EMERALD VIEWS RESIDENTIAL DEVELOPMENT
DRAFT ENVIRONMENTAL IMPACT REPORT

TECHNICAL APPENDICES:
VOLUME I

STATE CLEARINGHOUSE No. 2007112042

LSA

October 2011

EMERALD VIEWS RESIDENTIAL DEVELOPMENT DRAFT ENVIRONMENTAL IMPACT REPORT

TECHNICAL APPENDICES: VOLUME I

STATE CLEARINGHOUSE No. 2007112042

Submitted to:

City of Oakland
Community and Economic Development Agency
250 Frank H. Ogawa Plaza
Oakland, CA 94612

Prepared by:

LSA Associates, Inc.
2215 Fifth Street
Berkeley, CA 94710
510.540.7331

LSA

October 2011

EMERALD VIEWS RESIDENTIAL DEVELOPMENT
DRAFT ENVIRONMENTAL IMPACT REPORT

TECHNICAL APPENDICES

Volume I

APPENDIX A

NOTICE OF PREPARATION (NOP), AND COMMENT LETTERS

Appendix A-1:	NOP and Comment Letters
Appendix A-2:	Comments Received at Scoping Meetings
Appendix A-3:	Items Submitted for the Record

APPENDIX A-1

NOP AND COMMENT LETTERS

CITY OF OAKLAND

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

Community and Economic Development Agency
Economic Development Division

FAX (510) 238-2226
TDD (510) 839-6451

NOTICE OF PREPARATION (NOP) OF A DRAFT ENVIRONMENTAL IMPACT REPORT 19th STREET RESIDENTIAL CONDOMINIUMS PROJECT

The Oakland Community and Economic Development Agency, Planning and Zoning Division, is preparing a Draft Environmental Impact Report (EIR) for the project identified below, and is requesting comments on the scope and content of the EIR. The EIR will address the potential physical and environmental effects for each of the environmental topics outlined in the California Environmental Quality Act (CEQA). According to CEQA Section 15060(d), staff has determined that an EIR is clearly required and we will not prepare an Initial Study for the project.

The City of Oakland is the Lead Agency for the project and is the public agency with the greatest responsibility for either approving the project or 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. Responsible Agencies will need to use the EIR that is prepared when considering approvals related to the project. When the Draft EIR is published, it will be sent to all Responsible Agencies and to others who respond to this Notice of Preparation (NOP) or who otherwise indicate that they would like to receive a copy.

Please send any response you may have within 30 days from the date you receive this notice and before December 10, 2007. Response to this NOP and any additional questions or comments should be directed in writing to: Heather Klein, Planner III, City of Oakland, Community and Economic Development Agency, 250 Frank H. Ogawa Plaza, Suite 3315, Oakland, CA 94612; 510-238-3659 (phone); 510-238-6538 (fax); hklein@oaklandnet.com. Comments on the NOP must be received at the above mailing or email address **on or before December 10, 2007**. Please reference case number ER06-0009 in all correspondence. In addition, comments may be provided at the EIR Scoping Meeting to be held before the City Planning Commission. 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.

EIR PUBLIC SCOPING HEARING – The City Of Oakland Planning Commission will conduct a public scoping session on
Wednesday, November 28, 2007
6:00 p.m.
City Hall, 1 Frank H. Ogawa Plaza
Hearing Room 1 or Council Chambers

PROJECT TITLE: 19th Street Residential Condominiums Project

PROJECT LOCATION: The project site is located in Central Oakland, within the block that is bound by 19th Street, Harrison Street, 20th Street, Lakeside Drive and Jackson Street, as shown in Figures 1 and 2. The site is north of 19th Street and south of the 12-story residential structure (Lakeside Drive Apartments) and a 2-story garage structure at 244 Lakeside Drive. Snow Park is located west of the project site and the 8-story Regillus apartment building is located east of the site.

EXISTING CONDITIONS: The approximately 31,830 square-foot site (APN 8-634-3) currently contains a private, formal landscaped garden, several mature redwood trees and garden elements associated with the historic August Shilling Estate. The northern and central portions of the site contain a manicured lawn surrounded by a semi-circular walkway that forms the boundary between the lawn and formal garden areas to the east, south and west. The garden areas slope upwards away from the lawn. The garden areas include mature trees, shrubs and flowers as well foot paths and benches. There are two small green houses (totaling approximately 1,000 square feet) on the southwestern portion of the site and a paved entrance providing restricted access from 19th Street. A chain link fence surrounds the site and is intermittently covered with vines and bushes. This garden is a Designated Historic Property (DHP) and is rated A1+, of the "highest importance" by the Oakland Cultural Heritage Survey (OCHS). The garden an anchor and primary contributor to the 244 Lakeside Drive Building Group, an Area of Primary Importance (API).

The project site is not located on the current version of the Cortese List.

PROJECT SPONSOR: ian birchall + associates

PROJECT DESCRIPTION: The proposed 19th Street Residential Condominium project would include the construction of a 42-story residential tower with approximately 370 residential units (including a mix of one- and two-bedroom units). Project parking, approximately 357 spaces, would be provided in five levels of subsurface parking. The residential tower would have an overall contemporary appearance with a distinctive split pyramidal roof-form, with louvered sloped planes and twin spires, as shown in Figures 3a and 3b.

Common open space areas (20,322 square feet) would be provided to the north, south and west of the proposed building and would include an entry plaza with landscape plantings, a stone patio with elements relocated from the existing garden, a 40th floor viewing area, and a roof terrace. Private terraces and balconies with almost every unit would provide a total of 14,618 square-feet of private open space.

REQUESTED APPROVALS: Actions/approvals by the City that may be necessary for this project include without limitation: Minor variances; design review; major conditional use permit; major interim conditional use permit; minor conditional use permit, tentative parcel map; tree preservation/removal permit; demolition permit; grading permit; building permits; and, encroachment permits.

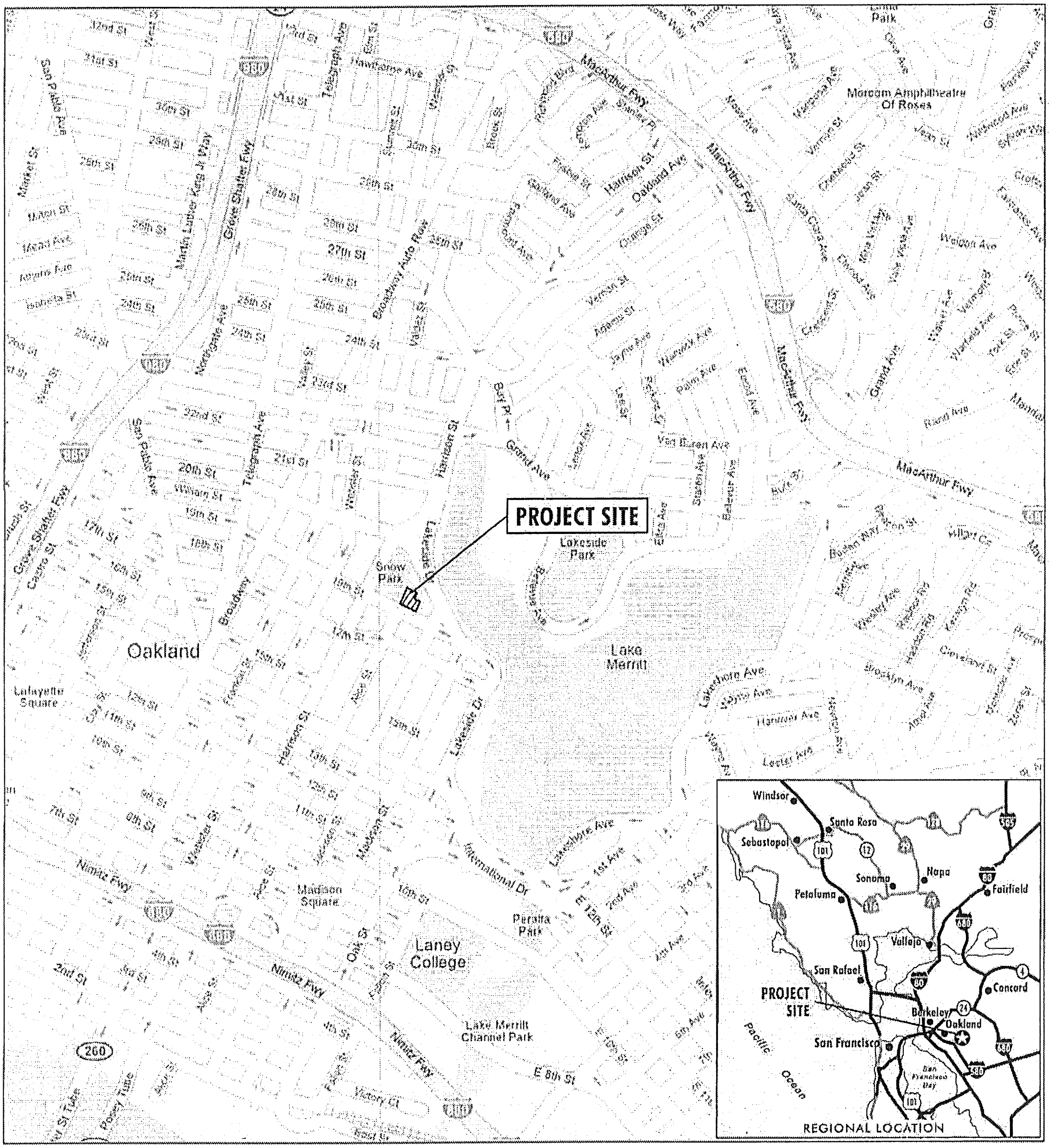
PROBABLE ENVIRONMENTAL EFFECTS: It is anticipated that the proposed project may have the following environmental effects: land use and planning impacts, traffic and circulation impacts, noise impacts, air quality impacts, hydrology impacts, geology and soils impacts, biological resource impacts, hazards impacts, utility and service system impacts, public services impacts, recreation impacts, aesthetic impacts, cultural resource impacts, and cumulative impacts. It is anticipated that the project will not result in significant impacts related to agricultural resources, mineral resource, and population and housing. However, to ensure a comprehensive analysis of all the project's potential environmental effects is provided, these environmental factors will be analyzed in the EIR.

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 of reducing or avoiding potential environmental effects.

November 9, 2007
File Number ER06-0009

Claudia Cappio
Development Director
Environmental Review Officer

Attachments: Figure 1: Project Location and Regional Vicinity Map; Figure 2: Project Site Map; Figures 3a and 3b: Elevations



LSA

FIGURE 1

N

0 500 1000

FEET

LEGEND

PROJECT AREA

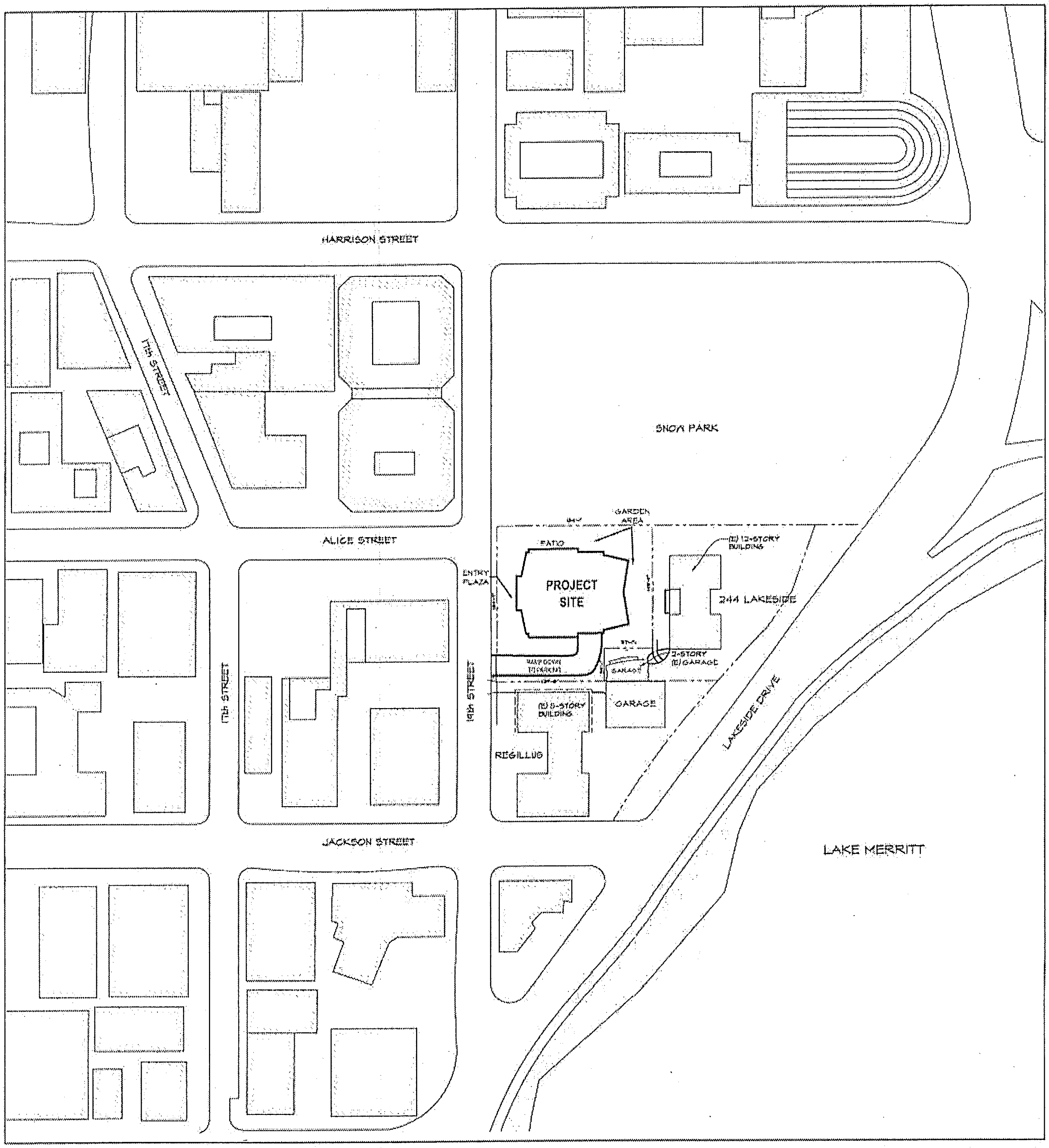
19th Street Residential Condominiums

Project Location and

Regional Vicinity Map

SOURCE: GOOGLE, LSA ASSOCIATES, INC., 2006.

I:\SDZ0601 19th street\figures\NOP\Fig_1.ai (10/2/06)



L S A

FIGURE 2

N

0 120 240

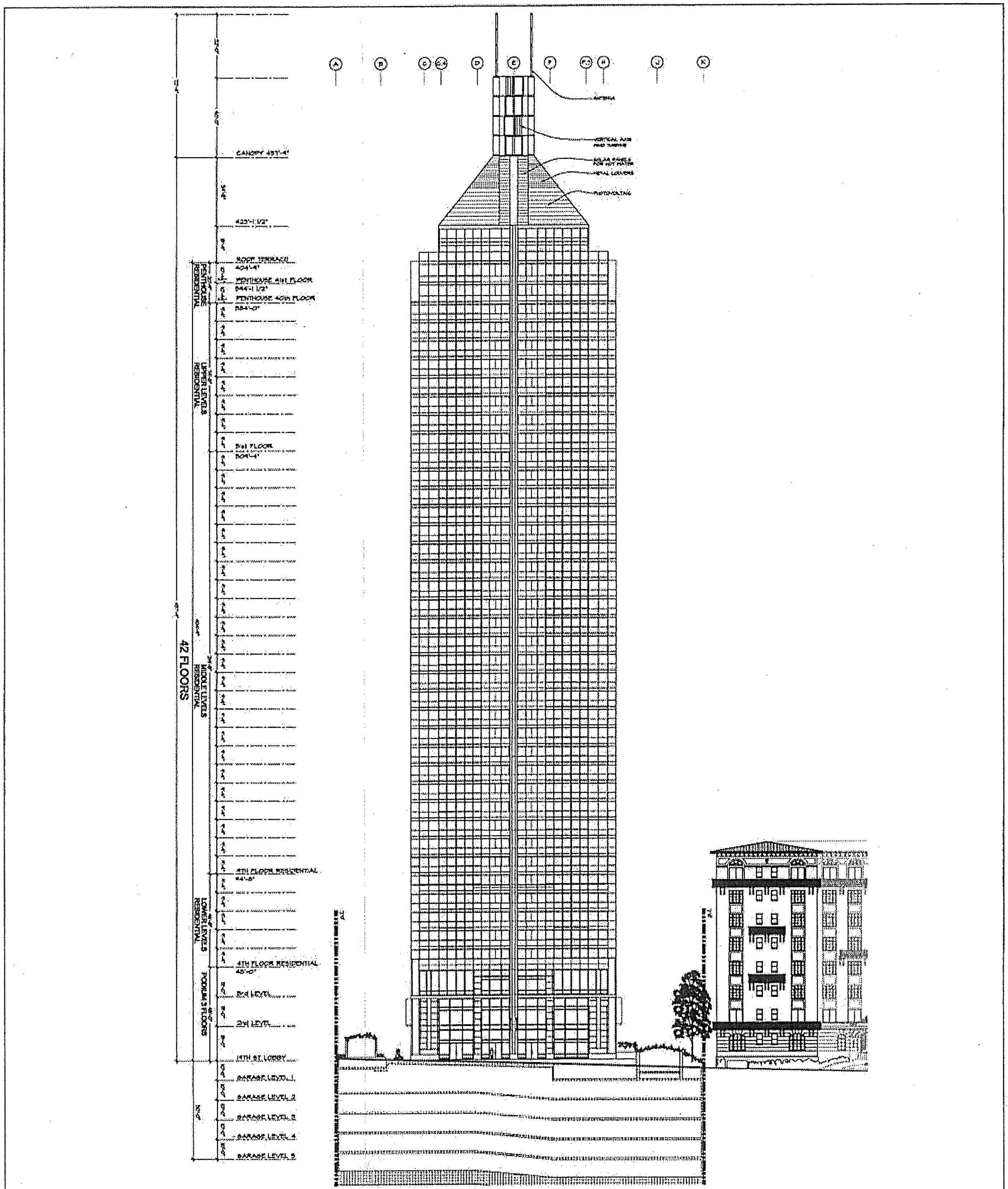
FEET

19th Street Residential Condominiums

Project Site Map

SOURCE: IAN BURCHALL & ASSOCIATES, INC., 2007.

I:\SDZ0601 19th street\figures\NOP\Fig_2.ai (10/1/07)



LSA

FIGURE 3a

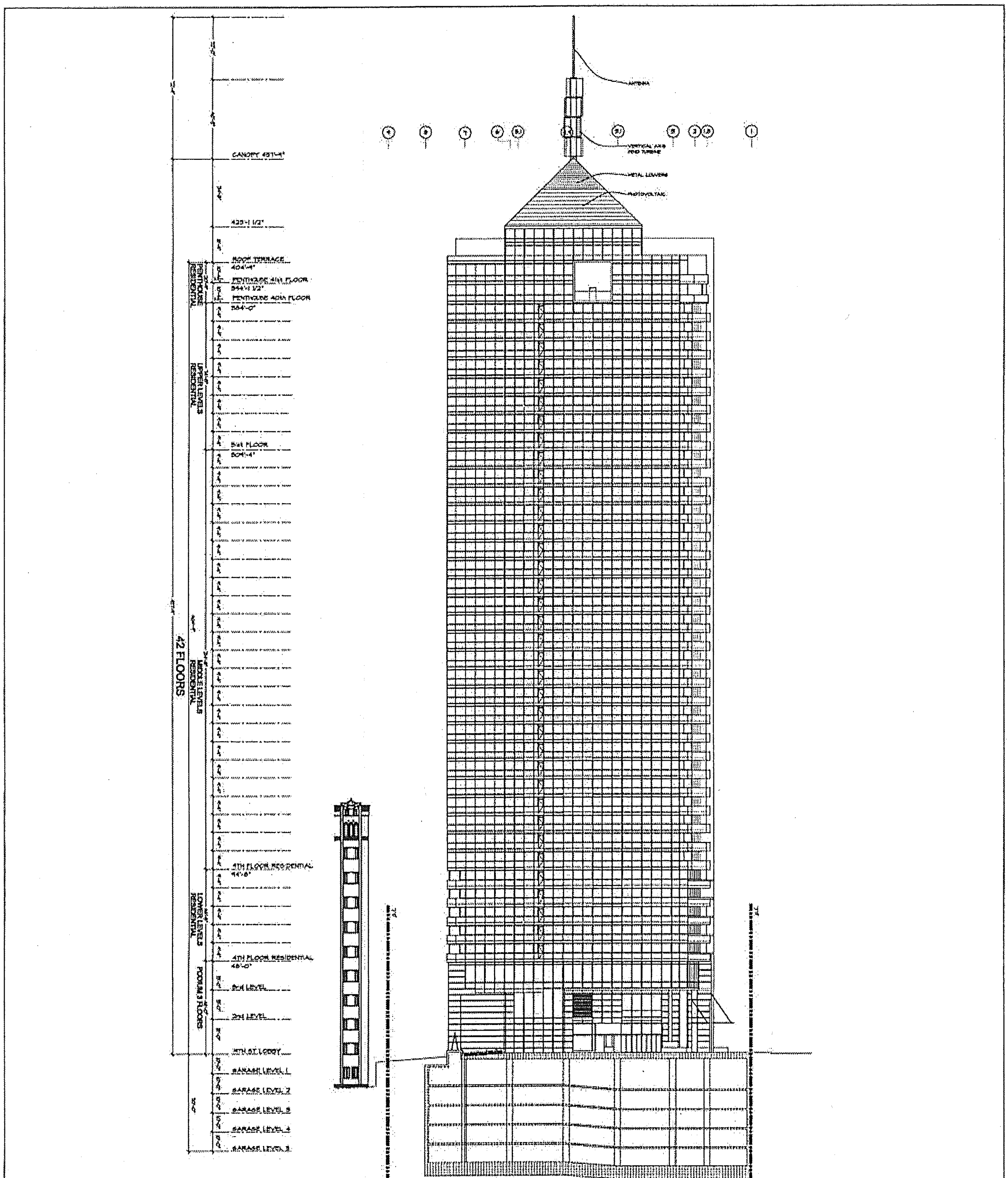
NOT TO SCALE

19th Street Residential Condominiums

Building Elevation - South (Front)

SOURCE: JB+A ARCHITECTURE, OCTOBER 29, 2007

I:\SDZ0601 19th street\figures\NOP\Fig_3a.ai (11/5/07)



LSA

FIGURE 3b

NOT TO SCALE

19th Street Residential Condominiums
Building Elevation - West
(From Snow Park)

SOURCE: IB+A ARCHITECTURE, OCTOBER 29, 2007

I:\SDZ0601 19th street\figures\NOP\Fig_3b.ai (11/5/07)

STATE OF CALIFORNIA
GOVERNOR'S OFFICE of PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

ARNOLD SCHWARZENEGGER
GOVERNOR

CYNTHIA BRYANT
DIRECTOR

Notice of Preparation

November 9, 2007

To: Reviewing Agencies

Re: 19th Street Residential Condominium Project
SCH# 2007112042

Attached for your review and comment is the Notice of Preparation (NOP) for the 19th Street Residential Condominium Project 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:

Heather Klein
City of Oakland
Community and Economic Development
250 Frank H. Ogawa Plaza, Suite 2215
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
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH# **2007112042**
Project Title 19th Street Residential Condominium Project
Lead Agency Oakland, City of

Type **NOP** Notice of Preparation

Description The proposed 19th Street Residential Condominium Project would include the construction of a 2-story residential tower with approximately 370 residential units (including a mix of one- and two-bedroom units). Project parking, approximately 357 spaces, would be provided in five levels of subsurface parking. The residential tower would have an overall contemporary appearance with a distinctive split pyramidal roof-form, with louvered sloped planes and twin spires. Common open space areas (20,322 square feet) would include an entry plaza with landscape plantings, a stone patio with elements relocated from the existing garden, a 40th floor viewing area and roof terrace. Private terraces and balconies would provide a total of 14,618 square feet of private open space. Project development would require the removall of the existing garden on the site. This garden is a Designated Historic Property (DHP) and is rated A1+, of the "highest importance" by the Oakland Cultural Heritage Survey (OCHS). The garden is an anchor and primary contributor to the 244 Lakeside Drive Building Group, an Area of Primary Importance (API).

Lead Agency Contact

Name Heather Klein
Agency City of Oakland
Phone 510-238-3659 **Fax**
email
Address Community and Economic Development
250 Frank H. Ogawa Plaza, Suite 2215
City Oakland **State** CA **Zip** 94612

Project Location

County Alameda
City Oakland
Region
Cross Streets 19th Street between Jackson and Alice Streets
Parcel No. 8-634-3
Township **Range** **Section** **Base**

Proximity to:

Highways 24, 61, 123
Airports none
Railways Union Pacific/Amtrak
Waterways Lake Merritt, Oakland Inner Harbor
Schools multiple
Land Use Garden (associated with former Shilling Estate)/R-90 Downtown Apartment Resdiential Zone/Central Business District

---

Project Issues Aesthetic/Visual; Air Quality; Archaeologic-Historic; Biological Resources; Drainage/Absorption; Flood Plain/Flooding; Geologic/Seismic; Public Services; Recreation/Parks; Noise; Sewer Capacity; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Water Quality; Water Supply; Landuse

---

Reviewing Agencies Resources Agency; Office of Historic Preservation; Department of Water Resources; Department of Fish and Game, Region 3; Native American Heritage Commission; Public Utilities Commission; Caltrans, District 4; Integrated Waste Management Board; Regional Water Quality Control Board, Region 2

Note: Blanks in data fields result from insufficient information provided by lead agency.

Document Details Report
State Clearinghouse Data Base

Date Received 11/09/2007 ***Start of Review*** 11/09/2007 ***End of Review*** 12/10/2007

Note: Blanks in data fields result from insufficient information provided by lead agency.

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5559
TTY 711

Flex your power!
Be energy efficient!

November 14, 2007

Ms. Heather Klein
Community and Economic Development Agency
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

ALAVAR002
SCH#2007112042

Dear Ms. Klein:

19th Street Residential Condominium Project – Notice of Preparation

Thank you for including the California Department of Transportation (Department) in the environmental review for the proposed project. The comments presented below are based on the Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the 19th Street Residential Condominium Project. As lead agency, the City of Oakland is responsible for all project mitigation, including improvements to state highways. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures. Any required roadway improvements should be completed prior to the issuance of a certificate of occupancy. While an encroachment permit is only required when the project involves work in the State Right of Way (ROW), the Department will not issue an encroachment permit until our concerns are adequately addressed. Therefore, we strongly recommend that the lead agency ensure resolution of the Department's concerns prior to submittal of an encroachment permit application. Further comments will be provided during the encroachment permit process; see the end of this letter for more information regarding encroachment permits.

Traffic Impact Analysis
Our primary concern with the project is the potentially significant impact it may have to traffic volume and congestion on the State Highway System. We recommend a traffic impact analysis be prepared. The traffic impact analysis should include, but not be limited to the following:

1. Information on the project's traffic impacts in terms of trip generation, distribution, and assignment. The assumptions and methodologies used in compiling this information should be addressed.

2. Average Daily Traffic (ADT) and AM and PM peak hour volumes on all significantly affected streets and highways, including crossroads and controlling intersections.

3. Schematic illustration of the traffic conditions for: 1) existing, 2) existing plus project, and 3) cumulative for the 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. Mitigation measures should consider highway and non-highway improvements and services. Special attention should be given to the development of alternate solutions to circulation problems that do not rely on increased highway construction.

6. All mitigation measures proposed should be fully discussed, including financing, scheduling, implementation responsibilities, and lead agency monitoring.

We encourage the City of Oakland to coordinate preparation of the study with our office, and we would appreciate the opportunity to review the scope of work. Please see the Caltrans' *"Guide for the Preparation of Traffic Impact Studies"* at the following website for more information:
http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

We look forward to reviewing the Traffic Impact Analysis, including Technical Appendices, and DEIR for this project. Please send two copies to the address at the top of this letterhead, marked ATTN: Lisa Carboni, Mail Stop #10D.

Encroachment Permit
Any work or traffic control within the State ROW requires an encroachment permit that is issued by the Department. 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: Michael Condie, Mail Stop #5E.

Should you have any questions regarding this letter, please call Lisa Carboni at (510) 622-5491.

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: Scott Morgan (State Clearinghouse)

ALAMEDA COUNTY
CONGESTION MANAGEMENT AGENCY

1333 BROADWAY, SUITE 220 • OAKLAND, CA 94612 • PHONE: (510) 836-2560 • FAX: (510) 836-2185
E-MAIL: mail@accma.ca.gov • WEB SITE: accma.ca.gov

December 7, 2007

Ms. Heather Klein
Planner III
City of Oakland
Community and Economic Development Agency
City of Oakland Planning Division
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612-2032
hklein@oaklandnet.com

SUBJECT: Comments on the Notice of Preparation for a Draft Environmental Impact Report (DEIR) for the 19th Street Residential Condominiums Project

Dear Ms. Klein:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) for a Draft Environmental Impact Report (DEIR) for the 19th Street Residential Condominiums Project in the City of Oakland.

The 31,380 square foot site is located in Central Oakland, bound by 19th Street, Harrison Street, 20th Street, Lakeside Drive and Jackson Street. The proposed project would include the construction of a 42-story residential tower with approximately 370 residential units, with a mix of one- and two- bedroom units. Approximately 357 parking spaces would be provided in five levels of subsurface parking. Common open space areas—20,322 square feet—would be provided to the north, south and west of the building. The project would require several approvals, including tentative parcel map, conditional use permits, and minor variances.

The ACCMA respectfully submits the following comments:

- The City of Oakland adopted Resolution No. 69475 on November 19, 1992 establishing guidelines for reviewing the impacts of local land use decisions consistent with the Alameda County Congestion Management Program (CMP). Based on our review of the NOP, the proposed project appears to generate at least 100 p.m. peak hour trips over existing conditions. If this is the case, the CMP Land Use Analysis Program requires the City to conduct a traffic analysis of the project using the Countywide Transportation Demand Model for projection years 2015 and 2030 conditions. Please note the following paragraph as it discusses the responsibility for modeling.
    - The CMA Board amended the CMP on March 26th, 1998 so that local jurisdictions are responsible for conducting the model runs themselves or through a consultant. The City of Oakland and the ACCMA have signed a Countywide Model Agreement on March 22, 1999. The Countywide model, which is based on Cube software and developed

incorporating ABAG's socio-economic data for Projections 2005, is available to the local jurisdictions for this purpose. Before the model can be used for this project, a letter must be submitted to the ACCMA requesting use of the model and describing the project. A copy of a sample letter agreement is available upon request.

- Potential impacts of the project on the Metropolitan Transportation System (MTS) need to be addressed. (See 2005 CMP Figures E-2 and E-3 and Figure 2). The DEIR should address all potential impacts of the project on the MTS roadway and transit systems. These include I-880, I-580, I-80, I-980, SR 24, West Grand Avenue, San Pablo Avenue, Telegraph Avenue, 14th Street, Martin Luther King Jr. Way, Broadway as well as BART and AC Transit. Potential impacts of the project must be addressed for 2010 and 2025 conditions.
  - Please note that the ACCMA does not have a policy for determining a threshold of significance for Level of Service for the Land Use Analysis Program of the CMP. Professional judgment should be applied to determine the significance of project impacts (Please see chapter 6 of 2005 CMP for more information).
  - In addition, the adopted 2005 CMP requires using 1985 Highway Capacity Manual for freeway capacity standards.

- The adequacy of any project mitigation measures should be discussed. On February 25, 1993, the CMA Board adopted three criteria for evaluating the adequacy of DEIR project mitigation measures:
  - Project mitigation measures must be adequate to sustain CMP service standards for roadways and transit;
  - Project mitigation measures must be fully funded to be considered adequate;
  - Project mitigation measures that rely on state or federal funds directed by or influenced by the CMA must be consistent with the project funding priorities established in the Capital Improvement Program (CIP) section of the CMP or the Regional Transportation Plan (RTP).

  The DEIR should include a discussion on the adequacy of proposed mitigation measures relative to these criteria. In particular, the DEIR should detail when proposed roadway or transit route improvements are expected to be completed, how they will be funded, and what would be the effect on LOS if only the funded portions of these projects were assumed to be built prior to project completion.

- Potential impacts of the project on CMP transit levels of service must be analyzed. (See 2005 CMP, Chapter 4). Transit service standards are 15-30 minute headways for bus service and 3.75-15 minute headways for BART during peak hours. The DEIR should address the issue of transit funding as a mitigation measure in the context of the CMA's policies as discussed above.

- The DEIR should also consider demand-related strategies that are designed to reduce the need for new roadway facilities over the long term and to make the most efficient use of existing facilities (see 2005 CMP, Chapter 5). The DEIR should consider the use of TDM measures, in conjunction with roadway and transit improvements, as a means of attaining acceptable levels of service. Whenever possible, mechanisms that encourage ridesharing, flextime, transit, bicycling, telecommuting and other means of reducing peak hour traffic trips should be considered. The Site Design Guidelines Checklist may be useful during the review of the development proposal. A copy of the checklist is enclosed.

- The EIR should consider opportunities to promote countywide bicycle routes identified in the Alameda Countywide Bicycle Plan, which was approved by the ACCMA Board on October 26, 2006. The approved Countywide Bike Plan is available at http://www.accma.ca.gov/pages/HomeBicyclePlan.aspx

- For projects adjacent to state roadway facilities, the analysis should address noise impacts of the project. If the analysis finds an impact, then mitigation measures (i.e., soundwalls) should be incorporated as part of the conditions of approval of the proposed project. It should not be assumed that federal or state funding is available.

Thank you for the opportunity to comment on this Notice of Preparation. Please do not hesitate to contact me at 510/836-2560 ext. 24 if you require additional information.

Sincerely,

Diane Stark

Diane Stark
Senior Transportation Planner

file: CMP - Environmental Review Opinions - Responses - 2007

EAST BAY
MUNICIPAL UTILITY DISTRICT

December 6, 2007

Heather Klein, Planner III
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland CA 94612-2032

Re: Notice of Preparation of a Draft Environmental Impact Report – 19th Street Residential Condominiums Project, Oakland

Dear Ms. Klein:

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Notice of Preparation of a Draft Environmental Impact Report (EIR) for the 19th Street Residential Condominiums Project in Oakland. EBMUD has the following comments.

WATER SERVICE

EBMUD's Central Pressure Zone, with a service elevation between 0 and 100 feet, will serve the proposed development. When the development plans are finalized, the project sponsor should contact EBMUD's New Business Office and request a water service estimate to determine costs and conditions for providing water service to the proposed development. Engineering and installation of water services requires substantial lead-time, which should be provided for in the project sponsor's development schedule.

WASTEWATER PLANNING

EBMUD's Main Wastewater Treatment Plant is anticipated to have adequate dry weather capacity to treat the proposed wastewater flow from this project, provided this wastewater meets the standards of EBMUD's Environmental Services Division. However, the City of Oakland's Infiltration/Inflow (I/I) Correction Program set a maximum allowable peak wastewater flow from each subbasin within the City and EBMUD agreed to design and construct wet weather conveyance and treatment facilities to accommodate these flows. EBMUD prohibits discharge of wastewater flows above the allocated peak flow for a subbasin because conveyance and treatment capacity for wet weather flows may be adversely impacted by flows above this agreed limit. The developer for this project needs to confirm with the City of Oakland Public Works Department that there is available capacity within the subbasin flow allocation and that it has not been allocated to other developments. The projected peak wet weather wastewater flows from this project need to be determined to assess the available capacity within the subbasin and confirmation included in the environmental documentation. Suggested language to include in the environmental documentation is as follows: "The City of Oakland Public Works Department has confirmed that there is available wastewater capacity within Subbasin *(insert subbasin number here)* that is reserved for this project."

In general, the project should address the replacement or rehabilitation of the existing sanitary sewer collection system to prevent an increase in I/I. Please include a provision to control or reduce the amount of I/I in the environmental documentation for this project. The main concern is the increase in total wet weather flows, which could have an adverse impact if the flows are greater than the maximum allowable flows from this subbasin.

WATER CONSERVATION

The proposed project presents an opportunity to incorporate water conservation measures. EBMUD would request that the City of Oakland include in its conditions of approval a requirement that the project sponsor comply with the Landscape Water Conservation Section of the Municipal Code of the City of Oakland Article 10 of Chapter 7. EBMUD staff would appreciate the opportunity to meet with the project sponsor to discuss water conservation programs. A key objective of this discussion will be to explore timely opportunities to expand water conservation via early consideration of EBMUD's conservation programs and best management practices applicable to the project.

If you have any questions concerning this response, please contact David J. Rehnstrom, Senior Civil Engineer, Water Service Planning at (510) 287-1365.

Sincerely,

John L. Ruit for WRK

William R. Kirkpatrick
Manager of Water Distribution Planning

WRK:DFC:sb
sb07_342.doc

cc: Ian Birchall & Associates
300 Beale Street, Suite A
San Francisco, CA 94105

Klein, Heather

From: Nadel, Nancy
Sent: Friday, November 09, 2007 3:13 PM
To: Klein, Heather
Subject: Re: 222 19th Street Notice of Preparation

Dear Heather,

Please include in the scope of the EIR analysis of view corridors; wind tunnels; traffic flow; shadows on the lake; loss of open space in an area where the public wanted more parkland as shown in voter support for DD; construction noise, construction worker parking and construction air pollution affects on the surrounding senior population and the lake ecology.

Thanks,

Nancy Nadel

-----Original Message-----
From: Klein, Heather
Sent: Fri Nov 09 12:29:19 2007
Subject: 222 19th Street Notice of Preparation

Dear Interested Parties,

This e-mail is to inform you that staff has published the Notice of Preparation that the City of Oakland is preparing an Environmental Impact Report (EIR) for a project at 222 19th Street (Schilling Gardens). The notice is to request comments on the scope and content of the EIR. The comment period is 30 days. Staff will hold a scoping session before the Planning Commission on November 28, 2007 and before the Landmarks Preservation Advisory Board on December 10, 2007. The comment period will close at the end of the public comment period for the Landmarks Board meeting.

Please submit comments to me per the instructions in the Notice of Preparation.

Heather Klein

Planner III

City of Oakland

250 Frank H. Ogawa Plaza, Suite 3315

Oakland, CA 94612

ph: (510) 238-3659

fax:(510) 238-6538

email: hklein@oaklandnet.com <mailto:hklein@oaklandnet.com>

ATTACHMENT B

OAKLAND HERITAGE ALLIANCE

December 10, 2007

Heather Klein
Oakland Planning Department, CEDA
250 Frank Ogawa Plaza
Oakland, CA 94612

RE: EIR to be prepared for the building proposed for the site of the historic Schilling Garden

Dear Ms. Klein

Oakland Heritage Alliance, Oakland's 26-year old preservation organization, requests that the below items be included in drafting an EIR for the project proposed at the site of the Schilling Garden on 19th St. at Alice St. We believe that the garden is an important cultural, historic, and natural resource, which should be preserved rather than bulldozed into oblivion.

CULTURAL RESOURCES SECTION

Research into history of site should include several likely periods of significance of the garden: the original Schilling estate period, the 1920s conversion as the Regillus and 244 Lakeside were built, and its mid-to-late-20th-century period when it was intensively used by the Bechtel family and others as a social venue as well as a graceful amenity for 244 Lakeside, and as it became a visual backdrop and spatial extension for Snow Park, built on the site of the former Snow Museum grounds.

Research into the plantings and outdoor constructions of the garden should include its value as a group of elements in a longstanding relationship. It should also delve into the Bechtel family's use and maintenance of the garden plantings and landscaping, as well as its earlier existence in the Schilling period.

Assess the proposal for whether its proposed re-creation of the historic arbor would follow the Secretary of Interior Standards for the Treatment of Historic Properties.

According to *The Secretary of the Interior's Standards for the Treatment of Historic Properties:* "**New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work will be differentiated from the old <u>and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment</u>.**" (Underlined for emphasis)

446 17th Street, Suite 301, Oakland, California 94612 • (510) 763-9218 • info@oaklandheritage.org
Web Site: www.oaklandheritage.org

Please study the project in light of the Secretary's Standards and its impact on surrounding historic and cultural resources:

- Lake Merritt, a National Historic Landmark
- Regillus, a city landmark
- 244 Lakeside, a cultural resource and A-rated building

Is the proposed project appropriate in scale? Would it destroy historic materials, scale, features, and spatial relationship to an adjoining a landmark property and the historic Lake Area Apartment district? Will excavation for a 42-story building endanger the Regillus and 244 Lakeside, and their historic outbuildings?

Please carefully study the potential impact on views from public spaces including Snow Park, Lakeside Park, and Lake Merritt, but not limited to these. This building would be visible from many places.

For example, please include views from Foothill Boulevard as it approaches the lake.

Please assess the economic impacts upon the historic Lake Area Apartment District, including affordable and mid-range rentals in the area that could result from this project.

Please study the historic use of this area for a cemetery. Please also assess the likelihood of Native American remnants at this site.

HYDROLOGY

Please include complete research into the hydrology of site. While it may be theoretically possible to engineer a five-story-below-ground garage at this location, the position at the edge of the historic marshland that became Lake Merritt requires us to ask whether this project might have unforeseen impacts upon the watershed, drainage, water table, and flows that effect Lake Merritt. It also requires that the question be asked, if the basement at the Essex is damp, as some unit owners say, what about this one, projected to reach far deeper?

Will the weight and displacement of a 42-story building have unpredictable effects on the fragile hydrology surrounding Lake Merritt?

Will excavation for a 42-story building cause unwanted changes to the fragile hydrology of Lake Merritt?

SEISMIC

Please address the seismic stability of the site.
Please address the life safety requirements of the site.
Please address whether the building might pose a threat to the adjoining historic resources.

WILDLIFE

Please evaluate the impacts upon resident birds and migratory birds of the Pacific Flyway of locating such a tall lit building next to Lake Merritt, a National Historic Landmark, and the nation's first wildlife refuge.

Please evaluate the potential impacts upon wildlife of including a wind turbine.

Please evaluate the effects of reducing the amount of plant habitat for wild birds, especially contiguous with Snow Park, and so near Lake Merritt.

ALTERNATIVES

Alternatives should consider
-Reuse of garden as public, daytime-only park
-Relocation of project to other site
-Potential funding sources, including private funding, to operate the garden as a park at this site. Please consult with community groups to this end. We will be happy to provide some contacts to the EIR preparer.
-Potential educational value of the garden as a horticultural training site, for example, for community college students from the Peralta Colleges.
-Potential value of the garden as a usable resource for local senior citizens.
-Use of historic building code to address ADA concerns about garden access.

IMPACTS ON PUBLIC PARK
Please study the impacts on Snow Park:
-Shadows
-Views from public places.
-The proposed use of the public park as a forecourt for a huge private building.
-Please review the proposal to redesign Snow Park as a network of paths rather than as an open grassy area. One might contend that this redesign proposal may be an assault on Snow Park, and a veiled attempt to incorporate it into the new project rather than to minimize impacts.
-Is such a redesign a takeover rather than an improvement?

Study present use of relatively unstructured park areas to provide recreation for local schools, private and charter, which do not have playgrounds.

Study present informal use of park as putting green, exercise place, lunch spot for local workers, and as adjunct gathering place for city events at Lake Merritt, and downtown. Example: the recent 2007 holiday parade used the park as an integral part of the parade plans. Many organizations use the park as staging area or venue for events such as fundraising round-the-lake walks or runs, or sizable outdoor gatherings.

ECONOMIC IMPACTS

Impacts upon the historic Lake Area Apartment District, since the 1920s a resource for moderately- to low-priced workforce housing, of constructing more luxury units.

Note that despite the talk of needing to put in a café, there are two cafes close by: one across 19th St. and one on 17th St (one block away). The contribution of this building to retail frontage would be minimal, and so it should be. Retail uses should be concentrated rather than new ones spread all around, too thinly. For best viability, retail should be concentrated one block west, where 19th St. becomes less residential and more retail-oriented.

PLANNING ISSUES

Oakland's Preservation Element was passed unanimously by the City Council and forms a component of the General Plan as worthy of consideration as housing, recreation, or land use elements.

Oakland is underserved by parks. With many new units going up, including rental and condo units, there is an increasing need for open space in the downtown area. Lakeside Park on this side of the lake is extremely narrow, and not easily usable for large gatherings, for school students, or for events requiring gathering space.

Please evaluate the project in the light of the improvements planned under Measure DD for Lakeside Drive, Lakeside Park, and Snow Park.

TRAFFIC

Others will comment, but obviously the traffic impacts should be studied and may be severe. The character of the Nineteenth Street pedestrian experience would be radically changed by the construction of a high parking podium with driveway traffic for hundreds of cars. While the claim is made that the project will be transit-friendly, it does lie beyond the high-transit-use distance of two blocks from BART or the Broadway bus lines, and the experience of other dense buildings in the neighborhood is that the tenants do indeed have and use automobiles.

SUSTAINABILITY

Although the proponents say they would build a "green" building, we question whether sticking a wind generator on top would bring significant improvement to the building's energy use. Does the requirement to use elevator systems, garage entries, and HVAC systems, when added to the inherent energy demand caused by building separate units (will each require its own laundry appliances, for example?), outweigh these modest though showy attempts at sustainability? True sustainability lies in reusing extant buildings wherever possible, and in building upon paved places rather than upon absorbent natural surfaces such as Schilling Garden.

Include the passive but significant contribution of open space on the site to water absorption (instead of run-off), habitat, and viability of the trees at Snow Park.

Study ground-level wind effects, and wind effects upon the lake, which is heavily used by rowers.

Please consult the Lake Merritt Rowing Club and wildlife organizations as you do this study.

We appreciate your consideration of these points.

Sincerely,

Valerie Garry

Valerie Garry
President
Oakland Heritage Alliance

James Maas, PhD 1850 Allce St. Oakland, CA 94612

September 5. 2007

Nancy Nadel, Councilor
City Council , District 3
One Frank H. Ogawa Plaza
Oakland, CA 94612

Dear Councilor Nadel,

I am the lead person for Lake Park residents on the issue of the proposed Emerald View 42-story building, extremely close to our building, We were scarcely heard by the developers at the July meeting, and I now want to tell you about misinformation, given to us as follows:

We were told that there would be ample parking for the 370 residents of Emerald View. We were told that the parking spaces would be underground, and that valets would drive the cars in and out. We were told that it was feasible. But, they did not tell us how long it might be for cars to get in and out of the spaces. We are convinced that there will be long lines of cars of up to 370 on 19th Street in mornings and evenings. And that doesn't include Emerald View's employees' or visitors' cars on an already over-crowded intersection. We foresee major traffic congestion here, for cars, trucks *and* pedestrian . We were told that Emerald View people could walk to buses on Boadway only two blocks away. In fact it is four blocks away.

We were told that no trees would be taken down in Snow Park. We are convinced that at least one of the magnificent eucalyptus trees would require it to be cut down. (Let alone the five huge redwood trees in the Emerald property)

Lake Park residents are convinced that more congestion on an uphill, narrow street at an intersection on Alice Street is *not* the place where the Emerald View building should be. A copy of signatures is attached.

We request a meeting of a short, small delegation of Lake Park wih you, at your convenience. Thank you.

James Maas
Phone 452-2929:

cc:Mayor Dellums

James Maas, PhD 1850 Alice St. #520 Oakland,CA 94612

November 13, 2007

Oakland City Planning Commisioners
250 Frank H.Ogawa Plaza
Oakland, CA 94612

To: Planning Commissioners Re:19th Street Residential Condominium

On behalf of the Senior citizens, who live in Lake Park Residence, opposite to the proposed 19th St. Condominium, I would like to be heard about a problem that has not, so far, been mentioned by the developers. (Copies from 68 petitioners, were sent from Lake Park citizens to Mayor Dellums and to Councillwoman Nancy Nadel, and are attached)

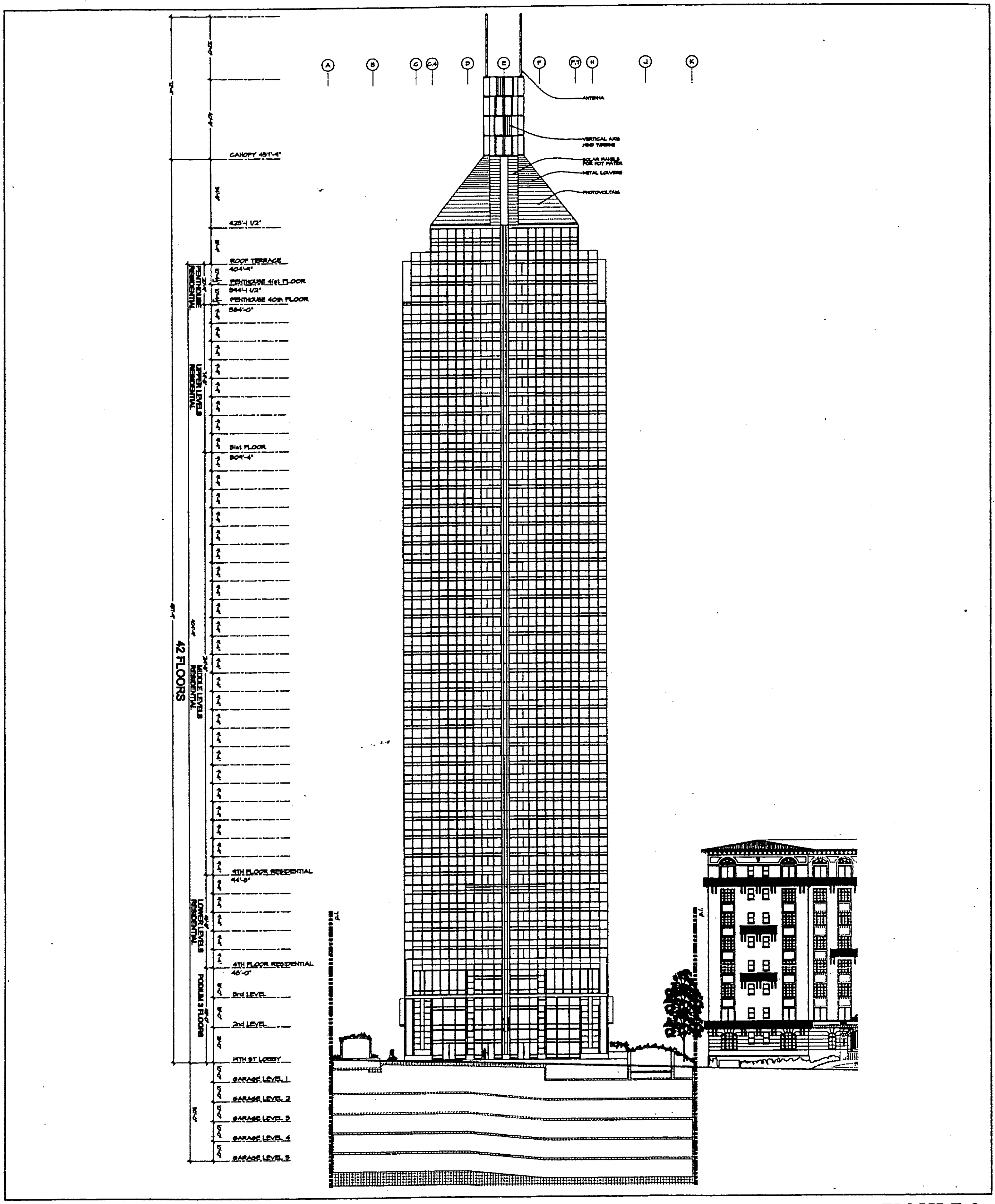
According to the developers at a community meeting last summer, the building would have 370 condominium apartments. As shown in figure 3a of the EIR, owners' automobiles woukd be garaged below grade in five tiers, with cars being moved either in or out by valets. Assuming that only half of the condominiums were occupied, 185 automobiles plus trucks would be moved very slowly on 19th street

Since 19th Sreet is a one-way street, owners cars would have to exit on to 19th or Alice Street. The streets away from the condominium driveway have only 17 parking spaces on Alice Street and 25 on 19th Street. All of these spaces are filled with office workers, many of whom have blue disabled cards. The congestion .would narrow to two lanes on 19th Street, to Jackson Sreet below. The owners of the cars will not likely give up their spaces or disabled blue cards. Traffic congestion will be a major problem, twice a day, five days a week. Visitors, valets, and other staff of the condominium will be hard pressed to find parking.

The intersection of Alice and 19th streets is a potential danger to Seniors crossing to Snow Park..

Cordially,

James Maas



LSA

FIGURE 3a

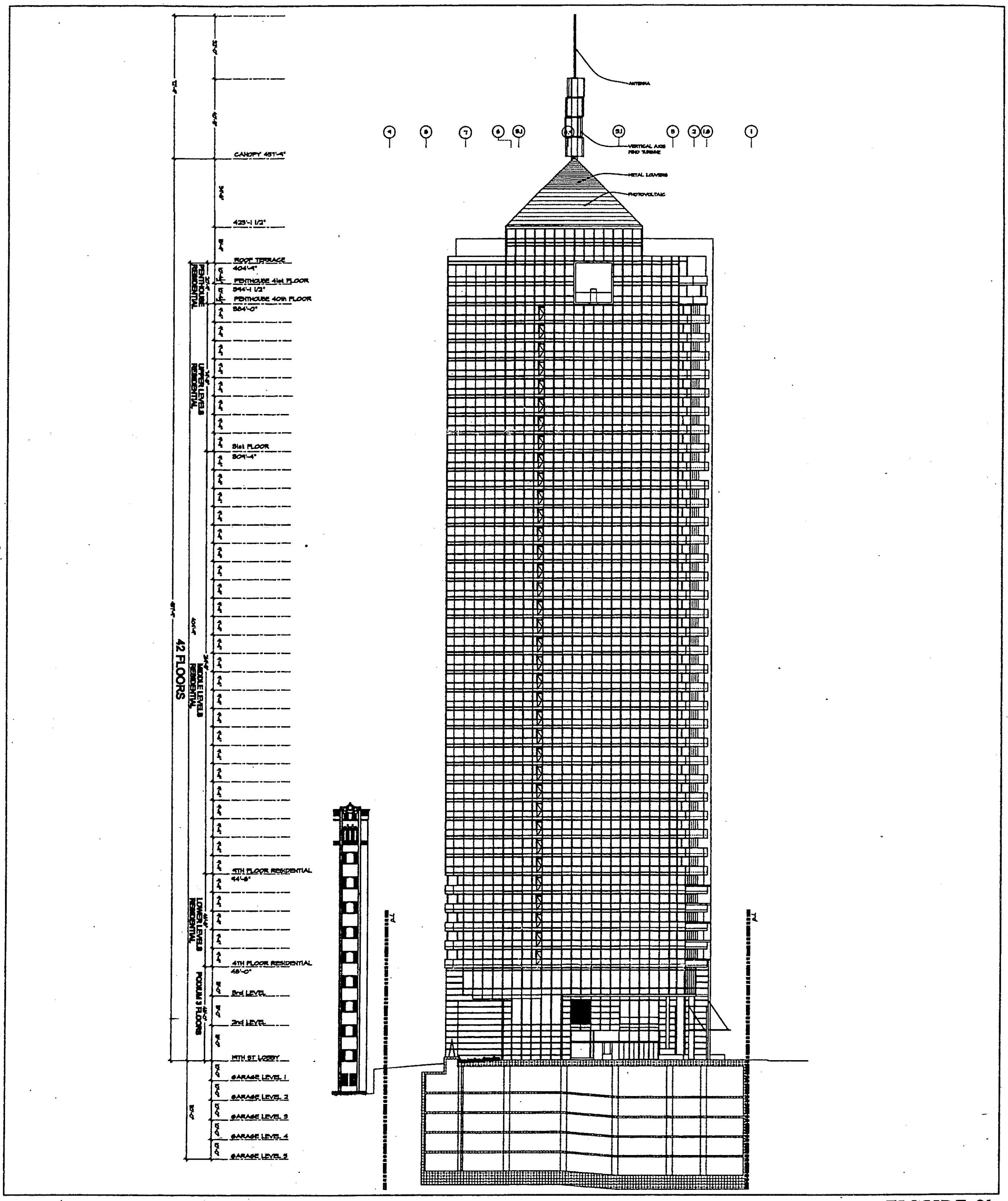
NOT TO SCALE

19th Street Residential Condominiums

Building Elevation - South (Front)

SOURCE: IB+A ARCHITECTURE, OCTOBER 29, 2007

I:\SDZ0601 19th street\figures\NOP\Fig_3a.ai (11/5/07)



LSA

FIGURE 3b

NOT TO SCALE

19th Street Residential Condominiums

Building Elevation - West
(From Snow Park)

SOURCE: IB+A ARCHITECTURE, OCTOBER 29, 2007

I:\SDZ0601 19th street\figures\NOP\Fig_3b.ai (11/5/07)

Klein, Heather

From: jaamee@comcast.net
Sent: Wednesday, November 14, 2007 3:28 PM
To: Klein, Heather
Subject: Hi rise on 19th street

I seem to have an incorrect address as taken from your earlier communication by mail. I am the president of Lake {ark Retirement residence. We are deeply concerned about the presumed high rise condominium structure to be built across from on 19th Street. The biggest concerns we have are traffic congestion and emergency vehicles being unable to get to our health unit in a timely fashion. Also, for our concern for patients in our health wing on the second floor of our business the ongoing noise from building equipment. Parking is already at premium first come first served.
The construction would put our many employees, as well as guests in an untenable situation of searching for a parking place.

Sincerely, Joyce Squires, Executive Committee President

1850 Alice St.
Oakland, CA 94612
Nov. 23, 2007

Heather Klein, Planner III
City of Oakland CEDA
250 Frank Ogawa Plaza, Ste. 3315
Oakland, CA 94612

RE: ER060009, 19th St. Residential Condominium Project

We are residents of the Residential Care Facility for the Elderly located directly accross the street from the proposed project.

Our environment would be severely harmed by the huge increase of auto pollution and noise pollution from the sheer number of people to be expected in this small space. For most of 24/7, we remain in and around our building. This is our home, and in the twilight of our lives, our health and well-being are already fragile and should not be exposed to further aggravation.

The signatures below represent the people who oppose the proposed 42-story residential tower because it will not only mar the charm of Lake Merritt but also will have a strongly negative environmental impact on our lives.

Mary Lee	Cecelia Stone
[illegible]	Suzanne Hikida
Pauline C. Thiebaud	Doris V. Gaskin
Margaret Cook	Emily A. Stover
Charlotte Peters	[illegible]

(over)

Shirley Wee

W Fong

Chester Fong

Jacklyn Melchior

Unais L. Pittman

Maceri J. Fisch

Muriel Huff

Jin-chen King

Jay Tepperman

Helen Tepperman

Anita Munk

Eleanora De West

Janet Chan Lee

Lucille J. Wong

Ching-yi Dougherty

Minerva Wong

Susan Y. Tom

Irene Ow

Jane Pan

Roger Bales

Erika Kunkel

Wulf B. Kunkel

Judy Reaves

Elizabeth Fyfe

Beatrice Wong

George Balint

Frances Ann Hamblin

Ruth Brugh

Jane Loo Lee

Betty Brown

Elizabeth Jong

Alice Greenwood

Amy Chan

Alison Grant

Robert W. Carr

Grace E. Chen

1850 Alice St.
Oakland, CA 94612
Nov. 23, 2007

Heather Klein, Planner III
City of Oakland CEDA
250 Frank Ogawa Plaza, Ste. 3315
Oakland, CA 94612

RE: ER060009, 19th St. Residential Condominium Project

We are residents of the Residential Care Facility for the Elderly located directly accross the street from the proposed project.

Our environment would be severely harmed by the huge increase of auto pollution and noise pollution from the sheer number of people to be expected in this small space. For most of 24/7, we remain in and around our building. This is our home, and in the twilight of our lives, our health and well-being are already fragile and should not be exposed to further aggravation.

The signatures below represent the people who oppose the proposed 42-story residential tower because it will not only mar the charm of Lake Merritt but also will have a strongly negative environmental impact on our lives.

Mercata V. Ratto
Cal Omer
Fran Peterson
Ann Teranishi
M. Sato

Gertrude Young #712
Virginia Robles #702
Lois Jackson
Mary L. Lopez
Lillie L. Mosely

1850 Alice St.
Oakland, CA 94612
Nov.. 23, 2007

Heather Klein, Planner III
City of Oakland CEDA
250 Frank Ogawa Plaza, Ste. 3315
Oakland, CA 94612

RE: ER060009, 19th St. Residential Condominium Project

We are residents of the Residential Care Facility for the Elderly located directly accross the street from the proposed project.

Our environment would be severely harmed by the huge increase of auto pollution and noise pollution from the sheer number of people to be expected in this small space. For most of 24/7, we remain in and around our building. This is our home, and in the twilight of our lives, our health and well-being are already fragile and should not be exposed to further aggravation.

The signatures below represent the people who oppose the proposed 42-story residential tower because it will not only mar the charm of Lake Merritt but also will have a strongly negative environmental impact on our lives.

Patricia C. Adams	Joyce Brown
Inga F. Shaw	A. Edwards
Hazel J. Hall	Terry Brock
Emma Okuki	Mary Manson
[illegible]	Leone Baker

SEP 6 2007

SIGNATURES AGAINST EMERALD VIEW BUILDING

Lake Park Residents

Robert M. Carr - APT 505	Alice Greenwood Apt 1215
Mabel A. Wong APT 903	[illegible] Apt 1210
Alice Casey Apt 810	Muriel Hing Apt 720
Aurela Vargas APT 523	Florence D. Fernand #920
Fernando Vargas Apt 523	Susan Tom Apt #916
Frances Ann Hamblin Apt. 902	Irene Ow #612
Roger L. Bales Apt 310	Lucille Wong #512
Marie V. Holmes Apt. 1200	Janet Chan Lee #1012
Kimi Narita Apt 312	Ruth Bosworth 320
Mary Lynn Cox Apt 507	Susanne Hikila Apt. 1201
Jui-chen King Apt. 1005	Raymond W. Lee Apt 807
Minerva Wong Apt 1221	Ann Teranishi Apt. 705
Jane Pon Apt. 900	Anita Munk Apt. 1213/11
Grace E. Chen Apt. 921	Vivienne Bluhm apt 1001
Chiz Yr. Dougherty " 923	Leontine J. C. Kelly Apt. 1008
[illegible] #711	Jack L. Court, MD apt 1100-1102
Betty Bowen #910	Carl C. Wilson Apt. 313
Blanche Leong #814	[illegible] Apt 714-16
Jane Loo Lee #1010	John R. Akinner Apt 912/914
Elizabeth Jong #1025	Harvey O. Cherry Apt 713
Ruth Baugh #1200	R Capes 801
Helen K. Dole 816	[illegible] 602/604
Sara Mansfield 809	Cecilia Stone 408
Kay S. Field 1207	Juliet Oliva 610
Dorothy Wrightson 1021	Beatrice Lee 707
James Wrightson 1021	

SEP 6 2007

Signatures
Against Emerald View Building

Mildred L. Kalam #719
Pauline C. Thiebaud #1218
Maggie Look # 617
Ella Jane Skinner #812
Jo Massotty # 501
Erika Kemke # 602
Miriam Scheffé # 510
Elizabeth [illegible] # 1120
Judy B Reaves #1016
Lorraine Weese #516
[illegible] # 1220
Caleb B. Case #729
Kathryn Riddell #913
Penny D. Foster # 908
Joyce Squires # 915
[illegible] # 1123
M.J. Wyman # 1112
Charlotte Harlan #1118

Klein, Heather

From: Doug Boxer [dboxer@gmail.com]
Sent: Monday, December 03, 2007 3:04 PM
To: Klein, Heather
Subject: Fwd: Schilling Gardens EIR

Heather:

For your file. This came to me last week.

db

---------- Forwarded message ----------
From: **Andy Asp** <westernsaga@yahoo.com>
Date: Nov 29, 2007 11:25 AM
Subject: Schilling Gardens EIR
To: dboxer@gmail.com

Dear Commissioner Boxer,

I attended last night's meeting about the proposed development of Schilling Gardens, but chose not to speak due to the crowded schedule. However, when preparing your EIR, please reconsider the historical importance of Schilling Gardens. One point that the developer's flunkies kept repeating is that because only a portion of the Gardens remain, it is no longer of historical significance – this is a spurious argument, i.e. if only a few of the giant redwoods remain, why bother preserving them?

Please take a moment to visit this website with postcard images from the Garden's heyday... they must have considered it important at that time.
http://www.alamedainfo.com/schilling_home_park.htm

I am not against development, and I support dense infill housing – I just think they chose a bad site. There are plenty of others - the Cathedral chose an empty parking lot, for instance. Also, in today's cooling climate, I'm afraid the project will never be finished. There's a saran-wrapped condo at 14 th & Jackson that's been empty and idle for a year and a half, and work has ceased at a site near the State building. Please consider Oakland's historical legacy as you prepare your report.
Thanks,
Andy Asp
Alice Street
Oakland

Klein, Heather

From: Mike Bowman [mikebow@hughes.net]
Sent: Sunday, December 09, 2007 11:47 AM
To: Klein, Heather
Cc: Maceo May
Subject: 19th St. Residential Condominium Project

December 8, 2007

To: Heather Klein, Planner III
City of Oakland

Re: 19th Street Residential Condominium Project
EROG-0009 CMDVOO-142

From: Michael C. Bowman
200 Lakeside Dr. #402
Oakland, CA 94612

Dear Ms. Klein,

This letter is written in response to issues pertaining to the proposed destruction of the famous Schilling Gardens, located at the site of this proposed development.

At the November 28, 2007 scoping hearing, I hand delivered to each Commissioner the following:

- References to the 1859 Witcher map showing this site to be a part of a cemetery, probably Chinese.
- A photocopy of page 274 from the book, Historical Gardens 1889, which may be found in the historical section of the Oakland Library. This page contains this statement, "as a condition of sale", the Hanging Gardens must remain intact.
  This is a reversionary statement meaning that if that condition is not met, the property shall revert to Schilling or his heirs. The deed needs to be examined. "Intact" does not mean parts can be moved or rearranged.

The zoning is not completely clear. Is all of the gold coast residential covered under the same zoning? What effect does Measure DD have to these properties? The Lake Merritt Master Plan? And if the building is constructed as designed what is the effect on the wind turbine and twin tower possibilities?

In the builders proposal a wind turbine is referred to in the "tower". Think of it, a wind turbine on the edge of a bird sanctuary. Insane.

Finally, think of this – Twin Towers. The ownership of the 19^{th} St. project and 244 Lakeside is practically the same. The contractor himself said there would be no disruption to the neighborhood during constructions of 222 19^{th} because access of the workers and materials would go through 244 Lakeside. Why would the owners of 244 allow that?

At present 244 is occupied in large part by family and associates of the owners 222 19^{th}. The "old" tenants of the building are being encouraged to leave. When they are gone, reasons, for tearing down 244 Lakeside will be found, i.e. can't make into condos, infrastructure is to deteriorated to repair, etc. The building will disappear and, "surprise", an application for another tower will appear for the most valuable residential lot in all of Oakland.

Sincerely,

Mike

CITY OF OAKLAND
BID MANAGER RESOURCE GUIDE SURVEY 2009

Name of BID: ____Laurel District Association______________________

	Name of Service Provider	Contact Information	Contract Terms
Ambassador Services	Peralta Services	Name: Harold Dees Phone #: 535-5027 Email Address: hdees@unitycouncil.org	Amt: $2800 per Frequency: Month Brief Description of Services: Weed Trimming, Trash Removal, Graffiti Removal, Sidewalk Cleaning, Steam Cleaning twice a year, Plant Watering
Graffiti Removal	same	Name: Phone #: Email Address:	Amt: per Frequency: Brief Description of Services:
Gardeners	Paul Ferguson	Name: Paul Ferguson Phone #: (415) 235- 0235 Email Address: ubik444@yahoo.com	Amt: $3000 approx per Frequency: Year Brief Description of Services: Pruning and shaping, removal, adding new plants and check watering
Marketing	Done by the BID Manager, Tommy Wong	Name: Phone #: Email Address:	Amt: per Frequency: Brief Description of Services:
Sidewalk Improvements		Name: Phone #: Email Address:	Amt: per Frequency: Brief Description of Services:
Sidewalk Sweeping	Peralta Services (see above)	Name: Phone #: Email Address:	Amt: per Frequency: Brief Description of Services:
Tree Trimming		Name: Phone #: Email Address:	Amt: per Frequency: Brief Description of Services:
Security	Enterprise Security	Name: Miriam Vega Phone #: (408) 427-1550 Email Address: mtvega@enterpriseprotective.com	Amt: $1500 per Frequency: Month Brief Description of Services: Security 3 days a week
Others:		Name: Phone #: Email Address:	Amt: per Frequency: Brief Description of Services:
Others:		Name: Phone #: Email Address:	Amt: per Frequency: Brief Description of Services:

Please return this survey to Mei Chan at mchan@oaklandnet.com

#2 11-28-07

n accused as accessory

n Bulwa,
n Zamora
Fulbright
TAFF WRITERS

ion into the slay-
resident Pamela
tling turn Thurs-
ce arrested the
6-year-old neigh-
the killing and
uspicion of being
urder.
n Fielding, 53, of

Lafayette was arrested on the same day her son, Scott Edgar Dyleski, was arraigned on a single count of murder in adult court in Martinez. Fielding was booked into Contra Costa County Jail in Martinez, where she was held in lieu of $500,000 bail.

It was not immediately clear what role Fielding is alleged to have played in connection with the slaying, in which Vitale — the wife of prominent East Bay attorney

▶ **MOTHER:** *Page A16*

The case so far

The slaying: Pamela Vitale, wife of prominent defense attorney and TV commentator Daniel Horowitz, was found stabbed and beaten to death Oct. 15.

The suspect: Scott Edgar Dyleski, a 16-year-old neighbor, was arraigned on a single count of murder Thursday.

The suspected accessory: Dyleski's mother, Esther Marion Fielding, 53, of Lafayette was arrested Thursday.

By Marc Sandalow
WASHINGTON BUREAU CHIEF

WASHINGTON — Harriet Miers' 25-day odyssey as a Supreme Court nominee exposed a serious rift between President Bush and his conservative base, posing a surprising challenge as he tries to emerge from his presidency's darkest days.

In choosing Miers, a nominee with no judicial track record but a long history of personal loyalty, Bush essentially told conservatives: "Trust me."

They didn't.

At a time when Bush's popularity has sunk to its lowest level, he must find a way to mollify his conservative, and traditionally most reliable, supporters at the same time he reaches out to moderates as he pur-

▶ **ANALYSIS:** *Page A17*

an hour to
. Sunday

2
3
Associated Press

Volume 285
ancisco Chronicle

Ex-planning chief took gift while being lobbied

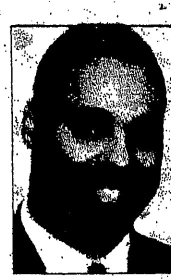
S.F.'s Olympic Club made him member as it sought permit

By Erin McCormick
CHRONICLE STAFF WRITER

Former Planning Director Gerald Green accepted an "honorary membership" worth $12,000 to the San Francisco Olympic Club while being lobbied to help the private club obtain permits for a major addition to its downtown athletic facility.

Green, who still holds a highly paid city job, belatedly acknowledged the gift in March on the advice of his attorney, inserting an amendment to his year 2000 financial disclosure statement.

At the time Green received the free membership, the Olympic Club's lobbyist, politically connected land-use attorney Robert McCarthy, was lobbying Green for the club's 10-story expansion on Sutter Street and on a host of other city development issues, including a permit dispute concerning the Sutro Tower telecommunication structure.



Gerald Green acknowledged the 2000 membership this year on a financial disclosure amendment.

The Sutro Tower deal prompted an inquiry by the FBI that grew into an investigation into possible corruption in the city's planning and building development offices, according to people close to the investigation, who say the probe continues today.

Green, who holds a $146,000-a-year position with the city's Public Utilities Commission, said in an interview that he tried to comply with ethics rules by disclosing the gift as soon as he realized it should be reported.

McCarthy did not respond to requests for comment.

Green, who was appointed planning director by former May-

▶ **GREEN:** *Page A6*

S.F. CHRONICLE OCT 28 2005

Former S.F. planning director took gift while being lobbied

▶ GREEN
From Page A1

or Willie Brown, said in his financial statement amendment that the Olympic Club membership covered initiation, dues and golfing fees over an 11-month period beginning Jan. 15, 2000. He said it had a cash value of $12,000.

The state's Political Reform Act prohibits public officials from accepting gifts valued at more than $360. The penalty for violating that law is a fine of up to $5,000.

In his disclosure, Green wrote that he had not known honorary memberships were considered "gifts" that needed to be reported under state law.

"I have recently been advised by my attorneys that honorary or complimentary membership in a private club becomes a reportable gift when a public official first uses the facilities of the club," Green wrote in his amendment.

"I apologize to the Ethics Commission and the public for not understanding the disclosure requirements when I originally filed my Form 700 for the year 2000," he wrote.

The Olympic Club, with two oceanside golf courses and a downtown athletic club, is one of the city's oldest private clubs. In 2000, initiation fees ranged from $7,000 for use of the athletic club with limited use of the golf courses to $25,000 for full golf privileges, according to Sam Singer, spokesman for the club.

The waiting list for golf memberships at the club, which has hosted four U.S. Open golf tournaments, is typically 10 to 15 years.

The club's admission policies have at times attracted controversy. The Olympic Club did not admit women until 1992, and when the U.S. Open was played there in 1987, the club had no African American members.

In 1987, City Attorney Louise Renne sued the club, charging that it discriminated against women and minorities. She filed the suit after discovering that the club leased land from the city for several holes of its golf courses. Two years later, the city filed another suit, saying that women and minorities were not being given equal access to club amenities.

The suits were settled after the club agreed to admit women and minorities. The city sold the club the land it had been leasing.

In his disclosure, Green, who is black, said he was one of several minorities — both inside and outside of city government — to receive honorary Olympic Club memberships. It said that, after his initial 11 months as an honorary member, he was made a full member and paid a $9,100 initiation fee.

Singer said the club discontinued its practice of giving free memberships to public officials in 2003 because the board determined that "there could be issues" with the practice. He declined to elaborate on those issues.

At the time Green accepted the free membership, the Olympic Club was paying attorney McCarthy, a Democratic fundraiser and supporter of Mayor Brown, to lobby Green for permission to rebuild a Sutter Street parking garage as an addition to the club's downtown fitness center.

Between October 1999 and September 2001, McCarthy's firm reported being paid $12,000 to lobby Green and others in the Planning Department regarding the project, which involved turning a 1939 parking garage into a new wing of the club, including a new pool, gymnasium, locker rooms and 212 parking spaces.

McCarthy's firm reported conferring at least seven times with Green about the project, city ethics department records show.

In April 2001, the Olympic Club was awarded a permit for the project by a unanimous vote of the Planning Commission. The planning director's report to the commission recommended the project be granted exemptions from the area's height and bulk limits.

Commission minutes do not indicate that Green disclosed his Olympic Club membership to the planning commissioners.

But the staff planner who worked on the Olympic Club project, Adam Light, said Green had disclosed his membership to staff members and said he did not wish to participate in the decision making on the project.

Just before Green accepted the membership, McCarthy also was lobbying him on behalf of a consortium of media companies regarding 177 antennas for television, radio and telephone communications, installed without permits on Sutro Tower.

> "I apologize to the Ethics Commission and the public for not understanding the disclosure requirements when I originally filed my Form 700 for the year 2000."
>
> GERALD GREEN, *former San Francisco planning director*

The issue was whether the city had to hold hearings about the antennas and any hazards posed by the 975-foot tower. The consortium contended the hearings were not necessary.

On Dec. 17, 1999, city zoning administrator Mary Gallagher ruled that the permit hearings were required.

The lobbying firm GCA Strategies, which operates out of McCarthy's office, had been paid more than $100,000 to lobby on behalf of the tower's owners to avoid the hearings. McCarthy told The Chronicle in 1999 that he had called Green to ask that the decision be rescinded.

Gallagher suddenly resigned her post on Dec. 22. The next day, Green said he was stepping in as acting zoning administrator to reverse the decision. Sutro Tower's owners were exempted from the hearing process.

Although the principals denied it, Twin Peaks neighborhood groups charged that the consortium's lobbyists had pulled strings with Mayor Brown to get Gallagher removed and her decision reversed.

The FBI began investigating the matter in January 2000, according to two neighborhood activists and one government official who were questioned by agents.

Lloyd Cluff, a national seismic expert who was active in his Twin Peaks neighborhood's fight to get the city to hold hearings on Sutro Tower, said two FBI agents knocked on his door one morning to ask whether Brown was connected with the Planning Department's decision.

"They said, 'We're here to talk to you about an investigation into the mayor's office,'" he said. "They wanted to know about the Planning Department and what was the mayor's input."

Cluff said that he had no knowledge to share with the agents and that he figured the FBI had since dropped the matter.

Brown did not respond to a request for comment.

But others who had sought hearings on the tower antennas said they were told by the FBI that the investigation continued. Those close to the investigation told The Chronicle that it evolved into a probe of development deals involving the Planning Department and the Department of Building Inspection.

On Aug. 4, FBI agents descended on the building inspection offices and arrested longtime city employee Augustine Fallay.

Fallay has pleaded not guilty to charges of accepting 10 bribes, including a $50,000 loan from developers. Many of the charges stem from Fallay's days in the Planning Department while it was headed by Green. Some concern his dealings after he moved to building inspection in 2001.

FBI spokeswoman LaRae Quy said the bureau would not comment on "any ongoing investigations."

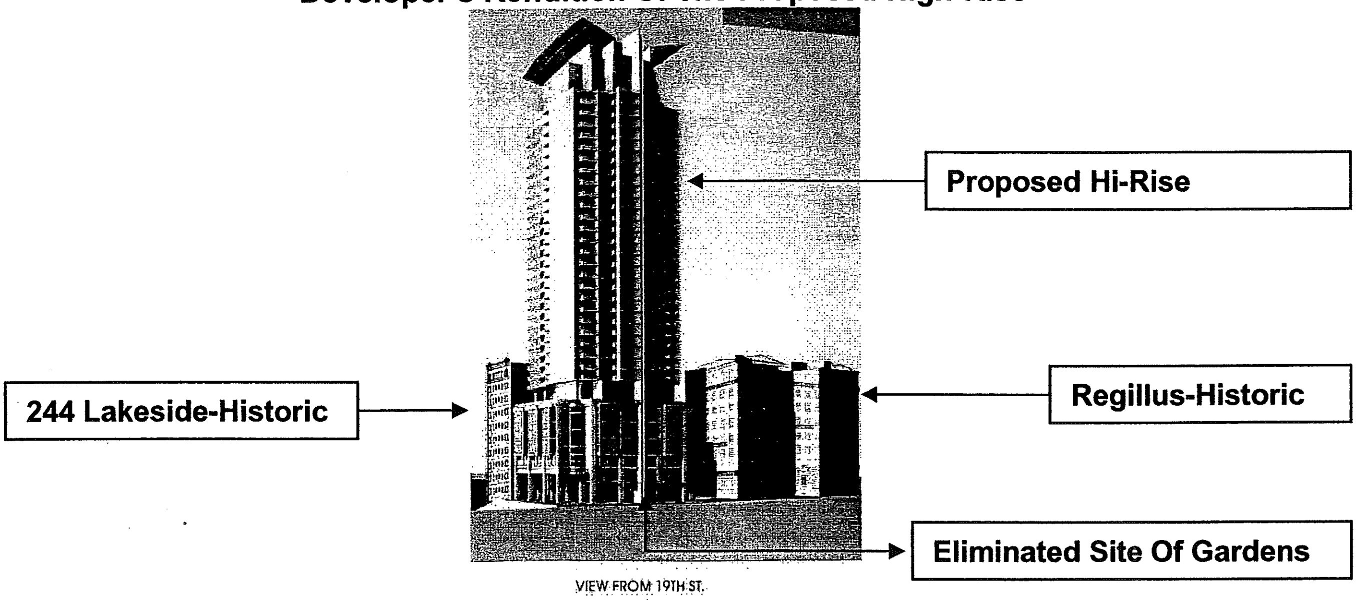
Chronicle staff writer Lance Williams contributed to this report.

E-mail Erin McCormick at emccormick@sfchronicle.com.

Mike Bowman 11/28/07 #2

HELP STOP: The Destruction of A Historic Garden & The Neighborhood With This High Rise Monster

Developer's Rendition Of The Proposed High-Rise



Some Of The Issues And Consequences Are:

<u>The Building (Proposed For 19th & Alice – Schilling Gardens), & Its' Effect on the Neighborhood</u>

* A 40 story building ***(3 times the height of existing buildings in the area),*** with the design proposed is totally out of character, context and has no relationship to the existing historic buildings in the immediate area or the neighborhood. ***Additionally, the development would destroy a historic garden***. Bottom line: it is simply out of place and inappropriate for the neighborhood.

* The height of this development will create ***harmful shadows, elimination of views and open space,*** affecting: Snow Park, the neighborhood and Lake Merritt. Further, construction would take close to 3 years and the noise – as well as construction dust - will profoundly affect seniors living across the street from the site, and seriously disrupt the lives of others in the neighborhood.

* **If built, it will open the door for many more developments like it in the neighborhood (there is also an insensitive development proposed on Jackson near the Hill Castle Apts), forcing the average, and many long time residents out of the area.**

* The traffic congestion caused by this development will be overwhelming and potentially catastrophic. Consider the following facts:

  * The developer is asking the Planning Department for an exemption to providing parking for each unit he is building. This would mean that an overwhelming number of vehicles will attempt to park on the streets where parking is already inadequate. Moreover, this does not include vehicles brought into the area by visitors, and those servicing the building.

  * The Lake Merritt Master Plan calls for the reduction of traffic on Lakeside Dr. When implemented a development like this will profoundly increase traffic problems in the area.

JOIN WITH US
STOP THIS DEVELOPMENT

A NEIGHBORHOOD MEETING WILL BE HELD AT THE REGILLUS BUILDING (200 LAKESIDE DR, CORNER OF JACKSON AND 19TH ST), ON SATURDAY JULY 28, 2007 FROM 1:00 P.M. TO 2:00 P.M. REFRESHMENTS WILL BE PROVIDED. PLEASE CONTACT: *<u>ANTONIO MAY – ANTONO@AOL.COM, TELE 645-9070 OR MIKE BOWMAN: MIKEBOW@HUGHES.NET, TELE: 835-4840 FOR ADDITIONAL INFORMATION IF NEEDED.</u>*

Mike Bowman 11/28/07

Posted on Fri, Sep. 15, 2006

LOOKING BACK: ERICA MAILMAN

Oakland's historic Schilling Garden in danger of being destroyed

THIS IS MY 200th column since I first began writing this history column in July 1999. One of the items I really enjoyed writing about was the Schilling Garden (which I covered three years ago), so as an "anniversary," I'd like to highlight that column and update readers on what is now happening there.

If you go right now and check your spice cabinet, I bet you'll see either the name Schilling or McCormick on at least several of the bottles. It's an Oaklander whose spice trade led to these brand names. German-born August Schilling came to the Bay Area in 1870, joining James A. Folger in the coffee trade (yes, the Folger of Folger's brand coffee) in 1878. A few years later, he started A. Schilling & Co., an internationally known tea and coffee firm. He also was a salt and spice merchant, and his company still lives on today within the larger corporation of McCormick.

Schilling lived in Oakland at the head of Jackson Street, where it meets Lake Merritt. There, he had a spectacular estate where he sunk a lot of money and attention into his garden. Generously, Schilling would leave his garden gates open to let anyone walk the grounds.

The garden still exists today, and they're causing a bit of controversy. The current owners offered it as a free gift to the city of Oakland, which sneezed at it. Instead of recognizing the incredible value of the historic garden once owned by a powerful entrepreneur, which nicely connects up with an already existing city park (Snow Park), city staff peremptorily declined the gift without even running the decision by the City Council.

And now the garden is in danger of being destroyed in favor of a 40-story condo project. To get some perspective, the nearby Essex building is only 20 stories and already towers over the lake.

"The Schilling Garden is significant as one of Oakland's best-known show places of the 19th century. It should be treasured," said Gloria Pieretti, who lives in the Regillus, an apartment building that borders the Schilling gardens.

She added: "I fought against the building of the Essex because of its height and lack of set-back from the street. At that hearing, we were promised that the City Council would not allow another building that tall around the lake. Once again, they are not keeping their promises to citizens. I feel betrayed."

Naomi Schiff, president of the Oakland Heritage Alliance, feels the project is clearly oversized for its proximity to the lake, casting huge shadows on the park land, and laments the city staff decision to refuse the gift of the gardens.

"This needs to be built somewhere else," she said.

Antonio May, who also lives near the garden, summed up the situation.

The condo project "is being plopped down in the midst of a historic area where it will drastically and irrevocably alter, if not destroy, a historic garden created in 1882, minimize and obscure two historic residences, harm the character of the Lake Merritt historic district and create a traffic nightmare. The design and height would have no relationship to the character of Beaux Arts, historic residences that would surround it," he said.

Laurie Gordon, who got married in the historic garden, remains optimistic that a solution can be found.

"I suspect that a deal can still be made to move that project to an alternate location farther away from the lake, bring the size down to a more acceptable scale and dedicate the Schilling Garden to the city as a conservatory open to the public," she said.

Unlike in Schilling's day, the garden is now locked. I gained a birds-eye view of the garden last week from the rooftop of

----- Original Message -----
From: Naomi Schiff
To: mikebow@hughes.net
Sent: Monday, September 11, 2006 10:33 AM
Subject: Fwd: Schilling g's -- cemetery underneath

Mike Bowman
11/28/07

Date: Sun, 10 Sep 2006 19:33:36 -0700
To: naomi@17th.com
From: Anna Naruta <naruta@berkeley.edu>
Subject: Schilling g's -- cemetery underneath
X-Spam: [F=0.0676755035; heur=0.500(1300); stat=0.067; spamtraq-heur=0.500(2006091011)]
X-Loop-Detect:1
X-DistLoop-Detect:1

Hi Naomi,

Don't know if you got my email in response to your query a while ago on Schilling Gardens. I sent it from what will become my primary email account, <anaruta@chsa.org>.

I guess that area is a park for a good reason.

The 1859 Witcher map shows it to be part of the cemetery:

http://sscl.berkeley.edu/~naruta/Jan2005report/Fig02.pdf

(OCHS has a copy of this in the "Naruta 2005" report.)

Nobody should get too hung up on the boundaries depicted there, either. Cemeteries have always had a way of spreading.

In the Oakland book, Beth Bagwell talks about the scandal in the newspapers at the time when new construction in the area kept creating grizzly scenes. The people paid to relocate the remains to Mountain View just pocketed the money. (That was the most common scenario for cemetery "relocation.") Looks like there would be some vivid quotes in the Oakland Daily News of April 28, 1874. She uses one (pgs 138-139).

There's probably better than 80% odds that the proposed project would impact still extant graves.

Don't know whether OHA would like to use this info in regards to the Public Works hearing, or keep the issues seperate and wait until discussion of impacts of a project.

I won't be at the hearing. I just lost my brother and it's a terrible blow.

take care,

Anna

11/28/07

Mike Bowman

The grounds were open to the public until nearly 1900, ...an due to vandalism, Mr. Schilling was compelled to close them. ...ter that they were open only on frequent occasions, a black and ...ld lettered sign over the Jackson Street entrance notifying ...e public that they were welcome to enter when the gate was open ...d stating the reason why Schilling had been forced to bar the ...blic.

The march of time made this property too valuable for a ...mesite, so the Regillus Apartments now stand where most of ...e grounds once were. As a condition to his deed of sale, however, ...hilling provided that the hanging gardens must remain intact ...d they are still to be seen on the property.

In 1922, the city filled in the land from the Schilling ...operty to the present borders of Lake Merritt thus cutting it ...f from the edge of the lake.

FROM "HISTORICAL GARDENS - 1889

- HISTORICAL SECTION IN OAKLAND LIBRARY

SCHILLINGS HOME GROUNDS

#2
11-28-07

State of California · 1985 **EXCERPT**
Historic Resources Inventory
Department of Parks & Recreation

Re Lakeside Drive Apartments, Schilling (August) House Garage and Garden located in the Lakeside Historic District

Significance:
The Lakeside Drive Complex exemplifies both the great era of luxury apartment building in the 1920's and the prominent garden siting of 19th century upper class homes. The combination has resulted in occupancy by some of Oakland's prominent citizens from the apartment building's opening and continuing today. Its large scale, distinctive design and prominent Lake Merritt location make the complex an especially familiar visual landmark in Oakland. Together with its neighbor, the Regillus, it dominates the middle portion of Lake Merritt's west shore and is closely identified with the image of the lake itself. The 19th Street garden frontage and rear elevation terminate the view along Alice Street from the south and with the tall trees, provide an attractive focal point for viewing the handsome group of early 20th century apartment buildings along Alice Street between 14th and 17th streets . The landscaping also provides a visual addition to Snow Park to the west.

7b. Physical Description
244 Lakeside Drive is a two story, stuccoed, reinforced concrete garage in Beaux Arts Style. The rear is an approximately 188 X 185 rear garden containing elements of the turn-of-the century August Schilling Gardens, which occupied the entire 244 and 200 Lakeside sites, approximately three times the remaining garden acreage. It is currently designed with a large semi elliptical central lawn area extending from the rear of the apartments and bordered by rich plantings of trees, shrubs, and herbacous flowering plants, including many unusual or exotic specimens. Informal stone paths pass through the perimter plantings. Parallel to 19th Street there still exists a section of Schilling's rustic style concrete arbor composed of imitation tree trunk posts and tree....

Excerpts: Lake Merritt Park Master Plan

Goals. "Marketing". "To maintain historical significance of landmark elements."
Plan. Reconfigure Lakeside Drive, 20th Street and Harrison areas including expansion and enhancement of Snow Park.
Shadow Study: "Tall buildings are located in the perimeter of the Lake casting deep shadows into the parkland. This is problematic in that it reduces solar access for park users and disrupts the normal growing conditions for park vegetation. Furthermore, the imbalance of scale presented by these masses creates an uncomfortable sensory conditions..."
"The placement of new buildings should consider views to popular landmarks such as the Oakland Hills, St. Paul's church" "Design guidelines consider building mass impact..."

Klein, Heather

From: Terry Brock [brockterry@sbcglobal.net]
Sent: Saturday, December 01, 2007 8:26 PM
To: Klein, Heather
Subject: Case File number ER06-0009; CMDV06-142 which is 222 19th Street

To the Oakland Planning Commission

RE: Case File number ER06-0009; CMDV06-142 which is 222 19th Street

Dear Sirs:

I am a longtime (65-year) resident of Oakland and for the last 10 years I have lived at the Lake Park Retirement Facility located at 1850 Alice Street. The Lake Park Retirement Facility is on the corner of 19th Street and Alice Street, directly adjacent to the proposed new residential tower at 222 19th Street.

I am writing you to express my grave concerns surrounding the proposed new residential tower.

1. 19th Street is a two-lane, one-way street with parking on both sides. It is already difficult enough for residents and visitors of Lake Park and the surrounding area to pass through. I am concerned about the inevitable increased congestion along 19th Street that will be caused both during and after the multi-year construction of the proposed new residential tower.

2. Alice Street runs to a dead-end at 19th Street, and that corner is heavily trafficked by both drivers trying to navigate the area, as well as pedestrians on their way to/from work, downtown, or Snow Park. This traffic along Alice at 19th will be significantly disrupted for both drivers and pedestrians, both during and after the multi-year construction of the proposed new residential tower.

3. I understand that the construction plan involves significant activity at night. Not only will this negatively impact the air quality, but also this will disrupt the peace and sleep for residents of the Lake Park Retirement Facility. We are longtime residents of the Lake Merritt community who moved to our current location because it is a peaceful, tranquil area. As Senior Citizens, we need to breathe and rest comfortably as an important health consideration.

4. The new facility, once completed, will change the complexion of the surrounding area. No longer will the area be peaceful and quiet as it was when we made the decision to move here. This is currently a place amenable to Senior Citizens for walking and solitude. When the new facility is constructed, this will be a popular area of hustle and bustle which is not amenable to Senior Citizens. Furthermore, many of us do not have the flexibility to relocate at this stage of our lives. In fact we are often in the least control of our existence as at any point in our lives. We must live out our golden years with the choices you are making.

In conclusion, I strongly urge you to reject this proposed new residential tower at 222 19th Street.

Respectfully,

Terry Brock

December 4, 2007

James J. Fenton
71 10th Street, #5
Oakland, CA 94607

Heather Klein, Planner II
Community & Economic Development Agency
City of Oakland
250 Frank Ogawa Plaza, Suite 2114
Oakland, CA 94612

RE: 222 19th St. ERO6-0009; CMDV06-142 (APN 008-0634-003-00)

Dear Heather Klein:

My name is James J. Fenton. I have been a Certified Horticulturist for nearly thirty years. While in college, I wrote an extensive paper on Redwoods (Sequoia sempervirens) and other related trees; later, I spent several years studying Redwoods in their natural habitat.

My observations have lead me to conclude that mature Sequoias (50 years old or more) would be very risky to move. Mature trees of almost any sort tend to adapt poorly to sudden changes of environment, especially transplantation. Like older people, if they are accustomed to a certain condition of life, that is where they will do best.

It is my professional opinion that any mature trees at Schilling Garden be left, and maintained just where they are; if moved they probably would not survive, no matter what extensive care someone glibly promised to give them.

Sincerely,

James J. Fenton

James J. Fenton

RECEIVED
DEC 5 2007
City of Oakland
Planning & Zoning Division

TO: HEATHER KLEIN

12-10-07

Received LPAB

FR: STEVE JACOBSON
LAKE PARK RETIREMENT RES.

SUBJECT: PROJECT AT 222 19TH ST.
EIR - REPORT

Please review previous decisions related to the height of buildings in the immediate area of the project. Presently the rest of buildings seem to be limited to 12-15 stories. A portion of the Kaiser owned building across the street from Lake Park on Oliver is also at a similar height as Lake Park. Since that building is relatively new, the research to determine the decision making process by the Planning Commission + City Council should be fairly easy the retrieve -

The point is, a 42 story building in this area is not compatible with the location.

Parking will also be a problem, both during construction and after. Where will Emerald View employees park?

Steve Jacobson

RECEIVED
DEC 1 0 2007
City of Oakland
Planning & Zoning Division

December 10, 2007

Heather Klein, Planner III
Community and Economic Development Agency
City of Oakland
250 Frank Ogawa Plaza, Suite 3315,
Oakland, CA 94612.

Re ***Submission of Elements to Include in EIR Analysis of the Subject Project Case File No: ER06-0009; Location: 222-19th Street; Schilling Gardens***

Preface
Schilling Gardens is located within very close proximity of Lake Merritt – the Eastern-most entrance to the garden is only 200' from the lake. The opposite side of the garden shares a common border with Snow Park that is nearly 250' long. As alternatives to the Birchall project, Schilling Gardens can be retained as a garden. The garden can also be reclaimed as park land, "day lighted", and connected to Snow Park to become part of the park system surrounding Lake Merritt.

The following three areas should be given considerable weight in the EIR analysis of this project:

1. The preference of Oakland residents and voters is to maintain, preserve, and acquire park land at Lake Merritt.

2. Commercial projects proposed on park land or potential park land near Lake Merritt which do not receive regulatory approval do not leave Oakland, but instead relocate to more appropriate sites.

3. Park land previously proposed for use by commercial projects is often enhanced and improved after the immediate threat of loss or sale has passed. The public is often willing to expend considerable public resources toward improving or acquiring park land to an extent and in ways often unanticipated by local officials.

1. The preference of Oakland residents and voters is to maintain, preserve, and acquire park land, or potential park land, at Lake Merritt.

Several important events show that the large majority of Oakland residents prefer park land and potential parkland near Lake Merritt to be preserved or reclaimed as park land.

- In 1907, a bond measure for raising money to acquire park in Oakland passed by an 80%-20% vote. Known as the "1907 Park Bond" a number of the parcels acquired are now well-established park areas at Lake Merritt including at 12th Street where the Kaiser Center stands, Adams Point property (now Lakeside Park), the "Willows" (along Lakeside Drive). (Exhibit 1, "By a Vote of Almost Five to One Oakland Declares for Parks," Oakland Enquirer 15 Jan. 1907, p. 9, Tuesday Evening.)

- In 2002, a bond measure for raising money to acquire and improve park land at Lake Merritt, among other things, passed, again by an 80%-20% vote. Known as "Measure DD" the bond will raise $198.2 million to "preserve and acquire open space; renovate parks." The bond specifically includes "expansion of Snow Park". (Exhibit 2, "Measure DD, Clean Water, Safe Parks", League of Women Voters, November 15, 2002, *www.smartvoter.org/2002/11/05/ca/alm/meas/DD*, last visited on 12/2/07.)

- In 1999, the City of Oakland attempted to sell Splash Pad Park, a small, under-utilized park on Grand Ave. and Lake Park, to Trader Joe's as a site for a new store. A survey taken at that time indicated "over 80% of the residents polled objected to the loss of park space" for this purpose. (Exhibit 3, Ken Katz, "Patience Paid Off for Splash Pad and Trader Joe's", Grand Lake Guardian, *http://grandlakeguardian.org/index.php/katz/2006/10/26/*, last visited 12/7/2007.)

2. Commercial projects proposed on park land near Lake Merritt which do not receive regulatory approval do not leave Oakland, but instead relocate to more appropriate sites.

When commercial projects proposed on park land near Lake Merritt are denied regulatory approvals and permits, these projects move to more appropriate sites. Contrary to "conventional wisdom", opposition to commercial projects on park land does not drive development away from Oakland. The following three instances are examples of this dynamic.

- **Splash Pad Park**. The public opposition to the loss of park land when the City of Oakland offered the park to Trader Joe's caused that project to be abandoned at that site. However, efforts continued to find a location for Trader Joe's. Finally, in 2007, Trader Joe's opened a new store at a previously abandoned storefront one block away from Splash Pad Park.

- **Fire Alarm site**. (14th Street and Lakeside Drive). In 2001, the Fire Alarm site was offered for sale to a 22-story condominium project. Although public opposition blocked this project, numerous housing projects continue to be proposed and built in the downtown area without opposition. See exhibit 4, "City of Oakland – Active Major Development Projects, Sept-Oct 2007" showing 36 separate housing projects (5,847 units) currently being built or planned in downtown Oakland.

- **12th Street and Kaiser Center**. In 2001, the park land at 12th Street at the west end of Lake Merritt, along with the parking lot of the Kaiser Center, was offered to the Catholic Church as a site for a new cathedral. Public records showed this property to be park land that has degraded over the years. Subsequent to public opposition to the sale of park land, the cathedral relocated to the corner of Grand Ave. & Harrison Street near Lake Merritt. Situating the cathedral at this location permanently replaced an under-utilized surface parking lot at that prominent intersection.

3. Park land previously proposed for use by commercial projects is often enhanced and improved after the immediate threat of loss or sale has passed. The public is often willing to expend considerable public resources toward improving or acquiring park land to an extent and in ways not previously anticipated by local officials.

- **Splash Pad Park**: The attention brought new public and City of Oakland interest to Splash Pad Park. Nearly $900,000 worth improvements to the park were completed by 2003. In addition, Splash Pad Park now hosts one of the most popular and successful farmer's markets in the Bay Area.

- **Fire Alarm site:** The Fire Alarm site will be integrated into the new landscape design for 12th Street using Measure DD funds.

- **12th Street**: The community's proposal in response to the proposed sale at 12th Street provided the impetus for the City Council to adopt Measure DD and place it on the 2002 ballot. The successful bond measure will fund improvements to park areas and will reclaim degraded park land areas.

Conclusion
The following three areas should be give considerable weight in the EIR analysis for this project:

1. The preference of Oakland residents to preserve and acquire potential park land at Lake Merritt.

2. Commercial projects near Lake Merritt which do not receive regulatory approval do not leave Oakland and relocate to more appropriate sites.

3. The public is often willing to expend considerable public resources toward improving or acquiring park land to an extent and in ways often unanticipated by local officials.

Respectfully submitted,

John Klein

John Klein

888 Vermont Street
Oakland CA 94610
Kleinjohne@comcast.net

Erika & Wulf Kunkel
1850 Alice Street, Apt. 602
Oakland, CA 94612

December 5,2007

Heather Klein, Planner III

Community and Economic Development Agency
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Re: Case File Nr. ER06-0009;CMDV06-142

Dear Ms. Klein:

Our primary concern regarding the 222 19th Street Project involves the long-term impact of setting an unfortunate precedent by approving construction of such a tall high-rise apartment building close to the lake:

It seems very likely that many developers will see an opportunity for similar proposals, and it will be difficult for the City of Oakland to turn them down once the Emerald View Apartments have been approved. This result is predictable and unavoidable. It is a clear step in the wrong direction. It will change the character of the Lake Merrit area, this precious gem in the heart of Oakland. It seems obvious that the tallest structures should be farthest from the lake instead of at its shore. Please consider it carefully!

Sincerely,

Erika Kunkel   Wulf Kunkel

Erika and Wulf Kunkel,
Residents at 1850 Alice Street

Klein, Heather

From: wekun@berkeley.edu
Sent: Tuesday, December 04, 2007 7:21 PM
To: Klein, Heather
Subject: Hi rise on 19th street

DRAFT Comments

To: Heather Klein, Planner III
Community and Economic Development Agency
City of Oakland

December 4,2007

Heather Klein, Planner III
Community and Economic Development Agency
City of Oakland

December 04, 2007

Re: Case File Number ER06-0009;CMDV06-142

Our primary concern regarding the 222 19th Street Project involves the long-term impact of setting an unfortunate precedent by approving construction of such a tall high-rise apartment building close to the lake:

It seems very likely that many developers will see an opportunity for similar proposals, and it will be difficult for the City of Oakland to turn them down once the Emerald View Apartments have been approved.
This result is predictable and unavoidable. It is a clear step in the wrong direction. It will change the character of the Lake Merrit area, this precious gem in the center of Oakland. It seems obvious that the tallest structures should be farthest from the lake instead of at its shore. Please consider it carefully!

Sincerely,

Erika and Wulf Kunkel,
Residents at 1850 Alice Street

ANTONIO MAY

200 LAKESIDE DR, #202
OAKLAND, CA 94612

TELE: (510) 645-9070
E-MAIL: ANTONO@AOL.COM

RECEIVED
DEC 10 2007
City of Oakland
Planning & Zoning Division

12/8/07

Heather Klein, Planner III
City of Oakland
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, Ca 94612.

RE: Issues To Be Considered For Environmental Review Of 222-19th St.

As a follow up to the commission hearing held on Oct 28, 2007, I am offering, below, some written comments and suggestions related to the over all composition of what will be reviewed under the EIR scheduled for the project proposed at 222 19th St, or the Emerald View Towers.

1. Impact of project on the anticipated upgrade and changes to Snow Park under Measure DD, including the reduction of traffic lanes on Lakeside Drive, which is in close proximity to this project.

2. The economic impact of this project on residential properties in the affected area, especially those just east of it.

3. The geological impact of this project on the foundation of the building located at 219 – 19th St, commonly known as the Regillus.

4. This project will have an impact of at least a mile radius around it. Cumulative impact is especially significant in analyzing the density represented by existing residential properties as well as new residential developments, either nearing completion, just started or where entitlements have already been granted.

5. Considering the overall impact of this project, the FAR for it (which is really stretching the envelope), should be strongly evaluated in determining whether what's been proposed is really sensible and sensitive to the community. This should not just be about the developer's right to make a profit, but should also take into consideration respect for the livability and quality of life for this neighborhood and the larger community.

6. Because of the proposed location of this site and the profound environmental issues associated with it, I strongly urge you to consider alternative sites. One of the significant elements of smart growth and achieving non-destructive density - seems to me - to be the practice of in-fill development. In that respect, there are several asphalt covered parking lots that are in the vicinity of the lake, but not so close in proximity that they would have nearly the environmental impact of this project in the location proposed.

7. It is well known that one of the negative impacts of urban development is the heat sourcing from concrete and asphalt which is commonly used in construction of our streets, roadways, and most parking lots. A building replacing a solar reflecting asphalt parking lot is far more beneficial to reducing negative green house build up than constructing a high rise on a site, which destroys a naturally green and open space that makes a positive contribution toward neutralizing CO_2 emissions.

Below, I have provided an excerpt from authors James Howard Kunstler and Nikos A. Salingaro in an Op Ed piece - published in the Planitizen, a planning and development network, in Sept 2001.

The most successful cities of the past were those where people and buildings were in a certain balance with nature. But high-rise buildings work against nature, or, in modern terms, against the environment. High-rise buildings work against man himself, because they isolate him from others, and this isolation is an important factor in the rising crime rate Children suffer even more because they lose their direct contacts with nature, and with other children. High-rise buildings work against society because they prevent the units of social importance -- the family ... the neighborhood, etc. -- from functioning as naturally and as normally as before. High-rise buildings work against networks of transportation, communication, and of utilities, since they lead to higher densities, to overloaded roads, to more extensive water supply systems -- and, more importantly, because they form vertical networks which create many additional problems -- crime being just one of them."

Peter Blake condemned mega towers in Form Follows Fiasco on several points. One was the disastrous wind shear that their surfaces created; the other was fires that had burned out of control in two skyscrapers in Latin America. He warned the world that (page 150):

"The first alternative to Modern Dogma should obviously be a moratorium on high-rise construction. It is outrageous that towers more than a hundred stories high are being built at a time when no honest engineer and no honest architect, anywhere on earth, can say for certain what these structures will do to the environment -- in terms of monumental congestion of services (including roads and mass-transit lines), in terms of wind currents at sidewalk level, in terms of surrounding water tables, in terms of fire hazards, in terms of various sorts of interior traumata, in terms of despoiling the neighborhoods, in terms of visually polluting the skylines of our cities, and in terms of endangering the lives of those within or without, through conceivable structural and related failures."

As a last comment, I strongly urge you to insure that each element identified for review in the EIR for this project is thoroughly and comprehensively evaluated. Because of the magnitude of this project and its' potential environmental impact, no element should be **expedited** or given cursory analysis.

Respectfully Submitted,
Antonio May

Antonio May

Heather Klein, Planner III, City of Oakland
Community and Economic Development Agency
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, Ca 94612

Dear Ms Klein,

This letter is in response to the request for comments on the scope and content of the EIR to be prepared by the Oakland Community and Economic Development Agency. Planning and Zoning Division, for the 19th street Residential Condominiums Project.

Among the numerous concerns to be investigated I assume the following items will be considered in the EIR.

Parking - Automobile parking in the immediate area is already a problem, day and night. It is logical to assume that each of the 400 condos will possess at least one car. Experience with other condominiums indicates that many residents have more than one car. 'The proposed project will provide one parking space per condo. A conservative estimate of one and a half cars per condo will result in approximately 200 more cars parked on the street with no space available.How can this overflow of on street parking be accommodated?

Shade - The shadow of the 42 story will affect the local existing buildings, Lake Merritt and Snow Park. The environmental affect of shade on these areas needs to be studied. Lake Merritt itself is environmentally fragile.

Wind - Existing structures, ie the Kaiser Center and 2000 Harrison, have virtually created a wind tunnel at the intersection of Harrison and 20th street. Will a 42 story structure just one block away exacerbate this problem? The aforementioned structures have already resulted in eliminating sailing winds in the west arm of Lake Merritt.

Visual - The 42 story building is totally out of conformity with the existing apartment and condominium structures in the immediate area. It will be a visual anomaly. The view from the north and east side of Lake Merritt will be totally dominated by a non conforming profile. /this should be considered in the EIR.

Lake Merritt- Salt water enters and leaves the lake from the Oakland-Alameda estuary. There are plans to enhance the existing system. How will changing the shadow, wind patterns and water runoff be changed by such a tall and large structure ?

Snow Park - Inner city schools currently use the large grass expanse of the park for physical education. It is used for this activity virtually every day. Any changes to the park, including sunlight, wind and noise caused by the proposed structure needs to be considered in the EIR.

Aeronautical - The FAA will need to be consulted re air traffic problems. Continual police and traffic advisory planes and helicopters are frequent flyovers. The EIR must consider this problem

Wildlife - How will the new building affect the local wildlife, especially migratory birds who use Lake Merritt as a safe haven. Wildlife disasters have developed from totally unexpected sources. The EIR should consider this possibility.

I thank you and your staff for this opportunity to comment on the input for the EIR and look forward to reviewing the document.

Yours truly,
Alden McElrath 11/20/07
Alden McElrath
244 Lakeside Drive Apt. #1
Oakland, Ca 94612
e-mail : bjwmac@juno.com

ISSUES/CONCERNS REGARDING THE
PROPOSED 19TH STREET CONDOMINIUM PROJECT

Submitted for consideration during EIR Scoping
Mary Ellen Navas and Robert Archibald
177 19th Street Apt 10E
Oakland 94612

SCALE AND HEIGHT

The proposed building height (42 stories) is seriously out of proportion with the rest of the neighborhood. Were it to be built as currently designed, rather than fitting in, to complement the neighborhood, it would completely dominate the area. Even though there are commercial buildings nearby, they are built in proportion to the adjacent commercial corridor. None overwhelms the skyline the way the proposed condominium high-rise would. The project must be downsized by at lease 35%, while maintaining it's scaled down footprint (to minimize shadow and preserve open space), in order to come anywhere near meeting a complementary size and scale. A 50% reduction would be much better.

PARKING AND TRAFFIC

The project proposes 370 one and two bedroom residential units and only 357 parking places for residents. Although it may be contemplated that some residents will not own a car and rely solely on public transit, the other possibility must be contemplated as well, that some may have more that one car. Even though public transit is near, to build a low upper limit of parking spaces will by definition place a huge parking burden on the surrounding neighborhood. Taken to an extreme it could be said that if the developer really believes that the area is so transit rich that the some occupant's of the building will not need cars, why not have no parking at all? Neither extreme makes sense. But the developer must know that the actual demand for cars will actually be significantly larger than what is proposed. Reasonably speaking, not only be anticipated that some of the units will be occupied by people who collectively own more than one car, like every other apartment or condominium building in Oakland, there will be many visitors to the building, increasing the need for parking.

Then, as a "service" to the neighborhood, the developer has proposed adding a restaurant and café as well as a membership based workout facility. While these services are attractive they undoubtedly will create congestion and contribute to an influx of many more people, automobiles and delivery trucks. Given that the area, has barely enough parking now, this demand could overwhelm the neighborhood. Parking that is now at a premium will become impossible for residents on all sides of the proposed building for several blocks in all directions.

It is disturbing that the current plan appears to be designed to exploit and dominate the neighborhood, rather than complement it. The proposed parking and traffics plans must be altered to realistically account for the influx of automobiles, both from the constant demand for space by residents as well as the episodic demands by visitors, all of which will seriously impact the neighborhood. As currently designed the development promises to place an unacceptable burden on everyone else in the surrounding community.

LIGHTING
The proposed plans call for exterior lighting that if allowed to be installed as designed will seriously impact residents on all sides in the surrounding buildings. Again, the theme of domination is unreasonable and must be scaled back significantly in order not to overwhelm the neighborhood. The night sky around the lake is beautiful. The neighborhood is tranquil. The necklace of lights surrounding the lake serves to complement and highlight the lake's natural beauty. The developers appear arrogantly hell bent to make their "emerald" building the new jewel of Oakland, gaudily upstaging the lake. Not only would the proposed lighting be energy inefficient it will offensively impact the entire surrounding area and its residents.

OPEN SPACE
Snow Park adjacent to the proposed development is the only open space within more than 100 city blocks. All things considered, Snow Park remains a precious asset to the neighborhood. It is the singular green space available for the thousands of people currently living in the apartment intensive neighborhood between the Lakeside and the Embarcadero and from the Kaiser Convention Center and Broadway. People who have no yards, no balconies or open space, find refuge in this small urban oasis. Daily from first light there are Tai Chi devotees, mothers and children in strollers, classes of youth from neighboring schools, and people from the surrounding apartments and commercial buildings who seek some respite in this tiny city park. What will happen to this last open space as a huge development is under construction? How will it be impacted with the shadow of this building blocking the sun for much of the mid day? By any reasonable urban living standard this area of Oakland is already deficient in ground usable open space. This development will add another burden while reducing open space and the sliver of nature that exists today.

ENVIRONMENTAL CONCERNS
Lake Merritt is the jewel of Oakland, enjoyed by thousands of people each day and critical for the wild bird population. Supplied by a tidal flow, it is a stopping place for large populations of migratory birds and home to large permanent bird populations. Another shadow, another building to block the path of birds may seem like a small price to pay for the hundreds of people who will one day occupy a new towering development but, for the thousands of birds and thousands of people who walk the lake each day it will be a loss, of light, air quality, health and human scale. Experience tells us that most of the birds will adjust, but another encroachment like this will have been added, incremental erosion of what has made this body of water a resting place, a sanctuary for wild life and for people for centuries.

Klein, Heather

From: Chris Pattillo [pattillo@pgadesign.com]
Sent: Monday, December 10, 2007 4:48 PM
To: Klein, Heather
Cc: Naomi Schiff
Subject: Schilling Garden

Ms. Klein,

I attended the planning commission EIR scoping meeting and know that Naomi Schiff asked for an evaluation of the trellis structure to be included in the EIR. I want to expand on that item. The Schilling trellis is an unusual structure unique to its period of construction. I has a steel structure covered with a cementitious material formed to look like the branches of a tree.

The project architect has stated that this structure will be relocated and incorporated into the new garden. I believe the EIR should include an evaluation by a structural engineer who is experienced in unique structures similar to this one that will describe 1) the condition of the steel and the cementitious material and 2) provide an assessment of the viability of moving it. If it can be moved, how will the trellis be prepared for moving, how will the move be done, ie. cut into pieces or moved as one unit, and how will it be reinstalled?

What is the timing? What will happen to the trellis during the construction period?

Portions of the cementitious material are missing. What repairs will be made to restore it and how will those repairs be made?

The EIR should also include a list of where similar structures exist elsewhere in Oakland and/or the East Bay. If this is the only one remaining in Oakland or the Bay Area we need to know that.

Second, I have heard Ian Birchall, Project Architect make the comment that this garden is not important because none of the plants in the garden are rare or unusual. His comment suggests that a garden is nothing more than a collection of plants, which is like saying a work of architecture is nothing more than some concrete, steel and glass.

The EIR should include an assessment of the garden from a qualified landscape architect or historian with experience in doing assessments of similar resources. It is important that the decision makers fully understand the value and unique features of this work of landscape architecture.

Chris Pattillo

PGAdesign
444 17th Street
Oakland, CA 94612
Direct 510 550 8855
Office 510 465 1284
Fax 510 465 1256
Pattillo@PGAdesign.com
www.PGAdesign.com
Co-Chair Northern California Chapter Historic American Landscape Survey (NCC HALS)

Klein, Heather

From: Gloria J Pieretti [gpieretti@sbcglobal.net]
Sent: Monday, December 10, 2007 7:25 PM
To: Klein, Heather
Subject: 222 19th St.

Heather Klein:

I was in Sicily at the time of the meeting held on the 42 story condo proposed at 222 19th St.and thus was unable to attend the meeting. Having lived at the Regillus since 1980 I am **TOTALLY OPPOSED** to it being built. With the number of condos and apartments recently constructed is there need for another one or will it only be partially filled?

Here are my other reasons for opposing the project:
First, a 42 story building is totally out of place in the neighborhood. (It will be taller than any residental or commercial building nearby.) It would even be taller than a football field, if vertical.

Second, it will dramatically increase traffic on 19th St. (especially since plans are to decrease the number of lanes on Lakeside Drive) making crossing 19th Street a nightmare for the seniors who live at Lake Park Residence, children who go to the Alice Street Learning Center, students at Oasis High School, (a public charter school whose students use Snow Park for a variety of activities daily) and those who have physical disabilities. Having had MS for 20 years, I am very aware of this even though still mobile.

Third, it will increase the wind and shadow effects on the neighborhood. After 1800 Harrison was built the amount of wind increased dramatically.

Fourth, a loss of part of Oakland's history is a loss to the entire community. Though the Schilling Gardens have been closed to the public in recent years, I always enjoy walking past the rock walls and seeing the concrete logs with wisteria and roses in bloom and the A-S on the gates.

Fifth, parking in the neighborhood will be impossibe for visitors. How can the developers be allowed to plan to have fewer than one parking place per unit? No area is being set aside for service vehicles. **Not everyone will use public transit exclusively. It is obvious that the developers do not use public transit.** Getting a cab to go short distances such as to a doctor on "pill hill" is sometimes difficult. If you depend on AC transit you need to add an extra hour to travel time: the 59 goes by once an hour. There are other bus lines on Broadway, but carrying groceries for 5 blocks is a problem.

Sixth, the developers say the garden and foyer will be open to the public. Once a condo is controlled by the owners and the board of directors, the developers words means NOTHING. It is guaranteed that the geese will use the garden!.

Lastly, the number of stores downtown has decreased in the last 25 years. Having more people isn't going to change this as this is a phenomenon that's happening everywhere, in part because people buy over the internet, by catalog, or at malls.

The Oakland Master Plan statesd that a number of mistakes were made during the '60's and that these errors in apartment design should not be repeated. They have/are being done so in those just built within the past two years.

I request the city planners, the Planning Commission and the City Council to think long and hard about allowing this condomium to be built in this location and that the EIR be looked into carefully with consideration for the neighbors. If the building is under construction for 2-3 years, the noise will make us prisoners within our units or drive us away.

A concerned voter and Oakland resident,
Gloria J. Pieretti
510-835-0361/gpieretti@sbcglobal.net

Klein, Heather

From: Steve Rochon [rochonsteve@yahoo.com]
Sent: Wednesday, November 14, 2007 4:04 PM
To: Klein, Heather
Subject: 222 19th Street Notice of Preparation -- Comment

Ms. Klein,

I'm writing in support of the proposed development on 222 19th Street. It appears to be a high-quality, well-designed building, and will be appropriately situated downtown among other high-rise buildings. I attended one of the community meetings the developers held earlier this year and was impressed with the community benefits they offered, including renovation and maintenance of Snow Park, as well as a cafe on the park, and even a viewing platform near the top of the building. High-density residential development should be encouraged downtown to revitalize downtown Oakland and to bring economic diversity to the city.

"Klein, Heather" <HKlein@oaklandnet.com> wrote:

> Dear Interested Parties,
> This e-mail is to inform you that staff has published the Notice of Preparation that the City of Oakland is preparing an Environmental Impact Report (EIR) for a project at 222 19th Street (Schilling Gardens). The notice is to request comments on the scope and content of the EIR. The comment period is 30 days. Staff will hold a scoping session before the Planning Commission on November 28, 2007 and before the Landmarks Preservation Advisory Board on December 10, 2007. The comment period will close at the end of the public comment period for the Landmarks Board meeting.
>
> Please submit comments to me per the instructions in the Notice of Preparation.
>
> Heather Klein
> Planner III
> City of Oakland
>
> 250 Frank H. Ogawa Plaza, Suite 3315
> Oakland, CA 94612
> ph: (510) 238-3659
> fax:(510) 238-6538
> email: hklein@oaklandnet.com

Heather Klein
Planning dept
250 Ogawa plaza
Oakland, CA

RECEIVED
DEC 10 2007
City of Oakland
Planning & Zoning Division

RE: ER06-0009; CMDV06-142

Ms Klien,

As the developer has seen fit to rewrite history and slander August schilling I would like to start by setting the record straight. Schilling Gardens was open to the public when Mr Schilling was alive. I personally researched the deed and it was sold whole and intact to Percival Palmer. Mr Palmer subdivided the land. The reason this garden is closed and forbidden to the public has more to do with the spirit of messrs O'donahue and O'keeffe than it does with Mr Schilling. When they were done rewriting historythey chose to rewrite reality. On documents released to the public to show scale it invariably says in small print "not to scale". Realizing that they would not get support from those of us who actually live here, they hired Mr Plazola to lobby East Oakland groups to masquerade as community support; even using their children as shills for his paid purpose. Any information supplied by these developers should be independently confirmed by a neutral and disinterested party.

One of the gifts that Oakland grants us is it's beauty. Thanks to Mayor Mott and the "City Beautiful"movement. Although much has been destroyed in recent years all Oaklanders are deserving heirs to postcard moments and the beauty that feeds us. One of those beautiful postcard moments is the view of the elegant "grand dames" the Bechtel Building and theRegillus nestled in the trees beside Henry Snow Park and serving as an appropriate gateway to the historic Lakeside Apartments/Gold Coast District. Most of us here live in small units and the expansive beauty of ourcity is important to us. To a degree it even shapes us. But this gouche, phallic structure says Oakland is foolish. It blocks off views of Lake Merritt, casts the lake into shadow in the evening and the park into shadow in the morning. Plus it will cast dangerous and blinding glare onto the roadways.

At some community forums earlier this year, a policy of a "Bowl Effect" was discused. I'd say most residents around the lake liked this idea. This means moving the high buildings away from the lake. Ironicly, if you are in a tall building right over Lake Merritt looking OUT of a window you will not see the lake unless you hang your head out the window and look straight down. The residents will have a nice vista, but no lake view and no street view. They won't be "eyes on the street " for security. If the developers built the project in East Oakland, where they recruited most of their advocates, they could have a vista with a view of the lake, with the bay beyond that and the sunset behind it. There it would stand out more without competing with the lake. Why shouldn't East Oaklanders BE taking the elevator to the top to enjoy the vista from their own neighborhood? I grew up in FLATLAND East Oakland. It's view deficient..

There is a common myth that new, affluent residents will pay more taxes thus curing the citie's financial ills. Thereare several things missing from that equation:

1. The new residents will rightfully demand services which will more than offset tax revenue.
2. Because much of Oakland is redevelopment zones, a substantial amount of tax revenue gets skimmed off for redevelopment.
3. Oakland is trying to chase the exact same tiny demographic every other redevelopment city is chasing; We assume large numbers of people with more dollars than sense are going come live in this overpriced crap!
4. BULLETIN: the rich want to live in Blackhawk; the middle class is vanishing, and the rest of us are trying to hang on and not be displaced.
5. Those "special" home ownership loans and programs for people who could not realisticly afford a condo, encouraged by redevelopment agencies across the country have predictably backfired causing a huge and tragic situation in our national and local economy. Realityis always a factor.

I found an interview online with Oakland naturalist Stephanie Benevidez. To paraphrase her, she said that as the migration flyway is developed over, geese become more and more concentrated and overcrowded into a smaller area. (end of paraphrase.) If too many geese are overcrowded into a small area they become a nuisance, not unlike our own highly invasive species, and with much the same results. We probably won't recognize the next ecological tipping point until after we have passed it. We may see the geese become more aggressive and a vector for disease. We may become more aggressive and a vector for disease as well. Look at our murder rate. A recent article in the Oakland Tribune said thatnearly two-thirds of our ((less invasive) birds are at risk including 50 avian species native to the Bay Area. I used to see swans at the lake, 50 years ago..

We have laws to protect our mature heritage trees for good reason. Redwood trees have remarkable recuperative powers IF they are Not relocated. Redwoods live in an area where fires are common and they even survive that IF they are not relocated. Around Lake Temescal you can see fire-scarred trees that have recovered their health. A large, established redwood can be a Gift from the earth for a thousand years. IF it is respected, in it's own location. A massing of mature trees such as in Schilling Gardens means it is likely the root system is completely intertwined. The garden needs that mature backdrop of magnificent trees.If a redwood is beyond recovery it has been very abused.

Regarding the other plants in the garden; it is difficult to know exactly what a hybrid plant is unless it is documented with tags and a studbook. This can be very important to hybridizers. A detail such as chromasome count can be crucial to hybridizers. If it isn't being done already, people will soon be doing very advanced D.N.A. testing on old plants where the documentation is lost. I doubt any responsible plant expert would lookat a plant and say beyond a shadow of a doubt this is exactly what an undocumented plant is, and you can get it at any nursery. They tend to say things like "It is related to" or "It seems to have some_____ in it " They don't get that specific because there could be something different umpteen generations back in the breeding that could show up. My boyfriend used to breed and hybridize Orchids. Once I tracked one of his orchids back 30 generations back to species. Even a documented species could be any of hundreds of clones unless the clone is specificly identified. Rare plants do show up in old collections. Unless each plant is either tagged and documented or has been D.N.A. tested who knows what it is? It could be unique. We do know that August Schilling had the knowlege,interest, and income to aquire the best cultivars of his time.

The last so-called "luxury Condominiums" built in our neighborhood at 14th and Jackson was built by a developer with more ambition than competance. This derelict blighted building has been shrouded in plastic for two years now. Local wags call it the "condom tower". I wonder what the local wags will call this projeet. Could we require developers to carry completion bonds? This projject will either happen concurrently or consecutively with work on DD. This is a cummulative of all the disruption that construction brings. DD is supposed to limit traffic., yet 370 units will exacerbate traffic, as will the combination of two majjor constructions going on in the same area at the same time. noise, particulate matter and stress from both projjects will make life un-healthy. for our elderly and the rest of us.

This is a very tricky project on a very tricky site.. It clearly has many engineering challenges requiring high expertise. It is a very prominent site. Neither the developer nor the architect has experience building this type of high-rise. The examples on Ian Birchal's website are high-risesin the planning stage only and have not been built. Their exprience is in midrise, and not very attractive. At 14th and Jackson we got a big dose of what happens when a glib developer with more ambition than competance messes up. The community pays. can we dare risk this extraordinary and unique site to people who want to experiment with their very first high-rise? This could be embarrassing!

Schilling gardens is so unique that even as a remnant it is listed at A1*. big buildings are commonplace. so many cities have them that they do nothing to put a city on the map. but a one of a kind historic resource,, a garden , unlike any other is one of those postcard moments of beauty to feed us all. Mr schilling didn't plant a garden to make money. he did it because he loved it. Then he shared it wãith the people of our city. There is a lesson in that. Don't destroy what he built.

Sincerely,

Orna Sasson

Orna Sasson
Lakeside Apartments Neighborhood Association
1428 Jackson st.
Oakland, CA 946122

WILLIAM O. SCHLOTTER JR
6203 ELDERBERRY DR
OAKLAND, CA 94611-1621
TEL. (510) 482-3183

RECEIVED
DEC 0 3 2007
City of Oakland
Planning & Zoning Division

28 Nov, 2007

OAKLAND PLANNING COMMISSION
250 FRANK OGAWA PLAZA
OAKLAND CA 94612

APM 008-0634-003-00 -- 222 19th Street Project

Dear Planning Commission:

I watched the hearing for E.I.R. scoping on 28 Nov, 2007 for this high rise project by the lake. I am neither for or against the project, but would like for the following subjects to be considered and abated as much as possible in the E.I.R.

1) If the building does not prohibit the tenants from having children, Where will they attend school? Does the OUSD have enough close-by capacity to handle the number of children that may occupy this apartment building? How will they get to school?

2) If the building allows children, what play areas will be provided by the project? Where is day-care available, and is there sufficient capacity for these children?

3) If new day-care or school facilities are needed, who will pay for the construction of new facilities, and where will they be built?

4) There is very little basic family shopping (Groceries, clothing, Drug stores, etc) available downtown, where will these families shop and how will they get their purchases home?

5) How much additional service will be required of our police and fire departments? Who will pay for this expansion, and can Oakland even recruit and train the additional personal needed?

6) Is the Fire Department prepared to fight a fire or other emergency in a 45 story building? What new equipment or training will be required and who will pay for it?

7) Is parking capacity based on the belief that few adults would have or need a car, or the reality that most middle-aged adults each have a car? Many of the surrounding buildings are filled with the elderly, who tend not to drive very much. Will the ownership of cars by tenants be restricted to fit the available parking? Where will visitors park?

Sincerely,

William O. Schlotter Jr.

William O. Schlotter Jr.

177 19th Street, #6B
Oakland, CA. 94612
December 3, 2007

Heather Klein, Planner III
City of Oakland
Community and Economic Development Agency
250 Frank Ogawa Plaza, Suite 3315
Oakland, CA. 94612

Ref: Case Number ER06-0009
Project Title: 19th Street Residential Condominiums Project

Dear Ms. Klein,

This is to register that I am against the construction of the "19th Street Residential Project," as proposed.

A 42 story, 370 unit residential building is very much out of character with the neighborhood. Be that as it may, my primary objection is the lack of adequate parking.

I live in the Lake Royal Apartments, 177 – 19th Street. This building has 55 residential units and 85 parking spaces: 1.5 parking spaces per unit. Even with this ratio the spaces reserved for guest are often full during the day.

The proposed 'Park View' building will have 370 residential units and 357 parking spaces: 0.96 parking spaces per apartment. The 357 parking spaces are proposed to be provided on five levels of subsurface parking. I feel that the number of planned parking spaces is grossly inadequate – it should be about 2.0 spaces per unit – or 740 parking spaces total, and will prove to be so inconvenient (driving down three to five flights) that residents will use whatever 'on-street' parking that may be available, whenever possible.

In conclusion, I feel that the proposed building would overwhelm the neighborhood by its height, density and inadequate parking, and therefore should not be constructed. It will not enhance the City of Oakland.

Sincerely,

Paul Thrash

Paul Thrash
510-763-1982

Klein, Heather

From: Thomas Thurston [tmthurston@msn.com]
Sent: Saturday, December 01, 2007 9:01 AM
To: Klein, Heather
Subject: EIR, 19th Street Residential Condominiums Project

Ms. Klein:
I was unable to make the hearing on the preparation of the draft EIR for this project. I would like to mention some items that should be taken into consideration.

