3.2	
Delay (s)	99.9	22.2		118.1	15.2	12.6	32.7	21.8	18.6	28.7	21.2	
Level of Service	F	C		F	B	B	C	C	B	C	C	
Approach Delay (s)		28.3			29.7			22.5			23.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	55.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	273	702	343	25	391	118	361	862	14	163	909	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.98		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.97		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3233		1770	3353		3433	3527		1770	3434	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3233		1770	3353		3433	3527		1770	3434	
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)	297	763	373	27	425	128	392	937	15	177	988	142
RTOR Reduction (vph)	0	52	0	0	25	0	0	1	0	0	10	0
Lane Group Flow (vph)	297	1084	0	27	528	0	392	951	0	177	1120	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	13.2	39.5		6.6	32.9		14.5	37.1		13.8	35.4	
Effective Green, g (s)	13.2	39.5		6.6	32.9		14.5	37.1		13.8	35.4	
Actuated g/C Ratio	0.12	0.36		0.06	0.30		0.13	0.34		0.13	0.32	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	411	1160		106	1002		452	1189		222	1105	
v/s Ratio Prot	c0.09	c0.34		0.02	0.16		c0.11	0.27		0.10	c0.33	
v/s Ratio Perm												
v/c Ratio	0.72	0.93		0.25	0.53		0.87	0.80		0.80	1.01	
Uniform Delay, d1	46.6	34.0		49.4	32.1		46.8	33.1		46.7	37.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.3	13.5		0.5	0.2		15.5	5.7		17.3	30.4	
Delay (s)	51.9	47.5		49.8	32.3		62.3	38.8		64.0	67.7	
Level of Service	D	D		D	C		E	D		E	E	
Approach Delay (s)		48.4			33.1			45.6			67.2	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	51.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	94.9%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	793	35	10	235	0	0	0	0	340	242	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.98	1.00
Satd. Flow (prot)		3510			5074					1610	3327	1540
Flt Permitted		1.00			0.90					0.95	0.98	1.00
Satd. Flow (perm)		3510			4597					1610	3327	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	793	35	10	235	0	0	0	0	340	242	401
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	0	211
Lane Group Flow (vph)	0	824	0	0	245	0	0	0	0	190	392	190
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		30.0			30.0					38.0	38.0	38.0
Effective Green, g (s)		30.0			30.0					38.0	38.0	38.0
Actuated g/C Ratio		0.38			0.38					0.48	0.48	0.48
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1316			1723					764	1580	731
v/s Ratio Prot		c0.23										
v/s Ratio Perm					0.05					0.12	0.12	c0.12
v/c Ratio		0.63			0.14					0.25	0.25	0.26
Uniform Delay, d1		20.4			16.5					12.5	12.5	12.6
Progression Factor		1.00			0.31					1.00	1.00	1.00
Incremental Delay, d2		2.3			0.2					0.8	0.4	0.9
Delay (s)		22.7			5.2					13.3	12.9	13.4
Level of Service		C			A					B	B	B
Approach Delay (s)		22.7			5.2			0.0			13.2	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.1%	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)	513	631	0	0	247	777	18	966	78	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	0.99			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3359			3539	2704		5014				
Flt Permitted	0.95	0.77			1.00	1.00		1.00				
Satd. Flow (perm)	1610	2622			3539	2704		5014				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	513	631	0	0	247	777	18	966	78	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	55	0	11	0	0	0	0
Lane Group Flow (vph)	369	775	0	0	247	722	0	1051	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	12.0	42.0			26.5	26.5		27.0				
Effective Green, g (s)	12.0	42.0			26.5	26.5		27.0				
Actuated g/C Ratio	0.15	0.52			0.33	0.33		0.34				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	241	1487			1172	895		1692				
v/s Ratio Prot	c0.23	0.08			0.07							
v/s Ratio Perm		0.20				c0.27		0.21				
v/c Ratio	1.53	0.52			0.21	0.81		0.62				
Uniform Delay, d1	34.0	12.4			19.2	24.4		22.2				
Progression Factor	1.02	2.41			1.00	1.00		1.00				
Incremental Delay, d2	256.5	1.1			0.4	7.7		1.7				
Delay (s)	291.1	31.1			19.6	32.1		23.9				
Level of Service	F	C			B	C		C				
Approach Delay (s)		114.9			29.1			23.9			0.0	
Approach LOS		F			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	57.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	85.3%	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)	6	345	67	66	772	20	305	22	206	33	10	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3375		1649	1528	1244	1480	1405	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3375		1649	1528	1244	1480	1405	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	6	345	67	66	772	20	305	22	206	33	10	30
RTOR Reduction (vph)	0	0	46	0	1	0	0	0	157	0	27	0
Lane Group Flow (vph)	6	345	21	66	791	0	162	165	49	33	13	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	0.9	20.7	20.7	7.6	27.4		15.8	15.8	15.8	5.7	5.7	
Effective Green, g (s)	0.9	20.7	20.7	7.6	27.4		15.8	15.8	15.8	5.7	5.7	
Actuated g/C Ratio	0.01	0.31	0.31	0.11	0.41		0.24	0.24	0.24	0.09	0.09	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	24	1034	379	147	1394		392	364	296	127	120	
v/s Ratio Prot	0.00	0.10		c0.05	c0.23		0.10	c0.11		c0.02	0.01	
v/s Ratio Perm			0.02						0.04			
v/c Ratio	0.25	0.33	0.06	0.45	0.57		0.41	0.45	0.17	0.26	0.10	
Uniform Delay, d1	32.4	17.5	16.0	27.4	14.9		21.3	21.6	20.0	28.3	27.9	
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	5.4	0.3	0.1	2.2	0.8		1.0	1.2	0.4	1.1	0.4	
Delay (s)	37.8	17.8	16.1	29.6	15.7		22.3	22.8	20.4	29.4	28.3	
Level of Service	D	B	B	C	B		C	C	C	C	C	
Approach Delay (s)		17.8			16.7			21.7			28.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	54.3%	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)	115	339	126	194	689	520	139	272	227	240	158	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.93		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (prot)	1337	3058		1687	3406	1509	1444	2944		1369	2778	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.98	
Satd. Flow (perm)	1337	3058		1687	3406	1509	1444	2944		1369	2778	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	115	339	126	194	689	520	139	272	227	240	158	23
RTOR Reduction (vph)	0	32	0	0	0	364	0	105	0	0	5	0
Lane Group Flow (vph)	115	433	0	194	689	156	139	394	0	139	277	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	14.4	25.4		16.8	27.8	27.8	18.2	18.2		15.8	15.8	
Effective Green, g (s)	14.4	25.4		16.8	27.8	27.8	18.2	18.2		15.8	15.8	
Actuated g/C Ratio	0.16	0.27		0.18	0.30	0.30	0.20	0.20		0.17	0.17	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	207	837		305	1021	452	283	578		233	473	
v/s Ratio Prot	0.09	0.14		c0.12	c0.20		0.10	c0.13		c0.10	0.10	
v/s Ratio Perm						0.10						
v/c Ratio	0.56	0.52		0.64	0.67	0.35	0.49	0.68		0.60	0.59	
Uniform Delay, d1	36.2	28.5		35.1	28.5	25.3	33.1	34.6		35.5	35.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	0.5		4.3	1.8	0.5	1.0	3.0		3.4	1.5	
Delay (s)	39.4	29.0		39.4	30.3	25.8	34.1	37.6		38.9	37.0	
Level of Service	D	C		D	C	C	C	D		D	D	
Approach Delay (s)		31.1			29.9			36.8			37.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	16.5
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)	0	633	137	179	937	0	0	0	0	452	384	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4811		1762	3312						3278	
Flt Permitted		1.00		0.33	1.00						0.98	
Satd. Flow (perm)		4811		603	3312						3278	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	633	137	179	937	0	0	0	0	452	384	285
RTOR Reduction (vph)	0	38	0	0	0	0	0	0	0	0	40	0
Lane Group Flow (vph)	0	732	0	179	937	0	0	0	0	0	1081	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		42.1		42.1	42.1						31.7	
Effective Green, g (s)		42.1		42.1	42.1						31.7	
Actuated g/C Ratio		0.50		0.50	0.50						0.38	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2416		302	1663						1240	
v/s Ratio Prot		0.15			0.28						c0.33	
v/s Ratio Perm				c0.30								
v/c Ratio		0.30		0.59	0.56						0.87	
Uniform Delay, d1		12.2		14.8	14.5						24.2	
Progression Factor		1.00		0.35	0.34						1.00	
Incremental Delay, d2		0.0		1.5	0.2						6.7	
Delay (s)		12.3		6.6	5.1						30.9	
Level of Service		B		A	A						C	
Approach Delay (s)		12.3			5.3			0.0			30.9	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	119.5%	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)	241	844	0	0	965	298	151	408	214	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.96				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3391			3339				
Flt Permitted	0.12	1.00			1.00			0.99				
Satd. Flow (perm)	221	3539			3391			3339				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	241	844	0	0	965	298	151	408	214	0	0	0
RTOR Reduction (vph)	0	0	0	0	32	0	0	48	0	0	0	0
Lane Group Flow (vph)	241	844	0	0	1231	0	0	725	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	42.1	42.1			42.1			31.7				
Effective Green, g (s)	42.1	42.1			42.1			31.7				
Actuated g/C Ratio	0.50	0.50			0.50			0.38				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	111	1777			1703			1263				
v/s Ratio Prot		0.24			0.36			c0.22				
v/s Ratio Perm	c1.09											
v/c Ratio	2.17	0.47			0.72			0.57				
Uniform Delay, d1	20.8	13.6			16.3			20.7				
Progression Factor	1.07	0.96			1.00			1.00				
Incremental Delay, d2	552.0	0.1			1.3			0.4				
Delay (s)	574.3	13.1			17.6			21.1				
Level of Service	F	B			B			C				
Approach Delay (s)		137.8			17.6			21.1			0.0	
Approach LOS		F			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	60.2	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	119.5%	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)	47	1377	26	57	1049	56	26	206	57	65	214	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.97		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)	1767	3461		1768	3350		1757	1792		1760	1789	
Flt Permitted	0.20	1.00		0.12	1.00		0.46	1.00		0.47	1.00	
Satd. Flow (perm)	366	3461		221	3350		844	1792		877	1789	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	47	1377	26	57	1049	56	26	206	57	65	214	60
RTOR Reduction (vph)	0	2	0	0	5	0	0	12	0	0	13	0
Lane Group Flow (vph)	47	1401	0	57	1100	0	26	251	0	65	261	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Effective Green, g (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.29	0.29		0.29	0.29	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	221	2098		133	2030		242	515		252	514	
v/s Ratio Prot		c0.40			0.33			0.14			c0.15	
v/s Ratio Perm	0.13			0.26			0.03			0.07		
v/c Ratio	0.21	0.67		0.43	0.54		0.11	0.49		0.26	0.51	
Uniform Delay, d1	7.1	10.4		8.4	9.2		21.0	23.6		21.9	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	1.7		9.8	1.0		0.9	3.3		2.5	3.6	
Delay (s)	9.3	12.1		18.2	10.3		21.8	26.9		24.4	27.3	
Level of Service	A	B		B	B		C	C		C	C	
Approach Delay (s)		12.0			10.7			26.4			26.8	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	81.8%	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)	97	1145	339	80	687	15	234	290	131	45	178	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			0.99	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3321			3256	1490	1655	1827	1504		1839	1500
Flt Permitted		0.82			0.59	1.00	0.49	1.00	1.00		0.84	1.00
Satd. Flow (perm)		2740			1941	1490	855	1827	1504		1553	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	97	1145	339	80	687	15	234	290	131	45	178	149
RTOR Reduction (vph)	0	24	0	0	0	6	0	0	42	0	0	105
Lane Group Flow (vph)	0	1557	0	0	767	9	234	290	89	0	223	44
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		54.5			54.5	54.5	26.5	26.5	26.5		26.5	26.5
Effective Green, g (s)		54.5			54.5	54.5	26.5	26.5	26.5		26.5	26.5
Actuated g/C Ratio		0.61			0.61	0.61	0.29	0.29	0.29		0.29	0.29
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1659			1175	902	251	537	442		457	441
v/s Ratio Prot								0.16				
v/s Ratio Perm		c0.57			0.40	0.01	c0.27		0.06		0.14	0.03
v/c Ratio		0.94			1.05dl	0.01	0.93	0.54	0.20		0.49	0.10
Uniform Delay, d1		16.2			11.6	7.0	30.9	26.6	23.8		26.2	23.1
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		11.7			2.8	0.0	38.3	0.6	0.1		0.3	0.0
Delay (s)		27.9			14.4	7.1	69.1	27.2	23.9		26.5	23.1
Level of Service		C			B	A	E	C	C		C	C
Approach Delay (s)		27.9			14.3			41.5			25.1	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	123.7%	ICU Level of Service	H
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)	133	1218	177	35	699	75	325	449	77	116	381	135
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3489	1482	1770	3195	1540	1726	3449		1759	3379	
Flt Permitted		0.70	1.00	0.11	1.00	1.00	0.43	1.00		0.42	1.00	
Satd. Flow (perm)		2471	1482	201	3195	1540	778	3449		781	3379	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	133	1218	177	35	699	75	325	449	77	116	381	135
RTOR Reduction (vph)	0	0	68	0	0	42	0	10	0	0	43	0
Lane Group Flow (vph)	0	1351	109	35	699	33	325	516	0	116	473	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		37.1	37.1	37.1	37.1	37.1	38.4	38.4		38.4	38.4	
Effective Green, g (s)		37.1	37.1	37.1	37.1	37.1	38.4	38.4		38.4	38.4	
Actuated g/C Ratio		0.44	0.44	0.44	0.44	0.44	0.45	0.45		0.45	0.45	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		1078	646	87	1394	672	351	1558		352	1526	
v/s Ratio Prot					0.22			0.15			0.14	
v/s Ratio Perm		c0.55	0.07	0.17		0.02	c0.42			0.15		
v/c Ratio		1.25	0.17	0.40	0.50	0.05	0.93	0.33		0.33	0.31	
Uniform Delay, d1		23.9	14.6	16.4	17.3	13.8	22.0	15.0		15.0	14.9	
Progression Factor		1.00	1.00	0.71	0.87	0.69	1.00	1.00		1.00	1.00	
Incremental Delay, d2		121.7	0.6	12.4	1.2	0.1	30.7	0.3		0.8	0.2	
Delay (s)		145.6	15.1	24.1	16.2	9.6	52.7	15.3		15.8	15.0	
Level of Service		F	B	C	B	A	D	B		B	B	
Approach Delay (s)		130.5			15.9			29.6			15.1	
Approach LOS		F			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	64.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	111.1%	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)	68	1161	10	26	864	40	20	173	242	35	78	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1583	3154	1361	1585	3065	1375		3160	1169		2841	
Flt Permitted	0.30	1.00	1.00	0.20	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	492	3154	1361	328	3065	1375		2906	1169		2530	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	68	1161	10	26	864	40	20	173	242	35	78	98
RTOR Reduction (vph)	0	0	3	0	0	10	0	0	25	0	63	0
Lane Group Flow (vph)	68	1161	7	26	864	30	0	193	217	0	148	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	55.3	55.3	55.3	55.3	55.3	55.3		21.2	21.2		21.2	
Effective Green, g (s)	55.3	55.3	55.3	55.3	55.3	55.3		21.2	21.2		21.2	
Actuated g/C Ratio	0.65	0.65	0.65	0.65	0.65	0.65		0.25	0.25		0.25	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	320	2051	885	213	1994	894		724	291		631	
v/s Ratio Prot		c0.37			0.28							
v/s Ratio Perm	0.14		0.00	0.08		0.02		0.07	c0.19		0.06	
v/c Ratio	0.21	0.57	0.01	0.12	0.43	0.03		0.27	0.75		0.23	
Uniform Delay, d1	6.0	8.2	5.2	5.6	7.2	5.3		25.6	29.4		25.4	
Progression Factor	1.34	1.35	1.78	1.15	1.26	1.21		1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.1	0.0	1.0	0.6	0.1		0.1	8.8		0.1	
Delay (s)	8.2	11.2	9.3	7.5	9.7	6.5		25.7	38.2		25.5	
Level of Service	A	B	A	A	A	A		C	D		C	
Approach Delay (s)		11.0			9.5			32.7			25.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	540	810	703	366	158	94
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	3023	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	3023	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	540	810	703	366	158	94
RTOR Reduction (vph)	0	0	0	227	11	68
Lane Group Flow (vph)	540	810	703	139	163	10
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	36.2	65.7	25.5	25.5	11.3	11.3
Effective Green, g (s)	36.2	65.7	25.5	25.5	11.3	11.3
Actuated g/C Ratio	0.43	0.77	0.30	0.30	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	671	2391	919	414	401	161
v/s Ratio Prot	c0.34	0.26	c0.23		c0.05	
v/s Ratio Perm				0.10		0.01
v/c Ratio	0.80	0.34	0.76	0.34	0.41	0.06
Uniform Delay, d1	21.3	3.0	27.0	23.2	33.8	32.2
Progression Factor	0.95	1.29	1.00	1.26	1.00	1.00
Incremental Delay, d2	5.7	0.3	3.3	0.2	0.2	0.1
Delay (s)	25.9	4.2	30.2	29.3	34.0	32.3
Level of Service	C	A	C	C	C	C
Approach Delay (s)		12.9	29.9		33.5	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	85.0	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	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	653	31	90	378	29	226	523	145	43	420	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	4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	0.98	1.00			1.00		0.98	1.00	1.00	0.97	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	3156			3109		1559	3185	1308	1548	3032	
Flt Permitted	0.43	1.00			0.73		0.38	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	714	3156			2297		622	3185	1308	635	3032	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	113	653	31	90	378	29	226	523	145	43	420	119
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	63	0	35	0
Lane Group Flow (vph)	113	681	0	0	493	0	226	523	82	43	504	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	42.7	42.7			42.7		34.3	34.3	34.3	34.3	34.3	
Effective Green, g (s)	42.7	42.7			42.7		34.3	34.3	34.3	34.3	34.3	
Actuated g/C Ratio	0.50	0.50			0.50		0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	358	1585			1153		250	1285	527	256	1223	
v/s Ratio Prot		c0.22						0.16			0.17	
v/s Ratio Perm	0.16				0.21		c0.36		0.06	0.07		
v/c Ratio	0.32	0.43			0.43		0.90	0.41	0.16	0.17	0.41	
Uniform Delay, d1	12.5	13.4			13.4		23.8	18.1	16.1	16.2	18.1	
Progression Factor	0.94	0.92			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.8			0.1		32.0	0.1	0.1	0.1	0.1	
Delay (s)	14.0	13.1			13.5		55.8	18.2	16.2	16.3	18.2	
Level of Service	B	B			B		E	B	B	B	B	
Approach Delay (s)		13.3			13.5			27.4			18.1	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.8%	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)	139	739	110	279	292	36	22	1068	707	2	505	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1349	3090	3185	1349		4570	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.92	1.00		0.94	1.00
Satd. Flow (perm)	3090	3154	1349	3090	3185	1349		4211	1391		4285	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	139	739	110	279	292	36	22	1068	707	2	505	53
RTOR Reduction (vph)	0	0	57	0	0	21	0	0	0	0	0	35
Lane Group Flow (vph)	139	739	53	279	292	15	0	1090	707	0	507	18
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	9.5	35.7	35.7	12.2	38.4	38.4		32.1	95.0		32.1	32.1
Effective Green, g (s)	9.5	35.7	35.7	12.2	38.4	38.4		32.1	95.0		32.1	32.1
Actuated g/C Ratio	0.10	0.38	0.38	0.13	0.40	0.40		0.34	1.00		0.34	0.34
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	309	1185	506	396	1287	545		1422	1391		1447	455
v/s Ratio Prot	0.04	c0.23		c0.09	0.09							
v/s Ratio Perm			0.04			0.01		c0.26	c0.51		0.12	0.01
v/c Ratio	0.45	0.62	0.10	0.70	0.23	0.03		0.77	0.51		0.35	0.04
Uniform Delay, d1	40.3	24.2	19.3	39.7	18.6	17.0		28.1	0.0		23.6	21.1
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	1.0	2.5	0.4	5.6	0.4	0.1		2.5	1.3		0.1	0.0
Delay (s)	41.3	26.7	19.7	45.3	19.0	17.1		30.6	1.3		23.8	21.1
Level of Service	D	C	B	D	B	B		C	A		C	C
Approach Delay (s)		27.9			31.0			19.1			23.5	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: Existing + Proj Pref PM

Adeline & 18th
Existing + Preferred Project PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	105	2.0	0.430	8.9	LOS A	2.4	60.8	0.64	0.92	25.9
8	T	256	2.0	0.430	8.9	LOS A	2.4	60.8	0.64	0.74	28.1
18	R	36	2.0	0.430	8.9	LOS A	2.4	60.8	0.64	0.78	27.8
Approach		397	2.0	0.430	8.9	LOS A	2.4	60.8	0.64	0.79	27.4
East: 18th Street (WB)											
1	L	33	2.0	0.239	6.1	LOS A	1.1	28.5	0.53	0.88	27.2
6	T	161	2.0	0.239	6.1	LOS A	1.1	28.5	0.53	0.64	29.9
16	R	34	2.0	0.239	6.1	LOS A	1.1	28.5	0.53	0.69	29.6
Approach		228	2.0	0.239	6.1	LOS A	1.1	28.5	0.53	0.68	29.4
North: Adeline Street (SB)											
7	L	56	2.0	0.287	6.3	LOS A	1.4	36.8	0.50	0.86	27.1
4	T	224	2.0	0.287	6.3	LOS A	1.4	36.8	0.50	0.60	29.8
14	R	18	2.0	0.287	6.3	LOS A	1.4	36.8	0.50	0.65	29.5
Approach		298	2.0	0.287	6.3	LOS A	1.4	36.8	0.50	0.65	29.2
West: 18th Street (EB)											
5	L	21	2.0	0.417	8.1	LOS A	2.4	60.2	0.58	0.89	26.4
2	T	337	2.0	0.417	8.1	LOS A	2.4	60.2	0.58	0.66	28.8
12	R	69	2.0	0.417	8.1	LOS A	2.4	60.2	0.58	0.70	28.5
Approach		427	2.0	0.417	8.1	LOS A	2.4	60.2	0.58	0.68	28.6
All Vehicles		1350	2.0	0.430	7.6	LOS A	2.4	60.8	0.57	0.71	28.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	392	41	19	249	83	24	439	28	282	331	25
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		1.00	0.99		1.00	1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		0.99	1.00			0.99	
Frt	1.00	0.99		1.00	0.96		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1759	1828		1743	1782		1746	3490			3385	
Flt Permitted	0.39	1.00		0.25	1.00		0.38	1.00			0.64	
Satd. Flow (perm)	723	1828		465	1782		702	3490			2230	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	45	392	41	19	249	83	24	439	28	282	331	25
RTOR Reduction (vph)	0	6	0	0	19	0	0	6	0	0	4	0
Lane Group Flow (vph)	45	427	0	19	313	0	24	461	0	0	634	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	20.5	20.5		20.5	20.5		37.2	37.2			37.2	
Effective Green, g (s)	20.5	20.5		20.5	20.5		37.2	37.2			37.2	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.57	0.57			0.57	
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)	225	570		145	556		397	1976			1262	
v/s Ratio Prot		c0.23			0.18			0.13				
v/s Ratio Perm	0.06			0.04			0.03				c0.28	
v/c Ratio	0.20	0.75		0.13	0.56		0.06	0.23			0.50	
Uniform Delay, d1	16.6	20.3		16.2	18.9		6.4	7.1			8.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.4	5.4		0.4	1.3		0.3	0.3			1.4	
Delay (s)	17.0	25.7		16.6	20.2		6.7	7.4			10.1	
Level of Service	B	C		B	C		A	A			B	
Approach Delay (s)		24.9			20.0			7.4			10.1	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: Existing + Proj Pref PM

Adeline & 14th
Existing + Preferred Project PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	14	2.0	0.368	7.5	LOS A	2.0	49.9	0.57	0.90	26.6
8	T	300	2.0	0.368	7.5	LOS A	2.0	49.9	0.57	0.66	29.1
18	R	52	2.0	0.368	7.5	LOS A	2.0	49.9	0.57	0.71	28.8
Approach		366	2.0	0.368	7.5	LOS A	2.0	49.9	0.57	0.68	29.0
East: 14th Street (WB)											
1	L	89	2.0	0.336	7.2	LOS A	1.7	43.8	0.56	0.87	26.6
6	T	203	2.0	0.336	7.2	LOS A	1.7	43.8	0.56	0.66	29.1
16	R	35	2.0	0.336	7.2	LOS A	1.7	43.8	0.56	0.71	28.8
Approach		327	2.0	0.336	7.2	LOS A	1.7	43.8	0.56	0.72	28.3
North: Adeline Street (SB)											
7	L	63	2.0	0.297	6.4	LOS A	1.5	38.3	0.51	0.86	27.0
4	T	209	2.0	0.297	6.4	LOS A	1.5	38.3	0.51	0.61	29.7
14	R	34	2.0	0.297	6.4	LOS A	1.5	38.3	0.51	0.66	29.3
Approach		306	2.0	0.297	6.4	LOS A	1.5	38.3	0.51	0.66	29.0
West: 14th Street (EB)											
5	L	49	2.0	0.307	6.8	LOS A	1.5	39.1	0.55	0.89	26.9
2	T	230	2.0	0.307	6.8	LOS A	1.5	39.1	0.55	0.65	29.5
12	R	21	2.0	0.307	6.8	LOS A	1.5	39.1	0.55	0.70	29.1
Approach		300	2.0	0.307	6.8	LOS A	1.5	39.1	0.55	0.69	29.0
All Vehicles		1299	2.0	0.368	7.0	LOS A	2.0	49.9	0.55	0.69	28.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: Existing + Proj PM

Adeline & 12th
Existing + Preferred Project PM
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.205	4.4	LOS A	1.1	26.9	0.18	0.89	27.8
8	T	268	2.0	0.205	4.4	LOS A	1.1	26.9	0.18	0.42	31.3
18	R	7	2.0	0.205	4.4	LOS A	1.1	26.9	0.18	0.52	30.7
Approach		276	2.0	0.205	4.4	LOS A	1.1	26.9	0.18	0.43	31.3
East: 12th Street (WB)											
1	L	9	2.0	0.105	4.3	LOS A	0.5	11.7	0.41	0.80	27.9
6	T	21	2.0	0.105	4.3	LOS A	0.5	11.7	0.41	0.52	31.1
16	R	82	2.0	0.105	4.3	LOS A	0.5	11.7	0.41	0.58	30.6
Approach		112	2.0	0.105	4.3	LOS A	0.5	11.7	0.41	0.59	30.5
North: Adeline Street (SB)											
7	L	34	2.0	0.222	4.5	LOS A	1.2	29.9	0.14	0.87	27.7
4	T	261	2.0	0.222	4.5	LOS A	1.2	29.9	0.14	0.41	31.2
14	R	8	2.0	0.222	4.5	LOS A	1.2	29.9	0.14	0.50	30.6
Approach		303	2.0	0.222	4.5	LOS A	1.2	29.9	0.14	0.46	30.7
West: 12th Street (EB)											
5	L	8	2.0	0.015	3.6	LOS A	0.1	1.6	0.40	0.73	28.2
2	T	5	2.0	0.015	3.6	LOS A	0.1	1.6	0.40	0.47	31.5
12	R	3	2.0	0.015	3.6	LOS A	0.1	1.6	0.40	0.53	31.0
Approach		16	2.0	0.015	3.6	LOS A	0.1	1.6	0.40	0.61	29.6
All Vehicles		707	2.0	0.222	4.4	LOS A	1.2	29.9	0.21	0.47	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	97	0	0	155	273	90	222	165	255	0	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.90		1.00	0.94		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2584		972	2858		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2584		972	2858		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	99	97	0	0	155	273	90	222	165	255	0	192
RTOR Reduction (vph)	0	0	0	0	225	0	0	109	0	0	0	138
Lane Group Flow (vph)	99	97	0	0	203	0	81	287	0	255	0	54
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	8.1	23.4			11.8		11.9	11.9		18.8		18.8
Effective Green, g (s)	8.1	23.4			11.8		11.9	11.9		18.8		18.8
Actuated g/C Ratio	0.12	0.35			0.18		0.18	0.18		0.28		0.28
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	165	1155			454		172	506		435		692
v/s Ratio Prot	c0.07	0.03			c0.08		0.08	c0.10		c0.16		0.02
v/s Ratio Perm												
v/c Ratio	0.60	0.08			0.45		0.47	0.57		0.59		0.08
Uniform Delay, d1	28.0	14.7			24.7		24.8	25.2		20.8		17.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	3.9	0.0			0.5		1.5	1.2		1.7		0.0
Delay (s)	31.8	14.7			25.2		26.3	26.4		22.5		17.8
Level of Service	C	B			C		C	C		C		B
Approach Delay (s)		23.3			25.2			26.4			20.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	59.4%	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)	111	704	22	144	636	151	20	128	132	189	169	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.97			0.94		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3379		1770	3286			1712		1760	1671	
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.50	1.00	
Satd. Flow (perm)	1770	3379		1770	3286			1666		932	1671	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	111	704	22	144	636	151	20	128	132	189	169	107
RTOR Reduction (vph)	0	3	0	0	34	0	0	29	0	0	21	0
Lane Group Flow (vph)	111	723	0	144	753	0	0	251	0	189	255	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	12.2	32.8		11.1	31.7			35.1		35.1	35.1	
Effective Green, g (s)	12.2	32.8		11.1	31.7			35.1		35.1	35.1	
Actuated g/C Ratio	0.14	0.36		0.12	0.35			0.39		0.39	0.39	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	239	1231		218	1157			649		363	651	
v/s Ratio Prot	0.06	c0.21		0.08	c0.23						0.15	
v/s Ratio Perm								0.15		c0.20		
v/c Ratio	0.46	0.59		0.66	0.65			0.39		0.52	0.39	
Uniform Delay, d1	35.9	23.1		37.7	24.5			19.7		21.0	19.8	
Progression Factor	0.94	0.91		0.96	0.61			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.5		5.6	2.8			0.1		0.6	0.1	
Delay (s)	34.4	21.6		42.0	17.7			19.9		21.6	19.9	
Level of Service	C	C		D	B			B		C	B	
Approach Delay (s)		23.3			21.4			19.9			20.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	76.3%	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)	53	1450	54	27	857	124	36	89	68	72	81	42
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1760	3376		1054	3471	1460	1573	1092		1756	1572	
Flt Permitted	0.27	1.00		0.09	1.00	1.00	0.68	1.00		0.63	1.00	
Satd. Flow (perm)	500	3376		101	3471	1460	1123	1092		1173	1572	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	1450	54	27	857	124	36	89	68	72	81	42
RTOR Reduction (vph)	0	3	0	0	0	56	0	18	0	0	23	0
Lane Group Flow (vph)	53	1501	0	27	857	68	36	139	0	72	100	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	275	1856		55	1909	803	393	382		410	550	
v/s Ratio Prot		c0.44			0.25			c0.13			0.06	
v/s Ratio Perm	0.11			0.27		0.05	0.03			0.06		
v/c Ratio	0.19	0.81		0.49	0.45	0.08	0.09	0.37		0.18	0.18	
Uniform Delay, d1	9.1	14.6		11.1	10.8	8.5	17.5	19.4		18.0	18.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	3.9		28.1	0.8	0.2	0.5	2.7		0.9	0.7	
Delay (s)	10.6	18.5		39.2	11.5	8.7	17.9	22.1		18.9	18.8	
Level of Service	B	B		D	B	A	B	C		B	B	
Approach Delay (s)		18.2			11.9			21.3			18.8	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	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)	124	1065	146	25	345	37	356	313	31	73	142	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		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)	1663	4274		1765	4520		1743	1863	1538	1752	3539	1215
Flt Permitted	0.52	1.00		0.16	1.00		0.66	1.00	1.00	0.48	1.00	1.00
Satd. Flow (perm)	905	4274		304	4520		1214	1863	1538	887	3539	1215
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	1065	146	25	345	37	356	313	31	73	142	273
RTOR Reduction (vph)	0	21	0	0	15	0	0	0	15	0	0	156
Lane Group Flow (vph)	124	1190	0	25	367	0	356	313	16	73	142	117
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	39.0	39.0		39.0	39.0		36.5	36.5	36.5	36.5	36.5	36.5
Effective Green, g (s)	39.0	39.0		39.0	39.0		36.5	36.5	36.5	36.5	36.5	36.5
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.43	0.43	0.43	0.43	0.43	0.43
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	415	1961		139	2073		521	799	660	380	1519	521
v/s Ratio Prot		c0.28			0.08			0.17			0.04	
v/s Ratio Perm	0.14			0.08			c0.29		0.01	0.08		0.10
v/c Ratio	0.30	0.61		0.18	0.18		0.68	0.39	0.02	0.19	0.09	0.23
Uniform Delay, d1	14.4	17.3		13.6	13.5		19.6	16.6	14.0	15.1	14.4	15.3
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	1.8	1.4		0.2	0.0		7.1	1.4	0.1	1.1	0.1	1.0
Delay (s)	16.3	18.7		13.8	13.6		26.7	18.1	14.1	16.2	14.5	16.3
Level of Service	B	B		B	B		C	B	B	B	B	B
Approach Delay (s)		18.4			13.6			22.3			15.8	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
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)	0	0	0	56	152	456	48	115	0	0	273	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3491	1561	1770	1111			2865	1558
Flt Permitted					0.99	1.00	0.58	1.00			1.00	1.00
Satd. Flow (perm)					3491	1561	1087	1111			2865	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	56	152	456	48	115	0	0	273	24
RTOR Reduction (vph)	0	0	0	0	0	388	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	208	68	48	115	0	0	273	18
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					13.4	13.4	67.1	67.1			67.1	67.1
Effective Green, g (s)					13.4	13.4	67.1	67.1			67.1	67.1
Actuated g/C Ratio					0.15	0.15	0.75	0.75			0.75	0.75
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					519	232	810	828			2136	1161
v/s Ratio Prot								c0.10			0.10	
v/s Ratio Perm					0.06	0.04	0.04					0.01
v/c Ratio					0.40	0.29	0.06	0.14			0.13	0.02
Uniform Delay, d1					34.7	34.1	3.0	3.2			3.2	2.9
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.2	0.3	0.0	0.0			0.1	0.0
Delay (s)					34.9	34.3	3.1	3.3			3.3	3.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			34.5			3.2			3.3	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	45.9%	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)	26	944	61	41	112	26	107	186	148	153	41	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.93		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	3371		1770	3330		1770	1031		1770	1142	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3371		1770	3330		1770	1031		1770	1142	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	61	41	112	26	107	186	148	153	41	13
RTOR Reduction (vph)	0	3	0	0	12	0	0	16	0	0	9	0
Lane Group Flow (vph)	26	1002	0	41	126	0	107	318	0	153	45	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	4.1	37.9		6.4	40.7		39.3	39.3		15.4	15.4	
Effective Green, g (s)	4.1	37.9		6.4	40.7		39.3	39.3		15.4	15.4	
Actuated g/C Ratio	0.04	0.33		0.06	0.35		0.34	0.34		0.13	0.13	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	63	1110		98	1178		604	352		237	152	
v/s Ratio Prot	0.01	c0.30		c0.02	c0.04		0.06	c0.31		c0.09	0.04	
v/s Ratio Perm												
v/c Ratio	0.41	0.90		0.42	0.11		0.18	0.90		0.65	0.30	
Uniform Delay, d1	54.3	36.8		52.5	24.9		26.5	36.1		47.2	44.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	10.3		2.1	0.0		0.2	25.6		5.9	1.1	
Delay (s)	55.9	47.1		54.6	25.0		26.7	61.7		53.1	46.0	
Level of Service	E	D		D	C		C	E		D	D	
Approach Delay (s)		47.3			31.8			53.2			51.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2035 AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1233	97	277	1443	254	124	206	195	384	562	162
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3488		1770	3539	1517	1770	1863	1541	1770	1792	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3488		1770	3539	1517	1770	1863	1541	1770	1792	
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)	51	1340	105	301	1568	276	135	224	212	417	611	176
RTOR Reduction (vph)	0	9	0	0	0	102	0	0	130	0	18	0
Lane Group Flow (vph)	51	1436	0	301	1568	174	135	224	82	417	769	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.4	18.6		7.0	23.2	23.2	4.0	16.0	16.0	4.0	16.0	
Effective Green, g (s)	2.4	18.6		7.0	23.2	23.2	4.0	16.0	16.0	4.0	16.0	
Actuated g/C Ratio	0.04	0.30		0.11	0.38	0.38	0.06	0.26	0.26	0.06	0.26	
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)	68	1053		201	1332	571	114	483	400	114	465	
v/s Ratio Prot	0.03	c0.41		c0.17	0.44		0.08	0.12		c0.24	c0.43	
v/s Ratio Perm						0.11			0.05			
v/c Ratio	0.75	1.36		1.50	1.18	0.30	1.18	0.46	0.21	3.66	1.65	
Uniform Delay, d1	29.3	21.5		27.3	19.2	13.5	28.8	19.2	17.8	28.8	22.8	
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	36.6	169.8		248.2	87.9	0.3	142.1	0.7	0.3	1217.4	303.9	
Delay (s)	65.9	191.3		275.5	107.1	13.8	170.9	19.9	18.1	1246.2	326.7	
Level of Service	E	F		F	F	B	F	B	B	F	F	
Approach Delay (s)		187.0			118.7			54.9			645.2	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	247.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	247	898	933	128	1184	190	895	865	46	165	1364	263
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3069		1770	3427		3433	3499		1770	3404	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3069		1770	3427		3433	3499		1770	3404	
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)	268	976	1014	139	1287	207	973	940	50	179	1483	286
RTOR Reduction (vph)	0	170	0	0	12	0	0	3	0	0	14	0
Lane Group Flow (vph)	268	1820	0	139	1482	0	973	987	0	179	1755	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	17.0	35.0		11.0	29.0		15.0	37.1		13.9	35.0	
Effective Green, g (s)	17.0	35.0		11.0	29.0		15.0	37.1		13.9	35.0	
Actuated g/C Ratio	0.15	0.32		0.10	0.26		0.14	0.34		0.13	0.32	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	273	976		177	903		468	1180		223	1083	
v/s Ratio Prot	c0.15	c0.59		0.08	0.43		c0.28	0.28		0.10	c0.52	
v/s Ratio Perm												
v/c Ratio	0.98	1.86		0.79	1.64		2.08	0.84		0.80	1.62	
Uniform Delay, d1	46.3	37.5		48.3	40.5		47.5	33.6		46.7	37.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	49.0	392.9		18.7	293.7		492.9	7.1		18.0	283.4	
Delay (s)	95.4	430.4		67.0	334.2		540.4	40.7		64.7	320.9	
Level of Service	F	F		E	F		F	D		E	F	
Approach Delay (s)		390.6			311.4			288.4			297.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	325.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	152.5%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	670	61	12	316	0	0	0	0	631	877	524
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3482			5075					1610	3366	1550
Flt Permitted		1.00			0.82					0.95	0.99	1.00
Satd. Flow (perm)		3482			4162					1610	3366	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	670	61	12	316	0	0	0	0	631	877	524
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	56
Lane Group Flow (vph)	0	722	0	0	328	0	0	0	0	486	1022	468
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		17.0			17.0					51.0	51.0	51.0
Effective Green, g (s)		17.0			17.0					51.0	51.0	51.0
Actuated g/C Ratio		0.21			0.21					0.64	0.64	0.64
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		739			884					1026	2145	988
v/s Ratio Prot		c0.21										
v/s Ratio Perm					0.08					0.30	0.30	0.30
v/c Ratio		0.98			0.37					0.47	0.48	0.47
Uniform Delay, d1		31.3			26.9					7.5	7.5	7.5
Progression Factor		1.00			1.12					1.00	1.00	1.00
Incremental Delay, d2		28.0			1.2					1.6	0.8	1.6
Delay (s)		59.4			31.4					9.1	8.3	9.2
Level of Service		E			C					A	A	A
Approach Delay (s)		59.4			31.4			0.0			8.7	
Approach LOS		E			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.1%	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)	395	920	0	0	305	737	11	781	32	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3383			3539	2702		5044				
Flt Permitted	0.95	0.94			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3190			3539	2702		5044				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	395	920	0	0	305	737	11	781	32	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	141	0	6	0	0	0	0
Lane Group Flow (vph)	355	960	0	0	305	596	0	818	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	23.5	52.5			25.5	25.5		16.5				
Effective Green, g (s)	23.5	52.5			25.5	25.5		16.5				
Actuated g/C Ratio	0.29	0.66			0.32	0.32		0.21				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	472	2150			1128	861		1040				
v/s Ratio Prot	c0.22	0.13			0.09							
v/s Ratio Perm		0.16				c0.22		0.16				
v/c Ratio	0.75	0.45			0.27	0.69		0.79				
Uniform Delay, d1	25.6	6.7			20.3	23.8		30.1				
Progression Factor	0.81	0.65			1.00	1.00		1.00				
Incremental Delay, d2	7.3	0.5			0.6	4.6		6.0				
Delay (s)	28.0	4.8			20.9	28.4		36.1				
Level of Service	C	A			C	C		D				
Approach Delay (s)		11.1			26.2			36.1			0.0	
Approach LOS		B			C			D			A	

Intersection Summary			
HCM 2000 Control Delay	22.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
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)	61	919	747	394	1677	70	214	45	331	30	21	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	919	747	394	1677	70	214	45	331	30	21	20
RTOR Reduction (vph)	0	0	337	0	2	0	0	0	281	0	19	0
Lane Group Flow (vph)	61	919	410	394	1745	0	128	131	50	30	22	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	5.5	46.3	46.3	34.3	75.1		18.0	18.0	18.0	4.4	4.4	
Effective Green, g (s)	5.5	46.3	46.3	34.3	75.1		18.0	18.0	18.0	4.4	4.4	
Actuated g/C Ratio	0.05	0.39	0.39	0.29	0.63		0.15	0.15	0.15	0.04	0.04	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	83	1283	543	442	2094		187	187	142	44	41	
v/s Ratio Prot	0.03	0.28		c0.26	c0.52		0.10	c0.10		c0.02	0.02	
v/s Ratio Perm			0.29						0.05			
v/c Ratio	0.73	0.72	0.76	0.89	0.83		0.68	0.70	0.35	0.68	0.53	
Uniform Delay, d1	56.3	31.0	31.7	40.8	17.3		48.1	48.2	45.5	56.9	56.5	
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	26.9	2.0	6.1	19.2	3.1		9.9	11.2	1.5	29.4	6.4	
Delay (s)	83.2	33.0	37.8	60.1	20.4		58.0	59.4	47.0	86.2	63.0	
Level of Service	F	C	D	E	C		E	E	D	F	E	
Approach Delay (s)		36.9			27.7			52.1			72.8	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	35.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	119.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	84.3%	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)	155	777	357	349	1440	321	540	270	504	224	318	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.90		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1014	2837		1299	3438	1369	1480	2543		1480	2279	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1014	2837		1299	3438	1369	1480	2543		1480	2279	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	777	357	349	1440	321	540	270	504	224	318	180
RTOR Reduction (vph)	0	39	0	0	0	151	0	241	0	0	44	0
Lane Group Flow (vph)	155	1095	0	349	1440	170	540	533	0	202	476	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	15.5	40.0		25.5	50.0	50.0	38.5	38.5		19.0	19.0	
Effective Green, g (s)	15.5	40.0		25.5	50.0	50.0	38.5	38.5		19.0	19.0	
Actuated g/C Ratio	0.11	0.29		0.18	0.36	0.36	0.28	0.28		0.14	0.14	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	112	813		237	1232	490	408	701		201	310	
v/s Ratio Prot	0.15	c0.39		c0.27	0.42		c0.36	0.21		0.14	c0.21	
v/s Ratio Perm						0.12						
v/c Ratio	1.38	1.35		1.47	1.17	0.35	1.32	0.76		1.00	1.54	
Uniform Delay, d1	62.0	49.8		57.0	44.8	32.8	50.5	46.3		60.2	60.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	218.6	164.5		234.2	85.0	0.4	161.8	4.7		64.8	256.5	
Delay (s)	280.6	214.3		291.2	129.8	33.2	212.3	50.9		125.0	316.8	
Level of Service	F	F		F	F	C	F	D		F	F	
Approach Delay (s)		222.2			141.8			117.3			263.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	171.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	110.4%	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)	0	1462	64	124	1315	0	0	0	0	442	321	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.94	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4955		1768	3343						3119	
Flt Permitted		1.00		0.11	1.00						0.98	
Satd. Flow (perm)		4955		203	3343						3119	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1462	64	124	1315	0	0	0	0	442	321	545
RTOR Reduction (vph)	0	5	0	0	0	0	0	0	0	0	22	0
Lane Group Flow (vph)	0	1521	0	124	1315	0	0	0	0	0	1286	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		45.0		45.0	45.0						32.0	
Effective Green, g (s)		45.0		45.0	45.0						32.0	
Actuated g/C Ratio		0.52		0.52	0.52						0.37	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2562		105	1729						1147	
v/s Ratio Prot		0.31			0.39						c0.41	
v/s Ratio Perm				c0.61								
v/c Ratio		0.59		1.18	0.76						1.12	
Uniform Delay, d1		14.6		21.0	16.7						27.5	
Progression Factor		1.00		0.36	0.25						1.00	
Incremental Delay, d2		0.2		133.5	1.4						66.4	
Delay (s)		14.9		141.0	5.6						93.9	
Level of Service		B		F	A						F	
Approach Delay (s)		14.9			17.2			0.0			93.9	
Approach LOS		B			B			A			F	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	88.7%	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)	344	1560	0	0	1375	319	64	349	59	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.98				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		5040			4915			3440				
Flt Permitted		0.66			1.00			0.99				
Satd. Flow (perm)		3336			4915			3440				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	344	1560	0	0	1375	319	64	349	59	0	0	0
RTOR Reduction (vph)	0	0	0	0	44	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	1904	0	0	1650	0	0	461	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)		45.0			45.0			32.0				
Effective Green, g (s)		45.0			45.0			32.0				
Actuated g/C Ratio		0.52			0.52			0.37				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		1725			2542			1265				
v/s Ratio Prot					0.34			c0.13				
v/s Ratio Perm		c0.57										
v/c Ratio		4.05dl			0.65			0.36				
Uniform Delay, d1		21.0			15.3			20.1				
Progression Factor		0.67			1.00			1.00				
Incremental Delay, d2		53.3			0.4			0.1				
Delay (s)		67.5			15.7			20.1				
Level of Service		E			B			C				
Approach Delay (s)		67.5			15.7			20.1			0.0	
Approach LOS		E			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	40.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
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)	48	1287	119	128	1686	16	33	84	39	27	154	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			1.00			0.96			0.97	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		4920			4883			3343			3379	
Flt Permitted		0.80			0.70			0.86			0.91	
Satd. Flow (perm)		3962			3419			2911			3094	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	1287	119	128	1686	16	33	84	39	27	154	50
RTOR Reduction (vph)	0	13	0	0	1	0	0	27	0	0	15	0
Lane Group Flow (vph)	0	1441	0	0	1829	0	0	129	0	0	216	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		47.5			47.5			24.0			24.0	
Effective Green, g (s)		47.5			47.5			24.0			24.0	
Actuated g/C Ratio		0.59			0.59			0.30			0.30	
Clearance Time (s)		3.5			3.5			5.0			5.0	
Lane Grp Cap (vph)		2352			2030			873			928	
v/s Ratio Prot												
v/s Ratio Perm		0.36			c0.53			0.04			c0.07	
v/c Ratio		0.61			0.90			0.15			0.23	
Uniform Delay, d1		10.4			14.2			20.5			21.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			7.0			0.4			0.6	
Delay (s)		11.6			21.2			20.9			21.7	
Level of Service		B			C			C			C	
Approach Delay (s)		11.6			21.2			20.9			21.7	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	118.9%	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)	95	997	230	52	1274	13	362	369	106	40	182	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.95		1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3431	1485		3298	1487	1654	1845	1508		1842	1519
Flt Permitted		0.59	1.00		0.82	1.00	0.54	1.00	1.00		0.89	1.00
Satd. Flow (perm)		2032	1485		2697	1487	938	1845	1508		1654	1519
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	997	230	52	1274	13	362	369	106	40	182	206
RTOR Reduction (vph)	0	0	109	0	0	3	0	0	50	0	0	23
Lane Group Flow (vph)	0	1092	121	0	1326	10	362	369	56	0	222	183
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)		47.2	47.2		47.2	47.2	33.8	33.8	33.8		33.8	33.8
Effective Green, g (s)		47.2	47.2		47.2	47.2	33.8	33.8	33.8		33.8	33.8
Actuated g/C Ratio		0.52	0.52		0.52	0.52	0.38	0.38	0.38		0.38	0.38
Clearance Time (s)		5.5	5.5		5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1065	778		1414	779	352	692	566		621	570
v/s Ratio Prot								0.20				
v/s Ratio Perm		c0.54	0.08		0.49	0.01	c0.39		0.04		0.13	0.12
v/c Ratio		1.03	0.16		0.94	0.01	1.03	0.53	0.10		0.36	0.32
Uniform Delay, d1		21.4	11.1		20.0	10.2	28.1	21.9	18.2		20.3	20.0
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		34.2	0.4		13.1	0.0	55.5	0.4	0.0		0.1	0.1
Delay (s)		55.6	11.5		33.1	10.3	83.6	22.3	18.3		20.4	20.1
Level of Service		E	B		C	B	F	C	B		C	C
Approach Delay (s)		47.9			32.9			48.3			20.2	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	120.5%	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)	84	901	245	69	1262	248	101	759	32	77	1321	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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3432	1510	1765	3252	1540	1669	3514		1763	3538	
Flt Permitted		0.58	1.00	0.16	1.00	1.00	0.10	1.00		0.28	1.00	
Satd. Flow (perm)		2002	1510	303	3252	1540	178	3514		519	3538	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	84	901	245	69	1262	248	101	759	32	77	1321	3
RTOR Reduction (vph)	0	0	18	0	0	67	0	4	0	0	0	0
Lane Group Flow (vph)	0	985	227	69	1262	181	101	787	0	77	1324	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		36.0	36.0	36.0	36.0	36.0	39.5	39.5		39.5	39.5	
Effective Green, g (s)		36.0	36.0	36.0	36.0	36.0	39.5	39.5		39.5	39.5	
Actuated g/C Ratio		0.42	0.42	0.42	0.42	0.42	0.46	0.46		0.46	0.46	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		847	639	128	1377	652	82	1632		241	1644	
v/s Ratio Prot					0.39			0.22			0.37	
v/s Ratio Perm		c0.49	0.15	0.23		0.12	c0.57			0.15		
v/c Ratio		1.16	0.35	0.54	0.92	0.28	1.23	0.48		0.32	0.81	
Uniform Delay, d1		24.5	16.6	18.3	23.1	16.0	22.8	15.7		14.3	19.5	
Progression Factor		1.00	1.00	1.41	1.04	1.80	1.00	1.00		1.00	1.00	
Incremental Delay, d2		86.2	1.5	12.8	9.5	0.9	174.1	0.5		1.0	3.1	
Delay (s)		110.7	18.2	38.6	33.5	29.8	196.9	16.2		15.3	22.6	
Level of Service		F	B	D	C	C	F	B		B	C	
Approach Delay (s)		92.3			33.1			36.6			22.2	
Approach LOS		F			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	123.0%	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)	55	894	27	108	1404	32	18	102	271	37	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1589	3124	1361	1506	3185	1375		3150	1175		2854	
Flt Permitted	0.15	1.00	1.00	0.30	1.00	1.00		0.89	1.00		0.89	
Satd. Flow (perm)	254	3124	1361	470	3185	1375		2837	1175		2572	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	894	27	108	1404	32	18	102	271	37	99	105
RTOR Reduction (vph)	0	0	7	0	0	6	0	0	111	0	36	0
Lane Group Flow (vph)	55	894	20	108	1404	26	0	120	160	0	205	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	60.6	60.6	60.6	60.6	60.6	60.6		15.9	15.9		15.9	
Effective Green, g (s)	60.6	60.6	60.6	60.6	60.6	60.6		15.9	15.9		15.9	
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71		0.19	0.19		0.19	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	181	2227	970	335	2270	980		530	219		481	
v/s Ratio Prot		0.29			c0.44							
v/s Ratio Perm	0.22		0.01	0.23		0.02		0.04	c0.14		0.08	
v/c Ratio	0.30	0.40	0.02	0.32	0.62	0.03		0.23	0.73		0.43	
Uniform Delay, d1	4.5	4.9	3.6	4.5	6.3	3.6		29.3	32.5		30.5	
Progression Factor	0.98	0.78	0.64	2.73	2.57	3.03		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.0	0.0	0.2	0.1	0.0		0.1	10.4		0.2	
Delay (s)	4.8	3.9	2.3	12.7	16.2	10.8		29.4	42.9		30.7	
Level of Service	A	A	A	B	B	B		C	D		C	
Approach Delay (s)		3.9			15.9			38.8			30.7	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	529	614	1403	124	647	212
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3050	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3050	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	529	614	1403	124	647	212
RTOR Reduction (vph)	0	0	0	36	3	142
Lane Group Flow (vph)	529	614	1403	88	665	49
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	20.3	55.3	31.0	31.0	21.7	21.7
Effective Green, g (s)	20.3	55.3	31.0	31.0	21.7	21.7
Actuated g/C Ratio	0.24	0.65	0.36	0.36	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	380	1956	1107	489	778	304
v/s Ratio Prot	c0.33	0.20	c0.46		c0.22	
v/s Ratio Perm				0.07		0.04
v/c Ratio	1.39	0.31	1.27	0.18	0.85	0.16
Uniform Delay, d1	32.4	6.5	27.0	18.4	30.1	24.6
Progression Factor	0.69	1.42	0.97	1.13	1.00	1.00
Incremental Delay, d2	190.6	0.4	122.8	0.0	8.8	0.1
Delay (s)	213.0	9.6	149.1	20.9	38.9	24.7
Level of Service	F	A	F	C	D	C
Approach Delay (s)		103.8	138.7		35.7	
Approach LOS		F	F		D	

Intersection Summary			
HCM 2000 Control Delay	102.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.8%	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)	76	872	53	136	1107	112	170	481	158	116	424	144
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		0.98	1.00	1.00	0.97	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1586	3148			3111		1562	3185	1306	1546	3007	
Flt Permitted	0.12	1.00			0.68		0.32	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	201	3148			2130		532	3185	1306	629	3007	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	76	872	53	136	1107	112	170	481	158	116	424	144
RTOR Reduction (vph)	0	5	0	0	8	0	0	0	72	0	40	0
Lane Group Flow (vph)	76	920	0	0	1347	0	170	481	86	116	528	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	49.0	49.0			49.0		28.0	28.0	28.0	28.0	28.0	
Effective Green, g (s)	49.0	49.0			49.0		28.0	28.0	28.0	28.0	28.0	
Actuated g/C Ratio	0.58	0.58			0.58		0.33	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	115	1814			1227		175	1049	430	207	990	
v/s Ratio Prot		0.29						0.15			0.18	
v/s Ratio Perm	0.38				c0.63		c0.32		0.07	0.18		
v/c Ratio	0.66	0.51			1.10		0.97	0.46	0.20	0.56	0.53	
Uniform Delay, d1	12.3	10.8			18.0		28.1	22.5	20.5	23.4	23.2	
Progression Factor	0.38	0.30			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	22.4	0.9			56.9		59.1	0.1	0.1	2.1	0.3	
Delay (s)	27.1	4.1			74.9		87.2	22.6	20.5	25.5	23.5	
Level of Service	C	A			E		F	C	C	C	C	
Approach Delay (s)		5.9			74.9			35.8			23.8	
Approach LOS		A			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	119.5%	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)	89	157	171	465	842	101	425	1243	423	28	1162	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4512	1352		4571	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.81	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3031	1352		3712	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	157	171	465	842	101	425	1243	423	28	1162	203
RTOR Reduction (vph)	0	0	81	0	0	50	0	0	242	0	0	83
Lane Group Flow (vph)	89	157	90	465	842	51	0	1668	181	0	1190	120
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	4.0	15.3	15.3	21.2	32.5	32.5		38.5	38.5		38.5	38.5
Effective Green, g (s)	4.0	15.3	15.3	21.2	32.5	32.5		38.5	38.5		38.5	38.5
Actuated g/C Ratio	0.04	0.17	0.17	0.24	0.36	0.36		0.43	0.43		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	137	536	229	727	1150	488		1296	578		1587	578
v/s Ratio Prot	c0.03	0.05		0.15	c0.26							
v/s Ratio Perm			0.07			0.04		c0.55	0.13		0.32	0.09
v/c Ratio	0.65	0.29	0.40	0.64	0.73	0.10		3.70dl	0.31		0.75	0.21
Uniform Delay, d1	42.3	32.6	33.2	31.0	25.0	19.1		25.8	17.0		21.7	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	10.2	1.4	5.0	1.9	4.1	0.4		135.1	0.3		2.0	0.2
Delay (s)	52.5	34.0	38.3	32.8	29.1	19.5		160.9	17.3		23.7	16.4
Level of Service	D	C	D	C	C	B		F	B		C	B
Approach Delay (s)		39.7			29.6			131.8			22.6	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	68.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	116.2%	ICU Level of Service	H
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)	8	53	9	37	194	45	37	164	70	76	312	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.96			0.98	
Flt Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		3438			3412			3355			3431	
Flt Permitted		0.92			0.92			0.87			0.85	
Satd. Flow (perm)		3193			3149			2942			2956	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	53	9	37	194	45	37	164	70	76	312	51
RTOR Reduction (vph)	0	5	0	0	27	0	0	39	0	0	18	0
Lane Group Flow (vph)	0	65	0	0	249	0	0	232	0	0	421	0
Confl. Peds. (#/hr)	15		10	10		15	15		15	15		15
Confl. Bikes (#/hr)			5			4						9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		21.5			21.5			24.5			24.5	
Effective Green, g (s)		21.5			21.5			24.5			24.5	
Actuated g/C Ratio		0.39			0.39			0.45			0.45	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Lane Grp Cap (vph)		1248			1230			1310			1316	
v/s Ratio Prot												
v/s Ratio Perm		0.02			c0.08			0.08			c0.14	
v/c Ratio		0.05			0.20			0.18			0.32	
Uniform Delay, d1		10.4			11.1			9.2			9.9	
Progression Factor		1.00			1.00			0.83			1.00	
Incremental Delay, d2		0.1			0.4			0.3			0.6	
Delay (s)		10.5			11.4			7.9			10.5	
Level of Service		B			B			A			B	
Approach Delay (s)		10.5			11.4			7.9			10.5	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	62.5%	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)	50	254	25	29	234	195	49	582	88	270	219	38
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		0.95			0.95		1.00	0.95			0.95	
Frpb, ped/bikes		1.00			0.99		1.00	0.99			1.00	
Flpb, ped/bikes		1.00			1.00		0.99	1.00			0.99	
Frt		0.99			0.94		1.00	0.98			0.99	
Flt Protected		0.99			1.00		0.95	1.00			0.98	
Satd. Flow (prot)		3457			3266		1755	3449			3383	
Flt Permitted		0.80			0.92		0.46	1.00			0.58	
Satd. Flow (perm)		2799			3000		843	3449			2005	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	254	25	29	234	195	49	582	88	270	219	38
RTOR Reduction (vph)	0	11	0	0	141	0	0	13	0	0	6	0
Lane Group Flow (vph)	0	318	0	0	317	0	49	657	0	0	521	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		12.9			12.9		37.4	37.4			37.4	
Effective Green, g (s)		12.9			12.9		37.4	37.4			37.4	
Actuated g/C Ratio		0.22			0.22		0.64	0.64			0.64	
Clearance Time (s)		4.0			4.0		4.0	4.0			4.0	
Vehicle Extension (s)		2.0			2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)		619			663		540	2212			1286	
v/s Ratio Prot								0.19				
v/s Ratio Perm		c0.11			0.11		0.06				c0.26	
v/c Ratio		0.51			0.48		0.09	0.30			0.41	
Uniform Delay, d1		19.9			19.8		4.0	4.6			5.1	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.3			0.2		0.3	0.3			0.9	
Delay (s)		20.2			20.0		4.3	5.0			6.0	
Level of Service		C			B		A	A			A	
Approach Delay (s)		20.2			20.0			4.9			6.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	58.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	109.9%	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)	24	154	14	34	148	42	11	209	25	32	298	26
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	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1759	3488		1762	3404			3469			3479	
Flt Permitted	0.63	1.00		0.65	1.00			0.94			0.92	
Satd. Flow (perm)	1170	3488		1197	3404			3263			3205	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	154	14	34	148	42	11	209	25	32	298	26
RTOR Reduction (vph)	0	8	0	0	24	0	0	14	0	0	11	0
Lane Group Flow (vph)	24	160	0	34	166	0	0	231	0	0	345	0
Confl. Peds. (#/hr)	11		8	8		11	3		15	15		3
Confl. Bikes (#/hr)			11			8			2			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	23.0	23.0		23.0	23.0			24.0			24.0	
Effective Green, g (s)	23.0	23.0		23.0	23.0			24.0			24.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42			0.44			0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	489	1458		500	1423			1423			1398	
v/s Ratio Prot		0.05			c0.05							
v/s Ratio Perm	0.02			0.03				0.07			c0.11	
v/c Ratio	0.05	0.11		0.07	0.12			0.16			0.25	
Uniform Delay, d1	9.5	9.8		9.6	9.8			9.4			9.8	
Progression Factor	1.00	1.00		1.00	1.00			0.75			2.09	
Incremental Delay, d2	0.2	0.2		0.3	0.2			0.2			0.4	
Delay (s)	9.7	9.9		9.8	10.0			7.2			20.9	
Level of Service	A	A		A	A			A			C	
Approach Delay (s)		9.9			9.9			7.2			20.9	
Approach LOS		A			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.6%	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)	2	7	1	8	29	63	1	173	5	26	319	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.91			1.00			1.00	
Flt Protected		0.99			1.00			1.00			1.00	
Satd. Flow (prot)		3444			3164			3522			3517	
Flt Permitted		0.93			0.94			0.95			0.93	
Satd. Flow (perm)		3243			3001			3361			3291	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	7	1	8	29	63	1	173	5	26	319	5
RTOR Reduction (vph)	0	1	0	0	43	0	0	2	0	0	2	0
Lane Group Flow (vph)	0	9	0	0	57	0	0	177	0	0	348	0
Confl. Peds. (#/hr)			9	9			5		11	11		5
Confl. Bikes (#/hr)			2			1			1			4
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		17.5			17.5			30.5			30.5	
Effective Green, g (s)		17.5			17.5			30.5			30.5	
Actuated g/C Ratio		0.32			0.32			0.55			0.55	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		1031			954			1863			1825	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.02			0.05			c0.11	
v/c Ratio		0.01			0.06			0.09			0.19	
Uniform Delay, d1		12.8			13.0			5.8			6.1	
Progression Factor		1.00			1.00			1.00			2.97	
Incremental Delay, d2		0.0			0.1			0.1			0.2	
Delay (s)		12.8			13.2			5.9			18.4	
Level of Service		B			B			A			B	
Approach Delay (s)		12.8			13.2			5.9			18.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.14		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	7.0
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)	142	45	0	0	311	436	443	518	91	148	0	570
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.91		1.00	0.98		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (prot)	1020	3282			2857		1173	2847		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (perm)	1020	3282			2857		1173	2847		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	142	45	0	0	311	436	443	518	91	148	0	570
RTOR Reduction (vph)	0	0	0	0	242	0	0	10	0	0	0	502
Lane Group Flow (vph)	142	45	0	0	505	0	346	696	0	148	0	68
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	16.4	41.9			22.0		32.9	32.9		11.8		11.8
Effective Green, g (s)	16.4	41.9			22.0		32.9	32.9		11.8		11.8
Actuated g/C Ratio	0.16	0.42			0.22		0.33	0.33		0.12		0.12
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	167	1380			631		387	940		182		232
v/s Ratio Prot	c0.14	0.01			c0.18		c0.29	0.24		c0.10		0.03
v/s Ratio Perm												
v/c Ratio	0.85	0.03			0.80		0.89	0.74		0.81		0.29
Uniform Delay, d1	40.4	16.9			36.7		31.7	29.6		42.8		40.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	30.7	0.0			6.8		22.1	3.0		22.9		0.5
Delay (s)	71.1	17.0			43.5		53.8	32.6		65.8		40.6
Level of Service	E	B			D		D	C		E		D
Approach Delay (s)		58.1			43.5			39.5			45.8	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	99.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	74.3%	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)	94	659	26	135	677	187	17	64	61	147	128	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.98		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.97			0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3197		1770	3292			1702		1755	1686	
Flt Permitted	0.95	1.00		0.95	1.00			0.95		0.52	1.00	
Satd. Flow (perm)	1770	3197		1770	3292			1630		953	1686	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	94	659	26	135	677	187	17	64	61	147	128	60
RTOR Reduction (vph)	0	2	0	0	19	0	0	32	0	0	20	0
Lane Group Flow (vph)	94	683	0	135	845	0	0	110	0	147	168	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	11.2	59.6		12.0	60.4			17.4		17.4	17.4	
Effective Green, g (s)	11.2	59.6		12.0	60.4			17.4		17.4	17.4	
Actuated g/C Ratio	0.11	0.60		0.12	0.60			0.17		0.17	0.17	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	198	1905		212	1988			283		165	293	
v/s Ratio Prot	c0.05	0.21		c0.08	c0.26						0.10	
v/s Ratio Perm								0.07		c0.15		
v/c Ratio	0.47	0.36		0.64	0.43			0.39		0.89	0.57	
Uniform Delay, d1	41.6	10.4		41.9	10.6			36.6		40.4	37.9	
Progression Factor	1.12	1.27		0.96	0.79			1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.0		4.5	0.7			0.3		39.6	1.7	
Delay (s)	47.2	13.2		44.6	9.0			36.9		79.9	39.6	
Level of Service	D	B		D	A			D		E	D	
Approach Delay (s)		17.3			13.8			36.9			57.3	
Approach LOS		B			B			D			E	

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	68.7%	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)	30	786	58	128	1427	126	26	64	66	93	91	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	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00			1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.92			0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1768	3284		1028	3471	1517	1348	1745			2975	
Flt Permitted	0.12	1.00		0.29	1.00	1.00	0.55	1.00			0.80	
Satd. Flow (perm)	229	3284		318	3471	1517	781	1745			2418	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	786	58	128	1427	126	26	64	66	93	91	76
RTOR Reduction (vph)	0	5	0	0	0	45	0	48	0	0	36	0
Lane Group Flow (vph)	30	839	0	128	1427	81	26	82	0	0	224	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0			28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0			28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	
Lane Grp Cap (vph)	146	2101		203	2221	970	218	488			677	
v/s Ratio Prot		0.26			c0.41			0.05				
v/s Ratio Perm	0.13			0.40		0.05	0.03				c0.09	
v/c Ratio	0.21	0.40		0.63	0.64	0.08	0.12	0.17			0.33	
Uniform Delay, d1	7.5	8.7		10.9	11.0	6.8	26.8	27.2			28.6	
Progression Factor	0.46	0.45		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	3.1	0.6		14.0	1.4	0.2	1.1	0.7			1.3	
Delay (s)	6.5	4.5		24.8	12.4	7.0	27.9	28.0			29.9	
Level of Service	A	A		C	B	A	C	C			C	
Approach Delay (s)		4.5			13.0			28.0			29.9	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	120.4%	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)	193	679	54	51	1231	58	243	260	14	74	104	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1582	4089		1760	4575		1761	1810	1541	1752	3539	1245
Flt Permitted	0.15	1.00		0.34	1.00		0.69	1.00	1.00	0.54	1.00	1.00
Satd. Flow (perm)	249	4089		631	4575		1272	1810	1541	995	3539	1245
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	193	679	54	51	1231	58	243	260	14	74	104	249
RTOR Reduction (vph)	0	12	0	0	7	0	0	0	8	0	0	17
Lane Group Flow (vph)	193	721	0	51	1282	0	243	260	6	74	104	232
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	35.0	35.0		35.0	35.0		30.5	30.5	30.5	30.5	30.5	30.5
Effective Green, g (s)	35.0	35.0		35.0	35.0		30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	116	1908		294	2135		517	736	626	404	1439	506
v/s Ratio Prot		0.18			0.28			0.14			0.03	
v/s Ratio Perm	c0.78			0.08			c0.19		0.00	0.07		0.19
v/c Ratio	1.66	0.38		0.17	0.60		0.47	0.35	0.01	0.18	0.07	0.46
Uniform Delay, d1	20.0	12.9		11.6	14.8		16.3	15.4	13.3	14.3	13.6	16.2
Progression Factor	1.00	1.00		1.00	1.00		1.07	1.07	1.46	1.00	1.00	1.00
Incremental Delay, d2	333.5	0.0		0.1	0.3		3.0	1.3	0.0	1.0	0.1	3.0
Delay (s)	353.5	13.0		11.7	15.1		20.5	17.9	19.4	15.3	13.7	19.2
Level of Service	F	B		B	B		C	B	B	B	B	B
Approach Delay (s)		84.0			15.0			19.2			17.2	
Approach LOS		F			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	35.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	90.5%	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)	0	0	0	70	243	231	23	71	0	0	112	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3499	1562	1770	990			3167	1558
Flt Permitted					0.99	1.00	0.68	1.00			1.00	1.00
Satd. Flow (perm)					3499	1562	1269	990			3167	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	70	243	231	23	71	0	0	112	67
RTOR Reduction (vph)	0	0	0	0	0	187	0	0	0	0	0	21
Lane Group Flow (vph)	0	0	0	0	313	44	23	71	0	0	112	46
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					14.3	14.3	51.2	51.2			51.2	51.2
Effective Green, g (s)					14.3	14.3	51.2	51.2			51.2	51.2
Actuated g/C Ratio					0.19	0.19	0.68	0.68			0.68	0.68
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					667	297	866	675			2162	1063
v/s Ratio Prot								c0.07			0.04	
v/s Ratio Perm					0.09	0.03	0.02					0.03
v/c Ratio					0.47	0.15	0.03	0.11			0.05	0.04
Uniform Delay, d1					27.0	25.3	3.8	4.1			3.9	3.9
Progression Factor					1.00	1.00	1.00	1.00			1.35	1.77
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.0	0.1
Delay (s)					27.2	25.4	3.9	4.1			5.3	7.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			26.4			4.0			5.9	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	31.1%	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)	26	634	114	85	177	24	56	129	137	114	174	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.92		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	3306		1770	3445		1770	1782		1610	2086	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3306		1770	3445		1770	1782		1610	2086	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	634	114	85	177	24	56	129	137	114	174	37
RTOR Reduction (vph)	0	10	0	0	7	0	0	114	0	0	10	0
Lane Group Flow (vph)	26	738	0	85	194	0	56	152	0	103	212	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	2.4	28.4		7.9	34.4		14.0	14.0		15.5	15.5	
Effective Green, g (s)	2.4	28.4		7.9	34.4		14.0	14.0		15.5	15.5	
Actuated g/C Ratio	0.03	0.35		0.10	0.42		0.17	0.17		0.19	0.19	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	51	1147		170	1448		302	304		305	395	
v/s Ratio Prot	0.01	c0.22		c0.05	0.06		0.03	c0.09		0.06	c0.10	
v/s Ratio Perm												
v/c Ratio	0.51	0.64		0.50	0.13		0.19	0.50		0.34	0.54	
Uniform Delay, d1	39.1	22.4		35.1	14.6		29.0	30.7		28.7	29.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	1.2		1.7	0.0		0.3	1.4		0.7	1.4	
Delay (s)	42.0	23.7		36.8	14.6		29.3	32.1		29.4	31.3	
Level of Service	D	C		D	B		C	C		C	C	
Approach Delay (s)		24.3			21.2			31.6			30.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	81.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2035 PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1106	254	332	1230	187	168	444	206	140	457	60
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3418		1770	3539	1510	1770	1863	1538	1770	1824	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3418		1770	3539	1510	1770	1863	1538	1770	1824	
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	1202	276	361	1337	203	183	483	224	152	497	65
RTOR Reduction (vph)	0	33	0	0	0	120	0	0	164	0	8	0
Lane Group Flow (vph)	141	1445	0	361	1337	83	183	483	60	152	554	0
Confl. Peds. (#/hr)			2			7			7			9
Confl. Bikes (#/hr)			24			10			11			12
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	5.0	16.0		5.0	16.0	16.0	6.0	16.0	16.0	7.0	17.0	
Effective Green, g (s)	5.0	16.0		5.0	16.0	16.0	6.0	16.0	16.0	7.0	17.0	
Actuated g/C Ratio	0.08	0.27		0.08	0.27	0.27	0.10	0.27	0.27	0.12	0.28	
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)	147	911		147	943	402	177	496	410	206	516	
v/s Ratio Prot	0.08	c0.42		c0.20	0.38		c0.10	0.26		0.09	c0.30	
v/s Ratio Perm						0.05			0.04			
v/c Ratio	0.96	1.59		2.46	1.42	0.21	1.03	0.97	0.15	0.74	1.07	
Uniform Delay, d1	27.4	22.0		27.5	22.0	17.1	27.0	21.8	16.8	25.6	21.5	
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	61.1	269.0		675.1	194.3	0.3	76.8	33.5	0.2	12.9	60.9	
Delay (s)	88.5	291.0		702.6	216.3	17.3	103.8	55.2	17.0	38.5	82.4	
Level of Service	F	F		F	F	B	F	E	B	D	F	
Approach Delay (s)		273.4			287.4			55.6			73.1	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	212.8	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)	16.0
Intersection Capacity Utilization	107.6%	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)	189	1057	519	59	815	142	950	1046	44	277	1225	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3251		1770	3430		3433	3506		1770	3445	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3251		1770	3430		3433	3506		1770	3445	
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)	205	1149	564	64	886	154	1033	1137	48	301	1332	163
RTOR Reduction (vph)	0	53	0	0	13	0	0	3	0	0	9	0
Lane Group Flow (vph)	205	1660	0	64	1027	0	1033	1182	0	301	1486	0
Confl. Peds. (#/hr)			59			38			53			68
Confl. Bikes (#/hr)			31			2			24			28
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)	13.9	33.8		8.8	28.7		13.0	39.4		15.0	40.4	
Effective Green, g (s)	13.9	33.8		8.8	28.7		13.0	39.4		15.0	40.4	
Actuated g/C Ratio	0.13	0.31		0.08	0.26		0.12	0.36		0.14	0.37	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	223	998		141	894		405	1255		241	1265	
v/s Ratio Prot	c0.12	c0.51		0.04	0.30		c0.30	0.34		0.17	c0.43	
v/s Ratio Perm												
v/c Ratio	0.92	1.66		0.45	1.15		2.55	0.94		1.25	1.17	
Uniform Delay, d1	47.5	38.1		48.3	40.6		48.5	34.2		47.5	34.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	37.8	303.1		0.8	80.2		705.0	14.9		141.7	87.3	
Delay (s)	85.3	341.2		49.2	120.8		753.5	49.1		189.2	122.1	
Level of Service	F	F		D	F		F	D		F	F	
Approach Delay (s)		313.9			116.7			377.2			133.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	256.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.51		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	136.1%	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)	0	1085	105	11	304	0	0	0	0	579	510	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.98	1.00
Satd. Flow (prot)		3478			5076					1610	3339	1540
Flt Permitted		1.00			0.90					0.95	0.98	1.00
Satd. Flow (perm)		3478			4554					1610	3339	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1085	105	11	304	0	0	0	0	579	510	470
RTOR Reduction (vph)	0	9	0	0	0	0	0	0	0	0	0	294
Lane Group Flow (vph)	0	1181	0	0	315	0	0	0	0	353	736	176
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		38.0			38.0					30.0	30.0	30.0
Effective Green, g (s)		38.0			38.0					30.0	30.0	30.0
Actuated g/C Ratio		0.48			0.48					0.38	0.38	0.38
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1652			2163					603	1252	577
v/s Ratio Prot		c0.34										
v/s Ratio Perm					0.07					0.22	0.22	0.11
v/c Ratio		0.71			0.15					0.59	0.59	0.31
Uniform Delay, d1		16.7			11.8					20.0	20.0	17.6
Progression Factor		1.00			0.33					1.00	1.00	1.00
Incremental Delay, d2		2.7			0.1					4.1	2.0	1.4
Delay (s)		19.4			4.0					24.1	22.1	19.0
Level of Service		B			A					C	C	B
Approach Delay (s)		19.4			4.0			0.0			21.6	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.5%	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)	617	1053	0	0	298	935	36	1231	73	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3379			3539	2700		5027				
Flt Permitted	0.95	0.92			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3102			3539	2700		5027				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	617	1053	0	0	298	935	36	1231	73	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	57	0	8	0	0	0	0
Lane Group Flow (vph)	543	1127	0	0	298	878	0	1332	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	22.5	50.5			24.5	24.5		18.5				
Effective Green, g (s)	22.5	50.5			24.5	24.5		18.5				
Actuated g/C Ratio	0.28	0.63			0.31	0.31		0.23				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	452	2036			1083	826		1162				
v/s Ratio Prot	c0.34	0.16			0.08							
v/s Ratio Perm		0.19				c0.33		0.27				
v/c Ratio	1.20	0.55			0.28	1.06		1.15				
Uniform Delay, d1	28.8	8.4			21.0	27.8		30.8				
Progression Factor	0.88	1.92			1.00	1.00		1.00				
Incremental Delay, d2	105.6	0.8			0.6	49.5		76.4				
Delay (s)	131.0	16.9			21.7	77.2		107.2				
Level of Service	F	B			C	E		F				
Approach Delay (s)		54.0			63.8			107.2			0.0	
Approach LOS		D			E			F			A	

Intersection Summary			
HCM 2000 Control Delay	73.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	106.0%	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)	15	945	410	256	1654	37	757	32	481	77	35	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3384		1649	1575	1262	1480	1389	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3384		1649	1575	1262	1480	1389	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	945	410	256	1654	37	757	32	481	77	35	73
RTOR Reduction (vph)	0	0	240	0	1	0	0	0	275	0	55	0
Lane Group Flow (vph)	15	945	170	256	1690	0	394	395	206	77	53	0
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	2.3	47.7	47.7	27.9	73.3		35.1	35.1	35.1	8.1	8.1	
Effective Green, g (s)	2.3	47.7	47.7	27.9	73.3		35.1	35.1	35.1	8.1	8.1	
Actuated g/C Ratio	0.02	0.35	0.35	0.21	0.54		0.26	0.26	0.26	0.06	0.06	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	30	1167	427	265	1833		427	408	327	88	83	
v/s Ratio Prot	0.01	0.29		c0.20	c0.50		0.24	c0.25		c0.05	0.04	
v/s Ratio Perm			0.14						0.16			
v/c Ratio	0.50	0.81	0.40	0.97	0.92		0.92	0.97	0.63	0.88	0.64	
Uniform Delay, d1	65.9	39.7	33.0	53.2	28.4		48.8	49.5	44.3	63.1	62.2	
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	12.5	4.7	1.1	45.5	8.5		25.7	36.0	4.2	56.5	15.9	
Delay (s)	78.4	44.4	34.0	98.7	36.8		74.5	85.6	48.6	119.6	78.1	
Level of Service	E	D	C	F	D		E	F	D	F	E	
Approach Delay (s)		41.7			45.0			68.1			95.4	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	52.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	135.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	91.6%	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)	251	750	497	489	1449	212	432	453	552	130	232	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1337	2993		1687	3406	1509	1444	2920		1369	2644	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1337	2993		1687	3406	1509	1444	2920		1369	2644	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	251	750	497	489	1449	212	432	453	552	130	232	76
RTOR Reduction (vph)	0	81	0	0	0	99	0	158	0	0	19	0
Lane Group Flow (vph)	251	1166	0	489	1449	113	432	847	0	117	302	0
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	20.5	44.0		31.5	55.0	55.0	35.5	35.5		12.0	12.0	
Effective Green, g (s)	20.5	44.0		31.5	55.0	55.0	35.5	35.5		12.0	12.0	
Actuated g/C Ratio	0.15	0.32		0.23	0.39	0.39	0.25	0.25		0.09	0.09	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	196	944		380	1342	594	367	743		117	227	
v/s Ratio Prot	0.19	c0.39		c0.29	0.43		c0.30	0.29		0.09	c0.11	
v/s Ratio Perm						0.07						
v/c Ratio	1.28	1.24		1.29	1.08	0.19	1.18	1.14		1.00	1.33	
Uniform Delay, d1	59.5	47.8		54.0	42.2	27.7	52.0	52.0		63.8	63.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	159.5	115.1		147.7	49.1	0.2	104.5	78.7		83.2	175.4	
Delay (s)	219.0	162.9		201.7	91.4	27.8	156.5	130.7		147.0	239.1	
Level of Service	F	F		F	F	C	F	F		F	F	
Approach Delay (s)		172.3			110.2			138.5			214.5	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	142.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	116.6%	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)	0	1334	65	179	1453	0	0	0	0	698	501	513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4905		1767	3312						3244	
Flt Permitted		1.00		0.12	1.00						0.98	
Satd. Flow (perm)		4905		227	3312						3244	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1334	65	179	1453	0	0	0	0	698	501	513
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	1393	0	179	1453	0	0	0	0	0	1703	0
Confl. Peds. (#/hr)			10	10						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		41.0		41.0	41.0						36.0	
Effective Green, g (s)		41.0		41.0	41.0						36.0	
Actuated g/C Ratio		0.47		0.47	0.47						0.41	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2311		106	1560						1342	
v/s Ratio Prot		0.28			0.44						c0.52	
v/s Ratio Perm				c0.79								
v/c Ratio		0.60		1.69	0.93						1.27	
Uniform Delay, d1		17.0		23.0	21.7						25.5	
Progression Factor		1.00		0.26	0.23						1.00	
Incremental Delay, d2		0.3		331.5	6.3						127.0	
Delay (s)		17.3		337.4	11.3						152.5	
Level of Service		B		F	B						F	
Approach Delay (s)		17.3			47.1			0.0			152.5	
Approach LOS		B			D			A			F	