As a member of the Central City East Redevelopment District Project Area Committee I have researched over the past few years the effect of housing projects on overall urban development. In the proposed project, I suggest you consider who is likely to move into the condominiums. I suggest that many of the buyers will be mature buyers rather than first-time buyers. These mature buyers may have raised their children in single family residences and now no longer need the space nor want the maintenance demands that these family houses entail. Instead, they seek a more urbane life offered by a luxury condominium in a city center. Such people would spend a significant amount on lifestyle consumption, enhancing the downtown life. At the same time, they would be freeing up their stand-alone houses for younger families. This natural recycling of the housing stock is part of the normal life cycle of housing in a market that is not stifled by excessive regulation. People may choose this tower because they already have deep roots in Oakland and wish to spend their senior years here.
A second consideration for the EIR is aesthetic. Coming from the west, Oakland already has its distinctive skyline, marked especially by the Federal Building and the Ask headquarters. The skyline from the lake is undistinguished, characterized by wide, massive blocks of buildings. With the new cathedral and the proposed tower, the eastern skyline will begin to take on a distinctive shape. (Won't the 40th story dining room be the ideal place for Sunday brunch after mass at the cathedral?)
Finally, I suggest consideration of how Snow Park will be enhanced. While the park is lovely and well-situated, it certainly has plenty of room for improvement.
Tom Thurston
1924 41st Ave.
Oakland, CA 94601

James E Vann, AIA, Architect
Architecture / Design / Planning

251 Wayne Avenue
Oakland, California USA 94606
510-763-0142

MEMO

10 December 2007

City Planning Commission
City of Oakland
Oakland, CA 94612

Landmarks Advisory Board
City of Oakland
Oakland, CA 94612

Attn: Heather Klein, Case Planner
Case File Number: ER06-0009; CMDV06-142

I write as an individual, a professional architect of over 30 years in Oakland, as well as being a member of Oakland Tenants Union (OTU) and of the Coalition of Advocates for Lake Merritt (CALM). I write to relate for your consideration the content of discussions held by my two organizations concerning the existing historic Shilling Garden and the 42-story tower being proposed for the site of the present garden.

Both of my organizations oppose equally, and for different reasons: (1) the demolition and disruption of Shilling Gardens and (2) the massive development of the proposed42-story construction at this site. Although the proposed plans are still schematic, we acknowledge some desirable qualities in the proposal, and would be completely in support of the project were its development intended to strengthen the urban core, especially along, or in the vicinity of Broadway, and convenient to BART and surface transportation hubs.

We believe the proposed tower and its related development will have severe negative visual, physical, and environmental impacts and consequences for Shilling Garden and the site itself, neighboring buildings, Lake Merritt, Snow Park, 19th Street, and the neighborhood environs, as specifically detailed below:

<u>The 42-Story Tower</u>

- Too high in relation to adjacent buildings – 244 Lakeside; The Regillus Apartments; 1800 Harrison Office Bldg.
- Too close to adjacent buildings – particularly, 244 Lakeside and The Regillus Apartments.
- Blocks and interrupts views of the lake from buildings, parks, and vistas situated to the south and west.
- Creates a concentrated development density in a small portion of one block that greatly exceeds the mean density of the city, and surpasses density levels any where else in the city, and possibly the region.
- Long shadows on Snow Park all mornings; on The Regillus Apts all afternoon.
- Subgrade parking intrudes deeply into high water table.
- Deep excavations into high water table could have destabilizing effects on adjacent tall building foundations.

- Need for onsite parking could be significantly diminished if situated in proximity to BART entries and surface transit facilities.
- Greatly increases vehicular traffic – auto, delivery, service vehicles – along 10th Street which is narrowed at this location.
- Must contribute to reducing the city's affordable housing shortage by providing at least 15% of its housing accommodations affordable to Oakland residents of mean income.

Lake Merritt
- Blocks and interrupts views of the lake from buildings, parks, and vistas situated to the south and west.
- Vibrations during deep water table excavations could have harmful effects on the sea life that inhabits the lake.
- Intrusion into water table below surface level of the Lake Merritt may affect the composition and quality of water in the lake.
- Significantly increased vehicular traffic to and from the development will add substantially to the quantity of air-borne particulates and pollutants affecting both air and water quality of the lake.

Shilling Garden
- Disruption and demolition of a unique, significant, important, and irreplaceable historical landmark
- Height, bulk, and scale of the development greatly overwhelms what may be left of the re-constructed garden
- Deep excavations into high water table will produce earth-carried vibrations through the Garden for vastly extended periods, and could have destabilizing effects on grade level improvements within and surrounding the Garden.

Snow Park
- Long shadows on Snow Park all throughout mornings throughout all year.
- Significantly increased vehicular traffic to and from the development will add substantially to the quantity of air-borne particulates and pollutants affecting both air and water quality of the park.
- Deep excavations into high water table will produce earth-carried vibrations through the park for vastly extended periods, and could have destabilizing effects on grade level improvements within and surrounding the park.

19tth Street
- Height, bulk, and scale of the development greatly overwhelms the contiguous street.
- Significantly increased vehicular traffic to and from the development will add substantially impact the carrying capacity of the narrowed width of 19th Street at this location.
- Deep excavations into high water table will produce earth-carried vibrations through the street foundations for vastly extended periods, and could have destabilizing effects on surface quality of the street and contiguous sidewalks and plantings.

The Regillus Apartments Building and The 244 Lakeside Apartments Building
- Deep excavations into high water table will produce earth-carried vibrations through the park for vastly extended periods, and could have destabilizing effects on building foundations of The Regillus Apartments Building and The 244 Lakeside Apartments Building.

- Long shadows cast on the Regillus Apts Building throughout all afternoons, and throughout all year.
- Blocks and interrupts views from adjacent buildings of parks, and vistas situated to the south and west and east.
- Greatly increased vehicular traffic to the proposed 42-story tower – auto, delivery, service vehicles – along surrounding streets will has disruptive impacts on parking and service traffic to and from The Regillus Apartments Building, The 244 Lakeside Apartments Building, and other buildings in the neighborhood environs.

I and my organizations believe that these conditions, together with both their projected and cumulative effects will cause and contribute to significant negative impacts now and for many years to come.

We urge the Commission(s) to reject the proposed tower development at this proposed site. We do recommend, however, that negotiations be extended to and made available to the developer to situate the proposed building, or a facsimile of the proposal before you, onto a more appropriate site within Oakland's urban core, especially along, or in the vicinity of Broadway, and convenient to BART and surface transportation hubs.

Sincerely,

James E Vann

James E Vann, AIA, Architecture and Planning
Oakland, California 94606
Tel & Fax: 510-763-0142
Email: jamesevann@aol.com

Klein, Heather

From: Leah Slyder Vass [slydervass@yahoo.com]
Sent: Tuesday, December 11, 2007 5:19 PM
To: Klein, Heather
Cc: Starks, Carletta; Nancy Nadel
Subject: Proposed Emerald View - 42 Story Condo EIR Issue

Dear Ms. Klein,

I attended the meeting on November 28 meeting at City Hall but left after 1 1/2 hours after hearing no one coming forward with the requested issues for the EIR report. I trust the session improved.

I certainly hope that seismic/safety issues will be thoroughly addressed in the EIR. Years ago I managed a 5 story building not far from the proposed condo development and was impressed with the extremely solid foundation that had been necessary to build even a building of that modest scale. The owner of the building had explained that, because of the nature of the land around the lake (lots of fill and silt) the foundations were necessarily massive. While I'm sure earthquake engineering has improved immensely over the past decades, we would be naive to think that such things are foolproof. What is more, with terrorism on the rise, such a tall building might be a target.

While anyone who lives or works in a structure assumes the structure is as safe as possible, it is the government we trust to look out for us (ie. "if it wasn't safe, they wouldn't have allowed it to be built"). Of course, condo developers are concerned with liability, but they have insurance and often a short-term interest in the property.

I hope that the safety of the future residents as well as the neighbors is fully addressed in the EIR.

Sincerely,
Leah Vass
250 Vernon Street
Oakland, CA 94610
510-326-6962

Klein, Heather

From: Pavlinec, Joann
Sent: Tuesday, December 11, 2007 8:54 AM
To: Klein, Heather
Subject: FW: Schilling Gardens Landmarks Hearing December 10, 2007

Joann Pavlinec
Planner IV, Historic Preservation
Major Projects
(510)238-6344

-----Original Message-----
From: Anne Wellington [mailto:awellington@wellingtonvisuals.com]
Sent: Monday, December 10, 2007 7:06 PM
To: Pavlinec, Joann
Subject: Schilling Gardens Landmarks Hearing December 10, 2007

Dear Ms.Pavlinec -

I am writing this email to add my voice to the community chorus seeking the intact preservation of Schilling Gardens. The loss of such a valuable resource, or its dismantling and partial reconstruction, would be a tragic loss for the City of Oakland. The reasons given by development supporters for such an act are specious at best, and are motivated by the myopic vision of greed, not legacy greatness.

One argument, that Oakland needs this high-rise in order to add distinction and uniqueness to our city, is blatantly false. In truth, the gardens are unique and irreplaceable. Even as the remnant of the original Schilling Estate that they comprise today, this remnant is considered such a valuable part of Oakland's heritage that it holds the highest ranking as a historic resource. No other city in the world has it.

The things that make cities distinctively world class are the individual features that cannot be duplicated in any other place in the world.
August Schilling propagated his spice gardens in Oakland, near Lake Merritt, and left Oakland with his unique mark as the founder of Schilling Spices. This history, distinction and historic resource cannot be improved upon by replacing it with a modern generic-style highrise.
"Emerald Views" type buildings are cropping up all over the world in every major city like fertile rabbits, rats or mice. Something this commonplace is no longer precious or unique.

The modern homogenous visual appearance of cities worldwide results directly from the recent proliferation of poorly designed modern buildings that have little distinctive in character or placement by artful urban planning.

More and more cities look like a jumble of concrete boxes punctuated by the latest fad: glass and aluminum towers. As cities raze their historic buildings and replace them with the aforementioned, the character that made affected cities unique is being lost. Infill development midrise buildings are designed with the concrete slab, cookie cutter architectural template that generates profits and BUBs (Big Ugly Buildings), little else. Variations in paint color and window placement are about all that distinguishes these individual buildings.

Now, we are having an infill development building boom with highrises jutting high above historic skylines designed with the same monotonous mediocrity, but with glass and aluminum instead - brilliant choice in a region of extensive landfill, a high water table, and riddled with major faults.

Are we really willing to let Oakland become the generic city so many others have become? Let's be wise enough to tease the doublespeak from the truth. Another highrise in the Bay Area will not make Oakland unique, it will simply make it look like every other city in the world that is doing exactly the same type of development with exactly the same high-rise design template.

For Oakland, Emerald Towers is the potential hole in the dike for even more highrises. There is another developer anxiously waiting in the wings for his chance to build his "unique" Oakland landmark a spare block away from Schilling Gardens at 1447 Alice Street. Approving the project at Schilling Gardens will open the floodgates. The plans for Alice Street look boringly similar to Emerald views, except that it is "only" 37 stories high.

Developers, knowing full well they have nothing original or distinctive to offer targeted cities, such as Oakland, sway Planning Departments and "Smart Growth" disciples with their fingers crossed behind their backs, with empty promises of the creation of a unique landmark that will make the city "world class".

The construction of such a project will do just the opposite. Destroying our truly world class assets to make way for these generic and gaudy structures is hardly the way to make Oakland a "model city".

In closing, I would like to suggest that officials in Oakland show world class courage and apply eminent domain to the Schilling Gardens in order to preserve this unique asset into perpetuity. In this way, Oakland may become the "model city" Mayor Dellums envisions by having the courage and integrity to save those precious assets Oakland has, which cannot be replaced or upstaged by any modern highrise.

Thank you for your time and careful attention to this issue. Our heritage is imperiled by this proposed project and our future distinction as a world class city is at risk.

Sincerely -

Anne Wellington

Klein, Heather

From: Sara Willis [sallydot@juno.com]
Sent: Thursday, November 29, 2007 12:00 PM
To: Klein, Heather
Cc: sallydot@juno.com
Subject: 19th Street Residential Condominiums Project

Good Day Ms. Heather Klein,

I writing as a Californian with a vested interest in the environment of Oakland.

Lake Merrit is a Gem of Oakland much like Central Park is to New York. It is an Oasis among a concrete landscape and to start shutting out the light with 42 or 45 story buildings could bring it to nothing more then a concrete fountain in a cocreate jungle.

400 unites with their families with their cars and visitor's cars will affect not only the Lake, the trees the wildlife but also the residents that live there.

I am writing this also in support of the residents of Lake Park on Alice who are elderly and will be afflicted with the woes and pollution of construction. I am sure a few will suffer greatly and may die with all the pollutants being kicked up and strewn around.

Sincerely,
Sara Willis
4216 Irene Dr.
Martinez, Calif. 94553

Klein, Heather

From: Robert Yeager [rcyeager@mac.com]
Sent: Thursday, December 06, 2007 10:18 PM
To: Klein, Heather
Subject: Schilling Garden tower project

I have lived in Oakland all my life and grew up around the lake. I still live only three blocks away from the southern part of the lake. We do not need a 42 story tower in Oakland. We already seem to be building more apartment buildings, condos, lofts, etc in a downward market - we don't need more. It would loom up and be way out of proportion to all the other buildings and look ridiculous.
Further, the garden is a historic landmark and should instead be preserved and brought back for all citizens to enjoy, especially with the lake development plans to make more green space and public places of natural beauty. This is a developer (with connections to former mayor Willie Brown) who does not have Oakland's best interests at heart.

Judi Yeager
2147 Park Blvd.
rcyeager@pacbell.net

1850 Alice St.
Oakland, CA 94612
Dec. 6, 2007

Heather Klein, Planner III
City of Oakland CEDA
250 Frank Ogawa Plaza, Ste. 3315
Oakland, CA 94612

RE: ER060009, 19th St. Residential Condominium Project

On behalf of the residents at 1850 Alice St., Oakland, CA. the Lake Park Residence, I submit the attached signatures representing the majority opinion and requesting that the proposed tower NOT be constructed at this site. We believe it would have a severely harmful effect on our lives by the number of cars and other vehicles to be associated with some 400 or so people in close proximity.

This is in response to your NOP of draft EIR, announcing the public Scoping Hearing of Nov. 28, 2007.

We would appreciate being kept informed of any further hearings. You may notify this group by contacting Gertrude Young Apt. 712, or Dr. Jane F. Lee, Apt. 1210, 1850 Alice St., Oakland, CA 94612.

Gertrude Young

Gertrude Young

Encl.

City Planning Commission
City of Oakland
City Hall

December 5, 2007

c/o Heather Klein, Senior Planner

re: Scoping comments for 222 19th Street Project
(my suggestions for Scope – discussion is in plain text, suggested Environmental Review activities – i.e. scope items - are in bold text)

I own property approximately 400 feet from the project proposed for 222 19th street in Oakland. It is my intention to retire to that location some day. My interest in the property is similar to the developer's, that of a property owner. My condominium – a single unit – was (according to assessor's records) sold to me at a sum almost twice that of the funds the developer invested in this parcel. The city need not be overly concerned with the developers' at-risk funds. The developers are attempting to leverage a relatively small investment of under $500,000 into a cash return in the $10s of millions of dollars. If the project were to receive approval and entitlements to build as proposed, the investment in land will be less than $2,000.00 per unit proposed, essentially nothing.

The project proposed is a 42 story condominium tower in a (much shorter – yet still dense) residential neighborhood on the south shore of the Glen Echo arm of Lake Merritt. Prior to its subdivision into separate properties, the parcel in question (project site) was part of a lakefront estate of historical significance and the parcel in question is the only portion of that estate that hasn't been built on. The garden that remains on the parcel itself (even without the portions developed in the early 20th century as the Regullus and 240 Lakeside), has been ruled historic.

It should be noted that the proposed condominium tower is three and one half to five times taller than the adjacent residential apartment buildings – which are already dense themselves. The site is immediately adjacent to Oakland's Snow Park. The park is scheduled to be enlarged with measure DD funds. The building proposed will affect both the present and future park. It will also affect the Glen Echo arm of Lake Merritt directly, generating a new looming presence over that arm of the lake, which will include the casting of shadows at certain times.

The Environmental Impact Report and Environmental Review of this project should consider at a minimum, the following:

1. A policy of Oakland's General Plan states that development should "respect parks". Building a 42 story high-rise adjacent to a park (soon to be enlarged) that already has two midrise office buildings on the south and west side of it, is "disrespectful" and in violation of this General Plan policy. **It can reasonably be argued that the General Plan - by the provision of this policy to "respect parks" - does not allow any building on this site that would shade its sun or**

loom over it in any significant way. The Environmental Impact Report(s) that are done by City agencies and commissions for this project must consider and evaluate this.

2. The general plan for R-90, which this parcel is shown within, allows for a certain maximum Floor Area Ratio. The proposed project is right at the limit. However the General Plan provides that "lower FARs should be considered near Lake Merritt". **The City's environmental impact reviews should consider the action lowering the portion of the office building at the southwest corner of Alice and 19th when it was constructed (20 years ago?) as a standard for heights appropriate around Lake Merritt in this case.** The Schilling Garden at 222 19th is a more sensitive site then the southwest corner across the street was. It is inappropriate to the Gold Coast/Lake Merritt westside residential neighborhood to allow any project on this site that is any taller than that shorter office block at the corner of Alice and 19th.

3. **The environmental review for this project must first consider just the project itself without the mitigations offered by the developer, and the project must be reviewed on its merits prior to and separate from considering the mitigations.** For example: Funds promised to a fight club in East Oakland should not be considered when evaluating a project that would disturb the Glen Echo Arm of Lake Merritt, Snow Park, and the entire Gold Cost neighborhood.

4. **In addition to any other studies, two separate EIR processes should be conducted by the City of Oakland Department of Recreation and Parks – one for the effect of this on Snow Park (including its future expanded foot print), and one for Lake Merritt (especially including its "Glen Echo" arm, and the shore areas thereof.**

5. **The technique of story-poling using sticks is not possible here. An alternative - with balloons and kite string (or something similar) should be used to disclose to the community just how tall this project is proposed.** (An assembly of kite strings and balloons can temporarily establish the presence of the building on the skyline, in the neighborhood, and over the lake, so that the community can have a preview of what it will be before its presence becomes irreversible).

6. **A topographic viewshed model, should be developed. These studies should be used, not the developer's models or renderings. This study should include a 3d-model in a GIS software that includes parcel information and becomes the basis for notification of owners and residents of the true area that would receive view and shade impact.** The developers' presentations and discussions of these impacts should not unduly influence the deliberations of city staff, officials, and the public. In hearings and community meetings, the developers have presented their renderings and models at hearings and

community meetings. The purpose of these presentations is to secure approval. They are marketing tools and planning tools.

7. **The ongoing operational energy budget of such a tall building should be evaluated. This includes special HVAC requirements, elevator requirements, etc.**

8. The neighborhood is already dense. It is in fact dense enough to be considered smart growth. This tower, as proposed, may be inordinately tall by a factor of 4, given the scale of the neighborhood around it, and the true need to balance work and housing. There are many vacant (parking lot) sites in the Gold Coast neighborhood and on Harrison that could accommodate housing – no one of them (including this one) needs to tower out of scale with the neighborhood. **The true housing needs and commuting patterns, etc, need to be thoroughly studied, independent of the developers' claims**.

9. **The effect of this project on an already congested parking situation should be evaluated. If there are 300 units, how many parking spaces will there be. Can the neighborhood sustain 250 extra second cars?** (assuming that a small minority of the larger units will have two parking spaces and the rest just one, as the pattern has been.

10. **The deed restrictions of a previous owner, requiring that certain historical features be kept intact should be considered and complied with.** They may prevent construction of this tower. It appears that one such restriction may prohibit developers' proposal to dismantle and reconstruct those features.

11. The City Planning Commission's scoping hearing stated that this project would involve the relocation of trees. There are four or five mature redwood trees on this site. The project scope statement presented by the Commission staff at the public hearing last week is incorrect if it is not possible to relocate mature redwood trees. The hearing may have to be repeated (or expanded upon) for the express purpose of developing a scope to evaluate the destruction of these trees if relocation is not possible. Competent neutral arborists will have to be consulted. In general, as part of the scope of any environmental studies, **City officials should take care not to repeat the developers' representations as fact without independent investigation**.

12. The developers and their staff have described mitigations along with their presentation of the project. **The environmental impact studies prepared by the city's staff(s) (plural if more than one agency - such as Parks and Rec in addition to planning, as I suggest elsewhere) must evaluate the proposed building as an entity and physical presence itself, before and apart from consideration of the proposed mitigations.** This is necessary in order to consider whether the proposed project does or does not have acceptable environmental impact, when considered by itself. Then the proposed mitigations

may be considered, from the stand point of whether they are sufficient (or whether any compensating mitigations that might be proposed would be sufficient) to compensate for negative or unacceptable base environmental impacts. This will enable the City to clearly examine alternatives to the base project itself (i.e. an actual reducation in scale or a no build alternative), a category of "mitigation" that is neglected in the developers' present proposal.

13. Any claims by the developers that the project offers benefits due to the economics of additional housing (apparently luxury), such as those proffered to an East Oakland fight club – cannot be taken at face value as an addition to Oakland's economy. The units here may merely represent a transfer of new housing units from the many other potential housing sites that exist, such as certain vacant lots on Lakeside Drive, Madison, Jackson, Harrison, and Alice. **Appropriate, neutral economic evaluation should be performed by the City, independent of the developers' assertion of benefits. Such studies should consider whether the project merely transfers Oakland housing that would have been built elsewhere – and whether other, more appropriate or in-scale sites and development proposals are available – both to the developer and the City.**

14. Neighborhood notification for this project should extend at least as far as its effects. This is far greater than 300 feet, and would definitely include Haddon Hill/Eastlake, Adams Point, various office building owners and tenants to the west and northwest, various property owners in the CBD to the Southwest, the Department of Recreation and Parks, and so on. **The limits for notification should be established after an objective view-shed analysis has been performed to assess view and shadow impacts and present. Shadow, traffic and other studies may well indicate a much wider impact than 300 feet, and the entire effected areas should be notified.**

15. Harrison and Alice Street do not really cross but if you project the straigt run of Harrison from Grand South to 20th through Snow Park and 240 Lakeside, and Alice, the two streets would meet on this site. This means that the tower would be directly in the line of sight of people using either street. It would also tower over the entire Gold Coast and West Lake Merritt Apartment district. **The study scope should include a comprehensive set of photographs or other illustrations looking towards the site from Alice, Harrison, 19th, 20th, and the other streets in the area – with the proposed tower drawn or airbrushed in. The photographs should be taken to reflect the perspective of a normal viewer and should be neither more wide-angle or telephoto than the view from the naked eyes. I would recommend Oleg Verbeyev, a distinguished photograph with the Oakland Camera Club and one of the world's leading experts in 3d photography, to prepare this study.**

16. A project that does not exceed the height of the Regellus Condominiums adjacent and east of the site will not shadow the Lake nor tower over its neighborhood and may clearly be consistent with the guidance of Oakland's General Plan for a

"reduced floor area ratio" of R-90 zoned areas near Lake Merritt.. A project which maintains the setback that the developer has proposed from the Regellus, and that is at least as far back from the edge of Snow Park as the project is tall, may clearly satisfy the "respects parks" criteria of the General Plan. and the guidance of Oakland's General Plan for a "reduced floor area ratio" of R-90 zoned areas near Lake Merritt. **If the environmental review process involves developing or considering alternatives or revisions, it should consider this one – which respects both of the pertinent items of guidance in the General Plan. A no-build alternative should also be pursued in the environmental review** as the project site is a very desirable and appropriate addition to Snow Park and the site's deed restrictions and historic designation may suggest or require historic open space as the most appropriate use for this site. The study should review whether destroying historic features (as the developers propose to do) and reconstructing them (as the developer promises to do) violates a deed restriction that requires that those features remain intact.

The above items are a partial list, and I may have further submittals during the public comment period for scoping over the next couple of days.

SERIOUS CONCERNS ABOUT PROPOSED HIGH RISE AT 222 19th Street Project

Case File #EROS-009;CMDVOG-142

1- AIR POLLUTION: The 3+ years of construction would significantly contaminate the air we breathe. What is the distance between the proposed building and the three residential buildings surrounding this small area? And one of these buildings is a Senior Retirement residence housing many frail and elderly.

2- TRAFFIC CONGESTION: Lakeside Drive will soon be only 2 lanes further contributing to the increased traffic if more residents are housed in this already congested area.

3- SNOW PARK: Wildlife would be compromised. The park is lovely as it is. What would be the significance of adding lights and commercializing this natural landmark? Children enjoy the park for play activities, and adults who work in the nearby offices enjoy the park for lunches.

4- NOISE POLLUTION: This is a quiet residential area. An observation deck on the top floor open to the public, and a café will not only create more traffic congestion, but also additional noise. It is not appropriate in this neighborhood.

5- CONSTRUCTION CONSEQUENCES. What effect would the weight of the major construction equipment and the ground shaking have on the 3 old adjacent buildings? Isn't this area on land fill?

6- TERRORISM TARGET. Far fetched, of course. But being Oakland's tallest building it would be a natural target and situated in a residential neighborhood would wreak havoc in the area.

7- AESTHETICS. The scope of this building is completely out of sync with the neighborhood. This area has the feel of Paris (a plus for Oakland) – symmetrical residential buildings, augmented by the curvy the Kaiser Center, 1999 Harrison & Essex. Think of how this building would look in Paris. It wouldn't fly here either.

8- THE SCHILLING GARDENS, A PIECE OF OAKLAND HISTORY. So little is left. Let's find a way to make it accessible to Oakland residents so that all can appreciate it.

9- LAKE MERRIT PLAN. How does this building fit in? What are the restrictions for high rising view-blockers on the lake? When will it end? Remember the Fontana debacles in San Francisco? Do we want this in Oakland?

Concerned Resident: 244 Lakeside Drive

APPENDIX A-2

COMMENTS RECEIVED AT SCOPING MEETINGS

DRAFT
19th Street Residential Condominiums
Scoping Meeting – Oakland Planning Commission
November 28, 2007

Public Comments

Grant Chapel

- The development will revitalize the area by providing jobs and green design

Jonathan Baer, Consultant for the developers

- After community meetings, the project was changed to become much more environmentally sensitive
- Below-grade parking
- Café will provide public use and access
- The peak roof will provide drama and add to the sky line
- There are environmental benefits to the location of the building. It is close to BART and downtown employment center

Mike Badinski

- Development of the site will make the now private gardens more accessible
- Existing neighborhood desires should not outweigh desires of future building.

____

- The City should embrace this signature building

Sean Kadren

- The project promotes high density, reducing environmental destruction

Laura Blair, Attorney with Terra Linda

- Has a “brief” on the historic resource value of the garden.
- City needs to base any conclusions on the project on the full record.
- Current garden is really just a remnant.

Sherry Matza

- Site does not meet definition of historic resource
- Most do not know it is there
- The original lot was subdivided

Christina Lloyd

- Development provides opportunity for city needed development
- This project is smart growth
- Provides welcoming landscape

Glen Wilson, Contractor for the project from San Francisco

- Proposed project will provide jobs
- The project will utilize “screw-in” pile, which is quieter than standard piles
- Study how this pile method will be better than traditional pile driving.

Bruce Steward, Insurance provider in Oakland and part of the East Oakland Boxing Association

- The development offers Oakland opportunities to achieve its goals

Kerry O’Keefe, Co-owner of the site

- This building is significant to its time, just as the garden and the Regillus and Bechtel buildings were significant to a past generation

Emelio Oterro

- Oakland supports this project, it will provide job opportunities in Oakland

Robert Mallace

- Traffic is an issue, people need to be able to walk and bike to work
- The building incorporates green design

David O’Keefe, Co-owner of the site and Project Applicant

- Location of project is good because it is near BART, recreation, and jobs
- Has solar voltaic cells, wind turbines, and a gray water system

Jane Powell

- This is a histories site with a City of Oakland “A” rating
- Oakland Parks and Recreation should have bought it when they had the chance
- Conduct an analysis to determine if the project really will prevent 1 acre in the Central Valley from being developed
- Seriously need to consider the “No Project Alternative”

Ann Wellington, Lakeside Apartment Building

- Represents a corruption of the City and the developer
- Characters involved in the project are “interesting”
- This garden is a first class landmark

_____

- Health of Lake Merritt is a huge concern for City
- Pumping of groundwater will impact the lake
- Look at housing and population - the project will not serve existing Oakland residents

John Burgess

- Will bring lots of people to the skyscraper
- Personally prefers the natural character of the lake
- Traffic is a huge concern
- Impact to existing Snow Park needs to be examined
- The building is just too large

Naomi Schiff, Oakland Heritage Alliance

- Has a postcard from 1911 with image of the cement arbor
- How is the arbor going to be preserved? Don’t move and recreate out of new materials. Need an analysis of the reuse of any garden materials.
- The arm of the lake that the building would sit on is very narrow and shallow. Need to examine the impact to wildlife habitat of the lake
- Lake Merritt is a National Historic Landmark
- Lake Merritt includes a National Wildlife Refuge
- The Preservation Element of General Plan needs evaluation
- Project should be moved – applicants also own a parcel1 at 19th and Webster
- The site has lots of credibility with City’s historic study
- Snow Park should not be merged with this project, it should be maintained as a separate entity
- Will the building shade oak trees in Snow Park?
- Need a community benefits analysis

Chris Patello

- Need additional information on arbor

James Moss, Representing Seniors in Lake Park Residences

- Submitted petition from residents

- Cars will move slowly with the valet service, cars will be moved onto the street where there is already limited space - need to look at the congestion it would cause on the surrounding streets
- Need to endure safety at senior crossing at 19th and Alice

John Kline

- This is the wrong site for this project; preserve the site as park land
- Voters have approved bonds for park funding and expanding parkland at the lake in the past, which shows Oakland residents are committed to saving open space.

Frank Rose, East Oakland Boxing Association

- Project will bring in money and help recruit police, which will help reduce crime. Look at how it will help the City recruit more police officers.
- The project will bring infrastructure improvements

Carl Chan

- Supports idea to build more units for more people on less land

Ms. Jackson

- Need to examine traffic impacts on Alice and Harrison
- Need to examine parking issues, there is no street parking
- Concerns with noise
- Concerns with pollution

John Jay

- Need to study:
  - Noise
  - Shadow
  - Traffic and transit
  - Impacts to the lake
- Is this the right spot for this building?
- Aesthetic of the garden – this asset can be expanded and replicated somewhere else

Mark Borsuk

- Supports project because the neighborhood needs gentrification over stagnation

Terry Brach, Resident from across the street

- The tallest building in the area is only 14 stories tall while the proposed building would be 45.
- 19th Street has only 2 side streets
- It is across from elderly housing

____

- Need to think about benefits this project will have in other parts of Oakland

Support from kids of East Oakland Boxing Association

Michael Stewart

- In support of project because cities grow and change

Ali Rasculi

- The area needs more development
- High rises along the lake are great

Carlos Plazola, Terra Linda, applicant team

- This is a public process and we embrace the range of comments provided

Leanne Zimmly

- Snow Park is a fine resource
- Need to study:
  - Light
  - Air
  - Drainage
  - Impacts on lakes
  - Impacts on incomes of residents
- Impacts on local business- will new residents support local business?
- Preserves neighborhood from other gentrification

Brian Canepa, Nelson/Nygard, consultant to the applicant.

- Parking and congestion will be studied in the Draft EIR
- The site is urban, not suburban; households will have fewer cars because of the proximity to transit.

Deborah Brown

- Consider loss of green space
- Impacts to Snow Park
- Traffic - Homeowners have higher automobile ownership than renters
- Building would dwarf other surrounding buildings
- Consider using other sites

Erika_____, Neighbor

- New tall needle built for wealthy and is only for the benefit of new residents

Gwen McDonald

- Traffic – the area is already congested
- Need to examine the geological impacts of sub-surface garage

Tim Keet

- The building will positively affect open space, green space, and public access
- The view platform included in the building design will mitigate visual impacts
- Revenue from project will be positive

Joe D_____

- Consider the positive impacts of the project:
  - Conversion of a private garden into public space
  - This project speaks to the character of the downtown neighborhood
  - Environmental Impacts – soil loading?

Blanch O_____

- Do not let Oakland become hostage to condos
- Examine impacts to traffic
- Dust during construction is a concern
- Need additional greenspace in the City

Matt Novack

- Look at the No Project Alternative; if the project is not built here, development spreads out
- While high end of housing marked, it does create a ripple in supply. Empty nesters will move from suburbs to this development, opening up housing units in the suburbs for others to move into.
- Need more vitality in area, Snow Park is not safe

Kelly _______

- Does not take kids to Snow Park either, area is dead at night and creepy

Kathy Keener

- The project will effect the environment and the entire city, Smart Growth is very important.

Joe O'Donoghue

- Shilling Park is not a historic resource
- Present site has been compromised

- There is a water crisis and other environmental issues; there is a dropping water table (associated with global warming, and associated water shortages
- Tall buildings are the paradigm

____

- Needs thorough and comprehensive review of hydrological and geological setting
- Construction may impact adjacent historic building
- Charter schools use Snow Park, Snow Park is closed at night
- Concerns with mixed use/retail, this is a residential neighborhood
- Be sure to consider traffic and circulation under Measure DD

Bob Schinoff

- Building will tower over Alice Street and the lake
- Make sure the project conforms with the General Plan
- Review General Plan Policy D8.2 – Does the project respect Snow Park

Michael Vellum

- The project is out of scale with existing buildings
- When the Essex building was built, the city promised no additional development on the lake
- This area was a cemetery, project development will disturb those bodies
- Land previously occupied by Chinese
- There is a condition in the deed of sale of this site that it cannot be developed

Steve Jacobson, Lake Park Retirement Management

- Height is a huge concern, a site closer to downtown would be more appropriate
- Economic impacts to Lake Park need to be examined
- Concerns with construction and noise
- New residents going elsewhere
- Look at affordable housing issues

Liz Dawson

- As a local business, supports additional residents in area, city should research benefits of adding population and support of local businesses. There would be benefits to local architects, surveyors, etc.
- Include moderate income units in building

Polly ______, Resident of Lake Park

- Likes the green elements of the building

- Concern with potential impacts to Snow Park; there are no lights in the park, however, lots of neighborhood uses take place in the park, such as Ti Chi, barbecues, and fairs. School children use the park as well

Michael Rollin

- New building can only be a benefit to City

Doug Comstock

- Elderly residents in area are not shut-in

Chris Katzen

- Impacts on mature redwood trees on the project site
- Look at cumulative impacts of shading and shadows

Sanja ______

- Look at the 30 story project in Emeryville, look at costs and impacts listed in EIR versus what happened in reality
- Code enforcement issues
- Take Measure DD into consideration
- Consult Laney, Peralta in outreach

Commissioners Comments

- Can we look at an off-site alternative
- Parking, there is concern with lack of available spaces the area
- Traffic
- Lake as natural wildlife resource, potential impacts to birds
- High income proposed, the project needs lower income opportunities
- Aesthetics – will the project cause a change to the skyline at lake
- Transportation Demand Management (TDM) is an interesting idea. Can the plan reduce the 1:1 parking ratio, can parking be un-bundled from residential unit
- How will the replicate the garden and provide public accessibility
- Safety in the neighborhood is important
- Staff has appropriately identified environmental topics in staff report
- List is comprehensive
    - Air quality – near seniors
    - 3 years of construction
    - Traffic
    - Shadow
- Likes the density

- The garden is special, but is it historic
- Opening the garden to the public will it maximize garden preservation
- The property tax collected is used throughout the city
- Parking
- Concern with liquefaction in proximity to historic waterfront
- There are migratory birds within the wildlife refuge
- Impacts to historic resources:
    - Garden
    - Apartment district
    - Lake Merritt
- Green building techniques – how much wind is needed to actually generate electricity
- Health and safety issues, pedestrian safety in area.

P:\SDZ0601\ADMIN\Mtgs-Hrgs\11.28.07 PC Scoping Comments.doc

DRAFT
19th Street Residential Condominiums
Scoping Meeting – Oakland Landmarks Preservation Advisory Board
December 10, 2007

Kirk Peterson, LPAB Vice-Chair

- Be sure the depth of soil provided is adequate to support landscaping (on roof, above sub-surface parking)
- Views from helicopter are not helpful

Rosemary Muller, Board Member

- Look at the recent history of the property

Public Comments

Joe O'Donoghue, project applicant team

- The property ownership went something like this: Bechtel to UC Berkeley to owner X to owner Y, who then tried to donate it to the city, the city rejected
- The park was closed to the public dues to safety and insurance restrictions
- Shilling estate has been subdivided, which changes the historic context and identity of the garden
- Any historic elements in the garden?
- There is a rumor that in the deed, it is stated that the arbor cannot be moved. However, this is completely unsupported by evidence.
- Development may use gate as a piece of art in the building
- How manage the access to the public viewing area?

Joyce Roy

- This is a good building in the wrong place. It belongs on Broadway where it could replace a concrete parking lot instead of a garden that helps diminish greenhouse gases.
- EIR should measure the greenhouse gases that will be caused by this building on this site.
- 19^{th} Street is not a nice walk at night from the BART so the residents will use cars.

Carlos Plazola, Terra Linda Development Services, project applicant team

- Good Transportation Demand Management (TDM) program developed for the project
- Good green elements in project design
- Brings people to the urban core, close proximity to mass transit

Joe O'Donoghue, project applicant team

- Dave O'Keefe was raised near a garden; Fiona Reed was brought over from Ireland to assess the site and the relocation of plants. Prior to current ownership, the garden was neglected and the soil was compacted. They are trying to figure out how to transplant the garden.
- This is a Victorian era garden – what values do we want to pass to our children -- this garden comes out of the Victorian era, which was great for the British but bad for the Irish. It was a time of conspicuous consumption and of accumulation. The garden does not mean as much to us today.

Naomi Schiff

- Please refer to the letter she submitted
- There needs to be a discussion in the EIR related to the new initiative by the National Trust for Historic Preservation that deals with historic American landscapes.
- The Landmarks Board has two examples of landscapes to be considered in a historic context, Mountain View Cemetery and Claremont Hotel
- Lake Merritt is a small body of water that needs careful treatment
- There are plenty of cafes in the area

Orna Sasson, Lakeside Apartment Neighborhood Association

- Plants need to be looked at and documented in order to determine if they are the same as the plants that are sold at nurseries. If there is no existing documentation, DNA testing needs to be done.
- Hybridization of plants on in garden?
- Project will close in Snow Park and Measure DD is trying to keep this from happening.

Jane Powell

- Seriously consider the No Project Alternative
- Just because the garden is not open to the public does not diminish its value.

John Klein

- In trying to save the garden consider day lighting or making it a part of Snow Park
- Oakland residents want to retain and expand parkland around Lake Merritt. (First in1907 and then 2002 with measure DD)
- Commercial projects on parkland that don't get approved don't leave Oakland, they move to a different site in the city - see examples of Splash Park and Trader Joes, 12th Street Cathedral Park, and the Fireland site.
- Once a project on parkland is turned down, more funding is generally given to that site for improvements.

Antonio May

- Garden is more than the arbor, it includes 4 mature redwoods
- The building cannot be sustainable if it is replacing a green garden. It should be put on harmful concrete parking lot, especially when there are several sites that are so close. The building will not reduce greenhouse gases or be sustainable.

- The garden is not what it was in 1892, but it should be compared to what was there in 1985 when the city designated it.
- The helicopter views are misleading.
- Building is too tall and doesn't reflect the style of the neighborhood
- "Eyes on the Street" are not needed because there are senior across the street
- Look at the No Project Alternative
- Look at moving the building to another site

Michael Bowman, Regillus resident

- Project would result in a loss of garden and a loss of Snow Park
- Issues with shadow need to be examined
- School children (there are 3 charter schools in the area) use this site during the day
- Schilling garden was opened to the public for a period of time
- The garden belonged to the Bechtel's and was Mrs. Bechtel's project. It is not just a collection of plants, but it is important because of the way they have been put together, age, and grow
- Regillus building was designed to view the garden. The largest window in each unit are on that elevation
- Present owner does not take care of the garden because they have an interest in letting the garden deteriorate

Jim Moss, Resident of Lake Park

- Site rates an A1 historical garden by Oakland

Laura Blair, Terra Linda Development, project applicant team

- Garden is not on the State registry, but is on the city's list that was completed in 1985
- CEQA does not require that it be on the state register, but local register does not meet CEQA guidelines. It would have to be designated as a landmark or recognized in an ordinance.

[Heather Klein, Senior Planner, City of Oakland: the Environmental Impact Report will clarify the historic resource designation an and analyze potential impacts to historic resources]

Landmark Board Discussion

Rosemary Muller, Board Member

- Review recent history leading up to the historic rating in 1985. Was the space private or quasi-public? Research should be done on this topic.

Betty Marvin, City of Oakland, Planner at the Oakland Cultural Heritage Survey

- Historic survey of the site was part of the central district surveys

Naomi Shiff

- The site has often been open to the public for garden tours and weddings; Jerry Brown held events there

Sean Tavernier, Board Member

- Need to show respect for an A1 rating. It was rated A1 for a reason.
- Consider the compatibility of building with adjacent uses (historic buildings, greenspace)
- Likes green building design
- If site continues as a park/garden, there is little value in preserving that resource if people cannot enjoy it. Parks in the city lack flowers. This garden has flowers, which makes it a special resource.
- Evaluate the No Project Alternative
- Has anyone looked at the possibility of a land swap?
    - ______ says that there were 2 site for consideration: One off of Alice, but the City didn't own the site, so it was not feasible, and second was on the other side of the lake, and it was determined that a highrise was not appropriate on that side of the lake.
- Project should be evaluated for inclusion on the National Register
- Analyze plants to see if there are any rare plants on the site
- Look at impacts to mature trees (oaks and redwoods)
- Shadow studies should look at existing and proposed landscape

Kirk Petersen, LPAB Vice-Chair

- What is the value of the land; does the building have to be 42 stories to be economically feasible? Would it be economically feasible to have a 10 or 20 story building?
- Address the issue with the historic designation. The site is also in between a historic district and a historic building. Will this project impact those areas?
- Redwood trees on site are rare in downtown
- Is there an architectural alternative? Could there be other treatments to the building that would allow it to integrate better into the surrounding neighborhood?

Date: July 31, 2007

Name: Monica Plazola

Comments: As a resident in the Fruitvale district with 3 young children, I welcome the opportunities Emerald Views presents - from gardens open to the public, to a way of viewing the lake from the upper stories, I feel it would enrich our experiences in Oakland + make me proud to show it off to my out-of-town family.

Emerald Views Community Meeting

Date: July 31, 2007

Name: Ken Ross

Comments: A thing that makes many of the buildings in the area interesting and beautiful is the use of curved lines in the architecture. Why are there none in yours? Please add some. Especially on the lower floors where it currently looks really sterile and boring.

Emerald Views Community Meeting

#3. Charter schools use the snow part for recreation, Tall building as in New York do not create better public schools. Are the families with children being included?

Date: _____July 31, 2007_____

Name: Ida Dunson

Comments: 1. How ethnically diverse is your Company. I grew up in West Oakland in the 30's and Prescott elementary & Jr. High were ethnically diverse. 2. If everyone from the subrubs come back into Oakland we will see this diversity

Date: _____July 31, 2007_____

Name: ______________________

Comments: ______________________

Date: July 31, 2007

Name: Nancy

Comments: Frankly, this project sho[uld] never have progressed to this st[age]. It's too large and the park should not have [been] sold for "a song" for the benefit o[f those] who don't live in ~~[illegible]~~ Oakland. Div[ide] project in 4 parts and build it [in] Walnut Creek, who claims its building a "walkable"

Emerald Views Commu[nity]

Date: July 31, 2007

Name: ORNA SASSON

Comments: TOO BIG. DOES NOT FIT WITH DISTRICT

Emerald Views Comm[unity]

Date: July 31, 2007

Name: [illegible]

Comments: A good building is needed but this space seen on 19th St does not seem to warrant a 40 story building that over shadows all surrounding buildings + the view of the lake from the neighbor's now high rise buildings

Emerald Views Community Meeting

Date: July 31, 2007

Name: Gold Coast Neighbor

Comments: This building is completely out of character with this neighborhood All urban areas need respite from relentless density. Today, Oakland is filled w/ residential areas (including the Gold Coast) that of the over built & overcrowded San Francisco urban landscape. Oakland was never meant to be a competing urban center to San Francisco. It has always been a bedroom community to S.F. Why change that? The ~~Emara~~ Emerald Views is an insult to the neighborhood & will destroy the livability of Oakland.

Date: July 31, 2007

Name: Virginia Robles

Comments:

Oakland - a Mediterranean City - no more?

Emerald Views Community Meeting

Date: 31 July 31, 2007

Name: LEONE EVANS

Comments: TOO TALL FOR THE LAKE!!

Emerald Views Community Meeting

Date: _____July 31, 2007_____

Name: Nancy Reilly

Comments: I work close by & walk around the lake most lunch hours. This building along with the landscape plan looks like a beautiful addition with a minimal impact to the environment

Date: _______July 31, 2007_____

Name: CAL FOX

Comments: TO BE GIVEN PUBLICLY

Date: July 31, 2007

Name: JAMES JARVIS JR

Comments: Does the building fit into the general plan, and what is the general plan and ~~the~~ zoning for this area?

Date: July 31, 2007

Name: Tom Thurston

Comments: I appreciate the value of the tower in unifying the skyline

Emerald Views Community Meeting

Date: July 31, 2007

Name: Elise Ackerman

Comments: There is a moratorium on condo conversions in Adams Point. Converting existing duplexes & triplexes would provide affordable housing. Your development will not. Why should we sacrifice a livable community ~~[illegible]~~ in return for no increase in affordable housing.

Date: July 31, 2007

Name: John Jay

Comments: Neighbor Resident - First Lived Here in 1975 ~~[illegible]~~ Will be able to see building from my residence Elegant Density - Transit friendly Economically positive - Esthetically positive

Date: _______July 31, 2007_____

Name: Steve Rochon 320 Lee St. #806

Comments: Good luck! ~~[illegible]~~ This is an excellent location for a high-rise & seems to be a well thought-out project.

Emerald Views Community Meeting

Date: _______July 31, 2007_____

Name: Mark Handin

Comments: Great project!
Best of luck.

- BayRock Residential

Emerald Views Community Meeting

Date: July 31, 2007

320 Lee St. # 703
Oakland, CA 94610

Name: BRIAN DOBBS

Comments:

I support the proposed new high rise building / Emerald Views. Oakland needs more high rise housing especially from downtown to the lake.

Thank you
Brian Dobbs

Emerald Views Community Meeting
7/31/07

Date: July 31, 2007

Name:

Comments:

What's the square footage of the coffee shop? Can you make it larger by wrapping it around 19th St, creating an "L" shape... or can you find space on the ground floor for another shop or store, perhaps a bakery or sandwich shop. Given all the potential negative impacts on the neighborhood — traffic, shadows, parking problems, etc — maximizing ground floor retail space is one way to offset those negative impacts

Emerald Views Community Meeting

Date: ______July 31, 2007_____

Name: Sandra Pike, Appraiser

Comments: (1) What plans are made for the ongoing mgmt of proj after it is built. Concern: abandon maintenance of project after initial construction

(2) Why would buyers be interested in purchasing here when there are so many new vacant units currently on the market + not selling? e.g. does this population support a project in this price range.

Emerald Views Community Meeting

Date: ______July 31, 2007_____ - please send answers:

nimiah@excite.com

Name: Nimia M. Lanes Bourchary

Comments: (1) Is the height rendition accurate in depictions demonstrated? For a 42 story building it seems only slightly smaller than the 20 story bldg. Wouldn't it stick out much higher? (2) Why not 10 story high or 20 story high? More density also creates greater use on public utilities & deterioration. Why not be more moderate? (3) What kind of linkage does this have with your projected bldg. projects along 12th St around 30-40 near safe storage? Could it be that bringing major projects together is more cost effective for Tierra Linda Developments which makes you more reluctant to compromise in height?
(4) Can you build a smaller building with all the same amenities included? Why not build a smaller bldg?
(5) FYI, just because the city plan permits large bldg does not mean they have to be built that way.
(6) What are the #s for long term employment generated by this project?
(7) What type of eco appropriate amenities are planned with this structure. Example solar panels, wind

Emerald Views Community Meeting

generating energy, composting, reuse, recycle. If Oakland is going to be in the forefront of eco sustainability what are you doing to help us get there?

(8) Will there be parking sufficient for visitors of the residents in the area?

(9) What about ~~our~~ our ducks & geese that walk to snow pond? They are an Oakland treasure how will they be impacted.

(10) How does this bldg really make the neighborhood safer? We have quite a bit of density already ~~what~~ wouldn't this create greater strain on our public enforcement services?

(11) What is the real economic feasability for a bldg any size in this neighborhood for Oakland?

(12) Will the park maintained by the bldg always be open to the public?

Date: July 31, 2007

Name:

Comments: ~~Too long. A lot of fluff. Let the facts speak for themself.~~

LEED certified? What sustainable/renewable energy features? What is the developer giving back to the Oakland community (e.g. donations to local non-profits? Is there a requirement or goal to use local sub-contractors?

Emerald Views Community Meeting

Date: July 31, 2007

Name: Lisa Young

Comments: In general I like the design ideas and ~~concepts~~ concepts - especially improvements to Schenley Park and efforts to build community. Very ne

To support this though, I would need to see a significant reduction in height. Personally, I prefer more traditional architecture - in particular beaux arts. The ~~[illegible]~~ buildings that were built prior to the 1950s are so beautiful.

Emerald Views Community Meeting

This is a note to City staff:
good idea would be to create
for this area so we don't have
this with each new building.

Date: _____July 31, 2007_____

Name: Manuel Beltran

Comments: ~~Here~~ We as fruit vendors & latinos would like the opportunity to enjoy the use ~~use~~ of the Park, without being scorned or feeling out of place.

Emerald Views Community Meeting

Date: _____July 31, 2007_____

Name: Michelle Serna

Comments: I am for this project, its about time Lake Merritt opens up to the public and it will Be nice to see people of all races taking in the Beauty of the Gardens — only Rich people are allowed this priveledge

Emerald Views Community Meeting

Date: July 31, 2007

Name: STAN Ossofsky

Comments: What about the Sound & vibration issues with Pile drivings this is a Residential area? the immediate area Could be uninhabitable.

Emerald Views Community Meeting

Date: July 31, 2007

Name: Jane Powell

Comments: Take your 42-story building and shove it! Neither the RBA nor Joe O'Donoghue is welcome in Oakland. Let Mr. O'Keefe (try to) build his 42-story tower in his hometown, not ours!

Emerald Views Community Meeting

Date: July 31, 2007

Name: Ella Jane Skinner

Comments: Besides having to dig "way down" for proper support for such a tall building (the noise would be terrific). ~~we~~ at Lake Park are concerned about cars & traffic. 19th St. is one way & 222-19th St. faces it; ALL traffic will enter at alice Street which is the entrance of a Senior Residence of approx 200 people - We cross 19th St all day long to get to Lake Merritt, Longs, Kaiser Post office, etc — also we cross Alice St!!

Emerald Views Community Meeting

Date: July 31, 2007

Name: RON BISHOP

Comments:
- OUT OF SCALE HEIGHT, REDUCE 1/2 OR MORE
- NO PLAN FOR OAKLAND TRAFFIC
- NO BIKE / PED INFRASTRUCTURE IMPROVEMENT
- BORING FACADE
- HOW IS THIS TO BE POWERED? SOLAR/WIND

Emerald Views Community Meeting

Date: July 31, 2007

Name: R Goodall

Comments: There are already too many tall buildings near the lake. No more should be permitted.

Emerald Views Community Meeting

Date: July 31, 2007

Name: MARLA KAUFMAN

Comments: I LOVE THE IDEA OF A PUBLIC RESTAURANT W/A VIEW & GYM/SPA OVERLOOKING THE LAKE.

Emerald Views Community Meeting

Date: July 31, 2007

Name: Jim Connolly

Comments: ① What projects of similar size or complexity has this developer completed? What is the development company name?

② How many parking spaces in the building.

Emerald Views Community Meeting

Date: July 31, 2007

Name: Liz Whitted - Dawson

Comments: 1. Will there be Inclusionary Housing?

How much - % of units

2. What other similar Projects has the developer Built in the Bay Area.

* Residential / Commercial * More than 200 units

Emerald Views Community Meeting

3. Is there sufficient Parking - RE: City's Parking Requirements

Date: July 31, 2007

Name: Gabriel Shin

Comments: Have you given any consideration to changing the color of the glass cladding to ~~s~~ a more subdued color. ~~How~~ would you consider changing the spire of the building to abstractly mimic city hall to it's left.

Emerald Views Community Meeting

Date: ~~Aug~~ July 31, 2007

Name: Fernando Vargas

Comments: I am against a 40 ~~floor~~ story building in the neighbourhood I am a resident of Lake Park.

F. Vargas

Emerald Views Community Meeting

Date: July 31, 2007

Name: Steven Jimenez

Comments: Are the pictures on brochure & powerpoint of building to scale?

Emerald Views Community Meeting

Date: July 31, 2007

Name:

Comments: IN A DECLINING HOUSING MARKET, HOW IS A 42 STORY BUILDING GOING TO BE ECONOMICALLY FEASIBLE? NO ONE HAS MADE THIS HEIGHT WORK, EVEN IN A PROVEN RESIDENTIAL AREA OF OAKLAND. WHAT'S YOUR SECRET? WOULD YOU SERIOUSLY CONSIDER A 20-30 STORY BUILDING?

Emerald Views Community Meeting

Date: July 31, 2007

Name: Jim Maas

Comments: What about those who walk and those in the neighborhood. What about their quality of life?

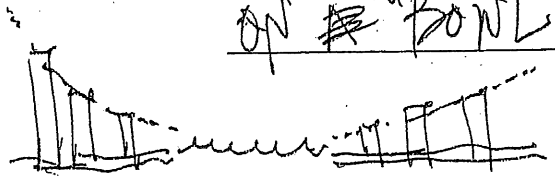
Emerald Views Community Meeting

Date: July 31, 2007

Name: JAMES E VANN

Comments: I AM NOT OPPOSED TO HIGH RISE BUILDINGS, AND, IN FACT, COMPLIMENT YOUR COURAGE, HOWEVER THE 42 STORY BLDG IS WRONG FOR THIS SITE.

2 RECENT COMMUNITY FORUMS AGREED ALMOST UNANIMOUSLY ON ~~A~~ "BOWL-SHAPED DEVELOPMENT FROM THE LAKE OUT



AT THIS LOCATION, THE PROPOSED BLDG VIOLATES THE "BOWL" CONCEPT.

Emerald Views Community Meeting

I OPPOSE!

Date: July 31, 2007

Name:

Comments: Tall buildings away from the lake!

Date: July 31, 2007

Name: Bryan Cohn

Comments: I question how many parking spaces you are providing per unit, Typically I think you will have two drivers per unit. (2 salaries to make payments) — are you allowing sufficient parking inside the building.

I could agree with a lower profile — shorter building — I think we disagree in our perception of beauty of the skyline

WJE | ENGINEERS
ARCHITECTS
MATERIALS SCIENTISTS

Alan R. Dreyfuss, AIA
Consultant

Wiss, Janney, Elstner Associates, Inc.
2200 Powell Street, Suite 925
Emeryville, California 94608
www.wje.com

tel 510.428.2907
fax 510.428.0456
adreyfuss@wje.com

SCHILLING GARDEN

EIR NEEDS TO SPECIFICALLY ADDRESS IMPACT OF NEW BUILDING ON NATIONAL HISTORIC LANDMARK LAKE MERRITT & ON WILDLIFE SANCTUARY

APPENDIX A-3

ITEMS SUBMITTED FOR THE RECORD

Laura Blair

From: Laura Blair [laurablairlee@sbcglobal.net]
Sent: Friday, December 07, 2007 9:30 AM
To: lblair@terralindaservices.com
Subject: Fwd: RE: Schilling Gardens / 244 Lakeside Apartments

"Toffelmier, Cynthia" <CTOFFELMIER@parks.ca.gov> wrote:
Subject: RE: Schilling Gardens / 244 Lakeside Apartments
Date: Thu, 6 Dec 2007 09:56:00 -0800
From: "Toffelmier, Cynthia" <CTOFFELMIER@parks.ca.gov>
To: "Laura Blair" <laurablairlee@sbcglobal.net>

The Historic Property Directory or Historical Resources Inventory (HRI) is a partial inventory of properties that have been identified and evaluated through one of the State programs. The inventory is not a comprehensive listing of all the historic properties in the State of California and includes many properties that have been identified through survey and evaluation as *not* historical or needing more research to determine eligibility. The inventory includes properties that have been *identified* as determined eligible or possibly eligible for listing in the National Register or California Register, as well as properties that have been *listed* in the National Register and the California Register. The status code indicates the historic identification of all listings.

Properties listed on the National Register of Historic Places go through a process where an applicant prepares a National Register nomination and submits it to Office of Historic Preservation for review. After a State review process, the Keeper of the National Register in Washington D.C. will approve or reject the final application.

State registration programs: California Register of Historical Resources; California Landmarks Program; and California Points of Historical Interest, also have an application and review process. The State Historical Resources Commission and/or the State Historic Preservation Office give final approval of properties seeking a listing under State registration programs.

Most (not all) of California properties listed on the National Register and through the State registration programs are included in the HRI with status codes reflecting their historical status.

For more information regarding National and State registration programs, registration requirements, and application materials and guidelines, please visit the Registration page on the OHP website, http://ohp.parks.ca.gov/?page_id=1056.

I hope this clears up some of your questions.

Cindy

Cynthia Toffelmier
State Historian II
Registration Unit
Office of Historic Preservation
1416 9th Street, Rm 1442
Sacramento, CA 95814
(916) 653-5789
(916)653-9824 fax
ctoffelmier@parks.ca.gov
www.ohp.parks.ca.gov

CALIFORNIA
HISTORICAL
RESOURCES
INFORMATION
SYSTEM

ALAMEDA
COLUSA
CONTRA COSTA
LAKE
MARIN
MENDOCINO
MONTEREY
NAPA
SAN BENITO
SAN FRANCISCO
SAN MATEO
SANTA CLARA
SANTA CRUZ
SOLANO
SONOMA
YOLO

Northwest Information Center
Sonoma State University
1303 Maurice Avenue
Rohnert Park, California 94928-3609
Tel: 707.664.0880 • Fax: 707.664.0890
E-mail: leigh.jordan@sonoma.edu

Betty Marvin
Oakland Cultural Heritage Survey
250 Frank H. Ogawa Plaza
Suite 3330
Oakland, CA 94612

RE: Maps of Oakland Districts and Landmarks

Dear Betty,

It was really nice speaking with you on Wednesday. I appreciate your help in improving our review capabilities and hope that we can continue to help each other out. I have included a copy of the September 2006 Office of Historic Preservation Historic Properties Directory for you as a thank-you for assembling some maps for us of your districts. These maps will aid us tremendously in our project reviews in Oakland. If you have any further questions, or if I can assist you in some manor, please do not hesitate to give me, or the office, a call at 707.664.0880.

Sincerely,

Bryan Much
Researcher I

PROPERTY-NUMBER	PRIMARY-#	STREET.ADDRESS............	NAMES............................	CITY.NAME........	OWN	YR-C	OHP-PROG..	PRG-REFERENCE-NUMBER	STAT-DAT	NRS	C
							HIST.SURV.	4623-1084-0000	09/30/94	7R	
011155	01-004123	3272 LAKESHORE AVE	EDY CANDY COMPANY, FENTONS ICE CRE	OAKLAND	P	1931	HIST.SURV.	4623-0091-0000		3S	
092806	01-000730	3277 LAKESHORE AVE	RUBINO BUILDING / LAKESHORE PUBLIC	OAKLAND	P	1927	HIST.SURV.	4623-4398-0000	09/30/95	5B	
							HIST.SURV.	4623-1085-0000	09/30/94	7R	
092808	01-000731	3291 LAKESHORE AVE	HERRICK-CROFT STORE BUILDING	OAKLAND	P	1936	HIST.SURV.	4623-4399-0000	09/30/95	5B	
							HIST.SURV.	4623-1086-0000	09/30/94	7R	
092809	01-000732	3300 LAKESHORE AVE	EUREKA PROPERTIES - KING GROCERY -	OAKLAND	P	1933	HIST.SURV.	4623-4400-0000	09/30/95	5B	
							HIST.SURV.	4623-1087-0000	09/30/94	7R	
092810	01-000733	3311 LAKESHORE AVE	MALLEY-DEZZANI GROCERY STORE	OAKLAND	P	1928	HIST.SURV.	4623-4401-0000	09/30/95	5B	
							HIST.SURV.	4623-1088-0000	09/30/94	7R	
092811	01-000734	3318 LAKESHORE AVE	JOLLY ROGER-DOELL PLUMBING STORE	OAKLAND	P	1935	HIST.SURV.	4623-4402-0000	09/30/95	5B	
							HIST.SURV.	4623-1089-0000	09/30/94	7R	
092812	01-000735	3333 LAKESHORE AVE	WOODBURN-PASSADORI SALON BUILDING	OAKLAND	P	1932	HIST.SURV.	4623-1090-0000	09/30/94	7R	
092813	01-000736	3339 LAKESHORE AVE	MALLEY-SCHNEIDER BAKERY	OAKLAND	P	1928	HIST.SURV.	4623-4403-0000	09/30/95	5B	
							HIST.SURV.	4623-1091-0000	09/30/94	7R	
092814	01-000737	3347 LAKESHORE AVE	MALLEY-SAFEWAY STORE	OAKLAND	P	1929	HIST.SURV.	4623-1092-0000	09/30/94	7R	
092815	01-000738	3355 LAKESHORE AVE	PARSONS-SHERMAN CLEANERS BUILDING	OAKLAND	P	1932	HIST.SURV.	4623-4404-0000	09/30/95	5B	
							HIST.SURV.	4623-1093-0000	09/30/94	7R	
092816	01-000739	3401 LAKESHORE AVE	MALLEY-STIER DRUG CO. BUILDING	OAKLAND	P	1927	HIST.SURV.	4623-4405-0000	09/30/95	5B	
							HIST.SURV.	4623-1094-0000	09/30/94	7R	
092817	01-000740	3415 LAKESHORE AVE	HEAFEY-LAKESHORE GROCERY COMPANY	OAKLAND	P	1927	HIST.SURV.	4623-4406-0000	09/30/95	5B	
							HIST.SURV.	4623-1095-0000	09/30/94	7R	
092818	01-000741	3421 LAKESHORE AVE	MALLEY STORE BUILDING	OAKLAND	P	1930	HIST.SURV.	4623-4407-0000	09/30/95	5B	
							HIST.SURV.	4623-1096-0000	09/30/94	7R	
092819	01-000742	3429 LAKESHORE AVE	FRANDSEN-SAFEWAY-TRAVERSE GROCERY	OAKLAND	P	1928	HIST.SURV.	4623-4408-0000	09/30/95	5B	
							HIST.SURV.	4623-1097-0000	09/30/94	7R	
092820	01-000743	3501 LAKESHORE AVE	HILSON APARTMENT BUILDING	OAKLAND	P	1921	HIST.SURV.	4623-4409-0000	09/30/95	5B	
							HIST.SURV.	4623-1098-0000	09/30/94	7R	
157044		3534 LAKESHORE AVE	LAKESHORE AVENUE BAPTIST CHURCH	OAKLAND	P	1957	PROJ.REVW.	FCC050322C	08/10/05	6Y	
106179	01-009446	3573 LAKESHORE AVE		OAKLAND	P	1924	HIST.SURV.	4623-3114-0000	01/08/97	7R	
106180	01-009447	3850 LAKESHORE AVE		OAKLAND	P	1912	HIST.SURV.	4623-3115-0000	01/08/97	7R	
011190	01-004158	LAKESIDE DR	MERRITT TRACT / LAKESIDE APARTMENT	OAKLAND	P	1907	HIST.SURV.	4623-0093-9999		3S	
011583	01-004546	200 LAKESIDE DR	REGILLUS APARTMENTS AND GARAGE	OAKLAND	P	1921	HIST.SURV.	4623-3587-0000	09/30/94	3B	
							HIST.SURV.	4623-3586-0000		3S	
							HIST.SURV.	4623-0159-0000	04/30/83	3S	
011192	01-004160	244 LAKESIDE DR	AUGUST SCHILLING HOUSE GARAGE / 24	OAKLAND	P	1909	HIST.SURV.	4623-0094-0002		3D	
011191	01-004159	244 LAKESIDE DR	LAKE DR APARTMENTS AND GARAGE ANNE	OAKLAND	P	1924	HIST.SURV.	4623-3588-0000	09/30/94	3B	
							HIST.SURV.	4623-0094-0001		3D	
011193	01-004161	244 LAKESIDE DR	SCHILLING GARDENS / 244 LAKESIDE A	OAKLAND	P	1901	HIST.SURV.	4623-0094-0003		3D	
011194	01-004162	244 LAKESIDE DR	LAKESIDE DRIVE APARTMENTS	OAKLAND	P	1924	HIST.SURV.	4623-0094-9999		3S	
011618	01-004579	1426 LAKESIDE DR	CAMRON-STANFORD HOUSE, OLD OAKLAND	OAKLAND	M	1875	ST.FND.PRG	619.0-HP-88-01-010	12/14/88	3	
							ST.FND.PRG	619.0-84-HP-01-028	10/01/86	3	
							FED.FND.PR	629.0-83-HPF-01-01	01/01/83	7L	
							FED.FND.PR	629.0-77-HPF-01-01	01/01/77	7L	
							HIST.RES.	NPS-72000213-0000	06/13/72	1S	
							HIST.SURV.	4623-0194-0000	06/13/72	1S	
011584	01-004547	1520 LAKESIDE DR	HIGH PRESSURE PUMPING STN #1 / CIT	OAKLAND	M	1909	HIST.SURV.	4623-0160-0000		3S	
092821	01-000744	1525 LAKESIDE DR	BAIRD APARTMENTS	OAKLAND	P	1914	HIST.SURV.	4623-4410-0000	09/30/95	3D	
							HIST.SURV.	4623-1099-0000	09/30/94	7R	
011585	01-004548	1543 LAKESIDE DR	SCOTTISH RITE TEMPLE	OAKLAND	P	1926	HIST.SURV.	4623-3589-0000	09/30/94	3B	
							HIST.SURV.	4623-0161-0000		3S	
092822	01-000745	603 LANCASTER ST	JOHNSON PROPELLER COMPANY MACHINE	OAKLAND	P	1945	HIST.SURV.	4623-4411-0000	09/30/95	6Z	
							HIST.SURV.	4623-1100-0000	09/30/94	7R	
106878	01-009890	1030 LANGLEY ST	BUILDING L-731, USAACMTDC	OAKLAND		1942	HIST.RES.	DOE-01-97-0066-0000	02/21/97	6Y	
							PROJ.REVW.	FAA960912A	02/21/97	6Y	
106877	01-009889	1069 LANGLEY ST	BUILDING L-737, USAACMTDC	OAKLAND			HIST.RES.	DOE-01-97-0065-0000	02/21/97	6Y	

MEMORANDUM

TO: CARLOS PLAZOLA, PRINCIPAL

FROM: LAURA BLAIR, ESQ. OF TERRA LINDA DEVELOPMENT SERVICES

SUBJECT: HISTORIC RELEVANCE OF SCHILLING GARDEN

DATE: 12/17/2007

I. Summary

For the City to establish that the anticipated project site is a significant historical resource under the *California Environmental Quality Act* (CEQA), one of three criteria must be met: it must be listed on the California Register of Historical Resources *or* be officially recognized in an ordinance by a local government *or* identified as significant in an historical resource survey that meets the requirements Section 5024.1(g) of the Public Resources Code. If it is not on the City's registered list, then there must be substantial evidence that the site is historical based on the entire record.

The site is not listed on the California Register. The site has not been recognized in an ordinance nor has it been identified in a historical resource survey that meets the requirements of Public Resources Code; therefore, the *only remaining option for designation of the site as historically significant* is evaluation of the site based on substantial evidence from the entire record.

The City cannot assume that the garden is historical based on the Oakland Heritage Survey performed over twenty years ago. The City must show with substantial and current evidence that the site is historical before the proposed project is considered to have an impact on a historical resource.

To date, the City has not demonstrated that the site is historically significant by any evidentiary measure.

II. Relevant Law: Determining a Historical Resource Under CEQA

CEQA requires local public agencies to identify the environmental impacts of proposed projects, determine if the impacts will be significant and identify mitigation measures that will substantially reduce or eliminate significant impacts to the environment and sets out the process by which those agencies shall identify significant impacts.

Local public agencies use the creation of an environmental impact report to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided.

CEQA further requires a local agency to determine whether a project will cause a substantial adverse effect on a historical resource. CEQA defines a historical resource in California Code of Regulations Section 15064.5:

A. A resource is listed in the California Register of Historical Resources, or determined to be eligible for such listing by the State Historical Resources Commission

B. A resource officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution or identified as significant in an historical resource survey that meets the requirements Section 5024.1(g) of the Public Resources Code, shall be presumed to be historically significant. (Public Resources Code Section 5020.1(k)). Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically significant. Subdivision (g) of Public Resources Code Section 5024.1 states:

A resource identified as significant in an historical resource survey may be listed in the California Register if the survey meets all of the following criteria:

(1) The survey has been or will be included in the State Historic Resources Inventory.

(2) The survey and the survey documentation were prepared in accordance with office procedures and requirements.

(3) The resource is evaluated and determined by the office of Historic Preservation to have a significance rating of Category 1 to 5 on DPR Form 523.

(4) If the survey is five or more years old at the time of its nomination for inclusion in the California Registry, the survey is updated to identify historical resources which have become eligible or ineligible due to changed circumstances or further documentation and those which have been demolished or altered in a manner that substantially diminishes the significance of the resource.

C. Any site which a lead agency determines to be historically significant or significant in the architectural, social, or cultural annals of California may be considered to be an historical resource provided the lead agency's determination is **supported by substantial evidence in light of the whole record**. [California Public Resources Code Section 21084.1].

III. The City has Not Demonstrated that the Project Site is a Historic Resource

A. The Site is Not Listed in the California Register of Historical Resources:

There has been much conjecture that the *Central District Survey* published in the *Oakland Cultural Heritage Survey V* in 1985 is evidence that the site is historically significant under CEQA law; however, the *Central District Survey* merely states that 244 Lakeside Drive and its garden are ***potentially eligible*** for the National Register. (Oakland Cultural Heritage Survey Volume V) The City did not nominate the site for listing with the state on the basis of this survey. To date the site has not been listed in the California Registry nor has it been determined to be eligible for listing by the State Historical Resources Commission. (See attached correspondence from that State of California Office of Historic Preservation.)

B. The Site Has Not Been Recognized by City Council or Identified as Significant in an Historical Resource Survey

Recognition by City Council: The site has not been recognized by an ordinance or resolution as historic.

Historical Resource Survey: A resource identified as significant in an historical resource survey may be considered historically significant if the survey meets all of the criteria set out in of Public Resources Code Section 5024.1(g). *(See II B, above).* The site was surveyed by the City in 1985 as a part of the *Central District Survey*. However, that survey does not meet any of the requirements set out by the statute. After submitting the survey to the State, the City never nominated the site for the State Registry. (See attached correspondence from that State of California Office of Historic Preservation.) If the City were to nominate the site today, the *Central District Survey* would not be admissible as evidence of historical significance because it was conducted over twenty years ago and has not been updated to determine whether the site has become ineligible due to changes in a manner that substantially diminishes the significance of the resource. Public Resources Code Section 5024.1(g)(4).

C. The Central District Survey Does Not Demonstrate that the Site is Historically Significant Today

In cases in which the first two criteria for a finding of a historical significance under CEQA are not met, the law still allows the City to determine that a site is a historical resource. In such matters, as is the case here, the City may determine that a resource of historic significance exists where none had been identified before, applying the requirements of Public Resource Code Section 21084.1 to properties that have not previously been formally recognized as historic.

The only documentation provided by the City that states that the site is historically significant is the *Central District Survey*. The *Central District Survey* as to the project site fails to demonstrate that the site meets the objective criteria set out by the California Office of Historic Preservation to determine historical significance. Instead, the *Central District Survey* merely concludes the site is historic without sufficient evidence to support such a finding.

The *Central District Survey* states that the site is historically significant as a local example of a nineteenth century garden. However, the Survey's physical description of the property supports a finding that the site no longer resembles a nineteenth century garden. That is, all of the historical elements that are cited as evidence that the site is historical either no longer exists or has been significantly altered:

- The current garden site is one third of its original size.
- After Schilling sold the property in 1910, Lakeside Drive, the Regillus Apartments, and the Lakeside Drive Apartments were built over at least two-thirds of the original garden.
- Most of the concrete arbor has been torn down and destroyed.
- The electric light fixtures in the garden and the arbor specifically no longer exist.
- The Schilling Garden contained fountains and statues that are not presently at the site.
- The historic gates are now mostly covered with chain link and wood slates.
- Much of the original landscaping has been changed.
- The Central District Survey reports that an artificial cave was a part of the Schilling Garden and that along with the arbor, were highly characteristic of late nineteenth century landscaping. However, Schilling had already sold the property by the time that the cave was installed. Furthermore, the cave is no longer on the site.

The *Central District Survey* describes the site as historically significant because it is one of the last remaining examples of a nineteenth-century garden; relying heavily on the historic arbor; however, all of the historical elements that cited as evidence of this either no longer exists or has been significantly altered.

The *Central District Survey* does not address how the site meets the criteria set out by the Office of Historic Preservation to determine whether a site is historic. Moreover, the *Central District Survey* fails to demonstrate how the site would meet *any* objective criteria for determining whether the site is historically significant. The discussion of historical significance relies on conjecture and assumption and does not back up those assumptions with evidence or significant historical documentation. (The *Central District Survey* sites an article written in 1947 from the San Francisco Chronicle, an article in the Oakland Tribune written in 1962 and "The Walking Guide to Lake Merritt" as its historical documentation—none of which are primary documents, expert opinion, or *any sort document* upon which a conclusion that the site is historical may be based.)

The historical evidence relied upon by the *Central District Survey* is not substantial enough to support a finding that the site is historic under CEQA. "Substantial evidence includes fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact. Substantial evidence is not argument, speculation, unsubstantiated opinion or narrative, evidence that is clearly inaccurate or erroneous, or evidence of social or economic impacts that do not contribute to, or are not caused by, physical impacts on the environment." [Public Resources Code, s 21080(e).]

The City is required to produce evidence that historical significance of the site has not been significantly altered over time. In a remarkably similar case, *Citizen's Committee to Save Our Village v. City of Claremont,* the Court held that the administrative record contained no substantial evidence that a landscape garden planned in 1905 was ever maintained: [(1995) 37 Cal.App.4th 1157].

There is no evidence, direct or circumstantial, that any specific plan of landscaping was maintained or continued during the intervening ninety years. (There is evidence that, over the intervening years, trees have died and been replaced and that the landscaping of the subject property has been supplemented and changed.)

Further, the Court noted:

Assuming arguendo that the landscaping of the subject property is of the extraordinary historical significance advocated by appellants, it is dumbfounding that the record for the period between 1905 and the present is utterly silent with respect thereto. It is reasonable to expect that, if appellants were correct, there would be considerable public touting of the subject property as a point of community and College pride and attraction. Yet, there is only silence--for ninety years.

Here, just as in *Claremont,* the *Central District Survey* fails to account for the nearly 100 years that have passed since Schilling owned the site, relying instead on assumptions. The Court in *Claremont* warned against assuming a site's historic significant has been preserved:

Appellants attempt to bridge the ninety (90) year gap between the dates of the ancient documents and the present with speculation and conjecture regarding the actual planting, maintenance, continuation and existence of planned landscaping.

In the present matter, the only historical survey of the site conducted in the last twenty years was commissioned by the owners. Said survey demonstrates that the garden has suffered greatly in the last one hundred years. In her survey of the garden, Ms. Reid found that a majority of the plants at the site were planted post-Schilling ownership, the garden had been subject to "grossly inappropriate pruning, poor cultivation techniques and over planting." *(p. 18)* Ms. Reid found that the so-called historic cave, which is no longer present, had been installed in the garden post-Schilling ownership and that many of the elements of the garden that were a part of the original Schilling garden were removed when Mr. Schilling left the property and that by 1926, the garden had become a backyard for nearby apartments. *(p. 18)*

Summary
There is no evidence that the site is a historical resource under CEQA.

Oakland Cultural Heritage Survey Volume 5

VOLUME V

The Oakland Cultural Heritage Survey is a project of the Oakland City Planning Department, informally co-sponsored by the Landmarks Preservation Advisory Board and by Oakland Heritage Alliance. This document is one of several prepared by survey staff to describe resources located in Oakland's Central District which appear to meet criteria for listing on the National Register of Historic Places. The Central District survey was conducted on a part-time basis from 1980 through 1985. Staff for the Central District survey has included the following:

CITY PLANNING DEPARTMENT:
Norman J. Lind, Director
Marc Herbert, Assistant Director (to 7/84)
Alvin James, Assistant Director (12/84 to present)

Gary Knecht, Survey Coordinator (11/82 to present)
Laura Niebling, Survey Coordinator (10/81 to 11/82)
Melinda Young Frye, Survey Coordinator (to 3/81)

Anne Bloomfield, Writer
Betty Marvin, Writer

Christopher Buckley, Assistant Planner

Rosanne DiMaggio, graphics

Carmelita Rickman et al, typing

CONSULTANTS:
Michael Corbett, Architectural Historian
Melinda Young Frye, Cultural Historian (to 11/83)
Tom Wolf, Cultural Historian (1/84 to present)
Sally Woodbridge, Architectural Historian

WORK-STUDY:
More than 15 students from the University of California at Berkeley have been employed as Survey Aides under the work-study program.

VOLUNTEERS:
And more than 100 volunteers have given willingly and generously of their time to assist in all aspects of the project.

This publication was partially funded under the National Historic Preservation Act of 1966 through the California Office of Historic Preservation.

A

VOLUME V - BUILDING GROUP STATE FORMS

This Volume contains State Forms for the following BUILDING GROUPS/COMPLEXES (listed on or appearing to be eligible for listing on the National Register of Historic Places.)

COMMON NAME / HISTORIC NAME	PROPERTIES
Colt Building Group / Colt (Roger) Building Group	1401-15 Harrison Street* 1425 Harrison Street 1435-45 Harrison Street 300-18 15th Street
King Block / King (Charles H., Kate & Joseph H.) Building Group	300-10 12th Street 312-32 12th Street 334-44 12th Street 337-47 13th Street 301-33 13th Street c. 1229 Harrison Street
Lakeside Drive (244) Complex / Lakeside Drive Apartments, Schilling (August) House Garage, and Garden	244 Lakeside Drive (front)* 244 Lakeside Drive (east side)* 244 Lakeside Drive (rear)*
Leamington Hotel Building Group / Leamington Hotel Building and California Building	1736-42 Franklin Street 1800-26 Franklin Street*
Marcus Hardware Warehouse Annex / Muller Brothers (Ernest F. and Carl G.) Pickle Factory Complex	200 Grove Street* 222-34 Grove Street 618-32 2nd Street 636 2nd Street 629 3rd Street
Oak St. (708-28) House Group/ Unknown (In 7R district)	708-10 Oak Street 714 Oak Street 720-22 Oak Street 726-28 Oak Street
Oakland Iron Works/Remillard Brick Co. Complex / Oakland Iron Works & Remillard Brick Co., later United Iron Works Co. Complex	552 2nd Street* 560-64 2nd Street 568-72 2nd Street* 580 2nd Street* 586-92 2nd Street*
Pacific Gas and Electric Company Station C / Same	601-45 Embarcadero* 628 Embarcadero 50 Grove Street*

* Appears to be Individually Eligible for the National Register

Oakland Cultural Heritage Survey
Oakland City Planning Department

Lake Merritt District properties in Bellevue-Staten (BVS) Apartment District:

RANK		HISTORIC NAME	ADDRESS	DATE ARCHITECT
C	DC	Hill Manor Apartments	461 Bellevue Ave.	1923 Andrew T. Hass (a)
C	DC	Hill Court Apartments	465 Bellevue Ave.	1920 McCall & Wythe (a)
C	DC	Clarke-Gross House	493 Bellevue Ave.	1913 W.H. Ratcliff, Jr. (a)
A	PR	Women's Athletic Club	525 Bellevue Ave.	1929 Roeth & Bangs (a)
C	DC	Jackson Arms Apartments	535 Bellevue Ave.	1924 Smith Building Co.
C	DC	Lockwood Apartments	473 Ellita Ave.	1924 Leonard H. Ford (a)
C	DC	Smith-Ayers-Pearson Duplex	481-99 Ellita Ave.	1914 Albert Caldwell ? (a)
B+	PR	Bellevue-Staten Garage	470 Staten Ave.	1929 H.C. Baumann (a)
C	DC	Bellevue Court Apartments	491 Staten Ave.	1921 Jas. T. Narbett (a-dev)
A	PR	Bellevue-Staten Apartments	492-98 Staten Ave.	1928 H.C. Baumann (a)

Lake Merritt District properties in the ~~Central~~ District survey area (preliminary list):

RANK		HISTORIC NAME	ADDRESS	DATE ARCHITECT
A	PR	Alameda County Courthouse	1225 Fallon St.	1935 Corlett, Minton et al (5 arch.)
A	PR	Veterans' Memorial Building	200 Grand Ave.	1926 Henry H. Meyers (a)
C	?	Snow Park	c.1900 Harrison St.	1922 Unknown
C	?	Alexandria Apartments	1906-14 Jackson St.	1921 Calif. Builder Corp. (b)
B	PR	Police Telegraph Box	c.1921 Jackson St.	1910 United Iron Works (b)
A	PR	Regillus Apartments	200 Lakeside Dr.	1921 Willis C. Lowe (a)
A	PR	244 Lakeside Dr. Apartments	244 Lakeside (frnt)*	1924 Maury I. Diggs (a)
A	PR	Schilling Garden	244 Lakeside (rear)*	1894 A. Schilling (amateur gardener)
B	PR	Schilling House Garage	244 Lakeside (side)*	1909 Blusome & Co. (b)
A	PR	Camron-Stanford House	1426 Lakeside Dr.	1875 Samuel Merritt (a/b/d)
C	?	Duel Brae Apartments	1445 Lakeside Dr.	1917 Maury I. Diggs (a)
A	PR	Municipal Boathouse	1520 Lakeside Dr.	1909 J.G. Howard (a) add. 1913
C	?	Unknown	1525 Lakeside Dr.	1914 C.N. Burrell (a)
A	PR	Scottish Rite Temple	1543-47 Lakeside Dr.	1926 O'Brien & Werner (a) rem. 1938
B	PR	Lake Merritt Hotel	1800 Madison St.	1927 William H. Weeks (a)
Ca2	?	Fire Alarm Building	1310 Oak St.	1911 Walter J. Mathews (a) rem. 1953
A	PR	Oakland Auditorium	10 10th St.	1913 Donovan (a), Hornbostel (a)
?	?	Unknown	101 17th St.(?)	1954 Herman & Bostern (b)
~~?~~	~~?~~	~~Venetia Apartments~~	~~116 17th St.~~	~~1912 C.W. McCall (a)~~ dem. 7/86
A	PR	Tudor Hall Apartments	150 17th St.	1929 Miller & Warnecke (a)
C	?	Lake Vista Apartments	160 17th St.(?)	1922 Clay Burrell (a)

* Part of Lakeside Drive Complex (a building group)

Individual Rank: A = Highest importance; B = Major importance; C = Secondary importance; D = Of no particular interest; * = not ranked (post 1945 construction date).

District Rank: PR = Primary resource (also appears to be eligible for individual National Register listing); DC = District contributor; CC = Contingency contributor; NC = Noncontributor.

PRESERVATION STUDY LIST (Continued)

2101-2570 Havenscourt Boulevard

825 Jackson Street (Buddhist Church of Oakland) A

1431 Jackson Street (Hill Castle Apartments) A

1569 Jackson Street (SW corner of 17th Street) (Lakehurst Hotel; Hotel Jackson) B

C.1921 Jackson Street (SW corner Lakeside Drive) (Police Telegraph Box with Harp Pedestal) B

707 Jefferson Street (NW corner 7th Street) (Part of St. Mary's Church Complex) (St. Mary's (Roman Catholic) Community Center) C/A3

721 Jefferson Street/601 8th Street (Part of St. Mary's Church Complex) (St. Mary's (Roman Catholic) Church; Church of the Immaculate Conception) A

1000-12 Jefferson Street/594-98 10th Street (Carles Apartment; Lewellyn Apartments) B

Lake Park Ave. right of way from Grand Ave. to Lake Shore Ave. (Path of Silver Streetlights) A/PR/LMD

200 Lakeside Drive (SW corner Jackson Street) (formerly 212 19th Street) (Regillus Apartments & Garage) A

244 Lakeside Drive (front) (Part of Lakeside Drive Complex) (244 Lakeside Drive Apartments) A

244 Lakeside Drive (rear) (Part of Lakeside Drive Complex) (244 Lakeside Drive Garden; Shilling (August) Garden Portion) A

244 Lakeside Drive (east side) (Part of Lakeside Drive Complex) (Lakeside Drive Apartments Garage; Shilling (August) House Garage) B

1520 Lakeside Drive (City of Oakland Parks and Recreation Administration Building; High Pressure Pumping Station No. 1, Oakland Fire Department & Municipal Boathouse) A

1543-47 Lakeside Drive (Scottish Rite Temple) A

Lake Shore Ave. right of way from Lake Park Ave. to Mandana Blvd. (Path of Silver Streetlights) A/PR

292 Lee St. (Dahlke-Aiken House) A

201-05 MacArthur Blvd. (Morris House) A

Historic Resources Inventory:

Lakeside Drive Apartments, Schilling House Garage and Garden

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

HISTORIC RESOURCES INVENTORY

Ser. No. ______
HABS ____ HAER ____ NR 3 SHL ____ Loc ____
UTM: A 10/564940/4184240 B ______
C ______ D ______

IDENTIFICATION

1. Common name: Lakeside Drive (244) Complex
2. Historic name: Lakeside Drive Apartments, Schilling (August) House Garage and Garden
3. Street or rural address: 244 Lakeside Drive
   City Oakland Zip 94612 County Alameda
4. Parcel number: 8-634-1 and 3
5. Present Owner: Lakeside Corp. Address: 155 Sansome St.
   City San Francisco Zip 94104 Ownership is: Public ______ Private X
6. Present Use: Apartments, garage, garden Original use: Same

DESCRIPTION

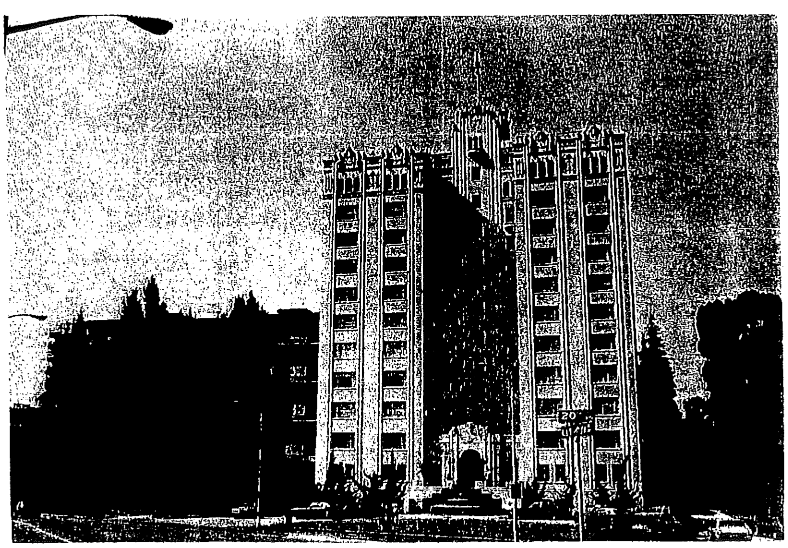
7a. Architectural style: Beaux Arts derivative

7b. Briefly describe the present *physical description* of the site or structure and describe any major alterations from its original condition:

On a mid block lot across Lakeside Drive from Lake Merritt and going through to 19th Street, the Lakeside Drive (244) Complex is a twelve-story 20-unit apartment building and a 2-story garage, both set in a large, partly historic garden. The apartment building is visible from a wide area across Lake Merritt. It is set back from and at an angle to Lakeside Drive, approached by a curving driveway. Open 35' side yards are used on the right (west) as landscaping that relates to the adjoining Snow Park, and on the left (east) for a driveway to the garage on the eastern lot line behind the main building. The two structures are connected by a one-story curved concrete wall penetrated by a curved center stairway leading to the rear garden which occupies roughly the southern half of the site (parcel 8-634-3).

244 Lakeside Drive (front), the apartment building, is a reinforced concrete structure of H-shaped plan open to the north and south. The design is in a somwhat unusual two part vertical composition with the shaft rising directly

(see continuation page 5)



269-28A Lakeside Drive (244) Comple
7/82

8. Construction date:
   Estimated ______ Factual c.1901-25
9. Architect Various, see continuation page 3
10. Builder Various, see continuation page 3
11. Approx. property size (in feet)
    Frontage ______ Depth ______
    or approx. acreage 1.41
12. Date(s) of enclosed photograph(s)

13. Condition: Excellent X Good X Fair ____ Deteriorated ____ No longer in existence ____

14. Alterations: Much original landscaping changed

15. Surroundings: (Check more than one if necessary) Open land ____ Scattered buildings ____ Densely built-up X
Residential X Industrial ____ Commercial ____ Other: Lake Merritt, Lakeside Park, Snow Park

16. Threats to site: None known X Private development ____ Zoning ____ Vandalism ____
Public Works project ____ Other: ____

17. Is the structure: On its original site? X Moved? ____ Unknown? ____

18. Related features: 200 Lakeside Drive (Regillus Apartments)

SIGNIFICANCE

19. Briefly state historical and/or architectural importance (include dates, events, and persons associated with the site.)

The Lakeside Drive Complex exemplifies both the great era of luxury apartment building in the 1920s and the prominent garden siting of 19th century upper-class homes. The combination has resulted in occupancy by some of Oakland's prominent citizens from the apartment building's opening and continuing today. Its large scale, distinctive design and prominent Lake Merritt location make the complex an especially familiar visual landmark in Oakland. Together with its neighbor, the Regillus, it dominates the middle portion of Lake Merritt's west shore and is closely identified with the image of the lake itself. The 19th Street garden frontage and rear elevation terminate the view along Alice Street from the south and, with the tall trees, provide an attractive focal point for viewing the handsome group of early 20th century apartment buildings along Alice Street between 14th and 17th Streets (see SHRI form for Lakeside Apartment District). The landscaping also provides a visual addition to Snow Park to the west.

(see continuation page 10)

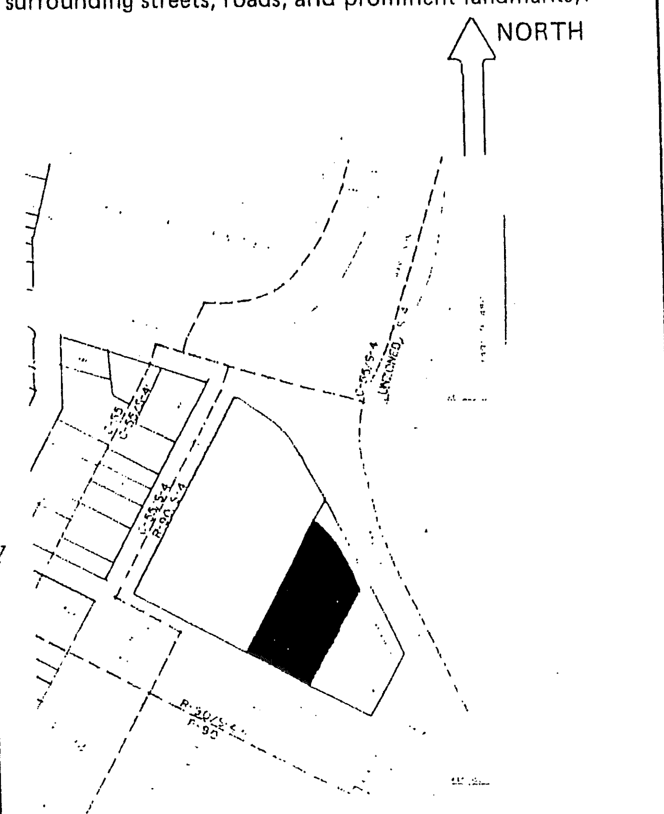
20. Main theme of the historic resource: (If more than one is checked, number in order of importance.)
Architecture 1 Arts & Leisure ____
Economic/Industrial ____ Exploration/Settlement ____
Government ____ Military ____
Religion ____ Social/Education 2

21. Sources (List books, documents, surveys, personal interviews and their dates).
Assessor's Block Books
Sanborn maps
Building permits, plans & specifications
Oakland Directories

(see continuation page 9)

22. Date form prepared December 31, 1984
By (name) Staff
Organization Oakland Cultural Heritage Survey
Address: City Planning Dept., City Hall
City Oakland Zip 94612
Phone: (415) 273-3941

Locational sketch map (draw and label site and surrounding streets, roads, and prominent landmarks):



CP

HISTORIC RESOURCES INVENTORY

Street or rural address: Lakeside Drive (244) Complex

Address Common Name Historic Name	Date, Cost Architect Builder	Source
244 Lakeside Dr. (front) 244 Lakeside Drive Apartments Lakeside Drive Apartments	1924-25, $500,000 Maury I. Diggs Same	Permit #99600
244 Lakeside Dr. (east side) ...Garage Schilling (August) House Garage	1909-10, $2,000 Unknown Bluxome & Company	Assessor's Block Book, 1910
244 Lakeside Dr. (rear) ... Garden Schilling Gardens (portion)	c.1901, unknown August Schilling Unknown	Assessor's Block Books Jones, Oakland Parks..., 1935: 273-74

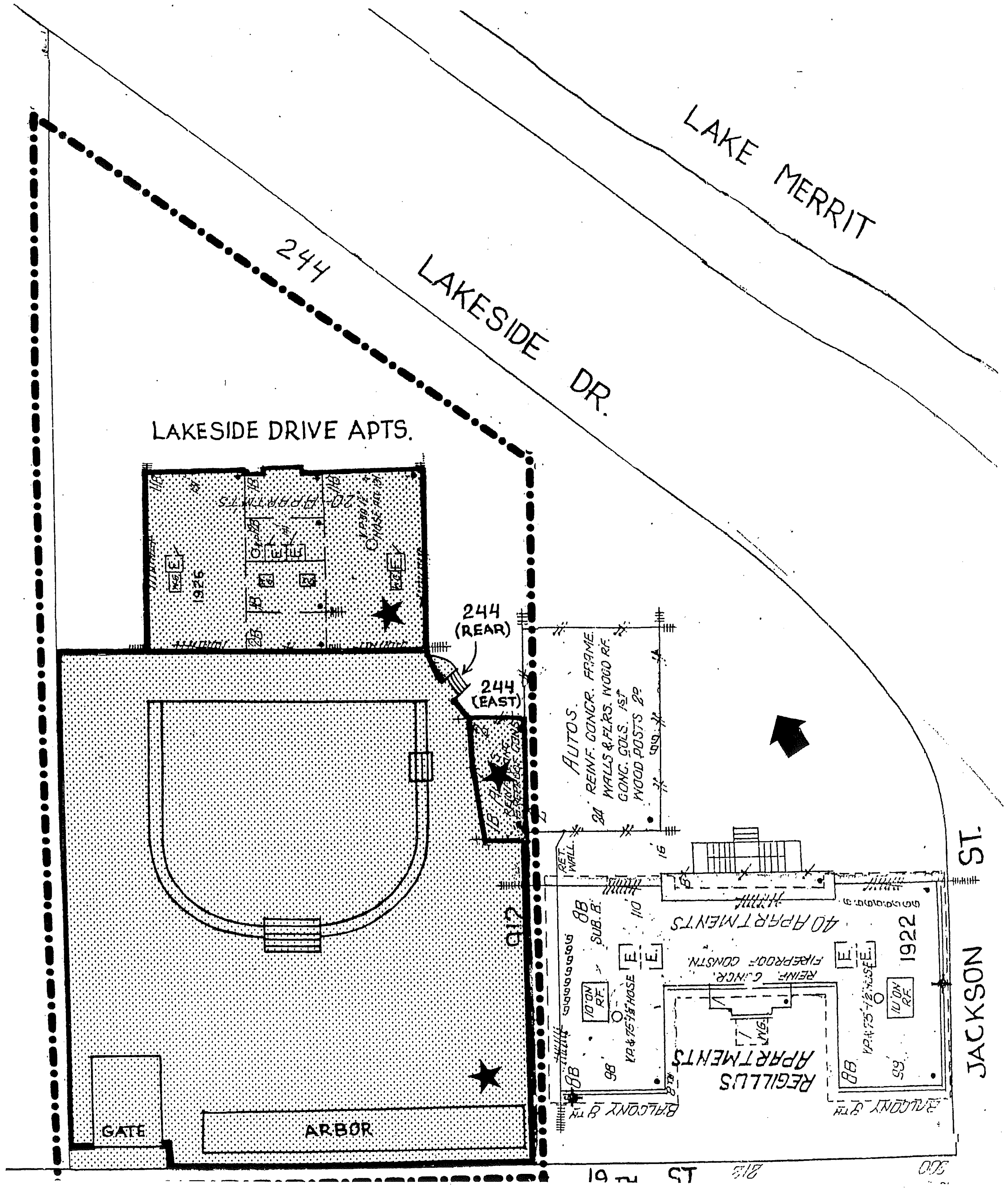
269-33A Left to right: garage, steps to garden, apartment building edge, Lakeside..., 7/82

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

CP

HISTORIC RESOURCES INVENTORY

Street or rural address: Lakeside Drive (244) Complex



Street or rural address: Lakeside Drive (244) Complex

7b. Physical Description (continued from page 1)

from the understated ground floor treated as a high basement. The shaft is crowned by a highly decorated twelfth floor level. An additional thirteenth floor extends along the stem of the "H", topped with center elevator tower. The main entrance is set in a slightly advancing second-floor pavilion filling the base of the north lightcourt, approached by a double staircase leading to a tile-floored terrace. Front landscaping includes a semi-circular fountain against the stairwalls. The stucco walls are painted a uniform cream color and are embellished with cast cement ornament concentrated around the first floor entrance pavilion and at the twelfth and thirteenth floors. Entry area railings, balustrades, light poles, marquee, door frame and window grills are of wrought iron. The ornamnetation is Spanish Renaissance/Baroque in style and includes twisted column orders with highly decorative friezes, decorative panels, cartouches, human figures and animal heads.

Inside, the main level consists of a central entrance and elevator lobby sequence flanked by a banquet hall-ballroom and a billiard room with servants' rooms and owners' store rooms at the rear. The richest of these spaces was originally the main lobby with colored glass skylight, ornamental tile columns, iron staircase and lamp, and mahogony doors, but the original surface treatments have been remodeled. The ballroom's cast plaster ornament remains intact. Upstairs, the third through tenth floors are shown on the original plans as two apartments apiece, each with 3 bedrooms and baths, a kitchen, laundry, service entrance, breakfast room, dining room, and living room with fireplace. The eleventh and twelfth floors are similar with some variations. The center section's thirteenth floor is shown as a "sun room".

244 Lakeside Drive (east side) is a two-story, stuccoed, reinforced concrete garage in Beaux Arts style. The plan is approximately rectangular with a slightly curved west side. Entrance to the lower level is on the main north elevation from a driveway along the main building's east side. The upper level, now used as a garden house, is entered from the south side where because of the sloped terrain only the upper level is exposed. According to the management, the upper level was originally used for carriages and had a revolving floor for turning the carriages around and rehitching the horses. The main north elevation is designed as an enframed pavilion in a two-part vertical composition dominated in the upper level by a large pair of slightly recessed French doors framed by Ionic columns. An entablature extends around the top below a classical balustrade. A belt cornice divides the two levels. The lower level has paired sliding wood doors, each with a large diagonally braced lower panel and two small glazed upper panels. Wall surfaces are scored to imitate stone and are almost entirely covered by vines. The east side of the structure is a common wall with the adjacent Regillus Apartments garage (see SHRI form for 200 Lakeside Drive).

244 Lakeside Drive (rear) is an approximately 188'X185' rear garden containing elements of the turn-of-the-century August Schilling Gardens, which occupied the entire 244 and 200 Lakeside Drive sites, approximately three times the remaining garden acreage. It is currently designed with a large semi-elliptical central lawn area extending from the rear of the apartments and bordered by rich plantings of trees, shrubs, and herbacous flowering plants, including many unusual or exotic specimens. Informal stone paths pass through the perimeter plantings. Parallel to 19th Street there still exists a section of Schilling's rustic-style concrete arbor

(see continuation page 6)

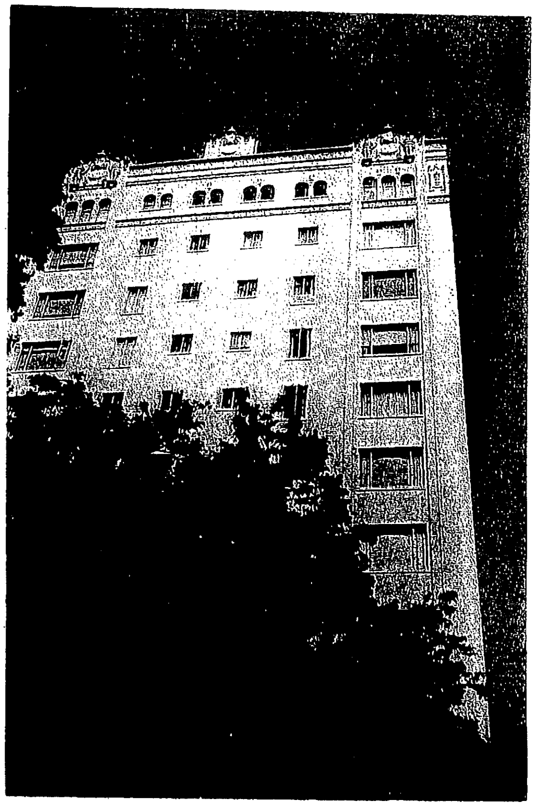
Street or rural address: Lakeside Drive (244) Complex

7b. Physical Description (continued from page 5)

composed of imitation tree trunk posts and tree branch beams, draped with original wisteria and roses. Other surviving elements from the Schilling Gardens include one of the several existing redwood trees, a large holly tree, a camperdown elm, tree ferns, and paired wrough iron gates with the initials "A.S." at the west end of the 19th Street frontage. The gates are now mostly covered with chain link and wood slates. Also probably part of the Schilling Garden is a high rubble stone embankment largely hidden by ivy along the 19th Street frontage east of the gates. Originally the gardens were densely landscaped with exotic plants and rare ferns along with fountains and statuary (Jones and old photos). There was also an "artificial cave" (1912-48 Sanborn map). The arbor along the 19th Street frontage once extended a perpendicular arm at the east and down to the auto garage and a shorter arm at the west end (1930-11 Sanborn map). The arbor formerly had electric light fixtures.

295-4 Garden, 244 Lakeside Dr.
looking southwest from lawn,
1983

Street or rural address: Lakeside Drive (244) Complex



269-35A East elevation, 244 Lakeside Dr. apartment, 7/82

269-27A Apartment, 244 Lakeside Dr., 7/82

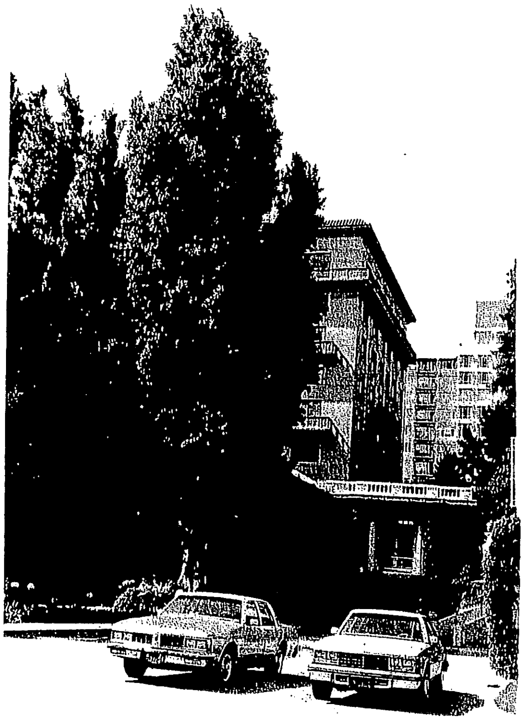
269-29A Entry, 244 Lakeside Dr. apartment, 7/82

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

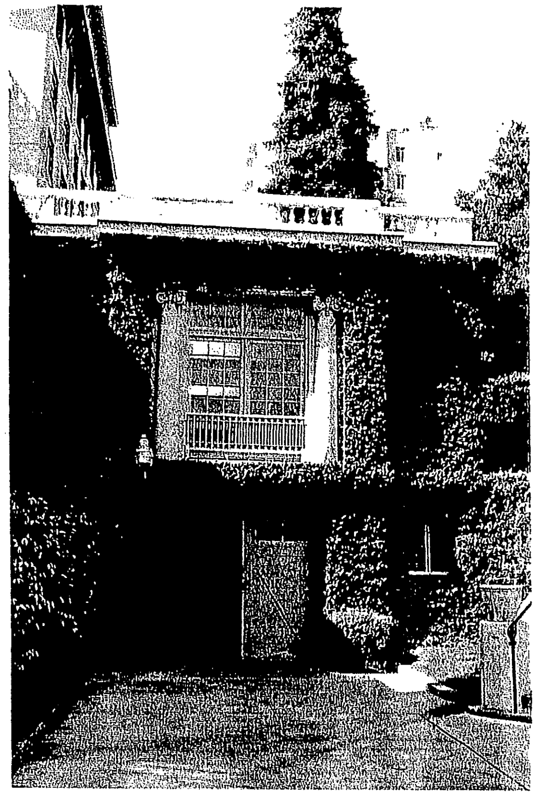
CP

HISTORIC RESOURCES INVENTORY

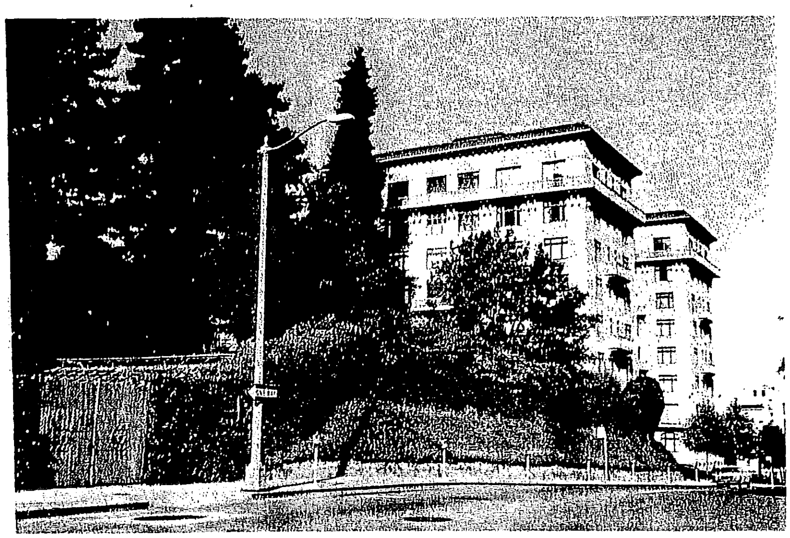
Street or rural address: Lakeside Drive (244) Complex



269-36A Lakeside... garage looking south from driveway beside apartment, 7/82



269-32A Garage, 244 Lakeside Drive, 7/82



278-9A Garden, 244 Lakeside Dr., 19th St. side, looking east, 7/82

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

CP

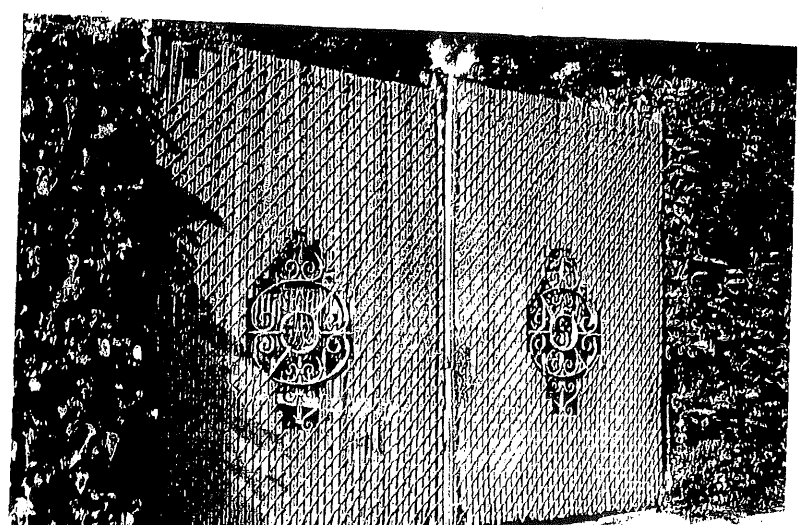
HISTORIC RESOURCES INVENTORY

Street or rural address: Lakeside Drive (244) Complex

290-35 Tree ferns in garden arbor, 244 Lakeside Dr., 1983

290-36 Vine-covered concrete "tree" in garden arbor 244 Lakeside Dr., 1983

278-12A Garden, 244 Lakeside Dr., 19th St. gate, 7/82



Street or rural address: Lakeside Drive (244) Complex

19. Historical and/or Architectural Importance (continued from page 2)

For the first two decades of the 20th century the August Schilling Estate occupied the three parcels now developed with the Lakeside Drive Apartments and the Regillus Apartments (see SHRI form for 200 Lakeside Drive). The Schilling house was on the east end of the estate facing Jackson Street on the site currently occupied by the Regillus Apartments. Lakeside Drive had not yet been constructed, and the north side of the Schilling property directly bordered Lake Merritt. The rest of the estate was devoted to the garden, with a servants' house and the still extant automobile garage in the center and several small outbuildings along the lake perimeter.

The Schilling Gardens were developed beginning in the 1890s by August Schilling, cofounder of the well known coffee, tea and spice firm, A. Schilling & Co., based in San Francisco. They were open to the public at certain times, and their rich and varied collection of exotic plants and fanciful structures made the gardens one of Oakland's favorite attractions. Schilling, a German immigrant, came to San Francisco in the 1870s and founded A. Schilling & Company in partnership with George F. Volkman (O'Brien). In 1892, Schilling bought as his residence the house at the northwest corner of 19th and Jackson Streets built about 1882 by Jonas Seely (Knave). In 1900-01 (Assessor's Block Book) Schilling acquired the large parcel to the west containing the Judge O.L. Shafter residence. He removed the Shafter House and developed the combined sites into the Schilling Gardens. Described as "a great flower fancier", Schilling may have designed much of the gardens himself. In 1903 he had planned a miniature Japanese garden with arched bridge and goldfish pond at the Schilling Company's new building at 2nd and Folsom Streets in San Francisco. The layout also included a geranum-planted hillside topped by a conservatory (O'Brien).

The opening of elaborate private homes and gardens without charge to the general public was a common nineteenth century practice. The Schilling Estate was one of several private parks open to the public in Oakland. In New York City, owners of the Fifth Avenue mansions would throw open their doors to public viewing on Sunday afternoons. These customs were stimulated in part by the belief that exposure of the general public to high quality environments would encourage individuals to improve the quality of their own lives, leading to improvement in the condition of society as a whole.

Jones states that the concrete arbor, called the "hanging gardens", was built later than the rest of the garden complex and was one of its most celebrated features. The arbor's appearance on a 1903 Sanbon Map, but not on a 1901 map, dates it sometime between 1901 and 1903. According to the present management of 244 Lakeside Drive, the arbor was built by Japanese craftsmen. Rustic arbors, built of natural or artificial tree trunks and branches, and similar types of romantically primitive or picturesque structures, such as Schilling's now-vanished cave, were highly characteristic of late nineteenth century landscaping design, reflecting the influence of Andrew Jackson Downing and others. The execution of such structures in concrete recalls more common small-scale concrete "tree branch" garden fences and furniture.

The appearance of $2,000 worth of new improvements on the parcel comprising the Schilling Estate in the 1910 city tax assessment block books with the note "concrete garage about complete" indicates that the garage annex was mostly built in 1910,

(see continuation page 11)

Street or rural address: Lakeside Drive (244) Complex

19. Historical and/or Architectural Importance (continued from page 10)

although possibly begun in 1909. The 1911 block book, with the garage valued at $2,000, also shows Schilling owning three autos, valued at $1,500, $2,000 and $300. Architect & Engineer shows the garage built by Bluxom & Company, a San Francisco firm created in 1907 to specialize in reinforced concrete construction, which also built a Sloat Blvd., S.F., water pumping station similar to Willis Polk's P.G.& E. Station G.

The Schilling House remained standing until 1921 when it was sold to Percival A. Palmer who in 1921-2 developed the Regillus Apartments on its site. The northwestern third of the property was developed with the 244 Lakeside Apartments in 1924-25. At about the same time the Schilling Estate sold the southwestern third to the Lakeside Apartment owners as a separate parcel with the condition that the "hanging gardens" remain intact (Jones).

Building permit 99600, issued February 13, 1925 for 244 Lakeside Drive shows owner as Lake Drive Corporation, architect and builder as Maury Diggs, and cost as $500,000. Original plans indicate that Diggs was also the structural engineer. The introduction to the 1926 directory (p.20) indicates that the building was finished during 1925 and describes it as "... a beautiful building constructed by Architect M.I. Diggs and a group of his business associates" and "the first community-owned apartment building in Oakland". A photograph of the building in the 1927 directory (p.20) indicates that it was originally called the Lake Drive Apartments.

Maury I. Diggs (1880-1953) was among the most enterprising and colorful of Oakland's early 20th century architects. An obituary in the January 20, 1953 Oakland Tribune describes him as "a sportsman, promoter and inventor". He is listed in the 1926 through at least 1928 directories as a resident of 244 Lakeside Drive, reflecting his tendency to become personally involved with his major projects. He had previously lived in Piedmont. His other large buildings in Oakland include the 1925-26 Latham Square Building at 1601-15 Telegraph Avenue and, in association with Weeks and Day, the 1927-28 Fox Oakland Theater complex at 1807 Telegraph Avenue (see SHRI forms). For both of these projects, Diggs acted as financial organizer (serving as secretary of a development corporation) and, when the buildings were finished, project manager, in addition to his roles as architect. contractor and engineer. In at least some of his projects he had a substantial financial interest himself. His projects outside of Oakland included Bay Meadows, Golden Gate Fields and Hollywood Race Tracks, the San Jose State Teachers College and San Quentin Prison. Early in his career he worked as California State Architect. After retiring from architecture, Diggs became an inventor, his innovations including new types of paint and insect killer.

The original organization of 244 Lakeside Drive as a community apartment is reflected in an attractive brochure in the possession of the present management, which describes each unit as a "home" and includes photographs of some of the apartments and other interiors, opulently decorated and furnished in the style of the large houses of the period. According to the present management, the condominium-like concept was too innovative for the time, and the building was soon converted to rental units.

The 1926 and 1927 City directories indicate that original or early residents of the building included some of Oakland's most important figures, including

(see continuation page 12)

Street or rural address: Lakeside Drive (244) Complex

19. Historical and/or Architectural Importance (continued from page 11)

Oakland Tribune publisher and political magnate Joseph R. Knowland, and William A. and Stephen D. Bechtel of the internationally known Bechtel engineering and construction firm, then called the Bechtel and Utah Construction Company and based in Oakland. A second brochure in the possession of the management, which appears to have been prepared when the building was changed to rentals, identifies Knowland as corporation president and William A. Bechtel as vice-president. The 1967 directory still lists S.D. Bechtel as a resident. According to the management, most of the early residents wished to be relived of the concerns of running a home and were attracted to 244 Lakeside Drive for its combination of apartment house convenience and home-like environment. Many of the residents had been friends or business associates prior to moving into the building.

The work of an important early 20th century architect, Maury I. Diggs, the main structure is one of Oakland's best examples of an early 20th century highrise apartment building in its use of materials and quality of detail. It is also significant as the residence during te 1920s of some of Oakland's most distinquished citizens and for its pioneering community ownership arrangement. Most important, however, are its siting, landscaping and citywide familiariety by virtue of its prominent Lake Merritt location.

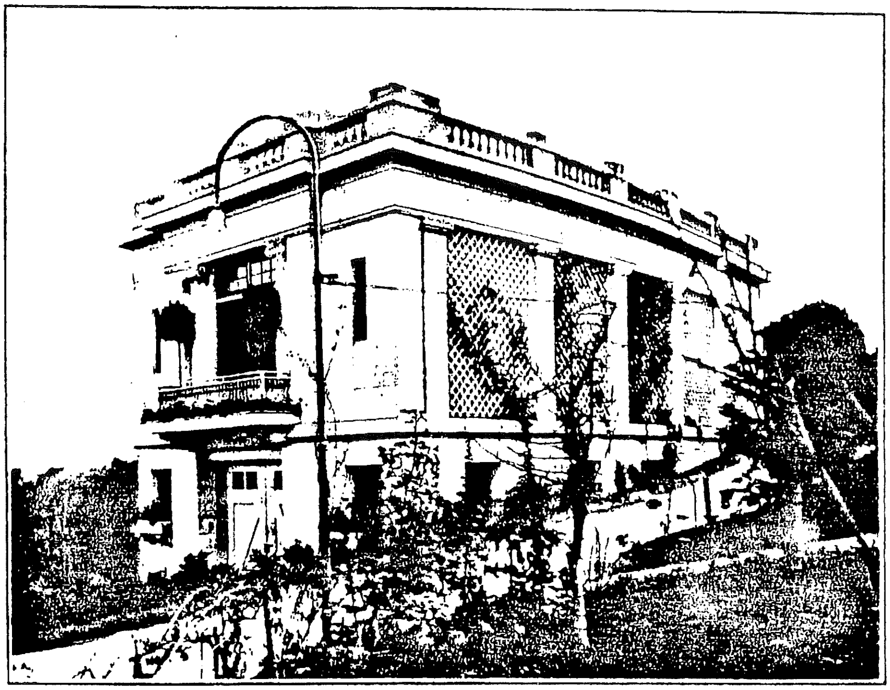
The surviving elements of the Schilling Gardens are significant as the last reminder of one of nineteenth century Oakland's best-known showplaces, illustrative of some of the social attitudes peculiar to its era, and a type of garden with few surviving local examples. The rustic style arbor section is especially significant as an extremely unusual turn-of-the-century garden element constructed in concrete. The garage is significant for its associations with the Schilling complex, as an early example of reinforced concrete construction and, in its Beau Arts influenced styling, an unusually elegant example of its type.

The complex as a whole appears eligible for listing on the National Reigster of Historic Places. Its apartment building and garden components also appear individually eligible for the Register.

21. Sources (continued from page 2)

Brochures c.1926 and c.1927 for 244 Lakeside Drive
(in possession of the management)
Jones, De witt, ed. Oakland Parks and Playgrounds, 1935: 273-274
Knave, Oakland Tribune, 18 Mar. 1962
O'Brien, Robert, "Riptides: The Two Young Men From Bremen"
San Francisco Chronicle, 7 May 1947: 16
Flint, Leslie, The Heart of Oakland: A Walking Guide to Lake Merritt, Camron Stanford House Preservation Association, c.1979: 13, 15
Architect & Engineer, Dec. 1913: 83; Nov. 1913: 83.

Street or rural address: Lakeside Drive (244) Complex



Concrete Garage for Mr. A. Schilling on Shore of Lake Merritt, Oakland
Bluxome & Company, Builders

Garage, 244 Lakeside Dr.
1913 view
Source: Architect & Engineer

Historic Resources Inventory:

Schilling Gardens (portion)

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

HISTORIC RESOURCES INVENTORY

Ser. No. ______
HABS ____ HAER ____ NR 3 SHL ____ Loc ____
UTM: A N4184368E564910 B ______
C ______ D ______

IDENTIFICATION

1. Common name: 244 Lakeside Drive Garden
2. Historic name: Schilling (August) Gardens (portion)
3. Street or rural address: 244 Lakeside Drive (rear)

   City Oakland Zip 94612 County Alameda
4. Parcel number: 8-634-3
5. Present Owner: Lakeside Corporation, Lakeside Realty Address: 155 Sansome Street

   City San Francisco Zip 94104 Ownership is: Public ______ Private X
6. Present Use: Garden Original use: Same

DESCRIPTION

7a. Architectural style: Nineteenth Century rustic garden

7b. Briefly describe the present *physical description* of the site or structure and describe any major alterations from its original condition:

In the nineteenth century, the August Schilling Estate occupied the parcels now developed with the large apartment building known as 244 Lakeside Drive and the Regillus Apartments at 200 Lakeside Drive (see SHRI forms). Elements of the original Schilling Gardens are still preserved as part of the large rear garden of 244 Lakeside Drive, which occupies about one-fifth of the area of the original estate. The Schilling House was on the east end of the estate facing Jackson Street on the site currently occupied by the Regillus Apartments. Lakeside Drive had not yet been constructed and the north side of the Schilling property directly bordered Lake Merritt. The rest of the estate was devoted to the garden, with a servants' house and the still extant automobile garage (see SHRI form for 244 Lakeside Drive) in the center and several small outbuildings along the lake perimeter. The gardens were landscaped with exotic plants and rare ferns along with fountains and statuary (Jones). There was also an "artificial cave" (1912-48 Sanborn map). A rustic-style concrete arbor composed of imitation tree trunk posts and tree branch beams extended along the 19th Street frontage, with a perpendicular arm at the east end extending down to the auto garage and a shorter arm at the west end (1903-11 Sanborn map). The arbor formerly had electric light fixtures. Old photographs indicate that, in addition to the arbor,
(See continuation, page 3)

8. Construction date:
   Estimated ______ Factual 1894 and subsequent years.
9. Architect August Schilling (amateur gardener)
10. Builder Unknown
11. Approx. property size (in feet)
    Frontage 150 Depth 170
    or approx. acreage ______
12. Date(s) of enclosed photograph(s)
    1982

295-4

244 Lakeside Drive (rear)
Schilling Gardens: (view southwest)

13. Condition: Excellent ___ Good x Fair ___ Deteriorated ___ No longer in existence ___

14. Alterations: Some changes to landscaping.

15. Surroundings: (Check more than one if necessary) Open land ___ Scattered buildings ___ Densely built-up x
Residential x Industrial ___ Commercial ___ Other: Snow Park

16. Threats to site: None known x Private development ___ Zoning ___ Vandalism ___
Public Works project ___ Other: ___

17. Is the structure: On its original site? x Moved? ___ Unknown? ___

18. Related features: 244 Lakeside Drive (front); 200 Lakeside Drive

SIGNIFICANCE

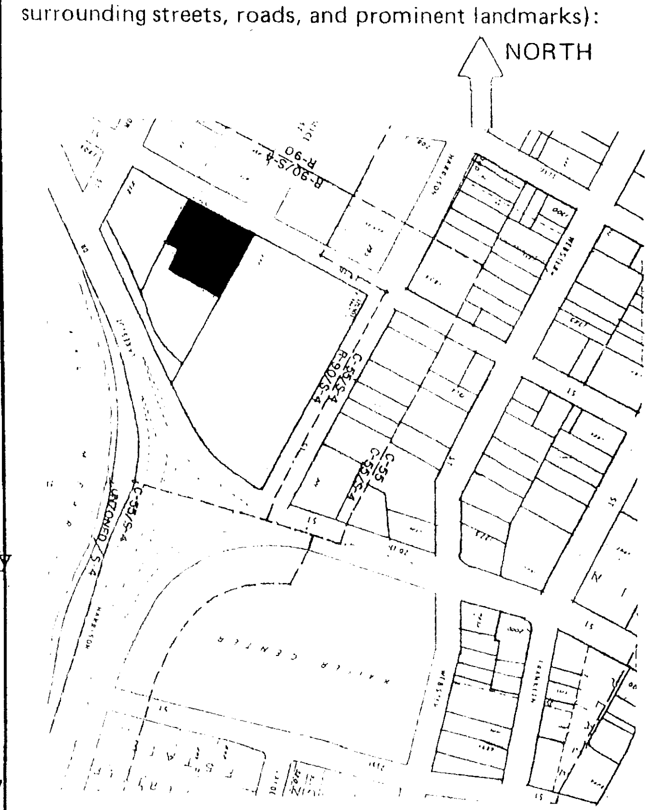
19. Briefly state historical and/or architectural importance (include dates, events, and persons associated with the site.)

The surviving elements of the Schilling Gardens are significant as the last reminder of one of nineteenth century Oakland's best-known show-places, illustrative of some of the social attitudes peculiar to its era, and a type of garden with few surviving local examples. The rustic style arbor section is especially significant as an extremely unusual and possible unique nineteenth century garden element constructed in concrete.

The Schilling Gardens were developed in the 1890's by August Schilling, cofounder of the well-known coffee, tea and spice firm, A. Schilling & Co., based in San Francisco. The gardens formed the grounds for Schilling's large residence at the northwest corner of 19th (then Durant) and Jackson Streets and were open to the public. Their rich and varied collection of exotic plants and fanciful structures made the gardens one of Oakland's favorite attractions. Schilling, a German immigrant, came to San Francisco in the 1870's and founded A. Schilling & Company in partnership with George F. Volkman (O'Brien). In 1892, Schilling bought as his residence the house at the northwest corner of 19th and Jackson Streets built about 1882 by Jonas Sedy. (Knave).

(see continuation page5)

Locational sketch map (draw and label site and surrounding streets, roads, and prominent landmarks):



20. Main theme of the historic resource: (If more than one is checked, number in order of importance.)
Architecture 1 Arts & Leisure 3
Economic/Industrial ___ Exploration/Settlement ___
Government ___ Military ___
Religion ___ Social/Education 2

21. Sources (List books, documents, surveys, personal interviews and their dates). Sanborn Map Co., Insurance Map of Oakland, Vol. 1, 1889 revised to 1901; and Vol. 2 1903 revised to 1911, and 1912 revised to 1948. DeWitt Jones (ed.), "Oakland Parks and Playgrounds" (W.P.A.), 1935, 273-4
*Continued below.

22. Date form prepared April 30, 1983
By (name) Staff and Consultants
Organization Oakland Cultural Heritage Survey
Address: City Planning Dept., City Hall
City Oakland Zip 94612
Phone: (415) 273-3941

*Robert O'Brian, "The Two Young Men from Bremen", San Francisco Chronicle, May 7,1947, 16. Leslie Flint, (Camron Stanford House Preservation Association, "The Heart of Oakland: A Walking Guide to Lake Merritt", n.d. (c. 1979). Knave, Oakland Tribune, March 18, 1962.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

HISTORIC RESOURCES INVENTORY

Street or rural address: 244 Lakeside Drive (rear)

7b. Physical Description (continued from page 1)

the area now occupied by the 244 Lakeside Drive Garden was generally densely landscaped with trees and shrubs.

The rear garden of 244 Lakeside Drive is currently designed with a large semi-elliptical central lawn area extending from the rear of the apartment and bordered by rich plantings of trees, shrubs, and herbacious flowering plants, including many unusual or exotic specimens. Informal stone paths pass through the perimeter plantings. A section of the concrete arbor paralleling 19th Street still exists, draped with original wisteria and roses, but the two perpendicular extensions have been removed. Other surviving elements from the original Schilling Gardens include one of the several existing redwood trees, a large holly tree, a camperdown elm, and paired wrought iron gates, at the west end of the 19th Street frontage, with the initials "A. S." (Flint). The gates are mostly covered with chain link and wood slats. Also probably part of the Schilling Garden is a high rubble stone embankment largely hidden by ivy along the 19th Street frontage east of the gates.

295-1

244 Lakeside Drive (rear);
Schilling Gardens:
(Arbor)

HISTORIC RESOURCES INVENTORY

Street or rural address: 244 Lakeside Drive (rear)

290-35 244 Lakeside Dr. (rear);
Schilling Gardens: (arbor)

295-6 244 Lakeside Drive (rear);
Schilling Gardens: (view to southeast)

HISTORIC RESOURCES INVENTORY

Street or rural address: 244 Lakeside Drive (rear)

19. Historical and/or Architectural Importance (continued from page 2)

Shortly after this purchase, Schilling acquired the large parcel to the west containing the Judge O. L. Shafter residence. Schilling removed the Shafter House and, in 1984, 1884 developed the combined sites into the Schilling Gardens which were open to the public until about 1900, when, due to vandalism, Schilling was forced to restrict their periods of public access. (Jones, Flint). The Schilling House remained standing until 1921 when it was sold to Percival A. Palmer who in 1921-2 developed the Regillus Apartments on the site. The west portion of the property was developed with the 244 Lakeside Apartments in 1924-5.

Schilling, described as "a great flower fancier", may have designed much of the gardens himself. In 1903 he planned a miniature Japanese garden with arched bridge and goldfish pond at the Schilling Company's new building at 2nd and Folsom Streets in San Francisco. The layout also included a geranium-planted hillside topped by a conservatory (O'Brian).

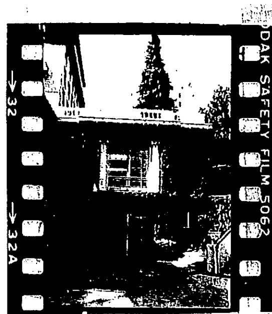
The opening of elaborate private homes and gardens without charge to the general public was a common nineteenth century practice. The Schilling Estate was one of several private parks open to the public in Oakland. In New York City, owners of the Fifth Avenue mansions would throw open their doors to public viewing on Sunday afternoons. These customs were stimulated in part by the belief that exposure of the general public to high quality environments would encourage individuals to improve the quality of their own lives, leading to improvement in the condition of society as a whole.

Jones states that the concrete arbor, called the "hanging gardens", was built later than the rest of the garden complex and was one of its most celebrated features. The arbor's appearance on a 1903 Sanborn Map, but not on a 1901 map strongly suggests that it was constructed sometime between 1901 and 1903. According to the present management of 244 Lakeside Drive, the arbor was built by Japanese craftsmen. The presence of rustic arbors, built of natural tree trunks and branches, and similar types of romantically primitive or picturesque structures, such as Schilling's now-vanished cave, was highly characteristic of late nineteenth century landscaped design, reflecting the influence of Alexander Jackson Downing and others. However, the execution of such structures in concrete was highly unusual.

The garden, in combination with the rear elevation of 244 Lakeside Drive, terminates the view along Alice Street from the south and, with its tall trees, provides an attractive focal point for viewing the handsome group of early 20th century apartment buildings along Alice Street between 14th and 17th Streets (see SHRI form for Alice Street District).

Historic Resources Inventory:

Garage



ltural Heritage Survey
FIELD FORM
ity Planning Department

8/80

← 1903-1911 portion

Survey Area: 29-31 (29 ; Blk912)

Classification Code:

Preliminary Survey: ☑A ☐B   ☑4 ☐– 1880's
Field Surveyor: ☐A ☐B   ☐+ ☐–

Date: 269   Roll/Frame No: 269

PART I IDENTIFICATION

A. Common and/or Historic Name: Garage (c) (H)

B. Address/Location: 244 Lakeside Dr. (accessory to 244 Lakeside Dr. and/or 200 19th st.(?))

C. Feature Classification: ☐Building ☐Building Group ☐Activity ~~☐Site~~ ~~☐Street Furniture~~
☐Landscape Element ☐Streetscape ☐District ☐Other (Specify): ______

D. Feature is part of Building Group, Streetscape or District ☐Yes ☐No. If yes, identify: ______

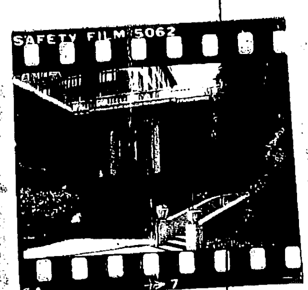
PART II DESCRIPTION

A. Building or Building Group (If feature is not a building or building group, go to Section B).

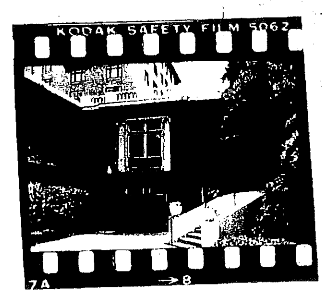
1. Style(s): ______
2. Roof Shape: ______ Roof Materials: ______
3. Window Type(s) and Distribution(s):

4. Surface Materials: Type and Distribution:
- ☐Wood Siding
- ☐Wood Shingles
- ☐Other Wood
- ☐Stucco
- ☐Half Timber
- ☐Brick
- ☐Stone
- ☐Terra Cotta
- ☐Concrete
- ☐Metal
- ☐Other (Specify):
- ☐Not Known
- ☐Unpainted Surfaces

5. Visible Alterations: Describe the Nature and Locations of the Alterations:
- ☐None
- ☐Surface Materials
- ☐Ornamentation
- ☐Windows
- ☐Floor Plan
- ☐Roof
- ☐Entry Area
- ☐Other (Specify):



295-7



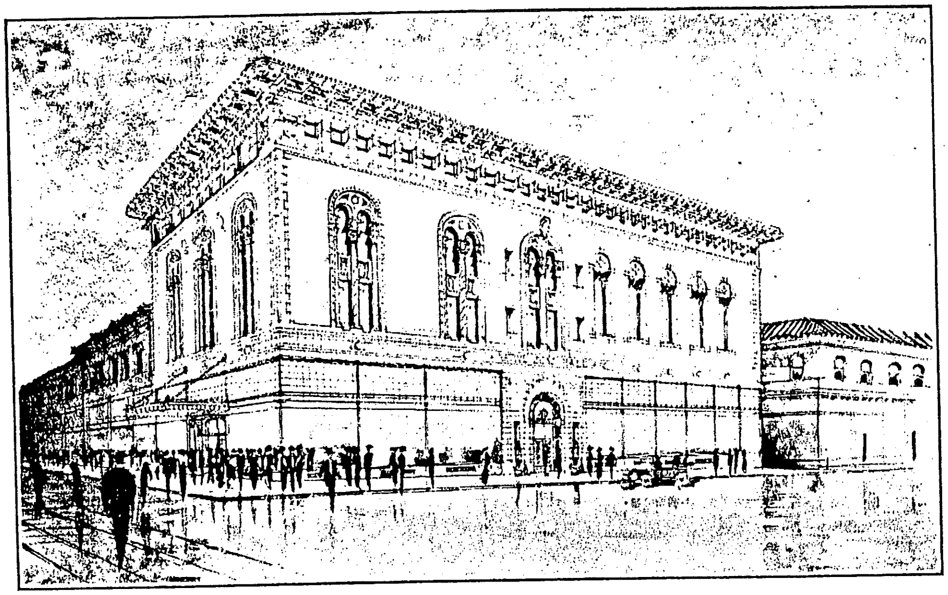
295-8

6. Condition: ☐Excellent ☐Good ☐Fair ☐Deteriorated
Comments:

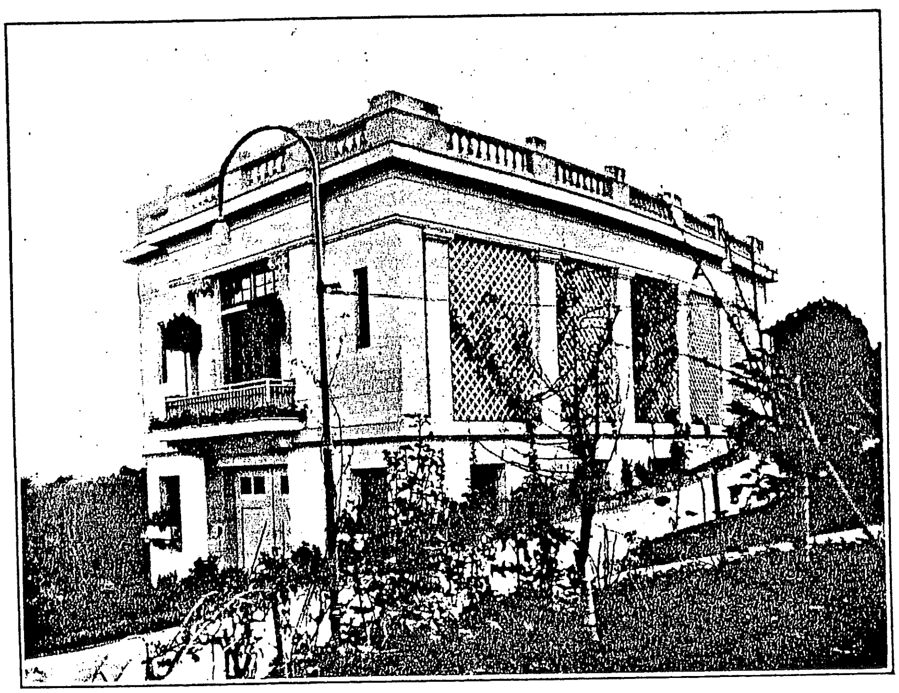
7. Vandalism: ☐Yes ☐No

8. Present Use(s): ☐Residential (# of units: ______) ☐Office ☐Other Commercial: ______
☐Industrial ☐Institutional: ______ ☐Recreational ☐Abandoned

9. Is the interior open to the public? ☐Yes ☐No If yes, describe any notable interior attributes in Section B.



Native Sons' Building, Sacramento *Washington J. Miller, Architect*
Exterior to be of Sacramento Sandstone Brick



Concrete Garage for Mr. A. Schilling on Shore of Lake Merritt, Oakland
Bluxome & Company, Builders

(east side)

Oakland Cultural Heritage Survey
EVALUATION SHEET
Oakland City Planning Department

Common (and Historic) Name(s) Lakeside Drive Apartments Garage (1) Schilling (August) House Garage (H)

Address/Location 244 ~~200~~ Lakeside Dr. ~~(accessory to 244 Lakeside Dr)~~ ~~and/or 200 19th St.~~

A. VISUAL QUALITY/DESIGN

1. Exterior Monumental imagery w/ window columns + parapet balustrade — E (VG) G FP
2. Interior (list best spaces first)
   - Space 1 — E VG G FP
   - Space 2 — E VG G FP
   - Other Spaces — E VG G FP
3. Construction Esp. early reinforced concrete, concrete — E (VG) G FP — Pre-1911 Esp. early?
4. Designer/Builder Unknown (1903-11) Bluxome & Co. bldrs — E VG G (FP)
5. Type/Style Esp. fine and very early B-Arts deriv. auto garage — E (VG) G FP
6. Supportive Elements landscaping (1) — E VG (G) FP

B. HISTORY/ASSOCIATION

7. Person/Organization August Schilling (S-TC) — E (VG) G FP
8. Event — E VG G (FP)
9. Patterns Early dev. of Automobile (S-C); 19th cent. Lake Merritt mansions (S-CC) — E VG (G) FP
10. Age ~~Betw. 1903-1911 (probably~~ ~~post 1907)~~ 1909-10 — E VG (G) FP

C. CONTEXT

11. Continuity Lake Merritt District (P) - contrib.; 244 Lakeside Drive Group (P) contrib. — E (VG) G FP
12. Familiarity — E VG G (FP)

D. INTEGRITY

13. Condition — (E) G F P
14. Exterior Alterations ~~1982 addition (see separate eval.~~ 1st est) — (E) (G) F P — E?
15. Interior Alterations
   - Space 1 — E G F P
   - Space 2 — E G F P
   - Other Spaces — E G F P

E. REVERSIBILITY

18. Exterior Alterations Addition can be removed — E G (F) P
19. Interior Alterations
   - Space 1 — E G F P
   - Other Spaces — E G F P

Evaluated by OP Date 3/25/83

Reviewed by MYF Date 3/25/83 [x] Approved [ ]

Reviewed by ______ Date ______ [ ] Approved [ ]

Reviewed by ______ Date ______ [ ] Approved [ ]

Reviewed by ______ Date ______ [ ] Approved [ ]

Reviewed by ______ Date ______ heet

Reviewed by ______ Date ______ heet

Check permits indexed by street. Construction under "Durant" 19th and "Jackson" Street.

Consultants - There have been evaluated as two structures. Should they instead be treated as one? MYF (put together)

8-634-1

STATUS

Group: [ ] A [x] B [ ] C [ ] D [ ] Not

City Landmark Status: [ ] Listed [ ] In progress

National Register Status: [ ] Listed [ ] Eligible

[ ] Potential if restored [ ] Potential when over

[x] Part of Group/Streetscape/District: Lake

[ ] Site of Opportunity:

[ ] Endangered:

Archeological Potential: [ ] Extreme [ ] Heavy [ ] Mo

ible

Study List + NR3D

This form has been adopted from the San Francisco Downtown Inv... Heritage by Charles Hall Page and Associates, and from Harold ...

(1) With garden, is surviving property most intact ... (illegible)

Rev. 9/81

SA5

ES

Oakland Cultural Heritage Survey
Oakland City Planning Department

EVALUATION SHEET

Common (and Historic) Name(s)
Address/Location 244 Lakeside Dr (east side) (part of Lakeside Drive group)

A. VISUAL QUALITY/DESIGN
1. Exterior ________ E VG G FP
2. Interior (list best spaces first)
Space 1 ________ E VG G FP
Space 2 ________ E VG G FP
Other Spaces ________ E VG G FP
3. Construction ________ E VG G FP
4. Designer/Builder ________ E VG G FP
5. Type/Style ________ E VG G FP
6. Supportive Elements ________ E VG G FP

B. HISTORY/ASSOCIATION
7. Person/Organization ________ E VG G FP
8. Event ________ E VG G FP
9. Patterns ________ E VG G FP
10. Age ________ E VG G FP

C. CONTEXT
11. Continuity ________ E VG G FP
12. Familiarity ________ E VG G FP

D. INTEGRITY
13. Condition ________ E G F P
14. Exterior Alterations ________ E G F P
15. Interior Alterations
Space 1 ________ E G F P
Space 2 ________ E G F P
Other Spaces ________ E G F P
16. Structural Removals ________ E G F P
17. Site ________ E G F P

E. REVERSIBILITY
18. Exterior Alterations ________ E G F P
19. Interior Alterations
Space 1 ________ E G F P
Other Spaces ________ E G F P

Evaluated by OAB Date 12/17/84

Reviewed by ________ Date ________ ☐ Approved ☐ See Comment Sheet

Reviewed by ________ Date ________ ☐ Approved ☐ See Comment Sheet

Reviewed by ________ Date ________ ☐ Approved ☐ See Comment Sheet

Reviewed by ________ Date ________ ☐ Approved ☐ See Comment Sheet

Reviewed by ________ Date ________ ☐ Approved ☐ See Comment Sheet

STATUS/RATING
Survey: ☐ A ☒ B ☐ C ☐ D ☐ Not Rated ________ Site of Opportunity ________
National Register (Individual): ☐ Listed (1) ☐ Determined eligible (2) ☒ Appears eligible (3) ☐ Potential if restored (4b) ☐ Potential when over 50 years old (4d) ☐ None of the above (6) ☐ Other ________
N R (as part of District only): ☐ Listed (1D) ☐ Determined eligible (2D) ☒ Appears eligible (3D) ☐ Potential if restored (4Db) ☐ Potential when over 50 years old (4Dd) ☐ None of the above (6) ☐ Other ________
SHRI: ☒ Primary resource (N R #1,2,or 3) ☐ District Contributor (N R #3D) ☐ Contingency Contributor (N R #4D..) ☐ Non-contributor (N R #6) ☐ Ineligible (N R #6) ☒ Part of a building group
City Landmark: ☐ Listed ☐ In progress ☐ Primary potential ☒ Secondary potential ☒ S-7 potential ☐ On study list ☐ None of the above

This form has been adopted from the San Francisco Downtown Inventory, prepared for the Foundation for San Francisco's Architectural Heritage by Charles Hall Page and Associates, and from Harold Kalman's The Evaluation of Historic Buildings.

Rev. 8/83

Statement of Significance

Finola Reid Plants and Gardens

Statement of Significance

Contents

9

Statement of Significance

1. Introduction

A Statement of Significance is a report setting out the historical significance of a building, place or site. It should be the starting point for any plan of adaption, conservation, repair or development, because a clear understanding of the significance of each period of a site's history is essential to decision-making for its future.

The purpose of this particular report is to evaluate the private garden of a long demolished mansion at 244 Lakeside Drive, Oakland, California, which once formed part of the former estate of a Mr August Schilling, salt, coffee, tea and spice merchant. The statement sets out the garden's history and development, in so far as this is known; identifies its significant features; determines which features, if any, are original and/or historically significant; and those that are worthy of preservation, conservation, restoration and/or re-use. The statement also takes into consideration the social history of the estate. This follows an evaluation of all discovered information on the garden. In doing so the intent is to establish whether or not the garden, what still remains of its original design and layout, what was planted, altered or added to, by successive owners since the 1890's, could still warrant it being considered as historically significant and worthy of preservation.

'Designed landscapes do not remain static. Instead they develop and decay and, while development should be carefully considered and setbacks mitigated, it is seldom possible (and rarely desirable) to maintain the status quo. Historic designed landscapes must adapt if they are to survive and, in practice, not everything can be preserved.' (The Garden History Society, Statements of Significance)

Statement of Significance

2. Definition of Significance

'Significance may be defined as that which makes a place unique, distinctive, important or of special merit by comparison with other places.' The qualities that determine significance include 'unique', 'distinctive', 'important' or 'of special merit' in comparison with other features. (The Garden History Society, Definition of Significance)

Applying these qualities to the 'Schilling Garden' enables its significance to be determined in a clear and objective way.

3. Research and Analysis

This report is primarily based on information gleaned from a site survey and inventory, a search of public archives, record offices and other researches plus supplied photographs and other documentation.

A site survey was carried out on the 28th & 29th November 2006 to assess and evaluate the surviving designed and built features of the garden and its plant collection. The entire garden was inspected and each area was recorded. All built features and plantings were noted. A photographic record was taken of the garden and of a considerable number of the trees, shrubs, perennials, tree ferns and ferns. In addition features were inspected and a photographic record taken of them.

Comparative research was carried out to establish the significance of the built features and the plants found in the garden. This was fuelled by extensive knowledge and experience of 18th, 19th and 20th century gardens and their owners in Ireland and Britain, and in particular the extensive collections of exotic trees, shrubs and perennial plants found in many of them. Fashion plays a major part in the choice of species in any garden and it is clear from what remains growing there, *and their ages,* which ones were fashionable at different periods.

The inspection survey followed searches of local public archives and records in Oakland, California and elsewhere. Searches were also carried out in the specialist libraries of several distinguished international institutions. The library of the Royal Botanic Gardens, Kew, England, the Lindley Library of the Royal Horticultural Society, London, the British Library and the National Botanic Gardens, Dublin, Ireland, were searched for information on August Schilling and his garden.

Because Mr Schilling was a wealthy spice merchant it was thought possible that he may have contributed to plant expeditions which were commonplace in the late 19th and early 20th centuries. It would have been a good investment for a man whose trade could have benefitted enormously from such an investment. Perhaps if he had imported seeds and plants for his garden and grown plants of economic importance, or if he had grown particular spice and herbal plants in his garden, this would have been recorded somewhere. If he had been a charitable benefactor, or patron, to horticultural clubs or societies, or contributed in some other generous way to significant horticultural endeavours he would have been a significant figure and his garden would have reflected his worthy activities.

If this garden were of significant historic importance *in its own right* because of its site history or its design and layout, disregarding any of Mr Schilling's spice trade activities, there surely would be some records or accounts in these repositories.

The Lindley Library in London has a tremendous range of books on American gardens and landscape design, etc. yet surprisingly neither Mr Schilling nor his garden beside Lake Merritt proved fruitful for any information which would strengthen a case for his garden's historic significance and preservation. The truth is that Mr Schilling's garden merited no particular note on a national or international scale. When he sold and moved to Portola Hall it was there he became a figure in gardening circles and that garden became well known.

4. Over view of the garden's history

The garden dates from c.1892 when Mr Schilling purchased an existing house on the north-west corner of 19th and Jackson Streets. In 1901 he acquired another large parcel of land to the west containing the residence of a Judge O. L. Shafter. Mr Schilling had this old house demolished and combined the two sites to create a small estate on the edge of Lake Merritt where he built a new mansion for himself. Around it he developed an ornamental garden to complement his new house.

In its heyday Mr Schilling's residence would have been one of many grandiose mansions with private gardens that graced the Lake Merritt lakeshore landscape. Those old mansions and their gardens have long disappeared or been re-developed and built on, making this a rare survivor of that period. The garden underwent significant adverse changes to its character and setting when building development began to surround it and particularly when the two apartment blocks, The Regillus Building and the Bechtel Building, (244 Lakeside Drive) were built in close proximity to it. The history of these sites is given in the Historic Resources Inventory, Department of Parks and Recreation, State of California. (See Appendices)

When the garden was created by Mr Schilling it gained local notoriety. Garden visiting was the height of fashion during the Victorian period and opening to the public was a common practice with owners. His wealth and social status helped his garden's reputation and he capitalised on this by opening occasionally to the public to allow them to enjoy it, free of charge. This recorded benevolence by Mr Schilling also helped popularise his garden, as everybody wanted to rub shoulders with a wealthy garden owner. By all accounts it was worth seeing in its heyday. Its fashionable arbour of 'faux trees' with its overhead ironwork entwined with wisteria and a scented tea rose would have charmed visitors. The use of electric light fittings on the arbour must have been a great talking point. His wrought iron garden gate was egotistically embellished with his initials and this too would have greatly impressed visitors. Although now closed and locked the gate still reminds present day passers-by of the old days when visitors were occasionally welcome in Mr Schilling's garden. An 'artificial cave' was constructed in 1912 (*post* Mr Schilling's ownership) but this has long disappeared and its actual site is not known, nor did any information or photographs of it come to light during recent researches.

In 1910 Mr Schilling sold 222 Lakeside Drive to Bluxome & Company and his mansion was subsequently demolished and a new 12 storey apartment block, known the 'Bechtal' Building, was built on part of the site in 1926. The house garage of the old Schilling mansion still survives to the present day. In 1914 August Schilling purchased another property, Portola Hill, along with surrounding land. He renovated that house and then lived there so his occupancy of 222 Lakeside Drive was relatively short-lived. In 1922 the Regillus Apartments were built. Recent aerial photographs of the garden show a site that is now bounded on two sides by the 'Bechtel' Building and the Regillus Apartments. Both are overlooking the garden and visually dominate it. Remarkably the garden has survived to the present day despite the various changes of ownership since it was first laid out.

At one stage in the recent past (c. Oct. 2005) the garden was offered for sale to the City of Oakland and the offer was declined. Although this is well documented it is unclear precisely why it wasn't purchased for the people of Oakland and it was a surprising decision if the garden were of historical significance. The Historic

Statement of Significance

Resources Inventory, Department of Parks and Recreation, State of California, lists and describes the garden in some detail. (See Appendices).

The garden's site is now zoned for residential development and it was recently purchased for such purpose. Resulting from that the opportunity now arises to preserve as many of its original features and plantings as possible and re-use them as part of proposed new landscape designs around a new 'landmark' apartment block. The present owner, being conscious of its plant collection and surviving arbour, is committed to saving and re-using them and opening the site up to the public once more. Moreover, adjoining the site is Snow Park, a public open space, managed by the City of Oakland Parks and Recreation Department. Snow Park was also originally part of the old estate of Mr Schilling. This historical connection with the 'Schilling garden' is not flagged by the City of Oakland/Parks and Recreation in its listing for Snow Park nor is it managed as a historic site. Although Snow Park is a well used public open space for the local community it could be given greater consideration, recognition, and funding to upgrade it, so that people could respect it and enjoy it all the more.

The proposed landscape designs for the new apartment development present a unique opportunity to re-join Snow Park visually to the old Schilling garden site. Opening up the garden site and re-establishing the link between the two areas as part of the new development would ensure that Snow Park would be given much needed investment and a new lease of life. A programme of restoration to include tree planting, the addition of colourful floral display borders and the general upgrading of Snow Park would ameliorate loss of the garden and would benefit all citizens of Oakland.

Statement of Significance

5. Significant Features

5.1 'Faux Trees' Arbour

Arbours were garden features that were highly fashionable in the late Victorian period. This one is constructed from cast concrete uprights with a metal framework overhead. The uprights are made to look like the large trunks of the Sweet Gum trees (*Liquidambar styraciflua*) which grow nearby. Some are even more cleverly made to look as if these 'trunks' were half decayed. The original supporting metalwork of the arbour still survives and the light fittings are still affixed to it. These lights must have been spectacular when fully lit.

This arbour supports a massive trunked old Wisteria (not in flower during site survey) and a climbing hybrid tea rose, (possibly '*Madame Caroline Testout*). This wisteria and rose have become formidable specimens with heavy main trunks and extensive branch-work. The rose cascades over the arbour and tumbles on to the boundary with 19th Street and no doubt flowers happily there all summer long. Attempts should be made to save these plants by trying to transplant them to a new location as part of the landscaping for the proposed development but it is unlikely that they could be saved, because of their great age they would probably not transplant. This task would be made all the more difficult because the wisteria and rose have entwined the faux trees and embedded themselves on the metal support structure. They should be propagated and young plants grown and used as part of the landscaping of the new development.

Under the Arbour, along its central path at ground level are long irregularly shaped rectangular beds, edged with lava rock. These beds once held thriving clumps of

Cymbidium orchids, but all are now dead with a few feeble exceptions. It is highly unlikely that these orchid beds are original and are probably only dating from a more recent ownership period. Elsewhere in the woodland area and along its path routes and under the large trees are mostly dead clumps of *Cymbidium* orchids.

Variegated ivies still clothe metal frames of vertically positioned trelliswork along the boundary fence and on closer inspection this trellis apparently seems to be part of the original design of the arbour, but even if it is not original it is still worthy of preservation.

Renovation of this arbour with its ornamental metalwork and fanciful faux trees would be a challenging and fascinating project. Its re-siting along the boundary with Snow Park, if agreed to by the Parks and Recreation Department, would greatly enhance that landscape and make a beautiful colonnade linking the two sites.

Judgement of Significance

- *This is the most significant surviving built feature of the garden*
- *It is not unique but is distinctive in design and of special merit*
- *There is originality of thought in using it as part of the garden's layout*
- *The use of electric light fittings as part of its design is of special note*
- *It should be preserved and given a new lease of life as a design element of the proposed new development*

Recommendations

1. *Record, dismantle, repair, and restore the arbour and its lights*
2. *Re-use it as part of the proposed landscaping scheme*
3. *Consider using it as a linking 'colonnade' with Snow Park*
4. *Make every effort to salvage the old wisteria and climbing rose*

5. *Propagate the wisteria and rose and use to re-plant the arbour*

5.2 The Greenhouse

The greenhouse is situated close by the original entrance to the garden with the 'A.S.' initials on the gates. It is a span glasshouse of white painted wood frame construction, with iron saddles supporting the roof. It is constructed on a brick base wall. It's interior is fitted out with slatted wooden staging and it has lever operated roof and window ventilation. It is a plant house that would have been used for propagating and growing on young plants rather than being used as an ornamental display house. It is in good condition and it presently lies empty. Because it is constructed with glass it is a potential hazard for people and unsuitable for use in a publicly accessible location. If its glass were replaced by toughened safety glass it could be offered for use to the Parks and Recreation Service who could re-site it in a safe position in a plant nursery and use it for propagating again. There is no obvious maker's mark on it however it is similar in construction and finish to glasshouses constructed by AGMCo. – American Greenhouse Manufacturing Company, who were prolific glasshouse makers for private and commercial purposes around that period.

Judgement of Significance

- *This feature is a significant surviving <u>built</u> feature of the garden*
- *It is not an integral part of the original design and layout*
- *Its siting close to the garden gate and the potting shed indicates that it was part of the working area of the garden*
- *It is neither unique nor distinctive in design and is of no special merit*

Recommendations

1. *Measure and photograph it in detail*
2. *Dismantle it, remove to safe keeping and seek a suitable new home*

5.3 'Lion's Head' Fountain

The 'Lion's Head' Fountain is an attractive mould-cast concrete garden ornament of recent vintage, certainly post 1961. (see Appendices). When closely inspected a maker's stamp is visible – 'Art Craft Oakland Cal'. The seam line of the mould cast is obvious and it has been given a 'stressed' paint finish by the manufacturer to give the impression that it is a white painted cast iron antique ornament. It is geared up for electricity and a water pump. It is centrally placed, but not fixed, on a flat area of raised 'crazy' pavement on the main axis of the garden. A flight of steps leads from it to the curved rose beds and to the lawn and it provides a pleasant focal point when viewed from a distance.

Judgement of Significance

- *It is not of any historical significance*
- *It is not unique, distinctive, important, or of any special merit that warrants its preservation*

Recommendations

1. *Remove it to a safe location and continue to use it a garden ornament*
2. *Place it in a location where it is not subject to vandalism*
3. *Place it in a fixed position where it can be enjoyed from a distance*

Statement of Significance

5.4 Paths, paving & steps

The main flagged path frames and encloses the lawn and has inter-linked minor paths leading off to various areas of the garden. These paths are made of irregular stone in a 'crazy paving' vernacular style rather than of any architectural design. Some paths are of more recent origin and were probably inserted by the previous owner to make access to re-planted areas of the borders and shrubberies. Some stretches of the path system are in a precarious and hazardous state, difficult to walk on and dislodged where old tree roots have pushed and raised them. This is particularly evident in the area around the Giant Redwood trees and the old greenhouse. There are stretches in this upper section of the garden that are moss covered, hard-packed earthen paths edged with small stone. Some sections of the paved paths are colonised by clumps of creeping perennials. The flight of steps leading to the 'Lion's Head' Fountain is in good order and not hazardous.

Judgement of Significance

- *The paths are vernacular in style and crudely made in places*
- *The paths are not unique', 'distinctive', or 'of any special merit'*

Recommendation

1. *Salvage the stone and re-cycle for use elsewhere*

5.5 Garden Seat

Statement of Significance

An unpainted and weathered wooden bench is well placed under the old evergreen oak tree (*Quercus ilex*). Over time its legs have become slightly embedded in the girdling roots of the oak. This is not an original feature of the garden and is likely to be only about 20-30 years old or thereabouts. It is well placed under the tree and when sitting there it affords a lovely sweeping view across the large central lawn to the perimeter borders, shrubberies and woodland.

Judgement of Significance

- *Not original and of common or vernacular style*
- *Not unique', 'distinctive', or 'of any special merit'*
-

Recommendations

1. *Salvage, restore and re-use as part of the proposed designs*
2. *Alternately re-site to the small area of garden that remains in the ownership of 244 Lakeside Apartments*

5.6 Lawn

The central lawn is bordered by a crazy-paved stone path with narrower paths linking it and leading off to various areas of the garden. It is in reasonable condition, and could be re-used as part of the new landscaping, however this would not be a practical suggestion given the effort needed to store it and then re-lay it.

Judgement of Significance

- *Distinctive in shape and defined by its bordering path*

- *Possibly original to the garden*
- *Of no special merit*

Recommendation

No recommendation

5.7 Plants and Plantings

The plants and plantings are undoubtedly significant elements of the garden. The range and number of plants in such a small space is remarkable and this plant collection, taken as a whole and in all its diversity, is by far the most important feature of the garden.

The trees and larger tree-like shrubs forms the main 'skeleton' of the garden. The deciduous and evergreen shrubs, rhododendrons, camellias, tree ferns form the framework of the garden along with myrtles, dogwoods, and several species of tree ferns. Large specimens of hybrid hollies line the boundary of the Regillus Apartments and screen the building from view while camellias form a hedge line along the boundary with Snow Park.

The Sweet Gums, Giant Redwoods, Evergreen Oak, Cork Oak, Olive tree, Camellias, Rhododendrons, Tree Ferns, Magnolias and hybrid Hollies are the most significant 'woody' plants and many of these have become substantial specimens. The abundant ferns and perennials, in all their diversity, form thriving colonies in the 'woodland' area of the garden. Some of these plantings are original to the 1890's –

1910 period when August Schilling owned the property and the majority were more likely planted from c. 1910 onwards up to quite recent years.

Numerous clumps and groups of perennials, ferns, grasses and herbage clothe the under-storey of the tree and shrub canopy. Many of the perennials have become widely spreading colonies and parts of the garden are truly 'Robinsonian' in style, *i.e.* mixing natives with the exotic.

The diversity of the plantings still gives some idea of how lovely the garden must have been. Some of the garden's oldest vegetation survives well. Evidence of original design and layout is obvious in the style and pattern of some plantings however much of the original plantings have died or been killed off due to various causes. Dead stumps of camellias, rhododendrons, and tree ferns still mark some of the old planting patterns.

In more recent years the garden has been subjected to grossly inappropriate pruning, poor cultivation techniques and over-planting and this has resulted in major problems for many of the plantings. Vigorous shrubs and perennials threaten less vigorous ones. Harsh pruning has caused damage to many shrubs. Savage pruning has been carried out to some of the large shrubs to 'contain' these more vigorous species from encroachment on their neighbours.

The use of irrigation, whilst it is essential in the heat of Californian summers has resulted in a leached soil and impoverished growing environment which is causing stress to many plants.

The Wisteria (*Wisteria sinensis cv.)* intertwined with a pale pink flowered climbing rose (?*Rosa cv. Madame Caroline Testout*) still grow reasonably well on the arbour. The Giant Redwoods (*Sequoiadendron giganteum*), Sweet Gums (*Liquidambar* *styraciflua*) a Cork Oak tree (*Quercus suber*), an Olive tree (*Olea europaea*) and an Evergreen Oak (*Quercus ilex*) are all thriving despite the passage of time and increased pressure on their root zones. Many camellias have reached fine proportions and are thriving while others have been savagely pruned, are chlorotic and are struggling. A dead 'Camperdown' Elm still stands near the large hollies, victim to beetle attack.

There are two rose borders, one which contains mixed varieties of hybrid tea roses is close to the walls of 244 Lakeside Drive (Bechtel Building). The curving central borders are planted with *Rosa cv. 'Iceberg'*, an old fashioned variety (introduced to cultivation in 1958 by Kordes) and not of any particular historical interest. The roses are all badly pruned, lacking vigour and in poor condition.

A small collection of dwarf conifers still survives. It was fashionable for a long period during the twentieth century to have displays of such stunted and grotesque 'bonsai' conifers in a rocky setting as these ones are. They are overcrowded and growing into each other's space so their individual characteristics are being hindered. These are not original plantings, however for some people they are desirable garden plants and therefore could be transplanted and given a new lease of life.

The Australasian tree ferns form a good collection. However common they may seem nowadays it should be noted that in the 1890's they were exceedingly rare and highly desirable exotic species.

These particular tree ferns, with a few notable exceptions, are unlikely to have been growing here since the 1890's. Because tree ferns are easily transplantable it is probable that Mr Schilling may have taken most or all of them with him to his new garden at Portola Hall. The ones still thriving here are, more than likely, later additions, possibly planted when the Bechtal family lived here (c. 1926-1967), but that does not greatly lessen their value. Tree ferns deservedly continue to be highly desirable garden plants and are becoming depleted in the wild because of habitat destruction so these species should be given priority for conservation and re-used elsewhere in a planting scheme.

Several Sweet Gum (*Liquidambar styraciflua*) and Giant Redwoods (*Sequoiadendron giganteum*) dominate the garden and screen it somewhat from the oppressive scale of nearby buildings. These trees are growing in the upper section of the garden, and the redwoods are of massive height and girth. Being native to this region, these redwoods were probably already growing on the property when Mr Schilling first planted his garden and he incorporated them into its layout.

The Giant Redwoods give strength and character to the garden and the Sweet Gums cast delightful dappled shade. These were no doubt the inspiration for the 'faux trees' arbour. Epiphytic ferns are planted on the redwood trees and diverse colonies of ferns abundant throughout the upper 'woodland' area of the garden. The garden has a 'Robinsonian' feel to parts of it and it is not co-incidental that this is so. The principles and writings of William Robinson were at their height during the late Victorian period and his influence is still present in this garden.

Judgement of Significance

- *The plant collection is the most significant surviving feature of the garden*
- *Many of its plants are distinctive specimens or colonies and of special merit*

Recommendation

- *Propagate as many trees, shrubs and perennials as possible prior to development of the site*
- *Remove as many plants as possible to safe storage for later re-use*

- *Design an integrated landscape design for the new apartment block using as many of the plants as possible in the new scheme*

6. Summary

The sale by Mr Schilling in 1910 and the construction of two apartment blocks close by heralded significant changes for the site early in its history. By 1926 the garden had already become the 'backyard' for nearby apartment blocks.

The mansion house is long gone and with its character and setting hugely altered, the garden lies waiting for re-development in accordance with its zoning for residential use.

The proposed use of the site for the construction of an apartment block will require the removal of the garden to facilitate this development. The garden has not been listed for preservation so this development is permissible.

In carrying out the site inspection survey, and taking into regard its designed and natural features, its plants and planting design, the question now arises how best to conserve what remains and re-use them as part of the landscaping for the new development.

Because of its history there is a perception and local opinion that it is of sufficient historic significance to warrant protection and preservation, despite the fact that the area is zoned for residential development.

The duration of ownership and its sale after 20 years or so and Mr Schilling's move to a more prestiguous property, its subsequent changes of ownership and the failure to have it taken into public ownership all lead to the conclusion that it was never considered worthy enough to be kept or invested in by any body or authority.

In recent times it was offered for sale to the City of Oakland but this offer was turned down and it subsequently sold to the present owner. The present owner is committed to salvaging and incorporating as much of the old garden as possible into new landscaping designs for a proposed apartment block.

Based on the information gleaned from sourced and supplied documents associated with, or relating to, August Schilling and his garden, the site inspection survey, the inventory and other researches, this report concludes that the garden is of local significance. It is more significant for its rarity and survival amongst the surrounding high rise apartments and office blocks rather than for any other reason.

The loss of the Redwoods and Sweet Gums would be the greatest loss to the site if the garden were built on, however this could be somewhat ameliorated by upgrading and embellishing Snow Park. Planting young redwoods and other specimen trees and flowering shrubs as part of new designs for this public open space would greatly benefit Snow Park and raise its profile as a public space.

The proposed incorporation of the arbour and many of the old plants into the landscaping designs for the new apartment development would ameliorate the loss of the garden and ensure that the spirit of the garden itself would not be lost.

7. Summary Recommendations

- *Dismantle and remove the Arbour for repair, restoration and re-use*
- *Seek a plant nursery or safe site as a holding area for the plants*

- *Engage a horticulturist to undertake a propagation programme*
- *Remove as many trees, shrubs and perennials as possible to safety prior to development of the site*
- *Design an integrated landscape design for the new apartment block using as many of the plants as possible in the new scheme*
- *Incorporate the restored faux tree arbour into the new designs as a colonnade linking the old garden with Snow Park*
- *Design a landscaping plan for Snow Park in association with the Parks Department and City of Oakland authorities*
- *Prepare a schedule of tree planting for Snow Park*
- *Source suitable large sized sapling trees and flowering shrubs for planting in Snow Park*
- *Consider using a 'Plant Hunters' theme planting scheme for Snow Park to reflect botanical connections between California and Europe*
- *Design floral display borders for the perimeters of Snow Park*
- *Consider using a 'Rainbow' theme planting scheme for the display borders to reflect the diversity of peoples and cultures in Oakland*

8. Appendices

Art Craft Statuary, Inc.

10441 Edes Avenue - Oakland, CA 94603 - Phone 510-633-1411 - Fax 510-633-0282

We are pleased to share with you our newest product line catalog.

Art Craft Statuary, Inc. is a family owned business, started in 1961, by our founder, Alipio Fabbri. The Fabbri family oversees and manages all operations. The family roots come from Northern Italy in the Tuscan region of San Cassiano di Controne, near Lucca.

The entire creation of our cast concrete products is made in our old world tradition, by hand,

beginning with casting the concrete to applying our special color finishes. Each piece is always truly a unique work of art that will be enjoyed for many years.
We take pride in manufacturing our fine statuary, and our customers have grown to expect our superior quality and excellent customer service. Advertisement.

"Snow Park"
19th Street & Harrison Street
Snow Park rests quietly across the street from Lakeside Park with sweeping views of Lake Merritt, located on the corner of a bustling business district, residential area and within walking distance of Children's Fairyland. Majestic trees shade much of the 4.2 acres, one of the amenities of the park is a manicured mini-course and putting green which allows patrons to play golf." City of Oakland/Parks and Recreation website listing.

"In October 2005, the land was offered to the city as a donation. Staff members demanded a huge endowment as the price of accepting the donation, and so the donor withdrew. The city council was never alerted to this valuable offer, and citizens had no opportunity to see whether funds could be raised for a park project. The owners sold the parcel."
Schiff, Naomi. Preserving Oakland's Heritage, web page.

William Robinson (1838, Ireland – 1935, England)
Horticulturist, author, plantsman, polemicist. William Robinson was not, as he occasionally claimed, a student gardener at the Royal Botanic Gardens, Glasnevin, nor is there explicit evidence for his exact origins. He was apprenticed at Curraghmore House (County Waterford), and later, employed at Ballykilcavan (County Laois). He went on to found several journals, in particular The Garden and Garden Illustrated. His influence on gardening at the time was profound. In 1870 he published a book entitled The Wild Garden, whose ideas are still a strong influence on gardening today. He favoured the naturalistic

style of planting over the formal parterres, carpet bedding and dull shrubberies of the Victorian era. The most comprehensive expression of his ideas came with the publication of The English flower garden in 1883, without doubt the single most important gardening book of the next century. National Botanic Gardens, Ireland

References

California Historical Landmarks

California Office of Historic Preservation, Department of Parks and Recreation

California Points of Historical Interest

California Register of Historical Resources

City of Oakland, Planning & Zoning. SUMMARY OF THE HISTORIC PRESERVATION ELEMENT OF THE OAKLAND GENERAL PLAN, Adopted 1994

Garden History Society, various documents

Historic Resources Inventory, Department of Parks and Recreation

ICOMOS, The Burra Charter

ICOMOS, The Florence Charter

Kushner, Samuel. Land Surveyor. Site Survey, Lands of 222 – 19th Street, Oakland, California, June 2006

National Register of Historic Places

Schiff, Naomi. Preserving Oakland's Heritage, web page.

Schilling, August. Family Files, various documents

Confirmation of the Historic Status of the Gardens

Office of Historic Preservation

-----Original Message-----
From: Toffelmier, Cynthia [mailto:CTOFFELMIER@parks.ca.gov]
Sent: Tuesday, September 18, 2007 11:12 AM
To: lblair@terralindaservices.com
Subject: Schilling Gardens / 244 Lakeside Apartments

Laura,

This is in response to your phone call about the Schilling Gardens, 244 Lakeside Drive, Oakland, Alameda County, CA, and its National Register and California Register status. The Schilling Gardens were identified in the Oakland Cultural Heritage Survey, 1985. The survey identified the Lakeside Drive Apartments as a potential district that appeared eligible to the National Register, and the Schilling Gardens as a property that appeared eligible to the National Register as a contributing element to the Lakeside Drive Apartments. The identification of a property as potentially eligible for the National Register through a local survey does not automatically list the property on the National Register of Historic Places or the California Register Historical Resources. The Office of Historic Preservation Historic Property File indicates that neither the Lakeside Drive Apartment District nor the Schilling Gardens as a contributor to the Lakeside Drive Apartment District, have been formally determined eligible for listing on the National Register of Historic Places through project review, or have been listed on the National Register of Historic Places or the California Register of Historical Resources through the application process.

Please contact me if you have further questions.

Cynthia Toffelmier
State Historian II
Registration Unit
Office of Historic Preservation
1416 9th Street, Rm 1442
Sacramento, CA 95814
(916) 653-5789
(916)653-9824 fax
ctoffelmier@parks.ca.gov
www.ohp.parks.ca.gov

PAGES 9 to 12

OAKLAND ENQUIRER

PAGES 9 to 12

OAKLAND ENQUIRER, TUESDAY EVENING, JANUARY 15, 1907.

By a Vote of Almost Five to One Oakland Declares for Parks

MAYOR F. K. MOTT, WHOSE EFFORTS TO ADVANCE THE INTERESTS OF OAKLAND AND MAKE THIS A BETTER CITY TO LIVE IN HAVE BEEN HEARTILY ENDORSED BY THE PEOPLE.

Bond Issue of Almost a Million Approved

The following are the park projects endorsed by the vote of the people in Monday's election:

No. 1.---Adams Point property, including oak trees, etc., as far as Grand avenue; $500,000.

No. 2.---Marsh land south of Twelfth street dam, between Peralta line and Fallon street, extending south to Tenth street; $45.000.

No. 3.---Balance of block on which the Adams Conservatory Park is located; $15,000.

No. 4.---Property east of Oak street, adjacent to Lake Merritt, known as the Willows property; $201,000.

No. 5.---The De Fremery property, located between Sixteenth and Eighteenth street, Adeline and Poplar streets; $120,400.

No. 6.---Entire Fifty-ninth street frontage between Racine and Shattuck avenue and adjoining Bushrod Park, North Oakland; $44,850.

No. 7.---Triangular block of land, corner "B," Haven and Peralta streets, North Oakland; $6000.

No. 8.---Narrow block of land between Sixteenth and Seventeenth streets and Fourteenth and Fifteenth avenues, East Oakland: $6300.

No. 9.---Tract of land containing fine grove of trees on eastern shore of Lake Merritt; $27.500.

No. 10.---Tract of land on west side of Peralta street between Ninth and Tenth streets, adjoining Prescott school land; $25,950.

CHARLES MULFORD ROBINSON, THE CELEBRATED CIVIC EXPERT, WHOSE SUGGESTIONS FOR THE BEAUTIFICATION OF OAKLAND WILL BE PARTIALLY CARRIED OUT AS A RESULT OF MONDAY'S BOND ELECTION.

OREGON LAWMAKERS BEGIN THEIR WORK

NORTHWESTERN TO ISSUE BONDS

PEOPLE ARE FOR PROGRESS

ENDORSE EFFORTS OF MAYOR AND COUNCIL FOR CITY

Overwhelmingly Carry the Project to Improve and Beautify Oakland

How Vote Was Recorded

The vote by precincts was as follows:

FIRST WARD:

	Yes.	No.
Precinct 1	24	27
" 2	27	12
" 3	57	12
" 4	47	19
" 5	87	22
" 6	36	14
" 7	20	22
" 8	52	10
Total	350	138

CONFIDENCE IN ADMINISTRATION

SHOWN BY THE VOTE AT THE BOND ELECTION OF MONDAY

Oaklanders Feel That the Money Voted Will Be Well Expended

ILLINOIS AFTER STATE'S RAILROAD

Claims Road Is Not Paying Its Just Share of Taxes

SHORT STORIES FROM POLICE RECORDS

Reports of Petty Robberies and Small Offenders Occupy Officers

Ex. 1

League of Women Voters of California

Alameda County, CA November 5, 2002 Election

Measure DD
Clean Water, Safe Parks
City of Oakland
Bond Issue - 2/3 vote

69979 / **80.0% Yes** votes ...... 17464 / **20.0% No** votes

See Also: Index of all Measures

Results as of Nov 15 4:54pm, 100.0% of Precincts Reporting (244/244)

Information shown below: Summary | Fiscal Impact | Impartial Analysis | Arguments | Tax Rate Statement | Full Text

To improve water quality; provide educational and recreational facilities for children; clean up Lake Merritt; restore Oakland's creeks, waterfront and Estuary; preserve and acquire open space; renovate parks; provide safe public spaces; and provide matching funds to qualify for state and federal funding for these projects, shall the City of Oakland issue $198,250,000 in bonds creating an Oakland Trust for Clean Water, Safe Parks to ensure money will be spent only on approved projects?

Summary Prepared by The City Attorney:

This measure would authorize the City of Oakland to issue general obligation bonds in the amount of one hundred ninety- eight million two hundred fifty thousand dollars ($198,250,000) to provide funds to finance the acquisition, construction, restoration and/ or improvement of recreational facilities, creeks and waterways, Lake Merritt and the Oakland Estuary.

The City may use the bond proceeds only to finance the projects/ improvements specified in the measure.

Proceeds from the bonds authorized by this measure would be used to finance: (i) Lake Merritt restoration and water quality improvements; (ii) estuary water-front access, parks and clean up; (iii) Lake Merritt to estuary connection (Lake Merritt Channel) ; (iv) public recreation facilities; and (v) creeks and waterways restoration.

Specifically, the bond proceeds may be used to help finance the following projects:

•replacement of the 12th Street culvert with an arched bridge;
•improvements to water quality improvements, including storm water filters, trash barriers, wildlife

News and Analysis

Montclarion

- October 18: Bond would improve lake and estuary

Oakland Tribune

- October 16: DD vote a catchall for lake, city assets

Suggest a link related to Measure DD

Links to sources outside of Smart Voter are provided for information only and do not imply endorsement.

Ex. 2

waste clean-up facilities and aeration fountains;
•improvements to Children's Fairyland;
•renovation and restoration of the municipal boathouse and the Lakeside Park sailboat house;
•creation of park space and beach area along Lake Merritt south shore;
•redesign of 12th Street to create pedestrian and bicycle access from Lake Merritt to Kaiser Convention Center and Channel Park;
•renovation of maintenance facilities, landscaping, docks, restrooms, furnishings and signage;
•repair of Lake Merritt retaining walls; improvement of pedestrian and bicycle paths and lanes in and around Lake Merritt;
•reconfiguration of Bellevue Avenue; expansion of Snow Park;
•reconfiguration of El Embarcadero roadways;
•acquisition of land for environmental clean up and conservation;
•clean up of hazardous materials clean up;
•acquisition and construction of pedestrian and bicycle trails along the Estuary's waterfront;
•creation of public access area for shoreline parks, Martin Luther King wetlands and trails and City sportsfields;
•acquisition and development of Estuary Park, Meadows Park, Union Point Park and creation of a new park along the Estuary waterfront;
•removal of 10th Street; relocation of flood control barrier at 7th Street;
•other Lake Merritt Channel and shoreline improvements;
•East Oakland aquatic, sports and recreation facilities;
•Studio One seismic renovations and recreation facilities;
•creek restoration; and
•acquisition of watershed protection easements.

The general obligation bonds would be secured by a supplemental property tax levy based upon the assessed value of real property and improvements within the City (known as an "ad valorem" tax) . The interest rate on the bonds secured by this levy cannot legally exceed twelve percent (12%) per annum.

Fiscal Impact from The City Auditor:

This measure will authorize the City of Oakland to issue $198,250,000 in bonds creating an Oakland Trust for Clean Water and Safe Parks. This Trust will ensure that money will be spent only on approved projects to improve water quality; provide educational and recreational facilities for children; clean up Lake

Grand Lake Guardian
Serving the neighborhoods surrounding Lake Merritt — Oakland, California

Ken Katz Takes a Gander

All the Poop That's Fit to Scoop!

Oakland, California Friday, December 7, 2007 — 9:53:26 PM grandlakeguardian.org

Patience paid off for Splash Pad and Trader Joe's

When viewed from a short-term historical perspective, today's announcement that Trader Joe's will soon occupy the vacant Albertsons on Lakeshore Avenue, demonstrates an amazing symmetry. In November of 1999, the Splash Pad Neighborhood Forum began circulating a questionnaire about the future of a what had become a very forlorn and largely underutilized public park. The SPNF survey was initiated in response to a controversy that had been roiling the Grand Lake area for well over a year. It was a proposal to use the park for commercial development—presumably, a Trader Joe's. The East Shore Park Preservation Association had already gathered some 6,000 signatures in opposition to the park conversion and the SPNF survey confirmed that over 80 percent of the residents polled objected to the loss of park space. Still, the most common response was: "Yes, we'd love to have a Trader Joe's, but why not an empty storefront instead".

Seven years later, that's exactly what has happened. That it did is in many ways a tribute to what is very likely one of the most politically active and community-oriented neighborhoods in all of Oakland. In the intervening seven years, we've turned all the negative attention directed towards the Splash Pad into a totally renovated park that is home to the hugely successful Saturday Farmers' Market. We've stopped the MacDonald's destined for the Kwik Way location. We've coaxed Arizmendi's onto Lakeshore and now Trader Joe's.

While we can take credit collectively for the good things that have transpired, the one person who is most deserving of our accolades is Pat Kernighan. As an aide to John Russo and Chief of Staff to Danny Wan, she attended all of our Splash Pad planning sessions as well as all the community meetings hosted by Landscape Architect Walter Hood and then personally walked the project through to its completion. As the District 2 Councilmember, she found out what we wanted in the vacant Albertsons and then hung tough to make sure we got it. This should be the model for future development throughout the City.

We thank you, Pat.

Ken Katz · 10/26/06 · 11:39:33 am · (Permalink)
Categories: News · 372 Words · 12 comments

« previous post
Homeless Connect returns November 13 to provide services and support

next post »
Outside money continues to pour in for Aimee Allison

To return to the main page for:
Ken Katz Takes a Gander

Comments

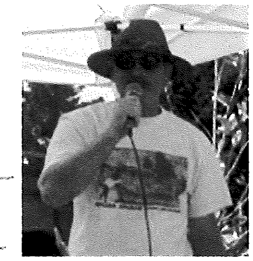
Comment from: Donald and Bette Spagel [Visitor]

THANK YOU PAT! Actions speak louder than words , and your work to secure a quality store for the neighborhood has paid off. Apart from that, we applaud your on going efforts for Eastlake and Chinatown residents. Don works at Shoong and ARC teaching ESL and we have seen how hard you haveworked to keep a Chinese speaking police officer there. A good counsil memeber DOES make a difference in the quality of life for her constituents! Thanks again

10/27/06 @ 10:48:12 am

Comment from: Simon Tatts [Visitor]

Ken writes: Still, the most common response was: "Yes, we'd love to have a Trader Joe's, but why not an empty storefront instead" Maybe that was a typo? Probably it should read that folks wanted a Trader Joes "IN" an empty storefront..." as I recall the buzz was that there were so many empty spaces at the time and either the no moves were made to entice them there or perhaps the offers were turned down. Two comments: the Guardian's overuse of the royal "we" is addressed in comments are for Jim's editorial about whether the Guardian is a "shill" for Kernighan. Second comment is this: I



Me at Splash Pad Park dedication, Oct. 20, 2003

While I've seen how things too often don't work, the incredible success of Splash Pad Park has inspired me to strive for nothing less than the best we can be.

Email Ken.

Subscribe to the Grand Lake Guardian Newsletter

Get our neighborhoods' headlines in your email Inbox weekly.

More...

Subscribe!

All Words
Some Word
Entire phrase
Search this column

All Words
Some Word
Entire phrase
Search all of the Guardian

Subscribe to the Guardian via RSS

Huh? WTF?

MY YAHOO!
Subscribe with Bloglines
newsgator

M EX. 3

CITY OF OAKLAND - ACTIVE MAJOR DEVELOPMENT PROJECTS
SEPT-OCT 2007

	PROJECT NAME	APPLICANT CONTACT	LOCATION (ADDRESS AND/OR APN)	COUNCIL DISTRICT	DESCRIPTION	CITY CONTACT	STATUS
RESIDENTIAL PROJECTS							
Pre-Application Discussions							
1	**~Altura Place**	Gerald Green (415)377-5286	7500 Altura Place APN:040A-3845-013-03	6	▪Subdivision into 5 units	Sung Kwon, 238-6414	Pre-application filed. Environmental scoping underway.
2	**~424 3rd St. ***	Abartare Architecture Igino Pellizzari (510)655-1466	424 3rd Street APN:001 -0139-008-00	3	▪64 residential units ▪Ground floor commercial	Peterson Vollmann, 238-6167	Pre-application filed. Environmental scoping underway.
3	**~1429-1433 Jackson Street***	Gerald Green (415)377-5286	1429-1433 Jackson Street APN: 008 -0627-019-02	3	▪149 residential units	Sung Kwon, 238-6414	Pre-application filed. Environmental scoping underway. Design Review Committee 0725/07.
4	**~Coliseum Gardens**	EBALDC Carlos Castellmos (510) 287-5335	66th Ave. at San Leandro Street APN-Multiple	6	▪67 residential units	Catherine Payne, Major Projects, 238-6168	Phase IV Pre-application filed.
5	**~2314 San Pablo Avenue**	Thomas Dolan (510)839-7200	2314 San Pablo Ave. APN: 008-0663-009-00	1	▪53-74 residential units	Heather Klein, Major Projects, 238-3659	Pre-application filed. Project to be processed by the City of Emeryville.
6	**~1032 39th Street**	Madison Park Financial (510)452-2944	1032 39th Street APN: 012 -0953-027-00	1	▪25 residential units in Oakland ▪75 residential units in Emeryville	Catherine Payne, Major Projects, 238-6168	Pre-application filed. Project to be processed both the City of Emeryville and the City of Oakland.
7	**250 14th Street / 1429 Alice Street***	YHLA Yui Hay Lee (510)836-6688	250 14th Street / 1429 Alice Street APN: 008 -0626-018-00 008 -0626-017-00	3	▪198 residential units	Lynn Warner, Major Projects, 238-6983	Pre-application filed. Environmental scoping underway.
8	**4299 Broadway**	Mona Hansen (925)256-4092	4299 Broadway APN:012 -1002-006-01 012 -1002-008-00 012 -1002-010-01	1	▪86 residential units ▪9,000 S.F. of retail	Peterson Vollmann, 238-6167	Pre-application filed. Environmental scoping underway.
9	**Jack London Inn***	City Shapers Dwayne Jensen (510)836-9300	444 Embarcadero APN: 001 -141-017-02	3	▪200 residential units ▪3,000 S.F. of retail	Catherine Payne, Major Projects, 238-6168	Pre-application filed. Environmental Scoping Session 04/05/06. Design Review Committee 04/26/06. Planning Commission 03/21/07 for a informational report on a possible General Plan amendment.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

EX. 4

10	**~1530 Martin Luther King Jr. Way***	Frank Gonsalves (650)508-9520	1530 M. L. King Jr. Way APN: 003-0071-001-00 003-0071-002-00 003-0071-010-00	3	▪121 condominium units	Peterson Vollmann, 238-6167	Pre-application filed. Environmental scoping underway. Design Review Committee 03/28/07.
11	**442 International Blvd.**	YHLA Yui Hay Lee (510)836-6688	442 International Blvd APN: 020 -0133-006-01		▪42 residential units	Lynn Warner, Major Projects, 238-6983	Pre-application filed. Environmental scoping underway.
12	**401 Alice Street***	Bob Baum (415)503-1411	401 Alice Street APN: 001 -0153-007-00	3	▪58 condominium units ▪5 flex units	Joann Pavlinec, Major Projects, 238-6344	Pre-application filed. Project inactive.
13	**~Chabot Hills**	Chabot Dunsmuir LP Joel Weingarten (925) 249-9155	Off Lochard St. APN: 048- 6165-059-03 048-6165-075-04 048-6165-076-01	7	▪42 single-family home/lots	Heather Klein, Major Projects, 238-3659	Pre-application filed. Environmental scoping underway.
Application Submitted – Under Review							
14	**~2985 Ford Street**	8855 San Leandro St. LLC (510)465-3700	2985 Ford Street APN:025 -0673-007-00	5	▪56 condominium units ▪15 work/live units	Sung Kwon, 238-6414	Application filed. Environmental scoping underway.
15	**~10550 International Blvd.**	Anthony Batarse (510)635-1700	10550 International Blvd. APN: 047 -5519-005-02 047 -5509-001-01	7	▪92 residential units	Tanya Boyce 238-2074	Application filed. Environmental scoping underway.
16	**~5132 Telegraph**	George Hauser Hauser Architects (415)519-5398	5132 Telegraph Ave APN: 014 -1226-013-00	1	▪105 residential units ▪9,600 S.F. of commercial	Darin Ranelletti, Major Projects, 238-3663	Application filed. Design Review Committee 03/28/07 and 05/23/07.
17	**~St Joseph's**	BRIDGE Housing Corp Smitha Seshadri (415) 989-1111	2647 International Blvd APN: 025 -0701-004-01	5	▪Rehabilitation of the historic building ▪80 units senior housing ▪15,000 S.F. office	Joann Pavlinec, Major Projects, 238-6344	Application filed. NOP and Initial Study published 04/17/07. LPAB 08/13/07 and 09/24/07.
18	**~Uptown Parcel 4 (Telegraph/19th Street)***	Forest City Residential, Inc. Susan Smartt (415) 836-5980	Telegraph/19th Street/New Street/Williams Street	3	▪370 residential units	Catherine Payne, Major Projects, 238-6168	Application filed. Design Review Committee 07/25/07.
19	**~1443 Alice Street***	Mark Borsuk (415)922-4740	1443 Alice Street / 1434 Harrison Street APN: 008 -0626-016-00 008 -0626-023-00	2	▪245 residential units	Darin Ranelletti, Major Projects, 238-3663	Application filed. Environmental scoping underway. Design Review Committee 05/23/07.
20	**~Wattling Street**	Phil Lesser (650)347-6014	3927 Wattling Street APN: 033-2170-003-00	5	▪80 residential units	Heather Klein, Major Projects, 238-3659	Application filed. Environmental scoping underway. Design Review Committee pending 10/24/07.
21	**~325 7th Street***	YHLA Yui Hay Lee (510)836-6688	325 7th Street APN:001 -0189-005-00 001 -0189-013-00 001 -0189-014-01	2	▪382 residential units	Heather Klein, Major Projects, 238-3659	Application filed. Environmental scoping underway. Design Review Committee pending 11/0707.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

CITY OF OAKLAND - ACTIVE MAJOR DEVELOPMENT PROJECTS
SEPT-OCT 2007

22	**46th Ave/E 12th St**	The Olson Company (925) 244-6213	Area centered on 46th Avenue and E 12th St APN: 034-2253-008-00, 034-2254-002-01, 034-2261-008-00	5	▪154 residential units	Robert Merkamp, 238-6283	Project withdrawn.
23	**Key Route Landing**	Carona Engineering Debo Sodipo (510)444-8311	4629 MLK Jr. Way APN: 013-1164-029-00	1	▪40 condominium units	Robert Merkamp 238-6283	Project withdrawn.
24	**~1309 Madison Street***	Toby Levy (415)777-0561	1309 Madison Street APN:002 -0079-005-00	2	▪72 condominium units	Lynn Warner, Major Projects, 238-6983	Application filed. Design Review Committee 09/05/07.
25	**226 13th Street***	K H Associates Al Chan (510)601-8889	226 13th Street APN:002 -0077-001-00	2	▪356 residential units ▪36,424 S.F. retail	Lynn Warner, Major Projects, 238-6983	Project inactive.
26	**~4311-4317 Macarthur Blvd**	AMG & Associates, LLC (818)380-2600	4311- 4317 Macarthur Blvd APN:030 -1982-121-00 030 -1982-122-00 030 -1982-123-00	4	▪115 apartment senior housing facility ▪3,100 S.F. retail	Robert Merkamp 238-6283	Application filed. Environmental Scoping underway. Design Review Committee 09/27/06.
27	**~Skyline Boulevard**	Skyline Estates Joint Venture Robert Wang (925)476-2300	Skyline Boulevard APN: 048H-7523-009-00	1	▪38 Single Family Homes	David Chlore (contract planner) 510-540-7331	Project inactive.
28	**~Cathedral Park***	Lakeside Partners Tom Peterson (510) 444-7191	2100 Martin Luther King APN: 008-0647-16-00 through 021-01	3	▪315 residential units ▪3,600 S.F. of retail	Heather Klein, Major Projects, 238-3659	Project withdrawn.
29	**4021 International Blvd**	Studio 3 Architects (949)660-7985	4021 International Blvd. APN: 033 -2155-003-00	5	*Phase I* ▪20,000 S.F. of retail *Phase II* ▪60 residential units	Catherine Payne, Major Projects, 238-6168	Pre-application filed for Phase II. Environmental scoping underway. Application filed for Phase I. Design Review Committee 02/28/07.
30	**250 12th Street***	YHLA Yui Hay Lee (510)836-6688	250 12th Street APN:002-0069-002	2	▪216 residential units ▪8,000 S.F. retail	Heather Klein, Major Projects, 238-3659	Application filed. Environmental scoping underway. Design Review Committee 10/25/06.
31	**19th Street Residential Condominiums ***	Ian Birchall (415)512-9660	222 19th Street APN: 008-0634-003-00	3	▪370 residential units	Heather Klein, Major Projects, 238-3659	Application filed. Environmental scoping underway.
32	**Skyline Ridge Estates**	IPA Planning Solutions Ineda Adesanya (510) 839-4550	Equestrian Trail APN: 037A-3141-001-15	6	▪22 single-family lots	Heather Klein, Major Projects, 238-3659	Application filed. NOP issued 05/10/04. Environmental Scoping Session 05/19/04.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

CITY OF OAKLAND - ACTIVE MAJOR DEVELOPMENT PROJECTS
SEPT-OCT 2007

Application Approved							
33	~**Bakery Lofts**	Madison Park Financial Frank Flores (510)452-2944	945 53rd Street APN: 049 -1173-002-00	1	*Phase III* ▪79 units ▪4,167 S.F. of commerical	Lynn Warner, Major Projects, 238-6983	Application filed. Design Review Committee 03/28/07. Planning Commission approval.
34	~**Courthouse Condominiums (formally 2935 Telegraph Ave.)**	MBH Architects (510) 865-8663	2935 Telegraph Ave.	3	▪142 residential units ▪3,000 S.F. retail	Joann Pavlinec, Major Projects, 238-6344	Application filed. NOP and Initial Study published 10/06/06. DEIR published 03/19/07; Design Review Committee 03/28/07 and 05/23/07. Planning Commission certification of the Final EIR and project approval 08/01/07.
35	~**HFH Apartments**	Andy Getz (510)652-4191	1401-1405 Wood Street APN: 000O-0310-012-00	3	▪*Phase I* 159 apartments ▪Phase II 142 apartments	Marge Stanzione, Major Projects Division 238-4932	Planning Commission approval 08/01/07.
36	~**4801 Shattuck Ave**	Bill Lambert (510)550-4200	4801 Shattuck Ave APN: 013-1162-009-01 013-1162-009-02 013-1162-010-00	1	▪44 units	Peterson Vollmann 238-6167	Design Review Committee 1/24/07. Planning Commission approval 04/04/07. Appeal denied by City Council 07/17/07. Under litigation.
37	**1538 Broadway***	Forum Design Marc DiGiacomo (415)252-7063	1538 Broadway APN: 008-0622-007	3	▪69 residential units ▪ground floor food sales	Peterson Vollmann 238-6167	Administrative approval 03/07/07.
38	**2116 Brush Street**	AGI Capital Tom Holt (415) 775-7005	2101-2116 Brush Street; 760 22nd Street APN: 003 -0025-010-00 thru 011-00 003-0035-006-00 thru 005-00 003-0023-007-01 thru 011-02	3	*Parcel A* ▪63 residential units *Parcel B* ▪18 residential units *Parcel C* ▪65 residential units	Heather Klein, Major Projects, 238-3659	Design Review Committee 10/25/06. Planning Commission approval 02/07/07. Extension granted 07/25/07.
39	~**459 23rd Street**	Toby Levy (415)777-0561	459 23rd Street APN: 008 -0658-004-01 008 -0658-002-01	3	▪60 residential units ▪ground floor retail	Peterson Vollmann 238-6167	Approved 12/28/06. Revision to increase the number of units to 70 approved 08/14/07. Grading permit #GR0700101.
40	~**1614 Campbell Street**	Madison Park Frank Flores (510)452-2944	1614 Campbell Street APN:007 -0560-001-02	3	▪92 live/work conservation ▪40 new residential units	Peterson Vollmann 238-6167	Planning Commission approval 12/13/06.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

41	**377 2nd Street***	Ian Birchall & Associates William Duncanson (415)512-9660	377 2nd Street APN: 001 -0143-008-00 001 -0143-007-00 001-0143-010-00	3	▪96 units ▪4,000 S.F. retail	Heather Klein, Major Projects, 238-3659	LPAB 06/12/06. LPAB for Design Review 10/16/06. Planning Commission approval 12/13/06.
42	**~3860 & 3880 Martin Luther King Jr. Way**	Neil Cotter (650) 259-9303	3860 & 3880 Martin Luther King Jr. Way APN: 012-0968-030-01 012-0968-031-00	1	▪74 units	Darin Ranelletti, Major Projects, 238-3663 Kathy Kleinbaum, Redevelopment Division, 238-7185	Planning Commission approval 9/20/06. Building permit #B0700448.
43	**3250 Hollis**	Bill Lightner (415)267-2900	3250 Hollis Entire Block of 007-0593	3	▪46 live/work units ▪74 residential units	Peterson Vollmann 238-6167	Design Review Committee 08/23/06. Planning Commission 10/18/06. Extension granted 12/21/06.
44	**~989 41st Street**	Pocket Development LLC Elizabeth Costello (510)655-8532	989 41st Street APN:012 -1021-021-01	1	▪48 residential units	Lynn Warner, Major Projects, 238-6983	Design Review Committee 06/28/06. Planning Commission approval11/15/06. Appeal filed but on hold. Project withdrawn. New project approved 08/01/07. New appeal filed.
45	**Hollis 34**	Dogtown Development (510)428-1714	3241 Hollis Entire Block of 007-0620	3	▪124 live/work units	Peterson Vollmann 238-6167	Application filed. Design Review Committee 08/23/06.Planning Commission approval 10/18/06. TPM approval 10/18/06.
46	**Tassafaronga Village**	Housing Authority of the City of Oakland Bridget Galka (510)587-2142	68–81st Ave. & 1001 83rd Ave. APN:042 -4281-007-04 042 -4280-001-01 041 -4206-001-00	7	▪General Plan Amendment from Business Mix to Mixed Housing Type ▪Redevelopment Plan Amendment from Industrial to Residential ▪Rezoning ▪191mixed housing residential (apartment, live/work, for sale, and affordable)	Gary Patton, Major Projects Manager, 238-3659 Charity Wagner (contract planner) (510)540-7331	Design Review Committee 05/24/06. Planning Commission approval and Mitigated Negative Declaration certification 06/20/06. City Council approval of General Plan Amendment, Redevelopment Plan Amendment, and Rezoning 10/03/06. TPM submittal pending.
47	**721-741 Broadway ***	Carona Engineering Debo Sodipo (510)444-8311	721-741 Broadway APN: 001-0201-015-00	3	▪48 residential units ▪5 live/work units ▪2,300 S.F.retail	Joann Pavlinec, Major Projects, 238-6344	LPAB 06/12/06. Planning Commission approval 8/16/06. Planning Commission approval for administrativ design review 10/04/06. TPM approval 05/24/07.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

CITY OF OAKLAND - ACTIVE MAJOR DEVELOPMENT PROJECTS
SEPT-OCT 2007

48	**460 Grand Ave**	Jim Burns (510)339-8880	460 Grand Ave APN: 010-0779-012-00 010-0779-014-01 010-0779-015-01	3	▪ 74 residential units	Darin Ranelletti, Major Projects, 238-3663	Design Review Committee 02/22/06. Planning Commission approval 06/07/06. Appeal denied by City Council 07/18/06.
49	**1919 Market Street**	1919 Market Street Simon Chen (510) 452-2944	1919 Market Street APN: 005 -0410-013-01	3	▪58 units	Peterson Vollmann 238-6167	Planning Commission approval 04/05/06. TTM approval 04/05/06.
50	**14th Street Apartments -Wood Street**	Bridge Housing Ben Metcalf (415)989-1111	Portions of APN: 0006-0029-001 and 0000-0315-006.	3	▪99 Affordable housing units	Marge Stanzione, Major Projects Division 238-4932	Planning Commission approval 02/15/06. Grading permit issued.
51	**2538 Telegraph Ave***	Rina Davis 2538 Telegraph LLC (510)390-4408	2538 Telegraph Ave 437 26th St APN: 009 -0683-021-01 009 -0683-024-00	3	▪ 97 residential units ▪ 9,000 S.F. of commercial space	Catherine Payne, Major Projects, 238-6168	Design Review Committee 11/16/05.; Planning Commission approval 01/04/06.
52	**51st & Telegraph, Civiq**	Roy Alper 5110 Telegraph, LLC (510)550-7175	Area bounded by Telegraph, 51st and Clark Streets APN: - Multiple	3	▪ 68 residential units ▪less than 3,000 S.F. of commercial space ▪4 buildings built over, ▪Subterranean Parking	Darin Ranelletti, Major Projects 238-3663	Design Review Committee 11/16/05. Planning Commission approval 1/18/06. Appealed to City Council. Appeal withdrawn at City Council 03/21/06.
53	**116 6th St***	Willie Cook (510) 528-9074	116 6th Street APN: 001-0173-009-00	2	▪80 residential condominium units	Heather Klein, Major Projects, 238-3659	Design Review Committee 10/26/05; Planning Commission approval 01/18/06.
54	**Valdez & 23rd Street Project***	The Enterprise Group Walter Cohen (415) 221-2534	Valdez St./Webster/23rd St./24th Streets APN: 008-0668-004-00 008-0668-009-07 008-0668-005-00	3	▪281 residential units ▪500 car parking structure including 250 public spaces ▪12,000 S.F. retail	Heather Klein, Major Projects, 238-3659	Design Review Committee 10/26/05; Planning Commission approval 12/07/05. TPM approval 02/28/06. Extension granted 09/19/07.
55	**~311 2nd St***	Urban Developments Michael Reynolds (510) 444-4064	311 2nd Street APN:001 -0149-007-00	3	▪105 residential condominium units	Heather Klein, Major Projects, 238-3659	Design Review Committee 10/26/05; Planning Commission approval 01/04/06. Design Review Committee 02/22/06; Planning Commission approval 04/05/06. Design changes approved 10/26/06. Building permit in plancheck.
56	**Emerald Parc**	Tom Dolan (510) 839-7200	2400 Filbert Street APN: 005-0433-018-04	3	▪55 townhomes	Peterson Vollmann 238-6167	Planning Commission approval. 11/16/05. Appeal denied by City Council 02/21/06.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

CITY OF OAKLAND - ACTIVE MAJOR DEVELOPMENT PROJECTS
SEPT-OCT 2007

65	**Jackson Center Two***	Encinal Jackson, LLC Peter Wong (510) 628-9060	11th, 12th, and Alice Streets APN: 002-0075-002-00	2	▪110 condominium units ▪5,000 S.F. retail	Heather Klein, Major Projects, 238-3659	Design Review Committee 07/23/03; Planning Commission approval 09/03/03. Application filed for revisions to project. Design Review Committee 07/27/05; Administrative approval 09/16/05. TPM approval 02/14/06. Building permit #B0504575 expired.
66	**2355 Broadway***	2355 Broadway LLC John Protopappas (510) 452-2944	2355 Broadway APN: 008-0666-006-00	6	▪Adaptive re-use of historic building into 24 condominiums and ground floor retail	Heather Klein, Major Projects, 238-3659	LPAB approval 06/13/05. Planning Commission approval 07/06/05. TPM approval 12/22/05. Building permit #B0505370 reinstated.
67	**1331 Harrison Project***	Toby Levy (415)777-0561	14th and Harrison Street APN: 002-0065-006-01	2	▪98 condominium units ▪9,000 S.F. commercial ▪Structured parking	Heather Klein, Major Projects, 238-3659	Planning Commission approval 12/3/03. Design Review Committee approval for revisions 03/23/05. Project revisions approved administratively 04/25/05. Foundation permit #B0504335 expired.
68	**557 Merrimac***	Dinar & Associates Mosha Dinar (510) 893-8900	557 Merrimac APN:009-0689-04-001	3	▪40 condominium units	Robert Merkamp 238-6283	Planning Commission approval 07/15/05. Building permit in plancheck #B0603095.
69	**~100 Grand***	Essex Property Trust John Eudy (650) 849-1600	124 Grand Ave and 2264 Webster St. APN: 008-0655-007-00 & 008-0655-009-01	3	▪241 residential units	Darin Ranelletti, Major Projects, 238-3663	Planning Commission approval 07/06/05. TPM approval 03/06/06. Grading and building permit #GR0600054 and B0600463. Project under construction.
70	**Pacific Cannery Lofts**	PCL Associates Cal Inman (510)547-2122	1111-1119 Pine Street APN: 006-0029-002-00	3	▪99 condo warehouse lofts ▪45 live/work lofts ▪15 townhouse lofts ▪4 work/live lofts (part Wood Street Development)	Marge Stanzione, Major Projects Division 238-4932	LPAB approval 04/11/05. Design Review Committee approval 01/26/05. Planning Commission approval 06/17/05. Demolition Permit #RB0505701.Mulitple Building permits. Project under construction.
71	**~683 9th Street***	Kodama Diseno Andrea Montalbano (415) 296-1144	683 9th Street APN: 001-0217-002-00	3	▪50 condominium units	Heather Klein, Major Projects, 238-3659	Design Review Committee 2/11/04. Project administratively approved 10/29/04. TPM approval 10/28/05. Building permit #B0601195 in plancheck.
72	**~901 Jefferson***	Pyatok Architects Inc Gary Struthers (510)465-7010	901& 907 Jefferson Street APN: 002-0025-007-00 through 002-0025-009-00	3	▪75 condominium units ▪1,030 S.F. retail	Darin Ranelletti, Major Projects, 238-3663	Planning Commission approval 09/21/05 Project under construction.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

73	**188 11th Street ***	DR Horton Dean Mills (925)808-2300	176 11th Street, 198 11th Street, 1110 Jackson APN: 002 -0081-008-00 002-0081-007-00 002-0081-002-00	2	▪287 residential units ▪3,660 S.F. retail	Heather Klein, Major Projects 238-3659	Design Review Committee 10/26/05; Planning Commission approval 12/07/05. Vesting TPM approval 07/31/06. Demolition permit #RB0603034. Extension granted 10/09/07.
74	**2847 Peralta Street**	William Lightner (415)267-2900	2847 Peralta Street APN: 007 -0589-018-02 007 -0589-023-00	3	▪76 dwelling units and 24 live work units	Peterson Vollmann 238-6167	Planning Commission approval 01/18/06. Grading permit #GR0600068.
75	**630 Thomas Berkley Square Housing ***	SUDA/ Alan Dones (510) 715-3491	630 Thomas L. Berkley Way APN: N/A - TPM7541 Parcel 3	3	▪88 residential condominium units ▪3 commercial spaces	Heather Klein, Major Projects, 238-3659	Design Review 07/27/05. Planning Commission approval 09/28/05. Building permit #B0505700. Project under construction.
76	**Uptown Project ***	Forest City Residential, Inc. Susan Smartt (415) 836-5980	Area bounded by San Pablo, Telegraph, 18th and 20th Streets APN - Multiple	3	▪Approximately 665 residential units ▪14,000 S.F. of retail and commercial ▪ 580 parking stalls ▪ Includes Parcels I-III and park	Catherine Payne, Major Projects, 238-6168 Don Smith, Bldg. Permits, 238-4778	Planning Commission hearing on DEIR 10/15/03. Planning Commission FEIR certification 2/18/03. Pre-application filed. City Council approval of the DA 7/20/04. Planning Commission approval 06/01/05 of the PUD and VTM. City Council approval of General Plan Amendment and Rezone 06/21/05. Project under construction for Phase I-III.
77	**3rd/Broadway Mixed Use***	The Enterprise Group Walter Cohen (415) 221-2534	200/210/228 Broadway APN: 001 -0141-002-01 001 -0141-011-00	3	▪134 residential units ▪11,000 S.F. retail	Heather Klein, Major Projects 238-3659 Don Smith, Bldg. Permits 238-4778	Design Review Committee 11/16/05; Planning Commission approval 01/18/06. Demolition permit #RB0600196, Grading permit #GR0600052, Building permit #B0600078. Project under construction.
78	**Siena Hills**	Hillside Homes Edward Patmont (925) 946-0583	Between Rilea Way and Greenridge Drive on Keller Ave. APN: 04A-3457-033-01	6	▪32 single-family homes	Heather Klein, Major Projects, 238-3659	DEIR published 01/05/05; FEIR published 2/18/05; Planning Commission certification of the Final EIR and approval of the project 03/02/05; TTM approval 06/1/05. Grading permit #GR0500061. Building permits # RB0501810-13 and 15-18. City Council GHAD approval 12/05/06. Project under construction.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

CITY OF OAKLAND - ACTIVE MAJOR DEVELOPMENT PROJECTS
SEPT-OCT 2007

79	**~Altenheim Senior Housing**	Citizens Housing Corporation Kaori Tokunhea (415) 421-8605	1720 Macarthur Boulevard APN: 023-0494-001-07	5	▪ 83 apartments units (new construction)	Joann Pavlinec, Major Projects, 238-6344	LPAB approval 07/12/04. Planning Commission approval 01/06/05.Design Review revision submitted LPAB 03/12/07. Planning Commission approval 03/21/07.
80	**8 Orchids***	BayRock Residential Marilyn Ponte (510) 594-8811	620-636 Broadway APN: 001-0197-002-00	2	▪3,600 S.F. retail ▪157 condominium units	Heather Klein, Major Projects, 238-3659	Design Review Committee 12/08/04; Planning Commission approval 01/19/05. TPM approval 09/14/05. Demolition Permit #RB0502535, Building Permit #B0503323. Project under construction.
81	**Madison Lofts***	Affordable Housing Associates Mark Garrel (510) 649-8500	160 14th St. APN: 008-0628-005-01	3	▪Approximately 76 condominium units ▪2,666 S.F. of retail	Neil Gray 238-3878	Planning Commission approval 09/03/03. Appeal to City Council 11/18/03. Final City Council approval on 12/16/03. Environmental Review upheld in court 06/21/04. Grading permit #GR0500127, Foundation permit #B0504618. NEPA review completed. Building permit #B0600408. Project under construction
82	**City Walk** **City Center T10 (2005)***	Olson Company (562) 596-4770	13th/14th/MLK/Jefferson APN: 002-0029-001-00	3	▪3,000 S.F. retail ▪252 residential units	Catherine Payne, Major Projects, 238-6168 Don Smith, Bldg. Permits, 238-4778	Planning Commission approval 08/18/04. Building permit #B0500525. Project under construction.
83	**Le Property Marks Building***	John Le, Dennis Reilly (510) 665-8044	380-388 12th Street APN: 002-0057-007-00	2	▪10 apartments units ▪1st floor commercial	Joann Pavlinec, Major Projects, 238-6344	LPAB 08/09/02; Planning Commission approval 10/01/03 Foundation permit #B0305324. Building permit #B030602. Project under construction.
84	**Coliseum Gardens**	EBALDC Carlos Castellmos (510) 287-5335	66th Ave. at San Leandro Street APN-Multiple	6	▪283 residential units ▪7,500 S.F. of civic and commercial space	Catherine Payne, Major Projects, 238-6168	Phase III under construction. Lion Creek Park PRAC 09/12/07. Planning Commission 09/19/07.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

85	**Leona Quarry**	The DeSilva Group David Chapman (925) 828-7999	7100 Mountain Boulevard APN: 037A-3151-001-01	6	▪545 residential units ▪6,000 S.F. community center ▪10,000 S.F. retail/commercial	Claudia Cappio, Development Director, 238-2229	City Council approval 12/03/02; City Council re-approval 02/17/04; Alameda Court approval of subsequent EIR on Hydrology and Geology issues and settlement agreement pending. Grading permit #GR0400025. Project under construction.
86	**Housewives Market***	A. F. Evans Steve Kuklin (415) 591-2204	8th/9th/Clay and Jefferson 801-807 Clay Street APN: 001-0209-001, 002, 003, 004	3	*Phase II* ▪72-86 condominium units ▪14,000 S.F. flexible space	Claudia Cappio, Development Director, 238-2229 Don Smith, Bldg. Permits 238-4778	Project approved 3/21/01. Phase II under construction.
87	**~Jackson Courtyard Condominiums***	J. Branch Developments 510-251-9611	210 – 14th Street APN 008 –0627-020-00	3	▪50 condominium units	Heather Klein, Major Projects, 238-3659	Project under construction.
88	**46th Street Lofts (formally Flecto Project)**	Levin, Menzies, Kelly Paul Menzies (925) 937-4111	47th and Adeline; land area is in both Oakland and Emeryville. 119 Linden Street APN: 049-1172-002 013-1172-003 013-1172-004	1	▪79 units and 3,000 S.F. commercial space ▪Adaptive reuse of and addition to the former Flecto building.	Catherine Payne, Major Projects 238-6168	Approved by Emeryville and Oakland. Project under construction.
MIXED-USE PROJECTS							
Pre-Application Discussions							
89	**~Alliance for West Oakland Mixed Use Development**	Jabari Herbert, (510) 393-1961	1357 5th St and Mandela. 3.5 acre site presently used for surface fee parking	3	▪Expanded project to be determined	Neil Gray 238-3878	Application filed; Environmental review completed. Planning Commission approval 08/06/03; City Council approval of General Plan and Zoning Amendments on 10/28/03. Extended 10/21/05. Planning Commission and City Council approvals extended. In pre application discussions.
90	**Kaiser Center**	Tomas Schoenberg (415)291-1100	300 Lakeside Drive Area bounded by 20th and 21st Streets and Webster and Harrison Streets	3	▪Amendment to the Kaiser Planned Development Permit ▪Up to 2 million S.F. of office/residential or some combination	Marge Stanzione, Major Projects Division 238-4932	Pre-application filed. Environmental scoping underway.
91	**~Macarthur BART Transit Village**	Macarthur Transit Community Partners, LLC Deborah Castles (510) 273-2002	7 acre site located between Telegraph, 40th, and Macarthur and Highway 24	1	▪± 540 residential units ▪30,000 S.F. retail/commercial space	Kathy Kleinbaum, Urban Development, 238-7185 Charity Wagner (contract planner) (510)540-7331	Application filed. NOP published 02/14/06. Environmental Scoping Session 03/15/06.

*** 10K PROJECT (project includes residential units located in Downtown)**
~Denotes new project, a recent change to the project description, or status.
Complied by Planning and Zoning, (510) 238-3941.
List updated twice a year.

APPENDIX B

TRANSPORTATION TECHNICAL DATA

Appendix B-1:	Intersection Turning Movement Counts
Appendix B-2:	Intersection Level of Service Calculation Worksheets
Appendix B-3:	Roadway Level of Service Calculation Worksheets
Appendix B-4:	Queue Calculation Worksheets
Appendix B-5:	Collision Summary Worksheets
Appendix B-6:	Peak Hour Signal Warrant Worksheets
Appendix B-7:	Supplementary Analyses
Appendix B-8:	Supplementary Analyses of Level of Service Calculation Worksheets
Appendix B-9:	ACCMA Model Inputs

APPENDIX B-1

INTERSECTION TURNING MOVEMENT COUNTS

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland   Oak St & 5th St   Date: 05/21/2008

	Oak St Southbound				5th St Westbound				Oak St Northbound				5th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	18	0	18	0	0	0	0	0	45	19	64	16	93	25	134	216
7:15	0	23	0	23	0	0	0	0	0	27	13	40	29	141	31	201	264
7:30	0	23	0	23	0	0	0	0	0	46	25	71	42	104	21	167	261
7:45	1	37	0	38	0	0	0	0	0	47	16	63	59	144	23	226	327
Total	1	101	0	102	0	0	0	0	0	165	73	238	146	482	100	728	1068
8:00	0	38	0	38	0	0	0	0	0	47	18	65	70	155	41	266	369
8:15	1	30	0	31	0	0	0	0	0	60	10	70	77	115	47	239	340
8:30	0	32	0	32	0	0	0	0	0	53	23	76	76	147	45	268	376
8:45	2	17	0	19	0	0	0	0	0	70	17	87	80	134	19	233	339
Total	3	117	0	120	0	0	0	0	0	230	68	298	303	551	152	1006	1424
16:00	2	10	0	12	0	0	0	0	0	58	15	73	30	91	18	139	224
16:15	1	18	0	19	0	0	0	0	0	43	13	56	42	129	19	190	265
16:30	0	24	0	24	0	0	0	0	0	59	20	79	58	123	14	195	298
16:45	0	14	0	14	0	0	0	0	0	78	13	91	66	128	24	218	323
Total	3	66	0	69	0	0	0	0	0	238	61	299	196	471	75	742	1110
17:00	1	19	0	20	0	0	0	0	0	97	22	119	71	124	20	215	354
17:15	0	16	0	16	0	0	0	0	0	123	14	137	57	122	16	195	348
17:30	0	9	0	9	0	0	0	0	0	148	13	161	49	102	9	160	330
17:45	0	9	0	9	0	0	0	0	0	106	14	120	39	104	6	149	278
Total	1	53	0	54	0	0	0	0	0	474	63	537	216	452	51	719	1310
Grand Total	8	337	0	345	0	0	0	0	0	1107	265	1372	861	1956	378	3195	4912
Apprch%	2.3%	97.7%	0.0%		0.0%	0.0%	0.0%		0.0%	80.7%	19.3%		26.9%	61.2%	11.8%		
Total %	0.2%	6.9%	0.0%	7.0%	0.0%	0.0%	0.0%	0.0%	0.0%	22.5%	5.4%	27.9%	17.5%	39.8%	7.7%	65.0%	

City of Oakland   Oak St & 5th St   Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Oak St Southbound				5th St Westbound				Oak St Northbound				5th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	38	0	38	0	0	0	0	0	47	18	65	70	155	41	266	369
815	1	30	0	31	0	0	0	0	0	60	10	70	77	115	47	239	340
830	0	32	0	32	0	0	0	0	0	53	23	76	76	147	45	268	376
845	2	17	0	19	0	0	0	0	0	70	17	87	80	134	19	233	339
Total Volume	3	117	0	120	0	0	0	0	0	230	68	298	303	551	152	1006	1424
% App Total.	2.5%	97.5%	0.0%		0.0%	0.0%	0.0%		0.0%	77.2%	22.8%		30.1%	54.8%	15.1%		
PHF	0.789				0.000				0.856				0.938				

PM Peak Hr Begins at 445 PM

	Oak St Southbound				5th St Westbound				Oak St Northbound				5th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	0	14	0	14	0	0	0	0	0	78	13	91	66	128	24	218	323
500	1	19	0	20	0	0	0	0	0	97	22	119	71	124	20	215	354
515	0	16	0	16	0	0	0	0	0	123	14	137	57	122	16	195	348
530	0	9	0	9	0	0	0	0	0	148	13	161	49	102	9	160	330
Total Volume	1	58	0	59	0	0	0	0	0	446	62	508	243	476	69	788	1355
% App Total.	1.7%	98.3%	0.0%		0.0%	0.0%	0.0%		0.0%	87.8%	12.2%		30.8%	60.4%	8.8%		
PHF	0.738				0.000				0.789				0.904				

ALL TRAFFIC DATA, INC

(916)771-8700
FAX 786-2879

City of Oakland — Oak St & 6th St — Date: 05/21/2008

	Oak St Southbound				6th St Westbound				Oak St Northbound				6th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	0	0	0	21	19	95	135	23	38	0	61	0	0	0	0	196
7:15	0	0	0	0	23	16	131	170	18	43	0	61	0	0	0	0	231
7:30	0	0	0	0	27	17	164	208	34	60	0	94	0	0	0	0	302
7:45	0	0	0	0	35	15	150	200	20	100	0	120	0	0	0	0	320
Total	0	0	0	0	106	67	540	713	95	241	0	336	0	0	0	0	1049
8:00	0	0	0	0	39	10	162	211	25	97	0	122	0	0	0	0	333
8:15	0	0	0	0	30	11	206	247	31	109	0	140	0	0	0	0	387
8:30	0	0	0	0	33	14	165	212	26	112	0	138	0	0	0	0	350
8:45	0	0	0	0	18	13	204	235	41	111	0	152	0	0	0	0	387
Total	0	0	0	0	120	48	737	905	123	429	0	552	0	0	0	0	1457
16:00	0	0	0	0	17	16	132	165	29	59	0	88	0	0	0	0	253
16:15	0	0	0	0	14	15	108	137	31	65	0	96	0	0	0	0	233
16:30	0	0	0	0	24	11	114	149	39	83	0	122	0	0	0	0	271
16:45	0	0	0	0	12	10	117	139	42	105	0	147	0	0	0	0	286
Total	0	0	0	0	67	52	471	590	141	312	0	453	0	0	0	0	1043
17:00	0	0	0	0	23	14	162	199	41	123	0	164	0	0	0	0	363
17:15	0	0	0	0	13	12	159	184	43	137	0	180	0	0	0	0	364
17:30	0	0	0	0	7	13	144	164	38	152	0	190	0	0	0	0	354
17:45	0	0	0	0	12	8	143	163	32	112	0	144	0	0	0	0	307
Total	0	0	0	0	55	47	608	710	154	524	0	678	0	0	0	0	1388
Grand Total	0	0	0	0	348	214	2356	2918	513	1506	0	2019	0	0	0	0	4937
Apprch%	0.0%	0.0%	0.0%		11.9%	7.3%	80.7%		25.4%	74.6%	0.0%		0.0%	0.0%	0.0%		
Total %	0.0%	0.0%	0.0%	0.0%	7.0%	4.3%	47.7%	59.1%	10.4%	30.5%	0.0%	40.9%	0.0%	0.0%	0.0%	0.0%	

City of Oakland — Oak St & 6th St — Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Oak St Southbound				6th St Westbound				Oak St Northbound				6th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	0	0	0	39	10	162	211	25	97	0	122	0	0	0	0	333
815	0	0	0	0	30	11	206	247	31	109	0	140	0	0	0	0	387
830	0	0	0	0	33	14	165	212	26	112	0	138	0	0	0	0	350
845	0	0	0	0	18	13	204	235	41	111	0	152	0	0	0	0	387
Total Volume	0	0	0	0	120	48	737	905	123	429	0	552	0	0	0	0	1457
% App Total.	0.0%	0.0%	0.0%		13.3%	5.3%	81.4%		22.3%	77.7%	0.0%		0.0%	0.0%	0.0%		
PHF	0.000				0.916				0.908				0.000				

PM Peak Hr Begins at 500 PM

	Oak St Southbound				6th St Westbound				Oak St Northbound				6th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	0	0	0	0	23	14	162	199	41	123	0	164	0	0	0	0	363
515	0	0	0	0	13	12	159	184	43	137	0	180	0	0	0	0	364
530	0	0	0	0	7	13	144	164	38	152	0	190	0	0	0	0	354
545	0	0	0	0	12	8	143	163	32	112	0	144	0	0	0	0	307
Total Volume	0	0	0	0	55	47	608	710	154	524	0	678	0	0	0	0	1388
% App Total.	0.0%	0.0%	0.0%		7.7%	6.6%	85.6%		22.7%	77.3%	0.0%		0.0%	0.0%	0.0%		
PHF	0.000				0.892				0.892				0.000				

ALL TRAFFIC DATA, INC

(916)771-8700
FAX 786-2879

City of Oakland — Madison St & 11th St — Date: 05/21/2008

	Madison St Southbound				11th St Westbound				Madison St Northbound				11th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	3	73	0	76	0	0	0	0	0	0	0	0	0	29	6	35	111
7:15	2	114	0	116	0	0	0	0	0	0	0	0	0	30	14	44	160
7:30	3	112	0	115	0	0	0	0	0	0	0	0	0	46	15	61	176
7:45	2	163	0	165	0	0	0	0	0	0	0	0	0	67	25	92	257
Total	10	462	0	472	0	0	0	0	0	0	0	0	0	172	60	232	704
8:00	1	160	0	161	0	0	0	0	0	0	0	0	0	82	30	112	273
8:15	9	161	0	170	0	0	0	0	0	0	0	0	0	91	30	121	291
8:30	10	172	0	182	0	0	0	0	0	0	0	0	0	98	36	134	316
8:45	9	159	0	168	0	0	0	0	0	0	0	0	0	61	26	87	255
Total	29	652	0	681	0	0	0	0	0	0	0	0	0	332	122	454	1135
16:00	12	160	0	172	0	0	0	0	0	0	0	0	0	140	32	172	344
16:15	9	144	0	153	0	0	0	0	0	0	0	0	0	125	27	152	305
16:30	17	188	0	205	0	0	0	0	0	0	0	0	0	158	43	201	406
16:45	11	153	0	164	0	0	0	0	0	0	0	0	0	151	32	183	347
Total	49	645	0	694	0	0	0	0	0	0	0	0	0	574	134	708	1402
17:00	13	198	0	211	0	0	0	0	0	0	0	0	0	181	35	216	427
17:15	15	195	0	210	0	0	0	0	0	0	0	0	0	194	41	235	445
17:30	7	162	0	169	0	0	0	0	0	0	0	0	0	198	39	237	406
17:45	8	174	0	182	0	0	0	0	0	0	0	0	0	187	47	234	416
Total	43	729	0	772	0	0	0	0	0	0	0	0	0	760	162	922	1694
Grand Total	131	2488	0	2619	0	0	0	0	0	0	0	0	0	1838	478	2316	4935
Apprch%	5.0%	95.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	79.4%	20.6%		
Total %	2.7%	50.4%	0.0%	53.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	37.2%	9.7%	46.9%	

City of Oakland — Madison St & 11th St — Date: 05/21/2008

AM Peak Hr Begins at 745 AM

	Madison St Southbound				11th St Westbound				Madison St Northbound				11th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
745	2	163	0	165	0	0	0	0	0	0	0	0	0	67	25	92	257
800	1	160	0	161	0	0	0	0	0	0	0	0	0	82	30	112	273
815	9	161	0	170	0	0	0	0	0	0	0	0	0	91	30	121	291
830	10	172	0	182	0	0	0	0	0	0	0	0	0	98	36	134	316
Total Volume	22	656	0	678	0	0	0	0	0	0	0	0	0	338	121	459	1137
% App Total.	3.2%	96.8%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	73.6%	26.4%		
PHF	0.931				0.000				0.000				0.856				

PM Peak Hr Begins at 500 PM

	Madison St Southbound				11th St Westbound				Madison St Northbound				11th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	13	198	0	211	0	0	0	0	0	0	0	0	0	181	35	216	427
515	15	195	0	210	0	0	0	0	0	0	0	0	0	194	41	235	445
530	7	162	0	169	0	0	0	0	0	0	0	0	0	198	39	237	406
545	8	174	0	182	0	0	0	0	0	0	0	0	0	187	47	234	416
Total Volume	43	729	0	772	0	0	0	0	0	0	0	0	0	760	162	922	1694
% App Total.	5.6%	94.4%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	82.4%	17.6%		
PHF	0.915				0.000				0.000				0.973				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Oak St & 7th St | Date: 05/21/2008

	Oak St Southbound				7th St Westbound				Oak St Northbound				7th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	0	0	0	0	0	0	0	0	125	18	143	13	55	0	68	211
7:15	0	0	0	0	0	0	0	0	0	137	25	162	14	55	0	69	231
7:30	0	0	0	0	0	0	0	0	0	192	36	228	23	84	0	107	335
7:45	0	0	0	0	0	0	0	0	0	201	49	250	22	131	0	153	403
Total	0	0	0	0	0	0	0	0	0	655	128	783	72	325	0	397	1180
8:00	0	0	0	0	0	0	0	0	0	218	53	271	28	98	0	126	397
8:15	0	0	0	0	0	0	0	0	0	277	44	321	31	133	0	164	485
8:30	0	0	0	0	0	0	0	0	0	220	63	283	30	127	0	157	440
8:45	0	0	0	0	0	0	0	0	0	223	87	310	26	125	0	151	461
Total	0	0	0	0	0	0	0	0	0	938	247	1185	115	483	0	598	1783
16:00	0	0	0	0	0	0	0	0	0	158	45	203	34	139	0	173	376
16:15	0	0	0	0	0	0	0	0	0	140	40	180	15	151	0	166	346
16:30	0	0	0	0	0	0	0	0	0	162	43	205	39	183	0	222	427
16:45	0	0	0	0	0	0	0	0	0	162	59	221	34	170	0	204	425
Total	0	0	0	0	0	0	0	0	0	622	187	809	122	643	0	765	1574
17:00	0	0	0	0	0	0	0	0	0	202	85	287	44	230	0	274	561
17:15	0	0	0	0	0	0	0	0	0	208	85	293	36	229	0	265	558
17:30	0	0	0	0	0	0	0	0	0	191	86	277	41	219	0	260	537
17:45	0	0	0	0	0	0	0	0	0	184	73	257	28	219	0	247	504
Total	0	0	0	0	0	0	0	0	0	785	329	1114	149	897	0	1046	2160
Grand Total	0	0	0	0	0	0	0	0	0	3000	891	3891	458	2348	0	2806	6697
Apprch%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	77.1%	22.9%		16.3%	83.7%	0.0%		
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	44.8%	13.3%	58.1%	6.8%	35.1%	0.0%	41.9%	

City of Oakland | Oak St & 7th St | Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Oak St Southbound				7th St Westbound				Oak St Northbound				7th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	0	0	0	0	0	0	0	0	218	53	271	28	98	0	126	397
815	0	0	0	0	0	0	0	0	0	277	44	321	31	133	0	164	485
830	0	0	0	0	0	0	0	0	0	220	63	283	30	127	0	157	440
845	0	0	0	0	0	0	0	0	0	223	87	310	26	125	0	151	461
Total Volume	0	0	0	0	0	0	0	0	0	938	247	1185	115	483	0	598	1783
% App Total.	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	79.2%	20.8%		19.2%	80.8%	0.0%		
PHF	0.000				0.000				0.923				0.912				

PM Peak Hr Begins at 500 PM

	Oak St Southbound				7th St Westbound				Oak St Northbound				7th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	0	0	0	0	0	0	0	0	0	202	85	287	44	230	0	274	561
515	0	0	0	0	0	0	0	0	0	208	85	293	36	229	0	265	558
530	0	0	0	0	0	0	0	0	0	191	86	277	41	219	0	260	537
545	0	0	0	0	0	0	0	0	0	184	73	257	28	219	0	247	504
Total Volume	0	0	0	0	0	0	0	0	0	785	329	1114	149	897	0	1046	2160
% App Total.	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	70.5%	29.5%		14.2%	85.8%	0.0%		
PHF	0.000				0.000				0.951				0.954				

ALL TRAFFIC DATA, INC

(916)771-8700
FAX 786-2879

City of Oakland | Oak St & 11th St | Date: 05/21/2008

	Oak St Southbound				11th St Westbound				Oak St Northbound				11th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	0	0	0	0	0	0	0	0	109	0	109	2	0	0	2	111
7:15	0	0	0	0	0	0	0	0	0	132	0	132	4	0	0	4	136
7:30	0	0	0	0	0	0	0	0	0	172	0	172	6	0	0	6	178
7:45	0	0	0	0	0	0	0	0	0	219	0	219	10	0	0	10	229
Total	0	0	0	0	0	0	0	0	0	632	0	632	22	0	0	22	654
8:00	0	0	0	0	0	0	0	0	0	220	0	220	11	0	0	11	231
8:15	0	0	0	0	0	0	0	0	0	229	0	229	14	0	0	14	243
8:30	0	0	0	0	0	0	0	0	0	225	0	225	16	0	0	16	241
8:45	0	0	0	0	0	0	0	0	0	229	0	229	15	0	0	15	244
Total	0	0	0	0	0	0	0	0	0	903	0	903	56	0	0	56	959
16:00	0	0	0	0	0	0	0	0	0	181	0	181	16	0	0	16	197
16:15	0	0	0	0	0	0	0	0	0	149	0	149	10	0	0	10	159
16:30	0	0	0	0	0	0	0	0	0	194	0	194	8	0	0	8	202
16:45	0	0	0	0	0	0	0	0	0	196	0	196	10	0	0	10	206
Total	0	0	0	0	0	0	0	0	0	720	0	720	44	0	0	44	764
17:00	0	0	0	0	0	0	0	0	0	244	0	244	20	0	0	20	264
17:15	0	0	0	0	0	0	0	0	0	235	0	235	17	0	0	17	252
17:30	0	0	0	0	0	0	0	0	0	221	0	221	11	0	0	11	232
17:45	0	0	0	0	0	0	0	0	0	201	0	201	9	0	0	9	210
Total	0	0	0	0	0	0	0	0	0	901	0	901	57	0	0	57	958
Grand Total	0	0	0	0	0	0	0	0	0	3156	0	3156	179	0	0	179	3335
Apprch%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	100.0%	0.0%		#####	0.0%	0.0%		
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	94.6%	0.0%	94.6%	5.4%	0.0%	0.0%	5.4%	

City of Oakland | Oak St & 11th St | Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Oak St Southbound				11th St Westbound				Oak St Northbound				11th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	0	0	0	0	0	0	0	0	220	0	220	11	0	0	11	231
815	0	0	0	0	0	0	0	0	0	229	0	229	14	0	0	14	243
830	0	0	0	0	0	0	0	0	0	225	0	225	16	0	0	16	241
845	0	0	0	0	0	0	0	0	0	229	0	229	15	0	0	15	244
Total Volume	0	0	0	0	0	0	0	0	0	903	0	903	56	0	0	56	959
% App Total.	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	100.0%	0.0%		#####	0.0%	0.0%		
PHF	0.000				0.000				0.986				0.875				

PM Peak Hr Begins at 500 PM

	Oak St Southbound				11th St Westbound				Oak St Northbound				11th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	0	0	0	0	0	0	0	0	0	244	0	244	20	0	0	20	264
515	0	0	0	0	0	0	0	0	0	235	0	235	17	0	0	17	252
530	0	0	0	0	0	0	0	0	0	221	0	221	11	0	0	11	232
545	0	0	0	0	0	0	0	0	0	201	0	201	9	0	0	9	210
Total Volume	0	0	0	0	0	0	0	0	0	901	0	901	57	0	0	57	958
% App Total.	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	100.0%	0.0%		#####	0.0%	0.0%		
PHF	0.000				0.000				0.923				0.713				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Oak St & 12th St | Date: 05/21/2008

	Oak St Southbound				12th St Westbound				Oak St Northbound				12th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	0	0	0	0	140	5	145	18	92	0	110	0	0	0	0	255
7:15	0	0	0	0	0	199	4	203	30	110	0	140	0	0	0	0	343
7:30	0	0	0	0	0	265	8	273	45	134	0	179	0	0	0	0	452
7:45	0	0	0	0	0	300	11	311	65	170	0	235	0	0	0	0	546
Total	0	0	0	0	0	904	28	932	158	506	0	664	0	0	0	0	1596
8:00	0	0	0	0	0	346	18	364	71	146	0	217	0	0	0	0	581
8:15	0	0	0	0	0	362	16	378	64	181	0	245	0	0	0	0	623
8:30	0	0	0	0	0	368	19	387	74	161	0	235	0	0	0	0	622
8:45	0	0	0	0	0	355	13	368	66	180	0	246	0	0	0	0	614
Total	0	0	0	0	0	1431	66	1497	275	668	0	943	0	0	0	0	2440
16:00	0	0	0	0	0	162	11	173	36	161	0	197	0	0	0	0	370
16:15	0	0	0	0	0	197	9	206	29	133	0	162	0	0	0	0	368
16:30	0	0	0	0	0	205	10	215	34	171	0	205	0	0	0	0	420
16:45	0	0	0	0	0	207	9	216	32	173	0	205	0	0	0	0	421
Total	0	0	0	0	0	771	39	810	131	638	0	769	0	0	0	0	1579
17:00	0	0	0	0	0	222	12	234	45	220	0	265	0	0	0	0	499
17:15	0	0	0	0	0	203	16	219	41	215	0	256	0	0	0	0	475
17:30	0	0	0	0	0	210	12	222	36	198	0	234	0	0	0	0	456
17:45	0	0	0	0	0	213	10	223	27	189	0	216	0	0	0	0	439
Total	0	0	0	0	0	848	50	898	149	822	0	971	0	0	0	0	1869
Grand Total	0	0	0	0	0	3954	183	4137	713	2634	0	3347	0	0	0	0	7484
Apprch%	0.0%	0.0%	0.0%		0.0%	95.6%	4.4%		21.3%	78.7%	0.0%		0.0%	0.0%	0.0%		
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	52.8%	2.4%	55.3%	9.5%	35.2%	0.0%	44.7%	0.0%	0.0%	0.0%	0.0%	

City of Oakland | Oak St & 12th St | Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Oak St Southbound				12th St Westbound				Oak St Northbound				12th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	0	0	0	0	346	18	364	71	146	0	217	0	0	0	0	581
815	0	0	0	0	0	362	16	378	64	181	0	245	0	0	0	0	623
830	0	0	0	0	0	368	19	387	74	161	0	235	0	0	0	0	622
845	0	0	0	0	0	355	13	368	66	180	0	246	0	0	0	0	614
Total Volume	0	0	0	0	0	1431	66	1497	275	668	0	943	0	0	0	0	2440
% App Total.	0.0%	0.0%	0.0%		0.0%	95.6%	4.4%		29.2%	70.8%	0.0%		0.0%	0.0%	0.0%		
PHF	0.000				0.967				0.958				0.000				

PM Peak Hr Begins at 500 PM

	Oak St Southbound				12th St Westbound				Oak St Northbound				12th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	0	0	0	0	0	222	12	234	45	220	0	265	0	0	0	0	499
515	0	0	0	0	0	203	16	219	41	215	0	256	0	0	0	0	475
530	0	0	0	0	0	210	12	222	36	198	0	234	0	0	0	0	456
545	0	0	0	0	0	213	10	223	27	189	0	216	0	0	0	0	439
Total Volume	0	0	0	0	0	848	50	898	149	822	0	971	0	0	0	0	1869
% App Total.	0.0%	0.0%	0.0%		0.0%	94.4%	5.6%		15.3%	84.7%	0.0%		0.0%	0.0%	0.0%		
PHF	0.000				0.959				0.916				0.000				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland — Oak St & 14th St — Date: 05/21/2008

	Oak St				14th St				Oak St				14th St				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	0	0	0	0	42	30	72	10	79	0	89	2	32	0	34	195
7:15	0	0	0	0	0	62	59	121	13	95	1	109	8	30	0	38	268
7:30	0	0	0	0	0	75	78	153	18	111	0	129	7	45	0	52	334
7:45	0	0	0	0	0	104	93	197	26	135	3	164	8	45	0	53	414
Total	0	0	0	0	0	283	260	543	67	420	4	491	25	152	0	177	1211
8:00	0	0	0	0	1	129	125	255	24	119	3	146	8	58	0	66	467
8:15	0	0	0	0	0	155	112	267	28	132	8	168	10	73	0	83	518
8:30	0	0	0	0	0	140	124	264	34	126	4	164	8	72	0	80	508
8:45	0	0	0	0	0	123	119	242	30	128	8	166	8	58	0	66	474
Total	0	0	0	0	1	547	480	1028	116	505	23	644	34	261	0	295	1967
16:00	0	0	0	0	0	85	51	136	43	104	8	155	25	106	0	131	422
16:15	0	0	0	0	0	80	54	134	25	95	7	127	21	119	0	140	401
16:30	0	0	0	0	0	90	46	136	35	119	7	161	21	126	0	147	444
16:45	0	0	0	0	0	92	52	144	32	120	12	164	12	165	0	177	485
Total	0	0	0	0	0	347	203	550	135	438	34	607	79	516	0	595	1752
17:00	0	0	0	0	0	92	48	140	44	144	7	195	7	174	0	181	516
17:15	0	0	0	0	0	87	57	144	51	133	8	192	13	224	0	237	573
17:30	0	0	0	0	0	84	61	145	44	131	8	183	21	204	0	225	553
17:45	0	0	0	0	0	71	40	111	40	132	3	175	23	173	0	196	482
Total	0	0	0	0	0	334	206	540	179	540	26	745	64	775	0	839	2124
Grand Total	0	0	0	0	1	1511	1149	2661	497	1903	87	2487	202	1704	0	1906	7054
Apprch%	0.0%	0.0%	0.0%		0.0%	56.8%	43.2%		20.0%	76.5%	3.5%		10.6%	89.4%	0.0%		
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	21.4%	16.3%	37.7%	7.0%	27.0%	1.2%	35.3%	2.9%	24.2%	0.0%	27.0%	

City of Oakland — Oak St & 14th St — Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Oak St				14th St				Oak St				14th St				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	0	0	0	1	129	125	255	24	119	3	146	8	58	0	66	467
815	0	0	0	0	0	155	112	267	28	132	8	168	10	73	0	83	518
830	0	0	0	0	0	140	124	264	34	126	4	164	8	72	0	80	508
845	0	0	0	0	0	123	119	242	30	128	8	166	8	58	0	66	474
Total Volume	0	0	0	0	1	547	480	1028	116	505	23	644	34	261	0	295	1967
% App Total.	0.0%	0.0%	0.0%		0.1%	53.2%	46.7%		18.0%	78.4%	3.6%		11.5%	88.5%	0.0%		
PHF	0.000				0.963				0.958				0.889				

PM Peak Hr Begins at 445 PM

	Oak St				14th St				Oak St				14th St				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	0	0	0	0	0	92	52	144	32	120	12	164	12	165	0	177	485
500	0	0	0	0	0	92	48	140	44	144	7	195	7	174	0	181	516
515	0	0	0	0	0	87	57	144	51	133	8	192	13	224	0	237	573
530	0	0	0	0	0	84	61	145	44	131	8	183	21	204	0	225	553
Total Volume	0	0	0	0	0	355	218	573	171	528	35	734	53	767	0	820	2127
% App Total.	0.0%	0.0%	0.0%		0.0%	62.0%	38.0%		23.3%	71.9%	4.8%		6.5%	93.5%	0.0%		
PHF	0.000				0.988				0.941				0.865				

ALL TRAFFIC DATA, INC

(916)771-8700
FAX 786-2879

City of Oakland   Madison St & 7th St   Date: 05/21/2008

	Madison St Southbound				7th St Westbound				Madison St Northbound				7th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	13	100	0	113	0	0	0	0	0	0	0	0	0	54	68	122	235
7:15	12	113	0	125	0	0	0	0	0	0	0	0	0	56	99	155	280
7:30	21	125	0	146	0	0	0	0	0	0	0	0	0	90	78	168	314
7:45	39	134	0	173	0	0	0	0	0	0	0	0	0	102	70	172	345
Total	85	472	0	557	0	0	0	0	0	0	0	0	0	302	315	617	1174
8:00	29	134	0	163	0	0	0	0	0	0	0	0	0	94	61	155	318
8:15	35	130	0	165	0	0	0	0	0	0	0	0	0	122	50	172	337
8:30	30	131	0	161	0	0	0	0	0	0	0	0	0	127	59	186	347
8:45	31	129	0	160	0	0	0	0	0	0	0	0	0	126	70	196	356
Total	125	524	0	649	0	0	0	0	0	0	0	0	0	469	240	709	1358
16:00	26	166	0	192	0	0	0	0	0	0	0	0	0	138	75	213	405
16:15	24	134	0	158	0	0	0	0	0	0	0	0	0	140	72	212	370
16:30	36	170	0	206	0	0	0	0	0	0	0	0	0	177	64	241	447
16:45	42	131	0	173	0	0	0	0	0	0	0	0	0	162	57	219	392
Total	128	601	0	729	0	0	0	0	0	0	0	0	0	617	268	885	1614
17:00	68	185	0	253	0	0	0	0	0	0	0	0	0	201	65	266	519
17:15	64	175	0	239	0	0	0	0	0	0	0	0	0	206	58	264	503
17:30	57	170	0	227	0	0	0	0	0	0	0	0	0	201	57	258	485
17:45	48	174	0	222	0	0	0	0	0	0	0	0	0	204	58	262	484
Total	237	704	0	941	0	0	0	0	0	0	0	0	0	812	238	1050	1991
Grand Total	575	2301	0	2876	0	0	0	0	0	0	0	0	0	2200	1061	3261	6137
Apprch%	####	80.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	67.5%	32.5%		
Total %	9.4%	37.5%	0.0%	46.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	35.8%	17.3%	53.1%	

City of Oakland   Madison St & 7th St   Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Madison St Southbound				7th St Westbound				Madison St Northbound				7th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	29	134	0	163	0	0	0	0	0	0	0	0	0	94	61	155	318
815	35	130	0	165	0	0	0	0	0	0	0	0	0	122	50	172	337
830	30	131	0	161	0	0	0	0	0	0	0	0	0	127	59	186	347
845	31	129	0	160	0	0	0	0	0	0	0	0	0	126	70	196	356
Total Volume	125	524	0	649	0	0	0	0	0	0	0	0	0	469	240	709	1358
% App Total.	####	80.7%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	66.1%	33.9%		
PHF	0.983				0.000				0.000				0.904				

PM Peak Hr Begins at 500 PM

	Madison St Southbound				7th St Westbound				Madison St Northbound				7th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	68	185	0	253	0	0	0	0	0	0	0	0	0	201	65	266	519
515	64	175	0	239	0	0	0	0	0	0	0	0	0	206	58	264	503
530	57	170	0	227	0	0	0	0	0	0	0	0	0	201	57	258	485
545	48	174	0	222	0	0	0	0	0	0	0	0	0	204	58	262	484
Total Volume	237	704	0	941	0	0	0	0	0	0	0	0	0	812	238	1050	1991
% App Total.	####	74.8%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	77.3%	22.7%		
PHF	0.930				0.000				0.000				0.987				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Madison St & 12th St | Date: 05/21/2008

	Madison St				12th St				Madison St				12th St				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	43	9	52	33	120	0	153	0	0	0	0	0	0	0	0	205
7:15	0	57	10	67	64	163	0	227	0	0	0	0	0	0	0	0	294
7:30	0	52	17	69	65	230	0	295	0	0	0	0	0	0	0	0	364
7:45	0	69	9	78	78	273	0	351	0	0	0	0	0	0	0	0	429
Total	0	221	45	266	240	786	0	1026	0	0	0	0	0	0	0	0	1292
8:00	0	80	12	92	79	315	0	394	0	0	0	0	0	0	0	0	486
8:15	0	80	20	100	86	315	0	401	0	0	0	0	0	0	0	0	501
8:30	0	81	18	99	97	329	0	426	0	0	0	0	0	0	0	0	525
8:45	0	75	15	90	91	318	0	409	0	0	0	0	0	0	0	0	499
Total	0	316	65	381	353	1277	0	1630	0	0	0	0	0	0	0	0	2011
16:00	0	120	11	131	50	152	0	202	0	0	0	0	0	0	0	0	333
16:15	0	116	13	129	47	168	0	215	0	0	0	0	0	0	0	0	344
16:30	0	127	17	144	62	179	0	241	0	0	0	0	0	0	0	0	385
16:45	0	120	24	144	48	188	0	236	0	0	0	0	0	0	0	0	380
Total	0	483	65	548	207	687	0	894	0	0	0	0	0	0	0	0	1442
17:00	0	157	11	168	57	202	0	259	0	0	0	0	0	0	0	0	427
17:15	0	169	10	179	44	198	0	242	0	0	0	0	0	0	0	0	421
17:30	0	129	8	137	54	195	0	249	0	0	0	0	0	0	0	0	386
17:45	0	127	9	136	53	191	0	244	0	0	0	0	0	0	0	0	380
Total	0	582	38	620	208	786	0	994	0	0	0	0	0	0	0	0	1614
Grand Total	0	1602	213	1815	1008	3536	0	4544	0	0	0	0	0	0	0	0	6359
Apprch%	0.0%	88.3%	11.7%		22.2%	77.8%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		
Total %	0.0%	25.2%	3.3%	28.5%	15.9%	55.6%	0.0%	71.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	

City of Oakland | Madison St & 12th St | Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Madison St				12th St				Madison St				12th St				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	80	12	92	79	315	0	394	0	0	0	0	0	0	0	0	486
815	0	80	20	100	86	315	0	401	0	0	0	0	0	0	0	0	501
830	0	81	18	99	97	329	0	426	0	0	0	0	0	0	0	0	525
845	0	75	15	90	91	318	0	409	0	0	0	0	0	0	0	0	499
Total Volume	0	316	65	381	353	1277	0	1630	0	0	0	0	0	0	0	0	2011
% App Total.	0.0%	82.9%	17.1%		21.7%	78.3%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		
PHF	0.953				0.957				0.000				0.000				

PM Peak Hr Begins at 500 PM

	Madison St				12th St				Madison St				12th St				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	0	157	11	168	57	202	0	259	0	0	0	0	0	0	0	0	427
515	0	169	10	179	44	198	0	242	0	0	0	0	0	0	0	0	421
530	0	129	8	137	54	195	0	249	0	0	0	0	0	0	0	0	386
545	0	127	9	136	53	191	0	244	0	0	0	0	0	0	0	0	380
Total Volume	0	582	38	620	208	786	0	994	0	0	0	0	0	0	0	0	1614
% App Total.	0.0%	93.9%	6.1%		20.9%	79.1%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		
PHF	0.866				0.959				0.000				0.000				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland Madison St & 14th St Date: 05/22/2008

	Madison St Southbound				14th St Westbound				Madison St Northbound				14th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	5	48	2	55	2	61	0	63	0	0	0	0	0	30	4	34	152
7:15	6	59	1	66	1	74	0	75	0	0	0	0	0	54	6	60	201
7:30	9	63	3	75	2	96	0	98	0	0	0	0	0	46	9	55	228
7:45	14	75	2	91	4	129	0	133	0	0	0	0	0	49	8	57	281
Total	34	245	8	287	9	360	0	369	0	0	0	0	0	179	27	206	862
8:00	10	79	6	95	2	142	0	144	0	0	0	0	0	52	10	62	301
8:15	17	80	5	102	6	161	0	167	0	0	0	0	0	78	14	92	361
8:30	14	74	2	90	8	160	0	168	0	0	0	0	0	52	9	61	319
8:45	9	75	4	88	5	158	0	163	0	0	0	0	0	51	6	57	308
Total	50	308	17	375	21	621	0	642	0	0	0	0	0	233	39	272	1289
16:00	42	107	2	151	3	127	0	130	0	0	0	0	0	103	16	119	400
16:15	42	128	4	174	6	130	0	136	0	0	0	0	0	104	21	125	435
16:30	52	112	4	168	8	124	0	132	0	0	0	0	0	110	15	125	425
16:45	61	115	6	182	6	116	0	122	0	0	0	0	0	115	15	130	434
Total	197	462	16	675	23	497	0	520	0	0	0	0	0	432	67	499	1694
17:00	69	131	3	203	7	129	0	136	0	0	0	0	0	123	15	138	477
17:15	74	123	1	198	2	109	0	111	0	0	0	0	0	143	20	163	472
17:30	76	125	6	207	6	112	0	118	0	0	0	0	0	148	14	162	487
17:45	68	122	6	196	7	118	0	125	0	0	0	0	0	124	12	136	457
Total	287	501	16	804	22	468	0	490	0	0	0	0	0	538	61	599	1893
Grand Total	568	1516	57	2141	75	1946	0	2021	0	0	0	0	0	1382	194	1576	5738
Apprch%	####	70.8%	2.7%		3.7%	96.3%	0.0%		0.0%	0.0%	0.0%		0.0%	87.7%	12.3%		
Total %	9.9%	26.4%	1.0%	37.3%	1.3%	33.9%	0.0%	35.2%	0.0%	0.0%	0.0%	0.0%	0.0%	24.1%	3.4%	27.5%	

City of Oakland Madison St & 14th St Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Madison St Southbound				14th St Westbound				Madison St Northbound				14th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	10	79	6	95	2	142	0	144	0	0	0	0	0	52	10	62	301
815	17	80	5	102	6	161	0	167	0	0	0	0	0	78	14	92	361
830	14	74	2	90	8	160	0	168	0	0	0	0	0	52	9	61	319
845	9	75	4	88	5	158	0	163	0	0	0	0	0	51	6	57	308
Total Volume	50	308	17	375	21	621	0	642	0	0	0	0	0	233	39	272	1289
% App Total.	####	82.1%	4.5%		3.3%	96.7%	0.0%		0.0%	0.0%	0.0%		0.0%	85.7%	14.3%		
PHF	0.919				0.955				0.000				0.739				

PM Peak Hr Begins at 500 PM

	Madison St Southbound				14th St Westbound				Madison St Northbound				14th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	69	131	3	203	7	129	0	136	0	0	0	0	0	123	15	138	477
515	74	123	1	198	2	109	0	111	0	0	0	0	0	143	20	163	472
530	76	125	6	207	6	112	0	118	0	0	0	0	0	148	14	162	487
545	68	122	6	196	7	118	0	125	0	0	0	0	0	124	12	136	457
Total Volume	287	501	16	804	22	468	0	490	0	0	0	0	0	538	61	599	1893
% App Total.	####	62.3%	2.0%		4.5%	95.5%	0.0%		0.0%	0.0%	0.0%		0.0%	89.8%	10.2%		
PHF	0.971				0.901				0.000				0.919				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Jackson St & 19th St | Date: 05/22/2008

	Jackson St Southbound				19th St Westbound				Jackson St Northbound				19th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	7	6	0	13	22	1	0	23	23	0	0	23	0	0	3	3	62
7:15	7	9	0	16	29	1	0	30	20	0	0	20	0	0	0	0	66
7:30	16	10	0	26	20	1	0	21	29	0	0	29	0	0	5	5	81
7:45	10	7	0	17	39	3	0	42	31	0	0	31	0	0	6	6	96
Total	40	32	0	72	110	6	0	116	103	0	0	103	0	0	14	14	305
8:00	22	5	0	27	54	3	0	57	46	0	0	46	0	0	4	4	134
8:15	26	11	0	37	42	1	0	43	40	0	0	40	0	0	2	2	122
8:30	17	4	0	21	45	2	0	47	60	0	0	60	0	0	4	4	132
8:45	21	12	0	33	55	3	0	58	37	0	0	37	0	0	2	2	130
Total	86	32	0	118	196	9	0	205	183	0	0	183	0	0	12	12	518
16:00	23	7	0	30	27	1	0	28	42	0	0	42	0	0	8	8	108
16:15	21	11	0	32	15	1	0	16	40	0	0	40	0	0	0	0	88
16:30	23	6	0	29	27	1	0	28	42	0	0	42	0	0	2	2	101
16:45	18	8	0	26	22	1	0	23	49	0	0	49	0	0	3	3	101
Total	85	32	0	117	91	4	0	95	173	0	0	173	0	0	13	13	398
17:00	21	3	0	24	18	2	0	20	25	0	0	25	0	0	4	4	73
17:15	21	6	0	27	20	4	0	24	68	0	0	68	0	0	3	3	122
17:30	23	8	0	31	12	0	0	12	35	0	0	35	0	0	2	2	80
17:45	31	11	0	42	14	3	0	17	41	0	0	41	0	0	2	2	102
Total	96	28	0	124	64	9	0	73	169	0	0	169	0	0	11	11	377
Grand Total	307	124	0	431	461	28	0	489	628	0	0	628	0	0	50	50	1598
Apprch%	####	28.8%	0.0%		94.3%	5.7%	0.0%		#####	0.0%	0.0%		0.0%	0.0%	100.0%		
Total %	####	7.8%	0.0%	27.0%	28.8%	1.8%	0.0%	30.6%	39.3%	0.0%	0.0%	39.3%	0.0%	0.0%	3.1%	3.1%	

City of Oakland | Jackson St & 19th St | Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Jackson St Southbound				19th St Westbound				Jackson St Northbound				19th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	22	5	0	27	54	3	0	57	46	0	0	46	0	0	4	4	134
815	26	11	0	37	42	1	0	43	40	0	0	40	0	0	2	2	122
830	17	4	0	21	45	2	0	47	60	0	0	60	0	0	4	4	132
845	21	12	0	33	55	3	0	58	37	0	0	37	0	0	2	2	130
Total Volume	86	32	0	118	196	9	0	205	183	0	0	183	0	0	12	12	518
% App Total.	####	27.1%	0.0%		95.6%	4.4%	0.0%		#####	0.0%	0.0%		0.0%	0.0%	100.0%		
PHF	0.797				0.884				0.763				0.750				

PM Peak Hr Begins at 400 PM

	Jackson St Southbound				19th St Westbound				Jackson St Northbound				19th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
400	23	7	0	30	27	1	0	28	42	0	0	42	0	0	8	8	108
415	21	11	0	32	15	1	0	16	40	0	0	40	0	0	0	0	88
430	23	6	0	29	27	1	0	28	42	0	0	42	0	0	2	2	101
445	18	8	0	26	22	1	0	23	49	0	0	49	0	0	3	3	101
Total Volume	85	32	0	117	91	4	0	95	173	0	0	173	0	0	13	13	398
% App Total.	####	27.4%	0.0%		95.8%	4.2%	0.0%		#####	0.0%	0.0%		0.0%	0.0%	100.0%		
PHF	0.914				0.848				0.883				0.406				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland Jackson St & Lakeside Dr Date: 05/21/2008

	Jackson St Southbound				Lakeside Dr Westbound				Jackson St Northbound				Lakeside Dr Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	0	0	0	0	81	0	81	20	0	1	21	0	36	15	51	153
7:15	0	0	0	0	0	98	0	98	15	0	0	15	0	36	18	54	167
7:30	0	0	0	0	0	154	0	154	23	0	0	23	0	42	27	69	246
7:45	0	0	0	0	0	161	0	161	25	0	1	26	0	70	22	92	279
Total	0	0	0	0	0	494	0	494	83	0	2	85	0	184	82	266	845
8:00	0	0	0	0	1	164	0	165	30	0	3	33	0	70	25	95	293
8:15	0	0	0	0	0	207	0	207	28	0	1	29	0	81	33	114	350
8:30	0	0	0	0	0	188	0	188	42	0	0	42	0	73	21	94	324
8:45	0	0	0	0	0	204	0	204	28	0	0	28	0	80	37	117	349
Total	0	0	0	0	1	763	0	764	128	0	4	132	0	304	116	420	1316
16:00	0	0	0	0	0	149	0	149	39	0	5	44	0	120	31	151	344
16:15	0	0	0	0	0	140	0	140	35	0	1	36	0	93	33	126	302
16:30	0	0	0	0	1	160	0	161	38	0	3	41	0	101	25	126	328
16:45	0	0	0	0	0	152	0	152	44	0	2	46	0	119	27	146	344
Total	0	0	0	0	1	601	0	602	156	0	11	167	0	433	116	549	1318
17:00	0	0	0	0	0	185	0	185	44	0	0	44	0	137	27	164	393
17:15	0	0	0	0	1	152	0	153	50	0	0	50	0	143	30	173	376
17:30	0	0	0	0	1	161	0	162	34	0	1	35	0	134	23	157	354
17:45	0	0	0	0	0	168	0	168	34	0	0	34	0	113	41	154	356
Total	0	0	0	0	2	666	0	668	162	0	1	163	0	527	121	648	1479
Grand Total	0	0	0	0	4	2524	0	2528	529	0	18	547	0	1448	435	1883	4958
Apprch%	0.0%	0.0%	0.0%		0.2%	99.8%	0.0%		96.7%	0.0%	3.3%		0.0%	76.9%	23.1%		
Total %	0.0%	0.0%	0.0%	0.0%	0.1%	50.9%	0.0%	51.0%	10.7%	0.0%	0.4%	11.0%	0.0%	29.2%	8.8%	38.0%	