Intersection Summary			
HCM 2000 Control Delay	76.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	100.6%	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)	431	1601	0	0	1545	398	87	502	261	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.91			0.91			0.95				
Frpb, ped/bikes		1.00			0.99			0.99				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.97			0.95				
Flt Protected		0.99			1.00			0.99				
Satd. Flow (prot)		5032			4900			3336				
Flt Permitted		0.68			1.00			0.99				
Satd. Flow (perm)		3438			4900			3336				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	431	1601	0	0	1545	398	87	502	261	0	0	0
RTOR Reduction (vph)	0	0	0	0	52	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	2032	0	0	1891	0	0	844	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)		41.0			41.0			36.0				
Effective Green, g (s)		41.0			41.0			36.0				
Actuated g/C Ratio		0.47			0.47			0.41				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		2.0			2.0			2.0				
Lane Grp Cap (vph)		1620			2309			1380				
v/s Ratio Prot					0.39			c0.25				
v/s Ratio Perm		c0.59										
v/c Ratio		5.01dl			0.82			0.61				
Uniform Delay, d1		23.0			19.8			20.0				
Progression Factor		0.78			1.00			1.00				
Incremental Delay, d2		117.3			2.3			0.6				
Delay (s)		135.1			22.1			20.6				
Level of Service		F			C			C				
Approach Delay (s)		135.1			22.1			20.6			0.0	
Approach LOS		F			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	69.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	116.2%	ICU Level of Service	H
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)	81	1460	419	123	1629	55	244	245	122	60	270	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			5.0			5.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.97			0.97	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		4826			4827			3329			3358	
Flt Permitted		0.74			0.67			0.64			0.72	
Satd. Flow (perm)		3571			3222			2190			2439	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	81	1460	419	123	1629	55	244	245	122	60	270	94
RTOR Reduction (vph)	0	61	0	0	4	0	0	28	0	0	20	0
Lane Group Flow (vph)	0	1899	0	0	1803	0	0	583	0	0	404	0
Confl. Peds. (#/hr)	6		1	1		6	17		21	21		17
Confl. Bikes (#/hr)			7			11			4			24
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		48.5			48.5			23.0			23.0	
Effective Green, g (s)		48.5			48.5			23.0			23.0	
Actuated g/C Ratio		0.61			0.61			0.29			0.29	
Clearance Time (s)		3.5			3.5			5.0			5.0	
Lane Grp Cap (vph)		2164			1953			629			701	
v/s Ratio Prot												
v/s Ratio Perm		0.53			c0.56			c0.27			0.17	
v/c Ratio		0.88			1.28dl			0.93			0.58	
Uniform Delay, d1		13.3			14.1			27.7			24.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		5.4			8.8			21.9			3.4	
Delay (s)		18.7			22.9			49.5			27.8	
Level of Service		B			C			D			C	
Approach Delay (s)		18.7			22.9			49.5			27.8	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	134.2%	ICU Level of Service	H
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)	273	1416	91	53	1217	18	358	638	126	58	85	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95	1.00		0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.95		1.00	0.97	1.00	1.00	0.96		1.00	0.97
Flpb, ped/bikes		1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		0.99	1.00		1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)		3454	1497		3307	1542	1674	1827	1518		1826	1541
Flt Permitted		0.53	1.00		0.68	1.00	0.62	1.00	1.00		0.21	1.00
Satd. Flow (perm)		1840	1497		2255	1542	1092	1827	1518		391	1541
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	273	1416	91	53	1217	18	358	638	126	58	85	90
RTOR Reduction (vph)	0	0	37	0	0	4	0	0	29	0	0	49
Lane Group Flow (vph)	0	1689	54	0	1270	14	358	638	97	0	143	41
Confl. Peds. (#/hr)	2		9	9		2	9		19	19		9
Confl. Bikes (#/hr)			21			5			13			7
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Actuated Green, G (s)		53.5	53.5		53.5	53.5	27.5	27.5	27.5		27.5	27.5
Effective Green, g (s)		53.5	53.5		53.5	53.5	27.5	27.5	27.5		27.5	27.5
Actuated g/C Ratio		0.59	0.59		0.59	0.59	0.31	0.31	0.31		0.31	0.31
Clearance Time (s)		5.5	5.5		5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1093	889		1340	916	333	558	463		119	470
v/s Ratio Prot								0.35				
v/s Ratio Perm		c0.92	0.04		0.56	0.01	0.33		0.06		c0.37	0.03
v/c Ratio		1.62dl	0.06		0.95	0.01	1.08	1.14	0.21		1.20	0.09
Uniform Delay, d1		18.2	7.7		17.0	7.5	31.2	31.2	23.2		31.2	22.3
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		250.0	0.1		14.9	0.0	70.7	84.2	0.1		146.6	0.0
Delay (s)		268.2	7.8		31.9	7.5	102.0	115.5	23.3		177.8	22.3
Level of Service		F	A		C	A	F	F	C		F	C
Approach Delay (s)		254.9			31.5			100.8			117.8	
Approach LOS		F			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	143.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	142.8%	ICU Level of Service	H
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)	229	1250	339	96	879	97	554	802	157	218	1015	219
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3481	1482	1770	3195	1540	1733	3438		1765	3431	
Flt Permitted		0.56	1.00	0.12	1.00	1.00	0.13	1.00		0.22	1.00	
Satd. Flow (perm)		1973	1482	226	3195	1540	234	3438		410	3431	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	229	1250	339	96	879	97	554	802	157	218	1015	219
RTOR Reduction (vph)	0	0	41	0	0	45	0	6	0	0	22	0
Lane Group Flow (vph)	0	1479	298	96	879	52	554	953	0	218	1213	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		33.0	33.0	33.0	33.0	33.0	42.5	42.5		42.5	42.5	
Effective Green, g (s)		33.0	33.0	33.0	33.0	33.0	42.5	42.5		42.5	42.5	
Actuated g/C Ratio		0.39	0.39	0.39	0.39	0.39	0.50	0.50		0.50	0.50	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		765	575	87	1240	597	117	1719		205	1715	
v/s Ratio Prot					0.28			0.28			0.35	
v/s Ratio Perm		c0.75	0.20	0.43		0.03	c2.37			0.53		
v/c Ratio		1.93	0.52	1.10	0.71	0.09	4.74	0.55		1.06	0.71	
Uniform Delay, d1		26.0	19.9	26.0	21.9	16.5	21.2	14.7		21.2	16.4	
Progression Factor		1.00	1.00	0.41	0.41	0.07	1.00	1.00		1.00	1.00	
Incremental Delay, d2		424.8	3.3	117.9	2.8	0.2	1700.1	0.7		80.6	1.5	
Delay (s)		450.8	23.2	128.6	11.9	1.4	1721.3	15.4		101.9	17.9	
Level of Service		F	C	F	B	A	F	B		F	B	
Approach Delay (s)		371.1			21.4			640.0			30.5	
Approach LOS		F			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	292.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.51		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	147.3%	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)	119	1316	25	55	1125	57	27	205	349	35	78	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00	0.96		1.00	0.93		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1587	3154	1364	1588	3065	1373		3153	1161		2825	
Flt Permitted	0.19	1.00	1.00	0.14	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	318	3154	1364	230	3065	1373		2876	1161		2506	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	1316	25	55	1125	57	27	205	349	35	78	98
RTOR Reduction (vph)	0	0	6	0	0	16	0	0	28	0	46	0
Lane Group Flow (vph)	119	1316	19	55	1125	41	0	232	321	0	165	0
Confl. Peds. (#/hr)	23		26	26		23	49		40	40		49
Confl. Bikes (#/hr)			13			4			20			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	50.4	50.4	50.4	50.4	50.4	50.4		26.1	26.1		26.1	
Effective Green, g (s)	50.4	50.4	50.4	50.4	50.4	50.4		26.1	26.1		26.1	
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59		0.31	0.31		0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	188	1870	808	136	1817	814		883	356		769	
v/s Ratio Prot		c0.42			0.37							
v/s Ratio Perm	0.37		0.01	0.24		0.03		0.08	c0.28		0.07	
v/c Ratio	0.63	0.70	0.02	0.40	0.62	0.05		0.26	0.90		0.21	
Uniform Delay, d1	11.3	12.1	7.1	9.3	11.1	7.3		22.2	28.2		21.8	
Progression Factor	0.76	0.81	0.89	1.45	1.42	1.41		1.00	1.00		1.00	
Incremental Delay, d2	1.5	0.2	0.0	4.0	0.7	0.1		0.1	24.6		0.1	
Delay (s)	10.1	10.0	6.4	17.4	16.5	10.3		22.3	52.8		21.9	
Level of Service	B	A	A	B	B	B		C	D		C	
Approach Delay (s)		9.9			16.3			40.6			21.9	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	594	1015	898	525	259	209
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	0.99	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	2972	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	2972	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	594	1015	898	525	259	209
RTOR Reduction (vph)	0	0	0	235	30	122
Lane Group Flow (vph)	594	1015	898	290	292	24
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	36.9	62.9	22.0	22.0	14.1	14.1
Effective Green, g (s)	36.9	62.9	22.0	22.0	14.1	14.1
Actuated g/C Ratio	0.43	0.74	0.26	0.26	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	684	2289	793	357	493	201
v/s Ratio Prot	c0.38	0.33	c0.29		c0.10	
v/s Ratio Perm				0.21		0.02
v/c Ratio	0.87	0.44	1.13	0.81	0.59	0.12
Uniform Delay, d1	21.8	4.3	31.5	29.6	32.8	30.2
Progression Factor	0.77	0.83	1.11	1.33	1.00	1.00
Incremental Delay, d2	7.8	0.4	61.3	1.3	1.3	0.1
Delay (s)	24.5	4.0	96.3	40.5	34.1	30.3
Level of Service	C	A	F	D	C	C
Approach Delay (s)		11.6	75.7		32.9	
Approach LOS		B	E		C	

Intersection Summary			
HCM 2000 Control Delay	40.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.7%	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)	173	955	33	124	856	93	399	1106	299	91	438	179
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.83	1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00		0.99	1.00	1.00	0.98	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1586	3160			3109		1575	3185	1186	1562	3003	
Flt Permitted	0.15	1.00			0.61		0.35	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	251	3160			1904		577	3185	1186	218	3003	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	173	955	33	124	856	93	399	1106	299	91	438	179
RTOR Reduction (vph)	0	3	0	0	8	0	0	0	23	0	43	0
Lane Group Flow (vph)	173	985	0	0	1065	0	399	1106	276	91	574	0
Confl. Peds. (#/hr)	27		81	81		27	35		141	141		35
Confl. Bikes (#/hr)			21			15			52			17
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Effective Green, g (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Actuated g/C Ratio	0.46	0.46			0.46		0.45	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	115	1449			873		257	1423	530	97	1342	
v/s Ratio Prot		0.31						0.35			0.19	
v/s Ratio Perm	c0.69				0.56		c0.69		0.23	0.42		
v/c Ratio	1.50	0.68			1.22		1.55	0.78	0.52	0.94	0.43	
Uniform Delay, d1	23.0	18.1			23.0		23.5	19.9	16.9	22.4	16.1	
Progression Factor	0.87	0.87			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	263.9	2.4			109.3		267.0	2.5	0.4	70.0	0.1	
Delay (s)	284.0	18.2			132.3		290.5	22.4	17.4	92.4	16.1	
Level of Service	F	B			F		F	C	B	F	B	
Approach Delay (s)		57.8			132.3			80.9			25.9	
Approach LOS		E			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	78.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	126.0%	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)	330	887	247	463	733	76	21	1939	731	3	1249	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3185	1349	3090	3185	1349		4574	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.91	1.00		0.93	1.00
Satd. Flow (perm)	3090	3185	1349	3090	3185	1349		4161	1391		4234	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	330	887	247	463	733	76	21	1939	731	3	1249	211
RTOR Reduction (vph)	0	0	65	0	0	53	0	0	0	0	0	79
Lane Group Flow (vph)	330	887	182	463	733	24	0	1960	731	0	1252	132
Confl. Peds. (#/hr)			40			40	40		40	40		40
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Effective Green, g (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Actuated g/C Ratio	0.12	0.29	0.29	0.13	0.30	0.30		0.43	1.00		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	357	921	390	390	955	404		1773	1391		1805	575
v/s Ratio Prot	0.11	c0.28		c0.15	0.23							
v/s Ratio Perm			0.13			0.02		c0.47	0.53		0.30	0.10
v/c Ratio	0.92	0.96	0.47	1.19	0.77	0.06		1.11	0.53		0.69	0.23
Uniform Delay, d1	41.6	33.2	27.7	41.5	30.2	23.7		27.2	0.0		22.2	17.3
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	29.0	22.0	4.0	107.2	5.9	0.3		56.4	1.4		1.2	0.2
Delay (s)	70.6	55.2	31.7	148.7	36.1	24.0		83.7	1.4		23.4	17.5
Level of Service	E	E	C	F	D	C		F	A		C	B
Approach Delay (s)		54.7			76.4			61.3			22.5	
Approach LOS		D			E			E			C	

Intersection Summary			
HCM 2000 Control Delay	54.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	112.3%	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)	38	262	14	24	86	54	14	541	113	363	386	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.95			0.97			0.99	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		3487			3311			3429			3402	
Flt Permitted		0.91			0.89			0.94			0.58	
Satd. Flow (perm)		3181			2967			3212			2031	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	262	14	24	86	54	14	541	113	363	386	64
RTOR Reduction (vph)	0	5	0	0	36	0	0	29	0	0	10	0
Lane Group Flow (vph)	0	309	0	0	128	0	0	639	0	0	803	0
Confl. Peds. (#/hr)	11		12	12		11	26		15	15		26
Confl. Bikes (#/hr)			5			3			8			19
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)		20.5			20.5			30.5			30.5	
Effective Green, g (s)		20.5			20.5			30.5			30.5	
Actuated g/C Ratio		0.34			0.34			0.51			0.51	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Lane Grp Cap (vph)		1086			1013			1632			1032	
v/s Ratio Prot												
v/s Ratio Perm		c0.10			0.04			0.20			c0.40	
v/c Ratio		0.28			0.13			0.39			1.03dl	
Uniform Delay, d1		14.4			13.6			9.1			12.0	
Progression Factor		1.00			1.00			0.40			1.00	
Incremental Delay, d2		0.7			0.3			0.7			5.8	
Delay (s)		15.1			13.8			4.3			17.8	
Level of Service		B			B			A			B	
Approach Delay (s)		15.1			13.8			4.3			17.8	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
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)	119	562	91	20	178	107	59	830	78	45	208	24
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		0.95			0.95		1.00	0.95			0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00			1.00	
Flpb, ped/bikes		1.00			1.00		0.98	1.00			1.00	
Frt		0.98			0.95		1.00	0.99			0.99	
Flt Protected		0.99			1.00		0.95	1.00			0.99	
Satd. Flow (prot)		3423			3315		1741	3486			3453	
Flt Permitted		0.83			0.89		0.58	1.00			0.79	
Satd. Flow (perm)		2871			2969		1066	3486			2738	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	562	91	20	178	107	59	830	78	45	208	24
RTOR Reduction (vph)	0	15	0	0	71	0	0	10	0	0	10	0
Lane Group Flow (vph)	0	757	0	0	234	0	59	898	0	0	267	0
Confl. Peds. (#/hr)	9		61	61		9	43		17	17		43
Confl. Bikes (#/hr)			1			2			9			1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		23.1			23.1		37.1	37.1			37.1	
Effective Green, g (s)		23.1			23.1		37.1	37.1			37.1	
Actuated g/C Ratio		0.34			0.34		0.54	0.54			0.54	
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)		972			1005		579	1896			1489	
v/s Ratio Prot								c0.26				
v/s Ratio Perm		c0.26			0.08		0.06				0.10	
v/c Ratio		0.78			0.23		0.10	0.47			0.18	
Uniform Delay, d1		20.3			16.2		7.5	9.6			7.9	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		4.0			0.1		0.4	0.9			0.3	
Delay (s)		24.2			16.3		7.9	10.4			8.1	
Level of Service		C			B		A	B			A	
Approach Delay (s)		24.2			16.3			10.3			8.1	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	68.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.7%	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)	52	228	21	90	203	35	18	568	53	63	309	33
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	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1751	3484		1749	3445			3482			3460	
Flt Permitted	0.60	1.00		0.60	1.00			0.94			0.81	
Satd. Flow (perm)	1113	3484		1100	3445			3279			2809	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	52	228	21	90	203	35	18	568	53	63	309	33
RTOR Reduction (vph)	0	11	0	0	20	0	0	11	0	0	11	0
Lane Group Flow (vph)	52	238	0	90	218	0	0	628	0	0	394	0
Confl. Peds. (#/hr)	21		24	24		21	7		20	20		7
Confl. Bikes (#/hr)			12			10			4			8
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	26.0	26.0		26.0	26.0			26.0			26.0	
Effective Green, g (s)	26.0	26.0		26.0	26.0			26.0			26.0	
Actuated g/C Ratio	0.43	0.43		0.43	0.43			0.43			0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Grp Cap (vph)	482	1509		476	1492			1420			1217	
v/s Ratio Prot		0.07			0.06							
v/s Ratio Perm	0.05			c0.08				c0.19			0.14	
v/c Ratio	0.11	0.16		0.19	0.15			0.44			0.32	
Uniform Delay, d1	10.1	10.3		10.5	10.3			11.9			11.2	
Progression Factor	1.00	1.00		1.00	1.00			1.25			1.71	
Incremental Delay, d2	0.5	0.2		0.9	0.2			1.0			0.5	
Delay (s)	10.6	10.6		11.4	10.5			15.9			19.7	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		10.6			10.7			15.9			19.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.3%	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)	8	5	3	10	21	134	1	491	7	25	370	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5			3.5			3.5			3.5	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		1.00			0.98			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.88			1.00			1.00	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		3339			3050			3530			3516	
Flt Permitted		0.88			0.95			0.95			0.92	
Satd. Flow (perm)		3020			2895			3371			3238	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	5	3	10	21	134	1	491	7	25	370	8
RTOR Reduction (vph)	0	2	0	0	93	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	14	0	0	72	0	0	497	0	0	400	0
Confl. Peds. (#/hr)	5		4	4		5	10		12	12		10
Confl. Bikes (#/hr)						3			1			7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			1			1	
Permitted Phases	2			2			1			1		
Actuated Green, G (s)		18.5			18.5			34.5			34.5	
Effective Green, g (s)		18.5			18.5			34.5			34.5	
Actuated g/C Ratio		0.31			0.31			0.58			0.58	
Clearance Time (s)		3.5			3.5			3.5			3.5	
Lane Grp Cap (vph)		931			892			1938			1861	
v/s Ratio Prot												
v/s Ratio Perm		0.00			c0.02			c0.15			0.12	
v/c Ratio		0.01			0.08			0.26			0.22	
Uniform Delay, d1		14.4			14.7			6.4			6.2	
Progression Factor		1.00			1.00			1.00			1.56	
Incremental Delay, d2		0.0			0.2			0.3			0.3	
Delay (s)		14.4			14.9			6.7			9.9	
Level of Service		B			B			A			A	
Approach Delay (s)		14.4			14.9			6.7			9.9	
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	0.20		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	51.5%	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)	258	182	0	0	152	275	157	537	202	306	0	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.90		1.00	0.96		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2562		972	2929		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2562		972	2929		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	258	182	0	0	152	275	157	537	202	306	0	580
RTOR Reduction (vph)	0	0	0	0	239	0	0	30	0	0	0	455
Lane Group Flow (vph)	258	182	0	0	188	0	141	725	0	306	0	125
Confl. Peds. (#/hr)						17						
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	21.0	37.3			12.8		26.2	26.2		21.1		21.1
Effective Green, g (s)	21.0	37.3			12.8		26.2	26.2		21.1		21.1
Actuated g/C Ratio	0.22	0.38			0.13		0.27	0.27		0.22		0.22
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	294	1265			336		260	786		336		534
v/s Ratio Prot	c0.19	0.05			c0.07		0.15	c0.25		c0.20		0.05
v/s Ratio Perm												
v/c Ratio	0.88	0.14			0.56		0.54	0.92		0.91		0.23
Uniform Delay, d1	37.1	19.7			39.8		30.6	34.7		37.3		31.6
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	23.5	0.0			1.6		1.8	16.2		27.7		0.2
Delay (s)	60.6	19.7			41.4		32.4	50.9		65.0		31.7
Level of Service	E	B			D		C	D		E		C
Approach Delay (s)		43.7			41.4			48.0			43.2	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	97.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	79.3%	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)	93	751	22	144	797	252	20	127	118	381	169	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.96			0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3382		1770	3226			1718		1750	1726	
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.53	1.00	
Satd. Flow (perm)	1770	3382		1770	3226			1672		972	1726	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	93	751	22	144	797	252	20	127	118	381	169	84
RTOR Reduction (vph)	0	2	0	0	33	0	0	34	0	0	21	0
Lane Group Flow (vph)	93	771	0	144	1016	0	0	231	0	381	232	0
Confl. Peds. (#/hr)			49			78	39		15	15		39
Confl. Bikes (#/hr)			12			8			10			24
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.6	32.7		9.5	35.6			36.8		36.8	36.8	
Effective Green, g (s)	6.6	32.7		9.5	35.6			36.8		36.8	36.8	
Actuated g/C Ratio	0.07	0.36		0.11	0.40			0.41		0.41	0.41	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	129	1228		186	1276			683		397	705	
v/s Ratio Prot	0.05	c0.23		0.08	c0.32						0.13	
v/s Ratio Perm								0.14		c0.39		
v/c Ratio	0.72	0.63		0.77	0.80			0.34		0.96	0.33	
Uniform Delay, d1	40.8	23.6		39.2	24.0			18.2		25.9	18.2	
Progression Factor	0.95	0.92		0.90	0.84			1.00		1.00	1.00	
Incremental Delay, d2	15.4	0.7		16.5	5.2			0.1		34.1	0.1	
Delay (s)	54.2	22.5		52.0	25.5			18.4		60.0	18.3	
Level of Service	D	C		D	C			B		E	B	
Approach Delay (s)		25.9			28.7			18.4			43.3	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	86.6%	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)	61	1719	37	72	1390	276	30	121	123	90	124	69
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	0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92			0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1768	3390		1055	3471	1486	1580	2025			3102	
Flt Permitted	0.10	1.00		0.09	1.00	1.00	0.56	1.00			0.79	
Satd. Flow (perm)	191	3390		101	3471	1486	938	2025			2476	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	1719	37	72	1390	276	30	121	123	90	124	69
RTOR Reduction (vph)	0	2	0	0	0	124	0	10	0	0	21	0
Lane Group Flow (vph)	61	1754	0	72	1390	152	30	234	0	0	262	0
Confl. Peds. (#/hr)	18		4	4		18	4		3	3		4
Confl. Bikes (#/hr)			9			7			9			
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0			28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0			28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35			0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0			4.0	
Lane Grp Cap (vph)	105	1864		55	1909	817	328	708			866	
v/s Ratio Prot		0.52			0.40			c0.12				
v/s Ratio Perm	0.32			c0.71		0.10	0.03				0.11	
v/c Ratio	0.58	0.94		1.31	0.73	0.19	0.09	0.33			0.30	
Uniform Delay, d1	11.9	16.8		18.0	13.5	9.0	17.5	19.1			18.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2	21.3	10.9		224.8	2.5	0.5	0.6	1.3			0.9	
Delay (s)	33.3	27.7		242.8	16.0	9.5	18.0	20.4			19.8	
Level of Service	C	C		F	B	A	B	C			B	
Approach Delay (s)		27.9			24.4			20.1			19.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	112.7%	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)	178	1465	49	25	985	62	524	440	40	85	71	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		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)	1670	4285		1769	4533		1752	1863	1548	1765	3539	1242
Flt Permitted	0.22	1.00		0.11	1.00		0.71	1.00	1.00	0.32	1.00	1.00
Satd. Flow (perm)	387	4285		197	4533		1307	1863	1548	601	3539	1242
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	178	1465	49	25	985	62	524	440	40	85	71	188
RTOR Reduction (vph)	0	4	0	0	8	0	0	0	16	0	0	45
Lane Group Flow (vph)	178	1510	0	25	1039	0	524	440	24	85	71	143
Confl. Peds. (#/hr)	5		1	1		5			7	7		
Confl. Bikes (#/hr)			9			3			8			
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	42.0	42.0		42.0	42.0		33.5	33.5	33.5	33.5	33.5	33.5
Effective Green, g (s)	42.0	42.0		42.0	42.0		33.5	33.5	33.5	33.5	33.5	33.5
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	191	2117		97	2239		515	734	610	236	1394	489
v/s Ratio Prot		0.35			0.23			0.24			0.02	
v/s Ratio Perm	c0.46			0.13			c0.40		0.02	0.14		0.11
v/c Ratio	0.93	0.71		0.26	0.46		1.02	0.60	0.04	0.36	0.05	0.29
Uniform Delay, d1	20.2	16.8		12.5	14.1		25.8	20.4	15.8	18.2	15.9	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	49.4	2.1		0.5	0.1		44.1	3.6	0.1	4.2	0.1	1.5
Delay (s)	69.6	18.9		13.0	14.2		69.9	24.0	16.0	22.4	16.0	19.1
Level of Service	E	B		B	B		E	C	B	C	B	B
Approach Delay (s)		24.2			14.1			47.6			19.3	
Approach LOS		C			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
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)	0	0	0	18	162	553	48	131	0	0	107	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.98	1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00	1.00	0.99	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			1.00	1.00
Satd. Flow (prot)					3518	1550	1753	1111			2865	1548
Flt Permitted					1.00	1.00	0.68	1.00			1.00	1.00
Satd. Flow (perm)					3518	1550	1263	1111			2865	1548
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	18	162	553	48	131	0	0	107	24
RTOR Reduction (vph)	0	0	0	0	0	470	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	180	83	48	131	0	0	107	18
Confl. Peds. (#/hr)				10		10	10					10
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					13.5	13.5	67.0	67.0			67.0	67.0
Effective Green, g (s)					13.5	13.5	67.0	67.0			67.0	67.0
Actuated g/C Ratio					0.15	0.15	0.74	0.74			0.74	0.74
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					527	232	940	827			2132	1152
v/s Ratio Prot								c0.12			0.04	
v/s Ratio Perm					0.05	c0.05	0.04					0.01
v/c Ratio					0.34	0.36	0.05	0.16			0.05	0.02
Uniform Delay, d1					34.3	34.4	3.1	3.3			3.1	3.0
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.1	0.3	0.0	0.0			0.0	0.0
Delay (s)					34.4	34.7	3.1	3.4			3.1	3.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			34.6			3.3			3.1	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
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)	26	944	65	41	112	26	107	268	148	142	164	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1770	3372		1770	3430		1770	2023		1610	2119	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1770	3372		1770	3430		1770	2023		1610	2119	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	65	41	112	26	107	268	148	142	164	14
RTOR Reduction (vph)	0	3	0	0	13	0	0	49	0	0	3	0
Lane Group Flow (vph)	26	1006	0	41	125	0	107	367	0	105	212	0
Confl. Peds. (#/hr)						1			2			6
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	3.4	41.6		5.8	44.5		27.0	27.0		17.4	17.4	
Effective Green, g (s)	3.4	41.6		5.8	44.5		27.0	27.0		17.4	17.4	
Actuated g/C Ratio	0.03	0.39		0.05	0.41		0.25	0.25		0.16	0.16	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	55	1301		95	1415		443	506		259	342	
v/s Ratio Prot	0.01	c0.30		c0.02	c0.04		0.06	c0.18		0.07	c0.10	
v/s Ratio Perm												
v/c Ratio	0.47	0.77		0.43	0.09		0.24	0.72		0.41	0.62	
Uniform Delay, d1	51.3	29.0		49.4	19.3		32.2	37.0		40.6	42.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	2.9		2.3	0.0		0.3	5.2		1.0	3.3	
Delay (s)	53.6	31.9		51.7	19.3		32.5	42.2		41.6	45.4	
Level of Service	D	C		D	B		C	D		D	D	
Approach Delay (s)		32.4			26.7			40.2			44.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	107.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2035 + Project Commercial
Alternative AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	1265	79	279	1368	247	62	169	197	370	564	160
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3498		1770	3539	1518	1770	1863	1540	1770	1793	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3498		1770	3539	1518	1770	1863	1540	1770	1793	
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)	72	1375	86	303	1487	268	67	184	214	402	613	174
RTOR Reduction (vph)	0	8	0	0	0	100	0	0	133	0	17	0
Lane Group Flow (vph)	72	1453	0	303	1487	168	67	184	81	402	770	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.3	18.9		7.0	23.6	23.6	2.3	14.6	14.6	4.0	16.3	
Effective Green, g (s)	2.3	18.9		7.0	23.6	23.6	2.3	14.6	14.6	4.0	16.3	
Actuated g/C Ratio	0.04	0.31		0.12	0.39	0.39	0.04	0.24	0.24	0.07	0.27	
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)	67	1092		204	1380	592	67	449	371	117	483	
v/s Ratio Prot	0.04	c0.42		c0.17	0.42		0.04	0.10		c0.23	c0.43	
v/s Ratio Perm						0.11			0.05			
v/c Ratio	1.07	1.33		1.49	1.08	0.28	1.00	0.41	0.22	3.44	1.59	
Uniform Delay, d1	29.1	20.8		26.8	18.4	12.7	29.1	19.3	18.4	28.2	22.1	
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	132.0	155.3		242.7	48.1	0.3	110.0	0.6	0.3	1117.4	277.2	
Delay (s)	161.1	176.1		269.4	66.5	12.9	139.1	19.9	18.7	1145.7	299.3	
Level of Service	F	F		F	E	B	F	B	B	F	F	
Approach Delay (s)		175.4			89.4			36.5			585.5	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	222.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.67		
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	249	941	912	128	1149	190	864	784	45	165	1350	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3084		1770	3424		3433	3496		1770	3407	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3084		1770	3424		3433	3496		1770	3407	
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	1023	991	139	1249	207	939	852	49	179	1467	277
RTOR Reduction (vph)	0	159	0	0	12	0	0	4	0	0	14	0
Lane Group Flow (vph)	271	1855	0	139	1444	0	939	897	0	179	1730	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	17.0	35.0		11.0	29.0		15.0	37.1		13.9	35.0	
Effective Green, g (s)	17.0	35.0		11.0	29.0		15.0	37.1		13.9	35.0	
Actuated g/C Ratio	0.15	0.32		0.10	0.26		0.14	0.34		0.13	0.32	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	273	981		177	902		468	1179		223	1084	
v/s Ratio Prot	c0.15	c0.60		0.08	0.42		c0.27	0.26		0.10	c0.51	
v/s Ratio Perm												
v/c Ratio	0.99	1.89		0.79	1.60		2.01	0.76		0.80	1.60	
Uniform Delay, d1	46.4	37.5		48.3	40.5		47.5	32.5		46.7	37.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	52.2	404.8		18.7	275.7		460.4	4.7		18.0	272.4	
Delay (s)	98.6	442.3		67.0	316.2		507.9	37.2		64.7	309.9	
Level of Service	F	F		E	F		F	D		E	F	
Approach Delay (s)		401.6			294.5			277.4			287.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	320.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	151.3%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	538	81	12	299	0	0	0	0	631	897	576
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		0.99			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3449			5074					1610	3368	1550
Flt Permitted		1.00			0.87					0.95	0.99	1.00
Satd. Flow (perm)		3449			4440					1610	3368	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	538	81	12	299	0	0	0	0	631	897	576
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	62
Lane Group Flow (vph)	0	604	0	0	311	0	0	0	0	492	1036	514
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		17.0			17.0					51.0	51.0	51.0
Effective Green, g (s)		17.0			17.0					51.0	51.0	51.0
Actuated g/C Ratio		0.21			0.21					0.64	0.64	0.64
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		732			943					1026	2147	988
v/s Ratio Prot		c0.18										
v/s Ratio Perm					0.07					0.31	0.31	c0.33
v/c Ratio		0.83			0.33					0.48	0.48	0.52
Uniform Delay, d1		30.1			26.7					7.6	7.6	7.9
Progression Factor		1.00			1.12					1.00	1.00	1.00
Incremental Delay, d2		10.3			0.9					1.6	0.8	2.0
Delay (s)		40.3			30.9					9.2	8.4	9.8
Level of Service		D			C					A	A	A
Approach Delay (s)		40.3			30.9			0.0			9.0	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.2%	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)	297	888	0	0	293	737	8	756	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3385			3539	2704		5045				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3210			3539	2704		5045				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	297	888	0	0	293	737	8	756	31	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	180	0	5	0	0	0	0
Lane Group Flow (vph)	267	918	0	0	293	557	0	790	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	21.5	51.5			26.5	26.5		17.5				
Effective Green, g (s)	21.5	51.5			26.5	26.5		17.5				
Actuated g/C Ratio	0.27	0.64			0.33	0.33		0.22				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	432	2113			1172	895		1103				
v/s Ratio Prot	c0.17	0.12			0.08							
v/s Ratio Perm		0.16				c0.21		0.16				
v/c Ratio	0.62	0.43			0.25	0.62		0.72				
Uniform Delay, d1	25.6	7.0			19.5	22.5		28.9				
Progression Factor	0.90	0.75			1.00	1.00		1.00				
Incremental Delay, d2	5.1	0.5			0.5	3.3		4.0				
Delay (s)	28.2	5.8			20.0	25.8		32.9				
Level of Service	C	A			C	C		C				
Approach Delay (s)		10.8			24.1			32.9			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	81.5%	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)	61	933	748	388	1621	69	213	45	335	31	21	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	933	748	388	1621	69	213	45	335	31	21	20
RTOR Reduction (vph)	0	0	337	0	2	0	0	0	285	0	19	0
Lane Group Flow (vph)	61	933	411	388	1688	0	128	130	50	31	22	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	5.5	46.5	46.5	33.9	74.9		17.9	17.9	17.9	4.5	4.5	
Effective Green, g (s)	5.5	46.5	46.5	33.9	74.9		17.9	17.9	17.9	4.5	4.5	
Actuated g/C Ratio	0.05	0.39	0.39	0.28	0.63		0.15	0.15	0.15	0.04	0.04	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	83	1290	547	438	2092		186	187	141	45	42	
v/s Ratio Prot	0.03	0.28		c0.25	c0.51		0.10	c0.10		c0.03	0.02	
v/s Ratio Perm			0.29						0.05			
v/c Ratio	0.73	0.72	0.75	0.89	0.81		0.69	0.70	0.36	0.69	0.52	
Uniform Delay, d1	56.2	30.9	31.4	40.8	16.7		48.1	48.1	45.5	56.7	56.3	
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	26.9	2.1	5.9	18.4	2.4		10.1	10.7	1.5	29.5	4.4	
Delay (s)	83.1	33.0	37.3	59.3	19.2		58.2	58.8	47.1	86.3	60.8	
Level of Service	F	C	D	E	B		E	E	D	F	E	
Approach Delay (s)		36.6			26.7			52.0			71.7	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	119.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	84.1%	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)	155	865	284	284	1387	343	526	233	514	324	241	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.90		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1014	2904		1299	3438	1369	1480	2543		1480	2316	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1014	2904		1299	3438	1369	1480	2543		1480	2316	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	865	284	284	1387	343	526	233	514	324	241	180
RTOR Reduction (vph)	0	23	0	0	0	168	0	201	0	0	52	0
Lane Group Flow (vph)	155	1126	0	284	1387	175	526	546	0	253	440	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	16.5	42.0		22.5	48.0	48.0	39.5	39.5		19.0	19.0	
Effective Green, g (s)	16.5	42.0		22.5	48.0	48.0	39.5	39.5		19.0	19.0	
Actuated g/C Ratio	0.12	0.30		0.16	0.34	0.34	0.28	0.28		0.14	0.14	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	119	874		209	1182	471	419	720		201	315	
v/s Ratio Prot	0.15	c0.39		c0.22	0.40		c0.36	0.21		0.17	c0.19	
v/s Ratio Perm						0.13						
v/c Ratio	1.30	1.29		1.36	1.17	0.37	1.26	0.88dr		1.26	1.40	
Uniform Delay, d1	61.5	48.8		58.5	45.8	34.4	50.0	45.6		60.2	60.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	184.3	138.3		189.3	87.3	0.5	133.1	4.4		150.2	197.1	
Delay (s)	245.8	187.1		247.8	133.0	34.9	183.1	50.0		210.4	257.3	
Level of Service	F	F		F	F	C	F	D		F	F	
Approach Delay (s)		194.1			132.5			105.0			241.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	156.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	106.6%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1646	79	140	1232	0	0	0	0	494	361	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.94	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4952		1770	3343						3145	
Flt Permitted		1.00		0.09	1.00						0.98	
Satd. Flow (perm)		4952		162	3343						3145	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1646	79	140	1232	0	0	0	0	494	361	530
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	31	0
Lane Group Flow (vph)	0	1719	0	140	1232	0	0	0	0	0	1354	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		46.0		46.0	46.0						31.0	
Effective Green, g (s)		46.0		46.0	46.0						31.0	
Actuated g/C Ratio		0.53		0.53	0.53						0.36	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2618		85	1767						1120	
v/s Ratio Prot		0.35			0.37						c0.43	
v/s Ratio Perm				c0.86								
v/c Ratio		0.66		1.65	0.70						1.21	
Uniform Delay, d1		14.8		20.5	15.3						28.0	
Progression Factor		1.00		0.40	0.34						1.00	
Incremental Delay, d2		0.5		313.3	0.4						102.6	
Delay (s)		15.3		321.4	5.7						130.6	
Level of Service		B		F	A						F	
Approach Delay (s)		15.3			37.9			0.0			130.6	
Approach LOS		B			D			A			F	

Intersection Summary			
HCM 2000 Control Delay	57.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	156.6%	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)	388	1752	0	0	1221	462	151	438	117	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.98				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3366			3402				
Flt Permitted	0.09	1.00			1.00			0.99				
Satd. Flow (perm)	162	3539			3366			3402				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	388	1752	0	0	1221	462	151	438	117	0	0	0
RTOR Reduction (vph)	0	0	0	0	45	0	0	8	0	0	0	0
Lane Group Flow (vph)	388	1752	0	0	1638	0	0	698	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	46.0	46.0			46.0			31.0				
Effective Green, g (s)	46.0	46.0			46.0			31.0				
Actuated g/C Ratio	0.53	0.53			0.53			0.36				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1871			1779			1212				
v/s Ratio Prot		0.50			0.49			c0.21				
v/s Ratio Perm	c2.40											
v/c Ratio	4.56	0.94			0.92			0.58				
Uniform Delay, d1	20.5	19.1			18.8			22.7				
Progression Factor	0.66	0.63			1.00			1.00				
Incremental Delay, d2	1620.1	6.1			8.2			0.4				
Delay (s)	1633.7	18.1			27.0			23.1				
Level of Service	F	B			C			C				
Approach Delay (s)		311.0			27.0			23.1			0.0	
Approach LOS		F			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	160.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.94		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	156.6%	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)	48	1318	127	107	1865	20	61	101	45	22	145	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		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	3420		1768	3400		1755	1762		1758	1776	
Flt Permitted	0.08	1.00		0.11	1.00		0.59	1.00		0.66	1.00	
Satd. Flow (perm)	157	3420		196	3400		1082	1762		1229	1776	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	1318	127	107	1865	20	61	101	45	22	145	51
RTOR Reduction (vph)	0	9	0	0	1	0	0	20	0	0	10	0
Lane Group Flow (vph)	48	1436	0	107	1884	0	61	126	0	22	186	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Effective Green, g (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30		0.30	0.30	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2030		116	2018		324	528		368	532	
v/s Ratio Prot		0.42			c0.55			0.07			c0.10	
v/s Ratio Perm	0.31			0.55			0.06			0.02		
v/c Ratio	0.52	0.71		0.92	0.93		0.19	0.24		0.06	0.35	
Uniform Delay, d1	9.5	11.4		14.6	14.8		20.8	21.1		20.0	21.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.0	2.1		64.7	9.5		1.3	1.1		0.3	1.8	
Delay (s)	28.5	13.5		79.3	24.3		22.1	22.2		20.3	23.7	
Level of Service	C	B		E	C		C	C		C	C	
Approach Delay (s)		14.0			27.3			22.1			23.4	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	140.6%	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)	50	1060	251	56	1373	13	495	281	107	4	120	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)		3319			3299	1488	1646	1845	1508		1859	1519
Flt Permitted		0.72			0.72	1.00	0.66	1.00	1.00		0.99	1.00
Satd. Flow (perm)		2392			2378	1488	1150	1845	1508		1848	1519
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	1060	251	56	1373	13	495	281	107	4	120	149
RTOR Reduction (vph)	0	22	0	0	0	3	0	0	43	0	0	19
Lane Group Flow (vph)	0	1339	0	0	1429	10	495	281	64	0	124	130
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		47.5			47.5	47.5	33.5	33.5	33.5		33.5	33.5
Effective Green, g (s)		47.5			47.5	47.5	33.5	33.5	33.5		33.5	33.5
Actuated g/C Ratio		0.53			0.53	0.53	0.37	0.37	0.37		0.37	0.37
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1262			1255	785	428	686	561		687	565
v/s Ratio Prot								0.15				
v/s Ratio Perm		0.56			c0.60	0.01	c0.43		0.04		0.07	0.09
v/c Ratio		1.06			1.14	0.01	1.16	0.41	0.11		0.18	0.23
Uniform Delay, d1		21.2			21.2	10.1	28.2	20.9	18.5		19.0	19.4
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		43.3			72.5	0.0	93.8	0.1	0.0		0.0	0.1
Delay (s)		64.5			93.8	10.1	122.0	21.1	18.6		19.1	19.5
Level of Service		E			F	B	F	C	B		B	B
Approach Delay (s)		64.5			93.0			77.4			19.3	
Approach LOS		E			F			E			B	

Intersection Summary			
HCM 2000 Control Delay	74.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	121.0%	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)	74	884	247	69	1335	220	101	691	32	60	1218	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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3432	1510	1764	3252	1540	1669	3512		1762	3538	
Flt Permitted		0.59	1.00	0.18	1.00	1.00	0.11	1.00		0.31	1.00	
Satd. Flow (perm)		2042	1510	335	3252	1540	191	3512		573	3538	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	884	247	69	1335	220	101	691	32	60	1218	3
RTOR Reduction (vph)	0	0	18	0	0	66	0	4	0	0	0	0
Lane Group Flow (vph)	0	958	229	69	1335	154	101	719	0	60	1221	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		37.0	37.0	37.0	37.0	37.0	38.5	38.5		38.5	38.5	
Effective Green, g (s)		37.0	37.0	37.0	37.0	37.0	38.5	38.5		38.5	38.5	
Actuated g/C Ratio		0.44	0.44	0.44	0.44	0.44	0.45	0.45		0.45	0.45	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		888	657	145	1415	670	86	1590		259	1602	
v/s Ratio Prot					0.41			0.20			0.35	
v/s Ratio Perm		c0.47	0.15	0.21		0.10	c0.53			0.10		
v/c Ratio		1.08	0.35	0.48	0.94	0.23	1.17	0.45		0.23	0.76	
Uniform Delay, d1		24.0	16.0	17.1	23.0	15.1	23.2	16.0		14.2	19.4	
Progression Factor		1.00	1.00	1.42	1.01	1.89	1.00	1.00		1.00	1.00	
Incremental Delay, d2		53.8	1.5	8.9	11.8	0.7	151.5	0.4		0.6	2.3	
Delay (s)		77.8	17.4	33.1	35.0	29.0	174.8	16.4		14.8	21.8	
Level of Service		E	B	C	D	C	F	B		B	C	
Approach Delay (s)		65.4			34.1			35.8			21.4	
Approach LOS		E			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	121.4%	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)	55	863	27	119	1447	32	18	109	263	37	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1589	3124	1361	1505	3185	1375		3152	1174		2853	
Flt Permitted	0.14	1.00	1.00	0.31	1.00	1.00		0.90	1.00		0.89	
Satd. Flow (perm)	242	3124	1361	491	3185	1375		2843	1174		2565	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	863	27	119	1447	32	18	109	263	37	99	105
RTOR Reduction (vph)	0	0	7	0	0	5	0	0	120	0	33	0
Lane Group Flow (vph)	55	863	20	119	1447	27	0	127	143	0	208	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	61.4	61.4	61.4	61.4	61.4	61.4		15.1	15.1		15.1	
Effective Green, g (s)	61.4	61.4	61.4	61.4	61.4	61.4		15.1	15.1		15.1	
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.72		0.18	0.18		0.18	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	174	2256	983	354	2300	993		505	208		455	
v/s Ratio Prot		0.28			c0.45							
v/s Ratio Perm	0.23		0.01	0.24		0.02		0.04	c0.12		0.08	
v/c Ratio	0.32	0.38	0.02	0.34	0.63	0.03		0.25	0.69		0.46	
Uniform Delay, d1	4.2	4.5	3.3	4.3	6.0	3.3		30.1	32.7		31.3	
Progression Factor	1.06	0.78	0.71	2.78	2.63	3.05		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.0	0.0	0.2	0.1	0.0		0.1	7.3		0.3	
Delay (s)	4.9	3.6	2.4	12.2	15.9	10.2		30.2	40.0		31.5	
Level of Service	A	A	A	B	B	B		C	D		C	
Approach Delay (s)		3.6			15.5			36.8			31.5	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	503	601	1428	122	663	242
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3048	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3048	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	503	601	1428	122	663	242
RTOR Reduction (vph)	0	0	0	34	3	162
Lane Group Flow (vph)	503	601	1428	88	684	56
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	19.0	55.0	32.0	32.0	22.0	22.0
Effective Green, g (s)	19.0	55.0	32.0	32.0	22.0	22.0
Actuated g/C Ratio	0.22	0.65	0.38	0.38	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	356	1946	1142	505	788	308
v/s Ratio Prot	c0.32	0.20	c0.47		c0.22	
v/s Ratio Perm				0.07		0.05
v/c Ratio	1.41	0.31	1.25	0.17	0.87	0.18
Uniform Delay, d1	33.0	6.6	26.5	17.7	30.1	24.5
Progression Factor	0.68	1.52	0.97	1.15	1.00	1.00
Incremental Delay, d2	200.6	0.4	115.0	0.0	9.7	0.1
Delay (s)	223.1	10.4	140.6	20.4	39.8	24.6
Level of Service	F	B	F	C	D	C
Approach Delay (s)		107.3	131.1		36.1	
Approach LOS		F	F		D	

Intersection Summary			
HCM 2000 Control Delay	99.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.8%	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)	72	864	53	136	1132	112	173	481	158	116	424	143
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		0.98	1.00	1.00	0.97	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1586	3148			3112		1562	3185	1306	1546	3008	
Flt Permitted	0.11	1.00			0.69		0.32	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	190	3148			2143		534	3185	1306	630	3008	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	864	53	136	1132	112	173	481	158	116	424	143
RTOR Reduction (vph)	0	5	0	0	7	0	0	0	74	0	37	0
Lane Group Flow (vph)	72	912	0	0	1373	0	173	481	84	116	530	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	48.9	48.9			48.9		28.1	28.1	28.1	28.1	28.1	
Effective Green, g (s)	48.9	48.9			48.9		28.1	28.1	28.1	28.1	28.1	
Actuated g/C Ratio	0.58	0.58			0.58		0.33	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	109	1811			1232		176	1052	431	208	994	
v/s Ratio Prot		0.29						0.15			0.18	
v/s Ratio Perm	0.38				c0.64		c0.32		0.06	0.18		
v/c Ratio	0.66	0.50			1.11		0.98	0.46	0.20	0.56	0.53	
Uniform Delay, d1	12.4	10.8			18.1		28.2	22.4	20.4	23.3	23.1	
Progression Factor	0.35	0.27			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	23.2	0.8			63.0		62.3	0.1	0.1	1.8	0.3	
Delay (s)	27.6	3.8			81.1		90.5	22.6	20.4	25.2	23.4	
Level of Service	C	A			F		F	C	C	C	C	
Approach Delay (s)		5.5			81.1			36.6			23.7	
Approach LOS		A			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	42.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	120.2%	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)	90	158	165	465	866	101	421	1249	423	28	1179	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4513	1352		4571	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.81	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3032	1352		3713	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	158	165	465	866	101	421	1249	423	28	1179	207
RTOR Reduction (vph)	0	0	81	0	0	50	0	0	242	0	0	83
Lane Group Flow (vph)	90	158	84	465	866	51	0	1670	181	0	1207	124
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	4.0	15.2	15.2	21.3	32.5	32.5		38.5	38.5		38.5	38.5
Effective Green, g (s)	4.0	15.2	15.2	21.3	32.5	32.5		38.5	38.5		38.5	38.5
Actuated g/C Ratio	0.04	0.17	0.17	0.24	0.36	0.36		0.43	0.43		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	137	532	228	731	1150	488		1297	578		1588	578
v/s Ratio Prot	c0.03	0.05		0.15	c0.27							
v/s Ratio Perm			0.06			0.04		c0.55	0.13		0.33	0.09
v/c Ratio	0.66	0.30	0.37	0.64	0.75	0.10		3.79dl	0.31		0.76	0.21
Uniform Delay, d1	42.3	32.7	33.2	30.9	25.2	19.1		25.8	17.0		21.8	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	10.8	1.4	4.6	1.8	4.6	0.4		135.4	0.3		2.2	0.2
Delay (s)	53.1	34.1	37.7	32.7	29.8	19.5		161.1	17.3		24.0	16.4
Level of Service	D	C	D	C	C	B		F	B		C	B
Approach Delay (s)		39.7			30.0			132.0			22.9	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	68.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt AM

Adeline & 18th
2035 + Project Commercial Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	49	2.0	0.914	35.7	LOS E	16.2	410.6	1.00	1.43	17.8
8	T	631	2.0	0.914	35.7	LOS E	16.2	410.6	1.00	1.43	18.2
18	R	88	2.0	0.914	35.7	LOS E	16.2	410.6	1.00	1.43	18.1
Approach		768	2.0	0.914	35.7	LOS E	16.2	410.6	1.00	1.43	18.2
East: 18th Street (WB)											
1	L	27	2.0	0.761	24.2	LOS C	6.8	172.3	0.90	1.20	20.6
6	T	215	2.0	0.761	24.2	LOS C	6.8	172.3	0.90	1.16	21.4
16	R	267	2.0	0.761	24.2	LOS C	6.8	172.3	0.90	1.17	21.3
Approach		509	2.0	0.761	24.2	LOS C	6.8	172.3	0.90	1.16	21.3
North: Adeline Street (SB)											
7	L	251	2.0	0.480	9.0	LOS A	3.0	75.0	0.60	0.83	25.7
4	T	211	2.0	0.480	9.0	LOS A	3.0	75.0	0.60	0.65	27.9
14	R	40	2.0	0.480	9.0	LOS A	3.0	75.0	0.60	0.69	27.6
Approach		502	2.0	0.480	9.0	LOS A	3.0	75.0	0.60	0.74	26.7
West: 18th Street (EB)											
5	L	50	2.0	0.305	7.6	LOS A	1.4	36.7	0.61	0.94	26.6
2	T	206	2.0	0.305	7.6	LOS A	1.4	36.7	0.61	0.73	29.0
12	R	5	2.0	0.305	7.6	LOS A	1.4	36.7	0.61	0.78	28.7
Approach		261	2.0	0.305	7.6	LOS A	1.4	36.7	0.61	0.77	28.5
All Vehicles		2040	2.0	0.914	22.6	LOS C	16.2	410.6	0.83	1.11	21.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Processed: Wednesday, October 02, 2013 11:06:19 AM
SIDRA INTERSECTION 5.1.13.2093
Project: C:\Users\aelias\Desktop\Synchro\Roundabout Analysis - Sidra\Adeline & 18th.sip
8001045, KITTELSON AND ASSOCIATES INC, FLOATING

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	206	5	27	215	267	49	631	88	251	211	40
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		1.00	0.99		1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.98	1.00			0.99	
Frt	1.00	1.00		1.00	0.92		1.00	0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1762	1854		1726	1685		1741	3439			3359	
Flt Permitted	0.21	1.00		0.56	1.00		0.46	1.00			0.56	
Satd. Flow (perm)	384	1854		1019	1685		841	3439			1932	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	206	5	27	215	267	49	631	88	251	211	40
RTOR Reduction (vph)	0	1	0	0	69	0	0	14	0	0	8	0
Lane Group Flow (vph)	50	210	0	27	413	0	49	705	0	0	494	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	19.3	19.3		19.3	19.3		37.3	37.3			37.3	
Effective Green, g (s)	19.3	19.3		19.3	19.3		37.3	37.3			37.3	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.58	0.58			0.58	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	114	553		304	503		485	1985			1115	
v/s Ratio Prot		0.11			c0.24			0.20				
v/s Ratio Perm	0.13			0.03			0.06				c0.26	
v/c Ratio	0.44	0.38		0.09	0.82		0.10	0.36			0.44	
Uniform Delay, d1	18.3	17.9		16.3	21.0		6.1	7.3			7.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.0	0.2		0.0	9.8		0.4	0.5			1.3	
Delay (s)	19.3	18.1		16.4	30.9		6.5	7.8			9.0	
Level of Service	B	B		B	C		A	A			A	
Approach Delay (s)		18.3			30.1			7.7			9.0	
Approach LOS		B			C			A			A	

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)	64.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt AM

Adeline & 14th
2035 + Project Commercial Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	18	2.0	0.309	6.1	LOS A	1.7	42.3	0.44	0.85	27.2
8	T	309	2.0	0.309	6.1	LOS A	1.7	42.3	0.44	0.54	30.1
18	R	25	2.0	0.309	6.1	LOS A	1.7	42.3	0.44	0.61	29.6
Approach		352	2.0	0.309	6.1	LOS A	1.7	42.3	0.44	0.56	29.9
East: 14th Street (WB)											
1	L	34	2.0	0.227	5.9	LOS A	1.1	27.2	0.51	0.87	27.3
6	T	148	2.0	0.227	5.9	LOS A	1.1	27.2	0.51	0.62	30.1
16	R	42	2.0	0.227	5.9	LOS A	1.1	27.2	0.51	0.67	29.7
Approach		224	2.0	0.227	5.9	LOS A	1.1	27.2	0.51	0.66	29.6
North: Adeline Street (SB)											
7	L	32	2.0	0.280	5.7	LOS A	1.5	37.3	0.42	0.84	27.3
4	T	264	2.0	0.280	5.7	LOS A	1.5	37.3	0.42	0.53	30.3
14	R	26	2.0	0.280	5.7	LOS A	1.5	37.3	0.42	0.59	29.8
Approach		322	2.0	0.280	5.7	LOS A	1.5	37.3	0.42	0.56	29.9
West: 14th Street (EB)											
5	L	24	2.0	0.194	5.4	LOS A	0.9	22.8	0.48	0.87	27.6
2	T	154	2.0	0.194	5.4	LOS A	0.9	22.8	0.48	0.59	30.5
12	R	18	2.0	0.194	5.4	LOS A	0.9	22.8	0.48	0.65	30.1
Approach		196	2.0	0.194	5.4	LOS A	0.9	22.8	0.48	0.63	30.0
All Vehicles		1094	2.0	0.309	5.8	LOS A	1.7	42.3	0.45	0.60	29.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt AM

Adeline & 12th
2035 + Project Commercial Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.205	4.4	LOS A	1.1	27.0	0.16	0.90	27.8
8	T	272	2.0	0.205	4.4	LOS A	1.1	27.0	0.16	0.42	31.3
18	R	5	2.0	0.205	4.4	LOS A	1.1	27.0	0.16	0.52	30.7
Approach		278	2.0	0.205	4.4	LOS A	1.1	27.0	0.16	0.42	31.3
East: 12th Street (WB)											
1	L	8	2.0	0.101	4.3	LOS A	0.4	11.2	0.41	0.81	28.0
6	T	29	2.0	0.101	4.3	LOS A	0.4	11.2	0.41	0.52	31.2
16	R	71	2.0	0.101	4.3	LOS A	0.4	11.2	0.41	0.58	30.7
Approach		108	2.0	0.101	4.3	LOS A	0.4	11.2	0.41	0.58	30.6
North: Adeline Street (SB)											
7	L	30	2.0	0.236	4.6	LOS A	1.3	32.2	0.16	0.87	27.6
4	T	285	2.0	0.236	4.6	LOS A	1.3	32.2	0.16	0.41	31.1
14	R	5	2.0	0.236	4.6	LOS A	1.3	32.2	0.16	0.51	30.5
Approach		320	2.0	0.236	4.6	LOS A	1.3	32.2	0.16	0.46	30.7
West: 12th Street (EB)											
5	L	2	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.78	28.4
2	T	7	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.48	31.7
12	R	1	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.54	31.2
Approach		10	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.55	30.9
All Vehicles		716	2.0	0.236	4.5	LOS A	1.3	32.2	0.20	0.46	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	46	0	0	355	376	443	452	93	116	0	558
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.98		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (prot)	1020	3282			2913		1173	2815		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (perm)	1020	3282			2913		1173	2815		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	46	0	0	355	376	443	452	93	116	0	558
RTOR Reduction (vph)	0	0	0	0	183	0	0	12	0	0	0	499
Lane Group Flow (vph)	141	46	0	0	548	0	328	648	0	116	0	59
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	16.3	42.6			22.8		30.9	30.9		10.3		10.3
Effective Green, g (s)	16.3	42.6			22.8		30.9	30.9		10.3		10.3
Actuated g/C Ratio	0.17	0.44			0.24		0.32	0.32		0.11		0.11
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	171	1444			686		374	898		164		208
v/s Ratio Prot	c0.14	0.01			c0.19		c0.28	0.23		c0.08		0.03
v/s Ratio Perm												
v/c Ratio	0.82	0.03			0.80		0.88	0.72		0.71		0.29
Uniform Delay, d1	38.9	15.4			34.8		31.2	29.2		41.8		39.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	25.3	0.0			6.3		19.9	2.7		12.1		0.6
Delay (s)	64.2	15.4			41.1		51.0	31.9		53.9		40.4
Level of Service	E	B			D		D	C		D		D
Approach Delay (s)		52.2			41.1			38.2			42.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	96.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	71.9%	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)	76	479	26	124	560	242	17	64	61	227	126	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.95			0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3187		1770	3234			1706		1755	1751	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.58	1.00	
Satd. Flow (perm)	1770	3187		1770	3234			1646		1074	1751	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	76	479	26	124	560	242	17	64	61	227	126	33
RTOR Reduction (vph)	0	3	0	0	35	0	0	33	0	0	11	0
Lane Group Flow (vph)	76	502	0	124	767	0	0	109	0	227	148	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	8.4	53.7		11.3	56.6			24.0		24.0	24.0	
Effective Green, g (s)	8.4	53.7		11.3	56.6			24.0		24.0	24.0	
Actuated g/C Ratio	0.08	0.54		0.11	0.57			0.24		0.24	0.24	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	148	1711		200	1830			395		257	420	
v/s Ratio Prot	c0.04	0.16		c0.07	c0.24						0.08	
v/s Ratio Perm								0.07		c0.21		
v/c Ratio	0.51	0.29		0.62	0.42			0.28		0.88	0.35	
Uniform Delay, d1	43.8	12.7		42.3	12.3			30.9		36.6	31.5	
Progression Factor	1.13	1.25		0.94	0.75			1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.0		3.9	0.7			0.1		27.3	0.2	
Delay (s)	51.0	15.9		43.6	10.0			31.1		64.0	31.7	
Level of Service	D	B		D	A			C		E	C	
Approach Delay (s)		20.5			14.5			31.1			50.7	
Approach LOS		C			B			C			D	

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)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.6%	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)	27	677	77	126	1340	198	32	68	66	91	82	74
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.93		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3250		1025	3471	1492	1347	919		1753	1476	
Flt Permitted	0.14	1.00		0.33	1.00	1.00	0.59	1.00		0.63	1.00	
Satd. Flow (perm)	265	3250		356	3471	1492	839	919		1159	1476	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	677	77	126	1340	198	32	68	66	91	82	74
RTOR Reduction (vph)	0	9	0	0	0	71	0	35	0	0	32	0
Lane Group Flow (vph)	27	745	0	126	1340	127	32	99	0	91	124	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	4.0	
Lane Grp Cap (vph)	169	2080		227	2221	954	234	257		324	413	
v/s Ratio Prot		0.23			c0.39			c0.11			0.08	
v/s Ratio Perm	0.10			0.35		0.08	0.04			0.08		
v/c Ratio	0.16	0.36		0.56	0.60	0.13	0.14	0.38		0.28	0.30	
Uniform Delay, d1	7.2	8.4		10.1	10.6	7.1	27.0	29.0		28.1	28.3	
Progression Factor	0.41	0.39		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.5		9.4	1.2	0.3	1.2	4.3		2.2	1.9	
Delay (s)	5.0	3.7		19.5	11.8	7.4	28.2	33.3		30.3	30.1	
Level of Service	A	A		B	B	A	C	C		C	C	
Approach Delay (s)		3.8			11.8			32.3			30.2	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.0%	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)	104	639	71	51	1228	52	297	249	15	81	103	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		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)	1582	4091		1760	4576		1761	1810	1541	1752	3539	1245
Flt Permitted	0.14	1.00		0.34	1.00		0.69	1.00	1.00	0.56	1.00	1.00
Satd. Flow (perm)	235	4091		639	4576		1273	1810	1541	1041	3539	1245
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	104	639	71	51	1228	52	297	249	15	81	103	183
RTOR Reduction (vph)	0	19	0	0	6	0	0	0	8	0	0	16
Lane Group Flow (vph)	104	691	0	51	1274	0	297	249	7	81	103	167
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	32.3	32.3		32.3	32.3		33.2	33.2	33.2	33.2	33.2	33.2
Effective Green, g (s)	32.3	32.3		32.3	32.3		33.2	33.2	33.2	33.2	33.2	33.2
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.44	0.44	0.44	0.44	0.44	0.44
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	101	1761		275	1970		563	801	682	460	1566	551
v/s Ratio Prot		0.17			0.28			0.14			0.03	
v/s Ratio Perm	c0.44			0.08			c0.23		0.00	0.08		0.13
v/c Ratio	1.03	0.39		0.19	0.65		0.53	0.31	0.01	0.18	0.07	0.30
Uniform Delay, d1	21.4	14.6		13.2	16.8		15.2	13.5	11.7	12.6	12.0	13.5
Progression Factor	1.00	1.00		1.00	1.00		1.08	1.09	1.46	1.00	1.00	1.00
Incremental Delay, d2	97.8	0.1		0.1	0.6		3.5	1.0	0.0	0.8	0.1	1.4
Delay (s)	119.2	14.7		13.3	17.4		19.9	15.7	17.0	13.5	12.1	14.9
Level of Service	F	B		B	B		B	B	B	B	B	B
Approach Delay (s)		28.0			17.2			18.0			13.8	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
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)	0	0	0	112	243	267	28	76	0	0	131	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3483	1562	1770	990			3167	1558
Flt Permitted					0.98	1.00	0.67	1.00			1.00	1.00
Satd. Flow (perm)					3483	1562	1246	990			3167	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	112	243	267	28	76	0	0	131	67
RTOR Reduction (vph)	0	0	0	0	0	213	0	0	0	0	0	22
Lane Group Flow (vph)	0	0	0	0	355	54	28	76	0	0	131	45
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					15.2	15.2	50.3	50.3			50.3	50.3
Effective Green, g (s)					15.2	15.2	50.3	50.3			50.3	50.3
Actuated g/C Ratio					0.20	0.20	0.67	0.67			0.67	0.67
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					705	316	835	663			2124	1044
v/s Ratio Prot								c0.08			0.04	
v/s Ratio Perm					0.10	0.03	0.02					0.03
v/c Ratio					0.50	0.17	0.03	0.11			0.06	0.04
Uniform Delay, d1					26.5	24.7	4.2	4.4			4.2	4.2
Progression Factor					1.00	1.00	1.00	1.00			1.26	1.65
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.1	0.1
Delay (s)					26.8	24.8	4.2	4.4			5.4	7.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			25.9			4.4			6.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	33.2%	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)	26	634	114	85	177	24	56	141	137	159	172	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		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	3301		1770	3397		1770	944		1770	1126	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3301		1770	3397		1770	944		1770	1126	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	634	114	85	177	24	56	141	137	159	172	37
RTOR Reduction (vph)	0	9	0	0	7	0	0	24	0	0	5	0
Lane Group Flow (vph)	26	739	0	85	194	0	56	254	0	159	204	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	3.5	36.9		10.1	44.0		40.8	40.8		28.7	28.7	
Effective Green, g (s)	3.5	36.9		10.1	44.0		40.8	40.8		28.7	28.7	
Actuated g/C Ratio	0.03	0.28		0.08	0.33		0.31	0.31		0.22	0.22	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	46	919		134	1128		545	290		383	243	
v/s Ratio Prot	0.01	c0.22		c0.05	0.06		0.03	c0.27		0.09	c0.18	
v/s Ratio Perm												
v/c Ratio	0.57	0.80		0.63	0.17		0.10	0.88		0.42	0.84	
Uniform Delay, d1	63.7	44.4		59.4	31.3		32.8	43.5		44.7	49.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.1	5.2		8.3	0.1		0.1	24.6		0.7	22.2	
Delay (s)	72.9	49.6		67.7	31.4		32.9	68.1		45.4	71.9	
Level of Service	E	D		E	C		C	E		D	E	
Approach Delay (s)		50.4			42.2			62.2			60.5	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	53.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	132.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2035 + Project Commercial
Alternative PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	1001	212	365	1261	183	96	438	273	139	425	77
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3416		1770	3539	1511	1770	1863	1542	1770	1814	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3416		1770	3539	1511	1770	1863	1542	1770	1814	
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)	135	1088	230	397	1371	199	104	476	297	151	462	84
RTOR Reduction (vph)	0	30	0	0	0	121	0	0	179	0	10	0
Lane Group Flow (vph)	135	1288	0	397	1371	78	104	476	118	151	536	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	5.0	16.0		5.0	16.0	16.0	4.8	16.8	16.8	7.0	19.0	
Effective Green, g (s)	5.0	16.0		5.0	16.0	16.0	4.8	16.8	16.8	7.0	19.0	
Actuated g/C Ratio	0.08	0.26		0.08	0.26	0.26	0.08	0.28	0.28	0.12	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)	145	898		145	931	397	139	514	426	203	566	
v/s Ratio Prot	0.08	0.38		c0.22	c0.39		0.06	0.26		c0.09	c0.30	
v/s Ratio Perm						0.05			0.08			
v/c Ratio	0.93	1.43		2.74	1.47	0.20	0.75	0.93	0.28	0.74	0.95	
Uniform Delay, d1	27.7	22.4		27.9	22.4	17.4	27.4	21.4	17.2	26.0	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	54.2	201.7		801.2	218.5	0.2	19.6	22.7	0.4	13.7	25.0	
Delay (s)	81.9	224.1		829.1	240.9	17.7	47.0	44.1	17.6	39.7	45.4	
Level of Service	F	F		F	F	B	D	D	B	D	D	
Approach Delay (s)		210.9			337.0			35.5			44.1	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	206.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.9%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	198	1064	476	57	870	142	913	1037	43	280	1186	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3250		1770	3426		3433	3508		1770	3432	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3250		1770	3426		3433	3508		1770	3432	
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)	215	1157	517	62	946	154	992	1127	47	304	1289	191
RTOR Reduction (vph)	0	45	0	0	12	0	0	3	0	0	11	0
Lane Group Flow (vph)	215	1629	0	62	1088	0	992	1171	0	304	1469	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	14.0	33.8		8.8	28.6		13.0	39.4		15.0	40.4	
Effective Green, g (s)	14.0	33.8		8.8	28.6		13.0	39.4		15.0	40.4	
Actuated g/C Ratio	0.13	0.31		0.08	0.26		0.12	0.36		0.14	0.37	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	225	998		141	890		405	1256		241	1260	
v/s Ratio Prot	c0.12	c0.50		0.04	0.32		c0.29	0.33		0.17	c0.43	
v/s Ratio Perm												
v/c Ratio	0.96	1.63		0.44	1.22		2.45	0.93		1.26	1.17	
Uniform Delay, d1	47.7	38.1		48.2	40.7		48.5	34.0		47.5	34.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	46.8	289.1		0.8	110.3		659.6	13.7		146.6	83.7	
Delay (s)	94.5	327.2		49.0	151.0		708.1	47.7		194.1	118.5	
Level of Service	F	F		D	F		F	D		F	F	
Approach Delay (s)		300.7			145.5			350.2			131.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	247.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.49		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	133.9%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1012	110	9	267	0	0	0	0	582	527	427
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3472			5077					1610	3341	1540
Flt Permitted		1.00			0.90					0.95	0.99	1.00
Satd. Flow (perm)		3472			4596					1610	3341	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1012	110	9	267	0	0	0	0	582	527	427
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	264
Lane Group Flow (vph)	0	1112	0	0	276	0	0	0	0	361	748	163
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		37.5			37.5					30.5	30.5	30.5
Effective Green, g (s)		37.5			37.5					30.5	30.5	30.5
Actuated g/C Ratio		0.47			0.47					0.38	0.38	0.38
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1627			2154					613	1273	587
v/s Ratio Prot		c0.32										
v/s Ratio Perm					0.06					c0.22	0.22	0.11
v/c Ratio		0.68			0.13					0.59	0.59	0.28
Uniform Delay, d1		16.6			12.0					19.7	19.7	17.1
Progression Factor		1.00			0.35					1.00	1.00	1.00
Incremental Delay, d2		2.3			0.1					4.1	2.0	1.2
Delay (s)		19.0			4.3					23.9	21.7	18.3
Level of Service		B			A					C	C	B
Approach Delay (s)		19.0			4.3			0.0			21.3	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
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)	569	1030	0	0	260	936	35	1254	61	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3381			3539	2700		5036				
Flt Permitted	0.95	0.93			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3157			3539	2700		5036				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	569	1030	0	0	260	936	35	1254	61	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	57	0	6	0	0	0	0
Lane Group Flow (vph)	512	1087	0	0	260	879	0	1344	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	22.5	50.5			24.5	24.5		18.5				
Effective Green, g (s)	22.5	50.5			24.5	24.5		18.5				
Actuated g/C Ratio	0.28	0.63			0.31	0.31		0.23				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	452	2055			1083	826		1164				
v/s Ratio Prot	c0.32	0.15			0.07							
v/s Ratio Perm		0.19				c0.33		0.27				
v/c Ratio	1.13	0.53			0.24	1.06		1.15				
Uniform Delay, d1	28.8	8.2			20.8	27.8		30.8				
Progression Factor	0.88	1.89			1.00	1.00		1.00				
Incremental Delay, d2	79.2	0.7			0.5	49.9		79.6				
Delay (s)	104.5	16.2			21.3	77.6		110.4				
Level of Service	F	B			C	E		F				
Approach Delay (s)		44.5			65.4			110.4			0.0	
Approach LOS		D			E			F			A	

Intersection Summary			
HCM 2000 Control Delay	72.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	104.8%	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)	15	916	412	261	1649	37	757	32	482	77	35	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	916	412	261	1649	37	757	32	482	77	35	73
RTOR Reduction (vph)	0	0	248	0	1	0	0	0	287	0	55	0
Lane Group Flow (vph)	15	916	164	261	1685	0	394	395	195	77	53	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	2.3	46.6	46.6	28.7	73.0		35.1	35.1	35.1	8.5	8.5	
Effective Green, g (s)	2.3	46.6	46.6	28.7	73.0		35.1	35.1	35.1	8.5	8.5	
Actuated g/C Ratio	0.02	0.34	0.34	0.21	0.54		0.26	0.26	0.26	0.06	0.06	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	30	1139	417	273	1823		427	408	321	92	87	
v/s Ratio Prot	0.01	0.28		c0.20	c0.50		0.24	c0.25		c0.05	0.04	
v/s Ratio Perm			0.14						0.16			
v/c Ratio	0.50	0.80	0.39	0.96	0.92		0.92	0.97	0.61	0.84	0.61	
Uniform Delay, d1	66.0	40.3	33.7	52.7	28.7		48.8	49.6	44.1	62.8	61.8	
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	12.5	4.7	1.1	42.1	8.7		25.7	36.0	3.7	45.2	11.4	
Delay (s)	78.5	44.9	34.7	94.9	37.4		74.5	85.6	47.8	108.0	73.2	
Level of Service	E	D	C	F	D		E	F	D	F	E	
Approach Delay (s)		42.2			45.1			67.8			87.7	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	52.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	135.4	Sum of lost time (s)	16.5
Intersection Capacity Utilization	91.5%	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)	251	760	460	451	1494	319	388	366	457	210	171	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1337	3004		1687	3406	1509	1444	2896		1369	2596	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1337	3004		1687	3406	1509	1444	2896		1369	2596	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	251	760	460	451	1494	319	388	366	457	210	171	76
RTOR Reduction (vph)	0	65	0	0	0	145	0	162	0	0	22	0
Lane Group Flow (vph)	251	1155	0	451	1494	174	388	661	0	153	282	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	22.5	44.0		31.5	53.0	53.0	34.5	34.5		13.0	13.0	
Effective Green, g (s)	22.5	44.0		31.5	53.0	53.0	34.5	34.5		13.0	13.0	
Actuated g/C Ratio	0.16	0.32		0.23	0.38	0.38	0.25	0.25		0.09	0.09	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	215	947		380	1294	573	357	716		127	241	
v/s Ratio Prot	0.19	0.38		c0.27	c0.44		c0.27	0.23		c0.11	0.11	
v/s Ratio Perm						0.12						
v/c Ratio	1.17	1.22		1.19	1.15	0.30	1.09	0.92		1.20	1.17	
Uniform Delay, d1	58.5	47.8		54.0	43.2	30.3	52.5	51.2		63.2	63.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	113.9	108.4		107.6	78.7	0.3	72.9	17.5		145.1	112.1	
Delay (s)	172.4	156.2		161.6	122.0	30.6	125.4	68.7		208.3	175.4	
Level of Service	F	F		F	F	C	F	E		F	F	
Approach Delay (s)		159.0			117.0			86.9			186.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	127.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	108.6%	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	1212	182	257	1556	0	0	0	0	774	706	521
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4845		1768	3312						3276	
Flt Permitted		1.00		0.12	1.00						0.98	
Satd. Flow (perm)		4845		229	3312						3276	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1212	182	257	1556	0	0	0	0	774	706	521
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	1371	0	257	1556	0	0	0	0	0	1994	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		41.0		41.0	41.0						36.0	
Effective Green, g (s)		41.0		41.0	41.0						36.0	
Actuated g/C Ratio		0.47		0.47	0.47						0.41	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2283		107	1560						1355	
v/s Ratio Prot		0.28			0.47						c0.61	
v/s Ratio Perm				c1.12								
v/c Ratio		0.60		2.40	1.00						1.47	
Uniform Delay, d1		17.0		23.0	22.9						25.5	
Progression Factor		1.00		0.29	0.29						1.00	
Incremental Delay, d2		0.3		633.4	6.2						216.3	
Delay (s)		17.3		640.2	12.9						241.8	
Level of Service		B		F	B						F	
Approach Delay (s)		17.3			101.8			0.0			241.8	
Approach LOS		B			F			A			F	

Intersection Summary			
HCM 2000 Control Delay	132.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.96		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	190.9%	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)	468	1518	0	0	1693	553	120	613	228	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.96				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3384			3375				
Flt Permitted	0.10	1.00			1.00			0.99				
Satd. Flow (perm)	182	3539			3384			3375				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	468	1518	0	0	1693	553	120	613	228	0	0	0
RTOR Reduction (vph)	0	0	0	0	36	0	0	8	0	0	0	0
Lane Group Flow (vph)	468	1518	0	0	2210	0	0	953	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	41.0	41.0			41.0			36.0				
Effective Green, g (s)	41.0	41.0			41.0			36.0				
Actuated g/C Ratio	0.47	0.47			0.47			0.41				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1667			1594			1396				
v/s Ratio Prot		0.43			0.65			c0.28				
v/s Ratio Perm	c2.58											
v/c Ratio	5.51	0.91			1.39			0.68				
Uniform Delay, d1	23.0	21.3			23.0			20.8				
Progression Factor	0.86	0.84			1.00			1.00				
Incremental Delay, d2	2036.4	2.9			177.7			1.1				
Delay (s)	2056.2	20.7			200.7			21.9				
Level of Service	F	C			F			C				
Approach Delay (s)		500.4			200.7			21.9			0.0	
Approach LOS		F			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	282.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.22		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	190.9%	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)	61	1357	388	107	1787	30	283	222	127	149	395	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.95		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)	1769	3346		1769	3366		1763	1744		1762	1801	
Flt Permitted	0.08	1.00		0.08	1.00		0.17	1.00		0.34	1.00	
Satd. Flow (perm)	154	3346		154	3366		323	1744		636	1801	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	1357	388	107	1787	30	283	222	127	149	395	89
RTOR Reduction (vph)	0	33	0	0	2	0	0	26	0	0	10	0
Lane Group Flow (vph)	61	1712	0	107	1815	0	283	323	0	149	474	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Effective Green, g (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.29	0.29		0.29	0.29	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2028		93	2040		92	501		182	517	
v/s Ratio Prot		0.51			0.54			0.19			0.26	
v/s Ratio Perm	0.40			c0.70			c0.88			0.23		
v/c Ratio	0.66	0.84		1.15	0.89		3.08	0.65		0.82	0.92	
Uniform Delay, d1	10.3	12.7		15.8	13.5		28.5	24.9		26.6	27.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	30.8	4.5		139.5	6.3		962.4	6.3		32.1	23.6	
Delay (s)	41.1	17.2		155.3	19.8		990.9	31.2		58.6	51.1	
Level of Service	D	B		F	B		F	C		E	D	
Approach Delay (s)		18.0			27.3			460.9			52.9	
Approach LOS		B			C			F			D	

Intersection Summary			
HCM 2000 Control Delay	82.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	142.7%	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)	115	1499	126	58	1321	9	396	550	177	7	23	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.97	1.00	1.00		1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3415			3307	1490	1640	1827	1503		1839	1499
Flt Permitted		0.62			0.67	1.00	0.74	1.00	1.00		0.61	1.00
Satd. Flow (perm)		2113			2228	1490	1273	1827	1503		1135	1499
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	115	1499	126	58	1321	9	396	550	177	7	23	55
RTOR Reduction (vph)	0	6	0	0	0	2	0	0	29	0	0	40
Lane Group Flow (vph)	0	1734	0	0	1379	7	396	550	148	0	30	15
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		56.0			56.0	56.0	25.0	25.0	25.0		25.0	25.0
Effective Green, g (s)		56.0			56.0	56.0	25.0	25.0	25.0		25.0	25.0
Actuated g/C Ratio		0.62			0.62	0.62	0.28	0.28	0.28		0.28	0.28
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1314			1386	927	353	507	417		315	416
v/s Ratio Prot								0.30				
v/s Ratio Perm		c0.82			0.62	0.00	c0.31		0.10		0.03	0.01
v/c Ratio		1.32			0.99	0.01	1.12	1.08	0.36		0.10	0.04
Uniform Delay, d1		17.0			16.9	6.5	32.5	32.5	26.0		24.1	23.7
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		149.1			23.0	0.0	85.1	64.9	0.2		0.0	0.0
Delay (s)		166.1			39.9	6.5	117.6	97.4	26.2		24.2	23.7
Level of Service		F			D	A	F	F	C		C	C
Approach Delay (s)		166.1			39.6			93.3			23.9	
Approach LOS		F			D			F			C	

Intersection Summary			
HCM 2000 Control Delay	104.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	128.5%	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)	204	1282	382	96	930	46	569	697	157	204	909	201
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3484	1482	1770	3195	1540	1732	3426		1764	3428	
Flt Permitted		0.55	1.00	0.12	1.00	1.00	0.17	1.00		0.26	1.00	
Satd. Flow (perm)		1943	1482	226	3195	1540	304	3426		490	3428	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	204	1282	382	96	930	46	569	697	157	204	909	201
RTOR Reduction (vph)	0	0	55	0	0	20	0	5	0	0	20	0
Lane Group Flow (vph)	0	1486	327	96	930	26	569	849	0	204	1091	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		33.0	33.0	33.0	33.0	33.0	42.5	42.5		42.5	42.5	
Effective Green, g (s)		33.0	33.0	33.0	33.0	33.0	42.5	42.5		42.5	42.5	
Actuated g/C Ratio		0.39	0.39	0.39	0.39	0.39	0.50	0.50		0.50	0.50	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		754	575	87	1240	597	152	1713		245	1714	
v/s Ratio Prot					0.29			0.25			0.32	
v/s Ratio Perm		c0.76	0.22	0.43		0.02	c1.87			0.42		
v/c Ratio		1.97	0.57	1.10	0.75	0.04	3.74	0.50		0.83	0.64	
Uniform Delay, d1		26.0	20.4	26.0	22.4	16.2	21.2	14.1		18.2	15.6	
Progression Factor		1.00	1.00	0.41	0.43	0.06	1.00	1.00		1.00	1.00	
Incremental Delay, d2		441.7	4.0	117.8	3.5	0.1	1250.5	0.5		21.6	0.9	
Delay (s)		467.7	24.5	128.4	13.0	1.1	1271.7	14.6		39.8	16.5	
Level of Service		F	C	F	B	A	F	B		D	B	
Approach Delay (s)		377.0			22.8			517.3			20.1	
Approach LOS		F			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	262.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.97		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	146.2%	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)	119	1334	25	60	1124	57	27	222	354	36	81	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1587	3154	1360	1588	3065	1375		3159	1171		2851	
Flt Permitted	0.19	1.00	1.00	0.13	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	317	3154	1360	222	3065	1375		2889	1171		2518	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	1334	25	60	1124	57	27	222	354	36	81	98
RTOR Reduction (vph)	0	0	6	0	0	16	0	0	26	0	46	0
Lane Group Flow (vph)	119	1334	19	60	1124	41	0	249	328	0	169	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	50.2	50.2	50.2	50.2	50.2	50.2		26.3	26.3		26.3	
Effective Green, g (s)	50.2	50.2	50.2	50.2	50.2	50.2		26.3	26.3		26.3	
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59		0.31	0.31		0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	187	1862	803	131	1810	812		893	362		779	
v/s Ratio Prot		c0.42			0.37							
v/s Ratio Perm	0.37		0.01	0.27		0.03		0.09	c0.28		0.07	
v/c Ratio	0.64	0.72	0.02	0.46	0.62	0.05		0.28	0.91		0.22	
Uniform Delay, d1	11.4	12.3	7.2	9.8	11.2	7.3		22.2	28.2		21.7	
Progression Factor	0.78	0.83	0.90	1.46	1.43	1.46		1.00	1.00		1.00	
Incremental Delay, d2	1.5	0.2	0.0	6.1	0.9	0.1		0.1	24.7		0.1	
Delay (s)	10.4	10.5	6.5	20.4	17.0	10.8		22.2	52.9		21.8	
Level of Service	B	B	A	C	B	B		C	D		C	
Approach Delay (s)		10.4			16.9			40.2			21.8	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	607	1024	882	525	260	230
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	0.99	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	2957	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	2957	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	607	1024	882	525	260	230
RTOR Reduction (vph)	0	0	0	239	38	128
Lane Group Flow (vph)	607	1024	882	286	298	26
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	35.8	62.8	23.0	23.0	14.2	14.2
Effective Green, g (s)	35.8	62.8	23.0	23.0	14.2	14.2
Actuated g/C Ratio	0.42	0.74	0.27	0.27	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	664	2285	829	373	493	202
v/s Ratio Prot	c0.38	0.33	c0.29		c0.10	
v/s Ratio Perm				0.21		0.02
v/c Ratio	0.91	0.45	1.06	0.77	0.60	0.13
Uniform Delay, d1	23.2	4.3	31.0	28.5	32.8	30.1
Progression Factor	0.79	0.84	1.10	1.32	1.00	1.00
Incremental Delay, d2	12.2	0.4	31.7	0.8	1.4	0.1
Delay (s)	30.5	4.1	65.9	38.4	34.2	30.2
Level of Service	C	A	E	D	C	C
Approach Delay (s)		13.9	55.7		33.0	
Approach LOS		B	E		C	

Intersection Summary			
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.2%	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)	170	958	33	132	830	92	413	1113	307	91	438	181
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	0.99	1.00			1.00		0.98	1.00	1.00	0.99	1.00	
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1581	3163			3103		1563	3185	1309	1579	2984	
Flt Permitted	0.16	1.00			0.59		0.35	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	261	3163			1853		571	3185	1309	216	2984	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	958	33	132	830	92	413	1113	307	91	438	181
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	28	0	41	0
Lane Group Flow (vph)	170	988	0	0	1045	0	413	1113	279	91	578	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Effective Green, g (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Actuated g/C Ratio	0.46	0.46			0.46		0.45	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	119	1451			850		255	1423	585	96	1334	
v/s Ratio Prot		0.31						0.35			0.19	
v/s Ratio Perm	c0.65				0.56		c0.72		0.21	0.42		
v/c Ratio	1.43	0.68			1.23		1.62	0.78	0.48	0.95	0.43	
Uniform Delay, d1	23.0	18.1			23.0		23.5	20.0	16.5	22.6	16.1	
Progression Factor	0.87	0.87			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	231.4	2.4			113.7		296.2	2.7	0.2	73.6	0.1	
Delay (s)	251.3	18.2			136.7		319.7	22.6	16.7	96.1	16.2	
Level of Service	F	B			F		F	C	B	F	B	
Approach Delay (s)		52.3			136.7			88.6			26.4	
Approach LOS		D			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	81.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	127.2%	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)	331	910	237	463	735	76	10	1948	731	3	1255	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1349	3090	3185	1349		4575	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.93	1.00
Satd. Flow (perm)	3090	3154	1349	3090	3185	1349		4254	1391		4237	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	331	910	237	463	735	76	10	1948	731	3	1255	212
RTOR Reduction (vph)	0	0	65	0	0	53	0	0	0	0	0	79
Lane Group Flow (vph)	331	910	172	463	735	24	0	1958	731	0	1258	133
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Effective Green, g (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Actuated g/C Ratio	0.12	0.29	0.29	0.13	0.30	0.30		0.43	1.00		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	357	913	390	390	955	404		1813	1391		1806	575
v/s Ratio Prot	0.11	c0.29		c0.15	0.23							
v/s Ratio Perm			0.13			0.02		c0.46	0.53		0.30	0.10
v/c Ratio	0.93	1.00	0.44	1.19	0.77	0.06		1.08	0.53		0.70	0.23
Uniform Delay, d1	41.6	33.7	27.5	41.5	30.3	23.7		27.2	0.0		22.2	17.3
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	29.5	29.0	3.6	107.2	6.0	0.3		46.4	1.4		1.2	0.2
Delay (s)	71.1	62.7	31.1	148.7	36.2	24.0		73.6	1.4		23.4	17.5
Level of Service	E	E	C	F	D	C		E	A		C	B
Approach Delay (s)		59.5			76.4			54.0			22.6	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	104.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt PM

Adeline & 18th
2035 + Project Commercial Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	59	2.0	1.392	204.6	LOS F	94.4	2396.6	1.00	4.42	5.9
8	T	794	2.0	1.392	204.6	LOS F	94.4	2396.6	1.00	4.42	5.6
18	R	64	2.0	1.392	204.6	LOS F	94.4	2396.6	1.00	4.42	5.6
Approach		917	2.0	1.392	204.6	LOS F	94.4	2396.6	1.00	4.42	5.6
East: 18th Street (WB)											
1	L	16	2.0	0.429	12.0	LOS B	2.2	55.5	0.74	1.03	24.7
6	T	144	2.0	0.429	12.0	LOS B	2.2	55.5	0.74	0.90	26.5
16	R	113	2.0	0.429	12.0	LOS B	2.2	55.5	0.74	0.92	26.3
Approach		273	2.0	0.429	12.0	LOS B	2.2	55.5	0.74	0.91	26.3
North: Adeline Street (SB)											
7	L	42	2.0	0.234	5.3	LOS A	1.2	29.7	0.40	0.83	27.5
4	T	202	2.0	0.234	5.3	LOS A	1.2	29.7	0.40	0.52	30.6
14	R	24	2.0	0.234	5.3	LOS A	1.2	29.7	0.40	0.58	30.1
Approach		268	2.0	0.234	5.3	LOS A	1.2	29.7	0.40	0.57	30.0
West: 18th Street (EB)											
5	L	166	2.0	0.693	14.0	LOS B	7.2	182.5	0.77	0.89	23.9
2	T	538	2.0	0.693	14.0	LOS B	7.2	182.5	0.77	0.78	25.5
12	R	45	2.0	0.693	14.0	LOS B	7.2	182.5	0.77	0.80	25.3
Approach		749	2.0	0.693	14.0	LOS B	7.2	182.5	0.77	0.80	25.1
All Vehicles		2207	2.0	1.392	91.9	LOS F	94.4	2396.6	0.82	2.29	10.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	166	538	45	16	144	113	59	794	64	42	202	24
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		1.00	0.99		1.00	0.99			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.98	1.00			1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1756	1834		1751	1721		1728	3477			3436	
Flt Permitted	0.51	1.00		0.17	1.00		0.59	1.00			0.80	
Satd. Flow (perm)	948	1834		307	1721		1067	3477			2771	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	166	538	45	16	144	113	59	794	64	42	202	24
RTOR Reduction (vph)	0	5	0	0	41	0	0	8	0	0	10	0
Lane Group Flow (vph)	166	578	0	16	216	0	59	850	0	0	258	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		37.0	37.0			37.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0		37.0	37.0			37.0	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.54	0.54			0.54	
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)	329	637		106	598		572	1864			1485	
v/s Ratio Prot		c0.32			0.13			c0.24				
v/s Ratio Perm	0.18			0.05			0.06				0.09	
v/c Ratio	0.50	0.91		0.15	0.36		0.10	0.46			0.17	
Uniform Delay, d1	17.8	21.4		15.5	16.8		7.9	9.8			8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.2	16.7		0.7	0.4		0.4	0.8			0.3	
Delay (s)	19.0	38.1		16.2	17.2		8.2	10.6			8.4	
Level of Service	B	D		B	B		A	B			A	
Approach Delay (s)		33.9			17.1			10.5			8.4	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt PM

Adeline & 14th
2035 + Project Commercial Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	19	2.0	0.741	18.2	LOS C	7.9	200.2	0.89	1.13	22.6
8	T	598	2.0	0.741	18.2	LOS C	7.9	200.2	0.89	1.06	23.8
18	R	53	2.0	0.741	18.2	LOS C	7.9	200.2	0.89	1.08	23.7
Approach		670	2.0	0.741	18.2	LOS C	7.9	200.2	0.89	1.07	23.7
East: 14th Street (WB)											
1	L	90	2.0	0.481	12.1	LOS B	2.7	69.6	0.74	1.03	24.6
6	T	205	2.0	0.481	12.1	LOS B	2.7	69.6	0.74	0.91	26.3
16	R	46	2.0	0.481	12.1	LOS B	2.7	69.6	0.74	0.93	26.1
Approach		341	2.0	0.481	12.1	LOS B	2.7	69.6	0.74	0.94	25.8
North: Adeline Street (SB)											
7	L	95	2.0	0.540	10.3	LOS B	3.8	96.7	0.66	0.90	25.4
4	T	424	2.0	0.540	10.3	LOS B	3.8	96.7	0.66	0.72	27.4
14	R	34	2.0	0.540	10.3	LOS B	3.8	96.7	0.66	0.76	27.2
Approach		553	2.0	0.540	10.3	LOS B	3.8	96.7	0.66	0.76	27.0
West: 14th Street (EB)											
5	L	57	2.0	0.541	12.9	LOS B	3.5	88.2	0.76	1.06	24.4
2	T	284	2.0	0.541	12.9	LOS B	3.5	88.2	0.76	0.93	26.0
12	R	69	2.0	0.541	12.9	LOS B	3.5	88.2	0.76	0.96	25.8
Approach		410	2.0	0.541	12.9	LOS B	3.5	88.2	0.76	0.96	25.7
All Vehicles		1974	2.0	0.741	13.8	LOS B	7.9	200.2	0.77	0.93	25.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Adeline & 12th
2035 + Project Commercial Alternative PM
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.425	7.3	LOS A	2.7	69.1	0.43	0.84	26.7
8	T	508	2.0	0.425	7.3	LOS A	2.7	69.1	0.43	0.52	29.4
18	R	7	2.0	0.425	7.3	LOS A	2.7	69.1	0.43	0.58	29.0
Approach		516	2.0	0.425	7.3	LOS A	2.7	69.1	0.43	0.52	29.4
East: 12th Street (WB)											
1	L	10	2.0	0.216	6.6	LOS A	1.0	24.3	0.58	0.91	26.9
6	T	21	2.0	0.216	6.6	LOS A	1.0	24.3	0.58	0.71	29.5
16	R	149	2.0	0.216	6.6	LOS A	1.0	24.3	0.58	0.75	29.1
Approach		180	2.0	0.216	6.6	LOS A	1.0	24.3	0.58	0.75	29.0
North: Adeline Street (SB)											
7	L	133	2.0	0.415	6.6	LOS A	2.9	72.8	0.19	0.82	26.7
4	T	426	2.0	0.415	6.6	LOS A	2.9	72.8	0.19	0.40	29.8
14	R	8	2.0	0.415	6.6	LOS A	2.9	72.8	0.19	0.49	29.2
Approach		567	2.0	0.415	6.6	LOS A	2.9	72.8	0.19	0.50	28.9
West: 12th Street (EB)											
5	L	8	2.0	0.020	4.7	LOS A	0.1	2.0	0.54	0.79	27.7
2	T	5	2.0	0.020	4.7	LOS A	0.1	2.0	0.54	0.58	30.6
12	R	3	2.0	0.020	4.7	LOS A	0.1	2.0	0.54	0.63	30.2
Approach		16	2.0	0.020	4.7	LOS A	0.1	2.0	0.54	0.69	29.0
All Vehicles		1279	2.0	0.425	6.8	LOS A	2.9	72.8	0.34	0.54	29.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	258	185	0	0	191	263	155	505	219	277	0	520
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.91		1.00	0.96		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2603		972	2915		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2603		972	2915		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	258	185	0	0	191	263	155	505	219	277	0	520
RTOR Reduction (vph)	0	0	0	0	226	0	0	37	0	0	0	414
Lane Group Flow (vph)	258	185	0	0	228	0	139	703	0	277	0	106
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	21.2	38.5			13.8		26.7	26.7		20.1		20.1
Effective Green, g (s)	21.2	38.5			13.8		26.7	26.7		20.1		20.1
Actuated g/C Ratio	0.22	0.39			0.14		0.27	0.27		0.20		0.20
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	294	1297			365		264	791		318		505
v/s Ratio Prot	c0.19	0.06			c0.09		0.14	c0.24		c0.18		0.04
v/s Ratio Perm												
v/c Ratio	0.88	0.14			0.62		0.53	0.89		0.87		0.21
Uniform Delay, d1	37.3	19.3			39.8		30.4	34.4		37.8		32.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	23.5	0.0			2.9		1.4	11.8		21.8		0.2
Delay (s)	60.8	19.3			42.7		31.9	46.2		59.7		32.7
Level of Service	E	B			D		C	D		E		C
Approach Delay (s)		43.5			42.7			43.9			42.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	98.3	Sum of lost time (s)	16.5
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)	80	679	22	102	713	414	20	113	68	464	163	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.94			0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3378		1770	3177			1745		1757	1720	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.60	1.00	
Satd. Flow (perm)	1770	3378		1770	3177			1689		1114	1720	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	679	22	102	713	414	20	113	68	464	163	66
RTOR Reduction (vph)	0	3	0	0	91	0	0	22	0	0	17	0
Lane Group Flow (vph)	80	698	0	102	1036	0	0	179	0	464	212	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.0	33.0		7.0	34.0			39.0		39.0	39.0	
Effective Green, g (s)	6.0	33.0		7.0	34.0			39.0		39.0	39.0	
Actuated g/C Ratio	0.07	0.37		0.08	0.38			0.43		0.43	0.43	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	118	1238		137	1200			731		482	745	
v/s Ratio Prot	0.05	c0.21		0.06	c0.33						0.12	
v/s Ratio Perm								0.11		c0.42		
v/c Ratio	0.68	0.56		0.74	0.86			0.25		0.96	0.28	
Uniform Delay, d1	41.1	22.8		40.6	25.9			16.2		24.8	16.5	
Progression Factor	0.95	0.91		0.96	0.71			1.00		1.00	1.00	
Incremental Delay, d2	11.5	0.4		17.2	8.3			0.1		31.2	0.1	
Delay (s)	50.3	21.1		56.4	26.6			16.2		56.0	16.6	
Level of Service	D	C		E	C			B		E	B	
Approach Delay (s)		24.1			29.1			16.2			43.0	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	30.2	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)	11.0
Intersection Capacity Utilization	89.3%	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)	58	1661	48	70	1437	305	52	120	122	159	128	50
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3383		1054	3471	1460	1574	1065		1759	1574	
Flt Permitted	0.09	1.00		0.09	1.00	1.00	0.61	1.00		0.52	1.00	
Satd. Flow (perm)	171	3383		101	3471	1460	1004	1065		962	1574	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	58	1661	48	70	1437	305	52	120	122	159	128	50
RTOR Reduction (vph)	0	3	0	0	0	137	0	10	0	0	18	0
Lane Group Flow (vph)	58	1706	0	70	1437	168	52	232	0	159	160	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	94	1860		55	1909	803	351	372		336	550	
v/s Ratio Prot		0.50			0.41			c0.22			0.10	
v/s Ratio Perm	0.34			c0.69		0.11	0.05			0.17		
v/c Ratio	0.62	0.92		1.27	0.75	0.21	0.15	0.62		0.47	0.29	
Uniform Delay, d1	12.3	16.3		18.0	13.8	9.2	17.8	21.6		20.3	18.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.7	8.7		211.4	2.8	0.6	0.9	7.6		4.7	1.3	
Delay (s)	39.0	25.1		229.4	16.6	9.7	18.7	29.2		25.0	20.2	
Level of Service	D	C		F	B	A	B	C		C	C	
Approach Delay (s)		25.5			23.7			27.4			22.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.9%	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)	107	1505	87	25	1051	68	591	396	63	84	60	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1669	4281		1767	4531		1742	1863	1538	1755	3539	1216
Flt Permitted	0.18	1.00		0.11	1.00		0.72	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	320	4281		201	4531		1312	1863	1538	758	3539	1216
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	107	1505	87	25	1051	68	591	396	63	84	60	132
RTOR Reduction (vph)	0	7	0	0	8	0	0	0	14	0	0	22
Lane Group Flow (vph)	107	1585	0	25	1111	0	591	396	49	84	60	110
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	37.0	37.0		37.0	37.0		38.5	38.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	37.0	37.0		37.0	37.0		38.5	38.5	38.5	38.5	38.5	38.5
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.45	0.45	0.45	0.45	0.45	0.45
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	139	1863		87	1972		594	843	696	343	1602	550
v/s Ratio Prot		c0.37			0.25			0.21			0.02	
v/s Ratio Perm	0.33			0.12			c0.45		0.03	0.11		0.09
v/c Ratio	0.77	0.85		0.29	0.56		0.99	0.47	0.07	0.24	0.04	0.20
Uniform Delay, d1	20.4	21.5		15.5	18.0		23.2	16.2	13.1	14.3	12.9	14.0
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	32.9	5.1		0.7	0.2		35.7	1.9	0.2	1.7	0.0	0.8
Delay (s)	53.3	26.6		16.2	18.2		58.9	18.0	13.3	16.0	13.0	14.8
Level of Service	D	C		B	B		E	B	B	B	B	B
Approach Delay (s)		28.3			18.1			40.7			14.8	
Approach LOS		C			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	109.3%	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)	0	0	0	34	162	561	48	172	0	0	133	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3508	1561	1770	1111			2865	1558
Flt Permitted					0.99	1.00	0.67	1.00			1.00	1.00
Satd. Flow (perm)					3508	1561	1244	1111			2865	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	34	162	561	48	172	0	0	133	24
RTOR Reduction (vph)	0	0	0	0	0	476	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	196	85	48	172	0	0	133	18
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					13.7	13.7	66.8	66.8			66.8	66.8
Effective Green, g (s)					13.7	13.7	66.8	66.8			66.8	66.8
Actuated g/C Ratio					0.15	0.15	0.74	0.74			0.74	0.74
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					533	237	923	824			2126	1156
v/s Ratio Prot								c0.15			0.05	
v/s Ratio Perm					0.06	0.05	0.04					0.01
v/c Ratio					0.37	0.36	0.05	0.21			0.06	0.02
Uniform Delay, d1					34.3	34.2	3.1	3.5			3.1	3.0
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.2	0.3	0.0	0.0			0.1	0.0
Delay (s)					34.4	34.6	3.1	3.6			3.2	3.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			34.5			3.5			3.2	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	54.7%	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)	26	944	65	41	112	26	107	312	148	166	162	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3366		1770	3295		1770	1077		1770	1090	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3366		1770	3295		1770	1077		1770	1090	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	65	41	112	26	107	312	148	166	162	14
RTOR Reduction (vph)	0	3	0	0	12	0	0	11	0	0	2	0
Lane Group Flow (vph)	26	1006	0	41	126	0	107	449	0	166	174	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	4.0	49.2		4.0	49.7		64.0	64.0		24.0	24.0	
Effective Green, g (s)	4.0	49.2		4.0	49.7		64.0	64.0		24.0	24.0	
Actuated g/C Ratio	0.03	0.31		0.03	0.32		0.41	0.41		0.15	0.15	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	45	1053		45	1041		720	438		270	166	
v/s Ratio Prot	0.01	c0.30		c0.02	0.04		0.06	c0.42		0.09	c0.16	
v/s Ratio Perm												
v/c Ratio	0.58	0.95		0.91	0.12		0.15	1.02		0.61	1.05	
Uniform Delay, d1	75.8	52.9		76.4	38.2		29.4	46.6		62.3	66.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.7	17.8		100.2	0.1		0.1	49.4		4.1	83.7	
Delay (s)	86.4	70.7		176.6	38.3		29.5	96.0		66.4	150.3	
Level of Service	F	E		F	D		C	F		E	F	
Approach Delay (s)		71.1			69.9			83.4			109.6	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	80.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	157.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

2035 + Project Commercial Alternative AM Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	1265	79	279	1368	247	62	169	197	370	564	160
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3498		1770	3539	1518	1770	1863	1540	1770	1793	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3498		1770	3539	1518	1770	1863	1540	1770	1793	
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)	72	1375	86	303	1487	268	67	184	214	402	613	174
RTOR Reduction (vph)	0	7	0	0	0	100	0	0	138	0	17	0
Lane Group Flow (vph)	72	1454	0	303	1487	168	67	184	76	402	770	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.3	17.9		8.0	23.6	23.6	2.3	14.6	14.6	4.0	16.3	
Effective Green, g (s)	2.3	17.9		8.0	23.6	23.6	2.3	14.6	14.6	4.0	16.3	
Actuated g/C Ratio	0.04	0.30		0.13	0.39	0.39	0.04	0.24	0.24	0.07	0.27	
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)	67	1034		234	1380	592	67	449	371	117	483	
v/s Ratio Prot	0.04	c0.42		c0.17	0.42		0.04	0.10		c0.23	c0.43	
v/s Ratio Perm						0.11			0.05			
v/c Ratio	1.07	1.41		1.29	1.08	0.28	1.00	0.41	0.20	3.44	1.59	
Uniform Delay, d1	29.1	21.3		26.2	18.4	12.7	29.1	19.3	18.3	28.2	22.1	
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	132.0	188.6		160.6	48.1	0.3	110.0	0.6	0.3	1117.4	277.2	
Delay (s)	161.1	209.9		186.9	66.5	12.9	139.1	19.9	18.6	1145.7	299.3	
Level of Service	F	F		F	E	B	F	B	B	F	F	
Approach Delay (s)		207.6			77.2			36.5			585.5	
Approach LOS		F			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	226.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	60.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	109.4%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	249	941	912	128	1149	190	864	784	45	165	1350	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3084		1770	3424		3433	3496		1770	3407	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3084		1770	3424		3433	3496		1770	3407	
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	1023	991	139	1249	207	939	852	49	179	1467	277
RTOR Reduction (vph)	0	159	0	0	12	0	0	4	0	0	14	0
Lane Group Flow (vph)	271	1855	0	139	1444	0	939	897	0	179	1730	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	18.3	35.0		11.0	27.7		15.0	37.1		13.9	35.0	
Effective Green, g (s)	18.3	35.0		11.0	27.7		15.0	37.1		13.9	35.0	
Actuated g/C Ratio	0.17	0.32		0.10	0.25		0.14	0.34		0.13	0.32	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	294	981		177	862		468	1179		223	1084	
v/s Ratio Prot	c0.15	c0.60		0.08	0.42		c0.27	0.26		0.10	c0.51	
v/s Ratio Perm												
v/c Ratio	0.92	1.89		0.79	1.68		2.01	0.76		0.80	1.60	
Uniform Delay, d1	45.1	37.5		48.3	41.1		47.5	32.5		46.7	37.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.2	404.8		18.7	308.9		460.4	4.7		18.0	272.4	
Delay (s)	77.4	442.3		67.0	350.1		507.9	37.2		64.7	309.9	
Level of Service	E	F		E	F		F	D		E	F	
Approach Delay (s)		399.1			325.4			277.4			287.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	326.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	151.3%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	538	81	12	299	0	0	0	0	631	897	576
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		0.99			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3449			5074					1610	3368	1550
Flt Permitted		1.00			0.87					0.95	0.99	1.00
Satd. Flow (perm)		3449			4440					1610	3368	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	538	81	12	299	0	0	0	0	631	897	576
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	62
Lane Group Flow (vph)	0	604	0	0	311	0	0	0	0	492	1036	514
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		17.0			17.0					51.0	51.0	51.0
Effective Green, g (s)		17.0			17.0					51.0	51.0	51.0
Actuated g/C Ratio		0.21			0.21					0.64	0.64	0.64
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		732			943					1026	2147	988
v/s Ratio Prot		c0.18										
v/s Ratio Perm					0.07					0.31	0.31	c0.33
v/c Ratio		0.83			0.33					0.48	0.48	0.52
Uniform Delay, d1		30.1			26.7					7.6	7.6	7.9
Progression Factor		1.00			1.12					1.00	1.00	1.00
Incremental Delay, d2		10.3			0.9					1.6	0.8	2.0
Delay (s)		40.3			30.9					9.2	8.4	9.8
Level of Service		D			C					A	A	A
Approach Delay (s)		40.3			30.9			0.0			9.0	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.2%	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)	297	888	0	0	293	737	8	756	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3385			3539	2704		5045				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3210			3539	2704		5045				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	297	888	0	0	293	737	8	756	31	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	180	0	5	0	0	0	0
Lane Group Flow (vph)	267	918	0	0	293	557	0	790	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	21.5	51.5			26.5	26.5		17.5				
Effective Green, g (s)	21.5	51.5			26.5	26.5		17.5				
Actuated g/C Ratio	0.27	0.64			0.33	0.33		0.22				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	432	2113			1172	895		1103				
v/s Ratio Prot	c0.17	0.12			0.08							
v/s Ratio Perm		0.16				c0.21		0.16				
v/c Ratio	0.62	0.43			0.25	0.62		0.72				
Uniform Delay, d1	25.6	7.0			19.5	22.5		28.9				
Progression Factor	0.90	0.75			1.00	1.00		1.00				
Incremental Delay, d2	5.1	0.5			0.5	3.3		4.0				
Delay (s)	28.2	5.8			20.0	25.8		32.9				
Level of Service	C	A			C	C		C				
Approach Delay (s)		10.8			24.1			32.9			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	81.5%	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)	61	933	748	388	1621	69	213	45	335	31	21	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	933	748	388	1621	69	213	45	335	31	21	20
RTOR Reduction (vph)	0	0	337	0	2	0	0	0	285	0	19	0
Lane Group Flow (vph)	61	933	411	388	1688	0	128	130	50	31	22	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	5.5	46.5	46.5	33.9	74.9		17.9	17.9	17.9	4.5	4.5	
Effective Green, g (s)	5.5	46.5	46.5	33.9	74.9		17.9	17.9	17.9	4.5	4.5	
Actuated g/C Ratio	0.05	0.39	0.39	0.28	0.63		0.15	0.15	0.15	0.04	0.04	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	83	1290	547	438	2092		186	187	141	45	42	
v/s Ratio Prot	0.03	0.28		c0.25	c0.51		0.10	c0.10		c0.03	0.02	
v/s Ratio Perm			0.29						0.05			
v/c Ratio	0.73	0.72	0.75	0.89	0.81		0.69	0.70	0.36	0.69	0.52	
Uniform Delay, d1	56.2	30.9	31.4	40.8	16.7		48.1	48.1	45.5	56.7	56.3	
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	26.9	2.1	5.9	18.4	2.4		10.1	10.7	1.5	29.5	4.4	
Delay (s)	83.1	33.0	37.3	59.3	19.2		58.2	58.8	47.1	86.3	60.8	
Level of Service	F	C	D	E	B		E	E	D	F	E	
Approach Delay (s)		36.6			26.7			52.0			71.7	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	119.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	84.1%	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)	155	865	284	284	1387	343	526	233	514	324	241	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.91		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	0.99		0.95	0.99	
Satd. Flow (prot)	1014	2904		1299	3438	1369	1346	2462		1480	2316	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	0.99		0.95	0.99	
Satd. Flow (perm)	1014	2904		1299	3438	1369	1346	2462		1480	2316	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	865	284	284	1387	343	526	233	514	324	241	180
RTOR Reduction (vph)	0	23	0	0	0	168	0	201	0	0	52	0
Lane Group Flow (vph)	155	1126	0	284	1387	175	442	630	0	253	440	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	16.5	42.0		22.5	48.0	48.0	39.5	39.5		19.0	19.0	
Effective Green, g (s)	16.5	42.0		22.5	48.0	48.0	39.5	39.5		19.0	19.0	
Actuated g/C Ratio	0.12	0.30		0.16	0.34	0.34	0.28	0.28		0.14	0.14	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	119	874		209	1182	471	381	697		201	315	
v/s Ratio Prot	0.15	c0.39		c0.22	0.40		c0.33	0.26		0.17	c0.19	
v/s Ratio Perm						0.13						
v/c Ratio	1.30	1.29		1.36	1.17	0.37	1.16	0.90		1.26	1.40	
Uniform Delay, d1	61.5	48.8		58.5	45.8	34.4	50.0	48.2		60.2	60.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	184.3	138.3		189.3	87.3	0.5	97.4	15.1		150.2	197.1	
Delay (s)	245.8	187.1		247.8	133.0	34.9	147.4	63.2		210.4	257.3	
Level of Service	F	F		F	F	C	F	E		F	F	
Approach Delay (s)		194.1			132.5			92.4			241.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	153.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	103.0%	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	1646	79	140	1232	0	0	0	0	494	361	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.94	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4952		1770	3343						3145	
Flt Permitted		1.00		0.09	1.00						0.98	
Satd. Flow (perm)		4952		162	3343						3145	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1646	79	140	1232	0	0	0	0	494	361	530
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	31	0
Lane Group Flow (vph)	0	1719	0	140	1232	0	0	0	0	0	1354	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		46.0		46.0	46.0						31.0	
Effective Green, g (s)		46.0		46.0	46.0						31.0	
Actuated g/C Ratio		0.53		0.53	0.53						0.36	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2618		85	1767						1120	
v/s Ratio Prot		0.35			0.37						c0.43	
v/s Ratio Perm				c0.86								
v/c Ratio		0.66		1.65	0.70						1.21	
Uniform Delay, d1		14.8		20.5	15.3						28.0	
Progression Factor		1.00		0.40	0.34						1.00	
Incremental Delay, d2		0.5		313.3	0.4						102.6	
Delay (s)		15.3		321.4	5.7						130.6	
Level of Service		B		F	A						F	
Approach Delay (s)		15.3			37.9			0.0			130.6	
Approach LOS		B			D			A			F	

Intersection Summary			
HCM 2000 Control Delay	57.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	156.6%	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)	388	1752	0	0	1221	462	151	438	117	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.98				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3366			3402				
Flt Permitted	0.09	1.00			1.00			0.99				
Satd. Flow (perm)	162	3539			3366			3402				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	388	1752	0	0	1221	462	151	438	117	0	0	0
RTOR Reduction (vph)	0	0	0	0	45	0	0	8	0	0	0	0
Lane Group Flow (vph)	388	1752	0	0	1638	0	0	698	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	46.0	46.0			46.0			31.0				
Effective Green, g (s)	46.0	46.0			46.0			31.0				
Actuated g/C Ratio	0.53	0.53			0.53			0.36				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1871			1779			1212				
v/s Ratio Prot		0.50			0.49			c0.21				
v/s Ratio Perm	c2.40											
v/c Ratio	4.56	0.94			0.92			0.58				
Uniform Delay, d1	20.5	19.1			18.8			22.7				
Progression Factor	0.66	0.63			1.00			1.00				
Incremental Delay, d2	1620.1	6.1			8.2			0.4				
Delay (s)	1633.7	18.1			27.0			23.1				
Level of Service	F	B			C			C				
Approach Delay (s)		311.0			27.0			23.1			0.0	
Approach LOS		F			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	160.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.94		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	156.6%	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)	48	1318	127	107	1865	20	61	101	45	22	145	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		3.5	3.5		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		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	3419		1770	3400		1770	1762		1770	1775	
Flt Permitted	0.08	1.00		0.08	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	158	3419		157	3400		1770	1762		1770	1775	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	1318	127	107	1865	20	61	101	45	22	145	51
RTOR Reduction (vph)	0	8	0	0	1	0	0	17	0	0	14	0
Lane Group Flow (vph)	48	1437	0	107	1884	0	61	129	0	22	182	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		2			6		3	8		7	4	
Permitted Phases	2			6								
Actuated Green, G (s)	47.2	47.2		48.7	48.7		3.2	27.2		1.6	25.6	
Effective Green, g (s)	47.2	47.2		48.7	48.7		3.2	27.2		1.6	25.6	
Actuated g/C Ratio	0.52	0.52		0.54	0.54		0.04	0.30		0.02	0.28	
Clearance Time (s)	5.0	5.0		3.5	3.5		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	82	1793		84	1839		62	532		31	504	
v/s Ratio Prot		0.42			0.55		c0.03	0.07		0.01	c0.10	
v/s Ratio Perm	0.30			c0.68								
v/c Ratio	0.59	0.80		1.27	1.02		0.98	0.24		0.71	0.36	
Uniform Delay, d1	14.7	17.6		20.6	20.6		43.4	23.6		44.0	25.7	
Progression Factor	1.00	1.00		0.86	0.85		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.2	2.7		131.6	13.9		108.0	0.2		54.2	0.4	
Delay (s)	24.9	20.2		149.4	31.6		151.4	23.9		98.1	26.1	
Level of Service	C	C		F	C		F	C		F	C	
Approach Delay (s)		20.4			37.9			61.4			33.4	
Approach LOS		C			D			E			C	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	118.5%	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)	50	1060	251	56	1373	13	495	281	107	4	120	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)		3319			3299	1488	1646	1845	1508		1859	1519
Flt Permitted		0.72			0.72	1.00	0.66	1.00	1.00		0.99	1.00
Satd. Flow (perm)		2392			2378	1488	1150	1845	1508		1848	1519
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	1060	251	56	1373	13	495	281	107	4	120	149
RTOR Reduction (vph)	0	22	0	0	0	3	0	0	43	0	0	19
Lane Group Flow (vph)	0	1339	0	0	1429	10	495	281	64	0	124	130
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		47.5			47.5	47.5	33.5	33.5	33.5		33.5	33.5
Effective Green, g (s)		47.5			47.5	47.5	33.5	33.5	33.5		33.5	33.5
Actuated g/C Ratio		0.53			0.53	0.53	0.37	0.37	0.37		0.37	0.37
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1262			1255	785	428	686	561		687	565
v/s Ratio Prot								0.15				
v/s Ratio Perm		0.56			c0.60	0.01	c0.43		0.04		0.07	0.09
v/c Ratio		1.06			1.14	0.01	1.16	0.41	0.11		0.18	0.23
Uniform Delay, d1		21.2			21.2	10.1	28.2	20.9	18.5		19.0	19.4
Progression Factor		0.54			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		39.0			72.5	0.0	93.8	0.1	0.0		0.0	0.1
Delay (s)		50.4			93.8	10.1	122.0	21.1	18.6		19.1	19.5
Level of Service		D			F	B	F	C	B		B	B
Approach Delay (s)		50.4			93.0			77.4			19.3	
Approach LOS		D			F			E			B	

Intersection Summary			
HCM 2000 Control Delay	69.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	121.0%	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)	74	884	247	69	1335	220	101	691	32	60	1218	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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3432	1510	1764	3252	1540	1669	3512		1762	3538	
Flt Permitted		0.59	1.00	0.18	1.00	1.00	0.11	1.00		0.31	1.00	
Satd. Flow (perm)		2042	1510	335	3252	1540	191	3512		573	3538	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	884	247	69	1335	220	101	691	32	60	1218	3
RTOR Reduction (vph)	0	0	18	0	0	66	0	4	0	0	0	0
Lane Group Flow (vph)	0	958	229	69	1335	154	101	719	0	60	1221	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		37.0	37.0	37.0	37.0	37.0	38.5	38.5		38.5	38.5	
Effective Green, g (s)		37.0	37.0	37.0	37.0	37.0	38.5	38.5		38.5	38.5	
Actuated g/C Ratio		0.44	0.44	0.44	0.44	0.44	0.45	0.45		0.45	0.45	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		888	657	145	1415	670	86	1590		259	1602	
v/s Ratio Prot					0.41			0.20			0.35	
v/s Ratio Perm		c0.47	0.15	0.21		0.10	c0.53			0.10		
v/c Ratio		1.08	0.35	0.48	0.94	0.23	1.17	0.45		0.23	0.76	
Uniform Delay, d1		24.0	16.0	17.1	23.0	15.1	23.2	16.0		14.2	19.4	
Progression Factor		1.00	1.00	1.42	1.01	1.89	1.00	1.00		1.00	1.00	
Incremental Delay, d2		53.8	1.5	8.9	11.8	0.7	151.5	0.4		0.6	2.3	
Delay (s)		77.8	17.4	33.1	35.0	29.0	174.8	16.4		14.8	21.8	
Level of Service		E	B	C	D	C	F	B		B	C	
Approach Delay (s)		65.4			34.1			35.8			21.4	
Approach LOS		E			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	121.4%	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)	55	863	27	119	1447	32	18	109	263	37	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1589	3124	1361	1505	3185	1375		3152	1174		2853	
Flt Permitted	0.14	1.00	1.00	0.31	1.00	1.00		0.90	1.00		0.89	
Satd. Flow (perm)	242	3124	1361	491	3185	1375		2843	1174		2565	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	863	27	119	1447	32	18	109	263	37	99	105
RTOR Reduction (vph)	0	0	7	0	0	5	0	0	120	0	33	0
Lane Group Flow (vph)	55	863	20	119	1447	27	0	127	143	0	208	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	61.4	61.4	61.4	61.4	61.4	61.4		15.1	15.1		15.1	
Effective Green, g (s)	61.4	61.4	61.4	61.4	61.4	61.4		15.1	15.1		15.1	
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.72		0.18	0.18		0.18	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	174	2256	983	354	2300	993		505	208		455	
v/s Ratio Prot		0.28			c0.45							
v/s Ratio Perm	0.23		0.01	0.24		0.02		0.04	c0.12		0.08	
v/c Ratio	0.32	0.38	0.02	0.34	0.63	0.03		0.25	0.69		0.46	
Uniform Delay, d1	4.2	4.5	3.3	4.3	6.0	3.3		30.1	32.7		31.3	
Progression Factor	1.06	0.78	0.71	2.77	2.63	3.05		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.0	0.0	0.2	0.1	0.0		0.1	7.3		0.3	
Delay (s)	4.9	3.6	2.4	12.2	15.9	10.2		30.2	40.0		31.5	
Level of Service	A	A	A	B	B	B		C	D		C	
Approach Delay (s)		3.6			15.5			36.8			31.5	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	503	601	1428	122	663	242
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3048	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3048	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	503	601	1428	122	663	242
RTOR Reduction (vph)	0	0	0	34	3	162
Lane Group Flow (vph)	503	601	1428	88	684	56
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	19.0	55.0	32.0	32.0	22.0	22.0
Effective Green, g (s)	19.0	55.0	32.0	32.0	22.0	22.0
Actuated g/C Ratio	0.22	0.65	0.38	0.38	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	356	1946	1142	505	788	308
v/s Ratio Prot	c0.32	0.20	c0.47		c0.22	
v/s Ratio Perm				0.07		0.05
v/c Ratio	1.41	0.31	1.25	0.17	0.87	0.18
Uniform Delay, d1	33.0	6.6	26.5	17.7	30.1	24.5
Progression Factor	0.68	1.52	0.99	0.77	1.00	1.00
Incremental Delay, d2	200.6	0.4	114.5	0.0	9.7	0.1
Delay (s)	223.1	10.4	140.7	13.7	39.8	24.6
Level of Service	F	B	F	B	D	C
Approach Delay (s)		107.3	130.7		36.1	
Approach LOS		F	F		D	

Intersection Summary			
HCM 2000 Control Delay	99.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.8%	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)	72	864	53	136	1132	112	173	481	158	116	424	143
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1586	3147			3112		1585	3185	1301	1581	3005	
Flt Permitted	0.11	1.00			0.68		0.29	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	176	3147			2116		484	3185	1301	499	3005	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	864	53	136	1132	112	173	481	158	116	424	143
RTOR Reduction (vph)	0	4	0	0	6	0	0	0	81	0	35	0
Lane Group Flow (vph)	72	913	0	0	1374	0	173	481	77	116	532	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	47.0	47.0			47.0		24.4	20.4	20.4	27.6	22.0	
Effective Green, g (s)	47.0	47.0			47.0		24.4	20.4	20.4	27.6	22.0	
Actuated g/C Ratio	0.55	0.55			0.55		0.29	0.24	0.24	0.32	0.26	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	97	1740			1170		190	764	312	233	777	
v/s Ratio Prot		0.29					c0.04	0.15		c0.03	0.18	
v/s Ratio Perm	0.41				c0.65		c0.22		0.06	0.13		
v/c Ratio	0.74	0.52			1.17		0.91	0.63	0.25	0.50	0.68	
Uniform Delay, d1	14.4	12.0			19.0		28.5	28.9	26.1	21.4	28.4	
Progression Factor	1.78	1.97			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	34.3	0.9			87.6		40.9	1.2	0.2	1.7	2.0	
Delay (s)	59.9	24.5			106.6		69.4	30.1	26.2	23.0	30.4	
Level of Service	E	C			F		E	C	C	C	C	
Approach Delay (s)		27.1			106.6			37.7			29.1	
Approach LOS		C			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	58.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.2%	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)	90	158	165	465	866	101	421	1249	423	28	1179	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4513	1352		4571	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.81	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3032	1352		3713	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	90	158	165	465	866	101	421	1249	423	28	1179	207
RTOR Reduction (vph)	0	0	81	0	0	50	0	0	242	0	0	83
Lane Group Flow (vph)	90	158	84	465	866	51	0	1670	181	0	1207	124
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	4.0	15.2	15.2	21.3	32.5	32.5		38.5	38.5		38.5	38.5
Effective Green, g (s)	4.0	15.2	15.2	21.3	32.5	32.5		38.5	38.5		38.5	38.5
Actuated g/C Ratio	0.04	0.17	0.17	0.24	0.36	0.36		0.43	0.43		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	137	532	228	731	1150	488		1297	578		1588	578
v/s Ratio Prot	c0.03	0.05		0.15	c0.27							
v/s Ratio Perm			0.06			0.04		c0.55	0.13		0.33	0.09
v/c Ratio	0.66	0.30	0.37	0.64	0.75	0.10		3.79dl	0.31		0.76	0.21
Uniform Delay, d1	42.3	32.7	33.2	30.9	25.2	19.1		25.8	17.0		21.8	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	10.8	1.4	4.6	1.8	4.6	0.4		135.4	0.3		2.2	0.2
Delay (s)	53.1	34.1	37.7	32.7	29.8	19.5		161.1	17.3		24.0	16.4
Level of Service	D	C	D	C	C	B		F	B		C	B
Approach Delay (s)		39.7			30.0			132.0			22.9	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	68.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	116.6%	ICU Level of Service	H
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)	11	109	14	30	265	45	94	213	63	85	281	51
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	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1742	1822		1744	1809		1752	1784		1751	1808	
Flt Permitted	0.52	1.00		0.68	1.00		0.56	1.00		0.59	1.00	
Satd. Flow (perm)	951	1822		1245	1809		1029	1784		1087	1808	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	11	109	14	30	265	45	94	213	63	85	281	51
RTOR Reduction (vph)	0	10	0	0	15	0	0	28	0	0	18	0
Lane Group Flow (vph)	11	113	0	30	295	0	94	248	0	85	314	0
Confl. Peds. (#/hr)	15		10	10		15	15		15	15		15
Confl. Bikes (#/hr)			5			4						9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	10.0	10.0		10.0	10.0		15.7	15.7		15.7	15.7	
Effective Green, g (s)	10.0	10.0		10.0	10.0		15.7	15.7		15.7	15.7	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.47	0.47		0.47	0.47	
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)	282	540		369	536		479	831		506	842	
v/s Ratio Prot		0.06			c0.16			0.14			c0.17	
v/s Ratio Perm	0.01			0.02			0.09			0.08		
v/c Ratio	0.04	0.21		0.08	0.55		0.20	0.30		0.17	0.37	
Uniform Delay, d1	8.4	8.9		8.5	10.0		5.3	5.6		5.2	5.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.1	1.2		0.2	0.2		0.2	0.3	
Delay (s)	8.5	9.1		8.6	11.1		5.5	5.8		5.4	6.1	
Level of Service	A	A		A	B		A	A		A	A	
Approach Delay (s)		9.0			10.9			5.7			6.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.9%	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)	50	206	5	27	215	267	49	631	88	251	211	40
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		1.00	0.99		1.00	0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.98	1.00			0.99	
Frt	1.00	1.00		1.00	0.92		1.00	0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1762	1854		1726	1685		1741	3439			3359	
Flt Permitted	0.21	1.00		0.56	1.00		0.46	1.00			0.56	
Satd. Flow (perm)	384	1854		1019	1685		841	3439			1932	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	206	5	27	215	267	49	631	88	251	211	40
RTOR Reduction (vph)	0	1	0	0	69	0	0	14	0	0	8	0
Lane Group Flow (vph)	50	210	0	27	413	0	49	705	0	0	494	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	19.3	19.3		19.3	19.3		37.3	37.3			37.3	
Effective Green, g (s)	19.3	19.3		19.3	19.3		37.3	37.3			37.3	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.58	0.58			0.58	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	114	553		304	503		485	1985			1115	
v/s Ratio Prot		0.11			c0.24			0.20				
v/s Ratio Perm	0.13			0.03			0.06				c0.26	
v/c Ratio	0.44	0.38		0.09	0.82		0.10	0.36			0.44	
Uniform Delay, d1	18.3	17.9		16.3	21.0		6.1	7.3			7.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.0	0.2		0.0	9.8		0.4	0.5			1.3	
Delay (s)	19.3	18.1		16.4	30.9		6.5	7.8			9.0	
Level of Service	B	B		B	C		A	A			A	
Approach Delay (s)		18.3			30.1			7.7			9.0	
Approach LOS		B			C			A			A	

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)	64.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt AM

Adeline & 14th
2035 + Project Commercial Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	18	2.0	0.309	6.1	LOS A	1.7	42.3	0.44	0.85	27.2
8	T	309	2.0	0.309	6.1	LOS A	1.7	42.3	0.44	0.54	30.1
18	R	25	2.0	0.309	6.1	LOS A	1.7	42.3	0.44	0.61	29.6
Approach		352	2.0	0.309	6.1	LOS A	1.7	42.3	0.44	0.56	29.9
East: 14th Street (WB)											
1	L	34	2.0	0.227	5.9	LOS A	1.1	27.2	0.51	0.87	27.3
6	T	148	2.0	0.227	5.9	LOS A	1.1	27.2	0.51	0.62	30.1
16	R	42	2.0	0.227	5.9	LOS A	1.1	27.2	0.51	0.67	29.7
Approach		224	2.0	0.227	5.9	LOS A	1.1	27.2	0.51	0.66	29.6
North: Adeline Street (SB)											
7	L	32	2.0	0.280	5.7	LOS A	1.5	37.3	0.42	0.84	27.3
4	T	264	2.0	0.280	5.7	LOS A	1.5	37.3	0.42	0.53	30.3
14	R	26	2.0	0.280	5.7	LOS A	1.5	37.3	0.42	0.59	29.8
Approach		322	2.0	0.280	5.7	LOS A	1.5	37.3	0.42	0.56	29.9
West: 14th Street (EB)											
5	L	24	2.0	0.194	5.4	LOS A	0.9	22.8	0.48	0.87	27.6
2	T	154	2.0	0.194	5.4	LOS A	0.9	22.8	0.48	0.59	30.5
12	R	18	2.0	0.194	5.4	LOS A	0.9	22.8	0.48	0.65	30.1
Approach		196	2.0	0.194	5.4	LOS A	0.9	22.8	0.48	0.63	30.0
All Vehicles		1094	2.0	0.309	5.8	LOS A	1.7	42.3	0.45	0.60	29.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt AM

Adeline & 12th
2035 + Project Commercial Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.205	4.4	LOS A	1.1	27.0	0.16	0.90	27.8
8	T	272	2.0	0.205	4.4	LOS A	1.1	27.0	0.16	0.42	31.3
18	R	5	2.0	0.205	4.4	LOS A	1.1	27.0	0.16	0.52	30.7
Approach		278	2.0	0.205	4.4	LOS A	1.1	27.0	0.16	0.42	31.3
East: 12th Street (WB)											
1	L	8	2.0	0.101	4.3	LOS A	0.4	11.2	0.41	0.81	28.0
6	T	29	2.0	0.101	4.3	LOS A	0.4	11.2	0.41	0.52	31.2
16	R	71	2.0	0.101	4.3	LOS A	0.4	11.2	0.41	0.58	30.7
Approach		108	2.0	0.101	4.3	LOS A	0.4	11.2	0.41	0.58	30.6
North: Adeline Street (SB)											
7	L	30	2.0	0.236	4.6	LOS A	1.3	32.2	0.16	0.87	27.6
4	T	285	2.0	0.236	4.6	LOS A	1.3	32.2	0.16	0.41	31.1
14	R	5	2.0	0.236	4.6	LOS A	1.3	32.2	0.16	0.51	30.5
Approach		320	2.0	0.236	4.6	LOS A	1.3	32.2	0.16	0.46	30.7
West: 12th Street (EB)											
5	L	2	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.78	28.4
2	T	7	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.48	31.7
12	R	1	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.54	31.2
Approach		10	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.55	30.9
All Vehicles		716	2.0	0.236	4.5	LOS A	1.3	32.2	0.20	0.46	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Processed: Wednesday, October 02, 2013 10:49:06 AM
SIDRA INTERSECTION 5.1.13.2093
Project: C:\Users\aelias\Desktop\Synchro\Roundabout Analysis - Sidra\Adeline & 12th.sip
8001045, KITTELSON AND ASSOCIATES INC, FLOATING

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	46	0	0	355	376	443	452	93	116	0	558
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.98		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (prot)	1020	3282			2913		1173	2815		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (perm)	1020	3282			2913		1173	2815		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	46	0	0	355	376	443	452	93	116	0	558
RTOR Reduction (vph)	0	0	0	0	183	0	0	12	0	0	0	499
Lane Group Flow (vph)	141	46	0	0	548	0	328	648	0	116	0	59
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	16.3	42.6			22.8		30.9	30.9		10.3		10.3
Effective Green, g (s)	16.3	42.6			22.8		30.9	30.9		10.3		10.3
Actuated g/C Ratio	0.17	0.44			0.24		0.32	0.32		0.11		0.11
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	171	1444			686		374	898		164		208
v/s Ratio Prot	c0.14	0.01			c0.19		c0.28	0.23		c0.08		0.03
v/s Ratio Perm												
v/c Ratio	0.82	0.03			0.80		0.88	0.72		0.71		0.29
Uniform Delay, d1	38.9	15.4			34.8		31.2	29.2		41.8		39.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	25.3	0.0			6.3		19.9	2.7		12.1		0.6
Delay (s)	64.2	15.4			41.1		51.0	31.9		53.9		40.4
Level of Service	E	B			D		D	C		D		D
Approach Delay (s)		52.2			41.1			38.2			42.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	96.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	71.9%	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)	76	479	26	124	560	242	17	64	61	227	126	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.95			0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3187		1770	3234			1706		1755	1751	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.58	1.00	
Satd. Flow (perm)	1770	3187		1770	3234			1646		1074	1751	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	76	479	26	124	560	242	17	64	61	227	126	33
RTOR Reduction (vph)	0	3	0	0	35	0	0	33	0	0	11	0
Lane Group Flow (vph)	76	502	0	124	767	0	0	109	0	227	148	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	8.4	53.7		11.3	56.6			24.0		24.0	24.0	
Effective Green, g (s)	8.4	53.7		11.3	56.6			24.0		24.0	24.0	
Actuated g/C Ratio	0.08	0.54		0.11	0.57			0.24		0.24	0.24	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	148	1711		200	1830			395		257	420	
v/s Ratio Prot	c0.04	0.16		c0.07	c0.24						0.08	
v/s Ratio Perm								0.07		c0.21		
v/c Ratio	0.51	0.29		0.62	0.42			0.28		0.88	0.35	
Uniform Delay, d1	43.8	12.7		42.3	12.3			30.9		36.6	31.5	
Progression Factor	1.13	1.25		0.94	0.75			1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.0		3.9	0.7			0.1		27.3	0.2	
Delay (s)	51.0	15.9		43.6	10.0			31.1		64.0	31.7	
Level of Service	D	B		D	A			C		E	C	
Approach Delay (s)		20.5			14.5			31.1			50.7	
Approach LOS		C			B			C			D	

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)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.6%	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)	27	677	77	126	1340	198	32	68	66	91	82	74
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.93		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3250		1025	3471	1492	1347	919		1753	1476	
Flt Permitted	0.14	1.00		0.33	1.00	1.00	0.59	1.00		0.63	1.00	
Satd. Flow (perm)	265	3250		356	3471	1492	839	919		1159	1476	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	677	77	126	1340	198	32	68	66	91	82	74
RTOR Reduction (vph)	0	9	0	0	0	71	0	35	0	0	32	0
Lane Group Flow (vph)	27	745	0	126	1340	127	32	99	0	91	124	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	4.0	
Lane Grp Cap (vph)	169	2080		227	2221	954	234	257		324	413	
v/s Ratio Prot		0.23			c0.39			c0.11			0.08	
v/s Ratio Perm	0.10			0.35		0.08	0.04			0.08		
v/c Ratio	0.16	0.36		0.56	0.60	0.13	0.14	0.38		0.28	0.30	
Uniform Delay, d1	7.2	8.4		10.1	10.6	7.1	27.0	29.0		28.1	28.3	
Progression Factor	0.41	0.39		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.5		9.4	1.2	0.3	1.2	4.3		2.2	1.9	
Delay (s)	5.0	3.7		19.5	11.8	7.4	28.2	33.3		30.3	30.1	
Level of Service	A	A		B	B	A	C	C		C	C	
Approach Delay (s)		3.8			11.8			32.3			30.2	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.0%	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)	104	639	71	51	1228	52	297	249	15	81	103	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		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)	1582	4091		1760	4576		1761	1810	1541	1752	3539	1245
Flt Permitted	0.14	1.00		0.34	1.00		0.69	1.00	1.00	0.56	1.00	1.00
Satd. Flow (perm)	235	4091		639	4576		1273	1810	1541	1041	3539	1245
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	104	639	71	51	1228	52	297	249	15	81	103	183
RTOR Reduction (vph)	0	19	0	0	6	0	0	0	8	0	0	16
Lane Group Flow (vph)	104	691	0	51	1274	0	297	249	7	81	103	167
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	32.3	32.3		32.3	32.3		33.2	33.2	33.2	33.2	33.2	33.2
Effective Green, g (s)	32.3	32.3		32.3	32.3		33.2	33.2	33.2	33.2	33.2	33.2
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.44	0.44	0.44	0.44	0.44	0.44
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	101	1761		275	1970		563	801	682	460	1566	551
v/s Ratio Prot		0.17			0.28			0.14			0.03	
v/s Ratio Perm	c0.44			0.08			c0.23		0.00	0.08		0.13
v/c Ratio	1.03	0.39		0.19	0.65		0.53	0.31	0.01	0.18	0.07	0.30
Uniform Delay, d1	21.4	14.6		13.2	16.8		15.2	13.5	11.7	12.6	12.0	13.5
Progression Factor	1.00	1.00		1.00	1.00		1.08	1.09	1.46	1.00	1.00	1.00
Incremental Delay, d2	97.8	0.1		0.1	0.6		3.5	1.0	0.0	0.8	0.1	1.4
Delay (s)	119.2	14.7		13.3	17.4		19.9	15.7	17.0	13.5	12.1	14.9
Level of Service	F	B		B	B		B	B	B	B	B	B
Approach Delay (s)		28.0			17.2			18.0			13.8	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
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)	0	0	0	112	243	267	28	76	0	0	131	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3483	1562	1770	990			3167	1558
Flt Permitted					0.98	1.00	0.67	1.00			1.00	1.00
Satd. Flow (perm)					3483	1562	1246	990			3167	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	112	243	267	28	76	0	0	131	67
RTOR Reduction (vph)	0	0	0	0	0	213	0	0	0	0	0	22
Lane Group Flow (vph)	0	0	0	0	355	54	28	76	0	0	131	45
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					15.2	15.2	50.3	50.3			50.3	50.3
Effective Green, g (s)					15.2	15.2	50.3	50.3			50.3	50.3
Actuated g/C Ratio					0.20	0.20	0.67	0.67			0.67	0.67
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					705	316	835	663			2124	1044
v/s Ratio Prot								c0.08			0.04	
v/s Ratio Perm					0.10	0.03	0.02					0.03
v/c Ratio					0.50	0.17	0.03	0.11			0.06	0.04
Uniform Delay, d1					26.5	24.7	4.2	4.4			4.2	4.2
Progression Factor					1.00	1.00	1.00	1.00			1.26	1.65
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.1	0.1
Delay (s)					26.8	24.8	4.2	4.4			5.4	7.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			25.9			4.4			6.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	33.2%	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)	26	634	114	85	177	24	56	141	137	159	172	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		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	3301		1770	3437		1770	945		1770	1127	
Flt Permitted	0.95	1.00		0.95	1.00		0.59	1.00		0.50	1.00	
Satd. Flow (perm)	1770	3301		1770	3437		1107	945		925	1127	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	634	114	85	177	24	56	141	137	159	172	37
RTOR Reduction (vph)	0	17	0	0	11	0	0	53	0	0	12	0
Lane Group Flow (vph)	26	731	0	85	190	0	56	225	0	159	197	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.7	21.5		4.3	24.6		18.5	18.5		18.5	18.5	
Effective Green, g (s)	1.7	21.5		4.3	24.6		18.5	18.5		18.5	18.5	
Actuated g/C Ratio	0.03	0.38		0.08	0.44		0.33	0.33		0.33	0.33	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	53	1260		135	1501		363	310		303	370	
v/s Ratio Prot	0.01	c0.22		c0.05	c0.06			c0.24			0.17	
v/s Ratio Perm							0.05			0.17		
v/c Ratio	0.49	0.58		0.63	0.13		0.15	0.73		0.52	0.53	
Uniform Delay, d1	26.9	13.8		25.2	9.4		13.4	16.7		15.3	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.6	0.7		7.7	0.0		0.2	8.3		1.6	1.5	
Delay (s)	29.5	14.5		32.9	9.5		13.6	25.0		17.0	16.9	
Level of Service	C	B		C	A		B	C		B	B	
Approach Delay (s)		15.0			16.5			23.0			16.9	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	56.3	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

2035 + Project Commercial
Alternative PM Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	1001	212	365	1261	183	96	438	273	139	425	77
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3416		1770	3539	1514	1770	1863	1541	1770	1814	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3416		1770	3539	1514	1770	1863	1541	1770	1814	
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)	135	1088	230	397	1371	199	104	476	297	151	462	84
RTOR Reduction (vph)	0	30	0	0	0	115	0	0	191	0	11	0
Lane Group Flow (vph)	135	1288	0	397	1371	84	104	476	106	151	535	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	6.0	16.0		8.0	18.0	18.0	4.0	16.0	16.0	4.0	16.0	
Effective Green, g (s)	6.0	16.0		8.0	18.0	18.0	4.0	16.0	16.0	4.0	16.0	
Actuated g/C Ratio	0.10	0.27		0.13	0.30	0.30	0.07	0.27	0.27	0.07	0.27	
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)	177	910		236	1061	454	118	496	410	118	483	
v/s Ratio Prot	0.08	0.38		c0.22	c0.39		0.06	0.26		c0.09	c0.29	
v/s Ratio Perm						0.06			0.07			
v/c Ratio	0.76	1.42		1.68	1.29	0.19	0.88	0.96	0.26	1.28	1.11	
Uniform Delay, d1	26.3	22.0		26.0	21.0	15.6	27.8	21.7	17.3	28.0	22.0	
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	17.5	193.4		324.8	138.6	0.2	48.1	30.0	0.3	175.8	73.7	
Delay (s)	43.8	215.4		350.8	159.6	15.8	75.9	51.6	17.7	203.8	95.7	
Level of Service	D	F		F	F	B	E	D	B	F	F	
Approach Delay (s)		199.5			183.6			43.0			119.1	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	154.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	100.9%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	198	1064	476	57	870	142	913	1037	43	280	1186	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3250		1770	3426		3433	3507		1770	3432	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3250		1770	3426		3433	3507		1770	3432	
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)	215	1157	517	62	946	154	992	1127	47	304	1289	191
RTOR Reduction (vph)	0	45	0	0	12	0	0	3	0	0	11	0
Lane Group Flow (vph)	215	1629	0	62	1088	0	992	1171	0	304	1469	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	15.3	34.6		9.0	28.3		13.0	37.4		16.0	39.4	
Effective Green, g (s)	15.3	34.6		9.0	28.3		13.0	37.4		16.0	39.4	
Actuated g/C Ratio	0.14	0.31		0.08	0.26		0.12	0.34		0.15	0.36	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	246	1022		144	881		405	1192		257	1229	
v/s Ratio Prot	c0.12	c0.50		0.04	0.32		c0.29	0.33		0.17	c0.43	
v/s Ratio Perm												
v/c Ratio	0.87	1.59		0.43	1.24		2.45	0.98		1.18	1.20	
Uniform Delay, d1	46.4	37.7		48.1	40.9		48.5	36.0		47.0	35.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.5	272.1		0.8	115.6		659.6	22.2		114.8	96.1	
Delay (s)	72.9	309.8		48.8	156.5		708.1	58.2		161.8	131.4	
Level of Service	E	F		D	F		F	E		F	F	
Approach Delay (s)		282.8			150.7			355.9			136.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	246.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	133.9%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1012	110	9	267	0	0	0	0	582	527	427
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.99			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3472			5077					1610	3341	1540
Flt Permitted		1.00			0.90					0.95	0.99	1.00
Satd. Flow (perm)		3472			4596					1610	3341	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1012	110	9	267	0	0	0	0	582	527	427
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	264
Lane Group Flow (vph)	0	1112	0	0	276	0	0	0	0	361	748	163
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		37.5			37.5					30.5	30.5	30.5
Effective Green, g (s)		37.5			37.5					30.5	30.5	30.5
Actuated g/C Ratio		0.47			0.47					0.38	0.38	0.38
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1627			2154					613	1273	587
v/s Ratio Prot		c0.32										
v/s Ratio Perm					0.06					c0.22	0.22	0.11
v/c Ratio		0.68			0.13					0.59	0.59	0.28
Uniform Delay, d1		16.6			12.0					19.7	19.7	17.1
Progression Factor		1.00			0.35					1.00	1.00	1.00
Incremental Delay, d2		2.3			0.1					4.1	2.0	1.2
Delay (s)		19.0			4.3					23.9	21.7	18.3
Level of Service		B			A					C	C	B
Approach Delay (s)		19.0			4.3			0.0			21.3	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
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)	569	1030	0	0	260	936	35	1254	61	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3381			3539	2700		5036				
Flt Permitted	0.95	0.93			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3157			3539	2700		5036				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	569	1030	0	0	260	936	35	1254	61	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	57	0	6	0	0	0	0
Lane Group Flow (vph)	512	1087	0	0	260	879	0	1344	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	22.5	50.5			24.5	24.5		18.5				
Effective Green, g (s)	22.5	50.5			24.5	24.5		18.5				
Actuated g/C Ratio	0.28	0.63			0.31	0.31		0.23				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	452	2055			1083	826		1164				
v/s Ratio Prot	c0.32	0.15			0.07							
v/s Ratio Perm		0.19				c0.33		0.27				
v/c Ratio	1.13	0.53			0.24	1.06		1.15				
Uniform Delay, d1	28.8	8.2			20.8	27.8		30.8				
Progression Factor	0.88	1.89			1.00	1.00		1.00				
Incremental Delay, d2	79.2	0.7			0.5	49.9		79.6				
Delay (s)	104.5	16.2			21.3	77.6		110.4				
Level of Service	F	B			C	E		F				
Approach Delay (s)		44.5			65.4			110.4			0.0	
Approach LOS		D			E			F			A	

Intersection Summary			
HCM 2000 Control Delay	72.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	104.8%	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)	15	916	412	261	1649	37	757	32	482	77	35	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	916	412	261	1649	37	757	32	482	77	35	73
RTOR Reduction (vph)	0	0	248	0	1	0	0	0	287	0	55	0
Lane Group Flow (vph)	15	916	164	261	1685	0	394	395	195	77	53	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	2.3	46.6	46.6	28.7	73.0		35.1	35.1	35.1	8.5	8.5	
Effective Green, g (s)	2.3	46.6	46.6	28.7	73.0		35.1	35.1	35.1	8.5	8.5	
Actuated g/C Ratio	0.02	0.34	0.34	0.21	0.54		0.26	0.26	0.26	0.06	0.06	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	30	1139	417	273	1823		427	408	321	92	87	
v/s Ratio Prot	0.01	0.28		c0.20	c0.50		0.24	c0.25		c0.05	0.04	
v/s Ratio Perm			0.14						0.16			
v/c Ratio	0.50	0.80	0.39	0.96	0.92		0.92	0.97	0.61	0.84	0.61	
Uniform Delay, d1	66.0	40.3	33.7	52.7	28.7		48.8	49.6	44.1	62.8	61.8	
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	12.5	4.7	1.1	42.1	8.7		25.7	36.0	3.7	45.2	11.4	
Delay (s)	78.5	44.9	34.7	94.9	37.4		74.5	85.6	47.8	108.0	73.2	
Level of Service	E	D	C	F	D		E	F	D	F	E	
Approach Delay (s)		42.2			45.1			67.8			87.7	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	52.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	135.4	Sum of lost time (s)	16.5
Intersection Capacity Utilization	91.5%	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)	251	760	460	451	1494	319	388	366	457	210	171	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1337	3004		1687	3406	1509	1314	2767		1369	2596	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1337	3004		1687	3406	1509	1314	2767		1369	2596	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	251	760	460	451	1494	319	388	366	457	210	171	76
RTOR Reduction (vph)	0	70	0	0	0	156	0	156	0	0	23	0
Lane Group Flow (vph)	251	1150	0	451	1494	163	349	706	0	153	281	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	18.5	41.0		28.5	51.0	51.0	30.0	30.0		14.0	14.0	
Effective Green, g (s)	18.5	41.0		28.5	51.0	51.0	30.0	30.0		14.0	14.0	
Actuated g/C Ratio	0.14	0.32		0.22	0.39	0.39	0.23	0.23		0.11	0.11	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	190	947		369	1336	591	303	638		147	279	
v/s Ratio Prot	c0.19	c0.38		c0.27	0.44		c0.27	0.26		c0.11	0.11	
v/s Ratio Perm						0.11						
v/c Ratio	1.32	1.21		1.22	1.12	0.28	1.15	1.11		1.04	1.01	
Uniform Delay, d1	55.8	44.5		50.8	39.5	26.9	50.0	50.0		58.0	58.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	176.4	106.3		122.0	63.8	0.3	99.3	68.4		85.5	55.5	
Delay (s)	232.2	150.8		172.7	103.3	27.2	149.3	118.4		143.5	113.5	
Level of Service	F	F		F	F	C	F	F		F	F	
Approach Delay (s)		164.7			106.4			127.3			123.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	128.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	107.8%	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)	0	1212	182	257	1556	0	0	0	0	774	706	521
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4845		1768	3312						3276	
Flt Permitted		1.00		0.12	1.00						0.98	
Satd. Flow (perm)		4845		229	3312						3276	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1212	182	257	1556	0	0	0	0	774	706	521
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	1371	0	257	1556	0	0	0	0	0	1994	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		41.0		41.0	41.0						36.0	
Effective Green, g (s)		41.0		41.0	41.0						36.0	
Actuated g/C Ratio		0.47		0.47	0.47						0.41	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2283		107	1560						1355	
v/s Ratio Prot		0.28			0.47						c0.61	
v/s Ratio Perm				c1.12								
v/c Ratio		0.60		2.40	1.00						1.47	
Uniform Delay, d1		17.0		23.0	22.9						25.5	
Progression Factor		1.00		0.29	0.29						1.00	
Incremental Delay, d2		0.3		633.4	6.2						216.3	
Delay (s)		17.3		640.2	12.9						241.8	
Level of Service		B		F	B						F	
Approach Delay (s)		17.3			101.8			0.0			241.8	
Approach LOS		B			F			A			F	

Intersection Summary			
HCM 2000 Control Delay	132.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.96		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	190.9%	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)	468	1518	0	0	1693	553	120	613	228	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			0.99				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.96				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3384			3375				
Flt Permitted	0.10	1.00			1.00			0.99				
Satd. Flow (perm)	182	3539			3384			3375				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	468	1518	0	0	1693	553	120	613	228	0	0	0
RTOR Reduction (vph)	0	0	0	0	36	0	0	8	0	0	0	0
Lane Group Flow (vph)	468	1518	0	0	2210	0	0	953	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	41.0	41.0			41.0			36.0				
Effective Green, g (s)	41.0	41.0			41.0			36.0				
Actuated g/C Ratio	0.47	0.47			0.47			0.41				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1667			1594			1396				
v/s Ratio Prot		0.43			0.65			c0.28				
v/s Ratio Perm	c2.58											
v/c Ratio	5.51	0.91			1.39			0.68				
Uniform Delay, d1	23.0	21.3			23.0			20.8				
Progression Factor	0.86	0.84			1.00			1.00				
Incremental Delay, d2	2036.4	2.9			177.7			1.1				
Delay (s)	2056.2	20.7			200.7			21.9				
Level of Service	F	C			F			C				
Approach Delay (s)		500.4			200.7			21.9			0.0	
Approach LOS		F			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	282.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.22		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	190.9%	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)	61	1357	388	107	1787	30	283	222	127	149	395	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.95		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)	1769	3340		1770	3366		1762	1744		1761	1801	
Flt Permitted	0.08	1.00		0.08	1.00		0.21	1.00		0.38	1.00	
Satd. Flow (perm)	141	3340		141	3366		391	1744		698	1801	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	1357	388	107	1787	30	283	222	127	149	395	89
RTOR Reduction (vph)	0	28	0	0	1	0	0	22	0	0	9	0
Lane Group Flow (vph)	61	1717	0	107	1816	0	283	327	0	149	475	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.0	53.0		53.0	53.0		32.0	32.0		32.0	32.0	
Effective Green, g (s)	53.0	53.0		53.0	53.0		32.0	32.0		32.0	32.0	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.34	0.34		0.34	0.34	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	78	1863		78	1877		131	587		235	606	
v/s Ratio Prot		0.51			0.54			0.19			0.26	
v/s Ratio Perm	0.43			c0.76			c0.72			0.21		
v/c Ratio	0.78	0.92		1.37	0.97		2.16	0.56		0.63	0.78	
Uniform Delay, d1	16.5	19.1		21.0	20.2		31.5	25.7		26.6	28.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	38.7	8.1		229.4	14.4		546.6	1.2		5.5	6.6	
Delay (s)	55.2	27.2		250.4	34.5		578.1	26.9		32.1	35.0	
Level of Service	E	C		F	C		F	C		C	C	
Approach Delay (s)		28.1			46.5			273.7			34.3	
Approach LOS		C			D			F			C	

Intersection Summary			
HCM 2000 Control Delay	67.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.66		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	143.5%	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)	115	1499	126	58	1321	9	396	550	177	7	23	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.97	1.00	1.00		1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)		3415			3307	1490	1640	1827	1503		1839	1499
Flt Permitted		0.62			0.67	1.00	0.74	1.00	1.00		0.61	1.00
Satd. Flow (perm)		2113			2228	1490	1273	1827	1503		1135	1499
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	115	1499	126	58	1321	9	396	550	177	7	23	55
RTOR Reduction (vph)	0	6	0	0	0	2	0	0	29	0	0	40
Lane Group Flow (vph)	0	1734	0	0	1379	7	396	550	148	0	30	15
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		56.0			56.0	56.0	25.0	25.0	25.0		25.0	25.0
Effective Green, g (s)		56.0			56.0	56.0	25.0	25.0	25.0		25.0	25.0
Actuated g/C Ratio		0.62			0.62	0.62	0.28	0.28	0.28		0.28	0.28
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1314			1386	927	353	507	417		315	416
v/s Ratio Prot								0.30				
v/s Ratio Perm		c0.82			0.62	0.00	c0.31		0.10		0.03	0.01
v/c Ratio		1.32			0.99	0.01	1.12	1.08	0.36		0.10	0.04
Uniform Delay, d1		17.0			16.9	6.5	32.5	32.5	26.0		24.1	23.7
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		149.1			23.0	0.0	85.1	64.9	0.2		0.0	0.0
Delay (s)		166.1			39.9	6.5	117.6	97.4	26.2		24.2	23.7
Level of Service		F			D	A	F	F	C		C	C
Approach Delay (s)		166.1			39.6			93.3			23.9	
Approach LOS		F			D			F			C	

Intersection Summary			
HCM 2000 Control Delay	104.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	128.5%	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)	204	1282	382	96	930	46	569	697	157	204	909	201
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3484	1482	1770	3195	1540	1732	3426		1764	3428	
Flt Permitted		0.55	1.00	0.12	1.00	1.00	0.17	1.00		0.26	1.00	
Satd. Flow (perm)		1943	1482	226	3195	1540	304	3426		490	3428	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	204	1282	382	96	930	46	569	697	157	204	909	201
RTOR Reduction (vph)	0	0	55	0	0	20	0	5	0	0	20	0
Lane Group Flow (vph)	0	1486	327	96	930	26	569	849	0	204	1091	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		33.0	33.0	33.0	33.0	33.0	42.5	42.5		42.5	42.5	
Effective Green, g (s)		33.0	33.0	33.0	33.0	33.0	42.5	42.5		42.5	42.5	
Actuated g/C Ratio		0.39	0.39	0.39	0.39	0.39	0.50	0.50		0.50	0.50	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		754	575	87	1240	597	152	1713		245	1714	
v/s Ratio Prot					0.29			0.25			0.32	
v/s Ratio Perm		c0.76	0.22	0.43		0.02	c1.87			0.42		
v/c Ratio		1.97	0.57	1.10	0.75	0.04	3.74	0.50		0.83	0.64	
Uniform Delay, d1		26.0	20.4	26.0	22.4	16.2	21.2	14.1		18.2	15.6	
Progression Factor		1.00	1.00	0.41	0.43	0.06	1.00	1.00		1.00	1.00	
Incremental Delay, d2		441.7	4.0	117.8	3.5	0.1	1250.5	0.5		21.6	0.9	
Delay (s)		467.7	24.5	128.4	13.0	1.1	1271.7	14.6		39.8	16.5	
Level of Service		F	C	F	B	A	F	B		D	B	
Approach Delay (s)		377.0			22.8			517.3			20.1	
Approach LOS		F			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	262.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.97		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	146.2%	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)	119	1334	25	60	1124	57	27	222	354	36	81	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1587	3154	1360	1588	3065	1375		3159	1171		2851	
Flt Permitted	0.19	1.00	1.00	0.13	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	317	3154	1360	222	3065	1375		2889	1171		2518	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	1334	25	60	1124	57	27	222	354	36	81	98
RTOR Reduction (vph)	0	0	6	0	0	16	0	0	26	0	46	0
Lane Group Flow (vph)	119	1334	19	60	1124	41	0	249	328	0	169	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	50.2	50.2	50.2	50.2	50.2	50.2		26.3	26.3		26.3	
Effective Green, g (s)	50.2	50.2	50.2	50.2	50.2	50.2		26.3	26.3		26.3	
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59		0.31	0.31		0.31	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	187	1862	803	131	1810	812		893	362		779	
v/s Ratio Prot		c0.42			0.37							
v/s Ratio Perm	0.37		0.01	0.27		0.03		0.09	c0.28		0.07	
v/c Ratio	0.64	0.72	0.02	0.46	0.62	0.05		0.28	0.91		0.22	
Uniform Delay, d1	11.4	12.3	7.2	9.8	11.2	7.3		22.2	28.2		21.7	
Progression Factor	0.78	0.83	0.90	1.47	1.43	1.46		1.00	1.00		1.00	
Incremental Delay, d2	1.5	0.2	0.0	6.1	0.9	0.1		0.1	24.7		0.1	
Delay (s)	10.4	10.5	6.5	20.4	17.0	10.8		22.2	52.9		21.8	
Level of Service	B	B	A	C	B	B		C	D		C	
Approach Delay (s)		10.4			16.9			40.2			21.8	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	607	1024	882	525	260	230
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	0.99	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	2957	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	2957	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	607	1024	882	525	260	230
RTOR Reduction (vph)	0	0	0	239	38	128
Lane Group Flow (vph)	607	1024	882	286	298	26
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	35.8	62.8	23.0	23.0	14.2	14.2
Effective Green, g (s)	35.8	62.8	23.0	23.0	14.2	14.2
Actuated g/C Ratio	0.42	0.74	0.27	0.27	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	664	2285	829	373	493	202
v/s Ratio Prot	c0.38	0.33	c0.29		c0.10	
v/s Ratio Perm				0.21		0.02
v/c Ratio	0.91	0.45	1.06	0.77	0.60	0.13
Uniform Delay, d1	23.2	4.3	31.0	28.5	32.8	30.1
Progression Factor	0.79	0.84	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.2	0.4	49.7	8.2	1.4	0.1
Delay (s)	30.5	4.1	80.7	36.7	34.2	30.2
Level of Service	C	A	F	D	C	C
Approach Delay (s)		13.9	64.3		33.0	
Approach LOS		B	E		C	

Intersection Summary			
HCM 2000 Control Delay	36.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.2%	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)	170	958	33	132	830	92	413	1113	307	91	438	181
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.90	1.00	0.97	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1580	3162			3099		1588	3185	1281	1591	2966	
Flt Permitted	0.17	1.00			0.59		0.20	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	283	3162			1829		335	3185	1281	223	2966	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	958	33	132	830	92	413	1113	307	91	438	181
RTOR Reduction (vph)	0	2	0	0	7	0	0	0	49	0	41	0
Lane Group Flow (vph)	170	989	0	0	1048	0	413	1113	258	91	578	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	55.0	55.0			55.0		47.0	39.0	39.0	34.0	30.0	
Effective Green, g (s)	55.0	55.0			55.0		47.0	39.0	39.0	34.0	30.0	
Actuated g/C Ratio	0.50	0.50			0.50		0.43	0.35	0.35	0.31	0.27	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	141	1581			914		291	1129	454	118	808	
v/s Ratio Prot		0.31					c0.17	0.35		0.03	0.19	
v/s Ratio Perm	c0.60				0.57		c0.44		0.20	0.21		
v/c Ratio	1.21	0.63			1.15		1.42	0.99	0.57	0.77	0.72	
Uniform Delay, d1	27.5	20.0			27.5		26.0	35.2	28.7	32.4	36.1	
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	141.5	1.9			78.6		207.7	23.1	1.0	26.2	2.5	
Delay (s)	169.0	21.9			106.1		233.7	58.3	29.7	58.6	38.7	
Level of Service	F	C			F		F	E	C	E	D	
Approach Delay (s)		43.4			106.1			93.0			41.2	
Approach LOS		D			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	76.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	127.2%	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)	331	910	237	463	735	76	10	1948	731	3	1255	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1349	3090	3185	1349		4575	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.93	1.00
Satd. Flow (perm)	3090	3154	1349	3090	3185	1349		4254	1391		4237	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	331	910	237	463	735	76	10	1948	731	3	1255	212
RTOR Reduction (vph)	0	0	65	0	0	53	0	0	0	0	0	79
Lane Group Flow (vph)	331	910	172	463	735	24	0	1958	731	0	1258	133
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Effective Green, g (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Actuated g/C Ratio	0.12	0.29	0.29	0.13	0.30	0.30		0.43	1.00		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	357	913	390	390	955	404		1813	1391		1806	575
v/s Ratio Prot	0.11	c0.29		c0.15	0.23							
v/s Ratio Perm			0.13			0.02		c0.46	0.53		0.30	0.10
v/c Ratio	0.93	1.00	0.44	1.19	0.77	0.06		1.08	0.53		0.70	0.23
Uniform Delay, d1	41.6	33.7	27.5	41.5	30.3	23.7		27.2	0.0		22.2	17.3
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	29.5	29.0	3.6	107.2	6.0	0.3		46.4	1.4		1.2	0.2
Delay (s)	71.1	62.7	31.1	148.7	36.2	24.0		73.6	1.4		23.4	17.5
Level of Service	E	E	C	F	D	C		E	A		C	B
Approach Delay (s)		59.5			76.4			54.0			22.6	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	52.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	104.6%	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)	50	348	97	12	157	54	65	547	101	366	459	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	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1733	1783		1758	1766		1747	1805		1754	1815	
Flt Permitted	0.52	1.00		0.24	1.00		0.40	1.00		0.32	1.00	
Satd. Flow (perm)	948	1783		435	1766		739	1805		595	1815	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	348	97	12	157	54	65	547	101	366	459	66
RTOR Reduction (vph)	0	14	0	0	17	0	0	10	0	0	8	0
Lane Group Flow (vph)	50	431	0	12	194	0	65	638	0	366	517	0
Confl. Peds. (#/hr)	15		10	10		15	15		15	15		15
Confl. Bikes (#/hr)			5			4						9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		43.8	43.8		43.8	43.8	
Effective Green, g (s)	17.0	17.0		17.0	17.0		43.8	43.8		43.8	43.8	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.64	0.64		0.64	0.64	
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)	234	440		107	436		470	1149		378	1155	
v/s Ratio Prot		c0.24			0.11			0.35			0.29	
v/s Ratio Perm	0.05			0.03			0.09			c0.61		
v/c Ratio	0.21	0.98		0.11	0.44		0.14	0.56		0.97	0.45	
Uniform Delay, d1	20.6	25.7		20.1	21.9		5.0	7.0		11.8	6.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	36.9		0.5	0.7		0.1	0.6		37.5	0.3	
Delay (s)	21.0	62.7		20.5	22.6		5.1	7.6		49.3	6.6	
Level of Service	C	E		C	C		A	A		D	A	
Approach Delay (s)		58.5			22.5			7.4			24.2	
Approach LOS		E			C			A			C	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.5%	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)	166	538	45	16	144	113	59	794	64	42	202	24
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		1.00	0.99		1.00	0.99			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.98	1.00			1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1756	1834		1751	1721		1728	3477			3436	
Flt Permitted	0.51	1.00		0.17	1.00		0.59	1.00			0.80	
Satd. Flow (perm)	948	1834		307	1721		1067	3477			2771	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	166	538	45	16	144	113	59	794	64	42	202	24
RTOR Reduction (vph)	0	5	0	0	41	0	0	8	0	0	10	0
Lane Group Flow (vph)	166	578	0	16	216	0	59	850	0	0	258	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		37.0	37.0			37.0	
Effective Green, g (s)	24.0	24.0		24.0	24.0		37.0	37.0			37.0	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.54	0.54			0.54	
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)	329	637		106	598		572	1864			1485	
v/s Ratio Prot		c0.32			0.13			c0.24				
v/s Ratio Perm	0.18			0.05			0.06				0.09	
v/c Ratio	0.50	0.91		0.15	0.36		0.10	0.46			0.17	
Uniform Delay, d1	17.8	21.4		15.5	16.8		7.9	9.8			8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.2	16.7		0.7	0.4		0.4	0.8			0.3	
Delay (s)	19.0	38.1		16.2	17.2		8.2	10.6			8.4	
Level of Service	B	D		B	B		A	B			A	
Approach Delay (s)		33.9			17.1			10.5			8.4	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt PM