City of Oakland Jackson St & Lakeside Dr Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Jackson St Southbound				Lakeside Dr Westbound				Jackson St Northbound				Lakeside Dr Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	0	0	0	1	164	0	165	30	0	3	33	0	70	25	95	293
815	0	0	0	0	0	207	0	207	28	0	1	29	0	81	33	114	350
830	0	0	0	0	0	188	0	188	42	0	0	42	0	73	21	94	324
845	0	0	0	0	0	204	0	204	28	0	0	28	0	80	37	117	349
Total Volume	0	0	0	0	1	763	0	764	128	0	4	132	0	304	116	420	1316
% App Total.	0.0%	0.0%	0.0%		0.1%	99.9%	0.0%		97.0%	0.0%	3.0%		0.0%	72.4%	27.6%		
PHF	0.000				0.923				0.786				0.897				

PM Peak Hr Begins at 500 PM

	Jackson St Southbound				Lakeside Dr Westbound				Jackson St Northbound				Lakeside Dr Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	0	0	0	0	0	185	0	185	44	0	0	44	0	137	27	164	393
515	0	0	0	0	1	152	0	153	50	0	0	50	0	143	30	173	376
530	0	0	0	0	1	161	0	162	34	0	1	35	0	134	23	157	354
545	0	0	0	0	0	168	0	168	34	0	0	34	0	113	41	154	356
Total Volume	0	0	0	0	2	666	0	668	162	0	1	163	0	527	121	648	1479
% App Total.	0.0%	0.0%	0.0%		0.3%	99.7%	0.0%		99.4%	0.0%	0.6%		0.0%	81.3%	18.7%		
PHF	0.000				0.903				0.815				0.936				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland — Alice St & 19th St — Date: 05/21/2008

	Alice St Southbound				19th St Westbound				Alice St Northbound				19th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	0	0	0	6	20	0	26	7	0	0	7	0	0	0	0	33
7:15	0	0	0	0	8	26	0	34	6	0	0	6	0	0	0	0	40
7:30	0	0	0	0	6	18	0	24	16	0	0	16	0	0	0	0	40
7:45	0	0	0	0	13	30	0	43	13	0	0	13	0	0	0	0	56
Total	0	0	0	0	33	94	0	127	42	0	0	42	0	0	0	0	169
8:00	0	0	0	0	7	37	0	44	19	0	0	19	0	0	0	0	63
8:15	0	0	0	0	13	40	0	53	23	0	0	23	0	0	0	0	76
8:30	0	0	0	0	7	31	0	38	14	0	0	14	0	0	0	0	52
8:45	0	0	0	0	12	42	0	54	22	0	0	22	0	0	0	0	76
Total	0	0	0	0	39	150	0	189	78	0	0	78	0	0	0	0	267
16:00	0	0	0	0	5	36	0	41	24	0	0	24	0	0	0	0	65
16:15	0	0	0	0	13	33	0	46	28	0	0	28	0	0	0	0	74
16:30	0	0	0	0	5	40	0	45	35	0	0	35	0	0	0	0	80
16:45	0	0	0	0	8	34	0	42	33	0	0	33	0	0	0	0	75
Total	0	0	0	0	31	143	0	174	120	0	0	120	0	0	0	0	294
17:00	0	0	0	0	3	38	0	41	35	0	0	35	0	0	0	0	76
17:15	0	0	0	0	6	42	0	48	36	0	0	36	0	0	0	0	84
17:30	0	0	0	0	5	31	0	36	28	0	0	28	0	0	0	0	64
17:45	0	0	0	0	5	25	0	30	29	0	0	29	0	0	0	0	59
Total	0	0	0	0	19	136	0	155	128	0	0	128	0	0	0	0	283
Grand Total	0	0	0	0	122	523	0	645	368	0	0	368	0	0	0	0	1013
Apprch%	0.0%	0.0%	0.0%		18.9%	81.1%	0.0%		#####	0.0%	0.0%		0.0%	0.0%	0.0%		
Total %	0.0%	0.0%	0.0%	0.0%	12.0%	51.6%	0.0%	63.7%	36.3%	0.0%	0.0%	36.3%	0.0%	0.0%	0.0%	0.0%	

City of Oakland — Alice St & 19th St — Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Alice St Southbound				19th St Westbound				Alice St Northbound				19th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	0	0	0	7	37	0	44	19	0	0	19	0	0	0	0	63
815	0	0	0	0	13	40	0	53	23	0	0	23	0	0	0	0	76
830	0	0	0	0	7	31	0	38	14	0	0	14	0	0	0	0	52
845	0	0	0	0	12	42	0	54	22	0	0	22	0	0	0	0	76
Total Volume	0	0	0	0	39	150	0	189	78	0	0	78	0	0	0	0	267
% App Total.	0.0%	0.0%	0.0%		20.6%	79.4%	0.0%		#####	0.0%	0.0%		0.0%	0.0%	0.0%		
PHF	0.000				0.875				0.848				0.000				

PM Peak Hr Begins at 430 PM

	Alice St Southbound				19th St Westbound				Alice St Northbound				19th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
430	0	0	0	0	5	40	0	45	35	0	0	35	0	0	0	0	80
445	0	0	0	0	8	34	0	42	33	0	0	33	0	0	0	0	75
500	0	0	0	0	3	38	0	41	35	0	0	35	0	0	0	0	76
515	0	0	0	0	6	42	0	48	36	0	0	36	0	0	0	0	84
Total Volume	0	0	0	0	22	154	0	176	139	0	0	139	0	0	0	0	315
% App Total.	0.0%	0.0%	0.0%		12.5%	87.5%	0.0%		#####	0.0%	0.0%		0.0%	0.0%	0.0%		
PHF	0.000				0.917				0.965				0.000				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Harrison St & 12th St | Date: 05/21/2008

	Harrison St Southbound				12th St Westbound				Harrison St Northbound				12th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	1	5	6	3	94	6	103	11	62	0	73	0	0	0	0	182
7:15	0	7	6	13	11	104	7	122	19	77	0	96	0	0	0	0	231
7:30	0	10	4	14	7	135	9	151	13	92	0	105	0	0	0	0	270
7:45	0	11	6	17	15	180	14	209	34	122	0	156	0	0	0	0	382
Total	0	29	21	50	36	513	36	585	77	353	0	430	0	0	0	0	1065
8:00	0	14	11	25	14	183	15	212	31	107	0	138	0	0	0	0	375
8:15	0	41	17	58	12	220	18	250	12	114	0	126	0	0	0	0	434
8:30	0	21	9	30	13	225	23	261	38	149	0	187	0	0	0	0	478
8:45	0	12	5	17	12	207	21	240	40	126	0	166	0	0	0	0	423
Total	0	88	42	130	51	835	77	963	121	496	0	617	0	0	0	0	1710
16:00	0	17	9	26	5	129	20	154	28	98	0	126	0	0	0	0	306
16:15	0	13	5	18	10	136	15	161	37	107	0	144	0	0	0	0	323
16:30	0	17	4	21	14	143	20	177	31	111	0	142	0	0	0	0	340
16:45	0	14	5	19	8	110	17	135	23	89	0	112	0	0	0	0	266
Total	0	61	23	84	37	518	72	627	119	405	0	524	0	0	0	0	1235
17:00	0	15	8	23	6	131	15	152	27	119	0	146	0	0	0	0	321
17:15	0	14	5	19	10	147	12	169	35	122	0	157	0	0	0	0	345
17:30	0	12	7	19	11	136	19	166	33	106	0	139	0	0	0	0	324
17:45	0	10	6	16	7	104	16	127	24	96	0	120	0	0	0	0	263
Total	0	51	26	77	34	518	62	614	119	443	0	562	0	0	0	0	1253
Grand Total	0	229	112	341	158	2384	247	2789	436	1697	0	2133	0	0	0	0	5263
Apprch%	0.0%	67.2%	32.8%		5.7%	85.5%	8.9%		20.4%	79.6%	0.0%		0.0%	0.0%	0.0%		
Total %	0.0%	4.4%	2.1%	6.5%	3.0%	45.3%	4.7%	53.0%	8.3%	32.2%	0.0%	40.5%	0.0%	0.0%	0.0%	0.0%	

City of Oakland | Harrison St & 12th St | Date: 05/21/2008

AM Peak Hr Begins at 800 AM

	Harrison St Southbound				12th St Westbound				Harrison St Northbound				12th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	14	11	25	14	183	15	212	31	107	0	138	0	0	0	0	375
815	0	41	17	58	12	220	18	250	12	114	0	126	0	0	0	0	434
830	0	21	9	30	13	225	23	261	38	149	0	187	0	0	0	0	478
845	0	12	5	17	12	207	21	240	40	126	0	166	0	0	0	0	423
Total Volume	0	88	42	130	51	835	77	963	121	496	0	617	0	0	0	0	1710
% App Total.	0.0%	67.7%	32.3%		5.3%	86.7%	8.0%		19.6%	80.4%	0.0%		0.0%	0.0%	0.0%		
PHF	0.560				0.922				0.825				0.000				

PM Peak Hr Begins at 430 PM

	Harrison St Southbound				12th St Westbound				Harrison St Northbound				12th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
430	0	17	4	21	14	143	20	177	31	111	0	142	0	0	0	0	340
445	0	14	5	19	8	110	17	135	23	89	0	112	0	0	0	0	266
500	0	15	8	23	6	131	15	152	27	119	0	146	0	0	0	0	321
515	0	14	5	19	10	147	12	169	35	122	0	157	0	0	0	0	345
Total Volume	0	60	22	82	38	531	64	633	116	441	0	557	0	0	0	0	1272
% App Total.	0.0%	73.2%	26.8%		6.0%	83.9%	10.1%		20.8%	79.2%	0.0%		0.0%	0.0%	0.0%		
PHF	0.891				0.894				0.887				0.000				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Harrison St & 20th St | Date: 05/22/2008

	Harrison St Southbound				20th St Westbound				Harrison St Northbound				20th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	33	38	71	0	11	0	11	13	35	1	49	13	5	8	26	157
7:15	0	57	34	91	4	8	0	12	12	30	1	43	16	5	15	36	182
7:30	0	47	38	85	3	20	1	24	11	45	1	57	15	4	11	30	196
7:45	0	80	32	112	2	29	0	31	19	49	4	72	15	4	20	39	254
Total	0	217	142	359	9	68	1	78	55	159	7	221	59	18	54	131	789
8:00	0	72	50	122	2	26	0	28	20	58	5	83	14	6	24	44	277
8:15	0	73	50	123	3	33	0	36	17	65	4	86	25	7	26	58	303
8:30	0	75	44	119	4	38	0	42	21	62	2	85	21	10	37	68	314
8:45	0	91	47	138	2	41	0	43	21	64	4	89	23	8	35	66	336
Total	0	311	191	502	11	138	0	149	79	249	15	343	83	31	122	236	1230
16:00	0	52	24	76	2	20	0	22	16	103	6	125	60	17	6	83	306
16:15	0	37	36	73	1	19	0	20	15	113	3	131	58	20	7	85	309
16:30	0	39	33	72	2	14	0	16	17	119	3	139	69	16	10	95	322
16:45	0	38	29	67	2	23	0	25	20	127	5	152	70	23	10	103	347
Total	0	166	122	288	7	76	0	83	68	462	17	547	257	76	33	366	1284
17:00	0	44	35	79	1	25	0	26	34	165	3	202	75	23	9	107	414
17:15	0	29	31	60	2	20	0	22	26	178	5	209	60	26	12	98	389
17:30	0	27	37	64	0	18	0	18	16	159	7	182	51	17	4	72	336
17:45	0	32	28	60	0	19	1	20	15	146	8	169	67	21	7	95	344
Total	0	132	131	263	3	82	1	86	91	648	23	762	253	87	32	372	1483
Grand Total	0	826	586	1412	30	364	2	396	293	1518	62	1873	652	212	241	1105	4786
Apprch%	0.0%	58.5%	41.5%		7.6%	91.9%	0.5%		15.6%	81.0%	3.3%		59.0%	19.2%	21.8%		
Total %	0.0%	17.3%	12.2%	29.5%	0.6%	7.6%	0.0%	8.3%	6.1%	31.7%	1.3%	39.1%	13.6%	4.4%	5.0%	23.1%	

City of Oakland | Harrison St & 20th St | Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Harrison St Southbound				20th St Westbound				Harrison St Northbound				20th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	72	50	122	2	26	0	28	20	58	5	83	14	6	24	44	277
815	0	73	50	123	3	33	0	36	17	65	4	86	25	7	26	58	303
830	0	75	44	119	4	38	0	42	21	62	2	85	21	10	37	68	314
845	0	91	47	138	2	41	0	43	21	64	4	89	23	8	35	66	336
Total Volume	0	311	191	502	11	138	0	149	79	249	15	343	83	31	122	236	1230
% App Total.	0.0%	62.0%	38.0%		7.4%	92.6%	0.0%		23.0%	72.6%	4.4%		35.2%	13.1%	51.7%		
PHF	0.909				0.866				0.963				0.868				

PM Peak Hr Begins at 445 PM

	Harrison St Southbound				20th St Westbound				Harrison St Northbound				20th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	0	38	29	67	2	23	0	25	20	127	5	152	70	23	10	103	347
500	0	44	35	79	1	25	0	26	34	165	3	202	75	23	9	107	414
515	0	29	31	60	2	20	0	22	26	178	5	209	60	26	12	98	389
530	0	27	37	64	0	18	0	18	16	159	7	182	51	17	4	72	336
Total Volume	0	138	132	270	5	86	0	91	96	629	20	745	256	89	35	380	1486
% App Total.	0.0%	51.1%	48.9%		5.5%	94.5%	0.0%		12.9%	84.4%	2.7%		67.4%	23.4%	9.2%		
PHF	0.854				0.875				0.891				0.888				

All Traffic Data

(916) 771-8700
F (916) 786-2879

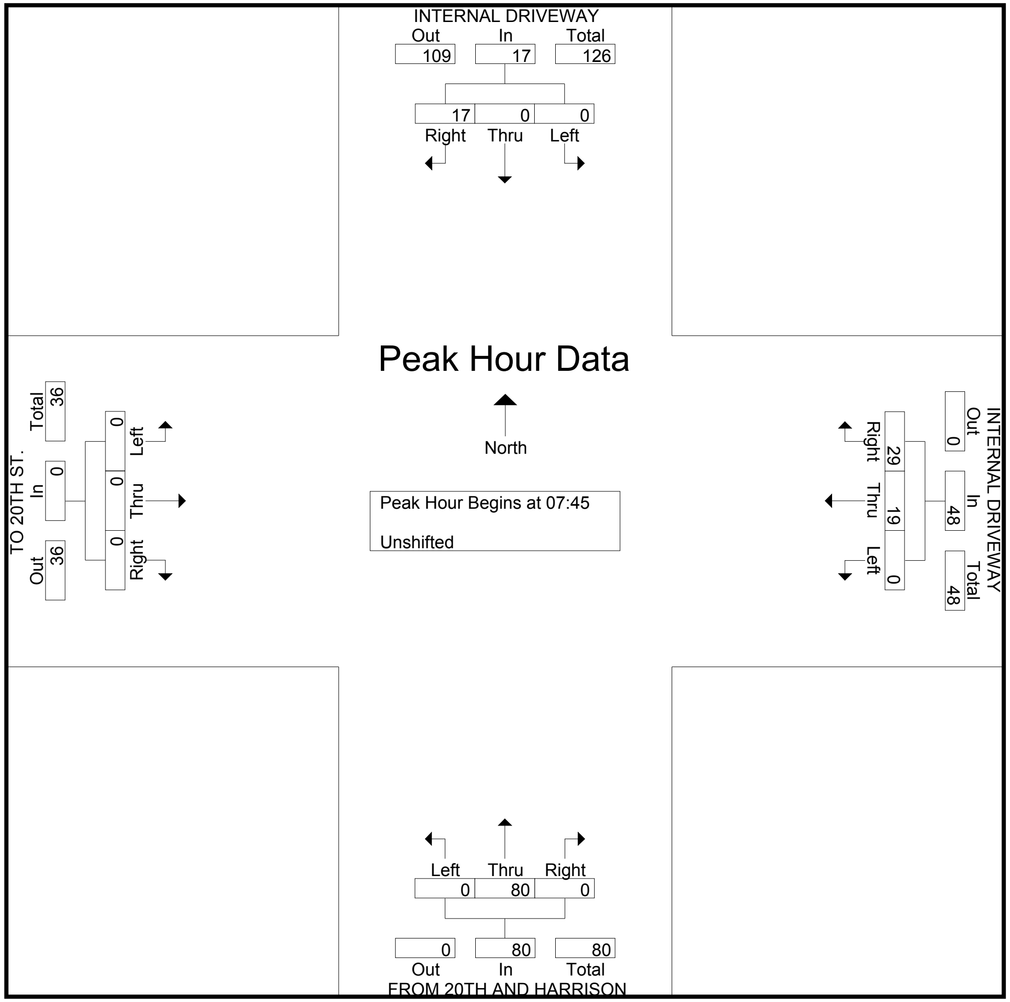
OAKLAND

File Name : 08-7458-015 INTERNAL-20TH ST-F
Site Code : 00000000
Start Date : 08/07/2008
Page No : 1

Groups Printed- Unshifted

	INTERNAL DRIVEWAY Southbound					INTERNAL DRIVEWAY Westbound					FROM 20TH AND HARRISON Northbound					TO 20TH ST. Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	0	0	1	11	1	0	4	2	1	6	0	14	0	11	14	0	0	0	0	0	23	21	44
07:15	0	0	0	21	0	0	1	1	0	2	0	11	0	19	11	0	0	0	0	0	40	13	53
07:30	0	0	3	62	3	0	3	3	0	6	0	15	0	46	15	0	0	0	0	0	108	24	132
07:45	0	0	9	84	9	0	8	5	0	13	0	17	0	64	17	0	0	0	0	0	148	39	187
Total	0	0	13	178	13	0	16	11	1	27	0	57	0	140	57	0	0	0	0	0	319	97	416
08:00	0	0	2	96	2	0	3	5	0	8	0	22	0	79	22	0	0	0	0	0	175	32	207
08:15	0	0	2	92	2	0	4	9	0	13	0	15	0	60	15	0	0	0	0	0	152	30	182
08:30	0	0	4	64	4	0	4	10	0	14	0	26	0	54	26	0	0	0	0	0	118	44	162
08:45	0	0	0	84	0	0	6	8	0	14	0	18	0	65	18	0	0	0	0	0	149	32	181
Total	0	0	8	336	8	0	17	32	0	49	0	81	0	258	81	0	0	0	0	0	594	138	732
*** BREAK ***																							
16:00	0	0	12	55	12	0	11	10	0	21	0	5	0	65	5	0	0	0	0	0	120	38	158
16:15	0	0	10	33	10	0	8	9	0	17	0	13	0	67	13	0	0	0	0	0	100	40	140
16:30	0	0	14	53	14	0	7	11	0	18	0	11	0	61	11	0	0	0	0	0	114	43	157
16:45	0	0	22	54	22	0	12	12	0	24	0	7	0	85	7	0	0	0	0	0	139	53	192
Total	0	0	58	195	58	0	38	42	0	80	0	36	0	278	36	0	0	0	0	0	473	174	647
17:00	0	0	12	37	12	0	9	10	0	19	0	9	0	54	9	0	0	0	0	0	91	40	131
17:15	0	0	15	57	15	0	3	12	0	15	0	10	0	79	10	0	0	0	0	0	136	40	176
17:30	0	0	10	34	10	0	11	5	0	16	0	11	0	61	11	0	0	0	0	0	95	37	132
17:45	0	0	10	26	10	0	10	9	0	19	0	9	0	54	9	0	0	0	0	0	80	38	118
Total	0	0	47	154	47	0	33	36	0	69	0	39	0	248	39	0	0	0	0	0	402	155	557
Grand Total	0	0	126	863	126	0	104	121	1	225	0	213	0	924	213	0	0	0	0	0	1788	564	2352
Apprch %	0	0	100			0	46.2	53.8			0	100	0			0	0	0					
Total %	0	0	22.3		22.3	0	18.4	21.5		39.9	0	37.8	0		37.8	0	0	0		0	76	24	

	INTERNAL DRIVEWAY Southbound				INTERNAL DRIVEWAY Westbound				FROM 20TH AND HARRISON Northbound				TO 20TH ST. Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	0	0	**9**	**9**	0	**8**	5	13	0	17	0	17	0	0	0	0	39
08:00	0	0	2	2	0	3	5	8	0	22	0	22	0	0	0	0	32
08:15	0	0	2	2	0	4	9	13	0	15	0	15	0	0	0	0	30
08:30	0	0	4	4	0	4	**10**	**14**	0	**26**	0	**26**	0	0	0	0	**44**
Total Volume	0	0	17	17	0	19	29	48	0	80	0	80	0	0	0	0	145
% App. Total	0	0	100		0	39.6	60.4		0	100	0		0	0	0		
PHF	.000	.000	.472	.472	.000	.594	.725	.857	.000	.769	.000	.769	.000	.000	.000	.000	.824



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:15

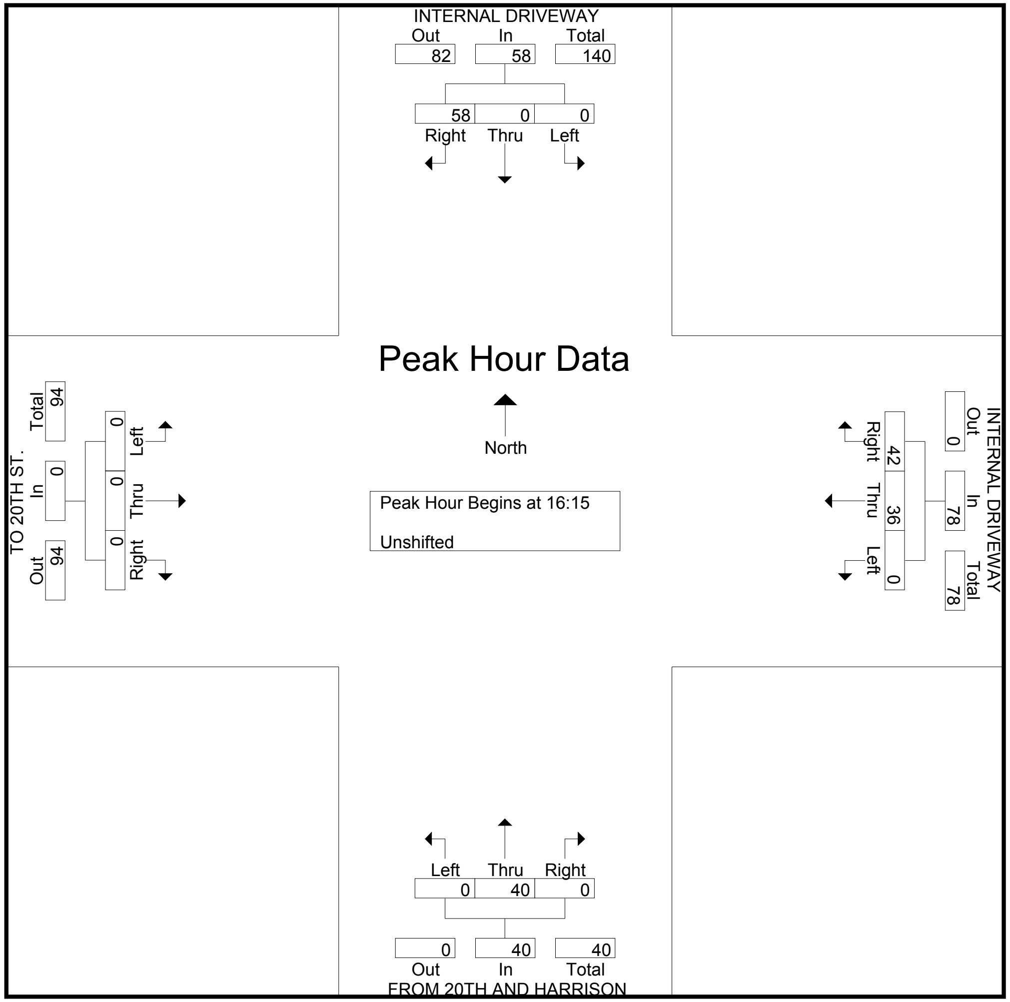
16:15	0	0	10	10	0	8	9	17	0	**13**	0	**13**	0	0	0	0	40
16:30	0	0	14	14	0	7	11	18	0	11	0	11	0	0	0	0	43
16:45	0	0	**22**	**22**	0	**12**	**12**	**24**	0	7	0	7	0	0	0	0	**53**
17:00	0	0	12	12	0	9	10	19	0	9	0	9	0	0	0	0	40
Total Volume	0	0	58	58	0	36	42	78	0	40	0	40	0	0	0	0	176
% App. Total	0	0	100		0	46.2	53.8		0	100	0		0	0	0		
PHF	.000	.000	.659	.659	.000	.750	.875	.813	.000	.769	.000	.769	.000	.000	.000	.000	.830

All Traffic Data

(916) 771-8700
F (916) 786-2879

OAKLAND

File Name : 08-7458-015 INTERNAL-20TH ST-F
Site Code : 00000000
Start Date : 08/07/2008
Page No : 3



ALL TRAFFIC DATA, INC

(916)771-8700
FAX 786-2879

City of Oakland — Harrison St & Lakeside Dr — Date: 05/22/2008

	Harrison St Southbound				Lakeside Dr Westbound				Harrison St Northbound				Lakeside Dr Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	42	76	118	0	0	0	0	0	96	0	96	0	50	0	50	264
7:15	0	48	85	133	0	0	0	0	0	103	0	103	0	42	0	42	278
7:30	0	63	85	148	0	0	0	0	0	131	0	131	0	66	0	66	345
7:45	0	77	115	192	0	0	0	0	0	152	0	152	0	65	0	65	409
Total	0	230	361	591	0	0	0	0	0	482	0	482	0	223	0	223	1296
8:00	0	90	114	204	0	0	0	0	0	160	0	160	0	71	0	71	435
8:15	0	94	126	220	0	0	0	0	0	167	0	167	0	92	0	92	479
8:30	0	98	120	218	0	0	0	0	0	159	0	159	0	83	0	83	460
8:45	0	96	139	235	0	0	0	0	0	168	0	168	0	86	0	86	489
Total	0	378	499	877	0	0	0	0	0	654	0	654	0	332	0	332	1863
16:00	0	88	70	158	0	0	0	0	0	176	0	176	0	165	0	165	499
16:15	0	115	75	190	0	0	0	0	0	164	0	164	0	165	0	165	519
16:30	0	154	70	224	0	0	0	0	0	173	0	173	0	184	0	184	581
16:45	0	151	70	221	0	0	0	0	0	158	0	158	0	195	0	195	574
Total	0	508	285	793	0	0	0	0	0	671	0	671	0	709	0	709	2173
17:00	0	155	81	236	0	0	0	0	0	189	0	189	0	236	0	236	661
17:15	0	156	65	221	0	0	0	0	0	179	0	179	0	233	0	233	633
17:30	0	158	68	226	0	0	0	0	0	172	0	172	0	212	0	212	610
17:45	0	155	58	213	0	0	0	0	0	163	0	163	0	212	0	212	588
Total	0	624	272	896	0	0	0	0	0	703	0	703	0	893	0	893	2492
Grand Total	0	1740	1417	3157	0	0	0	0	0	2510	0	2510	0	2157	0	2157	7824
Apprch%	0.0%	55.1%	44.9%		0.0%	0.0%	0.0%		0.0%	100.0%	0.0%		0.0%	100.0%	0.0%		
Total %	0.0%	22.2%	18.1%	40.4%	0.0%	0.0%	0.0%	0.0%	0.0%	32.1%	0.0%	32.1%	0.0%	27.6%	0.0%	27.6%	

City of Oakland — Harrison St & Lakeside Dr — Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Harrison St Southbound				Lakeside Dr Westbound				Harrison St Northbound				Lakeside Dr Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	90	114	204	0	0	0	0	0	160	0	160	0	71	0	71	435
815	0	94	126	220	0	0	0	0	0	167	0	167	0	92	0	92	479
830	0	98	120	218	0	0	0	0	0	159	0	159	0	83	0	83	460
845	0	96	139	235	0	0	0	0	0	168	0	168	0	86	0	86	489
Total Volume	0	378	499	877	0	0	0	0	0	654	0	654	0	332	0	332	1863
% App Total.	0.0%	43.1%	56.9%		0.0%	0.0%	0.0%		0.0%	100.0%	0.0%		0.0%	100.0%	0.0%		
PHF	0.933				0.000				0.973				0.902				

PM Peak Hr Begins at 500 PM

	Harrison St Southbound				Lakeside Dr Westbound				Harrison St Northbound				Lakeside Dr Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
500	0	155	81	236	0	0	0	0	0	189	0	189	0	236	0	236	661
515	0	156	65	221	0	0	0	0	0	179	0	179	0	233	0	233	633
530	0	158	68	226	0	0	0	0	0	172	0	172	0	212	0	212	610
545	0	155	58	213	0	0	0	0	0	163	0	163	0	212	0	212	588
Total Volume	0	624	272	896	0	0	0	0	0	703	0	703	0	893	0	893	2492
% App Total.	0.0%	69.6%	30.4%		0.0%	0.0%	0.0%		0.0%	100.0%	0.0%		0.0%	100.0%	0.0%		
PHF	0.949				0.000				0.930				0.946				

All Traffic Data

(916) 771-8700
F (916) 786-2879

OAKLAND

File Name : 08-7458-016 LAKESIDE-20TH-F
Site Code : 00000000
Start Date : 08/07/2008
Page No : 1

Groups Printed- Unshifted

	LAKESIDE DR. Southbound					Westbound					LAKESIDE DR. Northbound					20TH ST. Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
07:00	0	38	0	0	38	0	0	0	0	0	12	68	0	0	80	0	7	0	0	7	0	125	125
07:15	0	46	0	0	46	0	0	0	0	0	17	73	0	0	90	0	5	0	0	5	0	141	141
07:30	0	67	0	0	67	0	0	0	0	0	24	118	0	0	142	0	8	0	0	8	0	217	217
07:45	0	68	0	0	68	0	0	0	0	0	26	124	0	0	150	0	11	0	0	11	0	229	229
Total	0	219	0	0	219	0	0	0	0	0	79	383	0	0	462	0	31	0	0	31	0	712	712
08:00	0	77	0	0	77	0	0	0	0	0	26	142	0	0	168	0	14	0	0	14	0	259	259
08:15	0	86	0	0	86	0	0	0	0	0	36	137	0	0	173	0	10	0	0	10	0	269	269
08:30	0	105	0	0	105	0	0	0	0	0	27	152	0	0	179	0	14	0	0	14	0	298	298
08:45	0	76	0	0	76	0	0	0	0	0	33	138	0	0	171	0	15	0	0	15	0	262	262
Total	0	344	0	0	344	0	0	0	0	0	122	569	0	0	691	0	53	0	0	53	0	1088	1088
*** BREAK ***																							
16:00	0	112	0	0	112	0	0	0	0	0	24	158	0	0	182	0	21	0	0	21	0	315	315
16:15	0	90	0	0	90	0	0	0	0	0	21	129	0	0	150	0	13	0	0	13	0	253	253
16:30	0	103	0	0	103	0	0	0	0	0	19	169	0	0	188	0	20	0	0	20	0	311	311
16:45	0	123	0	0	123	0	0	0	0	0	25	168	0	0	193	0	20	0	0	20	0	336	336
Total	0	428	0	0	428	0	0	0	0	0	89	624	0	0	713	0	74	0	0	74	0	1215	1215
17:00	0	146	0	0	146	0	0	0	0	0	27	125	0	0	152	0	20	0	0	20	0	318	318
17:15	0	129	0	0	129	0	0	0	0	0	48	174	0	0	222	0	34	0	0	34	0	385	385
17:30	0	137	0	0	137	0	0	0	0	0	32	144	0	0	176	0	23	0	0	23	0	336	336
17:45	0	121	0	0	121	0	0	0	0	0	26	149	0	0	175	0	27	0	0	27	0	323	323
Total	0	533	0	0	533	0	0	0	0	0	133	592	0	0	725	0	104	0	0	104	0	1362	1362
Grand Total	0	1524	0	0	1524	0	0	0	0	0	423	2168	0	0	2591	0	262	0	0	262	0	4377	4377
Apprch %	0	100	0			0	0	0			16.3	83.7	0			0	100	0					
Total %	0	34.8	0		34.8	0	0	0		0	9.7	49.5	0		59.2	0	6	0		6	0	100	

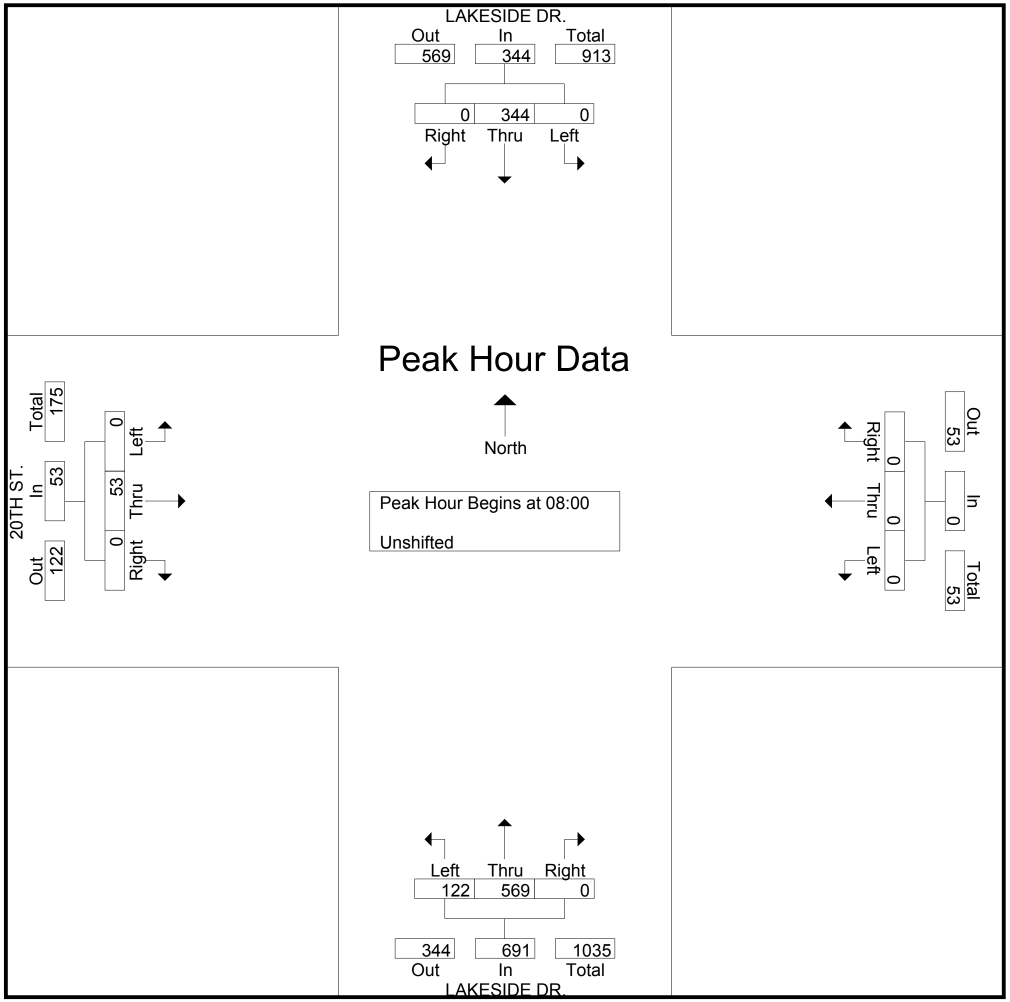
	LAKESIDE DR. Southbound				Westbound				LAKESIDE DR. Northbound				20TH ST. Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 11:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	0	77	0	77	0	0	0	0	26	142	0	168	0	14	0	14	259
08:15	0	86	0	86	0	0	0	0	**36**	137	0	173	0	10	0	10	269
08:30	0	**105**	0	**105**	0	0	0	0	27	**152**	0	**179**	0	14	0	14	**298**
08:45	0	76	0	76	0	0	0	0	33	138	0	171	0	**15**	0	**15**	262
Total Volume	0	344	0	344	0	0	0	0	122	569	0	691	0	53	0	53	1088
% App. Total	0	100	0		0	0	0		17.7	82.3	0		0	100	0		
PHF	.000	.819	.000	.819	.000	.000	.000	.000	.847	.936	.000	.965	.000	.883	.000	.883	.913

All Traffic Data

(916) 771-8700
F (916) 786-2879

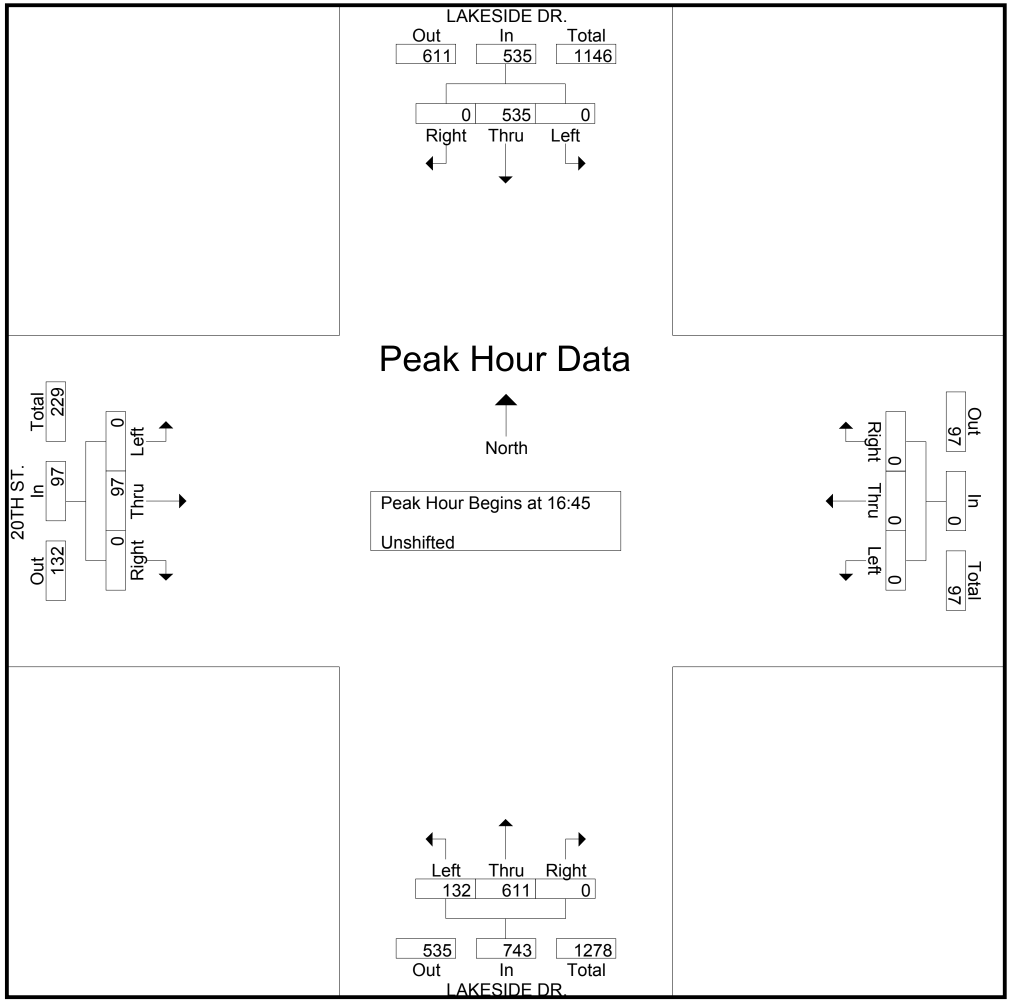
OAKLAND

File Name : 08-7458-016 LAKESIDE-20TH-F
Site Code : 00000000
Start Date : 08/07/2008
Page No : 2



Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 16:45

16:45	0	123	0	123	0	0	0	0	25	168	0	193	0	20	0	20	336
17:00	0	**146**	0	**146**	0	0	0	0	27	125	0	152	0	20	0	20	318
17:15	0	129	0	129	0	0	0	0	**48**	**174**	0	**222**	0	**34**	0	**34**	**385**
17:30	0	137	0	137	0	0	0	0	32	144	0	176	0	23	0	23	336
Total Volume	0	535	0	535	0	0	0	0	132	611	0	743	0	97	0	97	1375
% App. Total	0	100	0		0	0	0		17.8	82.2	0		0	100	0		
PHF	.000	.916	.000	.916	.000	.000	.000	.000	.688	.878	.000	.837	.000	.713	.000	.713	.893



LAKESIDE DR.
Out In Total
611 535 1146
0 535 0
Right Thru Left
Peak Hour Data
North
Peak Hour Begins at 16:45
Unshifted
20TH ST.
Total 229
In 97
Out 132
Left 0
Thru 97
Right 0
Right 0
Thru 0
Left 0
Out 97
In 0
Total 97
Left Thru Right
132 611 0
535 743 1278
Out In Total
LAKESIDE DR.

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland Harrison St & Grand Ave Date: 5/22/2008

	Harrison St Southbound				Grand Ave Westbound				Harrison St Northbound				Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	1	82	10	93	37	50	8	95	8	74	40	122	5	26	6	37	347
7:15	1	107	17	125	47	63	2	112	15	83	35	133	2	22	11	35	405
7:30	1	126	25	152	61	95	4	160	26	124	43	193	10	29	11	50	555
7:45	0	157	19	176	81	96	7	184	22	133	58	213	9	31	25	65	638
Total	3	472	71	546	226	304	21	551	71	414	176	661	26	108	53	187	1945
8:00	7	146	12	165	81	105	24	210	25	142	73	240	16	39	15	70	685
8:15	7	138	24	169	97	145	49	291	25	180	70	275	18	29	13	60	795
8:30	14	142	21	177	86	119	21	226	31	175	89	295	10	27	12	49	747
8:45	11	130	18	159	76	84	16	176	28	165	58	251	7	19	10	36	622
Total	39	556	75	670	340	453	110	903	109	662	290	1061	51	114	50	215	2849
16:00	1	75	18	94	56	65	9	130	2	238	95	335	22	80	25	127	686
16:15	1	88	14	103	64	70	13	147	2	217	146	365	32	80	30	142	757
16:30	0	129	9	138	54	62	11	127	2	236	169	407	16	109	36	161	833
16:45	0	120	4	124	68	60	12	140	2	224	193	419	21	122	33	176	859
Total	2	412	45	459	242	257	45	544	8	915	603	1526	91	391	124	606	3135
17:00	1	132	10	143	71	65	11	147	3	290	196	489	30	135	27	192	971
17:15	0	126	25	151	71	64	8	143	4	274	206	484	45	147	22	214	992
17:30	1	126	11	138	69	70	5	144	0	280	112	392	18	134	28	180	854
17:45	1	124	16	141	68	69	9	146	2	258	119	379	23	139	25	187	853
Total	3	508	62	573	279	268	33	580	9	1102	633	1744	116	555	102	773	3670
Grand Total	47	1948	253	2248	1087	1282	209	2578	197	3093	1702	4992	284	1168	329	1781	11599
Apprch%	2.1%	86.7%	11.3%		42.2%	49.7%	8.1%		3.9%	62.0%	34.1%		15.9%	65.6%	18.5%		
Total %	0.4%	16.8%	2.2%	19.4%	9.4%	11.1%	1.8%	22.2%	1.7%	26.7%	14.7%	43.0%	2.4%	10.1%	2.8%	15.4%	

City of Oakland Harrison St & Grand Ave Date: 5/22/2008

AM Peak Hr Begins at 745 AM

	Harrison St Southbound				Grand Ave Westbound				Harrison St Northbound				Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
745	0	157	19	176	81	96	7	184	22	133	58	213	9	31	25	65	638
800	7	146	12	165	81	105	24	210	25	142	73	240	16	39	15	70	685
815	7	138	24	169	97	145	49	291	25	180	70	275	18	29	13	60	795
830	14	142	21	177	86	119	21	226	31	175	89	295	10	27	12	49	747
Total Volume	28	583	76	687	345	465	101	911	103	630	290	1023	53	126	65	244	2865
% App Total.	4.1%	84.9%	11.1%		37.9%	51.0%	11.1%		10.1%	61.6%	28.3%		21.7%	51.6%	26.6%		
PHF	0.970				0.783				0.867				0.871				

PM Peak Hr Begins at 445 PM

	Harrison St Southbound				Grand Ave Westbound				Harrison St Northbound				Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	0	120	4	124	68	60	12	140	2	224	193	419	21	122	33	176	859
500	1	132	10	143	71	65	11	147	3	290	196	489	30	135	27	192	971
515	0	126	25	151	71	64	8	143	4	274	206	484	45	147	22	214	992
530	1	126	11	138	69	70	5	144	0	280	112	392	18	134	28	180	854
Total Volume	2	504	50	556	279	259	36	574	9	1068	707	1784	114	538	110	762	3676
% App Total.	0.4%	90.6%	9.0%		48.6%	45.1%	6.3%		0.5%	59.9%	39.6%		15.0%	70.6%	14.4%		
PHF	0.921				0.976				0.912				0.890				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland — Broadway & 20th St — Date: 05/22/2008

	Broadway Southbound				20th St Westbound				Broadway Northbound				20th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	6	35	2	43	6	18	13	37	5	52	6	63	0	13	7	20	163
7:15	3	40	8	51	4	14	18	36	5	53	9	67	1	20	13	34	188
7:30	7	51	12	70	3	34	16	53	10	63	10	83	3	17	7	27	233
7:45	10	69	9	88	6	31	23	60	9	83	13	105	2	27	11	40	293
Total	26	195	31	252	19	97	70	186	29	251	38	318	6	77	38	121	877
8:00	6	73	6	85	13	25	26	64	12	96	16	124	2	25	14	41	314
8:15	16	92	4	112	8	35	27	70	14	98	15	127	2	26	17	45	354
8:30	17	98	7	122	10	34	20	64	13	102	12	127	1	40	9	50	363
8:45	14	87	5	106	10	36	21	67	12	109	15	136	2	38	12	52	361
Total	53	350	22	425	41	130	94	265	51	405	58	514	7	129	52	188	1392
16:00	7	79	13	99	5	45	9	59	14	144	23	181	1	36	22	59	398
16:15	8	100	14	122	9	45	19	73	17	146	25	188	2	39	25	66	449
16:30	10	101	10	121	10	43	14	67	21	156	21	198	5	35	22	62	448
16:45	8	107	8	123	13	47	14	74	23	152	24	199	6	39	17	62	458
Total	33	387	45	465	37	180	56	273	75	598	93	766	14	149	86	249	1753
17:00	6	108	13	127	13	56	21	90	23	174	25	222	5	34	18	57	496
17:15	10	133	4	147	14	51	24	89	21	165	21	207	2	29	21	52	495
17:30	13	118	8	139	11	45	27	83	25	184	25	234	6	26	24	56	512
17:45	10	124	5	139	12	43	20	75	17	152	19	188	7	27	15	49	451
Total	39	483	30	552	50	195	92	337	86	675	90	851	20	116	78	214	1954
Grand Total	151	1415	128	1694	147	602	312	1061	241	1929	279	2449	47	471	254	772	5976
Apprch%	8.9%	83.5%	7.6%		13.9%	56.7%	29.4%		9.8%	78.8%	11.4%		6.1%	61.0%	32.9%		
Total %	2.5%	23.7%	2.1%	28.3%	2.5%	10.1%	5.2%	17.8%	4.0%	32.3%	4.7%	41.0%	0.8%	7.9%	4.3%	12.9%	

City of Oakland — Broadway & 20th St — Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Broadway Southbound				20th St Westbound				Broadway Northbound				20th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	6	73	6	85	13	25	26	64	12	96	16	124	2	25	14	41	314
815	16	92	4	112	8	35	27	70	14	98	15	127	2	26	17	45	354
830	17	98	7	122	10	34	20	64	13	102	12	127	1	40	9	50	363
845	14	87	5	106	10	36	21	67	12	109	15	136	2	38	12	52	361
Total Volume	53	350	22	425	41	130	94	265	51	405	58	514	7	129	52	188	1392
% App Total.	####	82.4%	5.2%		15.5%	49.1%	35.5%		9.9%	78.8%	11.3%		3.7%	68.6%	27.7%		
PHF	0.871				0.946				0.945				0.904				

PM Peak Hr Begins at 445 PM

	Broadway Southbound				20th St Westbound				Broadway Northbound				20th St Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	8	107	8	123	13	47	14	74	23	152	24	199	6	39	17	62	458
500	6	108	13	127	13	56	21	90	23	174	25	222	5	34	18	57	496
515	10	133	4	147	14	51	24	89	21	165	21	207	2	29	21	52	495
530	13	118	8	139	11	45	27	83	25	184	25	234	6	26	24	56	512
Total Volume	37	466	33	536	51	199	86	336	92	675	95	862	19	128	80	227	1961
% App Total.	6.9%	86.9%	6.2%		15.2%	59.2%	25.6%		10.7%	78.3%	11.0%		8.4%	56.4%	35.2%		
PHF	0.912				0.933				0.921				0.915				

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

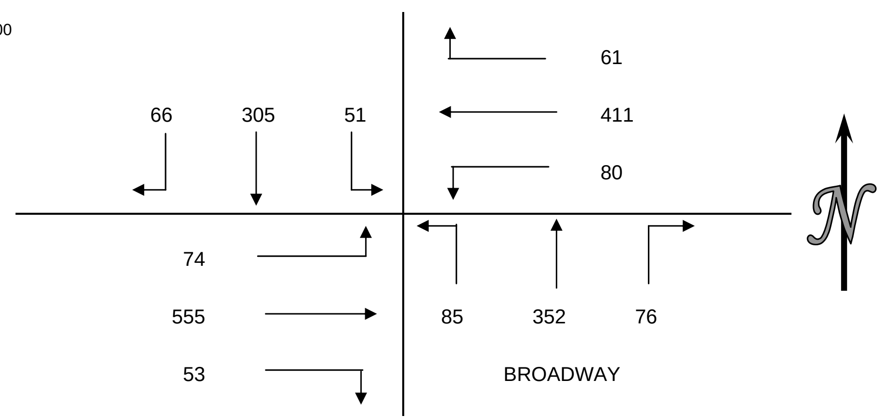
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		DOWLING ASSOCIATES
PROJECT:		1938 BROADWAY TRAFFIC COUNTS
DATE:		TUESDAY OCTOBER 21, 2008
PERIOD"		7:00 AM TO 9:00 AM
INTERSECTION:	N/S	BROADWAY
	E/W	GRAND AVENUE
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	11	21	7	4	81	11	10	49	20	5	72	11	302
715-730	12	33	5	7	89	13	17	58	13	7	69	11	334
730-745	14	41	6	9	97	15	14	73	17	18	94	13	411
745-800	12	55	8	6	97	24	12	97	24	15	109	20	479
800-815	17	72	23	17	100	24	10	93	23	9	140	12	540
815-830	20	74	10	13	114	21	17	83	14	17	151	26	560
830-845	13	87	9	14	102	21	20	96	14	9	133	16	534
845-900	16	72	9	17	95	14	29	80	34	18	131	20	535
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	49	150	26	26	364	63	53	277	74	45	344	55	1526
715-815	55	201	42	39	383	76	53	321	77	49	412	56	1764
730-830	63	242	47	45	408	84	53	346	78	59	494	71	1990
745-845	62	288	50	50	413	90	59	369	75	50	533	74	2113
800-900	66	305	51	61	411	80	76	352	85	53	555	74	2169

AM PEAK HOUR: 800-900



GRAND AVENUE

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	5	6	6	8	25
715-730	5	14	8	20	47
730-745	9	19	19	16	63
745-800	7	13	11	14	45
800-815	16	14	9	7	46
815-830	12	14	10	20	56
830-845	8	10	13	15	46
845-900	10	27	15	15	67
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	26	52	44	58	180
715-815	37	60	47	57	201
730-830	44	60	49	57	210
745-845	43	51	43	56	193
800-900	46	65	47	57	215

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	1	0	1	1	3
715-730	0	2	2	1	5
730-745	1	0	0	3	4
745-800	4	3	2	5	14
800-815	8	4	1	6	19
815-830	5	6	2	6	19
830-845	4	4	2	4	14
845-900	4	1	4	6	15
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	6	5	5	10	26
715-815	13	9	5	15	42
730-830	18	13	5	20	56
745-845	21	17	7	21	66
800-900	21	15	9	22	67

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

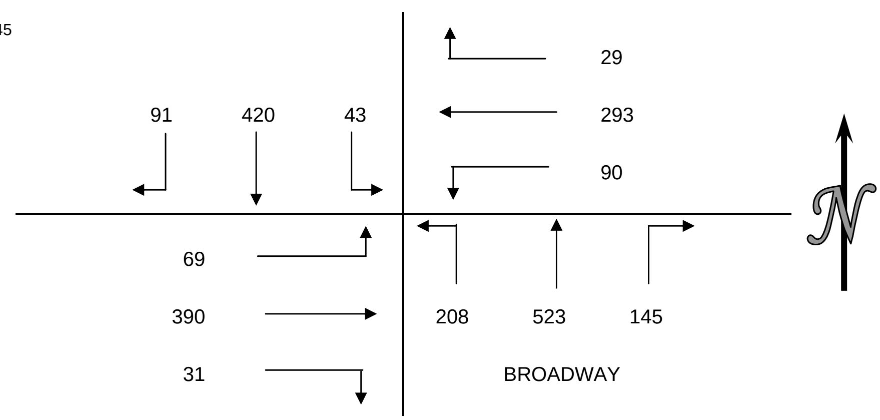
CLIENT:		DOWLING ASSOCIATES
PROJECT:		1938 BROADWAY TRAFFIC COUNTS
DATE:		TUESDAY OCTOBER 21, 2008
PERIOD"		4:00 PM TO 6:00 PM
INTERSECTION:	N/S	BROADWAY
	E/W	GRAND AVENUE
CITY:		OAKLAND

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
400-415	22	94	9	16	50	19	15	138	50	7	90	29	539
415-430	21	94	5	8	71	11	27	125	65	13	81	20	541
430-445	19	83	7	6	60	23	34	135	54	8	97	15	541
445-500	19	97	8	3	71	19	46	137	50	7	91	11	559
500-515	21	98	8	14	69	16	31	120	60	12	107	17	573
515-530	24	108	19	4	81	19	33	135	53	7	93	17	593
530-545	27	117	8	8	72	36	35	131	45	5	99	24	607
545-600	21	100	11	5	65	11	14	124	43	6	96	20	516
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
400-500	81	368	29	33	252	72	122	535	219	35	359	75	2180
415-515	80	372	28	31	271	69	138	517	229	40	376	63	2214
430-530	83	386	42	27	281	77	144	527	217	34	388	60	2266
445-545	91	420	43	29	293	90	145	523	208	31	390	69	2332
500-600	93	423	46	31	287	82	113	510	201	30	395	78	2289

AM PEAK HOUR: 445-545

GRAND AVENUE



PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	7	28	17	6	58
415-430	9	26	12	12	59
430-445	5	40	18	6	69
445-500	8	44	22	9	83
500-515	7	37	37	7	88
515-530	5	15	6	5	31
530-545	7	45	16	14	82
545-600	4	11	9	6	30
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-500	29	138	69	33	269
415-515	29	147	89	34	299
430-530	25	136	83	27	271
445-545	27	141	81	35	284
500-600	23	108	68	32	231

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	4	5	3	4	16
415-430	5	6	3	7	21
430-445	4	9	3	5	21
445-500	4	10	2	4	20
500-515	4	8	5	6	23
515-530	4	16	5	3	28
530-545	3	18	9	4	34
545-600	3	31	6	4	44
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-500	17	30	11	20	78
415-515	17	33	13	22	85
430-530	16	43	15	18	92
445-545	15	52	21	17	105
500-600	14	73	25	17	129

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

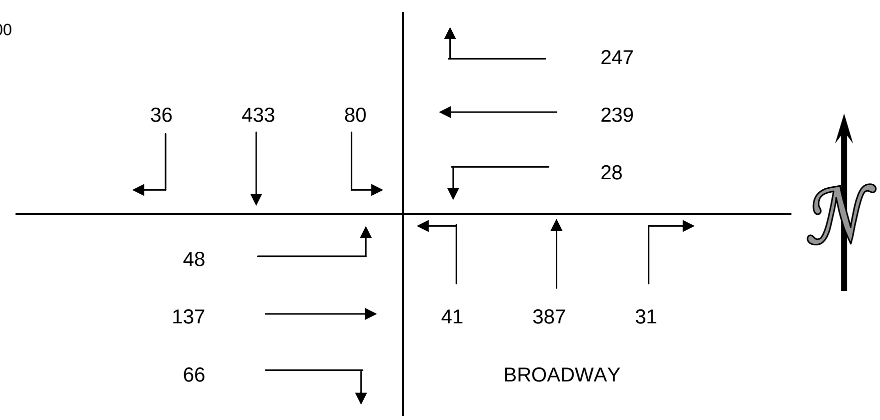
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		DOWLING ASSOCIATES
PROJECT:		1938 BROADWAY TRAFFIC COUNTS
DATE:		TUESDAY OCTOBER 21, 2008
PERIOD"		7:00 AM TO 9:00 AM
INTERSECTION:	N/S	BROADWAY
	E/W	27TH 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	6	68	8	17	16	9	4	54	4	7	19	6	218
715-730	3	83	12	44	23	2	3	76	7	7	11	7	278
730-745	9	94	17	44	43	5	4	81	6	18	22	11	354
745-800	10	113	18	51	51	6	6	90	9	20	33	11	418
800-815	15	104	17	55	59	2	6	100	7	18	35	11	429
815-830	4	119	13	61	63	12	9	94	15	17	32	7	446
830-845	7	113	28	73	62	6	8	93	7	14	33	10	454
845-900	10	97	22	58	55	8	8	100	12	17	37	20	444
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	28	358	55	156	133	22	17	301	26	52	85	35	1268
715-815	37	394	64	194	176	15	19	347	29	63	101	40	1479
730-830	38	430	65	211	216	25	25	365	37	73	122	40	1647
745-845	36	449	76	240	235	26	29	377	38	69	133	39	1747
800-900	36	433	80	247	239	28	31	387	41	66	137	48	1773
PHF	0.6	0.909664	0.714286	0.84589	0.948413	0.583333	0.861111	0.9675	0.683333	0.916667	0.925676	0.6	

AM PEAK HOUR: 800-900



27TH STREET

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	3	2	4	3	12
715-730	0	12	5	5	22
730-745	0	6	6	8	20
745-800	0	10	8	14	32
800-815	1	13	20	7	41
815-830	0	15	7	9	31
830-845	0	14	6	18	38
845-900	1	16	6	21	44
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	3	30	23	30	86
715-815	1	41	39	34	115
730-830	1	44	41	38	124
745-845	1	52	41	48	142
800-900	2	58	39	55	154

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-715	0	1	2	2	5
715-730	0	0	0	4	4
730-745	0	3	9	3	15
745-800	0	3	10	5	18
800-815	0	3	3	5	11
815-830	1	3	6	10	20
830-845	0	5	8	4	17
845-900	0	6	6	8	20
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
700-800	0	7	21	14	42
715-815	0	9	22	17	48
730-830	1	12	28	23	64
745-845	1	14	27	24	66
800-900	1	17	23	27	68

WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

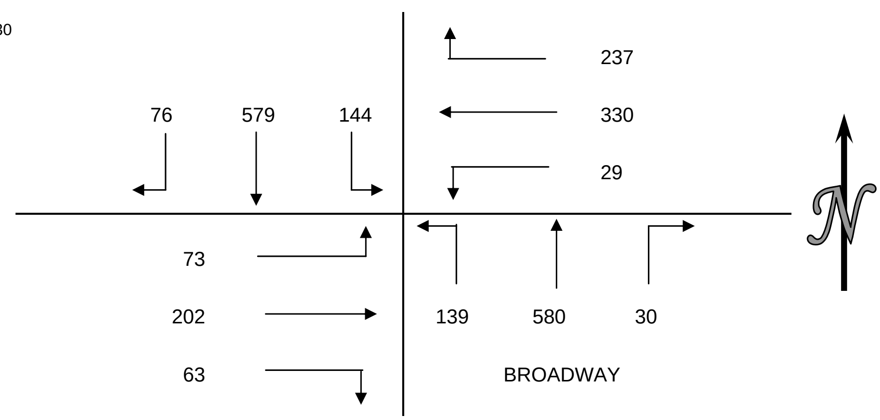
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:		DOWLING ASSOCIATES
PROJECT:		1938 BROADWAY TRAFFIC COUNTS
DATE:		TUESDAY OCTOBER 21, 2008
PERIOD"		4:00 PM TO 6:00 PM
INTERSECTION:	N/S	BROADWAY
	E/W	27TH 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
400-415	21	139	28	53	62	8	5	98	28	7	29	22	500
415-430	25	142	32	52	67	7	6	123	31	14	37	16	552
430-445	21	142	34	48	72	7	9	141	42	12	59	15	602
445-500	12	157	31	57	86	4	5	158	35	24	44	14	627
500-515	22	136	35	68	86	10	10	135	29	15	49	27	622
515-530	21	144	44	64	86	8	6	146	33	12	50	17	631
530-545	18	123	44	61	60	13	4	146	34	15	58	17	593
545-600	19	115	47	38	61	10	8	114	23	18	56	17	526
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
400-500	79	580	125	210	287	26	25	520	136	57	169	67	2281
415-515	80	577	132	225	311	28	30	557	137	65	189	72	2403
430-530	76	579	144	237	330	29	30	580	139	63	202	73	2482
445-545	73	560	154	250	318	35	25	585	131	66	201	75	2473
500-600	80	518	170	231	293	41	28	541	119	60	213	78	2372
PHF	0.863636	0.921975	0.818182	0.871324	0.959302	0.725	0.75	0.917722	0.827381	0.65625	0.855932	0.675926	

AM PEAK HOUR: 430-530



27TH STREET

PEDESTRIAN COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	1	6	8	7	22
415-430	1	11	5	9	26
430-445	0	16	9	8	33
445-500	2	11	5	25	43
500-515	1	14	6	7	28
515-530	0	10	9	9	28
530-545	2	23	6	7	38
545-600	0	16	7	10	33
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-500	4	44	27	49	124
415-515	4	52	25	49	130
430-530	3	51	29	49	132
445-545	5	58	26	48	137
500-600	3	63	28	33	127

BICYCLE COUNTS

15 MIN COUNTS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-415	1	8	6	5	20
415-430	0	10	10	3	23
430-445	0	8	4	11	23
445-500	1	9	5	2	17
500-515	0	7	8	3	18
515-530	0	8	12	5	25
530-545	1	12	7	9	29
545-600	1	13	8	11	33
HOUR TOTALS	NORTH	EAST	SOUTH	WEST	TOTAL
PERIOD	LEG	LEG	LEG	LEG	
400-500	2	35	25	21	83
415-515	1	34	27	19	81
430-530	1	32	29	21	83
445-545	2	36	32	19	89
500-600	2	40	35	28	105

ALL TRAFFIC DATA, INC

(916)771-8700

FAX 786-2879

City of Oakland | Telegraph Ave & West Grand Ave | Date: 05/22/2008

	Telegraph Ave Southbound				West Grand Ave Westbound				Telegraph Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	8	33	9	50	3	38	7	48	12	29	3	44	16	74	37	127	269
7:15	9	47	10	66	8	78	14	100	36	41	4	81	17	99	42	158	405
7:30	9	53	10	72	7	63	9	79	31	49	9	89	24	121	45	190	430
7:45	9	66	17	92	11	86	18	115	54	53	7	114	23	118	69	210	531
Total	35	199	46	280	29	265	48	342	133	172	23	328	80	412	193	685	1635
8:00	21	74	21	116	13	81	10	104	37	57	4	98	13	169	80	262	580
8:15	18	82	12	112	13	107	18	138	52	52	6	110	30	171	64	265	625
8:30	17	68	14	99	15	81	8	104	37	51	6	94	27	172	89	288	585
8:45	17	76	18	111	17	87	19	123	44	57	10	111	22	147	70	239	584
Total	73	300	65	438	58	356	55	469	170	217	26	413	92	659	303	1054	2374
16:00	32	69	29	130	2	141	20	163	21	101	4	126	10	97	4	111	530
16:15	15	79	22	116	5	164	21	190	13	94	7	114	8	129	2	139	559
16:30	25	73	18	116	4	162	19	185	19	104	11	134	9	148	6	163	598
16:45	27	95	22	144	4	174	17	195	18	118	8	144	4	136	3	143	626
Total	99	316	91	506	15	641	77	733	71	417	30	518	31	510	15	556	2313
17:00	28	92	16	136	7	189	28	224	22	112	2	136	9	181	8	198	694
17:15	33	87	20	140	1	164	29	194	23	140	7	170	7	117	5	129	633
17:30	27	87	31	145	4	166	25	195	17	107	11	135	3	145	11	159	634
17:45	20	66	28	114	5	172	29	206	18	119	3	140	12	126	11	149	609
Total	108	332	95	535	17	691	111	819	80	478	23	581	31	569	35	635	2570
Grand Total	315	1147	297	1759	119	1953	291	2363	454	1284	102	1840	234	2150	546	2930	8892
Apprch%	####	65.2%	16.9%		5.0%	82.6%	12.3%		24.7%	69.8%	5.5%		8.0%	73.4%	18.6%		
Total %	3.5%	12.9%	3.3%	19.8%	1.3%	22.0%	3.3%	26.6%	5.1%	14.4%	1.1%	20.7%	2.6%	24.2%	6.1%	33.0%	

City of Oakland | Telegraph Ave & West Grand Ave | Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Telegraph Ave Southbound				West Grand Ave Westbound				Telegraph Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	21	74	21	116	13	81	10	104	37	57	4	98	13	169	80	262	580
815	18	82	12	112	13	107	18	138	52	52	6	110	30	171	64	265	625
830	17	68	14	99	15	81	8	104	37	51	6	94	27	172	89	288	585
845	17	76	18	111	17	87	19	123	44	57	10	111	22	147	70	239	584
Total Volume	73	300	65	438	58	356	55	469	170	217	26	413	92	659	303	1054	2374
% App Total.	####	68.5%	14.8%		12.4%	75.9%	11.7%		41.2%	52.5%	6.3%		8.7%	62.5%	28.7%		
PHF	0.944				0.850				0.930				0.915				

PM Peak Hr Begins at 445 PM

	Telegraph Ave Southbound				West Grand Ave Westbound				Telegraph Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	27	95	22	144	4	174	17	195	18	118	8	144	4	136	3	143	626
500	28	92	16	136	7	189	28	224	22	112	2	136	9	181	8	198	694
515	33	87	20	140	1	164	29	194	23	140	7	170	7	117	5	129	633
530	27	87	31	145	4	166	25	195	17	107	11	135	3	145	11	159	634
Total Volume	115	361	89	565	16	693	99	808	80	477	28	585	23	579	27	629	2587
% App Total.	####	63.9%	15.8%		2.0%	85.8%	12.3%		13.7%	81.5%	4.8%		3.7%	92.1%	4.3%		
PHF	0.974				0.902				0.860				0.794				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Telegraph Ave & 27th Ave | Date: 05/22/2008

	Telegraph Ave Southbound				27th Ave Westbound				Telegraph Ave Northbound				27th Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	3	28	25	56	5	16	3	24	15	38	5	58	39	34	21	94	232
7:15	5	47	12	64	5	15	5	25	8	53	2	63	39	46	17	102	254
7:30	10	43	33	86	6	25	13	44	13	55	9	77	48	53	24	125	332
7:45	9	61	29	99	9	34	13	56	20	62	5	87	48	66	27	141	383
Total	27	179	99	305	25	90	34	149	56	208	21	285	174	199	89	462	1201
8:00	14	67	32	113	5	38	18	61	17	70	4	91	54	66	31	151	416
8:15	10	71	21	102	11	61	23	95	16	84	7	107	70	72	28	170	474
8:30	10	80	23	113	11	43	24	78	18	76	6	100	78	88	29	195	486
8:45	5	59	37	101	10	66	26	102	18	75	2	95	91	76	26	193	491
Total	39	277	113	429	37	208	91	336	69	305	19	393	293	302	114	709	1867
16:00	18	102	82	202	15	102	22	139	44	97	7	148	44	42	25	111	600
16:15	17	92	60	169	14	101	19	134	47	94	11	152	47	53	26	126	581
16:30	19	90	81	190	12	105	25	142	33	93	9	135	42	76	28	146	613
16:45	20	105	69	194	11	98	34	143	42	94	6	142	39	75	28	142	621
Total	74	389	292	755	52	406	100	558	166	378	33	577	172	246	107	525	2415
17:00	26	94	81	201	17	129	23	169	40	92	14	146	53	93	29	175	691
17:15	31	95	76	202	10	122	23	155	36	116	11	163	45	82	27	154	674
17:30	35	92	68	195	17	106	18	141	29	101	8	138	43	96	33	172	646
17:45	28	101	62	191	15	94	19	128	42	113	17	172	29	67	27	123	614
Total	120	382	287	789	59	451	83	593	147	422	50	619	170	338	116	624	2625
Grand Total	260	1227	791	2278	173	1155	308	1636	438	1313	123	1874	809	1085	426	2320	8108
Apprch%	####	53.9%	34.7%		10.6%	70.6%	18.8%		23.4%	70.1%	6.6%		34.9%	46.8%	18.4%		
Total %	3.2%	15.1%	9.8%	28.1%	2.1%	14.2%	3.8%	20.2%	5.4%	16.2%	1.5%	23.1%	10.0%	13.4%	5.3%	28.6%	

City of Oakland | Telegraph Ave & 27th Ave | Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Telegraph Ave Southbound				27th Ave Westbound				Telegraph Ave Northbound				27th Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	14	67	32	113	5	38	18	61	17	70	4	91	54	66	31	151	416
815	10	71	21	102	11	61	23	95	16	84	7	107	70	72	28	170	474
830	10	80	23	113	11	43	24	78	18	76	6	100	78	88	29	195	486
845	5	59	37	101	10	66	26	102	18	75	2	95	91	76	26	193	491
Total Volume	39	277	113	429	37	208	91	336	69	305	19	393	293	302	114	709	1867
% App Total.	9.1%	64.6%	26.3%		11.0%	61.9%	27.1%		17.6%	77.6%	4.8%		41.3%	42.6%	16.1%		
PHF	0.949				0.824				0.918				0.909				

PM Peak Hr Begins at 445 PM

	Telegraph Ave Southbound				27th Ave Westbound				Telegraph Ave Northbound				27th Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	20	105	69	194	11	98	34	143	42	94	6	142	39	75	28	142	621
500	26	94	81	201	17	129	23	169	40	92	14	146	53	93	29	175	691
515	31	95	76	202	10	122	23	155	36	116	11	163	45	82	27	154	674
530	35	92	68	195	17	106	18	141	29	101	8	138	43	96	33	172	646
Total Volume	112	386	294	792	55	455	98	608	147	403	39	589	180	346	117	643	2632
% App Total.	####	48.7%	37.1%		9.0%	74.8%	16.1%		25.0%	68.4%	6.6%		28.0%	53.8%	18.2%		
PHF	0.980				0.899				0.903				0.919				

ALL TRAFFIC DATA, INC

(916)771-8700
FAX 786-2879

City of Oakland — Northgate Ave & West Grand Ave — Date: 05/22/2008

	Northgate Ave Southbound				West Grand Ave Westbound				Northgate Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	92	0	42	134	0	51	13	64	0	0	0	0	17	57	0	74	272
7:15	97	0	52	149	0	99	13	112	0	0	1	1	17	61	0	78	340
7:30	114	0	42	156	0	80	21	101	1	0	1	2	20	66	0	86	345
7:45	122	0	38	160	0	129	23	152	0	0	1	1	21	81	0	102	415
Total	425	0	174	599	0	359	70	429	1	0	3	4	75	265	0	340	1372
8:00	156	0	40	196	0	105	22	127	0	0	0	0	30	81	0	111	434
8:15	179	0	47	226	0	139	30	169	0	0	1	1	32	94	0	126	522
8:30	165	0	42	207	0	133	16	149	0	0	0	0	25	117	0	142	498
8:45	147	0	39	186	0	119	16	135	1	0	0	1	33	108	0	141	463
Total	647	0	168	815	0	496	84	580	1	0	1	2	120	400	0	520	1917
16:00	44	0	18	62	2	110	69	181	0	0	2	2	51	93	0	144	389
16:15	32	0	21	53	0	127	86	213	0	0	0	0	57	95	0	152	418
16:30	44	0	21	65	0	124	91	215	0	1	0	1	79	115	0	194	475
16:45	55	0	26	81	0	122	91	213	0	0	1	1	54	117	0	171	466
Total	175	0	86	261	2	483	337	822	0	1	3	4	241	420	0	661	1748
17:00	27	1	18	46	0	136	90	226	0	0	0	0	57	123	0	180	452
17:15	32	0	24	56	0	146	94	240	0	0	0	0	44	130	1	175	471
17:30	27	0	19	46	0	138	97	235	0	0	0	0	41	132	0	173	454
17:45	31	0	23	54	0	135	58	193	0	0	0	0	46	121	0	167	414
Total	117	1	84	202	0	555	339	894	0	0	0	0	188	506	1	695	1791
Grand Total	1364	1	512	1877	2	1893	830	2725	2	1	7	10	624	1591	1	2216	6828
Apprch%	####	0.1%	27.3%		0.1%	69.5%	30.5%		20.0%	10.0%	70.0%		28.2%	71.8%	0.0%		
Total %	####	0.0%	7.5%	27.5%	0.0%	27.7%	12.2%	39.9%	0.0%	0.0%	0.1%	0.1%	9.1%	23.3%	0.0%	32.5%	

City of Oakland — Northgate Ave & West Grand Ave — Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Northgate Ave Southbound				West Grand Ave Westbound				Northgate Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	156	0	40	196	0	105	22	127	0	0	0	0	30	81	0	111	434
815	179	0	47	226	0	139	30	169	0	0	1	1	32	94	0	126	522
830	165	0	42	207	0	133	16	149	0	0	0	0	25	117	0	142	498
845	147	0	39	186	0	119	16	135	1	0	0	1	33	108	0	141	463
Total Volume	647	0	168	815	0	496	84	580	1	0	1	2	120	400	0	520	1917
% App Total.	####	0.0%	20.6%		0.0%	85.5%	14.5%		50.0%	0.0%	50.0%		23.1%	76.9%	0.0%		
PHF	0.902				0.858				0.500				0.915				

PM Peak Hr Begins at 430 PM

	Northgate Ave Southbound				West Grand Ave Westbound				Northgate Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
430	44	0	21	65	0	124	91	215	0	1	0	1	79	115	0	194	475
445	55	0	26	81	0	122	91	213	0	0	1	1	54	117	0	171	466
500	27	1	18	46	0	136	90	226	0	0	0	0	57	123	0	180	452
515	32	0	24	56	0	146	94	240	0	0	0	0	44	130	1	175	471
Total Volume	158	1	89	248	0	528	366	894	0	1	1	2	234	485	1	720	1864
% App Total.	####	0.4%	35.9%		0.0%	59.1%	40.9%		0.0%	50.0%	50.0%		32.5%	67.4%	0.1%		
PHF	0.765				0.931				0.500				0.928				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Telegraph Ave & West Grand Ave | Date: 05/22/2008

	Telegraph Ave Southbound				West Grand Ave Westbound				Telegraph Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	8	33	9	50	3	38	7	48	12	29	3	44	16	74	37	127	269
7:15	9	47	10	66	8	78	14	100	36	41	4	81	17	99	42	158	405
7:30	9	53	10	72	7	63	9	79	31	49	9	89	24	121	45	190	430
7:45	9	66	17	92	11	86	18	115	54	53	7	114	23	118	69	210	531
Total	35	199	46	280	29	265	48	342	133	172	23	328	80	412	193	685	1635
8:00	21	74	21	116	13	81	10	104	37	57	4	98	13	169	80	262	580
8:15	18	82	12	112	13	107	18	138	52	52	6	110	30	171	64	265	625
8:30	17	68	14	99	15	81	8	104	37	51	6	94	27	172	89	288	585
8:45	17	76	18	111	17	87	19	123	44	57	10	111	22	147	70	239	584
Total	73	300	65	438	58	356	55	469	170	217	26	413	92	659	303	1054	2374
16:00	32	69	29	130	2	141	20	163	21	101	4	126	10	97	4	111	530
16:15	15	79	22	116	5	164	21	190	13	94	7	114	8	129	2	139	559
16:30	25	73	18	116	4	162	19	185	19	104	11	134	9	148	6	163	598
16:45	27	95	22	144	4	174	17	195	18	118	8	144	4	136	3	143	626
Total	99	316	91	506	15	641	77	733	71	417	30	518	31	510	15	556	2313
17:00	28	92	16	136	7	189	28	224	22	112	2	136	9	181	8	198	694
17:15	33	87	20	140	1	164	29	194	23	140	7	170	7	117	5	129	633
17:30	27	87	31	145	4	166	25	195	17	107	11	135	3	145	11	159	634
17:45	20	66	28	114	5	172	29	206	18	119	3	140	12	126	11	149	609
Total	108	332	95	535	17	691	111	819	80	478	23	581	31	569	35	635	2570
Grand Total	315	1147	297	1759	119	1953	291	2363	454	1284	102	1840	234	2150	546	2930	8892
Apprch%	####	65.2%	16.9%		5.0%	82.6%	12.3%		24.7%	69.8%	5.5%		8.0%	73.4%	18.6%		
Total %	3.5%	12.9%	3.3%	19.8%	1.3%	22.0%	3.3%	26.6%	5.1%	14.4%	1.1%	20.7%	2.6%	24.2%	6.1%	33.0%	

City of Oakland | Telegraph Ave & West Grand Ave | Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Telegraph Ave Southbound				West Grand Ave Westbound				Telegraph Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	21	74	21	116	13	81	10	104	37	57	4	98	13	169	80	262	580
815	18	82	12	112	13	107	18	138	52	52	6	110	30	171	64	265	625
830	17	68	14	99	15	81	8	104	37	51	6	94	27	172	89	288	585
845	17	76	18	111	17	87	19	123	44	57	10	111	22	147	70	239	584
Total Volume	73	300	65	438	58	356	55	469	170	217	26	413	92	659	303	1054	2374
% App Total.	####	68.5%	14.8%		12.4%	75.9%	11.7%		41.2%	52.5%	6.3%		8.7%	62.5%	28.7%		
PHF	0.944				0.850				0.930				0.915				

PM Peak Hr Begins at 445 PM

	Telegraph Ave Southbound				West Grand Ave Westbound				Telegraph Ave Northbound				West Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	27	95	22	144	4	174	17	195	18	118	8	144	4	136	3	143	626
500	28	92	16	136	7	189	28	224	22	112	2	136	9	181	8	198	694
515	33	87	20	140	1	164	29	194	23	140	7	170	7	117	5	129	633
530	27	87	31	145	4	166	25	195	17	107	11	135	3	145	11	159	634
Total Volume	115	361	89	565	16	693	99	808	80	477	28	585	23	579	27	629	2587
% App Total.	####	63.9%	15.8%		2.0%	85.8%	12.3%		13.7%	81.5%	4.8%		3.7%	92.1%	4.3%		
PHF	0.974				0.902				0.860				0.794				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland | Northgate Ave (NB)/27th St & I-980 EB On-Ramp | Date: 05/22/2008

	Northgate Ave (NB)/27th St Southbound				I-980 EB On-Ramp Westbound				Northgate Ave (NB)/27th St Northbound				I-980 EB On-Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	0	0	0	0	0	18	41	59	0	32	1	33	18	91	0	109	201
7:15	0	0	0	0	0	13	24	37	1	29	2	32	11	106	0	117	186
7:30	0	0	0	0	0	26	47	73	0	42	4	46	19	118	0	137	256
7:45	0	0	0	0	0	23	66	89	0	52	6	58	19	135	0	154	301
Total	0	0	0	0	0	80	178	258	1	155	13	169	67	450	0	517	944
8:00	0	0	0	0	0	25	53	78	1	54	3	58	36	145	0	181	317
8:15	0	0	0	0	0	30	60	90	2	62	5	69	37	172	0	209	368
8:30	0	0	0	0	0	35	48	83	1	49	9	59	24	187	0	211	353
8:45	0	0	0	0	0	37	83	120	0	54	4	58	35	198	0	233	411
Total	0	0	0	0	0	127	244	371	4	219	21	244	132	702	0	834	1449
16:00	0	0	0	0	0	40	202	242	7	182	9	198	73	112	0	185	625
16:15	0	0	0	0	0	53	207	260	1	178	7	186	52	121	0	173	619
16:30	0	0	0	0	0	44	192	236	3	186	14	203	53	128	0	181	620
16:45	0	0	0	0	0	59	196	255	7	171	16	194	57	127	0	184	633
Total	0	0	0	0	0	196	797	993	18	717	46	781	235	488	0	723	2497
17:00	0	0	0	0	0	62	201	263	5	156	19	180	54	156	0	210	653
17:15	0	0	0	0	0	56	188	244	3	169	14	186	47	150	0	197	627
17:30	0	0	0	0	0	37	176	213	6	130	19	155	43	151	0	194	562
17:45	0	0	0	0	0	47	153	200	2	142	22	166	46	108	0	154	520
Total	0	0	0	0	0	202	718	920	16	597	74	687	190	565	0	755	2362
Grand Total	0	0	0	0	0	605	1937	2542	39	1688	154	1881	624	2205	0	2829	7252
Apprch%	0.0%	0.0%	0.0%		0.0%	23.8%	76.2%		2.1%	89.7%	8.2%		22.1%	77.9%	0.0%		
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	8.3%	26.7%	35.1%	0.5%	23.3%	2.1%	25.9%	8.6%	30.4%	0.0%	39.0%	

City of Oakland | Northgate Ave (NB)/27th St & I-980 EB On-Ramp | Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Northgate Ave (NB)/27th St Southbound				I-980 EB On-Ramp Westbound				Northgate Ave (NB)/27th St Northbound				I-980 EB On-Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	0	0	0	0	0	25	53	78	1	54	3	58	36	145	0	181	317
815	0	0	0	0	0	30	60	90	2	62	5	69	37	172	0	209	368
830	0	0	0	0	0	35	48	83	1	49	9	59	24	187	0	211	353
845	0	0	0	0	0	37	83	120	0	54	4	58	35	198	0	233	411
Total Volume	0	0	0	0	0	127	244	371	4	219	21	244	132	702	0	834	1449
% App Total.	0.0%	0.0%	0.0%		0.0%	34.2%	65.8%		1.6%	89.8%	8.6%		15.8%	84.2%	0.0%		
PHF	0.000				0.773				0.884				0.895				

PM Peak Hr Begins at 430 PM

	Northgate Ave (NB)/27th St Southbound				I-980 EB On-Ramp Westbound				Northgate Ave (NB)/27th St Northbound				I-980 EB On-Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
430	0	0	0	0	0	44	192	236	3	186	14	203	53	128	0	181	620
445	0	0	0	0	0	59	196	255	7	171	16	194	57	127	0	184	633
500	0	0	0	0	0	62	201	263	5	156	19	180	54	156	0	210	653
515	0	0	0	0	0	56	188	244	3	169	14	186	47	150	0	197	627
Total Volume	0	0	0	0	0	221	777	998	18	682	63	763	211	561	0	772	2533
% App Total.	0.0%	0.0%	0.0%		0.0%	22.1%	77.9%		2.4%	89.4%	8.3%		27.3%	72.7%	0.0%		
PHF	0.000				0.949				0.940				0.919				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland   Northgate Ave (SB)/27th St & I-980 WB Off-Ramp   Date: 05/22/2008

	Northgate Ave (SB)/27th St Southbound				I-980 WB Off-Ramp Westbound				Northgate Ave (SB)/27th St Northbound				I-980 WB Off-Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	79	140	53	272	0	10	0	10	0	0	0	0	0	26	3	29	311
7:15	86	168	62	316	2	16	0	18	0	0	0	0	0	28	3	31	365
7:30	96	168	59	323	2	24	0	26	0	0	0	0	0	43	5	48	397
7:45	105	177	63	345	4	18	0	22	0	0	0	0	0	48	7	55	422
Total	366	653	237	1256	8	68	0	76	0	0	0	0	0	145	18	163	1495
8:00	136	223	71	430	2	25	0	27	0	0	0	0	0	54	4	58	515
8:15	140	226	97	463	2	30	0	32	0	0	0	0	0	57	9	66	561
8:30	137	213	73	423	1	39	0	40	0	0	0	0	0	62	9	71	534
8:45	164	176	56	396	4	41	0	45	0	0	0	0	0	66	1	67	508
Total	577	838	297	1712	9	135	0	144	0	0	0	0	0	239	23	262	2118
16:00	79	68	50	197	6	42	0	48	0	0	0	0	0	95	7	102	347
16:15	85	54	58	197	2	49	0	51	0	0	0	0	0	91	9	100	348
16:30	83	67	44	194	5	37	0	42	0	0	0	0	0	96	4	100	336
16:45	71	77	45	193	2	56	0	58	0	0	0	0	0	99	8	107	358
Total	318	266	197	781	15	184	0	199	0	0	0	0	0	381	28	409	1389
17:00	78	59	47	184	2	61	0	63	0	0	0	0	0	111	6	117	364
17:15	93	57	31	181	2	55	0	57	0	0	0	0	0	109	10	119	357
17:30	98	49	49	196	4	37	0	41	0	0	0	0	0	104	9	113	350
17:45	84	52	36	172	2	47	0	49	0	0	0	0	0	90	11	101	322
Total	353	217	163	733	10	200	0	210	0	0	0	0	0	414	36	450	1393
Grand Total	1614	1974	894	4482	42	587	0	629	0	0	0	0	0	1179	105	1284	6395
Apprch%	####	44.0%	19.9%		6.7%	93.3%	0.0%		0.0%	0.0%	0.0%		0.0%	91.8%	8.2%		
Total %	####	30.9%	14.0%	70.1%	0.7%	9.2%	0.0%	9.8%	0.0%	0.0%	0.0%	0.0%	0.0%	18.4%	1.6%	20.1%	

City of Oakland   Northgate Ave (SB)/27th St & I-980 WB Off-Ramp   Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	Northgate Ave (SB)/27th St Southbound				I-980 WB Off-Ramp Westbound				Northgate Ave (SB)/27th St Northbound				I-980 WB Off-Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	136	223	71	430	2	25	0	27	0	0	0	0	0	54	4	58	515
815	140	226	97	463	2	30	0	32	0	0	0	0	0	57	9	66	561
830	137	213	73	423	1	39	0	40	0	0	0	0	0	62	9	71	534
845	164	176	56	396	4	41	0	45	0	0	0	0	0	66	1	67	508
Total Volume	577	838	297	1712	9	135	0	144	0	0	0	0	0	239	23	262	2118
% App Total.	####	48.9%	17.3%		6.3%	93.8%	0.0%		0.0%	0.0%	0.0%		0.0%	91.2%	8.8%		
PHF	0.924				0.800				0.000				0.923				

PM Peak Hr Begins at 445 PM

	Northgate Ave (SB)/27th St Southbound				I-980 WB Off-Ramp Westbound				Northgate Ave (SB)/27th St Northbound				I-980 WB Off-Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	71	77	45	193	2	56	0	58	0	0	0	0	0	99	8	107	358
500	78	59	47	184	2	61	0	63	0	0	0	0	0	111	6	117	364
515	93	57	31	181	2	55	0	57	0	0	0	0	0	109	10	119	357
530	98	49	49	196	4	37	0	41	0	0	0	0	0	104	9	113	350
Total Volume	340	242	172	754	10	209	0	219	0	0	0	0	0	423	33	456	1429
% App Total.	####	32.1%	22.8%		4.6%	95.4%	0.0%		0.0%	0.0%	0.0%		0.0%	92.8%	7.2%		
PHF	0.962				0.869				0.000				0.958				

ALL TRAFFIC DATA, INC
(916)771-8700
FAX 786-2879

City of Oakland San Pablo Ave & W Grand Ave Date: 05/22/2008

	San Pablo Ave Southbound				W Grand Ave Westbound				San Pablo Ave Northbound				W Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
7:00	10	30	1	41	1	139	12	152	8	36	3	47	2	41	5	48	288
7:15	14	31	2	47	6	150	21	177	3	40	2	45	3	62	1	66	335
7:30	14	66	0	80	3	110	11	124	11	53	4	68	5	55	6	66	338
7:45	26	60	1	87	2	148	18	168	7	64	7	78	5	62	10	77	410
Total	64	187	4	255	12	547	62	621	29	193	16	238	15	220	22	257	1371
8:00	20	73	0	93	9	126	19	154	8	60	9	77	2	84	5	91	415
8:15	14	58	1	73	7	165	20	192	15	60	8	83	2	92	7	101	449
8:30	23	76	0	99	5	145	21	171	13	59	9	81	2	102	6	110	461
8:45	19	69	0	88	3	148	19	170	11	63	6	80	1	99	4	104	442
Total	76	276	1	353	24	584	79	687	47	242	32	321	7	377	22	406	1767
16:00	23	87	32	142	10	127	20	157	67	86	11	164	29	132	35	196	659
16:15	21	85	31	137	10	109	16	135	60	91	10	161	26	119	28	173	606
16:30	14	73	27	114	8	141	14	163	82	86	14	182	27	160	35	222	681
16:45	23	94	27	144	13	123	15	151	73	105	19	197	32	151	37	220	712
Total	81	339	117	537	41	500	65	606	282	368	54	704	114	562	135	811	2658
17:00	32	83	42	157	6	151	18	175	87	121	25	233	34	160	29	223	788
17:15	25	76	17	118	8	141	11	160	77	78	15	170	19	149	23	191	639
17:30	25	77	35	137	8	126	10	144	75	104	18	197	33	160	25	218	696
17:45	15	81	32	128	9	124	25	158	66	88	14	168	37	165	20	222	676
Total	97	317	126	540	31	542	64	637	305	391	72	768	123	634	97	854	2799
Grand Total	318	1119	248	1685	108	2173	270	2551	663	1194	174	2031	259	1793	276	2328	8595
Apprch%	####	66.4%	14.7%		4.2%	85.2%	10.6%		32.6%	58.8%	8.6%		11.1%	77.0%	11.9%		
Total %	3.7%	13.0%	2.9%	19.6%	1.3%	25.3%	3.1%	29.7%	7.7%	13.9%	2.0%	23.6%	3.0%	20.9%	3.2%	27.1%	

City of Oakland San Pablo Ave & W Grand Ave Date: 05/22/2008

AM Peak Hr Begins at 800 AM

	San Pablo Ave Southbound				W Grand Ave Westbound				San Pablo Ave Northbound				W Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
800	20	73	0	93	9	126	19	154	8	60	9	77	2	84	5	91	415
815	14	58	1	73	7	165	20	192	15	60	8	83	2	92	7	101	449
830	23	76	0	99	5	145	21	171	13	59	9	81	2	102	6	110	461
845	19	69	0	88	3	148	19	170	11	63	6	80	1	99	4	104	442
Total Volume	76	276	1	353	24	584	79	687	47	242	32	321	7	377	22	406	1767
% App Total.	####	78.2%	0.3%		3.5%	85.0%	11.5%		14.6%	75.4%	10.0%		1.7%	92.9%	5.4%		
PHF	0.891				0.895				0.967				0.923				

PM Peak Hr Begins at 445 PM

	San Pablo Ave Southbound				W Grand Ave Westbound				San Pablo Ave Northbound				W Grand Ave Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int Total
445	23	94	27	144	13	123	15	151	73	105	19	197	32	151	37	220	712
500	32	83	42	157	6	151	18	175	87	121	25	233	34	160	29	223	788
515	25	76	17	118	8	141	11	160	77	78	15	170	19	149	23	191	639
530	25	77	35	137	8	126	10	144	75	104	18	197	33	160	25	218	696
Total Volume	105	330	121	556	35	541	54	630	312	408	77	797	118	620	114	852	2835
% App Total.	####	59.4%	21.8%		5.6%	85.9%	8.6%		39.1%	51.2%	9.7%		13.8%	72.8%	13.4%		
PHF	0.885				0.900				0.855				0.955				

APPENDIX B-2

INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS

Existing Conditions
AM Peak Hour

HCM Signalized Intersection Capacity Analysis
1: 5th St. & Oak St.

Existing AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	303	551	152	0	0	0	0	230	68	3	117	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.97						0.97			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		4847						1795			1858	
Flt Permitted		0.99						1.00			0.98	
Satd. Flow (perm)		1850						1500			1600	
Peak-hour factor, PHF	0.95	0.89	0.81	0.92	0.92	0.92	0.92	0.82	0.74	0.38	0.77	0.92
Adj. Flow (vph)	319	619	188	0	0	0	0	280	92	8	152	0
RTOR Reduction (vph)	0	67	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	1059	0	0	0	0	0	346	0	0	160	0
Confl. Peds. (#/hr)	14		14	52		52	1		1	4		4
Confl. Bikes (#/hr)			5			2						
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		925						618			551	
v/s Ratio Prot								c0.19				
v/s Ratio Perm		c0.57									0.10	
v/c Ratio		1.14						0.56			0.29	
Uniform Delay, d1		11.2						12.0			10.7	
Progression Factor		1.00						1.00			0.98	
Incremental Delay, d2		78.0						3.6			1.1	
Delay (s)		89.3						15.6			11.7	
Level of Service		F						B			B	
Approach Delay (s)		89.3			0.0			15.6			11.7	
Approach LOS		F			A			B			B	

Intersection Summary			
HCM Average Control Delay	65.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 6th St. & Oak St.

Existing AM
222 19th Street Transportation Study

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	123	429	120	48	737
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.90	0.85
Flt Protected			0.99		0.98	1.00
Satd. Flow (prot)			3491		3201	1441
Flt Permitted			0.99		0.98	1.00
Satd. Flow (perm)			3491		3201	1441
Peak-hour factor, PHF	0.92	0.75	0.96	0.77	0.86	0.89
Adj. Flow (vph)	0	164	447	156	56	828
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	611	0	626	414
Confl. Peds. (#/hr)	51	2				
Confl. Bikes (#/hr)	2					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1265		1152	519
v/s Ratio Prot						
v/s Ratio Perm			0.18		0.20	c0.29
v/c Ratio			0.48		0.54	0.80
Uniform Delay, d1			11.1		11.5	12.9
Progression Factor			0.81		1.00	1.00
Incremental Delay, d2			0.6		1.8	12.1
Delay (s)			9.6		13.3	25.0
Level of Service			A		B	C
Approach Delay (s)			9.6		18.0	
Approach LOS			A		B	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 7th St. & Oak St.

Existing AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	483	0	0	0	0	0	938	247	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6328						4877				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6328						4877				
Peak-hour factor, PHF	0.93	0.91	0.92	0.92	0.92	0.92	0.92	0.85	0.71	0.92	0.92	0.92
Adj. Flow (vph)	124	531	0	0	0	0	0	1104	348	0	0	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	99	0	0	0	0
Lane Group Flow (vph)	0	641	0	0	0	0	0	1353	0	0	0	0
Confl. Peds. (#/hr)	22		22	59		59	12		12	5		5
Confl. Bikes (#/hr)			6			4			2			1
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2531						1951				
v/s Ratio Prot								c0.28				
v/s Ratio Perm		0.10										
v/c Ratio		0.25						0.69				
Uniform Delay, d1		9.0						11.2				
Progression Factor		0.81						0.75				
Incremental Delay, d2		0.2						1.8				
Delay (s)		7.5						10.2				
Level of Service		A						B				
Approach Delay (s)		7.5			0.0			10.2			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: 11th Street & Oak Street

Existing AM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	56	0	0	903	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	64	0	0	912	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	240	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	240	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	100	100			
cM capacity (veh/h)	720	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	64	228	228	228	228
Volume Left	64	0	0	0	0
Volume Right	0	0	0	0	0
cSH	720	1700	1700	1700	1700
Volume to Capacity	0.09	0.13	0.13	0.13	0.13
Queue Length 95th (ft)	7	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.5	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1431	66	275	668	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6338			6163				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6338			6163				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.87	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1475	76	296	726	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	12	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1539	0	0	1014	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3158			2116				
v/s Ratio Prot					c0.24							
v/s Ratio Perm								0.16				
v/c Ratio					0.49			0.48				
Uniform Delay, d1					10.0			15.5				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.5			0.8				
Delay (s)					10.5			16.3				
Level of Service					B			B				
Approach Delay (s)		0.0			10.5			16.3			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	51.9%	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)	34	261	0	0	547	480	116	505	23	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.98		1.00	0.97			
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		0.99			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3513			3539	1548		3488	1531			
Flt Permitted		0.83			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		2945			3539	1548		3488	1531			
Peak-hour factor, PHF	0.85	0.89	0.92	0.96	0.88	0.96	0.85	0.96	0.72	0.92	0.92	0.92
Adj. Flow (vph)	40	293	0	0	622	500	136	526	32	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	186	0	0	15	0	0	0
Lane Group Flow (vph)	0	333	0	0	622	314	0	662	17	0	0	0
Confl. Peds. (#/hr)	35		35	6		6	26		26	2		2
Confl. Bikes (#/hr)			33			6		10				5
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		884			1062	464		1860	817			
v/s Ratio Prot					0.18							
v/s Ratio Perm		0.11				c0.20		0.19	0.01			
v/c Ratio		0.38			0.59	0.68		0.36	0.02			
Uniform Delay, d1		16.6			17.8	18.4		8.1	6.6			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		1.2			2.4	7.7		0.5	0.0			
Delay (s)		17.8			20.2	26.1		8.6	6.7			
Level of Service		B			C	C		A	A			
Approach Delay (s)		17.8			22.8			8.5			0.0	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.2%	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	469	240	0	0	0	0	0	0	125	524	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.95									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		6035									5025	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		6035									5025	
Peak-hour factor, PHF	0.92	0.92	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.98	0.92
Adj. Flow (vph)	0	510	279	0	0	0	0	0	0	140	535	0
RTOR Reduction (vph)	0	127	0	0	0	0	0	0	0	0	78	0
Lane Group Flow (vph)	0	662	0	0	0	0	0	0	0	0	597	0
Confl. Peds. (#/hr)	4		4	10		10	8		8	11		11
Confl. Bikes (#/hr)			1						7			2
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2414									2233	
v/s Ratio Prot		c0.11										
v/s Ratio Perm											0.12	
v/c Ratio		0.27									0.27	
Uniform Delay, d1		9.1									7.9	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.3									0.3	
Delay (s)		9.4									8.2	
Level of Service		A									A	
Approach Delay (s)		9.4			0.0			0.0			8.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	38.3%	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)	0	338	121	0	0	0	0	0	0	22	656	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6067									5067	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6067									5067	
Peak-hour factor, PHF	0.92	0.86	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.55	0.95	0.92
Adj. Flow (vph)	0	393	144	0	0	0	0	0	0	40	691	0
RTOR Reduction (vph)	0	74	0	0	0	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	463	0	0	0	0	0	0	0	0	720	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2326									2196	
v/s Ratio Prot		c0.08										
v/s Ratio Perm											0.14	
v/c Ratio		0.20									0.33	
Uniform Delay, d1		12.4									11.2	
Progression Factor		0.76									1.21	
Incremental Delay, d2		0.2									0.4	
Delay (s)		9.6									14.0	
Level of Service		A									B	
Approach Delay (s)		9.6			0.0			0.0			14.0	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Existing AM
9: 12th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	353	1277	0	0	0	0	0	316	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.97	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6290						4893	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6290						4893	
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.81
Adj. Flow (vph)	0	0	0	388	1316	0	0	0	0	0	322	80
RTOR Reduction (vph)	0	0	0	0	88	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	1616	0	0	0	0	0	394	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2726						2161	
v/s Ratio Prot											c0.08	
v/s Ratio Perm					0.26							
v/c Ratio					0.59						0.18	
Uniform Delay, d1					13.0						10.2	
Progression Factor					0.48						1.00	
Incremental Delay, d2					0.8						0.2	
Delay (s)					7.1						10.4	
Level of Service					A						B	
Approach Delay (s)		0.0			7.1			0.0			10.4	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Existing AM
10: 14th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	233	39	21	621	0	0	0	0	50	308	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.99	1.00	
Frt		0.98			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	1.00	
Satd. Flow (prot)		3435			3529					1589	3345	
Flt Permitted		1.00			0.93					0.95	1.00	
Satd. Flow (perm)		3435			3292					1589	3345	
Peak-hour factor, PHF	0.92	0.75	0.70	0.66	0.96	0.92	0.92	0.92	0.92	0.74	0.96	0.71
Adj. Flow (vph)	0	311	56	32	647	0	0	0	0	68	321	24
RTOR Reduction (vph)	0	32	0	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	335	0	0	679	0	0	0	0	61	340	0
Confl. Peds. (#/hr)	36		36	28		28	18		18	16		16
Confl. Bikes (#/hr)			4			10			3			1
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1450			1390					671	1412	
v/s Ratio Prot		0.10										
v/s Ratio Perm					c0.21					0.04	0.10	
v/c Ratio		0.23			0.49					0.09	0.24	
Uniform Delay, d1		8.3			9.5					7.8	8.4	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		0.4			1.2					0.3	0.4	
Delay (s)		8.7			10.7					8.1	8.8	
Level of Service		A			B					A	A	
Approach Delay (s)		8.7			10.7			0.0			8.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Existing AM
11: 19th Street & Jackson Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	12	195	9	39	129	0	0	86	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	13	212	10	42	140	0	0	93	37

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	119	116	183	130
Volume Left (vph)	13	0	42	0
Volume Right (vph)	0	10	0	37
Hadj (s)	0.09	-0.03	0.08	-0.14
Departure Headway (s)	5.3	5.2	4.7	4.6
Degree Utilization, x	0.18	0.17	0.24	0.17
Capacity (veh/h)	637	654	726	739
Control Delay (s)	8.3	8.1	9.2	8.5
Approach Delay (s)	8.2		9.2	8.5
Approach LOS	A		A	A

Intersection Summary			
Delay	8.6		
HCM Level of Service	A		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Existing AM
12: Jackson Street & Lakeside Drive
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	128	4	1	763	304	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.96	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1766			3539	3362	
Flt Permitted	0.95			0.95	1.00	
Satd. Flow (perm)	1766			3379	3362	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	139	4	1	829	330	126
RTOR Reduction (vph)	0	0	0	0	64	0
Lane Group Flow (vph)	143	0	0	830	392	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	16.0			22.0	22.0	
Effective Green, g (s)	16.0			22.0	22.0	
Actuated g/C Ratio	0.36			0.49	0.49	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	628			1652	1644	
v/s Ratio Prot	c0.08				0.12	
v/s Ratio Perm				c0.25		
v/c Ratio	0.23			0.50	0.24	
Uniform Delay, d1	10.2			7.8	6.7	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.8			1.1	0.3	
Delay (s)	11.0			8.9	7.0	
Level of Service	B			A	A	
Approach Delay (s)	11.0			8.9	7.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	39	150	78	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	42	163	85	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	97	109	85
Volume Left (vph)	42	0	85
Volume Right (vph)	0	0	0
Hadj (s)	0.25	0.03	0.23
Departure Headway (s)	5.0	4.7	4.6
Degree Utilization, x	0.13	0.14	0.11
Capacity (veh/h)	712	739	747
Control Delay (s)	7.5	7.3	8.2
Approach Delay (s)	7.4		8.2
Approach LOS	A		A

Intersection Summary			
Delay	7.6		
HCM Level of Service	A		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	51	835	77	121	496	0	0	88	42
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	
Lane Util. Factor					0.86			0.95			0.95	
Frpb, ped/bikes					1.00			1.00			0.98	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.99			1.00			0.95	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6271			3459			3302	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					6271			3000			3302	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	55	908	84	132	539	0	0	96	46
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	0	0	0	1024	0	0	671	0	0	130	0
Confl. Peds. (#/hr)	30		30	42		42	86		86	50		50
Confl. Bikes (#/hr)			3						1			3
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2247			1575			1734	
v/s Ratio Prot											0.04	
v/s Ratio Perm					0.16			c0.22				
v/c Ratio					0.46			0.43			0.07	
Uniform Delay, d1					14.8			8.7			7.0	
Progression Factor					1.44			1.00			1.00	
Incremental Delay, d2					0.5			0.8			0.1	
Delay (s)					21.8			9.6			7.1	
Level of Service					C			A			A	
Approach Delay (s)		0.0			21.8			9.6			7.1	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Volume (vph)	83	31	122	11	104	34	50	29	249	15	311	168
Ideal 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	0.91	0.91		1.00	0.95				0.95		0.91	0.91
Frpb, ped/bikes	1.00	1.00		1.00	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	0.89		1.00	0.96				0.99		0.99	0.85
Flt Protected	0.95	1.00		0.95	1.00				0.99		1.00	1.00
Satd. Flow (prot)	3221	1500		1770	3410				3470		3366	1441
Flt Permitted	0.95	1.00		0.95	1.00				0.99		1.00	1.00
Satd. Flow (perm)	3221	1500		1770	3410				3470		3366	1441
Peak-hour factor, PHF	0.79	0.82	0.83	0.69	0.84	0.84	0.94	0.94	0.96	0.75	0.85	0.96
Adj. Flow (vph)	105	38	147	16	124	40	53	31	259	20	366	175
RTOR Reduction (vph)	0	116	0	0	0	0	0	0	6	0	0	0
Lane Group Flow (vph)	94	80	0	16	164	0	0	0	357	0	384	157
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)		2							6			
Turn Type	custom			Split			Split	Split				custom
Protected Phases	1	1		7	7		8	8	8		2	6
Permitted Phases	1											6
Actuated Green, G (s)	16.6	16.6		7.4	7.4				24.0		16.0	36.6
Effective Green, g (s)	16.6	16.6		7.4	7.4				24.0		16.0	36.6
Actuated g/C Ratio	0.21	0.21		0.09	0.09				0.30		0.20	0.46
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)	668	311		164	315				1041		673	659
v/s Ratio Prot	0.03	0.05		0.01	c0.05				c0.10		c0.11	c0.11
v/s Ratio Perm												
v/c Ratio	0.14	0.26		0.10	0.52				0.34		0.57	0.24
Uniform Delay, d1	25.9	26.5		33.2	34.6				21.9		28.9	13.2
Progression Factor	0.89	0.79		0.88	0.89				1.00		1.13	1.11
Incremental Delay, d2	0.4	2.0		0.1	0.7				0.1		0.7	0.8
Delay (s)	23.5	23.0		29.2	31.7				21.9		33.2	15.5
Level of Service	C	C		C	C				C		C	B
Approach Delay (s)		23.2			31.5				21.9		27.7	
Approach LOS		C			C				C		C	

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR2
Lane Configurations	
Volume (vph)	23
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	24
RTOR Reduction (vph)	13
Lane Group Flow (vph)	11
Confl. Peds. (#/hr)	102
Confl. Bikes (#/hr)	10
Turn Type	custom
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	36.6
Effective Green, g (s)	36.6
Actuated g/C Ratio	0.46
Clearance Time (s)	4.0
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	724
v/s Ratio Prot	0.01
v/s Ratio Perm	
v/c Ratio	0.02
Uniform Delay, d1	11.9
Progression Factor	1.66
Incremental Delay, d2	0.0
Delay (s)	19.8
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis — Existing AM
16: Harrison Street & Lakeside Drive
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	332	0	0	654	378	499
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			4.0	4.0	4.0
Lane Util. Factor	0.94			0.91	0.95	0.76
Frpb, ped/bikes	1.00			1.00	1.00	0.97
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	4990			5085	3539	3510
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	4990			5085	3539	3510
Peak-hour factor, PHF	0.90	0.92	0.92	0.97	0.96	0.90
Adj. Flow (vph)	369	0	0	674	394	554
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	369	0	0	674	394	554
Confl. Peds. (#/hr)						14
Confl. Bikes (#/hr)						2
Turn Type						Free
Protected Phases	1			2	2	
Permitted Phases						Free
Actuated Green, G (s)	11.4			59.6	59.6	80.0
Effective Green, g (s)	11.4			59.6	59.6	80.0
Actuated g/C Ratio	0.14			0.74	0.74	1.00
Clearance Time (s)	5.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	711			3788	2637	3510
v/s Ratio Prot	c0.07			c0.13	0.11	
v/s Ratio Perm						0.16
v/c Ratio	0.52			0.18	0.15	0.16
Uniform Delay, d1	31.8			3.0	2.9	0.0
Progression Factor	0.77			1.00	0.98	1.00
Incremental Delay, d2	0.6			0.1	0.1	0.1
Delay (s)	25.1			3.1	3.0	0.1
Level of Service	C			A	A	A
Approach Delay (s)	25.1			3.1	1.3	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing AM
17: West Grand Avenue & Harrison Street
222 19th Street Transportation Study

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	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.94		1.00	0.90		0.99	
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		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	
Satd. Flow (prot)	3433	3539	1479	3433	3539	1485		5032	1419		4940	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.69	1.00		0.80	
Satd. Flow (perm)	3433	3539	1479	3433	3539	1485		3506	1419		3947	
Peak-hour factor, PHF	0.74	0.81	0.65	0.89	0.80	0.52	0.83	0.88	0.82	0.50	0.93	0.79
Adj. Flow (vph)	72	156	100	388	581	194	124	716	354	56	627	96
RTOR Reduction (vph)	0	0	48	0	0	108	0	0	227	0	19	0
Lane Group Flow (vph)	72	156	52	388	581	86	0	840	127	0	760	0
Confl. Peds. (#/hr)	38		38	34		34	60		60	28		28
Confl. Bikes (#/hr)			12			18			39			9
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	5.6	34.5	34.5	14.5	44.4	44.4		36.0	36.0		36.0	
Effective Green, g (s)	5.6	34.5	34.5	14.5	44.4	44.4		36.0	36.0		36.0	
Actuated g/C Ratio	0.06	0.34	0.34	0.14	0.44	0.44		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	192	1221	510	498	1571	659		1262	511		1421	
v/s Ratio Prot	0.02	0.04		c0.11	c0.16							
v/s Ratio Perm			0.04			0.06		c0.24	0.09		0.19	
v/c Ratio	0.38	0.13	0.10	0.78	0.37	0.13		0.67	0.25		0.54	
Uniform Delay, d1	45.5	22.4	22.2	41.2	18.5	16.4		26.9	22.5		25.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.2	0.4	6.9	0.7	0.4		2.8	1.2		1.4	
Delay (s)	46.0	22.7	22.6	48.1	19.2	16.8		29.7	23.7		26.8	
Level of Service	D	C	C	D	B	B		C	C		C	
Approach Delay (s)		27.8			28.4			27.9			26.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing AM
18: 20th Street & Broadway
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	129	52	41	130	94	51	405	58	53	350	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.98			0.96			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.95			0.98			0.99	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		3308			3143			3410			3457	
Flt Permitted		0.94			0.87			0.88			0.80	
Satd. Flow (perm)		3128			2768			3013			2799	
Peak-hour factor, PHF	0.88	0.81	0.76	0.79	0.90	0.87	0.91	0.93	0.91	0.78	0.89	0.79
Adj. Flow (vph)	8	159	68	52	144	108	56	435	64	68	393	28
RTOR Reduction (vph)	0	43	0	0	68	0	0	17	0	0	7	0
Lane Group Flow (vph)	0	192	0	0	236	0	0	538	0	0	482	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1147			1015			1503			840	
v/s Ratio Prot								c0.04				
v/s Ratio Perm		0.06			c0.09			0.13			c0.17	
v/c Ratio		0.17			0.23			0.36			0.57	
Uniform Delay, d1		12.8			13.2			9.7			17.8	
Progression Factor		0.83			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.5			0.7			2.8	
Delay (s)		11.0			13.7			10.3			20.6	
Level of Service		B			B			B			C	
Approach Delay (s)		11.0			13.7			10.3			20.6	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing AM
19: West Grand Avenue & Broadway
222 19th Street Transportation Study

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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99			0.99		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.98			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)	1750	3355			3321		1762	3539	1532	1760	3424	
Flt Permitted	0.27	1.00			0.64		0.49	1.00	1.00	0.52	1.00	
Satd. Flow (perm)	501	3355			2152		917	3539	1532	968	3424	
Peak-hour factor, PHF	0.71	0.92	0.74	0.83	0.90	0.90	0.63	0.92	0.66	0.55	0.88	0.83
Adj. Flow (vph)	104	603	72	96	457	68	135	383	115	93	347	80
RTOR Reduction (vph)	0	14	0	0	14	0	0	0	48	0	18	0
Lane Group Flow (vph)	104	661	0	0	607	0	135	383	67	93	409	0
Confl. Peds. (#/hr)	34		34	37		37	8		8	10		10
Confl. Bikes (#/hr)			11			8			35			7
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	25.6	25.6			25.6		46.4	46.4	46.4	46.4	46.4	
Effective Green, g (s)	25.6	25.6			25.6		46.4	46.4	46.4	46.4	46.4	
Actuated g/C Ratio	0.32	0.32			0.32		0.58	0.58	0.58	0.58	0.58	
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)	160	1074			689		532	2053	889	561	1986	
v/s Ratio Prot		0.20						0.11			0.12	
v/s Ratio Perm	0.21				c0.28		c0.15		0.04	0.10		
v/c Ratio	0.65	0.62			0.88		0.25	0.19	0.08	0.17	0.21	
Uniform Delay, d1	23.4	23.0			25.8		8.3	7.9	7.4	7.8	8.0	
Progression Factor	1.00	1.00			0.80		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.0	0.7			12.2		1.1	0.2	0.2	0.6	0.2	
Delay (s)	30.4	23.8			32.8		9.4	8.1	7.5	8.4	8.2	
Level of Service	C	C			C		A	A	A	A	A	
Approach Delay (s)		24.7			32.8			8.3			8.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing AM
20: 27th Street & Broadway
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	137	66	28	239	247	41	387	31	80	433	36
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	5.5		5.5	5.5	
Lane Util. Factor		0.91			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		4769			3505	1542	1758	3482		1765	3472	
Flt Permitted		0.79			0.85	1.00	0.43	1.00		0.49	1.00	
Satd. Flow (perm)		3809			3007	1542	799	3482		919	3472	
Peak-hour factor, PHF	0.60	0.93	0.92	0.58	0.95	0.85	0.68	0.97	0.86	0.71	0.91	0.60
Adj. Flow (vph)	80	147	72	48	252	291	60	399	36	113	476	60
RTOR Reduction (vph)	0	47	0	0	0	190	0	8	0	0	11	0
Lane Group Flow (vph)	0	252	0	0	300	101	60	427	0	113	525	0
Confl. Peds. (#/hr)	25		25	18		13	19		13	6		6
Confl. Bikes (#/hr)		16	16	59		5		5	59			6
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)		29.5			29.5	29.5	44.5	44.5		44.5	44.5	
Effective Green, g (s)		29.5			29.5	29.5	44.5	44.5		44.5	44.5	
Actuated g/C Ratio		0.35			0.35	0.35	0.52	0.52		0.52	0.52	
Clearance Time (s)		5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		1322			1044	535	418	1823		481	1818	
v/s Ratio Prot								0.12			c0.15	
v/s Ratio Perm		0.07			c0.10	0.07	0.08			0.12		
v/c Ratio		0.19			0.29	0.19	0.14	0.23		0.23	0.29	
Uniform Delay, d1		19.4			20.1	19.4	10.4	11.0		11.0	11.4	
Progression Factor		1.27			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.7	0.8	0.7	0.3		1.1	0.4	
Delay (s)		25.0			20.8	20.2	11.2	11.3		12.1	11.8	
Level of Service		C			C	C	B	B		B	B	
Approach Delay (s)		25.0			20.5			11.3			11.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing AM
21: West Grand Avenue & Telegraph Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	92	659	303	58	356	55	170	217	26	73	300	65
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		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		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3427	1553	1767	3339		1768	3448		1756	3414	
Flt Permitted	0.33	1.00	1.00	0.19	1.00		0.45	1.00		0.59	1.00	
Satd. Flow (perm)	615	3427	1553	361	3339		839	3448		1084	3414	
Peak-hour factor, PHF	0.77	0.96	0.85	0.85	0.83	0.72	0.82	0.95	0.65	0.87	0.92	0.77
Adj. Flow (vph)	119	686	356	68	429	76	207	228	40	84	326	84
RTOR Reduction (vph)	0	0	258	0	17	0	0	16	0	0	24	0
Lane Group Flow (vph)	119	686	98	68	488	0	207	252	0	84	386	0
Confl. Peds. (#/hr)	4		4	4		4	4		4	11		11
Confl. Bikes (#/hr)			3			7			21			1
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	23.5	23.5	23.5	23.5	23.5		51.0	51.0		37.5	37.5	
Effective Green, g (s)	23.5	23.5	23.5	23.5	23.5		51.0	51.0		37.5	37.5	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28		0.60	0.60		0.44	0.44	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	170	947	429	100	923		602	2069		478	1506	
v/s Ratio Prot		c0.20			0.15		c0.04	0.07			0.11	
v/s Ratio Perm	0.19		0.06	0.19			c0.17			0.08		
v/c Ratio	0.70	0.72	0.23	0.68	0.53		0.34	0.12		0.18	0.26	
Uniform Delay, d1	27.6	27.8	23.8	27.4	26.1		7.9	7.3		14.4	15.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.07	1.08	
Incremental Delay, d2	21.3	4.8	1.2	31.4	2.2		0.1	0.1		0.8	0.4	
Delay (s)	48.9	32.6	25.0	58.8	28.2		8.0	7.5		16.2	16.6	
Level of Service	D	C	C	E	C		A	A		B	B	
Approach Delay (s)		32.0			31.9			7.7			16.5	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing AM
22: 27th Street & Telegraph Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	293	302	114	37	208	91	69	305	19	39	277	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		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	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	3388		1766	3368		1760	3483		1764	3343	
Flt Permitted	0.47	1.00		0.48	1.00		0.30	1.00		0.43	1.00	
Satd. Flow (perm)	880	3388		892	3368		547	3483		797	3343	
Peak-hour factor, PHF	0.81	0.86	0.92	0.84	0.79	0.88	0.96	0.91	0.68	0.70	0.87	0.76
Adj. Flow (vph)	362	351	124	44	263	103	72	335	28	56	318	149
RTOR Reduction (vph)	0	23	0	0	33	0	0	10	0	0	88	0
Lane Group Flow (vph)	362	452	0	44	333	0	72	353	0	56	379	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	61.5	53.6		48.9	45.5		14.5	14.5		14.5	14.5	
Effective Green, g (s)	61.5	53.6		48.9	45.5		14.5	14.5		14.5	14.5	
Actuated g/C Ratio	0.72	0.63		0.58	0.54		0.17	0.17		0.17	0.17	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	757	2136		548	1803		93	594		136	570	
v/s Ratio Prot	c0.06	0.13		0.00	0.10			0.10			0.11	
v/s Ratio Perm	c0.28			0.04			c0.13			0.07		
v/c Ratio	0.48	0.21		0.08	0.18		0.77	0.59		0.41	0.67	
Uniform Delay, d1	4.4	6.7		7.9	10.2		33.7	32.5		31.4	33.0	
Progression Factor	1.00	1.00		0.73	0.64		0.91	0.90		1.00	1.00	
Incremental Delay, d2	0.2	0.2		0.0	0.2		28.8	1.0		0.7	2.3	
Delay (s)	4.6	6.9		5.8	6.7		59.3	30.3		32.2	35.3	
Level of Service	A	A		A	A		E	C		C	D	
Approach Delay (s)		5.9			6.6			35.1			34.9	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing AM
23: West Grand Avenue & Northgate Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	166	483	568	104	648	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3419		3431	1414
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3419		3431	1414
Peak-hour factor, PHF	0.91	0.86	0.89	0.70	0.90	0.89
Adj. Flow (vph)	182	562	638	149	720	188
RTOR Reduction (vph)	0	0	21	0	3	123
Lane Group Flow (vph)	182	562	766	0	736	46
Confl. Peds. (#/hr)	14			11	6	6
Confl. Bikes (#/hr)				10		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	12.0	50.3	34.3		21.7	21.7
Effective Green, g (s)	12.0	50.3	34.3		21.7	21.7
Actuated g/C Ratio	0.15	0.63	0.43		0.27	0.27
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)	266	2225	1466		931	384
v/s Ratio Prot	c0.10	0.16	c0.22		c0.21	
v/s Ratio Perm						0.03
v/c Ratio	0.68	0.25	0.52		0.79	0.12
Uniform Delay, d1	32.2	6.6	16.8		27.0	22.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.7	0.3	1.3		4.3	0.1
Delay (s)	37.9	6.8	18.2		31.4	22.0
Level of Service	D	A	B		C	C
Approach Delay (s)		14.4	18.2		29.6	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.7%	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)	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)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.86	0.86			0.86	0.86		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			0.92	0.85		0.98				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1520	4801			4426	1362		4973				
Flt Permitted	0.54	0.93			1.00	1.00		1.00				
Satd. Flow (perm)	871	4478			4426	1362		4973				
Peak-hour factor, PHF	0.89	0.89	0.92	0.92	0.86	0.74	0.50	0.88	0.58	0.92	0.92	0.92
Adj. Flow (vph)	148	789	0	0	148	330	8	249	36	0	0	0
RTOR Reduction (vph)	0	0	0	0	99	99	0	22	0	0	0	0
Lane Group Flow (vph)	133	804	0	0	214	66	0	271	0	0	0	0
Confl. Peds. (#/hr)	2		2				6		6	4		4
Confl. Bikes (#/hr)									4			3
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	348	1791			1770	545		1989				
v/s Ratio Prot					0.05							
v/s Ratio Perm	0.15	c0.18				0.05		0.05				
v/c Ratio	0.38	0.45			0.12	0.12		0.14				
Uniform Delay, d1	8.5	8.8			7.6	7.6		7.6				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	3.2	0.8			0.1	0.5		0.1				
Delay (s)	11.7	9.6			7.7	8.0		7.8				
Level of Service	B	A			A	A		A				
Approach Delay (s)		9.9			7.8			7.8			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	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)		4.0			4.0					4.0	4.0	4.0
Lane Util. Factor		0.91			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
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)		4984			5060					1610	3366	1583
Flt Permitted		1.00			0.91					0.95	0.99	1.00
Satd. Flow (perm)		4984			4613					1610	3366	1583
Peak-hour factor, PHF	0.92	0.91	0.64	0.56	0.82	0.92	0.92	0.92	0.92	0.88	0.93	0.77
Adj. Flow (vph)	0	263	36	16	165	0	0	0	0	656	901	386
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	187
Lane Group Flow (vph)	0	276	0	0	181	0	0	0	0	505	1052	199
Confl. Peds. (#/hr)	2		2	10		10	6		6			
Confl. Bikes (#/hr)			3			4			1			
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		21.0			21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0			21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35			0.35					0.52	0.52	0.52
Clearance Time (s)		4.0			4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1744			1615					832	1739	818
v/s Ratio Prot		c0.06										
v/s Ratio Perm					0.04					c0.31	0.31	0.13
v/c Ratio		0.16			0.11					0.61	0.60	0.24
Uniform Delay, d1		13.4			13.2					10.2	10.2	8.0
Progression Factor		1.00			1.00					1.00	1.00	1.00
Incremental Delay, d2		0.2			0.1					3.3	1.6	0.7
Delay (s)		13.6			13.3					13.5	11.8	8.7
Level of Service		B			B					B	B	A
Approach Delay (s)		13.6			13.3			0.0			11.6	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	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	4.0	4.0		4.0	4.0	
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	0.96	1.00	1.00	0.98	1.00	0.99		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)		3536	1523	1757	3539	1549	1756	3459		1760	3537	
Flt Permitted		0.95	1.00	0.51	1.00	1.00	0.46	1.00		0.49	1.00	
Satd. Flow (perm)		3347	1523	939	3539	1549	858	3459		915	3537	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	8	410	24	26	635	86	48	249	33	83	300	1
RTOR Reduction (vph)	0	0	6	0	0	22	0	19	0	0	1	0
Lane Group Flow (vph)	0	418	18	26	635	64	48	263	0	83	300	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		55.4	55.4	55.4	55.4	55.4	11.6	11.6		11.6	11.6	
Effective Green, g (s)		55.4	55.4	55.4	55.4	55.4	11.6	11.6		11.6	11.6	
Actuated g/C Ratio		0.74	0.74	0.74	0.74	0.74	0.15	0.15		0.15	0.15	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		2472	1125	694	2614	1144	133	535		142	547	
v/s Ratio Prot					c0.18			0.08			0.08	
v/s Ratio Perm		0.12	0.01	0.03		0.04	0.06			c0.09		
v/c Ratio		0.17	0.02	0.04	0.24	0.06	0.36	0.49		0.58	0.55	
Uniform Delay, d1		2.9	2.6	2.6	3.1	2.7	28.4	29.0		29.5	29.3	
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	0.0	0.1	0.2	0.1	0.6	0.3		3.9	0.6	
Delay (s)		3.1	2.6	2.7	3.3	2.8	29.0	29.3		33.4	29.9	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		3.0			3.3			29.2			30.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Existing Conditions
PM Peak Hour

HCM Signalized Intersection Capacity Analysis
1: 5th St. & Oak St.

Existing PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	243	476	69	0	0	0	0	446	62	1	58	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.98			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		4897						1830			1858	
Flt Permitted		0.98						1.00			0.71	
Satd. Flow (perm)		1000						1300			1300	
Peak-hour factor, PHF	0.86	0.93	0.72	0.25	0.25	0.25	0.25	0.75	0.70	0.25	0.76	0.25
Adj. Flow (vph)	283	512	96	0	0	0	0	595	89	4	76	0
RTOR Reduction (vph)	0	34	0	0	0	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	858	0	0	0	0	0	672	0	0	80	0
Confl. Peds. (#/hr)	9		9	38		38				2		2
Confl. Bikes (#/hr)			11			4						2
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		500						630			448	
v/s Ratio Prot								c0.37				
v/s Ratio Perm		c0.86									0.06	
v/c Ratio		1.72						1.07			0.18	
Uniform Delay, d1		11.2						14.8			10.3	
Progression Factor		1.00						1.00			0.03	
Incremental Delay, d2		330.2						55.1			0.8	
Delay (s)		341.4						69.8			1.2	
Level of Service		F						E			A	
Approach Delay (s)		341.4			0.0			69.8			1.2	
Approach LOS		F			A			E			A	

Intersection Summary			
HCM Average Control Delay	212.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.45		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 7th St. & Oak St.

Existing PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	149	897	0	0	0	0	0	785	329	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6340						4830				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6340						4830				
Peak-hour factor, PHF	0.85	0.98	0.25	0.25	0.25	0.25	0.25	0.94	0.96	0.25	0.25	0.25
Adj. Flow (vph)	175	915	0	0	0	0	0	835	343	0	0	0
RTOR Reduction (vph)	0	37	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	1053	0	0	0	0	0	1152	0	0	0	0
Confl. Peds. (#/hr)	22		22	50		50	14		14	6		6
Confl. Bikes (#/hr)			16			1			2			2
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2536						1932				
v/s Ratio Prot								c0.24				
v/s Ratio Perm		0.17										
v/c Ratio		0.42						0.60				
Uniform Delay, d1		9.7						10.6				
Progression Factor		0.99						1.58				
Incremental Delay, d2		0.4						1.1				
Delay (s)		10.0						18.0				
Level of Service		B						B				
Approach Delay (s)		10.0			0.0			18.0			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 6th St. & Oak St.