Adeline & 14th
2035 + Project Commercial Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	19	2.0	0.741	18.2	LOS C	7.9	200.2	0.89	1.13	22.6
8	T	598	2.0	0.741	18.2	LOS C	7.9	200.2	0.89	1.06	23.8
18	R	53	2.0	0.741	18.2	LOS C	7.9	200.2	0.89	1.08	23.7
Approach		670	2.0	0.741	18.2	LOS C	7.9	200.2	0.89	1.07	23.7
East: 14th Street (WB)											
1	L	90	2.0	0.481	12.1	LOS B	2.7	69.6	0.74	1.03	24.6
6	T	205	2.0	0.481	12.1	LOS B	2.7	69.6	0.74	0.91	26.3
16	R	46	2.0	0.481	12.1	LOS B	2.7	69.6	0.74	0.93	26.1
Approach		341	2.0	0.481	12.1	LOS B	2.7	69.6	0.74	0.94	25.8
North: Adeline Street (SB)											
7	L	95	2.0	0.540	10.3	LOS B	3.8	96.7	0.66	0.90	25.4
4	T	424	2.0	0.540	10.3	LOS B	3.8	96.7	0.66	0.72	27.4
14	R	34	2.0	0.540	10.3	LOS B	3.8	96.7	0.66	0.76	27.2
Approach		553	2.0	0.540	10.3	LOS B	3.8	96.7	0.66	0.76	27.0
West: 14th Street (EB)											
5	L	57	2.0	0.541	12.9	LOS B	3.5	88.2	0.76	1.06	24.4
2	T	284	2.0	0.541	12.9	LOS B	3.5	88.2	0.76	0.93	26.0
12	R	69	2.0	0.541	12.9	LOS B	3.5	88.2	0.76	0.96	25.8
Approach		410	2.0	0.541	12.9	LOS B	3.5	88.2	0.76	0.96	25.7
All Vehicles		1974	2.0	0.741	13.8	LOS B	7.9	200.2	0.77	0.93	25.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: 2035 + Proj Com Alt PM

Adeline & 12th
2035 + Project Commercial Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.425	7.3	LOS A	2.7	69.1	0.43	0.84	26.7
8	T	508	2.0	0.425	7.3	LOS A	2.7	69.1	0.43	0.52	29.4
18	R	7	2.0	0.425	7.3	LOS A	2.7	69.1	0.43	0.58	29.0
Approach		516	2.0	0.425	7.3	LOS A	2.7	69.1	0.43	0.52	29.4
East: 12th Street (WB)											
1	L	10	2.0	0.216	6.6	LOS A	1.0	24.3	0.58	0.91	26.9
6	T	21	2.0	0.216	6.6	LOS A	1.0	24.3	0.58	0.71	29.5
16	R	149	2.0	0.216	6.6	LOS A	1.0	24.3	0.58	0.75	29.1
Approach		180	2.0	0.216	6.6	LOS A	1.0	24.3	0.58	0.75	29.0
North: Adeline Street (SB)											
7	L	133	2.0	0.415	6.6	LOS A	2.9	72.8	0.19	0.82	26.7
4	T	426	2.0	0.415	6.6	LOS A	2.9	72.8	0.19	0.40	29.8
14	R	8	2.0	0.415	6.6	LOS A	2.9	72.8	0.19	0.49	29.2
Approach		567	2.0	0.415	6.6	LOS A	2.9	72.8	0.19	0.50	28.9
West: 12th Street (EB)											
5	L	8	2.0	0.020	4.7	LOS A	0.1	2.0	0.54	0.79	27.7
2	T	5	2.0	0.020	4.7	LOS A	0.1	2.0	0.54	0.58	30.6
12	R	3	2.0	0.020	4.7	LOS A	0.1	2.0	0.54	0.63	30.2
Approach		16	2.0	0.020	4.7	LOS A	0.1	2.0	0.54	0.69	29.0
All Vehicles		1279	2.0	0.425	6.8	LOS A	2.9	72.8	0.34	0.54	29.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	258	185	0	0	191	263	155	505	219	277	0	520
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.91		1.00	0.96		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2603		972	2915		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2603		972	2915		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	258	185	0	0	191	263	155	505	219	277	0	520
RTOR Reduction (vph)	0	0	0	0	226	0	0	37	0	0	0	414
Lane Group Flow (vph)	258	185	0	0	228	0	139	703	0	277	0	106
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	21.2	38.5			13.8		26.7	26.7		20.1		20.1
Effective Green, g (s)	21.2	38.5			13.8		26.7	26.7		20.1		20.1
Actuated g/C Ratio	0.22	0.39			0.14		0.27	0.27		0.20		0.20
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	294	1297			365		264	791		318		505
v/s Ratio Prot	c0.19	0.06			c0.09		0.14	c0.24		c0.18		0.04
v/s Ratio Perm												
v/c Ratio	0.88	0.14			0.62		0.53	0.89		0.87		0.21
Uniform Delay, d1	37.3	19.3			39.8		30.4	34.4		37.8		32.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	23.5	0.0			2.9		1.4	11.8		21.8		0.2
Delay (s)	60.8	19.3			42.7		31.9	46.2		59.7		32.7
Level of Service	E	B			D		C	D		E		C
Approach Delay (s)		43.5			42.7			43.9			42.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	98.3	Sum of lost time (s)	16.5
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)	80	679	22	102	713	414	20	113	68	464	163	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.94			0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3378		1770	3177			1745		1757	1720	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.60	1.00	
Satd. Flow (perm)	1770	3378		1770	3177			1689		1114	1720	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	80	679	22	102	713	414	20	113	68	464	163	66
RTOR Reduction (vph)	0	3	0	0	91	0	0	22	0	0	17	0
Lane Group Flow (vph)	80	698	0	102	1036	0	0	179	0	464	212	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.0	33.0		7.0	34.0			39.0		39.0	39.0	
Effective Green, g (s)	6.0	33.0		7.0	34.0			39.0		39.0	39.0	
Actuated g/C Ratio	0.07	0.37		0.08	0.38			0.43		0.43	0.43	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	118	1238		137	1200			731		482	745	
v/s Ratio Prot	0.05	c0.21		0.06	c0.33						0.12	
v/s Ratio Perm								0.11		c0.42		
v/c Ratio	0.68	0.56		0.74	0.86			0.25		0.96	0.28	
Uniform Delay, d1	41.1	22.8		40.6	25.9			16.2		24.8	16.5	
Progression Factor	0.95	0.91		0.96	0.71			1.00		1.00	1.00	
Incremental Delay, d2	11.5	0.4		17.2	8.3			0.1		31.2	0.1	
Delay (s)	50.3	21.1		56.4	26.6			16.2		56.0	16.6	
Level of Service	D	C		E	C			B		E	B	
Approach Delay (s)		24.1			29.1			16.2			43.0	
Approach LOS		C			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	30.2	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)	11.0
Intersection Capacity Utilization	89.3%	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)	58	1661	48	70	1437	305	52	120	122	159	128	50
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3383		1054	3471	1460	1574	1065		1759	1574	
Flt Permitted	0.09	1.00		0.09	1.00	1.00	0.61	1.00		0.52	1.00	
Satd. Flow (perm)	171	3383		101	3471	1460	1004	1065		962	1574	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	58	1661	48	70	1437	305	52	120	122	159	128	50
RTOR Reduction (vph)	0	3	0	0	0	137	0	10	0	0	18	0
Lane Group Flow (vph)	58	1706	0	70	1437	168	52	232	0	159	160	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	94	1860		55	1909	803	351	372		336	550	
v/s Ratio Prot		0.50			0.41			c0.22			0.10	
v/s Ratio Perm	0.34			c0.69		0.11	0.05			0.17		
v/c Ratio	0.62	0.92		1.27	0.75	0.21	0.15	0.62		0.47	0.29	
Uniform Delay, d1	12.3	16.3		18.0	13.8	9.2	17.8	21.6		20.3	18.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.7	8.7		211.4	2.8	0.6	0.9	7.6		4.7	1.3	
Delay (s)	39.0	25.1		229.4	16.6	9.7	18.7	29.2		25.0	20.2	
Level of Service	D	C		F	B	A	B	C		C	C	
Approach Delay (s)		25.5			23.7			27.4			22.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.9%	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)	107	1505	87	25	1051	68	591	396	63	84	60	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1669	4281		1767	4531		1742	1863	1538	1755	3539	1216
Flt Permitted	0.18	1.00		0.11	1.00		0.72	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	320	4281		201	4531		1312	1863	1538	758	3539	1216
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	107	1505	87	25	1051	68	591	396	63	84	60	132
RTOR Reduction (vph)	0	7	0	0	8	0	0	0	14	0	0	22
Lane Group Flow (vph)	107	1585	0	25	1111	0	591	396	49	84	60	110
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	37.0	37.0		37.0	37.0		38.5	38.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	37.0	37.0		37.0	37.0		38.5	38.5	38.5	38.5	38.5	38.5
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.45	0.45	0.45	0.45	0.45	0.45
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	139	1863		87	1972		594	843	696	343	1602	550
v/s Ratio Prot		c0.37			0.25			0.21			0.02	
v/s Ratio Perm	0.33			0.12			c0.45		0.03	0.11		0.09
v/c Ratio	0.77	0.85		0.29	0.56		0.99	0.47	0.07	0.24	0.04	0.20
Uniform Delay, d1	20.4	21.5		15.5	18.0		23.2	16.2	13.1	14.3	12.9	14.0
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	32.9	5.1		0.7	0.2		35.7	1.9	0.2	1.7	0.0	0.8
Delay (s)	53.3	26.6		16.2	18.2		58.9	18.0	13.3	16.0	13.0	14.8
Level of Service	D	C		B	B		E	B	B	B	B	B
Approach Delay (s)		28.3			18.1			40.7			14.8	
Approach LOS		C			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	27.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	109.3%	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)	0	0	0	34	162	561	48	172	0	0	133	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3508	1561	1770	1111			2865	1558
Flt Permitted					0.99	1.00	0.67	1.00			1.00	1.00
Satd. Flow (perm)					3508	1561	1244	1111			2865	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	34	162	561	48	172	0	0	133	24
RTOR Reduction (vph)	0	0	0	0	0	476	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	196	85	48	172	0	0	133	18
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					13.7	13.7	66.8	66.8			66.8	66.8
Effective Green, g (s)					13.7	13.7	66.8	66.8			66.8	66.8
Actuated g/C Ratio					0.15	0.15	0.74	0.74			0.74	0.74
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					533	237	923	824			2126	1156
v/s Ratio Prot								c0.15			0.05	
v/s Ratio Perm					0.06	0.05	0.04					0.01
v/c Ratio					0.37	0.36	0.05	0.21			0.06	0.02
Uniform Delay, d1					34.3	34.2	3.1	3.5			3.1	3.0
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.2	0.3	0.0	0.0			0.1	0.0
Delay (s)					34.4	34.6	3.1	3.6			3.2	3.0
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			34.5			3.5			3.2	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	54.7%	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)	26	944	65	41	112	26	107	312	148	166	162	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3367		1770	3366		1770	1078		1770	1090	
Flt Permitted	0.95	1.00		0.95	1.00		0.64	1.00		0.35	1.00	
Satd. Flow (perm)	1770	3367		1770	3366		1192	1078		650	1090	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	65	41	112	26	107	312	148	166	162	14
RTOR Reduction (vph)	0	6	0	0	16	0	0	22	0	0	4	0
Lane Group Flow (vph)	26	1003	0	41	122	0	107	438	0	166	172	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.9	25.7		2.1	26.4		32.2	32.2		32.2	32.2	
Effective Green, g (s)	1.9	25.7		2.1	26.4		32.2	32.2		32.2	32.2	
Actuated g/C Ratio	0.03	0.36		0.03	0.37		0.45	0.45		0.45	0.45	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	46	1201		51	1234		533	482		290	487	
v/s Ratio Prot	0.01	c0.30		c0.02	0.04			c0.41			0.16	
v/s Ratio Perm							0.09			0.26		
v/c Ratio	0.57	0.83		0.80	0.10		0.20	0.91		0.57	0.35	
Uniform Delay, d1	34.6	21.2		34.7	15.0		12.1	18.5		14.8	13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.1	5.2		57.7	0.0		0.2	21.0		2.7	0.4	
Delay (s)	43.8	26.4		92.5	15.0		12.3	39.6		17.5	13.5	
Level of Service	D	C		F	B		B	D		B	B	
Approach Delay (s)		26.8			32.8			34.4			15.4	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

2035 + Project Mid-Range Alternative AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1258	66	286	1369	250	62	166	189	374	511	146
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3504		1770	3539	1518	1770	1863	1540	1770	1792	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3504		1770	3539	1518	1770	1863	1540	1770	1792	
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)	51	1367	72	311	1488	272	67	180	205	407	555	159
RTOR Reduction (vph)	0	6	0	0	0	100	0	0	133	0	17	0
Lane Group Flow (vph)	51	1433	0	311	1488	172	67	180	72	407	697	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.3	18.9		7.0	23.6	23.6	2.3	14.5	14.5	4.0	16.2	
Effective Green, g (s)	2.3	18.9		7.0	23.6	23.6	2.3	14.5	14.5	4.0	16.2	
Actuated g/C Ratio	0.04	0.31		0.12	0.39	0.39	0.04	0.24	0.24	0.07	0.27	
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)	67	1096		205	1382	593	67	447	369	117	480	
v/s Ratio Prot	0.03	c0.41		c0.18	0.42		0.04	0.10		c0.23	c0.39	
v/s Ratio Perm						0.11			0.05			
v/c Ratio	0.76	1.31		1.52	1.08	0.29	1.00	0.40	0.20	3.48	1.45	
Uniform Delay, d1	28.8	20.8		26.7	18.4	12.6	29.1	19.3	18.3	28.2	22.1	
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	39.2	145.0		256.1	47.7	0.3	110.0	0.6	0.3	1136.6	215.0	
Delay (s)	67.9	165.7		282.8	66.1	12.9	139.0	19.9	18.6	1164.8	237.1	
Level of Service	E	F		F	E	B	F	B	B	F	F	
Approach Delay (s)		162.4			91.7			36.9			573.9	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	212.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.62		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	256	922	914	126	1163	190	861	814	44	165	1320	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3079		1770	3425		3433	3498		1770	3402	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3079		1770	3425		3433	3498		1770	3402	
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)	278	1002	993	137	1264	207	936	885	48	179	1435	283
RTOR Reduction (vph)	0	162	0	0	12	0	0	3	0	0	15	0
Lane Group Flow (vph)	278	1833	0	137	1459	0	936	930	0	179	1703	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	17.0	35.0		11.0	29.0		15.0	37.1		13.9	35.0	
Effective Green, g (s)	17.0	35.0		11.0	29.0		15.0	37.1		13.9	35.0	
Actuated g/C Ratio	0.15	0.32		0.10	0.26		0.14	0.34		0.13	0.32	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	273	979		177	902		468	1179		223	1082	
v/s Ratio Prot	c0.16	c0.60		0.08	0.43		c0.27	0.27		0.10	c0.50	
v/s Ratio Perm												
v/c Ratio	1.02	1.87		0.77	1.62		2.00	0.79		0.80	1.57	
Uniform Delay, d1	46.5	37.5		48.3	40.5		47.5	32.9		46.7	37.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.2	396.3		17.3	283.1		457.6	5.4		18.0	262.8	
Delay (s)	105.7	433.8		65.6	323.6		505.1	38.3		64.7	300.3	
Level of Service	F	F		E	F		F	D		E	F	
Approach Delay (s)		393.7			301.6			272.1			278.0	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	315.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	150.2%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	519	81	12	278	0	0	0	0	631	883	399
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		0.99			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3446			5073					1610	3367	1550
Flt Permitted		1.00			0.88					0.95	0.99	1.00
Satd. Flow (perm)		3446			4479					1610	3367	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	519	81	12	278	0	0	0	0	631	883	399
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	0	71
Lane Group Flow (vph)	0	584	0	0	290	0	0	0	0	492	1022	328
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		17.0			17.0					51.0	51.0	51.0
Effective Green, g (s)		17.0			17.0					51.0	51.0	51.0
Actuated g/C Ratio		0.21			0.21					0.64	0.64	0.64
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		732			951					1026	2146	988
v/s Ratio Prot		c0.17										
v/s Ratio Perm					0.06					c0.31	0.30	0.21
v/c Ratio		0.80			0.30					0.48	0.48	0.33
Uniform Delay, d1		29.9			26.5					7.6	7.5	6.7
Progression Factor		1.00			1.12					1.00	1.00	1.00
Incremental Delay, d2		8.9			0.8					1.6	0.8	0.9
Delay (s)		38.7			30.4					9.2	8.3	7.6
Level of Service		D			C					A	A	A
Approach Delay (s)		38.7			30.4			0.0			8.4	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	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)	284	882	0	0	270	737	7	747	28	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3385			3539	2706		5048				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3215			3539	2706		5048				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	284	882	0	0	270	737	7	747	28	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	192	0	5	0	0	0	0
Lane Group Flow (vph)	256	910	0	0	270	545	0	777	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	21.5	52.5			27.5	27.5		16.5				
Effective Green, g (s)	21.5	52.5			27.5	27.5		16.5				
Actuated g/C Ratio	0.27	0.66			0.34	0.34		0.21				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	432	2155			1216	930		1041				
v/s Ratio Prot	c0.16	0.11			0.08							
v/s Ratio Perm		0.16				c0.20		0.15				
v/c Ratio	0.59	0.42			0.22	0.59		0.75				
Uniform Delay, d1	25.4	6.5			18.7	21.6		29.8				
Progression Factor	0.92	0.77			1.00	1.00		1.00				
Incremental Delay, d2	4.7	0.5			0.4	2.7		4.9				
Delay (s)	28.0	5.5			19.1	24.3		34.7				
Level of Service	C	A			B	C		C				
Approach Delay (s)		10.4			22.9			34.7			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	81.1%	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)	61	816	747	387	1605	69	212	45	325	30	21	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3332		1243	1248	946	1203	1115	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3332		1243	1248	946	1203	1115	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	816	747	387	1605	69	212	45	325	30	21	20
RTOR Reduction (vph)	0	0	347	0	2	0	0	0	275	0	19	0
Lane Group Flow (vph)	61	816	400	387	1672	0	127	130	50	30	22	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	5.5	43.4	43.4	33.0	70.9		17.7	17.7	17.7	4.7	4.7	
Effective Green, g (s)	5.5	43.4	43.4	33.0	70.9		17.7	17.7	17.7	4.7	4.7	
Actuated g/C Ratio	0.05	0.38	0.38	0.29	0.61		0.15	0.15	0.15	0.04	0.04	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	86	1246	528	441	2048		190	191	145	49	45	
v/s Ratio Prot	0.03	0.25		c0.25	c0.50		0.10	c0.10		c0.02	0.02	
v/s Ratio Perm			0.29						0.05			
v/c Ratio	0.71	0.65	0.76	0.88	0.82		0.67	0.68	0.34	0.61	0.48	
Uniform Delay, d1	54.1	29.8	31.4	39.2	17.2		46.0	46.1	43.6	54.4	54.1	
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	21.9	1.3	6.4	17.1	2.7		8.6	9.6	1.4	14.9	3.0	
Delay (s)	76.0	31.1	37.7	56.3	19.9		54.6	55.7	45.0	69.3	57.1	
Level of Service	E	C	D	E	B		D	E	D	E	E	
Approach Delay (s)		35.8			26.7			49.5			62.2	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	115.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	83.9%	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)	155	748	275	284	1380	335	515	242	507	230	234	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1014	2883		1299	3438	1369	1480	2543		1480	2259	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1014	2883		1299	3438	1369	1480	2543		1480	2259	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	748	275	284	1380	335	515	242	507	230	234	180
RTOR Reduction (vph)	0	27	0	0	0	165	0	245	0	0	78	0
Lane Group Flow (vph)	155	996	0	284	1380	170	515	504	0	207	359	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	15.5	40.0		25.5	50.0	50.0	38.5	38.5		19.0	19.0	
Effective Green, g (s)	15.5	40.0		25.5	50.0	50.0	38.5	38.5		19.0	19.0	
Actuated g/C Ratio	0.11	0.29		0.18	0.36	0.36	0.28	0.28		0.14	0.14	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	112	826		237	1232	490	408	701		201	307	
v/s Ratio Prot	c0.15	c0.35		c0.22	0.40		c0.35	0.20		0.14	c0.16	
v/s Ratio Perm						0.12						
v/c Ratio	1.38	1.21		1.20	1.12	0.35	1.26	0.72		1.03	1.17	
Uniform Delay, d1	62.0	49.8		57.0	44.8	32.8	50.5	45.6		60.2	60.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	218.6	103.9		122.6	65.3	0.4	136.4	3.3		71.5	105.8	
Delay (s)	280.6	153.7		179.6	110.1	33.2	186.9	48.9		131.7	166.0	
Level of Service	F	F		F	F	C	F	D		F	F	
Approach Delay (s)		170.4			107.1			105.1			155.0	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	127.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	102.0%	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	1455	51	116	1232	0	0	0	0	449	322	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.94	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4961		1768	3343						3131	
Flt Permitted		1.00		0.12	1.00						0.98	
Satd. Flow (perm)		4961		219	3343						3131	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1455	51	116	1232	0	0	0	0	449	322	515
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	1502	0	116	1232	0	0	0	0	0	1253	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		47.0		47.0	47.0						30.0	
Effective Green, g (s)		47.0		47.0	47.0						30.0	
Actuated g/C Ratio		0.54		0.54	0.54						0.34	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2680		118	1805						1079	
v/s Ratio Prot		0.30			0.37						c0.40	
v/s Ratio Perm				c0.53								
v/c Ratio		0.56		0.98	0.68						1.16	
Uniform Delay, d1		13.2		19.6	14.6						28.5	
Progression Factor		1.00		0.43	0.36						1.00	
Incremental Delay, d2		0.2		58.5	0.5						82.9	
Delay (s)		13.3		67.0	5.8						111.4	
Level of Service		B		E	A						F	
Approach Delay (s)		13.3			11.0			0.0			111.4	
Approach LOS		B			B			A			F	

Intersection Summary			
HCM 2000 Control Delay	43.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	144.1%	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)	340	1564	0	0	1168	351	180	389	123	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.97			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3394			3387				
Flt Permitted	0.09	1.00			1.00			0.99				
Satd. Flow (perm)	159	3539			3394			3387				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	340	1564	0	0	1168	351	180	389	123	0	0	0
RTOR Reduction (vph)	0	0	0	0	33	0	0	14	0	0	0	0
Lane Group Flow (vph)	340	1564	0	0	1486	0	0	678	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	47.0	47.0			47.0			30.0				
Effective Green, g (s)	47.0	47.0			47.0			30.0				
Actuated g/C Ratio	0.54	0.54			0.54			0.34				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1911			1833			1167				
v/s Ratio Prot		0.44			0.44			c0.20				
v/s Ratio Perm	c2.14											
v/c Ratio	4.00	0.82			0.81			0.58				
Uniform Delay, d1	20.0	16.5			16.4			23.4				
Progression Factor	0.74	0.66			1.00			1.00				
Incremental Delay, d2	1369.5	1.9			2.7			0.5				
Delay (s)	1384.2	12.8			19.0			23.8				
Level of Service	F	B			B			C				
Approach Delay (s)		257.7			19.0			23.8			0.0	
Approach LOS		F			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	130.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.64		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	144.1%	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)	48	1264	115	111	1587	16	50	80	44	21	139	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		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)	1768	3423		1768	3401		1755	1747		1757	1774	
Flt Permitted	0.08	1.00		0.12	1.00		0.60	1.00		0.68	1.00	
Satd. Flow (perm)	157	3423		223	3401		1102	1747		1253	1774	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	1264	115	111	1587	16	50	80	44	21	139	50
RTOR Reduction (vph)	0	9	0	0	1	0	0	25	0	0	16	0
Lane Group Flow (vph)	48	1370	0	111	1602	0	50	100	0	21	173	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Effective Green, g (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30		0.30	0.30	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2032		132	2019		330	524		375	532	
v/s Ratio Prot		0.40			0.47			0.06			c0.10	
v/s Ratio Perm	0.31			c0.50			0.05			0.02		
v/c Ratio	0.52	0.67		0.84	0.79		0.15	0.19		0.06	0.33	
Uniform Delay, d1	9.5	11.0		13.2	12.5		20.5	20.8		19.9	21.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.0	1.8		44.5	3.3		1.0	0.8		0.3	1.6	
Delay (s)	28.5	12.8		57.6	15.8		21.5	21.6		20.2	23.3	
Level of Service	C	B		E	B		C	C		C	C	
Approach Delay (s)		13.4			18.5			21.6			23.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	136.4%	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)	50	1028	229	51	1250	13	365	286	108	3	111	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)		3325			3299	1489	1645	1845	1506		1860	1517
Flt Permitted		0.79			0.78	1.00	0.67	1.00	1.00		0.99	1.00
Satd. Flow (perm)		2634			2590	1489	1161	1845	1506		1851	1517
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	1028	229	51	1250	13	365	286	108	3	111	103
RTOR Reduction (vph)	0	19	0	0	0	3	0	0	60	0	0	34
Lane Group Flow (vph)	0	1288	0	0	1301	10	365	286	48	0	114	69
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		51.4			51.4	51.4	29.6	29.6	29.6		29.6	29.6
Effective Green, g (s)		51.4			51.4	51.4	29.6	29.6	29.6		29.6	29.6
Actuated g/C Ratio		0.57			0.57	0.57	0.33	0.33	0.33		0.33	0.33
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1504			1479	850	381	606	495		608	498
v/s Ratio Prot								0.16				
v/s Ratio Perm		0.49			c0.50	0.01	c0.31		0.03		0.06	0.05
v/c Ratio		0.86			0.88	0.01	0.96	0.47	0.10		0.19	0.14
Uniform Delay, d1		16.2			16.6	8.3	29.6	24.0	20.9		21.6	21.2
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		6.5			7.8	0.0	34.6	0.2	0.0		0.1	0.0
Delay (s)		22.7			24.4	8.4	64.2	24.2	21.0		21.7	21.3
Level of Service		C			C	A	E	C	C		C	C
Approach Delay (s)		22.7			24.3			43.0			21.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	108.3%	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)	74	865	233	69	1214	213	95	672	32	60	1212	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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3432	1510	1764	3252	1540	1669	3511		1762	3538	
Flt Permitted		0.62	1.00	0.19	1.00	1.00	0.11	1.00		0.32	1.00	
Satd. Flow (perm)		2145	1510	344	3252	1540	198	3511		594	3538	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	865	233	69	1214	213	95	672	32	60	1212	3
RTOR Reduction (vph)	0	0	18	0	0	71	0	4	0	0	0	0
Lane Group Flow (vph)	0	939	215	69	1214	142	95	700	0	60	1215	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		36.6	36.6	36.6	36.6	36.6	38.9	38.9		38.9	38.9	
Effective Green, g (s)		36.6	36.6	36.6	36.6	36.6	38.9	38.9		38.9	38.9	
Actuated g/C Ratio		0.43	0.43	0.43	0.43	0.43	0.46	0.46		0.46	0.46	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		923	650	148	1400	663	90	1606		271	1619	
v/s Ratio Prot					0.37			0.20			0.34	
v/s Ratio Perm		c0.44	0.14	0.20		0.09	c0.48			0.10		
v/c Ratio		1.02	0.33	0.47	0.87	0.21	1.06	0.44		0.22	0.75	
Uniform Delay, d1		24.2	16.1	17.2	22.0	15.2	23.1	15.6		13.9	19.0	
Progression Factor		1.00	1.00	1.34	0.97	1.84	1.00	1.00		1.00	1.00	
Incremental Delay, d2		34.0	1.4	8.9	6.5	0.6	110.8	0.4		0.6	2.1	
Delay (s)		58.2	17.4	32.0	27.8	28.5	133.8	16.0		14.5	21.2	
Level of Service		E	B	C	C	C	F	B		B	C	
Approach Delay (s)		50.1			28.1			30.0			20.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	117.4%	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)	55	842	27	114	1316	32	18	109	260	37	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1588	3124	1361	1504	3185	1375		3152	1173		2852	
Flt Permitted	0.18	1.00	1.00	0.32	1.00	1.00		0.89	1.00		0.89	
Satd. Flow (perm)	293	3124	1361	505	3185	1375		2841	1173		2563	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	842	27	114	1316	32	18	109	260	37	99	105
RTOR Reduction (vph)	0	0	7	0	0	6	0	0	127	0	45	0
Lane Group Flow (vph)	55	842	20	114	1316	26	0	127	133	0	196	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	61.9	61.9	61.9	61.9	61.9	61.9		14.6	14.6		14.6	
Effective Green, g (s)	61.9	61.9	61.9	61.9	61.9	61.9		14.6	14.6		14.6	
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.73	0.73		0.17	0.17		0.17	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	213	2275	991	367	2319	1001		487	201		440	
v/s Ratio Prot		0.27			c0.41							
v/s Ratio Perm	0.19		0.01	0.23		0.02		0.04	c0.11		0.08	
v/c Ratio	0.26	0.37	0.02	0.31	0.57	0.03		0.26	0.66		0.45	
Uniform Delay, d1	3.9	4.3	3.2	4.1	5.3	3.2		30.5	32.9		31.6	
Progression Factor	0.91	0.71	0.66	2.58	2.46	2.90		1.00	1.00		1.00	
Incremental Delay, d2	1.0	0.2	0.0	0.2	0.1	0.0		0.1	6.2		0.3	
Delay (s)	4.5	3.2	2.1	10.7	13.2	9.3		30.6	39.1		31.8	
Level of Service	A	A	A	B	B	A		C	D		C	
Approach Delay (s)		3.2			12.9			36.3			31.8	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	492	589	1310	122	664	224
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3050	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3050	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	492	589	1310	122	664	224
RTOR Reduction (vph)	0	0	0	37	3	150
Lane Group Flow (vph)	492	589	1310	85	683	52
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	20.0	55.0	31.0	31.0	22.0	22.0
Effective Green, g (s)	20.0	55.0	31.0	31.0	22.0	22.0
Actuated g/C Ratio	0.24	0.65	0.36	0.36	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	374	1946	1107	489	789	308
v/s Ratio Prot	c0.31	0.20	c0.43		c0.22	
v/s Ratio Perm				0.06		0.04
v/c Ratio	1.32	0.30	1.18	0.17	0.87	0.17
Uniform Delay, d1	32.5	6.6	27.0	18.3	30.1	24.4
Progression Factor	0.71	1.57	0.97	1.12	1.00	1.00
Incremental Delay, d2	158.6	0.4	86.8	0.0	9.5	0.1
Delay (s)	181.7	10.7	113.0	20.6	39.6	24.5
Level of Service	F	B	F	C	D	C
Approach Delay (s)		88.6	105.1		36.2	
Approach LOS		F	F		D	

Intersection Summary			
HCM 2000 Control Delay	81.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.3%	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)	71	855	53	136	1047	112	167	481	158	116	423	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	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		0.98	1.00	1.00	0.97	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1585	3147			3107		1561	3185	1305	1546	3023	
Flt Permitted	0.14	1.00			0.69		0.33	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	233	3147			2144		539	3185	1305	618	3023	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	71	855	53	136	1047	112	167	481	158	116	423	127
RTOR Reduction (vph)	0	5	0	0	8	0	0	0	77	0	35	0
Lane Group Flow (vph)	71	903	0	0	1287	0	167	481	81	116	515	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	50.1	50.1			50.1		26.9	26.9	26.9	26.9	26.9	
Effective Green, g (s)	50.1	50.1			50.1		26.9	26.9	26.9	26.9	26.9	
Actuated g/C Ratio	0.59	0.59			0.59		0.32	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	137	1854			1263		170	1007	412	195	956	
v/s Ratio Prot		0.29						0.15			0.17	
v/s Ratio Perm	0.30				c0.60		c0.31		0.06	0.19		
v/c Ratio	0.52	0.49			1.02		0.98	0.48	0.20	0.59	0.54	
Uniform Delay, d1	10.3	10.1			17.4		28.8	23.4	21.2	24.5	23.9	
Progression Factor	0.31	0.27			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.2	0.8			30.2		63.3	0.1	0.1	3.2	0.3	
Delay (s)	14.4	3.5			47.7		92.1	23.5	21.3	27.7	24.2	
Level of Service	B	A			D		F	C	C	C	C	
Approach Delay (s)		4.3			47.7			37.3			24.8	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	116.8%	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)	89	157	165	465	825	101	390	1249	423	28	1180	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4517	1352		4571	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.82	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3021	1352		3740	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	157	165	465	825	101	390	1249	423	28	1180	201
RTOR Reduction (vph)	0	0	81	0	0	51	0	0	242	0	0	83
Lane Group Flow (vph)	89	157	84	465	825	50	0	1639	181	0	1208	118
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	4.0	15.2	15.2	21.2	32.4	32.4		38.6	38.6		38.6	38.6
Effective Green, g (s)	4.0	15.2	15.2	21.2	32.4	32.4		38.6	38.6		38.6	38.6
Actuated g/C Ratio	0.04	0.17	0.17	0.24	0.36	0.36		0.43	0.43		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	137	532	228	727	1146	486		1295	579		1604	579
v/s Ratio Prot	c0.03	0.05		0.15	c0.26							
v/s Ratio Perm			0.06			0.04		c0.54	0.13		0.32	0.09
v/c Ratio	0.65	0.30	0.37	0.64	0.72	0.10		3.51dl	0.31		0.75	0.20
Uniform Delay, d1	42.3	32.7	33.2	31.0	24.9	19.1		25.7	17.0		21.7	16.1
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	10.2	1.4	4.6	1.9	3.9	0.4		125.8	0.3		2.1	0.2
Delay (s)	52.5	34.1	37.7	32.8	28.8	19.6		151.5	17.3		23.7	16.3
Level of Service	D	C	D	C	C	B		F	B		C	B
Approach Delay (s)		39.5			29.5			124.0			22.7	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	65.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt AM

Adeline & 18th
2035 + Project Mid-Range Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	43	2.0	0.245	5.3	LOS A	1.3	31.9	0.37	0.82	27.5
8	T	184	2.0	0.245	5.3	LOS A	1.3	31.9	0.37	0.50	30.6
18	R	63	2.0	0.245	5.3	LOS A	1.3	31.9	0.37	0.56	30.1
Approach		290	2.0	0.245	5.3	LOS A	1.3	31.9	0.37	0.56	29.9
East: 18th Street (WB)											
1	L	30	2.0	0.223	5.3	LOS A	1.1	27.7	0.43	0.84	27.5
6	T	172	2.0	0.223	5.3	LOS A	1.1	27.7	0.43	0.54	30.5
16	R	45	2.0	0.223	5.3	LOS A	1.1	27.7	0.43	0.60	30.1
Approach		247	2.0	0.223	5.3	LOS A	1.1	27.7	0.43	0.59	30.0
North: Adeline Street (SB)											
7	L	71	2.0	0.365	7.0	LOS A	2.0	52.0	0.50	0.84	26.7
4	T	279	2.0	0.365	7.0	LOS A	2.0	52.0	0.50	0.58	29.4
14	R	51	2.0	0.365	7.0	LOS A	2.0	52.0	0.50	0.63	29.0
Approach		401	2.0	0.365	7.0	LOS A	2.0	52.0	0.50	0.63	28.8
West: 18th Street (EB)											
5	L	9	2.0	0.115	4.8	LOS A	0.5	12.5	0.48	0.88	27.9
2	T	93	2.0	0.115	4.8	LOS A	0.5	12.5	0.48	0.60	30.9
12	R	8	2.0	0.115	4.8	LOS A	0.5	12.5	0.48	0.65	30.5
Approach		110	2.0	0.115	4.8	LOS A	0.5	12.5	0.48	0.62	30.6
All Vehicles		1048	2.0	0.365	5.9	LOS A	2.0	52.0	0.45	0.60	29.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	187	4	27	125	209	49	564	88	235	191	39
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		1.00	0.99		1.00	0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		0.98	1.00			0.99	
Frt	1.00	1.00		1.00	0.91		1.00	0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1760	1855		1729	1663		1742	3432			3354	
Flt Permitted	0.31	1.00		0.57	1.00		0.48	1.00			0.58	
Satd. Flow (perm)	566	1855		1037	1663		889	3432			2006	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	187	4	27	125	209	49	564	88	235	191	39
RTOR Reduction (vph)	0	2	0	0	104	0	0	14	0	0	8	0
Lane Group Flow (vph)	50	189	0	27	230	0	49	638	0	0	457	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	13.1	13.1		13.1	13.1		37.4	37.4			37.4	
Effective Green, g (s)	13.1	13.1		13.1	13.1		37.4	37.4			37.4	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64			0.64	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	126	415		232	372		568	2194			1282	
v/s Ratio Prot		0.10			c0.14			0.19				
v/s Ratio Perm	0.09			0.03			0.06				c0.23	
v/c Ratio	0.40	0.46		0.12	0.62		0.09	0.29			0.36	
Uniform Delay, d1	19.3	19.6		18.1	20.4		4.0	4.7			4.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.7	0.3		0.1	2.2		0.3	0.3			0.8	
Delay (s)	20.1	19.9		18.2	22.6		4.3	5.0			5.7	
Level of Service	C	B		B	C		A	A			A	
Approach Delay (s)		19.9			22.3			5.0			5.7	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	58.5	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 SUMMARY

Site: 2035 + Proj Mid Alt AM

Adeline & 14th
2035 + Project Mid-Range Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	9	2.0	0.234	5.3	LOS A	1.2	29.6	0.41	0.86	27.6
8	T	232	2.0	0.234	5.3	LOS A	1.2	29.6	0.41	0.53	30.6
18	R	25	2.0	0.234	5.3	LOS A	1.2	29.6	0.41	0.60	30.2
Approach		266	2.0	0.234	5.3	LOS A	1.2	29.6	0.41	0.55	30.5
East: 14th Street (WB)											
1	L	34	2.0	0.208	5.3	LOS A	1.0	25.2	0.44	0.84	27.5
6	T	148	2.0	0.208	5.3	LOS A	1.0	25.2	0.44	0.55	30.5
16	R	42	2.0	0.208	5.3	LOS A	1.0	25.2	0.44	0.61	30.1
Approach		224	2.0	0.208	5.3	LOS A	1.0	25.2	0.44	0.61	29.9
North: Adeline Street (SB)											
7	L	32	2.0	0.272	5.6	LOS A	1.4	36.1	0.40	0.84	27.4
4	T	258	2.0	0.272	5.6	LOS A	1.4	36.1	0.40	0.52	30.4
14	R	26	2.0	0.272	5.6	LOS A	1.4	36.1	0.40	0.59	29.9
Approach		316	2.0	0.272	5.6	LOS A	1.4	36.1	0.40	0.56	30.0
West: 14th Street (EB)											
5	L	24	2.0	0.193	5.4	LOS A	0.9	22.7	0.48	0.87	27.6
2	T	154	2.0	0.193	5.4	LOS A	0.9	22.7	0.48	0.59	30.5
12	R	18	2.0	0.193	5.4	LOS A	0.9	22.7	0.48	0.65	30.1
Approach		196	2.0	0.193	5.4	LOS A	0.9	22.7	0.48	0.63	30.1
All Vehicles		1002	2.0	0.272	5.4	LOS A	1.4	36.1	0.43	0.58	30.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt AM

Adeline & 12th
2035 + Project Mid-Range Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.155	3.9	LOS A	0.8	19.3	0.15	0.90	28.0
8	T	204	2.0	0.155	3.9	LOS A	0.8	19.3	0.15	0.42	31.7
18	R	5	2.0	0.155	3.9	LOS A	0.8	19.3	0.15	0.52	31.0
Approach		210	2.0	0.155	3.9	LOS A	0.8	19.3	0.15	0.42	31.6
East: 12th Street (WB)											
1	L	8	2.0	0.079	3.8	LOS A	0.3	8.7	0.35	0.79	28.2
6	T	29	2.0	0.079	3.8	LOS A	0.3	8.7	0.35	0.48	31.5
16	R	53	2.0	0.079	3.8	LOS A	0.3	8.7	0.35	0.54	31.0
Approach		90	2.0	0.079	3.8	LOS A	0.3	8.7	0.35	0.54	30.9
North: Adeline Street (SB)											
7	L	30	2.0	0.231	4.6	LOS A	1.2	31.4	0.16	0.87	27.7
4	T	279	2.0	0.231	4.6	LOS A	1.2	31.4	0.16	0.41	31.1
14	R	5	2.0	0.231	4.6	LOS A	1.2	31.4	0.16	0.51	30.5
Approach		314	2.0	0.231	4.6	LOS A	1.2	31.4	0.16	0.46	30.7
West: 12th Street (EB)											
5	L	2	2.0	0.010	3.6	LOS A	0.0	1.0	0.41	0.78	28.4
2	T	7	2.0	0.010	3.6	LOS A	0.0	1.0	0.41	0.48	31.7
12	R	1	2.0	0.010	3.6	LOS A	0.0	1.0	0.41	0.54	31.2
Approach		10	2.0	0.010	3.6	LOS A	0.0	1.0	0.41	0.55	30.9
All Vehicles		624	2.0	0.231	4.2	LOS A	1.2	31.4	0.19	0.46	31.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	44	0	0	347	352	443	447	95	107	0	553
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.98		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (prot)	1020	3282			2922		1173	2809		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (perm)	1020	3282			2922		1173	2809		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	138	44	0	0	347	352	443	447	95	107	0	553
RTOR Reduction (vph)	0	0	0	0	178	0	0	12	0	0	0	495
Lane Group Flow (vph)	138	44	0	0	521	0	323	650	0	107	0	58
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	15.9	41.2			21.8		30.4	30.4		10.0		10.0
Effective Green, g (s)	15.9	41.2			21.8		30.4	30.4		10.0		10.0
Actuated g/C Ratio	0.17	0.44			0.23		0.32	0.32		0.11		0.11
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	171	1429			673		376	902		163		207
v/s Ratio Prot	c0.14	0.01			c0.18		c0.28	0.23		c0.07		0.03
v/s Ratio Perm												
v/c Ratio	0.81	0.03			0.77		0.86	0.72		0.66		0.28
Uniform Delay, d1	37.9	15.3			34.1		30.1	28.4		40.6		39.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	22.4	0.0			5.3		17.2	2.7		8.2		0.5
Delay (s)	60.3	15.3			39.4		47.3	31.0		48.9		39.5
Level of Service	E	B			D		D	C		D		D
Approach Delay (s)		49.4			39.4			36.4			41.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	94.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	70.6%	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)	62	429	26	124	505	182	17	64	61	217	126	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.96			0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3183		1770	3259			1705		1755	1761	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.57	1.00	
Satd. Flow (perm)	1770	3183		1770	3259			1646		1061	1761	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	429	26	124	505	182	17	64	61	217	126	29
RTOR Reduction (vph)	0	3	0	0	27	0	0	34	0	0	10	0
Lane Group Flow (vph)	62	452	0	124	660	0	0	108	0	217	145	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	10.1	54.5		11.4	55.8			23.1		23.1	23.1	
Effective Green, g (s)	10.1	54.5		11.4	55.8			23.1		23.1	23.1	
Actuated g/C Ratio	0.10	0.54		0.11	0.56			0.23		0.23	0.23	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	178	1734		201	1818			380		245	406	
v/s Ratio Prot	c0.04	0.14		c0.07	c0.20						0.08	
v/s Ratio Perm								0.07		c0.20		
v/c Ratio	0.35	0.26		0.62	0.36			0.28		0.89	0.36	
Uniform Delay, d1	41.9	12.1		42.2	12.2			31.6		37.2	32.2	
Progression Factor	1.26	1.38		0.95	0.58			1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.0		3.8	0.6			0.2		28.7	0.2	
Delay (s)	53.2	16.7		43.8	7.6			31.8		65.8	32.4	
Level of Service	D	B		D	A			C		E	C	
Approach Delay (s)		21.1			13.1			31.8			51.9	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	62.9%	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	629	74	126	1233	139	26	64	66	84	82	75
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3248		1025	3471	1492	1347	918		1753	1477	
Flt Permitted	0.17	1.00		0.35	1.00	1.00	0.59	1.00		0.64	1.00	
Satd. Flow (perm)	314	3248		380	3471	1492	836	918		1172	1477	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	629	74	126	1233	139	26	64	66	84	82	75
RTOR Reduction (vph)	0	9	0	0	0	50	0	37	0	0	33	0
Lane Group Flow (vph)	27	694	0	126	1233	89	26	93	0	84	124	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	4.0	
Lane Grp Cap (vph)	200	2078		243	2221	954	234	257		328	413	
v/s Ratio Prot		0.21			c0.36			c0.10			0.08	
v/s Ratio Perm	0.09			0.33		0.06	0.03			0.07		
v/c Ratio	0.14	0.33		0.52	0.56	0.09	0.11	0.36		0.26	0.30	
Uniform Delay, d1	7.1	8.2		9.7	10.1	6.9	26.8	28.8		27.9	28.3	
Progression Factor	0.39	0.35		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.4		7.7	1.0	0.2	1.0	3.9		1.9	1.9	
Delay (s)	4.1	3.3		17.4	11.1	7.1	27.7	32.7		29.8	30.2	
Level of Service	A	A		B	B	A	C	C		C	C	
Approach Delay (s)		3.3			11.2			31.9			30.0	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.6%	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)	95	610	56	51	1176	51	206	242	14	79	96	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1581	4090		1759	4576		1760	1810	1541	1751	3539	1245
Flt Permitted	0.15	1.00		0.36	1.00		0.69	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	246	4090		672	4576		1282	1810	1541	1066	3539	1245
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	610	56	51	1176	51	206	242	14	79	96	158
RTOR Reduction (vph)	0	16	0	0	7	0	0	0	8	0	0	18
Lane Group Flow (vph)	95	650	0	51	1220	0	206	242	6	79	96	140
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	30.7	30.7		30.7	30.7		34.8	34.8	34.8	34.8	34.8	34.8
Effective Green, g (s)	30.7	30.7		30.7	30.7		34.8	34.8	34.8	34.8	34.8	34.8
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	100	1674		275	1873		594	839	715	494	1642	577
v/s Ratio Prot		0.16			0.27			0.13			0.03	
v/s Ratio Perm	c0.39			0.08			c0.16		0.00	0.07		0.11
v/c Ratio	0.95	0.39		0.19	0.65		0.35	0.29	0.01	0.16	0.06	0.24
Uniform Delay, d1	21.4	15.6		14.2	17.8		12.8	12.4	10.8	11.6	11.1	12.1
Progression Factor	1.00	1.00		1.00	1.00		1.09	1.09	1.45	1.00	1.00	1.00
Incremental Delay, d2	72.4	0.1		0.1	0.6		1.6	0.9	0.0	0.7	0.1	1.0
Delay (s)	93.8	15.6		14.3	18.5		15.6	14.4	15.8	12.3	11.1	13.1
Level of Service	F	B		B	B		B	B	B	B	B	B
Approach Delay (s)		25.4			18.3			15.0			12.4	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	82.0%	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	88	243	185	28	74	0	0	108	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3492	1562	1770	990			3167	1558
Flt Permitted					0.99	1.00	0.68	1.00			1.00	1.00
Satd. Flow (perm)					3492	1562	1274	990			3167	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	88	243	185	28	74	0	0	108	67
RTOR Reduction (vph)	0	0	0	0	0	149	0	0	0	0	0	22
Lane Group Flow (vph)	0	0	0	0	331	36	28	74	0	0	108	45
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					14.6	14.6	50.9	50.9			50.9	50.9
Effective Green, g (s)					14.6	14.6	50.9	50.9			50.9	50.9
Actuated g/C Ratio					0.19	0.19	0.68	0.68			0.68	0.68
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					679	304	864	671			2149	1057
v/s Ratio Prot								c0.07			0.03	
v/s Ratio Perm					0.09	0.02	0.02					0.03
v/c Ratio					0.49	0.12	0.03	0.11			0.05	0.04
Uniform Delay, d1					26.9	24.9	4.0	4.2			4.0	4.0
Progression Factor					1.00	1.00	1.00	1.00			1.22	1.72
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.0	0.1
Delay (s)					27.1	25.0	4.0	4.2			4.9	6.9
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			26.3			4.1			5.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	30.2%	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)	26	634	114	85	177	24	56	129	137	137	170	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.92		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	3301		1770	3398		1770	937		1770	1127	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3301		1770	3398		1770	937		1770	1127	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	634	114	85	177	24	56	129	137	137	170	37
RTOR Reduction (vph)	0	9	0	0	7	0	0	25	0	0	5	0
Lane Group Flow (vph)	26	739	0	85	194	0	56	241	0	137	202	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	3.4	36.6		10.1	43.8		38.6	38.6		28.3	28.3	
Effective Green, g (s)	3.4	36.6		10.1	43.8		38.6	38.6		28.3	28.3	
Actuated g/C Ratio	0.03	0.28		0.08	0.34		0.30	0.30		0.22	0.22	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	46	932		137	1148		527	279		386	246	
v/s Ratio Prot	0.01	c0.22		c0.05	0.06		0.03	c0.26		0.08	c0.18	
v/s Ratio Perm												
v/c Ratio	0.57	0.79		0.62	0.17		0.11	0.86		0.35	0.82	
Uniform Delay, d1	62.4	43.0		57.9	30.1		33.0	43.0		42.9	48.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.1	4.7		7.3	0.1		0.1	23.1		0.6	18.8	
Delay (s)	71.5	47.7		65.2	30.2		33.1	66.1		43.5	67.0	
Level of Service	E	D		E	C		C	E		D	E	
Approach Delay (s)		48.5			40.6			60.4			57.6	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	51.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	129.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2035 + Project Mid-Range Alternative PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	1007	199	321	1247	174	89	398	226	136	421	68
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3424		1770	3539	1513	1770	1863	1542	1770	1819	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3424		1770	3539	1513	1770	1863	1542	1770	1819	
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)	199	1095	216	349	1355	189	97	433	246	148	458	74
RTOR Reduction (vph)	0	27	0	0	0	119	0	0	178	0	10	0
Lane Group Flow (vph)	199	1284	0	349	1355	70	97	433	68	148	522	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	5.0	16.1		5.0	16.1	16.1	4.6	16.3	16.3	5.4	17.1	
Effective Green, g (s)	5.0	16.1		5.0	16.1	16.1	4.6	16.3	16.3	5.4	17.1	
Actuated g/C Ratio	0.09	0.27		0.09	0.27	0.27	0.08	0.28	0.28	0.09	0.29	
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)	150	937		150	969	414	138	516	427	162	528	
v/s Ratio Prot	0.11	0.38		c0.20	c0.38		0.05	0.23		c0.08	c0.29	
v/s Ratio Perm						0.05			0.04			
v/c Ratio	1.33	1.37		2.33	1.40	0.17	0.70	0.84	0.16	0.91	0.99	
Uniform Delay, d1	26.9	21.3		26.9	21.3	16.3	26.4	20.0	16.1	26.5	20.8	
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	185.6	173.5		617.4	185.6	0.2	15.0	11.4	0.2	46.0	35.9	
Delay (s)	212.5	194.9		644.3	206.9	16.4	41.4	31.5	16.2	72.5	56.6	
Level of Service	F	F		F	F	B	D	C	B	E	E	
Approach Delay (s)		197.2			268.5			27.9			60.1	
Approach LOS		F			F			C			E	

Intersection Summary			
HCM 2000 Control Delay	178.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	1034	470	56	846	142	914	1005	42	277	1178	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3246		1770	3423		3433	3507		1770	3443	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3246		1770	3423		3433	3507		1770	3443	
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)	199	1124	511	61	920	154	993	1092	46	301	1280	166
RTOR Reduction (vph)	0	46	0	0	12	0	0	3	0	0	9	0
Lane Group Flow (vph)	199	1589	0	61	1062	0	993	1135	0	301	1437	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	13.7	33.8		8.8	28.9		13.0	39.4		15.0	40.4	
Effective Green, g (s)	13.7	33.8		8.8	28.9		13.0	39.4		15.0	40.4	
Actuated g/C Ratio	0.12	0.31		0.08	0.26		0.12	0.36		0.14	0.37	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	220	997		141	899		405	1256		241	1264	
v/s Ratio Prot	c0.11	c0.49		0.03	0.31		c0.29	0.32		0.17	c0.42	
v/s Ratio Perm												
v/c Ratio	0.90	1.59		0.43	1.18		2.45	0.90		1.25	1.14	
Uniform Delay, d1	47.5	38.1		48.2	40.5		48.5	33.5		47.5	34.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	35.0	271.8		0.8	93.1		660.8	10.8		141.7	71.6	
Delay (s)	82.5	309.9		49.0	133.7		709.3	44.3		189.2	106.4	
Level of Service	F	F		D	F		F	D		F	F	
Approach Delay (s)		285.2			129.1			354.2			120.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	238.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	131.9%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	854	120	7	259	0	0	0	0	581	508	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		0.99			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.98	1.00
Satd. Flow (prot)		3454			5078					1610	3339	1540
Flt Permitted		1.00			0.92					0.95	0.98	1.00
Satd. Flow (perm)		3454			4659					1610	3339	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	854	120	7	259	0	0	0	0	581	508	380
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	0	230
Lane Group Flow (vph)	0	960	0	0	266	0	0	0	0	354	735	150
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		36.5			36.5					31.5	31.5	31.5
Effective Green, g (s)		36.5			36.5					31.5	31.5	31.5
Actuated g/C Ratio		0.46			0.46					0.39	0.39	0.39
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1575			2125					633	1314	606
v/s Ratio Prot		c0.28										
v/s Ratio Perm					0.06					0.22	0.22	0.10
v/c Ratio		0.61			0.13					0.56	0.56	0.25
Uniform Delay, d1		16.4			12.5					18.9	18.9	16.3
Progression Factor		1.00			0.38					1.00	1.00	1.00
Incremental Delay, d2		1.8			0.1					3.5	1.7	1.0
Delay (s)		18.2			4.9					22.4	20.6	17.3
Level of Service		B			A					C	C	B
Approach Delay (s)		18.2			4.9			0.0			20.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	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)	447	997	0	0	250	934	34	1135	55	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3383			3539	2703		5036				
Flt Permitted	0.95	0.94			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3182			3539	2703		5036				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	447	997	0	0	250	934	34	1135	55	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	73	0	6	0	0	0	0
Lane Group Flow (vph)	402	1042	0	0	250	861	0	1218	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	20.5	49.9			25.9	25.9		19.1				
Effective Green, g (s)	20.5	49.9			25.9	25.9		19.1				
Actuated g/C Ratio	0.26	0.62			0.32	0.32		0.24				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	412	2036			1145	875		1202				
v/s Ratio Prot	c0.25	0.13			0.07							
v/s Ratio Perm		0.19				c0.32		0.24				
v/c Ratio	0.98	0.51			0.22	0.98		1.01				
Uniform Delay, d1	29.5	8.3			19.7	26.8		30.4				
Progression Factor	0.87	1.78			1.00	1.00		1.00				
Incremental Delay, d2	34.4	0.8			0.4	26.8		29.3				
Delay (s)	60.1	15.6			20.1	53.6		59.7				
Level of Service	E	B			C	D		E				
Approach Delay (s)		28.0			46.6			59.7			0.0	
Approach LOS		C			D			E			A	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	99.8%	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)	15	878	410	248	1555	35	756	32	468	75	35	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	878	410	248	1555	35	756	32	468	75	35	73
RTOR Reduction (vph)	0	0	256	0	1	0	0	0	290	0	55	0
Lane Group Flow (vph)	15	878	154	248	1589	0	393	395	178	75	53	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	2.3	44.1	44.1	27.8	69.6		35.9	35.9	35.9	8.5	8.5	
Effective Green, g (s)	2.3	44.1	44.1	27.8	69.6		35.9	35.9	35.9	8.5	8.5	
Actuated g/C Ratio	0.02	0.33	0.33	0.21	0.52		0.27	0.27	0.27	0.06	0.06	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	31	1099	403	269	1773		445	425	335	94	88	
v/s Ratio Prot	0.01	0.27		c0.19	c0.47		0.24	c0.25		c0.05	0.04	
v/s Ratio Perm			0.13						0.14			
v/c Ratio	0.48	0.80	0.38	0.92	0.90		0.88	0.93	0.53	0.80	0.60	
Uniform Delay, d1	64.7	40.3	33.9	51.4	28.4		46.4	47.2	41.3	61.3	60.5	
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	11.4	4.6	1.0	34.7	6.7		18.7	26.8	2.1	36.1	10.5	
Delay (s)	76.1	44.9	35.0	86.1	35.0		65.2	74.1	43.3	97.4	71.0	
Level of Service	E	D	C	F	D		E	E	D	F	E	
Approach Delay (s)		42.2			41.9			59.8			81.8	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	132.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	88.8%	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)	251	718	449	446	1405	240	365	354	450	152	170	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1337	3000		1687	3406	1509	1444	2894		1369	2575	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1337	3000		1687	3406	1509	1444	2894		1369	2575	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	251	718	449	446	1405	240	365	354	450	152	170	76
RTOR Reduction (vph)	0	71	0	0	0	116	0	166	0	0	28	0
Lane Group Flow (vph)	251	1096	0	446	1405	124	365	638	0	134	236	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	20.5	44.0		31.5	55.0	55.0	35.5	35.5		12.0	12.0	
Effective Green, g (s)	20.5	44.0		31.5	55.0	55.0	35.5	35.5		12.0	12.0	
Actuated g/C Ratio	0.15	0.32		0.23	0.39	0.39	0.25	0.25		0.09	0.09	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	196	946		380	1342	594	367	736		117	221	
v/s Ratio Prot	c0.19	c0.37		c0.26	0.41		c0.25	0.22		c0.10	0.09	
v/s Ratio Perm						0.08						
v/c Ratio	1.28	1.16		1.17	1.05	0.21	0.99	0.87		1.15	1.07	
Uniform Delay, d1	59.5	47.8		54.0	42.2	27.9	51.9	49.7		63.8	63.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	159.5	83.5		102.6	37.8	0.2	45.3	10.4		127.5	79.2	
Delay (s)	219.0	131.2		156.6	80.1	28.1	97.2	60.1		191.3	143.0	
Level of Service	F	F		F	F	C	F	E		F	F	
Approach Delay (s)		146.8			90.4			71.7			159.2	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	107.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	105.1%	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	1105	178	235	1427	0	0	0	0	654	618	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4839		1767	3312						3268	
Flt Permitted		1.00		0.15	1.00						0.98	
Satd. Flow (perm)		4839		286	3312						3268	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1105	178	235	1427	0	0	0	0	654	618	480
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	1258	0	235	1427	0	0	0	0	0	1739	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		43.0		43.0	43.0						34.0	
Effective Green, g (s)		43.0		43.0	43.0						34.0	
Actuated g/C Ratio		0.49		0.49	0.49						0.39	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2391		141	1636						1277	
v/s Ratio Prot		0.26			0.43						c0.53	
v/s Ratio Perm				c0.82								
v/c Ratio		0.53		1.67	0.87						1.36	
Uniform Delay, d1		15.0		22.0	19.6						26.5	
Progression Factor		1.00		0.28	0.27						1.00	
Incremental Delay, d2		0.1		302.8	0.5						168.0	
Delay (s)		15.1		309.0	5.7						194.5	
Level of Service		B		F	A						F	
Approach Delay (s)		15.1			48.6			0.0			194.5	
Approach LOS		B			D			A			F	

Intersection Summary			
HCM 2000 Control Delay	93.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	170.2%	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)	424	1335	0	0	1555	443	107	542	178	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.97			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3399			3387				
Flt Permitted	0.09	1.00			1.00			0.99				
Satd. Flow (perm)	173	3539			3399			3387				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	424	1335	0	0	1555	443	107	542	178	0	0	0
RTOR Reduction (vph)	0	0	0	0	30	0	0	17	0	0	0	0
Lane Group Flow (vph)	424	1335	0	0	1968	0	0	810	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	43.0	43.0			43.0			34.0				
Effective Green, g (s)	43.0	43.0			43.0			34.0				
Actuated g/C Ratio	0.49	0.49			0.49			0.39				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1749			1679			1323				
v/s Ratio Prot		0.38			0.58			c0.24				
v/s Ratio Perm	c2.45											
v/c Ratio	4.99	0.76			1.17			0.61				
Uniform Delay, d1	22.0	17.9			22.0			21.2				
Progression Factor	0.90	0.85			1.00			1.00				
Incremental Delay, d2	1808.3	1.0			84.1			0.6				
Delay (s)	1828.0	16.1			106.1			21.8				
Level of Service	F	B			F			C				
Approach Delay (s)		452.8			106.1			21.8			0.0	
Approach LOS		F			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	223.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.04		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	170.2%	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)	60	1107	369	103	1626	26	248	214	166	104	281	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.93		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)	1769	3331		1769	3367		1760	1721		1763	1781	
Flt Permitted	0.08	1.00		0.10	1.00		0.31	1.00		0.30	1.00	
Satd. Flow (perm)	154	3331		192	3367		572	1721		551	1781	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	1107	369	103	1626	26	248	214	166	104	281	91
RTOR Reduction (vph)	0	41	0	0	2	0	0	35	0	0	14	0
Lane Group Flow (vph)	60	1435	0	103	1650	0	248	345	0	104	358	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Effective Green, g (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.29	0.29		0.29	0.29	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2019		116	2041		164	494		158	512	
v/s Ratio Prot		0.43			0.49			0.20			0.20	
v/s Ratio Perm	0.39			c0.54			c0.43			0.19		
v/c Ratio	0.65	0.71		0.89	0.81		1.51	0.70		0.66	0.70	
Uniform Delay, d1	10.2	10.9		13.4	12.2		28.5	25.4		25.0	25.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.7	2.2		57.5	3.6		259.3	8.0		19.5	7.7	
Delay (s)	39.9	13.1		70.9	15.7		287.8	33.4		44.5	33.1	
Level of Service	D	B		E	B		F	C		D	C	
Approach Delay (s)		14.1			19.0			133.9			35.6	
Approach LOS		B			B			F			D	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	131.6%	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)	79	1328	80	55	1203	9	357	565	133	29	12	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.97	1.00	1.00		1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)		3429			3306	1490	1640	1827	1505		1799	1500
Flt Permitted		0.72			0.73	1.00	0.73	1.00	1.00		0.41	1.00
Satd. Flow (perm)		2464			2413	1490	1261	1827	1505		755	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	79	1328	80	55	1203	9	357	565	133	29	12	44
RTOR Reduction (vph)	0	4	0	0	0	2	0	0	36	0	0	31
Lane Group Flow (vph)	0	1483	0	0	1258	7	357	565	97	0	41	13
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		53.7			53.7	53.7	27.3	27.3	27.3		27.3	27.3
Effective Green, g (s)		53.7			53.7	53.7	27.3	27.3	27.3		27.3	27.3
Actuated g/C Ratio		0.60			0.60	0.60	0.30	0.30	0.30		0.30	0.30
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1470			1439	889	382	554	456		229	455
v/s Ratio Prot								c0.31				
v/s Ratio Perm		c0.60			0.52	0.00	0.28		0.06		0.05	0.01
v/c Ratio		1.01			0.87	0.01	0.93	1.02	0.21		0.18	0.03
Uniform Delay, d1		18.1			15.3	7.4	30.5	31.4	23.4		23.1	22.0
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		25.6			7.7	0.0	29.4	43.3	0.1		0.1	0.0
Delay (s)		43.7			23.0	7.4	59.9	74.7	23.4		23.2	22.0
Level of Service		D			C	A	E	E	C		C	C
Approach Delay (s)		43.7			22.8			63.2			22.6	
Approach LOS		D			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	118.7%	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)	203	1101	338	96	839	39	545	686	157	176	890	199
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3481	1482	1770	3195	1540	1732	3425		1764	3427	
Flt Permitted		0.57	1.00	0.12	1.00	1.00	0.18	1.00		0.27	1.00	
Satd. Flow (perm)		2001	1482	233	3195	1540	326	3425		506	3427	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	203	1101	338	96	839	39	545	686	157	176	890	199
RTOR Reduction (vph)	0	0	63	0	0	20	0	9	0	0	22	0
Lane Group Flow (vph)	0	1304	275	96	839	19	545	834	0	176	1067	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		32.0	32.0	32.0	32.0	32.0	43.5	43.5		43.5	43.5	
Effective Green, g (s)		32.0	32.0	32.0	32.0	32.0	43.5	43.5		43.5	43.5	
Actuated g/C Ratio		0.38	0.38	0.38	0.38	0.38	0.51	0.51		0.51	0.51	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		753	557	87	1202	579	166	1752		258	1753	
v/s Ratio Prot					0.26			0.24			0.31	
v/s Ratio Perm		c0.65	0.19	0.41		0.01	c1.67			0.35		
v/c Ratio		1.73	0.49	1.10	0.70	0.03	3.28	0.48		0.68	0.61	
Uniform Delay, d1		26.5	20.3	26.5	22.4	16.7	20.8	13.4		15.6	14.7	
Progression Factor		1.00	1.00	0.57	0.61	0.12	1.00	1.00		1.00	1.00	
Incremental Delay, d2		334.8	3.1	120.5	2.9	0.1	1042.8	0.4		7.8	0.7	
Delay (s)		361.3	23.4	135.6	16.7	2.2	1063.5	13.8		23.4	15.4	
Level of Service		F	C	F	B	A	F	B		C	B	
Approach Delay (s)		291.8			27.8			426.0			16.5	
Approach LOS		F			C			F			B	

Intersection Summary			
HCM 2000 Control Delay	212.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.62		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	136.8%	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)	119	1124	25	63	1023	57	27	225	346	35	77	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1586	3154	1360	1585	3065	1375		3160	1171		2844	
Flt Permitted	0.23	1.00	1.00	0.20	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	379	3154	1360	325	3065	1375		2890	1171		2511	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	1124	25	63	1023	57	27	225	346	35	77	98
RTOR Reduction (vph)	0	0	6	0	0	17	0	0	45	0	61	0
Lane Group Flow (vph)	119	1124	19	63	1023	40	0	252	301	0	149	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	51.6	51.6	51.6	51.6	51.6	51.6		24.9	24.9		24.9	
Effective Green, g (s)	51.6	51.6	51.6	51.6	51.6	51.6		24.9	24.9		24.9	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61		0.29	0.29		0.29	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	230	1914	825	197	1860	834		846	343		735	
v/s Ratio Prot		c0.36			0.33							
v/s Ratio Perm	0.31		0.01	0.19		0.03		0.09	c0.26		0.06	
v/c Ratio	0.52	0.59	0.02	0.32	0.55	0.05		0.30	0.88		0.20	
Uniform Delay, d1	9.6	10.2	6.7	8.1	9.9	6.8		23.3	28.6		22.6	
Progression Factor	0.92	1.01	0.97	1.45	1.43	1.62		1.00	1.00		1.00	
Incremental Delay, d2	0.8	0.1	0.0	3.3	0.9	0.1		0.1	20.8		0.0	
Delay (s)	9.5	10.4	6.4	15.1	15.1	11.0		23.4	49.4		22.6	
Level of Service	A	B	A	B	B	B		C	D		C	
Approach Delay (s)		10.2			14.9			38.4			22.6	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	475	938	805	525	267	212
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	0.99	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	2977	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	2977	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	475	938	805	525	267	212
RTOR Reduction (vph)	0	0	0	240	27	126
Lane Group Flow (vph)	475	938	805	285	301	25
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	30.6	62.7	28.1	28.1	14.3	14.3
Effective Green, g (s)	30.6	62.7	28.1	28.1	14.3	14.3
Actuated g/C Ratio	0.36	0.74	0.33	0.33	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	567	2282	1013	456	500	204
v/s Ratio Prot	c0.30	0.30	c0.26		c0.10	
v/s Ratio Perm				0.21		0.02
v/c Ratio	0.84	0.41	0.79	0.62	0.60	0.12
Uniform Delay, d1	24.9	4.2	25.8	24.0	32.7	30.0
Progression Factor	0.92	0.95	1.12	1.36	1.00	1.00
Incremental Delay, d2	8.0	0.4	0.4	0.2	1.4	0.1
Delay (s)	31.0	4.4	29.4	32.9	34.1	30.1
Level of Service	C	A	C	C	C	C
Approach Delay (s)		13.3	30.8		32.9	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.7%	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)	148	906	33	125	797	92	402	1104	298	91	438	172
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	0.99	1.00			1.00		0.98	1.00	1.00	0.99	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1580	3162			3101		1563	3185	1309	1578	2991	
Flt Permitted	0.17	1.00			0.62		0.35	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	285	3162			1928		580	3185	1309	221	2991	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	148	906	33	125	797	92	402	1104	298	91	438	172
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	33	0	46	0
Lane Group Flow (vph)	148	936	0	0	1005	0	402	1104	265	91	564	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Effective Green, g (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Actuated g/C Ratio	0.46	0.46			0.46		0.45	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	130	1450			884		259	1423	585	98	1337	
v/s Ratio Prot		0.30						0.35			0.19	
v/s Ratio Perm	0.52				c0.52		c0.69		0.20	0.41		
v/c Ratio	1.14	0.65			1.14		1.55	0.78	0.45	0.93	0.42	
Uniform Delay, d1	23.0	17.7			23.0		23.5	19.9	16.3	22.2	16.0	
Progression Factor	0.83	0.86			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	118.2	2.1			75.6		266.7	2.5	0.2	66.6	0.1	
Delay (s)	137.2	17.2			98.6		290.2	22.4	16.5	88.8	16.1	
Level of Service	F	B			F		F	C	B	F	B	
Approach Delay (s)		33.6			98.6			81.1			25.5	
Approach LOS		C			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	65.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	123.7%	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)	324	871	233	463	720	76	10	1944	730	3	1257	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1349	3090	3185	1349		4575	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.93	1.00
Satd. Flow (perm)	3090	3154	1349	3090	3185	1349		4253	1391		4241	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	324	871	233	463	720	76	10	1944	730	3	1257	211
RTOR Reduction (vph)	0	0	65	0	0	53	0	0	0	0	0	79
Lane Group Flow (vph)	324	871	168	463	720	24	0	1954	730	0	1260	132
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Effective Green, g (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Actuated g/C Ratio	0.12	0.29	0.29	0.13	0.30	0.30		0.43	1.00		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	357	913	390	390	955	404		1813	1391		1808	575
v/s Ratio Prot	0.10	c0.28		c0.15	0.23							
v/s Ratio Perm			0.12			0.02		c0.46	0.52		0.30	0.10
v/c Ratio	0.91	0.95	0.43	1.19	0.75	0.06		1.08	0.52		0.70	0.23
Uniform Delay, d1	41.5	33.1	27.4	41.5	30.1	23.7		27.2	0.0		22.2	17.3
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	25.7	20.5	3.4	107.2	5.5	0.3		45.6	1.4		1.2	0.2
Delay (s)	67.2	53.7	30.8	148.7	35.6	24.0		72.8	1.4		23.4	17.5
Level of Service	E	D	C	F	D	C		E	A		C	B
Approach Delay (s)		53.0			76.5			53.4			22.6	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	50.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	103.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt PM

Adeline & 18th
2035 + Project Mid-Range Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	21	2.0	0.930	43.2	LOS E	14.8	376.5	1.00	1.53	16.4
8	T	526	2.0	0.930	43.2	LOS E	14.8	376.5	1.00	1.53	16.6
18	R	101	2.0	0.930	43.2	LOS E	14.8	376.5	1.00	1.53	16.5
Approach		648	2.0	0.930	43.2	LOS E	14.8	376.5	1.00	1.53	16.5
East: 18th Street (WB)											
1	L	13	2.0	0.252	7.7	LOS A	1.1	28.0	0.63	0.98	26.6
6	T	122	2.0	0.252	7.7	LOS A	1.1	28.0	0.63	0.78	29.0
16	R	54	2.0	0.252	7.7	LOS A	1.1	28.0	0.63	0.82	28.7
Approach		189	2.0	0.252	7.7	LOS A	1.1	28.0	0.63	0.81	28.7
North: Adeline Street (SB)											
7	L	325	2.0	0.627	11.0	LOS B	5.4	136.8	0.59	0.74	24.9
4	T	364	2.0	0.627	11.0	LOS B	5.4	136.8	0.59	0.56	26.9
14	R	64	2.0	0.627	11.0	LOS B	5.4	136.8	0.59	0.60	26.6
Approach		753	2.0	0.627	11.0	LOS B	5.4	136.8	0.59	0.64	25.9
West: 18th Street (EB)											
5	L	72	2.0	0.601	15.8	LOS C	4.1	103.0	0.81	1.09	23.3
2	T	294	2.0	0.601	15.8	LOS C	4.1	103.0	0.81	0.99	24.7
12	R	48	2.0	0.601	15.8	LOS C	4.1	103.0	0.81	1.02	24.5
Approach		414	2.0	0.601	15.8	LOS C	4.1	103.0	0.81	1.01	24.4
All Vehicles		2004	2.0	0.930	22.1	LOS C	14.8	376.5	0.77	1.02	21.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	483	45	16	114	102	59	765	52	45	191	24
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		1.00	0.99		1.00	0.99			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.98	1.00			1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1755	1831		1748	1711		1728	3486			3429	
Flt Permitted	0.56	1.00		0.18	1.00		0.59	1.00			0.79	
Satd. Flow (perm)	1043	1831		323	1711		1075	3486			2745	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	134	483	45	16	114	102	59	765	52	45	191	24
RTOR Reduction (vph)	0	5	0	0	48	0	0	7	0	0	10	0
Lane Group Flow (vph)	134	523	0	16	168	0	59	810	0	0	250	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	22.8	22.8		22.8	22.8		37.1	37.1			37.1	
Effective Green, g (s)	22.8	22.8		22.8	22.8		37.1	37.1			37.1	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.55	0.55			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)	350	614		108	574		587	1904			1499	
v/s Ratio Prot		c0.29			0.10			c0.23				
v/s Ratio Perm	0.13			0.05			0.05				0.09	
v/c Ratio	0.38	0.85		0.15	0.29		0.10	0.43			0.17	
Uniform Delay, d1	17.2	21.0		15.8	16.6		7.4	9.1			7.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.7	11.0		0.6	0.3		0.3	0.7			0.2	
Delay (s)	17.9	32.0		16.4	16.9		7.7	9.8			7.9	
Level of Service	B	C		B	B		A	A			A	
Approach Delay (s)		29.2			16.9			9.7			7.9	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt PM

Adeline & 14th
2035 + Project Mid-Range Alternative PM
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	18	2.0	0.623	12.6	LOS B	5.3	133.5	0.75	0.98	24.6
8	T	542	2.0	0.623	12.6	LOS B	5.3	133.5	0.75	0.84	26.3
18	R	53	2.0	0.623	12.6	LOS B	5.3	133.5	0.75	0.87	26.1
Approach		613	2.0	0.623	12.6	LOS B	5.3	133.5	0.75	0.84	26.2
East: 14th Street (WB)											
1	L	90	2.0	0.437	10.7	LOS B	2.4	60.3	0.71	1.01	25.2
6	T	203	2.0	0.437	10.7	LOS B	2.4	60.3	0.71	0.87	27.1
16	R	35	2.0	0.437	10.7	LOS B	2.4	60.3	0.71	0.90	26.9
Approach		328	2.0	0.437	10.7	LOS B	2.4	60.3	0.71	0.91	26.5
North: Adeline Street (SB)											
7	L	63	2.0	0.399	7.8	LOS A	2.2	56.7	0.57	0.87	26.4
4	T	313	2.0	0.399	7.8	LOS A	2.2	56.7	0.57	0.65	28.9
14	R	34	2.0	0.399	7.8	LOS A	2.2	56.7	0.57	0.69	28.6
Approach		410	2.0	0.399	7.8	LOS A	2.2	56.7	0.57	0.69	28.4
West: 14th Street (EB)											
5	L	58	2.0	0.368	8.3	LOS A	1.9	47.0	0.63	0.94	26.2
2	T	231	2.0	0.368	8.3	LOS A	1.9	47.0	0.63	0.75	28.5
12	R	34	2.0	0.368	8.3	LOS A	1.9	47.0	0.63	0.79	28.3
Approach		323	2.0	0.368	8.3	LOS A	1.9	47.0	0.63	0.78	28.0
All Vehicles		1674	2.0	0.623	10.2	LOS B	5.3	133.5	0.67	0.81	27.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt PM