Existing PM
222 19th Street Transportation Study

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	154	524	55	47	608
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.90	0.85
Flt Protected			0.99		0.98	1.00
Satd. Flow (prot)			3501		3192	1441
Flt Permitted			0.99		0.98	1.00
Satd. Flow (perm)			3501		3192	1441
Peak-hour factor, PHF	0.92	0.90	0.86	0.60	0.84	0.94
Adj. Flow (vph)	0	171	609	92	56	647
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	780	0	472	323
Confl. Peds. (#/hr)	46					
Confl. Bikes (#/hr)	3					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1268		1149	519
v/s Ratio Prot						
v/s Ratio Perm			0.22		0.15	c0.22
v/c Ratio			0.62		0.41	0.62
Uniform Delay, d1			11.8		10.8	11.9
Progression Factor			0.68		1.00	1.00
Incremental Delay, d2			0.2		1.1	5.5
Delay (s)			8.2		11.9	17.4
Level of Service			A		B	B
Approach Delay (s)			8.2		14.1	
Approach LOS			A		B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: 11th Street & Oak Street

Existing PM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	0	0	901	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	80	0	0	979	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	251	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	251	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	100	100			
cM capacity (veh/h)	712	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	80	245	245	245	245
Volume Left	80	0	0	0	0
Volume Right	0	0	0	0	0
cSH	712	1700	1700	1700	1700
Volume to Capacity	0.11	0.14	0.14	0.14	0.14
Queue Length 95th (ft)	9	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.7	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	23.1%	ICU Level of Service	A
Analysis Period (min)	15		

5: 12th Street & Oak St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	848	50	149	822	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6317			6222				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6317			6222				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.78	0.83	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	893	64	180	856	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	7	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	950	0	0	991	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3148			2136				
v/s Ratio Prot					c0.15							
v/s Ratio Perm								0.16				
v/c Ratio					0.30			0.46				
Uniform Delay, d1					8.9			15.4				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.2			0.7				
Delay (s)					9.1			16.1				
Level of Service					A			B				
Approach Delay (s)		0.0			9.1			16.1			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

6: 14th Street & Lakeside Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	767	0	0	355	218	171	528	35	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.92		1.00	0.96			
Flpb, ped/bikes		1.00			1.00	1.00		0.99	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3518			3539	1461		3467	1520			
Flt Permitted		0.87			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3078			3539	1461		3467	1520			
Peak-hour factor, PHF	0.63	0.86	0.25	0.99	0.96	0.96	0.84	0.92	0.73	0.25	0.25	0.25
Adj. Flow (vph)	84	892	0	0	370	227	204	574	48	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	158	0	0	6	0	0	0
Lane Group Flow (vph)	0	976	0	0	370	70	0	778	42	0	0	0
Confl. Peds. (#/hr)	36		36	52		52	35		35	10		10
Confl. Bikes (#/hr)			5			21						22
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		923			1062	438		1849	811			
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.32				0.05		0.22	0.03			
v/c Ratio		1.06			0.35	0.16		0.42	0.05			
Uniform Delay, d1		21.0			16.4	15.4		8.4	6.7			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		46.0			0.9	0.8		0.7	0.1			
Delay (s)		67.0			17.3	16.2		9.1	6.8			
Level of Service		E			B	B		A	A			
Approach Delay (s)		67.0			16.9			9.0			0.0	
Approach LOS		E			B			A			A	

Intersection Summary			
HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

7: 7th St. & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	812	238	0	0	0	0	0	0	362	1228	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		1.00									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		6153									5014	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		6153									5014	
Peak-hour factor, PHF	0.25	0.99	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.87	0.95	0.25
Adj. Flow (vph)	0	820	259	0	0	0	0	0	0	416	1293	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	1068	0	0	0	0	0	0	0	0	1671	0
Confl. Peds. (#/hr)	4		4	8		8	2		2	12		12
Confl. Bikes (#/hr)			2			2			2			
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2461									2228	
v/s Ratio Prot		c0.17										
v/s Ratio Perm											0.33	
v/c Ratio		0.43									0.75	
Uniform Delay, d1		9.8									10.4	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.6									2.4	
Delay (s)		10.4									12.8	
Level of Service		B									B	
Approach Delay (s)		10.4			0.0			0.0			12.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

8: 11th Street & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	760	162	0	0	0	0	0	0	43	729	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.97									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6181									5061	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6181									5061	
Peak-hour factor, PHF	0.25	0.96	0.86	0.25	0.25	0.25	0.25	0.25	0.25	0.72	0.93	0.25
Adj. Flow (vph)	0	792	188	0	0	0	0	0	0	60	784	0
RTOR Reduction (vph)	0	55	0	0	0	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	925	0	0	0	0	0	0	0	0	829	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2369									2193	
v/s Ratio Prot		c0.15										
v/s Ratio Perm											0.16	
v/c Ratio		0.39									0.38	
Uniform Delay, d1		13.4									11.5	
Progression Factor		1.00									0.60	
Incremental Delay, d2		0.5									0.5	
Delay (s)		13.9									7.4	
Level of Service		B									A	
Approach Delay (s)		13.9			0.0			0.0			7.4	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Existing PM
9: 12th Street & Madison Street — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	208	786	0	0	0	0	0	582	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6268						5025	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6268						5025	
Peak-hour factor, PHF	0.25	0.25	0.25	0.91	0.97	0.25	0.25	0.25	0.25	0.25	0.86	0.86
Adj. Flow (vph)	0	0	0	229	810	0	0	0	0	0	677	44
RTOR Reduction (vph)	0	0	0	0	69	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	0	0	0	970	0	0	0	0	0	709	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2716						2219	
v/s Ratio Prot											c0.14	
v/s Ratio Perm					0.15							
v/c Ratio					0.36						0.32	
Uniform Delay, d1					11.4						10.9	
Progression Factor					0.45						1.00	
Incremental Delay, d2					0.4						0.4	
Delay (s)					5.5						11.3	
Level of Service					A						B	
Approach Delay (s)		0.0			5.5			0.0			11.3	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Existing PM
11: 19th Street & Jackson Street — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	8	85	5	24	175	0	0	78	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	9	92	5	26	190	0	0	85	29

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	55	52	216	114
Volume Left (vph)	9	0	26	0
Volume Right (vph)	0	5	0	29
Hadj (s)	0.11	-0.04	0.06	-0.12
Departure Headway (s)	5.4	5.2	4.4	4.3
Degree Utilization, x	0.08	0.07	0.26	0.14
Capacity (veh/h)	628	649	801	800
Control Delay (s)	7.6	7.4	8.9	8.0
Approach Delay (s)	7.5		8.9	8.0
Approach LOS	A		A	A

Intersection Summary			
Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Existing PM
10: 14th Street & Madison Street — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	538	61	22	468	0	0	0	0	287	501	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.98	1.00	
Frt		0.98			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	1.00	
Satd. Flow (prot)		3451			3529					1578	3352	
Flt Permitted		1.00			0.91					0.95	1.00	
Satd. Flow (perm)		3451			3233					1578	3352	
Peak-hour factor, PHF	0.25	0.91	0.76	0.79	0.91	0.25	0.25	0.25	0.25	0.94	0.96	0.67
Adj. Flow (vph)	0	591	80	28	514	0	0	0	0	305	522	24
RTOR Reduction (vph)	0	24	0	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	647	0	0	542	0	0	0	0	274	571	0
Confl. Peds. (#/hr)	50		50	25		25	17		17	24		24
Confl. Bikes (#/hr)			16			17			2			
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1457			1365					666	1415	
v/s Ratio Prot		c0.19										
v/s Ratio Perm					0.17					c0.17	0.17	
v/c Ratio		0.44			0.40					0.41	0.40	
Uniform Delay, d1		9.2			9.0					9.1	9.1	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		1.0			0.9					1.9	0.9	
Delay (s)		10.2			9.9					11.0	9.9	
Level of Service		B			A					B	A	
Approach Delay (s)		10.2			9.9			0.0			10.2	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Existing PM
12: Jackson Street & Lakeside Drive — 222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	162	1	2	666	527	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			3.0	4.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.97	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1773			3539	3411	
Flt Permitted	0.95			0.95	1.00	
Satd. Flow (perm)	1773			3375	3411	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	176	1	2	724	573	132
RTOR Reduction (vph)	0	0	0	0	40	0
Lane Group Flow (vph)	177	0	0	726	665	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	30.0			13.0	12.0	
Effective Green, g (s)	30.0			13.0	12.0	
Actuated g/C Ratio	0.60			0.26	0.24	
Clearance Time (s)	4.0			3.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	1064			878	819	
v/s Ratio Prot	c0.10				0.20	
v/s Ratio Perm				c0.22		
v/c Ratio	0.17			0.83	0.81	
Uniform Delay, d1	4.4			17.4	17.9	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.3			8.8	8.6	
Delay (s)	4.8			26.2	26.6	
Level of Service	A			C	C	
Approach Delay (s)	4.8			26.2	26.6	
Approach LOS	A			C	C	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	22	154	139	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	24	167	151	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	80	112	151
Volume Left (vph)	24	0	151
Volume Right (vph)	0	0	0
Hadj (s)	0.18	0.03	0.23
Departure Headway (s)	5.1	4.9	4.6
Degree Utilization, x	0.11	0.15	0.19
Capacity (veh/h)	692	709	755
Control Delay (s)	7.5	7.6	8.7
Approach Delay (s)	7.6		8.7
Approach LOS	A		A

Intersection Summary			
Delay	8.1		
HCM Level of Service	A		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Volume (vph)	256	89	35	7	111	14	75	21	629	20	138	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
Lane Util. Factor	0.91	0.91		1.00	0.95				0.95		0.91	0.91
Frpb, ped/bikes	1.00	1.00		1.00	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	0.96		1.00	0.98				1.00		0.98	0.85
Flt Protected	0.95	0.99		0.95	1.00				0.99		1.00	1.00
Satd. Flow (prot)	3221	1614		1770	3481				3495		3334	1441
Flt Permitted	0.95	0.99		0.95	1.00				0.99		1.00	1.00
Satd. Flow (perm)	3221	1614		1770	3481				3495		3334	1441
Peak-hour factor, PHF	0.91	0.86	0.73	0.63	0.86	0.86	0.71	0.71	0.88	0.71	0.78	0.89
Adj. Flow (vph)	281	103	48	11	129	16	106	30	715	28	177	108
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	3	0	0	0
Lane Group Flow (vph)	253	164	0	11	145	0	0	0	876	0	199	86
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)		12							7			
Turn Type	custom			Split			Split	Split				custom
Protected Phases	1	1		7	7		8	8	8		2	6
Permitted Phases	1											6
Actuated Green, G (s)	19.3	19.3		7.7	7.7				26.0		11.0	34.3
Effective Green, g (s)	19.3	19.3		7.7	7.7				26.0		11.0	34.3
Actuated g/C Ratio	0.24	0.24		0.10	0.10				0.32		0.14	0.43
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)	777	389		170	335				1136		458	618
v/s Ratio Prot	0.08	c0.10		0.01	c0.04				c0.25		c0.06	0.06
v/s Ratio Perm												
v/c Ratio	0.33	0.42		0.06	0.43				0.77		0.43	0.14
Uniform Delay, d1	25.0	25.6		32.9	34.1				24.3		31.6	13.9
Progression Factor	0.92	0.92		0.78	0.82				1.00		0.85	0.93
Incremental Delay, d2	1.1	3.3		0.1	0.3				3.0		0.2	0.5
Delay (s)	24.1	26.8		25.6	28.2				27.3		27.1	13.3
Level of Service	C	C		C	C				C		C	B
Approach Delay (s)		25.2			28.0				27.3		21.7	
Approach LOS		C			C				C		C	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.3%	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)	0	0	0	38	531	64	116	441	0	0	60	22
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	
Lane Util. Factor					0.86			0.95			0.95	
Frpb, ped/bikes					1.00			1.00			0.99	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6256			3471			3355	
Flt Permitted					1.00			0.87			1.00	
Satd. Flow (perm)					6256			3049			3355	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	41	577	70	126	479	0	0	65	24
RTOR Reduction (vph)	0	0	0	0	32	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	0	0	0	656	0	0	605	0	0	78	0
Confl. Peds. (#/hr)	13		13	22		22	52		52	34		34
Confl. Bikes (#/hr)			3			4			4			2
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2242			1601			1761	
v/s Ratio Prot											0.02	
v/s Ratio Perm					0.10			c0.20				
v/c Ratio					0.29			0.38			0.04	
Uniform Delay, d1					13.8			8.4			6.9	
Progression Factor					1.23			1.00			1.00	
Incremental Delay, d2					0.3			0.7			0.0	
Delay (s)					17.3			9.1			7.0	
Level of Service					B			A			A	
Approach Delay (s)		0.0			17.3			9.1			7.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR2
Lane Configurations	
Volume (vph)	36
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.89
Adj. Flow (vph)	40
RTOR Reduction (vph)	23
Lane Group Flow (vph)	17
Confl. Peds. (#/hr)	74
Confl. Bikes (#/hr)	8
Turn Type	custom
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	34.3
Effective Green, g (s)	34.3
Actuated g/C Ratio	0.43
Clearance Time (s)	4.0
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	679
v/s Ratio Prot	0.01
v/s Ratio Perm	
v/c Ratio	0.03
Uniform Delay, d1	13.2
Progression Factor	0.94
Incremental Delay, d2	0.1
Delay (s)	12.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM Signalized Intersection Capacity Analysis
16: Harrison Street & Lakeside Drive

Existing PM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	893	0	0	703	624	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			4.0	4.0	4.0
Lane Util. Factor	0.94			0.91	0.95	0.76
Frpb, ped/bikes	1.00			1.00	1.00	0.96
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	4990			5085	3539	3481
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	4990			5085	3539	3481
Peak-hour factor, PHF	0.95	0.95	0.25	0.93	0.99	0.84
Adj. Flow (vph)	940	0	0	756	630	324
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	940	0	0	756	630	324
Confl. Peds. (#/hr)						20
Confl. Bikes (#/hr)						16
Turn Type						Free
Protected Phases	1			2	2	
Permitted Phases						Free
Actuated Green, G (s)	21.9			49.1	49.1	80.0
Effective Green, g (s)	21.9			49.1	49.1	80.0
Actuated g/C Ratio	0.27			0.61	0.61	1.00
Clearance Time (s)	5.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1366			3121	2172	3481
v/s Ratio Prot	c0.19			0.15	c0.18	
v/s Ratio Perm						0.09
v/c Ratio	0.69			0.24	0.29	0.09
Uniform Delay, d1	26.0			7.0	7.3	0.0
Progression Factor	0.59			1.00	0.79	1.00
Incremental Delay, d2	1.2			0.2	0.3	0.1
Delay (s)	16.6			7.2	6.1	0.1
Level of Service	B			A	A	A
Approach Delay (s)	16.6			7.2	4.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: West Grand Avenue & Harrison Street

Existing PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	538	110	279	724	36	9	1086	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	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.92		1.00	0.93		0.99	
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		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1484	3433	3539	1459		5081	1466		4912	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.93	
Satd. Flow (perm)	3433	3539	1484	3433	3539	1459		4709	1466		4580	
Peak-hour factor, PHF	0.63	0.92	0.83	0.98	0.93	0.75	0.56	0.92	0.86	0.50	0.96	0.50
Adj. Flow (vph)	181	585	133	285	778	48	16	1180	822	4	525	100
RTOR Reduction (vph)	0	0	74	0	0	29	0	0	262	0	28	0
Lane Group Flow (vph)	181	585	59	285	778	19	0	1196	560	0	601	0
Confl. Peds. (#/hr)	31		31	48		48	42		42	34		34
Confl. Bikes (#/hr)			22			15			22			20
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	9.6	36.5	36.5	12.5	40.4	40.4		36.0	36.0		36.0	
Effective Green, g (s)	9.6	36.5	36.5	12.5	40.4	40.4		36.0	36.0		36.0	
Actuated g/C Ratio	0.10	0.36	0.36	0.12	0.40	0.40		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	330	1292	542	429	1430	589		1695	528		1649	
v/s Ratio Prot	0.05	0.17		c0.08	c0.22							
v/s Ratio Perm			0.04			0.01		0.25	c0.38		0.13	
v/c Ratio	0.55	0.45	0.11	0.66	0.54	0.03		0.71	1.06		0.36	
Uniform Delay, d1	43.1	24.2	21.0	41.7	22.8	18.0		27.5	32.0		23.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	1.0	1.1	0.4	3.0	1.5	0.1		2.5	56.0		0.6	
Delay (s)	44.1	25.3	21.4	44.7	24.3	18.1		30.0	88.0		24.2	
Level of Service	D	C	C	D	C	B		C	F		C	
Approach Delay (s)		28.5			29.2			53.6			24.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	39.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: 20th Street & Broadway

Existing PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	128	80	51	199	86	92	675	95	37	466	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.97			0.96			0.99			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.96			0.98			0.99	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		3216			3209			3413			3449	
Flt Permitted		0.91			0.87			0.73			0.81	
Satd. Flow (perm)		2937			2828			2499			2791	
Peak-hour factor, PHF	0.79	0.82	0.83	0.91	0.89	0.80	0.92	0.92	0.95	0.71	0.88	0.63
Adj. Flow (vph)	24	156	96	56	224	108	100	734	100	52	530	52
RTOR Reduction (vph)	0	61	0	0	65	0	0	16	0	0	11	0
Lane Group Flow (vph)	0	215	0	0	323	0	0	919	0	0	623	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1077			1037			1314			837	
v/s Ratio Prot								c0.08				
v/s Ratio Perm		0.07			c0.11			c0.26			0.22	
v/c Ratio		0.20			0.31			0.70			0.74	
Uniform Delay, d1		13.0			13.6			12.1			18.9	
Progression Factor		1.92			1.00			1.00			1.00	
Incremental Delay, d2		0.4			0.8			3.1			5.9	
Delay (s)		25.3			14.4			15.2			24.9	
Level of Service		C			B			B			C	
Approach Delay (s)		25.3			14.4			15.2			24.9	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: West Grand Avenue & Broadway

Existing PM
222 19th Street Transportation Study

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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.98			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)	1764	3368			3320		1764	3539	1551	1746	3407	
Flt Permitted	0.32	1.00			0.64		0.42	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	591	3368			2142		771	3539	1551	787	3407	
Peak-hour factor, PHF	0.72	0.91	0.65	0.63	0.90	0.52	0.87	0.95	0.79	0.57	0.90	0.84
Adj. Flow (vph)	96	429	48	143	326	56	239	551	184	75	467	108
RTOR Reduction (vph)	0	14	0	0	14	0	0	0	71	0	17	0
Lane Group Flow (vph)	96	463	0	0	511	0	239	551	113	75	558	0
Confl. Peds. (#/hr)	8		8	2		2	8		8	32		32
Confl. Bikes (#/hr)			6			6			4			28
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	23.0	23.0			23.0		49.0	49.0	49.0	49.0	49.0	
Effective Green, g (s)	23.0	23.0			23.0		49.0	49.0	49.0	49.0	49.0	
Actuated g/C Ratio	0.29	0.29			0.29		0.61	0.61	0.61	0.61	0.61	
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)	170	968			616		472	2168	950	482	2087	
v/s Ratio Prot		0.14						0.16			0.16	
v/s Ratio Perm	0.16				c0.24		c0.31		0.07	0.10		
v/c Ratio	0.56	0.48			0.83		0.51	0.25	0.12	0.16	0.27	
Uniform Delay, d1	24.2	23.5			26.7		8.7	7.1	6.5	6.6	7.2	
Progression Factor	1.00	1.00			0.90		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.5	0.1			8.6		3.8	0.3	0.3	0.7	0.3	
Delay (s)	26.8	23.7			32.5		12.6	7.4	6.7	7.3	7.5	
Level of Service	C	C			C		B	A	A	A	A	
Approach Delay (s)		24.2			32.5			8.5			7.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing PM
20: 27th Street & Broadway — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	202	63	29	330	237	139	580	30	144	579	76
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	5.5		5.5	5.5	
Lane Util. Factor		0.91			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			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		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		4790			3519	1536	1767	3502		1767	3453	
Flt Permitted		0.77			0.87	1.00	0.31	1.00		0.33	1.00	
Satd. Flow (perm)		3720			3073	1536	576	3502		623	3453	
Peak-hour factor, PHF	0.68	0.86	0.66	0.73	0.96	0.87	0.83	0.92	0.75	0.82	0.92	0.86
Adj. Flow (vph)	107	235	95	40	344	272	167	630	40	176	629	88
RTOR Reduction (vph)	0	55	0	0	0	96	0	6	0	0	13	0
Lane Group Flow (vph)	0	382	0	0	384	176	167	664	0	176	704	0
Confl. Peds. (#/hr)	32		32	10		10	6		6	5		5
Confl. Bikes (#/hr)			20			18			17			66
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)		36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)		36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio		0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)		5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		1576			1302	651	258	1566		279	1544	
v/s Ratio Prot								0.19			0.20	
v/s Ratio Perm		0.10			c0.12	0.11	c0.29			0.28		
v/c Ratio		0.24			0.29	0.27	0.65	0.42		0.63	0.46	
Uniform Delay, d1		15.7			16.1	16.0	18.3	16.0		18.1	16.3	
Progression Factor		0.84			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.6	1.0	11.9	0.8		10.4	1.0	
Delay (s)		13.6			16.7	17.0	30.2	16.9		28.5	17.3	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		13.6			16.8			19.5			19.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing PM
22: 27th Street & Telegraph Avenue — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	346	117	55	455	98	147	403	39	112	386	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		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	0.96		1.00	0.97		1.00	0.98		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	3388		1769	3415		1761	3468		1762	3253	
Flt Permitted	0.26	1.00		0.45	1.00		0.25	1.00		0.39	1.00	
Satd. Flow (perm)	479	3388		831	3415		463	3468		731	3253	
Peak-hour factor, PHF	0.85	0.90	0.89	0.81	0.88	0.72	0.88	0.87	0.70	0.80	0.92	0.91
Adj. Flow (vph)	212	384	131	68	517	136	167	463	56	140	420	323
RTOR Reduction (vph)	0	34	0	0	26	0	0	12	0	0	172	0
Lane Group Flow (vph)	212	481	0	68	627	0	167	507	0	140	571	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	45.5	36.1		37.3	32.0		30.1	30.1		30.1	30.1	
Effective Green, g (s)	45.5	36.1		37.3	32.0		30.1	30.1		30.1	30.1	
Actuated g/C Ratio	0.54	0.42		0.44	0.38		0.35	0.35		0.35	0.35	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	399	1439		423	1286		164	1228		259	1152	
v/s Ratio Prot	c0.06	0.14		0.01	0.18			0.15			0.18	
v/s Ratio Perm	c0.23			0.06			c0.36			0.19		
v/c Ratio	0.53	0.33		0.16	0.49		1.02	0.41		0.54	0.50	
Uniform Delay, d1	11.8	16.4		13.9	20.2		27.4	20.8		21.9	21.5	
Progression Factor	1.00	1.00		1.54	1.47		1.46	1.48		1.00	1.00	
Incremental Delay, d2	0.7	0.6		0.1	1.3		73.1	0.1		1.2	0.1	
Delay (s)	12.5	17.0		21.5	31.0		113.2	30.9		23.2	21.6	
Level of Service	B	B		C	C		F	C		C	C	
Approach Delay (s)		15.7			30.1			50.9			21.9	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing PM
21: West Grand Avenue & Telegraph Avenue — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	579	27	16	693	99	80	447	28	115	361	89
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	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	0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3427	1532	1760	3342		1769	3493		1760	3378	
Flt Permitted	0.17	1.00	1.00	0.17	1.00		0.40	1.00		0.44	1.00	
Satd. Flow (perm)	311	3427	1532	322	3342		751	3493		811	3378	
Peak-hour factor, PHF	0.64	0.80	0.61	0.57	0.92	0.85	0.87	0.85	0.64	0.87	0.95	0.72
Adj. Flow (vph)	36	724	44	28	753	116	92	526	44	132	380	124
RTOR Reduction (vph)	0	0	32	0	14	0	0	7	0	0	31	0
Lane Group Flow (vph)	36	724	12	28	855	0	92	563	0	132	473	0
Confl. Peds. (#/hr)	12		12	18		18	3		3	12		12
Confl. Bikes (#/hr)			8			6			10			28
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	23.9	23.9	23.9	23.9	23.9		50.6	50.6		40.7	40.7	
Effective Green, g (s)	23.9	23.9	23.9	23.9	23.9		50.6	50.6		40.7	40.7	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28		0.60	0.60		0.48	0.48	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	87	964	431	91	940		512	2079		388	1617	
v/s Ratio Prot		0.21			c0.26		0.01	c0.16			0.14	
v/s Ratio Perm	0.12		0.01	0.09			0.10			c0.16		
v/c Ratio	0.41	0.75	0.03	0.31	0.91		0.18	0.27		0.34	0.29	
Uniform Delay, d1	24.9	27.8	22.1	24.0	29.5		7.6	8.3		13.8	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.87	0.85	
Incremental Delay, d2	13.9	5.4	0.1	8.6	14.2		0.1	0.3		2.2	0.4	
Delay (s)	38.7	33.2	22.3	32.6	43.7		7.7	8.6		14.2	11.8	
Level of Service	D	C	C	C	D		A	A		B	B	
Approach Delay (s)		32.9			43.4			8.5			12.3	
Approach LOS		C			D			A			B	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Existing PM
23: West Grand Avenue & Northgate Avenue — 222 19th Street Transportation Study

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
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.94		0.99	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3284		3424	1421
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3284		3424	1421
Peak-hour factor, PHF	0.74	0.93	0.90	0.97	0.72	0.86
Adj. Flow (vph)	316	522	587	377	219	103
RTOR Reduction (vph)	0	0	101	0	5	82
Lane Group Flow (vph)	316	522	863	0	224	11
Confl. Peds. (#/hr)	14			18		
Confl. Bikes (#/hr)				7		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	20.4	62.4	38.0		9.6	9.6
Effective Green, g (s)	20.4	62.4	38.0		9.6	9.6
Actuated g/C Ratio	0.26	0.78	0.48		0.12	0.12
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)	451	2760	1560		411	171
v/s Ratio Prot	c0.18	0.15	c0.26		c0.07	
v/s Ratio Perm						0.01
v/c Ratio	0.70	0.19	0.55		0.54	0.07
Uniform Delay, d1	27.0	2.3	15.0		33.1	31.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.0	0.2	1.4		0.8	0.1
Delay (s)	31.0	2.4	16.4		33.9	31.3
Level of Service	C	A	B		C	C
Approach Delay (s)		13.2	16.4		33.2	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

24: 27th Street & Northgate Avenue (NB)

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)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.86	0.86			0.86	0.86		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			0.91	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1521	4783			4360	1362		5000				
Flt Permitted	0.38	0.84			1.00	1.00		1.00				
Satd. Flow (perm)	607	4043			4360	1362		5000				
Peak-hour factor, PHF	0.93	0.90	0.25	0.25	0.89	0.97	0.64	0.92	0.83	0.25	0.25	0.25
Adj. Flow (vph)	227	623	0	0	248	801	28	741	76	0	0	0
RTOR Reduction (vph)	0	0	0	0	55	55	0	29	0	0	0	0
Lane Group Flow (vph)	163	687	0	0	594	345	0	816	0	0	0	0
Confl. Peds. (#/hr)	2		2				4		4	3		3
Confl. Bikes (#/hr)			4						5			7
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	243	1617			1744	545		2000				
v/s Ratio Prot					0.14							
v/s Ratio Perm	c0.27	0.17				0.25		0.16				
v/c Ratio	0.67	0.42			0.34	0.63		0.41				
Uniform Delay, d1	9.8	8.7			8.3	9.6		8.6				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	13.8	0.8			0.5	5.5		0.6				
Delay (s)	23.6	9.5			8.9	15.2		9.2				
Level of Service	C	A			A	B		A				
Approach Delay (s)		12.2			11.3			9.2			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

26: West Grand Avenue & San Pablo Avenue

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	4.0	4.0		4.0	4.0	
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	0.96	1.00	1.00	0.98	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00	1.00	0.95	1.00	1.00	0.99	1.00		1.00	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)		3509	1522	1763	3539	1548	1759	3438		1763	3376	
Flt Permitted		0.74	1.00	0.27	1.00	1.00	0.42	1.00		0.42	1.00	
Satd. Flow (perm)		2610	1522	504	3539	1548	780	3438		771	3376	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	128	674	124	38	588	59	322	421	79	114	359	132
RTOR Reduction (vph)	0	0	64	0	0	31	0	21	0	0	50	0
Lane Group Flow (vph)	0	802	60	38	588	28	322	479	0	114	441	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		36.0	36.0	36.0	36.0	36.0	31.0	31.0		31.0	31.0	
Effective Green, g (s)		36.0	36.0	36.0	36.0	36.0	31.0	31.0		31.0	31.0	
Actuated g/C Ratio		0.48	0.48	0.48	0.48	0.48	0.41	0.41		0.41	0.41	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		5.0	5.0	5.0	5.0	5.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		1253	731	242	1699	743	322	1421		319	1395	
v/s Ratio Prot					0.17			0.14			0.13	
v/s Ratio Perm		c0.31	0.04	0.08		0.02	c0.41			0.15		
v/c Ratio		0.64	0.08	0.16	0.35	0.04	1.00	0.34		0.36	0.32	
Uniform Delay, d1		14.6	10.6	11.0	12.2	10.3	22.0	15.0		15.1	14.8	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.5	0.2	1.4	0.6	0.1	50.2	0.1		0.3	0.0	
Delay (s)		17.2	10.8	12.3	12.7	10.4	72.2	15.1		15.4	14.9	
Level of Service		B	B	B	B	B	E	B		B	B	
Approach Delay (s)		16.3			12.5			37.4			15.0	
Approach LOS		B			B			D			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

25: 27th Street & I-980 Off Ramp

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)		4.0			4.0					4.0	4.0	4.0
Lane Util. Factor		0.91			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	0.98	1.00
Satd. Flow (prot)		5014			5069					1605	3328	1558
Flt Permitted		1.00			0.91					0.95	0.98	1.00
Satd. Flow (perm)		5014			4607					1605	3328	1558
Peak-hour factor, PHF	0.25	0.95	0.83	0.63	0.86	0.25	0.25	0.25	0.25	0.87	0.79	0.88
Adj. Flow (vph)	0	445	40	16	243	0	0	0	0	391	306	195
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	0	94
Lane Group Flow (vph)	0	467	0	0	259	0	0	0	0	227	470	101
Confl. Peds. (#/hr)	4		4	4		4	1		1	3		3
Confl. Bikes (#/hr)			5			9			1			1
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		21.0			21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0			21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35			0.35					0.52	0.52	0.52
Clearance Time (s)		4.0			4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1755			1612					829	1719	805
v/s Ratio Prot		c0.09										
v/s Ratio Perm					0.06					c0.14	0.14	0.06
v/c Ratio		0.27			0.16					0.27	0.27	0.13
Uniform Delay, d1		14.0			13.4					8.2	8.2	7.5
Progression Factor		1.00			1.00					1.00	1.00	1.00
Incremental Delay, d2		0.4			0.2					0.8	0.4	0.3
Delay (s)		14.4			13.6					9.0	8.6	7.8
Level of Service		B			B					A	A	A
Approach Delay (s)		14.4			13.6			0.0			8.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2015 Baseline Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	372	678	187	0	0	0	0	283	84	4	144	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.97			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		4857						1800			1860	
Flt Permitted		0.99						1.00			0.99	
Satd. Flow (perm)		1850						1500			1600	
Peak-hour factor, PHF	0.95	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)	392	737	203	0	0	0	0	308	91	4	157	0
RTOR Reduction (vph)	0	57	0	0	0	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	1275	0	0	0	0	0	375	0	0	161	0
Confl. Peds. (#/hr)	14		14	52		52	1		1	4		4
Confl. Bikes (#/hr)			5			2						
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		925						620			551	
v/s Ratio Prot								c0.21				
v/s Ratio Perm		c0.69									0.10	
v/c Ratio		1.38						0.61			0.29	
Uniform Delay, d1		11.2						12.2			10.8	
Progression Factor		1.00						1.00			0.94	
Incremental Delay, d2		177.1						4.3			1.1	
Delay (s)		188.3						16.6			11.1	
Level of Service		F						B			B	
Approach Delay (s)		188.3			0.0			16.6			11.1	
Approach LOS		F			A			B			B	

Intersection Summary			
HCM Average Control Delay	137.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	151	527	147	59	910
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.90	0.85
Flt Protected			0.99		0.98	1.00
Satd. Flow (prot)			3497		3191	1441
Flt Permitted			0.99		0.98	1.00
Satd. Flow (perm)			3497		3191	1441
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	164	549	160	64	989
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	713	0	719	494
Confl. Peds. (#/hr)	51	2				
Confl. Bikes (#/hr)	2					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1267		1149	519
v/s Ratio Prot						
v/s Ratio Perm			0.20		0.23	c0.34
v/c Ratio			0.56		0.87dr	0.95
Uniform Delay, d1			11.5		11.9	14.0
Progression Factor			0.82		1.00	1.00
Incremental Delay, d2			0.2		2.6	29.2
Delay (s)			9.6		14.5	43.2
Level of Service			A		B	D
Approach Delay (s)			9.6		26.2	
Approach LOS			A		C	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
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)	141	606	0	0	0	0	0	1157	303	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						1.00				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6329						4905				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6329						4905				
Peak-hour factor, PHF	0.93	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)	152	659	0	0	0	0	0	1258	329	0	0	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	64	0	0	0	0
Lane Group Flow (vph)	0	803	0	0	0	0	0	1523	0	0	0	0
Confl. Peds. (#/hr)	22		22	59		59	12		12	5		5
Confl. Bikes (#/hr)			6			4			2			1
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2532						1962				
v/s Ratio Prot								c0.31				
v/s Ratio Perm		0.13										
v/c Ratio		0.32						0.78				
Uniform Delay, d1		9.3						11.7				
Progression Factor		0.82						0.76				
Incremental Delay, d2		0.3						2.2				
Delay (s)		7.9						11.1				
Level of Service		A						B				
Approach Delay (s)		7.9			0.0			11.1			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	69	0	0	1113	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	75	0	0	1124	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	293	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	293	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	100	100			
cM capacity (veh/h)	667	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	75	281	281	281	281
Volume Left	75	0	0	0	0
Volume Right	0	0	0	0	0
cSH	667	1700	1700	1700	1700
Volume to Capacity	0.11	0.17	0.17	0.17	0.17
Queue Length 95th (ft)	9	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM

5: 12th St. & Oak St.

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1758	81	338	824	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6342			6164				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6342			6164				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1812	88	363	896	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1892	0	0	1256	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3160			2116				
v/s Ratio Prot					c0.30							
v/s Ratio Perm								0.20				
v/c Ratio					0.60			0.59				
Uniform Delay, d1					10.8			16.2				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.8			1.2				
Delay (s)					11.6			17.5				
Level of Service					B			B				
Approach Delay (s)		0.0			11.6			17.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM

6: 14th Street & Lakeside Dr.

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	321	0	1	672	590	143	624	28	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.98		1.00	0.97			
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		0.99			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3514			3539	1548		3491	1531			
Flt Permitted		0.76			0.95	1.00		0.99	1.00			
Satd. Flow (perm)		2687			3378	1548		3491	1531			
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.92	0.96	0.92	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	349	0	1	730	615	155	650	30	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	136	0	0	14	0	0	0
Lane Group Flow (vph)	0	395	0	0	731	479	0	805	16	0	0	0
Confl. Peds. (#/hr)	35		35	6		6	26		26	2		2
Confl. Bikes (#/hr)			33			6		10				5
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		806			1013	464		1862	817			
v/s Ratio Prot												
v/s Ratio Perm		0.15			0.22	c0.31		0.23	0.01			
v/c Ratio		0.49			0.72	1.03		0.43	0.02			
Uniform Delay, d1		17.2			18.8	21.0		8.5	6.6			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		2.1			4.4	50.5		0.7	0.0			
Delay (s)		19.4			23.2	71.5		9.2	6.6			
Level of Service		B			C	E		A	A			
Approach Delay (s)		19.4			45.3			9.1			0.0	
Approach LOS		B			D			A			A	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM

7: 7th St. & Madison Street

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	576	392	0	0	0	0	0	0	195	1019	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.94									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5981									5036	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5981									5036	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	626	426	0	0	0	0	0	0	212	1040	0
RTOR Reduction (vph)	0	26	0	0	0	0	0	0	0	0	69	0
Lane Group Flow (vph)	0	1026	0	0	0	0	0	0	0	0	1183	0
Confl. Peds. (#/hr)	4		4	10		10	8		8	11		11
Confl. Bikes (#/hr)			1						7			2
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2392									2238	
v/s Ratio Prot		c0.17										
v/s Ratio Perm											0.23	
v/c Ratio		0.43									0.53	
Uniform Delay, d1		9.8									9.1	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.6									0.9	
Delay (s)		10.3									10.0	
Level of Service		B									A	
Approach Delay (s)		10.3			0.0			0.0			10.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM

8: 11th Street & Madison Street

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	415	149	0	0	0	0	0	0	42	807	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6071									5068	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6071									5068	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	0	451	162	0	0	0	0	0	0	46	849	0
RTOR Reduction (vph)	0	44	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	569	0	0	0	0	0	0	0	0	885	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2327									2196	
v/s Ratio Prot		c0.09										
v/s Ratio Perm											0.17	
v/c Ratio		0.24									0.40	
Uniform Delay, d1		12.6									11.7	
Progression Factor		0.76									1.08	
Incremental Delay, d2		0.2									0.5	
Delay (s)		9.8									13.1	
Level of Service		A									B	
Approach Delay (s)		9.8			0.0			0.0			13.1	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
9: 12th St. & Madison Street — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	434	1569	0	0	0	0	0	450	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6291						4927	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6291						4927	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	0	0	472	1618	0	0	0	0	0	459	90
RTOR Reduction (vph)	0	0	0	0	88	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	2002	0	0	0	0	0	546	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2726						2176	
v/s Ratio Prot											c0.11	
v/s Ratio Perm					0.32							
v/c Ratio					0.73						0.25	
Uniform Delay, d1					14.1						10.5	
Progression Factor					0.48						1.00	
Incremental Delay, d2					1.4						0.3	
Delay (s)					8.2						10.8	
Level of Service					A						B	
Approach Delay (s)		0.0			8.2			0.0			10.8	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
10: 14th Street & Madison Street — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	286	84	84	765	0	0	0	0	126	380	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.99	1.00	
Frt		0.97			1.00					1.00	0.99	
Flt Protected		1.00			0.99					0.95	1.00	
Satd. Flow (prot)		3385			3516					1589	3352	
Flt Permitted		1.00			0.88					0.95	1.00	
Satd. Flow (perm)		3385			3093					1589	3352	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	0	311	91	91	797	0	0	0	0	137	396	23
RTOR Reduction (vph)	0	53	0	0	0	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	349	0	0	888	0	0	0	0	123	424	0
Confl. Peds. (#/hr)	36		36	28		28	18		18	16		16
Confl. Bikes (#/hr)			4			10			3			1
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1429			1306					671	1415	
v/s Ratio Prot		0.10										
v/s Ratio Perm					c0.29					0.08	0.13	
v/c Ratio		0.24			0.68					0.18	0.30	
Uniform Delay, d1		8.4			10.5					8.1	8.6	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		0.4			2.9					0.6	0.5	
Delay (s)		8.8			13.4					8.7	9.1	
Level of Service		A			B					A	A	
Approach Delay (s)		8.8			13.4			0.0			9.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
11: 19th Street & Jackson Street — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	15	240	11	48	158	0	0	106	42
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	16	261	12	52	172	0	0	115	46

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	147	142	224	161
Volume Left (vph)	16	0	52	0
Volume Right (vph)	0	12	0	46
Hadj (s)	0.09	-0.02	0.08	-0.14
Departure Headway (s)	5.5	5.4	4.9	4.8
Degree Utilization, x	0.23	0.21	0.31	0.22
Capacity (veh/h)	613	629	696	703
Control Delay (s)	9.0	8.7	10.1	9.1
Approach Delay (s)	8.8		10.1	9.1
Approach LOS	A		B	A

Intersection Summary			
Delay	9.3		
HCM Level of Service	A		
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
12: Jackson Street & Lakeside Drive — 222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	157	5	1	937	374	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.96	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1764			1863	1777	
Flt Permitted	0.95			1.00	1.00	
Satd. Flow (perm)	1764			1862	1777	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	5	1	1018	407	155
RTOR Reduction (vph)	0	0	0	0	27	0
Lane Group Flow (vph)	176	0	0	1019	535	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	20.0			22.0	22.0	
Effective Green, g (s)	20.0			22.0	22.0	
Actuated g/C Ratio	0.40			0.44	0.44	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	706			819	782	
v/s Ratio Prot	c0.10				0.30	
v/s Ratio Perm				c0.55		
v/c Ratio	0.25			1.24	0.68	
Uniform Delay, d1	10.0			14.0	11.2	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.8			120.1	4.8	
Delay (s)	10.8			134.1	16.0	
Level of Service	B			F	B	
Approach Delay (s)	10.8			134.1	16.0	
Approach LOS	B			F	B	

Intersection Summary			
HCM Average Control Delay	84.0	HCM Level of Service	F
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
13: 19th Street & Alice Street — 222 19th Street Transportation Study

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	48	184	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	52	200	104	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	119	133	104
Volume Left (vph)	52	0	104
Volume Right (vph)	0	0	0
Hadj (s)	0.25	0.03	0.23
Departure Headway (s)	5.0	4.8	4.7
Degree Utilization, x	0.17	0.18	0.14
Capacity (veh/h)	703	730	728
Control Delay (s)	7.8	7.6	8.5
Approach Delay (s)	7.7		8.5
Approach LOS	A		A

Intersection Summary			
Delay	7.9		
HCM Level of Service	A		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
14: 12th St. & Harrison — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	63	1026	95	149	609	0	0	108	52
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	
Lane Util. Factor					0.86			0.95			1.00	
Frt					0.99			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6314			3505			1780	
Flt Permitted					1.00			0.85			1.00	
Satd. Flow (perm)					6314			2997			1780	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	68	1115	103	162	662	0	0	117	57
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	1263	0	0	824	0	0	166	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2263			1573			935	
v/s Ratio Prot											0.09	
v/s Ratio Perm					0.20			c0.27				
v/c Ratio					0.56			0.52			0.18	
Uniform Delay, d1					15.4			9.3			7.5	
Progression Factor					1.55			1.00			1.00	
Incremental Delay, d2					0.7			1.3			0.4	
Delay (s)					24.6			10.6			7.9	
Level of Service					C			B			A	
Approach Delay (s)		0.0			24.6			10.6			7.9	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
15: 20th Street & Harrison Street — 222 19th Street Transportation Study

Movement	EBL2	EBL	EBR	NBL2	NBL	NBT	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations												
Volume (vph)	103	148	190	74	76	352	428	499	108	0	15	32
Ideal 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	0.94				0.95	0.91	0.91	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00				1.00	1.00	1.00	1.00		1.00	0.94
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	0.95	0.85	0.85		0.85	0.85
Flt Protected	0.95	0.98				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	4707				3486	3230	1441	1583		1583	1491
Flt Permitted	0.95	0.98				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	4707				3486	3230	1441	1583		1583	1491
Peak-hour factor, PHF	0.95	0.92	0.92	0.94	0.94	0.96	0.92	0.96	0.96	0.92	0.95	0.95
Adj. Flow (vph)	108	161	207	79	81	367	465	520	112	0	16	34
RTOR Reduction (vph)	0	151	0	0	0	0	0	0	67	0	0	27
Lane Group Flow (vph)	108	217	0	0	0	527	678	307	45	0	16	7
Confl. Peds. (#/hr)	16								102			32
Confl. Bikes (#/hr)						6			10			2
Turn Type	Prot			Split	Split			custom	custom		custom	custom
Protected Phases	5	1		8	8	8	2	6	6			
Permitted Phases		1						6			9	2
Actuated Green, G (s)	8.1	21.7				24.0	16.9	30.5	30.5		1.4	16.9
Effective Green, g (s)	8.1	21.7				24.0	16.9	30.5	30.5		1.4	16.9
Actuated g/C Ratio	0.10	0.27				0.30	0.21	0.38	0.38		0.02	0.21
Clearance Time (s)	4.0	4.0				4.0	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	2.0				2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	179	1277				1046	682	549	604		28	315
v/s Ratio Prot	c0.06	0.05				c0.15	c0.21	c0.21	0.03			
v/s Ratio Perm											c0.01	0.00
v/c Ratio	0.60	0.17				0.50	0.99	0.56	0.07		0.57	0.02
Uniform Delay, d1	34.4	22.3				23.1	31.5	19.5	15.8		39.0	25.0
Progression Factor	0.86	1.97				1.00	1.32	1.58	3.37		1.00	1.00
Incremental Delay, d2	5.5	0.3				0.1	31.9	3.9	0.2		16.3	0.0
Delay (s)	35.0	44.2				23.2	73.6	34.7	53.4		55.3	25.0
Level of Service	C	D				C	E	C	D		E	C
Approach Delay (s)		42.1				23.2	60.7			34.7		
Approach LOS		D				C	E			C		

Intersection Summary			
HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
16: Harrison Street & Lakeside Drive — 222 19th Street Transportation Study

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	446	57	466	753	284	885
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	4999		3433	5085	3225	1441
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	4999		3433	5085	3225	1441
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.97
Adj. Flow (vph)	485	62	485	818	309	912
RTOR Reduction (vph)	20	0	0	0	356	368
Lane Group Flow (vph)	527	0	485	818	409	88
Confl. Bikes (#/hr)				2		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	33.0		18.5	56.5	15.5	15.5
Effective Green, g (s)	33.0		18.5	56.5	15.5	15.5
Actuated g/C Ratio	0.41		0.23	0.71	0.19	0.19
Clearance Time (s)	5.0		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)	2062		794	3591	625	279
v/s Ratio Prot	c0.11		c0.14	0.16	c0.13	
v/s Ratio Perm						0.06
v/c Ratio	0.26		0.61	0.23	0.66	0.32
Uniform Delay, d1	15.4		27.5	4.1	29.8	27.7
Progression Factor	0.41		0.76	1.02	1.00	1.00
Incremental Delay, d2	0.3		3.1	0.1	2.5	0.7
Delay (s)	6.7		24.2	4.3	32.3	28.4
Level of Service	A		C	A	C	C
Approach Delay (s)	6.7			11.7	30.8	
Approach LOS	A			B	C	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: West Grand Avenue & Harrison Street

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	188	82	634	637	124	179	847	357	37	958	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.94		1.00	0.90		0.99	
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		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	
Satd. Flow (prot)	3433	3539	1479	3433	3539	1485		5034	1419		4917	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.82	
Satd. Flow (perm)	3433	3539	1479	3433	3539	1485		3345	1419		4037	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92
Adj. Flow (vph)	90	204	89	689	692	135	195	921	388	40	1030	201
RTOR Reduction (vph)	0	0	9	0	0	76	0	0	248	0	28	0
Lane Group Flow (vph)	90	204	80	689	692	59	0	1116	140	0	1243	0
Confl. Peds. (#/hr)	38		38	34		34	60		60	28		28
Confl. Bikes (#/hr)			12			18			39			9
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	6.0	33.0	33.0	16.0	44.0	44.0		36.0	36.0		36.0	
Effective Green, g (s)	6.0	33.0	33.0	16.0	44.0	44.0		36.0	36.0		36.0	
Actuated g/C Ratio	0.06	0.33	0.33	0.16	0.44	0.44		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	206	1168	488	549	1557	653		1204	511		1453	
v/s Ratio Prot	0.03	0.06		c0.20	c0.20							
v/s Ratio Perm			0.05			0.04		c0.33	0.10		0.31	
v/c Ratio	0.44	0.17	0.16	1.26	0.44	0.09		2.64dl	0.27		0.86	
Uniform Delay, d1	45.4	23.8	23.7	42.0	19.5	16.3		30.7	22.7		29.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.5	0.3	0.7	129.1	0.9	0.3		13.5	1.3		6.7	
Delay (s)	45.9	24.1	24.5	171.1	20.4	16.6		44.2	24.0		36.3	
Level of Service	D	C	C	F	C	B		D	C		D	
Approach Delay (s)		29.3			88.6			39.0			36.3	
Approach LOS		C			F			D			D	

Intersection Summary			
HCM Average Control Delay	53.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.4%	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

HCM Signalized Intersection Capacity Analysis
18: 20th Street & Broadway

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	160	61	48	154	111	60	476	71	67	410	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.91	
Frpb, ped/bikes		0.98			0.96			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.95			0.98			0.99	
Flt Protected		1.00			0.99			1.00			0.99	
Satd. Flow (prot)		3326			3150			3408			4978	
Flt Permitted		0.94			0.88			0.86			0.79	
Satd. Flow (perm)		3139			2787			2954			3962	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	174	66	52	167	121	65	512	77	73	446	28
RTOR Reduction (vph)	0	42	0	0	77	0	0	17	0	0	10	0
Lane Group Flow (vph)	0	207	0	0	263	0	0	637	0	0	537	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1151			1022			1481			1189	
v/s Ratio Prot								c0.05				
v/s Ratio Perm		0.07			c0.09			c0.16			0.14	
v/c Ratio		0.18			0.26			0.43			0.45	
Uniform Delay, d1		12.9			13.3			10.1			17.0	
Progression Factor		0.90			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.6			0.9			1.2	
Delay (s)		12.0			13.9			11.0			18.2	
Level of Service		B			B			B			B	
Approach Delay (s)		12.0			13.9			11.0			18.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: West Grand Avenue & Broadway

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	779	90	98	505	75	113	436	97	96	397	81
Ideal 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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99			0.99		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98			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)	1753	3357			3324		1764	3539	1528	1762	3435	
Flt Permitted	0.25	1.00			0.59		0.42	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	468	3357			1980		784	3539	1528	836	3435	
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)	107	847	98	107	549	82	123	474	105	104	432	88
RTOR Reduction (vph)	0	12	0	0	13	0	0	0	39	0	19	0
Lane Group Flow (vph)	107	933	0	0	725	0	123	474	66	104	501	0
Confl. Peds. (#/hr)	34		34	37		37	8		8	10		10
Confl. Bikes (#/hr)			11			8			35			7
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.2	32.2			32.2		39.8	39.8	39.8	39.8	39.8	
Effective Green, g (s)	32.2	32.2			32.2		39.8	39.8	39.8	39.8	39.8	
Actuated g/C Ratio	0.40	0.40			0.40		0.50	0.50	0.50	0.50	0.50	
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)	188	1351			797		390	1761	760	416	1709	
v/s Ratio Prot		0.28						0.13			0.15	
v/s Ratio Perm	0.23				c0.37		c0.16		0.04	0.12		
v/c Ratio	0.57	0.69			0.91		0.32	0.27	0.09	0.25	0.29	
Uniform Delay, d1	18.5	19.8			22.5		12.0	11.7	10.6	11.5	11.8	
Progression Factor	1.00	1.00			1.25		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	1.2			13.8		2.1	0.4	0.2	1.4	0.4	
Delay (s)	20.9	21.0			42.0		14.1	12.0	10.8	13.0	12.3	
Level of Service	C	C			D		B	B	B	B	B	
Approach Delay (s)		21.0			42.0			12.2			12.4	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: 27th Street & Broadway

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	180	98	34	295	303	54	476	38	98	584	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	5.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1746	3302			3517	1543	1760	3485		1766	3497	
Flt Permitted	0.54	1.00			0.89	1.00	0.33	1.00		0.42	1.00	
Satd. Flow (perm)	997	3302			3151	1543	607	3485		774	3497	
Peak-hour factor, PHF	0.92	0.93	0.92	0.92	0.95	0.92	0.92	0.97	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	194	107	37	311	329	59	491	41	107	635	48
RTOR Reduction (vph)	0	62	0	0	0	140	0	7	0	0	7	0
Lane Group Flow (vph)	64	239	0	0	348	189	59	525	0	107	676	0
Confl. Peds. (#/hr)	25		25	18		13	19		13	6		6
Confl. Bikes (#/hr)		16	16	59		5		5	59			6
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)	422	1398			1335	654	271	1558		346	1563	
v/s Ratio Prot		0.07						0.15			c0.19	
v/s Ratio Perm	0.06				0.11	c0.12	0.10			0.14		
v/c Ratio	0.15	0.17			0.26	0.29	0.22	0.34		0.31	0.43	
Uniform Delay, d1	15.1	15.2			15.9	16.1	14.4	15.3		15.1	16.1	
Progression Factor	1.68	1.88			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.3			0.5	1.1	1.8	0.6		2.3	0.9	
Delay (s)	26.1	28.8			16.4	17.2	16.2	15.9		17.4	17.0	
Level of Service	C	C			B	B	B	B		B	B	
Approach Delay (s)		28.3			16.8			15.9			17.0	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: West Grand Avenue & Telegraph Avenue

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	903	372	71	439	69	209	267	32	119	370	80
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		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		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3427	1553	1768	3348		1768	3471		1757	3430	
Flt Permitted	0.31	1.00	1.00	0.16	1.00		0.39	1.00		0.56	1.00	
Satd. Flow (perm)	571	3427	1553	297	3348		731	3471		1036	3430	
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	941	404	77	477	75	227	281	35	129	402	87
RTOR Reduction (vph)	0	0	285	0	14	0	0	5	0	0	20	0
Lane Group Flow (vph)	123	941	119	77	538	0	227	311	0	129	469	0
Confl. Peds. (#/hr)	4		4	4		4	4		4	11		11
Confl. Bikes (#/hr)			3			7			21			1
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	25.1	25.1	25.1	25.1	25.1		49.4	49.4		35.3	35.3	
Effective Green, g (s)	25.1	25.1	25.1	25.1	25.1		49.4	49.4		35.3	35.3	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.58	0.58		0.42	0.42	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	169	1012	459	88	989		542	2017		430	1424	
v/s Ratio Prot		c0.27			0.16		c0.05	0.09			0.14	
v/s Ratio Perm	0.22		0.08	0.26			c0.20			0.12		
v/c Ratio	0.73	0.93	0.26	0.88	0.54		0.42	0.15		0.30	0.33	
Uniform Delay, d1	26.9	29.1	22.9	28.5	25.1		8.9	8.2		16.6	16.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.07	1.09	
Incremental Delay, d2	23.8	15.7	1.4	65.9	2.1		0.2	0.2		1.7	0.6	
Delay (s)	50.7	44.8	24.2	94.4	27.3		9.1	8.4		19.5	18.9	
Level of Service	D	D	C	F	C		A	A		B	B	
Approach Delay (s)		39.7			35.5			8.7			19.1	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: 27th Street & Telegraph Avenue

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	360	392	145	45	263	112	87	375	23	48	356	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1863	1561	1765	1863	1546	1761	3498		1765	3367	
Flt Permitted	0.46	1.00	1.00	0.51	1.00	1.00	0.27	1.00		0.38	1.00	
Satd. Flow (perm)	858	1863	1561	955	1863	1546	503	3498		706	3367	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	426	158	49	286	122	91	408	25	52	387	151
RTOR Reduction (vph)	0	0	65	0	0	64	0	7	0	0	63	0
Lane Group Flow (vph)	391	426	93	49	286	58	91	426	0	52	475	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	58.3	50.3	50.3	43.7	40.2	40.2	17.7	17.7		17.7	17.7	
Effective Green, g (s)	58.3	50.3	50.3	43.7	40.2	40.2	17.7	17.7		17.7	17.7	
Actuated g/C Ratio	0.69	0.59	0.59	0.51	0.47	0.47	0.21	0.21		0.21	0.21	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	734	1102	924	524	881	731	105	728		147	701	
v/s Ratio Prot	c0.09	0.23		0.00	0.15			0.12			0.14	
v/s Ratio Perm	c0.28		0.06	0.04		0.04	c0.18			0.07		
v/c Ratio	0.53	0.39	0.10	0.09	0.32	0.08	0.87	0.58		0.35	0.68	
Uniform Delay, d1	6.2	9.2	7.5	10.3	13.9	12.3	32.5	30.3		28.8	31.0	
Progression Factor	1.00	1.00	1.00	0.72	0.68	0.41	0.92	0.90		1.00	1.00	
Incremental Delay, d2	0.4	1.0	0.2	0.0	1.0	0.2	45.5	0.7		0.5	2.1	
Delay (s)	6.6	10.2	7.8	7.5	10.5	5.2	75.3	27.9		29.3	33.1	
Level of Service	A	B	A	A	B	A	E	C		C	C	
Approach Delay (s)		8.4			8.8			36.2			32.8	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: West Grand Avenue & Northgate Avenue

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	204	602	698	132	857	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
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	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3438		3432	1414
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3438		3432	1414
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	654	759	143	932	223
RTOR Reduction (vph)	0	0	18	0	2	137
Lane Group Flow (vph)	222	654	884	0	952	64
Confl. Peds. (#/hr)	14			11	6	6
Confl. Bikes (#/hr)				10		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	13.1	46.6	29.5		25.4	25.4
Effective Green, g (s)	13.1	46.6	29.5		25.4	25.4
Actuated g/C Ratio	0.16	0.58	0.37		0.32	0.32
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)	290	2061	1268		1090	449
v/s Ratio Prot	c0.13	0.18	c0.26		c0.28	
v/s Ratio Perm						0.05
v/c Ratio	0.77	0.32	0.70		0.87	0.14
Uniform Delay, d1	32.0	8.6	21.5		25.8	19.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.3	0.4	3.2		7.7	0.1
Delay (s)	42.3	9.0	24.6		33.5	19.6
Level of Service	D	A	C		C	B
Approach Delay (s)		17.4	24.6		31.0	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: 27th Street & I-980 On Ramp

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	872	0	0	156	312	5	270	26	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		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)	1608	3387			3539	2787		5008				
Flt Permitted	0.64	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1091	3218			3539	2787		5008				
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)	176	948	0	0	170	339	5	293	28	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	203	0	17	0	0	0	0
Lane Group Flow (vph)	158	966	0	0	170	136	0	309	0	0	0	0
Confl. Peds. (#/hr)	2		2				6		6	4		4
Confl. Bikes (#/hr)									4			3
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	436	1287			1416	1115		2003				
v/s Ratio Prot					0.05							
v/s Ratio Perm	0.14	c0.30				0.05		0.06				
v/c Ratio	0.36	0.75			0.12	0.12		0.15				
Uniform Delay, d1	8.4	10.3			7.6	7.6		7.7				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	2.3	4.1			0.2	0.2		0.2				
Delay (s)	10.7	14.4			7.7	7.8		7.8				
Level of Service	B	B			A	A		A				
Approach Delay (s)		13.8			7.8			7.8			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

25: 27th Street & I-980 Off Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	294	28	11	166	0	0	0	0	730	1092	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95					0.91	0.91	1.00
Frpb, ped/bikes		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
Frt		1.00	0.85		1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00					0.95	0.99	1.00
Satd. Flow (prot)		3539	1558		3527					1610	3370	1583
Flt Permitted		1.00	1.00		0.93					0.95	0.99	1.00
Satd. Flow (perm)		3539	1558		3296					1610	3370	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92
Adj. Flow (vph)	0	320	30	12	180	0	0	0	0	793	1174	382
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	0	0	0	185
Lane Group Flow (vph)	0	320	11	0	192	0	0	0	0	634	1333	197
Confl. Peds. (#/hr)	2		2	10		10	6		6			
Confl. Bikes (#/hr)			3			4			1			
Turn Type			Perm	Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		21.0	21.0		21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0	21.0		21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35	0.35		0.35					0.52	0.52	0.52
Clearance Time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1239	545		1154					832	1741	818
v/s Ratio Prot		c0.09										
v/s Ratio Perm			0.01		0.06					0.39	0.40	0.12
v/c Ratio		0.26	0.02		0.17					0.76	0.77	0.24
Uniform Delay, d1		13.9	12.8		13.5					11.6	11.6	8.0
Progression Factor		1.00	1.00		1.00					1.00	1.00	1.00
Incremental Delay, d2		0.5	0.1		0.3					6.5	3.3	0.7
Delay (s)		14.4	12.8		13.8					18.1	14.9	8.7
Level of Service		B	B		B					B	B	A
Approach Delay (s)		14.3			13.8			0.0			14.7	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

26: West Grand Avenue & San Pablo Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	463	27	29	718	97	50	257	34	81	293	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	4.0	4.0		4.0	4.0	
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	0.96	1.00	1.00	0.98	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		1.00	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)		3536	1523	1759	3539	1549	1757	3460		1761	3537	
Flt Permitted		0.94	1.00	0.46	1.00	1.00	0.46	1.00		0.48	1.00	
Satd. Flow (perm)		3332	1523	857	3539	1549	844	3460		895	3537	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	10	503	29	32	780	105	52	265	35	88	318	1
RTOR Reduction (vph)	0	0	8	0	0	29	0	19	0	0	0	0
Lane Group Flow (vph)	0	513	21	32	780	76	52	281	0	88	319	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		54.0	54.0	54.0	54.0	54.0	13.0	13.0		13.0	13.0	
Effective Green, g (s)		54.0	54.0	54.0	54.0	54.0	13.0	13.0		13.0	13.0	
Actuated g/C Ratio		0.72	0.72	0.72	0.72	0.72	0.17	0.17		0.17	0.17	
Clearance Time (s)		4.0	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	2.0	
Lane Grp Cap (vph)		2399	1097	617	2548	1115	146	600		155	613	
v/s Ratio Prot					c0.22			0.08			0.09	
v/s Ratio Perm		0.15	0.01	0.04		0.05	0.06			c0.10		
v/c Ratio		0.21	0.02	0.05	0.31	0.07	0.36	0.47		0.57	0.52	
Uniform Delay, d1		3.5	3.0	3.1	3.8	3.1	27.3	27.9		28.4	28.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2	0.0	0.2	0.3	0.1	0.5	0.2		2.8	0.4	
Delay (s)		3.7	3.0	3.2	4.1	3.2	27.9	28.1		31.3	28.5	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		3.6			4.0			28.1			29.1	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2015 Baseline Conditions
PM Peak Hour

HCM Signalized Intersection Capacity Analysis
1: 5th St. & Oak St.

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	302	617	86	0	0	0	0	534	74	1	69	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.98			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		4921						1832			1862	
Flt Permitted		0.99						1.00			0.84	
Satd. Flow (perm)		1000						1300			1300	
Peak-hour factor, PHF	0.92	0.93	0.92	0.25	0.25	0.25	0.25	0.92	0.92	0.92	0.92	0.25
Adj. Flow (vph)	328	663	93	0	0	0	0	580	80	1	75	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	1060	0	0	0	0	0	649	0	0	76	0
Confl. Peds. (#/hr)	9		9	38		38				2		2
Confl. Bikes (#/hr)			11			4						2
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		500						631			448	
v/s Ratio Prot								c0.35				
v/s Ratio Perm		c1.06									0.06	
v/c Ratio		2.12						1.03			0.17	
Uniform Delay, d1		11.2						14.8			10.3	
Progression Factor		1.00						1.00			0.05	
Incremental Delay, d2		510.3						43.3			0.7	
Delay (s)		521.5						58.0			1.3	
Level of Service		F						E			A	
Approach Delay (s)		521.5			0.0			58.0			1.3	
Approach LOS		F			A			E			A	

Intersection Summary			
HCM Average Control Delay	331.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.67		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 6th St. & Oak St.

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	184	627	68	58	756
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.89	0.85
Flt Protected			0.99		0.99	1.00
Satd. Flow (prot)			3500		3169	1441
Flt Permitted			0.99		0.99	1.00
Satd. Flow (perm)			3500		3169	1441
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.94
Adj. Flow (vph)	0	200	682	74	63	804
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	882	0	539	402
Confl. Peds. (#/hr)	46					
Confl. Bikes (#/hr)	3					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1268		1141	519
v/s Ratio Prot						
v/s Ratio Perm			0.25		0.17	c0.28
v/c Ratio			0.70		0.47	0.77
Uniform Delay, d1			12.2		11.1	12.8
Progression Factor			0.76		1.00	1.00
Incremental Delay, d2			0.3		1.4	10.8
Delay (s)			9.6		12.5	23.6
Level of Service			A		B	C
Approach Delay (s)			9.6		17.2	
Approach LOS			A		B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 7th St. & Oak St.

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	1198	0	0	0	0	0	947	728	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.94				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6348						4710				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6348						4710				
Peak-hour factor, PHF	0.92	0.98	0.25	0.25	0.25	0.25	0.25	0.94	0.96	0.25	0.25	0.25
Adj. Flow (vph)	201	1222	0	0	0	0	0	1007	758	0	0	0
RTOR Reduction (vph)	0	20	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	1403	0	0	0	0	0	1757	0	0	0	0
Confl. Peds. (#/hr)	22		22	50		50	14		14	6		6
Confl. Bikes (#/hr)			16			1			2			2
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2539						1884				
v/s Ratio Prot								c0.37				
v/s Ratio Perm		0.22										
v/c Ratio		0.55						1.17dr				
Uniform Delay, d1		10.4						12.9				
Progression Factor		0.88						1.45				
Incremental Delay, d2		0.6						8.6				
Delay (s)		9.8						27.4				
Level of Service		A						C				
Approach Delay (s)		9.8			0.0			27.4			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: 11th Street & Oak Street

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	71	0	0	1084	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	77	0	0	1178	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	301	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	301	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	100	100			
cM capacity (veh/h)	663	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	77	295	295	295	295
Volume Left	77	0	0	0	0
Volume Right	0	0	0	0	0
cSH	663	1700	1700	1700	1700
Volume to Capacity	0.12	0.17	0.17	0.17	0.17
Queue Length 95th (ft)	10	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
5: 12th Street & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1054	62	283	989	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6330			6163				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6330			6163				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.92	0.92	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	1109	67	308	1030	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1172	0	0	1314	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3154			2116				
v/s Ratio Prot					c0.19							
v/s Ratio Perm								0.21				
v/c Ratio					0.37			0.62				
Uniform Delay, d1					9.3			16.4				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.3			1.4				
Delay (s)					9.6			17.8				
Level of Service					A			B				
Approach Delay (s)		0.0			9.6			17.8			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
6: 14th Street & Lakeside Dr.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	953	0	0	441	271	205	637	42	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.92		1.00	0.96			
Flpb, ped/bikes		1.00			1.00	1.00		0.99	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3524			3539	1461		3472	1520			
Flt Permitted		0.88			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3113			3539	1461		3472	1520			
Peak-hour factor, PHF	0.92	0.92	0.25	0.99	0.96	0.96	0.92	0.92	0.92	0.25	0.25	0.25
Adj. Flow (vph)	72	1036	0	0	459	282	223	692	46	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	117	0	0	3	0	0	0
Lane Group Flow (vph)	0	1108	0	0	459	165	0	915	43	0	0	0
Confl. Peds. (#/hr)	36		36	52		52	35		35	10		10
Confl. Bikes (#/hr)			5			21						22
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		934			1062	438		1852	811			
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.36				0.11		0.26	0.03			
v/c Ratio		1.19			0.43	0.38		0.49	0.05			
Uniform Delay, d1		21.0			16.9	16.6		8.9	6.7			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		94.7			1.3	2.5		0.9	0.1			
Delay (s)		115.7			18.2	19.0		9.8	6.8			
Level of Service		F			B	B		A	A			
Approach Delay (s)		115.7			18.5			9.7			0.0	
Approach LOS		F			B			A			A	

Intersection Summary			
HCM Average Control Delay	53.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
7: 7th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1170	353	0	0	0	0	0	0	472	1514	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		1.00									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		6148									5014	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		6148									5014	
Peak-hour factor, PHF	0.25	0.99	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.95	0.25
Adj. Flow (vph)	0	1182	384	0	0	0	0	0	0	513	1594	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	1562	0	0	0	0	0	0	0	0	2096	0
Confl. Peds. (#/hr)	4		4	8		8	2		2	12		12
Confl. Bikes (#/hr)			2			2			2			
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2459									2228	
v/s Ratio Prot		c0.25										
v/s Ratio Perm											0.42	
v/c Ratio		0.64									0.94	
Uniform Delay, d1		10.9									11.9	
Progression Factor		1.00									1.00	
Incremental Delay, d2		1.3									9.5	
Delay (s)		12.1									21.4	
Level of Service		B									C	
Approach Delay (s)		12.1			0.0			0.0			21.4	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1010	201	0	0	0	0	0	0	51	956	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.97									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6205									5068	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6205									5068	
Peak-hour factor, PHF	0.25	0.96	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.93	0.25
Adj. Flow (vph)	0	1052	218	0	0	0	0	0	0	55	1028	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	1245	0	0	0	0	0	0	0	0	1073	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2379									2196	
v/s Ratio Prot		c0.20										
v/s Ratio Perm											0.21	
v/c Ratio		0.52									0.49	
Uniform Delay, d1		14.3									12.2	
Progression Factor		0.84									0.57	
Incremental Delay, d2		0.8									0.7	
Delay (s)		12.7									7.7	
Level of Service		B									A	
Approach Delay (s)		12.7			0.0			0.0			7.7	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
9: 12th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	258	977	0	0	0	0	0	780	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6270						5029	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6270						5029	
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.97	0.25	0.25	0.25	0.25	0.25	0.92	0.92
Adj. Flow (vph)	0	0	0	280	1007	0	0	0	0	0	848	51
RTOR Reduction (vph)	0	0	0	0	40	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	0	0	0	1247	0	0	0	0	0	888	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2717						2221	
v/s Ratio Prot											c0.18	
v/s Ratio Perm					0.20							
v/c Ratio					0.46						0.40	
Uniform Delay, d1					12.0						11.4	
Progression Factor					0.56						1.00	
Incremental Delay, d2					0.5						0.5	
Delay (s)					7.3						11.9	
Level of Service					A						B	
Approach Delay (s)		0.0			7.3			0.0			11.9	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
10: 14th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	669	76	34	582	0	0	0	0	472	683	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.98	1.00	
Frt		0.98			1.00					1.00	1.00	
Flt Protected		1.00			1.00					0.95	0.99	
Satd. Flow (prot)		3463			3528					1578	3342	
Flt Permitted		1.00			0.90					0.95	0.99	
Satd. Flow (perm)		3463			3169					1578	3342	
Peak-hour factor, PHF	0.25	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.25	0.94	0.96	0.92
Adj. Flow (vph)	0	727	83	37	633	0	0	0	0	502	711	27
RTOR Reduction (vph)	0	20	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	790	0	0	670	0	0	0	0	402	833	0
Confl. Peds. (#/hr)	50		50	25		25	17		17	24		24
Confl. Bikes (#/hr)			16			17			2			
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1462			1338					666	1411	
v/s Ratio Prot		c0.23										
v/s Ratio Perm					0.21					c0.25	0.25	
v/c Ratio		0.54			0.50					0.60	0.59	
Uniform Delay, d1		9.7			9.5					10.1	10.0	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		1.4			1.3					4.0	1.8	
Delay (s)		11.2			10.9					14.1	11.8	
Level of Service		B			B					B	B	
Approach Delay (s)		11.2			10.9			0.0			12.6	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
11: 19th Street & Jackson Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	10	106	6	27	195	0	0	87	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	11	115	7	29	212	0	0	95	33

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	68	64	241	127
Volume Left (vph)	11	0	29	0
Volume Right (vph)	0	7	0	33
Hadj (s)	0.11	-0.04	0.06	-0.12
Departure Headway (s)	5.5	5.3	4.5	4.4
Degree Utilization, x	0.10	0.09	0.30	0.16
Capacity (veh/h)	615	635	782	777
Control Delay (s)	7.9	7.7	9.3	8.2
Approach Delay (s)	7.8		9.3	8.2
Approach LOS	A		A	A

Intersection Summary			
Delay	8.6		
HCM Level of Service	A		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
12: Jackson Street & Lakeside Drive
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	181	1	2	828	655	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.97	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1772			1863	1805	
Flt Permitted	0.95			0.73	1.00	
Satd. Flow (perm)	1772			1363	1805	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	1	2	900	712	163
RTOR Reduction (vph)	0	0	0	0	16	0
Lane Group Flow (vph)	198	0	0	902	859	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	20.0			22.0	22.0	
Effective Green, g (s)	20.0			22.0	22.0	
Actuated g/C Ratio	0.40			0.44	0.44	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	709			600	794	
v/s Ratio Prot	c0.11				0.48	
v/s Ratio Perm				c0.66		
v/c Ratio	0.28			1.50	1.08	
Uniform Delay, d1	10.1			14.0	14.0	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.0			235.1	56.3	
Delay (s)	11.1			249.1	70.3	
Level of Service	B			F	E	
Approach Delay (s)	11.1			249.1	70.3	
Approach LOS	B			F	E	

Intersection Summary			
HCM Average Control Delay	146.0	HCM Level of Service	F
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	27	191	155	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	29	208	168	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	99	138	168
Volume Left (vph)	29	0	168
Volume Right (vph)	0	0	0
Hadj (s)	0.18	0.03	0.23
Departure Headway (s)	5.1	5.0	4.7
Degree Utilization, x	0.14	0.19	0.22
Capacity (veh/h)	685	701	735
Control Delay (s)	7.7	7.9	9.0
Approach Delay (s)	7.9		9.0
Approach LOS	A		A

Intersection Summary			
Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	47	660	80	130	492	0	0	67	25
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	
Lane Util. Factor					0.86			0.95			0.95	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6291			3503			3396	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					6291			3056			3396	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	51	717	87	141	535	0	0	73	27
RTOR Reduction (vph)	0	0	0	0	32	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	0	823	0	0	676	0	0	87	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2254			1604			1783	
v/s Ratio Prot											0.03	
v/s Ratio Perm					0.13			c0.22				
v/c Ratio					0.37			0.42			0.05	
Uniform Delay, d1					14.2			8.7			6.9	
Progression Factor					1.49			1.00			1.00	
Incremental Delay, d2					0.4			0.8			0.1	
Delay (s)					21.6			9.5			7.0	
Level of Service					C			A			A	
Approach Delay (s)		0.0			21.6			9.5			7.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	NBL2	NBL	NBT	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations												
Volume (vph)	14	472	158	166	51	840	199	409	90	0	78	27
Ideal 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	0.94				0.95	0.91	0.91	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
Flpb, ped/bikes	0.48	1.00				1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.96				1.00	0.92	0.85	0.85		0.85	0.85
Flt Protected	0.95	0.96				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	841	4873				3503	3132	1441	1583		1583	1554
Flt Permitted	0.95	0.96				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	841	4873				3503	3132	1441	1583		1583	1554
Peak-hour factor, PHF	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	15	513	172	180	55	913	216	445	98	0	82	28
RTOR Reduction (vph)	0	88	0	0	0	0	0	0	54	0	0	21
Lane Group Flow (vph)	15	597	0	0	0	1148	439	222	44	0	82	7
Confl. Peds. (#/hr)	22								74			
Confl. Bikes (#/hr)						7			8			7
Turn Type	Prot			Split	Split			custom	custom		custom	custom
Protected Phases	5	1		8	8	8	2	6	6			
Permitted Phases		1						6			9	2
Actuated Green, G (s)	0.8	14.7				16.0	17.2	31.1	31.1		6.1	17.2
Effective Green, g (s)	0.8	14.7				16.0	17.2	31.1	31.1		6.1	17.2
Actuated g/C Ratio	0.01	0.21				0.23	0.25	0.44	0.44		0.09	0.25
Clearance Time (s)	4.0	4.0				4.0	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	2.0				2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	10	1023				801	770	640	703		138	382
v/s Ratio Prot	0.02	c0.12				c0.33	c0.14	0.15	0.03			
v/s Ratio Perm											c0.05	0.00
v/c Ratio	1.50	0.58				1.43	0.57	0.35	0.06		0.59	0.02
Uniform Delay, d1	34.6	24.9				27.0	23.2	12.8	11.1		30.8	20.0
Progression Factor	1.00	1.00				1.00	1.26	1.40	2.43		1.00	1.00
Incremental Delay, d2	478.8	2.4				202.1	0.6	1.4	0.2		4.5	0.0
Delay (s)	513.4	27.3				229.1	29.8	19.3	27.1		35.3	20.0
Level of Service	F	C				F	C	B	C		D	C
Approach Delay (s)		37.7				229.1	26.4			31.4		
Approach LOS		D				F	C			C		

Intersection Summary			
HCM Average Control Delay	115.2	HCM Level of Service	F
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1113	146	830	387	299	845
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	4994		3433	5085	3230	1441
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	4994		3433	5085	3230	1441
Peak-hour factor, PHF	0.95	0.92	0.99	0.92	0.92	0.93
Adj. Flow (vph)	1172	159	838	421	325	909
RTOR Reduction (vph)	25	0	0	0	319	318
Lane Group Flow (vph)	1306	0	838	421	462	136
Confl. Bikes (#/hr)				16		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	18.0		19.0	41.0	21.0	21.0
Effective Green, g (s)	18.0		19.0	41.0	21.0	21.0
Actuated g/C Ratio	0.26		0.27	0.59	0.30	0.30
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)	1284		932	2978	969	432
v/s Ratio Prot	c0.26		c0.24	0.08	c0.14	
v/s Ratio Perm						0.09
v/c Ratio	1.02		0.90	0.14	0.48	0.32
Uniform Delay, d1	26.0		24.6	6.5	20.0	18.9
Progression Factor	0.96		1.00	1.00	1.00	1.00
Incremental Delay, d2	12.5		13.3	0.1	1.7	1.9
Delay (s)	37.6		37.9	6.6	21.7	20.8
Level of Service	D		D	A	C	C
Approach Delay (s)	37.6			27.4	21.4	
Approach LOS	D			C	C	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: West Grand Avenue & Harrison Street

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	244	669	137	373	900	45	11	1345	1279	2	645	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.92		1.00	0.93		0.99	
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		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1483	3433	3539	1459		5083	1466		4899	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.94	
Satd. Flow (perm)	3433	3539	1483	3433	3539	1459		4729	1466		4589	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.93	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	265	727	149	381	968	49	12	1462	1390	2	672	140
RTOR Reduction (vph)	0	0	41	0	0	24	0	0	247	0	32	0
Lane Group Flow (vph)	265	727	108	381	968	25	0	1474	1143	0	782	0
Confl. Peds. (#/hr)	31		31	48		48	42		42	34		34
Confl. Bikes (#/hr)			22			15			22			20
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	12.0	34.6	34.6	14.4	38.0	38.0		36.0	36.0		36.0	
Effective Green, g (s)	12.0	34.6	34.6	14.4	38.0	38.0		36.0	36.0		36.0	
Actuated g/C Ratio	0.12	0.35	0.35	0.14	0.38	0.38		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	412	1224	513	494	1345	554		1702	528		1652	
v/s Ratio Prot	0.08	0.21		c0.11	c0.27							
v/s Ratio Perm			0.07			0.02		0.31	c0.78		0.17	
v/c Ratio	0.64	0.59	0.21	0.77	0.72	0.04		0.87	2.16		0.47	
Uniform Delay, d1	42.0	26.9	23.1	41.2	26.5	19.6		29.8	32.0		24.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	2.6	2.1	0.9	6.7	3.3	0.2		6.2	530.4		1.0	
Delay (s)	44.5	29.0	24.0	47.9	29.8	19.7		36.0	562.4		25.7	
Level of Service	D	C	C	D	C	B		D	F		C	
Approach Delay (s)		32.0			34.4			291.4			25.7	
Approach LOS		C			C			F			C	

Intersection Summary			
HCM Average Control Delay	151.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	136.0%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: 20th Street & Broadway

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	162	99	63	294	124	109	804	117	45	568	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.91	
Frpb, ped/bikes		0.97			0.97			0.99			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.96			0.98			0.99	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		3219			3236			3410			4989	
Flt Permitted		0.90			0.87			0.72			0.80	
Satd. Flow (perm)		2900			2832			2474			4026	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	26	176	108	68	320	135	118	874	123	49	617	42
RTOR Reduction (vph)	0	68	0	0	46	0	0	16	0	0	12	0
Lane Group Flow (vph)	0	242	0	0	477	0	0	1099	0	0	696	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1063			1038			1305			1208	
v/s Ratio Prot								c0.10				
v/s Ratio Perm		0.08			c0.17			c0.31			0.17	
v/c Ratio		0.23			0.46			0.84			0.58	
Uniform Delay, d1		13.1			14.5			13.5			17.8	
Progression Factor		2.10			1.00			1.00			1.00	
Incremental Delay, d2		0.5			1.5			6.7			2.0	
Delay (s)		28.1			15.9			20.2			19.8	
Level of Service		C			B			C			B	
Approach Delay (s)		28.1			15.9			20.2			19.8	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: West Grand Avenue & Broadway

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	487	42	112	366	36	342	679	173	58	506	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	0.99	
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	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1764	3380			3350		1765	3539	1551	1752	3415	
Flt Permitted	0.30	1.00			0.61		0.37	1.00	1.00	0.34	1.00	
Satd. Flow (perm)	561	3380			2076		681	3539	1551	635	3415	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	529	46	122	398	39	372	715	188	63	550	117
RTOR Reduction (vph)	0	10	0	0	8	0	0	0	71	0	16	0
Lane Group Flow (vph)	93	565	0	0	551	0	372	715	117	63	651	0
Confl. Peds. (#/hr)	8		8	2		2	8		8	32		32
Confl. Bikes (#/hr)			6			6			4			28
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	24.1	24.1			24.1		47.9	47.9	47.9	47.9	47.9	
Effective Green, g (s)	24.1	24.1			24.1		47.9	47.9	47.9	47.9	47.9	
Actuated g/C Ratio	0.30	0.30			0.30		0.60	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	169	1018			625		408	2119	929	380	2045	
v/s Ratio Prot		0.17						0.20			0.19	
v/s Ratio Perm	0.17				c0.27		c0.55		0.08	0.10		
v/c Ratio	0.55	0.56			0.88		0.91	0.34	0.13	0.17	0.32	
Uniform Delay, d1	23.4	23.5			26.6		14.2	8.1	7.0	7.1	8.0	
Progression Factor	1.00	1.00			1.08		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.4			13.2		27.1	0.4	0.3	0.9	0.4	
Delay (s)	25.6	23.8			42.0		41.3	8.5	7.2	8.1	8.4	
Level of Service	C	C			D		D	A	A	A	A	
Approach Delay (s)		24.1			42.0			17.9			8.3	
Approach LOS		C			D			B			A	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: 27th Street & Broadway

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	252	75	48	438	283	175	687	35	202	683	95
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	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1747	3379			3519	1536	1767	3509		1768	3454	
Flt Permitted	0.43	1.00			0.88	1.00	0.25	1.00		0.28	1.00	
Satd. Flow (perm)	783	3379			3095	1536	459	3509		512	3454	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	274	82	52	456	308	190	747	38	220	742	103
RTOR Reduction (vph)	0	33	0	0	0	67	0	4	0	0	13	0
Lane Group Flow (vph)	99	323	0	0	508	241	190	781	0	220	832	0
Confl. Peds. (#/hr)	32		32	10		10	6		6	5		5
Confl. Bikes (#/hr)			20			18			17			66
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)	332	1431			1311	651	205	1569		229	1544	
v/s Ratio Prot		0.10						0.22			0.24	
v/s Ratio Perm	0.13				c0.16	0.16	0.41			c0.43		
v/c Ratio	0.30	0.23			0.39	0.37	0.93	0.50		0.96	0.54	
Uniform Delay, d1	16.2	15.6			16.9	16.8	22.2	16.7		22.8	17.1	
Progression Factor	0.87	0.86			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.3			0.9	1.6	46.3	1.1		50.1	1.4	
Delay (s)	15.9	13.7			17.8	18.4	68.4	17.8		72.9	18.5	
Level of Service	B	B			B	B	E	B		E	B	
Approach Delay (s)		14.1			18.0			27.7			29.7	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	24.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	107.0%	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)	29	722	34	20	893	141	99	566	35	144	449	111
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	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	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3427	1532	1761	3340		1769	3504		1761	3405	
Flt Permitted	0.17	1.00	1.00	0.17	1.00		0.35	1.00		0.40	1.00	
Satd. Flow (perm)	308	3427	1532	306	3340		654	3504		748	3405	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	32	785	37	22	971	153	108	615	38	157	473	121
RTOR Reduction (vph)	0	0	26	0	14	0	0	5	0	0	23	0
Lane Group Flow (vph)	32	785	11	22	1110	0	108	648	0	157	571	0
Confl. Peds. (#/hr)	12		12	18		18	3		3	12		12
Confl. Bikes (#/hr)			8			6			10			28
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	24.2	24.2	24.2	24.2	24.2		50.3	50.3		40.0	40.0	
Effective Green, g (s)	24.2	24.2	24.2	24.2	24.2		50.3	50.3		40.0	40.0	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28		0.59	0.59		0.47	0.47	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	88	976	436	87	951		463	2074		352	1602	
v/s Ratio Prot		0.23			c0.33		0.02	c0.18			0.17	
v/s Ratio Perm	0.10		0.01	0.07			0.12			c0.21		
v/c Ratio	0.36	0.80	0.02	0.25	1.17		0.23	0.31		0.45	0.36	
Uniform Delay, d1	24.3	28.2	21.9	23.4	30.4		8.0	8.7		15.1	14.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.27	1.29	
Incremental Delay, d2	11.2	7.0	0.1	6.9	86.6		0.1	0.4		3.5	0.5	
Delay (s)	35.5	35.2	22.0	30.3	117.0		8.1	9.1		22.7	19.0	
Level of Service	D	D	C	C	F		A	A		C	B	
Approach Delay (s)		34.7			115.3			8.9			19.8	
Approach LOS		C			F			A			B	

Intersection Summary			
HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	415	140	66	660	117	210	506	48	139	480	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1554	1769	1863	1552	1764	3482		1763	3257	
Flt Permitted	0.12	1.00	1.00	0.34	1.00	1.00	0.18	1.00		0.35	1.00	
Satd. Flow (perm)	227	1863	1554	636	1863	1552	339	3482		654	3257	
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)	234	451	152	72	717	127	228	550	52	151	522	397
RTOR Reduction (vph)	0	0	93	0	0	81	0	9	0	0	162	0
Lane Group Flow (vph)	234	451	59	72	717	46	228	593	0	151	757	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	33.1	33.1	33.7	28.3	28.3	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	33.1	33.1	33.7	28.3	28.3	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.40	0.33	0.33	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	300	725	605	324	620	517	132	1352		254	1264	
v/s Ratio Prot	c0.09	0.24		0.01	c0.38			0.17			0.23	
v/s Ratio Perm	0.30		0.04	0.07		0.03	c0.67			0.23		
v/c Ratio	0.78	0.62	0.10	0.22	1.16	0.09	1.73	0.44		0.59	0.60	
Uniform Delay, d1	18.1	20.9	16.5	16.7	28.4	19.5	26.0	19.2		20.7	20.7	
Progression Factor	1.00	1.00	1.00	1.56	1.40	2.59	0.76	0.66		1.00	1.00	
Incremental Delay, d2	11.4	4.0	0.3	0.1	86.3	0.3	354.3	0.1		2.5	0.5	
Delay (s)	29.5	24.9	16.8	26.2	126.2	50.8	374.1	12.8		23.2	21.2	
Level of Service	C	C	B	C	F	D	F	B		C	C	
Approach Delay (s)		24.7			107.9			112.0			21.5	
Approach LOS		C			F			F			C	

Intersection Summary			
HCM Average Control Delay	64.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	291	604	658	493	206	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.94		0.99	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	3269		3416	1421
Flt Permitted	0.95	1.00	1.00		0.96	1.00
Satd. Flow (perm)	1770	3539	3269		3416	1421
Peak-hour factor, PHF	0.92	0.93	0.92	0.97	0.92	0.92
Adj. Flow (vph)	316	649	715	508	224	121
RTOR Reduction (vph)	0	0	125	0	8	93
Lane Group Flow (vph)	316	649	1098	0	231	13
Confl. Peds. (#/hr)	14			18		
Confl. Bikes (#/hr)				7		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	20.4	62.2	37.8		9.8	9.8
Effective Green, g (s)	20.4	62.2	37.8		9.8	9.8
Actuated g/C Ratio	0.26	0.78	0.47		0.12	0.12
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)	451	2752	1545		418	174
v/s Ratio Prot	c0.18	0.18	c0.34		c0.07	
v/s Ratio Perm						0.01
v/c Ratio	0.70	0.24	0.71		0.55	0.07
Uniform Delay, d1	27.0	2.4	16.8		33.0	31.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.0	0.2	2.8		0.9	0.1
Delay (s)	31.0	2.6	19.6		33.9	31.2
Level of Service	C	A	B		C	C
Approach Delay (s)		11.9	19.6		33.1	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.9%	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)	252	672	0	0	264	1069	22	876	78	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		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)	1609	3384			3539	2787		5011				
Flt Permitted	0.58	0.94			1.00	1.00		1.00				
Satd. Flow (perm)	975	3181			3539	2787		5011				
Peak-hour factor, PHF	0.93	0.92	0.25	0.25	0.92	0.97	0.92	0.92	0.92	0.25	0.25	0.25
Adj. Flow (vph)	271	730	0	0	287	1102	24	952	85	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	46	0	25	0	0	0	0
Lane Group Flow (vph)	244	757	0	0	287	1056	0	1036	0	0	0	0
Confl. Peds. (#/hr)	2		2				4		4	3		3
Confl. Bikes (#/hr)			4						5			7
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	390	1272			1416	1115		2004				
v/s Ratio Prot					0.08							
v/s Ratio Perm	0.25	0.24				c0.38		0.21				
v/c Ratio	0.63	0.60			0.20	0.95		0.52				
Uniform Delay, d1	9.6	9.4			7.8	11.6		9.1				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	7.4	2.1			0.3	17.0		1.0				
Delay (s)	17.0	11.5			8.2	28.5		10.0				
Level of Service	B	B			A	C		B				
Approach Delay (s)		12.8			24.3			10.0			0.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.1%	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)	0	506	39	12	250	0	0	0	0	412	307	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95					0.91	0.91	1.00
Frpb, ped/bikes		1.00	0.98		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		1.00	1.00		1.00					0.95	0.98	1.00
Satd. Flow (prot)		3539	1552		3531					1605	3325	1558
Flt Permitted		1.00	1.00		0.93					0.95	0.98	1.00
Satd. Flow (perm)		3539	1552		3285					1605	3325	1558
Peak-hour factor, PHF	0.25	0.95	0.92	0.92	0.92	0.25	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	0	533	42	13	272	0	0	0	0	448	334	223
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	0	0	0	108
Lane Group Flow (vph)	0	533	15	0	285	0	0	0	0	255	527	115
Confl. Peds. (#/hr)	4		4	4		4	1		1	3		3
Confl. Bikes (#/hr)			5			9			1			1
Turn Type			Perm	Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		21.0	21.0		21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0	21.0		21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35	0.35		0.35					0.52	0.52	0.52
Clearance Time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1239	543		1150					829	1718	805
v/s Ratio Prot		c0.15										
v/s Ratio Perm			0.01		0.09					c0.16	0.16	0.07
v/c Ratio		0.43	0.03		0.25					0.31	0.31	0.14
Uniform Delay, d1		14.9	12.8		13.9					8.3	8.3	7.6
Progression Factor		1.00	1.00		1.00					1.00	1.00	1.00
Incremental Delay, d2		1.1	0.1		0.5					1.0	0.5	0.4
Delay (s)		16.0	12.9		14.4					9.3	8.8	7.9
Level of Service		B	B		B					A	A	A
Approach Delay (s)		15.8			14.4			0.0			8.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	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)	147	770	142	43	672	67	367	480	91	124	389	142
Ideal 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	3.0	3.0		3.0	3.0	
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	0.96	1.00	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	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)		3509	1522	1765	3539	1548	1762	3438		1764	3378	
Flt Permitted		0.65	1.00	0.19	1.00	1.00	0.36	1.00		0.35	1.00	
Satd. Flow (perm)		2317	1522	355	3539	1548	662	3438		650	3378	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	160	837	154	47	730	73	378	495	94	135	423	154
RTOR Reduction (vph)	0	0	80	0	0	38	0	21	0	0	49	0
Lane Group Flow (vph)	0	997	74	47	730	35	378	568	0	135	528	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		36.0	36.0	36.0	36.0	36.0	32.0	32.0		32.0	32.0	
Effective Green, g (s)		36.0	36.0	36.0	36.0	36.0	32.0	32.0		32.0	32.0	
Actuated g/C Ratio		0.48	0.48	0.48	0.48	0.48	0.43	0.43		0.43	0.43	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
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)		1112	731	170	1699	743	282	1467		277	1441	
v/s Ratio Prot					0.21			0.17			0.16	
v/s Ratio Perm		c0.43	0.05	0.13		0.02	c0.57			0.21		
v/c Ratio		0.90	0.10	0.28	0.43	0.05	1.34	0.39		0.49	0.37	
Uniform Delay, d1		17.8	10.7	11.7	12.8	10.4	21.5	14.8		15.6	14.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		11.3	0.3	4.0	0.8	0.1	175.2	0.1		0.5	0.1	
Delay (s)		29.1	10.9	15.7	13.6	10.5	196.7	14.8		16.1	14.7	
Level of Service		C	B	B	B	B	F	B		B	B	
Approach Delay (s)		26.7			13.4			85.9			14.9	
Approach LOS		C			B			F			B	

Intersection Summary			
HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2030 Baseline Conditions
AM Peak Hour

HCM Signalized Intersection Capacity Analysis
1: 5th St. & Oak St.

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	451	823	226	0	0	0	0	343	101	4	174	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.97			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		4857						1800			1861	
Flt Permitted		0.99						1.00			0.99	
Satd. Flow (perm)		1850						1500			1600	
Peak-hour factor, PHF	0.95	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)	475	895	246	0	0	0	0	373	110	4	189	0
RTOR Reduction (vph)	0	57	0	0	0	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	1559	0	0	0	0	0	459	0	0	193	0
Confl. Peds. (#/hr)	14		14	52		52	1		1	4		4
Confl. Bikes (#/hr)			5			2						
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		925						620			551	
v/s Ratio Prot								c0.26				
v/s Ratio Perm		c0.84									0.12	
v/c Ratio		1.69						0.74			0.35	
Uniform Delay, d1		11.2						13.0			11.0	
Progression Factor		1.00						1.00			0.88	
Incremental Delay, d2		313.1						7.8			1.1	
Delay (s)		324.4						20.8			10.8	
Level of Service		F						C			B	
Approach Delay (s)		324.4			0.0			20.8			10.8	
Approach LOS		F			A			C			B	

Intersection Summary			
HCM Average Control Delay	234.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 6th St. & Oak St.

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	183	639	179	72	1108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.90	0.85
Flt Protected			0.99		0.98	1.00
Satd. Flow (prot)			3497		3191	1441
Flt Permitted			0.99		0.98	1.00
Satd. Flow (perm)			3497		3191	1441
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	199	666	195	78	1204
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	865	0	875	602
Confl. Peds. (#/hr)	51	2				
Confl. Bikes (#/hr)	2					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1267		1149	519
v/s Ratio Prot						
v/s Ratio Perm			0.25		0.27	c0.42
v/c Ratio			0.68		1.06dr	1.16
Uniform Delay, d1			12.2		12.7	14.4
Progression Factor			0.87		1.00	1.00
Incremental Delay, d2			0.3		4.8	91.7
Delay (s)			10.9		17.5	106.1
Level of Service			B		B	F
Approach Delay (s)			10.9		53.6	
Approach LOS			B		D	

Intersection Summary			
HCM Average Control Delay	37.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 7th St. & Oak St.

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	746	0	0	0	0	0	1408	368	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						1.00				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6330						4905				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6330						4905				
Peak-hour factor, PHF	0.93	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)	184	811	0	0	0	0	0	1530	400	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	38	0	0	0	0
Lane Group Flow (vph)	0	992	0	0	0	0	0	1892	0	0	0	0
Confl. Peds. (#/hr)	22		22	59		59	12		12	5		5
Confl. Bikes (#/hr)			6			4			2			1
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2532						1962				
v/s Ratio Prot								c0.39				
v/s Ratio Perm		0.16										
v/c Ratio		0.39						0.96				
Uniform Delay, d1		9.6						13.2				
Progression Factor		0.82						0.78				
Incremental Delay, d2		0.3						8.5				
Delay (s)		8.3						18.7				
Level of Service		A						B				
Approach Delay (s)		8.3			0.0			18.7			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: 11th Street & Oak Street

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	83	0	0	1353	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	90	0	0	1367	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	354	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	612	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	90	342	342	342	342
Volume Left	90	0	0	0	0
Volume Right	0	0	0	0	0
cSH	612	1700	1700	1700	1700
Volume to Capacity	0.15	0.20	0.20	0.20	0.20
Queue Length 95th (ft)	13	0	0	0	0
Control Delay (s)	11.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline AM
5: 12th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	2132	98	410	1002	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6341			6164				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6341			6164				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2198	107	441	1089	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2301	0	0	1529	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3160			2116				
v/s Ratio Prot					c0.36							
v/s Ratio Perm								0.25				
v/c Ratio					0.73			0.72				
Uniform Delay, d1					11.9			17.2				
Progression Factor					1.00			1.00				
Incremental Delay, d2					1.5			2.2				
Delay (s)					13.4			19.4				
Level of Service					B			B				
Approach Delay (s)		0.0			13.4			19.4			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline AM
6: 14th Street & Lakeside Dr.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	389	0	1	815	715	173	759	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		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.98		1.00	0.97			
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		0.99			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3516			3539	1548		3491	1531			
Flt Permitted		0.66			0.95	1.00		0.99	1.00			
Satd. Flow (perm)		2334			3378	1548		3491	1531			
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.92	0.96	0.92	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	423	0	1	886	745	188	791	37	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	95	0	0	17	0	0	0
Lane Group Flow (vph)	0	478	0	0	887	650	0	979	20	0	0	0
Confl. Peds. (#/hr)	35		35	6		6	26		26	2		2
Confl. Bikes (#/hr)			33			6		10				5
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		700			1013	464		1862	817			
v/s Ratio Prot												
v/s Ratio Perm		0.20			0.26	c0.42		0.28	0.01			
v/c Ratio		0.68			0.88	1.40		0.53	0.02			
Uniform Delay, d1		18.5			19.9	21.0		9.1	6.6			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		5.3			10.5	192.9		1.1	0.1			
Delay (s)		23.8			30.5	213.9		10.1	6.7			
Level of Service		C			C	F		B	A			
Approach Delay (s)		23.8			114.2			10.0			0.0	
Approach LOS		C			F			B			A	

Intersection Summary			
HCM Average Control Delay	66.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline AM
7: 7th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	699	565	0	0	0	0	0	0	276	1584	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.93									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5937									5040	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5937									5040	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	760	614	0	0	0	0	0	0	300	1616	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	47	0
Lane Group Flow (vph)	0	1370	0	0	0	0	0	0	0	0	1869	0
Confl. Peds. (#/hr)	4		4	10		10	8		8	11		11
Confl. Bikes (#/hr)			1						7			2
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2375									2240	
v/s Ratio Prot		c0.23										
v/s Ratio Perm											0.37	
v/c Ratio		0.95dr									0.83	
Uniform Delay, d1		10.5									11.0	
Progression Factor		1.00									1.00	
Incremental Delay, d2		1.0									3.8	
Delay (s)		11.6									14.9	
Level of Service		B									B	
Approach Delay (s)		11.6			0.0			0.0			14.9	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline AM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	504	180	0	0	0	0	0	0	64	980	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6072									5064	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6072									5064	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	0	548	196	0	0	0	0	0	0	70	1032	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	719	0	0	0	0	0	0	0	0	1090	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2328									2194	
v/s Ratio Prot		c0.12										
v/s Ratio Perm											0.22	
v/c Ratio		0.31									0.50	
Uniform Delay, d1		12.9									12.3	
Progression Factor		0.77									0.98	
Incremental Delay, d2		0.3									0.6	
Delay (s)		10.3									12.6	
Level of Service		B									B	
Approach Delay (s)		10.3			0.0			0.0			12.6	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	43.6%	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	0	0	526	1903	0	0	0	0	0	603	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6291						4935	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6291						4935	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	0	0	572	1962	0	0	0	0	0	615	113
RTOR Reduction (vph)	0	0	0	0	84	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	2450	0	0	0	0	0	727	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2726						2180	
v/s Ratio Prot											c0.15	
v/s Ratio Perm					0.39							
v/c Ratio					0.90						0.33	
Uniform Delay, d1					15.8						11.0	
Progression Factor					0.46						1.00	
Incremental Delay, d2					3.6						0.4	
Delay (s)					10.9						11.4	
Level of Service					B						B	
Approach Delay (s)		0.0			10.9			0.0			11.4	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	347	135	156	930	0	0	0	0	212	462	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.99	1.00	
Frt		0.96			1.00					1.00	0.99	
Flt Protected		1.00			0.99					0.95	1.00	
Satd. Flow (prot)		3349			3507					1589	3351	
Flt Permitted		1.00			0.78					0.95	1.00	
Satd. Flow (perm)		3349			2767					1589	3351	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	0	377	147	170	969	0	0	0	0	230	481	27
RTOR Reduction (vph)	0	85	0	0	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	439	0	0	1139	0	0	0	0	207	523	0
Confl. Peds. (#/hr)	36		36	28		28	18		18	16		16
Confl. Bikes (#/hr)			4			10			3			1
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1414			1168					671	1415	
v/s Ratio Prot		0.13										
v/s Ratio Perm					c0.41					0.13	0.16	
v/c Ratio		0.31			0.98					0.31	0.37	
Uniform Delay, d1		8.6			12.8					8.6	8.9	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		0.6			21.0					1.2	0.7	
Delay (s)		9.2			33.8					9.8	9.6	
Level of Service		A			C					A	A	
Approach Delay (s)		9.2			33.8			0.0			9.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.6%	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												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	18	293	13	59	192	0	0	128	55
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	20	318	14	64	209	0	0	139	60

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	179	173	273	199
Volume Left (vph)	20	0	64	0
Volume Right (vph)	0	14	0	60
Hadj (s)	0.09	-0.02	0.08	-0.15
Departure Headway (s)	5.8	5.7	5.2	5.1
Degree Utilization, x	0.29	0.27	0.39	0.28
Capacity (veh/h)	586	600	664	667
Control Delay (s)	9.9	9.6	11.5	10.0
Approach Delay (s)	9.8		11.5	10.0
Approach LOS	A		B	B

Intersection Summary			
Delay	10.4		
HCM Level of Service	B		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	191	19	1	1137	453	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.96	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1741			1863	1775	
Flt Permitted	0.96			1.00	1.00	
Satd. Flow (perm)	1741			1862	1775	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	21	1	1236	492	192
RTOR Reduction (vph)	0	0	0	0	28	0
Lane Group Flow (vph)	229	0	0	1237	656	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	20.0			22.0	22.0	
Effective Green, g (s)	20.0			22.0	22.0	
Actuated g/C Ratio	0.40			0.44	0.44	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	696			819	781	
v/s Ratio Prot	c0.13				0.37	
v/s Ratio Perm				c0.66		
v/c Ratio	0.33			1.51	0.84	
Uniform Delay, d1	10.4			14.0	12.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.3			236.0	10.5	
Delay (s)	11.6			250.0	23.0	
Level of Service	B			F	C	
Approach Delay (s)	11.6			250.0	23.0	
Approach LOS	B			F	C	

Intersection Summary			
HCM Average Control Delay	152.4	HCM Level of Service	F
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	68	240	116	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	74	261	126	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	161	174	126
Volume Left (vph)	74	0	126
Volume Right (vph)	0	0	0
Hadj (s)	0.26	0.03	0.23
Departure Headway (s)	5.1	4.9	4.9
Degree Utilization, x	0.23	0.24	0.17
Capacity (veh/h)	692	721	698
Control Delay (s)	8.4	8.2	8.9
Approach Delay (s)	8.3		8.9
Approach LOS	A		A

Intersection Summary			
Delay	8.5		
HCM Level of Service	A		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	76	1246	115	180	739	0	0	131	63
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	
Lane Util. Factor					0.86			0.95			0.95	
Frt					0.99			1.00			0.95	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6314			3505			3367	
Flt Permitted					1.00			0.83			1.00	
Satd. Flow (perm)					6314			2933			3367	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	83	1354	125	196	803	0	0	142	68
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	1539	0	0	999	0	0	207	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2263			1540			1768	
v/s Ratio Prot											0.06	
v/s Ratio Perm					0.24			c0.34				
v/c Ratio					0.68			0.65			0.12	
Uniform Delay, d1					16.3			10.3			7.2	
Progression Factor					1.55			1.00			1.00	
Incremental Delay, d2					0.8			2.1			0.1	
Delay (s)					26.2			12.4			7.3	
Level of Service					C			B			A	
Approach Delay (s)		0.0			26.2			12.4			7.3	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	62.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	NBL2	NBL	NBT	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations												
Volume (vph)	109	185	208	102	108	453	534	616	125	0	21	18
Ideal 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	0.94				0.95	0.91	0.91	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00				1.00	1.00	1.00	1.00		1.00	0.94
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	0.95	0.85	0.85		0.85	0.85
Flt Protected	0.95	0.98				0.98	1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	4725				3483	3232	1441	1583		1583	1490
Flt Permitted	0.95	0.98				0.98	1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	4725				3483	3232	1441	1583		1583	1490
Peak-hour factor, PHF	0.98	0.92	0.92	0.94	0.94	0.96	0.92	0.96	0.96	0.92	0.98	0.98
Adj. Flow (vph)	111	201	226	109	115	472	580	642	130	0	21	18
RTOR Reduction (vph)	0	168	0	0	0	0	0	0	64	0	0	14
Lane Group Flow (vph)	111	259	0	0	0	696	843	379	66	0	21	4
Confl. Peds. (#/hr)	16								102			32
Confl. Bikes (#/hr)						6			10			2
Turn Type	Prot			Split	Split			custom	custom		custom	custom
Protected Phases	5	1		8	8	8	2	6	6			
Permitted Phases		1						6			9	2
Actuated Green, G (s)	7.6	20.5				24.0	16.8	29.7	29.7		2.7	16.8
Effective Green, g (s)	7.6	20.5				24.0	16.8	29.7	29.7		2.7	16.8
Actuated g/C Ratio	0.10	0.26				0.30	0.21	0.37	0.37		0.03	0.21
Clearance Time (s)	4.0	4.0				4.0	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	2.0				2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	168	1211				1045	679	535	588		53	313
v/s Ratio Prot	c0.06	0.05				c0.20	c0.26	c0.26	0.04			
v/s Ratio Perm											c0.01	0.00
v/c Ratio	0.66	0.21				0.67	1.24	0.71	0.11		0.40	0.01
Uniform Delay, d1	35.0	23.4				24.5	31.6	21.5	16.5		37.9	25.0
Progression Factor	0.89	1.84				1.00	1.43	1.58	2.65		1.00	1.00
Incremental Delay, d2	9.0	0.4				1.3	119.7	6.9	0.3		1.8	0.0
Delay (s)	40.0	43.4				25.7	165.0	40.8	44.1		39.6	25.0
Level of Service	D	D				C	F	D	D		D	C
Approach Delay (s)		42.7				25.7	118.6			32.9		
Approach LOS		D				C	F			C		

Intersection Summary			
HCM Average Control Delay	77.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	577	90	566	1044	363	1148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	4982		3433	5085	3224	1441
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	4982		3433	5085	3224	1441
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.97
Adj. Flow (vph)	627	98	590	1135	395	1184
RTOR Reduction (vph)	26	0	0	0	340	340
Lane Group Flow (vph)	699	0	590	1135	647	252
Confl. Bikes (#/hr)				2		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	33.0		15.5	53.5	18.5	18.5
Effective Green, g (s)	33.0		15.5	53.5	18.5	18.5
Actuated g/C Ratio	0.41		0.19	0.67	0.23	0.23
Clearance Time (s)	5.0		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)	2055		665	3401	746	333
v/s Ratio Prot	0.14		c0.17	c0.22	c0.20	
v/s Ratio Perm						0.18
v/c Ratio	0.34		0.89	0.33	0.87	0.76
Uniform Delay, d1	16.1		31.4	5.7	29.6	28.7
Progression Factor	0.46		0.80	1.05	1.00	1.00
Incremental Delay, d2	0.4		14.8	0.2	10.4	9.5
Delay (s)	7.7		39.9	6.2	40.0	38.1
Level of Service	A		D	A	D	D
Approach Delay (s)	7.7			17.7	39.3	
Approach LOS	A			B	D	

Intersection Summary			
HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	118	259	101	846	834	150	265	1094	433	48	1387	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.94		1.00	0.90		0.99	
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		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	
Satd. Flow (prot)	3433	3539	1479	3433	3539	1484		5036	1419		4897	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.69	1.00		0.73	
Satd. Flow (perm)	3433	3539	1479	3433	3539	1484		3500	1419		3564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92
Adj. Flow (vph)	128	282	110	920	907	163	288	1189	471	52	1491	337
RTOR Reduction (vph)	0	0	1	0	0	72	0	0	301	0	35	0
Lane Group Flow (vph)	128	282	109	920	907	91	0	1477	170	0	1845	0
Confl. Peds. (#/hr)	38		38	34		34	60		60	28		28
Confl. Bikes (#/hr)			12			18			39			9
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	8.1	33.0	33.0	16.0	41.9	41.9		36.0	36.0		36.0	
Effective Green, g (s)	8.1	33.0	33.0	16.0	41.9	41.9		36.0	36.0		36.0	
Actuated g/C Ratio	0.08	0.33	0.33	0.16	0.42	0.42		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	278	1168	488	549	1483	622		1260	511		1283	
v/s Ratio Prot	0.04	0.08		c0.27	c0.26							
v/s Ratio Perm			0.07			0.06		0.42	0.12		c0.52	
v/c Ratio	0.46	0.24	0.22	1.68	0.61	0.15		3.84dl	0.33		1.44	
Uniform Delay, d1	43.9	24.4	24.2	42.0	22.7	18.0		32.0	23.3		32.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.5	1.1	312.0	1.9	0.5		86.2	1.7		201.8	
Delay (s)	44.3	24.9	25.3	354.0	24.6	18.5		118.2	25.0		233.8	
Level of Service	D	C	C	F	C	B		F	C		F	
Approach Delay (s)		29.7			176.4			95.7			233.8	
Approach LOS		C			F			F			F	

Intersection Summary			
HCM Average Control Delay	156.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	122.5%	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)	10	226	77	61	196	141	76	606	97	80	522	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.91	
Frpb, ped/bikes		0.98			0.96			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.95			0.98			0.99	
Flt Protected		1.00			0.99			1.00			0.99	
Satd. Flow (prot)		3341			3155			3405			4983	
Flt Permitted		0.94			0.85			0.80			0.76	
Satd. Flow (perm)		3146			2714			2750			3792	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	246	84	66	213	153	83	652	105	87	567	36
RTOR Reduction (vph)	0	53	0	0	86	0	0	19	0	0	10	0
Lane Group Flow (vph)	0	288	0	0	347	0	0	821	0	0	680	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1154			995			1406			1138	
v/s Ratio Prot								c0.07				
v/s Ratio Perm		0.09			c0.13			c0.21			0.18	
v/c Ratio		0.25			0.35			0.58			0.60	
Uniform Delay, d1		13.2			13.8			11.2			17.9	
Progression Factor		0.90			1.00			1.00			1.00	
Incremental Delay, d2		0.5			1.0			1.8			2.3	
Delay (s)		12.4			14.8			12.9			20.2	
Level of Service		B			B			B			C	
Approach Delay (s)		12.4			14.8			12.9			20.2	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.0%	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)	112	877	100	119	613	91	130	529	115	105	464	98
Ideal 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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98			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)	1757	3358			3326		1765	3539	1525	1763	3431	
Flt Permitted	0.21	1.00			0.57		0.35	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	388	3358			1898		652	3539	1525	691	3431	
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)	122	953	109	129	666	99	141	575	125	114	504	107
RTOR Reduction (vph)	0	10	0	0	11	0	0	0	32	0	23	0
Lane Group Flow (vph)	122	1052	0	0	883	0	141	575	93	114	589	0
Confl. Peds. (#/hr)	34		34	37		37	8		8	10		10
Confl. Bikes (#/hr)			11			8			35			7
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	37.0	37.0			37.0		35.0	35.0	35.0	35.0	35.0	
Effective Green, g (s)	37.0	37.0			37.0		35.0	35.0	35.0	35.0	35.0	
Actuated g/C Ratio	0.46	0.46			0.46		0.44	0.44	0.44	0.44	0.44	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	179	1553			878		285	1548	667	302	1501	
v/s Ratio Prot		0.31						0.16			0.17	
v/s Ratio Perm	0.31				c0.47		c0.22		0.06	0.17		
v/c Ratio	0.68	0.68			1.01		0.49	0.37	0.14	0.38	0.39	
Uniform Delay, d1	16.9	16.8			21.5		16.2	15.1	13.5	15.2	15.3	
Progression Factor	1.00	1.00			1.36		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.2	0.9			31.5		6.0	0.7	0.4	3.6	0.8	
Delay (s)	25.1	17.8			60.9		22.2	15.8	13.9	18.7	16.0	
Level of Service	C	B			E		C	B	B	B	B	
Approach Delay (s)		18.5			60.9			16.6			16.5	
Approach LOS		B			E			B			B	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.6%	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)	72	209	110	42	360	368	63	578	46	119	663	54
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	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1749	3307			3517	1543	1762	3484		1767	3494	
Flt Permitted	0.48	1.00			0.88	1.00	0.28	1.00		0.35	1.00	
Satd. Flow (perm)	891	3307			3102	1543	515	3484		647	3494	
Peak-hour factor, PHF	0.92	0.93	0.92	0.92	0.95	0.92	0.92	0.97	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	225	120	46	379	400	68	596	50	129	721	59
RTOR Reduction (vph)	0	69	0	0	0	101	0	7	0	0	7	0
Lane Group Flow (vph)	78	276	0	0	425	299	68	639	0	129	773	0
Confl. Peds. (#/hr)	25		25	18		13	19		13	6		6
Confl. Bikes (#/hr)		16	16	59		5		5	59			6
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)	377	1401			1314	654	230	1558		289	1562	
v/s Ratio Prot		0.08						0.18			c0.22	
v/s Ratio Perm	0.09				0.14	c0.19	0.13			0.20		
v/c Ratio	0.21	0.20			0.32	0.46	0.30	0.41		0.45	0.49	
Uniform Delay, d1	15.5	15.4			16.4	17.5	15.0	15.9		16.2	16.7	
Progression Factor	1.60	1.93			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.3			0.7	2.3	3.3	0.8		4.9	1.1	
Delay (s)	25.9	30.0			17.0	19.8	18.2	16.7		21.2	17.8	
Level of Service	C	C			B	B	B	B		C	B	
Approach Delay (s)		29.2			18.4			16.9			18.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: West Grand Avenue & Telegraph Avenue

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1019	451	86	533	83	253	325	39	132	451	97
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		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		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3427	1553	1770	3348		1769	3472		1758	3431	
Flt Permitted	0.22	1.00	1.00	0.16	1.00		0.33	1.00		0.52	1.00	
Satd. Flow (perm)	416	3427	1553	297	3348		608	3472		970	3431	
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	1061	490	93	579	90	275	342	42	143	490	105
RTOR Reduction (vph)	0	0	313	0	14	0	0	3	0	0	20	0
Lane Group Flow (vph)	149	1061	177	93	655	0	275	381	0	143	575	0
Confl. Peds. (#/hr)	4		4	4		4	4		4	11		11
Confl. Bikes (#/hr)			3			7			21			1
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	25.1	25.1	25.1	25.1	25.1		49.4	49.4		34.4	34.4	
Effective Green, g (s)	25.1	25.1	25.1	25.1	25.1		49.4	49.4		34.4	34.4	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.58	0.58		0.40	0.40	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	123	1012	459	88	989		497	2018		393	1389	
v/s Ratio Prot		0.31			0.20		c0.07	0.11			0.17	
v/s Ratio Perm	c0.36		0.11	0.31			c0.25			0.15		
v/c Ratio	1.21	1.05	0.39	1.06	0.66		0.55	0.19		0.36	0.41	
Uniform Delay, d1	30.0	30.0	23.8	30.0	26.2		9.6	8.4		17.7	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.04	1.06	
Incremental Delay, d2	148.8	41.8	2.4	112.2	3.5		0.8	0.2		2.5	0.9	
Delay (s)	178.7	71.8	26.3	142.2	29.7		10.3	8.6		20.9	20.1	
Level of Service	F	E	C	F	C		B	A		C	C	
Approach Delay (s)		68.0			43.4			9.3			20.3	
Approach LOS		E			D			A			C	

Intersection Summary			
HCM Average Control Delay	44.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
22: 27th Street & Telegraph Avenue

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	437	459	173	55	315	136	104	455	28	59	420	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1863	1561	1766	1863	1545	1763	3500		1765	3365	
Flt Permitted	0.31	1.00	1.00	0.48	1.00	1.00	0.24	1.00		0.33	1.00	
Satd. Flow (perm)	583	1863	1561	893	1863	1545	448	3500		621	3365	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	475	499	188	60	342	148	108	495	30	64	457	183
RTOR Reduction (vph)	0	0	89	0	0	99	0	6	0	0	61	0
Lane Group Flow (vph)	475	499	99	60	342	49	108	519	0	64	579	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	54.0	44.6	44.6	33.2	28.3	28.3	22.0	22.0		22.0	22.0	
Effective Green, g (s)	54.0	44.6	44.6	33.2	28.3	28.3	22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.64	0.52	0.52	0.39	0.33	0.33	0.26	0.26		0.26	0.26	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	666	978	819	399	620	514	116	906		161	871	
v/s Ratio Prot	c0.18	0.27		0.01	0.18			0.15			0.17	
v/s Ratio Perm	c0.28		0.06	0.05		0.03	c0.24			0.10		
v/c Ratio	0.71	0.51	0.12	0.15	0.55	0.10	0.93	0.57		0.40	0.67	
Uniform Delay, d1	10.0	13.1	10.2	16.3	23.2	19.5	30.8	27.4		26.0	28.2	
Progression Factor	1.00	1.00	1.00	0.73	0.72	0.51	0.95	0.92		1.00	1.00	
Incremental Delay, d2	3.0	1.9	0.3	0.1	3.4	0.4	57.3	0.5		0.6	1.5	
Delay (s)	13.0	15.0	10.5	12.0	20.0	10.4	86.4	25.6		26.6	29.7	
Level of Service	B	B	B	B	B	B	F	C		C	C	
Approach Delay (s)		13.5			16.5			36.0			29.4	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
23: West Grand Avenue & Northgate Avenue

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	247	728	847	157	989	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
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	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3439		3431	1414
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3439		3431	1414
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	268	791	921	171	1075	271
RTOR Reduction (vph)	0	0	19	0	2	162
Lane Group Flow (vph)	268	791	1073	0	1100	82
Confl. Peds. (#/hr)	14			11	6	6
Confl. Bikes (#/hr)				10		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	14.2	45.2	27.0		26.8	26.8
Effective Green, g (s)	14.2	45.2	27.0		26.8	26.8
Actuated g/C Ratio	0.18	0.57	0.34		0.34	0.34
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)	314	2000	1161		1149	474
v/s Ratio Prot	c0.15	0.22	c0.31		c0.32	
v/s Ratio Perm						0.06
v/c Ratio	0.85	0.40	0.92		0.96	0.17
Uniform Delay, d1	31.9	9.7	25.5		26.0	18.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	18.9	0.6	13.6		17.0	0.1
Delay (s)	50.8	10.3	39.1		43.0	18.8
Level of Service	D	B	D		D	B
Approach Delay (s)		20.6	39.1		38.6	
Approach LOS		C	D		D	

Intersection Summary			
HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: 27th Street & I-980 On Ramp

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	1058	0	0	189	370	6	329	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		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)	1609	3387			3539	2787		5008				
Flt Permitted	0.62	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1055	3216			3539	2787		5008				
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	1150	0	0	205	402	7	358	34	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	241	0	13	0	0	0	0
Lane Group Flow (vph)	193	1171	0	0	205	161	0	386	0	0	0	0
Confl. Peds. (#/hr)	2		2				6		6	4		4
Confl. Bikes (#/hr)									4			3
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	422	1286			1416	1115		2003				
v/s Ratio Prot					0.06							
v/s Ratio Perm	0.18	c0.36				0.06		0.08				
v/c Ratio	0.46	0.91			0.14	0.14		0.19				
Uniform Delay, d1	8.8	11.3			7.6	7.6		7.8				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	3.5	11.2			0.2	0.3		0.2				
Delay (s)	12.4	22.5			7.9	7.9		8.0				
Level of Service	B	C			A	A		A				
Approach Delay (s)		21.1			7.9			8.0			0.0	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline AM
25: 27th Street & I-980 Off Ramp — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	356	34	13	201	0	0	0	0	835	1167	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95					0.91	0.91	1.00
Frpb, ped/bikes		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
Frt		1.00	0.85		1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00					0.95	0.99	1.00
Satd. Flow (prot)		3539	1558		3527					1610	3366	1583
Flt Permitted		1.00	1.00		0.93					0.95	0.99	1.00
Satd. Flow (perm)		3539	1558		3282					1610	3366	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92
Adj. Flow (vph)	0	387	37	14	218	0	0	0	0	908	1255	440
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	0	0	0	213
Lane Group Flow (vph)	0	387	13	0	232	0	0	0	0	699	1464	227
Confl. Peds. (#/hr)	2		2	10		10	6		6			
Confl. Bikes (#/hr)			3			4			1			
Turn Type			Perm	Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		21.0	21.0		21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0	21.0		21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35	0.35		0.35					0.52	0.52	0.52
Clearance Time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1239	545		1149					832	1739	818
v/s Ratio Prot		c0.11										
v/s Ratio Perm			0.01		0.07					0.43	0.43	0.14
v/c Ratio		0.31	0.02		0.20					0.84	0.84	0.28
Uniform Delay, d1		14.2	12.8		13.6					12.4	12.4	8.2
Progression Factor		1.00	1.00		1.00					1.00	1.00	1.00
Incremental Delay, d2		0.7	0.1		0.4					10.0	5.1	0.8
Delay (s)		14.9	12.9		14.0					22.4	17.5	9.0
Level of Service		B	B		B					C	B	A
Approach Delay (s)		14.7			14.0			0.0			17.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline AM
26: West Grand Avenue & San Pablo Avenue — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	563	33	36	875	118	53	273	36	86	312	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	3.0	3.0		3.0	3.0	
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	0.96	1.00	1.00	0.98	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		1.00	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)		3536	1523	1760	3539	1549	1758	3461		1762	3537	
Flt Permitted		0.94	1.00	0.41	1.00	1.00	0.41	1.00		0.43	1.00	
Satd. Flow (perm)		3322	1523	759	3539	1549	753	3461		805	3537	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	11	612	36	39	951	128	55	281	37	93	339	1
RTOR Reduction (vph)	0	0	10	0	0	37	0	19	0	0	0	0
Lane Group Flow (vph)	0	623	26	39	951	91	55	299	0	93	340	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		53.6	53.6	53.6	53.6	53.6	14.4	14.4		14.4	14.4	
Effective Green, g (s)		53.6	53.6	53.6	53.6	53.6	14.4	14.4		14.4	14.4	
Actuated g/C Ratio		0.71	0.71	0.71	0.71	0.71	0.19	0.19		0.19	0.19	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
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)		2374	1088	542	2529	1107	145	665		155	679	
v/s Ratio Prot					c0.27			0.09			0.10	
v/s Ratio Perm		0.19	0.02	0.05		0.06	0.07			c0.12		
v/c Ratio		0.26	0.02	0.07	0.38	0.08	0.38	0.45		0.60	0.50	
Uniform Delay, d1		3.8	3.1	3.2	4.2	3.2	26.4	26.8		27.7	27.1	
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	0.0	0.3	0.4	0.1	0.6	0.2		4.4	0.2	
Delay (s)		4.0	3.1	3.5	4.6	3.4	27.0	27.0		32.1	27.3	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		4.0			4.4			27.0			28.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2030 Baseline Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	369	735	105	0	0	0	0	622	86	1	81	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.98			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		4919						1832			1862	
Flt Permitted		0.98						1.00			0.72	
Satd. Flow (perm)		1000						1300			1300	
Peak-hour factor, PHF	0.92	0.93	0.92	0.25	0.25	0.25	0.25	0.92	0.92	0.92	0.92	0.25
Adj. Flow (vph)	401	790	114	0	0	0	0	676	93	1	88	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	1280	0	0	0	0	0	758	0	0	89	0
Confl. Peds. (#/hr)	9		9	38		38				2		2
Confl. Bikes (#/hr)			11			4						2
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		500						631			448	
v/s Ratio Prot								c0.41				
v/s Ratio Perm		c1.28									0.07	
v/c Ratio		2.56						1.20			0.20	
Uniform Delay, d1		11.2						14.8			10.4	
Progression Factor		1.00						1.00			0.02	
Incremental Delay, d2		707.9						105.1			0.8	
Delay (s)		719.1						119.9			1.0	
Level of Service		F						F			A	
Approach Delay (s)		719.1			0.0			119.9			1.0	
Approach LOS		F			A			F			A	

Intersection Summary			
HCM Average Control Delay	476.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.01		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	215	731	84	71	926
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.89	0.85
Flt Protected			0.99		0.99	1.00
Satd. Flow (prot)			3499		3169	1441
Flt Permitted			0.99		0.99	1.00
Satd. Flow (perm)			3499		3169	1441
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.94
Adj. Flow (vph)	0	234	795	91	77	985
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1029	0	661	492
Confl. Peds. (#/hr)	46					
Confl. Bikes (#/hr)	3					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1267		1141	519
v/s Ratio Prot						
v/s Ratio Perm			0.29		0.21	c0.34
v/c Ratio			0.81		0.86dr	0.95
Uniform Delay, d1			13.0		11.6	14.0
Progression Factor			0.79		1.00	1.00
Incremental Delay, d2			0.5		2.1	28.5
Delay (s)			10.7		13.8	42.5
Level of Service			B		B	D
Approach Delay (s)			10.7		26.0	
Approach LOS			B		C	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
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)	226	1541	0	0	0	0	0	1102	1185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.92				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6351						4638				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6351						4638				
Peak-hour factor, PHF	0.92	0.98	0.25	0.25	0.25	0.25	0.25	0.94	0.96	0.25	0.25	0.25
Adj. Flow (vph)	246	1572	0	0	0	0	0	1172	1234	0	0	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1807	0	0	0	0	0	2404	0	0	0	0
Confl. Peds. (#/hr)	22		22	50		50	14		14	6		6
Confl. Bikes (#/hr)			16			1			2			2
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2540						1855				
v/s Ratio Prot								c0.52				
v/s Ratio Perm		0.28										
v/c Ratio		0.71						1.93dr				
Uniform Delay, d1		11.3						13.5				
Progression Factor		0.78						1.38				
Incremental Delay, d2		0.6						136.5				
Delay (s)		9.5						155.1				
Level of Service		A						F				
Approach Delay (s)		9.5			0.0			155.1			0.0	
Approach LOS		A			A			F			A	

Intersection Summary			
HCM Average Control Delay	92.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	87	0	0	1262	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	95	0	0	1372	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	349	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	619	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	95	343	343	343	343
Volume Left	95	0	0	0	0
Volume Right	0	0	0	0	0
cSH	619	1700	1700	1700	1700
Volume to Capacity	0.15	0.20	0.20	0.20	0.20
Queue Length 95th (ft)	13	0	0	0	0
Control Delay (s)	11.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline PM
5: 12th Street & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1289	76	436	1152	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6329			6107				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6329			6107				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.92	0.92	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	1357	83	474	1200	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1438	0	0	1662	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3154			2097				
v/s Ratio Prot					c0.23							
v/s Ratio Perm								0.27				
v/c Ratio					0.46			0.79				
Uniform Delay, d1					9.8			17.8				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.5			3.2				
Delay (s)					10.2			20.9				
Level of Service					B			C				
Approach Delay (s)		0.0			10.2			20.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline PM
6: 14th Street & Lakeside Dr.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	1166	0	0	540	331	239	742	49	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.92		1.00	0.96			
Flpb, ped/bikes		1.00			1.00	1.00		0.99	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3524			3539	1461		3472	1520			
Flt Permitted		0.80			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		2817			3539	1461		3472	1520			
Peak-hour factor, PHF	0.92	0.92	0.25	0.99	0.96	0.96	0.92	0.92	0.92	0.25	0.25	0.25
Adj. Flow (vph)	88	1267	0	0	562	345	260	807	53	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	87	0	0	1	0	0	0
Lane Group Flow (vph)	0	1355	0	0	562	258	0	1067	52	0	0	0
Confl. Peds. (#/hr)	36		36	52		52	35		35	10		10
Confl. Bikes (#/hr)			5			21						22
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		845			1062	438		1852	811			
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.48				0.18		0.31	0.03			
v/c Ratio		1.60			0.53	0.59		0.58	0.06			
Uniform Delay, d1		21.0			17.5	17.9		9.4	6.8			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		277.1			1.9	5.7		1.3	0.2			
Delay (s)		298.1			19.4	23.6		10.7	6.9			
Level of Service		F			B	C		B	A			
Approach Delay (s)		298.1			21.0			10.6			0.0	
Approach LOS		F			C			B			A	

Intersection Summary			
HCM Average Control Delay	128.6	HCM Level of Service	F
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline PM
7: 7th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1580	485	0	0	0	0	0	0	544	1756	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		1.00									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		6145									5015	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		6145									5015	
Peak-hour factor, PHF	0.25	0.99	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.95	0.25
Adj. Flow (vph)	0	1596	527	0	0	0	0	0	0	591	1848	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	2121	0	0	0	0	0	0	0	0	2437	0
Confl. Peds. (#/hr)	4		4	8		8	2		2	12		12
Confl. Bikes (#/hr)			2			2			2			
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2458									2229	
v/s Ratio Prot		c0.35										
v/s Ratio Perm											0.49	
v/c Ratio		0.86									1.09	
Uniform Delay, d1		12.4									12.5	
Progression Factor		1.00									1.00	
Incremental Delay, d2		4.3									49.9	
Delay (s)		16.7									62.4	
Level of Service		B									E	
Approach Delay (s)		16.7			0.0			0.0			62.4	
Approach LOS		B			A			A			E	

Intersection Summary			
HCM Average Control Delay	41.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline PM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1295	246	0	0	0	0	0	0	60	1100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.98									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6212									5068	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6212									5068	
Peak-hour factor, PHF	0.25	0.96	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.93	0.25
Adj. Flow (vph)	0	1349	267	0	0	0	0	0	0	65	1183	0
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	1601	0	0	0	0	0	0	0	0	1244	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2381									2196	
v/s Ratio Prot		c0.26										
v/s Ratio Perm											0.25	
v/c Ratio		0.67									0.57	
Uniform Delay, d1		15.4									12.8	
Progression Factor		0.81									0.56	
Incremental Delay, d2		1.5									0.9	
Delay (s)		14.0									8.1	
Level of Service		B									A	
Approach Delay (s)		14.0			0.0			0.0			8.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: 12th Street & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	316	1195	0	0	0	0	0	895	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6270						5026	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6270						5026	
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.97	0.25	0.25	0.25	0.25	0.25	0.92	0.92
Adj. Flow (vph)	0	0	0	343	1232	0	0	0	0	0	973	62
RTOR Reduction (vph)	0	0	0	0	27	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	1548	0	0	0	0	0	1026	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2717						2220	
v/s Ratio Prot											c0.20	
v/s Ratio Perm					0.25							
v/c Ratio					0.57						0.46	
Uniform Delay, d1					12.8						11.7	
Progression Factor					0.62						1.00	
Incremental Delay, d2					0.7						0.7	
Delay (s)					8.7						12.4	
Level of Service					A						B	
Approach Delay (s)		0.0			8.7			0.0			12.4	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	49.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: 14th Street & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	818	93	47	711	0	0	0	0	684	782	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.98	1.00	
Frt		0.98			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	0.99	
Satd. Flow (prot)		3463			3527					1578	3322	
Flt Permitted		1.00			0.85					0.95	0.99	
Satd. Flow (perm)		3463			3014					1578	3322	
Peak-hour factor, PHF	0.25	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.25	0.94	0.96	0.92
Adj. Flow (vph)	0	889	101	51	773	0	0	0	0	728	815	38
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	971	0	0	824	0	0	0	0	517	1058	0
Confl. Peds. (#/hr)	50		50	25		25	17		17	24		24
Confl. Bikes (#/hr)			16			17			2			
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1462			1273					666	1403	
v/s Ratio Prot		c0.28										
v/s Ratio Perm					0.27					c0.33	0.32	
v/c Ratio		0.66			0.65					0.78	0.75	
Uniform Delay, d1		10.4			10.3					11.2	11.0	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		2.4			2.6					8.6	3.8	
Delay (s)		12.8			12.9					19.8	14.8	
Level of Service		B			B					B	B	
Approach Delay (s)		12.8			12.9			0.0			16.5	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: 19th Street & Jackson Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	12	137	8	32	219	0	0	98	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	13	149	9	35	238	0	0	107	54