Adeline & 12th
2035 + Project Mid-Range Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.363	6.1	LOS A	2.3	57.4	0.27	0.86	27.0
8	T	469	2.0	0.363	6.1	LOS A	2.3	57.4	0.27	0.44	30.1
18	R	7	2.0	0.363	6.1	LOS A	2.3	57.4	0.27	0.53	29.6
Approach		477	2.0	0.363	6.1	LOS A	2.3	57.4	0.27	0.44	30.1
East: 12th Street (WB)											
1	L	10	2.0	0.188	6.1	LOS A	0.8	21.0	0.56	0.88	27.1
6	T	21	2.0	0.188	6.1	LOS A	0.8	21.0	0.56	0.67	29.8
16	R	132	2.0	0.188	6.1	LOS A	0.8	21.0	0.56	0.72	29.5
Approach		163	2.0	0.188	6.1	LOS A	0.8	21.0	0.56	0.72	29.4
North: Adeline Street (SB)											
7	L	57	2.0	0.306	5.3	LOS A	1.8	45.9	0.16	0.86	27.3
4	T	353	2.0	0.306	5.3	LOS A	1.8	45.9	0.16	0.41	30.6
14	R	8	2.0	0.306	5.3	LOS A	1.8	45.9	0.16	0.50	30.0
Approach		418	2.0	0.306	5.3	LOS A	1.8	45.9	0.16	0.47	30.1
West: 12th Street (EB)											
5	L	8	2.0	0.017	4.0	LOS A	0.1	1.8	0.47	0.75	28.0
2	T	5	2.0	0.017	4.0	LOS A	0.1	1.8	0.47	0.52	31.1
12	R	3	2.0	0.017	4.0	LOS A	0.1	1.8	0.47	0.57	30.7
Approach		16	2.0	0.017	4.0	LOS A	0.1	1.8	0.47	0.65	29.4
All Vehicles		1074	2.0	0.363	5.8	LOS A	2.3	57.4	0.27	0.50	30.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	185	0	0	173	232	156	505	219	239	0	507
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.91		1.00	0.96		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2607		972	2915		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2607		972	2915		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	253	185	0	0	173	232	156	505	219	239	0	507
RTOR Reduction (vph)	0	0	0	0	200	0	0	37	0	0	0	415
Lane Group Flow (vph)	253	185	0	0	205	0	140	703	0	239	0	92
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	20.9	37.5			13.1		26.5	26.5		17.1		17.1
Effective Green, g (s)	20.9	37.5			13.1		26.5	26.5		17.1		17.1
Actuated g/C Ratio	0.22	0.40			0.14		0.28	0.28		0.18		0.18
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	303	1319			362		273	820		282		449
v/s Ratio Prot	c0.19	0.06			c0.08		0.14	c0.24		c0.15		0.04
v/s Ratio Perm												
v/c Ratio	0.83	0.14			0.57		0.51	0.86		0.85		0.21
Uniform Delay, d1	35.0	18.0			37.9		28.4	32.0		37.2		32.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	17.0	0.0			1.7		1.2	8.7		20.1		0.2
Delay (s)	51.9	18.1			39.5		29.6	40.8		57.3		32.9
Level of Service	D	B			D		C	D		E		C
Approach Delay (s)		37.6			39.5			39.0			40.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	94.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	74.1%	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)	85	679	22	102	635	380	20	108	30	405	162	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			1.00		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.94			0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3378		1770	3173			1781		1756	1752	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.63	1.00	
Satd. Flow (perm)	1770	3378		1770	3173			1711		1172	1752	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	679	22	102	635	380	20	108	30	405	162	46
RTOR Reduction (vph)	0	2	0	0	89	0	0	11	0	0	12	0
Lane Group Flow (vph)	85	699	0	102	926	0	0	147	0	405	196	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.2	37.0		7.9	38.7			34.1		34.1	34.1	
Effective Green, g (s)	6.2	37.0		7.9	38.7			34.1		34.1	34.1	
Actuated g/C Ratio	0.07	0.41		0.09	0.43			0.38		0.38	0.38	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	121	1388		155	1364			648		444	663	
v/s Ratio Prot	c0.05	0.21		0.06	c0.29						0.11	
v/s Ratio Perm								0.09		c0.35		
v/c Ratio	0.70	0.50		0.66	0.68			0.23		0.91	0.29	
Uniform Delay, d1	41.0	19.7		39.7	20.6			19.0		26.5	19.5	
Progression Factor	0.95	0.92		0.98	0.67			1.00		1.00	1.00	
Incremental Delay, d2	14.0	0.1		7.4	2.7			0.1		22.5	0.1	
Delay (s)	52.8	18.1		46.3	16.6			19.1		49.0	19.6	
Level of Service	D	B		D	B			B		D	B	
Approach Delay (s)		21.9			19.3			19.1			39.0	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	80.4%	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)	62	1571	44	70	1335	254	42	116	122	92	116	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	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	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3383		1054	3471	1460	1574	1062		1758	1574	
Flt Permitted	0.12	1.00		0.09	1.00	1.00	0.63	1.00		0.53	1.00	
Satd. Flow (perm)	216	3383		101	3471	1460	1042	1062		972	1574	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	1571	44	70	1335	254	42	116	122	92	116	45
RTOR Reduction (vph)	0	2	0	0	0	114	0	13	0	0	18	0
Lane Group Flow (vph)	62	1613	0	70	1335	140	42	225	0	92	143	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	118	1860		55	1909	803	364	371		340	550	
v/s Ratio Prot		0.48			0.38			c0.21			0.09	
v/s Ratio Perm	0.29			c0.69		0.10	0.04			0.09		
v/c Ratio	0.53	0.87		1.27	0.70	0.17	0.12	0.61		0.27	0.26	
Uniform Delay, d1	11.4	15.5		18.0	13.2	9.0	17.6	21.5		18.7	18.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.7	5.8		211.4	2.2	0.5	0.6	7.2		2.0	1.2	
Delay (s)	27.1	21.2		229.4	15.3	9.4	18.3	28.6		20.6	19.7	
Level of Service	C	C		F	B	A	B	C		C	B	
Approach Delay (s)		21.5			23.5			27.1			20.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.5%	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)	104	1366	74	25	998	68	513	385	35	78	57	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1668	4281		1767	4531		1742	1863	1538	1755	3539	1216
Flt Permitted	0.20	1.00		0.11	1.00		0.72	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	349	4281		201	4531		1316	1863	1538	777	3539	1216
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	104	1366	74	25	998	68	513	385	35	78	57	111
RTOR Reduction (vph)	0	7	0	0	9	0	0	0	14	0	0	26
Lane Group Flow (vph)	104	1433	0	25	1057	0	513	385	21	78	57	85
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	37.0	37.0		37.0	37.0		38.5	38.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	37.0	37.0		37.0	37.0		38.5	38.5	38.5	38.5	38.5	38.5
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.45	0.45	0.45	0.45	0.45	0.45
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	151	1863		87	1972		596	843	696	351	1602	550
v/s Ratio Prot		c0.33			0.23			0.21			0.02	
v/s Ratio Perm	0.30			0.12			c0.39		0.01	0.10		0.07
v/c Ratio	0.69	0.77		0.29	0.54		0.86	0.46	0.03	0.22	0.04	0.16
Uniform Delay, d1	19.4	20.4		15.5	17.7		20.8	16.0	12.9	14.1	12.9	13.7
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	22.7	3.1		0.7	0.1		15.1	1.8	0.1	1.5	0.0	0.6
Delay (s)	42.1	23.5		16.2	17.8		35.9	17.8	13.0	15.6	13.0	14.3
Level of Service	D	C		B	B		D	B	B	B	B	B
Approach Delay (s)		24.8			17.8			27.6			14.4	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	102.0%	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	24	162	500	47	133	0	0	118	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3516	1561	1770	1111			2865	1558
Flt Permitted					0.99	1.00	0.68	1.00			1.00	1.00
Satd. Flow (perm)					3516	1561	1262	1111			2865	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	24	162	500	47	133	0	0	118	24
RTOR Reduction (vph)	0	0	0	0	0	427	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	186	73	47	133	0	0	118	18
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					13.2	13.2	67.3	67.3			67.3	67.3
Effective Green, g (s)					13.2	13.2	67.3	67.3			67.3	67.3
Actuated g/C Ratio					0.15	0.15	0.75	0.75			0.75	0.75
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					515	228	943	830			2142	1165
v/s Ratio Prot								c0.12			0.04	
v/s Ratio Perm					0.05	0.05	0.04					0.01
v/c Ratio					0.36	0.32	0.05	0.16			0.06	0.02
Uniform Delay, d1					34.6	34.4	3.0	3.3			3.0	2.9
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.2	0.3	0.0	0.0			0.0	0.0
Delay (s)					34.8	34.7	3.0	3.3			3.0	2.9
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			34.7			3.2			3.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	49.3%	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)	26	944	65	41	112	26	107	283	148	143	158	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3366		1770	3295		1770	1068		1770	1091	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3366		1770	3295		1770	1068		1770	1091	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	65	41	112	26	107	283	148	143	158	14
RTOR Reduction (vph)	0	3	0	0	12	0	0	12	0	0	2	0
Lane Group Flow (vph)	26	1006	0	41	126	0	107	419	0	143	170	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	4.0	49.6		4.0	50.1		62.0	62.0		25.0	25.0	
Effective Green, g (s)	4.0	49.6		4.0	50.1		62.0	62.0		25.0	25.0	
Actuated g/C Ratio	0.03	0.32		0.03	0.32		0.40	0.40		0.16	0.16	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	45	1066		45	1054		700	422		282	174	
v/s Ratio Prot	0.01	c0.30		c0.02	0.04		0.06	c0.39		0.08	c0.16	
v/s Ratio Perm												
v/c Ratio	0.58	0.94		0.91	0.12		0.15	0.99		0.51	0.98	
Uniform Delay, d1	75.5	52.1		76.1	37.7		30.4	47.1		60.2	65.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.7	15.7		100.2	0.1		0.1	41.7		1.4	61.3	
Delay (s)	86.1	67.8		176.3	37.7		30.5	88.8		61.6	126.8	
Level of Service	F	E		F	D		C	F		E	F	
Approach Delay (s)		68.3			69.4			77.2			97.2	
Approach LOS		E			E			E			F	

Intersection Summary			
HCM 2000 Control Delay	75.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	156.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

2035 + Project Mid-Range Alternative AM Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	47	1258	66	286	1369	250	62	166	189	374	511	146
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3504		1770	3539	1518	1770	1863	1540	1770	1792	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3504		1770	3539	1518	1770	1863	1540	1770	1792	
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)	51	1367	72	311	1488	272	67	180	205	407	555	159
RTOR Reduction (vph)	0	6	0	0	0	100	0	0	138	0	17	0
Lane Group Flow (vph)	51	1433	0	311	1488	172	67	180	67	407	697	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.3	17.9		8.0	23.6	23.6	2.3	14.5	14.5	4.0	16.2	
Effective Green, g (s)	2.3	17.9		8.0	23.6	23.6	2.3	14.5	14.5	4.0	16.2	
Actuated g/C Ratio	0.04	0.30		0.13	0.39	0.39	0.04	0.24	0.24	0.07	0.27	
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)	67	1038		234	1382	593	67	447	369	117	480	
v/s Ratio Prot	0.03	c0.41		c0.18	0.42		0.04	0.10		c0.23	c0.39	
v/s Ratio Perm						0.11			0.04			
v/c Ratio	0.76	1.38		1.33	1.08	0.29	1.00	0.40	0.18	3.48	1.45	
Uniform Delay, d1	28.8	21.2		26.2	18.4	12.6	29.1	19.3	18.2	28.2	22.1	
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	39.2	177.2		174.4	47.7	0.3	110.0	0.6	0.2	1136.6	215.0	
Delay (s)	67.9	198.4		200.6	66.1	12.9	139.0	19.9	18.5	1164.8	237.1	
Level of Service	E	F		F	E	B	F	B	B	F	F	
Approach Delay (s)		194.0			79.3			36.9			573.9	
Approach LOS		F			E			D			F	

Intersection Summary			
HCM 2000 Control Delay	216.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.62		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	256	922	914	126	1163	190	861	814	44	165	1320	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3079		1770	3425		3433	3498		1770	3402	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3079		1770	3425		3433	3498		1770	3402	
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)	278	1002	993	137	1264	207	936	885	48	179	1435	283
RTOR Reduction (vph)	0	162	0	0	12	0	0	3	0	0	15	0
Lane Group Flow (vph)	278	1833	0	137	1459	0	936	930	0	179	1703	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	18.6	35.0		11.0	27.4		15.0	37.1		13.9	35.0	
Effective Green, g (s)	18.6	35.0		11.0	27.4		15.0	37.1		13.9	35.0	
Actuated g/C Ratio	0.17	0.32		0.10	0.25		0.14	0.34		0.13	0.32	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	299	979		177	853		468	1179		223	1082	
v/s Ratio Prot	c0.16	c0.60		0.08	0.43		c0.27	0.27		0.10	c0.50	
v/s Ratio Perm												
v/c Ratio	0.93	1.87		0.77	1.71		2.00	0.79		0.80	1.57	
Uniform Delay, d1	45.1	37.5		48.3	41.3		47.5	32.9		46.7	37.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	33.2	396.3		17.3	324.7		457.6	5.4		18.0	262.8	
Delay (s)	78.3	433.8		65.6	366.0		505.1	38.3		64.7	300.3	
Level of Service	E	F		E	F		F	D		E	F	
Approach Delay (s)		390.3			340.4			272.1			278.0	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	323.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	150.2%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	519	81	12	278	0	0	0	0	631	883	399
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		0.99			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3446			5073					1610	3367	1550
Flt Permitted		1.00			0.88					0.95	0.99	1.00
Satd. Flow (perm)		3446			4479					1610	3367	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	519	81	12	278	0	0	0	0	631	883	399
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	0	0	0	71
Lane Group Flow (vph)	0	584	0	0	290	0	0	0	0	492	1022	328
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		17.0			17.0					51.0	51.0	51.0
Effective Green, g (s)		17.0			17.0					51.0	51.0	51.0
Actuated g/C Ratio		0.21			0.21					0.64	0.64	0.64
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		732			951					1026	2146	988
v/s Ratio Prot		c0.17										
v/s Ratio Perm					0.06					c0.31	0.30	0.21
v/c Ratio		0.80			0.30					0.48	0.48	0.33
Uniform Delay, d1		29.9			26.5					7.6	7.5	6.7
Progression Factor		1.00			1.12					1.00	1.00	1.00
Incremental Delay, d2		8.9			0.8					1.6	0.8	0.9
Delay (s)		38.7			30.4					9.2	8.3	7.6
Level of Service		D			C					A	A	A
Approach Delay (s)		38.7			30.4			0.0			8.4	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	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)	284	882	0	0	270	737	7	747	28	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3385			3539	2706		5048				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3215			3539	2706		5048				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	284	882	0	0	270	737	7	747	28	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	192	0	5	0	0	0	0
Lane Group Flow (vph)	256	910	0	0	270	545	0	777	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	21.5	52.5			27.5	27.5		16.5				
Effective Green, g (s)	21.5	52.5			27.5	27.5		16.5				
Actuated g/C Ratio	0.27	0.66			0.34	0.34		0.21				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	432	2155			1216	930		1041				
v/s Ratio Prot	c0.16	0.11			0.08							
v/s Ratio Perm		0.16				c0.20		0.15				
v/c Ratio	0.59	0.42			0.22	0.59		0.75				
Uniform Delay, d1	25.4	6.5			18.7	21.6		29.8				
Progression Factor	0.92	0.77			1.00	1.00		1.00				
Incremental Delay, d2	4.7	0.5			0.4	2.7		4.9				
Delay (s)	28.0	5.5			19.1	24.3		34.7				
Level of Service	C	A			B	C		C				
Approach Delay (s)		10.4			22.9			34.7			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	81.1%	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)	61	816	747	387	1605	69	212	45	325	30	21	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3332		1243	1248	946	1203	1115	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3332		1243	1248	946	1203	1115	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	816	747	387	1605	69	212	45	325	30	21	20
RTOR Reduction (vph)	0	0	347	0	2	0	0	0	275	0	19	0
Lane Group Flow (vph)	61	816	400	387	1672	0	127	130	50	30	22	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	5.5	43.4	43.4	33.0	70.9		17.7	17.7	17.7	4.7	4.7	
Effective Green, g (s)	5.5	43.4	43.4	33.0	70.9		17.7	17.7	17.7	4.7	4.7	
Actuated g/C Ratio	0.05	0.38	0.38	0.29	0.61		0.15	0.15	0.15	0.04	0.04	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	86	1246	528	441	2048		190	191	145	49	45	
v/s Ratio Prot	0.03	0.25		c0.25	c0.50		0.10	c0.10		c0.02	0.02	
v/s Ratio Perm			0.29						0.05			
v/c Ratio	0.71	0.65	0.76	0.88	0.82		0.67	0.68	0.34	0.61	0.48	
Uniform Delay, d1	54.1	29.8	31.4	39.2	17.2		46.0	46.1	43.6	54.4	54.1	
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	21.9	1.3	6.4	17.1	2.7		8.6	9.6	1.4	14.9	3.0	
Delay (s)	76.0	31.1	37.7	56.3	19.9		54.6	55.7	45.0	69.3	57.1	
Level of Service	E	C	D	E	B		D	E	D	E	E	
Approach Delay (s)		35.8			26.7			49.5			62.2	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	115.3	Sum of lost time (s)	16.5
Intersection Capacity Utilization	83.9%	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)	155	748	275	284	1380	335	515	242	507	230	234	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.90		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1014	2883		1299	3438	1369	1480	2543		1480	2259	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1014	2883		1299	3438	1369	1480	2543		1480	2259	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	748	275	284	1380	335	515	242	507	230	234	180
RTOR Reduction (vph)	0	27	0	0	0	165	0	245	0	0	78	0
Lane Group Flow (vph)	155	996	0	284	1380	170	515	504	0	207	359	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	15.5	40.0		25.5	50.0	50.0	38.5	38.5		19.0	19.0	
Effective Green, g (s)	15.5	40.0		25.5	50.0	50.0	38.5	38.5		19.0	19.0	
Actuated g/C Ratio	0.11	0.29		0.18	0.36	0.36	0.28	0.28		0.14	0.14	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	112	826		237	1232	490	408	701		201	307	
v/s Ratio Prot	c0.15	c0.35		c0.22	0.40		c0.35	0.20		0.14	c0.16	
v/s Ratio Perm						0.12						
v/c Ratio	1.38	1.21		1.20	1.12	0.35	1.26	0.72		1.03	1.17	
Uniform Delay, d1	62.0	49.8		57.0	44.8	32.8	50.5	45.6		60.2	60.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	218.6	103.9		122.6	65.3	0.4	136.4	3.3		71.5	105.8	
Delay (s)	280.6	153.7		179.6	110.1	33.2	186.9	48.9		131.7	166.0	
Level of Service	F	F		F	F	C	F	D		F	F	
Approach Delay (s)		170.4			107.1			105.1			155.0	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	127.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	102.0%	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	1455	51	116	1232	0	0	0	0	449	322	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.94	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4961		1768	3343						3131	
Flt Permitted		1.00		0.12	1.00						0.98	
Satd. Flow (perm)		4961		219	3343						3131	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1455	51	116	1232	0	0	0	0	449	322	515
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	33	0
Lane Group Flow (vph)	0	1502	0	116	1232	0	0	0	0	0	1253	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		47.0		47.0	47.0						30.0	
Effective Green, g (s)		47.0		47.0	47.0						30.0	
Actuated g/C Ratio		0.54		0.54	0.54						0.34	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2680		118	1805						1079	
v/s Ratio Prot		0.30			0.37						c0.40	
v/s Ratio Perm				c0.53								
v/c Ratio		0.56		0.98	0.68						1.16	
Uniform Delay, d1		13.2		19.6	14.6						28.5	
Progression Factor		1.00		0.43	0.36						1.00	
Incremental Delay, d2		0.2		58.5	0.5						82.9	
Delay (s)		13.3		67.0	5.8						111.4	
Level of Service		B		E	A						F	
Approach Delay (s)		13.3			11.0			0.0			111.4	
Approach LOS		B			B			A			F	

Intersection Summary			
HCM 2000 Control Delay	43.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	144.1%	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)	340	1564	0	0	1168	351	180	389	123	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.97			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3394			3387				
Flt Permitted	0.09	1.00			1.00			0.99				
Satd. Flow (perm)	159	3539			3394			3387				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	340	1564	0	0	1168	351	180	389	123	0	0	0
RTOR Reduction (vph)	0	0	0	0	33	0	0	14	0	0	0	0
Lane Group Flow (vph)	340	1564	0	0	1486	0	0	678	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	47.0	47.0			47.0			30.0				
Effective Green, g (s)	47.0	47.0			47.0			30.0				
Actuated g/C Ratio	0.54	0.54			0.54			0.34				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1911			1833			1167				
v/s Ratio Prot		0.44			0.44			c0.20				
v/s Ratio Perm	c2.14											
v/c Ratio	4.00	0.82			0.81			0.58				
Uniform Delay, d1	20.0	16.5			16.4			23.4				
Progression Factor	0.74	0.66			1.00			1.00				
Incremental Delay, d2	1369.5	1.9			2.7			0.5				
Delay (s)	1384.2	12.8			19.0			23.8				
Level of Service	F	B			B			C				
Approach Delay (s)		257.7			19.0			23.8			0.0	
Approach LOS		F			B			C			A	

Intersection Summary			
HCM 2000 Control Delay	130.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.64		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	144.1%	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)	48	1264	115	111	1587	16	50	80	44	21	139	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		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)	1768	3423		1768	3401		1755	1747		1757	1774	
Flt Permitted	0.08	1.00		0.12	1.00		0.60	1.00		0.68	1.00	
Satd. Flow (perm)	157	3423		223	3401		1102	1747		1253	1774	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	1264	115	111	1587	16	50	80	44	21	139	50
RTOR Reduction (vph)	0	9	0	0	1	0	0	25	0	0	16	0
Lane Group Flow (vph)	48	1370	0	111	1602	0	50	100	0	21	173	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Effective Green, g (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30		0.30	0.30	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2032		132	2019		330	524		375	532	
v/s Ratio Prot		0.40			0.47			0.06			c0.10	
v/s Ratio Perm	0.31			c0.50			0.05			0.02		
v/c Ratio	0.52	0.67		0.84	0.79		0.15	0.19		0.06	0.33	
Uniform Delay, d1	9.5	11.0		13.2	12.5		20.5	20.8		19.9	21.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.0	1.8		44.5	3.3		1.0	0.8		0.3	1.6	
Delay (s)	28.5	12.8		57.6	15.8		21.5	21.6		20.2	23.3	
Level of Service	C	B		E	B		C	C		C	C	
Approach Delay (s)		13.4			18.5			21.6			23.0	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	136.4%	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)	50	1028	229	51	1250	13	365	286	108	3	111	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)		3325			3299	1489	1645	1845	1506		1860	1517
Flt Permitted		0.79			0.78	1.00	0.67	1.00	1.00		0.99	1.00
Satd. Flow (perm)		2634			2590	1489	1161	1845	1506		1851	1517
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	1028	229	51	1250	13	365	286	108	3	111	103
RTOR Reduction (vph)	0	19	0	0	0	3	0	0	60	0	0	34
Lane Group Flow (vph)	0	1288	0	0	1301	10	365	286	48	0	114	69
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		51.4			51.4	51.4	29.6	29.6	29.6		29.6	29.6
Effective Green, g (s)		51.4			51.4	51.4	29.6	29.6	29.6		29.6	29.6
Actuated g/C Ratio		0.57			0.57	0.57	0.33	0.33	0.33		0.33	0.33
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1504			1479	850	381	606	495		608	498
v/s Ratio Prot								0.16				
v/s Ratio Perm		0.49			c0.50	0.01	c0.31		0.03		0.06	0.05
v/c Ratio		0.86			0.88	0.01	0.96	0.47	0.10		0.19	0.14
Uniform Delay, d1		16.2			16.6	8.3	29.6	24.0	20.9		21.6	21.2
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		6.5			7.8	0.0	34.6	0.2	0.0		0.1	0.0
Delay (s)		22.7			24.4	8.4	64.2	24.2	21.0		21.7	21.3
Level of Service		C			C	A	E	C	C		C	C
Approach Delay (s)		22.7			24.3			43.0			21.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	108.3%	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)	74	865	233	69	1214	213	95	672	32	60	1212	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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3432	1510	1764	3252	1540	1669	3511		1762	3538	
Flt Permitted		0.62	1.00	0.19	1.00	1.00	0.11	1.00		0.32	1.00	
Satd. Flow (perm)		2145	1510	344	3252	1540	198	3511		594	3538	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	865	233	69	1214	213	95	672	32	60	1212	3
RTOR Reduction (vph)	0	0	18	0	0	71	0	4	0	0	0	0
Lane Group Flow (vph)	0	939	215	69	1214	142	95	700	0	60	1215	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		36.6	36.6	36.6	36.6	36.6	38.9	38.9		38.9	38.9	
Effective Green, g (s)		36.6	36.6	36.6	36.6	36.6	38.9	38.9		38.9	38.9	
Actuated g/C Ratio		0.43	0.43	0.43	0.43	0.43	0.46	0.46		0.46	0.46	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		923	650	148	1400	663	90	1606		271	1619	
v/s Ratio Prot					0.37			0.20			0.34	
v/s Ratio Perm		c0.44	0.14	0.20		0.09	c0.48			0.10		
v/c Ratio		1.02	0.33	0.47	0.87	0.21	1.06	0.44		0.22	0.75	
Uniform Delay, d1		24.2	16.1	17.2	22.0	15.2	23.1	15.6		13.9	19.0	
Progression Factor		1.00	1.00	1.34	0.97	1.84	1.00	1.00		1.00	1.00	
Incremental Delay, d2		34.0	1.4	8.9	6.5	0.6	110.8	0.4		0.6	2.1	
Delay (s)		58.2	17.4	32.0	27.8	28.5	133.8	16.0		14.5	21.2	
Level of Service		E	B	C	C	C	F	B		B	C	
Approach Delay (s)		50.1			28.1			30.0			20.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	117.4%	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)	55	842	27	114	1316	32	18	109	260	37	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1588	3124	1361	1504	3185	1375		3152	1173		2852	
Flt Permitted	0.18	1.00	1.00	0.32	1.00	1.00		0.89	1.00		0.89	
Satd. Flow (perm)	293	3124	1361	505	3185	1375		2841	1173		2563	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	842	27	114	1316	32	18	109	260	37	99	105
RTOR Reduction (vph)	0	0	7	0	0	6	0	0	127	0	45	0
Lane Group Flow (vph)	55	842	20	114	1316	26	0	127	133	0	196	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	61.9	61.9	61.9	61.9	61.9	61.9		14.6	14.6		14.6	
Effective Green, g (s)	61.9	61.9	61.9	61.9	61.9	61.9		14.6	14.6		14.6	
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.73	0.73		0.17	0.17		0.17	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	213	2275	991	367	2319	1001		487	201		440	
v/s Ratio Prot		0.27			c0.41							
v/s Ratio Perm	0.19		0.01	0.23		0.02		0.04	c0.11		0.08	
v/c Ratio	0.26	0.37	0.02	0.31	0.57	0.03		0.26	0.66		0.45	
Uniform Delay, d1	3.9	4.3	3.2	4.1	5.3	3.2		30.5	32.9		31.6	
Progression Factor	0.91	0.71	0.66	2.58	2.46	2.90		1.00	1.00		1.00	
Incremental Delay, d2	1.0	0.2	0.0	0.2	0.1	0.0		0.1	6.2		0.3	
Delay (s)	4.5	3.2	2.1	10.7	13.2	9.3		30.6	39.1		31.8	
Level of Service	A	A	A	B	B	A		C	D		C	
Approach Delay (s)		3.2			12.9			36.3			31.8	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	492	589	1310	122	664	224
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3050	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3050	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	492	589	1310	122	664	224
RTOR Reduction (vph)	0	0	0	37	3	150
Lane Group Flow (vph)	492	589	1310	85	683	52
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	20.0	55.0	31.0	31.0	22.0	22.0
Effective Green, g (s)	20.0	55.0	31.0	31.0	22.0	22.0
Actuated g/C Ratio	0.24	0.65	0.36	0.36	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	374	1946	1107	489	789	308
v/s Ratio Prot	c0.31	0.20	c0.43		c0.22	
v/s Ratio Perm				0.06		0.04
v/c Ratio	1.32	0.30	1.18	0.17	0.87	0.17
Uniform Delay, d1	32.5	6.6	27.0	18.3	30.1	24.4
Progression Factor	0.71	1.57	0.97	1.12	1.00	1.00
Incremental Delay, d2	158.6	0.4	86.8	0.0	9.5	0.1
Delay (s)	181.7	10.7	113.0	20.6	39.6	24.5
Level of Service	F	B	F	C	D	C
Approach Delay (s)		88.6	105.1		36.2	
Approach LOS		F	F		D	

Intersection Summary			
HCM 2000 Control Delay	81.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.3%	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)	71	855	53	136	1047	112	167	481	158	116	423	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	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		0.98	1.00	1.00	0.97	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1585	3147			3107		1561	3185	1305	1546	3023	
Flt Permitted	0.14	1.00			0.69		0.33	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	233	3147			2144		539	3185	1305	618	3023	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	71	855	53	136	1047	112	167	481	158	116	423	127
RTOR Reduction (vph)	0	5	0	0	8	0	0	0	77	0	35	0
Lane Group Flow (vph)	71	903	0	0	1287	0	167	481	81	116	515	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	50.1	50.1			50.1		26.9	26.9	26.9	26.9	26.9	
Effective Green, g (s)	50.1	50.1			50.1		26.9	26.9	26.9	26.9	26.9	
Actuated g/C Ratio	0.59	0.59			0.59		0.32	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	137	1854			1263		170	1007	412	195	956	
v/s Ratio Prot		0.29						0.15			0.17	
v/s Ratio Perm	0.30				c0.60		c0.31		0.06	0.19		
v/c Ratio	0.52	0.49			1.02		0.98	0.48	0.20	0.59	0.54	
Uniform Delay, d1	10.3	10.1			17.4		28.8	23.4	21.2	24.5	23.9	
Progression Factor	0.31	0.27			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.2	0.8			30.2		63.3	0.1	0.1	3.2	0.3	
Delay (s)	14.4	3.5			47.7		92.1	23.5	21.3	27.7	24.2	
Level of Service	B	A			D		F	C	C	C	C	
Approach Delay (s)		4.3			47.7			37.3			24.8	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	116.8%	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)	89	157	165	465	825	101	390	1249	423	28	1180	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4517	1352		4571	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.82	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3021	1352		3740	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	157	165	465	825	101	390	1249	423	28	1180	201
RTOR Reduction (vph)	0	0	81	0	0	51	0	0	242	0	0	83
Lane Group Flow (vph)	89	157	84	465	825	50	0	1639	181	0	1208	118
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	4.0	15.2	15.2	21.2	32.4	32.4		38.6	38.6		38.6	38.6
Effective Green, g (s)	4.0	15.2	15.2	21.2	32.4	32.4		38.6	38.6		38.6	38.6
Actuated g/C Ratio	0.04	0.17	0.17	0.24	0.36	0.36		0.43	0.43		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	137	532	228	727	1146	486		1295	579		1604	579
v/s Ratio Prot	c0.03	0.05		0.15	c0.26							
v/s Ratio Perm			0.06			0.04		c0.54	0.13		0.32	0.09
v/c Ratio	0.65	0.30	0.37	0.64	0.72	0.10		3.51dl	0.31		0.75	0.20
Uniform Delay, d1	42.3	32.7	33.2	31.0	24.9	19.1		25.7	17.0		21.7	16.1
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	10.2	1.4	4.6	1.9	3.9	0.4		125.8	0.3		2.1	0.2
Delay (s)	52.5	34.1	37.7	32.8	28.8	19.6		151.5	17.3		23.7	16.3
Level of Service	D	C	D	C	C	B		F	B		C	B
Approach Delay (s)		39.5			29.5			124.0			22.7	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	65.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt AM

Adeline & 18th
2035 + Project Mid-Range Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	43	2.0	0.245	5.3	LOS A	1.3	31.9	0.37	0.82	27.5
8	T	184	2.0	0.245	5.3	LOS A	1.3	31.9	0.37	0.50	30.6
18	R	63	2.0	0.245	5.3	LOS A	1.3	31.9	0.37	0.56	30.1
Approach		290	2.0	0.245	5.3	LOS A	1.3	31.9	0.37	0.56	29.9
East: 18th Street (WB)											
1	L	30	2.0	0.223	5.3	LOS A	1.1	27.7	0.43	0.84	27.5
6	T	172	2.0	0.223	5.3	LOS A	1.1	27.7	0.43	0.54	30.5
16	R	45	2.0	0.223	5.3	LOS A	1.1	27.7	0.43	0.60	30.1
Approach		247	2.0	0.223	5.3	LOS A	1.1	27.7	0.43	0.59	30.0
North: Adeline Street (SB)											
7	L	71	2.0	0.365	7.0	LOS A	2.0	52.0	0.50	0.84	26.7
4	T	279	2.0	0.365	7.0	LOS A	2.0	52.0	0.50	0.58	29.4
14	R	51	2.0	0.365	7.0	LOS A	2.0	52.0	0.50	0.63	29.0
Approach		401	2.0	0.365	7.0	LOS A	2.0	52.0	0.50	0.63	28.8
West: 18th Street (EB)											
5	L	9	2.0	0.115	4.8	LOS A	0.5	12.5	0.48	0.88	27.9
2	T	93	2.0	0.115	4.8	LOS A	0.5	12.5	0.48	0.60	30.9
12	R	8	2.0	0.115	4.8	LOS A	0.5	12.5	0.48	0.65	30.5
Approach		110	2.0	0.115	4.8	LOS A	0.5	12.5	0.48	0.62	30.6
All Vehicles		1048	2.0	0.365	5.9	LOS A	2.0	52.0	0.45	0.60	29.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	187	4	27	125	209	49	564	88	235	191	39
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		1.00	0.99		1.00	0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		0.98	1.00			0.99	
Frt	1.00	1.00		1.00	0.91		1.00	0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1760	1855		1729	1663		1742	3432			3354	
Flt Permitted	0.31	1.00		0.57	1.00		0.48	1.00			0.58	
Satd. Flow (perm)	566	1855		1037	1663		889	3432			2006	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	187	4	27	125	209	49	564	88	235	191	39
RTOR Reduction (vph)	0	2	0	0	104	0	0	14	0	0	8	0
Lane Group Flow (vph)	50	189	0	27	230	0	49	638	0	0	457	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	13.1	13.1		13.1	13.1		37.4	37.4			37.4	
Effective Green, g (s)	13.1	13.1		13.1	13.1		37.4	37.4			37.4	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.64	0.64			0.64	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	126	415		232	372		568	2194			1282	
v/s Ratio Prot		0.10			c0.14			0.19				
v/s Ratio Perm	0.09			0.03			0.06				c0.23	
v/c Ratio	0.40	0.46		0.12	0.62		0.09	0.29			0.36	
Uniform Delay, d1	19.3	19.6		18.1	20.4		4.0	4.7			4.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.7	0.3		0.1	2.2		0.3	0.3			0.8	
Delay (s)	20.1	19.9		18.2	22.6		4.3	5.0			5.7	
Level of Service	C	B		B	C		A	A			A	
Approach Delay (s)		19.9			22.3			5.0			5.7	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	58.5	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 SUMMARY

Site: 2035 + Proj Mid Alt AM

Adeline & 14th
2035 + Project Mid-Range Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	9	2.0	0.234	5.3	LOS A	1.2	29.6	0.41	0.86	27.6
8	T	232	2.0	0.234	5.3	LOS A	1.2	29.6	0.41	0.53	30.6
18	R	25	2.0	0.234	5.3	LOS A	1.2	29.6	0.41	0.60	30.2
Approach		266	2.0	0.234	5.3	LOS A	1.2	29.6	0.41	0.55	30.5
East: 14th Street (WB)											
1	L	34	2.0	0.208	5.3	LOS A	1.0	25.2	0.44	0.84	27.5
6	T	148	2.0	0.208	5.3	LOS A	1.0	25.2	0.44	0.55	30.5
16	R	42	2.0	0.208	5.3	LOS A	1.0	25.2	0.44	0.61	30.1
Approach		224	2.0	0.208	5.3	LOS A	1.0	25.2	0.44	0.61	29.9
North: Adeline Street (SB)											
7	L	32	2.0	0.272	5.6	LOS A	1.4	36.1	0.40	0.84	27.4
4	T	258	2.0	0.272	5.6	LOS A	1.4	36.1	0.40	0.52	30.4
14	R	26	2.0	0.272	5.6	LOS A	1.4	36.1	0.40	0.59	29.9
Approach		316	2.0	0.272	5.6	LOS A	1.4	36.1	0.40	0.56	30.0
West: 14th Street (EB)											
5	L	24	2.0	0.193	5.4	LOS A	0.9	22.7	0.48	0.87	27.6
2	T	154	2.0	0.193	5.4	LOS A	0.9	22.7	0.48	0.59	30.5
12	R	18	2.0	0.193	5.4	LOS A	0.9	22.7	0.48	0.65	30.1
Approach		196	2.0	0.193	5.4	LOS A	0.9	22.7	0.48	0.63	30.1
All Vehicles		1002	2.0	0.272	5.4	LOS A	1.4	36.1	0.43	0.58	30.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt AM

Adeline & 12th
2035 + Project Mid-Range Alternative AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.155	3.9	LOS A	0.8	19.3	0.15	0.90	28.0
8	T	204	2.0	0.155	3.9	LOS A	0.8	19.3	0.15	0.42	31.7
18	R	5	2.0	0.155	3.9	LOS A	0.8	19.3	0.15	0.52	31.0
Approach		210	2.0	0.155	3.9	LOS A	0.8	19.3	0.15	0.42	31.6
East: 12th Street (WB)											
1	L	8	2.0	0.079	3.8	LOS A	0.3	8.7	0.35	0.79	28.2
6	T	29	2.0	0.079	3.8	LOS A	0.3	8.7	0.35	0.48	31.5
16	R	53	2.0	0.079	3.8	LOS A	0.3	8.7	0.35	0.54	31.0
Approach		90	2.0	0.079	3.8	LOS A	0.3	8.7	0.35	0.54	30.9
North: Adeline Street (SB)											
7	L	30	2.0	0.231	4.6	LOS A	1.2	31.4	0.16	0.87	27.7
4	T	279	2.0	0.231	4.6	LOS A	1.2	31.4	0.16	0.41	31.1
14	R	5	2.0	0.231	4.6	LOS A	1.2	31.4	0.16	0.51	30.5
Approach		314	2.0	0.231	4.6	LOS A	1.2	31.4	0.16	0.46	30.7
West: 12th Street (EB)											
5	L	2	2.0	0.010	3.6	LOS A	0.0	1.0	0.41	0.78	28.4
2	T	7	2.0	0.010	3.6	LOS A	0.0	1.0	0.41	0.48	31.7
12	R	1	2.0	0.010	3.6	LOS A	0.0	1.0	0.41	0.54	31.2
Approach		10	2.0	0.010	3.6	LOS A	0.0	1.0	0.41	0.55	30.9
All Vehicles		624	2.0	0.231	4.2	LOS A	1.2	31.4	0.19	0.46	31.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	44	0	0	347	352	443	447	95	107	0	553
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.98		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (prot)	1020	3282			2922		1173	2809		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (perm)	1020	3282			2922		1173	2809		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	138	44	0	0	347	352	443	447	95	107	0	553
RTOR Reduction (vph)	0	0	0	0	178	0	0	12	0	0	0	495
Lane Group Flow (vph)	138	44	0	0	521	0	323	650	0	107	0	58
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	15.9	41.2			21.8		30.4	30.4		10.0		10.0
Effective Green, g (s)	15.9	41.2			21.8		30.4	30.4		10.0		10.0
Actuated g/C Ratio	0.17	0.44			0.23		0.32	0.32		0.11		0.11
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	171	1429			673		376	902		163		207
v/s Ratio Prot	c0.14	0.01			c0.18		c0.28	0.23		c0.07		0.03
v/s Ratio Perm												
v/c Ratio	0.81	0.03			0.77		0.86	0.72		0.66		0.28
Uniform Delay, d1	37.9	15.3			34.1		30.1	28.4		40.6		39.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	22.4	0.0			5.3		17.2	2.7		8.2		0.5
Delay (s)	60.3	15.3			39.4		47.3	31.0		48.9		39.5
Level of Service	E	B			D		D	C		D		D
Approach Delay (s)		49.4			39.4			36.4			41.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	94.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	70.6%	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)	62	429	26	124	505	182	17	64	61	217	126	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.96			0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3183		1770	3259			1705		1755	1761	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.57	1.00	
Satd. Flow (perm)	1770	3183		1770	3259			1646		1061	1761	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	429	26	124	505	182	17	64	61	217	126	29
RTOR Reduction (vph)	0	3	0	0	27	0	0	34	0	0	10	0
Lane Group Flow (vph)	62	452	0	124	660	0	0	108	0	217	145	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	10.1	54.5		11.4	55.8			23.1		23.1	23.1	
Effective Green, g (s)	10.1	54.5		11.4	55.8			23.1		23.1	23.1	
Actuated g/C Ratio	0.10	0.54		0.11	0.56			0.23		0.23	0.23	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	178	1734		201	1818			380		245	406	
v/s Ratio Prot	c0.04	0.14		c0.07	c0.20						0.08	
v/s Ratio Perm								0.07		c0.20		
v/c Ratio	0.35	0.26		0.62	0.36			0.28		0.89	0.36	
Uniform Delay, d1	41.9	12.1		42.2	12.2			31.6		37.2	32.2	
Progression Factor	1.26	1.38		0.95	0.58			1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.0		3.8	0.6			0.2		28.7	0.2	
Delay (s)	53.2	16.7		43.8	7.6			31.8		65.8	32.4	
Level of Service	D	B		D	A			C		E	C	
Approach Delay (s)		21.1			13.1			31.8			51.9	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	62.9%	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	629	74	126	1233	139	26	64	66	84	82	75
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3248		1025	3471	1492	1347	918		1753	1477	
Flt Permitted	0.17	1.00		0.35	1.00	1.00	0.59	1.00		0.64	1.00	
Satd. Flow (perm)	314	3248		380	3471	1492	836	918		1172	1477	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	629	74	126	1233	139	26	64	66	84	82	75
RTOR Reduction (vph)	0	9	0	0	0	50	0	37	0	0	33	0
Lane Group Flow (vph)	27	694	0	126	1233	89	26	93	0	84	124	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	4.0	
Lane Grp Cap (vph)	200	2078		243	2221	954	234	257		328	413	
v/s Ratio Prot		0.21			c0.36			c0.10			0.08	
v/s Ratio Perm	0.09			0.33		0.06	0.03			0.07		
v/c Ratio	0.14	0.33		0.52	0.56	0.09	0.11	0.36		0.26	0.30	
Uniform Delay, d1	7.1	8.2		9.7	10.1	6.9	26.8	28.8		27.9	28.3	
Progression Factor	0.39	0.35		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.4		7.7	1.0	0.2	1.0	3.9		1.9	1.9	
Delay (s)	4.1	3.3		17.4	11.1	7.1	27.7	32.7		29.8	30.2	
Level of Service	A	A		B	B	A	C	C		C	C	
Approach Delay (s)		3.3			11.2			31.9			30.0	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.6%	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)	95	610	56	51	1176	51	206	242	14	79	96	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1581	4090		1759	4576		1760	1810	1541	1751	3539	1245
Flt Permitted	0.15	1.00		0.36	1.00		0.69	1.00	1.00	0.58	1.00	1.00
Satd. Flow (perm)	246	4090		672	4576		1282	1810	1541	1066	3539	1245
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	610	56	51	1176	51	206	242	14	79	96	158
RTOR Reduction (vph)	0	16	0	0	7	0	0	0	8	0	0	18
Lane Group Flow (vph)	95	650	0	51	1220	0	206	242	6	79	96	140
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	30.7	30.7		30.7	30.7		34.8	34.8	34.8	34.8	34.8	34.8
Effective Green, g (s)	30.7	30.7		30.7	30.7		34.8	34.8	34.8	34.8	34.8	34.8
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	100	1674		275	1873		594	839	715	494	1642	577
v/s Ratio Prot		0.16			0.27			0.13			0.03	
v/s Ratio Perm	c0.39			0.08			c0.16		0.00	0.07		0.11
v/c Ratio	0.95	0.39		0.19	0.65		0.35	0.29	0.01	0.16	0.06	0.24
Uniform Delay, d1	21.4	15.6		14.2	17.8		12.8	12.4	10.8	11.6	11.1	12.1
Progression Factor	1.00	1.00		1.00	1.00		1.09	1.09	1.45	1.00	1.00	1.00
Incremental Delay, d2	72.4	0.1		0.1	0.6		1.6	0.9	0.0	0.7	0.1	1.0
Delay (s)	93.8	15.6		14.3	18.5		15.6	14.4	15.8	12.3	11.1	13.1
Level of Service	F	B		B	B		B	B	B	B	B	B
Approach Delay (s)		25.4			18.3			15.0			12.4	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	82.0%	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	88	243	185	28	74	0	0	108	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3492	1562	1770	990			3167	1558
Flt Permitted					0.99	1.00	0.68	1.00			1.00	1.00
Satd. Flow (perm)					3492	1562	1274	990			3167	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	88	243	185	28	74	0	0	108	67
RTOR Reduction (vph)	0	0	0	0	0	149	0	0	0	0	0	22
Lane Group Flow (vph)	0	0	0	0	331	36	28	74	0	0	108	45
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					14.6	14.6	50.9	50.9			50.9	50.9
Effective Green, g (s)					14.6	14.6	50.9	50.9			50.9	50.9
Actuated g/C Ratio					0.19	0.19	0.68	0.68			0.68	0.68
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					679	304	864	671			2149	1057
v/s Ratio Prot								c0.07			0.03	
v/s Ratio Perm					0.09	0.02	0.02					0.03
v/c Ratio					0.49	0.12	0.03	0.11			0.05	0.04
Uniform Delay, d1					26.9	24.9	4.0	4.2			4.0	4.0
Progression Factor					1.00	1.00	1.00	1.00			1.22	1.72
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.0	0.1
Delay (s)					27.1	25.0	4.0	4.2			4.9	6.9
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			26.3			4.1			5.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	30.2%	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)	26	634	114	85	177	24	56	129	137	137	170	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.92		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	3301		1770	3438		1770	939		1770	1127	
Flt Permitted	0.95	1.00		0.95	1.00		0.60	1.00		0.51	1.00	
Satd. Flow (perm)	1770	3301		1770	3438		1112	939		950	1127	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	634	114	85	177	24	56	129	137	137	170	37
RTOR Reduction (vph)	0	17	0	0	11	0	0	59	0	0	12	0
Lane Group Flow (vph)	26	731	0	85	190	0	56	207	0	137	195	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.7	21.1		4.3	24.2		17.4	17.4		17.4	17.4	
Effective Green, g (s)	1.7	21.1		4.3	24.2		17.4	17.4		17.4	17.4	
Actuated g/C Ratio	0.03	0.39		0.08	0.44		0.32	0.32		0.32	0.32	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	54	1271		138	1518		353	298		301	357	
v/s Ratio Prot	0.01	c0.22		c0.05	c0.06			c0.22			0.17	
v/s Ratio Perm							0.05			0.14		
v/c Ratio	0.48	0.57		0.62	0.13		0.16	0.69		0.46	0.55	
Uniform Delay, d1	26.1	13.3		24.5	9.0		13.4	16.4		14.9	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	0.6		6.8	0.0		0.2	6.9		1.1	1.7	
Delay (s)	28.6	13.9		31.3	9.1		13.7	23.3		16.0	17.1	
Level of Service	C	B		C	A		B	C		B	B	
Approach Delay (s)		14.4			15.7			21.6			16.7	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2035 + Project Mid-Range Alternative PM Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	1007	199	321	1247	174	89	398	226	136	421	68
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3418		1770	3539	1508	1770	1863	1536	1770	1818	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3418		1770	3539	1508	1770	1863	1536	1770	1818	
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)	199	1095	216	349	1355	189	97	433	246	148	458	74
RTOR Reduction (vph)	0	22	0	0	0	93	0	0	191	0	7	0
Lane Group Flow (vph)	199	1289	0	349	1355	96	97	433	55	148	525	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	13.0	23.0		12.0	22.0	22.0	5.6	16.8	16.8	8.0	19.2	
Effective Green, g (s)	13.0	23.0		12.0	22.0	22.0	5.6	16.8	16.8	8.0	19.2	
Actuated g/C Ratio	0.17	0.30		0.16	0.29	0.29	0.07	0.22	0.22	0.11	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)	303	1037		280	1027	437	130	412	340	186	460	
v/s Ratio Prot	0.11	0.38		c0.20	c0.38		0.05	0.23		c0.08	c0.29	
v/s Ratio Perm						0.06			0.04			
v/c Ratio	0.66	1.24		1.25	1.32	0.22	0.75	1.05	0.16	0.80	1.14	
Uniform Delay, d1	29.3	26.4		31.9	26.9	20.4	34.4	29.5	23.8	33.1	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	5.1	117.5		137.2	150.6	0.3	20.6	58.3	0.2	20.5	86.4	
Delay (s)	34.4	143.9		169.1	177.5	20.6	55.0	87.8	24.0	53.6	114.7	
Level of Service	C	F		F	F	C	D	F	C	D	F	
Approach Delay (s)		129.5			160.3			63.5			101.4	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	127.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	183	1034	470	56	846	142	914	1005	42	277	1178	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3246		1770	3423		3433	3507		1770	3443	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3246		1770	3423		3433	3507		1770	3443	
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)	199	1124	511	61	920	154	993	1092	46	301	1280	166
RTOR Reduction (vph)	0	46	0	0	12	0	0	3	0	0	9	0
Lane Group Flow (vph)	199	1589	0	61	1062	0	993	1135	0	301	1437	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	13.7	33.8		8.8	28.9		13.0	39.4		15.0	40.4	
Effective Green, g (s)	13.7	33.8		8.8	28.9		13.0	39.4		15.0	40.4	
Actuated g/C Ratio	0.12	0.31		0.08	0.26		0.12	0.36		0.14	0.37	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	220	997		141	899		405	1256		241	1264	
v/s Ratio Prot	c0.11	c0.49		0.03	0.31		c0.29	0.32		0.17	c0.42	
v/s Ratio Perm												
v/c Ratio	0.90	1.59		0.43	1.18		2.45	0.90		1.25	1.14	
Uniform Delay, d1	47.5	38.1		48.2	40.5		48.5	33.5		47.5	34.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	35.0	271.8		0.8	93.1		660.8	10.8		141.7	71.6	
Delay (s)	82.5	309.9		49.0	133.7		709.3	44.3		189.2	106.4	
Level of Service	F	F		D	F		F	D		F	F	
Approach Delay (s)		285.2			129.1			354.2			120.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	238.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	131.9%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	854	120	7	259	0	0	0	0	581	508	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		0.99			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.98	1.00
Satd. Flow (prot)		3454			5078					1610	3339	1540
Flt Permitted		1.00			0.92					0.95	0.98	1.00
Satd. Flow (perm)		3454			4659					1610	3339	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	854	120	7	259	0	0	0	0	581	508	380
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	0	230
Lane Group Flow (vph)	0	960	0	0	266	0	0	0	0	354	735	150
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		36.5			36.5					31.5	31.5	31.5
Effective Green, g (s)		36.5			36.5					31.5	31.5	31.5
Actuated g/C Ratio		0.46			0.46					0.39	0.39	0.39
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1575			2125					633	1314	606
v/s Ratio Prot		c0.28										
v/s Ratio Perm					0.06					0.22	0.22	0.10
v/c Ratio		0.61			0.13					0.56	0.56	0.25
Uniform Delay, d1		16.4			12.5					18.9	18.9	16.3
Progression Factor		1.00			0.38					1.00	1.00	1.00
Incremental Delay, d2		1.8			0.1					3.5	1.7	1.0
Delay (s)		18.2			4.9					22.4	20.6	17.3
Level of Service		B			A					C	C	B
Approach Delay (s)		18.2			4.9			0.0			20.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	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)	447	997	0	0	250	934	34	1135	55	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3383			3539	2703		5036				
Flt Permitted	0.95	0.94			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3182			3539	2703		5036				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	447	997	0	0	250	934	34	1135	55	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	73	0	6	0	0	0	0
Lane Group Flow (vph)	402	1042	0	0	250	861	0	1218	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	20.5	49.9			25.9	25.9		19.1				
Effective Green, g (s)	20.5	49.9			25.9	25.9		19.1				
Actuated g/C Ratio	0.26	0.62			0.32	0.32		0.24				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	412	2036			1145	875		1202				
v/s Ratio Prot	c0.25	0.13			0.07							
v/s Ratio Perm		0.19				c0.32		0.24				
v/c Ratio	0.98	0.51			0.22	0.98		1.01				
Uniform Delay, d1	29.5	8.3			19.7	26.8		30.4				
Progression Factor	0.87	1.78			1.00	1.00		1.00				
Incremental Delay, d2	34.4	0.8			0.4	26.8		29.3				
Delay (s)	60.1	15.6			20.1	53.6		59.7				
Level of Service	E	B			C	D		E				
Approach Delay (s)		28.0			46.6			59.7			0.0	
Approach LOS		C			D			E			A	

Intersection Summary			
HCM 2000 Control Delay	43.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	99.8%	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)	15	878	410	248	1555	35	756	32	468	75	35	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	878	410	248	1555	35	756	32	468	75	35	73
RTOR Reduction (vph)	0	0	256	0	1	0	0	0	290	0	55	0
Lane Group Flow (vph)	15	878	154	248	1589	0	393	395	178	75	53	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	2.3	44.1	44.1	27.8	69.6		35.9	35.9	35.9	8.5	8.5	
Effective Green, g (s)	2.3	44.1	44.1	27.8	69.6		35.9	35.9	35.9	8.5	8.5	
Actuated g/C Ratio	0.02	0.33	0.33	0.21	0.52		0.27	0.27	0.27	0.06	0.06	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	31	1099	403	269	1773		445	425	335	94	88	
v/s Ratio Prot	0.01	0.27		c0.19	c0.47		0.24	c0.25		c0.05	0.04	
v/s Ratio Perm			0.13						0.14			
v/c Ratio	0.48	0.80	0.38	0.92	0.90		0.88	0.93	0.53	0.80	0.60	
Uniform Delay, d1	64.7	40.3	33.9	51.4	28.4		46.4	47.2	41.3	61.3	60.5	
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	11.4	4.6	1.0	34.7	6.7		18.7	26.8	2.1	36.1	10.5	
Delay (s)	76.1	44.9	35.0	86.1	35.0		65.2	74.1	43.3	97.4	71.0	
Level of Service	E	D	C	F	D		E	E	D	F	E	
Approach Delay (s)		42.2			41.9			59.8			81.8	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	132.8	Sum of lost time (s)	16.5
Intersection Capacity Utilization	88.8%	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)	251	718	449	446	1405	240	365	354	450	152	170	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1337	3000		1687	3406	1509	1444	2894		1369	2575	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1337	3000		1687	3406	1509	1444	2894		1369	2575	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	251	718	449	446	1405	240	365	354	450	152	170	76
RTOR Reduction (vph)	0	71	0	0	0	116	0	166	0	0	28	0
Lane Group Flow (vph)	251	1096	0	446	1405	124	365	638	0	134	236	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	20.5	44.0		31.5	55.0	55.0	35.5	35.5		12.0	12.0	
Effective Green, g (s)	20.5	44.0		31.5	55.0	55.0	35.5	35.5		12.0	12.0	
Actuated g/C Ratio	0.15	0.32		0.23	0.39	0.39	0.25	0.25		0.09	0.09	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	196	946		380	1342	594	367	736		117	221	
v/s Ratio Prot	c0.19	c0.37		c0.26	0.41		c0.25	0.22		c0.10	0.09	
v/s Ratio Perm						0.08						
v/c Ratio	1.28	1.16		1.17	1.05	0.21	0.99	0.87		1.15	1.07	
Uniform Delay, d1	59.5	47.8		54.0	42.2	27.9	51.9	49.7		63.8	63.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	159.5	83.5		102.6	37.8	0.2	45.3	10.4		127.5	79.2	
Delay (s)	219.0	131.2		156.6	80.1	28.1	97.2	60.1		191.3	143.0	
Level of Service	F	F		F	F	C	F	E		F	F	
Approach Delay (s)		146.8			90.4			71.7			159.2	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	107.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	105.1%	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	1105	178	235	1427	0	0	0	0	654	618	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4839		1767	3312						3268	
Flt Permitted		1.00		0.15	1.00						0.98	
Satd. Flow (perm)		4839		286	3312						3268	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1105	178	235	1427	0	0	0	0	654	618	480
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	1258	0	235	1427	0	0	0	0	0	1739	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		43.0		43.0	43.0						34.0	
Effective Green, g (s)		43.0		43.0	43.0						34.0	
Actuated g/C Ratio		0.49		0.49	0.49						0.39	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2391		141	1636						1277	
v/s Ratio Prot		0.26			0.43						c0.53	
v/s Ratio Perm				c0.82								
v/c Ratio		0.53		1.67	0.87						1.36	
Uniform Delay, d1		15.0		22.0	19.6						26.5	
Progression Factor		1.00		0.28	0.27						1.00	
Incremental Delay, d2		0.1		302.8	0.5						168.0	
Delay (s)		15.1		309.0	5.7						194.5	
Level of Service		B		F	A						F	
Approach Delay (s)		15.1			48.6			0.0			194.5	
Approach LOS		B			D			A			F	

Intersection Summary				
HCM 2000 Control Delay	93.9		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.53			
Actuated Cycle Length (s)	87.0		Sum of lost time (s)	10.0
Intersection Capacity Utilization	170.2%		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)	424	1335	0	0	1555	443	107	542	178	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.97			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3399			3387				
Flt Permitted	0.09	1.00			1.00			0.99				
Satd. Flow (perm)	173	3539			3399			3387				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	424	1335	0	0	1555	443	107	542	178	0	0	0
RTOR Reduction (vph)	0	0	0	0	30	0	0	17	0	0	0	0
Lane Group Flow (vph)	424	1335	0	0	1968	0	0	810	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	43.0	43.0			43.0			34.0				
Effective Green, g (s)	43.0	43.0			43.0			34.0				
Actuated g/C Ratio	0.49	0.49			0.49			0.39				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1749			1679			1323				
v/s Ratio Prot		0.38			0.58			c0.24				
v/s Ratio Perm	c2.45											
v/c Ratio	4.99	0.76			1.17			0.61				
Uniform Delay, d1	22.0	17.9			22.0			21.2				
Progression Factor	0.90	0.85			1.00			1.00				
Incremental Delay, d2	1808.3	1.0			84.1			0.6				
Delay (s)	1828.0	16.1			106.1			21.8				
Level of Service	F	B			F			C				
Approach Delay (s)		452.8			106.1			21.8			0.0	
Approach LOS		F			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	223.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.04		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	170.2%	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)	60	1107	369	103	1626	26	248	214	166	104	281	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.93		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)	1769	3331		1769	3367		1760	1721		1763	1781	
Flt Permitted	0.08	1.00		0.10	1.00		0.31	1.00		0.30	1.00	
Satd. Flow (perm)	154	3331		192	3367		572	1721		551	1781	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	1107	369	103	1626	26	248	214	166	104	281	91
RTOR Reduction (vph)	0	41	0	0	2	0	0	35	0	0	14	0
Lane Group Flow (vph)	60	1435	0	103	1650	0	248	345	0	104	358	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Effective Green, g (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.29	0.29		0.29	0.29	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2019		116	2041		164	494		158	512	
v/s Ratio Prot		0.43			0.49			0.20			0.20	
v/s Ratio Perm	0.39			c0.54			c0.43			0.19		
v/c Ratio	0.65	0.71		0.89	0.81		1.51	0.70		0.66	0.70	
Uniform Delay, d1	10.2	10.9		13.4	12.2		28.5	25.4		25.0	25.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.7	2.2		57.5	3.6		259.3	8.0		19.5	7.7	
Delay (s)	39.9	13.1		70.9	15.7		287.8	33.4		44.5	33.1	
Level of Service	D	B		E	B		F	C		D	C	
Approach Delay (s)		14.1			19.0			133.9			35.6	
Approach LOS		B			B			F			D	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	131.6%	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)	79	1328	80	55	1203	9	357	565	133	29	12	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.97	1.00	1.00		1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		0.97	1.00
Satd. Flow (prot)		3429			3306	1490	1640	1827	1505		1799	1500
Flt Permitted		0.72			0.73	1.00	0.73	1.00	1.00		0.41	1.00
Satd. Flow (perm)		2464			2413	1490	1261	1827	1505		755	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	79	1328	80	55	1203	9	357	565	133	29	12	44
RTOR Reduction (vph)	0	4	0	0	0	2	0	0	36	0	0	31
Lane Group Flow (vph)	0	1483	0	0	1258	7	357	565	97	0	41	13
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		53.7			53.7	53.7	27.3	27.3	27.3		27.3	27.3
Effective Green, g (s)		53.7			53.7	53.7	27.3	27.3	27.3		27.3	27.3
Actuated g/C Ratio		0.60			0.60	0.60	0.30	0.30	0.30		0.30	0.30
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1470			1439	889	382	554	456		229	455
v/s Ratio Prot								c0.31				
v/s Ratio Perm		c0.60			0.52	0.00	0.28		0.06		0.05	0.01
v/c Ratio		1.01			0.87	0.01	0.93	1.02	0.21		0.18	0.03
Uniform Delay, d1		18.1			15.3	7.4	30.5	31.4	23.4		23.1	22.0
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		25.6			7.7	0.0	29.4	43.3	0.1		0.1	0.0
Delay (s)		43.7			23.0	7.4	59.9	74.7	23.4		23.2	22.0
Level of Service		D			C	A	E	E	C		C	C
Approach Delay (s)		43.7			22.8			63.2			22.6	
Approach LOS		D			C			E			C	

Intersection Summary			
HCM 2000 Control Delay	41.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	118.7%	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)	203	1101	338	96	839	39	545	686	157	176	890	199
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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3481	1482	1770	3195	1540	1732	3425		1764	3427	
Flt Permitted		0.57	1.00	0.12	1.00	1.00	0.18	1.00		0.27	1.00	
Satd. Flow (perm)		2001	1482	233	3195	1540	326	3425		506	3427	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	203	1101	338	96	839	39	545	686	157	176	890	199
RTOR Reduction (vph)	0	0	63	0	0	20	0	9	0	0	22	0
Lane Group Flow (vph)	0	1304	275	96	839	19	545	834	0	176	1067	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		32.0	32.0	32.0	32.0	32.0	43.5	43.5		43.5	43.5	
Effective Green, g (s)		32.0	32.0	32.0	32.0	32.0	43.5	43.5		43.5	43.5	
Actuated g/C Ratio		0.38	0.38	0.38	0.38	0.38	0.51	0.51		0.51	0.51	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		753	557	87	1202	579	166	1752		258	1753	
v/s Ratio Prot					0.26			0.24			0.31	
v/s Ratio Perm		c0.65	0.19	0.41		0.01	c1.67			0.35		
v/c Ratio		1.73	0.49	1.10	0.70	0.03	3.28	0.48		0.68	0.61	
Uniform Delay, d1		26.5	20.3	26.5	22.4	16.7	20.8	13.4		15.6	14.7	
Progression Factor		1.00	1.00	0.57	0.61	0.12	1.00	1.00		1.00	1.00	
Incremental Delay, d2		334.8	3.1	120.5	2.9	0.1	1042.8	0.4		7.8	0.7	
Delay (s)		361.3	23.4	135.6	16.7	2.2	1063.5	13.8		23.4	15.4	
Level of Service		F	C	F	B	A	F	B		C	B	
Approach Delay (s)		291.8			27.8			426.0			16.5	
Approach LOS		F			C			F			B	

Intersection Summary			
HCM 2000 Control Delay	212.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.62		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	136.8%	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)	119	1124	25	63	1023	57	27	225	346	35	77	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1586	3154	1360	1585	3065	1375		3160	1171		2844	
Flt Permitted	0.23	1.00	1.00	0.20	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	379	3154	1360	325	3065	1375		2890	1171		2511	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	1124	25	63	1023	57	27	225	346	35	77	98
RTOR Reduction (vph)	0	0	6	0	0	17	0	0	45	0	61	0
Lane Group Flow (vph)	119	1124	19	63	1023	40	0	252	301	0	149	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	51.6	51.6	51.6	51.6	51.6	51.6		24.9	24.9		24.9	
Effective Green, g (s)	51.6	51.6	51.6	51.6	51.6	51.6		24.9	24.9		24.9	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61		0.29	0.29		0.29	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	230	1914	825	197	1860	834		846	343		735	
v/s Ratio Prot		c0.36			0.33							
v/s Ratio Perm	0.31		0.01	0.19		0.03		0.09	c0.26		0.06	
v/c Ratio	0.52	0.59	0.02	0.32	0.55	0.05		0.30	0.88		0.20	
Uniform Delay, d1	9.6	10.2	6.7	8.1	9.9	6.8		23.3	28.6		22.6	
Progression Factor	0.92	1.01	0.97	1.45	1.43	1.62		1.00	1.00		1.00	
Incremental Delay, d2	0.8	0.1	0.0	3.3	0.9	0.1		0.1	20.8		0.0	
Delay (s)	9.5	10.4	6.4	15.1	15.1	11.0		23.4	49.4		22.6	
Level of Service	A	B	A	B	B	B		C	D		C	
Approach Delay (s)		10.2			14.9			38.4			22.6	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	475	938	805	525	267	212
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	0.99	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	2977	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	2977	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	475	938	805	525	267	212
RTOR Reduction (vph)	0	0	0	240	27	126
Lane Group Flow (vph)	475	938	805	285	301	25
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	30.6	62.7	28.1	28.1	14.3	14.3
Effective Green, g (s)	30.6	62.7	28.1	28.1	14.3	14.3
Actuated g/C Ratio	0.36	0.74	0.33	0.33	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	567	2282	1013	456	500	204
v/s Ratio Prot	c0.30	0.30	c0.26		c0.10	
v/s Ratio Perm				0.21		0.02
v/c Ratio	0.84	0.41	0.79	0.62	0.60	0.12
Uniform Delay, d1	24.9	4.2	25.8	24.0	32.7	30.0
Progression Factor	0.92	0.95	1.12	1.36	1.00	1.00
Incremental Delay, d2	8.0	0.4	0.4	0.2	1.4	0.1
Delay (s)	31.0	4.4	29.4	32.9	34.1	30.1
Level of Service	C	A	C	C	C	C
Approach Delay (s)		13.3	30.8		32.9	
Approach LOS		B	C		C	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.7%	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)	148	906	33	125	797	92	402	1104	298	91	438	172
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	0.99	1.00			1.00		0.98	1.00	1.00	0.99	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1580	3162			3101		1563	3185	1309	1578	2991	
Flt Permitted	0.17	1.00			0.62		0.35	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	285	3162			1928		580	3185	1309	221	2991	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	148	906	33	125	797	92	402	1104	298	91	438	172
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	33	0	46	0
Lane Group Flow (vph)	148	936	0	0	1005	0	402	1104	265	91	564	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Effective Green, g (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Actuated g/C Ratio	0.46	0.46			0.46		0.45	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	130	1450			884		259	1423	585	98	1337	
v/s Ratio Prot		0.30						0.35			0.19	
v/s Ratio Perm	0.52				c0.52		c0.69		0.20	0.41		
v/c Ratio	1.14	0.65			1.14		1.55	0.78	0.45	0.93	0.42	
Uniform Delay, d1	23.0	17.7			23.0		23.5	19.9	16.3	22.2	16.0	
Progression Factor	0.83	0.86			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	118.2	2.1			75.6		266.7	2.5	0.2	66.6	0.1	
Delay (s)	137.2	17.2			98.6		290.2	22.4	16.5	88.8	16.1	
Level of Service	F	B			F		F	C	B	F	B	
Approach Delay (s)		33.6			98.6			81.1			25.5	
Approach LOS		C			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	65.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	123.7%	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)	324	871	233	463	720	76	10	1944	730	3	1257	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1349	3090	3185	1349		4575	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.93	1.00
Satd. Flow (perm)	3090	3154	1349	3090	3185	1349		4253	1391		4241	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	324	871	233	463	720	76	10	1944	730	3	1257	211
RTOR Reduction (vph)	0	0	65	0	0	53	0	0	0	0	0	79
Lane Group Flow (vph)	324	871	168	463	720	24	0	1954	730	0	1260	132
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Effective Green, g (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Actuated g/C Ratio	0.12	0.29	0.29	0.13	0.30	0.30		0.43	1.00		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	357	913	390	390	955	404		1813	1391		1808	575
v/s Ratio Prot	0.10	c0.28		c0.15	0.23							
v/s Ratio Perm			0.12			0.02		c0.46	0.52		0.30	0.10
v/c Ratio	0.91	0.95	0.43	1.19	0.75	0.06		1.08	0.52		0.70	0.23
Uniform Delay, d1	41.5	33.1	27.4	41.5	30.1	23.7		27.2	0.0		22.2	17.3
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	25.7	20.5	3.4	107.2	5.5	0.3		45.6	1.4		1.2	0.2
Delay (s)	67.2	53.7	30.8	148.7	35.6	24.0		72.8	1.4		23.4	17.5
Level of Service	E	D	C	F	D	C		E	A		C	B
Approach Delay (s)		53.0			76.5			53.4			22.6	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	50.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	103.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt PM

Adeline & 18th
2035 + Project Mid-Range Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	21	2.0	0.930	43.2	LOS E	14.8	376.5	1.00	1.53	16.4
8	T	526	2.0	0.930	43.2	LOS E	14.8	376.5	1.00	1.53	16.6
18	R	101	2.0	0.930	43.2	LOS E	14.8	376.5	1.00	1.53	16.5
Approach		648	2.0	0.930	43.2	LOS E	14.8	376.5	1.00	1.53	16.5
East: 18th Street (WB)											
1	L	13	2.0	0.252	7.7	LOS A	1.1	28.0	0.63	0.98	26.6
6	T	122	2.0	0.252	7.7	LOS A	1.1	28.0	0.63	0.78	29.0
16	R	54	2.0	0.252	7.7	LOS A	1.1	28.0	0.63	0.82	28.7
Approach		189	2.0	0.252	7.7	LOS A	1.1	28.0	0.63	0.81	28.7
North: Adeline Street (SB)											
7	L	325	2.0	0.627	11.0	LOS B	5.4	136.8	0.59	0.74	24.9
4	T	364	2.0	0.627	11.0	LOS B	5.4	136.8	0.59	0.56	26.9
14	R	64	2.0	0.627	11.0	LOS B	5.4	136.8	0.59	0.60	26.6
Approach		753	2.0	0.627	11.0	LOS B	5.4	136.8	0.59	0.64	25.9
West: 18th Street (EB)											
5	L	72	2.0	0.601	15.8	LOS C	4.1	103.0	0.81	1.09	23.3
2	T	294	2.0	0.601	15.8	LOS C	4.1	103.0	0.81	0.99	24.7
12	R	48	2.0	0.601	15.8	LOS C	4.1	103.0	0.81	1.02	24.5
Approach		414	2.0	0.601	15.8	LOS C	4.1	103.0	0.81	1.01	24.4
All Vehicles		2004	2.0	0.930	22.1	LOS C	14.8	376.5	0.77	1.02	21.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	134	483	45	16	114	102	59	765	52	45	191	24
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		1.00	0.99		1.00	0.99			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.98	1.00			1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1755	1831		1748	1711		1728	3486			3429	
Flt Permitted	0.56	1.00		0.18	1.00		0.59	1.00			0.79	
Satd. Flow (perm)	1043	1831		323	1711		1075	3486			2745	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	134	483	45	16	114	102	59	765	52	45	191	24
RTOR Reduction (vph)	0	5	0	0	48	0	0	7	0	0	10	0
Lane Group Flow (vph)	134	523	0	16	168	0	59	810	0	0	250	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	22.8	22.8		22.8	22.8		37.1	37.1			37.1	
Effective Green, g (s)	22.8	22.8		22.8	22.8		37.1	37.1			37.1	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.55	0.55			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)	350	614		108	574		587	1904			1499	
v/s Ratio Prot		c0.29			0.10			c0.23				
v/s Ratio Perm	0.13			0.05			0.05				0.09	
v/c Ratio	0.38	0.85		0.15	0.29		0.10	0.43			0.17	
Uniform Delay, d1	17.2	21.0		15.8	16.6		7.4	9.1			7.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.7	11.0		0.6	0.3		0.3	0.7			0.2	
Delay (s)	17.9	32.0		16.4	16.9		7.7	9.8			7.9	
Level of Service	B	C		B	B		A	A			A	
Approach Delay (s)		29.2			16.9			9.7			7.9	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	67.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt PM

Adeline & 14th
2035 + Project Mid-Range Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	18	2.0	0.623	12.6	LOS B	5.3	133.5	0.75	0.98	24.6
8	T	542	2.0	0.623	12.6	LOS B	5.3	133.5	0.75	0.84	26.3
18	R	53	2.0	0.623	12.6	LOS B	5.3	133.5	0.75	0.87	26.1
Approach		613	2.0	0.623	12.6	LOS B	5.3	133.5	0.75	0.84	26.2
East: 14th Street (WB)											
1	L	90	2.0	0.437	10.7	LOS B	2.4	60.3	0.71	1.01	25.2
6	T	203	2.0	0.437	10.7	LOS B	2.4	60.3	0.71	0.87	27.1
16	R	35	2.0	0.437	10.7	LOS B	2.4	60.3	0.71	0.90	26.9
Approach		328	2.0	0.437	10.7	LOS B	2.4	60.3	0.71	0.91	26.5
North: Adeline Street (SB)											
7	L	63	2.0	0.399	7.8	LOS A	2.2	56.7	0.57	0.87	26.4
4	T	313	2.0	0.399	7.8	LOS A	2.2	56.7	0.57	0.65	28.9
14	R	34	2.0	0.399	7.8	LOS A	2.2	56.7	0.57	0.69	28.6
Approach		410	2.0	0.399	7.8	LOS A	2.2	56.7	0.57	0.69	28.4
West: 14th Street (EB)											
5	L	58	2.0	0.368	8.3	LOS A	1.9	47.0	0.63	0.94	26.2
2	T	231	2.0	0.368	8.3	LOS A	1.9	47.0	0.63	0.75	28.5
12	R	34	2.0	0.368	8.3	LOS A	1.9	47.0	0.63	0.79	28.3
Approach		323	2.0	0.368	8.3	LOS A	1.9	47.0	0.63	0.78	28.0
All Vehicles		1674	2.0	0.623	10.2	LOS B	5.3	133.5	0.67	0.81	27.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: 2035 + Proj Mid Alt PM

Adeline & 12th
2035 + Project Mid-Range Alternative PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.363	6.1	LOS A	2.3	57.4	0.27	0.86	27.0
8	T	469	2.0	0.363	6.1	LOS A	2.3	57.4	0.27	0.44	30.1
18	R	7	2.0	0.363	6.1	LOS A	2.3	57.4	0.27	0.53	29.6
Approach		477	2.0	0.363	6.1	LOS A	2.3	57.4	0.27	0.44	30.1
East: 12th Street (WB)											
1	L	10	2.0	0.188	6.1	LOS A	0.8	21.0	0.56	0.88	27.1
6	T	21	2.0	0.188	6.1	LOS A	0.8	21.0	0.56	0.67	29.8
16	R	132	2.0	0.188	6.1	LOS A	0.8	21.0	0.56	0.72	29.5
Approach		163	2.0	0.188	6.1	LOS A	0.8	21.0	0.56	0.72	29.4
North: Adeline Street (SB)											
7	L	57	2.0	0.306	5.3	LOS A	1.8	45.9	0.16	0.86	27.3
4	T	353	2.0	0.306	5.3	LOS A	1.8	45.9	0.16	0.41	30.6
14	R	8	2.0	0.306	5.3	LOS A	1.8	45.9	0.16	0.50	30.0
Approach		418	2.0	0.306	5.3	LOS A	1.8	45.9	0.16	0.47	30.1
West: 12th Street (EB)											
5	L	8	2.0	0.017	4.0	LOS A	0.1	1.8	0.47	0.75	28.0
2	T	5	2.0	0.017	4.0	LOS A	0.1	1.8	0.47	0.52	31.1
12	R	3	2.0	0.017	4.0	LOS A	0.1	1.8	0.47	0.57	30.7
Approach		16	2.0	0.017	4.0	LOS A	0.1	1.8	0.47	0.65	29.4
All Vehicles		1074	2.0	0.363	5.8	LOS A	2.3	57.4	0.27	0.50	30.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	253	185	0	0	173	232	156	505	219	239	0	507
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.91		1.00	0.96		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2607		972	2915		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2607		972	2915		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	253	185	0	0	173	232	156	505	219	239	0	507
RTOR Reduction (vph)	0	0	0	0	200	0	0	37	0	0	0	415
Lane Group Flow (vph)	253	185	0	0	205	0	140	703	0	239	0	92
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	20.9	37.5			13.1		26.5	26.5		17.1		17.1
Effective Green, g (s)	20.9	37.5			13.1		26.5	26.5		17.1		17.1
Actuated g/C Ratio	0.22	0.40			0.14		0.28	0.28		0.18		0.18
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	303	1319			362		273	820		282		449
v/s Ratio Prot	c0.19	0.06			c0.08		0.14	c0.24		c0.15		0.04
v/s Ratio Perm												
v/c Ratio	0.83	0.14			0.57		0.51	0.86		0.85		0.21
Uniform Delay, d1	35.0	18.0			37.9		28.4	32.0		37.2		32.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	17.0	0.0			1.7		1.2	8.7		20.1		0.2
Delay (s)	51.9	18.1			39.5		29.6	40.8		57.3		32.9
Level of Service	D	B			D		C	D		E		C
Approach Delay (s)		37.6			39.5			39.0			40.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	94.1	Sum of lost time (s)	16.5
Intersection Capacity Utilization	74.1%	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)	85	679	22	102	635	380	20	108	30	405	162	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			1.00		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	1.00		1.00	0.94			0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3378		1770	3173			1781		1756	1752	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.63	1.00	
Satd. Flow (perm)	1770	3378		1770	3173			1711		1172	1752	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	679	22	102	635	380	20	108	30	405	162	46
RTOR Reduction (vph)	0	2	0	0	89	0	0	11	0	0	12	0
Lane Group Flow (vph)	85	699	0	102	926	0	0	147	0	405	196	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	6.2	37.0		7.9	38.7			34.1		34.1	34.1	
Effective Green, g (s)	6.2	37.0		7.9	38.7			34.1		34.1	34.1	
Actuated g/C Ratio	0.07	0.41		0.09	0.43			0.38		0.38	0.38	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	121	1388		155	1364			648		444	663	
v/s Ratio Prot	c0.05	0.21		0.06	c0.29						0.11	
v/s Ratio Perm								0.09		c0.35		
v/c Ratio	0.70	0.50		0.66	0.68			0.23		0.91	0.29	
Uniform Delay, d1	41.0	19.7		39.7	20.6			19.0		26.5	19.5	
Progression Factor	0.95	0.92		0.98	0.67			1.00		1.00	1.00	
Incremental Delay, d2	14.0	0.1		7.4	2.7			0.1		22.5	0.1	
Delay (s)	52.8	18.1		46.3	16.6			19.1		49.0	19.6	
Level of Service	D	B		D	B			B		D	B	
Approach Delay (s)		21.9			19.3			19.1			39.0	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	80.4%	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)	62	1571	44	70	1335	254	42	116	122	92	116	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	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	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3383		1054	3471	1460	1574	1062		1758	1574	
Flt Permitted	0.12	1.00		0.09	1.00	1.00	0.63	1.00		0.53	1.00	
Satd. Flow (perm)	216	3383		101	3471	1460	1042	1062		972	1574	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	1571	44	70	1335	254	42	116	122	92	116	45
RTOR Reduction (vph)	0	2	0	0	0	114	0	13	0	0	18	0
Lane Group Flow (vph)	62	1613	0	70	1335	140	42	225	0	92	143	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	118	1860		55	1909	803	364	371		340	550	
v/s Ratio Prot		0.48			0.38			c0.21			0.09	
v/s Ratio Perm	0.29			c0.69		0.10	0.04			0.09		
v/c Ratio	0.53	0.87		1.27	0.70	0.17	0.12	0.61		0.27	0.26	
Uniform Delay, d1	11.4	15.5		18.0	13.2	9.0	17.6	21.5		18.7	18.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.7	5.8		211.4	2.2	0.5	0.6	7.2		2.0	1.2	
Delay (s)	27.1	21.2		229.4	15.3	9.4	18.3	28.6		20.6	19.7	
Level of Service	C	C		F	B	A	B	C		C	B	
Approach Delay (s)		21.5			23.5			27.1			20.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.5%	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)	104	1366	74	25	998	68	513	385	35	78	57	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1668	4281		1767	4531		1742	1863	1538	1755	3539	1216
Flt Permitted	0.20	1.00		0.11	1.00		0.72	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	349	4281		201	4531		1316	1863	1538	777	3539	1216
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	104	1366	74	25	998	68	513	385	35	78	57	111
RTOR Reduction (vph)	0	7	0	0	9	0	0	0	14	0	0	26
Lane Group Flow (vph)	104	1433	0	25	1057	0	513	385	21	78	57	85
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	37.0	37.0		37.0	37.0		38.5	38.5	38.5	38.5	38.5	38.5
Effective Green, g (s)	37.0	37.0		37.0	37.0		38.5	38.5	38.5	38.5	38.5	38.5
Actuated g/C Ratio	0.44	0.44		0.44	0.44		0.45	0.45	0.45	0.45	0.45	0.45
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	151	1863		87	1972		596	843	696	351	1602	550
v/s Ratio Prot		c0.33			0.23			0.21			0.02	
v/s Ratio Perm	0.30			0.12			c0.39		0.01	0.10		0.07
v/c Ratio	0.69	0.77		0.29	0.54		0.86	0.46	0.03	0.22	0.04	0.16
Uniform Delay, d1	19.4	20.4		15.5	17.7		20.8	16.0	12.9	14.1	12.9	13.7
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	22.7	3.1		0.7	0.1		15.1	1.8	0.1	1.5	0.0	0.6
Delay (s)	42.1	23.5		16.2	17.8		35.9	17.8	13.0	15.6	13.0	14.3
Level of Service	D	C		B	B		D	B	B	B	B	B
Approach Delay (s)		24.8			17.8			27.6			14.4	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	102.0%	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	24	162	500	47	133	0	0	118	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3516	1561	1770	1111			2865	1558
Flt Permitted					0.99	1.00	0.68	1.00			1.00	1.00
Satd. Flow (perm)					3516	1561	1262	1111			2865	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	24	162	500	47	133	0	0	118	24
RTOR Reduction (vph)	0	0	0	0	0	427	0	0	0	0	0	6
Lane Group Flow (vph)	0	0	0	0	186	73	47	133	0	0	118	18
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					13.2	13.2	67.3	67.3			67.3	67.3
Effective Green, g (s)					13.2	13.2	67.3	67.3			67.3	67.3
Actuated g/C Ratio					0.15	0.15	0.75	0.75			0.75	0.75
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					515	228	943	830			2142	1165
v/s Ratio Prot								c0.12			0.04	
v/s Ratio Perm					0.05	0.05	0.04					0.01
v/c Ratio					0.36	0.32	0.05	0.16			0.06	0.02
Uniform Delay, d1					34.6	34.4	3.0	3.3			3.0	2.9
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.2	0.3	0.0	0.0			0.0	0.0
Delay (s)					34.8	34.7	3.0	3.3			3.0	2.9
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			34.7			3.2			3.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	49.3%	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)	26	944	65	41	112	26	107	283	148	143	158	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3367		1770	3368		1770	1069		1770	1091	
Flt Permitted	0.95	1.00		0.95	1.00		0.64	1.00		0.37	1.00	
Satd. Flow (perm)	1770	3367		1770	3368		1201	1069		687	1091	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	65	41	112	26	107	283	148	143	158	14
RTOR Reduction (vph)	0	6	0	0	16	0	0	24	0	0	4	0
Lane Group Flow (vph)	26	1003	0	41	122	0	107	407	0	143	168	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.9	25.5		2.0	26.1		30.2	30.2		30.2	30.2	
Effective Green, g (s)	1.9	25.5		2.0	26.1		30.2	30.2		30.2	30.2	
Actuated g/C Ratio	0.03	0.37		0.03	0.37		0.43	0.43		0.43	0.43	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	48	1231		50	1261		520	463		297	472	
v/s Ratio Prot	0.01	c0.30		c0.02	0.04			c0.38			0.15	
v/s Ratio Perm							0.09			0.21		
v/c Ratio	0.54	0.81		0.82	0.10		0.21	0.88		0.48	0.36	
Uniform Delay, d1	33.5	20.0		33.7	14.1		12.3	18.1		14.1	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.5	4.3		62.7	0.0		0.2	17.1		1.2	0.5	
Delay (s)	40.0	24.2		96.4	14.2		12.5	35.2		15.4	13.7	
Level of Service	D	C		F	B		B	D		B	B	
Approach Delay (s)		24.6			33.0			30.7			14.5	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	69.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

2035 + Preferred Project AM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	1260	85	330	1372	249	69	167	191	373	551	159
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3495		1770	3539	1517	1770	1863	1540	1770	1792	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3495		1770	3539	1517	1770	1863	1540	1770	1792	
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	1370	92	359	1491	271	75	182	208	405	599	173
RTOR Reduction (vph)	0	8	0	0	0	101	0	0	131	0	18	0
Lane Group Flow (vph)	62	1454	0	359	1491	170	75	182	77	405	754	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.3	18.7		7.0	23.4	23.4	3.1	15.2	15.2	4.0	16.1	
Effective Green, g (s)	2.3	18.7		7.0	23.4	23.4	3.1	15.2	15.2	4.0	16.1	
Actuated g/C Ratio	0.04	0.31		0.11	0.38	0.38	0.05	0.25	0.25	0.07	0.26	
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)	66	1073		203	1359	582	90	464	384	116	473	
v/s Ratio Prot	0.04	c0.42		c0.20	0.42		0.04	0.10		c0.23	c0.42	
v/s Ratio Perm						0.11			0.05			
v/c Ratio	0.94	1.36		1.77	1.10	0.29	0.83	0.39	0.20	3.49	1.59	
Uniform Delay, d1	29.2	21.1		26.9	18.8	13.0	28.6	19.0	18.0	28.4	22.4	
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	88.5	166.1		365.1	55.5	0.3	45.4	0.5	0.3	1142.5	277.5	
Delay (s)	117.7	187.2		392.1	74.2	13.3	74.0	19.6	18.3	1170.9	299.9	
Level of Service	F	F		F	E	B	E	B	B	F	F	
Approach Delay (s)		184.4			120.3			27.8			599.6	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM 2000 Control Delay	237.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.72		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	112.0%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	252	926	914	126	1195	190	853	795	45	165	1348	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.99		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	3080		1770	3428		3433	3497		1770	3394	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3080		1770	3428		3433	3497		1770	3394	
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)	274	1007	993	137	1299	207	927	864	49	179	1465	308
RTOR Reduction (vph)	0	162	0	0	12	0	0	4	0	0	16	0
Lane Group Flow (vph)	274	1838	0	137	1494	0	927	909	0	179	1757	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	17.0	35.0		11.0	29.0		15.0	37.1		13.9	35.0	
Effective Green, g (s)	17.0	35.0		11.0	29.0		15.0	37.1		13.9	35.0	
Actuated g/C Ratio	0.15	0.32		0.10	0.26		0.14	0.34		0.13	0.32	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	273	980		177	903		468	1179		223	1079	
v/s Ratio Prot	c0.15	c0.60		0.08	0.44		c0.27	0.26		0.10	c0.52	
v/s Ratio Perm												
v/c Ratio	1.00	1.88		0.77	1.65		1.98	0.77		0.80	1.63	
Uniform Delay, d1	46.5	37.5		48.3	40.5		47.5	32.6		46.7	37.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	55.4	398.1		17.3	299.6		449.0	4.9		18.0	286.9	
Delay (s)	101.9	435.6		65.6	340.1		496.5	37.6		64.7	324.4	
Level of Service	F	F		E	F		F	D		E	F	
Approach Delay (s)		395.4			317.2			268.8			300.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	324.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	151.6%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	532	82	12	292	0	0	0	0	631	899	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		0.99			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3447			5073					1610	3368	1550
Flt Permitted		1.00			0.88					0.95	0.99	1.00
Satd. Flow (perm)		3447			4450					1610	3368	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	532	82	12	292	0	0	0	0	631	899	511
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	65
Lane Group Flow (vph)	0	599	0	0	304	0	0	0	0	498	1032	446
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		17.0			17.0					51.0	51.0	51.0
Effective Green, g (s)		17.0			17.0					51.0	51.0	51.0
Actuated g/C Ratio		0.21			0.21					0.64	0.64	0.64
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		732			945					1026	2147	988
v/s Ratio Prot		c0.17										
v/s Ratio Perm					0.07					c0.31	0.31	0.29
v/c Ratio		0.82			0.32					0.49	0.48	0.45
Uniform Delay, d1		30.0			26.6					7.6	7.6	7.4
Progression Factor		1.00			1.12					1.00	1.00	1.00
Incremental Delay, d2		9.9			0.9					1.6	0.8	1.5
Delay (s)		39.9			30.6					9.3	8.4	8.9
Level of Service		D			C					A	A	A
Approach Delay (s)		39.9			30.6			0.0			8.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	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)	293	886	0	0	284	737	9	755	32	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3385			3539	2704		5044				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3213			3539	2704		5044				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	293	886	0	0	284	737	9	755	32	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	183	0	5	0	0	0	0
Lane Group Flow (vph)	264	915	0	0	284	554	0	791	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	21.5	51.5			26.5	26.5		17.5				
Effective Green, g (s)	21.5	51.5			26.5	26.5		17.5				
Actuated g/C Ratio	0.27	0.64			0.33	0.33		0.22				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	432	2114			1172	895		1103				
v/s Ratio Prot	c0.16	0.12			0.08							
v/s Ratio Perm		0.16				c0.20		0.16				
v/c Ratio	0.61	0.43			0.24	0.62		0.72				
Uniform Delay, d1	25.6	7.0			19.5	22.5		29.0				
Progression Factor	0.91	0.75			1.00	1.00		1.00				
Incremental Delay, d2	4.9	0.5			0.5	3.2		4.0				
Delay (s)	28.2	5.8			19.9	25.7		33.0				
Level of Service	C	A			B	C		C				
Approach Delay (s)		10.8			24.1			33.0			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	81.5%	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)	61	950	747	391	1662	70	212	45	335	31	21	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	950	747	391	1662	70	212	45	335	31	21	20
RTOR Reduction (vph)	0	0	337	0	2	0	0	0	285	0	19	0
Lane Group Flow (vph)	61	950	410	391	1730	0	127	130	50	31	22	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	5.5	46.4	46.4	34.0	74.9		17.9	17.9	17.9	4.5	4.5	
Effective Green, g (s)	5.5	46.4	46.4	34.0	74.9		17.9	17.9	17.9	4.5	4.5	
Actuated g/C Ratio	0.05	0.39	0.39	0.28	0.63		0.15	0.15	0.15	0.04	0.04	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	83	1288	546	439	2092		186	187	141	45	42	
v/s Ratio Prot	0.03	0.29		c0.25	c0.52		0.10	c0.10		c0.03	0.02	
v/s Ratio Perm			0.29						0.05			
v/c Ratio	0.73	0.74	0.75	0.89	0.83		0.68	0.70	0.36	0.69	0.52	
Uniform Delay, d1	56.2	31.2	31.5	40.9	17.2		48.0	48.1	45.5	56.7	56.3	
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	26.9	2.3	6.0	19.3	2.9		9.9	10.7	1.5	29.5	4.4	
Delay (s)	83.1	33.6	37.4	60.1	20.1		57.9	58.8	47.1	86.3	60.8	
Level of Service	F	C	D	E	C		E	E	D	F	E	
Approach Delay (s)		36.9			27.5			52.0			71.7	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	119.3	Sum of lost time (s)	16.5
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)	155	867	302	299	1396	360	564	270	512	332	253	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.90		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1014	2893		1299	3438	1369	1480	2543		1480	2320	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1014	2893		1299	3438	1369	1480	2543		1480	2320	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	867	302	299	1396	360	564	270	512	332	253	180
RTOR Reduction (vph)	0	25	0	0	0	175	0	199	0	0	47	0
Lane Group Flow (vph)	155	1144	0	299	1396	185	564	583	0	259	459	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	15.5	42.0		22.5	49.0	49.0	40.5	40.5		18.0	18.0	
Effective Green, g (s)	15.5	42.0		22.5	49.0	49.0	40.5	40.5		18.0	18.0	
Actuated g/C Ratio	0.11	0.30		0.16	0.35	0.35	0.29	0.29		0.13	0.13	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	112	871		209	1207	480	429	738		190	299	
v/s Ratio Prot	0.15	c0.40		c0.23	0.41		c0.38	0.23		0.18	c0.20	
v/s Ratio Perm						0.14						
v/c Ratio	1.38	1.31		1.43	1.16	0.39	1.31	0.87dr		1.36	1.54	
Uniform Delay, d1	62.0	48.8		58.5	45.2	33.9	49.5	45.6		60.8	60.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	218.6	149.1		219.1	80.1	0.5	157.4	5.4		193.5	256.9	
Delay (s)	280.6	197.9		277.6	125.4	34.5	206.9	51.0		254.2	317.7	
Level of Service	F	F		F	F	C	F	D		F	F	
Approach Delay (s)		207.6			131.6			116.3			296.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	169.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	110.5%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1647	83	133	1272	0	0	0	0	507	363	532
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.94	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4950		1770	3343						3147	
Flt Permitted		1.00		0.09	1.00						0.98	
Satd. Flow (perm)		4950		166	3343						3147	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1647	83	133	1272	0	0	0	0	507	363	532
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	1724	0	133	1272	0	0	0	0	0	1377	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		45.0		45.0	45.0						32.0	
Effective Green, g (s)		45.0		45.0	45.0						32.0	
Actuated g/C Ratio		0.52		0.52	0.52						0.37	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2560		85	1729						1157	
v/s Ratio Prot		0.35			0.38						c0.44	
v/s Ratio Perm				c0.80								
v/c Ratio		0.67		1.56	0.74						1.19	
Uniform Delay, d1		15.6		21.0	16.4						27.5	
Progression Factor		1.00		0.40	0.37						1.00	
Incremental Delay, d2		0.6		275.1	0.6						94.3	
Delay (s)		16.1		283.6	6.6						121.8	
Level of Service		B		F	A						F	
Approach Delay (s)		16.1			32.8			0.0			121.8	
Approach LOS		B			C			A			F	

Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	158.6%	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)	440	1714	0	0	1231	491	174	433	111	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.98				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3360			3404				
Flt Permitted	0.09	1.00			1.00			0.99				
Satd. Flow (perm)	166	3539			3360			3404				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	440	1714	0	0	1231	491	174	433	111	0	0	0
RTOR Reduction (vph)	0	0	0	0	49	0	0	8	0	0	0	0
Lane Group Flow (vph)	440	1714	0	0	1673	0	0	710	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	45.0	45.0			45.0			32.0				
Effective Green, g (s)	45.0	45.0			45.0			32.0				
Actuated g/C Ratio	0.52	0.52			0.52			0.37				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1830			1737			1252				
v/s Ratio Prot		0.48			0.50			c0.21				
v/s Ratio Perm	c2.66											
v/c Ratio	5.18	0.94			0.96			0.57				
Uniform Delay, d1	21.0	19.7			20.2			22.0				
Progression Factor	0.65	0.61			1.00			1.00				
Incremental Delay, d2	1894.5	6.1			13.8			0.4				
Delay (s)	1908.1	18.1			34.0			22.3				
Level of Service	F	B			C			C				
Approach Delay (s)		404.2			34.0			22.3			0.0	
Approach LOS		F			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	205.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.23		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	158.6%	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)	48	1297	122	112	1898	4	56	90	46	21	141	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		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	3422		1768	3405		1755	1753		1758	1775	
Flt Permitted	0.08	1.00		0.11	1.00		0.59	1.00		0.67	1.00	
Satd. Flow (perm)	157	3422		206	3405		1097	1753		1240	1775	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	1297	122	112	1898	4	56	90	46	21	141	50
RTOR Reduction (vph)	0	9	0	0	0	0	0	23	0	0	9	0
Lane Group Flow (vph)	48	1410	0	112	1902	0	56	113	0	21	182	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Effective Green, g (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30		0.30	0.30	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2031		122	2021		329	525		372	532	
v/s Ratio Prot		0.41			c0.56			0.06			c0.10	
v/s Ratio Perm	0.31			0.54			0.05			0.02		
v/c Ratio	0.52	0.69		0.92	0.94		0.17	0.22		0.06	0.34	
Uniform Delay, d1	9.5	11.2		14.5	15.0		20.7	21.0		19.9	21.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.0	2.0		61.8	10.3		1.1	0.9		0.3	1.7	
Delay (s)	28.5	13.2		76.3	25.2		21.8	21.9		20.2	23.6	
Level of Service	C	B		E	C		C	C		C	C	
Approach Delay (s)		13.7			28.1			21.9			23.3	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	144.7%	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)	46	1052	240	56	1379	13	479	280	107	5	119	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)		3323			3299	1488	1646	1845	1508		1858	1518
Flt Permitted		0.74			0.74	1.00	0.66	1.00	1.00		0.99	1.00
Satd. Flow (perm)		2476			2432	1488	1147	1845	1508		1842	1518
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	1052	240	56	1379	13	479	280	107	5	119	182
RTOR Reduction (vph)	0	21	0	0	0	3	0	0	48	0	0	20
Lane Group Flow (vph)	0	1317	0	0	1435	10	479	280	59	0	124	162
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		48.5			48.5	48.5	32.5	32.5	32.5		32.5	32.5
Effective Green, g (s)		48.5			48.5	48.5	32.5	32.5	32.5		32.5	32.5
Actuated g/C Ratio		0.54			0.54	0.54	0.36	0.36	0.36		0.36	0.36
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1334			1310	801	414	666	544		665	548
v/s Ratio Prot								0.15				
v/s Ratio Perm		0.53			c0.59	0.01	c0.42		0.04		0.07	0.11
v/c Ratio		0.99			1.10	0.01	1.16	0.42	0.11		0.19	0.30
Uniform Delay, d1		20.4			20.8	9.6	28.8	21.7	19.1		19.7	20.6
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		21.8			55.2	0.0	94.6	0.2	0.0		0.0	0.1
Delay (s)		42.3			76.0	9.7	123.3	21.8	19.2		19.7	20.7
Level of Service		D			E	A	F	C	B		B	C
Approach Delay (s)		42.3			75.4			77.6			20.3	
Approach LOS		D			E			E			C	

Intersection Summary			
HCM 2000 Control Delay	60.4	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)	9.0
Intersection Capacity Utilization	120.2%	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)	74	880	245	69	1348	218	98	683	32	60	1215	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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3432	1510	1764	3252	1540	1669	3512		1762	3538	
Flt Permitted		0.59	1.00	0.18	1.00	1.00	0.11	1.00		0.31	1.00	
Satd. Flow (perm)		2030	1510	338	3252	1540	192	3512		580	3538	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	880	245	69	1348	218	98	683	32	60	1215	3
RTOR Reduction (vph)	0	0	18	0	0	65	0	4	0	0	0	0
Lane Group Flow (vph)	0	954	227	69	1348	153	98	711	0	60	1218	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		37.0	37.0	37.0	37.0	37.0	38.5	38.5		38.5	38.5	
Effective Green, g (s)		37.0	37.0	37.0	37.0	37.0	38.5	38.5		38.5	38.5	
Actuated g/C Ratio		0.44	0.44	0.44	0.44	0.44	0.45	0.45		0.45	0.45	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		883	657	147	1415	670	86	1590		262	1602	
v/s Ratio Prot					0.41			0.20			0.34	
v/s Ratio Perm		c0.47	0.15	0.20		0.10	c0.51			0.10		
v/c Ratio		1.08	0.35	0.47	0.95	0.23	1.14	0.45		0.23	0.76	
Uniform Delay, d1		24.0	16.0	17.0	23.2	15.0	23.2	16.0		14.2	19.4	
Progression Factor		1.00	1.00	1.42	1.01	1.88	1.00	1.00		1.00	1.00	
Incremental Delay, d2		54.4	1.4	8.5	13.0	0.6	139.6	0.4		0.6	2.3	
Delay (s)		78.4	17.4	32.7	36.3	28.9	162.9	16.4		14.8	21.7	
Level of Service		E	B	C	D	C	F	B		B	C	
Approach Delay (s)		65.9			35.1			34.0			21.4	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	121.6%	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)	55	857	27	121	1455	32	18	109	266	37	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1589	3124	1361	1505	3185	1375		3152	1174		2853	
Flt Permitted	0.14	1.00	1.00	0.31	1.00	1.00		0.90	1.00		0.89	
Satd. Flow (perm)	239	3124	1361	494	3185	1375		2843	1174		2565	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	857	27	121	1455	32	18	109	266	37	99	105
RTOR Reduction (vph)	0	0	7	0	0	5	0	0	122	0	32	0
Lane Group Flow (vph)	55	857	20	121	1455	27	0	127	144	0	209	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	61.3	61.3	61.3	61.3	61.3	61.3		15.2	15.2		15.2	
Effective Green, g (s)	61.3	61.3	61.3	61.3	61.3	61.3		15.2	15.2		15.2	
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.72		0.18	0.18		0.18	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	172	2252	981	356	2296	991		508	209		458	
v/s Ratio Prot		0.27			c0.46							
v/s Ratio Perm	0.23		0.01	0.25		0.02		0.04	c0.12		0.08	
v/c Ratio	0.32	0.38	0.02	0.34	0.63	0.03		0.25	0.69		0.46	
Uniform Delay, d1	4.3	4.6	3.4	4.4	6.1	3.4		30.0	32.7		31.2	
Progression Factor	1.08	0.78	0.71	2.77	2.62	3.04		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.0	0.0	0.2	0.1	0.0		0.1	7.7		0.3	
Delay (s)	5.1	3.6	2.4	12.4	16.1	10.2		30.1	40.4		31.5	
Level of Service	A	A	A	B	B	B		C	D		C	
Approach Delay (s)		3.7			15.7			37.1			31.5	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	502	603	1434	123	664	246
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3048	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3048	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	502	603	1434	123	664	246
RTOR Reduction (vph)	0	0	0	34	3	164
Lane Group Flow (vph)	502	603	1434	89	686	57
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	18.9	54.9	32.0	32.0	22.1	22.1
Effective Green, g (s)	18.9	54.9	32.0	32.0	22.1	22.1
Actuated g/C Ratio	0.22	0.65	0.38	0.38	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	354	1942	1142	505	792	309
v/s Ratio Prot	c0.32	0.20	c0.47		c0.23	
v/s Ratio Perm				0.07		0.05
v/c Ratio	1.42	0.31	1.26	0.18	0.87	0.19
Uniform Delay, d1	33.0	6.7	26.5	17.7	30.0	24.5
Progression Factor	0.68	1.52	0.97	1.15	1.00	1.00
Incremental Delay, d2	202.9	0.4	117.4	0.0	9.5	0.1
Delay (s)	225.5	10.5	143.1	20.3	39.5	24.6
Level of Service	F	B	F	C	D	C
Approach Delay (s)		108.2	133.4		35.9	
Approach LOS		F	F		D	

Intersection Summary			
HCM 2000 Control Delay	100.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.0%	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)	72	866	53	136	1139	112	170	481	158	116	424	143
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		0.98	1.00	1.00	0.97	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1586	3148			3112		1562	3185	1306	1546	3008	
Flt Permitted	0.11	1.00			0.69		0.32	1.00	1.00	0.39	1.00	
Satd. Flow (perm)	190	3148			2147		531	3185	1306	627	3008	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	866	53	136	1139	112	170	481	158	116	424	143
RTOR Reduction (vph)	0	5	0	0	7	0	0	0	73	0	37	0
Lane Group Flow (vph)	72	914	0	0	1380	0	170	481	85	116	530	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	49.2	49.2			49.2		27.8	27.8	27.8	27.8	27.8	
Effective Green, g (s)	49.2	49.2			49.2		27.8	27.8	27.8	27.8	27.8	
Actuated g/C Ratio	0.58	0.58			0.58		0.33	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	109	1822			1242		173	1041	427	205	983	
v/s Ratio Prot		0.29						0.15			0.18	
v/s Ratio Perm	0.38				c0.64		c0.32		0.06	0.18		
v/c Ratio	0.66	0.50			1.11		0.98	0.46	0.20	0.57	0.54	
Uniform Delay, d1	12.2	10.6			17.9		28.4	22.7	20.6	23.6	23.4	
Progression Factor	0.35	0.28			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	23.2	0.8			61.7		62.8	0.1	0.1	2.1	0.3	
Delay (s)	27.5	3.8			79.6		91.2	22.8	20.7	25.7	23.7	
Level of Service	C	A			E		F	C	C	C	C	
Approach Delay (s)		5.5			79.6			36.7			24.0	
Approach LOS		A			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	41.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	120.3%	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)	89	159	165	465	875	101	420	1249	423	28	1178	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4513	1352		4571	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.81	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3031	1352		3714	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	159	165	465	875	101	420	1249	423	28	1178	206
RTOR Reduction (vph)	0	0	81	0	0	50	0	0	242	0	0	83
Lane Group Flow (vph)	89	159	84	465	875	51	0	1669	181	0	1206	123
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	4.0	15.2	15.2	21.3	32.5	32.5		38.5	38.5		38.5	38.5
Effective Green, g (s)	4.0	15.2	15.2	21.3	32.5	32.5		38.5	38.5		38.5	38.5
Actuated g/C Ratio	0.04	0.17	0.17	0.24	0.36	0.36		0.43	0.43		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	137	532	228	731	1150	488		1296	578		1588	578
v/s Ratio Prot	c0.03	0.05		0.15	c0.27							
v/s Ratio Perm			0.06			0.04		c0.55	0.13		0.32	0.09
v/c Ratio	0.65	0.30	0.37	0.64	0.76	0.10		3.75dl	0.31		0.76	0.21
Uniform Delay, d1	42.3	32.7	33.2	30.9	25.3	19.1		25.8	17.0		21.8	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	10.2	1.4	4.6	1.8	4.8	0.4		135.5	0.3		2.1	0.2
Delay (s)	52.5	34.2	37.7	32.7	30.1	19.5		161.2	17.3		24.0	16.4
Level of Service	D	C	D	C	C	B		F	B		C	B
Approach Delay (s)		39.5			30.2			132.1			22.9	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	68.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	116.5%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

MOVEMENT SUMMARY

Site: 2035 + Proj Pref AM

Adeline & 18th
2035 + Preferred Project AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	118	2.0	0.338	6.5	LOS A	1.9	47.3	0.46	0.80	26.9
8	T	199	2.0	0.338	6.5	LOS A	1.9	47.3	0.46	0.55	29.6
18	R	63	2.0	0.338	6.5	LOS A	1.9	47.3	0.46	0.60	29.2
Approach		380	2.0	0.338	6.5	LOS A	1.9	47.3	0.46	0.64	28.6
East: 18th Street (WB)											
1	L	30	2.0	0.352	7.3	LOS A	1.9	47.2	0.55	0.89	26.7
6	T	279	2.0	0.352	7.3	LOS A	1.9	47.2	0.55	0.65	29.3
16	R	45	2.0	0.352	7.3	LOS A	1.9	47.2	0.55	0.70	28.9
Approach		354	2.0	0.352	7.3	LOS A	1.9	47.2	0.55	0.67	29.0
North: Adeline Street (SB)											
7	L	81	2.0	0.453	9.4	LOS A	2.6	67.1	0.66	0.95	25.7
4	T	281	2.0	0.453	9.4	LOS A	2.6	67.1	0.66	0.77	27.9
14	R	51	2.0	0.453	9.4	LOS A	2.6	67.1	0.66	0.81	27.6
Approach		413	2.0	0.453	9.4	LOS A	2.6	67.1	0.66	0.81	27.3
West: 18th Street (EB)											
5	L	12	2.0	0.166	5.4	LOS A	0.7	18.7	0.51	0.89	27.6
2	T	129	2.0	0.166	5.4	LOS A	0.7	18.7	0.51	0.62	30.5
12	R	16	2.0	0.166	5.4	LOS A	0.7	18.7	0.51	0.68	30.1
Approach		157	2.0	0.166	5.4	LOS A	0.7	18.7	0.51	0.65	30.2
All Vehicles		1304	2.0	0.453	7.5	LOS A	2.6	67.1	0.55	0.70	28.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	222	6	27	225	263	49	619	88	241	203	42
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		1.00	0.99		1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.98	1.00			0.99	
Frt	1.00	1.00		1.00	0.92		1.00	0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1762	1853		1728	1690		1740	3437			3354	
Flt Permitted	0.20	1.00		0.54	1.00		0.47	1.00			0.56	
Satd. Flow (perm)	373	1853		976	1690		856	3437			1938	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	222	6	27	225	263	49	619	88	241	203	42
RTOR Reduction (vph)	0	1	0	0	65	0	0	15	0	0	9	0
Lane Group Flow (vph)	50	227	0	27	423	0	49	692	0	0	477	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	19.9	19.9		19.9	19.9		37.3	37.3			37.3	
Effective Green, g (s)	19.9	19.9		19.9	19.9		37.3	37.3			37.3	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.57	0.57			0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	113	565		297	515		489	1966			1108	
v/s Ratio Prot		0.12			c0.25			0.20				
v/s Ratio Perm	0.13			0.03			0.06				c0.25	
v/c Ratio	0.44	0.40		0.09	0.82		0.10	0.35			0.43	
Uniform Delay, d1	18.2	17.9		16.2	21.0		6.3	7.5			7.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.0	0.2		0.0	9.7		0.4	0.5			1.2	
Delay (s)	19.2	18.1		16.2	30.7		6.7	8.0			9.1	
Level of Service	B	B		B	C		A	A			A	
Approach Delay (s)		18.3			29.9			7.9			9.1	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	65.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Pref AM

Adeline & 14th
2035 + Preferred Project AM
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	27	2.0	0.326	6.3	LOS A	1.8	45.4	0.45	0.85	27.1
8	T	319	2.0	0.326	6.3	LOS A	1.8	45.4	0.45	0.55	29.9
18	R	25	2.0	0.326	6.3	LOS A	1.8	45.4	0.45	0.61	29.5
Approach		371	2.0	0.326	6.3	LOS A	1.8	45.4	0.45	0.57	29.7
East: 14th Street (WB)											
1	L	34	2.0	0.232	6.0	LOS A	1.1	27.6	0.52	0.88	27.2
6	T	148	2.0	0.232	6.0	LOS A	1.1	27.6	0.52	0.63	30.0
16	R	42	2.0	0.232	6.0	LOS A	1.1	27.6	0.52	0.68	29.6
Approach		224	2.0	0.232	6.0	LOS A	1.1	27.6	0.52	0.68	29.5
North: Adeline Street (SB)											
7	L	32	2.0	0.284	5.8	LOS A	1.5	37.9	0.43	0.84	27.3
4	T	266	2.0	0.284	5.8	LOS A	1.5	37.9	0.43	0.54	30.2
14	R	26	2.0	0.284	5.8	LOS A	1.5	37.9	0.43	0.60	29.8
Approach		324	2.0	0.284	5.8	LOS A	1.5	37.9	0.43	0.57	29.9
West: 14th Street (EB)											
5	L	24	2.0	0.194	5.4	LOS A	0.9	22.7	0.48	0.87	27.6
2	T	154	2.0	0.194	5.4	LOS A	0.9	22.7	0.48	0.60	30.5
12	R	17	2.0	0.194	5.4	LOS A	0.9	22.7	0.48	0.65	30.1
Approach		195	2.0	0.194	5.4	LOS A	0.9	22.7	0.48	0.63	30.0
All Vehicles		1114	2.0	0.326	6.0	LOS A	1.8	45.4	0.46	0.60	29.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: 2035 + Proj AM

Adeline & 12th
2035 + Preferred Project AM
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.218	4.5	LOS A	1.1	29.2	0.16	0.90	27.7
8	T	290	2.0	0.218	4.5	LOS A	1.1	29.2	0.16	0.42	31.3
18	R	5	2.0	0.218	4.5	LOS A	1.1	29.2	0.16	0.52	30.6
Approach		296	2.0	0.218	4.5	LOS A	1.1	29.2	0.16	0.42	31.2
East: 12th Street (WB)											
1	L	8	2.0	0.105	4.4	LOS A	0.5	11.6	0.43	0.81	27.9
6	T	29	2.0	0.105	4.4	LOS A	0.5	11.6	0.43	0.53	31.1
16	R	73	2.0	0.105	4.4	LOS A	0.5	11.6	0.43	0.59	30.6
Approach		110	2.0	0.105	4.4	LOS A	0.5	11.6	0.43	0.59	30.5
North: Adeline Street (SB)											
7	L	29	2.0	0.236	4.6	LOS A	1.3	32.3	0.16	0.87	27.6
4	T	287	2.0	0.236	4.6	LOS A	1.3	32.3	0.16	0.41	31.1
14	R	5	2.0	0.236	4.6	LOS A	1.3	32.3	0.16	0.51	30.5
Approach		321	2.0	0.236	4.6	LOS A	1.3	32.3	0.16	0.46	30.7
West: 12th Street (EB)											
5	L	2	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.78	28.4
2	T	7	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.48	31.7
12	R	1	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.54	31.2
Approach		10	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.55	30.9
All Vehicles		737	2.0	0.236	4.5	LOS A	1.3	32.3	0.20	0.46	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	142	47	0	0	356	429	443	462	100	130	0	561
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.98		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (prot)	1020	3282			2887		1173	2818		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (perm)	1020	3282			2887		1173	2818		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	142	47	0	0	356	429	443	462	100	130	0	561
RTOR Reduction (vph)	0	0	0	0	208	0	0	12	0	0	0	500
Lane Group Flow (vph)	142	47	0	0	577	0	332	661	0	130	0	61
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	16.4	43.9			24.0		31.4	31.4		10.7		10.7
Effective Green, g (s)	16.4	43.9			24.0		31.4	31.4		10.7		10.7
Actuated g/C Ratio	0.17	0.44			0.24		0.32	0.32		0.11		0.11
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	168	1455			699		372	893		166		211
v/s Ratio Prot	c0.14	0.01			c0.20		c0.28	0.23		c0.08		0.03
v/s Ratio Perm												
v/c Ratio	0.85	0.03			0.83		0.89	0.74		0.78		0.29
Uniform Delay, d1	40.1	15.6			35.5		32.2	30.2		43.0		40.6
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	29.3	0.0			7.7		22.5	3.1		20.3		0.5
Delay (s)	69.4	15.6			43.3		54.7	33.2		63.4		41.2
Level of Service	E	B			D		D	C		E		D
Approach Delay (s)		56.0			43.3			40.3			45.4	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	99.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	74.1%	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)	85	595	26	124	588	233	17	64	61	228	126	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.99		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.96			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3194		1770	3246			1706		1755	1728	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.58	1.00	
Satd. Flow (perm)	1770	3194		1770	3246			1645		1075	1728	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	595	26	124	588	233	17	64	61	228	126	42
RTOR Reduction (vph)	0	2	0	0	31	0	0	32	0	0	14	0
Lane Group Flow (vph)	85	619	0	124	790	0	0	110	0	228	154	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	9.2	53.6		11.3	55.7			24.1		24.1	24.1	
Effective Green, g (s)	9.2	53.6		11.3	55.7			24.1		24.1	24.1	
Actuated g/C Ratio	0.09	0.54		0.11	0.56			0.24		0.24	0.24	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	162	1711		200	1808			396		259	416	
v/s Ratio Prot	c0.05	0.19		c0.07	c0.24						0.09	
v/s Ratio Perm								0.07		c0.21		
v/c Ratio	0.52	0.36		0.62	0.44			0.28		0.88	0.37	
Uniform Delay, d1	43.3	13.4		42.3	13.0			30.9		36.6	31.6	
Progression Factor	1.08	1.17		0.95	0.81			1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.0		3.9	0.8			0.1		26.8	0.2	
Delay (s)	48.3	15.6		44.1	11.2			31.0		63.3	31.8	
Level of Service	D	B		D	B			C		E	C	
Approach Delay (s)		19.5			15.5			31.0			50.0	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	67.5%	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)	29	796	78	126	1361	217	32	66	66	90	83	74
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3262		1026	3471	1492	1347	919		1753	1476	
Flt Permitted	0.14	1.00		0.28	1.00	1.00	0.59	1.00		0.63	1.00	
Satd. Flow (perm)	256	3262		305	3471	1492	836	919		1166	1476	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	796	78	126	1361	217	32	66	66	90	83	74
RTOR Reduction (vph)	0	7	0	0	0	78	0	36	0	0	32	0
Lane Group Flow (vph)	29	867	0	126	1361	139	32	96	0	90	125	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	4.0	
Lane Grp Cap (vph)	163	2087		195	2221	954	234	257		326	413	
v/s Ratio Prot		0.27			0.39			c0.10			0.08	
v/s Ratio Perm	0.11			c0.41		0.09	0.04			0.08		
v/c Ratio	0.18	0.42		0.65	0.61	0.15	0.14	0.37		0.28	0.30	
Uniform Delay, d1	7.3	8.8		11.0	10.7	7.1	27.0	28.9		28.1	28.3	
Progression Factor	0.49	0.46		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.6		15.4	1.3	0.3	1.2	4.1		2.1	1.9	
Delay (s)	5.9	4.6		26.4	11.9	7.5	28.2	33.1		30.2	30.2	
Level of Service	A	A		C	B	A	C	C		C	C	
Approach Delay (s)		4.7			12.4			32.1			30.2	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.0%	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)	133	718	82	51	1254	54	308	252	15	78	103	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		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)	1582	4092		1761	4576		1761	1810	1541	1752	3539	1245
Flt Permitted	0.14	1.00		0.31	1.00		0.69	1.00	1.00	0.55	1.00	1.00
Satd. Flow (perm)	241	4092		576	4576		1273	1810	1541	1012	3539	1245
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	133	718	82	51	1254	54	308	252	15	78	103	186
RTOR Reduction (vph)	0	19	0	0	6	0	0	0	9	0	0	17
Lane Group Flow (vph)	133	781	0	51	1302	0	308	252	6	78	103	169
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	35.0	35.0		35.0	35.0		30.5	30.5	30.5	30.5	30.5	30.5
Effective Green, g (s)	35.0	35.0		35.0	35.0		30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	112	1909		268	2135		517	736	626	411	1439	506
v/s Ratio Prot		0.19			0.28			0.14			0.03	
v/s Ratio Perm	c0.55			0.09			c0.24		0.00	0.08		0.14
v/c Ratio	1.19	0.41		0.19	0.61		0.60	0.34	0.01	0.19	0.07	0.33
Uniform Delay, d1	20.0	13.2		11.7	14.9		17.4	15.3	13.3	14.3	13.6	15.3
Progression Factor	1.00	1.00		1.00	1.00		1.08	1.09	1.45	1.00	1.00	1.00
Incremental Delay, d2	144.0	0.1		0.1	0.3		5.0	1.3	0.0	1.0	0.1	1.8
Delay (s)	164.0	13.2		11.8	15.3		23.7	17.9	19.3	15.3	13.7	17.0
Level of Service	F	B		B	B		C	B	B	B	B	B
Approach Delay (s)		34.7			15.1			21.1			15.7	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	91.2%	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	110	243	276	27	77	0	0	142	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3484	1562	1770	990			3167	1558
Flt Permitted					0.98	1.00	0.66	1.00			1.00	1.00
Satd. Flow (perm)					3484	1562	1233	990			3167	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	110	243	276	27	77	0	0	142	67
RTOR Reduction (vph)	0	0	0	0	0	220	0	0	0	0	0	22
Lane Group Flow (vph)	0	0	0	0	353	56	27	77	0	0	142	45
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					15.1	15.1	50.4	50.4			50.4	50.4
Effective Green, g (s)					15.1	15.1	50.4	50.4			50.4	50.4
Actuated g/C Ratio					0.20	0.20	0.67	0.67			0.67	0.67
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					701	314	828	665			2128	1046
v/s Ratio Prot								c0.08			0.04	
v/s Ratio Perm					0.10	0.04	0.02					0.03
v/c Ratio					0.50	0.18	0.03	0.12			0.07	0.04
Uniform Delay, d1					26.6	24.8	4.1	4.4			4.2	4.2
Progression Factor					1.00	1.00	1.00	1.00			1.26	1.59
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.1	0.1
Delay (s)					26.8	24.9	4.1	4.4			5.4	6.7
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			26.0			4.3			5.8	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	33.7%	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)	26	634	114	85	177	24	56	140	137	159	173	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		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	3301		1770	3397		1770	943		1770	1126	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3301		1770	3397		1770	943		1770	1126	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	634	114	85	177	24	56	140	137	159	173	37
RTOR Reduction (vph)	0	9	0	0	7	0	0	24	0	0	5	0
Lane Group Flow (vph)	26	739	0	85	194	0	56	253	0	159	205	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	3.5	36.9		10.1	44.0		40.7	40.7		28.8	28.8	
Effective Green, g (s)	3.5	36.9		10.1	44.0		40.7	40.7		28.8	28.8	
Actuated g/C Ratio	0.03	0.28		0.08	0.33		0.31	0.31		0.22	0.22	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	46	919		134	1128		543	289		384	244	
v/s Ratio Prot	0.01	c0.22		c0.05	0.06		0.03	c0.27		0.09	c0.18	
v/s Ratio Perm												
v/c Ratio	0.57	0.80		0.63	0.17		0.10	0.88		0.41	0.84	
Uniform Delay, d1	63.7	44.4		59.4	31.3		32.8	43.5		44.6	49.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.1	5.2		8.3	0.1		0.1	24.6		0.7	22.2	
Delay (s)	72.9	49.6		67.7	31.4		32.9	68.1		45.3	71.9	
Level of Service	E	D		E	C		C	E		D	E	
Approach Delay (s)		50.4			42.2			62.2			60.4	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	53.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	132.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2035 + Preferred Project PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	156	1064	214	394	1254	177	118	433	229	136	426	68
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3421		1770	3539	1511	1770	1863	1542	1770	1819	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3421		1770	3539	1511	1770	1863	1542	1770	1819	
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)	170	1157	233	428	1363	192	128	471	249	148	463	74
RTOR Reduction (vph)	0	28	0	0	0	121	0	0	180	0	9	0
Lane Group Flow (vph)	170	1362	0	428	1363	71	128	471	69	148	528	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	5.0	16.0		5.0	16.0	16.0	4.8	16.8	16.8	7.0	19.0	
Effective Green, g (s)	5.0	16.0		5.0	16.0	16.0	4.8	16.8	16.8	7.0	19.0	
Actuated g/C Ratio	0.08	0.26		0.08	0.26	0.26	0.08	0.28	0.28	0.12	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)	145	900		145	931	397	139	514	426	203	568	
v/s Ratio Prot	0.10	c0.40		c0.24	0.39		0.07	0.25		c0.08	c0.29	
v/s Ratio Perm						0.05			0.04			
v/c Ratio	1.17	1.51		2.95	1.46	0.18	0.92	0.92	0.16	0.73	0.93	
Uniform Delay, d1	27.9	22.4		27.9	22.4	17.3	27.8	21.3	16.7	26.0	20.3	
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	128.5	236.8		896.7	214.7	0.2	52.9	21.1	0.2	12.3	21.7	
Delay (s)	156.4	259.2		924.6	237.1	17.5	80.7	42.4	16.8	38.3	41.9	
Level of Service	F	F		F	F	B	F	D	B	D	D	
Approach Delay (s)		248.0			364.2			40.7			41.1	
Approach LOS		F			F			D			D	

Intersection Summary			
HCM 2000 Control Delay	230.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	1078	469	57	889	142	915	1020	44	277	1185	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3255		1770	3428		3433	3506		1770	3426	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3255		1770	3428		3433	3506		1770	3426	
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)	214	1172	510	62	966	154	995	1109	48	301	1288	202
RTOR Reduction (vph)	0	43	0	0	12	0	0	3	0	0	11	0
Lane Group Flow (vph)	214	1639	0	62	1108	0	995	1154	0	301	1479	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	14.0	33.8		8.8	28.6		13.0	39.4		15.0	40.4	
Effective Green, g (s)	14.0	33.8		8.8	28.6		13.0	39.4		15.0	40.4	
Actuated g/C Ratio	0.13	0.31		0.08	0.26		0.12	0.36		0.14	0.37	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	225	1000		141	891		405	1255		241	1258	
v/s Ratio Prot	c0.12	c0.50		0.04	0.32		c0.29	0.33		0.17	c0.43	
v/s Ratio Perm												
v/c Ratio	0.95	1.64		0.44	1.24		2.46	0.92		1.25	1.18	
Uniform Delay, d1	47.7	38.1		48.2	40.7		48.5	33.8		47.5	34.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	45.9	292.1		0.8	119.2		663.0	12.3		141.7	87.6	
Delay (s)	93.6	330.2		49.0	159.9		711.5	46.1		189.2	122.4	
Level of Service	F	F		D	F		F	D		F	F	
Approach Delay (s)		303.5			154.1			353.7			133.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	250.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	134.4%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	990	115	7	271	0	0	0	0	580	516	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3467			5079					1610	3340	1540
Flt Permitted		1.00			0.91					0.95	0.99	1.00
Satd. Flow (perm)		3467			4647					1610	3340	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	990	115	7	271	0	0	0	0	580	516	422
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	261
Lane Group Flow (vph)	0	1094	0	0	278	0	0	0	0	360	736	161
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		37.5			37.5					30.5	30.5	30.5
Effective Green, g (s)		37.5			37.5					30.5	30.5	30.5
Actuated g/C Ratio		0.47			0.47					0.38	0.38	0.38
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1625			2178					613	1273	587
v/s Ratio Prot		c0.32										
v/s Ratio Perm					0.06					c0.22	0.22	0.10
v/c Ratio		0.67			0.13					0.59	0.58	0.27
Uniform Delay, d1		16.5			12.0					19.7	19.6	17.1
Progression Factor		1.00			0.35					1.00	1.00	1.00
Incremental Delay, d2		2.2			0.1					4.1	1.9	1.2
Delay (s)		18.7			4.3					23.8	21.6	18.3
Level of Service		B			A					C	C	B
Approach Delay (s)		18.7			4.3			0.0			21.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.2%	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)	568	1008	0	0	262	935	35	1265	61	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3381			3539	2700		5036				
Flt Permitted	0.95	0.93			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3155			3539	2700		5036				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	568	1008	0	0	262	935	35	1265	61	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	57	0	6	0	0	0	0
Lane Group Flow (vph)	511	1065	0	0	262	878	0	1355	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	22.5	50.5			24.5	24.5		18.5				
Effective Green, g (s)	22.5	50.5			24.5	24.5		18.5				
Actuated g/C Ratio	0.28	0.63			0.31	0.31		0.23				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	452	2055			1083	826		1164				
v/s Ratio Prot	c0.32	0.15			0.07							
v/s Ratio Perm		0.18				c0.33		0.27				
v/c Ratio	1.13	0.52			0.24	1.06		1.16				
Uniform Delay, d1	28.8	8.1			20.8	27.8		30.8				
Progression Factor	0.88	1.87			1.00	1.00		1.00				
Incremental Delay, d2	78.5	0.7			0.5	49.5		83.5				
Delay (s)	103.8	15.8			21.3	77.2		114.2				
Level of Service	F	B			C	E		F				
Approach Delay (s)		44.3			65.0			114.2			0.0	
Approach LOS		D			E			F			A	

Intersection Summary			
HCM 2000 Control Delay	73.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	104.6%	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)	15	947	411	261	1662	37	755	32	484	78	35	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	947	411	261	1662	37	755	32	484	78	35	73
RTOR Reduction (vph)	0	0	239	0	1	0	0	0	280	0	55	0
Lane Group Flow (vph)	15	947	172	261	1698	0	393	394	204	78	53	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	2.4	47.6	47.6	28.5	73.7		35.0	35.0	35.0	8.3	8.3	
Effective Green, g (s)	2.4	47.6	47.6	28.5	73.7		35.0	35.0	35.0	8.3	8.3	
Actuated g/C Ratio	0.02	0.35	0.35	0.21	0.54		0.26	0.26	0.26	0.06	0.06	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	31	1160	425	270	1834		424	405	319	90	84	
v/s Ratio Prot	0.01	0.29		c0.20	c0.50		0.24	c0.25		c0.05	0.04	
v/s Ratio Perm			0.14						0.16			
v/c Ratio	0.48	0.82	0.40	0.97	0.93		0.93	0.97	0.64	0.87	0.63	
Uniform Delay, d1	66.1	40.2	33.4	53.2	28.6		49.2	50.0	44.8	63.3	62.3	
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	11.4	5.0	1.1	45.1	8.8		26.5	37.5	4.7	53.4	13.7	
Delay (s)	77.6	45.2	34.5	98.4	37.4		75.7	87.5	49.5	116.6	76.0	
Level of Service	E	D	C	F	D		E	F	D	F	E	
Approach Delay (s)		42.3			45.5			69.4			93.0	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	52.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	135.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	91.8%	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)	251	766	486	429	1486	307	409	397	499	207	179	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1337	2998		1687	3406	1509	1444	2895		1369	2604	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1337	2998		1687	3406	1509	1444	2895		1369	2604	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	251	766	486	429	1486	307	409	397	499	207	179	76
RTOR Reduction (vph)	0	73	0	0	0	141	0	163	0	0	21	0
Lane Group Flow (vph)	251	1179	0	429	1486	166	409	733	0	153	288	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	21.5	44.0		29.5	52.0	52.0	34.5	34.5		15.0	15.0	
Effective Green, g (s)	21.5	44.0		29.5	52.0	52.0	34.5	34.5		15.0	15.0	
Actuated g/C Ratio	0.15	0.32		0.21	0.37	0.37	0.25	0.25		0.11	0.11	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	206	945		356	1269	562	357	715		147	280	
v/s Ratio Prot	0.19	c0.39		c0.25	0.44		c0.28	0.25		c0.11	0.11	
v/s Ratio Perm						0.11						
v/c Ratio	1.22	1.25		1.21	1.17	0.30	1.15	1.02		1.04	1.03	
Uniform Delay, d1	59.0	47.8		55.0	43.8	30.8	52.5	52.5		62.2	62.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	134.0	120.5		115.9	85.7	0.3	93.4	40.1		85.5	61.8	
Delay (s)	193.0	168.3		170.9	129.4	31.1	145.9	92.6		147.7	124.1	
Level of Service	F	F		F	F	C	F	F		F	F	
Approach Delay (s)		172.4			123.9			109.3			131.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	134.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	110.7%	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)	0	1235	199	255	1534	0	0	0	0	785	726	505
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4839		1768	3312						3283	
Flt Permitted		1.00		0.11	1.00						0.98	
Satd. Flow (perm)		4839		213	3312						3283	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	199	255	1534	0	0	0	0	785	726	505
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	1409	0	255	1534	0	0	0	0	0	2008	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		41.0		41.0	41.0						36.0	
Effective Green, g (s)		41.0		41.0	41.0						36.0	
Actuated g/C Ratio		0.47		0.47	0.47						0.41	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2280		100	1560						1358	
v/s Ratio Prot		0.29			0.46						c0.61	
v/s Ratio Perm				c1.19								
v/c Ratio		0.62		2.55	0.98						1.48	
Uniform Delay, d1		17.2		23.0	22.7						25.5	
Progression Factor		1.00		0.29	0.29						1.00	
Incremental Delay, d2		0.4		700.2	3.9						219.5	
Delay (s)		17.5		706.9	10.4						245.0	
Level of Service		B		F	B						F	
Approach Delay (s)		17.5			109.7			0.0			245.0	
Approach LOS		B			F			A			F	

Intersection Summary			
HCM 2000 Control Delay	136.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.04		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	191.9%	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)	484	1536	0	0	1673	567	116	633	212	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3380			3385				
Flt Permitted	0.10	1.00			1.00			0.99				
Satd. Flow (perm)	182	3539			3380			3385				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	484	1536	0	0	1673	567	116	633	212	0	0	0
RTOR Reduction (vph)	0	0	0	0	39	0	0	7	0	0	0	0
Lane Group Flow (vph)	484	1536	0	0	2201	0	0	954	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	41.0	41.0			41.0			36.0				
Effective Green, g (s)	41.0	41.0			41.0			36.0				
Actuated g/C Ratio	0.47	0.47			0.47			0.41				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1667			1592			1400				
v/s Ratio Prot		0.43			0.65			c0.28				
v/s Ratio Perm	c2.66											
v/c Ratio	5.69	0.92			1.38			0.68				
Uniform Delay, d1	23.0	21.5			23.0			20.8				
Progression Factor	0.85	0.83			1.00			1.00				
Incremental Delay, d2	2120.4	3.1			176.2			1.1				
Delay (s)	2140.1	21.0			199.2			21.9				
Level of Service	F	C			F			C				
Approach Delay (s)		528.8			199.2			21.9			0.0	
Approach LOS		F			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	294.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.32		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	191.9%	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)	61	1361	377	117	1770	27	262	227	114	124	356	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.95		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)	1769	3350		1769	3367		1762	1754		1762	1796	
Flt Permitted	0.08	1.00		0.08	1.00		0.20	1.00		0.35	1.00	
Satd. Flow (perm)	154	3350		154	3367		378	1754		658	1796	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	1361	377	117	1770	27	262	227	114	124	356	89
RTOR Reduction (vph)	0	32	0	0	1	0	0	23	0	0	11	0
Lane Group Flow (vph)	61	1707	0	117	1796	0	262	318	0	124	434	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Effective Green, g (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.29	0.29		0.29	0.29	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2030		93	2041		108	504		189	516	
v/s Ratio Prot		0.51			0.53			0.18			0.24	
v/s Ratio Perm	0.40			c0.76			c0.69			0.19		
v/c Ratio	0.66	0.84		1.26	0.88		2.43	0.63		0.66	0.84	
Uniform Delay, d1	10.3	12.6		15.8	13.3		28.5	24.8		25.0	26.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	30.8	4.4		177.8	5.8		668.9	5.9		16.4	15.2	
Delay (s)	41.1	17.1		193.5	19.1		697.4	30.7		41.5	41.9	
Level of Service	D	B		F	B		F	C		D	D	
Approach Delay (s)		17.9			29.8			320.4			41.8	
Approach LOS		B			C			F			D	

Intersection Summary			
HCM 2000 Control Delay	62.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	143.3%	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)	62	1537	108	57	1310	9	388	577	183	29	28	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.97	1.00	1.00		1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)		3425			3307	1490	1641	1827	1504		1817	1500
Flt Permitted		0.76			0.67	1.00	0.72	1.00	1.00		0.36	1.00
Satd. Flow (perm)		2617			2228	1490	1244	1827	1504		678	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	1537	108	57	1310	9	388	577	183	29	28	69
RTOR Reduction (vph)	0	6	0	0	0	2	0	0	23	0	0	39
Lane Group Flow (vph)	0	1701	0	0	1367	7	388	577	160	0	57	30
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		54.5			54.5	54.5	26.5	26.5	26.5		26.5	26.5
Effective Green, g (s)		54.5			54.5	54.5	26.5	26.5	26.5		26.5	26.5
Actuated g/C Ratio		0.61			0.61	0.61	0.29	0.29	0.29		0.29	0.29
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1584			1349	902	366	537	442		199	441
v/s Ratio Prot								c0.32				
v/s Ratio Perm		c0.65			0.61	0.00	0.31		0.11		0.08	0.02
v/c Ratio		1.07			1.01	0.01	1.06	1.07	0.36		0.29	0.07
Uniform Delay, d1		17.8			17.8	7.0	31.8	31.8	25.1		24.5	22.9
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		45.5			27.9	0.0	63.8	60.4	0.2		0.3	0.0
Delay (s)		63.2			45.6	7.0	95.6	92.1	25.3		24.8	22.9
Level of Service		E			D	A	F	F	C		C	C
Approach Delay (s)		63.2			45.3			82.6			23.7	
Approach LOS		E			D			F			C	

Intersection Summary			
HCM 2000 Control Delay	61.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	128.6%	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)	204	1333	368	96	918	42	570	692	157	193	898	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	4.0	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3485	1482	1770	3195	1540	1732	3425		1764	3427	
Flt Permitted		0.57	1.00	0.12	1.00	1.00	0.16	1.00		0.26	1.00	
Satd. Flow (perm)		1982	1482	219	3195	1540	301	3425		486	3427	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	204	1333	368	96	918	42	570	692	157	193	898	202
RTOR Reduction (vph)	0	0	52	0	0	19	0	5	0	0	23	0
Lane Group Flow (vph)	0	1537	316	96	918	23	570	844	0	193	1077	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		34.0	34.0	34.0	34.0	34.0	41.5	41.5		41.5	41.5	
Effective Green, g (s)		34.0	34.0	34.0	34.0	34.0	41.5	41.5		41.5	41.5	
Actuated g/C Ratio		0.40	0.40	0.40	0.40	0.40	0.49	0.49		0.49	0.49	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		792	592	87	1278	616	146	1672		237	1673	
v/s Ratio Prot					0.29			0.25			0.31	
v/s Ratio Perm		c0.78	0.21	0.44		0.01	c1.90			0.40		
v/c Ratio		1.94	0.53	1.10	0.72	0.04	3.90	0.50		0.81	0.64	
Uniform Delay, d1		25.5	19.5	25.5	21.5	15.5	21.8	14.8		18.5	16.2	
Progression Factor		1.00	1.00	0.39	0.39	0.05	1.00	1.00		1.00	1.00	
Incremental Delay, d2		427.9	3.4	118.5	2.9	0.1	1323.2	0.5		19.8	1.0	
Delay (s)		453.4	22.9	128.5	11.4	0.9	1345.0	15.3		38.3	17.2	
Level of Service		F	C	F	B	A	F	B		D	B	
Approach Delay (s)		370.3			21.6			549.4			20.3	
Approach LOS		F			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	270.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.01		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	147.1%	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)	119	1373	25	60	1106	57	27	222	348	35	78	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1587	3154	1360	1588	3065	1375		3159	1171		2846	
Flt Permitted	0.20	1.00	1.00	0.13	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	330	3154	1360	210	3065	1375		2889	1171		2516	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	1373	25	60	1106	57	27	222	348	35	78	98
RTOR Reduction (vph)	0	0	6	0	0	16	0	0	26	0	52	0
Lane Group Flow (vph)	119	1373	19	60	1106	41	0	249	322	0	159	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	50.8	50.8	50.8	50.8	50.8	50.8		25.7	25.7		25.7	
Effective Green, g (s)	50.8	50.8	50.8	50.8	50.8	50.8		25.7	25.7		25.7	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60		0.30	0.30		0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	197	1884	812	125	1831	821		873	354		760	
v/s Ratio Prot		c0.44			0.36							
v/s Ratio Perm	0.36		0.01	0.29		0.03		0.09	c0.28		0.06	
v/c Ratio	0.60	0.73	0.02	0.48	0.60	0.05		0.29	0.91		0.21	
Uniform Delay, d1	10.8	12.2	7.0	9.6	10.8	7.1		22.6	28.5		22.1	
Progression Factor	0.74	0.77	0.79	1.52	1.47	1.54		1.00	1.00		1.00	
Incremental Delay, d2	1.2	0.2	0.0	6.3	0.7	0.1		0.1	26.2		0.1	
Delay (s)	9.2	9.6	5.5	20.9	16.6	11.0		22.7	54.7		22.1	
Level of Service	A	A	A	C	B	B		C	D		C	
Approach Delay (s)		9.5			16.5			41.4			22.1	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	620	1044	878	525	265	216
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	0.99	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	2972	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	2972	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	620	1044	878	525	265	216
RTOR Reduction (vph)	0	0	0	241	31	126
Lane Group Flow (vph)	620	1044	878	284	299	25
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	36.8	62.8	22.0	22.0	14.2	14.2
Effective Green, g (s)	36.8	62.8	22.0	22.0	14.2	14.2
Actuated g/C Ratio	0.43	0.74	0.26	0.26	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	682	2285	793	357	496	202
v/s Ratio Prot	c0.39	0.34	c0.29		c0.10	
v/s Ratio Perm				0.21		0.02
v/c Ratio	0.91	0.46	1.11	0.80	0.60	0.12
Uniform Delay, d1	22.5	4.4	31.5	29.4	32.8	30.1
Progression Factor	0.77	0.83	1.10	1.31	1.00	1.00
Incremental Delay, d2	11.1	0.4	50.3	1.1	1.4	0.1
Delay (s)	28.4	4.0	85.0	39.7	34.2	30.2
Level of Service	C	A	F	D	C	C
Approach Delay (s)		13.1	68.0		33.0	
Approach LOS		B	E		C	

Intersection Summary			
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.8%	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)	185	970	33	125	835	92	410	1106	307	91	438	185
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.92	1.00	0.98	
Flpb, ped/bikes	0.99	1.00			1.00		0.98	1.00	1.00	0.99	1.00	
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1581	3164			3104		1564	3185	1309	1579	2981	
Flt Permitted	0.16	1.00			0.60		0.34	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	262	3164			1877		568	3185	1309	220	2981	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	185	970	33	125	835	92	410	1106	307	91	438	185
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	27	0	41	0
Lane Group Flow (vph)	185	1000	0	0	1043	0	410	1106	280	91	582	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Effective Green, g (s)	39.0	39.0			39.0		38.0	38.0	38.0	38.0	38.0	
Actuated g/C Ratio	0.46	0.46			0.46		0.45	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	120	1451			861		253	1423	585	98	1332	
v/s Ratio Prot		0.32						0.35			0.20	
v/s Ratio Perm	c0.71				0.56		c0.72		0.21	0.41		
v/c Ratio	1.54	0.69			1.21		1.62	0.78	0.48	0.93	0.44	
Uniform Delay, d1	23.0	18.2			23.0		23.5	19.9	16.5	22.2	16.1	
Progression Factor	0.88	0.88			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	277.9	2.5			106.0		296.7	2.5	0.2	66.6	0.1	
Delay (s)	298.1	18.4			129.0		320.2	22.4	16.8	88.8	16.2	
Level of Service	F	B			F		F	C	B	F	B	
Approach Delay (s)		62.0			129.0			88.4			25.5	
Approach LOS		E			F			F			C	

Intersection Summary			
HCM 2000 Control Delay	81.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.58		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	127.4%	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)	332	914	237	463	734	76	10	1950	731	3	1256	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1349	3090	3185	1349		4575	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.93	1.00
Satd. Flow (perm)	3090	3154	1349	3090	3185	1349		4254	1391		4235	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	332	914	237	463	734	76	10	1950	731	3	1256	211
RTOR Reduction (vph)	0	0	65	0	0	53	0	0	0	0	0	79
Lane Group Flow (vph)	332	914	172	463	734	24	0	1960	731	0	1259	132
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Effective Green, g (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Actuated g/C Ratio	0.12	0.29	0.29	0.13	0.30	0.30		0.43	1.00		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	357	913	390	390	955	404		1813	1391		1805	575
v/s Ratio Prot	0.11	c0.29		c0.15	0.23							
v/s Ratio Perm			0.13			0.02		c0.46	0.53		0.30	0.10
v/c Ratio	0.93	1.00	0.44	1.19	0.77	0.06		1.08	0.53		0.70	0.23
Uniform Delay, d1	41.6	33.8	27.5	41.5	30.2	23.7		27.2	0.0		22.2	17.3
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	29.9	30.0	3.6	107.2	5.9	0.3		46.8	1.4		1.2	0.2
Delay (s)	71.6	63.8	31.1	148.7	36.2	24.0		74.1	1.4		23.4	17.5
Level of Service	E	E	C	F	D	C		E	A		C	B
Approach Delay (s)		60.3			76.4			54.3			22.6	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	52.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	104.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Pref PM

Adeline & 18th
2035 + Preferred Project PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	57	2.0	1.073	82.6	LOS F	30.2	767.5	1.00	2.30	11.4
8	T	508	2.0	1.073	82.6	LOS F	30.2	767.5	1.00	2.30	11.2
18	R	101	2.0	1.073	82.6	LOS F	30.2	767.5	1.00	2.30	11.2
Approach		666	2.0	1.073	82.6	LOS F	30.2	767.5	1.00	2.30	11.2
East: 18th Street (WB)											
1	L	13	2.0	0.319	8.4	LOS A	1.5	37.3	0.65	0.98	26.3
6	T	179	2.0	0.319	8.4	LOS A	1.5	37.3	0.65	0.80	28.6
16	R	55	2.0	0.319	8.4	LOS A	1.5	37.3	0.65	0.84	28.3
Approach		247	2.0	0.319	8.4	LOS A	1.5	37.3	0.65	0.82	28.4
North: Adeline Street (SB)											
7	L	358	2.0	0.777	17.5	LOS C	10.4	265.1	0.88	0.90	22.5
4	T	426	2.0	0.777	17.5	LOS C	10.4	265.1	0.88	0.85	23.7
14	R	68	2.0	0.777	17.5	LOS C	10.4	265.1	0.88	0.86	23.6
Approach		852	2.0	0.777	17.5	LOS C	10.4	265.1	0.88	0.87	23.2
West: 18th Street (EB)											
5	L	60	2.0	0.856	34.8	LOS D	9.4	238.4	0.96	1.35	18.0
2	T	386	2.0	0.856	34.8	LOS D	9.4	238.4	0.96	1.33	18.4
12	R	89	2.0	0.856	34.8	LOS D	9.4	238.4	0.96	1.33	18.3
Approach		535	2.0	0.856	34.8	LOS D	9.4	238.4	0.96	1.33	18.3
All Vehicles		2300	2.0	1.073	39.4	LOS E	30.2	767.5	0.91	1.38	17.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	570	45	17	163	112	64	818	61	31	202	24
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		1.00	0.99		1.00	0.99			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.98	1.00			1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1757	1835		1753	1731		1726	3481			3441	
Flt Permitted	0.49	1.00		0.16	1.00		0.59	1.00			0.84	
Satd. Flow (perm)	910	1835		299	1731		1077	3481			2897	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	570	45	17	163	112	64	818	61	31	202	24
RTOR Reduction (vph)	0	4	0	0	36	0	0	8	0	0	11	0
Lane Group Flow (vph)	167	611	0	17	239	0	64	871	0	0	246	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	24.7	24.7		24.7	24.7		37.0	37.0			37.0	
Effective Green, g (s)	24.7	24.7		24.7	24.7		37.0	37.0			37.0	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.53	0.53			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)	322	650		105	613		571	1847			1537	
v/s Ratio Prot		c0.33			0.14			c0.25				
v/s Ratio Perm	0.18			0.06			0.06				0.08	
v/c Ratio	0.52	0.94		0.16	0.39		0.11	0.47			0.16	
Uniform Delay, d1	17.8	21.8		15.4	16.9		8.2	10.2			8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.4	21.8		0.7	0.4		0.4	0.9			0.2	
Delay (s)	19.2	43.5		16.1	17.3		8.6	11.1			8.6	
Level of Service	B	D		B	B		A	B			A	
Approach Delay (s)		38.3			17.2			10.9			8.6	
Approach LOS		D			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	69.7	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 SUMMARY

Site: 2035 + Proj Pref PM

Adeline & 14th
2035 + Preferred Project PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	18	2.0	0.677	15.0	LOS C	6.3	159.6	0.82	1.06	23.7
8	T	557	2.0	0.677	15.0	LOS C	6.3	159.6	0.82	0.96	25.2
18	R	53	2.0	0.677	15.0	LOS C	6.3	159.6	0.82	0.98	25.0
Approach		628	2.0	0.677	15.0	LOS C	6.3	159.6	0.82	0.96	25.1
East: 14th Street (WB)											
1	L	90	2.0	0.470	11.4	LOS B	2.7	68.0	0.73	1.02	24.9
6	T	212	2.0	0.470	11.4	LOS B	2.7	68.0	0.73	0.89	26.7
16	R	47	2.0	0.470	11.4	LOS B	2.7	68.0	0.73	0.92	26.5
Approach		349	2.0	0.470	11.4	LOS B	2.7	68.0	0.73	0.93	26.1
North: Adeline Street (SB)											
7	L	85	2.0	0.505	9.6	LOS A	3.3	83.5	0.64	0.89	25.7
4	T	395	2.0	0.505	9.6	LOS A	3.3	83.5	0.64	0.71	27.8
14	R	34	2.0	0.505	9.6	LOS A	3.3	83.5	0.64	0.74	27.5
Approach		514	2.0	0.505	9.6	LOS A	3.3	83.5	0.64	0.74	27.4
West: 14th Street (EB)											
5	L	53	2.0	0.503	11.6	LOS B	3.1	78.5	0.73	1.04	24.9
2	T	273	2.0	0.503	11.6	LOS B	3.1	78.5	0.73	0.90	26.7
12	R	71	2.0	0.503	11.6	LOS B	3.1	78.5	0.73	0.93	26.5
Approach		397	2.0	0.503	11.6	LOS B	3.1	78.5	0.73	0.92	26.4
All Vehicles		1888	2.0	0.677	12.2	LOS B	6.3	159.6	0.74	0.89	26.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: 2035 + Proj PM

Adeline & 12th
2035 + Preferred Project PM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.392	6.7	LOS A	2.5	62.3	0.37	0.84	26.9
8	T	481	2.0	0.392	6.7	LOS A	2.5	62.3	0.37	0.49	29.7
18	R	7	2.0	0.392	6.7	LOS A	2.5	62.3	0.37	0.56	29.3
Approach		489	2.0	0.392	6.7	LOS A	2.5	62.3	0.37	0.49	29.7
East: 12th Street (WB)											
1	L	10	2.0	0.189	6.1	LOS A	0.8	21.1	0.56	0.89	27.1
6	T	21	2.0	0.189	6.1	LOS A	0.8	21.1	0.56	0.68	29.8
16	R	131	2.0	0.189	6.1	LOS A	0.8	21.1	0.56	0.73	29.4
Approach		162	2.0	0.189	6.1	LOS A	0.8	21.1	0.56	0.73	29.3
North: Adeline Street (SB)											
7	L	108	2.0	0.394	6.3	LOS A	2.6	67.1	0.18	0.83	26.8
4	T	423	2.0	0.394	6.3	LOS A	2.6	67.1	0.18	0.40	29.9
14	R	8	2.0	0.394	6.3	LOS A	2.6	67.1	0.18	0.49	29.4
Approach		539	2.0	0.394	6.3	LOS A	2.6	67.1	0.18	0.49	29.2
West: 12th Street (EB)											
5	L	8	2.0	0.019	4.6	LOS A	0.1	1.9	0.53	0.78	27.8
2	T	5	2.0	0.019	4.6	LOS A	0.1	1.9	0.53	0.57	30.7
12	R	3	2.0	0.019	4.6	LOS A	0.1	1.9	0.53	0.62	30.3
Approach		16	2.0	0.019	4.6	LOS A	0.1	1.9	0.53	0.68	29.0
All Vehicles		1206	2.0	0.394	6.4	LOS A	2.6	67.1	0.32	0.52	29.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	259	184	0	0	190	288	157	515	225	288	0	531
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.91		1.00	0.96		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2591		972	2915		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2591		972	2915		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	259	184	0	0	190	288	157	515	225	288	0	531
RTOR Reduction (vph)	0	0	0	0	248	0	0	37	0	0	0	422
Lane Group Flow (vph)	259	184	0	0	230	0	141	719	0	288	0	109
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	21.2	38.5			13.8		26.6	26.6		20.1		20.1
Effective Green, g (s)	21.2	38.5			13.8		26.6	26.6		20.1		20.1
Actuated g/C Ratio	0.22	0.39			0.14		0.27	0.27		0.20		0.20
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	295	1298			364		263	789		318		505
v/s Ratio Prot	c0.19	0.06			c0.09		0.15	c0.25		c0.19		0.04
v/s Ratio Perm												
v/c Ratio	0.88	0.14			0.63		0.54	0.91		0.91		0.22
Uniform Delay, d1	37.2	19.2			39.8		30.5	34.7		38.1		32.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	23.5	0.0			3.1		1.6	14.6		27.6		0.2
Delay (s)	60.8	19.3			42.9		32.2	49.3		65.8		32.6
Level of Service	E	B			D		C	D		E		C
Approach Delay (s)		43.5			42.9			46.6			44.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	16.5
Intersection Capacity Utilization	78.9%	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)	84	670	22	139	785	433	20	119	104	467	174	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			0.99		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.95			0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3377		1770	3184			1723		1758	1709	
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.57	1.00	
Satd. Flow (perm)	1770	3377		1770	3184			1675		1051	1709	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	84	670	22	139	785	433	20	119	104	467	174	79
RTOR Reduction (vph)	0	3	0	0	83	0	0	30	0	0	18	0
Lane Group Flow (vph)	84	689	0	139	1135	0	0	213	0	467	235	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	5.1	27.8		10.3	33.0			40.9		40.9	40.9	
Effective Green, g (s)	5.1	27.8		10.3	33.0			40.9		40.9	40.9	
Actuated g/C Ratio	0.06	0.31		0.11	0.37			0.45		0.45	0.45	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	100	1043		202	1167			761		477	776	
v/s Ratio Prot	0.05	c0.20		0.08	c0.36						0.14	
v/s Ratio Perm								0.13		c0.44		
v/c Ratio	0.84	0.66		0.69	0.97			0.28		0.98	0.30	
Uniform Delay, d1	42.0	27.0		38.3	28.1			15.3		24.1	15.5	
Progression Factor	0.94	0.91		0.86	0.74			1.00		1.00	1.00	
Incremental Delay, d2	41.5	1.2		7.5	20.5			0.1		35.2	0.1	
Delay (s)	81.3	25.9		40.4	41.3			15.4		59.3	15.6	
Level of Service	F	C		D	D			B		E	B	
Approach Delay (s)		31.9			41.2			15.4			44.0	
Approach LOS		C			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	94.9%	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)	52	1697	48	70	1566	293	48	119	123	139	129	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	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3383		1054	3471	1460	1574	1064		1759	1574	
Flt Permitted	0.09	1.00		0.09	1.00	1.00	0.59	1.00		0.52	1.00	
Satd. Flow (perm)	169	3383		101	3471	1460	986	1064		962	1574	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	52	1697	48	70	1566	293	48	119	123	139	129	57
RTOR Reduction (vph)	0	3	0	0	0	132	0	9	0	0	13	0
Lane Group Flow (vph)	52	1742	0	70	1566	161	48	233	0	139	173	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	92	1860		55	1909	803	345	372		336	550	
v/s Ratio Prot		0.51			0.45			c0.22			0.11	
v/s Ratio Perm	0.31			c0.69		0.11	0.05			0.14		
v/c Ratio	0.57	0.94		1.27	0.82	0.20	0.14	0.63		0.41	0.31	
Uniform Delay, d1	11.8	16.7		18.0	14.8	9.1	17.8	21.6		19.8	19.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.8	10.5		211.4	4.1	0.6	0.8	7.7		3.7	1.5	
Delay (s)	34.5	27.2		229.4	18.9	9.7	18.6	29.4		23.5	20.5	
Level of Service	C	C		F	B	A	B	C		C	C	
Approach Delay (s)		27.4			25.1			27.6			21.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.7%	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)	123	1506	87	25	1068	67	633	404	76	80	60	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1669	4281		1767	4532		1742	1863	1538	1755	3539	1216
Flt Permitted	0.17	1.00		0.11	1.00		0.72	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	306	4281		207	4532		1312	1863	1538	756	3539	1216
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	123	1506	87	25	1068	67	633	404	76	80	60	189
RTOR Reduction (vph)	0	7	0	0	8	0	0	0	14	0	0	18
Lane Group Flow (vph)	123	1586	0	25	1127	0	633	404	62	80	60	171
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.0	36.0		36.0	36.0		39.5	39.5	39.5	39.5	39.5	39.5
Effective Green, g (s)	36.0	36.0		36.0	36.0		39.5	39.5	39.5	39.5	39.5	39.5
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	129	1813		87	1919		609	865	714	351	1644	565
v/s Ratio Prot		0.37			0.25			0.22			0.02	
v/s Ratio Perm	c0.40			0.12			c0.48		0.04	0.11		0.14
v/c Ratio	0.95	0.87		0.29	0.59		1.04	0.47	0.09	0.23	0.04	0.30
Uniform Delay, d1	23.7	22.4		16.1	18.8		22.8	15.6	12.7	13.6	12.4	14.2
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	67.6	6.2		0.7	0.3		47.1	1.8	0.2	1.5	0.0	1.4
Delay (s)	91.3	28.7		16.7	19.1		69.8	17.4	12.9	15.1	12.4	15.5
Level of Service	F	C		B	B		E	B	B	B	B	B
Approach Delay (s)		33.2			19.0			46.9			14.9	
Approach LOS		C			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	111.6%	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)	0	0	0	36	162	600	47	193	0	0	133	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3507	1561	1770	1111			2865	1558
Flt Permitted					0.99	1.00	0.67	1.00			1.00	1.00
Satd. Flow (perm)					3507	1561	1244	1111			2865	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	36	162	600	47	193	0	0	133	24
RTOR Reduction (vph)	0	0	0	0	0	461	0	0	0	0	0	7
Lane Group Flow (vph)	0	0	0	0	198	139	47	193	0	0	133	17
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					14.9	14.9	65.6	65.6			65.6	65.6
Effective Green, g (s)					14.9	14.9	65.6	65.6			65.6	65.6
Actuated g/C Ratio					0.17	0.17	0.73	0.73			0.73	0.73
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					580	258	906	809			2088	1135
v/s Ratio Prot								c0.17			0.05	
v/s Ratio Perm					0.06	c0.09	0.04					0.01
v/c Ratio					0.34	0.54	0.05	0.24			0.06	0.02
Uniform Delay, d1					33.2	34.4	3.4	4.0			3.5	3.3
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.1	1.1	0.0	0.1			0.1	0.0
Delay (s)					33.3	35.5	3.4	4.1			3.5	3.4
Level of Service					C	D	A	A			A	A
Approach Delay (s)		0.0			34.9			3.9			3.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	57.9%	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)	26	944	65	41	112	26	107	308	148	166	161	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3366		1770	3295		1770	1075		1770	1090	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3366		1770	3295		1770	1075		1770	1090	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	65	41	112	26	107	308	148	166	161	14
RTOR Reduction (vph)	0	3	0	0	12	0	0	11	0	0	2	0
Lane Group Flow (vph)	26	1006	0	41	126	0	107	445	0	166	173	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	4.0	48.4		4.0	48.9		64.0	64.0		25.0	25.0	
Effective Green, g (s)	4.0	48.4		4.0	48.9		64.0	64.0		25.0	25.0	
Actuated g/C Ratio	0.03	0.31		0.03	0.31		0.41	0.41		0.16	0.16	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	44	1035		44	1023		719	437		281	173	
v/s Ratio Prot	0.01	c0.30		c0.02	0.04		0.06	c0.41		0.09	c0.16	
v/s Ratio Perm												
v/c Ratio	0.59	0.97		0.93	0.12		0.15	1.02		0.59	1.00	
Uniform Delay, d1	75.9	53.8		76.6	38.9		29.5	46.7		61.5	66.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.3	21.3		109.0	0.1		0.1	47.6		3.3	68.9	
Delay (s)	89.2	75.1		185.6	38.9		29.6	94.3		64.8	135.1	
Level of Service	F	E		F	D		C	F		E	F	
Approach Delay (s)		75.4			72.5			82.0			100.9	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	81.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	157.4	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

2035 + Preferred Project AM
Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	1260	85	330	1372	249	69	167	191	373	551	159
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3494		1770	3539	1517	1770	1863	1540	1770	1792	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3494		1770	3539	1517	1770	1863	1540	1770	1792	
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	1370	92	359	1491	271	75	182	208	405	599	173
RTOR Reduction (vph)	0	8	0	0	0	104	0	0	156	0	17	0
Lane Group Flow (vph)	62	1454	0	359	1491	167	75	182	52	405	755	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	2.3	14.7		10.0	22.4	22.4	3.1	15.2	15.2	5.0	17.1	
Effective Green, g (s)	2.3	14.7		10.0	22.4	22.4	3.1	15.2	15.2	5.0	17.1	
Actuated g/C Ratio	0.04	0.24		0.16	0.37	0.37	0.05	0.25	0.25	0.08	0.28	
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)	66	843		290	1301	557	90	464	384	145	503	
v/s Ratio Prot	0.04	c0.42		c0.20	0.42		0.04	0.10		c0.23	c0.42	
v/s Ratio Perm						0.11			0.03			
v/c Ratio	0.94	1.73		1.24	1.15	0.30	0.83	0.39	0.14	2.79	1.50	
Uniform Delay, d1	29.2	23.1		25.4	19.2	13.7	28.6	19.0	17.7	27.9	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	88.5	331.4		133.1	75.2	0.3	45.4	0.5	0.2	825.8	235.5	
Delay (s)	117.7	354.5		158.5	94.5	14.0	74.0	19.6	17.9	853.7	257.4	
Level of Service	F	F		F	F	B	E	B	B	F	F	
Approach Delay (s)		344.8			95.0			27.6			462.6	
Approach LOS		F			F			C			F	

Intersection Summary			
HCM 2000 Control Delay	242.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.70		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	112.0%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰↰	↑↱		↰	↑↱	
Volume (vph)	252	926	914	126	1195	190	853	795	45	165	1348	283
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.98		1.00	0.99		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	3081		1770	3428		3433	3497		1770	3394	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3081		1770	3428		3433	3497		1770	3394	
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)	274	1007	993	137	1299	207	927	864	49	179	1465	308
RTOR Reduction (vph)	0	161	0	0	11	0	0	3	0	0	16	0
Lane Group Flow (vph)	274	1839	0	137	1495	0	927	910	0	179	1757	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	19.0	36.0		11.0	28.0		15.0	36.1		13.9	34.0	
Effective Green, g (s)	19.0	36.0		11.0	28.0		15.0	36.1		13.9	34.0	
Actuated g/C Ratio	0.17	0.33		0.10	0.25		0.14	0.33		0.13	0.31	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	305	1008		177	872		468	1147		223	1049	
v/s Ratio Prot	c0.15	c0.60		0.08	0.44		c0.27	0.26		0.10	c0.52	
v/s Ratio Perm												
v/c Ratio	0.90	1.82		0.77	1.71		1.98	0.79		0.80	1.68	
Uniform Delay, d1	44.6	37.0		48.3	41.0		47.5	33.6		46.7	38.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.5	374.7		17.3	326.3		449.0	5.7		18.0	308.0	
Delay (s)	71.0	411.7		65.6	367.3		496.5	39.2		64.7	346.0	
Level of Service	E	F		E	F		F	D		E	F	
Approach Delay (s)		370.6			342.1			269.6			320.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	327.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	151.6%	ICU Level of Service	H
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	532	82	12	292	0	0	0	0	631	899	511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		0.99			1.00					1.00	1.00	0.98
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3447			5073					1610	3368	1550
Flt Permitted		1.00			0.88					0.95	0.99	1.00
Satd. Flow (perm)		3447			4450					1610	3368	1550
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	532	82	12	292	0	0	0	0	631	899	511
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	65
Lane Group Flow (vph)	0	599	0	0	304	0	0	0	0	498	1032	446
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		17.0			17.0					51.0	51.0	51.0
Effective Green, g (s)		17.0			17.0					51.0	51.0	51.0
Actuated g/C Ratio		0.21			0.21					0.64	0.64	0.64
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		732			945					1026	2147	988
v/s Ratio Prot		c0.17										
v/s Ratio Perm					0.07					c0.31	0.31	0.29
v/c Ratio		0.82			0.32					0.49	0.48	0.45
Uniform Delay, d1		30.0			26.6					7.6	7.6	7.4
Progression Factor		1.00			1.12					1.00	1.00	1.00
Incremental Delay, d2		9.9			0.9					1.6	0.8	1.5
Delay (s)		39.9			30.6					9.3	8.4	8.9
Level of Service		D			C					A	A	A
Approach Delay (s)		39.9			30.6			0.0			8.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	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)	293	886	0	0	284	737	9	755	32	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3385			3539	2704		5044				
Flt Permitted	0.95	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3213			3539	2704		5044				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	293	886	0	0	284	737	9	755	32	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	183	0	5	0	0	0	0
Lane Group Flow (vph)	264	915	0	0	284	554	0	791	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	21.5	51.5			26.5	26.5		17.5				
Effective Green, g (s)	21.5	51.5			26.5	26.5		17.5				
Actuated g/C Ratio	0.27	0.64			0.33	0.33		0.22				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	432	2114			1172	895		1103				
v/s Ratio Prot	c0.16	0.12			0.08							
v/s Ratio Perm		0.16				c0.20		0.16				
v/c Ratio	0.61	0.43			0.24	0.62		0.72				
Uniform Delay, d1	25.6	7.0			19.5	22.5		29.0				
Progression Factor	0.91	0.75			1.00	1.00		1.00				
Incremental Delay, d2	4.9	0.5			0.5	3.2		4.0				
Delay (s)	28.2	5.8			19.9	25.7		33.0				
Level of Service	C	A			B	C		C				
Approach Delay (s)		10.8			24.1			33.0			0.0	
Approach LOS		B			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	81.5%	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)	61	950	747	391	1662	70	212	45	335	31	21	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1404	1543	3333		1243	1248	946	1203	1115	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	950	747	391	1662	70	212	45	335	31	21	20
RTOR Reduction (vph)	0	0	337	0	2	0	0	0	285	0	19	0
Lane Group Flow (vph)	61	950	410	391	1730	0	127	130	50	31	22	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	15%	17%	7%	21%	38%	44%	68%	50%	75%	40%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	5.5	46.4	46.4	34.0	74.9		17.9	17.9	17.9	4.5	4.5	
Effective Green, g (s)	5.5	46.4	46.4	34.0	74.9		17.9	17.9	17.9	4.5	4.5	
Actuated g/C Ratio	0.05	0.39	0.39	0.28	0.63		0.15	0.15	0.15	0.04	0.04	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	2.5	3.5	3.5	2.0	3.5		3.0	3.0	3.0	2.0	2.0	
Lane Grp Cap (vph)	83	1288	546	439	2092		186	187	141	45	42	
v/s Ratio Prot	0.03	0.29		c0.25	c0.52		0.10	c0.10		c0.03	0.02	
v/s Ratio Perm			0.29						0.05			
v/c Ratio	0.73	0.74	0.75	0.89	0.83		0.68	0.70	0.36	0.69	0.52	
Uniform Delay, d1	56.2	31.2	31.5	40.9	17.2		48.0	48.1	45.5	56.7	56.3	
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	26.9	2.3	6.0	19.3	2.9		9.9	10.7	1.5	29.5	4.4	
Delay (s)	83.1	33.6	37.4	60.1	20.1		57.9	58.8	47.1	86.3	60.8	
Level of Service	F	C	D	E	C		E	E	D	F	E	
Approach Delay (s)		36.9			27.5			52.0			71.7	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	119.3	Sum of lost time (s)	16.5
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)	155	867	302	299	1396	360	564	270	512	332	253	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.90		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1014	2893		1299	3438	1369	1480	2543		1480	2320	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1014	2893		1299	3438	1369	1480	2543		1480	2320	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	155	867	302	299	1396	360	564	270	512	332	253	180
RTOR Reduction (vph)	0	25	0	0	0	175	0	199	0	0	47	0
Lane Group Flow (vph)	155	1144	0	299	1396	185	564	583	0	259	459	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	78%	14%	37%	39%	5%	18%	22%	42%	19%	11%	45%	45%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	15.5	42.0		22.5	49.0	49.0	40.5	40.5		18.0	18.0	
Effective Green, g (s)	15.5	42.0		22.5	49.0	49.0	40.5	40.5		18.0	18.0	
Actuated g/C Ratio	0.11	0.30		0.16	0.35	0.35	0.29	0.29		0.13	0.13	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	112	871		209	1207	480	429	738		190	299	
v/s Ratio Prot	0.15	c0.40		c0.23	0.41		c0.38	0.23		0.18	c0.20	
v/s Ratio Perm						0.14						
v/c Ratio	1.38	1.31		1.43	1.16	0.39	1.31	0.87dr		1.36	1.54	
Uniform Delay, d1	62.0	48.8		58.5	45.2	33.9	49.5	45.6		60.8	60.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	218.6	149.1		219.1	80.1	0.5	157.4	5.4		193.5	256.9	
Delay (s)	280.6	197.9		277.6	125.4	34.5	206.9	51.0		254.2	317.7	
Level of Service	F	F		F	F	C	F	D		F	F	
Approach Delay (s)		207.6			131.6			116.3			296.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	169.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	110.5%	ICU Level of Service	H
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1647	83	133	1272	0	0	0	0	507	363	532
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						0.94	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4950		1770	3343						3147	
Flt Permitted		1.00		0.09	1.00						0.98	
Satd. Flow (perm)		4950		166	3343						3147	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1647	83	133	1272	0	0	0	0	507	363	532
RTOR Reduction (vph)	0	6	0	0	0	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	1724	0	133	1272	0	0	0	0	0	1377	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	6%	4%	2%	2%	8%	2%	0%	0%	0%	2%	2%	11%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		45.0		45.0	45.0						32.0	
Effective Green, g (s)		45.0		45.0	45.0						32.0	
Actuated g/C Ratio		0.52		0.52	0.52						0.37	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2560		85	1729						1157	
v/s Ratio Prot		0.35			0.38						c0.44	
v/s Ratio Perm				c0.80								
v/c Ratio		0.67		1.56	0.74						1.19	
Uniform Delay, d1		15.6		21.0	16.4						27.5	
Progression Factor		1.00		0.40	0.37						1.00	
Incremental Delay, d2		0.6		275.1	0.6						94.3	
Delay (s)		16.1		283.6	6.6						121.8	
Level of Service		B		F	A						F	
Approach Delay (s)		16.1			32.8			0.0			121.8	
Approach LOS		B			C			A			F	