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	88	83	273	161
Volume Left (vph)	13	0	35	0
Volume Right (vph)	0	9	0	54
Hadj (s)	0.11	-0.04	0.06	-0.17
Departure Headway (s)	5.6	5.5	4.6	4.5
Degree Utilization, x	0.14	0.13	0.35	0.20
Capacity (veh/h)	596	614	753	755
Control Delay (s)	8.3	8.1	10.1	8.7
Approach Delay (s)	8.2		10.1	8.7
Approach LOS	A		B	A

Intersection Summary			
Delay	9.2		
HCM Level of Service	A		
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
12: Jackson Street & Lakeside Drive

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	245	32	14	1012	801	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.97	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1732			1861	1796	
Flt Permitted	0.96			0.54	1.00	
Satd. Flow (perm)	1732			1013	1796	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	35	15	1100	871	235
RTOR Reduction (vph)	0	0	0	0	20	0
Lane Group Flow (vph)	301	0	0	1115	1086	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	20.0			22.0	22.0	
Effective Green, g (s)	20.0			22.0	22.0	
Actuated g/C Ratio	0.40			0.44	0.44	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	693			446	790	
v/s Ratio Prot	c0.17				0.60	
v/s Ratio Perm				c1.10		
v/c Ratio	0.43			2.50	1.38	
Uniform Delay, d1	10.9			14.0	14.0	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	2.0			681.7	176.8	
Delay (s)	12.9			695.7	190.8	
Level of Service	B			F	F	
Approach Delay (s)	12.9			695.7	190.8	
Approach LOS	B			F	F	

Intersection Summary			
HCM Average Control Delay	392.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	38	242	174	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	41	263	189	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	129	175	189
Volume Left (vph)	41	0	189
Volume Right (vph)	0	0	0
Hadj (s)	0.19	0.03	0.23
Departure Headway (s)	5.2	5.0	4.9
Degree Utilization, x	0.19	0.25	0.26
Capacity (veh/h)	666	693	709
Control Delay (s)	8.2	8.5	9.5
Approach Delay (s)	8.3		9.5
Approach LOS	A		A

Intersection Summary			
Delay	8.8		
HCM Level of Service	A		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	58	808	97	145	551	0	0	75	28
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	
Lane Util. Factor					0.86			0.95			0.95	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6292			3503			3397	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					6292			3034			3397	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	63	878	105	158	599	0	0	82	30
RTOR Reduction (vph)	0	0	0	0	31	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	0	1015	0	0	757	0	0	98	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2255			1593			1783	
v/s Ratio Prot											0.03	
v/s Ratio Perm					0.16			c0.25				
v/c Ratio					0.45			0.48			0.05	
Uniform Delay, d1					14.7			9.0			7.0	
Progression Factor					1.62			1.00			1.00	
Incremental Delay, d2					0.5			1.0			0.1	
Delay (s)					24.4			10.0			7.0	
Level of Service					C			B			A	
Approach Delay (s)		0.0			24.4			10.0			7.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	NBL2	NBL	NBT	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations												
Volume (vph)	14	518	139	270	85	1020	235	405	118	0	81	126
Ideal 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	0.94				0.95	0.91	0.91	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
Flpb, ped/bikes	0.48	1.00				1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.97				1.00	0.93	0.85	0.85		0.85	0.85
Flt Protected	0.95	0.96				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	841	4893				3494	3155	1441	1583		1583	1554
Flt Permitted	0.95	0.96				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	841	4893				3494	3155	1441	1583		1583	1554
Peak-hour factor, PHF	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.98	0.98
Adj. Flow (vph)	14	563	151	293	92	1109	255	440	128	0	83	129
RTOR Reduction (vph)	0	71	0	0	0	0	0	0	71	0	0	97
Lane Group Flow (vph)	14	643	0	0	0	1494	475	220	57	0	83	32
Confl. Peds. (#/hr)	22								74			
Confl. Bikes (#/hr)						7			8			7
Turn Type	Prot			Split	Split			custom	custom		custom	custom
Protected Phases	5	1		8	8	8	2	6	6			
Permitted Phases		1						6			9	2
Actuated Green, G (s)	0.8	14.7				16.0	17.2	31.1	31.1		6.1	17.2
Effective Green, g (s)	0.8	14.7				16.0	17.2	31.1	31.1		6.1	17.2
Actuated g/C Ratio	0.01	0.21				0.23	0.25	0.44	0.44		0.09	0.25
Clearance Time (s)	4.0	4.0				4.0	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	2.0				2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	10	1028				799	775	640	703		138	382
v/s Ratio Prot	0.02	c0.13				c0.43	c0.15	0.15	0.04			
v/s Ratio Perm											c0.05	0.02
v/c Ratio	1.40	0.63				1.87	0.61	0.34	0.08		0.60	0.08
Uniform Delay, d1	34.6	25.1				27.0	23.4	12.8	11.2		30.8	20.3
Progression Factor	1.00	1.00				1.00	1.25	1.40	2.65		1.00	1.00
Incremental Delay, d2	438.6	2.9				396.2	0.9	1.3	0.2		5.0	0.0
Delay (s)	473.2	28.0				423.2	30.3	19.2	29.9		35.8	20.4
Level of Service	F	C				F	C	B	C		D	C
Approach Delay (s)		36.6				423.2	27.3			26.4		
Approach LOS		D				F	C			C		

Intersection Summary			
HCM Average Control Delay	210.9	HCM Level of Service	F
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1365	250	953	518	367	984
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	4468		3090	4577	2912	1297
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	4468		3090	4577	2912	1297
Peak-hour factor, PHF	0.95	0.92	0.99	0.92	0.92	0.93
Adj. Flow (vph)	1437	272	963	563	399	1058
RTOR Reduction (vph)	39	0	0	0	344	370
Lane Group Flow (vph)	1670	0	963	563	584	159
Confl. Bikes (#/hr)				16		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	18.0		19.0	41.0	21.0	21.0
Effective Green, g (s)	18.0		19.0	41.0	21.0	21.0
Actuated g/C Ratio	0.26		0.27	0.59	0.30	0.30
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)	1149		839	2681	874	389
v/s Ratio Prot	c0.37		c0.31	0.12	c0.20	
v/s Ratio Perm						0.12
v/c Ratio	1.45		1.15	0.21	0.67	0.41
Uniform Delay, d1	26.0		25.5	6.8	21.4	19.5
Progression Factor	0.93		1.00	1.00	1.00	1.00
Incremental Delay, d2	204.4		80.3	0.2	4.0	3.2
Delay (s)	228.6		105.8	7.0	25.5	22.7
Level of Service	F		F	A	C	C
Approach Delay (s)	228.6			69.4	24.5	
Approach LOS	F			E	C	

Intersection Summary			
HCM Average Control Delay	113.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

17: West Grand Avenue & Harrison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	392	820	168	436	1100	55	13	1260	1718	3	744	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.92		1.00	0.93		0.99	
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		0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1483	3433	3539	1458		5082	1466		4832	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.92	1.00		0.94	
Satd. Flow (perm)	3433	3539	1483	3433	3539	1458		4689	1466		4522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.93	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	426	891	183	445	1183	60	14	1370	1867	3	775	239
RTOR Reduction (vph)	0	0	27	0	0	8	0	0	237	0	56	0
Lane Group Flow (vph)	426	891	156	445	1183	52	0	1384	1630	0	961	0
Confl. Peds. (#/hr)	31		31	48		48	42		42	34		34
Confl. Bikes (#/hr)			22			15			22			20
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	15.1	33.7	33.7	15.3	34.9	34.9		36.0	36.0		36.0	
Effective Green, g (s)	15.1	33.7	33.7	15.3	34.9	34.9		36.0	36.0		36.0	
Actuated g/C Ratio	0.15	0.34	0.34	0.15	0.35	0.35		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	518	1193	500	525	1235	509		1688	528		1628	
v/s Ratio Prot	0.12	0.25		c0.13	c0.33							
v/s Ratio Perm			0.11			0.04		0.30	c1.11		0.21	
v/c Ratio	0.82	0.75	0.31	0.85	0.96	0.10		0.82	3.09		0.59	
Uniform Delay, d1	41.2	29.4	24.6	41.2	31.8	22.0		29.1	32.0		26.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	9.7	4.3	1.6	11.6	17.3	0.4		4.6	943.8		1.6	
Delay (s)	50.8	33.7	26.2	52.8	49.2	22.4		33.7	975.8		27.6	
Level of Service	D	C	C	D	D	C		C	F		C	
Approach Delay (s)		37.6			49.2			574.7			27.6	
Approach LOS		D			D			F			C	

Intersection Summary			
HCM Average Control Delay	273.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	165.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

18: 20th Street & Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	197	122	78	331	141	127	932	135	52	656	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.91	
Frpb, ped/bikes		0.97			0.97			0.99			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.96			0.98			0.99	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		3218			3237			3413			4989	
Flt Permitted		0.88			0.84			0.65			0.77	
Satd. Flow (perm)		2856			2743			2240			3877	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	32	214	133	85	360	153	138	1013	142	57	713	50
RTOR Reduction (vph)	0	84	0	0	33	0	0	16	0	0	12	0
Lane Group Flow (vph)	0	295	0	0	565	0	0	1277	0	0	808	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1047			1006			1220			1163	
v/s Ratio Prot								c0.12				
v/s Ratio Perm		0.10			c0.21			c0.38			0.21	
v/c Ratio		0.28			0.56			1.05			0.69	
Uniform Delay, d1		13.4			15.2			15.5			18.6	
Progression Factor		2.03			1.00			1.00			1.00	
Incremental Delay, d2		0.7			2.3			38.9			3.4	
Delay (s)		27.9			17.4			54.4			22.0	
Level of Service		C			B			D			C	
Approach Delay (s)		27.9			17.4			54.4			22.0	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	97.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

19: West Grand Avenue & Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	599	49	137	449	44	382	778	201	66	586	126
Ideal 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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	0.99	
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	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1765	3383			3350		1766	3539	1550	1756	3413	
Flt Permitted	0.27	1.00			0.59		0.29	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	509	3383			2000		547	3539	1550	506	3413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	651	53	149	488	48	415	819	218	72	637	137
RTOR Reduction (vph)	0	8	0	0	7	0	0	0	80	0	20	0
Lane Group Flow (vph)	114	696	0	0	678	0	415	819	138	72	754	0
Confl. Peds. (#/hr)	8		8	2		2	8		8	32		32
Confl. Bikes (#/hr)			6			6			4			28
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	30.9	30.9			30.9		41.1	41.1	41.1	41.1	41.1	
Effective Green, g (s)	30.9	30.9			30.9		41.1	41.1	41.1	41.1	41.1	
Actuated g/C Ratio	0.39	0.39			0.39		0.51	0.51	0.51	0.51	0.51	
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)	197	1307			773		281	1818	796	260	1753	
v/s Ratio Prot		0.21						0.23			0.22	
v/s Ratio Perm	0.22				c0.34		c0.76		0.09	0.14		
v/c Ratio	0.58	0.53			0.88		1.48	0.45	0.17	0.28	0.43	
Uniform Delay, d1	19.4	19.0			22.8		19.4	12.3	10.4	11.0	12.1	
Progression Factor	1.00	1.00			1.25		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.6	0.2			10.5		232.9	0.8	0.5	2.6	0.8	
Delay (s)	22.0	19.2			39.0		252.3	13.1	10.9	13.7	12.9	
Level of Service	C	B			D		F	B	B	B	B	
Approach Delay (s)		19.6			39.0			81.1			13.0	
Approach LOS		B			D			F			B	

Intersection Summary			
HCM Average Control Delay	45.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

20: 27th Street & Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	288	90	54	493	337	200	810	41	234	803	110
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	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1749	3373			3519	1536	1768	3509		1768	3455	
Flt Permitted	0.38	1.00			0.86	1.00	0.18	1.00		0.21	1.00	
Satd. Flow (perm)	706	3373			3047	1536	343	3509		394	3455	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	113	313	98	59	514	366	217	880	45	254	873	120
RTOR Reduction (vph)	0	35	0	0	0	44	0	4	0	0	13	0
Lane Group Flow (vph)	113	376	0	0	573	322	217	921	0	254	980	0
Confl. Peds. (#/hr)	32		32	10		10	6		6	5		5
Confl. Bikes (#/hr)			20			18			17			66
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)	299	1429			1290	651	153	1569		176	1545	
v/s Ratio Prot		0.11						0.26			0.28	
v/s Ratio Perm	0.16				0.19	c0.21	0.63			c0.64		
v/c Ratio	0.38	0.26			0.44	0.49	1.42	0.59		1.44	0.63	
Uniform Delay, d1	16.8	15.9			17.4	17.9	23.5	17.6		23.5	18.1	
Progression Factor	0.93	0.93			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.3			1.1	2.7	222.1	1.6		228.5	2.0	
Delay (s)	17.9	15.1			18.5	20.5	245.6	19.2		252.0	20.1	
Level of Service	B	B			B	C	F	B		F	C	
Approach Delay (s)		15.7			19.3			62.2			67.4	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	47.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline PM
21: West Grand Avenue & Telegraph Avenue — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	886	41	24	1074	157	122	688	43	176	549	135
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		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	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3427	1533	1764	3346		1769	3504		1762	3405	
Flt Permitted	0.16	1.00	1.00	0.16	1.00		0.27	1.00		0.35	1.00	
Satd. Flow (perm)	292	3427	1533	291	3346		510	3504		651	3405	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	38	963	45	26	1167	171	133	748	47	191	578	147
RTOR Reduction (vph)	0	0	32	0	13	0	0	5	0	0	24	0
Lane Group Flow (vph)	38	963	14	26	1325	0	133	790	0	191	701	0
Confl. Peds. (#/hr)	12		12	18		18	3		3	12		12
Confl. Bikes (#/hr)			8			6			10			28
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5		49.0	49.0		37.2	37.2	
Effective Green, g (s)	25.5	25.5	25.5	25.5	25.5		49.0	49.0		37.2	37.2	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.58	0.58		0.44	0.44	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	88	1028	460	87	1004		402	2020		285	1490	
v/s Ratio Prot		0.28			c0.40		0.03	c0.23			0.21	
v/s Ratio Perm	0.13		0.01	0.09			0.16			c0.29		
v/c Ratio	0.43	0.94	0.03	0.30	1.32		0.33	0.39		0.67	0.47	
Uniform Delay, d1	23.9	29.0	21.0	22.9	29.7		9.2	9.8		19.0	16.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.24	1.25	
Incremental Delay, d2	14.7	16.4	0.1	8.6	150.8		0.2	0.6		9.5	0.8	
Delay (s)	38.6	45.4	21.1	31.5	180.5		9.4	10.4		32.9	22.1	
Level of Service	D	D	C	C	F		A	B		C	C	
Approach Delay (s)		44.1			177.7			10.3			24.3	
Approach LOS		D			F			B			C	

Intersection Summary			
HCM Average Control Delay	75.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	85.0	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			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline PM
22: 27th Street & Telegraph Avenue — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	256	493	166	78	734	139	238	619	59	170	588	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1554	1769	1863	1552	1766	3482		1765	3257	
Flt Permitted	0.12	1.00	1.00	0.24	1.00	1.00	0.12	1.00		0.27	1.00	
Satd. Flow (perm)	232	1863	1554	444	1863	1552	225	3482		507	3257	
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	536	180	85	798	151	259	673	64	185	639	486
RTOR Reduction (vph)	0	0	111	0	0	71	0	9	0	0	162	0
Lane Group Flow (vph)	278	536	69	85	798	80	259	728	0	185	963	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)						10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	32.8	32.8	33.3	27.6	27.6	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	32.8	32.8	33.3	27.6	27.6	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.39	0.32	0.32	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	315	719	600	263	605	504	87	1352		197	1264	
v/s Ratio Prot	c0.11	0.29		0.02	c0.43			0.21			0.30	
v/s Ratio Perm	0.33		0.04	0.11		0.05	c1.15			0.37		
v/c Ratio	0.88	0.75	0.12	0.32	1.32	0.16	2.98	0.54		0.94	0.76	
Uniform Delay, d1	20.9	22.5	16.8	17.7	28.7	20.4	26.0	20.1		25.0	22.6	
Progression Factor	1.00	1.00	1.00	1.53	1.37	2.00	0.74	0.64		1.00	1.00	
Incremental Delay, d2	23.3	6.9	0.4	0.2	152.9	0.5	915.5	0.2		46.0	2.5	
Delay (s)	44.2	29.4	17.2	27.2	192.2	41.4	934.6	13.1		71.0	25.1	
Level of Service	D	C	B	C	F	D	F	B		E	C	
Approach Delay (s)		31.3			156.6			252.8			31.6	
Approach LOS		C			F			F			C	

Intersection Summary			
HCM Average Control Delay	112.2	HCM Level of Service	F
HCM Volume to Capacity ratio	2.02		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	113.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline PM
23: West Grand Avenue & Northgate Avenue — 222 19th Street Transportation Study

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	356	739	807	573	245	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.94		0.99	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00
Satd. Flow (prot)	1770	3539	3276		3415	1421
Flt Permitted	0.95	1.00	1.00		0.96	1.00
Satd. Flow (perm)	1770	3539	3276		3415	1421
Peak-hour factor, PHF	0.92	0.93	0.92	0.97	0.92	0.92
Adj. Flow (vph)	387	795	877	591	266	147
RTOR Reduction (vph)	0	0	136	0	9	111
Lane Group Flow (vph)	387	795	1332	0	276	17
Confl. Peds. (#/hr)	14			18		
Confl. Bikes (#/hr)				7		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	27.5	61.1	29.6		10.9	10.9
Effective Green, g (s)	27.5	61.1	29.6		10.9	10.9
Actuated g/C Ratio	0.34	0.76	0.37		0.14	0.14
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)	608	2703	1212		465	194
v/s Ratio Prot	c0.22	0.22	c0.41		c0.08	
v/s Ratio Perm						0.01
v/c Ratio	0.64	0.29	1.10		0.59	0.09
Uniform Delay, d1	22.1	2.9	25.2		32.5	30.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.3	57.3		1.4	0.1
Delay (s)	23.7	3.2	82.5		33.8	30.3
Level of Service	C	A	F		C	C
Approach Delay (s)		9.9	82.5		32.7	
Approach LOS		A	F		C	

Intersection Summary			
HCM Average Control Delay	47.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline PM
24: 27th Street & I-980 On Ramp — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	799	0	0	314	1197	27	1053	96	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		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)	1609	3382			3539	2787		5010				
Flt Permitted	0.55	0.92			1.00	1.00		1.00				
Satd. Flow (perm)	926	3133			3539	2787		5010				
Peak-hour factor, PHF	0.93	0.92	0.25	0.25	0.92	0.97	0.92	0.92	0.92	0.25	0.25	0.25
Adj. Flow (vph)	323	868	0	0	341	1234	29	1145	104	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	23	0	26	0	0	0	0
Lane Group Flow (vph)	278	913	0	0	341	1211	0	1252	0	0	0	0
Confl. Peds. (#/hr)	2		2				4		4	3		3
Confl. Bikes (#/hr)			4						5			7
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	370	1253			1416	1115		2004				
v/s Ratio Prot					0.10							
v/s Ratio Perm	0.30	0.29				c0.43		0.25				
v/c Ratio	0.75	0.73			0.24	1.09		0.62				
Uniform Delay, d1	10.3	10.2			8.0	12.0		9.6				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	13.2	3.7			0.4	53.6		1.5				
Delay (s)	23.4	13.9			8.4	65.6		11.1				
Level of Service	C	B			A	E		B				
Approach Delay (s)		16.1			53.2			11.1			0.0	
Approach LOS		B			D			B			A	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	601	47	14	297	0	0	0	0	473	352	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95					0.91	0.91	1.00
Frpb, ped/bikes		1.00	0.98		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		1.00	1.00		1.00					0.95	0.98	1.00
Satd. Flow (prot)		3539	1552		3531					1605	3325	1558
Flt Permitted		1.00	1.00		0.92					0.95	0.98	1.00
Satd. Flow (perm)		3539	1552		3266					1605	3325	1558
Peak-hour factor, PHF	0.25	0.95	0.92	0.92	0.92	0.25	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	0	633	51	15	323	0	0	0	0	514	383	258
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	0	0	0	125
Lane Group Flow (vph)	0	633	18	0	338	0	0	0	0	293	604	133
Confl. Peds. (#/hr)	4		4	4		4	1		1	3		3
Confl. Bikes (#/hr)			5			9			1			1
Turn Type			Perm	Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		21.0	21.0		21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0	21.0		21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35	0.35		0.35					0.52	0.52	0.52
Clearance Time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1239	543		1143					829	1718	805
v/s Ratio Prot		c0.18										
v/s Ratio Perm			0.01		0.10					c0.18	0.18	0.09
v/c Ratio		0.51	0.03		0.30					0.35	0.35	0.17
Uniform Delay, d1		15.4	12.8		14.1					8.6	8.6	7.7
Progression Factor		1.00	1.00		1.00					1.00	1.00	1.00
Incremental Delay, d2		1.5	0.1		0.7					1.2	0.6	0.4
Delay (s)		16.9	12.9		14.8					9.8	9.1	8.1
Level of Service		B	B		B					A	A	A
Approach Delay (s)		16.6			14.8			0.0			9.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.3%	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)	179	947	173	53	825	82	431	563	106	145	455	167
Ideal 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		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.96	1.00	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	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)		3510	1522	1767	3539	1548	1763	3438		1765	3376	
Flt Permitted		0.59	1.00	0.11	1.00	1.00	0.31	1.00		0.30	1.00	
Satd. Flow (perm)		2088	1522	211	3539	1548	574	3438		563	3376	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	195	1029	188	58	897	89	444	580	109	158	495	182
RTOR Reduction (vph)	0	0	92	0	0	47	0	20	0	0	49	0
Lane Group Flow (vph)	0	1224	96	58	897	42	444	669	0	158	628	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		35.6	35.6	35.6	35.6	35.6	31.4	31.4		31.4	31.4	
Effective Green, g (s)		35.6	35.6	35.6	35.6	35.6	31.4	31.4		31.4	31.4	
Actuated g/C Ratio		0.47	0.47	0.47	0.47	0.47	0.42	0.42		0.42	0.42	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	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)		991	722	100	1680	735	240	1439		236	1413	
v/s Ratio Prot					0.25			0.19			0.19	
v/s Ratio Perm		c0.59	0.06	0.27		0.03	c0.77			0.28		
v/c Ratio		1.24	0.13	0.58	0.53	0.06	1.85	0.46		0.67	0.44	
Uniform Delay, d1		19.7	11.0	14.3	13.9	10.6	21.8	15.7		17.6	15.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		114.6	0.4	22.2	1.2	0.1	398.2	0.1		5.5	0.1	
Delay (s)		134.3	11.4	36.5	15.1	10.8	420.0	15.8		23.1	15.7	
Level of Service		F	B	D	B	B	F	B		C	B	
Approach Delay (s)		117.9			15.9			174.2			17.1	
Approach LOS		F			B			F			B	

Intersection Summary			
HCM Average Control Delay	89.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	112.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Existing plus Project Conditions
AM Peak Hour

HCM Signalized Intersection Capacity Analysis
1: 5th St. & Oak St.

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	305	577	152	0	0	0	0	230	68	3	117	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.97			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		4852						1795			1858	
Flt Permitted		0.99						1.00			0.98	
Satd. Flow (perm)		1850						1500			1600	
Peak-hour factor, PHF	0.95	0.89	0.81	0.92	0.92	0.92	0.92	0.82	0.74	0.38	0.77	0.92
Adj. Flow (vph)	321	648	188	0	0	0	0	280	92	8	152	0
RTOR Reduction (vph)	0	64	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	1094	0	0	0	0	0	346	0	0	160	0
Confl. Peds. (#/hr)	14		14	52		52	1		1	4		4
Confl. Bikes (#/hr)			5			2						
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		925						618			551	
v/s Ratio Prot								c0.19				
v/s Ratio Perm		c0.59									0.10	
v/c Ratio		1.18						0.56			0.29	
Uniform Delay, d1		11.2						12.0			10.7	
Progression Factor		1.00						1.00			0.98	
Incremental Delay, d2		93.1						3.6			1.1	
Delay (s)		104.3						15.6			11.7	
Level of Service		F						B			B	
Approach Delay (s)		104.3			0.0			15.6			11.7	
Approach LOS		F			A			B			B	

Intersection Summary			
HCM Average Control Delay	76.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 7th St. & Oak St.

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	483	0	0	0	0	0	947	247	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6328						4878				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6328						4878				
Peak-hour factor, PHF	0.93	0.91	0.92	0.92	0.92	0.92	0.92	0.85	0.71	0.92	0.92	0.92
Adj. Flow (vph)	124	531	0	0	0	0	0	1114	348	0	0	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	99	0	0	0	0
Lane Group Flow (vph)	0	641	0	0	0	0	0	1363	0	0	0	0
Confl. Peds. (#/hr)	22		22	59		59	12		12	5		5
Confl. Bikes (#/hr)			6			4			2			1
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2531						1951				
v/s Ratio Prot								c0.28				
v/s Ratio Perm		0.10										
v/c Ratio		0.25						0.70				
Uniform Delay, d1		9.0						11.2				
Progression Factor		0.80						0.75				
Incremental Delay, d2		0.2						1.8				
Delay (s)		7.5						10.2				
Level of Service		A						B				
Approach Delay (s)		7.5			0.0			10.2			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 6th St. & Oak St.

Existing plus Project AM
222 19th Street Transportation Study

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	123	431	120	48	744
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.90	0.85
Flt Protected			0.99		0.98	1.00
Satd. Flow (prot)			3491		3200	1441
Flt Permitted			0.99		0.98	1.00
Satd. Flow (perm)			3491		3200	1441
Peak-hour factor, PHF	0.92	0.75	0.96	0.77	0.86	0.89
Adj. Flow (vph)	0	164	449	156	56	836
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	613	0	630	418
Confl. Peds. (#/hr)	51	2				
Confl. Bikes (#/hr)	2					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1265		1152	519
v/s Ratio Prot						
v/s Ratio Perm			0.18		0.20	c0.29
v/c Ratio			0.48		0.55	0.81
Uniform Delay, d1			11.1		11.5	13.0
Progression Factor			0.80		1.00	1.00
Incremental Delay, d2			0.6		1.9	12.6
Delay (s)			9.5		13.3	25.5
Level of Service			A		B	C
Approach Delay (s)			9.5		18.2	
Approach LOS			A		B	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: 11th Street & Oak Street

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	56	0	0	912	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	64	0	0	921	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	242	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	242	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	100	100			
cM capacity (veh/h)	718	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	64	230	230	230	230
Volume Left	64	0	0	0	0
Volume Right	0	0	0	0	0
cSH	718	1700	1700	1700	1700
Volume to Capacity	0.09	0.14	0.14	0.14	0.14
Queue Length 95th (ft)	7	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.5	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	23.2%	ICU Level of Service	A
Analysis Period (min)	15		

5: 12th St. & Oak St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	1431	66	275	677	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6338			6165				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6338			6165				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.87	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1475	76	296	736	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	12	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1539	0	0	1024	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3158			2117				
v/s Ratio Prot					c0.24							
v/s Ratio Perm								0.17				
v/c Ratio					0.49			0.48				
Uniform Delay, d1					10.0			15.5				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.5			0.8				
Delay (s)					10.5			16.3				
Level of Service					B			B				
Approach Delay (s)		0.0			10.5			16.3			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Existing plus Project AM
222 19th Street Transportation Study

6: 14th Street & Lakeside Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↰↑	↱		↰↑	↱			
Volume (vph)	34	261	0	0	547	480	116	514	23	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.98		1.00	0.97			
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		0.99			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3513			3539	1548		3489	1531			
Flt Permitted		0.83			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		2945			3539	1548		3489	1531			
Peak-hour factor, PHF	0.85	0.89	0.92	0.96	0.88	0.96	0.85	0.96	0.72	0.92	0.92	0.92
Adj. Flow (vph)	40	293	0	0	622	500	136	535	32	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	182	0	0	15	0	0	0
Lane Group Flow (vph)	0	333	0	0	622	318	0	671	17	0	0	0
Confl. Peds. (#/hr)	35		35	6		6	26		26	2		2
Confl. Bikes (#/hr)			33			6		10				5
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		884			1062	464		1861	817			
v/s Ratio Prot					0.18							
v/s Ratio Perm		0.11				c0.21		0.19	0.01			
v/c Ratio		0.38			0.59	0.69		0.36	0.02			
Uniform Delay, d1		16.6			17.8	18.5		8.1	6.6			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		1.2			2.4	8.0		0.5	0.0			
Delay (s)		17.8			20.2	26.5		8.6	6.7			
Level of Service		B			C	C		A	A			
Approach Delay (s)		17.8			23.0			8.5			0.0	
Approach LOS		B			C			A			A	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Existing plus Project AM
222 19th Street Transportation Study

7: 7th St. & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑	
Volume (vph)	0	469	240	0	0	0	0	0	0	125	550	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.95									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		6035									5028	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		6035									5028	
Peak-hour factor, PHF	0.92	0.92	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.98	0.92
Adj. Flow (vph)	0	510	279	0	0	0	0	0	0	140	561	0
RTOR Reduction (vph)	0	118	0	0	0	0	0	0	0	0	78	0
Lane Group Flow (vph)	0	671	0	0	0	0	0	0	0	0	623	0
Confl. Peds. (#/hr)	4		4	10		10	8		8	11		11
Confl. Bikes (#/hr)			1						7			2
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2414									2235	
v/s Ratio Prot		c0.11										
v/s Ratio Perm											0.12	
v/c Ratio		0.28									0.28	
Uniform Delay, d1		9.1									7.9	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.3									0.3	
Delay (s)		9.4									8.2	
Level of Service		A									A	
Approach Delay (s)		9.4			0.0			0.0			8.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Existing plus Project AM
222 19th Street Transportation Study

8: 11th Street & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑	
Volume (vph)	0	338	121	0	0	0	0	0	0	22	682	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6067									5067	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6067									5067	
Peak-hour factor, PHF	0.92	0.86	0.84	0.92	0.92	0.92	0.92	0.92	0.92	0.55	0.95	0.92
Adj. Flow (vph)	0	393	144	0	0	0	0	0	0	40	718	0
RTOR Reduction (vph)	0	68	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	469	0	0	0	0	0	0	0	0	748	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2326									2196	
v/s Ratio Prot		c0.08										
v/s Ratio Perm											0.15	
v/c Ratio		0.20									0.34	
Uniform Delay, d1		12.4									11.3	
Progression Factor		0.76									1.17	
Incremental Delay, d2		0.2									0.4	
Delay (s)		9.7									13.6	
Level of Service		A									B	
Approach Delay (s)		9.7			0.0			0.0			13.6	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: 12th St. & Madison Street

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	353	1277	0	0	0	0	0	342	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.97	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6290						4905	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6290						4905	
Peak-hour factor, PHF	0.92	0.92	0.92	0.91	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.81
Adj. Flow (vph)	0	0	0	388	1316	0	0	0	0	0	349	80
RTOR Reduction (vph)	0	0	0	0	88	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	1616	0	0	0	0	0	421	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2726						2166	
v/s Ratio Prot											c0.09	
v/s Ratio Perm					0.26							
v/c Ratio					0.59						0.19	
Uniform Delay, d1					13.0						10.2	
Progression Factor					0.48						1.00	
Incremental Delay, d2					0.8						0.2	
Delay (s)					7.1						10.4	
Level of Service					A						B	
Approach Delay (s)		0.0			7.1			0.0			10.4	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
11: 19th Street & Jackson Street

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	12	204	9	41	129	0	0	86	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	13	222	10	45	140	0	0	93	54

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	124	121	185	148
Volume Left (vph)	13	0	45	0
Volume Right (vph)	0	10	0	54
Hadj (s)	0.09	-0.02	0.08	-0.19
Departure Headway (s)	5.4	5.3	4.8	4.6
Degree Utilization, x	0.19	0.18	0.25	0.19
Capacity (veh/h)	631	647	717	741
Control Delay (s)	8.4	8.2	9.3	8.6
Approach Delay (s)	8.3		9.3	8.6
Approach LOS	A		A	A

Intersection Summary			
Delay	8.7		
HCM Level of Service	A		
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
10: 14th Street & Madison Street

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	233	65	21	621	0	0	0	0	50	308	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.99	1.00	
Frt		0.97			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	1.00	
Satd. Flow (prot)		3383			3529					1589	3345	
Flt Permitted		1.00			0.93					0.95	1.00	
Satd. Flow (perm)		3383			3286					1589	3345	
Peak-hour factor, PHF	0.92	0.75	0.70	0.66	0.96	0.92	0.92	0.92	0.92	0.74	0.96	0.71
Adj. Flow (vph)	0	311	93	32	647	0	0	0	0	68	321	24
RTOR Reduction (vph)	0	54	0	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	350	0	0	679	0	0	0	0	61	340	0
Confl. Peds. (#/hr)	36		36	28		28	18		18	16		16
Confl. Bikes (#/hr)			4			10			3			1
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1428			1387					671	1412	
v/s Ratio Prot		0.10										
v/s Ratio Perm					c0.21					0.04	0.10	
v/c Ratio		0.25			0.49					0.09	0.24	
Uniform Delay, d1		8.4			9.5					7.8	8.4	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		0.4			1.2					0.3	0.4	
Delay (s)		8.8			10.7					8.1	8.8	
Level of Service		A			B					A	A	
Approach Delay (s)		8.8			10.7			0.0			8.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Jackson Street & Lakeside Drive

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	128	4	1	763	304	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0			4.0	4.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.95	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1766			3539	3346	
Flt Permitted	0.95			0.95	1.00	
Satd. Flow (perm)	1766			3379	3346	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	139	4	1	829	330	143
RTOR Reduction (vph)	0	0	0	0	73	0
Lane Group Flow (vph)	143	0	0	830	400	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			Perm			
Protected Phases	4			2	6	
Permitted Phases			2			
Actuated Green, G (s)	16.0			22.0	22.0	
Effective Green, g (s)	16.0			22.0	22.0	
Actuated g/C Ratio	0.36			0.49	0.49	
Clearance Time (s)	3.0			4.0	4.0	
Lane Grp Cap (vph)	628			1652	1636	
v/s Ratio Prot	c0.08				0.12	
v/s Ratio Perm				c0.25		
v/c Ratio	0.23			0.50	0.24	
Uniform Delay, d1	10.2			7.8	6.7	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.8			1.1	0.4	
Delay (s)	11.0			8.9	7.0	
Level of Service	B			A	A	
Approach Delay (s)	11.0			8.9	7.0	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

13: 19th Street & Alice Street

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	78	216	78	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	85	235	85	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	163	157	85
Volume Left (vph)	85	0	85
Volume Right (vph)	0	0	0
Hadj (s)	0.29	0.03	0.23
Departure Headway (s)	5.0	4.8	4.9
Degree Utilization, x	0.23	0.21	0.11
Capacity (veh/h)	706	740	703
Control Delay (s)	8.3	7.8	8.5
Approach Delay (s)	8.0		8.5
Approach LOS	A		A

Intersection Summary			
Delay	8.1		
HCM Level of Service	A		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

15: 20th Street & Harrison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Volume (vph)	111	31	156	11	104	34	50	30	249	15	311	168
Ideal 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	0.91	0.91		1.00	0.95				0.95		0.91	0.91
Frpb, ped/bikes	1.00	1.00		1.00	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	0.88		1.00	0.96				0.99		0.99	0.85
Flt Protected	0.95	1.00		0.95	1.00				0.99		1.00	1.00
Satd. Flow (prot)	3221	1492		1770	3410				3470		3366	1441
Flt Permitted	0.95	1.00		0.95	1.00				0.99		1.00	1.00
Satd. Flow (perm)	3221	1492		1770	3410				3470		3366	1441
Peak-hour factor, PHF	0.79	0.82	0.83	0.69	0.84	0.84	0.94	0.94	0.96	0.75	0.85	0.96
Adj. Flow (vph)	141	38	188	16	124	40	53	32	259	20	366	175
RTOR Reduction (vph)	0	149	0	0	0	0	0	0	5	0	0	0
Lane Group Flow (vph)	127	91	0	16	164	0	0	0	359	0	384	157
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)		2							6			
Turn Type	custom			Split			Split	Split				custom
Protected Phases	1	1		7	7		8	8	8		2	6
Permitted Phases	1											6
Actuated Green, G (s)	16.6	16.6		7.4	7.4				24.0		16.0	36.6
Effective Green, g (s)	16.6	16.6		7.4	7.4				24.0		16.0	36.6
Actuated g/C Ratio	0.21	0.21		0.09	0.09				0.30		0.20	0.46
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)	668	310		164	315				1041		673	659
v/s Ratio Prot	0.04	c0.06		0.01	c0.05				c0.10		c0.11	0.11
v/s Ratio Perm												
v/c Ratio	0.19	0.29		0.10	0.52				0.34		0.57	0.24
Uniform Delay, d1	26.2	26.8		33.2	34.6				21.9		28.9	13.2
Progression Factor	0.89	0.78		0.88	0.89				1.00		1.13	1.11
Incremental Delay, d2	0.6	2.4		0.1	0.7				0.1		0.7	0.8
Delay (s)	23.9	23.4		29.2	31.7				21.9		33.2	15.5
Level of Service	C	C		C	C				C		C	B
Approach Delay (s)		23.6			31.5				21.9		27.7	
Approach LOS		C			C				C		C	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

14: 12th St. & Harrison St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	51	841	77	121	496	0	0	88	42
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	
Lane Util. Factor					0.86			0.95			0.95	
Frpb, ped/bikes					1.00			1.00			0.98	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.99			1.00			0.95	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6272			3453			3296	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					6272			2995			3296	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	55	914	84	132	539	0	0	96	46
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	0	0	0	1031	0	0	671	0	0	130	0
Confl. Peds. (#/hr)	30		30	42		42	86		86	50		50
Confl. Bikes (#/hr)			3						1			3
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2247			1572			1730	
v/s Ratio Prot											0.04	
v/s Ratio Perm					0.16			c0.22				
v/c Ratio					0.46			0.43			0.08	
Uniform Delay, d1					14.8			8.7			7.0	
Progression Factor					1.44			1.00			1.00	
Incremental Delay, d2					0.6			0.8			0.1	
Delay (s)					21.8			9.6			7.1	
Level of Service					C			A			A	
Approach Delay (s)		0.0			21.8			9.6			7.1	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

15: 20th Street & Harrison Street

Movement	SBR2
Lane Configurations	
Volume (vph)	23
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	24
RTOR Reduction (vph)	13
Lane Group Flow (vph)	11
Confl. Peds. (#/hr)	102
Confl. Bikes (#/hr)	10
Turn Type	custom
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	36.6
Effective Green, g (s)	36.6
Actuated g/C Ratio	0.46
Clearance Time (s)	4.0
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	724
v/s Ratio Prot	0.01
v/s Ratio Perm	
v/c Ratio	0.02
Uniform Delay, d1	11.9
Progression Factor	1.66
Incremental Delay, d2	0.0
Delay (s)	19.8
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	370	0	0	654	393	499
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			4.0	4.0	4.0
Lane Util. Factor	0.94			0.91	0.95	0.76
Frpb, ped/bikes	1.00			1.00	1.00	0.97
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	4990			5085	3539	3510
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	4990			5085	3539	3510
Peak-hour factor, PHF	0.90	0.92	0.92	0.97	0.96	0.90
Adj. Flow (vph)	411	0	0	674	409	554
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	411	0	0	674	409	554
Confl. Peds. (#/hr)						14
Confl. Bikes (#/hr)						2
Turn Type						Free
Protected Phases	1			2	2	
Permitted Phases						Free
Actuated Green, G (s)	12.0			59.0	59.0	80.0
Effective Green, g (s)	12.0			59.0	59.0	80.0
Actuated g/C Ratio	0.15			0.74	0.74	1.00
Clearance Time (s)	5.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	749			3750	2610	3510
v/s Ratio Prot	c0.08			c0.13	0.12	
v/s Ratio Perm						0.16
v/c Ratio	0.55			0.18	0.16	0.16
Uniform Delay, d1	31.5			3.2	3.1	0.0
Progression Factor	0.87			1.00	0.97	1.00
Incremental Delay, d2	0.8			0.1	0.1	0.1
Delay (s)	28.2			3.3	3.2	0.1
Level of Service	C			A	A	A
Approach Delay (s)	28.2			3.3	1.4	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	27.9%	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)	7	129	52	41	135	117	51	405	58	54	350	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.98			0.95			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.94			0.98			0.99	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		3308			3110			3410			3456	
Flt Permitted		0.94			0.88			0.88			0.80	
Satd. Flow (perm)		3126			2757			3013			2792	
Peak-hour factor, PHF	0.88	0.81	0.76	0.79	0.90	0.87	0.91	0.93	0.91	0.78	0.89	0.79
Adj. Flow (vph)	8	159	68	52	150	134	56	435	64	69	393	28
RTOR Reduction (vph)	0	43	0	0	85	0	0	17	0	0	7	0
Lane Group Flow (vph)	0	192	0	0	251	0	0	538	0	0	483	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1146			1011			1503			838	
v/s Ratio Prot								c0.04				
v/s Ratio Perm		0.06			c0.09			0.13			c0.17	
v/c Ratio		0.17			0.25			0.36			0.58	
Uniform Delay, d1		12.8			13.2			9.7			17.8	
Progression Factor		0.83			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.6			0.7			2.9	
Delay (s)		11.0			13.8			10.3			20.7	
Level of Service		B			B			B			C	
Approach Delay (s)		11.0			13.8			10.3			20.7	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.0
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)	53	126	77	348	465	101	103	656	302	28	583	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.94		1.00	0.90		0.99	
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		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	
Satd. Flow (prot)	3433	3539	1479	3433	3539	1485		5034	1419		4940	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.69	1.00		0.79	
Satd. Flow (perm)	3433	3539	1479	3433	3539	1485		3517	1419		3914	
Peak-hour factor, PHF	0.74	0.81	0.65	0.89	0.80	0.52	0.83	0.88	0.82	0.50	0.93	0.79
Adj. Flow (vph)	72	156	118	391	581	194	124	745	368	56	627	96
RTOR Reduction (vph)	0	0	48	0	0	108	0	0	236	0	19	0
Lane Group Flow (vph)	72	156	70	391	581	86	0	869	132	0	760	0
Confl. Peds. (#/hr)	38		38	34		34	60		60	28		28
Confl. Bikes (#/hr)			12			18			39			9
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	5.6	34.4	34.4	14.6	44.4	44.4		36.0	36.0		36.0	
Effective Green, g (s)	5.6	34.4	34.4	14.6	44.4	44.4		36.0	36.0		36.0	
Actuated g/C Ratio	0.06	0.34	0.34	0.15	0.44	0.44		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	192	1217	509	501	1571	659		1266	511		1409	
v/s Ratio Prot	0.02	0.04		c0.11	c0.16							
v/s Ratio Perm			0.05			0.06		c0.25	0.09		0.19	
v/c Ratio	0.38	0.13	0.14	0.78	0.37	0.13		0.69	0.26		0.54	
Uniform Delay, d1	45.5	22.5	22.6	41.2	18.5	16.4		27.2	22.6		25.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.2	0.6	7.1	0.7	0.4		3.0	1.2		1.5	
Delay (s)	46.0	22.7	23.2	48.3	19.2	16.8		30.2	23.8		26.9	
Level of Service	D	C	C	D	B	B		C	C		C	
Approach Delay (s)		27.7			28.5			28.3			26.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
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)	74	567	53	80	411	61	103	357	76	51	306	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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99			0.99		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.98			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)	1750	3356			3321		1763	3539	1532	1760	3425	
Flt Permitted	0.27	1.00			0.64		0.49	1.00	1.00	0.52	1.00	
Satd. Flow (perm)	504	3356			2139		916	3539	1532	961	3425	
Peak-hour factor, PHF	0.71	0.92	0.74	0.83	0.90	0.90	0.63	0.92	0.66	0.55	0.88	0.83
Adj. Flow (vph)	104	616	72	96	457	68	163	388	115	93	348	80
RTOR Reduction (vph)	0	14	0	0	14	0	0	0	49	0	19	0
Lane Group Flow (vph)	104	674	0	0	607	0	163	388	66	93	409	0
Confl. Peds. (#/hr)	34		34	37		37	8		8	10		10
Confl. Bikes (#/hr)			11			8			35			7
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	25.8	25.8			25.8		46.2	46.2	46.2	46.2	46.2	
Effective Green, g (s)	25.8	25.8			25.8		46.2	46.2	46.2	46.2	46.2	
Actuated g/C Ratio	0.32	0.32			0.32		0.58	0.58	0.58	0.58	0.58	
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)	163	1082			690		529	2044	885	555	1978	
v/s Ratio Prot		0.20						0.11			0.12	
v/s Ratio Perm	0.21				c0.28		c0.18		0.04	0.10		
v/c Ratio	0.64	0.62			0.88		0.31	0.19	0.08	0.17	0.21	
Uniform Delay, d1	23.1	23.0			25.6		8.7	8.0	7.5	7.9	8.1	
Progression Factor	1.00	1.00			0.80		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.9	0.8			11.9		1.5	0.2	0.2	0.7	0.2	
Delay (s)	29.0	23.8			32.4		10.2	8.2	7.6	8.6	8.3	
Level of Service	C	C			C		B	A	A	A	A	
Approach Delay (s)		24.5			32.4			8.6			8.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: 27th Street & Broadway

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	137	66	28	265	247	41	392	31	80	434	36
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	5.5		5.5	5.5	
Lane Util. Factor		0.91			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		4772			3508	1543	1758	3481		1765	3472	
Flt Permitted		0.79			0.86	1.00	0.41	1.00		0.48	1.00	
Satd. Flow (perm)		3807			3043	1543	765	3481		888	3472	
Peak-hour factor, PHF	0.60	0.93	0.92	0.58	0.95	0.85	0.68	0.97	0.86	0.71	0.91	0.60
Adj. Flow (vph)	80	147	72	48	279	291	60	404	36	113	477	60
RTOR Reduction (vph)	0	42	0	0	0	168	0	8	0	0	12	0
Lane Group Flow (vph)	0	257	0	0	327	123	60	432	0	113	525	0
Confl. Peds. (#/hr)	25		25	18		13	19		13	6		6
Confl. Bikes (#/hr)		16	16	59		5		5	59			6
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)		36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)		36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio		0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)		5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		1612			1289	654	342	1556		397	1552	
v/s Ratio Prot								0.12			c0.15	
v/s Ratio Perm		0.07			c0.11	0.08	0.08			0.13		
v/c Ratio		0.16			0.25	0.19	0.18	0.28		0.28	0.34	
Uniform Delay, d1		15.1			15.8	15.3	14.1	14.8		14.9	15.3	
Progression Factor		1.31			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.5	0.6	1.1	0.4		1.8	0.6	
Delay (s)		20.0			16.3	16.0	15.2	15.3		16.7	15.9	
Level of Service		B			B	B	B	B		B	B	
Approach Delay (s)		20.0			16.2			15.3			16.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: 27th Street & Telegraph Avenue

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	293	302	114	37	234	91	69	310	19	39	278	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		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	0.96		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	3388		1766	3382		1760	3484		1764	3343	
Flt Permitted	0.45	1.00		0.48	1.00		0.29	1.00		0.42	1.00	
Satd. Flow (perm)	842	3388		892	3382		543	3484		782	3343	
Peak-hour factor, PHF	0.81	0.86	0.92	0.84	0.79	0.88	0.96	0.91	0.68	0.70	0.87	0.76
Adj. Flow (vph)	362	351	124	44	296	103	72	341	28	56	320	149
RTOR Reduction (vph)	0	23	0	0	28	0	0	10	0	0	87	0
Lane Group Flow (vph)	362	452	0	44	371	0	72	359	0	56	382	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	61.5	53.6		48.7	45.3		14.5	14.5		14.5	14.5	
Effective Green, g (s)	61.5	53.6		48.7	45.3		14.5	14.5		14.5	14.5	
Actuated g/C Ratio	0.72	0.63		0.57	0.53		0.17	0.17		0.17	0.17	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	737	2136		546	1802		93	594		133	570	
v/s Ratio Prot	c0.07	0.13		0.00	0.11			0.10			0.11	
v/s Ratio Perm	c0.29			0.04			c0.13			0.07		
v/c Ratio	0.49	0.21		0.08	0.21		0.77	0.60		0.42	0.67	
Uniform Delay, d1	4.5	6.7		7.9	10.4		33.7	32.6		31.5	33.0	
Progression Factor	1.00	1.00		0.74	0.69		0.91	0.89		1.00	1.00	
Incremental Delay, d2	0.2	0.2		0.0	0.3		28.7	1.1		0.8	2.4	
Delay (s)	4.6	6.9		5.9	7.4		59.2	30.2		32.3	35.4	
Level of Service	A	A		A	A		E	C		C	D	
Approach Delay (s)		5.9			7.3			35.0			35.1	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: West Grand Avenue & Telegraph Avenue

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	92	670	303	58	374	55	170	222	26	74	300	65
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		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		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3427	1553	1767	3343		1768	3450		1756	3414	
Flt Permitted	0.32	1.00	1.00	0.19	1.00		0.45	1.00		0.58	1.00	
Satd. Flow (perm)	586	3427	1553	353	3343		837	3450		1078	3414	
Peak-hour factor, PHF	0.77	0.96	0.85	0.85	0.83	0.72	0.82	0.95	0.65	0.87	0.92	0.77
Adj. Flow (vph)	119	698	356	68	451	76	207	234	40	85	326	84
RTOR Reduction (vph)	0	0	256	0	16	0	0	16	0	0	24	0
Lane Group Flow (vph)	119	698	100	68	511	0	207	258	0	85	386	0
Confl. Peds. (#/hr)	4		4	4		4	4		4	11		11
Confl. Bikes (#/hr)			3			7			21			1
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	23.8	23.8	23.8	23.8	23.8		50.7	50.7		37.2	37.2	
Effective Green, g (s)	23.8	23.8	23.8	23.8	23.8		50.7	50.7		37.2	37.2	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28		0.60	0.60		0.44	0.44	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	164	960	435	99	936		598	2058		472	1494	
v/s Ratio Prot		c0.20			0.15		c0.04	0.07			0.11	
v/s Ratio Perm	0.20		0.06	0.19			c0.17			0.08		
v/c Ratio	0.73	0.73	0.23	0.69	0.55		0.35	0.13		0.18	0.26	
Uniform Delay, d1	27.6	27.7	23.5	27.3	26.0		8.0	7.5		14.6	15.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.01	1.02	
Incremental Delay, d2	24.3	4.8	1.2	32.4	2.3		0.1	0.1		0.8	0.4	
Delay (s)	51.9	32.5	24.8	59.7	28.3		8.2	7.6		15.5	15.9	
Level of Service	D	C	C	E	C		A	A		B	B	
Approach Delay (s)		32.1			31.9			7.8			15.8	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: West Grand Avenue & Northgate Avenue

Existing plus Project AM
222 19th Street Transportation Study

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	166	488	586	104	654	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3422		3431	1414
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3422		3431	1414
Peak-hour factor, PHF	0.91	0.86	0.89	0.70	0.90	0.89
Adj. Flow (vph)	182	567	658	149	727	188
RTOR Reduction (vph)	0	0	21	0	3	123
Lane Group Flow (vph)	182	567	786	0	743	46
Confl. Peds. (#/hr)	14			11	6	6
Confl. Bikes (#/hr)				10		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	12.0	50.1	34.1		21.9	21.9
Effective Green, g (s)	12.0	50.1	34.1		21.9	21.9
Actuated g/C Ratio	0.15	0.63	0.43		0.27	0.27
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)	266	2216	1459		939	387
v/s Ratio Prot	c0.10	0.16	c0.23		c0.22	
v/s Ratio Perm						0.03
v/c Ratio	0.68	0.26	0.54		0.79	0.12
Uniform Delay, d1	32.2	6.7	17.1		26.9	21.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.7	0.3	1.4		4.3	0.1
Delay (s)	37.9	6.9	18.5		31.2	21.9
Level of Service	D	A	B		C	C
Approach Delay (s)		14.5	18.5		29.5	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	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)	132	702	0	0	127	270	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)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.86	0.86			0.86	0.86		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			0.92	0.85		0.98				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1520	4801			4407	1362		4973				
Flt Permitted	0.53	0.93			1.00	1.00		1.00				
Satd. Flow (perm)	854	4477			4407	1362		4973				
Peak-hour factor, PHF	0.89	0.89	0.92	0.92	0.86	0.74	0.50	0.88	0.58	0.92	0.92	0.92
Adj. Flow (vph)	148	789	0	0	148	365	8	249	36	0	0	0
RTOR Reduction (vph)	0	0	0	0	110	109	0	22	0	0	0	0
Lane Group Flow (vph)	133	804	0	0	221	73	0	271	0	0	0	0
Confl. Peds. (#/hr)	2		2				6		6	4		4
Confl. Bikes (#/hr)									4			3
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	342	1791			1763	545		1989				
v/s Ratio Prot					0.05							
v/s Ratio Perm	0.16	c0.18				0.05		0.05				
v/c Ratio	0.39	0.45			0.13	0.13		0.14				
Uniform Delay, d1	8.5	8.8			7.6	7.6		7.6				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	3.3	0.8			0.1	0.5		0.1				
Delay (s)	11.8	9.6			7.7	8.1		7.8				
Level of Service	B	A			A	A		A				
Approach Delay (s)		9.9			7.9			7.8			0.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	239	23	9	135	0	0	0	0	577	844	297
Ideal 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		0.91			0.91					0.91	0.91	1.00
Frpb, ped/bikes		1.00			1.00					1.00	1.00	1.00
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)		4984			5060					1610	3366	1583
Flt Permitted		1.00			0.91					0.95	0.99	1.00
Satd. Flow (perm)		4984			4613					1610	3366	1583
Peak-hour factor, PHF	0.92	0.91	0.64	0.56	0.82	0.92	0.92	0.92	0.92	0.88	0.93	0.77
Adj. Flow (vph)	0	263	36	16	165	0	0	0	0	656	908	386
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	187
Lane Group Flow (vph)	0	276	0	0	181	0	0	0	0	505	1059	199
Confl. Peds. (#/hr)	2		2	10		10	6		6			
Confl. Bikes (#/hr)			3			4			1			
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		21.0			21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0			21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35			0.35					0.52	0.52	0.52
Clearance Time (s)		4.0			4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1744			1615					832	1739	818
v/s Ratio Prot		c0.06										
v/s Ratio Perm					0.04					0.31	0.31	0.13
v/c Ratio		0.16			0.11					0.61	0.61	0.24
Uniform Delay, d1		13.4			13.2					10.2	10.2	8.0
Progression Factor		1.00			1.00					1.00	1.00	1.00
Incremental Delay, d2		0.2			0.1					3.3	1.6	0.7
Delay (s)		13.6			13.3					13.5	11.8	8.7
Level of Service		B			B					B	B	A
Approach Delay (s)		13.6			13.3			0.0			11.6	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.1%	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)	7	382	22	24	602	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	4.0	4.0		4.0	4.0	
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	0.96	1.00	1.00	0.98	1.00	0.99		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)		3536	1514	1753	3539	1545	1756	3459		1760	3537	
Flt Permitted		0.95	1.00	0.51	1.00	1.00	0.48	1.00		0.50	1.00	
Satd. Flow (perm)		3346	1514	932	3539	1545	882	3459		935	3537	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	8	415	24	26	654	86	48	249	33	83	300	1
RTOR Reduction (vph)	0	0	7	0	0	24	0	19	0	0	1	0
Lane Group Flow (vph)	0	423	17	26	654	62	48	263	0	83	300	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		54.4	54.4	54.4	54.4	54.4	12.6	12.6		12.6	12.6	
Effective Green, g (s)		54.4	54.4	54.4	54.4	54.4	12.6	12.6		12.6	12.6	
Actuated g/C Ratio		0.73	0.73	0.73	0.73	0.73	0.17	0.17		0.17	0.17	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		2427	1098	676	2567	1121	148	581		157	594	
v/s Ratio Prot					c0.18			0.08			0.08	
v/s Ratio Perm		0.13	0.01	0.03		0.04	0.05			c0.09		
v/c Ratio		0.17	0.02	0.04	0.25	0.06	0.32	0.45		0.53	0.51	
Uniform Delay, d1		3.2	2.9	2.9	3.5	2.9	27.5	28.1		28.5	28.4	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2	0.0	0.1	0.2	0.1	0.9	0.4		2.4	0.5	
Delay (s)		3.4	2.9	3.0	3.7	3.0	28.4	28.5		30.9	28.9	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		3.4			3.6			28.5			29.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Existing plus Project Conditions
PM Peak Hour

HCM Signalized Intersection Capacity Analysis
1: 5th St. & Oak St.

Existing plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	489	69	0	0	0	0	446	62	1	58	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.98			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		4899						1830			1858	
Flt Permitted		0.98						1.00			0.71	
Satd. Flow (perm)		1000						1300			1300	
Peak-hour factor, PHF	0.86	0.93	0.72	0.25	0.25	0.25	0.25	0.75	0.70	0.25	0.76	0.25
Adj. Flow (vph)	291	526	96	0	0	0	0	595	89	4	76	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	881	0	0	0	0	0	672	0	0	80	0
Confl. Peds. (#/hr)	9		9	38		38				2		2
Confl. Bikes (#/hr)			11			4						2
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		500						630			448	
v/s Ratio Prot								c0.37				
v/s Ratio Perm		c0.88									0.06	
v/c Ratio		1.76						1.07			0.18	
Uniform Delay, d1		11.2						14.8			10.3	
Progression Factor		1.00						1.00			0.03	
Incremental Delay, d2		350.6						55.1			0.8	
Delay (s)		361.8						69.8			1.1	
Level of Service		F						E			A	
Approach Delay (s)		361.8			0.0			69.8			1.1	
Approach LOS		F			A			E			A	

Intersection Summary			
HCM Average Control Delay	225.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 6th St. & Oak St.

Existing plus Project PM
222 19th Street Transportation Study

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	154	531	55	47	634
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.90	0.85
Flt Protected			0.99		0.98	1.00
Satd. Flow (prot)			3501		3188	1441
Flt Permitted			0.99		0.98	1.00
Satd. Flow (perm)			3501		3188	1441
Peak-hour factor, PHF	0.92	0.90	0.86	0.60	0.84	0.94
Adj. Flow (vph)	0	171	617	92	56	674
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	788	0	485	337
Confl. Peds. (#/hr)	46					
Confl. Bikes (#/hr)	3					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1268		1148	519
v/s Ratio Prot						
v/s Ratio Perm			0.23		0.15	c0.23
v/c Ratio			0.62		0.42	0.65
Uniform Delay, d1			11.8		10.9	12.0
Progression Factor			0.69		1.00	1.00
Incremental Delay, d2			0.2		1.1	6.2
Delay (s)			8.3		12.0	18.2
Level of Service			A		B	B
Approach Delay (s)			8.3		14.6	
Approach LOS			A		B	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	59.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 7th St. & Oak St.

Existing plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	149	897	0	0	0	0	0	818	329	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.96				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6340						4837				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6340						4837				
Peak-hour factor, PHF	0.85	0.98	0.25	0.25	0.25	0.25	0.25	0.94	0.96	0.25	0.25	0.25
Adj. Flow (vph)	175	915	0	0	0	0	0	870	343	0	0	0
RTOR Reduction (vph)	0	32	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	1058	0	0	0	0	0	1187	0	0	0	0
Confl. Peds. (#/hr)	22		22	50		50	14		14	6		6
Confl. Bikes (#/hr)			16			1			2			2
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2536						1935				
v/s Ratio Prot								c0.25				
v/s Ratio Perm		0.17										
v/c Ratio		0.42						0.61				
Uniform Delay, d1		9.7						10.7				
Progression Factor		0.99						1.59				
Incremental Delay, d2		0.4						1.2				
Delay (s)		10.0						18.3				
Level of Service		B						B				
Approach Delay (s)		10.0			0.0			18.3			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: 11th Street & Oak Street

Existing plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	57	0	0	934	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	80	0	0	1015	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	260	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	260	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	100	100			
cM capacity (veh/h)	703	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	80	254	254	254	254
Volume Left	80	0	0	0	0
Volume Right	0	0	0	0	0
cSH	703	1700	1700	1700	1700
Volume to Capacity	0.11	0.15	0.15	0.15	0.15
Queue Length 95th (ft)	10	0	0	0	0
Control Delay (s)	10.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	10.8	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	23.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	855	50	149	822	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6318			6222				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6318			6222				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.78	0.83	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	900	64	180	856	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	7	0	0	45	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	957	0	0	991	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3148			2136				
v/s Ratio Prot					c0.15							
v/s Ratio Perm								0.16				
v/c Ratio					0.30			0.46				
Uniform Delay, d1					8.9			15.4				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.2			0.7				
Delay (s)					9.1			16.1				
Level of Service					A			B				
Approach Delay (s)		0.0			9.1			16.1			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	43.7%	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)	53	767	0	0	355	218	171	561	35	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.92		1.00	0.96			
Flpb, ped/bikes		1.00			1.00	1.00		0.99	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3518			3539	1461		3470	1520			
Flt Permitted		0.87			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3078			3539	1461		3470	1520			
Peak-hour factor, PHF	0.63	0.86	0.25	0.99	0.96	0.96	0.84	0.92	0.73	0.25	0.25	0.25
Adj. Flow (vph)	84	892	0	0	370	227	204	610	48	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	144	0	0	6	0	0	0
Lane Group Flow (vph)	0	976	0	0	370	83	0	814	42	0	0	0
Confl. Peds. (#/hr)	36		36	52		52	35		35	10		10
Confl. Bikes (#/hr)			5			21						22
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		923			1062	438		1851	811			
v/s Ratio Prot					0.10							
v/s Ratio Perm		c0.32				0.06		0.23	0.03			
v/c Ratio		1.06			0.35	0.19		0.44	0.05			
Uniform Delay, d1		21.0			16.4	15.6		8.5	6.7			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		46.0			0.9	1.0		0.8	0.1			
Delay (s)		67.0			17.3	16.5		9.3	6.8			
Level of Service		E			B	B		A	A			
Approach Delay (s)		67.0			17.0			9.2			0.0	
Approach LOS		E			B			A			A	

Intersection Summary			
HCM Average Control Delay	34.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
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)	0	812	238	0	0	0	0	0	0	362	1241	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		1.00									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		6153									5015	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		6153									5015	
Peak-hour factor, PHF	0.25	0.99	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.87	0.95	0.25
Adj. Flow (vph)	0	820	259	0	0	0	0	0	0	416	1306	0
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	1068	0	0	0	0	0	0	0	0	1684	0
Confl. Peds. (#/hr)	4		4	8		8	2		2	12		12
Confl. Bikes (#/hr)			2			2			2			
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2461									2229	
v/s Ratio Prot		c0.17										
v/s Ratio Perm											0.34	
v/c Ratio		0.43									0.76	
Uniform Delay, d1		9.8									10.5	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.6									2.4	
Delay (s)		10.4									12.9	
Level of Service		B									B	
Approach Delay (s)		10.4			0.0			0.0			12.9	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	760	162	0	0	0	0	0	0	43	742	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.97									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6181									5062	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6181									5062	
Peak-hour factor, PHF	0.25	0.96	0.86	0.25	0.25	0.25	0.25	0.25	0.25	0.72	0.93	0.25
Adj. Flow (vph)	0	792	188	0	0	0	0	0	0	60	798	0
RTOR Reduction (vph)	0	52	0	0	0	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	928	0	0	0	0	0	0	0	0	844	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2369									2194	
v/s Ratio Prot		c0.15										
v/s Ratio Perm											0.17	
v/c Ratio		0.39									0.38	
Uniform Delay, d1		13.4									11.6	
Progression Factor		1.00									0.60	
Incremental Delay, d2		0.5									0.5	
Delay (s)		13.9									7.4	
Level of Service		B									A	
Approach Delay (s)		13.9			0.0			0.0			7.4	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	38.5%	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)	0	0	0	208	786	0	0	0	0	0	595	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6268						5026	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6268						5026	
Peak-hour factor, PHF	0.25	0.25	0.25	0.91	0.97	0.25	0.25	0.25	0.25	0.25	0.86	0.86
Adj. Flow (vph)	0	0	0	229	810	0	0	0	0	0	692	44
RTOR Reduction (vph)	0	0	0	0	65	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	0	0	0	974	0	0	0	0	0	724	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2716						2220	
v/s Ratio Prot											c0.14	
v/s Ratio Perm					0.16							
v/c Ratio					0.36						0.33	
Uniform Delay, d1					11.4						10.9	
Progression Factor					0.45						1.00	
Incremental Delay, d2					0.4						0.4	
Delay (s)					5.5						11.3	
Level of Service					A						B	
Approach Delay (s)		0.0			5.5			0.0			11.3	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	38.6%	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	538	74	22	468	0	0	0	0	287	501	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.98	1.00	
Frt		0.98			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	1.00	
Satd. Flow (prot)		3434			3529					1578	3352	
Flt Permitted		1.00			0.91					0.95	1.00	
Satd. Flow (perm)		3434			3230					1578	3352	
Peak-hour factor, PHF	0.25	0.91	0.76	0.79	0.91	0.25	0.25	0.25	0.25	0.94	0.96	0.67
Adj. Flow (vph)	0	591	97	28	514	0	0	0	0	305	522	24
RTOR Reduction (vph)	0	29	0	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	659	0	0	542	0	0	0	0	274	571	0
Confl. Peds. (#/hr)	50		50	25		25	17		17	24		24
Confl. Bikes (#/hr)			16			17			2			
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1450			1364					666	1415	
v/s Ratio Prot		c0.19										
v/s Ratio Perm					0.17					c0.17	0.17	
v/c Ratio		0.45			0.40					0.41	0.40	
Uniform Delay, d1		9.3			9.0					9.1	9.1	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		1.0			0.9					1.9	0.9	
Delay (s)		10.3			9.9					11.0	9.9	
Level of Service		B			A					B	A	
Approach Delay (s)		10.3			9.9			0.0			10.2	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	55.4%	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												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	8	85	5	30	175	0	0	78	92
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	9	92	5	33	190	0	0	85	100

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	55	52	223	185
Volume Left (vph)	9	0	33	0
Volume Right (vph)	0	5	0	100
Hadj (s)	0.11	-0.04	0.06	-0.29
Departure Headway (s)	5.5	5.4	4.4	4.1
Degree Utilization, x	0.08	0.08	0.28	0.21
Capacity (veh/h)	605	624	784	831
Control Delay (s)	7.8	7.6	9.1	8.3
Approach Delay (s)	7.7		9.1	8.3
Approach LOS	A		A	A

Intersection Summary			
Delay	8.5		
HCM Level of Service	A		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	162	1	2	666	527	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			3.0	4.0	
Lane Util. Factor	1.00			0.95	0.95	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.96	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1773			3539	3361	
Flt Permitted	0.95			0.95	1.00	
Satd. Flow (perm)	1773			3374	3361	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	176	1	2	724	573	202
RTOR Reduction (vph)	0	0	0	0	71	0
Lane Group Flow (vph)	177	0	0	726	704	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	30.0			13.0	12.0	
Effective Green, g (s)	30.0			13.0	12.0	
Actuated g/C Ratio	0.60			0.26	0.24	
Clearance Time (s)	4.0			3.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	1064			877	807	
v/s Ratio Prot	c0.10				0.21	
v/s Ratio Perm				c0.22		
v/c Ratio	0.17			0.83	0.87	
Uniform Delay, d1	4.4			17.4	18.3	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.3			8.9	12.5	
Delay (s)	4.8			26.3	30.8	
Level of Service	A			C	C	
Approach Delay (s)	4.8			26.3	30.8	
Approach LOS	A			C	C	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	41	186	139	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	45	202	151	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	112	135	151
Volume Left (vph)	45	0	151
Volume Right (vph)	0	0	0
Hadj (s)	0.23	0.03	0.23
Departure Headway (s)	5.1	4.9	4.7
Degree Utilization, x	0.16	0.18	0.20
Capacity (veh/h)	686	709	730
Control Delay (s)	7.9	7.8	8.9
Approach Delay (s)	7.9		8.9
Approach LOS	A		A

Intersection Summary			
Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	38	534	64	116	441	0	0	60	22
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	
Lane Util. Factor					0.86			0.95			0.95	
Frpb, ped/bikes					1.00			1.00			0.99	
Flpb, ped/bikes					1.00			0.99			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6254			3467			3352	
Flt Permitted					1.00			0.87			1.00	
Satd. Flow (perm)					6254			3046			3352	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	41	580	70	126	479	0	0	65	24
RTOR Reduction (vph)	0	0	0	0	32	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	0	0	0	659	0	0	605	0	0	78	0
Confl. Peds. (#/hr)	13		13	22		22	52		52	34		34
Confl. Bikes (#/hr)			3			4			4			2
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2241			1599			1760	
v/s Ratio Prot											0.02	
v/s Ratio Perm					0.11			c0.20				
v/c Ratio					0.29			0.38			0.04	
Uniform Delay, d1					13.8			8.4			6.9	
Progression Factor					1.23			1.00			1.00	
Incremental Delay, d2					0.3			0.7			0.0	
Delay (s)					17.4			9.1			7.0	
Level of Service					B			A			A	
Approach Delay (s)		0.0			17.4			9.1			7.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBT	SBR
Lane Configurations												
Volume (vph)	269	89	51	7	111	14	75	26	629	20	138	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
Lane Util. Factor	0.91	0.91		1.00	0.95				0.95		0.91	0.91
Frpb, ped/bikes	1.00	1.00		1.00	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	0.95		1.00	0.98				1.00		0.98	0.85
Flt Protected	0.95	0.99		0.95	1.00				0.99		1.00	1.00
Satd. Flow (prot)	3221	1596		1770	3481				3494		3334	1441
Flt Permitted	0.95	0.99		0.95	1.00				0.99		1.00	1.00
Satd. Flow (perm)	3221	1596		1770	3481				3494		3334	1441
Peak-hour factor, PHF	0.91	0.86	0.73	0.63	0.86	0.86	0.71	0.71	0.88	0.71	0.78	0.89
Adj. Flow (vph)	296	103	70	11	129	16	106	37	715	28	177	108
RTOR Reduction (vph)	0	22	0	0	0	0	0	0	3	0	0	0
Lane Group Flow (vph)	266	181	0	11	145	0	0	0	883	0	199	86
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)		12							7			
Turn Type	custom			Split			Split	Split				custom
Protected Phases	1	1		7	7		8	8	8		2	6
Permitted Phases	1											6
Actuated Green, G (s)	19.2	19.2		7.7	7.7				26.1		11.0	34.2
Effective Green, g (s)	19.2	19.2		7.7	7.7				26.1		11.0	34.2
Actuated g/C Ratio	0.24	0.24		0.10	0.10				0.33		0.14	0.43
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)	773	383		170	335				1140		458	616
v/s Ratio Prot	0.08	c0.11		0.01	c0.04				c0.25		c0.06	0.06
v/s Ratio Perm												
v/c Ratio	0.34	0.47		0.06	0.43				0.77		0.43	0.14
Uniform Delay, d1	25.2	26.1		32.9	34.1				24.3		31.6	13.9
Progression Factor	0.92	0.91		0.78	0.82				1.00		0.85	0.93
Incremental Delay, d2	1.2	4.1		0.1	0.3				3.1		0.2	0.5
Delay (s)	24.4	27.9		25.6	28.2				27.4		27.1	13.4
Level of Service	C	C		C	C				C		C	B
Approach Delay (s)		26.0			28.0				27.4		21.7	
Approach LOS		C			C				C		C	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR2
Lane Configurations	
Volume (vph)	36
Ideal Flow (vphpl)	1900
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1583
Flt Permitted	1.00
Satd. Flow (perm)	1583
Peak-hour factor, PHF	0.89
Adj. Flow (vph)	40
RTOR Reduction (vph)	23
Lane Group Flow (vph)	17
Confl. Peds. (#/hr)	74
Confl. Bikes (#/hr)	8
Turn Type	custom
Protected Phases	6
Permitted Phases	
Actuated Green, G (s)	34.2
Effective Green, g (s)	34.2
Actuated g/C Ratio	0.43
Clearance Time (s)	4.0
Vehicle Extension (s)	2.0
Lane Grp Cap (vph)	677
v/s Ratio Prot	0.01
v/s Ratio Perm	
v/c Ratio	0.03
Uniform Delay, d1	13.3
Progression Factor	0.94
Incremental Delay, d2	0.1
Delay (s)	12.6
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

16: Harrison Street & Lakeside Drive

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	912	0	0	703	684	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0			4.0	4.0	4.0
Lane Util. Factor	0.94			0.91	0.95	0.76
Frpb, ped/bikes	1.00			1.00	1.00	0.96
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	0.95			1.00	1.00	1.00
Satd. Flow (prot)	4990			5085	3539	3481
Flt Permitted	0.95			1.00	1.00	1.00
Satd. Flow (perm)	4990			5085	3539	3481
Peak-hour factor, PHF	0.95	0.95	0.25	0.93	0.99	0.84
Adj. Flow (vph)	960	0	0	756	691	324
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	960	0	0	756	691	324
Confl. Peds. (#/hr)						20
Confl. Bikes (#/hr)						16
Turn Type						Free
Protected Phases	1			2	2	
Permitted Phases						Free
Actuated Green, G (s)	22.4			48.6	48.6	80.0
Effective Green, g (s)	22.4			48.6	48.6	80.0
Actuated g/C Ratio	0.28			0.61	0.61	1.00
Clearance Time (s)	5.0			4.0	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1397			3089	2150	3481
v/s Ratio Prot	c0.19			0.15	c0.20	
v/s Ratio Perm						0.09
v/c Ratio	0.69			0.24	0.32	0.09
Uniform Delay, d1	25.7			7.2	7.7	0.0
Progression Factor	0.58			1.00	0.82	1.00
Incremental Delay, d2	1.1			0.2	0.4	0.1
Delay (s)	16.1			7.4	6.7	0.1
Level of Service	B			A	A	A
Approach Delay (s)	16.1			7.4	4.6	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

17: West Grand Avenue & Harrison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	538	158	291	724	36	9	1099	713	2	504	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.92		1.00	0.93		0.99	
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		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1484	3433	3539	1459		5081	1466		4912	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.93	
Satd. Flow (perm)	3433	3539	1484	3433	3539	1459		4710	1466		4579	
Peak-hour factor, PHF	0.63	0.92	0.83	0.98	0.93	0.75	0.56	0.92	0.86	0.50	0.96	0.50
Adj. Flow (vph)	181	585	190	297	778	48	16	1195	829	4	525	100
RTOR Reduction (vph)	0	0	73	0	0	29	0	0	262	0	28	0
Lane Group Flow (vph)	181	585	117	297	778	19	0	1211	567	0	601	0
Confl. Peds. (#/hr)	31		31	48		48	42		42	34		34
Confl. Bikes (#/hr)			22			15			22			20
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	9.6	36.2	36.2	12.8	40.4	40.4		36.0	36.0		36.0	
Effective Green, g (s)	9.6	36.2	36.2	12.8	40.4	40.4		36.0	36.0		36.0	
Actuated g/C Ratio	0.10	0.36	0.36	0.13	0.40	0.40		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	330	1281	537	439	1430	589		1696	528		1648	
v/s Ratio Prot	0.05	0.17		c0.09	c0.22							
v/s Ratio Perm			0.08			0.01		0.26	c0.39		0.13	
v/c Ratio	0.55	0.46	0.22	0.68	0.54	0.03		0.71	1.07		0.36	
Uniform Delay, d1	43.1	24.4	22.1	41.6	22.8	18.0		27.6	32.0		23.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	1.0	1.2	0.9	3.2	1.5	0.1		2.6	60.2		0.6	
Delay (s)	44.1	25.6	23.0	44.9	24.3	18.1		30.2	92.2		24.2	
Level of Service	D	C	C	D	C	B		C	F		C	
Approach Delay (s)		28.6			29.4			55.4			24.2	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM Average Control Delay	39.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

18: 20th Street & Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	128	80	51	201	97	92	675	95	42	466	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.95	
Frpb, ped/bikes		0.97			0.96			0.99			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.95			0.98			0.99	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		3217			3191			3413			3447	
Flt Permitted		0.91			0.88			0.73			0.79	
Satd. Flow (perm)		2933			2818			2489			2722	
Peak-hour factor, PHF	0.79	0.82	0.83	0.91	0.89	0.80	0.92	0.92	0.95	0.71	0.88	0.63
Adj. Flow (vph)	24	156	96	56	226	121	100	734	100	59	530	52
RTOR Reduction (vph)	0	61	0	0	65	0	0	16	0	0	11	0
Lane Group Flow (vph)	0	215	0	0	338	0	0	919	0	0	630	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1075			1033			1311			817	
v/s Ratio Prot								c0.08				
v/s Ratio Perm		0.07			c0.12			c0.26			0.23	
v/c Ratio		0.20			0.33			0.70			0.77	
Uniform Delay, d1		13.0			13.7			12.1			19.1	
Progression Factor		1.92			1.00			1.00			1.00	
Incremental Delay, d2		0.4			0.8			3.1			6.9	
Delay (s)		25.3			14.5			15.2			26.1	
Level of Service		C			B			B			C	
Approach Delay (s)		25.3			14.5			15.2			26.1	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

19: West Grand Avenue & Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	438	31	90	293	29	217	525	145	43	425	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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	0.99	1.00	
Frt	1.00	0.99			0.98		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)	1764	3374			3320		1764	3539	1551	1746	3408	
Flt Permitted	0.32	1.00			0.61		0.41	1.00	1.00	0.43	1.00	
Satd. Flow (perm)	601	3374			2064		764	3539	1551	783	3408	
Peak-hour factor, PHF	0.72	0.91	0.65	0.63	0.90	0.52	0.87	0.95	0.79	0.57	0.90	0.84
Adj. Flow (vph)	96	481	48	143	326	56	249	553	184	75	472	108
RTOR Reduction (vph)	0	12	0	0	14	0	0	0	73	0	17	0
Lane Group Flow (vph)	96	517	0	0	511	0	249	553	111	75	563	0
Confl. Peds. (#/hr)	8		8	2		2	8		8	32		32
Confl. Bikes (#/hr)			6			6			4			28
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	23.6	23.6			23.6		48.4	48.4	48.4	48.4	48.4	
Effective Green, g (s)	23.6	23.6			23.6		48.4	48.4	48.4	48.4	48.4	
Actuated g/C Ratio	0.30	0.30			0.30		0.60	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)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	177	995			609		462	2141	938	474	2062	
v/s Ratio Prot		0.15						0.16			0.17	
v/s Ratio Perm	0.16				c0.25		c0.33		0.07	0.10		
v/c Ratio	0.54	0.52			0.84		0.54	0.26	0.12	0.16	0.27	
Uniform Delay, d1	23.7	23.5			26.4		9.3	7.4	6.7	6.9	7.5	
Progression Factor	1.00	1.00			0.88		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	0.2			9.4		4.5	0.3	0.3	0.7	0.3	
Delay (s)	25.5	23.7			32.7		13.7	7.7	7.0	7.6	7.8	
Level of Service	C	C			C		B	A	A	A	A	
Approach Delay (s)		24.0			32.7			9.1			7.8	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	202	63	29	343	237	139	582	30	144	584	76
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	5.5		5.5	5.5	
Lane Util. Factor		0.91			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			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		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		4790			3520	1536	1767	3502		1767	3454	
Flt Permitted		0.76			0.87	1.00	0.31	1.00		0.33	1.00	
Satd. Flow (perm)		3707			3080	1536	570	3502		620	3454	
Peak-hour factor, PHF	0.68	0.86	0.66	0.73	0.96	0.87	0.83	0.92	0.75	0.82	0.92	0.86
Adj. Flow (vph)	107	235	95	40	357	272	167	633	40	176	635	88
RTOR Reduction (vph)	0	55	0	0	0	95	0	6	0	0	13	0
Lane Group Flow (vph)	0	382	0	0	397	177	167	667	0	176	710	0
Confl. Peds. (#/hr)	32		32	10		10	6		6	5		5
Confl. Bikes (#/hr)			20			18			17			66
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)		36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)		36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio		0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)		5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)		1570			1304	651	255	1566		277	1544	
v/s Ratio Prot								0.19			0.21	
v/s Ratio Perm		0.10			c0.13	0.12	c0.29			0.28		
v/c Ratio		0.24			0.30	0.27	0.65	0.43		0.64	0.46	
Uniform Delay, d1		15.7			16.2	16.0	18.4	16.1		18.1	16.4	
Progression Factor		0.84			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.6	1.0	12.4	0.9		10.6	1.0	
Delay (s)		13.5			16.8	17.0	30.8	16.9		28.8	17.3	
Level of Service		B			B	B	C	B		C	B	
Approach Delay (s)		13.5			16.9			19.7			19.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	103.8%	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)	23	622	27	16	702	99	80	449	28	120	361	89
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	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		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3427	1532	1761	3343		1769	3493		1760	3378	
Flt Permitted	0.17	1.00	1.00	0.17	1.00		0.40	1.00		0.44	1.00	
Satd. Flow (perm)	310	3427	1532	309	3343		750	3493		809	3378	
Peak-hour factor, PHF	0.64	0.80	0.61	0.57	0.92	0.85	0.87	0.85	0.64	0.87	0.95	0.72
Adj. Flow (vph)	36	778	44	28	763	116	92	528	44	138	380	124
RTOR Reduction (vph)	0	0	32	0	14	0	0	7	0	0	31	0
Lane Group Flow (vph)	36	778	12	28	865	0	92	565	0	138	473	0
Confl. Peds. (#/hr)	12		12	18		18	3		3	12		12
Confl. Bikes (#/hr)			8			6			10			28
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0		50.5	50.5		40.6	40.6	
Effective Green, g (s)	24.0	24.0	24.0	24.0	24.0		50.5	50.5		40.6	40.6	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28		0.59	0.59		0.48	0.48	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	88	968	433	87	944		510	2075		386	1613	
v/s Ratio Prot		0.23			c0.26		0.01	c0.16			0.14	
v/s Ratio Perm	0.12		0.01	0.09			0.10			c0.17		
v/c Ratio	0.41	0.80	0.03	0.32	0.92		0.18	0.27		0.36	0.29	
Uniform Delay, d1	24.7	28.3	22.1	24.1	29.5		7.6	8.4		14.0	13.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.88	0.86	
Incremental Delay, d2	13.5	7.1	0.1	9.5	15.0		0.1	0.3		2.4	0.4	
Delay (s)	38.2	35.4	22.2	33.6	44.5		7.7	8.7		14.7	12.0	
Level of Service	D	D	C	C	D		A	A		B	B	
Approach Delay (s)		34.8			44.2			8.5			12.6	
Approach LOS		C			D			A			B	

Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	64.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	346	117	55	468	98	147	405	39	112	391	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		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	0.96		1.00	0.97		1.00	0.98		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)	1769	3388		1769	3418		1761	3468		1762	3255	
Flt Permitted	0.25	1.00		0.45	1.00		0.25	1.00		0.39	1.00	
Satd. Flow (perm)	461	3388		830	3418		462	3468		730	3255	
Peak-hour factor, PHF	0.85	0.90	0.89	0.81	0.88	0.72	0.88	0.87	0.70	0.80	0.92	0.91
Adj. Flow (vph)	212	384	131	68	532	136	167	466	56	140	425	323
RTOR Reduction (vph)	0	34	0	0	24	0	0	12	0	0	169	0
Lane Group Flow (vph)	212	481	0	68	644	0	167	510	0	140	579	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	45.2	35.8		37.0	31.7		30.4	30.4		30.4	30.4	
Effective Green, g (s)	45.2	35.8		37.0	31.7		30.4	30.4		30.4	30.4	
Actuated g/C Ratio	0.53	0.42		0.44	0.37		0.36	0.36		0.36	0.36	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	390	1427		420	1275		165	1240		261	1164	
v/s Ratio Prot	c0.06	0.14		0.01	0.19			0.15			0.18	
v/s Ratio Perm	c0.23			0.06			c0.36			0.19		
v/c Ratio	0.54	0.34		0.16	0.50		1.01	0.41		0.54	0.50	
Uniform Delay, d1	12.1	16.6		14.1	20.6		27.3	20.6		21.7	21.3	
Progression Factor	1.00	1.00		1.56	1.48		1.46	1.47		1.00	1.00	
Incremental Delay, d2	0.8	0.6		0.1	1.4		71.2	0.1		1.1	0.1	
Delay (s)	12.9	17.2		22.1	31.8		111.0	30.3		22.8	21.5	
Level of Service	B	B		C	C		F	C		C	C	
Approach Delay (s)		16.0			30.9			49.9			21.7	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM Average Control Delay	28.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	73.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	234	503	537	366	183	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.94		0.99	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3287		3426	1421
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3287		3426	1421
Peak-hour factor, PHF	0.74	0.93	0.90	0.97	0.72	0.86
Adj. Flow (vph)	316	541	597	377	254	103
RTOR Reduction (vph)	0	0	99	0	4	81
Lane Group Flow (vph)	316	541	875	0	260	12
Confl. Peds. (#/hr)	14			18		
Confl. Bikes (#/hr)				7		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	20.4	61.5	37.1		10.5	10.5
Effective Green, g (s)	20.4	61.5	37.1		10.5	10.5
Actuated g/C Ratio	0.26	0.77	0.46		0.13	0.13
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)	451	2721	1524		450	187
v/s Ratio Prot	c0.18	0.15	c0.27		c0.08	
v/s Ratio Perm						0.01
v/c Ratio	0.70	0.20	0.57		0.58	0.07
Uniform Delay, d1	27.0	2.5	15.7		32.7	30.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.0	0.2	1.6		1.1	0.1
Delay (s)	31.0	2.7	17.3		33.8	30.5
Level of Service	C	A	B		C	C
Approach Delay (s)		13.1	17.3		32.9	
Approach LOS		B	B		C	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
24: 27th Street & Northgate Avenue (NB)

Existing plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↑↑			↑↑↱	↱		↰↑↱				
Volume (vph)	211	561	0	0	221	790	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)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.86	0.86			0.86	0.86		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			0.91	0.85		0.99				
Flt Protected	0.95	1.00			1.00	1.00		1.00				
Satd. Flow (prot)	1521	4783			4358	1362		5000				
Flt Permitted	0.38	0.84			1.00	1.00		1.00				
Satd. Flow (perm)	603	4040			4358	1362		5000				
Peak-hour factor, PHF	0.93	0.90	0.25	0.25	0.89	0.97	0.64	0.92	0.83	0.25	0.25	0.25
Adj. Flow (vph)	227	623	0	0	248	814	28	741	76	0	0	0
RTOR Reduction (vph)	0	0	0	0	55	55	0	29	0	0	0	0
Lane Group Flow (vph)	163	687	0	0	600	352	0	816	0	0	0	0
Confl. Peds. (#/hr)	2		2				4		4	3		3
Confl. Bikes (#/hr)			4						5			7
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	241	1616			1743	545		2000				
v/s Ratio Prot					0.14							
v/s Ratio Perm	c0.27	0.17				0.26		0.16				
v/c Ratio	0.68	0.43			0.34	0.65		0.41				
Uniform Delay, d1	9.9	8.7			8.4	9.7		8.6				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	14.2	0.8			0.5	5.8		0.6				
Delay (s)	24.1	9.5			8.9	15.5		9.2				
Level of Service	C	A			A	B		A				
Approach Delay (s)		12.3			11.4			9.2			0.0	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
25: 27th Street & I-980 Off Ramp

Existing plus Project PM
222 19th Street Transportation Study

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	267	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
Lane Util. Factor		0.91			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	0.98	1.00
Satd. Flow (prot)		5014			5069					1605	3335	1558
Flt Permitted		1.00			0.91					0.95	0.98	1.00
Satd. Flow (perm)		5014			4607					1605	3335	1558
Peak-hour factor, PHF	0.25	0.95	0.83	0.63	0.86	0.25	0.25	0.25	0.25	0.87	0.79	0.88
Adj. Flow (vph)	0	445	40	16	243	0	0	0	0	391	338	195
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	0	0	0	94
Lane Group Flow (vph)	0	467	0	0	259	0	0	0	0	239	490	101
Confl. Peds. (#/hr)	4		4	4		4	1		1	3		3
Confl. Bikes (#/hr)			5			9			1			1
Turn Type				Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases				8						6		6
Actuated Green, G (s)		21.0			21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0			21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35			0.35					0.52	0.52	0.52
Clearance Time (s)		4.0			4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1755			1612					829	1723	805
v/s Ratio Prot		c0.09										
v/s Ratio Perm					0.06					c0.15	0.15	0.06
v/c Ratio		0.27			0.16					0.29	0.28	0.13
Uniform Delay, d1		14.0			13.4					8.2	8.2	7.5
Progression Factor		1.00			1.00					1.00	1.00	1.00
Incremental Delay, d2		0.4			0.2					0.9	0.4	0.3
Delay (s)		14.4			13.6					9.1	8.6	7.8
Level of Service		B			B					A	A	A
Approach Delay (s)		14.4			13.6			0.0			8.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
26: West Grand Avenue & San Pablo Avenue

Existing plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱	↰	↑↑	↱	↰	↑↱		↰	↑↑	
Volume (vph)	118	638	114	35	550	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)		5.0	5.0	5.0	5.0	5.0	4.0	4.0		4.0	4.0	
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	0.96	1.00	1.00	0.97	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		1.00	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)		3509	1512	1762	3539	1543	1759	3438		1763	3376	
Flt Permitted		0.72	1.00	0.27	1.00	1.00	0.42	1.00		0.42	1.00	
Satd. Flow (perm)		2558	1512	496	3539	1543	780	3438		771	3376	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	128	693	124	38	598	59	322	421	79	114	359	132
RTOR Reduction (vph)	0	0	66	0	0	31	0	21	0	0	50	0
Lane Group Flow (vph)	0	821	58	38	598	28	322	479	0	114	441	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		35.0	35.0	35.0	35.0	35.0	31.0	31.0		31.0	31.0	
Effective Green, g (s)		35.0	35.0	35.0	35.0	35.0	31.0	31.0		31.0	31.0	
Actuated g/C Ratio		0.47	0.47	0.47	0.47	0.47	0.41	0.41		0.41	0.41	
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)		4.0	4.0	4.0	4.0	4.0	2.5	2.5		2.5	2.5	
Lane Grp Cap (vph)		1194	706	231	1652	720	322	1421		319	1395	
v/s Ratio Prot					0.17			0.14			0.13	
v/s Ratio Perm		c0.32	0.04	0.08		0.02	c0.41			0.15		
v/c Ratio		0.69	0.08	0.16	0.36	0.04	1.00	0.34		0.36	0.32	
Uniform Delay, d1		15.7	11.1	11.6	12.8	10.9	22.0	15.0		15.1	14.8	
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	0.2	1.5	0.6	0.1	50.2	0.1		0.5	0.1	
Delay (s)		19.0	11.3	13.1	13.5	11.0	72.2	15.1		15.6	14.9	
Level of Service		B	B	B	B	B	E	B		B	B	
Approach Delay (s)		17.9			13.2			37.5			15.1	
Approach LOS		B			B			D			B	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Cumulative Year 2015 Baseline plus Project Conditions
AM Peak Hour

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM
1: 5th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	374	704	187	0	0	0	0	283	84	4	144	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.97			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		4862						1800			1860	
Flt Permitted		0.99						1.00			0.99	
Satd. Flow (perm)		1850						1500			1600	
Peak-hour factor, PHF	0.95	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)	394	765	203	0	0	0	0	308	91	4	157	0
RTOR Reduction (vph)	0	55	0	0	0	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	1307	0	0	0	0	0	375	0	0	161	0
Confl. Peds. (#/hr)	14		14	52		52	1		1	4		4
Confl. Bikes (#/hr)			5			2						
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		925						620			551	
v/s Ratio Prot								c0.21				
v/s Ratio Perm		c0.71									0.10	
v/c Ratio		1.41						0.61			0.29	
Uniform Delay, d1		11.2						12.2			10.8	
Progression Factor		1.00						1.00			0.93	
Incremental Delay, d2		192.3						4.3			1.0	
Delay (s)		203.5						16.6			11.1	
Level of Service		F						B			B	
Approach Delay (s)		203.5			0.0			16.6			11.1	
Approach LOS		F			A			B			B	

Intersection Summary			
HCM Average Control Delay	148.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM
2: 6th St. & Oak St.
222 19th Street Transportation Study

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	151	529	147	59	917
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.90	0.85
Flt Protected			0.99		0.98	1.00
Satd. Flow (prot)			3498		3190	1441
Flt Permitted			0.99		0.98	1.00
Satd. Flow (perm)			3498		3190	1441
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	164	551	160	64	997
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	715	0	723	498
Confl. Peds. (#/hr)	51	2				
Confl. Bikes (#/hr)	2					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1267		1148	519
v/s Ratio Prot						
v/s Ratio Perm			0.20		0.23	c0.35
v/c Ratio			0.56		0.88dr	0.96
Uniform Delay, d1			11.5		11.9	14.1
Progression Factor			0.82		1.00	1.00
Incremental Delay, d2			0.2		2.6	30.7
Delay (s)			9.6		14.5	44.7
Level of Service			A		B	D
Approach Delay (s)			9.6		26.9	
Approach LOS			A		C	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM
3: 7th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	606	0	0	0	0	0	1166	303	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						1.00				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6329						4906				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6329						4906				
Peak-hour factor, PHF	0.93	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)	152	659	0	0	0	0	0	1267	329	0	0	0
RTOR Reduction (vph)	0	8	0	0	0	0	0	64	0	0	0	0
Lane Group Flow (vph)	0	803	0	0	0	0	0	1532	0	0	0	0
Confl. Peds. (#/hr)	22		22	59		59	12		12	5		5
Confl. Bikes (#/hr)			6			4			2			1
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2532						1962				
v/s Ratio Prot								c0.31				
v/s Ratio Perm		0.13										
v/c Ratio		0.32						0.78				
Uniform Delay, d1		9.3						11.8				
Progression Factor		0.82						0.76				
Incremental Delay, d2		0.3						2.3				
Delay (s)		7.9						11.2				
Level of Service		A						B				
Approach Delay (s)		7.9			0.0			11.2			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM
4: 11th Street & Oak Street
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	69	0	0	1122	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	75	0	0	1133	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	295	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	295	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	100	100			
cM capacity (veh/h)	665	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	75	283	283	283	283
Volume Left	75	0	0	0	0
Volume Right	0	0	0	0	0
cSH	665	1700	1700	1700	1700
Volume to Capacity	0.11	0.17	0.17	0.17	0.17
Queue Length 95th (ft)	9	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1758	81	338	833	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6342			6165				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6342			6165				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1812	88	363	905	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	8	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1892	0	0	1265	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3160			2117				
v/s Ratio Prot					c0.30							
v/s Ratio Perm								0.21				
v/c Ratio					0.60			0.60				
Uniform Delay, d1					10.8			16.3				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.8			1.3				
Delay (s)					11.6			17.5				
Level of Service					B			B				
Approach Delay (s)		0.0			11.6			17.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	60.4%	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)	42	321	0	1	672	590	143	633	28	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.98		1.00	0.97			
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		0.99			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3514			3539	1548		3492	1531			
Flt Permitted		0.76			0.95	1.00		0.99	1.00			
Satd. Flow (perm)		2687			3378	1548		3492	1531			
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.92	0.96	0.92	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	349	0	1	730	615	155	659	30	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	133	0	0	14	0	0	0
Lane Group Flow (vph)	0	395	0	0	731	482	0	814	16	0	0	0
Confl. Peds. (#/hr)	35		35	6		6	26		26	2		2
Confl. Bikes (#/hr)			33			6		10				5
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		806			1013	464		1862	817			
v/s Ratio Prot												
v/s Ratio Perm		0.15			0.22	c0.31		0.23	0.01			
v/c Ratio		0.49			0.72	1.04		0.44	0.02			
Uniform Delay, d1		17.2			18.8	21.0		8.5	6.6			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		2.1			4.4	52.2		0.7	0.0			
Delay (s)		19.4			23.2	73.2		9.3	6.6			
Level of Service		B			C	E		A	A			
Approach Delay (s)		19.4			46.0			9.2			0.0	
Approach LOS		B			D			A			A	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	576	392	0	0	0	0	0	0	195	1045	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.94									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5981									5037	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5981									5037	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	626	426	0	0	0	0	0	0	212	1066	0
RTOR Reduction (vph)	0	24	0	0	0	0	0	0	0	0	66	0
Lane Group Flow (vph)	0	1028	0	0	0	0	0	0	0	0	1212	0
Confl. Peds. (#/hr)	4		4	10		10	8		8	11		11
Confl. Bikes (#/hr)			1						7			2
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2392									2239	
v/s Ratio Prot		c0.17										
v/s Ratio Perm											0.24	
v/c Ratio		0.43									0.54	
Uniform Delay, d1		9.8									9.1	
Progression Factor		1.00									1.00	
Incremental Delay, d2		0.6									0.9	
Delay (s)		10.3									10.1	
Level of Service		B									B	
Approach Delay (s)		10.3			0.0			0.0			10.1	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	48.1%	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)	0	415	149	0	0	0	0	0	0	42	833	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6071									5068	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6071									5068	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	0	451	162	0	0	0	0	0	0	46	877	0
RTOR Reduction (vph)	0	41	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	572	0	0	0	0	0	0	0	0	913	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2327									2196	
v/s Ratio Prot		c0.09										
v/s Ratio Perm											0.18	
v/c Ratio		0.25									0.42	
Uniform Delay, d1		12.6									11.8	
Progression Factor		0.76									1.12	
Incremental Delay, d2		0.3									0.5	
Delay (s)		9.9									13.6	
Level of Service		A									B	
Approach Delay (s)		9.9			0.0			0.0			13.6	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
Cumulative 2015 Baseline plus Project AM
9: 12th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	476	1569	0	0	0	0	0	450	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6282						4927	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6282						4927	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	0	0	517	1618	0	0	0	0	0	459	90
RTOR Reduction (vph)	0	0	0	0	96	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	2039	0	0	0	0	0	546	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2722						2176	
v/s Ratio Prot											c0.11	
v/s Ratio Perm					0.32							
v/c Ratio					0.75						0.25	
Uniform Delay, d1					14.3						10.5	
Progression Factor					0.48						1.00	
Incremental Delay, d2					1.6						0.3	
Delay (s)					8.4						10.8	
Level of Service					A						B	
Approach Delay (s)		0.0			8.4			0.0			10.8	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
Cumulative 2015 Baseline plus Project AM
10: 14th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	286	84	110	765	0	0	0	0	126	380	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.99	1.00	
Frt		0.97			1.00					1.00	0.99	
Flt Protected		1.00			0.99					0.95	1.00	
Satd. Flow (prot)		3385			3510					1589	3352	
Flt Permitted		1.00			0.85					0.95	1.00	
Satd. Flow (perm)		3385			2993					1589	3352	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	0	311	91	120	797	0	0	0	0	137	396	23
RTOR Reduction (vph)	0	53	0	0	0	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	349	0	0	917	0	0	0	0	123	424	0
Confl. Peds. (#/hr)	36		36	28		28	18		18	16		16
Confl. Bikes (#/hr)			4			10			3			1
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1429			1264					671	1415	
v/s Ratio Prot		0.10										
v/s Ratio Perm					c0.31					0.08	0.13	
v/c Ratio		0.24			0.73					0.18	0.30	
Uniform Delay, d1		8.4			10.8					8.1	8.6	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		0.4			3.7					0.6	0.5	
Delay (s)		8.8			14.5					8.7	9.1	
Level of Service		A			B					A	A	
Approach Delay (s)		8.8			14.5			0.0			9.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
Cumulative 2015 Baseline plus Project AM
11: 19th Street & Jackson Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	15	249	11	50	158	0	0	106	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	16	271	12	54	172	0	0	115	63

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	152	147	226	178
Volume Left (vph)	16	0	54	0
Volume Right (vph)	0	12	0	63
Hadj (s)	0.09	-0.02	0.08	-0.18
Departure Headway (s)	5.6	5.5	5.0	4.8
Degree Utilization, x	0.24	0.22	0.31	0.24
Capacity (veh/h)	607	622	688	705
Control Delay (s)	9.1	8.9	10.3	9.3
Approach Delay (s)	9.0		10.3	9.3
Approach LOS	A		B	A

Intersection Summary			
Delay	9.5		
HCM Level of Service	A		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
Cumulative 2015 Baseline plus Project AM
12: Jackson Street & Lakeside Drive
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	157	5	1	937	374	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.96	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1764			1863	1770	
Flt Permitted	0.95			1.00	1.00	
Satd. Flow (perm)	1764			1862	1770	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	171	5	1	1018	407	173
RTOR Reduction (vph)	0	0	0	0	31	0
Lane Group Flow (vph)	176	0	0	1019	549	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	20.0			22.0	22.0	
Effective Green, g (s)	20.0			22.0	22.0	
Actuated g/C Ratio	0.40			0.44	0.44	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	706			819	779	
v/s Ratio Prot	c0.10				0.31	
v/s Ratio Perm				c0.55		
v/c Ratio	0.25			1.24	0.71	
Uniform Delay, d1	10.0			14.0	11.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.8			120.1	5.3	
Delay (s)	10.8			134.1	16.7	
Level of Service	B			F	B	
Approach Delay (s)	10.8			134.1	16.7	
Approach LOS	B			F	B	

Intersection Summary			
HCM Average Control Delay	83.5	HCM Level of Service	F
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	87	250	96	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	95	272	104	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	185	181	104
Volume Left (vph)	95	0	104
Volume Right (vph)	0	0	0
Hadj (s)	0.29	0.03	0.23
Departure Headway (s)	5.1	4.8	5.0
Degree Utilization, x	0.26	0.24	0.14
Capacity (veh/h)	698	731	688
Control Delay (s)	8.7	8.1	8.8
Approach Delay (s)	8.4		8.8
Approach LOS	A		A

Intersection Summary			
Delay	8.5		
HCM Level of Service	A		
Intersection Capacity Utilization	24.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	63	1032	95	149	609	0	0	108	52
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	
Lane Util. Factor					0.86			0.95			1.00	
Frt					0.99			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6315			3505			1780	
Flt Permitted					1.00			0.85			1.00	
Satd. Flow (perm)					6315			2997			1780	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	68	1122	103	162	662	0	0	117	57
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	0	0	0	1271	0	0	824	0	0	167	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2263			1573			935	
v/s Ratio Prot											0.09	
v/s Ratio Perm					0.20			c0.27				
v/c Ratio					0.56			0.52			0.18	
Uniform Delay, d1					15.5			9.3			7.5	
Progression Factor					1.55			1.00			1.00	
Incremental Delay, d2					0.7			1.3			0.4	
Delay (s)					24.7			10.6			7.9	
Level of Service					C			B			A	
Approach Delay (s)		0.0			24.7			10.6			7.9	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	NBL2	NBL	NBT	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations												
Volume (vph)	103	176	224	74	77	352	428	499	108	0	15	32
Ideal 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	0.94				0.95	0.91	0.91	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00				1.00	1.00	1.00	1.00		1.00	0.94
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	0.95	0.85	0.85		0.85	0.85
Flt Protected	0.95	0.98				0.98	1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	4708				3486	3230	1441	1583		1583	1491
Flt Permitted	0.95	0.98				0.98	1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	4708				3486	3230	1441	1583		1583	1491
Peak-hour factor, PHF	0.95	0.92	0.92	0.94	0.94	0.96	0.92	0.96	0.96	0.92	0.95	0.95
Adj. Flow (vph)	108	191	243	79	82	367	465	520	112	0	16	34
RTOR Reduction (vph)	0	177	0	0	0	0	0	0	67	0	0	27
Lane Group Flow (vph)	108	257	0	0	0	528	678	307	45	0	16	7
Confl. Peds. (#/hr)	16								102			32
Confl. Bikes (#/hr)						6			10			2
Turn Type	Prot			Split	Split			custom	custom		custom	custom
Protected Phases	5	1		8	8	8	2	6	6			
Permitted Phases		1						6			9	2
Actuated Green, G (s)	8.1	21.7				24.0	16.9	30.5	30.5		1.4	16.9
Effective Green, g (s)	8.1	21.7				24.0	16.9	30.5	30.5		1.4	16.9
Actuated g/C Ratio	0.10	0.27				0.30	0.21	0.38	0.38		0.02	0.21
Clearance Time (s)	4.0	4.0				4.0	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	2.0				2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	179	1277				1046	682	549	604		28	315
v/s Ratio Prot	c0.06	0.05				c0.15	c0.21	c0.21	0.03			
v/s Ratio Perm											c0.01	0.00
v/c Ratio	0.60	0.20				0.50	0.99	0.56	0.07		0.57	0.02
Uniform Delay, d1	34.4	22.5				23.1	31.5	19.5	15.8		39.0	25.0
Progression Factor	0.88	1.78				1.00	1.32	1.58	3.36		1.00	1.00
Incremental Delay, d2	5.5	0.3				0.1	31.9	3.9	0.2		16.3	0.0
Delay (s)	35.7	40.3				23.2	73.6	34.7	53.2		55.3	25.0
Level of Service	D	D				C	E	C	D		E	C
Approach Delay (s)		39.4				23.2	60.6			34.7		
Approach LOS		D				C	E			C		

Intersection Summary			
HCM Average Control Delay	45.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	484	57	481	753	284	885
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	5005		3433	5085	3225	1441
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	5005		3433	5085	3225	1441
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.97
Adj. Flow (vph)	526	62	501	818	309	912
RTOR Reduction (vph)	18	0	0	0	356	368
Lane Group Flow (vph)	570	0	501	818	409	88
Confl. Bikes (#/hr)				2		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	33.0		18.5	56.5	15.5	15.5
Effective Green, g (s)	33.0		18.5	56.5	15.5	15.5
Actuated g/C Ratio	0.41		0.23	0.71	0.19	0.19
Clearance Time (s)	5.0		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)	2065		794	3591	625	279
v/s Ratio Prot	c0.11		c0.15	0.16	c0.13	
v/s Ratio Perm						0.06
v/c Ratio	0.28		0.63	0.23	0.66	0.32
Uniform Delay, d1	15.6		27.7	4.1	29.8	27.7
Progression Factor	0.47		0.77	1.02	1.00	1.00
Incremental Delay, d2	0.3		3.4	0.1	2.5	0.7
Delay (s)	7.6		24.7	4.3	32.3	28.4
Level of Service	A		C	A	C	C
Approach Delay (s)	7.6			12.1	30.8	
Approach LOS	A			B	C	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM

17: West Grand Avenue & Harrison Street — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	188	94	637	637	124	179	873	369	37	958	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.94		1.00	0.90		0.99	
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		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	
Satd. Flow (prot)	3433	3539	1479	3433	3539	1485		5035	1419		4917	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.66	1.00		0.81	
Satd. Flow (perm)	3433	3539	1479	3433	3539	1485		3341	1419		4008	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92
Adj. Flow (vph)	90	204	102	692	692	135	195	949	401	40	1030	201
RTOR Reduction (vph)	0	0	9	0	0	76	0	0	257	0	28	0
Lane Group Flow (vph)	90	204	93	692	692	59	0	1144	144	0	1243	0
Confl. Peds. (#/hr)	38		38	34		34	60		60	28		28
Confl. Bikes (#/hr)			12			18			39			9
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	6.0	33.0	33.0	16.0	44.0	44.0		36.0	36.0		36.0	
Effective Green, g (s)	6.0	33.0	33.0	16.0	44.0	44.0		36.0	36.0		36.0	
Actuated g/C Ratio	0.06	0.33	0.33	0.16	0.44	0.44		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	206	1168	488	549	1557	653		1203	511		1443	
v/s Ratio Prot	0.03	0.06		c0.20	c0.20							
v/s Ratio Perm			0.06			0.04		c0.34	0.10		0.31	
v/c Ratio	0.44	0.17	0.19	1.26	0.44	0.09		2.64dl	0.28		0.86	
Uniform Delay, d1	45.4	23.8	24.0	42.0	19.5	16.3		31.1	22.8		29.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.5	0.3	0.9	131.4	0.9	0.3		16.6	1.4		7.0	
Delay (s)	45.9	24.1	24.8	173.4	20.4	16.6		47.7	24.2		36.7	
Level of Service	D	C	C	F	C	B		D	C		D	
Approach Delay (s)		29.3			89.8			41.6			36.7	
Approach LOS		C			F			D			D	

Intersection Summary			
HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	99.5%	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

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM

18: 20th Street & Broadway — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	202	64	50	167	139	63	499	86	68	430	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.91	
Frpb, ped/bikes		0.98			0.95			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.94			0.98			0.99	
Flt Protected		1.00			0.99			1.00			0.99	
Satd. Flow (prot)		3351			3126			3396			4981	
Flt Permitted		0.94			0.87			0.86			0.79	
Satd. Flow (perm)		3159			2752			2928			3937	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	220	70	54	182	151	68	537	93	74	467	29
RTOR Reduction (vph)	0	44	0	0	96	0	0	20	0	0	10	0
Lane Group Flow (vph)	0	256	0	0	291	0	0	678	0	0	560	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1158			1009			1470			1181	
v/s Ratio Prot								c0.05				
v/s Ratio Perm		0.08			c0.11			c0.17			0.14	
v/c Ratio		0.22			0.29			0.46			0.47	
Uniform Delay, d1		13.1			13.5			10.3			17.1	
Progression Factor		0.90			1.00			1.00			1.00	
Incremental Delay, d2		0.4			0.7			1.0			1.4	
Delay (s)		12.3			14.2			11.3			18.5	
Level of Service		B			B			B			B	
Approach Delay (s)		12.3			14.2			11.3			18.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM

19: West Grand Avenue & Broadway — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	791	90	98	505	75	131	436	97	96	398	81
Ideal 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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98			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)	1753	3358			3325		1764	3539	1528	1762	3435	
Flt Permitted	0.25	1.00			0.59		0.42	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	469	3358			1970		783	3539	1528	835	3435	
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)	107	860	98	107	549	82	142	474	105	104	433	88
RTOR Reduction (vph)	0	11	0	0	13	0	0	0	38	0	19	0
Lane Group Flow (vph)	107	947	0	0	725	0	142	474	67	104	502	0
Confl. Peds. (#/hr)	34		34	37		37	8		8	10		10
Confl. Bikes (#/hr)			11			8			35			7
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.3	32.3			32.3		39.7	39.7	39.7	39.7	39.7	
Effective Green, g (s)	32.3	32.3			32.3		39.7	39.7	39.7	39.7	39.7	
Actuated g/C Ratio	0.40	0.40			0.40		0.50	0.50	0.50	0.50	0.50	
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)	189	1356			795		389	1756	758	414	1705	
v/s Ratio Prot		0.28						0.13			0.15	
v/s Ratio Perm	0.23				c0.37		c0.18		0.04	0.12		
v/c Ratio	0.57	0.70			0.91		0.37	0.27	0.09	0.25	0.29	
Uniform Delay, d1	18.4	19.8			22.5		12.4	11.7	10.6	11.6	11.9	
Progression Factor	1.00	1.00			1.25		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.3	1.3			14.3		2.6	0.4	0.2	1.5	0.4	
Delay (s)	20.7	21.1			42.5		15.0	12.1	10.8	13.0	12.3	
Level of Service	C	C			D		B	B	B	B	B	
Approach Delay (s)		21.1			42.5			12.5			12.4	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM

20: 27th Street & Broadway — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	180	98	34	321	303	54	481	38	98	585	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	5.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1747	3302			3518	1543	1761	3485		1766	3497	
Flt Permitted	0.52	1.00			0.90	1.00	0.33	1.00		0.41	1.00	
Satd. Flow (perm)	959	3302			3164	1543	606	3485		768	3497	
Peak-hour factor, PHF	0.92	0.93	0.92	0.92	0.95	0.92	0.92	0.97	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	194	107	37	338	329	59	496	41	107	636	48
RTOR Reduction (vph)	0	62	0	0	0	137	0	7	0	0	7	0
Lane Group Flow (vph)	64	239	0	0	375	192	59	530	0	107	677	0
Confl. Peds. (#/hr)	25		25	18		13	19		13	6		6
Confl. Bikes (#/hr)		16	16	59		5		5	59			6
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)	406	1398			1340	654	271	1558		343	1563	
v/s Ratio Prot		0.07						0.15			c0.19	
v/s Ratio Perm	0.07				0.12	c0.12	0.10			0.14		
v/c Ratio	0.16	0.17			0.28	0.29	0.22	0.34		0.31	0.43	
Uniform Delay, d1	15.1	15.2			16.0	16.1	14.4	15.3		15.1	16.1	
Progression Factor	1.68	1.88			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.3			0.5	1.1	1.8	0.6		2.4	0.9	
Delay (s)	26.3	28.8			16.5	17.3	16.2	15.9		17.5	17.0	
Level of Service	C	C			B	B	B	B		B	B	
Approach Delay (s)		28.4			16.9			15.9			17.1	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	96.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	113	914	372	71	457	69	209	272	32	120	370	80
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		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		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3427	1553	1768	3350		1768	3472		1757	3430	
Flt Permitted	0.29	1.00	1.00	0.16	1.00		0.39	1.00		0.56	1.00	
Satd. Flow (perm)	543	3427	1553	297	3350		731	3472		1031	3430	
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	952	404	77	497	75	227	286	35	130	402	87
RTOR Reduction (vph)	0	0	285	0	13	0	0	5	0	0	20	0
Lane Group Flow (vph)	123	952	119	77	559	0	227	316	0	130	469	0
Confl. Peds. (#/hr)	4		4	4		4	4		4	11		11
Confl. Bikes (#/hr)			3			7			21			1
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	25.1	25.1	25.1	25.1	25.1		49.4	49.4		35.3	35.3	
Effective Green, g (s)	25.1	25.1	25.1	25.1	25.1		49.4	49.4		35.3	35.3	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.58	0.58		0.42	0.42	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	160	1012	459	88	989		542	2018		428	1424	
v/s Ratio Prot		c0.28			0.17		c0.05	0.09			0.14	
v/s Ratio Perm	0.23		0.08	0.26			c0.20			0.13		
v/c Ratio	0.77	0.94	0.26	0.88	0.56		0.42	0.16		0.30	0.33	
Uniform Delay, d1	27.3	29.2	22.9	28.5	25.3		8.9	8.2		16.6	16.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.07	1.09	
Incremental Delay, d2	29.2	17.2	1.4	65.9	2.3		0.2	0.2		1.8	0.6	
Delay (s)	56.5	46.4	24.2	94.4	27.7		9.1	8.4		19.6	19.0	
Level of Service	E	D	C	F	C		A	A		B	B	
Approach Delay (s)		41.2			35.6			8.7			19.1	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	78.1%	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)	360	392	145	45	289	112	87	380	23	48	357	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1863	1561	1765	1863	1546	1761	3499		1765	3368	
Flt Permitted	0.43	1.00	1.00	0.51	1.00	1.00	0.27	1.00		0.37	1.00	
Satd. Flow (perm)	806	1863	1561	955	1863	1546	501	3499		695	3368	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	426	158	49	314	122	91	413	25	52	388	151
RTOR Reduction (vph)	0	0	65	0	0	65	0	6	0	0	63	0
Lane Group Flow (vph)	391	426	93	49	314	57	91	432	0	52	476	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	58.3	50.3	50.3	43.1	39.6	39.6	17.7	17.7		17.7	17.7	
Effective Green, g (s)	58.3	50.3	50.3	43.1	39.6	39.6	17.7	17.7		17.7	17.7	
Actuated g/C Ratio	0.69	0.59	0.59	0.51	0.47	0.47	0.21	0.21		0.21	0.21	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	714	1102	924	518	868	720	104	729		145	701	
v/s Ratio Prot	c0.09	0.23		0.00	0.17			0.12			0.14	
v/s Ratio Perm	c0.28		0.06	0.04		0.04	c0.18			0.07		
v/c Ratio	0.55	0.39	0.10	0.09	0.36	0.08	0.88	0.59		0.36	0.68	
Uniform Delay, d1	6.4	9.2	7.5	10.6	14.6	12.6	32.6	30.4		28.8	31.0	
Progression Factor	1.00	1.00	1.00	0.69	0.66	0.35	0.91	0.89		1.00	1.00	
Incremental Delay, d2	0.5	1.0	0.2	0.0	1.1	0.2	47.9	0.8		0.6	2.1	
Delay (s)	6.9	10.2	7.8	7.4	10.7	4.6	77.6	27.9		29.3	33.1	
Level of Service	A	B	A	A	B	A	E	C		C	C	
Approach Delay (s)		8.5			8.8			36.5			32.8	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	204	607	716	132	863	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
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	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3440		3432	1414
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3440		3432	1414
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	660	778	143	938	223
RTOR Reduction (vph)	0	0	18	0	2	137
Lane Group Flow (vph)	222	660	903	0	958	64
Confl. Peds. (#/hr)	14			11	6	6
Confl. Bikes (#/hr)				10		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	13.1	46.6	29.5		25.4	25.4
Effective Green, g (s)	13.1	46.6	29.5		25.4	25.4
Actuated g/C Ratio	0.16	0.58	0.37		0.32	0.32
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)	290	2061	1269		1090	449
v/s Ratio Prot	c0.13	0.19	c0.26		c0.28	
v/s Ratio Perm						0.05
v/c Ratio	0.77	0.32	0.71		0.88	0.14
Uniform Delay, d1	32.0	8.6	21.6		25.8	19.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	10.3	0.4	3.4		8.0	0.1
Delay (s)	42.3	9.0	25.0		33.8	19.6
Level of Service	D	A	C		C	B
Approach Delay (s)		17.4	25.0		31.4	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.3%	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)	162	872	0	0	156	338	5	270	26	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		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)	1608	3387			3539	2787		5008				
Flt Permitted	0.64	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1091	3218			3539	2787		5008				
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)	176	948	0	0	170	367	5	293	28	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	220	0	17	0	0	0	0
Lane Group Flow (vph)	158	966	0	0	170	147	0	309	0	0	0	0
Confl. Peds. (#/hr)	2		2				6		6	4		4
Confl. Bikes (#/hr)									4			3
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	436	1287			1416	1115		2003				
v/s Ratio Prot					0.05							
v/s Ratio Perm	0.14	c0.30				0.05		0.06				
v/c Ratio	0.36	0.75			0.12	0.13		0.15				
Uniform Delay, d1	8.4	10.3			7.6	7.6		7.7				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	2.3	4.1			0.2	0.2		0.2				
Delay (s)	10.7	14.4			7.7	7.8		7.8				
Level of Service	B	B			A	A		A				
Approach Delay (s)		13.8			7.8			7.8			0.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.3%	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)	0	294	28	11	166	0	0	0	0	730	1098	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95					0.91	0.91	1.00
Frpb, ped/bikes		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
Frt		1.00	0.85		1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00					0.95	0.99	1.00
Satd. Flow (prot)		3539	1558		3527					1610	3371	1583
Flt Permitted		1.00	1.00		0.93					0.95	0.99	1.00
Satd. Flow (perm)		3539	1558		3296					1610	3371	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92
Adj. Flow (vph)	0	320	30	12	180	0	0	0	0	793	1181	382
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	0	0	0	185
Lane Group Flow (vph)	0	320	11	0	192	0	0	0	0	642	1332	197
Confl. Peds. (#/hr)	2		2	10		10	6		6			
Confl. Bikes (#/hr)			3			4			1			
Turn Type			Perm	Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		21.0	21.0		21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0	21.0		21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35	0.35		0.35					0.52	0.52	0.52
Clearance Time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1239	545		1154					832	1742	818
v/s Ratio Prot		c0.09										
v/s Ratio Perm			0.01		0.06					c0.40	0.40	0.12
v/c Ratio		0.26	0.02		0.17					0.77	0.76	0.24
Uniform Delay, d1		13.9	12.8		13.5					11.7	11.6	8.0
Progression Factor		1.00	1.00		1.00					1.00	1.00	1.00
Incremental Delay, d2		0.5	0.1		0.3					6.9	3.3	0.7
Delay (s)		14.4	12.8		13.8					18.5	14.8	8.7
Level of Service		B	B		B					B	B	A
Approach Delay (s)		14.3			13.8			0.0			14.8	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱	↰	↑↑	↱	↰	↑↱		↰	↑↑	
Volume (vph)	9	468	27	29	736	97	50	257	34	81	293	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	4.0	4.0		4.0	4.0	
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	0.96	1.00	1.00	0.98	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		1.00	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)		3536	1523	1759	3539	1549	1757	3460		1761	3537	
Flt Permitted		0.94	1.00	0.46	1.00	1.00	0.46	1.00		0.48	1.00	
Satd. Flow (perm)		3331	1523	852	3539	1549	844	3460		895	3537	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	10	509	29	32	800	105	52	265	35	88	318	1
RTOR Reduction (vph)	0	0	8	0	0	29	0	19	0	0	0	0
Lane Group Flow (vph)	0	519	21	32	800	76	52	281	0	88	319	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		54.0	54.0	54.0	54.0	54.0	13.0	13.0		13.0	13.0	
Effective Green, g (s)		54.0	54.0	54.0	54.0	54.0	13.0	13.0		13.0	13.0	
Actuated g/C Ratio		0.72	0.72	0.72	0.72	0.72	0.17	0.17		0.17	0.17	
Clearance Time (s)		4.0	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	2.0	
Lane Grp Cap (vph)		2398	1097	613	2548	1115	146	600		155	613	
v/s Ratio Prot					c0.23			0.08			0.09	
v/s Ratio Perm		0.16	0.01	0.04		0.05	0.06			c0.10		
v/c Ratio		0.22	0.02	0.05	0.31	0.07	0.36	0.47		0.57	0.52	
Uniform Delay, d1		3.5	3.0	3.1	3.8	3.1	27.3	27.9		28.4	28.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2	0.0	0.2	0.3	0.1	0.5	0.2		2.8	0.4	
Delay (s)		3.7	3.0	3.2	4.1	3.2	27.9	28.1		31.3	28.5	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		3.7			4.0			28.1			29.1	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2015 Baseline plus Project Conditions
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	630	86	0	0	0	0	534	74	1	69	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.98			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		4923						1832			1862	
Flt Permitted		0.99						1.00			0.84	
Satd. Flow (perm)		1000						1300			1300	
Peak-hour factor, PHF	0.92	0.93	0.92	0.25	0.25	0.25	0.25	0.92	0.92	0.92	0.92	0.25
Adj. Flow (vph)	336	677	93	0	0	0	0	580	80	1	75	0
RTOR Reduction (vph)	0	24	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	1082	0	0	0	0	0	649	0	0	76	0
Confl. Peds. (#/hr)	9		9	38		38				2		2
Confl. Bikes (#/hr)			11			4						2
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		500						631			448	
v/s Ratio Prot								c0.35				
v/s Ratio Perm		c1.08									0.06	
v/c Ratio		2.16						1.03			0.17	
Uniform Delay, d1		11.2						14.8			10.3	
Progression Factor		1.00						1.00			0.05	
Incremental Delay, d2		530.4						43.3			0.7	
Delay (s)		541.7						58.0			1.3	
Level of Service		F						E			A	
Approach Delay (s)		541.7			0.0			58.0			1.3	
Approach LOS		F			A			E			A	

Intersection Summary			
HCM Average Control Delay	346.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.70		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	184	634	68	58	782
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.89	0.85
Flt Protected			0.99		0.99	1.00
Satd. Flow (prot)			3500		3167	1441
Flt Permitted			0.99		0.99	1.00
Satd. Flow (perm)			3500		3167	1441
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.94
Adj. Flow (vph)	0	200	689	74	63	832
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	889	0	553	416
Confl. Peds. (#/hr)	46					
Confl. Bikes (#/hr)	3					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1268		1140	519
v/s Ratio Prot						
v/s Ratio Perm			0.25		0.17	c0.29
v/c Ratio			0.70		0.49	0.80
Uniform Delay, d1			12.3		11.2	13.0
Progression Factor			0.77		1.00	1.00
Incremental Delay, d2			0.3		1.5	12.3
Delay (s)			9.8		12.6	25.3
Level of Service			A		B	C
Approach Delay (s)			9.8		18.1	
Approach LOS			A		B	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	68.9%	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)	185	1198	0	0	0	0	0	980	728	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.94				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6348						4717				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6348						4717				
Peak-hour factor, PHF	0.92	0.98	0.25	0.25	0.25	0.25	0.25	0.94	0.96	0.25	0.25	0.25
Adj. Flow (vph)	201	1222	0	0	0	0	0	1043	758	0	0	0
RTOR Reduction (vph)	0	17	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	1406	0	0	0	0	0	1793	0	0	0	0
Confl. Peds. (#/hr)	22		22	50		50	14		14	6		6
Confl. Bikes (#/hr)			16			1			2			2
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2539						1887				
v/s Ratio Prot								c0.38				
v/s Ratio Perm		0.22										
v/c Ratio		0.55						1.17dr				
Uniform Delay, d1		10.4						13.1				
Progression Factor		0.88						1.46				
Incremental Delay, d2		0.6						10.3				
Delay (s)		9.8						29.4				
Level of Service		A						C				
Approach Delay (s)		9.8			0.0			29.4			0.0	
Approach LOS		A			A			C			A	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	71	0	0	1117	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	77	0	0	1214	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	310	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	100	100			
cM capacity (veh/h)	655	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	77	304	304	304	304
Volume Left	77	0	0	0	0
Volume Right	0	0	0	0	0
cSH	655	1700	1700	1700	1700
Volume to Capacity	0.12	0.18	0.18	0.18	0.18
Queue Length 95th (ft)	10	0	0	0	0
Control Delay (s)	11.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.2	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

5: 12th Street & Oak St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1054	62	283	1022	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6330			6169				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6330			6169				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.92	0.92	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	1109	67	308	1065	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1173	0	0	1349	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3154			2118				
v/s Ratio Prot					c0.19							
v/s Ratio Perm								0.22				
v/c Ratio					0.37			0.64				
Uniform Delay, d1					9.3			16.6				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.3			1.5				
Delay (s)					9.6			18.0				
Level of Service					A			B				
Approach Delay (s)		0.0			9.6			18.0			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

6: 14th Street & Lakeside Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	66	953	0	0	441	271	205	670	42	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.92		1.00	0.96			
Flpb, ped/bikes		1.00			1.00	1.00		0.99	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3524			3539	1461		3475	1520			
Flt Permitted		0.88			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		3113			3539	1461		3475	1520			
Peak-hour factor, PHF	0.92	0.92	0.25	0.99	0.96	0.96	0.92	0.92	0.92	0.25	0.25	0.25
Adj. Flow (vph)	72	1036	0	0	459	282	223	728	46	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	106	0	0	3	0	0	0
Lane Group Flow (vph)	0	1108	0	0	459	176	0	951	43	0	0	0
Confl. Peds. (#/hr)	36		36	52		52	35		35	10		10
Confl. Bikes (#/hr)			5			21						22
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		934			1062	438		1853	811			
v/s Ratio Prot					0.13							
v/s Ratio Perm		c0.36				0.12		0.27	0.03			
v/c Ratio		1.19			0.43	0.40		0.51	0.05			
Uniform Delay, d1		21.0			16.9	16.7		9.0	6.7			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		94.7			1.3	2.7		1.0	0.1			
Delay (s)		115.7			18.2	19.4		10.0	6.8			
Level of Service		F			B	B		B	A			
Approach Delay (s)		115.7			18.7			9.9			0.0	
Approach LOS		F			B			A			A	

Intersection Summary			
HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

7: 7th St. & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1170	353	0	0	0	0	0	0	472	1527	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		1.00									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		6148									5015	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		6148									5015	
Peak-hour factor, PHF	0.25	0.99	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.95	0.25
Adj. Flow (vph)	0	1182	384	0	0	0	0	0	0	513	1607	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	1562	0	0	0	0	0	0	0	0	2109	0
Confl. Peds. (#/hr)	4		4	8		8	2		2	12		12
Confl. Bikes (#/hr)			2			2			2			
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2459									2229	
v/s Ratio Prot		c0.25										
v/s Ratio Perm											0.42	
v/c Ratio		0.64									0.95	
Uniform Delay, d1		10.9									12.0	
Progression Factor		1.00									1.00	
Incremental Delay, d2		1.3									10.1	
Delay (s)		12.1									22.0	
Level of Service		B									C	
Approach Delay (s)		12.1			0.0			0.0			22.0	
Approach LOS		B			A			A			C	

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

8: 11th Street & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1010	201	0	0	0	0	0	0	51	969	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.97									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6205									5068	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6205									5068	
Peak-hour factor, PHF	0.25	0.96	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.93	0.25
Adj. Flow (vph)	0	1052	218	0	0	0	0	0	0	55	1042	0
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	1247	0	0	0	0	0	0	0	0	1087	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2379									2196	
v/s Ratio Prot		c0.20										
v/s Ratio Perm											0.21	
v/c Ratio		0.52									0.50	
Uniform Delay, d1		14.3									12.3	
Progression Factor		0.84									0.57	
Incremental Delay, d2		0.8									0.7	
Delay (s)		12.7									7.7	
Level of Service		B									A	
Approach Delay (s)		12.7			0.0			0.0			7.7	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: 12th Street & Madison Street

Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	258	977	0	0	0	0	0	793	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6270						5030	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6270						5030	
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.97	0.25	0.25	0.25	0.25	0.25	0.92	0.92
Adj. Flow (vph)	0	0	0	280	1007	0	0	0	0	0	862	51
RTOR Reduction (vph)	0	0	0	0	39	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	0	0	0	1248	0	0	0	0	0	902	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2717						2222	
v/s Ratio Prot											c0.18	
v/s Ratio Perm					0.20							
v/c Ratio					0.46						0.41	
Uniform Delay, d1					12.0						11.4	
Progression Factor					0.56						1.00	
Incremental Delay, d2					0.5						0.6	
Delay (s)					7.3						11.9	
Level of Service					A						B	
Approach Delay (s)		0.0			7.3			0.0			11.9	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: 14th Street & Madison Street

Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	669	89	34	582	0	0	0	0	472	683	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.98	1.00	
Frt		0.98			1.00					1.00	1.00	
Flt Protected		1.00			1.00					0.95	0.99	
Satd. Flow (prot)		3452			3528					1578	3342	
Flt Permitted		1.00			0.89					0.95	0.99	
Satd. Flow (perm)		3452			3165					1578	3342	
Peak-hour factor, PHF	0.25	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.25	0.94	0.96	0.92
Adj. Flow (vph)	0	727	97	37	633	0	0	0	0	502	711	27
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	801	0	0	670	0	0	0	0	402	833	0
Confl. Peds. (#/hr)	50		50	25		25	17		17	24		24
Confl. Bikes (#/hr)			16			17			2			
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1458			1336					666	1411	
v/s Ratio Prot		c0.23										
v/s Ratio Perm					0.21					c0.25	0.25	
v/c Ratio		0.55			0.50					0.60	0.59	
Uniform Delay, d1		9.8			9.5					10.1	10.0	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		1.5			1.3					4.0	1.8	
Delay (s)		11.3			10.9					14.1	11.8	
Level of Service		B			B					B	B	
Approach Delay (s)		11.3			10.9			0.0			12.6	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: 19th Street & Jackson Street

Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	10	106	6	27	195	0	0	87	95
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	11	115	7	29	212	0	0	95	103

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	68	64	241	198
Volume Left (vph)	11	0	29	0
Volume Right (vph)	0	7	0	103
Hadj (s)	0.11	-0.04	0.06	-0.28
Departure Headway (s)	5.6	5.5	4.5	4.3
Degree Utilization, x	0.11	0.10	0.30	0.23
Capacity (veh/h)	596	614	766	806
Control Delay (s)	8.1	7.8	9.5	8.6
Approach Delay (s)	8.0		9.5	8.6
Approach LOS	A		A	A

Intersection Summary			
Delay	8.8		
HCM Level of Service	A		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
12: Jackson Street & Lakeside Drive

Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	181	1	2	828	655	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.97	
Flt Protected	0.95			1.00	1.00	
Satd. Flow (prot)	1772			1863	1786	
Flt Permitted	0.95			0.73	1.00	
Satd. Flow (perm)	1772			1363	1786	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	1	2	900	712	234
RTOR Reduction (vph)	0	0	0	0	24	0
Lane Group Flow (vph)	198	0	0	902	922	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	20.0			22.0	22.0	
Effective Green, g (s)	20.0			22.0	22.0	
Actuated g/C Ratio	0.40			0.44	0.44	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	709			600	786	
v/s Ratio Prot	c0.11				0.52	
v/s Ratio Perm				c0.66		
v/c Ratio	0.28			1.50	1.17	
Uniform Delay, d1	10.1			14.0	14.0	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.0			235.1	91.4	
Delay (s)	11.1			249.1	105.4	
Level of Service	B			F	F	
Approach Delay (s)	11.1			249.1	105.4	
Approach LOS	B			F	F	

Intersection Summary			
HCM Average Control Delay	159.6	HCM Level of Service	F
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
13: 19th Street & Alice Street
222 19th Street Transportation Study

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	46	223	155	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	50	242	168	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	131	162	168
Volume Left (vph)	50	0	168
Volume Right (vph)	0	0	0
Hadj (s)	0.23	0.03	0.23
Departure Headway (s)	5.2	5.0	4.8
Degree Utilization, x	0.19	0.22	0.23
Capacity (veh/h)	680	702	713
Control Delay (s)	8.2	8.2	9.2
Approach Delay (s)	8.2		9.2
Approach LOS	A		A

Intersection Summary			
Delay	8.6		
HCM Level of Service	A		
Intersection Capacity Utilization	26.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
14: 12th Street & Harrison
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	47	663	80	130	492	0	0	67	25
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	
Lane Util. Factor					0.86			0.95			0.95	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6292			3503			3396	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					6292			3056			3396	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	51	721	87	141	535	0	0	73	27
RTOR Reduction (vph)	0	0	0	0	32	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	0	827	0	0	676	0	0	87	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2255			1604			1783	
v/s Ratio Prot											0.03	
v/s Ratio Perm					0.13			c0.22				
v/c Ratio					0.37			0.42			0.05	
Uniform Delay, d1					14.2			8.7			6.9	
Progression Factor					1.49			1.00			1.00	
Incremental Delay, d2					0.4			0.8			0.1	
Delay (s)					21.6			9.5			7.0	
Level of Service					C			A			A	
Approach Delay (s)		0.0			21.6			9.5			7.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
15: 20th Street & Harrison Street
222 19th Street Transportation Study

Movement	EBL2	EBL	EBR	NBL2	NBL	NBT	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations												
Volume (vph)	14	485	174	166	56	840	199	409	90	0	78	27
Ideal 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	0.94				0.95	0.91	0.91	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
Flpb, ped/bikes	0.48	1.00				1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.96				1.00	0.92	0.85	0.85		0.85	0.85
Flt Protected	0.95	0.96				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	841	4866				3503	3132	1441	1583		1583	1554
Flt Permitted	0.95	0.96				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	841	4866				3503	3132	1441	1583		1583	1554
Peak-hour factor, PHF	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	15	527	189	180	61	913	216	445	98	0	82	28
RTOR Reduction (vph)	0	95	0	0	0	0	0	0	54	0	0	21
Lane Group Flow (vph)	15	621	0	0	0	1154	439	222	44	0	82	7
Confl. Peds. (#/hr)	22								74			
Confl. Bikes (#/hr)						7			8			7
Turn Type	Prot			Split	Split			custom	custom		custom	custom
Protected Phases	5	1		8	8	8	2	6	6			
Permitted Phases		1						6			9	2
Actuated Green, G (s)	0.8	14.7				16.0	17.2	31.1	31.1		6.1	17.2
Effective Green, g (s)	0.8	14.7				16.0	17.2	31.1	31.1		6.1	17.2
Actuated g/C Ratio	0.01	0.21				0.23	0.25	0.44	0.44		0.09	0.25
Clearance Time (s)	4.0	4.0				4.0	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	2.0				2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	10	1022				801	770	640	703		138	382
v/s Ratio Prot	0.02	c0.13				c0.33	c0.14	0.15	0.03			
v/s Ratio Perm											c0.05	0.00
v/c Ratio	1.50	0.61				1.44	0.57	0.35	0.06		0.59	0.02
Uniform Delay, d1	34.6	25.0				27.0	23.2	12.8	11.1		30.8	20.0
Progression Factor	1.00	1.00				1.00	1.26	1.40	2.43		1.00	1.00
Incremental Delay, d2	478.8	2.7				205.4	0.6	1.4	0.2		4.5	0.0
Delay (s)	513.4	27.7				232.4	29.8	19.3	27.1		35.3	20.0
Level of Service	F	C				F	C	B	C		D	C
Approach Delay (s)		37.7				232.4	26.4			31.4		
Approach LOS		D				F	C			C		

Intersection Summary			
HCM Average Control Delay	115.9	HCM Level of Service	F
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
16: Harrison Street & Lakeside Drive
222 19th Street Transportation Study

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1132	146	890	387	299	845
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	4996		3433	5085	3230	1441
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	4996		3433	5085	3230	1441
Peak-hour factor, PHF	0.95	0.92	0.99	0.92	0.92	0.93
Adj. Flow (vph)	1192	159	899	421	325	909
RTOR Reduction (vph)	25	0	0	0	319	318
Lane Group Flow (vph)	1326	0	899	421	462	136
Confl. Bikes (#/hr)				16		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	18.0		19.0	41.0	21.0	21.0
Effective Green, g (s)	18.0		19.0	41.0	21.0	21.0
Actuated g/C Ratio	0.26		0.27	0.59	0.30	0.30
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)	1285		932	2978	969	432
v/s Ratio Prot	c0.27		c0.26	0.08	c0.14	
v/s Ratio Perm						0.09
v/c Ratio	1.03		0.96	0.14	0.48	0.32
Uniform Delay, d1	26.0		25.2	6.5	20.0	18.9
Progression Factor	0.97		1.00	1.00	1.00	1.00
Incremental Delay, d2	17.8		22.1	0.1	1.7	1.9
Delay (s)	43.0		47.2	6.6	21.7	20.8
Level of Service	D		D	A	C	C
Approach Delay (s)	43.0			34.3	21.4	
Approach LOS	D			C	C	

Intersection Summary			
HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
17: West Grand Avenue & Harrison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	244	669	185	385	900	45	11	1358	1285	2	645	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.92		1.00	0.93		0.99	
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		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1483	3433	3539	1459		5083	1466		4899	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.93	1.00		0.94	
Satd. Flow (perm)	3433	3539	1483	3433	3539	1459		4729	1466		4589	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.93	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	265	727	201	393	968	49	12	1476	1397	2	672	140
RTOR Reduction (vph)	0	0	40	0	0	24	0	0	247	0	32	0
Lane Group Flow (vph)	265	727	161	393	968	25	0	1488	1150	0	782	0
Confl. Peds. (#/hr)	31		31	48		48	42		42	34		34
Confl. Bikes (#/hr)			22			15			22			20
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	12.0	34.4	34.4	14.6	38.0	38.0		36.0	36.0		36.0	
Effective Green, g (s)	12.0	34.4	34.4	14.6	38.0	38.0		36.0	36.0		36.0	
Actuated g/C Ratio	0.12	0.34	0.34	0.15	0.38	0.38		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	412	1217	510	501	1345	554		1702	528		1652	
v/s Ratio Prot	0.08	0.21		c0.11	c0.27							
v/s Ratio Perm			0.11			0.02		0.31	c0.78		0.17	
v/c Ratio	0.64	0.60	0.32	0.78	0.72	0.04		0.87	2.18		0.47	
Uniform Delay, d1	42.0	27.1	24.1	41.2	26.5	19.6		29.9	32.0		24.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	2.6	2.2	1.6	7.3	3.3	0.2		6.6	536.3		1.0	
Delay (s)	44.5	29.3	25.8	48.5	29.8	19.7		36.5	568.3		25.7	
Level of Service	D	C	C	D	C	B		D	F		C	
Approach Delay (s)		32.1			34.7			294.0			25.7	
Approach LOS		C			C			F			C	

Intersection Summary			
HCM Average Control Delay	151.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	136.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
18: 20th Street & Broadway
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	162	99	63	296	135	109	804	117	50	568	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.91	
Frpb, ped/bikes		0.97			0.96			0.99			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.96			0.98			0.99	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		3219			3222			3410			4988	
Flt Permitted		0.90			0.87			0.72			0.79	
Satd. Flow (perm)		2897			2825			2468			3965	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	26	176	108	68	322	147	118	874	123	54	617	42
RTOR Reduction (vph)	0	68	0	0	46	0	0	16	0	0	11	0
Lane Group Flow (vph)	0	242	0	0	491	0	0	1099	0	0	702	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1062			1036			1303			1190	
v/s Ratio Prot								c0.10				
v/s Ratio Perm		0.08			c0.17			c0.31			0.18	
v/c Ratio		0.23			0.47			0.84			0.59	
Uniform Delay, d1		13.1			14.6			13.5			17.9	
Progression Factor		2.10			1.00			1.00			1.00	
Incremental Delay, d2		0.5			1.6			6.8			2.1	
Delay (s)		28.1			16.1			20.3			20.0	
Level of Service		C			B			C			C	
Approach Delay (s)		28.1			16.1			20.3			20.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
19: West Grand Avenue & Broadway
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	86	535	42	112	366	36	351	681	173	58	511	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	0.99	
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	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1764	3384			3350		1765	3539	1551	1752	3416	
Flt Permitted	0.31	1.00			0.59		0.36	1.00	1.00	0.34	1.00	
Satd. Flow (perm)	571	3384			2011		674	3539	1551	630	3416	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	582	46	122	398	39	382	717	188	63	555	117
RTOR Reduction (vph)	0	9	0	0	8	0	0	0	72	0	16	0
Lane Group Flow (vph)	93	619	0	0	551	0	382	717	116	63	656	0
Confl. Peds. (#/hr)	8		8	2		2	8		8	32		32
Confl. Bikes (#/hr)			6			6			4			28
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	24.7	24.7			24.7		47.3	47.3	47.3	47.3	47.3	
Effective Green, g (s)	24.7	24.7			24.7		47.3	47.3	47.3	47.3	47.3	
Actuated g/C Ratio	0.31	0.31			0.31		0.59	0.59	0.59	0.59	0.59	
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)	176	1045			621		399	2092	917	372	2020	
v/s Ratio Prot		0.18						0.20			0.19	
v/s Ratio Perm	0.16				c0.27		c0.57		0.07	0.10		
v/c Ratio	0.53	0.59			0.89		0.96	0.34	0.13	0.17	0.32	
Uniform Delay, d1	22.8	23.4			26.3		15.4	8.4	7.2	7.4	8.3	
Progression Factor	1.00	1.00			1.10		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	0.6			13.8		35.5	0.4	0.3	1.0	0.4	
Delay (s)	24.2	24.0			42.7		50.9	8.8	7.5	8.4	8.7	
Level of Service	C	C			D		D	A	A	A	A	
Approach Delay (s)		24.0			42.7			21.1			8.7	
Approach LOS		C			D			C			A	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
20: 27th Street & Broadway
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	252	75	48	451	283	175	689	35	202	688	95
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	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	3379			3520	1536	1767	3509		1768	3455	
Flt Permitted	0.42	1.00			0.88	1.00	0.24	1.00		0.27	1.00	
Satd. Flow (perm)	766	3379			3102	1536	454	3509		510	3455	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	274	82	52	470	308	190	749	38	220	748	103
RTOR Reduction (vph)	0	33	0	0	0	66	0	4	0	0	13	0
Lane Group Flow (vph)	99	323	0	0	522	242	190	783	0	220	838	0
Confl. Peds. (#/hr)	32		32	10		10	6		6	5		5
Confl. Bikes (#/hr)			20			18			17			66
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)	324	1431			1314	651	203	1569		228	1545	
v/s Ratio Prot		0.10						0.22			0.24	
v/s Ratio Perm	0.13				c0.17	0.16	0.42			c0.43		
v/c Ratio	0.31	0.23			0.40	0.37	0.94	0.50		0.96	0.54	
Uniform Delay, d1	16.2	15.6			17.0	16.8	22.3	16.7		22.9	17.2	
Progression Factor	0.87	0.86			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.3			0.9	1.6	48.4	1.1		51.2	1.4	
Delay (s)	16.0	13.7			17.9	18.4	70.7	17.9		74.0	18.5	
Level of Service	B	B			B	B	E	B		E	B	
Approach Delay (s)		14.2			18.1			28.1			29.9	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	107.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
21: West Grand Avenue & Telegraph Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	765	34	20	902	141	99	568	35	149	449	111
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	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	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3427	1532	1762	3341		1769	3505		1761	3405	
Flt Permitted	0.17	1.00	1.00	0.17	1.00		0.35	1.00		0.40	1.00	
Satd. Flow (perm)	308	3427	1532	307	3341		654	3505		747	3405	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	32	832	37	22	980	153	108	617	38	162	473	121
RTOR Reduction (vph)	0	0	26	0	14	0	0	5	0	0	23	0
Lane Group Flow (vph)	32	832	11	22	1119	0	108	650	0	162	571	0
Confl. Peds. (#/hr)	12		12	18		18	3		3	12		12
Confl. Bikes (#/hr)			8			6			10			28
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	24.2	24.2	24.2	24.2	24.2		50.3	50.3		40.0	40.0	
Effective Green, g (s)	24.2	24.2	24.2	24.2	24.2		50.3	50.3		40.0	40.0	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28		0.59	0.59		0.47	0.47	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	88	976	436	87	951		463	2074		352	1602	
v/s Ratio Prot		0.24			c0.33		0.02	c0.19			0.17	
v/s Ratio Perm	0.10		0.01	0.07			0.12			c0.22		
v/c Ratio	0.36	0.85	0.02	0.25	1.18		0.23	0.31		0.46	0.36	
Uniform Delay, d1	24.3	28.7	21.9	23.4	30.4		8.0	8.7		15.2	14.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.27	1.29	
Incremental Delay, d2	11.2	9.3	0.1	6.9	90.4		0.1	0.4		3.7	0.5	
Delay (s)	35.5	38.1	22.0	30.3	120.8		8.1	9.1		23.1	19.1	
Level of Service	D	D	C	C	F		A	A		C	B	
Approach Delay (s)		37.3			119.1			8.9			19.9	
Approach LOS		D			F			A			B	

Intersection Summary			
HCM Average Control Delay	54.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
22: 27th Street & Telegraph Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	415	140	66	673	117	210	508	48	139	485	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1554	1769	1863	1552	1764	3482		1763	3258	
Flt Permitted	0.12	1.00	1.00	0.34	1.00	1.00	0.18	1.00		0.35	1.00	
Satd. Flow (perm)	227	1863	1554	636	1863	1552	335	3482		651	3258	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	451	152	72	732	127	228	552	52	151	527	397
RTOR Reduction (vph)	0	0	93	0	0	79	0	9	0	0	160	0
Lane Group Flow (vph)	234	451	59	72	732	48	228	595	0	151	764	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	33.1	33.1	33.7	28.3	28.3	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	33.1	33.1	33.7	28.3	28.3	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.40	0.33	0.33	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	300	725	605	324	620	517	130	1352		253	1265	
v/s Ratio Prot	c0.09	0.24		0.01	c0.39			0.17			0.23	
v/s Ratio Perm	0.30		0.04	0.07		0.03	c0.68			0.23		
v/c Ratio	0.78	0.62	0.10	0.22	1.18	0.09	1.75	0.44		0.60	0.60	
Uniform Delay, d1	18.1	20.9	16.5	16.7	28.4	19.5	26.0	19.2		20.7	20.8	
Progression Factor	1.00	1.00	1.00	1.57	1.41	2.55	0.76	0.66		1.00	1.00	
Incremental Delay, d2	11.4	4.0	0.3	0.1	95.9	0.3	366.2	0.1		2.5	0.6	
Delay (s)	29.5	24.9	16.8	26.3	135.9	50.1	385.9	12.8		23.2	21.3	
Level of Service	C	C	B	C	F	D	F	B		C	C	
Approach Delay (s)		24.7			115.8			115.0			21.6	
Approach LOS		C			F			F			C	

Intersection Summary			
HCM Average Control Delay	67.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
23: West Grand Avenue & Northgate Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	291	622	667	493	231	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.94		0.99	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3271		3423	1421
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3271		3423	1421
Peak-hour factor, PHF	0.92	0.93	0.92	0.97	0.92	0.92
Adj. Flow (vph)	316	669	725	508	251	121
RTOR Reduction (vph)	0	0	125	0	6	95
Lane Group Flow (vph)	316	669	1108	0	257	14
Confl. Peds. (#/hr)	14			18		
Confl. Bikes (#/hr)				7		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	20.4	61.6	37.2		10.4	10.4
Effective Green, g (s)	20.4	61.6	37.2		10.4	10.4
Actuated g/C Ratio	0.26	0.77	0.46		0.13	0.13
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)	451	2725	1521		445	185
v/s Ratio Prot	c0.18	0.19	c0.34		c0.08	
v/s Ratio Perm						0.01
v/c Ratio	0.70	0.25	0.73		0.58	0.08
Uniform Delay, d1	27.0	2.6	17.3		32.7	30.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.0	0.2	3.1		1.1	0.1
Delay (s)	31.0	2.8	20.4		33.9	30.6
Level of Service	C	A	C		C	C
Approach Delay (s)		11.9	20.4		32.9	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
24: 27th Street & I-980 On Ramp
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	252	672	0	0	264	1082	22	876	78	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		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)	1609	3384			3539	2787		5011				
Flt Permitted	0.58	0.94			1.00	1.00		1.00				
Satd. Flow (perm)	975	3181			3539	2787		5011				
Peak-hour factor, PHF	0.93	0.92	0.25	0.25	0.92	0.97	0.92	0.92	0.92	0.25	0.25	0.25
Adj. Flow (vph)	271	730	0	0	287	1115	24	952	85	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	46	0	25	0	0	0	0
Lane Group Flow (vph)	244	757	0	0	287	1069	0	1036	0	0	0	0
Confl. Peds. (#/hr)	2		2				4		4	3		3
Confl. Bikes (#/hr)			4						5			7
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	390	1272			1416	1115		2004				
v/s Ratio Prot					0.08							
v/s Ratio Perm	0.25	0.24				c0.38		0.21				
v/c Ratio	0.63	0.60			0.20	0.96		0.52				
Uniform Delay, d1	9.6	9.4			7.8	11.7		9.1				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	7.4	2.1			0.3	18.8		1.0				
Delay (s)	17.0	11.5			8.2	30.4		10.0				
Level of Service	B	B			A	C		B				
Approach Delay (s)		12.8			25.9			10.0			0.0	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM

25: 27th Street & I-980 Off Ramp — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	506	39	12	250	0	0	0	0	412	332	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95					0.91	0.91	1.00
Frpb, ped/bikes		1.00	0.98		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		1.00	1.00		1.00					0.95	0.98	1.00
Satd. Flow (prot)		3539	1552		3531					1605	3330	1558
Flt Permitted		1.00	1.00		0.93					0.95	0.98	1.00
Satd. Flow (perm)		3539	1552		3285					1605	3330	1558
Peak-hour factor, PHF	0.25	0.95	0.92	0.92	0.92	0.25	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	0	533	42	13	272	0	0	0	0	448	361	223
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	0	0	0	108
Lane Group Flow (vph)	0	533	15	0	285	0	0	0	0	264	545	115
Confl. Peds. (#/hr)	4		4	4		4	1		1	3		3
Confl. Bikes (#/hr)			5			9			1			1
Turn Type			Perm	Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		21.0	21.0		21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0	21.0		21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35	0.35		0.35					0.52	0.52	0.52
Clearance Time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1239	543		1150					829	1721	805
v/s Ratio Prot		c0.15										
v/s Ratio Perm			0.01		0.09					c0.16	0.16	0.07
v/c Ratio		0.43	0.03		0.25					0.32	0.32	0.14
Uniform Delay, d1		14.9	12.8		13.9					8.4	8.4	7.6
Progression Factor		1.00	1.00		1.00					1.00	1.00	1.00
Incremental Delay, d2		1.1	0.1		0.5					1.0	0.5	0.4
Delay (s)		16.0	12.9		14.4					9.4	8.9	7.9
Level of Service		B	B		B					A	A	A
Approach Delay (s)		15.8			14.4			0.0			8.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM

26: West Grand Avenue & San Pablo Avenue — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	788	142	43	681	67	367	480	91	124	389	142
Ideal 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	3.0	3.0		3.0	3.0	
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	0.96	1.00	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	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)		3510	1522	1765	3539	1548	1762	3438		1764	3378	
Flt Permitted		0.65	1.00	0.18	1.00	1.00	0.36	1.00		0.35	1.00	
Satd. Flow (perm)		2311	1522	342	3539	1548	662	3438		650	3378	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	160	857	154	47	740	73	378	495	94	135	423	154
RTOR Reduction (vph)	0	0	80	0	0	38	0	21	0	0	49	0
Lane Group Flow (vph)	0	1017	74	47	740	35	378	568	0	135	528	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		36.0	36.0	36.0	36.0	36.0	32.0	32.0		32.0	32.0	
Effective Green, g (s)		36.0	36.0	36.0	36.0	36.0	32.0	32.0		32.0	32.0	
Actuated g/C Ratio		0.48	0.48	0.48	0.48	0.48	0.43	0.43		0.43	0.43	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
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)		1109	731	164	1699	743	282	1467		277	1441	
v/s Ratio Prot					0.21			0.17			0.16	
v/s Ratio Perm		c0.44	0.05	0.14		0.02	c0.57			0.21		
v/c Ratio		0.92	0.10	0.29	0.44	0.05	1.34	0.39		0.49	0.37	
Uniform Delay, d1		18.1	10.7	11.8	12.8	10.4	21.5	14.8		15.6	14.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		13.2	0.3	4.4	0.8	0.1	175.2	0.1		0.5	0.1	
Delay (s)		31.4	10.9	16.1	13.6	10.5	196.7	14.8		16.1	14.7	
Level of Service		C	B	B	B	B	F	B		B	B	
Approach Delay (s)		28.7			13.5			85.9			14.9	
Approach LOS		C			B			F			B	

Intersection Summary			
HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	101.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2015 Baseline plus Project Conditions Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	415	140	66	673	117	210	508	48	139	485	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1553	1769	1863	1552	1763	3482		1763	3260	
Flt Permitted	0.12	1.00	1.00	0.29	1.00	1.00	0.21	1.00		0.37	1.00	
Satd. Flow (perm)	226	1863	1553	535	1863	1552	382	3482		680	3260	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	234	451	152	72	732	127	228	552	52	151	527	397
RTOR Reduction (vph)	0	0	96	0	0	76	0	8	0	0	115	0
Lane Group Flow (vph)	234	451	56	72	732	51	228	596	0	151	809	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	39.5	33.0	33.0	34.5	30.5	30.5	39.5	39.5		39.5	39.5	
Effective Green, g (s)	39.5	33.0	33.0	34.5	30.5	30.5	39.5	39.5		39.5	39.5	
Actuated g/C Ratio	0.44	0.37	0.37	0.38	0.34	0.34	0.44	0.44		0.44	0.44	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	211	683	569	260	631	526	168	1528		298	1431	
v/s Ratio Prot	c0.08	0.24		0.01	0.39			0.17			0.25	
v/s Ratio Perm	c0.41		0.04	0.09		0.03	c0.60			0.22		
v/c Ratio	1.11	0.66	0.10	0.28	1.16	0.10	1.36	0.39		0.51	0.57	
Uniform Delay, d1	22.3	23.8	18.7	18.9	29.8	20.3	25.2	17.1		18.2	18.8	
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	94.2	5.0	0.3	0.2	88.8	0.4	194.4	0.1		0.5	0.3	
Delay (s)	116.5	28.8	19.1	19.1	118.5	20.7	219.6	17.2		18.7	19.2	
Level of Service	F	C	B	B	F	C	F	B		B	B	
Approach Delay (s)		51.5			97.5			72.6			19.1	
Approach LOS		D			F			E			B	

Intersection Summary			
HCM Average Control Delay	58.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.5
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Cumulative Year 2030 Baseline plus Project Conditions
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	453	849	226	0	0	0	0	343	101	4	174	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		0.99						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.98						0.97			1.00	
Flt Protected		0.99						1.00			1.00	
Satd. Flow (prot)		4861						1800			1861	
Flt Permitted		0.99						1.00			0.99	
Satd. Flow (perm)		1850						1500			1600	
Peak-hour factor, PHF	0.95	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)	477	923	246	0	0	0	0	373	110	4	189	0
RTOR Reduction (vph)	0	55	0	0	0	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	1591	0	0	0	0	0	459	0	0	193	0
Confl. Peds. (#/hr)	14		14	52		52	1		1	4		4
Confl. Bikes (#/hr)			5			2						
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		925						620			551	
v/s Ratio Prot								c0.26				
v/s Ratio Perm		c0.86									0.12	
v/c Ratio		1.72						0.74			0.35	
Uniform Delay, d1		11.2						13.0			11.0	
Progression Factor		1.00						1.00			0.88	
Incremental Delay, d2		328.6						7.8			1.1	
Delay (s)		339.8						20.8			10.8	
Level of Service		F						C			B	
Approach Delay (s)		339.8			0.0			20.8			10.8	
Approach LOS		F			A			C			B	

Intersection Summary			
HCM Average Control Delay	246.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.32		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	183	641	179	72	1115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.90	0.85
Flt Protected			0.99		0.98	1.00
Satd. Flow (prot)			3498		3190	1441
Flt Permitted			0.99		0.98	1.00
Satd. Flow (perm)			3498		3190	1441
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.92
Adj. Flow (vph)	0	199	668	195	78	1212
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	867	0	879	606
Confl. Peds. (#/hr)	51	2				
Confl. Bikes (#/hr)	2					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1267		1148	519
v/s Ratio Prot						
v/s Ratio Perm			0.25		0.28	c0.42
v/c Ratio			0.68		1.06dr	1.17
Uniform Delay, d1			12.2		12.7	14.4
Progression Factor			0.87		1.00	1.00
Incremental Delay, d2			0.3		4.9	94.7
Delay (s)			10.9		17.6	109.1
Level of Service			B		B	F
Approach Delay (s)			10.9		54.9	
Approach LOS			B		D	

Intersection Summary			
HCM Average Control Delay	38.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
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)	171	746	0	0	0	0	0	1417	368	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						1.00				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.97				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6330						4906				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6330						4906				
Peak-hour factor, PHF	0.93	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)	184	811	0	0	0	0	0	1540	400	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	38	0	0	0	0
Lane Group Flow (vph)	0	992	0	0	0	0	0	1902	0	0	0	0
Confl. Peds. (#/hr)	22		22	59		59	12		12	5		5
Confl. Bikes (#/hr)			6			4			2			1
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2532						1962				
v/s Ratio Prot								c0.39				
v/s Ratio Perm		0.16										
v/c Ratio		0.39						0.97				
Uniform Delay, d1		9.6						13.2				
Progression Factor		0.82						0.77				
Incremental Delay, d2		0.3						9.0				
Delay (s)		8.2						19.3				
Level of Service		A						B				
Approach Delay (s)		8.2			0.0			19.3			0.0	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	83	0	0	1362	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	90	0	0	1376	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	356	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	356	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	610	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	90	344	344	344	344
Volume Left	90	0	0	0	0
Volume Right	0	0	0	0	0
cSH	610	1700	1700	1700	1700
Volume to Capacity	0.15	0.20	0.20	0.20	0.20
Queue Length 95th (ft)	13	0	0	0	0
Control Delay (s)	11.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
5: 12th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑↱			↰↑↑↑				
Volume (vph)	0	0	0	0	2132	98	410	1011	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6341			6165				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6341			6165				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2198	107	441	1099	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2301	0	0	1539	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3160			2117				
v/s Ratio Prot					c0.36							
v/s Ratio Perm								0.25				
v/c Ratio					0.73			0.73				
Uniform Delay, d1					11.9			17.2				
Progression Factor					1.00			1.00				
Incremental Delay, d2					1.5			2.2				
Delay (s)					13.4			19.5				
Level of Service					B			B				
Approach Delay (s)		0.0			13.4			19.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
6: 14th Street & Lakeside Dr.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑			↰↑	↱		↰↑	↱			
Volume (vph)	51	389	0	1	815	715	173	768	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		5.0	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.98		1.00	0.97			
Flpb, ped/bikes		1.00			1.00	1.00		1.00	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		0.99			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3516			3539	1548		3492	1531			
Flt Permitted		0.66			0.95	1.00		0.99	1.00			
Satd. Flow (perm)		2334			3378	1548		3492	1531			
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.92	0.96	0.92	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	423	0	1	886	745	188	800	37	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	93	0	0	17	0	0	0
Lane Group Flow (vph)	0	478	0	0	887	652	0	988	20	0	0	0
Confl. Peds. (#/hr)	35		35	6		6	26		26	2		2
Confl. Bikes (#/hr)			33			6		10				5
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		700			1013	464		1862	817			
v/s Ratio Prot												
v/s Ratio Perm		0.20			0.26	c0.42		0.28	0.01			
v/c Ratio		0.68			0.88	1.40		0.53	0.02			
Uniform Delay, d1		18.5			19.9	21.0		9.1	6.6			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		5.3			10.5	194.8		1.1	0.1			
Delay (s)		23.8			30.5	215.8		10.2	6.7			
Level of Service		C			C	F		B	A			
Approach Delay (s)		23.8			115.1			10.1			0.0	
Approach LOS		C			F			B			A	

Intersection Summary			
HCM Average Control Delay	66.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	98.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
7: 7th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑	
Volume (vph)	0	699	565	0	0	0	0	0	0	276	1610	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.93									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		5937									5041	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		5937									5041	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	760	614	0	0	0	0	0	0	300	1643	0
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	0	0	47	0
Lane Group Flow (vph)	0	1370	0	0	0	0	0	0	0	0	1896	0
Confl. Peds. (#/hr)	4		4	10		10	8		8	11		11
Confl. Bikes (#/hr)			1						7			2
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2375									2240	
v/s Ratio Prot		c0.23										
v/s Ratio Perm											0.38	
v/c Ratio		0.95dr									0.85	
Uniform Delay, d1		10.5									11.1	
Progression Factor		1.00									1.00	
Incremental Delay, d2		1.0									4.2	
Delay (s)		11.6									15.3	
Level of Service		B									B	
Approach Delay (s)		11.6			0.0			0.0			15.3	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↱									↰↑↑	
Volume (vph)	0	504	180	0	0	0	0	0	0	64	1006	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6072									5064	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6072									5064	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	0	548	196	0	0	0	0	0	0	70	1059	0
RTOR Reduction (vph)	0	22	0	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	722	0	0	0	0	0	0	0	0	1117	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2328									2194	
v/s Ratio Prot		c0.12										
v/s Ratio Perm											0.22	
v/c Ratio		0.31									0.51	
Uniform Delay, d1		12.9									12.4	
Progression Factor		0.77									0.96	
Incremental Delay, d2		0.3									0.7	
Delay (s)		10.3									12.5	
Level of Service		B									B	
Approach Delay (s)		10.3			0.0			0.0			12.5	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM

9: 12th St. & Madison Street

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	526	1903	0	0	0	0	0	629	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6291						4940	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6291						4940	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	0	0	572	1962	0	0	0	0	0	642	113
RTOR Reduction (vph)	0	0	0	0	78	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	2456	0	0	0	0	0	754	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2726						2182	
v/s Ratio Prot											c0.15	
v/s Ratio Perm					0.39							
v/c Ratio					0.90						0.35	
Uniform Delay, d1					15.8						11.0	
Progression Factor					0.47						1.00	
Incremental Delay, d2					3.7						0.4	
Delay (s)					11.1						11.5	
Level of Service					B						B	
Approach Delay (s)		0.0			11.1			0.0			11.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM

10: 14th Street & Madison Street

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	347	135	161	930	0	0	0	0	212	462	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.99	1.00	
Frt		0.96			1.00					1.00	0.99	
Flt Protected		1.00			0.99					0.95	1.00	
Satd. Flow (prot)		3349			3507					1589	3351	
Flt Permitted		1.00			0.78					0.95	1.00	
Satd. Flow (perm)		3349			2744					1589	3351	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	0	377	147	175	969	0	0	0	0	230	481	27
RTOR Reduction (vph)	0	85	0	0	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	439	0	0	1144	0	0	0	0	207	523	0
Confl. Peds. (#/hr)	36		36	28		28	18		18	16		16
Confl. Bikes (#/hr)			4			10			3			1
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1414			1159					671	1415	
v/s Ratio Prot		0.13										
v/s Ratio Perm					c0.42					0.13	0.16	
v/c Ratio		0.31			0.99					0.31	0.37	
Uniform Delay, d1		8.6			12.9					8.6	8.9	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		0.6			23.5					1.2	0.7	
Delay (s)		9.2			36.4					9.8	9.6	
Level of Service		A			D					A	A	
Approach Delay (s)		9.2			36.4			0.0			9.7	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM

11: 19th Street & Jackson Street

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	18	293	13	61	192	0	0	128	71
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	20	318	14	66	209	0	0	139	77

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	179	173	275	216
Volume Left (vph)	20	0	66	0
Volume Right (vph)	0	14	0	77
Hadj (s)	0.09	-0.02	0.08	-0.18
Departure Headway (s)	5.9	5.8	5.2	5.1
Degree Utilization, x	0.29	0.28	0.40	0.30
Capacity (veh/h)	581	594	660	671
Control Delay (s)	10.1	9.7	11.7	10.3
Approach Delay (s)	9.9		11.7	10.3
Approach LOS	A		B	B

Intersection Summary			
Delay	10.6		
HCM Level of Service	B		
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM

12: Jackson Street & Lakeside Drive

222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	191	19	1	1137	453	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.96	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1741			1863	1770	
Flt Permitted	0.96			1.00	1.00	
Satd. Flow (perm)	1741			1862	1770	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	208	21	1	1236	492	210
RTOR Reduction (vph)	0	0	0	0	31	0
Lane Group Flow (vph)	229	0	0	1237	671	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	20.0			22.0	22.0	
Effective Green, g (s)	20.0			22.0	22.0	
Actuated g/C Ratio	0.40			0.44	0.44	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	696			819	779	
v/s Ratio Prot	c0.13				0.38	
v/s Ratio Perm				c0.66		
v/c Ratio	0.33			1.51	0.86	
Uniform Delay, d1	10.4			14.0	12.6	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	1.3			236.0	12.1	
Delay (s)	11.6			250.0	24.7	
Level of Service	B			F	C	
Approach Delay (s)	11.6			250.0	24.7	
Approach LOS	B			F	C	

Intersection Summary			
HCM Average Control Delay	151.9	HCM Level of Service	F
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
13: 19th Street & Alice Street — 222 19th Street Transportation Study

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	107	306	116	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	116	333	126	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	227	222	126
Volume Left (vph)	116	0	126
Volume Right (vph)	0	0	0
Hadj (s)	0.29	0.03	0.23
Departure Headway (s)	5.1	4.9	5.1
Degree Utilization, x	0.32	0.30	0.18
Capacity (veh/h)	689	721	666
Control Delay (s)	9.4	8.8	9.2
Approach Delay (s)	9.1		9.2
Approach LOS	A		A

Intersection Summary			
Delay	9.1		
HCM Level of Service	A		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
14: 12th St. & Harrison — 222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	76	1252	115	180	739	0	0	131	63
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	
Lane Util. Factor					0.86			0.95			0.95	
Frt					0.99			1.00			0.95	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6315			3505			3367	
Flt Permitted					1.00			0.83			1.00	
Satd. Flow (perm)					6315			2933			3367	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	83	1361	125	196	803	0	0	142	68
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	1547	0	0	999	0	0	207	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2263			1540			1768	
v/s Ratio Prot											0.06	
v/s Ratio Perm					0.24			c0.34				
v/c Ratio					0.68			0.65			0.12	
Uniform Delay, d1					16.4			10.3			7.2	
Progression Factor					1.56			1.00			1.00	
Incremental Delay, d2					0.8			2.1			0.1	
Delay (s)					26.2			12.4			7.3	
Level of Service					C			B			A	
Approach Delay (s)		0.0			26.2			12.4			7.3	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
15: 20th Street & Harrison Street — 222 19th Street Transportation Study

Movement	EBL2	EBL	EBR	NBL2	NBL	NBT	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations												
Volume (vph)	109	213	242	102	109	453	534	616	125	0	21	18
Ideal 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	0.94				0.95	0.91	0.91	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00				1.00	1.00	1.00	1.00		1.00	0.94
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	0.95	0.85	0.85		0.85	0.85
Flt Protected	0.95	0.98				0.98	1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	1770	4724				3483	3232	1441	1583		1583	1490
Flt Permitted	0.95	0.98				0.98	1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	1770	4724				3483	3232	1441	1583		1583	1490
Peak-hour factor, PHF	0.98	0.92	0.92	0.94	0.94	0.96	0.92	0.96	0.96	0.92	0.98	0.98
Adj. Flow (vph)	111	232	263	109	116	472	580	642	130	0	21	18
RTOR Reduction (vph)	0	196	0	0	0	0	0	0	64	0	0	14
Lane Group Flow (vph)	111	299	0	0	0	697	843	379	66	0	21	4
Confl. Peds. (#/hr)	16								102			32
Confl. Bikes (#/hr)						6			10			2
Turn Type	Prot			Split	Split			custom	custom		custom	custom
Protected Phases	5	1		8	8	8	2	6	6			
Permitted Phases		1						6			9	2
Actuated Green, G (s)	7.6	20.5				24.0	16.8	29.7	29.7		2.7	16.8
Effective Green, g (s)	7.6	20.5				24.0	16.8	29.7	29.7		2.7	16.8
Actuated g/C Ratio	0.10	0.26				0.30	0.21	0.37	0.37		0.03	0.21
Clearance Time (s)	4.0	4.0				4.0	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	2.0				2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	168	1211				1045	679	535	588		53	313
v/s Ratio Prot	c0.06	0.06				c0.20	c0.26	c0.26	0.04			
v/s Ratio Perm											c0.01	0.00
v/c Ratio	0.66	0.25				0.67	1.24	0.71	0.11		0.40	0.01
Uniform Delay, d1	35.0	23.6				24.5	31.6	21.5	16.5		37.9	25.0
Progression Factor	0.90	1.68				1.00	1.43	1.57	2.64		1.00	1.00
Incremental Delay, d2	9.1	0.5				1.3	119.7	6.9	0.3		1.8	0.0
Delay (s)	40.5	40.2				25.8	164.9	40.7	43.9		39.6	25.0
Level of Service	D	D				C	F	D	D		D	C
Approach Delay (s)		40.3				25.8	118.5			32.9		
Approach LOS		D				C	F			C		

Intersection Summary			
HCM Average Control Delay	75.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
16: Harrison Street & Lakeside Drive — 222 19th Street Transportation Study

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	581	90	615	1044	363	1148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	4983		3433	5085	3224	1441
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	4983		3433	5085	3224	1441
Peak-hour factor, PHF	0.92	0.92	0.96	0.92	0.92	0.97
Adj. Flow (vph)	632	98	641	1135	395	1184
RTOR Reduction (vph)	26	0	0	0	339	339
Lane Group Flow (vph)	704	0	641	1135	648	253
Confl. Bikes (#/hr)				2		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	33.0		15.5	53.5	18.5	18.5
Effective Green, g (s)	33.0		15.5	53.5	18.5	18.5
Actuated g/C Ratio	0.41		0.19	0.67	0.23	0.23
Clearance Time (s)	5.0		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)	2055		665	3401	746	333
v/s Ratio Prot	0.14		c0.19	c0.22	c0.20	
v/s Ratio Perm						0.18
v/c Ratio	0.34		0.96	0.33	0.87	0.76
Uniform Delay, d1	16.1		32.0	5.7	29.6	28.7
Progression Factor	0.48		0.81	1.05	1.00	1.00
Incremental Delay, d2	0.4		25.4	0.2	10.5	9.6
Delay (s)	8.1		51.4	6.2	40.1	38.3
Level of Service	A		D	A	D	D
Approach Delay (s)	8.1			22.5	39.4	
Approach LOS	A			C	D	

Intersection Summary			
HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.1%	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)	118	259	113	849	834	150	265	1120	445	48	1387	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00	0.94		1.00	0.90		0.99	
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		0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		0.99	1.00		1.00	
Satd. Flow (prot)	3433	3539	1479	3433	3539	1484		5037	1419		4897	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.69	1.00		0.72	
Satd. Flow (perm)	3433	3539	1479	3433	3539	1484		3494	1419		3541	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92
Adj. Flow (vph)	128	282	123	923	907	163	288	1217	484	52	1491	337
RTOR Reduction (vph)	0	0	1	0	0	72	0	0	310	0	35	0
Lane Group Flow (vph)	128	282	122	923	907	91	0	1505	174	0	1845	0
Confl. Peds. (#/hr)	38		38	34		34	60		60	28		28
Confl. Bikes (#/hr)			12			18			39			9
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	8.1	33.0	33.0	16.0	41.9	41.9		36.0	36.0		36.0	
Effective Green, g (s)	8.1	33.0	33.0	16.0	41.9	41.9		36.0	36.0		36.0	
Actuated g/C Ratio	0.08	0.33	0.33	0.16	0.42	0.42		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	278	1168	488	549	1483	622		1258	511		1275	
v/s Ratio Prot	0.04	0.08		c0.27	c0.26							
v/s Ratio Perm			0.08			0.06		0.43	0.12		c0.52	
v/c Ratio	0.46	0.24	0.25	1.68	0.61	0.15		3.84dl	0.34		1.45	
Uniform Delay, d1	43.9	24.4	24.5	42.0	22.7	18.0		32.0	23.3		32.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.5	1.2	314.4	1.9	0.5		96.3	1.8		205.8	
Delay (s)	44.3	24.9	25.7	356.4	24.6	18.5		128.3	25.2		237.8	
Level of Service	D	C	C	F	C	B		F	C		F	
Approach Delay (s)		29.7			177.8			103.2			237.8	
Approach LOS		C			F			F			F	

Intersection Summary			
HCM Average Control Delay	159.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	123.0%	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)	10	226	77	61	201	164	81	606	97	80	522	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.91	
Frpb, ped/bikes		0.98			0.95			0.99			1.00	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.96			0.94			0.98			0.99	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		3342			3131			3405			4983	
Flt Permitted		0.94			0.86			0.79			0.76	
Satd. Flow (perm)		3143			2707			2695			3788	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	246	84	66	218	178	88	652	105	87	567	36
RTOR Reduction (vph)	0	53	0	0	86	0	0	19	0	0	10	0
Lane Group Flow (vph)	0	288	0	0	377	0	0	826	0	0	680	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1152			993			1385			1136	
v/s Ratio Prot								c0.07				
v/s Ratio Perm		0.09			c0.14			c0.22			0.18	
v/c Ratio		0.25			0.38			0.60			0.60	
Uniform Delay, d1		13.2			14.0			11.3			17.9	
Progression Factor		0.90			1.00			1.00			1.00	
Incremental Delay, d2		0.5			1.1			1.9			2.3	
Delay (s)		12.4			15.1			13.2			20.3	
Level of Service		B			B			B			C	
Approach Delay (s)		12.4			15.1			13.2			20.3	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.1%	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)	112	889	100	119	613	91	148	534	115	105	465	98
Ideal 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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			0.99		1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98			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)	1757	3359			3326		1765	3539	1525	1763	3432	
Flt Permitted	0.21	1.00			0.56		0.35	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	388	3359			1887		651	3539	1525	685	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)	122	966	109	129	666	99	161	580	125	114	505	107
RTOR Reduction (vph)	0	10	0	0	11	0	0	0	30	0	23	0
Lane Group Flow (vph)	122	1065	0	0	883	0	161	580	95	114	590	0
Confl. Peds. (#/hr)	34		34	37		37	8		8	10		10
Confl. Bikes (#/hr)			11			8			35			7
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	37.0	37.0			37.0		35.0	35.0	35.0	35.0	35.0	
Effective Green, g (s)	37.0	37.0			37.0		35.0	35.0	35.0	35.0	35.0	
Actuated g/C Ratio	0.46	0.46			0.46		0.44	0.44	0.44	0.44	0.44	
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	179	1554			873		285	1548	667	300	1502	
v/s Ratio Prot		0.32						0.16			0.17	
v/s Ratio Perm	0.31				c0.47		c0.25		0.06	0.17		
v/c Ratio	0.68	0.69			1.06dl		0.56	0.37	0.14	0.38	0.39	
Uniform Delay, d1	16.9	16.9			21.5		16.8	15.1	13.5	15.2	15.3	
Progression Factor	1.00	1.00			1.36		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.2	1.0			33.1		7.9	0.7	0.4	3.6	0.8	
Delay (s)	25.1	17.9			62.4		24.7	15.8	13.9	18.8	16.1	
Level of Service	C	B			E		C	B	B	B	B	
Approach Delay (s)		18.7			62.4			17.2			16.5	
Approach LOS		B			E			B			B	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.9%	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)	72	209	110	42	386	368	63	583	46	119	664	54
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	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	3307			3518	1543	1762	3485		1767	3494	
Flt Permitted	0.46	1.00			0.88	1.00	0.28	1.00		0.35	1.00	
Satd. Flow (perm)	855	3307			3115	1543	514	3485		642	3494	
Peak-hour factor, PHF	0.92	0.93	0.92	0.92	0.95	0.92	0.92	0.97	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	225	120	46	406	400	68	601	50	129	722	59
RTOR Reduction (vph)	0	69	0	0	0	100	0	7	0	0	7	0
Lane Group Flow (vph)	78	276	0	0	452	300	68	644	0	129	774	0
Confl. Peds. (#/hr)	25		25	18		13	19		13	6		6
Confl. Bikes (#/hr)		16	16	59		5		5	59			6
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)	362	1401			1319	654	230	1558		287	1562	
v/s Ratio Prot		0.08						0.18			c0.22	
v/s Ratio Perm	0.09				0.15	c0.19	0.13			0.20		
v/c Ratio	0.22	0.20			0.34	0.46	0.30	0.41		0.45	0.50	
Uniform Delay, d1	15.5	15.4			16.5	17.5	15.0	15.9		16.3	16.7	
Progression Factor	1.53	1.58			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.3			0.7	2.3	3.3	0.8		5.0	1.1	
Delay (s)	24.9	24.6			17.2	19.8	18.2	16.7		21.3	17.8	
Level of Service	C	C			B	B	B	B		C	B	
Approach Delay (s)		24.6			18.5			16.9			18.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
21: West Grand Avenue & Telegraph Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	1030	451	86	551	83	253	330	39	133	451	97
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		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		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3427	1553	1770	3351		1769	3473		1758	3431	
Flt Permitted	0.21	1.00	1.00	0.16	1.00		0.33	1.00		0.52	1.00	
Satd. Flow (perm)	392	3427	1553	297	3351		608	3473		966	3431	
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	1073	490	93	599	90	275	347	42	145	490	105
RTOR Reduction (vph)	0	0	313	0	13	0	0	3	0	0	20	0
Lane Group Flow (vph)	149	1073	177	93	676	0	275	386	0	145	575	0
Confl. Peds. (#/hr)	4		4	4		4	4		4	11		11
Confl. Bikes (#/hr)			3			7			21			1
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	25.1	25.1	25.1	25.1	25.1		49.4	49.4		34.4	34.4	
Effective Green, g (s)	25.1	25.1	25.1	25.1	25.1		49.4	49.4		34.4	34.4	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.58	0.58		0.40	0.40	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	116	1012	459	88	990		497	2018		391	1389	
v/s Ratio Prot		0.31			0.20		c0.07	0.11			0.17	
v/s Ratio Perm	c0.38		0.11	0.31			c0.25			0.15		
v/c Ratio	1.28	1.06	0.39	1.06	0.68		0.55	0.19		0.37	0.41	
Uniform Delay, d1	30.0	30.0	23.8	30.0	26.4		9.6	8.4		17.7	18.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.10	1.12	
Incremental Delay, d2	178.3	45.7	2.4	112.2	3.8		0.8	0.2		2.6	0.9	
Delay (s)	208.3	75.6	26.3	142.2	30.2		10.3	8.6		22.0	21.1	
Level of Service	F	E	C	F	C		B	A		C	C	
Approach Delay (s)		73.1			43.6			9.3			21.3	
Approach LOS		E			D			A			C	

Intersection Summary			
HCM Average Control Delay	46.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
22: 27th Street & Telegraph Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	437	459	173	55	341	136	104	460	28	59	421	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1863	1561	1766	1863	1545	1763	3500		1765	3366	
Flt Permitted	0.27	1.00	1.00	0.48	1.00	1.00	0.24	1.00		0.33	1.00	
Satd. Flow (perm)	506	1863	1561	893	1863	1545	447	3500		613	3366	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	475	499	188	60	371	148	108	500	30	64	458	183
RTOR Reduction (vph)	0	0	89	0	0	100	0	6	0	0	61	0
Lane Group Flow (vph)	475	499	99	60	371	48	108	524	0	64	580	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	54.0	44.6	44.6	32.4	27.5	27.5	22.0	22.0		22.0	22.0	
Effective Green, g (s)	54.0	44.6	44.6	32.4	27.5	27.5	22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.64	0.52	0.52	0.38	0.32	0.32	0.26	0.26		0.26	0.26	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	648	978	819	391	603	500	116	906		159	871	
v/s Ratio Prot	c0.19	0.27		0.01	0.20			0.15			0.17	
v/s Ratio Perm	c0.28		0.06	0.05		0.03	c0.24			0.10		
v/c Ratio	0.73	0.51	0.12	0.15	0.62	0.10	0.93	0.58		0.40	0.67	
Uniform Delay, d1	10.6	13.1	10.2	16.8	24.3	20.1	30.8	27.5		26.1	28.2	
Progression Factor	1.00	1.00	1.00	0.64	0.61	0.19	0.94	0.91		1.00	1.00	
Incremental Delay, d2	3.7	1.9	0.3	0.1	4.5	0.4	56.8	0.5		0.6	1.5	
Delay (s)	14.3	15.0	10.5	10.9	19.4	4.2	85.8	25.5		26.7	29.7	
Level of Service	B	B	B	B	B	A	F	C		C	C	
Approach Delay (s)		14.0			14.6			35.7			29.4	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
23: West Grand Avenue & Northgate Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	247	733	847	157	995	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
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	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3439		3431	1414
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3439		3431	1414
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	268	797	921	171	1082	271
RTOR Reduction (vph)	0	0	19	0	2	162
Lane Group Flow (vph)	268	797	1073	0	1107	82
Confl. Peds. (#/hr)	14			11	6	6
Confl. Bikes (#/hr)				10		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	14.2	45.2	27.0		26.8	26.8
Effective Green, g (s)	14.2	45.2	27.0		26.8	26.8
Actuated g/C Ratio	0.18	0.57	0.34		0.34	0.34
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)	314	2000	1161		1149	474
v/s Ratio Prot	c0.15	0.23	c0.31		c0.32	
v/s Ratio Perm						0.06
v/c Ratio	0.85	0.40	0.92		0.96	0.17
Uniform Delay, d1	31.9	9.8	25.5		26.1	18.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	18.9	0.6	13.6		18.2	0.1
Delay (s)	50.8	10.4	39.1		44.3	18.8
Level of Service	D	B	D		D	B
Approach Delay (s)		20.5	39.1		39.7	
Approach LOS		C	D		D	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
24: 27th Street & I-980 On Ramp
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	1058	0	0	189	396	6	329	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		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)	1609	3387			3539	2787		5008				
Flt Permitted	0.62	0.95			1.00	1.00		1.00				
Satd. Flow (perm)	1055	3216			3539	2787		5008				
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	1150	0	0	205	430	7	358	34	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	258	0	13	0	0	0	0
Lane Group Flow (vph)	193	1171	0	0	205	172	0	386	0	0	0	0
Confl. Peds. (#/hr)	2		2				6		6	4		4
Confl. Bikes (#/hr)									4			3
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	422	1286			1416	1115		2003				
v/s Ratio Prot					0.06							
v/s Ratio Perm	0.18	c0.36				0.06		0.08				
v/c Ratio	0.46	0.91			0.14	0.15		0.19				
Uniform Delay, d1	8.8	11.3			7.6	7.7		7.8				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	3.5	11.2			0.2	0.3		0.2				
Delay (s)	12.4	22.5			7.9	8.0		8.0				
Level of Service	B	C			A	A		A				
Approach Delay (s)		21.1			7.9			8.0			0.0	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.4%	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	356	34	13	201	0	0	0	0	835	1173	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95					0.91	0.91	1.00
Frpb, ped/bikes		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
Frt		1.00	0.85		1.00					1.00	1.00	0.85
Flt Protected		1.00	1.00		1.00					0.95	0.99	1.00
Satd. Flow (prot)		3539	1558		3527					1610	3366	1583
Flt Permitted		1.00	1.00		0.93					0.95	0.99	1.00
Satd. Flow (perm)		3539	1558		3282					1610	3366	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92
Adj. Flow (vph)	0	387	37	14	218	0	0	0	0	908	1261	440
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	0	0	0	213
Lane Group Flow (vph)	0	387	13	0	232	0	0	0	0	699	1470	227
Confl. Peds. (#/hr)	2		2	10		10	6		6			
Confl. Bikes (#/hr)			3			4			1			
Turn Type			Perm	Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		21.0	21.0		21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0	21.0		21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35	0.35		0.35					0.52	0.52	0.52
Clearance Time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1239	545		1149					832	1739	818
v/s Ratio Prot		c0.11										
v/s Ratio Perm			0.01		0.07					0.43	0.44	0.14
v/c Ratio		0.31	0.02		0.20					0.84	0.85	0.28
Uniform Delay, d1		14.2	12.8		13.6					12.4	12.4	8.2
Progression Factor		1.00	1.00		1.00					1.00	1.00	1.00
Incremental Delay, d2		0.7	0.1		0.4					10.0	5.3	0.8
Delay (s)		14.9	12.9		14.0					22.4	17.7	9.0
Level of Service		B	B		B					C	B	A
Approach Delay (s)		14.7			14.0			0.0			17.5	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	568	33	36	893	118	53	273	36	86	312	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	3.0	3.0		3.0	3.0	
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	0.96	1.00	1.00	0.98	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		1.00	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)		3536	1523	1760	3539	1549	1758	3461		1762	3537	
Flt Permitted		0.94	1.00	0.41	1.00	1.00	0.41	1.00		0.43	1.00	
Satd. Flow (perm)		3321	1523	755	3539	1549	753	3461		805	3537	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	11	617	36	39	971	128	55	281	37	93	339	1
RTOR Reduction (vph)	0	0	10	0	0	37	0	19	0	0	0	0
Lane Group Flow (vph)	0	628	26	39	971	91	55	299	0	93	340	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		53.6	53.6	53.6	53.6	53.6	14.4	14.4		14.4	14.4	
Effective Green, g (s)		53.6	53.6	53.6	53.6	53.6	14.4	14.4		14.4	14.4	
Actuated g/C Ratio		0.71	0.71	0.71	0.71	0.71	0.19	0.19		0.19	0.19	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
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)		2373	1088	540	2529	1107	145	665		155	679	
v/s Ratio Prot					c0.27			0.09			0.10	
v/s Ratio Perm		0.19	0.02	0.05		0.06	0.07			c0.12		
v/c Ratio		0.26	0.02	0.07	0.38	0.08	0.38	0.45		0.60	0.50	
Uniform Delay, d1		3.8	3.1	3.2	4.2	3.2	26.4	26.8		27.7	27.1	
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	0.0	0.3	0.4	0.1	0.6	0.2		4.4	0.2	
Delay (s)		4.0	3.1	3.5	4.7	3.4	27.0	27.0		32.1	27.3	
Level of Service		A	A	A	A	A	C	C		C	C	
Approach Delay (s)		4.0			4.5			27.0			28.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2030 Baseline plus Project Conditions
PM Peak Hour

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
1: 5th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	376	748	105	0	0	0	0	622	86	1	81	0
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	
Lane Util. Factor		0.91						1.00			1.00	
Frpb, ped/bikes		1.00						1.00			1.00	
Flpb, ped/bikes		1.00						1.00			1.00	
Frt		0.99						0.98			1.00	
Flt Protected		0.98						1.00			1.00	
Satd. Flow (prot)		4920						1832			1862	
Flt Permitted		0.98						1.00			0.72	
Satd. Flow (perm)		1000						1300			1300	
Peak-hour factor, PHF	0.92	0.93	0.92	0.25	0.25	0.25	0.25	0.92	0.92	0.92	0.92	0.25
Adj. Flow (vph)	409	804	114	0	0	0	0	676	93	1	88	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	0	1303	0	0	0	0	0	758	0	0	89	0
Confl. Peds. (#/hr)	9		9	38		38				2		2
Confl. Bikes (#/hr)			11			4						2
Turn Type	Perm									Perm		
Protected Phases		1						2			2	
Permitted Phases	1									2		
Actuated Green, G (s)		22.5						15.5			15.5	
Effective Green, g (s)		22.5						15.5			15.5	
Actuated g/C Ratio		0.50						0.34			0.34	
Clearance Time (s)		3.5						3.5			3.5	
Lane Grp Cap (vph)		500						631			448	
v/s Ratio Prot								c0.41				
v/s Ratio Perm		c1.30									0.07	
v/c Ratio		2.60						1.20			0.20	
Uniform Delay, d1		11.2						14.8			10.4	
Progression Factor		1.00						1.00			0.02	
Incremental Delay, d2		728.0						105.1			0.8	
Delay (s)		739.3						119.9			1.0	
Level of Service		F						F			A	
Approach Delay (s)		739.3			0.0			119.9			1.0	
Approach LOS		F			A			F			A	

Intersection Summary			
HCM Average Control Delay	491.2	HCM Level of Service	F
HCM Volume to Capacity ratio	2.03		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
2: 6th St. & Oak St.
222 19th Street Transportation Study

Movement	WBR	NBL	NBT	NWL2	NWL	NWR
Lane Configurations						
Volume (vph)	0	215	738	84	71	926
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			3.5		2.0	2.0
Lane Util. Factor			0.95		0.97	0.91
Frpb, ped/bikes			1.00		1.00	1.00
Flpb, ped/bikes			1.00		1.00	1.00
Frt			1.00		0.89	0.85
Flt Protected			0.99		0.99	1.00
Satd. Flow (prot)			3500		3169	1441
Flt Permitted			0.99		0.99	1.00
Satd. Flow (perm)			3500		3169	1441
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.94
Adj. Flow (vph)	0	234	802	91	77	985
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	1036	0	661	492
Confl. Peds. (#/hr)	46					
Confl. Bikes (#/hr)	3					
Turn Type	custom	Perm		Perm		Perm
Protected Phases			3		1	
Permitted Phases	2	3		1		1
Actuated Green, G (s)			16.3		16.2	16.2
Effective Green, g (s)			16.3		16.2	16.2
Actuated g/C Ratio			0.36		0.36	0.36
Clearance Time (s)			3.5		2.0	2.0
Lane Grp Cap (vph)			1268		1141	519
v/s Ratio Prot						
v/s Ratio Perm			0.30		0.21	c0.34
v/c Ratio			0.82		0.86dr	0.95
Uniform Delay, d1			13.0		11.6	14.0
Progression Factor			0.79		1.00	1.00
Incremental Delay, d2			0.6		2.1	28.5
Delay (s)			10.9		13.8	42.5
Level of Service			B		B	D
Approach Delay (s)			10.9		26.0	
Approach LOS			B		C	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	78.6%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
3: 7th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	226	1541	0	0	0	0	0	1135	1185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.92				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6351						4644				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6351						4644				
Peak-hour factor, PHF	0.92	0.98	0.25	0.25	0.25	0.25	0.25	0.94	0.96	0.25	0.25	0.25
Adj. Flow (vph)	246	1572	0	0	0	0	0	1207	1234	0	0	0
RTOR Reduction (vph)	0	10	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	1808	0	0	0	0	0	2439	0	0	0	0
Confl. Peds. (#/hr)	22		22	50		50	14		14	6		6
Confl. Bikes (#/hr)			16			1			2			2
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		18.0						18.0				
Effective Green, g (s)		18.0						18.0				
Actuated g/C Ratio		0.40						0.40				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		2540						1858				
v/s Ratio Prot								c0.53				
v/s Ratio Perm		0.28										
v/c Ratio		0.71						1.93dr				
Uniform Delay, d1		11.3						13.5				
Progression Factor		0.78						1.37				
Incremental Delay, d2		0.6						143.9				
Delay (s)		9.5						162.4				
Level of Service		A						F				
Approach Delay (s)		9.5			0.0			162.4			0.0	
Approach LOS		A			A			F			A	

Intersection Summary			
HCM Average Control Delay	97.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
4: 11th Street & Oak Street
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	87	0	0	1295	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	95	0	0	1408	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	358	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	611	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	95	352	352	352	352
Volume Left	95	0	0	0	0
Volume Right	0	0	0	0	0
cSH	611	1700	1700	1700	1700
Volume to Capacity	0.15	0.21	0.21	0.21	0.21
Queue Length 95th (ft)	14	0	0	0	0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.0	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
5: 12th Street & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1289	76	436	1185	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.86			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.97				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					6329			6113				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					6329			6113				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.92	0.92	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	1357	83	474	1234	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	12	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1438	0	0	1696	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					3154			2099				
v/s Ratio Prot					c0.23							
v/s Ratio Perm								0.28				
v/c Ratio					0.46			0.81				
Uniform Delay, d1					9.8			17.9				
Progression Factor					1.00			1.00				
Incremental Delay, d2					0.5			3.5				
Delay (s)					10.2			21.4				
Level of Service					B			C				
Approach Delay (s)		0.0			10.2			21.4			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
6: 14th Street & Lakeside Dr.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	81	1166	0	0	540	331	239	775	49	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	5.0			
Lane Util. Factor		0.95			0.95	1.00		0.95	1.00			
Frpb, ped/bikes		1.00			1.00	0.92		1.00	0.96			
Flpb, ped/bikes		1.00			1.00	1.00		0.99	1.00			
Frt		1.00			1.00	0.85		1.00	0.85			
Flt Protected		1.00			1.00	1.00		0.99	1.00			
Satd. Flow (prot)		3524			3539	1461		3474	1520			
Flt Permitted		0.80			1.00	1.00		0.99	1.00			
Satd. Flow (perm)		2817			3539	1461		3474	1520			
Peak-hour factor, PHF	0.92	0.92	0.25	0.99	0.96	0.96	0.92	0.92	0.92	0.25	0.25	0.25
Adj. Flow (vph)	88	1267	0	0	562	345	260	842	53	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	79	0	0	1	0	0	0
Lane Group Flow (vph)	0	1355	0	0	562	266	0	1102	52	0	0	0
Confl. Peds. (#/hr)	36		36	52		52	35		35	10		10
Confl. Bikes (#/hr)			5			21						22
Turn Type	Perm			Perm		Perm	Perm		Perm			
Protected Phases		4			8			2				
Permitted Phases	4			8		8	2		2			
Actuated Green, G (s)		18.0			18.0	18.0		32.0	32.0			
Effective Green, g (s)		18.0			18.0	18.0		32.0	32.0			
Actuated g/C Ratio		0.30			0.30	0.30		0.53	0.53			
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0			
Lane Grp Cap (vph)		845			1062	438		1853	811			
v/s Ratio Prot					0.16							
v/s Ratio Perm		c0.48				0.18		0.32	0.03			
v/c Ratio		1.60			0.53	0.61		0.59	0.06			
Uniform Delay, d1		21.0			17.5	18.0		9.6	6.8			
Progression Factor		1.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2		277.1			1.9	6.1		1.4	0.2			
Delay (s)		298.1			19.4	24.1		11.0	6.9			
Level of Service		F			B	C		B	A			
Approach Delay (s)		298.1			21.2			10.8			0.0	
Approach LOS		F			C			B			A	

Intersection Summary			
HCM Average Control Delay	127.5	HCM Level of Service	F
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	100.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
7: 7th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1580	485	0	0	0	0	0	0	544	1769	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0									3.0	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		1.00									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									0.99	
Satd. Flow (prot)		6145									5015	
Flt Permitted		1.00									0.99	
Satd. Flow (perm)		6145									5015	
Peak-hour factor, PHF	0.25	0.99	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.95	0.25
Adj. Flow (vph)	0	1596	527	0	0	0	0	0	0	591	1862	0
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	2121	0	0	0	0	0	0	0	0	2451	0
Confl. Peds. (#/hr)	4		4	8		8	2		2	12		12
Confl. Bikes (#/hr)			2			2			2			
Turn Type										Perm		
Protected Phases		4									6	
Permitted Phases										6		
Actuated Green, G (s)		18.0									20.0	
Effective Green, g (s)		18.0									20.0	
Actuated g/C Ratio		0.40									0.44	
Clearance Time (s)		4.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		2458									2229	
v/s Ratio Prot		c0.35										
v/s Ratio Perm											0.49	
v/c Ratio		0.86									1.10	
Uniform Delay, d1		12.4									12.5	
Progression Factor		1.00									1.00	
Incremental Delay, d2		4.3									52.4	
Delay (s)		16.7									64.9	
Level of Service		B									E	
Approach Delay (s)		16.7			0.0			0.0			64.9	
Approach LOS		B			A			A			E	

Intersection Summary			
HCM Average Control Delay	42.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1295	246	0	0	0	0	0	0	60	1113	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.86									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.98									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		6212									5068	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		6212									5068	
Peak-hour factor, PHF	0.25	0.96	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.93	0.25
Adj. Flow (vph)	0	1349	267	0	0	0	0	0	0	65	1197	0
RTOR Reduction (vph)	0	14	0	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	1602	0	0	0	0	0	0	0	0	1258	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		2381									2196	
v/s Ratio Prot		c0.26										
v/s Ratio Perm											0.25	
v/c Ratio		0.67									0.57	
Uniform Delay, d1		15.4									12.8	
Progression Factor		0.81									0.56	
Incremental Delay, d2		1.5									1.0	
Delay (s)		14.0									8.1	
Level of Service		B									A	
Approach Delay (s)		14.0			0.0			0.0			8.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
9: 12th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	316	1195	0	0	0	0	0	908	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.86						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					6270						5027	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					6270						5027	
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.97	0.25	0.25	0.25	0.25	0.25	0.92	0.92
Adj. Flow (vph)	0	0	0	343	1232	0	0	0	0	0	987	62
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	1550	0	0	0	0	0	1040	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2717						2220	
v/s Ratio Prot											c0.21	
v/s Ratio Perm					0.25							
v/c Ratio					0.57						0.47	
Uniform Delay, d1					12.8						11.8	
Progression Factor					0.62						1.00	
Incremental Delay, d2					0.7						0.7	
Delay (s)					8.7						12.5	
Level of Service					A						B	
Approach Delay (s)		0.0			8.7			0.0			12.5	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
10: 14th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	818	106	47	711	0	0	0	0	684	782	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0			3.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.91	0.91	
Frpb, ped/bikes		0.99			1.00					1.00	1.00	
Flpb, ped/bikes		1.00			1.00					0.98	1.00	
Frt		0.98			1.00					1.00	0.99	
Flt Protected		1.00			1.00					0.95	0.99	
Satd. Flow (prot)		3454			3527					1578	3322	
Flt Permitted		1.00			0.85					0.95	0.99	
Satd. Flow (perm)		3454			2995					1578	3322	
Peak-hour factor, PHF	0.25	0.92	0.92	0.92	0.92	0.25	0.25	0.25	0.25	0.94	0.96	0.92
Adj. Flow (vph)	0	889	115	51	773	0	0	0	0	728	815	38
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	981	0	0	824	0	0	0	0	517	1058	0
Confl. Peds. (#/hr)	50		50	25		25	17		17	24		24
Confl. Bikes (#/hr)			16			17			2			
Turn Type				Perm						Perm		
Protected Phases		8			4						6	
Permitted Phases				4						6		
Actuated Green, G (s)		19.0			19.0					19.0	19.0	
Effective Green, g (s)		19.0			19.0					19.0	19.0	
Actuated g/C Ratio		0.42			0.42					0.42	0.42	
Clearance Time (s)		3.0			3.0					4.0	4.0	
Vehicle Extension (s)		2.0			2.0					2.0	2.0	
Lane Grp Cap (vph)		1458			1265					666	1403	
v/s Ratio Prot		c0.28										
v/s Ratio Perm					0.28					c0.33	0.32	
v/c Ratio		0.67			0.65					0.78	0.75	
Uniform Delay, d1		10.5			10.4					11.2	11.0	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		2.5			2.6					8.6	3.8	
Delay (s)		13.0			13.0					19.8	14.8	
Level of Service		B			B					B	B	
Approach Delay (s)		13.0			13.0			0.0			16.5	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
11: 19th Street & Jackson Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	12	137	8	38	219	0	0	98	115
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	13	149	9	41	238	0	0	107	125

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total (vph)	88	83	279	232
Volume Left (vph)	13	0	41	0
Volume Right (vph)	0	9	0	125
Hadj (s)	0.11	-0.04	0.06	-0.29
Departure Headway (s)	5.8	5.6	4.7	4.4
Degree Utilization, x	0.14	0.13	0.37	0.28
Capacity (veh/h)	576	592	737	774
Control Delay (s)	8.5	8.3	10.4	9.2
Approach Delay (s)	8.4		10.4	9.2
Approach LOS	A		B	A

Intersection Summary			
Delay	9.5		
HCM Level of Service	A		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
12: Jackson Street & Lakeside Drive
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	245	32	14	1012	801	281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	0.99			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.96	
Flt Protected	0.96			1.00	1.00	
Satd. Flow (prot)	1732			1861	1782	
Flt Permitted	0.96			0.54	1.00	
Satd. Flow (perm)	1732			1013	1782	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	35	15	1100	871	305
RTOR Reduction (vph)	0	0	0	0	25	0
Lane Group Flow (vph)	301	0	0	1115	1151	0
Confl. Peds. (#/hr)	52	52				10
Confl. Bikes (#/hr)		18				3
Turn Type			custom			
Protected Phases	4				6	
Permitted Phases			2	2		
Actuated Green, G (s)	20.0			22.0	22.0	
Effective Green, g (s)	20.0			22.0	22.0	
Actuated g/C Ratio	0.40			0.44	0.44	
Clearance Time (s)	4.0			4.0	4.0	
Vehicle Extension (s)	3.0			2.0	3.0	
Lane Grp Cap (vph)	693			446	784	
v/s Ratio Prot	c0.17				0.65	
v/s Ratio Perm				c1.10		
v/c Ratio	0.43			2.50	1.47	
Uniform Delay, d1	10.9			14.0	14.0	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	2.0			681.7	217.5	
Delay (s)	12.9			695.7	231.5	
Level of Service	B			F	F	
Approach Delay (s)	12.9			695.7	231.5	
Approach LOS	B			F	F	

Intersection Summary			
HCM Average Control Delay	405.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

13: 19th Street & Alice Street

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	57	274	174	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	62	298	189	0

Direction, Lane #	WB 1	WB 2	NE 1
Volume Total (vph)	161	199	189
Volume Left (vph)	62	0	189
Volume Right (vph)	0	0	0
Hadj (s)	0.23	0.03	0.23
Departure Headway (s)	5.2	5.0	5.0
Degree Utilization, x	0.23	0.28	0.26
Capacity (veh/h)	662	693	691
Control Delay (s)	8.6	8.8	9.7
Approach Delay (s)	8.7		9.7
Approach LOS	A		A

Intersection Summary			
Delay	9.1		
HCM Level of Service	A		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

14: 12th Street &

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	58	811	97	145	551	0	0	75	28
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	
Lane Util. Factor					0.86			0.95			0.95	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					6293			3503			3397	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					6293			3034			3397	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	63	882	105	158	599	0	0	82	30
RTOR Reduction (vph)	0	0	0	0	31	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	0	1019	0	0	757	0	0	98	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					2255			1593			1783	
v/s Ratio Prot											0.03	
v/s Ratio Perm					0.16			c0.25				
v/c Ratio					0.45			0.48			0.05	
Uniform Delay, d1					14.7			9.0			7.0	
Progression Factor					1.62			1.00			1.00	
Incremental Delay, d2					0.5			1.0			0.1	
Delay (s)					24.4			10.0			7.0	
Level of Service					C			B			A	
Approach Delay (s)		0.0			24.4			10.0			7.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

15: 20th Street & Harrison Street

Movement	EBL2	EBL	EBR	NBL2	NBL	NBT	SBT	SBR	SBR2	SEL	SER	SER2
Lane Configurations												
Volume (vph)	14	531	155	270	90	1020	235	405	118	0	81	126
Ideal 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	0.94				0.95	0.91	0.91	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
Flpb, ped/bikes	0.48	1.00				1.00	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.97				1.00	0.93	0.85	0.85		0.85	0.85
Flt Protected	0.95	0.96				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (prot)	841	4886				3494	3155	1441	1583		1583	1554
Flt Permitted	0.95	0.96				0.99	1.00	1.00	1.00		1.00	1.00
Satd. Flow (perm)	841	4886				3494	3155	1441	1583		1583	1554
Peak-hour factor, PHF	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.98	0.98
Adj. Flow (vph)	14	577	168	293	98	1109	255	440	128	0	83	129
RTOR Reduction (vph)	0	77	0	0	0	0	0	0	71	0	0	97
Lane Group Flow (vph)	14	668	0	0	0	1500	475	220	57	0	83	32
Confl. Peds. (#/hr)	22								74			
Confl. Bikes (#/hr)						7			8			7
Turn Type	Prot			Split	Split			custom	custom		custom	custom
Protected Phases	5	1		8	8	8	2	6	6			
Permitted Phases		1						6			9	2
Actuated Green, G (s)	0.8	14.7				16.0	17.2	31.1	31.1		6.1	17.2
Effective Green, g (s)	0.8	14.7				16.0	17.2	31.1	31.1		6.1	17.2
Actuated g/C Ratio	0.01	0.21				0.23	0.25	0.44	0.44		0.09	0.25
Clearance Time (s)	4.0	4.0				4.0	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	2.0				2.0	2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	10	1026				799	775	640	703		138	382
v/s Ratio Prot	0.02	c0.14				c0.43	c0.15	0.15	0.04			
v/s Ratio Perm											c0.05	0.02
v/c Ratio	1.40	0.65				1.88	0.61	0.34	0.08		0.60	0.08
Uniform Delay, d1	34.6	25.3				27.0	23.4	12.8	11.2		30.8	20.3
Progression Factor	1.00	1.00				1.00	1.25	1.40	2.65		1.00	1.00
Incremental Delay, d2	438.6	3.2				399.6	0.9	1.3	0.2		5.0	0.0
Delay (s)	473.2	28.5				426.6	30.3	19.2	29.9		35.8	20.4
Level of Service	F	C				F	C	B	C		D	C
Approach Delay (s)		36.7				426.6	27.3			26.4		
Approach LOS		D				F	C			C		

Intersection Summary			
HCM Average Control Delay	211.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

16: Harrison Street & Lakeside Drive

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1384	250	1013	518	367	984
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	4469		3090	4577	2912	1297
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	4469		3090	4577	2912	1297
Peak-hour factor, PHF	0.95	0.92	0.99	0.92	0.92	0.93
Adj. Flow (vph)	1457	272	1023	563	399	1058
RTOR Reduction (vph)	39	0	0	0	344	370
Lane Group Flow (vph)	1690	0	1023	563	584	159
Confl. Bikes (#/hr)				16		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	18.0		19.0	41.0	21.0	21.0
Effective Green, g (s)	18.0		19.0	41.0	21.0	21.0
Actuated g/C Ratio	0.26		0.27	0.59	0.30	0.30
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)	1149		839	2681	874	389
v/s Ratio Prot	c0.38		c0.33	0.12	c0.20	
v/s Ratio Perm						0.12
v/c Ratio	1.47		1.22	0.21	0.67	0.41
Uniform Delay, d1	26.0		25.5	6.8	21.4	19.5
Progression Factor	0.94		1.00	1.00	1.00	1.00
Incremental Delay, d2	212.5		109.4	0.2	4.0	3.2
Delay (s)	236.9		134.9	7.0	25.5	22.7
Level of Service	F		F	A	C	C
Approach Delay (s)	236.9			89.5	24.5	
Approach LOS	F			F	C	

Intersection Summary			
HCM Average Control Delay	123.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM

17: West Grand Avenue & Harrison Street

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	392	820	216	448	1100	55	13	1273	1724	3	744	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00		0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00	0.94	1.00	1.00	0.92		1.00	0.93		0.99	
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		0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00		1.00	1.00		1.00	
Satd. Flow (prot)	3433	3539	1483	3433	3539	1458		5082	1466		4832	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00		0.92	1.00		0.94	
Satd. Flow (perm)	3433	3539	1483	3433	3539	1458		4690	1466		4522	
Peak-hour factor, PHF	0.92	0.92	0.92	0.98	0.93	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Adj. Flow (vph)	426	891	235	457	1183	60	14	1384	1874	3	775	239
RTOR Reduction (vph)	0	0	26	0	0	8	0	0	237	0	56	0
Lane Group Flow (vph)	426	891	209	457	1183	52	0	1398	1637	0	961	0
Confl. Peds. (#/hr)	31		31	48		48	42		42	34		34
Confl. Bikes (#/hr)			22			15			22			20
Turn Type	Prot		Perm	Prot		Perm	Perm		Perm	Perm		
Protected Phases	1	6		5	2			4			4	
Permitted Phases			6			2	4		4	4		
Actuated Green, G (s)	15.1	33.5	33.5	15.5	34.9	34.9		36.0	36.0		36.0	
Effective Green, g (s)	15.1	33.5	33.5	15.5	34.9	34.9		36.0	36.0		36.0	
Actuated g/C Ratio	0.15	0.34	0.34	0.16	0.35	0.35		0.36	0.36		0.36	
Clearance Time (s)	4.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
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)	518	1186	497	532	1235	509		1688	528		1628	
v/s Ratio Prot	0.12	0.25		c0.13	c0.33							
v/s Ratio Perm			0.14			0.04		0.30	c1.12		0.21	
v/c Ratio	0.82	0.75	0.42	0.86	0.96	0.10		0.83	3.10		0.59	
Uniform Delay, d1	41.2	29.5	25.7	41.2	31.8	22.0		29.2	32.0		26.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	9.7	4.4	2.6	12.6	17.3	0.4		4.8	949.8		1.6	
Delay (s)	50.8	34.0	28.3	53.7	49.2	22.4		34.0	981.8		27.6	
Level of Service	D	C	C	D	D	C		C	F		C	
Approach Delay (s)		37.7			49.4			576.9			27.6	
Approach LOS		D			D			F			C	

Intersection Summary			
HCM Average Control Delay	272.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	166.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM

18: 20th Street & Broadway

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	197	122	78	333	152	127	932	135	57	656	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			5.0			5.0	
Lane Util. Factor		0.95			0.95			0.95			0.91	
Frpb, ped/bikes		0.97			0.97			0.99			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			1.00	
Frt		0.95			0.96			0.98			0.99	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		3218			3225			3413			4988	
Flt Permitted		0.88			0.84			0.65			0.76	
Satd. Flow (perm)		2852			2739			2234			3803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	32	214	133	85	362	165	138	1013	142	62	713	50
RTOR Reduction (vph)	0	84	0	0	33	0	0	16	0	0	12	0
Lane Group Flow (vph)	0	295	0	0	579	0	0	1277	0	0	813	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm			Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		22.0			22.0			29.0			18.0	
Effective Green, g (s)		22.0			22.0			29.0			18.0	
Actuated g/C Ratio		0.37			0.37			0.48			0.30	
Clearance Time (s)		4.0			4.0			5.0			5.0	
Lane Grp Cap (vph)		1046			1004			1217			1141	
v/s Ratio Prot								c0.12				
v/s Ratio Perm		0.10			c0.21			c0.38			0.21	
v/c Ratio		0.28			0.58			1.05			0.71	
Uniform Delay, d1		13.4			15.3			15.5			18.7	
Progression Factor		2.03			1.00			1.00			1.00	
Incremental Delay, d2		0.7			2.4			39.7			3.8	
Delay (s)		27.9			17.7			55.2			22.5	
Level of Service		C			B			E			C	
Approach Delay (s)		27.9			17.7			55.2			22.5	
Approach LOS		C			B			E			C	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM

19: West Grand Avenue & Broadway

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	647	49	137	449	44	391	780	201	66	591	126
Ideal 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	*0.92			*0.92		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	0.98	1.00	0.99	
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	0.97	
Flt Protected	0.95	1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1765	3386			3351		1766	3539	1550	1756	3414	
Flt Permitted	0.28	1.00			0.57		0.29	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	514	3386			1943		539	3539	1550	502	3414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92	0.92
Adj. Flow (vph)	114	703	53	149	488	48	425	821	218	72	642	137
RTOR Reduction (vph)	0	7	0	0	7	0	0	0	69	0	20	0
Lane Group Flow (vph)	114	749	0	0	678	0	425	821	149	72	759	0
Confl. Peds. (#/hr)	8		8	2		2	8		8	32		32
Confl. Bikes (#/hr)			6			6			4			28
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	31.3	31.3			31.3		40.7	40.7	40.7	40.7	40.7	
Effective Green, g (s)	31.3	31.3			31.3		40.7	40.7	40.7	40.7	40.7	
Actuated g/C Ratio	0.39	0.39			0.39		0.51	0.51	0.51	0.51	0.51	
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)	201	1325			760		274	1800	789	255	1737	
v/s Ratio Prot		0.22						0.23			0.22	
v/s Ratio Perm	0.22				c0.35		c0.79		0.10	0.14		
v/c Ratio	0.57	0.57			0.89		1.55	0.46	0.19	0.28	0.44	
Uniform Delay, d1	19.1	19.0			22.8		19.6	12.6	10.7	11.3	12.4	
Progression Factor	1.00	1.00			1.27		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.3			12.3		265.3	0.8	0.5	2.8	0.8	
Delay (s)	21.2	19.4			41.1		284.9	13.4	11.2	14.0	13.2	
Level of Service	C	B			D		F	B	B	B	B	
Approach Delay (s)		19.6			41.1			91.9			13.3	
Approach LOS		B			D			F			B	

Intersection Summary			
HCM Average Control Delay	49.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM

20: 27th Street & Broadway

222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	288	90	54	506	337	200	812	41	234	808	110
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	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	3373			3520	1536	1768	3509		1768	3455	
Flt Permitted	0.38	1.00			0.86	1.00	0.18	1.00		0.21	1.00	
Satd. Flow (perm)	692	3373			3052	1536	339	3509		392	3455	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	113	313	98	59	527	366	217	883	45	254	878	120
RTOR Reduction (vph)	0	35	0	0	0	44	0	4	0	0	13	0
Lane Group Flow (vph)	113	376	0	0	586	322	217	924	0	254	985	0
Confl. Peds. (#/hr)	32		32	10		10	6		6	5		5
Confl. Bikes (#/hr)			20			18			17			66
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			2	
Permitted Phases	4			8		8	2			2		
Actuated Green, G (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Effective Green, g (s)	36.0	36.0			36.0	36.0	38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42			0.42	0.42	0.45	0.45		0.45	0.45	
Clearance Time (s)	5.5	5.5			5.5	5.5	5.5	5.5		5.5	5.5	
Lane Grp Cap (vph)	293	1429			1293	651	152	1569		175	1545	
v/s Ratio Prot		0.11						0.26			0.29	
v/s Ratio Perm	0.16				0.19	c0.21	0.64			c0.65		
v/c Ratio	0.39	0.26			0.45	0.49	1.43	0.59		1.45	0.64	
Uniform Delay, d1	16.9	15.9			17.5	17.9	23.5	17.6		23.5	18.2	
Progression Factor	0.93	0.93			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.3			1.1	2.7	226.1	1.6		232.1	2.0	
Delay (s)	18.1	15.1			18.6	20.5	249.6	19.3		255.6	20.2	
Level of Service	B	B			B	C	F	B		F	C	
Approach Delay (s)		15.7			19.4			62.9			68.0	
Approach LOS		B			B			E			E	

Intersection Summary			
HCM Average Control Delay	47.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

21: West Grand Avenue & Telegraph Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	929	41	24	1083	157	122	690	43	181	549	135
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	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.92	1.00	1.00	*0.92		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		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	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3427	1533	1770	3346		1769	3504		1762	3405	
Flt Permitted	0.16	1.00	1.00	0.16	1.00		0.27	1.00		0.35	1.00	
Satd. Flow (perm)	292	3427	1533	292	3346		510	3504		650	3405	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	38	1010	45	26	1177	171	133	750	47	197	578	147
RTOR Reduction (vph)	0	0	32	0	13	0	0	4	0	0	24	0
Lane Group Flow (vph)	38	1010	14	26	1335	0	133	793	0	197	701	0
Confl. Peds. (#/hr)	12		12	18		18	3		3	12		12
Confl. Bikes (#/hr)			8			6			10			28
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			4		5	2			6	
Permitted Phases	4		4	4			2			6		
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5		49.0	49.0		37.2	37.2	
Effective Green, g (s)	25.5	25.5	25.5	25.5	25.5		49.0	49.0		37.2	37.2	
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30		0.58	0.58		0.44	0.44	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	6.0		6.0	6.0	
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)	88	1028	460	88	1004		402	2020		284	1490	
v/s Ratio Prot		0.29			c0.40		0.03	c0.23			0.21	
v/s Ratio Perm	0.13		0.01	0.09			0.16			c0.30		
v/c Ratio	0.43	0.98	0.03	0.30	1.33		0.33	0.39		0.69	0.47	
Uniform Delay, d1	23.9	29.5	21.0	22.9	29.7		9.2	9.9		19.3	16.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.24	1.26	
Incremental Delay, d2	14.7	24.2	0.1	8.4	155.4		0.2	0.6		10.4	0.8	
Delay (s)	38.6	53.7	21.1	31.2	185.2		9.4	10.4		34.3	22.1	
Level of Service	D	D	C	C	F		A	B		C	C	
Approach Delay (s)		51.8			182.3			10.3			24.7	
Approach LOS		D			F			B			C	

Intersection Summary			
HCM Average Control Delay	78.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

22: 27th Street & Telegraph Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	256	493	166	78	734	139	238	621	59	170	593	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1554	1769	1863	1552	1766	3482		1765	3258	
Flt Permitted	0.12	1.00	1.00	0.24	1.00	1.00	0.12	1.00		0.27	1.00	
Satd. Flow (perm)	232	1863	1554	444	1863	1552	225	3482		505	3258	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	536	180	85	798	151	259	675	64	185	645	486
RTOR Reduction (vph)	0	0	111	0	0	70	0	9	0	0	160	0
Lane Group Flow (vph)	278	536	69	85	798	81	259	730	0	185	971	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	32.8	32.8	33.3	27.6	27.6	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	32.8	32.8	33.3	27.6	27.6	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.39	0.32	0.32	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	315	719	600	263	605	504	87	1352		196	1265	
v/s Ratio Prot	c0.11	0.29		0.02	c0.43			0.21			0.30	
v/s Ratio Perm	0.33		0.04	0.11		0.05	c1.15			0.37		
v/c Ratio	0.88	0.75	0.12	0.32	1.32	0.16	2.98	0.54		0.94	0.77	
Uniform Delay, d1	20.9	22.5	16.8	17.7	28.7	20.4	26.0	20.1		25.1	22.7	
Progression Factor	1.00	1.00	1.00	1.54	1.38	2.02	0.73	0.64		1.00	1.00	
Incremental Delay, d2	23.3	6.9	0.4	0.2	152.8	0.5	915.4	0.2		47.7	2.6	
Delay (s)	44.2	29.4	17.2	27.5	192.4	41.9	934.5	13.2		72.8	25.2	
Level of Service	D	C	B	C	F	D	F	B		E	C	
Approach Delay (s)		31.3			156.9			252.3			31.9	
Approach LOS		C			F			F			C	

Intersection Summary			
HCM Average Control Delay	112.2	HCM Level of Service	F
HCM Volume to Capacity ratio	2.02		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	113.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

23: West Grand Avenue & Northgate Avenue

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	356	757	807	573	270	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	0.91
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.94		0.99	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3276		3422	1421
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	3276		3422	1421
Peak-hour factor, PHF	0.92	0.93	0.92	0.97	0.92	0.92
Adj. Flow (vph)	387	814	877	591	293	147
RTOR Reduction (vph)	0	0	137	0	6	113
Lane Group Flow (vph)	387	814	1331	0	302	19
Confl. Peds. (#/hr)	14			18		
Confl. Bikes (#/hr)				7		1
Turn Type	Prot					Perm
Protected Phases	5	2	6		4	
Permitted Phases						4
Actuated Green, G (s)	27.4	60.5	29.1		11.5	11.5
Effective Green, g (s)	27.4	60.5	29.1		11.5	11.5
Actuated g/C Ratio	0.34	0.76	0.36		0.14	0.14
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)	606	2676	1192		492	204
v/s Ratio Prot	c0.22	0.23	c0.41		c0.09	
v/s Ratio Perm						0.01
v/c Ratio	0.64	0.30	1.12		0.61	0.09
Uniform Delay, d1	22.1	3.1	25.4		32.2	29.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	0.3	64.1		1.6	0.1
Delay (s)	23.8	3.4	89.6		33.8	29.8
Level of Service	C	A	F		C	C
Approach Delay (s)		9.9	89.6		32.6	
Approach LOS		A	F		C	

Intersection Summary			
HCM Average Control Delay	50.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

24: 27th Street & I-980 On Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	799	0	0	314	1210	27	1053	96	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	0.91	0.91			0.95	0.88		0.91				
Frpb, ped/bikes	1.00	1.00			1.00	1.00		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)	1609	3382			3539	2787		5010				
Flt Permitted	0.55	0.92			1.00	1.00		1.00				
Satd. Flow (perm)	926	3133			3539	2787		5010				
Peak-hour factor, PHF	0.93	0.92	0.25	0.25	0.92	0.97	0.92	0.92	0.92	0.25	0.25	0.25
Adj. Flow (vph)	323	868	0	0	341	1247	29	1145	104	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	23	0	26	0	0	0	0
Lane Group Flow (vph)	278	913	0	0	341	1224	0	1252	0	0	0	0
Confl. Peds. (#/hr)	2		2				4		4	3		3
Confl. Bikes (#/hr)			4						5			7
Turn Type	Perm					Perm	Perm					
Protected Phases		4			8			2				
Permitted Phases	4					8	2					
Actuated Green, G (s)	16.0	16.0			16.0	16.0		16.0				
Effective Green, g (s)	16.0	16.0			16.0	16.0		16.0				
Actuated g/C Ratio	0.40	0.40			0.40	0.40		0.40				
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Grp Cap (vph)	370	1253			1416	1115		2004				
v/s Ratio Prot					0.10							
v/s Ratio Perm	0.30	0.29				c0.44		0.25				
v/c Ratio	0.75	0.73			0.24	1.10		0.62				
Uniform Delay, d1	10.3	10.2			8.0	12.0		9.6				
Progression Factor	1.00	1.00			1.00	1.00		1.00				
Incremental Delay, d2	13.2	3.7			0.4	57.9		1.5				
Delay (s)	23.4	13.9			8.4	69.9		11.1				
Level of Service	C	B			A	E		B				
Approach Delay (s)		16.1			56.7			11.1			0.0	
Approach LOS		B			E			B			A	

Intersection Summary			
HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

25: 27th Street & I-980 Off Ramp

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	601	47	14	297	0	0	0	0	473	377	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00		0.95					0.91	0.91	1.00
Frpb, ped/bikes		1.00	0.98		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		1.00	1.00		1.00					0.95	0.98	1.00
Satd. Flow (prot)		3539	1552		3531					1605	3330	1558
Flt Permitted		1.00	1.00		0.92					0.95	0.98	1.00
Satd. Flow (perm)		3539	1552		3266					1605	3330	1558
Peak-hour factor, PHF	0.25	0.95	0.92	0.92	0.92	0.25	0.25	0.25	0.25	0.92	0.92	0.92
Adj. Flow (vph)	0	633	51	15	323	0	0	0	0	514	410	258
RTOR Reduction (vph)	0	0	33	0	0	0	0	0	0	0	0	125
Lane Group Flow (vph)	0	633	18	0	338	0	0	0	0	303	621	133
Confl. Peds. (#/hr)	4		4	4		4	1		1	3		3
Confl. Bikes (#/hr)			5			9			1			1
Turn Type			Perm	Perm						Perm		Perm
Protected Phases		4			8						6	
Permitted Phases			4	8						6		6
Actuated Green, G (s)		21.0	21.0		21.0					31.0	31.0	31.0
Effective Green, g (s)		21.0	21.0		21.0					31.0	31.0	31.0
Actuated g/C Ratio		0.35	0.35		0.35					0.52	0.52	0.52
Clearance Time (s)		4.0	4.0		4.0					4.0	4.0	4.0
Lane Grp Cap (vph)		1239	543		1143					829	1721	805
v/s Ratio Prot		c0.18										
v/s Ratio Perm			0.01		0.10					c0.19	0.19	0.09
v/c Ratio		0.51	0.03		0.30					0.37	0.36	0.17
Uniform Delay, d1		15.4	12.8		14.1					8.6	8.6	7.7
Progression Factor		1.00	1.00		1.00					1.00	1.00	1.00
Incremental Delay, d2		1.5	0.1		0.7					1.2	0.6	0.4
Delay (s)		16.9	12.9		14.8					9.9	9.2	8.1
Level of Service		B	B		B					A	A	A
Approach Delay (s)		16.6			14.8			0.0			9.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

26: West Grand Avenue & San Pablo Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	965	173	53	834	82	431	563	106	145	455	167
Ideal 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		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.96	1.00	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	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)		3510	1522	1767	3539	1548	1763	3438		1765	3376	
Flt Permitted		0.59	1.00	0.11	1.00	1.00	0.31	1.00		0.30	1.00	
Satd. Flow (perm)		2082	1522	209	3539	1548	574	3438		563	3376	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	195	1049	188	58	907	89	444	580	109	158	495	182
RTOR Reduction (vph)	0	0	91	0	0	47	0	20	0	0	47	0
Lane Group Flow (vph)	0	1244	97	58	907	42	444	669	0	158	630	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2		2	2		2	4			4		
Actuated Green, G (s)		35.6	35.6	35.6	35.6	35.6	31.4	31.4		31.4	31.4	
Effective Green, g (s)		35.6	35.6	35.6	35.6	35.6	31.4	31.4		31.4	31.4	
Actuated g/C Ratio		0.47	0.47	0.47	0.47	0.47	0.42	0.42		0.42	0.42	
Clearance Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	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)		988	722	99	1680	735	240	1439		236	1413	
v/s Ratio Prot					0.26			0.19			0.19	
v/s Ratio Perm		c0.60	0.06	0.28		0.03	c0.77			0.28		
v/c Ratio		1.26	0.13	0.59	0.54	0.06	1.85	0.46		0.67	0.45	
Uniform Delay, d1		19.7	11.1	14.3	13.9	10.6	21.8	15.7		17.6	15.6	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		124.9	0.4	22.9	1.2	0.1	398.2	0.1		5.5	0.1	
Delay (s)		144.6	11.4	37.2	15.2	10.8	420.0	15.8		23.1	15.7	
Level of Service		F	B	D	B	B	F	B		C	B	
Approach Delay (s)		127.1			16.0			174.2			17.1	
Approach LOS		F			B			F			B	

Intersection Summary			
HCM Average Control Delay	92.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	75.0	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

Cumulative Year 2030 Baseline plus Project Conditions Mitigated

3: 7th St. & Oak St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	226	1541	0	0	0	0	0	1135	1185	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5						4.5				
Lane Util. Factor		0.86						0.91				
Frpb, ped/bikes		1.00						0.99				
Flpb, ped/bikes		1.00						1.00				
Frt		1.00						0.92				
Flt Protected		0.99						1.00				
Satd. Flow (prot)		6343						4631				
Flt Permitted		0.99						1.00				
Satd. Flow (perm)		6343						4631				
Peak-hour factor, PHF	0.92	0.98	0.25	0.25	0.25	0.25	0.25	0.94	0.96	0.25	0.25	0.25
Adj. Flow (vph)	246	1572	0	0	0	0	0	1207	1234	0	0	0
RTOR Reduction (vph)	0	40	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1778	0	0	0	0	0	2441	0	0	0	0
Confl. Peds. (#/hr)	22		22	50		50	14		14	6		6
Confl. Bikes (#/hr)			16			1			2			2
Turn Type	Perm											
Protected Phases		1						2				
Permitted Phases	1											
Actuated Green, G (s)		21.5						39.5				
Effective Green, g (s)		21.5						39.5				
Actuated g/C Ratio		0.31						0.56				
Clearance Time (s)		4.5						4.5				
Lane Grp Cap (vph)		1948						2613				
v/s Ratio Prot								c0.53				
v/s Ratio Perm		0.28										
v/c Ratio		0.91						1.38dr				
Uniform Delay, d1		23.3						14.0				
Progression Factor		1.00						1.00				
Incremental Delay, d2		8.0						7.7				
Delay (s)		31.4						21.8				
Level of Service		C						C				
Approach Delay (s)		31.4			0.0			21.8			0.0	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	25.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

16: Harrison Street & Lakeside Drive

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1384	250	1013	518	367	984
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		0.97	0.91	0.97	0.91
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	0.91	0.85
Flt Protected	1.00		0.95	1.00	0.98	1.00
Satd. Flow (prot)	4469		3090	4577	2912	1297
Flt Permitted	1.00		0.95	1.00	0.98	1.00
Satd. Flow (perm)	4469		3090	4577	2912	1297
Peak-hour factor, PHF	0.95	0.92	0.99	0.92	0.92	0.93
Adj. Flow (vph)	1457	272	1023	563	399	1058
RTOR Reduction (vph)	46	0	0	0	402	429
Lane Group Flow (vph)	1684	0	1023	563	526	100
Confl. Bikes (#/hr)				16		
Turn Type			Prot			Perm
Protected Phases	8		7	4	6	
Permitted Phases						6
Actuated Green, G (s)	21.0		18.0	43.0	9.0	9.0
Effective Green, g (s)	21.0		18.0	43.0	9.0	9.0
Actuated g/C Ratio	0.35		0.30	0.72	0.15	0.15
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1564		927	3280	437	195
v/s Ratio Prot	c0.38		c0.33	0.12	c0.18	
v/s Ratio Perm						0.08
v/c Ratio	1.08		1.10	0.17	1.20	0.51
Uniform Delay, d1	19.5		21.0	2.7	25.5	23.5
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	46.4		62.1	0.1	111.6	9.3
Delay (s)	65.9		83.1	2.9	137.1	32.8
Level of Service	E		F	A	F	C
Approach Delay (s)	65.9			54.6	99.2	
Approach LOS	E			D	F	

Intersection Summary			
HCM Average Control Delay	72.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

26: West Grand Avenue & San Pablo Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	179	965	173	53	834	82	431	563	106	145	455	167
Ideal 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		0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.95	1.00	1.00	0.97	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	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)		3510	1507	1766	3539	1541	1769	3435		1761	3370	
Flt Permitted		0.59	1.00	0.13	1.00	1.00	0.14	1.00		0.39	1.00	
Satd. Flow (perm)		2073	1507	238	3539	1541	261	3435		722	3370	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92
Adj. Flow (vph)	195	1049	188	58	907	89	444	580	109	158	495	182
RTOR Reduction (vph)	0	0	57	0	0	41	0	13	0	0	31	0
Lane Group Flow (vph)	0	1244	131	58	907	48	444	676	0	158	646	0
Confl. Peds. (#/hr)	13		13	10		10	12		12	8		8
Confl. Bikes (#/hr)			4			7			15			5
Turn Type	Perm		Perm	Perm		Perm	pm+pt			Perm		
Protected Phases		2			2		3	8			4	
Permitted Phases	2		2	2		2	8			4		
Actuated Green, G (s)		64.5	64.5	64.5	64.5	64.5	47.5	47.5		24.5	24.5	
Effective Green, g (s)		64.5	64.5	64.5	64.5	64.5	47.5	47.5		24.5	24.5	
Actuated g/C Ratio		0.54	0.54	0.54	0.54	0.54	0.40	0.40		0.20	0.20	
Clearance Time (s)		4.0	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	3.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		1114	810	128	1902	828	342	1360		147	688	
v/s Ratio Prot					0.26		c0.21	0.20			0.19	
v/s Ratio Perm		c0.60	0.09	0.24		0.03	c0.31			0.22		
v/c Ratio		1.12	0.16	0.45	0.48	0.06	1.30	0.50		1.07	0.94	
Uniform Delay, d1		27.8	14.1	17.0	17.3	13.2	35.2	27.3		47.8	47.0	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		65.0	0.4	11.1	0.9	0.1	154.2	0.1		95.6	20.2	
Delay (s)		92.8	14.5	28.1	18.1	13.4	189.3	27.4		143.4	67.3	
Level of Service		F	B	C	B	B	F	C		F	E	
Approach Delay (s)		82.5			18.3			90.8			81.7	
Approach LOS		F			B			F			F	

Intersection Summary			
HCM Average Control Delay	69.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	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

Intersection Level of Service Calculation Worksheets
Alternative Measure DD

Cumulative Year 2015 Baseline Conditions

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	103	129	38	171	141	42	654	74	76	343	18	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0		4.0	4.0		
Lane Util. Factor	1.00	0.97	1.00		1.00		0.88		0.95	0.95		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		0.99	1.00		
Flpb, ped/bikes	0.98	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.88		0.97		0.85		0.94	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.99	1.00		
Satd. Flow (prot)	1737	3433	1634		1798		2787		1620	1504		
Flt Permitted	0.31	0.95	1.00		1.00		1.00		0.99	1.00		
Satd. Flow (perm)	562	3433	1634		1798		2787		1620	1504		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	112	140	41	186	153	46	711	79	81	357	20	16
RTOR Reduction (vph)	0	0	122	0	0	0	365	0	0	3	0	0
Lane Group Flow (vph)	112	140	105	0	199	0	346	0	278	256	0	0
Confl. Peds. (#/hr)	16											
Confl. Bikes (#/hr)										6		
Turn Type	custom	Prot					pt+ov	Split		Prot		Split
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	13.0	13.0	27.5		14.5		29.1		14.7	14.7		
Effective Green, g (s)	13.0	13.0	27.5		14.5		29.1		14.7	14.7		
Actuated g/C Ratio	0.16	0.16	0.34		0.18		0.36		0.18	0.18		
Clearance Time (s)	4.0	4.0	4.0		4.0				4.0	4.0		
Vehicle Extension (s)	3.0	3.0	2.0		2.0				2.0	2.0		
Lane Grp Cap (vph)	91	558	643		326		1014		298	276		
v/s Ratio Prot		0.04	0.03		c0.11		0.12		c0.17	0.17		
v/s Ratio Perm	0.20		0.03									
v/c Ratio	1.23	0.25	0.16		0.61		0.34		0.93	0.93		
Uniform Delay, d1	33.5	29.2	18.3		30.1		18.5		32.2	32.1		
Progression Factor	0.70	0.66	2.10		1.00		1.00		1.00	1.00		
Incremental Delay, d2	167.5	0.2	0.0		2.4		0.1		37.5	38.2		
Delay (s)	190.8	19.5	38.4		32.5		18.6		69.6	70.3		
Level of Service	F	B	D		C		B		E	E		
Approach Delay (s)			68.5		21.6				70.0			
Approach LOS			E		C				E			

Intersection Summary			
HCM Average Control Delay	104.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	32	27	466	415	371	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.75	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.98	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1834	1181	1610	3221	1583	
Flt Permitted	0.98	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1834	1181	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	35	29	507	451	386	70
RTOR Reduction (vph)	0	28	0	0	8	0
Lane Group Flow (vph)	51	1	319	639	448	0
Confl. Peds. (#/hr)		32		102		102
Confl. Bikes (#/hr)		2				10
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	3.2	3.2	14.6	14.6	13.0	
Effective Green, g (s)	3.2	3.2	14.6	14.6	13.0	
Actuated g/C Ratio	0.04	0.04	0.18	0.18	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	3.0	
Lane Grp Cap (vph)	73	47	294	588	257	
v/s Ratio Prot	c0.03		0.20	c0.20	c0.28	
v/s Ratio Perm		0.00				
v/c Ratio	0.70	0.02	1.09	1.09	1.74	
Uniform Delay, d1	37.9	36.9	32.7	32.7	33.5	
Progression Factor	1.00	1.00	0.81	0.82	0.83	
Incremental Delay, d2	25.3	0.2	76.1	62.2	348.9	
Delay (s)	63.2	37.1	102.6	88.9	376.8	
Level of Service	E	D	F	F	F	
Approach Delay (s)	53.7			184.8		
Approach LOS	D			F		

Intersection Summary

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	14	416	111	103	146	18	703	166	51	829	22	27
Ideal 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	0.97	1.00		1.00		0.88		0.95	0.95		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		0.99	1.00		
Flpb, ped/bikes	0.96	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.93		0.98		0.85		0.91	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.98	1.00		
Satd. Flow (prot)	1702	3433	1728		1832		2787		1569	1504		
Flt Permitted	0.44	0.95	1.00		1.00		1.00		0.98	1.00		
Satd. Flow (perm)	796	3433	1728		1832		2787		1569	1504		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	15	452	121	112	159	20	764	177	54	864	24	29
RTOR Reduction (vph)	0	0	44	0	0	0	163	0	0	2	0	0
Lane Group Flow (vph)	15	452	189	0	179	0	601	0	577	540	0	0
Confl. Peds. (#/hr)	22											
Confl. Bikes (#/hr)										7		
Turn Type	custom	Prot					pt+ov	Split		Prot		Split
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	9.0	9.0	19.0		10.0		26.0		21.0	21.0		
Effective Green, g (s)	9.0	9.0	19.0		10.0		26.0		21.0	21.0		
Actuated g/C Ratio	0.11	0.11	0.24		0.12		0.32		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)	90	386	497		229		906		412	395		
v/s Ratio Prot		0.13	0.05		c0.10		0.22		c0.37	0.36		
v/s Ratio Perm	0.02		0.06									
v/c Ratio	0.17	1.17	0.38		0.78		0.66		1.40	1.37		
Uniform Delay, d1	32.1	35.5	25.6		33.9		23.2		29.5	29.5		
Progression Factor	0.68	0.72	0.72		1.00		1.00		1.00	1.00		
Incremental Delay, d2	3.8	100.4	2.1		22.8		1.4		194.4	180.5		
Delay (s)	25.5	125.8	20.5		56.8		24.7		223.9	210.0		
Level of Service	C	F	C		E		C		F	F		
Approach Delay (s)			88.6		30.8				217.1			
Approach LOS			F		C				F			

Intersection Summary			
HCM Average Control Delay	149.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	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	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	78	205	830	190	272	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.99	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1839	1515	1610	3221	1583	
Flt Permitted	0.99	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1839	1515	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	85	223	902	207	283	75
RTOR Reduction (vph)	0	212	0	0	12	0
Lane Group Flow (vph)	114	11	451	658	346	0
Confl. Peds. (#/hr)				74		74
Confl. Bikes (#/hr)		7				8
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	4.0	4.0	16.0	16.0	9.0	
Effective Green, g (s)	4.0	4.0	16.0	16.0	9.0	
Actuated g/C Ratio	0.05	0.05	0.20	0.20	0.11	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	92	76	322	644	178	
v/s Ratio Prot	c0.06		c0.28	0.20	c0.22	
v/s Ratio Perm		0.01				
v/c Ratio	1.24	0.15	1.40	1.34dl	1.95	
Uniform Delay, d1	38.0	36.4	32.0	32.0	35.5	
Progression Factor	1.00	1.00	0.82	0.81	1.00	
Incremental Delay, d2	171.3	0.9	196.8	39.7	444.3	
Delay (s)	209.3	37.3	223.2	65.7	479.7	
Level of Service	F	D	F	E	F	
Approach Delay (s)	95.5			215.2		
Approach LOS	F			F		

Intersection Summary

Cumulative Year 2030 Baseline Conditions

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	103	129	38	171	141	42	654	74	76	343	18	13
Ideal 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	0.97	1.00		1.00		0.88		0.95	0.95		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		0.99	1.00		
Flpb, ped/bikes	0.98	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.88		0.97		0.85		0.94	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.99	1.00		
Satd. Flow (prot)	1731	3433	1634		1798		2787		1620	1504		
Flt Permitted	0.36	0.95	1.00		1.00		1.00		0.99	1.00		
Satd. Flow (perm)	662	3433	1634		1798		2787		1620	1504		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	112	140	41	186	153	46	711	79	81	357	20	14
RTOR Reduction (vph)	0	0	130	0	0	0	313	0	0	4	0	0
Lane Group Flow (vph)	112	140	97	0	199	0	398	0	278	255	0	0
Confl. Peds. (#/hr)	16											
Confl. Bikes (#/hr)										6		
Turn Type	custom	Prot					pt+ov	Split		Prot		Split
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	11.0	11.0	24.3		13.3		31.8		14.8	14.8		
Effective Green, g (s)	11.0	11.0	24.3		13.3		31.8		14.8	14.8		
Actuated g/C Ratio	0.14	0.14	0.30		0.17		0.40		0.18	0.18		
Clearance Time (s)	4.0	4.0	4.0		4.0				4.0	4.0		
Vehicle Extension (s)	3.0	3.0	2.0		2.0				2.0	2.0		
Lane Grp Cap (vph)	91	472	578		299		1108		300	278		
v/s Ratio Prot		0.04	0.03		c0.11		0.14		c0.17	0.17		
v/s Ratio Perm	0.17		0.03									
v/c Ratio	1.23	0.30	0.17		0.67		0.36		0.93	0.92		
Uniform Delay, d1	34.5	31.0	20.4		31.3		16.9		32.1	32.0		
Progression Factor	0.66	0.63	2.49		1.00		1.00		1.00	1.00		
Incremental Delay, d2	165.9	0.3	0.0		4.3		0.1		36.2	36.3		
Delay (s)	188.6	19.9	50.9		35.6		17.0		68.2	68.3		
Level of Service	F	B	D		D		B		E	E		
Approach Delay (s)			74.0		21.1				68.3			
Approach LOS			E		C				E			

Intersection Summary			
HCM Average Control Delay	106.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	20	28	466	415	371	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.68	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.98	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1827	1081	1610	3221	1583	
Flt Permitted	0.98	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1827	1081	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	22	30	507	451	386	70
RTOR Reduction (vph)	0	29	0	0	8	0
Lane Group Flow (vph)	36	1	319	639	448	0
Confl. Peds. (#/hr)		32		102		102
Confl. Bikes (#/hr)		2				10
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	2.4	2.4	18.5	18.5	11.0	
Effective Green, g (s)	2.4	2.4	18.5	18.5	11.0	
Actuated g/C Ratio	0.03	0.03	0.23	0.23	0.14	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	3.0	
Lane Grp Cap (vph)	55	32	372	745	218	
v/s Ratio Prot	c0.02		0.20	c0.20	c0.28	
v/s Ratio Perm		0.00				
v/c Ratio	0.65	0.03	0.86	0.86	2.06	
Uniform Delay, d1	38.4	37.7	29.5	29.5	34.5	
Progression Factor	1.00	1.00	0.73	0.73	0.78	
Incremental Delay, d2	24.6	0.4	15.7	8.6	489.6	
Delay (s)	63.0	38.0	37.2	30.2	516.5	
Level of Service	E	D	D	C	F	
Approach Delay (s)	51.7			188.6		
Approach LOS	D			F		

Intersection Summary

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	14	416	111	103	146	18	703	166	51	829	22	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	0.97	1.00		1.00		0.88		0.95	0.95		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		0.99	1.00		
Flpb, ped/bikes	0.96	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.93		0.98		0.85		0.91	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.98	1.00		
Satd. Flow (prot)	1702	3433	1728		1832		2787		1569	1504		
Flt Permitted	0.44	0.95	1.00		1.00		1.00		0.98	1.00		
Satd. Flow (perm)	796	3433	1728		1832		2787		1569	1504		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	15	452	121	112	159	20	764	177	54	864	24	43
RTOR Reduction (vph)	0	0	44	0	0	0	163	0	0	2	0	0
Lane Group Flow (vph)	15	452	189	0	179	0	601	0	577	540	0	0
Confl. Peds. (#/hr)	22											
Confl. Bikes (#/hr)										7		
Turn Type	custom	Prot					pt+ov	Split		Prot		Split
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	9.0	9.0	19.0		10.0		26.0		21.0	21.0		
Effective Green, g (s)	9.0	9.0	19.0		10.0		26.0		21.0	21.0		
Actuated g/C Ratio	0.11	0.11	0.24		0.12		0.32		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)	90	386	497		229		906		412	395		
v/s Ratio Prot		0.13	0.05		c0.10		0.22		c0.37	0.36		
v/s Ratio Perm	0.02		0.06									
v/c Ratio	0.17	1.17	0.38		0.78		0.66		1.40	1.37		
Uniform Delay, d1	32.1	35.5	25.6		33.9		23.2		29.5	29.5		
Progression Factor	0.58	0.63	0.74		1.00		1.00		1.00	1.00		
Incremental Delay, d2	3.5	98.9	1.9		22.8		1.4		194.4	180.5		
Delay (s)	22.0	121.3	20.8		56.8		24.7		223.9	210.0		
Level of Service	C	F	C		E		C		F	F		
Approach Delay (s)			85.7		30.8				217.1			
Approach LOS			F		C				F			

Intersection Summary			
HCM Average Control Delay	160.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	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	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	123	208	830	190	272	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.99	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1840	1515	1610	3221	1583	
Flt Permitted	0.99	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1840	1515	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	134	226	902	207	283	75
RTOR Reduction (vph)	0	172	0	0	12	0
Lane Group Flow (vph)	177	54	451	658	346	0
Confl. Peds. (#/hr)				74		74
Confl. Bikes (#/hr)		7				8
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	4.0	4.0	16.0	16.0	9.0	
Effective Green, g (s)	4.0	4.0	16.0	16.0	9.0	
Actuated g/C Ratio	0.05	0.05	0.20	0.20	0.11	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	92	76	322	644	178	
v/s Ratio Prot	c0.10		c0.28	0.20	c0.22	
v/s Ratio Perm		0.04				
v/c Ratio	1.92	0.71	1.40	1.34dl	1.95	
Uniform Delay, d1	38.0	37.4	32.0	32.0	35.5	
Progression Factor	1.00	1.00	0.74	0.73	0.96	
Incremental Delay, d2	453.1	26.8	195.2	37.8	442.4	
Delay (s)	491.1	64.2	218.9	61.1	476.6	
Level of Service	F	E	F	E	F	
Approach Delay (s)	251.7			211.0		
Approach LOS	F			F		

Intersection Summary

Cumulative Year 2015 Baseline plus Project Conditions

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	103	157	38	205	141	42	654	74	77	343	18	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0		4.0	4.0		
Lane Util. Factor	1.00	0.97	1.00		1.00		0.88		0.95	0.95		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		0.99	1.00		
Flpb, ped/bikes	0.98	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.87		0.97		0.85		0.94	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.99	1.00		
Satd. Flow (prot)	1737	3433	1627		1798		2787		1621	1504		
Flt Permitted	0.31	0.95	1.00		1.00		1.00		0.99	1.00		
Satd. Flow (perm)	562	3433	1627		1798		2787		1621	1504		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	112	171	41	223	153	46	711	79	82	357	20	16
RTOR Reduction (vph)	0	0	146	0	0	0	325	0	0	3	0	0
Lane Group Flow (vph)	112	171	118	0	199	0	386	0	279	256	0	0
Confl. Peds. (#/hr)	16											
Confl. Bikes (#/hr)										6		
Turn Type	custom	Prot					pt+ov	Split		Prot		Split
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	13.0	13.0	27.6		14.6		29.2		14.6	14.6		
Effective Green, g (s)	13.0	13.0	27.6		14.6		29.2		14.6	14.6		
Actuated g/C Ratio	0.16	0.16	0.34		0.18		0.36		0.18	0.18		
Clearance Time (s)	4.0	4.0	4.0		4.0				4.0	4.0		
Vehicle Extension (s)	3.0	3.0	2.0		2.0				2.0	2.0		
Lane Grp Cap (vph)	91	558	643		328		1017		296	274		
v/s Ratio Prot		0.05	0.03		c0.11		0.14		c0.17	0.17		
v/s Ratio Perm	0.20		0.04									
v/c Ratio	1.23	0.31	0.18		0.61		0.38		0.94	0.93		
Uniform Delay, d1	33.5	29.5	18.3		30.1		18.7		32.3	32.2		
Progression Factor	0.74	0.71	2.05		1.00		1.00		1.00	1.00		
Incremental Delay, d2	167.8	0.3	0.0		2.2		0.1		39.5	39.6		
Delay (s)	192.5	21.1	37.6		32.2		18.8		71.8	71.8		
Level of Service	F	C	D		C		B		E	E		
Approach Delay (s)			64.1		21.7				71.8			
Approach LOS			E		C				E			

Intersection Summary			
HCM Average Control Delay	102.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	32	27	466	415	371	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.75	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.98	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1834	1181	1610	3221	1583	
Flt Permitted	0.98	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1834	1181	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	35	29	507	451	386	70
RTOR Reduction (vph)	0	28	0	0	8	0
Lane Group Flow (vph)	51	1	319	639	448	0
Confl. Peds. (#/hr)		32		102		102
Confl. Bikes (#/hr)		2				10
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	3.2	3.2	14.6	14.6	13.0	
Effective Green, g (s)	3.2	3.2	14.6	14.6	13.0	
Actuated g/C Ratio	0.04	0.04	0.18	0.18	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	3.0	
Lane Grp Cap (vph)	73	47	294	588	257	
v/s Ratio Prot	c0.03		0.20	c0.20	c0.28	
v/s Ratio Perm		0.00				
v/c Ratio	0.70	0.02	1.09	1.09	1.74	
Uniform Delay, d1	37.9	36.9	32.7	32.7	33.5	
Progression Factor	1.00	1.00	0.81	0.82	0.83	
Incremental Delay, d2	25.3	0.2	76.1	62.2	348.9	
Delay (s)	63.2	37.1	102.6	88.9	376.8	
Level of Service	E	D	F	F	F	
Approach Delay (s)	53.7			184.8		
Approach LOS	D			F		

Intersection Summary

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	14	429	111	119	146	18	703	166	56	829	22	27
Ideal 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	0.97	1.00		1.00		0.88		0.95	0.95		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		0.99	1.00		
Flpb, ped/bikes	0.96	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.92		0.98		0.85		0.91	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.98	1.00		
Satd. Flow (prot)	1702	3433	1719		1832		2787		1573	1504		
Flt Permitted	0.44	0.95	1.00		1.00		1.00		0.98	1.00		
Satd. Flow (perm)	796	3433	1719		1832		2787		1573	1504		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	15	466	121	129	159	20	764	177	60	864	24	29
RTOR Reduction (vph)	0	0	51	0	0	0	162	0	0	2	0	0
Lane Group Flow (vph)	15	466	199	0	179	0	602	0	574	549	0	0
Confl. Peds. (#/hr)	22											
Confl. Bikes (#/hr)										7		
Turn Type	custom	Prot					pt+ov	Split		Prot		Split
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	9.0	9.0	19.0		10.0		26.0		21.0	21.0		
Effective Green, g (s)	9.0	9.0	19.0		10.0		26.0		21.0	21.0		
Actuated g/C Ratio	0.11	0.11	0.24		0.12		0.32		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)	90	386	494		229		906		413	395		
v/s Ratio Prot		0.14	0.05		c0.10		0.22		c0.37	0.36		
v/s Ratio Perm	0.02		0.07									
v/c Ratio	0.17	1.21	0.40		0.78		0.66		1.39	1.39		
Uniform Delay, d1	32.1	35.5	25.7		33.9		23.2		29.5	29.5		
Progression Factor	0.68	0.73	0.73		1.00		1.00		1.00	1.00		
Incremental Delay, d2	3.8	114.6	2.3		22.8		1.4		189.8	190.2		
Delay (s)	25.6	140.4	21.1		56.8		24.7		219.3	219.7		
Level of Service	C	F	C		E		C		F	F		
Approach Delay (s)			97.3		30.8				219.5			
Approach LOS			F		C				F			

Intersection Summary			
HCM Average Control Delay	151.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	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	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	78	205	830	190	272	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.99	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1839	1515	1610	3221	1583	
Flt Permitted	0.99	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1839	1515	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	85	223	902	207	283	75
RTOR Reduction (vph)	0	212	0	0	12	0
Lane Group Flow (vph)	114	11	451	658	346	0
Confl. Peds. (#/hr)				74		74
Confl. Bikes (#/hr)		7				8
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	4.0	4.0	16.0	16.0	9.0	
Effective Green, g (s)	4.0	4.0	16.0	16.0	9.0	
Actuated g/C Ratio	0.05	0.05	0.20	0.20	0.11	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	92	76	322	644	178	
v/s Ratio Prot	c0.06		c0.28	0.20	c0.22	
v/s Ratio Perm		0.01				
v/c Ratio	1.24	0.15	1.40	1.34dl	1.95	
Uniform Delay, d1	38.0	36.4	32.0	32.0	35.5	
Progression Factor	1.00	1.00	0.82	0.81	1.00	
Incremental Delay, d2	171.3	0.9	196.8	39.7	444.3	
Delay (s)	209.3	37.3	223.2	65.7	479.7	
Level of Service	F	D	F	E	F	
Approach Delay (s)	95.5			215.2		
Approach LOS	F			F		

Intersection Summary

Cumulative Year 2030 Baseline plus Project Conditions

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	109	190	46	219	171	51	885	102	109	442	22	13
Ideal 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	0.97	1.00		1.00		0.88		0.95	0.95		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		0.99	1.00		
Flpb, ped/bikes	0.98	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.88		0.97		0.85		0.94	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.99	1.00		
Satd. Flow (prot)	1733	3433	1632		1799		2787		1630	1504		
Flt Permitted	0.36	0.95	1.00		1.00		1.00		0.99	1.00		
Satd. Flow (perm)	663	3433	1632		1799		2787		1630	1504		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	118	207	50	238	186	55	962	109	116	460	24	14
RTOR Reduction (vph)	0	0	163	0	0	0	230	0	0	3	0	0
Lane Group Flow (vph)	118	207	125	0	241	0	732	0	368	338	0	0
Confl. Peds. (#/hr)	16											
Confl. Bikes (#/hr)										6		
Turn Type	custom	Prot					pt+ov	Split		Prot		Split
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	11.0	11.0	25.3		14.3		32.5		14.1	14.1		
Effective Green, g (s)	11.0	11.0	25.3		14.3		32.5		14.1	14.1		
Actuated g/C Ratio	0.14	0.14	0.32		0.18		0.41		0.18	0.18		
Clearance Time (s)	4.0	4.0	4.0		4.0				4.0	4.0		
Vehicle Extension (s)	3.0	3.0	2.0		2.0				2.0	2.0		
Lane Grp Cap (vph)	91	472	598		322		1132		287	265		
v/s Ratio Prot		0.06	0.04		c0.13		0.26		c0.23	0.22		
v/s Ratio Perm	0.18		0.04									
v/c Ratio	1.30	0.44	0.21		0.75		0.65		1.28	1.27		
Uniform Delay, d1	34.5	31.7	20.0		31.1		19.1		33.0	33.0		
Progression Factor	0.73	0.72	2.13		1.00		1.00		1.00	1.00		
Incremental Delay, d2	191.8	0.6	0.1		8.1		1.0		151.0	149.5		
Delay (s)	217.1	23.4	42.7		39.2		20.1		183.9	182.5		
Level of Service	F	C	D		D		C		F	F		
Approach Delay (s)			69.8		23.9				183.2			
Approach LOS			E		C				F			

Intersection Summary			
HCM Average Control Delay	163.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.30		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	20	28	566	517	461	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.68	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.98	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1827	1081	1610	3221	1583	
Flt Permitted	0.98	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1827	1081	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	22	30	615	562	480	77
RTOR Reduction (vph)	0	29	0	0	7	0
Lane Group Flow (vph)	36	1	394	783	550	0
Confl. Peds. (#/hr)		32		102		102
Confl. Bikes (#/hr)		2				10
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	2.4	2.4	18.2	18.2	11.0	
Effective Green, g (s)	2.4	2.4	18.2	18.2	11.0	
Actuated g/C Ratio	0.03	0.03	0.23	0.23	0.14	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	3.0	
Lane Grp Cap (vph)	55	32	366	733	218	
v/s Ratio Prot	c0.02		c0.24	0.24	c0.35	
v/s Ratio Perm		0.00				
v/c Ratio	0.65	0.03	1.08	1.07	2.52	
Uniform Delay, d1	38.4	37.7	30.9	30.9	34.5	
Progression Factor	1.00	1.00	0.78	0.78	0.82	
Incremental Delay, d2	24.6	0.4	67.8	52.2	698.3	
Delay (s)	63.0	38.0	91.8	76.3	726.4	
Level of Service	E	D	F	E	F	
Approach Delay (s)	51.7			288.7		
Approach LOS	D			F		

Intersection Summary

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	14	463	135	87	179	22	981	270	90	1007	25	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	0.97	1.00		1.00		0.88		0.95	0.95		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		0.99	1.00		
Flpb, ped/bikes	0.96	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.94		0.98		0.85		0.93	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.98	1.00		
Satd. Flow (prot)	1706	3433	1753		1832		2787		1595	1504		
Flt Permitted	0.44	0.95	1.00		1.00		1.00		0.98	1.00		
Satd. Flow (perm)	798	3433	1753		1832		2787		1595	1504		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	15	503	147	95	195	24	1066	287	96	1049	27	43
RTOR Reduction (vph)	0	0	31	0	0	0	156	0	0	1	0	0
Lane Group Flow (vph)	15	503	211	0	219	0	910	0	750	708	0	0
Confl. Peds. (#/hr)	22											
Confl. Bikes (#/hr)										7		
Turn Type	custom	Prot					pt+ov	Split		Prot		Split
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	9.0	9.0	19.0		10.0		26.0		21.0	21.0		
Effective Green, g (s)	9.0	9.0	19.0		10.0		26.0		21.0	21.0		
Actuated g/C Ratio	0.11	0.11	0.24		0.12		0.32		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)	90	386	504		229		906		419	395		
v/s Ratio Prot		0.15	0.05		0.12		c0.33		0.47	c0.47		
v/s Ratio Perm	0.02		0.07									
v/c Ratio	0.17	1.30	0.42		0.96		1.00		1.79	1.79		
Uniform Delay, d1	32.1	35.5	25.8		34.8		27.0		29.5	29.5		
Progression Factor	0.61	0.66	0.72		1.00		1.00		1.00	1.00		
Incremental Delay, d2	3.6	152.7	2.3		49.2		31.0		365.0	366.1		
Delay (s)	23.2	176.1	20.8		83.9		58.0		394.5	395.6		
Level of Service	C	F	C		F		E		F	F		
Approach Delay (s)			123.6		62.4				395.0			
Approach LOS			F		E				F			