Intersection Summary			
HCM 2000 Control Delay	53.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	158.6%	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)	440	1714	0	0	1231	491	174	433	111	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.98				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3360			3404				
Flt Permitted	0.09	1.00			1.00			0.99				
Satd. Flow (perm)	166	3539			3360			3404				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	440	1714	0	0	1231	491	174	433	111	0	0	0
RTOR Reduction (vph)	0	0	0	0	49	0	0	8	0	0	0	0
Lane Group Flow (vph)	440	1714	0	0	1673	0	0	710	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	45.0	45.0			45.0			32.0				
Effective Green, g (s)	45.0	45.0			45.0			32.0				
Actuated g/C Ratio	0.52	0.52			0.52			0.37				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1830			1737			1252				
v/s Ratio Prot		0.48			0.50			c0.21				
v/s Ratio Perm	c2.66											
v/c Ratio	5.18	0.94			0.96			0.57				
Uniform Delay, d1	21.0	19.7			20.2			22.0				
Progression Factor	0.65	0.61			1.00			1.00				
Incremental Delay, d2	1894.5	6.1			13.8			0.4				
Delay (s)	1908.1	18.1			34.0			22.3				
Level of Service	F	B			C			C				
Approach Delay (s)		404.2			34.0			22.3			0.0	
Approach LOS		F			C			C			A	

Intersection Summary			
HCM 2000 Control Delay	205.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.23		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	158.6%	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)	48	1297	122	112	1898	4	56	90	46	21	141	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.95		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	3422		1768	3405		1755	1753		1758	1775	
Flt Permitted	0.08	1.00		0.11	1.00		0.59	1.00		0.67	1.00	
Satd. Flow (perm)	157	3422		206	3405		1097	1753		1240	1775	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	48	1297	122	112	1898	4	56	90	46	21	141	50
RTOR Reduction (vph)	0	9	0	0	0	0	0	23	0	0	9	0
Lane Group Flow (vph)	48	1410	0	112	1902	0	56	113	0	21	182	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Effective Green, g (s)	47.5	47.5		47.5	47.5		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.30	0.30		0.30	0.30	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2031		122	2021		329	525		372	532	
v/s Ratio Prot		0.41			c0.56			0.06			c0.10	
v/s Ratio Perm	0.31			0.54			0.05			0.02		
v/c Ratio	0.52	0.69		0.92	0.94		0.17	0.22		0.06	0.34	
Uniform Delay, d1	9.5	11.2		14.5	15.0		20.7	21.0		19.9	21.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.0	2.0		61.8	10.3		1.1	0.9		0.3	1.7	
Delay (s)	28.5	13.2		76.3	25.2		21.8	21.9		20.2	23.6	
Level of Service	C	B		E	C		C	C		C	C	
Approach Delay (s)		13.7			28.1			21.9			23.3	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	144.7%	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)	46	1052	240	56	1379	13	479	280	107	5	119	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		0.99			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00	1.00		1.00	1.00
Frt		0.97			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		1.00	1.00
Satd. Flow (prot)		3323			3299	1488	1646	1845	1508		1858	1518
Flt Permitted		0.74			0.74	1.00	0.66	1.00	1.00		0.99	1.00
Satd. Flow (perm)		2476			2432	1488	1147	1845	1508		1842	1518
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	1052	240	56	1379	13	479	280	107	5	119	182
RTOR Reduction (vph)	0	21	0	0	0	3	0	0	48	0	0	20
Lane Group Flow (vph)	0	1317	0	0	1435	10	479	280	59	0	124	162
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	5%	3%	39%	8%	2%	7%	3%	2%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		48.5			48.5	48.5	32.5	32.5	32.5		32.5	32.5
Effective Green, g (s)		48.5			48.5	48.5	32.5	32.5	32.5		32.5	32.5
Actuated g/C Ratio		0.54			0.54	0.54	0.36	0.36	0.36		0.36	0.36
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1334			1310	801	414	666	544		665	548
v/s Ratio Prot								0.15				
v/s Ratio Perm		0.53			c0.59	0.01	c0.42		0.04		0.07	0.11
v/c Ratio		0.99			1.10	0.01	1.16	0.42	0.11		0.19	0.30
Uniform Delay, d1		20.4			20.8	9.6	28.8	21.7	19.1		19.7	20.6
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		21.8			55.2	0.0	94.6	0.2	0.0		0.0	0.1
Delay (s)		42.3			76.0	9.7	123.3	21.8	19.2		19.7	20.7
Level of Service		D			E	A	F	C	B		B	C
Approach Delay (s)		42.3			75.4			77.6			20.3	
Approach LOS		D			E			E			C	

Intersection Summary			
HCM 2000 Control Delay	60.4	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)	9.0
Intersection Capacity Utilization	120.2%	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)	74	880	245	69	1348	218	98	683	32	60	1215	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	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3432	1510	1764	3252	1540	1669	3512		1762	3538	
Flt Permitted		0.59	1.00	0.18	1.00	1.00	0.11	1.00		0.31	1.00	
Satd. Flow (perm)		2030	1510	338	3252	1540	192	3512		580	3538	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	880	245	69	1348	218	98	683	32	60	1215	3
RTOR Reduction (vph)	0	0	18	0	0	65	0	4	0	0	0	0
Lane Group Flow (vph)	0	954	227	69	1348	153	98	711	0	60	1218	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	5%	4%	2%	11%	2%	8%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		37.0	37.0	37.0	37.0	37.0	38.5	38.5		38.5	38.5	
Effective Green, g (s)		37.0	37.0	37.0	37.0	37.0	38.5	38.5		38.5	38.5	
Actuated g/C Ratio		0.44	0.44	0.44	0.44	0.44	0.45	0.45		0.45	0.45	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		883	657	147	1415	670	86	1590		262	1602	
v/s Ratio Prot					0.41			0.20			0.34	
v/s Ratio Perm		c0.47	0.15	0.20		0.10	c0.51			0.10		
v/c Ratio		1.08	0.35	0.47	0.95	0.23	1.14	0.45		0.23	0.76	
Uniform Delay, d1		24.0	16.0	17.0	23.2	15.0	23.2	16.0		14.2	19.4	
Progression Factor		1.00	1.00	1.42	1.01	1.88	1.00	1.00		1.00	1.00	
Incremental Delay, d2		54.4	1.4	8.5	13.0	0.6	139.6	0.4		0.6	2.3	
Delay (s)		78.4	17.4	32.7	36.2	28.9	162.9	16.4		14.8	21.7	
Level of Service		E	B	C	D	C	F	B		B	C	
Approach Delay (s)		65.9			35.1			34.0			21.4	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	121.6%	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)	55	857	27	121	1455	32	18	109	266	37	99	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.97		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1589	3124	1361	1505	3185	1375		3152	1174		2853	
Flt Permitted	0.14	1.00	1.00	0.31	1.00	1.00		0.90	1.00		0.89	
Satd. Flow (perm)	239	3124	1361	494	3185	1375		2843	1174		2565	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	857	27	121	1455	32	18	109	266	37	99	105
RTOR Reduction (vph)	0	0	7	0	0	5	0	0	122	0	32	0
Lane Group Flow (vph)	55	857	20	121	1455	27	0	127	144	0	209	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	4%	2%	7%	2%	2%	2%	2%	16%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	61.3	61.3	61.3	61.3	61.3	61.3		15.2	15.2		15.2	
Effective Green, g (s)	61.3	61.3	61.3	61.3	61.3	61.3		15.2	15.2		15.2	
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.72		0.18	0.18		0.18	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	172	2252	981	356	2296	991		508	209		458	
v/s Ratio Prot		0.27			c0.46							
v/s Ratio Perm	0.23		0.01	0.25		0.02		0.04	c0.12		0.08	
v/c Ratio	0.32	0.38	0.02	0.34	0.63	0.03		0.25	0.69		0.46	
Uniform Delay, d1	4.3	4.6	3.4	4.4	6.1	3.4		30.0	32.7		31.2	
Progression Factor	1.08	0.78	0.71	2.77	2.63	3.05		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.0	0.0	0.2	0.1	0.0		0.1	7.7		0.3	
Delay (s)	5.1	3.6	2.4	12.4	16.1	10.3		30.1	40.4		31.5	
Level of Service	A	A	A	B	B	B		C	D		C	
Approach Delay (s)		3.7			15.7			37.1			31.5	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: W. Grand Avenue & Northgate Avenue 10/6/2013

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	502	603	1434	123	664	246
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.99	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1593	3008	3036	1343	3048	1191
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1593	3008	3036	1343	3048	1191
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	502	603	1434	123	664	246
RTOR Reduction (vph)	0	0	0	34	3	164
Lane Group Flow (vph)	502	603	1434	89	686	57
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	2%	8%	7%	5%	3%	8%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	18.9	54.9	32.0	32.0	22.1	22.1
Effective Green, g (s)	18.9	54.9	32.0	32.0	22.1	22.1
Actuated g/C Ratio	0.22	0.65	0.38	0.38	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	354	1942	1142	505	792	309
v/s Ratio Prot	c0.32	0.20	c0.47		c0.23	
v/s Ratio Perm				0.07		0.05
v/c Ratio	1.42	0.31	1.26	0.18	0.87	0.19
Uniform Delay, d1	33.0	6.7	26.5	17.7	30.0	24.5
Progression Factor	0.68	1.52	0.98	0.77	1.00	1.00
Incremental Delay, d2	202.9	0.4	116.8	0.0	9.5	0.1
Delay (s)	225.5	10.5	142.9	13.6	39.5	24.6
Level of Service	F	B	F	B	D	C
Approach Delay (s)		108.2	132.7		35.9	
Approach LOS		F	F		D	

Intersection Summary			
HCM 2000 Control Delay	100.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.0%	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)	72	866	53	136	1139	112	170	481	158	116	424	143
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.91	1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.99			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1587	3148			3112		1585	3185	1301	1581	3005	
Flt Permitted	0.10	1.00			0.68		0.29	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	173	3148			2116		484	3185	1301	499	3005	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	72	866	53	136	1139	112	170	481	158	116	424	143
RTOR Reduction (vph)	0	4	0	0	6	0	0	0	81	0	35	0
Lane Group Flow (vph)	72	915	0	0	1381	0	170	481	77	116	532	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	47.0	47.0			47.0		24.4	20.4	20.4	27.6	22.0	
Effective Green, g (s)	47.0	47.0			47.0		24.4	20.4	20.4	27.6	22.0	
Actuated g/C Ratio	0.55	0.55			0.55		0.29	0.24	0.24	0.32	0.26	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	95	1740			1170		190	764	312	233	777	
v/s Ratio Prot		0.29					c0.04	0.15		c0.03	0.18	
v/s Ratio Perm	0.42				c0.65		c0.21		0.06	0.13		
v/c Ratio	0.76	0.53			1.18		0.89	0.63	0.25	0.50	0.68	
Uniform Delay, d1	14.6	12.0			19.0		28.3	28.9	26.1	21.4	28.4	
Progression Factor	1.79	1.97			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	36.8	0.9			90.1		37.2	1.2	0.2	1.7	2.0	
Delay (s)	63.0	24.5			109.1		65.4	30.1	26.2	23.0	30.4	
Level of Service	E	C			F		E	C	C	C	C	
Approach Delay (s)		27.3			109.1			36.8			29.1	
Approach LOS		C			F			D			C	

Intersection Summary			
HCM 2000 Control Delay	58.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.3%	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)	89	159	165	465	875	101	420	1249	423	28	1178	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1352	3090	3185	1352		4513	1352		4571	1352
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.81	1.00
Satd. Flow (perm)	3090	3154	1352	3090	3185	1352		3031	1352		3714	1352
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	159	165	465	875	101	420	1249	423	28	1178	206
RTOR Reduction (vph)	0	0	81	0	0	50	0	0	242	0	0	83
Lane Group Flow (vph)	89	159	84	465	875	51	0	1669	181	0	1206	123
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		2	6		6
Actuated Green, G (s)	4.0	15.2	15.2	21.3	32.5	32.5		38.5	38.5		38.5	38.5
Effective Green, g (s)	4.0	15.2	15.2	21.3	32.5	32.5		38.5	38.5		38.5	38.5
Actuated g/C Ratio	0.04	0.17	0.17	0.24	0.36	0.36		0.43	0.43		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	5.5		5.5	5.5
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)	137	532	228	731	1150	488		1296	578		1588	578
v/s Ratio Prot	c0.03	0.05		0.15	c0.27							
v/s Ratio Perm			0.06			0.04		c0.55	0.13		0.32	0.09
v/c Ratio	0.65	0.30	0.37	0.64	0.76	0.10		3.75dl	0.31		0.76	0.21
Uniform Delay, d1	42.3	32.7	33.2	30.9	25.3	19.1		25.8	17.0		21.8	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	10.2	1.4	4.6	1.8	4.8	0.4		135.5	0.3		2.1	0.2
Delay (s)	52.5	34.2	37.7	32.7	30.1	19.5		161.2	17.3		24.0	16.4
Level of Service	D	C	D	C	C	B		F	B		C	B
Approach Delay (s)		39.5			30.2			132.1			22.9	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	68.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	116.5%	ICU Level of Service	H
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)	12	129	16	30	279	45	118	199	63	81	281	51
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	
Frpb, ped/bikes		1.00			0.99			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.98			0.98			0.98	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1822			1813			1778			1801	
Flt Permitted		0.96			0.97			0.81			0.87	
Satd. Flow (perm)		1759			1759			1464			1588	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	129	16	30	279	45	118	199	63	81	281	51
RTOR Reduction (vph)	0	11	0	0	15	0	0	17	0	0	12	0
Lane Group Flow (vph)	0	146	0	0	339	0	0	363	0	0	401	0
Confl. Peds. (#/hr)	15		10	10		15	15		15	15		15
Confl. Bikes (#/hr)			5			4						9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		11.3			11.3			14.2			14.2	
Effective Green, g (s)		11.3			11.3			14.2			14.2	
Actuated g/C Ratio		0.34			0.34			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)		593			593			620			673	
v/s Ratio Prot												
v/s Ratio Perm		0.08			c0.19			0.25			c0.25	
v/c Ratio		0.25			0.57			0.59			0.60	
Uniform Delay, d1		8.0			9.1			7.4			7.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			1.3			1.4			1.4	
Delay (s)		8.2			10.5			8.8			8.9	
Level of Service		A			B			A			A	
Approach Delay (s)		8.2			10.5			8.8			8.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	33.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.5%	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)	50	222	6	27	225	263	49	619	88	241	203	42
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		1.00	0.99		1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		0.98	1.00			0.99	
Frt	1.00	1.00		1.00	0.92		1.00	0.98			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1762	1853		1728	1690		1740	3437			3354	
Flt Permitted	0.20	1.00		0.54	1.00		0.47	1.00			0.56	
Satd. Flow (perm)	373	1853		976	1690		856	3437			1938	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	222	6	27	225	263	49	619	88	241	203	42
RTOR Reduction (vph)	0	1	0	0	65	0	0	15	0	0	9	0
Lane Group Flow (vph)	50	227	0	27	423	0	49	692	0	0	477	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	19.9	19.9		19.9	19.9		37.3	37.3			37.3	
Effective Green, g (s)	19.9	19.9		19.9	19.9		37.3	37.3			37.3	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.57	0.57			0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0			2.0	
Lane Grp Cap (vph)	113	565		297	515		489	1966			1108	
v/s Ratio Prot		0.12			c0.25			0.20				
v/s Ratio Perm	0.13			0.03			0.06				c0.25	
v/c Ratio	0.44	0.40		0.09	0.82		0.10	0.35			0.43	
Uniform Delay, d1	18.2	17.9		16.2	21.0		6.3	7.5			7.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.0	0.2		0.0	9.7		0.4	0.5			1.2	
Delay (s)	19.2	18.1		16.2	30.7		6.7	8.0			9.1	
Level of Service	B	B		B	C		A	A			A	
Approach Delay (s)		18.3			29.9			7.9			9.1	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	65.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

MOVEMENT SUMMARY

Site: 2035 + Proj Pref AM

Adeline & 14th
2035 + Preferred Project AM
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	27	2.0	0.326	6.3	LOS A	1.8	45.4	0.45	0.85	27.1
8	T	319	2.0	0.326	6.3	LOS A	1.8	45.4	0.45	0.55	29.9
18	R	25	2.0	0.326	6.3	LOS A	1.8	45.4	0.45	0.61	29.5
Approach		371	2.0	0.326	6.3	LOS A	1.8	45.4	0.45	0.57	29.7
East: 14th Street (WB)											
1	L	34	2.0	0.232	6.0	LOS A	1.1	27.6	0.52	0.88	27.2
6	T	148	2.0	0.232	6.0	LOS A	1.1	27.6	0.52	0.63	30.0
16	R	42	2.0	0.232	6.0	LOS A	1.1	27.6	0.52	0.68	29.6
Approach		224	2.0	0.232	6.0	LOS A	1.1	27.6	0.52	0.68	29.5
North: Adeline Street (SB)											
7	L	32	2.0	0.284	5.8	LOS A	1.5	37.9	0.43	0.84	27.3
4	T	266	2.0	0.284	5.8	LOS A	1.5	37.9	0.43	0.54	30.2
14	R	26	2.0	0.284	5.8	LOS A	1.5	37.9	0.43	0.60	29.8
Approach		324	2.0	0.284	5.8	LOS A	1.5	37.9	0.43	0.57	29.9
West: 14th Street (EB)											
5	L	24	2.0	0.194	5.4	LOS A	0.9	22.7	0.48	0.87	27.6
2	T	154	2.0	0.194	5.4	LOS A	0.9	22.7	0.48	0.60	30.5
12	R	17	2.0	0.194	5.4	LOS A	0.9	22.7	0.48	0.65	30.1
Approach		195	2.0	0.194	5.4	LOS A	0.9	22.7	0.48	0.63	30.0
All Vehicles		1114	2.0	0.326	6.0	LOS A	1.8	45.4	0.46	0.60	29.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

MOVEMENT SUMMARY

Site: 2035 + Proj AM

Adeline & 12th
2035 + Preferred Project AM
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.218	4.5	LOS A	1.1	29.2	0.16	0.90	27.7
8	T	290	2.0	0.218	4.5	LOS A	1.1	29.2	0.16	0.42	31.3
18	R	5	2.0	0.218	4.5	LOS A	1.1	29.2	0.16	0.52	30.6
Approach		296	2.0	0.218	4.5	LOS A	1.1	29.2	0.16	0.42	31.2
East: 12th Street (WB)											
1	L	8	2.0	0.105	4.4	LOS A	0.5	11.6	0.43	0.81	27.9
6	T	29	2.0	0.105	4.4	LOS A	0.5	11.6	0.43	0.53	31.1
16	R	73	2.0	0.105	4.4	LOS A	0.5	11.6	0.43	0.59	30.6
Approach		110	2.0	0.105	4.4	LOS A	0.5	11.6	0.43	0.59	30.5
North: Adeline Street (SB)											
7	L	29	2.0	0.236	4.6	LOS A	1.3	32.3	0.16	0.87	27.6
4	T	287	2.0	0.236	4.6	LOS A	1.3	32.3	0.16	0.41	31.1
14	R	5	2.0	0.236	4.6	LOS A	1.3	32.3	0.16	0.51	30.5
Approach		321	2.0	0.236	4.6	LOS A	1.3	32.3	0.16	0.46	30.7
West: 12th Street (EB)											
5	L	2	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.78	28.4
2	T	7	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.48	31.7
12	R	1	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.54	31.2
Approach		10	2.0	0.010	3.6	LOS A	0.0	1.0	0.42	0.55	30.9
All Vehicles		737	2.0	0.236	4.5	LOS A	1.3	32.3	0.20	0.46	30.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	142	47	0	0	356	429	443	462	100	130	0	561
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.92		1.00	0.98		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (prot)	1020	3282			2887		1173	2818		1543		1960
Flt Permitted	0.95	1.00			1.00		0.95	0.99		0.95		1.00
Satd. Flow (perm)	1020	3282			2887		1173	2818		1543		1960
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	142	47	0	0	356	429	443	462	100	130	0	561
RTOR Reduction (vph)	0	0	0	0	208	0	0	12	0	0	0	500
Lane Group Flow (vph)	142	47	0	0	577	0	332	661	0	130	0	61
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	77%	10%	0%	0%	8%	17%	40%	15%	14%	17%	0%	45%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	16.4	43.9			24.0		31.4	31.4		10.7		10.7
Effective Green, g (s)	16.4	43.9			24.0		31.4	31.4		10.7		10.7
Actuated g/C Ratio	0.17	0.44			0.24		0.32	0.32		0.11		0.11
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	168	1455			699		372	893		166		211
v/s Ratio Prot	c0.14	0.01			c0.20		c0.28	0.23		c0.08		0.03
v/s Ratio Perm												
v/c Ratio	0.85	0.03			0.83		0.89	0.74		0.78		0.29
Uniform Delay, d1	40.1	15.6			35.5		32.2	30.2		43.0		40.6
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	29.3	0.0			7.7		22.5	3.1		20.3		0.5
Delay (s)	69.4	15.6			43.3		54.7	33.2		63.4		41.2
Level of Service	E	B			D		D	C		E		D
Approach Delay (s)		56.0			43.3			40.3			45.4	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	99.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	74.1%	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)	85	595	26	124	588	233	17	64	61	228	126	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.99		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99		0.99	1.00	
Frt	1.00	0.99		1.00	0.96			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1770	3194		1770	3246			1706		1755	1728	
Flt Permitted	0.95	1.00		0.95	1.00			0.96		0.58	1.00	
Satd. Flow (perm)	1770	3194		1770	3246			1645		1075	1728	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	595	26	124	588	233	17	64	61	228	126	42
RTOR Reduction (vph)	0	2	0	0	31	0	0	32	0	0	14	0
Lane Group Flow (vph)	85	619	0	124	790	0	0	110	0	228	154	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	12%	2%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	9.2	53.6		11.3	55.7			24.1		24.1	24.1	
Effective Green, g (s)	9.2	53.6		11.3	55.7			24.1		24.1	24.1	
Actuated g/C Ratio	0.09	0.54		0.11	0.56			0.24		0.24	0.24	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	162	1711		200	1808			396		259	416	
v/s Ratio Prot	c0.05	0.19		c0.07	c0.24						0.09	
v/s Ratio Perm								0.07		c0.21		
v/c Ratio	0.52	0.36		0.62	0.44			0.28		0.88	0.37	
Uniform Delay, d1	43.3	13.4		42.3	13.0			30.9		36.6	31.6	
Progression Factor	1.08	1.17		0.95	0.81			1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.0		3.9	0.8			0.1		26.8	0.2	
Delay (s)	48.3	15.6		44.1	11.2			31.0		63.3	31.8	
Level of Service	D	B		D	B			C		E	C	
Approach Delay (s)		19.5			15.5			31.0			50.0	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	67.5%	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)	29	796	78	126	1361	217	32	66	66	90	83	74
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	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3262		1026	3471	1492	1347	919		1753	1476	
Flt Permitted	0.14	1.00		0.28	1.00	1.00	0.59	1.00		0.63	1.00	
Satd. Flow (perm)	256	3262		305	3471	1492	836	919		1166	1476	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	796	78	126	1361	217	32	66	66	90	83	74
RTOR Reduction (vph)	0	7	0	0	0	78	0	36	0	0	32	0
Lane Group Flow (vph)	29	867	0	126	1361	139	32	96	0	90	125	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	8%	17%	75%	4%	4%	33%	100%	78%	2%	33%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	64.0	64.0		64.0	64.0	64.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64	0.64	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	4.0	
Lane Grp Cap (vph)	163	2087		195	2221	954	234	257		326	413	
v/s Ratio Prot		0.27			0.39			c0.10			0.08	
v/s Ratio Perm	0.11			c0.41		0.09	0.04			0.08		
v/c Ratio	0.18	0.42		0.65	0.61	0.15	0.14	0.37		0.28	0.30	
Uniform Delay, d1	7.3	8.8		11.0	10.7	7.1	27.0	28.9		28.1	28.3	
Progression Factor	0.49	0.46		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.6		15.4	1.3	0.3	1.2	4.1		2.1	1.9	
Delay (s)	5.9	4.6		26.4	11.9	7.5	28.2	33.1		30.2	30.2	
Level of Service	A	A		C	B	A	C	C		C	C	
Approach Delay (s)		4.7			12.4			32.1			30.2	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.0%	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)	133	718	82	51	1254	54	308	252	15	78	103	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.99		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)	1582	4092		1761	4576		1761	1810	1541	1752	3539	1245
Flt Permitted	0.14	1.00		0.31	1.00		0.69	1.00	1.00	0.55	1.00	1.00
Satd. Flow (perm)	241	4092		576	4576		1273	1810	1541	1012	3539	1245
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	133	718	82	51	1254	54	308	252	15	78	103	186
RTOR Reduction (vph)	0	19	0	0	6	0	0	0	9	0	0	17
Lane Group Flow (vph)	133	781	0	51	1302	0	308	252	6	78	103	169
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	14%	27%	2%	2%	13%	2%	2%	5%	2%	2%	2%	27%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	35.0	35.0		35.0	35.0		30.5	30.5	30.5	30.5	30.5	30.5
Effective Green, g (s)	35.0	35.0		35.0	35.0		30.5	30.5	30.5	30.5	30.5	30.5
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	112	1909		268	2135		517	736	626	411	1439	506
v/s Ratio Prot		0.19			0.28			0.14			0.03	
v/s Ratio Perm	c0.55			0.09			c0.24		0.00	0.08		0.14
v/c Ratio	1.19	0.41		0.19	0.61		0.60	0.34	0.01	0.19	0.07	0.33
Uniform Delay, d1	20.0	13.2		11.7	14.9		17.4	15.3	13.3	14.3	13.6	15.3
Progression Factor	1.00	1.00		1.00	1.00		1.08	1.09	1.45	1.00	1.00	1.00
Incremental Delay, d2	144.0	0.1		0.1	0.3		5.0	1.3	0.0	1.0	0.1	1.8
Delay (s)	164.0	13.2		11.8	15.3		23.7	17.9	19.3	15.3	13.7	17.0
Level of Service	F	B		B	B		C	B	B	B	B	B
Approach Delay (s)		34.7			15.1			21.1			15.7	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	91.2%	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	110	243	276	27	77	0	0	142	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.98	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3484	1562	1770	990			3167	1558
Flt Permitted					0.98	1.00	0.66	1.00			1.00	1.00
Satd. Flow (perm)					3484	1562	1233	990			3167	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	110	243	276	27	77	0	0	142	67
RTOR Reduction (vph)	0	0	0	0	0	220	0	0	0	0	0	22
Lane Group Flow (vph)	0	0	0	0	353	56	27	77	0	0	142	45
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	2%	15%	88%	2%	2%	2%	2%	92%	0%	2%	14%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					15.1	15.1	50.4	50.4			50.4	50.4
Effective Green, g (s)					15.1	15.1	50.4	50.4			50.4	50.4
Actuated g/C Ratio					0.20	0.20	0.67	0.67			0.67	0.67
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					701	314	828	665			2128	1046
v/s Ratio Prot								c0.08			0.04	
v/s Ratio Perm					0.10	0.04	0.02					0.03
v/c Ratio					0.50	0.18	0.03	0.12			0.07	0.04
Uniform Delay, d1					26.6	24.8	4.1	4.4			4.2	4.2
Progression Factor					1.00	1.00	1.00	1.00			1.26	1.59
Incremental Delay, d2					0.2	0.1	0.0	0.0			0.1	0.1
Delay (s)					26.8	24.9	4.1	4.4			5.4	6.7
Level of Service					C	C	A	A			A	A
Approach Delay (s)		0.0			26.0			4.3			5.8	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	33.7%	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)	26	634	114	85	177	24	56	140	137	159	173	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		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	3301		1770	3442		1770	945		1770	1127	
Flt Permitted	0.95	1.00		0.95	1.00		0.62	1.00		0.53	1.00	
Satd. Flow (perm)	1770	3301		1770	3442		1156	945		981	1127	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	634	114	85	177	24	56	140	137	159	173	37
RTOR Reduction (vph)	0	24	0	0	15	0	0	63	0	0	14	0
Lane Group Flow (vph)	26	724	0	85	186	0	56	214	0	159	196	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	6%	9%	2%	2%	2%	2%	74%	96%	2%	77%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.2	17.0		2.4	18.7		16.1	16.1		16.1	16.1	
Effective Green, g (s)	1.2	17.0		2.4	18.7		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.03	0.36		0.05	0.39		0.34	0.34		0.34	0.34	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	44	1181		89	1355		391	320		332	381	
v/s Ratio Prot	0.01	c0.22		c0.05	0.05			c0.23			0.17	
v/s Ratio Perm							0.05			0.16		
v/c Ratio	0.59	0.61		0.96	0.14		0.14	0.67		0.48	0.51	
Uniform Delay, d1	22.9	12.5		22.5	9.2		10.9	13.4		12.4	12.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.3	1.0		79.9	0.0		0.2	5.3		1.1	1.2	
Delay (s)	36.2	13.5		102.4	9.3		11.1	18.7		13.5	13.7	
Level of Service	D	B		F	A		B	B		B	B	
Approach Delay (s)		14.3			36.9			17.5			13.6	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

2035 + Preferred Project PM
Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	156	1064	214	394	1254	177	118	433	229	136	426	68
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	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.95	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3421		1770	3539	1511	1770	1863	1541	1770	1819	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3421		1770	3539	1511	1770	1863	1541	1770	1819	
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)	170	1157	233	428	1363	192	128	471	249	148	463	74
RTOR Reduction (vph)	0	28	0	0	0	123	0	0	183	0	10	0
Lane Group Flow (vph)	170	1362	0	428	1363	69	128	471	66	148	527	0
Confl. Peds. (#/hr)			32			7			5			6
Confl. Bikes (#/hr)			4			9			11			3
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6			8			
Actuated Green, G (s)	7.9	17.0		6.0	15.1	15.1	5.0	16.0	16.0	5.0	16.0	
Effective Green, g (s)	7.9	17.0		6.0	15.1	15.1	5.0	16.0	16.0	5.0	16.0	
Actuated g/C Ratio	0.13	0.28		0.10	0.25	0.25	0.08	0.27	0.27	0.08	0.27	
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)	233	969		177	890	380	147	496	410	147	485	
v/s Ratio Prot	0.10	c0.40		c0.24	0.39		0.07	0.25		c0.08	c0.29	
v/s Ratio Perm						0.05			0.04			
v/c Ratio	0.73	1.41		2.42	1.53	0.18	0.87	0.95	0.16	1.01	1.09	
Uniform Delay, d1	25.0	21.5		27.0	22.4	17.6	27.2	21.6	16.9	27.5	22.0	
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	10.9	188.8		655.0	244.8	0.2	39.1	27.8	0.2	76.0	66.7	
Delay (s)	35.9	210.3		682.0	267.3	17.8	66.3	49.4	17.0	103.5	88.7	
Level of Service	D	F		F	F	B	E	D	B	F	F	
Approach Delay (s)		191.3			332.7			42.4			91.9	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	208.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		
Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards			
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	1078	469	57	889	142	915	1020	44	277	1185	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3255		1770	3428		3433	3506		1770	3426	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3255		1770	3428		3433	3506		1770	3426	
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)	214	1172	510	62	966	154	995	1109	48	301	1288	202
RTOR Reduction (vph)	0	42	0	0	11	0	0	3	0	0	12	0
Lane Group Flow (vph)	214	1640	0	62	1109	0	995	1154	0	301	1478	0
Confl. Peds. (#/hr)			83			52			53			68
Confl. Bikes (#/hr)			15			8			15			12
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)	15.3	34.6		9.0	28.3		13.0	37.4		16.0	39.4	
Effective Green, g (s)	15.3	34.6		9.0	28.3		13.0	37.4		16.0	39.4	
Actuated g/C Ratio	0.14	0.31		0.08	0.26		0.12	0.34		0.15	0.36	
Clearance Time (s)	3.0	3.0		3.0	3.0		4.0	4.0		3.0	4.0	
Vehicle Extension (s)	2.0	2.5		2.0	2.0		2.0	4.0		2.5	4.0	
Lane Grp Cap (vph)	246	1023		144	881		405	1192		257	1227	
v/s Ratio Prot	c0.12	c0.50		0.04	0.32		c0.29	0.33		0.17	c0.43	
v/s Ratio Perm												
v/c Ratio	0.87	1.60		0.43	1.26		2.46	0.97		1.17	1.20	
Uniform Delay, d1	46.4	37.7		48.1	40.9		48.5	35.7		47.0	35.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	25.5	275.8		0.8	125.6		663.0	19.5		110.5	100.2	
Delay (s)	71.9	313.5		48.8	166.4		711.5	55.2		157.5	135.5	
Level of Service	E	F		D	F		F	E		F	F	
Approach Delay (s)		286.2			160.3			358.6			139.2	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	249.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.49		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	134.4%	ICU Level of Service	H
Analysis Period (min)	15		

Description: Counts for this Intersection are for Saturday Counts per Emeryville Standards

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	990	115	7	271	0	0	0	0	580	516	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5					6.5	6.5	6.5
Lane Util. Factor		0.95			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
Frt		0.98			1.00					1.00	1.00	0.85
Flt Protected		1.00			1.00					0.95	0.99	1.00
Satd. Flow (prot)		3467			5079					1610	3340	1540
Flt Permitted		1.00			0.91					0.95	0.99	1.00
Satd. Flow (perm)		3467			4647					1610	3340	1540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	990	115	7	271	0	0	0	0	580	516	422
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	261
Lane Group Flow (vph)	0	1094	0	0	278	0	0	0	0	360	736	161
Confl. Peds. (#/hr)	20		20	20								20
Turn Type		NA		Perm	NA					Perm	NA	Perm
Protected Phases		1			1						2	
Permitted Phases				1						2		2
Actuated Green, G (s)		37.5			37.5					30.5	30.5	30.5
Effective Green, g (s)		37.5			37.5					30.5	30.5	30.5
Actuated g/C Ratio		0.47			0.47					0.38	0.38	0.38
Clearance Time (s)		5.5			5.5					6.5	6.5	6.5
Lane Grp Cap (vph)		1625			2178					613	1273	587
v/s Ratio Prot		c0.32										
v/s Ratio Perm					0.06					c0.22	0.22	0.10
v/c Ratio		0.67			0.13					0.59	0.58	0.27
Uniform Delay, d1		16.5			12.0					19.7	19.6	17.1
Progression Factor		1.00			0.35					1.00	1.00	1.00
Incremental Delay, d2		2.2			0.1					4.1	1.9	1.2
Delay (s)		18.7			4.3					23.8	21.6	18.3
Level of Service		B			A					C	C	B
Approach Delay (s)		18.7			4.3			0.0			21.2	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.2%	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)	568	1008	0	0	262	935	35	1265	61	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	0.97		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1610	3381			3539	2700		5036				
Flt Permitted	0.95	0.93			1.00	1.00		1.00				
Satd. Flow (perm)	1610	3155			3539	2700		5036				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	568	1008	0	0	262	935	35	1265	61	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	57	0	6	0	0	0	0
Lane Group Flow (vph)	511	1065	0	0	262	878	0	1355	0	0	0	0
Confl. Peds. (#/hr)						20			20			
Turn Type	Prot	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			8				
Permitted Phases						6	8					
Actuated Green, G (s)	22.5	50.5			24.5	24.5		18.5				
Effective Green, g (s)	22.5	50.5			24.5	24.5		18.5				
Actuated g/C Ratio	0.28	0.63			0.31	0.31		0.23				
Clearance Time (s)	3.5	5.5			5.5	5.5		5.5				
Lane Grp Cap (vph)	452	2055			1083	826		1164				
v/s Ratio Prot	c0.32	0.15			0.07							
v/s Ratio Perm		0.18				c0.33		0.27				
v/c Ratio	1.13	0.52			0.24	1.06		1.16				
Uniform Delay, d1	28.8	8.1			20.8	27.8		30.8				
Progression Factor	0.88	1.87			1.00	1.00		1.00				
Incremental Delay, d2	78.5	0.7			0.5	49.5		83.5				
Delay (s)	103.8	15.8			21.3	77.2		114.2				
Level of Service	F	B			C	E		F				
Approach Delay (s)		44.3			65.0			114.2			0.0	
Approach LOS		D			E			F			A	

Intersection Summary			
HCM 2000 Control Delay	73.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	104.6%	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)	15	947	411	261	1662	37	755	32	484	78	35	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.95	0.95	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1805	3312	1214	1289	3383		1649	1575	1240	1480	1389	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	947	411	261	1662	37	755	32	484	78	35	73
RTOR Reduction (vph)	0	0	239	0	1	0	0	0	280	0	55	0
Lane Group Flow (vph)	15	947	172	261	1698	0	393	394	204	78	53	0
Confl. Peds. (#/hr)						1			3			
Heavy Vehicles (%)	0%	9%	33%	40%	5%	65%	4%	73%	28%	22%	50%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		8	8		7	7	
Permitted Phases			2						8			
Actuated Green, G (s)	2.4	47.6	47.6	28.5	73.7		35.0	35.0	35.0	8.3	8.3	
Effective Green, g (s)	2.4	47.6	47.6	28.5	73.7		35.0	35.0	35.0	8.3	8.3	
Actuated g/C Ratio	0.02	0.35	0.35	0.21	0.54		0.26	0.26	0.26	0.06	0.06	
Clearance Time (s)	3.5	5.5	5.5	3.5	5.5		4.0	4.0	4.0	3.5	3.5	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5		4.0	4.0	4.0	3.0	3.0	
Lane Grp Cap (vph)	31	1160	425	270	1834		424	405	319	90	84	
v/s Ratio Prot	0.01	0.29		c0.20	c0.50		0.24	c0.25		c0.05	0.04	
v/s Ratio Perm			0.14						0.16			
v/c Ratio	0.48	0.82	0.40	0.97	0.93		0.93	0.97	0.64	0.87	0.63	
Uniform Delay, d1	66.1	40.2	33.4	53.2	28.6		49.2	50.0	44.8	63.3	62.3	
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	11.4	5.0	1.1	45.1	8.8		26.5	37.5	4.7	53.4	13.7	
Delay (s)	77.6	45.2	34.5	98.4	37.4		75.7	87.5	49.5	116.6	76.0	
Level of Service	E	D	C	F	D		E	F	D	F	E	
Approach Delay (s)		42.3			45.5			69.4			93.0	
Approach LOS		D			D			E			F	

Intersection Summary			
HCM 2000 Control Delay	52.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	135.9	Sum of lost time (s)	16.5
Intersection Capacity Utilization	91.8%	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)	251	766	486	429	1486	307	409	397	499	207	179	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1337	2998		1687	3406	1509	1444	2895		1369	2604	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	1337	2998		1687	3406	1509	1444	2895		1369	2604	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	251	766	486	429	1486	307	409	397	499	207	179	76
RTOR Reduction (vph)	0	73	0	0	0	141	0	163	0	0	21	0
Lane Group Flow (vph)	251	1179	0	429	1486	166	409	733	0	153	288	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	35%	13%	14%	7%	6%	7%	25%	14%	13%	20%	16%	57%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA		Split	NA	
Protected Phases	7	4		3	8		2	2		1	1	
Permitted Phases						8						
Actuated Green, G (s)	21.5	44.0		29.5	52.0	52.0	34.5	34.5		15.0	15.0	
Effective Green, g (s)	21.5	44.0		29.5	52.0	52.0	34.5	34.5		15.0	15.0	
Actuated g/C Ratio	0.15	0.32		0.21	0.37	0.37	0.25	0.25		0.11	0.11	
Clearance Time (s)	3.5	5.0		3.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)	206	945		356	1269	562	357	715		147	280	
v/s Ratio Prot	0.19	c0.39		c0.25	0.44		c0.28	0.25		c0.11	0.11	
v/s Ratio Perm						0.11						
v/c Ratio	1.22	1.25		1.21	1.17	0.30	1.15	1.02		1.04	1.03	
Uniform Delay, d1	59.0	47.8		55.0	43.8	30.8	52.5	52.5		62.2	62.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	134.0	120.5		115.9	85.7	0.3	93.4	40.1		85.5	61.8	
Delay (s)	193.0	168.3		170.9	129.4	31.1	145.9	92.6		147.7	124.1	
Level of Service	F	F		F	F	C	F	F		F	F	
Approach Delay (s)		172.4			123.9			109.3			131.9	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	134.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	139.5	Sum of lost time (s)	16.5
Intersection Capacity Utilization	110.7%	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)	0	1235	199	255	1534	0	0	0	0	785	726	505
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0						5.0	
Lane Util. Factor		0.91		1.00	0.95						0.95	
Frpb, ped/bikes		1.00		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.96	
Flt Protected		1.00		0.95	1.00						0.98	
Satd. Flow (prot)		4839		1768	3312						3283	
Flt Permitted		1.00		0.11	1.00						0.98	
Satd. Flow (perm)		4839		213	3312						3283	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	1235	199	255	1534	0	0	0	0	785	726	505
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	1409	0	255	1534	0	0	0	0	0	2008	0
Confl. Peds. (#/hr)			8	8						10		10
Heavy Vehicles (%)	16%	5%	2%	2%	9%	2%	1%	0%	0%	2%	2%	7%
Turn Type		NA		Perm	NA					Split	NA	
Protected Phases		4			8					6	6	
Permitted Phases				8								
Actuated Green, G (s)		41.0		41.0	41.0						36.0	
Effective Green, g (s)		41.0		41.0	41.0						36.0	
Actuated g/C Ratio		0.47		0.47	0.47						0.41	
Clearance Time (s)		5.0		5.0	5.0						5.0	
Vehicle Extension (s)		2.0		2.0	2.0						2.0	
Lane Grp Cap (vph)		2280		100	1560						1358	
v/s Ratio Prot		0.29			0.46						c0.61	
v/s Ratio Perm				c1.19								
v/c Ratio		0.62		2.55	0.98						1.48	
Uniform Delay, d1		17.2		23.0	22.7						25.5	
Progression Factor		1.00		0.29	0.29						1.00	
Incremental Delay, d2		0.4		700.2	3.9						219.5	
Delay (s)		17.5		706.9	10.4						245.0	
Level of Service		B		F	B						F	
Approach Delay (s)		17.5			109.7			0.0			245.0	
Approach LOS		B			F			A			F	

Intersection Summary			
HCM 2000 Control Delay	136.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.04		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	191.9%	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)	484	1536	0	0	1673	567	116	633	212	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0				
Lane Util. Factor	1.00	0.95			0.95			0.95				
Frpb, ped/bikes	1.00	1.00			0.99			1.00				
Flpb, ped/bikes	1.00	1.00			1.00			1.00				
Frt	1.00	1.00			0.96			0.97				
Flt Protected	0.95	1.00			1.00			0.99				
Satd. Flow (prot)	1770	3539			3380			3385				
Flt Permitted	0.10	1.00			1.00			0.99				
Satd. Flow (perm)	182	3539			3380			3385				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	484	1536	0	0	1673	567	116	633	212	0	0	0
RTOR Reduction (vph)	0	0	0	0	39	0	0	7	0	0	0	0
Lane Group Flow (vph)	484	1536	0	0	2201	0	0	954	0	0	0	0
Confl. Peds. (#/hr)	10					10			10			
Turn Type	Perm	NA			NA		Split	NA				
Protected Phases		4			8		2	2				
Permitted Phases	4											
Actuated Green, G (s)	41.0	41.0			41.0			36.0				
Effective Green, g (s)	41.0	41.0			41.0			36.0				
Actuated g/C Ratio	0.47	0.47			0.47			0.41				
Clearance Time (s)	5.0	5.0			5.0			5.0				
Vehicle Extension (s)	2.0	2.0			2.0			2.0				
Lane Grp Cap (vph)	85	1667			1592			1400				
v/s Ratio Prot		0.43			0.65			c0.28				
v/s Ratio Perm	c2.66											
v/c Ratio	5.69	0.92			1.38			0.68				
Uniform Delay, d1	23.0	21.5			23.0			20.8				
Progression Factor	0.85	0.83			1.00			1.00				
Incremental Delay, d2	2120.4	3.1			176.2			1.1				
Delay (s)	2140.1	21.0			199.2			21.9				
Level of Service	F	C			F			C				
Approach Delay (s)		528.8			199.2			21.9			0.0	
Approach LOS		F			F			C			A	

Intersection Summary			
HCM 2000 Control Delay	294.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.32		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	191.9%	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)	61	1361	377	117	1770	27	262	227	114	124	356	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.95		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)	1769	3350		1769	3367		1762	1754		1762	1796	
Flt Permitted	0.08	1.00		0.08	1.00		0.20	1.00		0.35	1.00	
Satd. Flow (perm)	154	3350		154	3367		378	1754		658	1796	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	1361	377	117	1770	27	262	227	114	124	356	89
RTOR Reduction (vph)	0	32	0	0	1	0	0	23	0	0	11	0
Lane Group Flow (vph)	61	1707	0	117	1796	0	262	318	0	124	434	0
Confl. Peds. (#/hr)	8		7	7		8	11		8	8		11
Confl. Bikes (#/hr)			9			11			8			10
Heavy Vehicles (%)	2%	4%	2%	2%	7%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Actuated Green, G (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Effective Green, g (s)	48.5	48.5		48.5	48.5		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.29	0.29		0.29	0.29	
Clearance Time (s)	3.5	3.5		3.5	3.5		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	93	2030		93	2041		108	504		189	516	
v/s Ratio Prot		0.51			0.53			0.18			0.24	
v/s Ratio Perm	0.40			c0.76			c0.69			0.19		
v/c Ratio	0.66	0.84		1.26	0.88		2.43	0.63		0.66	0.84	
Uniform Delay, d1	10.3	12.6		15.8	13.3		28.5	24.8		25.0	26.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	30.8	4.4		177.8	5.8		668.9	5.9		16.4	15.2	
Delay (s)	41.1	17.1		193.5	19.1		697.4	30.7		41.5	41.9	
Level of Service	D	B		F	B		F	C		D	D	
Approach Delay (s)		17.9			29.8			320.4			41.8	
Approach LOS		B			C			F			D	

Intersection Summary			
HCM 2000 Control Delay	62.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	143.3%	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)	62	1537	108	57	1310	9	388	577	183	29	28	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00			1.00	0.94	1.00	1.00	0.95		1.00	0.95
Flpb, ped/bikes		1.00			1.00	1.00	0.97	1.00	1.00		1.00	1.00
Frt		0.99			1.00	0.85	1.00	1.00	0.85		1.00	0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00		0.98	1.00
Satd. Flow (prot)		3425			3307	1490	1641	1827	1504		1817	1500
Flt Permitted		0.76			0.67	1.00	0.72	1.00	1.00		0.36	1.00
Satd. Flow (perm)		2617			2228	1490	1244	1827	1504		678	1500
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	1537	108	57	1310	9	388	577	183	29	28	69
RTOR Reduction (vph)	0	6	0	0	0	2	0	0	23	0	0	39
Lane Group Flow (vph)	0	1701	0	0	1367	7	388	577	160	0	57	30
Confl. Peds. (#/hr)	21		15	15		21	27		25	25		27
Confl. Bikes (#/hr)			18			17			16			17
Heavy Vehicles (%)	2%	4%	3%	30%	8%	2%	7%	4%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)		54.5			54.5	54.5	26.5	26.5	26.5		26.5	26.5
Effective Green, g (s)		54.5			54.5	54.5	26.5	26.5	26.5		26.5	26.5
Actuated g/C Ratio		0.61			0.61	0.61	0.29	0.29	0.29		0.29	0.29
Clearance Time (s)		5.5			5.5	5.5	3.5	3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		1584			1349	902	366	537	442		199	441
v/s Ratio Prot								c0.32				
v/s Ratio Perm		c0.65			0.61	0.00	0.31		0.11		0.08	0.02
v/c Ratio		1.07			1.01	0.01	1.06	1.07	0.36		0.29	0.07
Uniform Delay, d1		17.8			17.8	7.0	31.8	31.8	25.1		24.5	22.9
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2		45.5			27.9	0.0	63.8	60.4	0.2		0.3	0.0
Delay (s)		63.2			45.6	7.0	95.6	92.1	25.3		24.8	22.9
Level of Service		E			D	A	F	F	C		C	C
Approach Delay (s)		63.2			45.3			82.6			23.7	
Approach LOS		E			D			F			C	

Intersection Summary			
HCM 2000 Control Delay	61.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	128.6%	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)	204	1333	368	96	918	42	570	692	157	193	898	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	4.0	5.5	5.5		5.5	5.5	
Lane Util. Factor		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected		0.99	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3485	1482	1770	3195	1540	1732	3425		1764	3427	
Flt Permitted		0.57	1.00	0.12	1.00	1.00	0.16	1.00		0.26	1.00	
Satd. Flow (perm)		1982	1482	219	3195	1540	301	3425		486	3427	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	204	1333	368	96	918	42	570	692	157	193	898	202
RTOR Reduction (vph)	0	0	52	0	0	19	0	5	0	0	23	0
Lane Group Flow (vph)	0	1537	316	96	918	23	570	844	0	193	1077	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Heavy Vehicles (%)	2%	3%	6%	2%	13%	2%	4%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			2			6	
Permitted Phases	4		4	4		4	2			6		
Actuated Green, G (s)		34.0	34.0	34.0	34.0	34.0	41.5	41.5		41.5	41.5	
Effective Green, g (s)		34.0	34.0	34.0	34.0	34.0	41.5	41.5		41.5	41.5	
Actuated g/C Ratio		0.40	0.40	0.40	0.40	0.40	0.49	0.49		0.49	0.49	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	5.5	5.5		5.5	5.5	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		4.0	4.0	
Lane Grp Cap (vph)		792	592	87	1278	616	146	1672		237	1673	
v/s Ratio Prot					0.29			0.25			0.31	
v/s Ratio Perm		c0.78	0.21	0.44		0.01	c1.90			0.40		
v/c Ratio		1.94	0.53	1.10	0.72	0.04	3.90	0.50		0.81	0.64	
Uniform Delay, d1		25.5	19.5	25.5	21.5	15.5	21.8	14.8		18.5	16.2	
Progression Factor		1.00	1.00	0.39	0.40	0.05	1.00	1.00		1.00	1.00	
Incremental Delay, d2		427.9	3.4	118.5	2.9	0.1	1323.2	0.5		19.8	1.0	
Delay (s)		453.4	22.9	128.5	11.4	0.9	1345.0	15.3		38.3	17.2	
Level of Service		F	C	F	B	A	F	B		D	B	
Approach Delay (s)		370.3			21.6			549.4			20.3	
Approach LOS		F			C			F			C	

Intersection Summary			
HCM 2000 Control Delay	270.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.01		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	147.1%	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)	119	1373	25	60	1106	57	27	222	348	35	78	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.96		1.00	0.94		0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		0.99	
Satd. Flow (prot)	1587	3154	1360	1588	3065	1375		3159	1171		2846	
Flt Permitted	0.20	1.00	1.00	0.13	1.00	1.00		0.91	1.00		0.88	
Satd. Flow (perm)	330	3154	1360	210	3065	1375		2889	1171		2516	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	119	1373	25	60	1106	57	27	222	348	35	78	98
RTOR Reduction (vph)	0	0	6	0	0	16	0	0	26	0	52	0
Lane Group Flow (vph)	119	1373	19	60	1106	41	0	249	322	0	159	0
Confl. Peds. (#/hr)	22		31	31		22	34		37	37		34
Confl. Bikes (#/hr)			7			3			12			19
Heavy Vehicles (%)	2%	3%	2%	2%	6%	2%	2%	2%	17%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4		4	4		4	2		2	2		
Actuated Green, G (s)	50.8	50.8	50.8	50.8	50.8	50.8		25.7	25.7		25.7	
Effective Green, g (s)	50.8	50.8	50.8	50.8	50.8	50.8		25.7	25.7		25.7	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60		0.30	0.30		0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.0	4.0		4.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	
Lane Grp Cap (vph)	197	1884	812	125	1831	821		873	354		760	
v/s Ratio Prot		c0.44			0.36							
v/s Ratio Perm	0.36		0.01	0.29		0.03		0.09	c0.28		0.06	
v/c Ratio	0.60	0.73	0.02	0.48	0.60	0.05		0.29	0.91		0.21	
Uniform Delay, d1	10.8	12.2	7.0	9.6	10.8	7.1		22.6	28.5		22.1	
Progression Factor	0.74	0.77	0.79	1.51	1.47	1.54		1.00	1.00		1.00	
Incremental Delay, d2	1.2	0.2	0.0	6.3	0.7	0.1		0.1	26.2		0.1	
Delay (s)	9.2	9.6	5.5	20.9	16.6	11.0		22.7	54.7		22.1	
Level of Service	A	A	A	C	B	B		C	D		C	
Approach Delay (s)		9.5			16.5			41.4			22.1	
Approach LOS		A			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	620	1044	878	525	265	216
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	0.95	0.95	1.00	0.97	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.97	0.99	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.97	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (prot)	1577	3094	3065	1382	2972	1213
Flt Permitted	0.95	1.00	1.00	1.00	0.96	1.00
Satd. Flow (perm)	1577	3094	3065	1382	2972	1213
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	620	1044	878	525	265	216
RTOR Reduction (vph)	0	0	0	241	31	126
Lane Group Flow (vph)	620	1044	878	284	299	25
Confl. Peds. (#/hr)				15	15	15
Heavy Vehicles (%)	3%	5%	6%	2%	3%	6%
Turn Type	Prot	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6		4	
Permitted Phases				6		4
Actuated Green, G (s)	36.8	62.8	22.0	22.0	14.2	14.2
Effective Green, g (s)	36.8	62.8	22.0	22.0	14.2	14.2
Actuated g/C Ratio	0.43	0.74	0.26	0.26	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	682	2285	793	357	496	202
v/s Ratio Prot	c0.39	0.34	c0.29		c0.10	
v/s Ratio Perm				0.21		0.02
v/c Ratio	0.91	0.46	1.11	0.80	0.60	0.12
Uniform Delay, d1	22.5	4.4	31.5	29.4	32.8	30.1
Progression Factor	0.77	0.83	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	0.4	65.5	10.9	1.4	0.1
Delay (s)	28.4	4.0	97.0	40.3	34.2	30.2
Level of Service	C	A	F	D	C	C
Approach Delay (s)		13.1	75.8		33.0	
Approach LOS		B	E		C	

Intersection Summary			
HCM 2000 Control Delay	40.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.8%	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)	185	970	33	125	835	92	410	1106	307	91	438	185
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			0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.90	1.00	0.97	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00			0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1579	3162			3100		1588	3185	1281	1591	2963	
Flt Permitted	0.17	1.00			0.60		0.20	1.00	1.00	0.13	1.00	
Satd. Flow (perm)	291	3162			1863		331	3185	1281	223	2963	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	185	970	33	125	835	92	410	1106	307	91	438	185
RTOR Reduction (vph)	0	2	0	0	6	0	0	0	50	0	42	0
Lane Group Flow (vph)	185	1001	0	0	1046	0	410	1106	257	91	581	0
Confl. Peds. (#/hr)	46		47	47		46	57		65	65		57
Confl. Bikes (#/hr)			9			21			15			22
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	56.0	56.0			56.0		46.0	38.0	38.0	34.0	30.0	
Effective Green, g (s)	56.0	56.0			56.0		46.0	38.0	38.0	34.0	30.0	
Actuated g/C Ratio	0.51	0.51			0.51		0.42	0.35	0.35	0.31	0.27	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		3.0	2.0	2.0	3.0	2.0	
Lane Grp Cap (vph)	148	1609			948		275	1100	442	118	808	
v/s Ratio Prot		0.32					c0.16	0.35		0.03	0.20	
v/s Ratio Perm	c0.64				0.56		c0.46		0.20	0.21		
v/c Ratio	1.25	0.62			1.10		1.49	1.01	0.58	0.77	0.72	
Uniform Delay, d1	27.0	19.4			27.0		26.8	36.0	29.5	32.7	36.2	
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	156.3	1.8			61.6		239.3	28.5	1.3	26.2	2.6	
Delay (s)	183.3	21.2			88.6		266.1	64.5	30.7	58.9	38.8	
Level of Service	F	C			F		F	E	C	E	D	
Approach Delay (s)		46.5			88.6			104.1			41.3	
Approach LOS		D			F			F			D	

Intersection Summary			
HCM 2000 Control Delay	77.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	127.4%	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)	332	914	237	463	734	76	10	1950	731	3	1256	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5	4.0		5.5	5.5
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.98		1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	1.00
Satd. Flow (prot)	3090	3154	1349	3090	3185	1349		4575	1391		4576	1349
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.93	1.00
Satd. Flow (perm)	3090	3154	1349	3090	3185	1349		4254	1391		4235	1349
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	332	914	237	463	734	76	10	1950	731	3	1256	211
RTOR Reduction (vph)	0	0	65	0	0	53	0	0	0	0	0	79
Lane Group Flow (vph)	332	914	172	463	734	24	0	1960	731	0	1259	132
Confl. Peds. (#/hr)			40			40	40		40	40		40
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Free	Perm	NA	Perm
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8			4	2		Free	6		6
Actuated Green, G (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Effective Green, g (s)	11.0	27.5	27.5	12.0	28.5	28.5		40.5	95.0		40.5	40.5
Actuated g/C Ratio	0.12	0.29	0.29	0.13	0.30	0.30		0.43	1.00		0.43	0.43
Clearance Time (s)	4.0	5.5	5.5	4.0	5.5	5.5		5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)	357	913	390	390	955	404		1813	1391		1805	575
v/s Ratio Prot	0.11	c0.29		c0.15	0.23							
v/s Ratio Perm			0.13			0.02		c0.46	0.53		0.30	0.10
v/c Ratio	0.93	1.00	0.44	1.19	0.77	0.06		1.08	0.53		0.70	0.23
Uniform Delay, d1	41.6	33.8	27.5	41.5	30.2	23.7		27.2	0.0		22.2	17.3
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	29.9	30.0	3.6	107.2	5.9	0.3		46.8	1.4		1.2	0.2
Delay (s)	71.6	63.8	31.1	148.7	36.2	24.0		74.1	1.4		23.4	17.5
Level of Service	E	E	C	F	D	C		E	A		C	B
Approach Delay (s)		60.3			76.4			54.3			22.6	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM 2000 Control Delay	52.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	15.0
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)	60	386	89	13	179	55	57	508	101	358	426	68
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	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1737	1795		1759	1775		1749	1802		1754	1811	
Flt Permitted	0.52	1.00		0.25	1.00		0.41	1.00		0.33	1.00	
Satd. Flow (perm)	943	1795		463	1775		762	1802		616	1811	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	60	386	89	13	179	55	57	508	101	358	426	68
RTOR Reduction (vph)	0	14	0	0	18	0	0	12	0	0	10	0
Lane Group Flow (vph)	60	461	0	13	216	0	57	597	0	358	484	0
Confl. Peds. (#/hr)	15		10	10		15	15		15	15		15
Confl. Bikes (#/hr)			5			4						9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		35.7	35.7		35.7	35.7	
Effective Green, g (s)	16.0	16.0		16.0	16.0		35.7	35.7		35.7	35.7	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.60	0.60		0.60	0.60	
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)	252	481		124	475		455	1077		368	1082	
v/s Ratio Prot		c0.26			0.12			0.33			0.27	
v/s Ratio Perm	0.06			0.03			0.07			c0.58		
v/c Ratio	0.24	0.96		0.10	0.45		0.13	0.55		0.97	0.45	
Uniform Delay, d1	17.1	21.5		16.5	18.2		5.2	7.2		11.5	6.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	30.3		0.4	0.7		0.1	0.6		39.4	0.3	
Delay (s)	17.6	51.9		16.8	18.9		5.3	7.8		51.0	6.9	
Level of Service	B	D		B	B		A	A		D	A	
Approach Delay (s)		48.0			18.8			7.6			25.4	
Approach LOS		D			B			A			C	

Intersection Summary			
HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	59.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.5%	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)	167	570	45	17	163	112	64	818	61	31	202	24
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		1.00	0.99		1.00	0.99			0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.98	1.00			1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1757	1835		1753	1731		1726	3481			3441	
Flt Permitted	0.49	1.00		0.16	1.00		0.59	1.00			0.84	
Satd. Flow (perm)	910	1835		299	1731		1077	3481			2897	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	167	570	45	17	163	112	64	818	61	31	202	24
RTOR Reduction (vph)	0	4	0	0	36	0	0	8	0	0	11	0
Lane Group Flow (vph)	167	611	0	17	239	0	64	871	0	0	246	0
Confl. Peds. (#/hr)	14		44	44		14	37		71	71		37
Confl. Bikes (#/hr)			6			2			2			11
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)	24.7	24.7		24.7	24.7		37.0	37.0			37.0	
Effective Green, g (s)	24.7	24.7		24.7	24.7		37.0	37.0			37.0	
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.53	0.53			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)	322	650		105	613		571	1847			1537	
v/s Ratio Prot		c0.33			0.14			c0.25				
v/s Ratio Perm	0.18			0.06			0.06				0.08	
v/c Ratio	0.52	0.94		0.16	0.39		0.11	0.47			0.16	
Uniform Delay, d1	17.8	21.8		15.4	16.9		8.2	10.2			8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.4	21.8		0.7	0.4		0.4	0.9			0.2	
Delay (s)	19.2	43.5		16.1	17.3		8.6	11.1			8.6	
Level of Service	B	D		B	B		A	B			A	
Approach Delay (s)		38.3			17.2			10.9			8.6	
Approach LOS		D			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	69.7	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 SUMMARY

Site: 2035 + Proj Pref PM

Adeline & 14th
2035 + Preferred Project PM
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	18	2.0	0.677	15.0	LOS C	6.3	159.6	0.82	1.06	23.7
8	T	557	2.0	0.677	15.0	LOS C	6.3	159.6	0.82	0.96	25.2
18	R	53	2.0	0.677	15.0	LOS C	6.3	159.6	0.82	0.98	25.0
Approach		628	2.0	0.677	15.0	LOS C	6.3	159.6	0.82	0.96	25.1
East: 14th Street (WB)											
1	L	90	2.0	0.470	11.4	LOS B	2.7	68.0	0.73	1.02	24.9
6	T	212	2.0	0.470	11.4	LOS B	2.7	68.0	0.73	0.89	26.7
16	R	47	2.0	0.470	11.4	LOS B	2.7	68.0	0.73	0.92	26.5
Approach		349	2.0	0.470	11.4	LOS B	2.7	68.0	0.73	0.93	26.1
North: Adeline Street (SB)											
7	L	85	2.0	0.505	9.6	LOS A	3.3	83.5	0.64	0.89	25.7
4	T	395	2.0	0.505	9.6	LOS A	3.3	83.5	0.64	0.71	27.8
14	R	34	2.0	0.505	9.6	LOS A	3.3	83.5	0.64	0.74	27.5
Approach		514	2.0	0.505	9.6	LOS A	3.3	83.5	0.64	0.74	27.4
West: 14th Street (EB)											
5	L	53	2.0	0.503	11.6	LOS B	3.1	78.5	0.73	1.04	24.9
2	T	273	2.0	0.503	11.6	LOS B	3.1	78.5	0.73	0.90	26.7
12	R	71	2.0	0.503	11.6	LOS B	3.1	78.5	0.73	0.93	26.5
Approach		397	2.0	0.503	11.6	LOS B	3.1	78.5	0.73	0.92	26.4
All Vehicles		1888	2.0	0.677	12.2	LOS B	6.3	159.6	0.74	0.89	26.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: 2035 + Proj PM

Adeline & 12th
2035 + Preferred Project PM
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Adeline Street (NB)											
3	L	1	2.0	0.392	6.7	LOS A	2.5	62.3	0.37	0.84	26.9
8	T	481	2.0	0.392	6.7	LOS A	2.5	62.3	0.37	0.49	29.7
18	R	7	2.0	0.392	6.7	LOS A	2.5	62.3	0.37	0.56	29.3
Approach		489	2.0	0.392	6.7	LOS A	2.5	62.3	0.37	0.49	29.7
East: 12th Street (WB)											
1	L	10	2.0	0.189	6.1	LOS A	0.8	21.1	0.56	0.89	27.1
6	T	21	2.0	0.189	6.1	LOS A	0.8	21.1	0.56	0.68	29.8
16	R	131	2.0	0.189	6.1	LOS A	0.8	21.1	0.56	0.73	29.4
Approach		162	2.0	0.189	6.1	LOS A	0.8	21.1	0.56	0.73	29.3
North: Adeline Street (SB)											
7	L	108	2.0	0.394	6.3	LOS A	2.6	67.1	0.18	0.83	26.8
4	T	423	2.0	0.394	6.3	LOS A	2.6	67.1	0.18	0.40	29.9
14	R	8	2.0	0.394	6.3	LOS A	2.6	67.1	0.18	0.49	29.4
Approach		539	2.0	0.394	6.3	LOS A	2.6	67.1	0.18	0.49	29.2
West: 12th Street (EB)											
5	L	8	2.0	0.019	4.6	LOS A	0.1	1.9	0.53	0.78	27.8
2	T	5	2.0	0.019	4.6	LOS A	0.1	1.9	0.53	0.57	30.7
12	R	3	2.0	0.019	4.6	LOS A	0.1	1.9	0.53	0.62	30.3
Approach		16	2.0	0.019	4.6	LOS A	0.1	1.9	0.53	0.68	29.0
All Vehicles		1206	2.0	0.394	6.4	LOS A	2.6	67.1	0.32	0.52	29.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Model used. Geometric Delay not included.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	259	184	0	0	190	288	157	515	225	288	0	531
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Lane Util. Factor	1.00	0.95			0.95		0.91	0.91		1.00		0.88
Frpb, ped/bikes	1.00	1.00			0.98		1.00	1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Frt	1.00	1.00			0.91		1.00	0.96		1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1367	3312			2591		972	2915		1556		2472
Flt Permitted	0.95	1.00			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1367	3312			2591		972	2915		1556		2472
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	259	184	0	0	190	288	157	515	225	288	0	531
RTOR Reduction (vph)	0	0	0	0	248	0	0	37	0	0	0	422
Lane Group Flow (vph)	259	184	0	0	230	0	141	719	0	288	0	109
Confl. Peds. (#/hr)						14						
Confl. Bikes (#/hr)						1						
Heavy Vehicles (%)	32%	9%	0%	0%	25%	24%	69%	12%	12%	16%	0%	15%
Turn Type	Prot	NA			NA		Split	NA		Prot		custom
Protected Phases	1	6			2		4	4		3		3
Permitted Phases												
Actuated Green, G (s)	21.2	38.5			13.8		26.6	26.6		20.1		20.1
Effective Green, g (s)	21.2	38.5			13.8		26.6	26.6		20.1		20.1
Actuated g/C Ratio	0.22	0.39			0.14		0.27	0.27		0.20		0.20
Clearance Time (s)	3.5	4.5			4.5		4.5	4.5		4.0		4.0
Vehicle Extension (s)	2.0	2.5			2.5		2.5	2.5		2.5		2.5
Lane Grp Cap (vph)	295	1298			364		263	789		318		505
v/s Ratio Prot	c0.19	0.06			c0.09		0.15	c0.25		c0.19		0.04
v/s Ratio Perm												
v/c Ratio	0.88	0.14			0.63		0.54	0.91		0.91		0.22
Uniform Delay, d1	37.2	19.2			39.8		30.5	34.7		38.1		32.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	23.5	0.0			3.1		1.6	14.6		27.6		0.2
Delay (s)	60.8	19.3			42.9		32.2	49.3		65.8		32.6
Level of Service	E	B			D		C	D		E		C
Approach Delay (s)		43.5			42.9			46.6			44.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	98.2	Sum of lost time (s)	16.5
Intersection Capacity Utilization	78.9%	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)	84	670	22	139	785	433	20	119	104	467	174	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0		3.0	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	
Frpb, ped/bikes	1.00	1.00		1.00	0.97			0.99		1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.95			0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1770	3377		1770	3184			1723		1758	1709	
Flt Permitted	0.95	1.00		0.95	1.00			0.97		0.57	1.00	
Satd. Flow (perm)	1770	3377		1770	3184			1675		1051	1709	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	84	670	22	139	785	433	20	119	104	467	174	79
RTOR Reduction (vph)	0	3	0	0	83	0	0	30	0	0	18	0
Lane Group Flow (vph)	84	689	0	139	1135	0	0	213	0	467	235	0
Confl. Peds. (#/hr)			58			47	70		8	8		70
Confl. Bikes (#/hr)			15			6			9			38
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	5.1	27.8		10.3	33.0			40.9		40.9	40.9	
Effective Green, g (s)	5.1	27.8		10.3	33.0			40.9		40.9	40.9	
Actuated g/C Ratio	0.06	0.31		0.11	0.37			0.45		0.45	0.45	
Clearance Time (s)	3.0	4.0		3.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	100	1043		202	1167			761		477	776	
v/s Ratio Prot	0.05	c0.20		0.08	c0.36						0.14	
v/s Ratio Perm								0.13		c0.44		
v/c Ratio	0.84	0.66		0.69	0.97			0.28		0.98	0.30	
Uniform Delay, d1	42.0	27.0		38.3	28.1			15.3		24.1	15.5	
Progression Factor	0.94	0.91		0.86	0.74			1.00		1.00	1.00	
Incremental Delay, d2	41.5	1.2		7.5	20.5			0.1		35.2	0.1	
Delay (s)	81.3	25.9		40.4	41.3			15.4		59.3	15.6	
Level of Service	F	C		D	D			B		E	B	
Approach Delay (s)		31.9			41.2			15.4			44.0	
Approach LOS		C			D			B			D	

Intersection Summary			
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	94.9%	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)	52	1697	48	70	1566	293	48	119	123	139	129	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	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.92		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3383		1054	3471	1460	1574	1064		1759	1574	
Flt Permitted	0.09	1.00		0.09	1.00	1.00	0.59	1.00		0.52	1.00	
Satd. Flow (perm)	169	3383		101	3471	1460	986	1064		962	1574	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	52	1697	48	70	1566	293	48	119	123	139	129	57
RTOR Reduction (vph)	0	3	0	0	0	132	0	9	0	0	13	0
Lane Group Flow (vph)	52	1742	0	70	1566	161	48	233	0	139	173	0
Confl. Peds. (#/hr)	21		23	23		21	9		11	11		9
Confl. Bikes (#/hr)			4			5						1
Heavy Vehicles (%)	2%	6%	11%	71%	4%	6%	14%	50%	76%	2%	20%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1		1	2			2		
Actuated Green, G (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)	44.0	44.0		44.0	44.0	44.0	28.0	28.0		28.0	28.0	
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	92	1860		55	1909	803	345	372		336	550	
v/s Ratio Prot		0.51			0.45			c0.22			0.11	
v/s Ratio Perm	0.31			c0.69		0.11	0.05			0.14		
v/c Ratio	0.57	0.94		1.27	0.82	0.20	0.14	0.63		0.41	0.31	
Uniform Delay, d1	11.8	16.7		18.0	14.8	9.1	17.8	21.6		19.8	19.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	22.8	10.5		211.4	4.1	0.6	0.8	7.7		3.7	1.5	
Delay (s)	34.5	27.2		229.4	18.9	9.7	18.6	29.4		23.5	20.5	
Level of Service	C	C		F	B	A	B	C		C	C	
Approach Delay (s)		27.4			25.1			27.6			21.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.7%	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)	123	1506	87	25	1068	67	633	404	76	80	60	189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	1.00
Frt	1.00	0.99		1.00	0.99		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)	1669	4281		1767	4532		1742	1863	1538	1755	3539	1216
Flt Permitted	0.17	1.00		0.11	1.00		0.72	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)	306	4281		207	4532		1312	1863	1538	756	3539	1216
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	123	1506	87	25	1068	67	633	404	76	80	60	189
RTOR Reduction (vph)	0	7	0	0	8	0	0	0	14	0	0	18
Lane Group Flow (vph)	123	1586	0	25	1127	0	633	404	62	80	60	171
Confl. Peds. (#/hr)	10		20	20		10	8		20	20		8
Confl. Bikes (#/hr)			7			3						6
Heavy Vehicles (%)	8%	21%	2%	2%	14%	2%	3%	2%	2%	2%	2%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	36.0	36.0		36.0	36.0		39.5	39.5	39.5	39.5	39.5	39.5
Effective Green, g (s)	36.0	36.0		36.0	36.0		39.5	39.5	39.5	39.5	39.5	39.5
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	5.0	5.0		5.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	129	1813		87	1919		609	865	714	351	1644	565
v/s Ratio Prot		0.37			0.25			0.22			0.02	
v/s Ratio Perm	c0.40			0.12			c0.48		0.04	0.11		0.14
v/c Ratio	0.95	0.87		0.29	0.59		1.04	0.47	0.09	0.23	0.04	0.30
Uniform Delay, d1	23.7	22.4		16.1	18.8		22.8	15.6	12.7	13.6	12.4	14.2
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	67.6	6.2		0.7	0.3		47.1	1.8	0.2	1.5	0.0	1.4
Delay (s)	91.3	28.7		16.7	19.1		69.8	17.4	12.9	15.1	12.4	15.5
Level of Service	F	C		B	B		E	B	B	B	B	B
Approach Delay (s)		33.2			19.0			46.9			14.9	
Approach LOS		C			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	111.6%	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)	0	0	0	36	162	600	47	193	0	0	133	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Lane Util. Factor					0.95	1.00	1.00	1.00			0.95	1.00
Frpb, ped/bikes					1.00	0.99	1.00	1.00			1.00	0.98
Flpb, ped/bikes					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					0.99	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					3507	1561	1770	1111			2865	1558
Flt Permitted					0.99	1.00	0.67	1.00			1.00	1.00
Satd. Flow (perm)					3507	1561	1244	1111			2865	1558
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	36	162	600	47	193	0	0	133	24
RTOR Reduction (vph)	0	0	0	0	0	461	0	0	0	0	0	7
Lane Group Flow (vph)	0	0	0	0	198	139	47	193	0	0	133	17
Confl. Peds. (#/hr)				1		2			8	8		
Confl. Bikes (#/hr)												13
Heavy Vehicles (%)	0%	13%	100%	2%	2%	2%	2%	71%	83%	0%	26%	2%
Turn Type				Perm	NA	Perm	Perm	NA			NA	Perm
Protected Phases					4			6			2	
Permitted Phases				4		4	6					2
Actuated Green, G (s)					14.9	14.9	65.6	65.6			65.6	65.6
Effective Green, g (s)					14.9	14.9	65.6	65.6			65.6	65.6
Actuated g/C Ratio					0.17	0.17	0.73	0.73			0.73	0.73
Clearance Time (s)					5.0	5.0	4.5	4.5			4.5	4.5
Vehicle Extension (s)					2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)					580	258	906	809			2088	1135
v/s Ratio Prot								c0.17			0.05	
v/s Ratio Perm					0.06	c0.09	0.04					0.01
v/c Ratio					0.34	0.54	0.05	0.24			0.06	0.02
Uniform Delay, d1					33.2	34.4	3.4	4.0			3.5	3.3
Progression Factor					1.00	1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2					0.1	1.1	0.0	0.1			0.1	0.0
Delay (s)					33.3	35.5	3.4	4.1			3.5	3.4
Level of Service					C	D	A	A			A	A
Approach Delay (s)		0.0			34.9			3.9			3.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

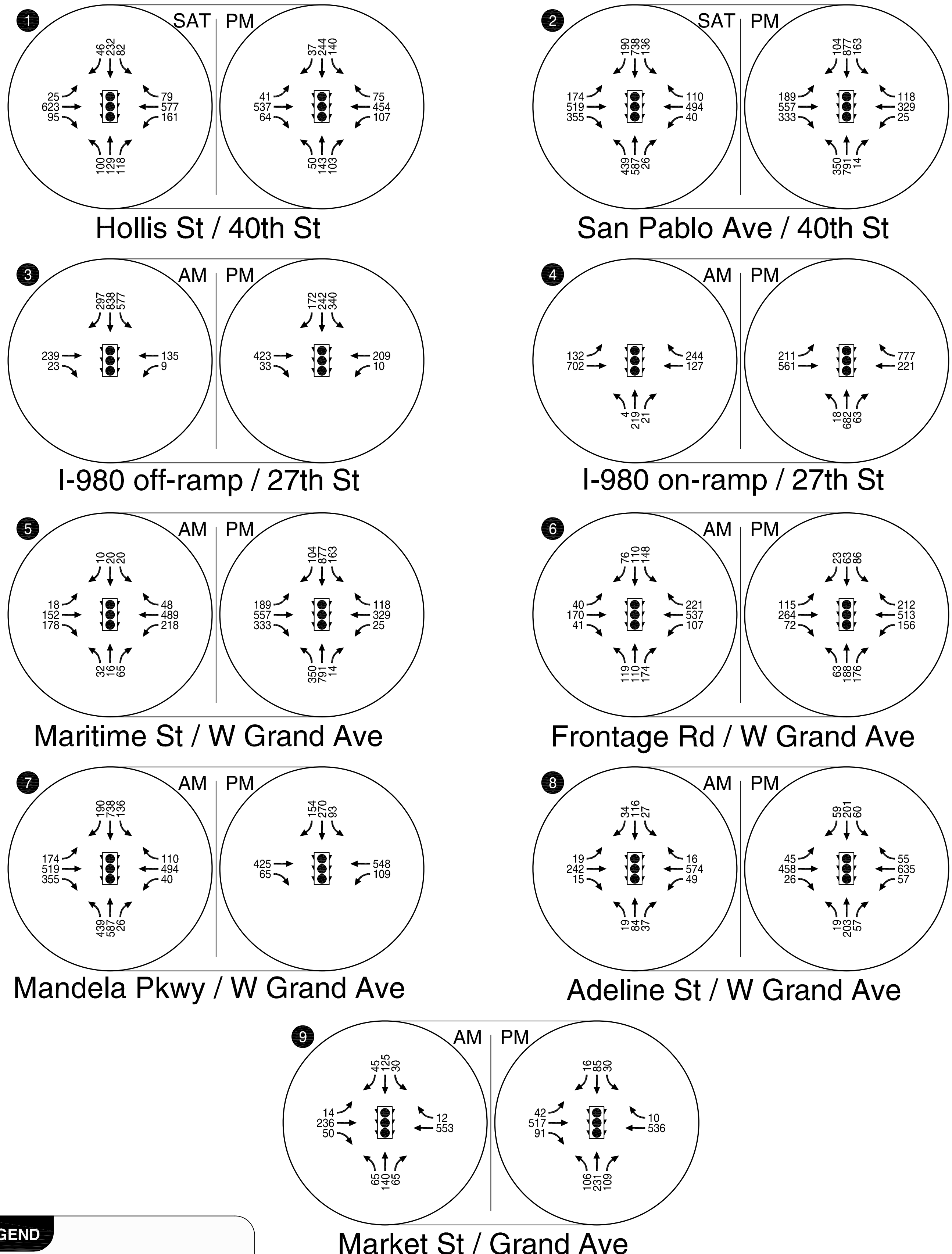
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	944	65	41	112	26	107	308	148	166	161	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	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	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3367		1770	3367		1770	1077		1770	1091	
Flt Permitted	0.95	1.00		0.95	1.00		0.64	1.00		0.35	1.00	
Satd. Flow (perm)	1770	3367		1770	3367		1196	1077		659	1091	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	944	65	41	112	26	107	308	148	166	161	14
RTOR Reduction (vph)	0	6	0	0	17	0	0	22	0	0	4	0
Lane Group Flow (vph)	26	1003	0	41	121	0	107	434	0	166	171	0
Confl. Peds. (#/hr)						50			3			3
Confl. Bikes (#/hr)			4						1			
Heavy Vehicles (%)	2%	5%	21%	2%	2%	2%	2%	57%	88%	2%	78%	2%
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.9	25.2		2.1	25.9		31.9	31.9		31.9	31.9	
Effective Green, g (s)	1.9	25.2		2.1	25.9		31.9	31.9		31.9	31.9	
Actuated g/C Ratio	0.03	0.35		0.03	0.36		0.45	0.45		0.45	0.45	
Clearance Time (s)	3.5	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	3.0		2.5	3.0		3.2	3.2		3.0	3.0	
Lane Grp Cap (vph)	47	1191		52	1224		535	482		295	488	
v/s Ratio Prot	0.01	c0.30		c0.02	0.04			c0.40			0.16	
v/s Ratio Perm							0.09			0.25		
v/c Ratio	0.55	0.84		0.79	0.10		0.20	0.90		0.56	0.35	
Uniform Delay, d1	34.2	21.2		34.3	15.0		11.9	18.2		14.5	12.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.8	5.6		52.3	0.0		0.2	19.8		2.5	0.4	
Delay (s)	42.0	26.7		86.6	15.0		12.1	38.0		17.0	13.3	
Level of Service	D	C		F	B		B	D		B	B	
Approach Delay (s)		27.1			31.4			33.1			15.1	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	71.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Appendix C: Intersection Turning Movement Volumes

Existing

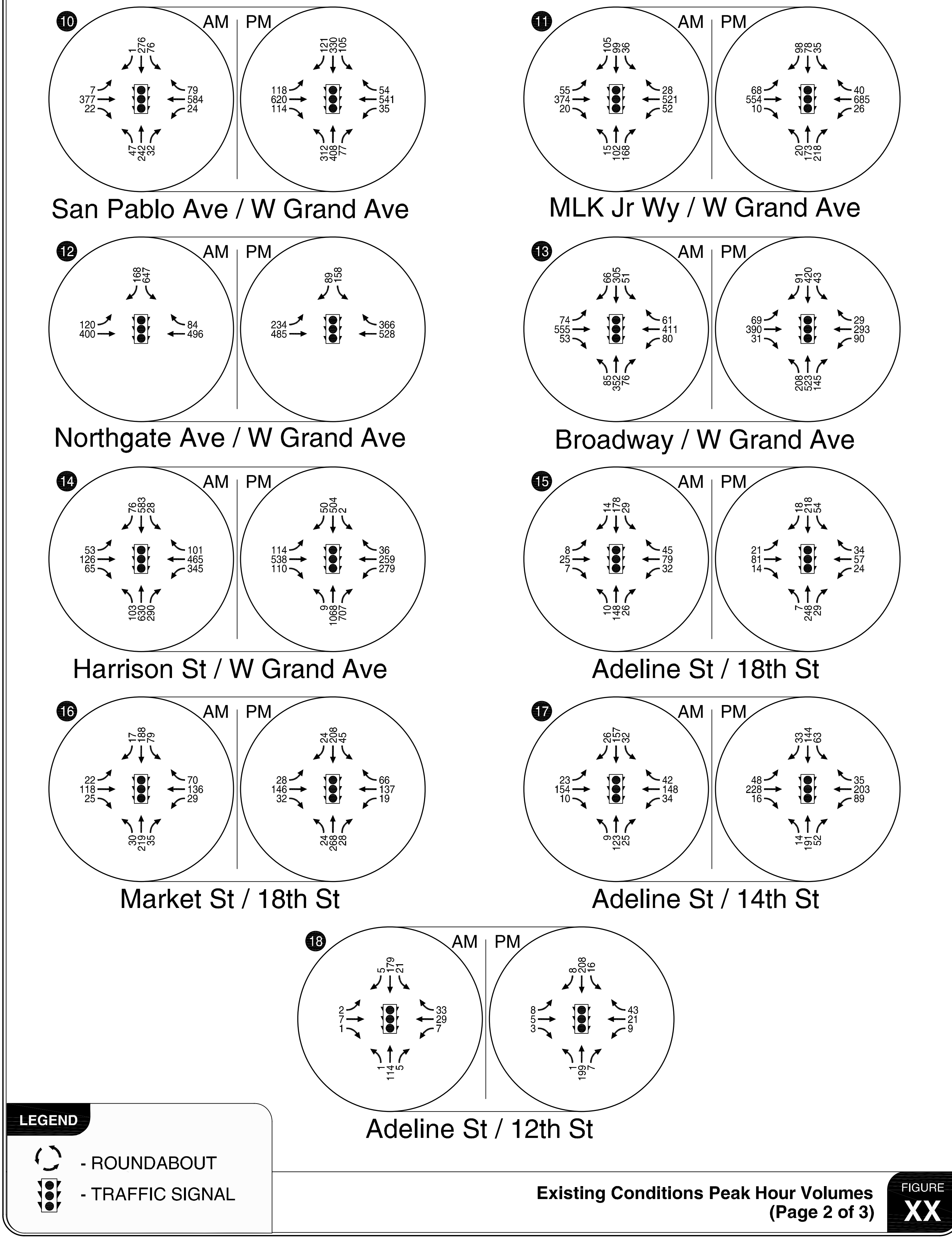


LEGEND

- ROUNDABOUT
- TRAFFIC SIGNAL

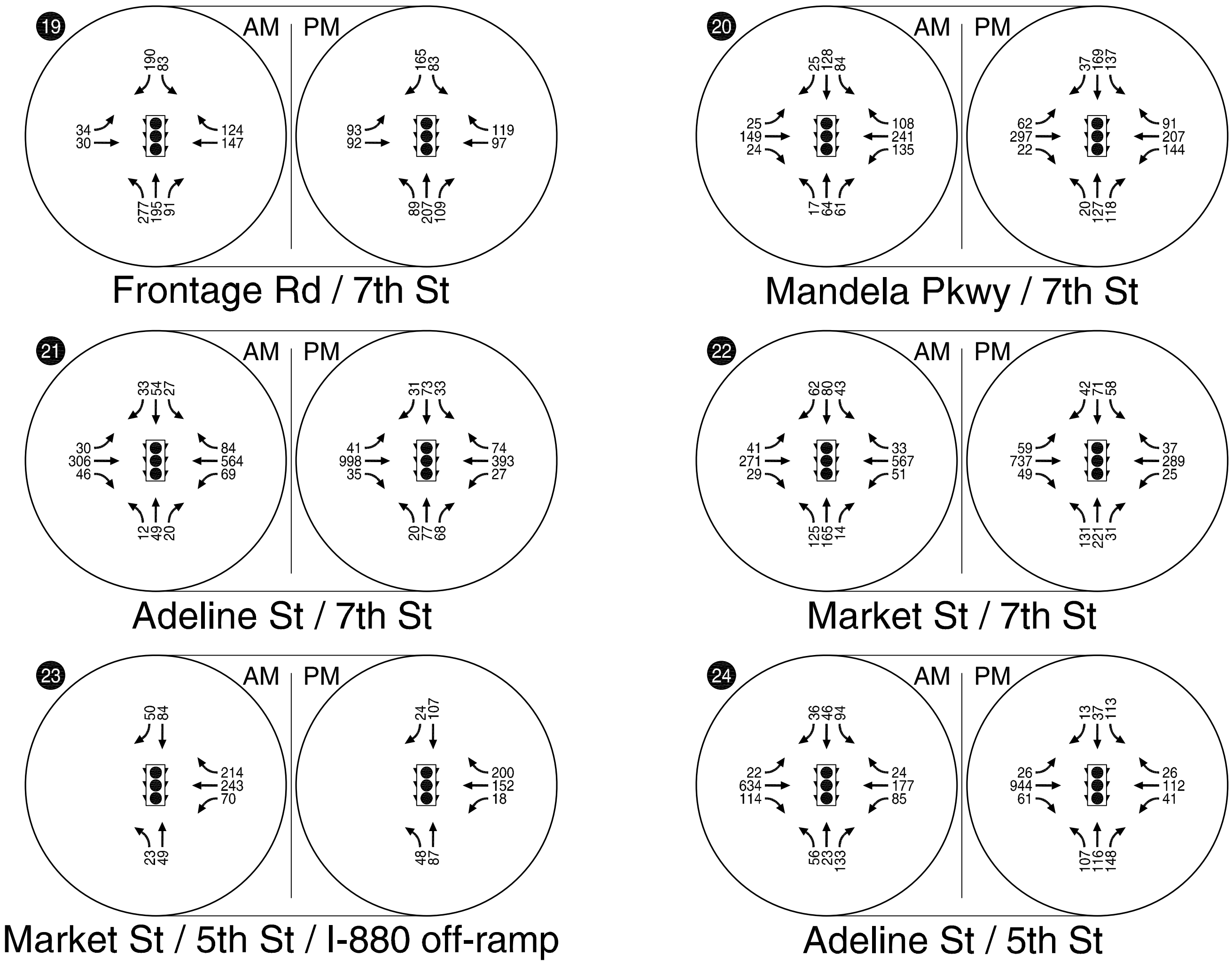
Existing Conditions Peak Hour Volumes (Page 1 of 3)

FIGURE **XX**



Existing Conditions Peak Hour Volumes (Page 2 of 3)

FIGURE XX



LEGEND

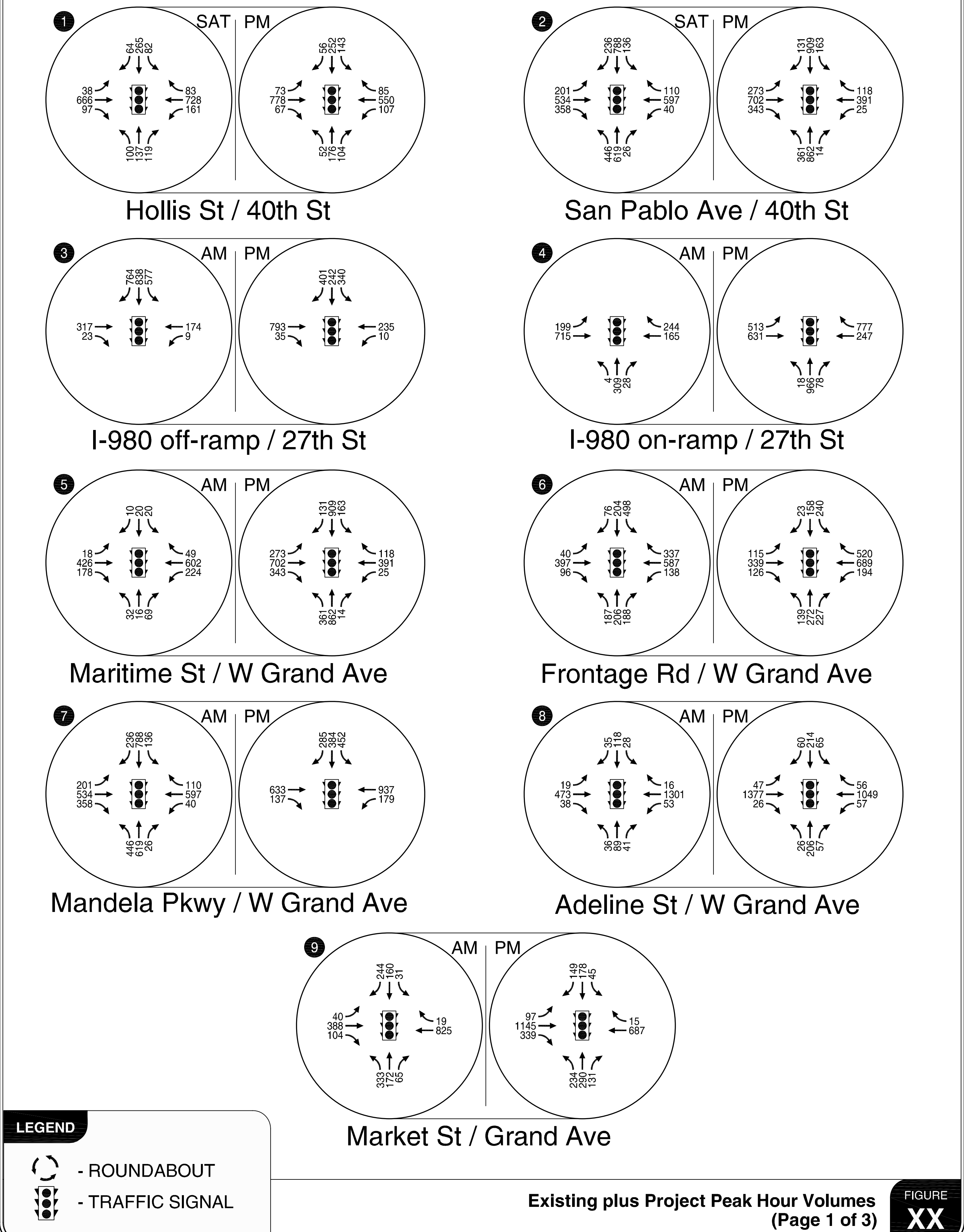
- ROUNDABOUT

- TRAFFIC SIGNAL

Existing Conditions Peak Hour Volumes (Page 3 of 3)

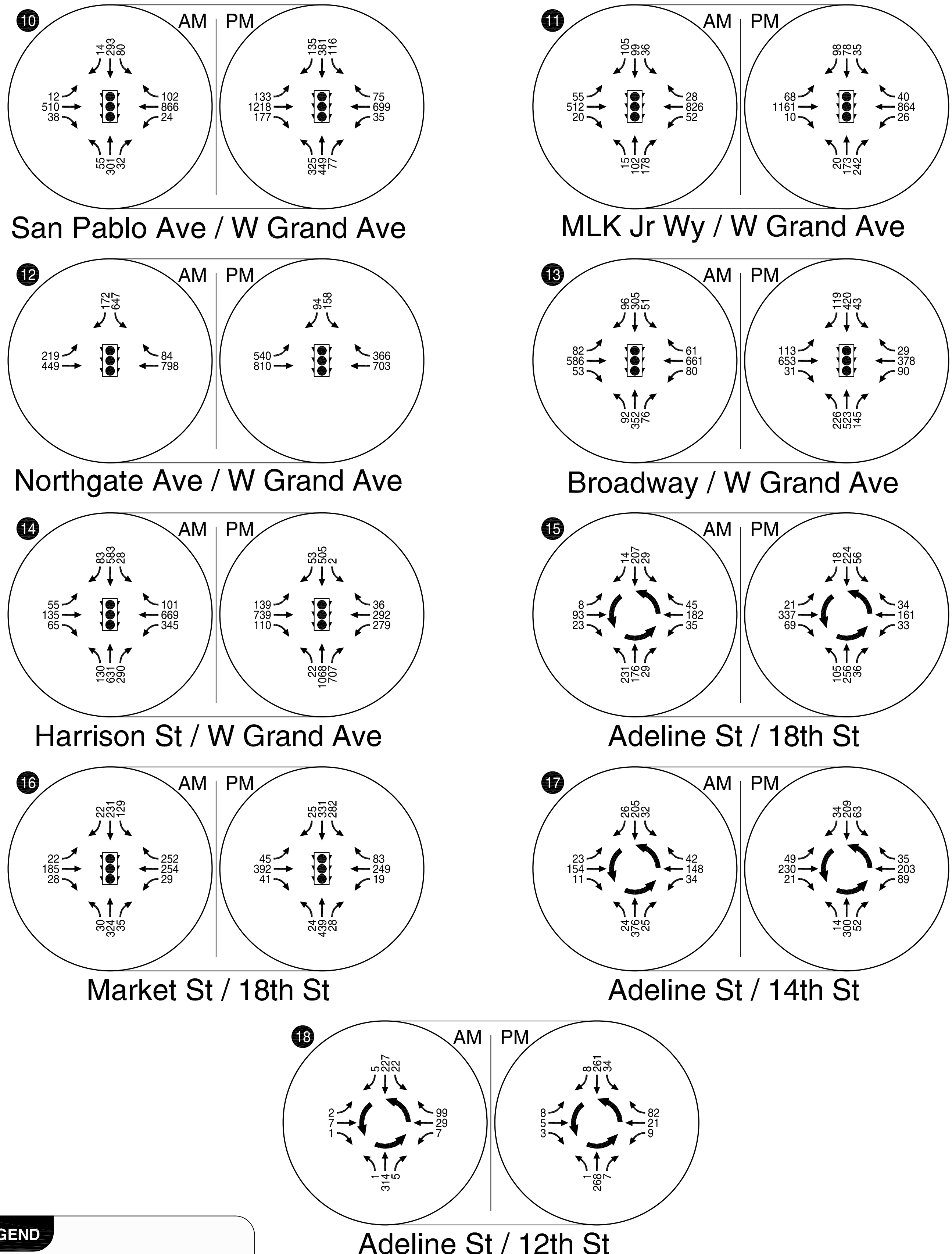
FIGURE XX

Existing + Preferred Project



Existing plus Project Peak Hour Volumes (Page 1 of 3)

FIGURE **XX**



LEGEND

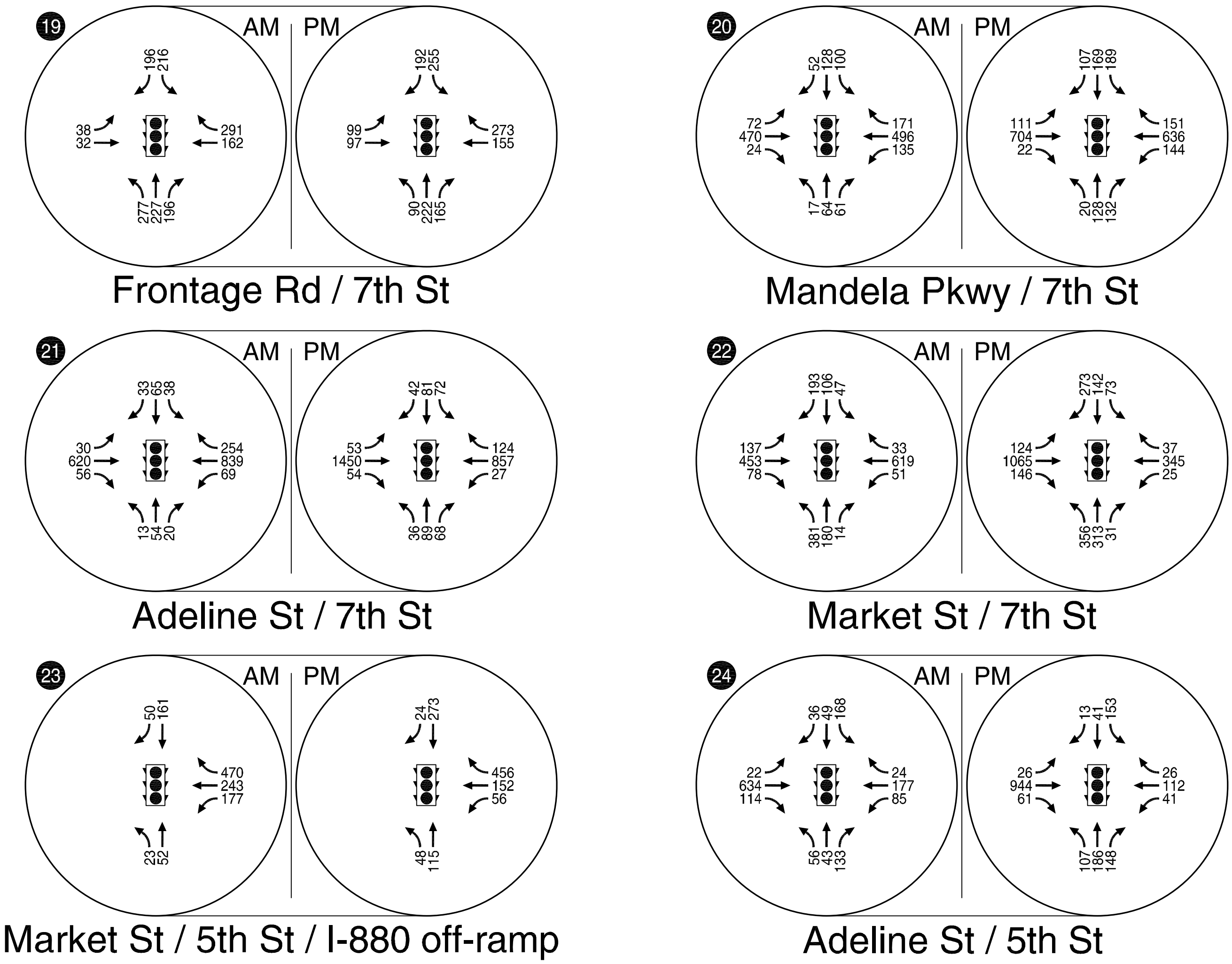
- ROUNDABOUT
- TRAFFIC SIGNAL

Existing plus Project Peak Hour Volumes (Page 2 of 3)

FIGURE **XX**

H:\projfile\17232 - West Oakland Specific Plan & EIR\Fig\17232_WestOakEIR_PHV.dwg Mar 26, 2013 - 3:13pm - jsommerville Layout Tab: ExtPP PHV 2

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING



LEGEND

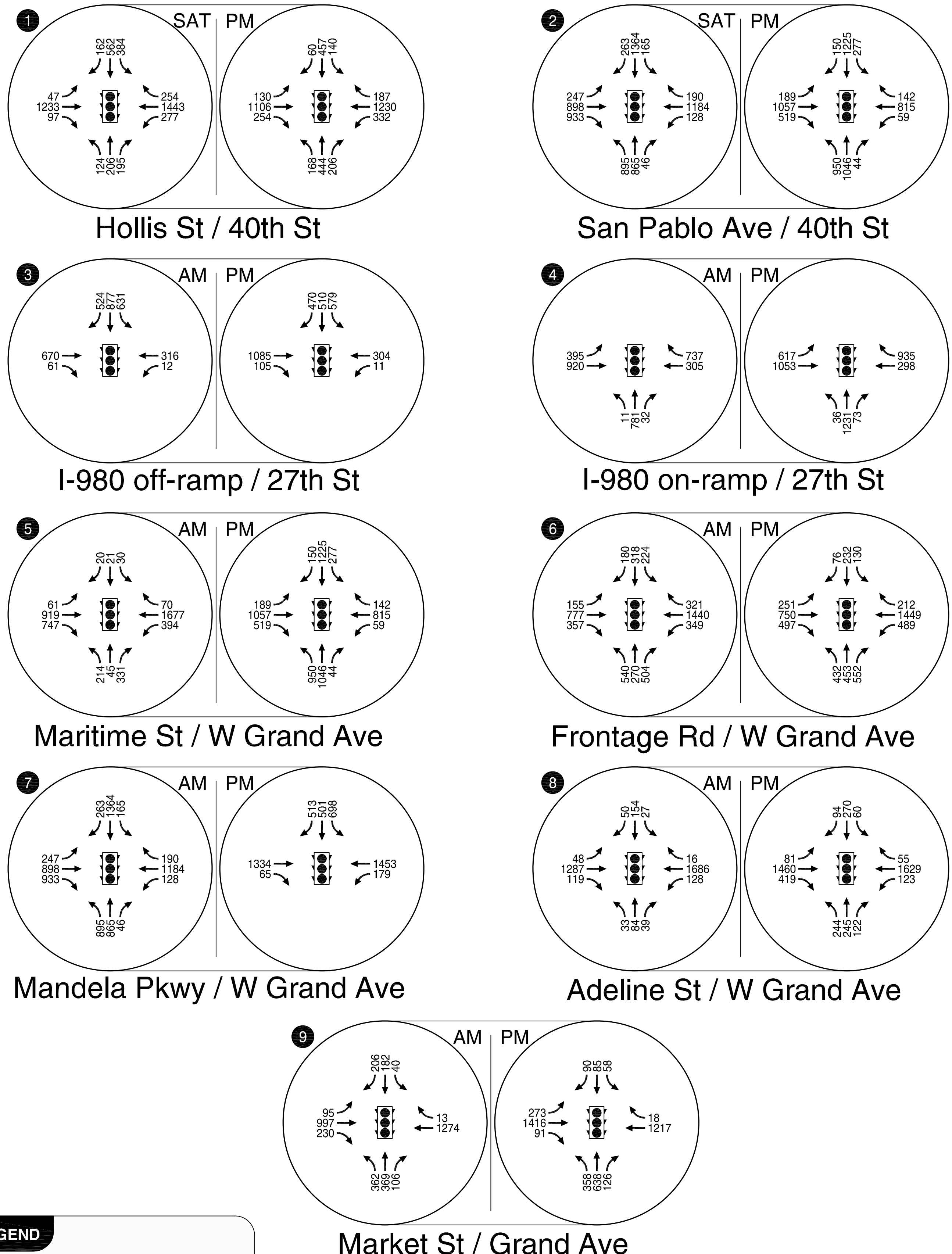
- ROUNDABOUT

- TRAFFIC SIGNAL

Existing plus Project Peak Hour Volumes (Page 3 of 3)

FIGURE **XX**

Year 2035 Cumulative No Project



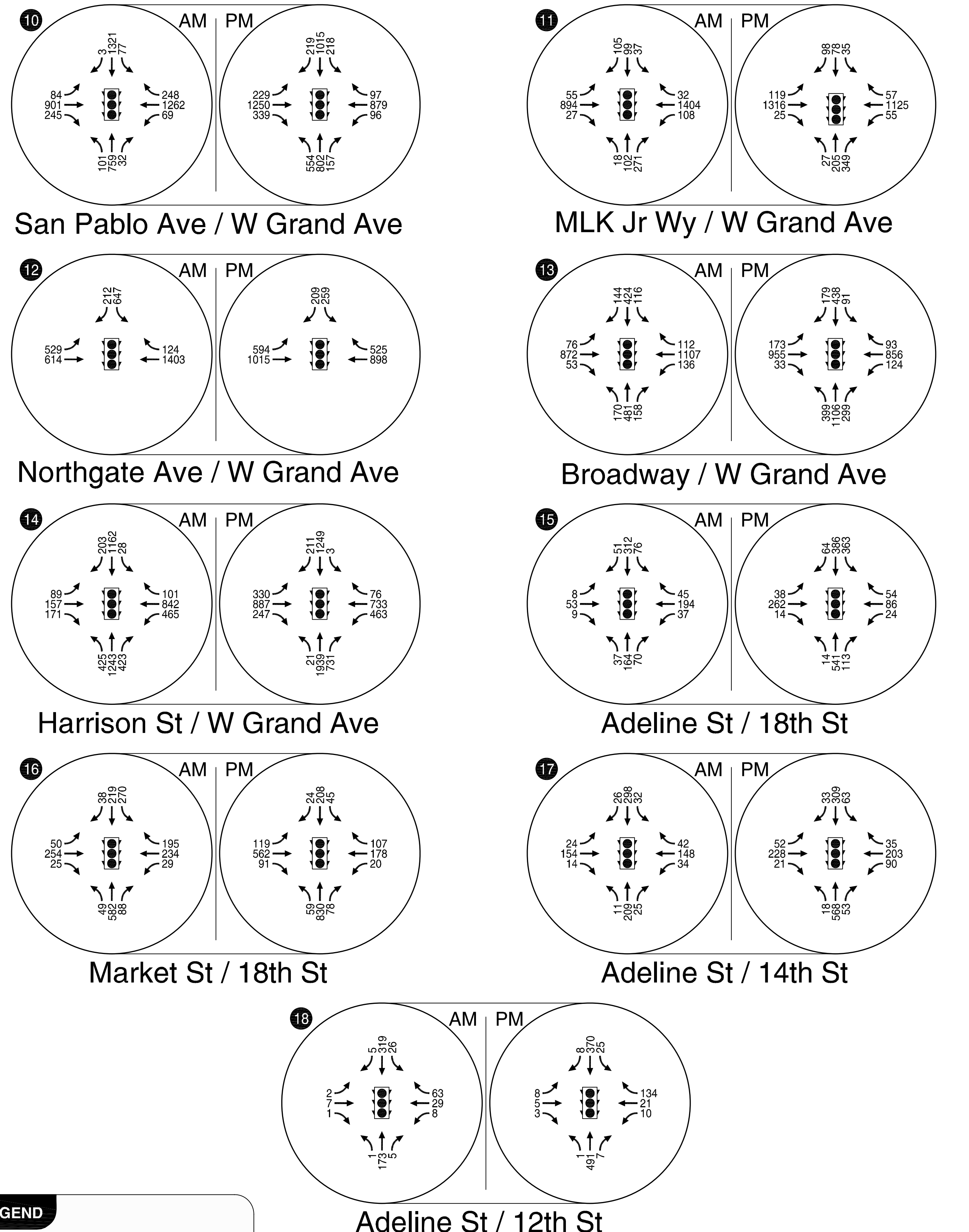
LEGEND

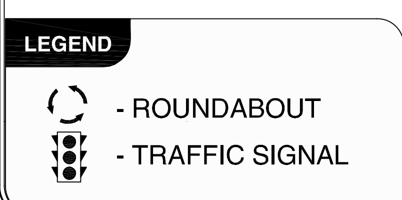
- ROUNDABOUT
- TRAFFIC SIGNAL

2035 No Project Peak Hour Volumes (Page 1 of 3)

FIGURE **XX**

H:\projfile\17232 - West Oakland Specific Plan & EIR\Fig\17232_WestOakEIR_PHV.dwg Mar 26, 2013 - 3:13pm - jsommerville Layout Tab: 2035 NP PHV 1

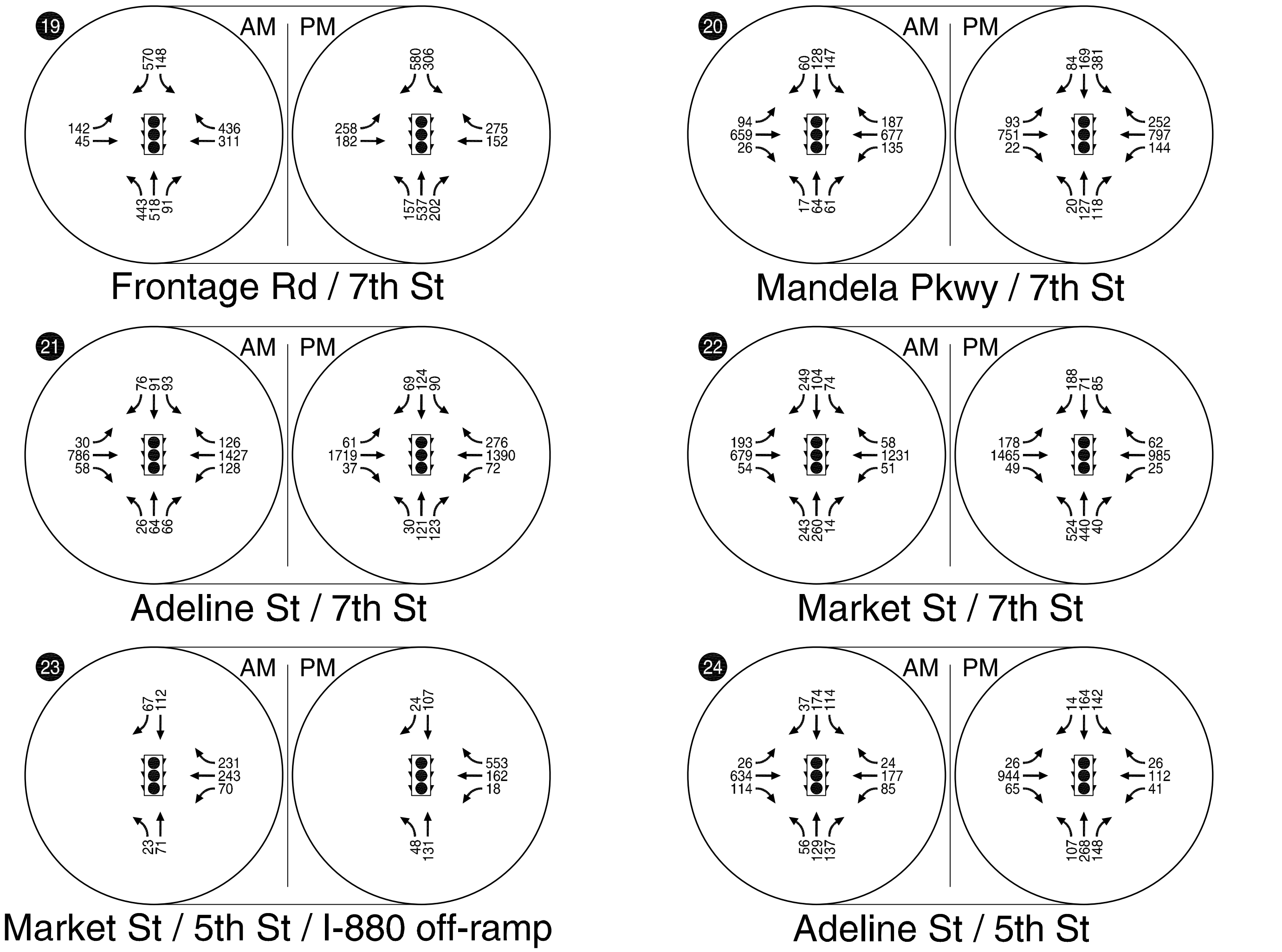




2035 No Project Peak Hour Volumes (Page 2 of 3)

FIGURE XX

H:\projfile\17232 - West Oakland Specific Plan & EIR\Fig\17232_WestOakEIR_PHV.dwg Mar 26, 2013 - 3:13pm - jsommerville Layout Tab: 2035 NP PHV 2



LEGEND

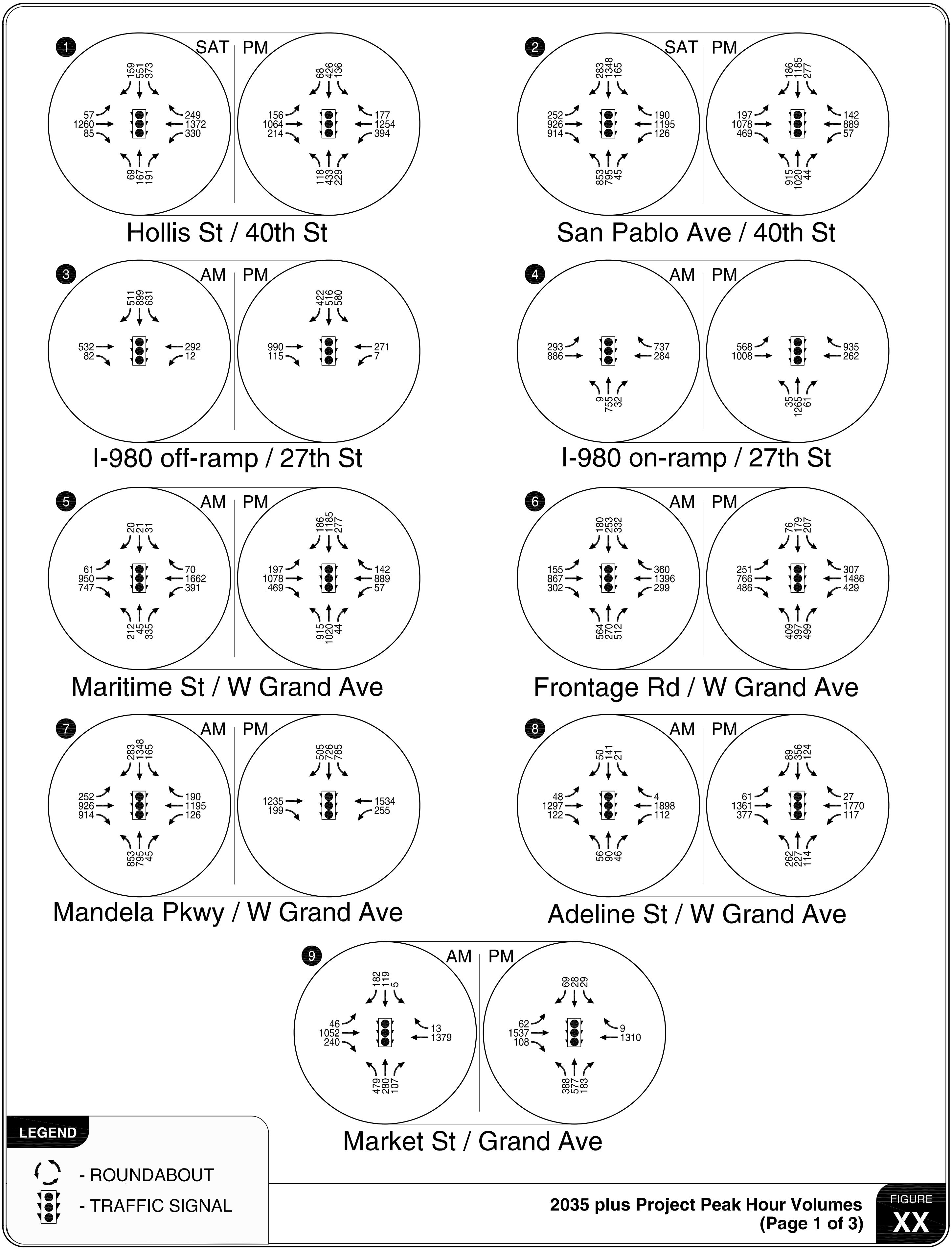
- ROUNDABOUT
- TRAFFIC SIGNAL

2035 No Project Peak Hour Volumes (Page 3 of 3)

FIGURE **XX**

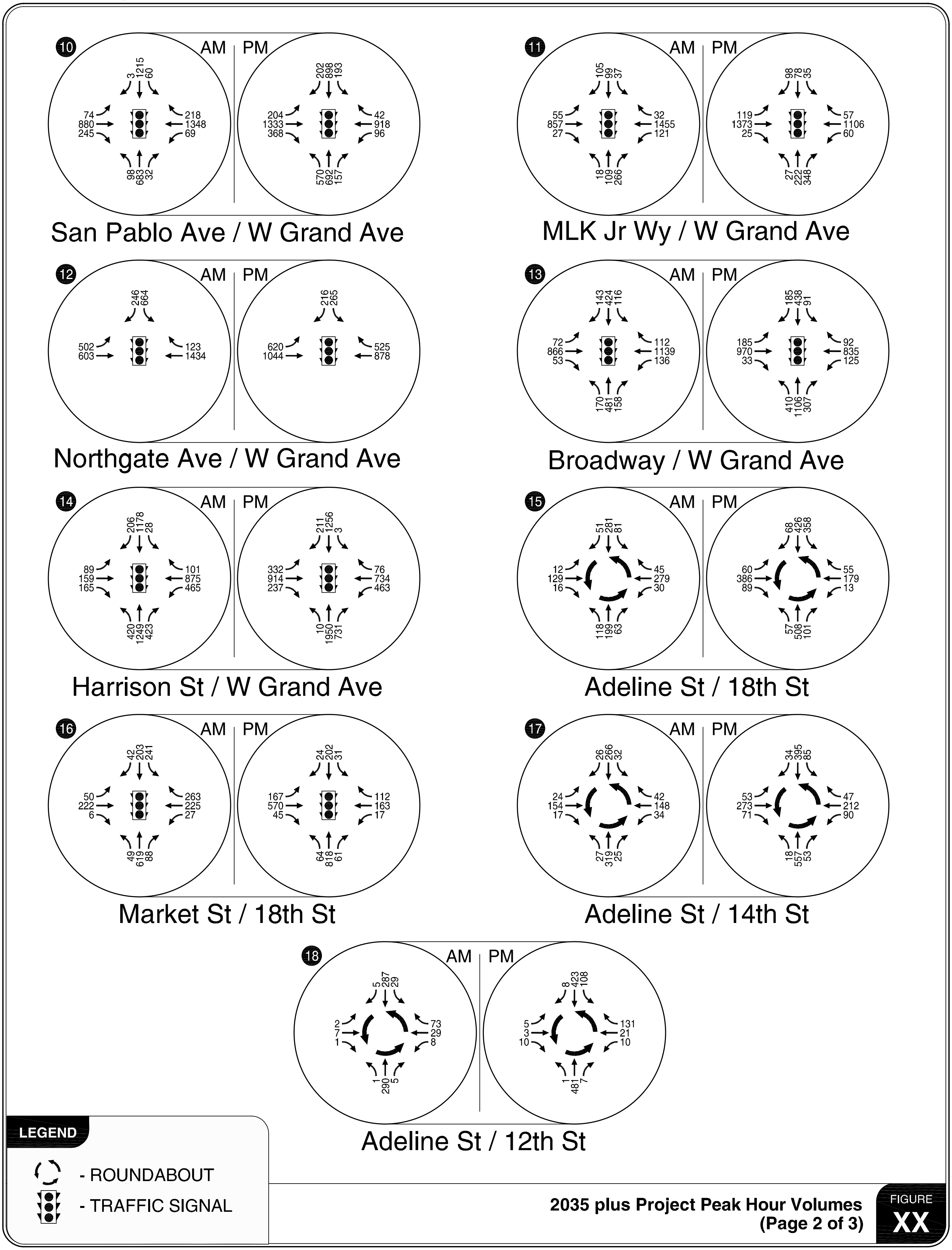
KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

Year 2035 Cumulative +
Preferred Project



2035 plus Project Peak Hour Volumes (Page 1 of 3)

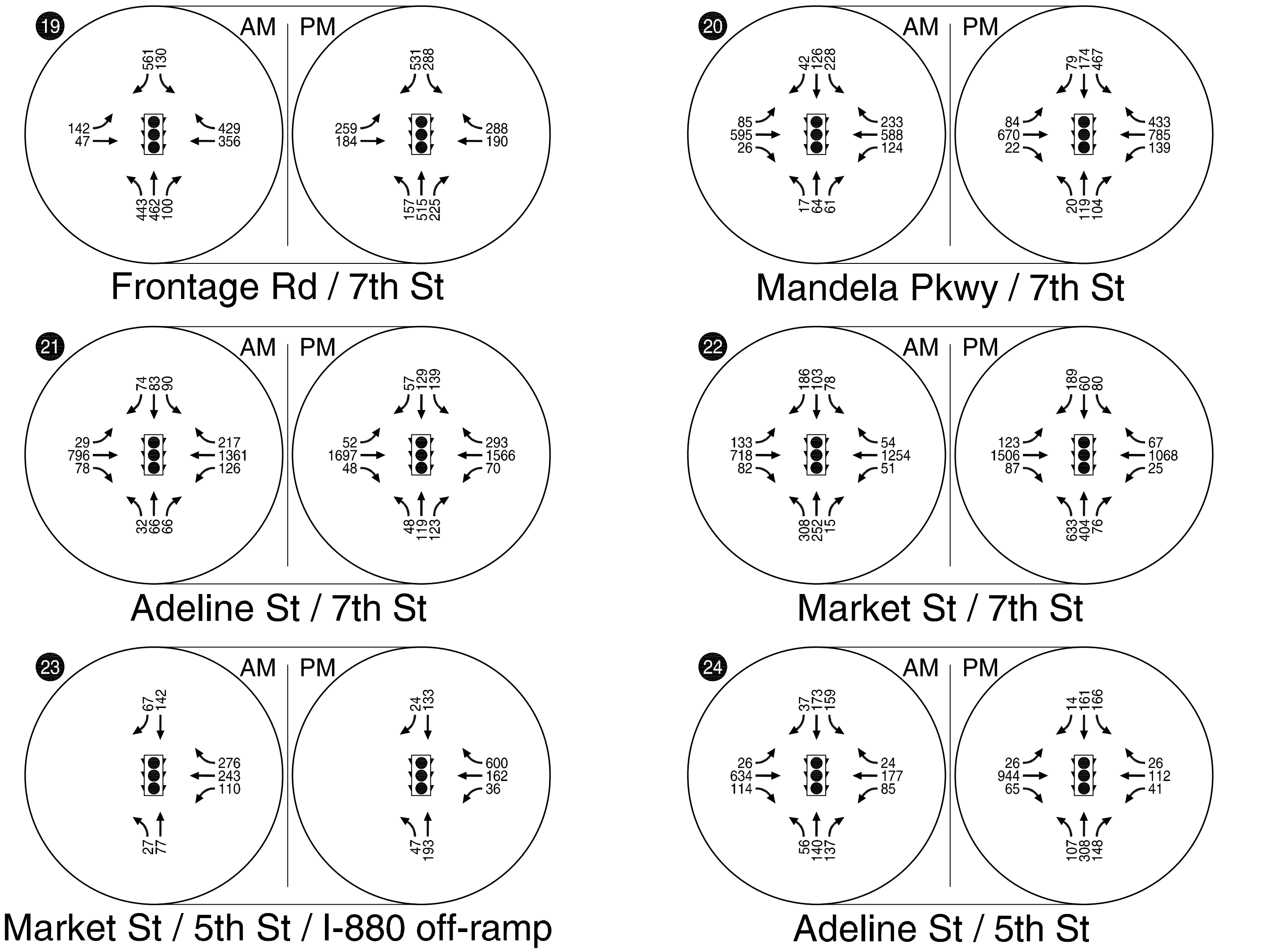
H:\projfile\17232 - West Oakland Specific Plan & EIR\Fig\17232_WestOakEIR_PHV.dwg Mar 26, 2013 - 3:13pm - jsommerville Layout Tab: 2035 PP PHV 1



2035 plus Project Peak Hour Volumes (Page 2 of 3)

H:\projfile\17232 - West Oakland Specific Plan & EIR\Fig\17232_WestOakEIR_PHV.dwg Mar 26, 2013 - 3:13pm - jsommerville Layout Tab: 2035 PP PHV 2

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING



LEGEND

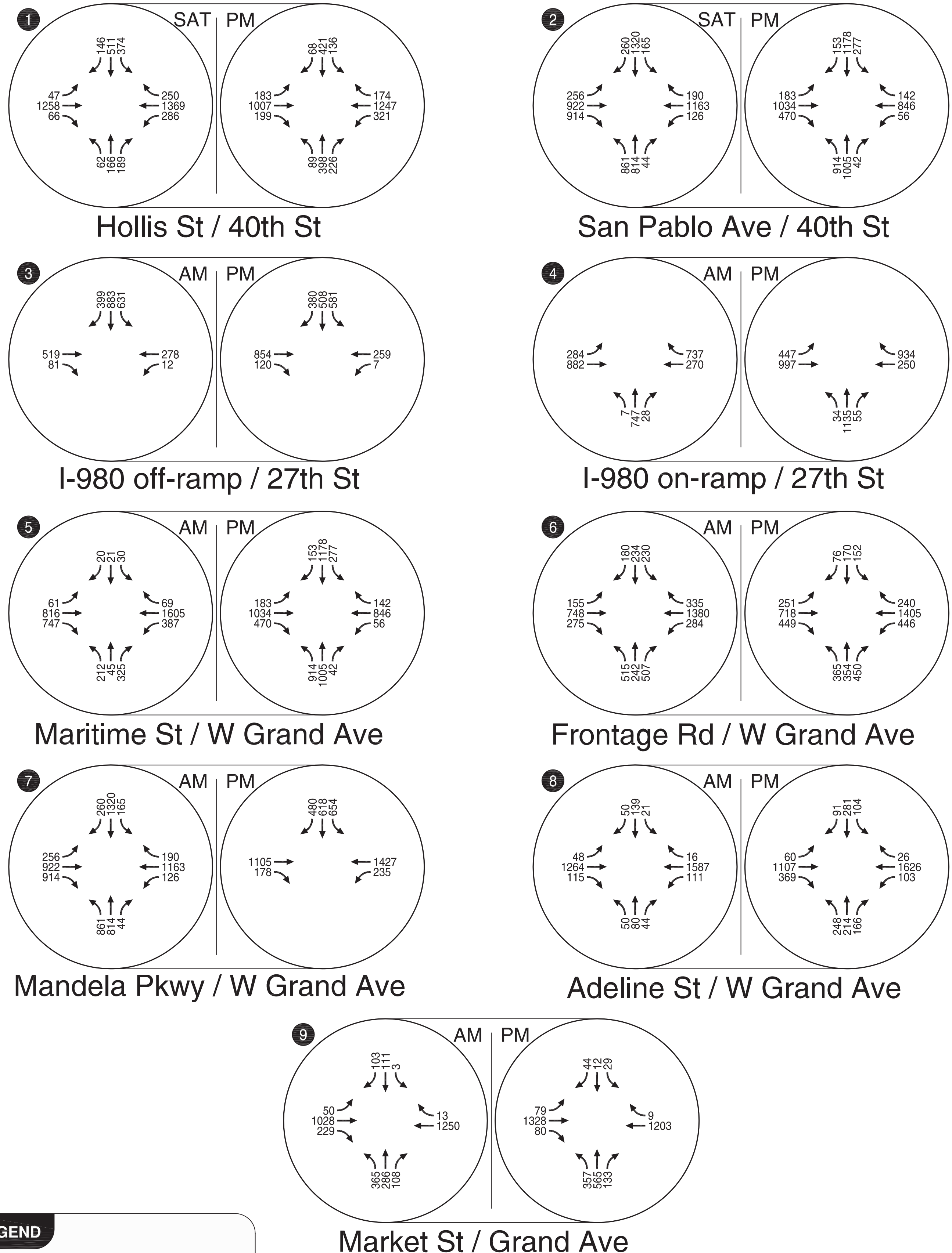
- ROUNDABOUT
- TRAFFIC SIGNAL

2035 plus Project Peak Hour Volumes (Page 3 of 3)

FIGURE **XX**

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING

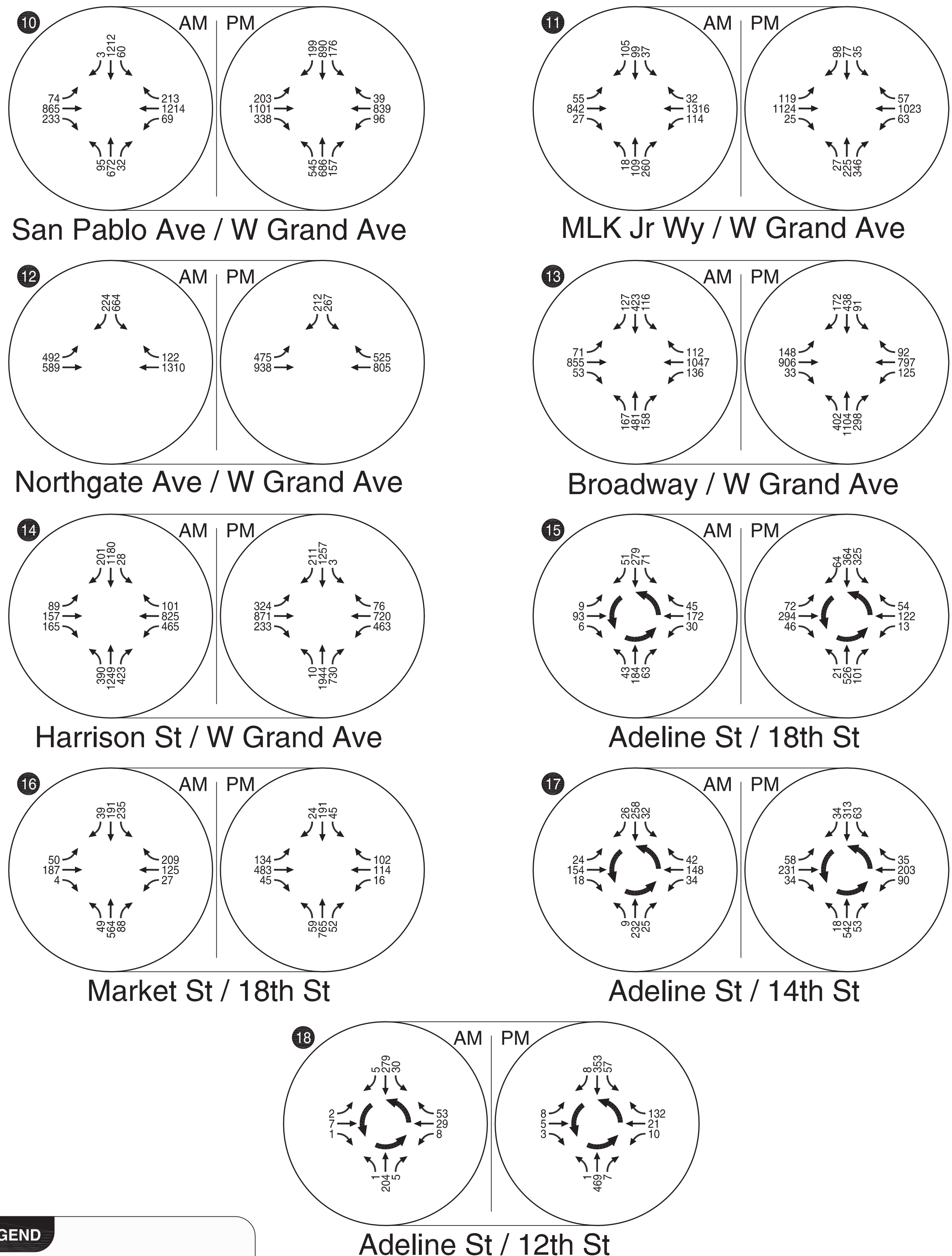
Year 2035 Cumulative +
Alternative 2 Reduced Project



LEGEND

- ROUNDABOUT
- TRAFFIC SIGNAL

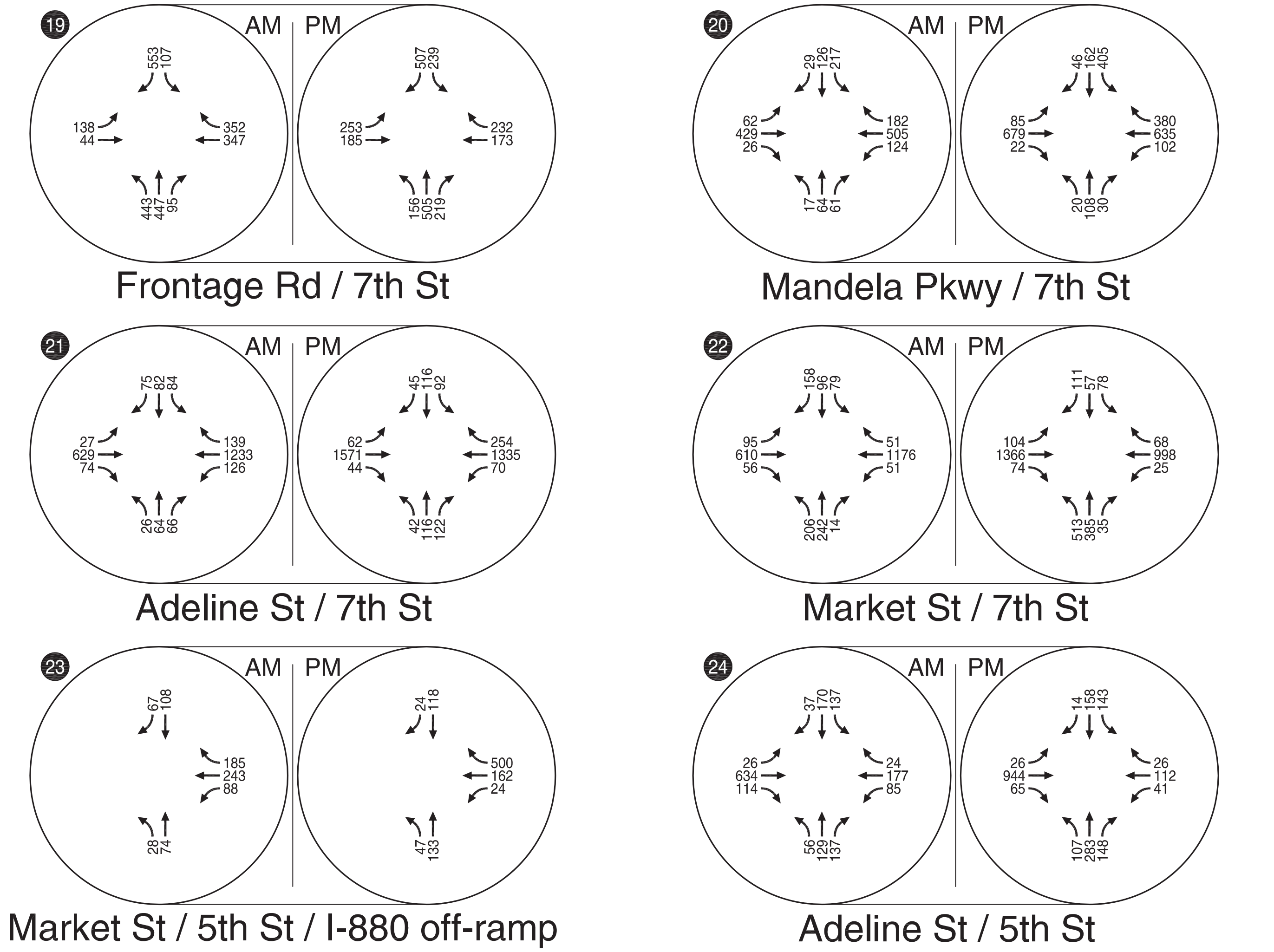
West Oakland Specific Plan
Reduced Project Alternative
(Page 1 of 3)



LEGEND

- ROUNDABOUT
- TRAFFIC SIGNAL

West Oakland Specific Plan
Reduced Project Alternative
(Page 2 of 3)



H:\projfile\17232 - West Oakland Specific Plan & EIR\Figures\Fig\17232_WestOakEIR_PHV_JS.dwg Aug 26, 2013 - 10:13am - rona Layout Tab: 2035 MIDR 3

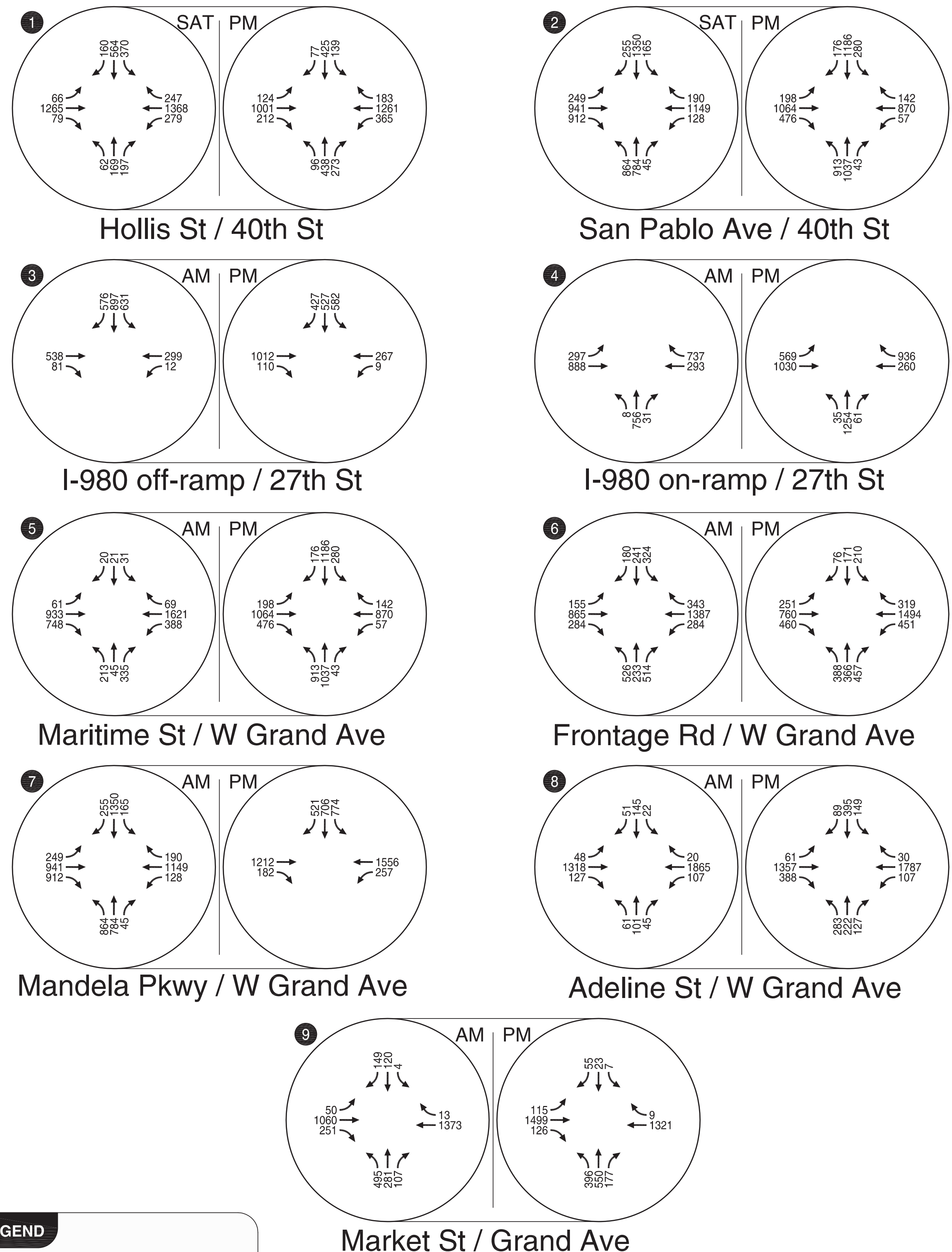
LEGEND

- ROUNDABOUT
- TRAFFIC SIGNAL

West Oakland Specific Plan
Reduced Project Alternative
(Page 3 of 3)

Kittelson & Associates, Inc.
TRANSPORTATION ENGINEERING / PLANNING

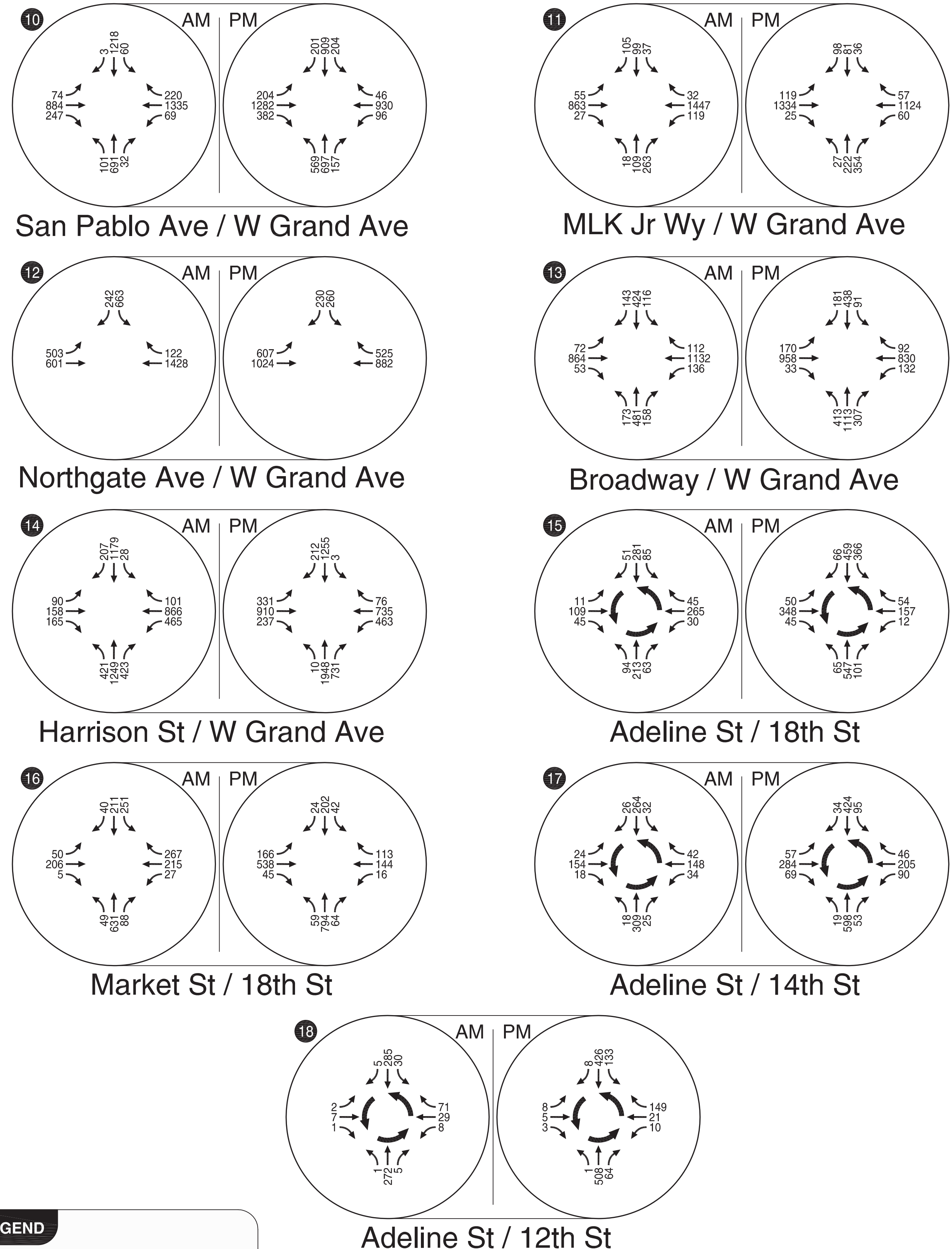
Year 2035 Cumulative +
Alternative 3 Commercial & Job
Emphasis Alternative



LEGEND

- ROUNDABOUT
- TRAFFIC SIGNAL

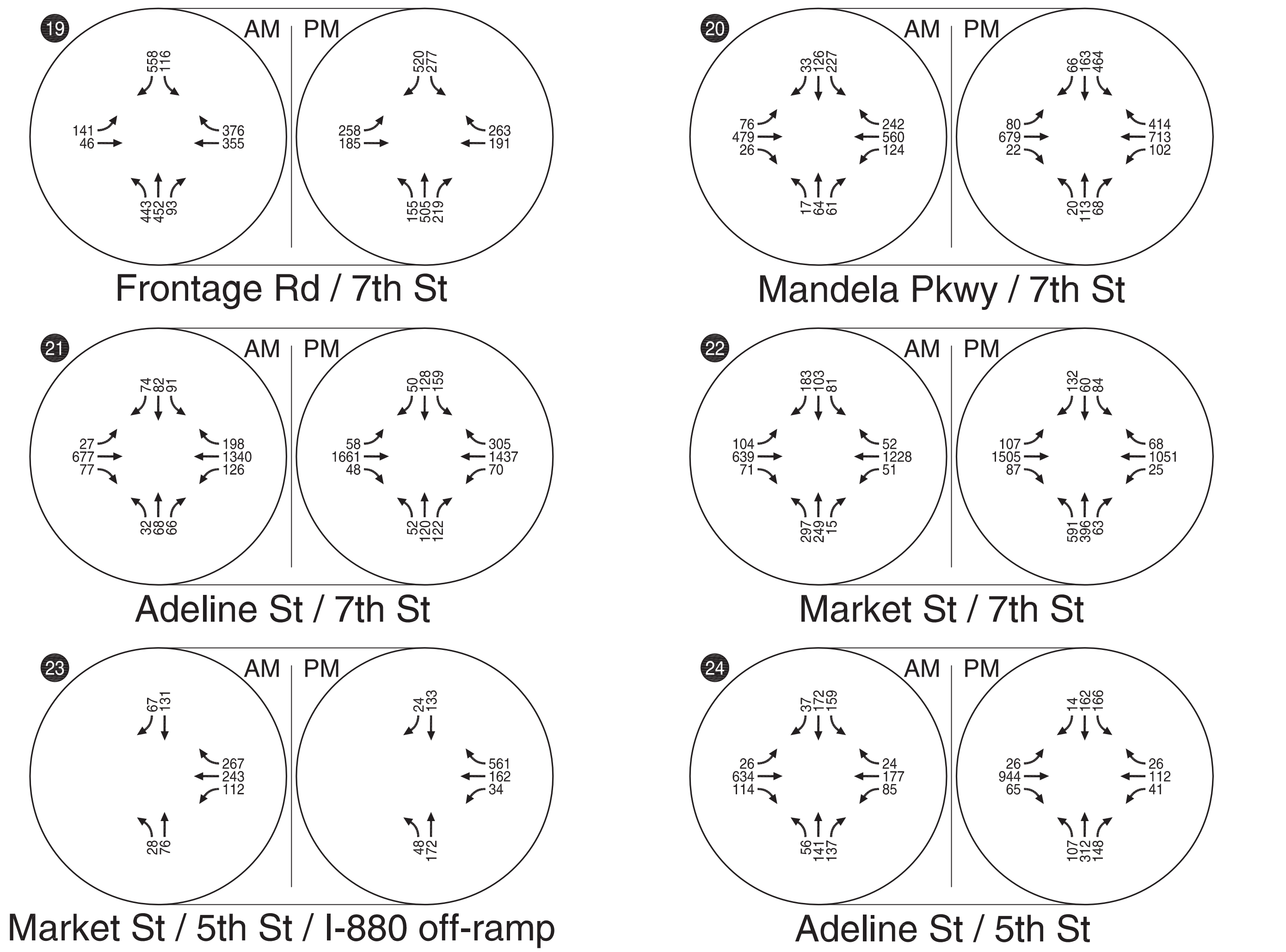
West Oakland Specific Plan
Employment/Commercial Focused Alternative
(Page 1 of 3)



LEGEND

- ROUNDABOUT
- TRAFFIC SIGNAL

West Oakland Specific Plan
Employment/Commercial Focused Alternative
(Page 2 of 3)



LEGEND

- ROUNDABOUT
- TRAFFIC SIGNAL

West Oakland Specific Plan
Employee/Commercial Focused Alternative
(Page 3 of 3)

H:\projfile\17232 - West Oakland Specific Plan & EIR\Figures\Fig\17232_WestOakEIR_PHV_JS.dwg Aug 26, 2013 - 10:13am - rona Layout Tab: 2035 COMM 3

Kittelson & Associates, Inc.
TRANSPORTATION ENGINEERING / PLANNING

Appendix D: Queuing Analysis Tables

Existing

INTERSECTION QUEUE LENGTH – EXISTING CONDITIONS

	Intersection	Length	Existing Conditions											
		in feet	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	Hollis Street & 40th Street	Storage	440			925			250					
		SAT Queue	30	66	55	170	164		29	29	13	31	36	
		PM Queue	15	81	20	62	170		125	129	48	42	33	
2	San Pablo Avenue & 40th Street	Storage	800			275		321	585			462		
		SAT Queue	55	78		110	189	51	120	69		126	90	
		PM Queue	111	115		139	184	51	69	104		74	55	
3	I-980 off-ramp & 27th Street	Storage												
		AM Queue		13		13	25			58			37	
		PM Queue		27		18	33			93			89	
4	I-980 on-ramp & 27th Street	Storage												
		AM Queue		29			67			40			51	
		PM Queue		53			76			80			95	
5	Maritime Street & West Grand Avenue	Storage						80	104		104			100
		AM Queue		43	13		107	6	65	111	30		124	25
		PM Queue		97	16		106	6	95	178	38		98	9
6	Frontage Road & West Grand Avenue	Storage			141	142		100	80			100		
		AM Queue		83	8	10	60	1	40	74		58	79	
		PM Queue		228	29	0	206	37	#284	106		69	89	
7	Mandela Parkway & West Grand Avenue	Storage	75		75			80			50			
		AM Queue	14	33	1	m4	11	m0		44	45		57	
		PM Queue	m38	127	m3	11	194	6		67	59		50	
8	Adeline Street & West Grand Avenue	Storage	205					100				375		
		AM Queue	116	87			171	11				206		42
		PM Queue	171	102			162	53				58		34
9	Market Street & West Grand Avenue	Storage	197						150		85	103		
		AM Queue	m23	69			115		76	105	27	47	102	
		PM Queue	36	75			123		160	110	27	29	101	
10	San Pablo Avenue & West Grand Avenue	Storage	440			925			250					
		AM Queue	30	66	55	170	164		29	29	13	31	36	
		PM Queue	15	81	20	62	170		125	129	48	42	33	
11	Martin Luther King Jr Way & West Grand Avenue	Storage	800			275		321	585			462		
		AM Queue	55	78		110	189	51	120	69		126	90	
		PM Queue	111	115		139	184	51	69	104		74	55	
12	Northgate Avenue & West Grand Avenue	Storage												
		AM Queue		13		13	25			58			37	
		PM Queue		27		18	33			93			89	
13	Broadway & West Grand Avenue	Storage												
		AM Queue		29			67			40			51	
		PM Queue		53			76			80			95	
14	Harrison Street & West Grand Avenue	Storage	275		85	225		100						75
		AM Queue	32	48	15	141	142	31		163	51		126	2
		PM Queue	59	193	42	122	87	5		248			107	
16	Market Street & 18th Street	Storage												
		AM Queue		11			27			19			35	
		PM Queue		25			23			33			50	
19	Frontage Road & 7th Street	Storage							120					
		AM Queue		40			48		18	40			48	
		PM Queue		48			46		15	47			46	
20	Mandela Parkway	Storage	125			128								

Intersection		Length in feet	Existing Conditions											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	& 7th Street	AM Queue	15	30		20	30			31			56	
		PM Queue	27	44		44	41			53			69	
21	Adeline Street & 7th Street	Storage												
		AM Queue		5			15			16			49	
		PM Queue		7			16			27			48	
22	Market Street & 7th Street	Storage										175		
		AM Queue	48	13			66		180	134		88		32
		PM Queue	93	25			48		90	112		85		29
23	Market Street & 5th Street & I-880 off-ramp	Storage	130			175								
		AM Queue	46	64		114	74			118		100	142	
		PM Queue	70	66		117	22			168		128	139	
24	Adeline Street & 5th Street	Storage	142			143			75					
		AM Queue	4	8		37	99	16	20	30			42	
		PM Queue	24	215		24	71	17	21	33			37	

Note:
# denotes 95th percentile volume exceeds capacity, queue may be longer
m denotes volume for 95th percentile queue is metered by upstream signal
~ denotes volumes exceeds capacity, queue is theoretically infinite

Source: Kittelson & Associates, January 2014

Existing + Preferred Project

INTERSECTION QUEUE LENGTH – EXISTING PLUS PROJECT CONDITIONS

	Intersection	Length	Existing plus Project Conditions											
		in feet	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	Hollis Street & 40th Street	Storage	141			110		95	175			115		
		SAT Queue	41	#233		#161	182	6	#124	85	23	#100	#222	
		PM Queue	#77	#290		#120	147	8	50	106	16	#140	176	
2	San Pablo Avenue & 40th Street	Storage	255			98			270			142		
		SAT Queue	#271	#407		65	#348		#295	279		168	#566	
		PM Queue	#442	#622		46	231		#240	382		#223	#483	
3	I-980 off-ramp & 27th Street	Storage										150		
		AM Queue		118			60					171	151	208
		PM Queue		233			4					104	90	44
4	I-980 on-ramp & 27th Street	Storage	150					265						
		AM Queue	159	164			64	31		54				
		PM Queue	#487	#295			73	#284		202				
5	Maritime Street & West Grand Avenue	Storage	440			925			250					
		AM Queue	34	174	52	205	201		35	35	16	36	42	
		PM Queue	17	125	19	77	261		148	153	55	48	37	
6	Frontage Road & West Grand Avenue	Storage	800			275		321	585			462		
		AM Queue	64	223		167	254	72	208	145		#342	#309	
		PM Queue	147	193		#254	326	90	171	215		189	160	
7	Mandela Parkway & West Grand Avenue	Storage												
		AM Queue	#313	45		#143	57			151			112	
		PM Queue	m#340	267		m27	64			206			354	
8	Adeline Street & West Grand Avenue	Storage	200			200			150			150		
		AM Queue	15	80		26	274		35	79		29	97	
		PM Queue	28	288		52	202		29	173		59	180	
9	Market Street & West Grand Avenue	Storage						80	104		104			100
		AM Queue		120			249	12	#322	109	24		122	96
		PM Queue		#651			241	9	#239	195	67		156	38
10	San Pablo Avenue & West Grand Avenue	Storage			141	142		100	80			100		
		AM Queue		114	14	16	162	20	45	90		62	85	
		PM Queue		#624	57	m16	113	2	#319	120		77	105	
11	Martin Luther King Jr Way & West Grand Avenue	Storage	75		75			80			50			
		AM Queue	43	125	9	m22	289	m7		44	46		57	
		PM Queue	m18	m142	m1	m22	310	m21		58	157		46	
12	Northgate Avenue & West Grand Avenue	Storage	205					100				375		
		AM Queue	187	131			#326	16				206		42
		PM Queue	#597	173			220	m84				58		35
13	Broadway & West Grand Avenue	Storage	197						150		85	103		
		AM Queue	m33	93			186		85	105	27	47	106	
		PM Queue	66	146			157		#207	110	38	29	104	
14	Harrison Street & West Grand Avenue	Storage	275		85	225		100						75
		AM Queue	33	51	15	141	213	37		171	51		126	5
		PM Queue	69	262	43	#135	98	5		253			107	
16	Market Street & 18th Street	Storage												
		AM Queue		13			35			53			34	
		PM Queue		60			29			61			37	
19	Frontage Road & 7th Street	Storage	175			175			120					
		AM Queue	23	112		25	#311		18	57			67	
		PM Queue	36	244		20	173		16	76			132	

Intersection		Length in feet	Existing plus Project Conditions											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
20	Mandela Parkway & 7th Street	Storage												
		AM Queue		21			29			55			29	
		PM Queue		39			44			50			38	
21	Adeline Street & 7th Street	Storage												
		AM Queue		1			15			32			24	
		PM Queue		2			12			27			30	
22	Market Street & 7th Street	Storage										175		
		AM Queue	53	14			86		#282	143		#233		31
		PM Queue	104	30			84		96	127		#287		31
23	Market Street & 5th Street & I-880 off-ramp	Storage	130			175								
		AM Queue	92	161		122	116			118		#123	158	
		PM Queue	110	218		84	170			181		168	185	
24	Adeline Street & 5th Street	Storage	142			143			75			100		
		AM Queue	7	38		43	157	26	21	66	0	44	78	
		PM Queue	33	391		#51	167	22	32	100	0	54	67	

Note:
# denotes 95th percentile volume exceeds capacity, queue may be longer
m denotes volume for 95th percentile queue is metered by upstream signal
~ denotes volumes exceeds capacity, queue is theoretically infinite

Source: Kittelson & Associates, January 2014

Existing + Preferred Project with Intersection Mitigation Measures

INTERSECTION QUEUE LENGTH – EXISTING PLUS PROJECT CONDITIONS – WITH INTERSECTION MITIGATION MEASURES

	Intersection	Length in feet	Existing plus Project Conditions - Mitigated											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	Hollis Street & 40th Street	Storage	141			110		95	175			175		
		AM Queue	41	#233		#161	182	6	#124	85	23	#100	#222	
		PM Queue	#77	#290		#120	147	8	50	106	16	#140	176	
2	San Pablo Avenue & 40th Street	Storage	255			98			270			142		
		AM Queue	#125	#465		65	332		#283	267		165	#516	
		PM Queue	149	#563		46	218		#240	412		#223	#567	
3	I-980 off-ramp & 27th Street	Storage										150		
		AM Queue		118			60					171	151	208
		PM Queue		233			4					104	90	44
4	I-980 on-ramp & 27th Street	Storage	150					265						
		AM Queue	159	164			64	31		54				
		PM Queue	#487	#295			73	#284		202				
5	Maritime Street & West Grand Avenue	Storage	440			925			250					
		AM Queue	34	174	52	205	201		35	35	16	36	42	
		PM Queue	17	125	19	77	261		148	153	55	48	37	
6	Frontage Road & West Grand Avenue	Storage	800			275		321	585			462		
		AM Queue	64	223		167	254	72	208	145		#342	#309	
		PM Queue	147	193		#254	326	90	171	215		189	160	
7	Mandela Parkway & West Grand Avenue	Storage												
		AM Queue	#313	45		#143	57			151			112	
		PM Queue	m#340	267		m27	64			206			354	
8	Adeline Street & West Grand Avenue	Storage	200			200			150			150		
		AM Queue	15	80		26	274		35	79		29	97	
		PM Queue	28	288		52	202		29	173		59	180	
9	Market Street & West Grand Avenue	Storage						80	104		104			100
		AM Queue		120			249	12	#322	109	24		122	96
		PM Queue		#651			241	9	#239	195	67		156	38
10	San Pablo Avenue & West Grand Avenue	Storage			141	142		100	80			100		
		AM Queue		114	14	16	162	20	45	90		62	85	
		PM Queue		#624	57	m16	113	2	#319	120		77	105	
11	Martin Luther King Jr Way & West Grand Avenue	Storage	75		75			80			50			
		AM Queue	43	125	9	m22	289	m7		44	46		57	
		PM Queue	m18	m142	m1	m22	310	m21		58	157		46	
12	Northgate Avenue & West Grand Avenue	Storage	205					100				375		
		AM Queue	187	131			#326	16				206		42
		PM Queue	#597	173			220	m84				58		35
13	Broadway & West Grand Avenue	Storage	197						150		85	103		
		AM Queue	m33	93			186		85	105	27	47	106	
		PM Queue	66	146			157		#207	110	38	29	104	
14	Harrison Street & West Grand Avenue	Storage	275		85	225		100						75
		AM Queue	33	51	15	141	213	37		171	51		126	5
		PM Queue	69	262	43	#135	98	5		253			107	
16	Market Street & 18th Street	Storage												
		AM Queue		13			35			53			34	
		PM Queue		60			29			61			37	
19	Frontage Road & 7th Street	Storage	175			175			120					
		AM Queue	23	112		25	#311		18	57			67	
		PM Queue	36	244		20	173		16	76			132	

Intersection		Length in feet	Existing plus Project Conditions - Mitigated											
			EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
20	Mandela Parkway & 7th Street	Storage												
		AM Queue		21			29			55			29	
		PM Queue		39			44			50			38	
21	Adeline Street & 7th Street	Storage												
		AM Queue		1			15			32			24	
		PM Queue		2			12			27			30	
22	Market Street & 7th Street	Storage										175		
		AM Queue	53	14			86		#282	143		#233		31
		PM Queue	104	30			84		96	127		#287		31
23	Market Street & 5th Street & I-880 off-ramp	Storage	130			175								
		AM Queue	92	161		122	116			118		#123	158	
		PM Queue	110	218		84	170			181		168	185	
24	Adeline Street & 5th Street	Storage	142			143			75			100		
		AM Queue	7	38		43	157	26	21	66	0	44	78	
		PM Queue	33	391		#51	167	22	32	100	0	54	67	

Note:
# denotes 95th percentile volume exceeds capacity, queue may be longer
m denotes volume for 95th percentile queue is metered by upstream signal
~ denotes volumes exceeds capacity, queue is theoretically infinite

Source: Kittelson & Associates, January 2014