Intersection Summary			
HCM Average Control Delay	226.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	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	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	123	208	953	224	237	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.99	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1840	1515	1610	3221	1583	
Flt Permitted	0.99	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1840	1515	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	134	226	1036	243	247	100
RTOR Reduction (vph)	0	172	0	0	19	0
Lane Group Flow (vph)	177	54	518	761	328	0
Confl. Peds. (#/hr)				74		74
Confl. Bikes (#/hr)		7				8
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	4.0	4.0	16.0	16.0	9.0	
Effective Green, g (s)	4.0	4.0	16.0	16.0	9.0	
Actuated g/C Ratio	0.05	0.05	0.20	0.20	0.11	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	92	76	322	644	178	
v/s Ratio Prot	c0.10		c0.32	0.24	c0.21	
v/s Ratio Perm		0.04				
v/c Ratio	1.92	0.71	1.61	1.54dl	1.84	
Uniform Delay, d1	38.0	37.4	32.0	32.0	35.5	
Progression Factor	1.00	1.00	0.78	0.77	0.96	
Incremental Delay, d2	453.1	26.8	286.2	95.3	398.4	
Delay (s)	491.1	64.2	311.1	119.8	432.6	
Level of Service	F	E	F	F	F	
Approach Delay (s)	251.7			247.5		
Approach LOS	F			F		

Intersection Summary

Cumulative Year 2030 Baseline plus Project Conditions Mitigated

HCM Signalized Intersection Capacity Analysis Cumulative Year 2030 Baseline plus Project AM
15: 20th Street & Harrison Street
222 19th Street Transportation Study

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBT
Lane Configurations												
Volume (vph)	109	190	46	219	171	51	885	102	109	442	22	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	0.97	1.00		1.00		0.88		1.00	0.88		1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		1.00	1.00		1.00
Flpb, ped/bikes	0.99	1.00	1.00		1.00		1.00		1.00	1.00		1.00
Frt	1.00	1.00	0.88		0.97		0.85		1.00	0.85		1.00
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.98	1.00		1.00
Satd. Flow (prot)	1753	3433	1632		1799		2787		1819	2787		1863
Flt Permitted	0.13	0.95	1.00		1.00		1.00		0.98	1.00		1.00
Satd. Flow (perm)	238	3433	1632		1799		2787		1819	2787		1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	118	207	50	238	186	55	962	109	116	460	24	36
RTOR Reduction (vph)	0	0	138	0	0	0	456	0	0	3	0	0
Lane Group Flow (vph)	118	207	150	0	241	0	506	0	225	481	0	36
Confl. Peds. (#/hr)	16											
Confl. Bikes (#/hr)										6		
Turn Type	custom	Prot					pt+ov	Split		Prot		
Protected Phases		1	7		7		2 7	8	8	8		9
Permitted Phases	1		1									
Actuated Green, G (s)	31.0	31.0	42.0		11.0		30.6		15.2	15.2		3.2
Effective Green, g (s)	31.0	31.0	42.0		11.0		30.6		15.2	15.2		3.2
Actuated g/C Ratio	0.31	0.31	0.42		0.11		0.31		0.15	0.15		0.03
Clearance Time (s)	4.0	4.0	4.0		4.0				4.0	4.0		4.0
Vehicle Extension (s)	3.0	3.0	2.0		2.0				2.0	2.0		3.0
Lane Grp Cap (vph)	74	1064	751		198		853		276	424		60
v/s Ratio Prot		0.06	0.02		c0.13		0.18		0.12	c0.17		c0.02
v/s Ratio Perm	c0.50		0.07									
v/c Ratio	1.59	0.19	0.20		1.22		0.59		0.82	1.13		0.60
Uniform Delay, d1	34.5	25.3	18.4		44.5		29.4		41.0	42.4		47.8
Progression Factor	1.00	1.00	1.00		1.00		1.00		1.00	1.00		1.00
Incremental Delay, d2	321.8	0.1	0.0		134.7		0.7		22.6	85.4		15.7
Delay (s)	356.3	25.4	18.4		179.2		30.2		63.7	127.8		63.5
Level of Service	F	C	B		F		C		E	F		E
Approach Delay (s)			85.8		60.0				107.5			56.1
Approach LOS			F		E				F			E

Intersection Summary			
HCM Average Control Delay	107.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis Cumulative Year 2030 Baseline plus Project PM
15: 20th Street & Harrison Street
222 19th Street Transportation Study

Movement	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations						
Volume (vph)	163	208	953	224	237	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	1.00	0.97	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.85	
Flt Protected	1.00	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1863	1531	1610	3221	1583	
Flt Permitted	1.00	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1863	1531	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	177	226	1036	243	247	100
RTOR Reduction (vph)	0	92	0	0	9	0
Lane Group Flow (vph)	177	134	518	761	338	0
Confl. Peds. (#/hr)				74		74
Confl. Bikes (#/hr)		7				8
Turn Type		Perm	Split		Over	
Protected Phases	9		2	2	1	
Permitted Phases		9				
Actuated Green, G (s)	11.0	11.0	36.0	36.0	22.0	
Effective Green, g (s)	11.0	11.0	36.0	36.0	22.0	
Actuated g/C Ratio	0.07	0.07	0.24	0.24	0.15	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	137	112	386	773	232	
v/s Ratio Prot	c0.10		c0.32	0.24	c0.21	
v/s Ratio Perm		0.09				
v/c Ratio	1.29	1.20	1.34	1.29dl	1.46	
Uniform Delay, d1	69.5	69.5	57.0	56.7	64.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	175.0	148.0	170.4	28.2	227.2	
Delay (s)	244.5	217.5	227.4	85.0	291.2	
Level of Service	F	F	F	F	F	
Approach Delay (s)	229.4			174.4		
Approach LOS	F			F		

Intersection Summary

HCM Signalized Intersection Capacity Analysis Cumulative Year 2030 Baseline plus Project AM
15: 20th Street & Harrison Street
222 19th Street Transportation Study

Movement	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations					
Volume (vph)	28	566	517	461	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91	0.91	1.00	
Frpb, ped/bikes	0.69	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	
Frt	0.85	1.00	1.00	0.85	
Flt Protected	1.00	0.95	0.95	1.00	
Satd. Flow (prot)	1088	1610	3221	1583	
Flt Permitted	1.00	0.95	0.95	1.00	
Satd. Flow (perm)	1088	1610	3221	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	30	615	562	480	77
RTOR Reduction (vph)	29	0	0	6	0
Lane Group Flow (vph)	1	394	783	551	0
Confl. Peds. (#/hr)	32		102		102
Confl. Bikes (#/hr)	2				10
Turn Type	Perm	Split		Over	
Protected Phases		2	2	1	
Permitted Phases	9				
Actuated Green, G (s)	3.2	19.6	19.6	31.0	
Effective Green, g (s)	3.2	19.6	19.6	31.0	
Actuated g/C Ratio	0.03	0.20	0.20	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	2.0	2.0	3.0	
Lane Grp Cap (vph)	35	316	631	491	
v/s Ratio Prot		c0.24	0.24	0.35	
v/s Ratio Perm	0.00				
v/c Ratio	0.03	1.25	1.24	1.12	
Uniform Delay, d1	46.9	40.2	40.2	34.5	
Progression Factor	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	134.8	121.5	78.9	
Delay (s)	47.2	175.0	161.7	113.4	
Level of Service	D	F	F	F	
Approach Delay (s)			149.2		
Approach LOS			F		

Intersection Summary

HCM Signalized Intersection Capacity Analysis Cumulative Year 2030 Baseline plus Project PM
15: 20th Street & Harrison Street
222 19th Street Transportation Study

Movement	EBL2	EBL	EBT	EBR	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL
Lane Configurations												
Volume (vph)	14	463	135	87	179	22	981	270	90	1007	25	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0		4.0		4.0	4.0		
Lane Util. Factor	1.00	0.97	1.00		1.00		0.88		1.00	0.88		
Frpb, ped/bikes	1.00	1.00	1.00		1.00		1.00		1.00	1.00		
Flpb, ped/bikes	0.97	1.00	1.00		1.00		1.00		1.00	1.00		
Frt	1.00	1.00	0.94		0.98		0.85		1.00	0.85		
Flt Protected	0.95	0.95	1.00		1.00		1.00		0.96	1.00		
Satd. Flow (prot)	1721	3433	1753		1832		2787		1795	2787		
Flt Permitted	0.18	0.95	1.00		1.00		1.00		0.96	1.00		
Satd. Flow (perm)	329	3433	1753		1832		2787		1795	2787		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.94	0.96	0.92	0.92
Adj. Flow (vph)	15	503	147	95	195	24	1066	287	96	1049	27	0
RTOR Reduction (vph)	0	0	16	0	0	0	187	0	0	1	0	0
Lane Group Flow (vph)	15	503	226	0	219	0	879	0	383	1075	0	0
Confl. Peds. (#/hr)	22											
Confl. Bikes (#/hr)										7		
Turn Type	custom	Prot					pt+ov	Split		Prot		Perm
Protected Phases		1	7		7		2 7	8	8	8		
Permitted Phases	1		1									9
Actuated Green, G (s)	22.0	22.0	35.0		13.0		49.0		48.0	48.0		
Effective Green, g (s)	22.0	22.0	35.0		13.0		49.0		48.0	48.0		
Actuated g/C Ratio	0.15	0.15	0.23		0.09		0.33		0.32	0.32		
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)	48	504	456		159		910		574	892		
v/s Ratio Prot		0.15	0.04		c0.12		0.32		0.21	c0.39		
v/s Ratio Perm	0.05		0.09									
v/c Ratio	0.31	1.00	0.50		1.38		0.97		0.67	1.20		
Uniform Delay, d1	57.2	64.0	49.8		68.5		49.7		44.1	51.0		
Progression Factor	1.00	1.00	1.00		1.00		1.00		1.00	1.00		
Incremental Delay, d2	16.2	39.6	3.8		204.2		21.6		6.0	102.8		
Delay (s)	73.4	103.6	53.7		272.7		71.2		50.1	153.8		
Level of Service	E	F	D		F		E		D	F		
Approach Delay (s)			87.1		105.6				126.6			
Approach LOS			F		F				F			

Intersection Summary			
HCM Average Control Delay	137.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	Err%	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			

Intersection Level of Service Calculation Worksheets
Preferred Measure DD

Cumulative Year 2015 Baseline Conditions

HCM Signalized Intersection Capacity Analysis
15: 20th St & Harrison St

2/14/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	128	171	415	371	59	61	76	318	13	20	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.91		0.97	0.95	1.00		1.00	0.88		1.00	1.00
Frpb, ped/bikes		0.95		1.00	1.00	0.77		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		0.94		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99		0.95	1.00	1.00		0.98	1.00		0.98	1.00
Satd. Flow (prot)		4429		3433	3406	1376		1822	2612		1827	1583
Flt Permitted		0.99		0.95	1.00	1.00		0.98	1.00		0.98	1.00
Satd. Flow (perm)		4429		3433	3406	1376		1822	2612		1827	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	139	186	451	403	64	66	83	346	14	22	29
RTOR Reduction (vph)	0	138	0	0	0	49	0	0	200	0	0	17
Lane Group Flow (vph)	0	299	0	451	403	15	0	149	146	0	36	12
Confl. Peds. (#/hr)			70	70		70						
Confl. Bikes (#/hr)			16			16			16			
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5	0		
Turn Type	Split			Split		Perm	Split		pt+ov	Split		pt+ov
Protected Phases	2	2		1	1		3	3	3 1	4	4	4 2
Permitted Phases						1						
Actuated Green, G (s)		23.0		21.0	21.0	21.0		17.0	38.0		13.0	36.0
Effective Green, g (s)		23.0		21.0	21.0	21.0		17.0	38.0		13.0	36.0
Actuated g/C Ratio		0.26		0.23	0.23	0.23		0.19	0.42		0.14	0.40
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		1132		801	795	321		344	1103		264	633
v/s Ratio Prot		c0.07		c0.13	0.12			c0.08	0.06		c0.02	0.01
v/s Ratio Perm						0.01						
v/c Ratio		0.26		0.56	0.51	0.05		0.43	0.13		0.14	0.02
Uniform Delay, d1		26.7		30.5	30.0	26.7		32.2	15.9		33.6	16.3
Progression Factor		1.00		0.83	0.83	1.02		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.6		2.6	2.1	0.2		3.9	0.2		1.1	0.1
Delay (s)		27.3		28.0	26.9	27.6		36.2	16.2		34.7	16.4
Level of Service		C		C	C	C		D	B		C	B
Approach Delay (s)		27.3			27.5			22.2			26.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Lakeside Dr & Harrison St

2/14/2011

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	243	788	398	29	457	636
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.91		0.97	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	2787	4814		3367	3406
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1736	2787	4814		3367	3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	264	857	433	32	497	691
RTOR Reduction (vph)	0	44	10	0	0	0
Lane Group Flow (vph)	264	813	455	0	497	691
Confl. Peds. (#/hr)	70			70	70	
Confl. Bikes (#/hr)		16		16		
Heavy Vehicles (%)	4%	2%	6%	4%	4%	6%
Turn Type		pt+ov			Prot	
Protected Phases	2	2 3	4		3	8
Permitted Phases						
Actuated Green, G (s)	41.8	64.2	17.8		18.4	33.8
Effective Green, g (s)	41.8	64.2	17.8		18.4	33.8
Actuated g/C Ratio	0.46	0.71	0.20		0.20	0.38
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	806	1988	952		688	1279
v/s Ratio Prot	0.15	c0.29	0.09		c0.15	c0.20
v/s Ratio Perm						
v/c Ratio	0.33	0.41	0.48		0.72	0.54
Uniform Delay, d1	15.2	5.2	32.0		33.4	22.0
Progression Factor	1.02	0.65	1.01		1.05	0.55
Incremental Delay, d2	0.3	0.0	0.1		2.2	0.2
Delay (s)	15.9	3.4	32.4		37.2	12.3
Level of Service	B	A	C		D	B
Approach Delay (s)	6.3		32.4			22.7
Approach LOS	A		C			C

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
15: 20th St & Harrison St

2/14/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	416	103	190	272	51	97	31	829	39	121	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.91		0.97	0.95	1.00		1.00	0.88		1.00	1.00
Frpb, ped/bikes		0.98		1.00	1.00	0.76		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		0.97		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (prot)		4684		3433	3406	1364		1795	2612		1841	1583
Flt Permitted		1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (perm)		4684		3433	3406	1364		1795	2612		1841	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	452	112	207	296	55	105	34	901	42	132	223
RTOR Reduction (vph)	0	45	0	0	0	45	0	0	305	0	0	136
Lane Group Flow (vph)	0	534	0	207	296	10	0	139	596	0	174	87
Confl. Peds. (#/hr)			70	70		70	70					70
Confl. Bikes (#/hr)			16			16			16			
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5	0		
Turn Type	Split			Split		Perm	Split		pt+ov	Split		pt+ov
Protected Phases	2	2		1	1		3	3	3 1	4	4	4 2
Permitted Phases						1						
Actuated Green, G (s)		22.0		16.0	16.0	16.0		23.0	39.0		13.0	35.0
Effective Green, g (s)		22.0		16.0	16.0	16.0		23.0	39.0		13.0	35.0
Actuated g/C Ratio		0.24		0.18	0.18	0.18		0.26	0.43		0.14	0.39
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		1145		610	606	242		459	1132		266	616
v/s Ratio Prot		c0.11		0.06	0.09			0.08	c0.23		c0.09	0.05
v/s Ratio Perm						0.01						
v/c Ratio		0.47		0.34	0.49	0.04		0.30	0.53		0.65	0.14
Uniform Delay, d1		29.0		32.4	33.3	30.6		27.0	18.7		36.4	17.8
Progression Factor		1.00		0.60	0.61	0.56		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.4		1.5	2.7	0.3		1.7	1.8		11.9	0.5
Delay (s)		30.4		20.9	23.2	17.4		28.7	20.5		48.3	18.3
Level of Service		C		C	C	B		C	C		D	B
Approach Delay (s)		30.4			21.8			21.6			31.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Lakeside Dr & Harrison St

2/14/2011

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	153	845	1099	71	830	332
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.91		0.97	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	2787	4826		3367	3406
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1736	2787	4826		3367	3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	918	1195	77	902	361
RTOR Reduction (vph)	0	6	8	0	0	0
Lane Group Flow (vph)	166	912	1264	0	902	361
Confl. Peds. (#/hr)	70			70	70	
Confl. Bikes (#/hr)		16		16		
Heavy Vehicles (%)	4%	2%	6%	4%	4%	6%
Turn Type		pt+ov			Prot	
Protected Phases	2	2 3	4		3	8
Permitted Phases						
Actuated Green, G (s)	14.0	46.5	35.5		28.5	61.6
Effective Green, g (s)	14.0	46.5	35.5		28.5	61.6
Actuated g/C Ratio	0.16	0.52	0.39		0.32	0.68
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	270	1440	1904		1066	2331
v/s Ratio Prot	0.10	c0.33	c0.26		c0.27	0.11
v/s Ratio Perm						
v/c Ratio	0.61	0.63	0.66		0.85	0.15
Uniform Delay, d1	35.5	15.6	22.4		28.7	5.0
Progression Factor	0.94	1.05	0.80		0.44	0.53
Incremental Delay, d2	4.1	0.3	1.5		4.7	0.1
Delay (s)	37.4	16.7	19.4		17.4	2.8
Level of Service	D	B	B		B	A
Approach Delay (s)	19.9		19.4			13.2
Approach LOS	B		B			B

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Cumulative Year 2030 Baseline Conditions

HCM Signalized Intersection Capacity Analysis
15: 20th St & Harrison St
2/14/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	181	204	531	589	116	102	108	451	13	20	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.91		0.97	0.95	1.00		1.00	0.88		1.00	1.00
Frpb, ped/bikes		0.96		1.00	1.00	0.77		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		0.94		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99		0.95	1.00	1.00		0.98	1.00		0.98	1.00
Satd. Flow (prot)		4443		3433	3406	1376		1818	2612		1827	1583
Flt Permitted		0.99		0.95	1.00	1.00		0.98	1.00		0.98	1.00
Satd. Flow (perm)		4443		3433	3406	1376		1818	2612		1827	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	197	222	577	640	126	111	117	490	14	22	32
RTOR Reduction (vph)	0	141	0	0	0	81	0	0	283	0	0	19
Lane Group Flow (vph)	0	396	0	577	640	46	0	228	207	0	36	13
Confl. Peds. (#/hr)			70	70		70						
Confl. Bikes (#/hr)			16			16			16			
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5	0		
Turn Type	Split			Split		Perm	Split		pt+ov	Split		pt+ov
Protected Phases	2	2		1	1		3	3	3 1	4	4	4 2
Permitted Phases						1						
Actuated Green, G (s)		23.0		21.0	21.0	21.0		17.0	38.0		13.0	36.0
Effective Green, g (s)		23.0		21.0	21.0	21.0		17.0	38.0		13.0	36.0
Actuated g/C Ratio		0.26		0.23	0.23	0.23		0.19	0.42		0.14	0.40
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		1135		801	795	321		343	1103		264	633
v/s Ratio Prot		c0.09		0.17	c0.19			c0.13	0.08		c0.02	0.01
v/s Ratio Perm						0.03						
v/c Ratio		0.35		0.72	0.81	0.14		0.66	0.19		0.14	0.02
Uniform Delay, d1		27.4		31.8	32.6	27.4		33.9	16.3		33.6	16.3
Progression Factor		1.00		0.69	0.70	0.81		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.8		4.3	6.6	0.7		9.8	0.4		1.1	0.1
Delay (s)		28.2		26.3	29.5	22.7		43.6	16.7		34.7	16.4
Level of Service		C		C	C	C		D	B		C	B
Approach Delay (s)		28.2			27.5			25.2			26.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Lakeside Dr & Harrison St
2/14/2011

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	192	1148	577	56	544	1044
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.91		0.97	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	2787	4793		3367	3406
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1736	2787	4793		3367	3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	1248	627	61	591	1135
RTOR Reduction (vph)	0	22	13	0	0	0
Lane Group Flow (vph)	209	1226	675	0	591	1135
Confl. Peds. (#/hr)	70			70	70	
Confl. Bikes (#/hr)		16		16		
Heavy Vehicles (%)	4%	2%	6%	4%	4%	6%
Turn Type		pt+ov			Prot	
Protected Phases	2	2 3	4		3	8
Permitted Phases						
Actuated Green, G (s)	33.1	57.9	24.1		20.8	42.5
Effective Green, g (s)	33.1	57.9	24.1		20.8	42.5
Actuated g/C Ratio	0.37	0.64	0.27		0.23	0.47
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	638	1793	1283		778	1608
v/s Ratio Prot	0.12	c0.44	0.14		c0.18	c0.33
v/s Ratio Perm						
v/c Ratio	0.33	0.68	0.53		0.76	0.71
Uniform Delay, d1	20.5	10.2	28.1		32.3	18.8
Progression Factor	1.00	0.65	1.05		1.07	0.44
Incremental Delay, d2	0.5	0.3	0.2		2.7	0.8
Delay (s)	21.0	7.0	29.6		37.3	9.2
Level of Service	C	A	C		D	A
Approach Delay (s)	9.0		29.6			18.8
Approach LOS	A		C			B

Intersection Summary			
HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: 20th St & Harrison St
2/14/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	505	127	233	374	114	270	85	1018	40	123	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.91		0.97	0.95	1.00		1.00	0.88		1.00	1.00
Frpb, ped/bikes		0.98		1.00	1.00	0.76		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		0.97		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (prot)		4681		3433	3406	1364		1794	2612		1840	1583
Flt Permitted		1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (perm)		4681		3433	3406	1364		1794	2612		1840	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	549	138	253	407	124	293	92	1107	43	134	226
RTOR Reduction (vph)	0	46	0	0	0	102	0	0	292	0	0	92
Lane Group Flow (vph)	0	656	0	253	407	22	0	385	815	0	177	134
Confl. Peds. (#/hr)			70	70		70	70					70
Confl. Bikes (#/hr)			16			16			16			
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5	0		
Turn Type	Split			Split		Perm	Split		pt+ov	Split		pt+ov
Protected Phases	2	2		1	1		3	3	3 1	4	4	4 2
Permitted Phases						1						
Actuated Green, G (s)		22.0		16.0	16.0	16.0		23.0	39.0		13.0	35.0
Effective Green, g (s)		22.0		16.0	16.0	16.0		23.0	39.0		13.0	35.0
Actuated g/C Ratio		0.24		0.18	0.18	0.18		0.26	0.43		0.14	0.39
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		1144		610	606	242		458	1132		266	616
v/s Ratio Prot		c0.14		0.07	0.12			c0.21	c0.31		c0.10	0.08
v/s Ratio Perm						0.02						
v/c Ratio		0.57		0.41	0.67	0.09		0.84	0.72		0.67	0.22
Uniform Delay, d1		29.9		32.8	34.5	30.9		31.8	21.0		36.4	18.4
Progression Factor		1.00		0.64	0.65	0.56		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.1		2.0	5.6	0.7		16.8	4.0		12.4	0.8
Delay (s)		32.0		22.9	28.1	18.1		48.6	25.0		48.9	19.2
Level of Service		C		C	C	B		D	C		D	B
Approach Delay (s)		32.0			24.8			31.1			32.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
16: Lakeside Dr & Harrison St
2/14/2011

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	188	984	1350	170	953	518
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.91		0.97	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	2787	4769		3367	3406
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1736	2787	4769		3367	3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	204	1070	1467	185	1036	563
RTOR Reduction (vph)	0	2	18	0	0	0
Lane Group Flow (vph)	204	1068	1634	0	1036	563
Confl. Peds. (#/hr)	70			70	70	
Confl. Bikes (#/hr)		16		16		
Heavy Vehicles (%)	4%	2%	6%	4%	4%	6%
Turn Type		pt+ov			Prot	
Protected Phases	2	2 3	4		3	8
Permitted Phases						
Actuated Green, G (s)	14.0	48.3	33.7		30.3	61.6
Effective Green, g (s)	14.0	48.3	33.7		30.3	61.6
Actuated g/C Ratio	0.16	0.54	0.37		0.34	0.68
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	270	1496	1786		1134	2331
v/s Ratio Prot	0.12	c0.38	c0.34		c0.31	0.17
v/s Ratio Perm						
v/c Ratio	0.76	0.71	0.92		0.91	0.24
Uniform Delay, d1	36.4	15.7	26.8		28.6	5.4
Progression Factor	0.93	1.06	0.82		0.48	0.45
Incremental Delay, d2	7.7	0.5	6.4		6.9	0.1
Delay (s)	41.6	17.1	28.2		20.5	2.6
Level of Service	D	B	C		C	A
Approach Delay (s)	21.0		28.2			14.2
Approach LOS	C		C			B

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2015 Baseline plus Project Conditions

HCM Signalized Intersection Capacity Analysis
15: 20th St & Harrison St

2/14/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	103	156	205	415	371	59	62	76	328	13	20	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.91		0.97	0.95	1.00		1.00	0.88		1.00	1.00
Frpb, ped/bikes		0.95		1.00	1.00	0.77		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		0.93		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99		0.95	1.00	1.00		0.98	1.00		0.98	1.00
Satd. Flow (prot)		4414		3433	3406	1376		1822	2612		1827	1583
Flt Permitted		0.99		0.95	1.00	1.00		0.98	1.00		0.98	1.00
Satd. Flow (perm)		4414		3433	3406	1376		1822	2612		1827	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	112	170	223	451	403	64	67	83	357	14	22	29
RTOR Reduction (vph)	0	159	0	0	0	49	0	0	206	0	0	17
Lane Group Flow (vph)	0	346	0	451	403	15	0	150	151	0	36	12
Confl. Peds. (#/hr)			70	70		70						
Confl. Bikes (#/hr)			16			16			16			
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5	0		
Turn Type	Split			Split		Perm	Split		pt+ov	Split		pt+ov
Protected Phases	2	2		1	1		3	3	3 1	4	4	4 2
Permitted Phases						1						
Actuated Green, G (s)		23.0		21.0	21.0	21.0		17.0	38.0		13.0	36.0
Effective Green, g (s)		23.0		21.0	21.0	21.0		17.0	38.0		13.0	36.0
Actuated g/C Ratio		0.26		0.23	0.23	0.23		0.19	0.42		0.14	0.40
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		1128		801	795	321		344	1103		264	633
v/s Ratio Prot		c0.08		c0.13	0.12			c0.08	0.06		c0.02	0.01
v/s Ratio Perm						0.01						
v/c Ratio		0.31		0.56	0.51	0.05		0.44	0.14		0.14	0.02
Uniform Delay, d1		27.1		30.5	30.0	26.7		32.3	15.9		33.6	16.3
Progression Factor		1.00		0.84	0.83	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.7		2.6	2.1	0.2		4.0	0.3		1.1	0.1
Delay (s)		27.8		28.1	27.1	27.1		36.2	16.2		34.7	16.4
Level of Service		C		C	C	C		D	B		C	B
Approach Delay (s)		27.8			27.6			22.1			26.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Lakeside Dr & Harrison St

2/14/2011

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	243	788	436	29	472	636
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.91		0.97	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	2787	4821		3367	3406
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1736	2787	4821		3367	3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	264	857	474	32	513	691
RTOR Reduction (vph)	0	37	10	0	0	0
Lane Group Flow (vph)	264	820	496	0	513	691
Confl. Peds. (#/hr)	70			70	70	
Confl. Bikes (#/hr)		16		16		
Heavy Vehicles (%)	4%	2%	6%	4%	4%	6%
Turn Type		pt+ov			Prot	
Protected Phases	2	2 3	4		3	8
Permitted Phases						
Actuated Green, G (s)	40.9	63.6	18.4		18.7	34.7
Effective Green, g (s)	40.9	63.6	18.4		18.7	34.7
Actuated g/C Ratio	0.45	0.71	0.20		0.21	0.39
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	789	1969	986		700	1313
v/s Ratio Prot	0.15	c0.29	0.10		c0.15	c0.20
v/s Ratio Perm						
v/c Ratio	0.33	0.42	0.50		0.73	0.53
Uniform Delay, d1	15.8	5.5	31.7		33.3	21.3
Progression Factor	1.02	0.65	1.01		1.04	0.54
Incremental Delay, d2	0.3	0.0	0.1		2.4	0.1
Delay (s)	16.4	3.6	32.1		36.9	11.6
Level of Service	B	A	C		D	B
Approach Delay (s)	6.6		32.1			22.4
Approach LOS	A		C			C

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: 20th St & Harrison St

2/14/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	429	119	190	272	51	102	31	835	39	121	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.91		0.97	0.95	1.00		1.00	0.88		1.00	1.00
Frpb, ped/bikes		0.98		1.00	1.00	0.76		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		0.97		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (prot)		4665		3433	3406	1364		1794	2612		1841	1583
Flt Permitted		1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (perm)		4665		3433	3406	1364		1794	2612		1841	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	466	129	207	296	55	111	34	908	42	132	223
RTOR Reduction (vph)	0	54	0	0	0	45	0	0	303	0	0	136
Lane Group Flow (vph)	0	556	0	207	296	10	0	145	605	0	174	87
Confl. Peds. (#/hr)			70	70		70	70					70
Confl. Bikes (#/hr)			16			16			16			
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5	0		
Turn Type	Split			Split		Perm	Split		pt+ov	Split		pt+ov
Protected Phases	2	2		1	1		3	3	3 1	4	4	4 2
Permitted Phases						1						
Actuated Green, G (s)		22.0		16.0	16.0	16.0		23.0	39.0		13.0	35.0
Effective Green, g (s)		22.0		16.0	16.0	16.0		23.0	39.0		13.0	35.0
Actuated g/C Ratio		0.24		0.18	0.18	0.18		0.26	0.43		0.14	0.39
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		1140		610	606	242		458	1132		266	616
v/s Ratio Prot		c0.12		0.06	0.09			0.08	c0.23		c0.09	0.05
v/s Ratio Perm						0.01						
v/c Ratio		0.49		0.34	0.49	0.04		0.32	0.53		0.65	0.14
Uniform Delay, d1		29.2		32.4	33.3	30.6		27.1	18.8		36.4	17.8
Progression Factor		1.00		0.61	0.63	0.56		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.5		1.5	2.7	0.3		1.8	1.8		11.9	0.5
Delay (s)		30.7		21.4	23.6	17.5		28.9	20.6		48.3	18.3
Level of Service		C		C	C	B		C	C		D	B
Approach Delay (s)		30.7			22.2			21.8			31.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Lakeside Dr & Harrison St

2/14/2011

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	153	845	1118	71	890	332
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.91		0.97	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	2787	4827		3367	3406
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1736	2787	4827		3367	3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	918	1215	77	967	361
RTOR Reduction (vph)	0	6	7	0	0	0
Lane Group Flow (vph)	166	912	1285	0	967	361
Confl. Peds. (#/hr)	70			70	70	
Confl. Bikes (#/hr)		16		16		
Heavy Vehicles (%)	4%	2%	6%	4%	4%	6%
Turn Type		pt+ov			Prot	
Protected Phases	2	2 3	4		3	8
Permitted Phases						
Actuated Green, G (s)	14.0	47.4	34.6		29.4	61.6
Effective Green, g (s)	14.0	47.4	34.6		29.4	61.6
Actuated g/C Ratio	0.16	0.53	0.38		0.33	0.68
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	270	1468	1856		1100	2331
v/s Ratio Prot	0.10	c0.33	c0.27		c0.29	0.11
v/s Ratio Perm						
v/c Ratio	0.61	0.62	0.69		0.88	0.15
Uniform Delay, d1	35.5	15.0	23.2		28.6	5.0
Progression Factor	0.94	1.06	0.80		0.47	0.55
Incremental Delay, d2	4.1	0.2	1.7		6.4	0.1
Delay (s)	37.4	16.1	20.3		20.0	2.9
Level of Service	D	B	C		B	A
Approach Delay (s)	19.4		20.3			15.3
Approach LOS	B		C			B

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2030 Baseline plus Project Conditions

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	209	238	531	589	116	103	108	461	13	20	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.91		0.97	0.95	1.00		1.00	0.88		1.00	1.00
Frpb, ped/bikes		0.95		1.00	1.00	0.77		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		0.94		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		0.99		0.95	1.00	1.00		0.98	1.00		0.98	1.00
Satd. Flow (prot)		4428		3433	3406	1376		1818	2612		1827	1583
Flt Permitted		0.99		0.95	1.00	1.00		0.98	1.00		0.98	1.00
Satd. Flow (perm)		4428		3433	3406	1376		1818	2612		1827	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	227	259	577	640	126	112	117	501	14	22	32
RTOR Reduction (vph)	0	150	0	0	0	81	0	0	289	0	0	19
Lane Group Flow (vph)	0	454	0	577	640	46	0	229	212	0	36	13
Confl. Peds. (#/hr)			70	70		70						
Confl. Bikes (#/hr)			16			16			16			
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5	0		
Turn Type	Split			Split		Perm	Split		pt+ov	Split		pt+ov
Protected Phases	2	2		1	1		3	3	3 1	4	4	4 2
Permitted Phases						1						
Actuated Green, G (s)		23.0		21.0	21.0	21.0		17.0	38.0		13.0	36.0
Effective Green, g (s)		23.0		21.0	21.0	21.0		17.0	38.0		13.0	36.0
Actuated g/C Ratio		0.26		0.23	0.23	0.23		0.19	0.42		0.14	0.40
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		1132		801	795	321		343	1103		264	633
v/s Ratio Prot		c0.10		0.17	c0.19			c0.13	0.08		c0.02	0.01
v/s Ratio Perm						0.03						
v/c Ratio		0.40		0.72	0.81	0.14		0.67	0.19		0.14	0.02
Uniform Delay, d1		27.8		31.8	32.6	27.4		33.9	16.3		33.6	16.3
Progression Factor		1.00		0.71	0.72	0.79		1.00	1.00		1.00	1.00
Incremental Delay, d2		1.1		4.3	6.7	0.7		9.9	0.4		1.1	0.1
Delay (s)		28.8		26.8	30.1	22.4		43.8	16.7		34.7	16.4
Level of Service		C		C	C	C		D	B		C	B
Approach Delay (s)		28.8			27.9			25.2			26.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	192	1148	615	56	559	1044
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.91		0.97	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	2787	4799		3367	3406
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1736	2787	4799		3367	3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	209	1248	668	61	608	1135
RTOR Reduction (vph)	0	18	12	0	0	0
Lane Group Flow (vph)	209	1230	717	0	608	1135
Confl. Peds. (#/hr)	70			70	70	
Confl. Bikes (#/hr)		16		16		
Heavy Vehicles (%)	4%	2%	6%	4%	4%	6%
Turn Type		pt+ov			Prot	
Protected Phases	2	2 3	4		3	8
Permitted Phases						
Actuated Green, G (s)	32.4	57.4	24.6		21.0	43.2
Effective Green, g (s)	32.4	57.4	24.6		21.0	43.2
Actuated g/C Ratio	0.36	0.64	0.27		0.23	0.48
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	625	1777	1312		786	1635
v/s Ratio Prot	0.12	c0.44	0.15		c0.18	c0.33
v/s Ratio Perm						
v/c Ratio	0.33	0.69	0.55		0.77	0.69
Uniform Delay, d1	21.0	10.6	27.9		32.3	18.2
Progression Factor	1.00	0.65	1.06		1.06	0.44
Incremental Delay, d2	0.5	0.4	0.2		3.2	0.8
Delay (s)	21.5	7.2	29.8		37.5	8.7
Level of Service	C	A	C		D	A
Approach Delay (s)	9.3		29.8			18.8
Approach LOS	A		C			B

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
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)	14	518	143	233	374	114	275	85	1024	40	123	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	16	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.91		0.97	0.95	1.00		1.00	0.88		1.00	1.00
Frpb, ped/bikes		0.98		1.00	1.00	0.76		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		0.97		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (prot)		4665		3433	3406	1364		1794	2612		1840	1583
Flt Permitted		1.00		0.95	1.00	1.00		0.96	1.00		0.99	1.00
Satd. Flow (perm)		4665		3433	3406	1364		1794	2612		1840	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	563	155	253	407	124	299	92	1113	43	134	226
RTOR Reduction (vph)	0	54	0	0	0	102	0	0	291	0	0	89
Lane Group Flow (vph)	0	679	0	253	407	22	0	391	822	0	177	137
Confl. Peds. (#/hr)			70	70		70	70					70
Confl. Bikes (#/hr)			16			16			16			
Heavy Vehicles (%)	2%	6%	2%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)			5						5	0		
Turn Type	Split			Split		Perm	Split		pt+ov	Split		pt+ov
Protected Phases	2	2		1	1		3	3	3 1	4	4	4 2
Permitted Phases						1						
Actuated Green, G (s)		22.0		16.0	16.0	16.0		23.0	39.0		13.0	35.0
Effective Green, g (s)		22.0		16.0	16.0	16.0		23.0	39.0		13.0	35.0
Actuated g/C Ratio		0.24		0.18	0.18	0.18		0.26	0.43		0.14	0.39
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		1140		610	606	242		458	1132		266	616
v/s Ratio Prot		c0.15		0.07	0.12			c0.22	c0.31		c0.10	0.09
v/s Ratio Perm						0.02						
v/c Ratio		0.60		0.41	0.67	0.09		0.85	0.73		0.67	0.22
Uniform Delay, d1		30.1		32.8	34.5	30.9		31.9	21.1		36.4	18.4
Progression Factor		1.00		0.64	0.66	0.56		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.3		2.0	5.6	0.7		18.0	4.1		12.4	0.8
Delay (s)		32.4		23.1	28.3	18.0		49.9	25.2		48.9	19.2
Level of Service		C		C	C	B		D	C		D	B
Approach Delay (s)		32.4			25.0			31.6			32.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Volume (vph)	188	984	1369	170	1013	518
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.88	0.91		0.97	0.95
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1736	2787	4770		3367	3406
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1736	2787	4770		3367	3406
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	204	1070	1488	185	1101	563
RTOR Reduction (vph)	0	2	17	0	0	0
Lane Group Flow (vph)	204	1068	1656	0	1101	563
Confl. Peds. (#/hr)	70			70	70	
Confl. Bikes (#/hr)		16		16		
Heavy Vehicles (%)	4%	2%	6%	4%	4%	6%
Turn Type		pt+ov			Prot	
Protected Phases	2	2 3	4		3	8
Permitted Phases						
Actuated Green, G (s)	14.0	48.9	33.1		30.9	61.6
Effective Green, g (s)	14.0	48.9	33.1		30.9	61.6
Actuated g/C Ratio	0.16	0.54	0.37		0.34	0.68
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	2.0		2.0		2.0	2.0
Lane Grp Cap (vph)	270	1514	1754		1156	2331
v/s Ratio Prot	0.12	c0.38	c0.35		c0.33	0.17
v/s Ratio Perm						
v/c Ratio	0.76	0.71	0.94		0.95	0.24
Uniform Delay, d1	36.4	15.2	27.6		28.8	5.4
Progression Factor	0.93	1.04	0.81		0.50	0.47
Incremental Delay, d2	7.7	0.5	8.7		11.4	0.2
Delay (s)	41.6	16.4	31.1		25.9	2.7
Level of Service	D	B	C		C	A
Approach Delay (s)	20.4		31.1			18.0
Approach LOS	C		C			B

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX B-3

ROADWAY LEVEL OF SERVICE CALCULATION WORKSHEETS

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	Existing					
						AM Peak Hour			PM Peak Hour		
						LOS	Volume	v/c	LOS	Volume	v/c
CMP	SR 260 (Posey/Webster Tubes) between Alameda city limits and I-880	NB	1,700	2	3,400	E	3,081	0.91	D	2,478	0.73
		SB	1,700	2	3,400	B	1,575	0.46	C	2,347	0.69
	I-880 West of I-980 / Market Street	EB	2,000	4	8,000	B	3,070	0.38	B	3,164	0.40
		WB	2,000	4	8,000	B	3,720	0.47	B	3,426	0.43
	I-880 East of Oak Street	EB	2,000	4	8,000	C	4,968	0.62	D	5,737	0.72
		WB	2,000	4	8,000	C	5,606	0.70	C	5,075	0.63
	I-980 North of 27th Street	NB	2,000	3	6,000	A	1,611	0.27	C	3,609	0.60
		SB	2,000	3	6,000	D	4,679	0.78	B	1,858	0.31
Other MTS	Broadway between 19th St. and Grand Ave.	NB	900	2	1,800	A	513	0.29	B	876	0.49
		SB	900	2	1,800	A	438	0.24	B	597	0.33
	Telegraph between 20th St. and 27th St.	NB	900	2	1,800	A	464	0.26	B	678	0.38
		SB	900	2	1,800	B	661	0.37	B	565	0.31
	Grand between San Pablo and Telegraph	EB	900	2	1,800	C	1,054	0.59	B	719	0.40
		WB	900	2	1,800	B	672	0.37	B	862	0.48
	Grand between Broadway and Harrison St.	EB	900	2	1,800	B	682	0.38	B	762	0.42
		WB	900	2	1,800	B	644	0.36	B	783	0.44
	Grand between Harrison St. and El Embarcadero	EB	900	2	1,800	B	751	0.42	E	1,700	0.94
		WB	900	2	1,800	E	1,531	0.85	C	968	0.54
	Harrison between I-580 and 27th St.	NB	900	2	1,800	C	1,189	0.66	E	1,536	0.85
		SB	900	2	1,800	C	1,041	0.58	B	686	0.38
	Harrison between 27th St. and Grand Ave.	NB	900	3	2,700	A	784	0.29	B	1,236	0.46
		SB	900	3	2,700	B	899	0.33	A	556	0.21
	Harrison between 20th St. and 14th St.	NB	900	2	1,800	A	475	0.26	B	745	0.41
		SB	900	2	1,800	A	444	0.25	A	286	0.16

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	2015					
						AM Peak Hour			PM Peak Hour		
						LOS	Volume	v/c	LOS	Volume	v/c
CMP	SR 260 (Posey/Webster Tubes) between Alameda city limits and I-880	NB	1,700	2	3,400	E	3,386	1.00	D	2,906	0.85
		SB	1,700	2	3,400	C	2,108	0.62	D	2,950	0.87
	I-880 West of I-980 / Market Street	EB	2,000	4	8,000	B	3,303	0.41	B	3,234	0.40
		WB	2,000	4	8,000	B	3,939	0.49	B	3,610	0.45
	I-880 East of Oak Street	EB	2,000	4	8,000	D	5,705	0.71	D	6,401	0.80
		WB	2,000	4	8,000	D	6,312	0.79	D	5,727	0.72
	I-980 North of 27th Street	NB	2,000	3	6,000	B	1,821	0.30	C	3,973	0.66
		SB	2,000	3	6,000	D	5,280	0.88	B	2,208	0.37
Other MTS	Broadway between 19th St. and Grand Ave.	NB	900	2	1,800	B	646	0.36	C	1,195	0.66
		SB	900	2	1,800	B	586	0.33	B	731	0.41
	Telegraph between 20th St. and 27th St.	NB	900	2	1,800	B	582	0.32	C	913	0.51
		SB	900	2	1,800	B	814	0.45	B	703	0.39
	Grand between Telegraph and San Pablo	EB	900	2	1,800	D	1,388	0.77	B	894	0.50
		WB	900	2	1,800	B	831	0.46	C	1,103	0.61
	Grand between Broadway and Harrison St.	EB	900	2	1,800	C	972	0.54	C	1,050	0.58
		WB	900	2	1,800	C	1,001	0.56	C	1,040	0.58
	Grand between Harrison St. and El Embarcadero	EB	900	2	1,800	B	843	0.47	F	2,424	1.35
		WB	900	2	1,800	E	1,579	0.88	C	1,172	0.65
	Harrison between I-580 and 27th St.	NB	900	2	1,800	D	1,511	0.84	F	2,061	1.14
		SB	900	2	1,800	D	1,462	0.81	B	861	0.48
	Harrison between 27th St. and Grand Ave.	NB	900	3	2,700	B	1,054	0.39	C	1,634	0.61
		SB	900	3	2,700	B	1,313	0.49	A	776	0.29
	Harrison between 20th St. and 14th St.	NB	900	2	1,800	B	581	0.32	C	1,057	0.59
		SB	900	2	1,800	B	618	0.34	A	360	0.20

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	2030					
						AM Peak Hour			PM Peak Hour		
						LOS	Volume	v/c	LOS	Volume	v/c
CMP	SR 260 (Posey/Webster Tubes) between Alameda city limits and I-880	NB	1,700	2	3,400	F	4,084	1.20	F	3,885	1.14
		SB	1,700	2	3,400	E	3,327	0.98	F	4,329	1.27
	I-880 West of I-980 / Market Street	EB	2,000	4	8,000	B	3,835	0.48	B	3,394	0.42
		WB	2,000	4	8,000	C	4,441	0.56	C	4,031	0.50
	I-880 East of Oak Street	EB	2,000	4	8,000	E	7,390	0.92	E	7,920	0.99
		WB	2,000	4	8,000	E	7,925	0.99	E	7,217	0.90
	I-980 North of 27th Street	NB	2,000	3	6,000	B	2,300	0.38	D	4,806	0.80
		SB	2,000	3	6,000	F	6,653	1.11	C	3,009	0.50
Other MTS	Broadway between 19th St. and Grand Ave.	NB	900	2	1,800	B	774	0.43	D	1,360	0.76
		SB	900	2	1,800	B	683	0.38	B	855	0.48
	Telegraph between 20th St. and 27th St.	NB	900	2	1,800	B	688	0.38	C	1,080	0.60
		SB	900	2	1,800	C	988	0.55	B	861	0.48
	Grand between Telegraph and San Pablo	EB	900	2	1,800	E	1,608	0.89	C	1,095	0.61
		WB	900	2	1,800	C	1,005	0.56	D	1,331	0.74
	Grand between Broadway and Harrison St.	EB	900	2	1,800	C	1,098	0.61	D	1,380	0.77
		WB	900	2	1,800	D	1,409	0.78	D	1,333	0.74
	Grand between Harrison St. and El Embarcadero	EB	900	2	1,800	C	954	0.53	F	3,132	1.74
		WB	900	2	1,800	F	1,823	1.01	D	1,473	0.82
	Harrison between I-580 and 27th St.	NB	900	2	1,800	A	0	0.00	A	-300	-0.17
		SB	900	2	1,800	E	1,516	0.84	B	900	0.50
	Harrison between 27th St. and Grand Ave.	NB	900	3	2,700	C	1,362	0.50	C	1,707	0.63
		SB	900	3	2,700	C	1,361	0.50	B	967	0.36
	Harrison between 20th St. and 14th St.	NB	900	2	1,800	B	643	0.36	D	1,375	0.76
		SB	900	2	1,800	B	742	0.41	A	399	0.22

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	Existing + Project					
						AM Peak Hour			PM Peak Hour		
						LOS	Volume	v/c	LOS	Volume	v/c
CMP	SR 260 (Posey/Webster Tubes) between Alameda city limits and I-880	NB	1,700	2	3,400	E	3,086	0.91	D	2,479	0.73
		SB	1,700	2	3,400	B	1,577	0.46	C	2,363	0.70
	I-880 West of I-980 / Market Street	EB	2,000	4	8,000	B	3,164	0.40	B	3,181	0.40
		WB	2,000	4	8,000	B	3,733	0.47	B	3,512	0.44
	I-880 East of Oak Street	EB	2,000	4	8,000	C	4,983	0.62	D	5,831	0.73
		WB	2,000	4	8,000	D	5,710	0.71	C	5,095	0.64
	I-980 North of 27th Street	NB	2,000	3	6,000	A	1,647	0.27	C	3,842	0.64
		SB	2,000	3	6,000	D	4,832	0.81	B	1,885	0.31
Other MTS	Broadway between 19th St. and Grand Ave.	NB	900	2	1,800	A	536	0.30	B	887	0.49
		SB	900	2	1,800	A	439	0.24	B	597	0.33
	Telegraph between 20th St. and 27th St.	NB	900	2	1,800	A	464	0.26	B	678	0.38
		SB	900	2	1,800	B	661	0.37	B	570	0.32
	Grand between San Pablo and Telegraph	EB	900	2	1,800	C	1,065	0.59	B	737	0.41
		WB	900	2	1,800	B	690	0.38	B	871	0.48
	Grand between Broadway and Harrison St.	EB	900	2	1,800	B	694	0.39	B	810	0.45
		WB	900	2	1,800	B	644	0.36	B	783	0.44
	Grand between Harrison St. and El Embarcadero	EB	900	2	1,800	B	751	0.42	E	1,700	0.94
		WB	900	2	1,800	E	1,531	0.85	C	968	0.54
	Harrison between I-580 and 27th St.	NB	900	2	1,800	C	1,247	0.69	F	1,808	1.00
		SB	900	2	1,800	D	1,278	0.71	B	726	0.40
	Harrison between 27th St. and Grand Ave.	NB	900	3	2,700	A	810	0.30	B	1,249	0.46
		SB	900	3	2,700	B	1,155	0.43	A	556	0.21
	Harrison between 20th St. and 14th St.	NB	900	2	1,800	A	475	0.26	B	750	0.42
		SB	900	2	1,800	A	478	0.27	A	286	0.16

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	2015 + Project					
						AM Peak Hour			PM Peak Hour		
						LOS	Volume	v/c	LOS	Volume	v/c
CMP	SR 260 (Posey/Webster Tubes) between Alameda city limits and I-880	NB	1,700	2	3,400	E	3,391	1.00	D	2,909	0.86
		SB	1,700	2	3,400	C	2,110	0.62	D	2,951	0.87
	I-880 West of I-980 / Market Street	EB	2,000	4	8,000	B	3,397	0.42	B	3,251	0.41
		WB	2,000	4	8,000	B	3,952	0.49	B	3,696	0.46
	I-880 East of Oak Street	EB	2,000	4	8,000	D	5,720	0.72	D	6,495	0.81
		WB	2,000	4	8,000	D	6,416	0.80	D	5,747	0.72
	I-980 North of 27th Street	NB	2,000	3	6,000	B	1,857	0.31	C	4,206	0.70
		SB	2,000	3	6,000	E	5,433	0.91	B	2,235	0.37
Other MTS	Broadway between 19th St. and Grand Ave.	NB	900	2	1,800	B	669	0.37	C	1,206	0.67
		SB	900	2	1,800	B	587	0.33	B	731	0.41
	Telegraph between 20th St. and 27th St.	NB	900	2	1,800	B	582	0.32	C	913	0.51
		SB	900	2	1,800	B	814	0.45	B	708	0.39
	Grand between Telegraph and San Pablo	EB	900	2	1,800	D	1,399	0.78	C	912	0.51
		WB	900	2	1,800	B	849	0.47	C	1,112	0.62
	Grand between Broadway and Harrison St.	EB	900	2	1,800	C	984	0.55	C	1,098	0.61
		WB	900	2	1,800	C	1,001	0.56	C	1,040	0.58
	Grand between Harrison St. and El Embarcadero	EB	900	2	1,800	B	843	0.47	F	2,424	1.35
		WB	900	2	1,800	E	1,579	0.88	C	1,172	0.65
	Harrison between I-580 and 27th St.	NB	900	2	1,800	E	1,569	0.87	F	2,333	1.30
		SB	900	2	1,800	E	1,699	0.94	C	901	0.50
	Harrison between 27th St. and Grand Ave.	NB	900	3	2,700	B	1,080	0.40	C	1,647	0.61
		SB	900	3	2,700	C	1,569	0.58	A	776	0.29
	Harrison between 20th St. and 14th St.	NB	900	2	1,800	B	581	0.32	C	1,062	0.59
		SB	900	2	1,800	B	652	0.36	A	360	0.20

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	2030 + Project						
						AM Peak Hour				PM Peak Hour		
						LOS	Volume	v/c	v/c Inc.	LOS	Volume	v/c
CMP	SR 260 (Posey/Webster Tubes) between Alameda city limits and I-880	NB	1,700	2	3,400	F	4,089	1.20	0.12%	F	3,888	1.14
		SB	1,700	2	3,400	E	3,329	0.98	0.06%	F	4,330	1.27
	I-880 West of I-980 / Market Street	EB	2,000	4	8,000	B	3,929	0.49	2.45%	B	3,411	0.43
		WB	2,000	4	8,000	C	4,454	0.56	0.29%	C	4,117	0.51
	I-880 East of Oak Street	EB	2,000	4	8,000	E	7,405	0.93	0.20%	F	8,014	1.00
		WB	2,000	4	8,000	F	8,029	1.00	1.31%	E	7,237	0.90
	I-980 North of 27th Street	NB	2,000	3	6,000	B	2,336	0.39	1.57%	D	5,039	0.84
		SB	2,000	3	6,000	F	6,806	1.13	2.30%	C	3,036	0.51
Other MTS	Broadway between 19th St. and Grand Ave.	NB	900	2	1,800	B	797	0.44	2.97%	D	1,371	0.76
		SB	900	2	1,800	B	684	0.38	0.15%	B	855	0.48
	Telegraph between 20th St. and 27th St.	NB	900	2	1,800	B	688	0.38	0.00%	C	1,080	0.60
		SB	900	2	1,800	C	988	0.55	0.00%	B	866	0.48
	Grand between Telegraph and San Pablo	EB	900	2	1,800	E	1,619	0.90	0.68%	C	1,113	0.62
		WB	900	2	1,800	C	1,023	0.57	1.79%	D	1,340	0.74
	Grand between Broadway and Harrison St.	EB	900	2	1,800	C	1,110	0.62	1.09%	D	1,428	0.79
		WB	900	2	1,800	D	1,409	0.78	0.00%	D	1,333	0.74
	Grand between Harrison St. and El Embarcadero	EB	900	2	1,800	C	954	0.53	0.00%	F	3,132	1.74
		WB	900	2	1,800	F	1,823	1.01	0.00%	D	1,473	0.82
	Harrison between I-580 and 27th St.	NB	900	2	1,800	A	58	0.03	#DIV/0!	A	-28	-0.02
		SB	900	2	1,800	E	1,753	0.97	15.63%	C	940	0.52
	Harrison between 27th St. and Grand Ave.	NB	900	3	2,700	C	1,388	0.51	1.91%	C	1,720	0.64
		SB	900	3	2,700	C	1,617	0.60	18.81%	B	967	0.36
	Harrison between 20th St. and 14th St.	NB	900	2	1,800	B	643	0.36	0.00%	D	1,380	0.77
		SB	900	2	1,800	B	776	0.43	4.58%	A	399	0.22

APPENDIX B-4

QUEUE CALCULATION WORKSHEETS

Existing Conditions

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	891	684	80
v/c Ratio	1.67	1.07	0.18
Control Delay	327.0	74.1	1.2
Queue Delay	0.0	0.0	0.0
Total Delay	327.0	74.1	1.2
Queue Length 50th (ft)	~130	~204	0
Queue Length 95th (ft)	#197	#275	0
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	534	642	448
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.67	1.07	0.18

Intersection Summary

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

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

Cumulative Year 2015 Baseline Conditions

Queues
1: 5th St. & Oak St.

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	1332	399	161
v/c Ratio	1.36	0.62	0.29
Control Delay	184.4	16.2	11.6
Queue Delay	0.0	0.0	0.0
Total Delay	184.4	16.2	11.6
Queue Length 50th (ft)	~172	74	45
Queue Length 95th (ft)	#249	145	m78
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	982	644	551
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.36	0.62	0.29

Intersection Summary

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

Queues
12: Jackson Street & Lakeside Drive

Cumulative 2015 Baseline AM
222 19th Street Transportation Study

Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	176	1019	562
v/c Ratio	0.25	1.24	0.69
Control Delay	11.2	138.9	15.9
Queue Delay	0.0	6.8	0.0
Total Delay	11.2	145.7	15.9
Queue Length 50th (ft)	33	~390	112
Queue Length 95th (ft)	67	#581	207
Internal Link Dist (ft)	111	295	183
Turn Bay Length (ft)			
Base Capacity (vph)	706	820	809
Starvation Cap Reductn	0	10	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.25	1.26	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Queues
1: 5th St. & Oak St.

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	1084	660	76
v/c Ratio	2.06	1.03	0.17
Control Delay	503.1	62.2	1.3
Queue Delay	0.0	0.0	0.0
Total Delay	503.1	62.2	1.3
Queue Length 50th (ft)	~174	~172	0
Queue Length 95th (ft)	#246	#354	m1
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	525	643	448
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	2.06	1.03	0.17

Intersection Summary

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

Queues
12: Jackson Street & Lakeside Drive

Cumulative 2015 Baseline PM
222 19th Street Transportation Study

Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	198	902	875
v/c Ratio	0.28	1.50	1.08
Control Delay	11.5	254.8	73.9
Queue Delay	0.0	0.0	0.0
Total Delay	11.5	254.8	73.9
Queue Length 50th (ft)	37	~385	~297
Queue Length 95th (ft)	74	#569	#486
Internal Link Dist (ft)	111	295	183
Turn Bay Length (ft)			
Base Capacity (vph)	709	600	810
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.28	1.50	1.08

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

15: 20th Street & Harrison Street

Lane Group	EBL2	EBL	NBT	SBT	SBR	SBR2	SER	SER2
Lane Group Flow (vph)	15	685	1148	439	222	98	82	28
v/c Ratio	0.13	0.49	1.43	0.70	0.31	0.12	0.52	0.08
Control Delay	34.1	20.3	227.9	39.6	19.0	8.6	41.5	10.4
Queue Delay	0.0	0.0	477.9	12.4	1.3	0.4	0.0	0.0
Total Delay	34.1	20.3	705.8	52.0	20.3	9.0	41.5	10.4
Queue Length 50th (ft)	6	76	~361	109	75	0	34	0
Queue Length 95th (ft)	24	111	#479	158	143	m30	74	19
Internal Link Dist (ft)		450	601	103				
Turn Bay Length (ft)	100	100			90	90	75	75
Base Capacity (vph)	116	1384	801	627	723	843	181	333
Starvation Cap Reductn	0	0	0	167	322	450	0	0
Spillback Cap Reductn	0	31	659	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.51	8.08	0.95	0.55	0.25	0.45	0.08

Intersection Summary

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

17: West Grand Avenue & Harrison Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	265	727	149	381	968	49	1474	1390	814
v/c Ratio	0.64	0.59	0.27	0.77	0.72	0.08	0.87	1.79	0.48
Control Delay	49.0	29.7	15.7	52.2	30.8	9.5	36.4	382.1	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	29.7	15.7	52.2	30.8	9.5	36.4	382.1	24.3
Queue Length 50th (ft)	84	201	39	120	273	4	315	~1183	136
Queue Length 95th (ft)	121	266	88	170	370	29	379	#1444	175
Internal Link Dist (ft)		526			509		546		632
Turn Bay Length (ft)	240			230					
Base Capacity (vph)	549	1225	554	549	1343	577	1702	775	1684
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.59	0.27	0.69	0.72	0.08	0.87	1.79	0.48

Intersection Summary

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

22: 27th Street & Telegraph Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	234	451	152	72	717	127	228	602	151	919
v/c Ratio	0.79	0.61	0.21	0.21	1.15	0.21	1.73	0.44	0.59	0.64
Control Delay	37.7	25.6	4.2	20.1	122.4	13.2	376.0	13.5	32.4	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	25.6	4.2	20.1	122.4	13.2	376.0	13.5	32.4	17.1
Queue Length 50th (ft)	71	193	0	25	~488	9	~186	78	63	145
Queue Length 95th (ft)	#185	307	38	m45	m#676	m39	m#298	m98	#135	211
Internal Link Dist (ft)		468			962			1466		318
Turn Bay Length (ft)				150			70		80	
Base Capacity (vph)	311	745	712	434	621	599	132	1360	254	1426
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.61	0.21	0.17	1.15	0.21	1.73	0.44	0.59	0.64

Intersection Summary

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

Cumulative Year 2030 Baseline Conditions

1: 5th St. & Oak St.

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	1616	483	193
v/c Ratio	1.65	0.75	0.35
Control Delay	313.1	22.0	11.3
Queue Delay	0.0	0.0	0.0
Total Delay	313.1	22.0	11.3
Queue Length 50th (ft)	~234	98	56
Queue Length 95th (ft)	#315	#225	m68
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	982	644	551
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.65	0.75	0.35

Intersection Summary

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

15: 20th Street & Harrison Street

Lane Group	EBL2	EBL	NBT	SBT	SBR	SBR2	SER	SER2
Lane Group Flow (vph)	111	427	696	843	379	130	21	18
v/c Ratio	0.56	0.27	0.67	1.30	0.64	0.18	0.19	0.06
Control Delay	41.5	20.7	28.2	184.9	40.2	19.0	38.2	12.7
Queue Delay	0.0	0.0	2.7	508.3	182.2	1.5	0.0	0.0
Total Delay	41.5	20.7	30.9	693.2	222.4	20.5	38.2	12.7
Queue Length 50th (ft)	54	50	158	~314	191	29	10	0
Queue Length 95th (ft)	#120	83	217	m#416	m#345	m60	31	17
Internal Link Dist (ft)		450	601	94				
Turn Bay Length (ft)	100	100			90	90	50	50
Base Capacity (vph)	203	1557	1045	646	592	710	158	312
Starvation Cap Reductn	0	0	0	300	320	432	0	0
Spillback Cap Reductn	0	15	232	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.28	0.86	2.44	1.39	0.47	0.13	0.06

Intersection Summary

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

12: Jackson Street & Lakeside Drive

Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	229	1237	684
v/c Ratio	0.33	1.51	0.85
Control Delay	12.0	254.7	24.5
Queue Delay	0.0	5.8	0.0
Total Delay	12.0	260.6	24.5
Queue Length 50th (ft)	44	~529	154
Queue Length 95th (ft)	86	#732	#339
Internal Link Dist (ft)	111	295	183
Turn Bay Length (ft)			
Base Capacity (vph)	697	820	809
Starvation Cap Reductn	0	7	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.33	1.52	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

17: West Grand Avenue & Harrison Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	128	282	110	920	907	163	1477	471	1880
v/c Ratio	0.46	0.24	0.22	1.68	0.61	0.24	3.84dl	0.58	1.43
Control Delay	48.8	25.1	25.4	341.4	25.3	6.9	117.2	5.4	224.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	25.1	25.4	341.4	25.3	6.9	117.2	5.4	224.0
Queue Length 50th (ft)	40	68	49	~443	232	15	~413	0	~593
Queue Length 95th (ft)	69	101	93	#565	312	57	#508	70	#691
Internal Link Dist (ft)		526			2242		546		632
Turn Bay Length (ft)	240			230					
Base Capacity (vph)	549	1168	489	549	1482	693	1260	812	1318
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.24	0.22	1.68	0.61	0.24	1.17	0.58	1.43

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

1: 5th St. & Oak St.

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	1305	769	89
v/c Ratio	2.49	1.20	0.20
Control Delay	690.9	122.8	1.0
Queue Delay	4.7	18.6	0.0
Total Delay	695.6	141.4	1.0
Queue Length 50th (ft)	~222	~255	0
Queue Length 95th (ft)	#298	#429	m0
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	525	643	448
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	7	22	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	2.52	1.24	0.20

Intersection Summary

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

3: 7th St. & Oak St.

Lane Group	EBT	NBT
Lane Group Flow (vph)	1818	2406
v/c Ratio	0.71	1.93dr
Control Delay	9.5	158.1
Queue Delay	0.0	25.5
Total Delay	9.5	183.5
Queue Length 50th (ft)	92	~323
Queue Length 95th (ft)	m94	m#403
Internal Link Dist (ft)	276	196
Turn Bay Length (ft)		
Base Capacity (vph)	2550	1857
Starvation Cap Reductn	0	78
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.71	1.35

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

6: 14th Street & Lakeside Dr.

Lane Group	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	1355	562	345	1067	53
v/c Ratio	1.60	0.53	0.66	0.58	0.07
Control Delay	299.4	19.7	18.5	11.0	6.9
Queue Delay	0.0	0.0	0.0	3.5	0.0
Total Delay	299.4	19.7	18.5	14.5	6.9
Queue Length 50th (ft)	~382	87	66	124	8
Queue Length 95th (ft)	#499	131	148	174	22
Internal Link Dist (ft)	299	570		197	
Turn Bay Length (ft)					
Base Capacity (vph)	845	1062	525	1852	812
Starvation Cap Reductn	0	0	0	670	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.60	0.53	0.66	0.90	0.07

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

12: Jackson Street & Lakeside Drive

Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	301	1115	1106
v/c Ratio	0.43	2.50	1.37
Control Delay	13.4	698.3	191.6
Queue Delay	0.0	0.0	0.0
Total Delay	13.4	698.3	191.6
Queue Length 50th (ft)	61	~571	~450
Queue Length 95th (ft)	114	#768	#654
Internal Link Dist (ft)	111	295	183
Turn Bay Length (ft)			
Base Capacity (vph)	693	446	810
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.43	2.50	1.37

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL2	EBL	NBT	SBT	SBR	SBR2	SER	SER2
Lane Group Flow (vph)	14	714	1494	475	220	128	83	129
v/c Ratio	0.12	0.52	1.87	0.75	0.30	0.15	0.52	0.31
Control Delay	33.9	21.5	419.9	41.3	18.9	8.4	41.7	7.4
Queue Delay	0.0	0.1	281.1	37.7	1.8	0.5	0.0	0.0
Total Delay	33.9	21.5	701.0	79.1	20.7	8.9	41.7	7.4
Queue Length 50th (ft)	6	84	~528	119	74	0	34	0
Queue Length 95th (ft)	22	120	#654	m#162	m126	m32	75	40
Internal Link Dist (ft)		450	601	103				
Turn Bay Length (ft)	100	100			90	90	50	50
Base Capacity (vph)	116	1372	798	631	722	857	181	414
Starvation Cap Reductn	0	0	0	182	354	455	0	0
Spillback Cap Reductn	0	76	745	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.55	28.19	1.06	0.60	0.32	0.46	0.31

Intersection Summary

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

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1709	963	563	928	529
v/c Ratio	1.44	1.15	0.21	0.76	0.70
Control Delay	221.7	107.2	7.1	14.9	7.8
Queue Delay	476.2	0.0	0.0	42.3	0.0
Total Delay	697.9	107.2	7.1	57.2	7.8
Queue Length 50th (ft)	~388	~257	37	82	0
Queue Length 95th (ft)	m#238	#367	53	153	86
Internal Link Dist (ft)	103		400	511	
Turn Bay Length (ft)					
Base Capacity (vph)	1188	839	2681	1217	759
Starvation Cap Reductn	517	0	0	0	0
Spillback Cap Reductn	0	0	110	359	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	2.55	1.15	0.22	1.08	0.70

Intersection Summary

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

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	426	891	183	445	1183	60	1384	1867	1017
v/c Ratio	0.82	0.75	0.35	0.85	0.96	0.12	0.82	2.44	0.60
Control Delay	55.2	34.3	21.8	56.9	50.1	19.7	34.0	669.5	25.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.2	34.3	21.8	56.9	50.1	19.7	34.0	669.5	25.5
Queue Length 50th (ft)	136	265	67	142	390	21	290	~1846	175
Queue Length 95th (ft)	#201	340	127	#215	#539	50	350	#2114	221
Internal Link Dist (ft)		526			509		546		632
Turn Bay Length (ft)	240			230					
Base Capacity (vph)	549	1191	525	549	1236	516	1688	765	1685
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.75	0.35	0.81	0.96	0.12	0.82	2.44	0.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	278	536	180	85	798	151	259	737	185	1125
v/c Ratio	0.90	0.73	0.25	0.30	1.32	0.26	2.98	0.54	0.94	0.79
Control Delay	51.7	30.4	4.2	20.8	186.3	16.9	931.0	14.2	79.5	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	30.4	4.2	20.8	186.3	16.9	931.0	14.2	79.5	22.0
Queue Length 50th (ft)	96	246	0	29	~582	21	~249	96	93	212
Queue Length 95th (ft)	#245	#428	41	m48	m#702	m54	m#357	m114	#225	296
Internal Link Dist (ft)		468			962			1466		318
Turn Bay Length (ft)				150			70		80	
Base Capacity (vph)	312	738	724	368	605	575	87	1360	197	1426
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.73	0.25	0.23	1.32	0.26	2.98	0.54	0.94	0.79

Intersection Summary

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

Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1224	188	58	897	89	444	689	158	677
v/c Ratio	1.24	0.23	0.57	0.53	0.11	1.85	0.47	0.67	0.46
Control Delay	137.0	3.1	42.2	15.3	3.2	419.5	16.2	34.9	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	137.0	3.1	42.2	15.3	3.2	419.5	16.2	34.9	14.8
Queue Length 50th (ft)	~378	3	19	146	0	~320	111	57	99
Queue Length 95th (ft)	#501	34	#80	198	22	#391	157	#151	144
Internal Link Dist (ft)	263			696			2023		423
Turn Bay Length (ft)		140	240			200		100	
Base Capacity (vph)	991	815	101	1680	782	240	1459	236	1463
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.24	0.23	0.57	0.53	0.11	1.85	0.47	0.67	0.46

Intersection Summary

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

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

Existing plus Project Conditions

Existing Plus Project 95th Percentile Queues

No.	Intersection	Lane Group		Existing Conditions Storage Cap. (ft)	Existing Conditions Queue Length (ft)	Existing plus Project Conditions Storage Cap. (ft)	Existing plus Project Conditions Queue Length (ft)
PM Peak Hour							
1	Oak Street/ 5th Street/ I-880 SB On-Ramp	NB	TR	100	**275**	100	**275**
		SB	LT	200	-	200	-
		EB	LTR	300	200	300	275

Bold indicates exceedance of storage capacity.
All storage capacities and queue lengths rounded to the nearest 25 feet.
Source: AECOM, 2009.

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	913	684	80
v/c Ratio	1.71	1.07	0.18
Control Delay	346.7	74.1	1.2
Queue Delay	0.0	0.0	0.0
Total Delay	346.7	74.1	1.2
Queue Length 50th (ft)	~135	~204	0
Queue Length 95th (ft)	#202	#275	0
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	533	642	448
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.71	1.07	0.18

Intersection Summary

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

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

Cumulative Year 2015 Baseline plus Project Conditions

Cumulative Year 2015 Baseline Plus Project 95th Percentile Queues

No.	Intersection	Lane Group		Cumulative 2015 Baseline Conditions Storage Cap. (ft)	Cumulative 2015 Baseline Conditions Queue Length (ft)	Cumulative 2015 plus Project Conditions Storage Cap. (ft)	Cumulative 2015 plus Project Conditions Queue Length (ft)
AM Peak Hour							
1	Oak Street/ 5th Street/ I-880 SB On-Ramp	NB	TR	100	**150**	100	**150**
		SB	LT	200	100	200	100
		EB	LTR	300	250	300	275
12	Jackson Street/ Lakeside Drive[a]	NB	LT	225	**600**	225	**600**
		SB	TR	550	225	550	250
		EB	LR	125	125	125	75
PM Peak Hour							
1	Oak Street/ 5th Street/ I-880 SB On-Ramp	NB	TR	100	**375**	100	**375**
		SB	LT	200	25	200	25
		EB	LTR	300	250	300	275
12	Jackson Street/ Lakeside Drive[a]	NB	LT	225	**575**	225	**575**
		SB	TR	550	500	550	550
		EB	LR	125	75	125	75
15	Harrison Street/ 20th Street/Kaiser Center Access Road[a]	NB	LTR	575	500	575	500
		SB	T	575	175	575	175
			R1	575	150	575	150
			R2	125	50	125	50
		SE	LT	150	75	150	75
			R	50	25	50	25
		EB	L2	100	25	100	25
			TR	375	125	375	125
17	Harrison Street/ Grand Avenue	NB	T	500	400	500	400
			R	525	**1,450**	525	**1,475**
		SB	TR	125	**175**	125	**175**
		EB	L	250	125	250	125
			T	450	275	450	275
			R	100	100	100	**150**
		WB	L	225	175	225	175
			T	425	375	425	375
			R	100	50	100	50
22	Telegraph Avenue/ 27th Street[a]	NB	L	100	**300**	100	**300**
			TR	175	100	175	100
		SB	L	75	**150**	75	**150**
			TR	150	**225**	150	**225**
		EB	L	150	**200**	150	**200**
			T	475	325	475	325
			R	475	50	475	50
		WB	L	150	50	150	50
			T	1,000	700	1,000	700
			R	1,000	50	1,000	50

Bold indicates exceedance of storage capacity.
All storage capacities and queue lengths rounded to the nearest 25 feet.
[a] Cumulative Year 2015 Baseline Conditions assumes implementation of planned and funded intersection geometry changes.
Source: AECOM, 2009.

Queues
1: 5th St. & Oak St.

	→	↑	↓
Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	1362	399	161
v/c Ratio	1.39	0.62	0.29
Control Delay	199.2	16.2	11.5
Queue Delay	0.0	0.0	0.0
Total Delay	199.2	16.2	11.5
Queue Length 50th (ft)	~179	74	45
Queue Length 95th (ft)	#256	145	m77
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	980	644	551
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.39	0.62	0.29

Intersection Summary

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

Queues
12: Jackson Street & Lakeside Drive

	↗	↑	↓
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	176	1019	580
v/c Ratio	0.25	1.24	0.72
Control Delay	11.2	138.9	16.8
Queue Delay	0.0	6.8	0.0
Total Delay	11.2	145.7	16.8
Queue Length 50th (ft)	33	~390	116
Queue Length 95th (ft)	67	#581	#226
Internal Link Dist (ft)	111	295	183
Turn Bay Length (ft)			
Base Capacity (vph)	706	820	810
Starvation Cap Reductn	0	10	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.25	1.26	0.72

Intersection Summary

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

Queues
1: 5th St. & Oak St.

	→	↑	↓
Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	1106	660	76
v/c Ratio	2.11	1.03	0.17
Control Delay	523.5	62.2	1.3
Queue Delay	0.0	0.0	0.0
Total Delay	523.5	62.2	1.3
Queue Length 50th (ft)	~179	~172	0
Queue Length 95th (ft)	#251	#354	m1
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	524	643	448
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	2.11	1.03	0.17

Intersection Summary

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

Queues
12: Jackson Street & Lakeside Drive

	↗	↑	↓
Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	198	902	946
v/c Ratio	0.28	1.50	1.17
Control Delay	11.5	254.8	107.8
Queue Delay	0.0	0.0	0.0
Total Delay	11.5	254.8	107.8
Queue Length 50th (ft)	37	~385	~342
Queue Length 95th (ft)	74	#569	#537
Internal Link Dist (ft)	111	295	183
Turn Bay Length (ft)			
Base Capacity (vph)	709	600	809
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.28	1.50	1.17

Intersection Summary

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

Queues
15: 20th Street & Harrison Street

Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

Lane Group	EBL2	EBL	NBT	SBT	SBR	SBR2	SER	SER2
Lane Group Flow (vph)	15	716	1154	439	222	98	82	28
v/c Ratio	0.13	0.52	1.44	0.70	0.31	0.12	0.52	0.08
Control Delay	34.1	20.4	231.2	39.6	19.0	8.6	41.5	10.4
Queue Delay	0.0	0.0	474.5	12.4	1.3	0.4	0.0	0.0
Total Delay	34.1	20.4	705.7	52.0	20.3	9.0	41.5	10.4
Queue Length 50th (ft)	6	80	~363	109	75	0	34	0
Queue Length 95th (ft)	24	115	#482	158	143	m30	74	19
Internal Link Dist (ft)		450	601	103				
Turn Bay Length (ft)	100	100			90	90	75	75
Base Capacity (vph)	116	1388	801	627	723	843	181	333
Starvation Cap Reductn	0	0	0	167	322	450	0	0
Spillback Cap Reductn	0	34	672	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.53	8.95	0.95	0.55	0.25	0.45	0.08

Intersection Summary

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

Queues
17: West Grand Avenue & Harrison Street

Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	265	727	201	393	968	49	1488	1397	814
v/c Ratio	0.64	0.60	0.37	0.78	0.72	0.08	0.87	1.80	0.48
Control Delay	49.0	29.9	19.5	52.8	30.8	9.5	36.9	386.1	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	29.9	19.5	52.8	30.8	9.5	36.9	386.1	24.3
Queue Length 50th (ft)	84	203	65	124	273	4	320	~1192	136
Queue Length 95th (ft)	121	266	128	175	370	29	385	#1454	175
Internal Link Dist (ft)		526			509		546		632
Turn Bay Length (ft)	240			230					
Base Capacity (vph)	549	1217	550	549	1343	577	1702	775	1683
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.60	0.37	0.72	0.72	0.08	0.87	1.80	0.48

Intersection Summary

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

Queues
22: 27th Street & Telegraph Avenue

Cumulative 2015 Baseline plus Project PM
222 19th Street Transportation Study

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	234	451	152	72	732	127	228	604	151	924
v/c Ratio	0.79	0.61	0.21	0.21	1.18	0.21	1.75	0.44	0.60	0.65
Control Delay	37.7	25.6	4.2	20.2	131.6	13.7	387.8	13.5	32.5	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	25.6	4.2	20.2	131.6	13.7	387.8	13.5	32.5	17.3
Queue Length 50th (ft)	71	193	0	25	~504	10	~187	78	63	147
Queue Length 95th (ft)	#185	307	38	m46	m#692	m41	m#299	m98	#136	212
Internal Link Dist (ft)		468			962			1466		318
Turn Bay Length (ft)				150			70		80	
Base Capacity (vph)	311	745	712	434	621	597	130	1360	253	1426
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.61	0.21	0.17	1.18	0.21	1.75	0.44	0.60	0.65

Intersection Summary

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

Cumulative Year 2030 Baseline plus Project Conditions

Cumulative Year 2030 Baseline plus Project 95th Percentile Queues

No.	Intersection	Lane Group		Cumulative 2030 Baseline Conditions Storage Cap. (ft)	Cumulative 2030 Baseline Conditions Queue Length (ft)	Cumulative 2030 plus Project Conditions Storage Cap. (ft)	Cumulative 2030 plus Project Conditions Queue Length (ft)
AM Peak Hour							
1	Oak Street/ 5th Street/ I-880 SB On-Ramp	NB	TR	100	**225**	100	**225**
		SB	LT	200	75	200	75
		EB	LTR	300	**325**	300	**325**
12	Jackson Street/ Lakeside Drive[a]	NB	LT	225	**750**	225	**750**
		SB	TR	550	350	550	375
		EB	L	125	100	125	100
17	Harrison Street/ Grand Avenue	NB	T	500	**525**	500	**525**
			R	525	75	525	75
		SB	TR	125	**700**	125	**700**
		EB	L	250	75	250	75
			T	450	125	450	125
			R	100	100	100	**125**
		WB	L	225	**575**	225	**575**
			T	425	325	425	325
			R	100	75	100	75
PM Peak Hour							
1	Oak Street/ 5th Street/ I-880 SB On-Ramp	NB	TR	100	**450**	100	**450**
		SB	LT	200	-	200	-
		EB	LTR	300	300	300	**325**
3	Oak Street/ 7th Street	NB	TR	200	**425**	200	**425**
		EB	LT	300	100	300	100
6	Oak Street/ 14th Street	NB	LT	175	175	175	**200**
			R	175	25	175	25
		EB	LT	300	**500**	300	**500**
		WB	LT	700	150	700	150
			R	175	150	175	**175**
12	Jackson Street/ Lakeside Drive[a]	NB	TL	225	**775**	225	**775**
		SB	TR	550	**675**	550	**725**
		EB	LR	125	125	125	125
15	Harrison Street/ 20th Street/ Kaiser Center Access Road[a]	NB	LTR	575	**675**	575	**675**
		SB	T	575	225	575	225
			R1	575	200	575	200
			R2	125	50	125	50
		SE	LT	150	75	150	75
			R	50	50	50	50
		EB	L2	100	25	100	25
			TR	375	150	375	150
16	Harrison Street/ Lakeside Drive	NB	L	375	175	375	175
			R	375	100	375	100
		EB	T	225	**250**	225	**250**
		WB	L	250	**375**	250	**400**
			T	500	75	500	75
17	Harrison Street/	NB	T	500	350	500	375

No.	Intersection	Lane Group		Cumulative 2030 Baseline Conditions Storage Cap. (ft)	Cumulative 2030 Baseline Conditions Queue Length (ft)	Cumulative 2030 plus Project Conditions Storage Cap. (ft)	Cumulative 2030 plus Project Conditions Queue Length (ft)
	Grand Avenue		R	525	**>1,500**	525	**>1,500**
		SB	TR	125	**225**	125	**225**
		EB	L	250	225	250	225
			T	450	350	450	350
			R	100	**150**	100	**175**
		WB	L	225	225	225	225
			T	425	**550**	425	**550**
			R	100	50	100	50
22	Telegraph Avenue/ 27th Street[a]	NB	L	100	**375**	100	**375**
			TR	175	125	175	125
		SB	L	75	**225**	75	**225**
			TR	150	300	150	300
		EB	L	150	**250**	150	**250**
			T	475	450	475	450
			R	475	50	475	50
		WB	L	150	50	150	50
			T	1,000	725	1,000	725
			R	1,000	75	1,000	75
26	San Pablo Avenue/ West Grand Avenue	NB	L	125	**400**	125	**400**
			TR	325	175	325	175
		SB	L	125	**175**	125	**175**
			TR	275	150	275	150
		EB	T	500	**525**	500	**525**
			R	125	50	125	50
		WB	L	100	100	100	100
			T	250	200	250	225
			R	125	25	125	25

Bold indicates exceedance of storage capacity.
All storage capacities and queue lengths rounded to the nearest 25 feet.
[a] Cumulative Year 2030 Baseline Conditions assumes implementation of planned and funded intersection geometry changes.
Source: AECOM, 2009.

Queues
1: 5th St. & Oak St.

Cumulative 2030 Baseline plus Project AM
222 19th Street Transportation Study

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	1646	483	193
v/c Ratio	1.68	0.75	0.35
Control Delay	328.3	22.0	11.3
Queue Delay	0.0	0.0	0.0
Total Delay	328.3	22.0	11.3
Queue Length 50th (ft)	~241	98	56
Queue Length 95th (ft)	#323	#225	m67
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	980	644	551
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	1.68	0.75	0.35

Intersection Summary

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

Queues
12: Jackson Street & Lakeside Drive

Cumulative 2030 Baseline plus Project AM
222 19th Street Transportation Study

Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	229	1237	702
v/c Ratio	0.33	1.51	0.87
Control Delay	12.0	254.7	26.3
Queue Delay	0.0	5.8	0.0
Total Delay	12.0	260.6	26.3
Queue Length 50th (ft)	44	~529	160
Queue Length 95th (ft)	86	#732	#352
Internal Link Dist (ft)	111	295	183
Turn Bay Length (ft)			
Base Capacity (vph)	697	820	810
Starvation Cap Reductn	0	7	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.33	1.52	0.87

Intersection Summary

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

Queues
17: West Grand Avenue & Harrison Street

Cumulative 2030 Baseline plus Project AM
222 19th Street Transportation Study

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	128	282	123	923	907	163	1505	484	1880
v/c Ratio	0.46	0.24	0.25	1.68	0.61	0.24	3.84dl	0.59	1.44
Control Delay	48.8	25.1	25.8	343.8	25.3	6.9	127.0	5.5	228.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	25.1	25.8	343.8	25.3	6.9	127.0	5.5	228.3
Queue Length 50th (ft)	40	68	56	~445	232	15	~428	0	~595
Queue Length 95th (ft)	69	101	102	#568	312	57	#523	71	#694
Internal Link Dist (ft)		526			2242		546		632
Turn Bay Length (ft)	240			230					
Base Capacity (vph)	549	1168	489	549	1482	693	1258	821	1309
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.24	0.25	1.68	0.61	0.24	1.20	0.59	1.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Queues
1: 5th St. & Oak St.

Cumulative 2030 Baseline plus Project PM
222 19th Street Transportation Study

Lane Group	EBT	NBT	SBT
Lane Group Flow (vph)	1327	769	89
v/c Ratio	2.53	1.20	0.20
Control Delay	709.0	122.8	1.0
Queue Delay	0.0	21.2	0.0
Total Delay	709.0	144.0	1.0
Queue Length 50th (ft)	~227	~255	0
Queue Length 95th (ft)	#304	#429	m0
Internal Link Dist (ft)	310	104	207
Turn Bay Length (ft)			
Base Capacity (vph)	525	643	448
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	7	25	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	2.56	1.24	0.20

Intersection Summary

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

Lane Group	EBT	NBT
Lane Group Flow (vph)	1818	2441
v/c Ratio	0.71	1.93dr
Control Delay	9.5	165.4
Queue Delay	0.0	25.4
Total Delay	9.5	190.9
Queue Length 50th (ft)	92	~330
Queue Length 95th (ft)	m94	m#411
Internal Link Dist (ft)	276	196
Turn Bay Length (ft)		
Base Capacity (vph)	2549	1860
Starvation Cap Reductn	0	77
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.71	1.37

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Lane Group	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	1355	562	345	1102	53
v/c Ratio	1.60	0.53	0.67	0.60	0.07
Control Delay	299.4	19.7	19.7	11.3	6.9
Queue Delay	0.0	0.0	0.0	4.4	0.0
Total Delay	299.4	19.7	19.7	15.6	6.9
Queue Length 50th (ft)	~382	87	70	130	8
Queue Length 95th (ft)	#499	131	#157	183	22
Internal Link Dist (ft)	299	570		197	
Turn Bay Length (ft)					
Base Capacity (vph)	845	1062	517	1852	812
Starvation Cap Reductn	0	0	0	659	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.60	0.53	0.67	0.92	0.07

Intersection Summary

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

Lane Group	EBL	NBT	SBT
Lane Group Flow (vph)	301	1115	1176
v/c Ratio	0.43	2.50	1.45
Control Delay	13.4	698.3	230.2
Queue Delay	0.0	0.0	0.0
Total Delay	13.4	698.3	230.2
Queue Length 50th (ft)	61	~571	~495
Queue Length 95th (ft)	114	#768	#704
Internal Link Dist (ft)	111	295	183
Turn Bay Length (ft)			
Base Capacity (vph)	693	446	809
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.43	2.50	1.45

Intersection Summary

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

Lane Group	EBL2	EBL	NBT	SBT	SBR	SBR2	SER	SER2
Lane Group Flow (vph)	14	745	1500	475	220	128	83	129
v/c Ratio	0.12	0.54	1.88	0.75	0.30	0.15	0.52	0.31
Control Delay	33.9	21.6	423.2	41.3	18.9	8.4	41.7	7.4
Queue Delay	0.0	0.1	277.7	37.7	1.8	0.5	0.0	0.0
Total Delay	33.9	21.7	700.9	79.1	20.7	8.9	41.7	7.4
Queue Length 50th (ft)	6	88	~531	119	74	0	34	0
Queue Length 95th (ft)	22	125	#657	m#162	m126	m32	75	40
Internal Link Dist (ft)		450	601	103				
Turn Bay Length (ft)	100	100			90	90	50	50
Base Capacity (vph)	116	1375	798	631	722	857	181	414
Starvation Cap Reductn	0	0	0	182	354	455	0	0
Spillback Cap Reductn	0	111	755	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.59	34.88	1.06	0.60	0.32	0.46	0.31

Intersection Summary

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

16: Harrison Street & Lakeside Drive

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	1729	1023	563	928	529
v/c Ratio	1.46	1.22	0.21	0.76	0.70
Control Delay	229.8	135.9	7.1	14.9	7.8
Queue Delay	468.1	0.0	0.0	42.3	0.0
Total Delay	697.9	135.9	7.1	57.2	7.8
Queue Length 50th (ft)	~395	~285	37	82	0
Queue Length 95th (ft)	m#246	#397	53	153	86
Internal Link Dist (ft)	103		400	511	
Turn Bay Length (ft)					
Base Capacity (vph)	1187	839	2681	1217	759
Starvation Cap Reductn	515	0	0	0	0
Spillback Cap Reductn	0	0	110	359	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	2.57	1.22	0.22	1.08	0.70

Intersection Summary

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

17: West Grand Avenue & Harrison Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	426	891	235	457	1183	60	1398	1874	1017
v/c Ratio	0.82	0.75	0.45	0.86	0.96	0.12	0.83	2.45	0.60
Control Delay	55.2	34.5	25.0	58.2	50.1	19.7	34.4	673.5	25.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.2	34.5	25.0	58.2	50.1	19.7	34.4	673.5	25.5
Queue Length 50th (ft)	136	265	97	146	390	21	293	~1855	175
Queue Length 95th (ft)	#201	340	168	#224	#539	50	355	#2123	221
Internal Link Dist (ft)		526			509		546		632
Turn Bay Length (ft)	240			230					
Base Capacity (vph)	549	1186	523	549	1236	516	1688	765	1685
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.75	0.45	0.83	0.96	0.12	0.83	2.45	0.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

22: 27th Street & Telegraph Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	278	536	180	85	798	151	259	739	185	1131
v/c Ratio	0.90	0.73	0.25	0.30	1.32	0.26	2.98	0.54	0.94	0.79
Control Delay	51.7	30.4	4.2	21.0	186.4	17.3	931.0	14.2	80.7	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	30.4	4.2	21.0	186.4	17.3	931.0	14.2	80.7	22.3
Queue Length 50th (ft)	96	246	0	29	~582	21	~248	96	93	215
Queue Length 95th (ft)	#245	#428	41	m48	m#702	m55	m#357	m114	#225	299
Internal Link Dist (ft)		468			962			1466		318
Turn Bay Length (ft)				150			70		80	
Base Capacity (vph)	312	738	724	368	605	574	87	1360	196	1425
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.73	0.25	0.23	1.32	0.26	2.98	0.54	0.94	0.79

Intersection Summary

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

26: West Grand Avenue & San Pablo Avenue

Lane Group	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1244	188	58	907	89	444	689	158	677
v/c Ratio	1.26	0.23	0.59	0.54	0.11	1.85	0.47	0.67	0.46
Control Delay	146.7	3.3	43.8	15.4	3.2	419.5	16.2	34.9	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	146.7	3.3	43.8	15.4	3.2	419.5	16.2	34.9	14.9
Queue Length 50th (ft)	~389	4	19	148	0	~320	111	57	100
Queue Length 95th (ft)	#512	35	#81	201	22	#391	157	#151	145
Internal Link Dist (ft)	263			696			2023		423
Turn Bay Length (ft)		140	240			200		100	
Base Capacity (vph)	989	813	99	1680	782	240	1459	236	1461
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.26	0.23	0.59	0.54	0.11	1.85	0.47	0.67	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX B-5

COLLISION SUMMARY WORKSHEETS

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Oak Street / 5th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1757723	11/25/04	00:09	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2074443	5/31/05	12:00	0	In Int.	Not Stated	Other Motor Vehicle	East	Making Left Turn	East	Proceeding Straight	Unknown	0	0
2086245	6/18/05	21:30	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2211417	9/3/05	14:00	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2241221	9/10/05	09:30	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2342208	10/18/05	09:00	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2348279	11/11/05	18:30	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2484635	1/30/06	14:02	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2660495	5/13/06	14:15	0	In Int.	Sideswipe	Other Motor Vehicle	East	Making Left Turn	East	Proceeding Straight	Improper Turning	1	0
2671937	6/10/06	15:28	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	1	0
2687233	6/21/06	13:18	0	In Int.	Broadside	Other Motor Vehicle	East	Making Left Turn	East	Proceeding Straight	Improper Turning	0	0
2871796	10/23/06	09:14	0	In Int.	Sideswipe	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2942459	12/1/06	12:40	0	In Int.	Hit Object	Fixed Object	South	Proceeding Straight			Other Hazardous Movement	0	0

City of Oakland

Transportation Services Division

Traffic Collision History Report

Location: Oak Street / 5th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 13

Settings Used For Query

Parameter	Setting
Street Name	Oak Street
Cross Street	5th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Oak Street / Route 880 Wb Offramp
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2409483	1/8/06	16:13	0	In Int.	Sideswipe	Other Motor Vehicle	North	Making Right Turn	North	Making Right Turn	Improper Turning	0	0
2513696	3/8/06	15:55	0	In Int.	Sideswipe	Other Motor Vehicle	West	Making Right Turn	West	Making Right Turn	Other Hazardous Movement	0	0
2674224	5/27/06	23:25	0	In Int.	Rear-End	Other Motor Vehicle	North	Proceeding Straight	West	Entering Traffic	Traffic Signals and Signs	0	0
2871807	10/31/06	19:00	0	In Int.	Broadside	Not Stated	West	Proceeding Straight	North	Proceeding Straight	Unsafe Speed	0	0
3331298	8/17/07	10:45	0	In Int.	Sideswipe	Other Motor Vehicle	North	Making Right Turn	North	Making Right Turn	Unknown	0	0

Location: Oak Street / Route 880 Wb Offramp

Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 5

Settings Used For Query

Parameter	Setting
Street Name	Oak Street
Cross Street	Route 880 Wb Offramp
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Oak Street / 7th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1821655	12/29/04	15:55	0	In Int.	Not Stated	Not Stated	East	Making Left Turn	East	Proceeding Straight	Improper Turning	1	0
2122698	7/1/05	23:20	20	South	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Stopped in Road	Unsafe Speed	1	0
2225794	9/2/05	13:10	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2438546	10/15/05	14:45	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	1	0
2494133	2/22/06	10:42	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2660526	5/15/06	06:00	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2822896	10/3/06	04:50	0	In Int.	Broadside	Motor Vehicle on Other	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	1	0
3002151	1/20/07	10:05	0	In Int.	Sideswipe	Other Motor Vehicle	Not Stated	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0

City of Oakland

Transportation Services Division

Traffic Collision History Report

Location: Oak Street / 7th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 8

Settings Used For Query

Parameter	Setting
Street Name	Oak Street
Cross Street	7th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Oak Street / 11th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1735090	11/11/04	23:00	0	In Int.	Sideswipe	Fixed Object	East	Proceeding Straight			Improper Turning	0	0

Total Number of Collisions: 1

Settings Used For Query

Parameter	Setting
Street Name	Oak Street
Cross Street	11th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Oak Street / 14th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2005149	5/8/05	01:10	0	In Int.	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Stopped in Road	Unsafe Speed	0	0
2070731	6/6/05	14:22	0	In Int.	Broadside	Other Motor Vehicle	West	Making Left Turn	East	Proceeding Straight	Other Hazardous Movement	1	0
2329313	11/5/05	17:21	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2537563	3/19/06	22:25	86	West	Rear-End	Parked Motor Vehicle	East	Proceeding Straight	East	Parked	Improper Turning	0	0
2830483	10/8/06	09:40	0	In Int.	Broadside	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	2	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Oak Street / 14th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 5

Settings Used For Query

Parameter	Setting
Street Name	Oak Street
Cross Street	14th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Madison Street / 7th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1703391	10/29/04	18:25	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2121534	6/23/05	18:09	45	West	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Stopped in Road	Unsafe Speed	1	0
2205406	8/28/05	04:03	15	South	Rear-End	Parked Motor Vehicle	South	Proceeding Straight	South	Parked	Improper Turning	0	0
2265787	10/9/05	11:40	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2359984	11/25/05	10:00	0	In Int.	Sideswipe	Other Motor Vehicle	East	Merging	East	Proceeding Straight	Unsafe Speed	0	0
2511822	2/18/06	20:13	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2511801	2/21/06	16:45	0	In Int.	Sideswipe	Other Motor Vehicle	South	Making Left Turn	South	Proceeding Straight	Improper Turning	0	0
2544572	3/22/06	01:14	0	In Int.	Rear-End	Other Motor Vehicle	South	Proceeding Straight	South	Stopped in Road	Unsafe Speed	0	0
2703719	6/25/06	11:29	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2985892	1/13/07	14:26	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
3042915	2/3/07	12:53	0	In Int.	Sideswipe	Other Motor Vehicle	East	Changing Lanes	East	Proceeding Straight	Unsafe Lane Change	0	0
3260257	7/7/07	07:40	30	South	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	South	Proceeding Straight	Improper Turning	0	0
3388414	9/22/07	15:49	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	4	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Madison Street / 7th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 13

Settings Used For Query

Parameter	Setting
Street Name	Madison Street
Cross Street	7th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008
Page 1

Location: Madison Street / 11th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2515430	2/26/06	18:41	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2817432	10/2/06	18:45	0	In Int.	Broadside	Other Motor Vehicle	East	Making Left Turn	South	Proceeding Straight	Improper Turning	0	0
2871787	10/30/06	19:53	0	In Int.	Broadside	Motor Vehicle on Other	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0

Total Number of Collisions: 3

Settings Used For Query

Parameter	Setting
Street Name	Madison Street
Cross Street	11th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Madison Street / 12th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2059421	5/27/05	11:40	0	In Int.	Broadside	Motor Vehicle on Other	South	Proceeding Straight	West	Making Left Turn	Traffic Signals and Signs	0	0
2057934	5/31/05	08:15	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	2	0
2870504	10/28/06	02:11	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Making Left Turn	Traffic Signals and Signs	1	0
3020396	1/24/07	13:48	20	South	Sideswipe	Parked Motor Vehicle	South	Making Left Turn	South	Parked	Improper Turning	0	0
3056498	2/23/07	12:43	0	In Int.	Vehicle - Pedestrian	Pedestrian	West	Making Left Turn	North	Not Stated	Ped R/W Violation	1	0
3330321	8/23/07	19:00	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0

City of Oakland

Transportation Services Division

Traffic Collision History Report

Location: Madison Street / 12th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 6

Settings Used For Query

Parameter	Setting
Street Name	Madison Street
Cross Street	12th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Madison Street / 14th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1993668	4/21/05	09:00	0	In Int.	Hit Object	Fixed Object	South	Ran Off Road			Other Than Driver or Ped	1	0
2074444	6/4/05	08:32	0	In Int.	Sideswipe	Other Motor Vehicle	East	Making Left Turn	East	Making Left Turn	Improper Turning	0	0
2245931	9/23/05	02:15	30	East	Head-On	Fixed Object	West	Ran Off Road			Improper Turning	0	0
2337956	10/31/05		0	In Int.	Not Stated	Other Motor Vehicle	South	Making Left Turn	South	Making Left Turn	Unsafe Lane Change	0	0
2308195	10/31/05		0	In Int.	Sideswipe	Parked Motor Vehicle	East	Proceeding Straight	East	Parked	Unsafe Speed	0	0
2360042	11/27/05	15:30	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	South	Making Left Turn	Other Hazardous Movement	0	0
2632338	5/17/06	13:55	39	East	Sideswipe	Parked Motor Vehicle	West	Proceeding Straight	West	Merging	Improper Turning	0	0
3056526	2/21/07	11:30	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	South	Making Left Turn	Other Hazardous Movement	0	0
3095061	3/22/07	17:15	15	East	Rear-End	Other Motor Vehicle	East	Slowing/Stoppi ng	East	Slowing/Stoppi ng	Unsafe Speed	0	0
3346832	8/25/07	11:29	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	South	Making Right Turn	Improper Turning	0	0
3377718	9/10/07	00:11	0	In Int.	Sideswipe	Other Motor Vehicle	South	Making Left Turn	South	Proceeding Straight	Improper Turning	0	0

City of Oakland

Transportation Services Division

Traffic Collision History Report

Location: Madison Street / 14th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 11

Settings Used For Query

Parameter	Setting
Street Name	Madison Street
Cross Street	14th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Jackson Street / Lakeside Drive
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1977645	4/8/05	15:10	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	South	Proceeding Straight	Improper Turning	0	0
2158396	7/13/05	16:10	50	West	Sideswipe	Other Motor Vehicle	East	Proceeding Straight	East	Parked	Improper Turning	0	0
2349439	11/8/05	13:15	30	West	Sideswipe	Other Motor Vehicle	South	Merging	South	Slowing/Stopping	Improper Turning	0	0
2579430	4/12/06	15:15	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	1	0

City of Oakland

Transportation Services Division

Traffic Collision History Report

Location: Jackson Street / Lakeside Drive
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 4

Settings Used For Query

Parameter	Setting
Street Name	Jackson Street
Cross Street	Lakeside Drive
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Harrison Street / 12th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1708867	11/4/04	08:37	30	South	Sideswipe	Other Motor Vehicle	North	Changing Lanes	North	Proceeding Straight	Improper Turning	0	0
2000322	5/3/05	18:45	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	1	0
2152381	7/27/05	07:15	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	1	0
2181233	8/17/05	18:26	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	1	0
2211421	8/30/05	10:40	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	1	0
2225802	9/1/05	15:50	20	East	Sideswipe	Other Motor Vehicle	West	Passing Other Vehicle	West	Stopped in Road	Improper Turning	0	0
2225786	9/2/05	14:07	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2257311	9/29/05	10:55	0	In Int.	Sideswipe	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2304486	10/2/05	11:40	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	1	0
2330802	10/17/05	12:00	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2342008	10/22/05	09:28	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2361628	11/20/05	09:45	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0
2368999	12/4/05	13:20	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	3	0
2403377	12/27/05	15:15	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	1	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Harrison Street / 12th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2409103	12/28/05	10:33	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Not Stated	Traffic Signals and Signs	0	0
2455961	1/15/06	12:45	15	North	Broadside	Other Motor Vehicle	South	Making U Turn	North	Proceeding Straight	Improper Turning	0	0
2455934	1/16/06	14:00	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	1	0
2479140	1/29/06	15:35	0	In Int.	Vehicle - Pedestrian	Pedestrian	West	Proceeding Straight	North	Other	Traffic Signals and Signs	1	0
2508558	2/10/06	14:18	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	2	0
2506022	2/14/06	14:28	25	Not Stated	Rear-End	Other Motor Vehicle	North	Not Stated	North	Not Stated	Unsafe Speed	0	0
2494985	2/19/06	09:48	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	1	0
2706228	3/18/06	09:50	0	In Int.	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Proceeding Straight	Unknown	0	0
2706961	3/20/06	23:15	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0
2584219	4/14/06	21:30	0	In Int.	Broadside	Not Stated	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2651088	5/13/06	13:47	0	In Int.	Broadside	Motor Vehicle on Other	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2683060	6/3/06	10:00	0	In Int.	Rear-End	Other Motor Vehicle	West	Backing	West	Stopped in Road	Unsafe Starting or Backing	0	0
2672100	6/9/06	18:54	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2989618	1/10/07	13:00	0	In Int.	Broadside	Motor Vehicle on Other	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Harrison Street / 12th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
3359589	8/29/07	18:00	0	In Int.	Vehicle - Pedestrian	Pedestrian	West	Proceeding Straight	South	Proceeding Straight	Ped R/W Violation	1	0

Total Number of Collisions: 29

Settings Used For Query

Parameter	Setting
Street Name	Harrison Street
Cross Street	12th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Harrison Street / 20th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1752223	11/22/04	08:00	0	In Int.	Sideswipe	Parked Motor Vehicle	East	Proceeding Straight	East	Parked	Improper Turning	0	0
2012227	5/1/05	06:23	0	In Int.	Sideswipe	Other Motor Vehicle	North	Proceeding Straight	North	Proceeding Straight	Other	1	0
2202154	8/22/05	11:15	0	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	East	Proceeding Straight	Other Hazardous Movement	1	0
2632288	5/18/06	17:00	0	In Int.	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Proceeding Straight	Following Too Closely	0	0
3297003	7/25/07	09:45	10	North	Rear-End	Other Motor Vehicle	South	Proceeding Straight	South	Stopped in Road	Unsafe Speed	0	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Harrison Street / 20th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 5

Settings Used For Query

Parameter	Setting
Street Name	Harrison Street
Cross Street	20th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Traffic Engineering Department
Traffic Collision History Report

8/27/2009

Location: Harrison St / Lakeside Dr (1)
Date Range Reported: 1/1/2006 - 12/31/2008
Total Number of Collisions: 8

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2632288	5/18/06	17:00	0	In Int.	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Proceeding Straight	Following Too Closely	0	0
2687144	6/19/06	12:29	15	North	Rear-End	Other Motor Vehicle	South	Proceeding Straight	South	Proceeding Straight	Unsafe Speed	0	0
3240692	6/21/07	09:00	50	West	Sideswipe	Other Motor Vehicle	West	Proceeding Straight	West	Proceeding Straight	Improper Turning	0	0
3297003	7/25/07	09:45	10	North	Rear-End	Other Motor Vehicle	South	Stopped in Road	South	Proceeding Straight	Unsafe Speed	0	0
3472387	10/22/07	16:27	15	South	Sideswipe	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
3451104	10/30/07	15:19	30	North	Rear-End	Other Motor Vehicle	South	Proceeding Straight	South	Stopped in Road	Unsafe Speed	3	0
3472256	11/17/07	11:10	10	North	Rear-End	Other Motor Vehicle	South	Backing	South	Stopped in Road	Unsafe Starting or Backing	0	0
3795441	6/24/08	13:33	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0

City of Oakland
Traffic Engineering Department
Traffic Collision History Report

Location: Harrison St / Lakeside Dr (1)
Date Range Reported: 1/1/2006 - 12/31/2008
Total Number of Collisions: 8

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 8

Settings Used For Query

Parameter	Setting
Street Name	HARRISON ST
Cross Street	LAKESIDE DR (1)
Starting Date	1/1/2006
Ending Date	12/31/2008
Intersection	Intersection Related

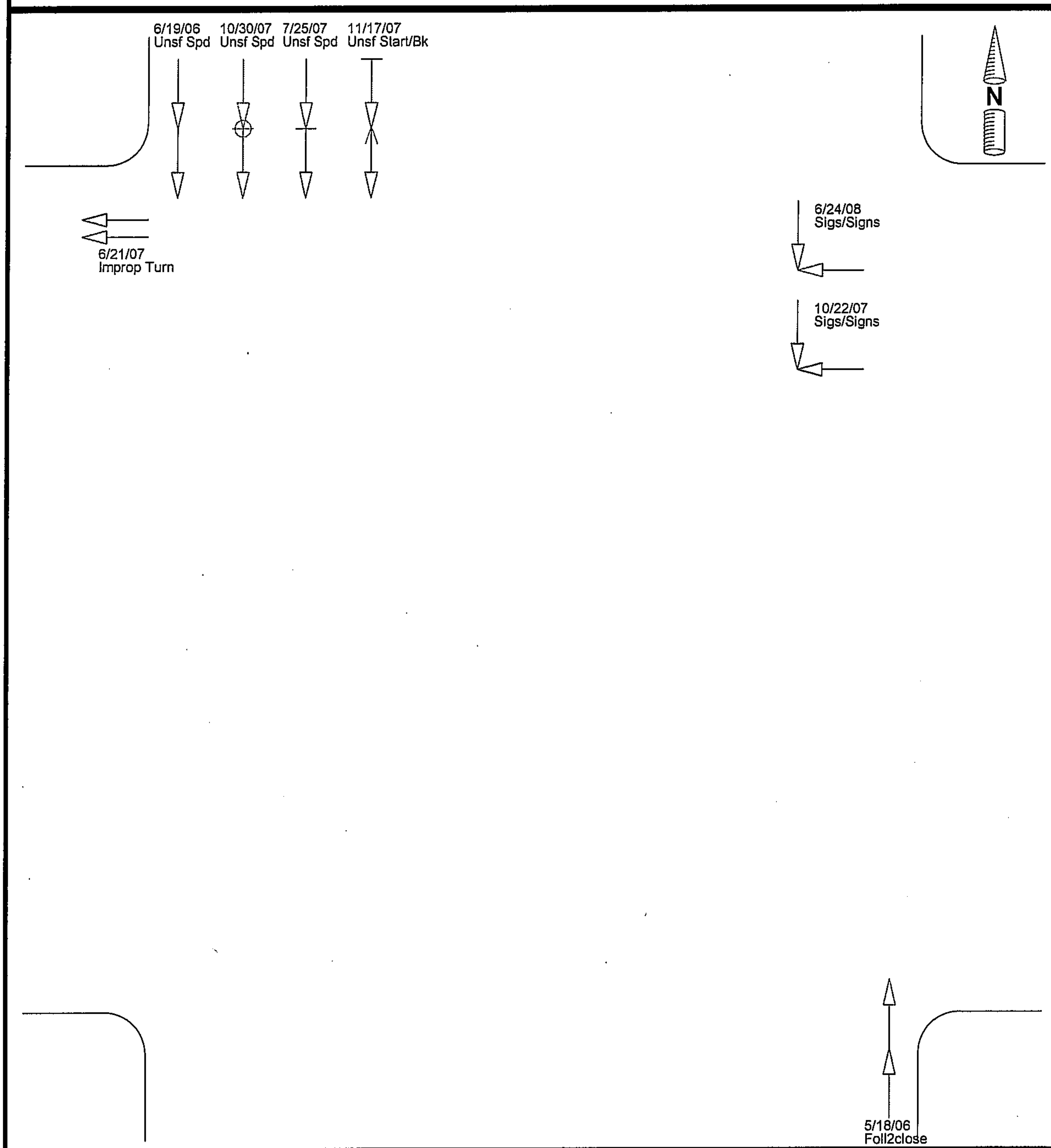
Collision Diagram

Horizontal Street: LAKESIDE DR (1)

Vertical Street: HARRISON ST

From: 1/1/2006 To: 12/31/2008

Date Prepared: 8/27/2009



Number of Collisions

7 Property Damage Only
1 Injury Collisions
0 Fatal Collisions
8 Total Collisions

Legend

Moving Vehicle
Stopped Vehicle
Backing Vehicle
Ran Off Road
Movement Unknown
Right Turn
Left Turn
Sideswipe
Day
Night
Pedestrian
Fixed Object
Bicycle
DUI
Injury
Fatal

Color Legend - Highest Degree of Injury

Maroon = Fatal

Purple = Severe Injury

Green = Other Visible Injury

Teal = Complaint of Pain

Dark Blue = Property Damage Only

Settings Used For Query

Parameter	Setting
Street Name	HARRISON ST
Cross Street	LAKESIDE DR (1)
Starting Date	1/1/2006
Ending Date	12/31/2008
Intersection	Intersection Related

City of Oakland
Traffic Engineering Department
Traffic Collision History Report

8/27/2009
Page 1

Location: Harrison St / Lakeside Dr (4)
Date Range Reported: 1/1/2006 - 12/31/2008
Total Number of Collisions: 6

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2567432	4/6/06	08:00	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	South	Changing Lanes	Improper Turning	0	0
2632256	5/22/06	18:15	15	North	Hit Object	Other Object	West	Proceeding Straight			Other	0	0
2922144	12/3/06	02:26	12	South	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Stopped in Road	Unsafe Speed	0	0
2926200	12/4/06	11:58	0	In Int.	Head-On	Other Motor Vehicle	East	Making Left Turn	South	Proceeding Straight	Wrong Side of Road	0	0
3236458	6/20/07	23:19	10	South	Rear-End	Other Motor Vehicle	North	Stopped in Road	North	Proceeding Straight	Unsafe Speed	0	0
3430124	10/13/07	01:35	0	In Int.	Rear-End	Other Motor Vehicle	East	Stopped in Road	East	Proceeding Straight	Unsafe Speed	0	0

City of Oakland
Traffic Engineering Department
Traffic Collision History Report

Location: Harrison St / Lakeside Dr (4)
Date Range Reported: 1/1/2006 - 12/31/2008
Total Number of Collisions: 6

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 6

Settings Used For Query

Parameter	Setting
Street Name	HARRISON ST
Cross Street	LAKESIDE DR (4)
Starting Date	1/1/2006
Ending Date	12/31/2008
Intersection	Intersection Related

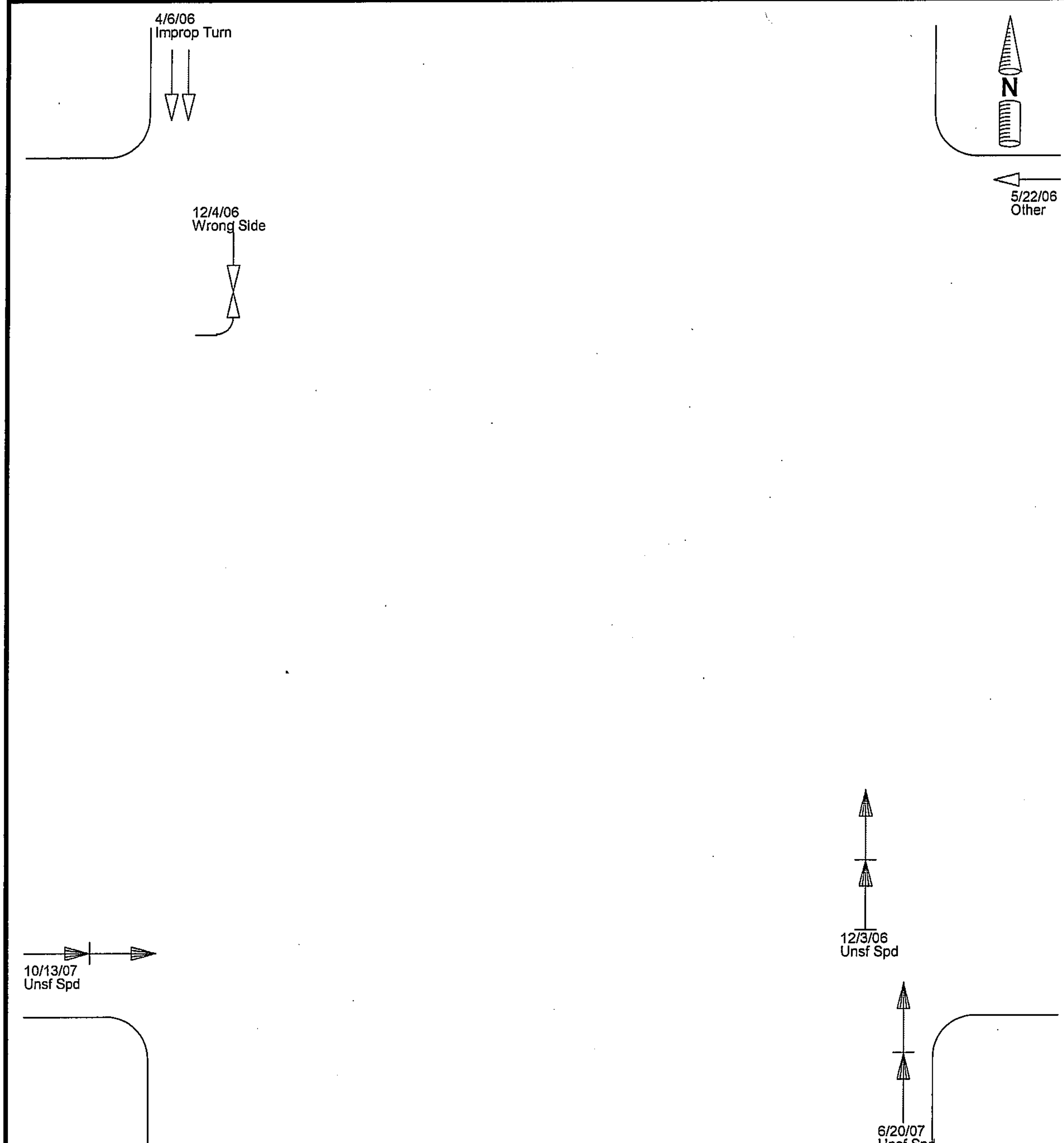
Collision Diagram

Horizontal Street: HARRISON ST

Vertical Street: LAKESIDE DR (4)

From: 1/1/2006 To: 12/31/2008

Date Prepared: 8/27/2009



Number of Collisions

6 Property Damage Only
0 Injury Collisions
0 Fatal Collisions
6 Total Collisions

Legend

Moving Vehicle
Stopped Vehicle
Backing Vehicle
Ran Off Road
Movement Unknown
Right Turn
Left Turn
Sideswipe
Day
Night
Pedestrian
Fixed Object
Bicycle
DUI
Injury
Fatal

Color Legend - Highest Degree of Injury

Maroon = Fatal

Purple = Severe Injury

Green = Other Visible Injury

Teal = Complaint of Pain

Dark Blue = Property Damage Only

Settings Used For Query

Parameter	Setting
Street Name	HARRISON ST
Cross Street	LAKESIDE DR (4)
Starting Date	1/1/2006
Ending Date	12/31/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Harrison Street / Grand Avenue
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1639671	10/4/04	20:07	0	In Int.	Head-On	Other Motor Vehicle	South	Proceeding Straight	North	Making Left Turn	Other	0	0
1687802	10/5/04	14:45	100	South	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Stopped in Road	Unsafe Speed	1	0
2329314	11/2/05	12:45	0	In Int.	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Stopped in Road	Unsafe Speed	0	0
2586664	4/9/06	10:00	30	South	Sideswipe	Other Motor Vehicle	North	Proceeding Straight	North	Stopped in Road	Unsafe Speed	0	0
2605543	4/26/06	20:25	0	In Int.	Sideswipe	Other Motor Vehicle	North	Proceeding Straight	North	Proceeding Straight	Improper Turning	0	0
2682938	6/6/06	13:09	30	West	Sideswipe	Bicycle	East	Changing Lanes	East	Slowing/Stopping	Improper Turning	1	0
2870510	10/28/06	23:15	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	2	0
3075980	2/23/07	07:38	0	In Int.	Sideswipe	Other Motor Vehicle	West	Making Left Turn	South	Proceeding Straight	Traffic Signals and Signs	0	0
3108962	3/23/07	08:51	18	North	Rear-End	Other Motor Vehicle	South	Proceeding Straight	South	Proceeding Straight	Unsafe Speed	1	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Harrison Street / Grand Avenue
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 9

Settings Used For Query

Parameter	Setting
Street Name	Harrison Street
Cross Street	Grand Avenue
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Broadway / 20th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 4

Settings Used For Query

Parameter	Setting
Street Name	Broadway
Cross Street	20th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Broadway / Grand Avenue
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1735155	11/5/04	06:00	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Auto R/W Violation	0	0
2059374	5/28/05	15:10	0	In Int.	Broadside	Not Stated	North	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	1	0
2186169	8/17/05	18:10	0	In Int.	Broadside	Bicycle	West	Making Left Turn	East	Proceeding Straight	Auto R/W Violation	1	0
2265819	10/8/05	16:50	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	2	0
2496680	2/27/06	12:35	0	In Int.	Rear-End	Other Motor Vehicle	South	Proceeding Straight	South	Stopped in Road	Following Too Closely	0	0
2555915	3/25/06	02:00	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
2806372	9/20/06	20:20	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Driving Under Influence	0	0
2965252	12/16/06	21:50	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	1	0
3067040	2/26/07	19:30	0	In Int.	Head-On	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	0	0
3071252	3/3/07	22:35	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	4	0
3283022	7/17/07	11:05	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	0	0
3346820	8/24/07	19:47	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	3	0

Location: Broadway / Grand Avenue
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 12

Settings Used For Query

Parameter	Setting
Street Name	Broadway
Cross Street	Grand Avenue
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008
Page 1

Location: Broadway / 27th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1687966	10/7/04	08:25	0	In Int.	Other	Bicycle	East	Proceeding Straight	North	Proceeding Straight	Wrong Side of Road	0	0
1821627	12/20/04	12:00	0	In Int.	Rear-End	Other Motor Vehicle	South	Proceeding Straight	South	Making Right Turn	Unsafe Speed	0	0
2122641	7/1/05	14:45	20	North	Sideswipe	Other Motor Vehicle	South	Making Right Turn	South	Stopped in Road	Improper Turning	0	0
2205392	8/26/05	12:00	0	In Int.	Broadside	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	0	0
2241168	9/9/05	08:30	30	North	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Making Right Turn	Traffic Signals and Signs	0	0
2361620	10/20/05	18:15	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2348692	11/28/05	17:57	0	In Int.	Vehicle - Pedestrian	Pedestrian	East	Making Left Turn	West	Other	Ped R/W Violation	1	0
2474880	1/27/06	19:50	0	In Int.	Sideswipe	Other Motor Vehicle	North	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	0	0
2515780	2/28/06	11:18	0	In Int.	Head-On	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	1	0
2521738	3/4/06	15:50	0	In Int.	Broadside	Other Motor Vehicle	North	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	0	0
2515857	3/5/06	19:30	0	In Int.	Vehicle - Pedestrian	Pedestrian	East	Making Left Turn	North	Proceeding Straight	Ped R/W Violation	0	0
2985773	1/11/07	18:06	0	In Int.	Sideswipe	Other Motor Vehicle	West	Making Left Turn	East	Proceeding Straight	Auto R/W Violation	0	0
3045750	1/27/07	06:37	6	South	Hit Object	Fixed Object	South	Other Unsafe Turning			Unsafe Speed	0	0
3092597	2/23/07	02:06	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	2	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Broadway / 27th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 14

Settings Used For Query

Parameter	Setting
Street Name	Broadway
Cross Street	27th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Telegraph Avenue / Grand Avenue
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1893002	12/17/04	10:02	0	In Int.	Broadside	Pedestrian	West	Making U Turn	South	Proceeding Straight	Ped R/W Violation	0	0
1821607	12/20/04	18:30	0	In Int.	Head-On	Other Motor Vehicle	East	Making Left Turn	West	Proceeding Straight	Auto R/W Violation	0	0
1987251	4/9/05	19:30	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
1999474	4/28/05	00:37	0	In Int.	Head-On	Fixed Object	South	Making Left Turn			Improper Turning	1	0
2059291	5/26/05	08:45	0	In Int.	Head-On	Other Motor Vehicle	West	Making Left Turn	East	Proceeding Straight	Auto R/W Violation	2	0
2119813	6/29/05	11:35	0	In Int.	Head-On	Fixed Object	East	Making Right Turn			Improper Turning	0	0
2152405	7/6/05	12:45	0	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	0	0
2342325	10/29/05		0	In Int.	Sideswipe	Other Motor Vehicle	North	Making Right Turn	East	Proceeding Straight	Driving Under Influence	0	0
2342084	10/29/05	00:55	0	In Int.	Sideswipe	Other Motor Vehicle	North	Making Right Turn	East	Proceeding Straight	Driving Under Influence	0	0
2386985	12/14/05	02:20	20	South	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Stopped in Road	Unsafe Speed	0	0
2396842	12/22/05	06:45	3	North	Vehicle - Pedestrian	Pedestrian	West	Other	North	Proceeding Straight	Pedestrian Violation	1	0
2508528	2/13/06	18:41	0	In Int.	Not Stated	Bicycle	South	Stopped in Road	North	Stopped in Road	Unknown	1	0
2548597	3/25/06	01:40	0	In Int.	Head-On	Other Motor Vehicle	North	Making Left Turn	South	Proceeding Straight	Auto R/W Violation	0	0
2563239	4/4/06	22:25	2	East	Hit Object	Fixed Object	East	Proceeding Straight			Improper Turning	0	0

City of Oakland

Transportation Services Division

Traffic Collision History Report

Location: Telegraph Avenue / Grand Avenue
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2683080	6/3/06	02:10	30	East	Not Stated	Bicycle	West	Proceeding Straight	West	Stopped in Road	Unsafe Speed	1	0
2703707	6/25/06	12:17	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	3	0
3109029	3/26/07	00:23	0	In Int.	Broadside	Other Motor Vehicle	West	Making Left Turn	East	Proceeding Straight	Auto R/W Violation	0	0
3282982	7/13/07	14:48	0	In Int.	Broadside	Other Motor Vehicle	West	Making Left Turn	East	Proceeding Straight	Auto R/W Violation	0	0
3283192	7/20/07	09:03	0	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	North	Proceeding Straight	Auto R/W Violation	0	0
3481255	9/9/07	18:04	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	1	0

Location: Telegraph Avenue / Grand Avenue
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 20

Settings Used For Query

Parameter	Setting
Street Name	Telegraph Avenue
Cross Street	Grand Avenue
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Telegraph Avenue / 27th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1831302	12/2/04	11:20	0	In Int.	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Proceeding Straight	Unsafe Speed	0	0
1831336	12/11/04	06:57	0	In Int.	Vehicle - Pedestrian	Pedestrian	North	Proceeding Straight	Not Stated	Making Left Turn	Pedestrian Violation	1	0
1982840	4/13/05	05:30	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2179059	8/3/05	08:03	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2342288	10/20/05	11:40	9	West	Broadside	Bicycle	East	Proceeding Straight	South	Proceeding Straight	Other Hazardous Movement	1	0
2304455	10/23/05		40	East	Sideswipe	Parked Motor Vehicle	East	Proceeding Straight	Not Stated	Parked	Wrong Side of Road	0	0
2342395	10/25/05	16:00	10	West	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Stopped in Road	Unsafe Speed	0	0
2386981	12/15/05	14:40	0	In Int.	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Stopped in Road	Unsafe Speed	0	0
2403381	12/27/05	09:30	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	West	Making Left Turn	Other Hazardous Movement	0	0
2407359	1/3/06	22:45	0	In Int.	Not Stated	Non-Collision	West	Making Right Turn	South	Making Right Turn	Improper Turning	0	0
2458150	1/25/06	06:15	0	In Int.	Broadside	Bicycle	West	Proceeding Straight	South	Making Right Turn	Traffic Signals and Signs	0	0
2555890	3/19/06	18:55	0	In Int.	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Making Right Turn	Unknown	0	0
2844352	10/12/06	20:54	0	In Int.	Sideswipe	Other Motor Vehicle	North	Changing Lanes	North	Proceeding Straight	Improper Turning	0	0
2922096	12/4/06	10:48	17	South	Broadside	Other Motor Vehicle	East	Making Right Turn	North	Stopped in Road	Improper Turning	0	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Telegraph Avenue / 27th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2946032	12/16/06	01:51	0	In Int.	Broadside	Other Motor Vehicle	West	Not Stated	South	Proceeding Straight	Traffic Signals and Signs	0	0
3321511	8/1/07	10:53	20	South	Rear-End	Other Motor Vehicle	North	Proceeding Straight	North	Stopped in Road	Unsafe Speed	0	0

Total Number of Collisions: 16

Settings Used For Query

Parameter	Setting
Street Name	Telegraph Avenue
Cross Street	27th Street
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Northgate Avenue / Grand Avenue
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil

Total Number of Collisions: 7

Settings Used For Query

Parameter	Setting
Street Name	Northgate Avenue
Cross Street	Grand Avenue
Starting Date	10/1/2004
Ending Date	9/30/2008
Intersection	Intersection Related

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Northgate Avenue / 27th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
1708879	10/14/04	13:05	14	North	Broadside	Other Motor Vehicle	West	Making Right Turn	West	Proceeding Straight	Improper Turning	0	0
1834061	12/30/04	15:49	0	In Int.	Head-On	Other Motor Vehicle	Not Stated	Proceeding Straight	Not Stated	Making Left Turn	Traffic Signals and Signs	1	0
1997496	4/19/05	18:00	0	In Int.	Other	Bicycle	West	Proceeding Straight	North	Making Right Turn	Improper Turning	0	0
2044284	5/4/05	15:50	0	In Int.	Broadside	Other Motor Vehicle	West	Making Right Turn	West	Proceeding Straight	Improper Turning	0	0
2044356	5/17/05	16:18	0	In Int.	Sideswipe	Other Motor Vehicle	South	Making Left Turn	South	Making Left Turn	Improper Turning	0	0
2059288	5/24/05	07:15	0	In Int.	Sideswipe	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2058927	5/25/05	11:18	0	In Int.	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Stopped in Road	Unsafe Speed	2	0
2061576	6/2/05	09:15	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	1	0
2085069	6/10/05	17:45	0	In Int.	Broadside	Other Motor Vehicle	South	Making Left Turn	South	Proceeding Straight	Improper Turning	1	0
2094429	6/24/05	06:50	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	South	Making Left Turn	Improper Turning	1	0
2158397	7/11/05	07:35	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Making Left Turn	Traffic Signals and Signs	1	0
2187878	7/13/05	16:30	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2225771	9/5/05	16:40	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	2	0
2257348	9/29/05	16:15	0	In Int.	Sideswipe	Other Motor Vehicle	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	0	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

6/9/2008

Location: Northgate Avenue / 27th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2304405	9/30/05	18:00	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	2	0
2342344	10/24/05	09:30	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2348632	11/13/05	13:00	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	East	Making Left Turn	Traffic Signals and Signs	2	0
2388230	12/1/05	17:50	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	2	0
2394365	12/5/05	15:36	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	1	0
2390572	12/20/05	16:45	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	2	0
2407327	1/2/06	13:55	0	In Int.	Rear-End	Other Motor Vehicle	East	Proceeding Straight	East	Stopped in Road	Unsafe Speed	0	0
2422608	1/5/06	16:57	0	In Int.	Not Stated	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2515820	3/4/06	11:40	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2523369	3/11/06	12:36	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	1	0
2555859	3/24/06	17:57	0	In Int.	Sideswipe	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Other	2	0
2615468	4/29/06	18:25	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Making Left Turn	Traffic Signals and Signs	0	0
2632398	5/6/06	10:00	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2639614	5/23/06	18:06	0	In Int.	Head-On	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0

City of Oakland
Transportation Services Division
Traffic Collision History Report

Location: Northgate Avenue / 27th Street
Date Range Reported: 10/1/2004 - 9/30/2008

Report No.	Date	Time	Dist.	Dir.	Type of Collision	Motor Veh. Involved With	Direct. of Travel 1	Movement Prec. Coll. 1	Direct. of Travel 2	Movement Prec. Coll. 2	PCF	Inj.	Kil
2844396	10/17/06	17:05	5	East	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Stopped in Road	Unsafe Speed	0	0
2855408	10/24/06	17:37	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	South	Proceeding Straight	Traffic Signals and Signs	0	0
2870549	10/27/06	17:00	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	East	Making Right Turn	Unknown	1	0
2906730	11/16/06	09:33	0	In Int.	Broadside	Other Motor Vehicle	East	Proceeding Straight	North	Proceeding Straight	Traffic Signals and Signs	0	0
2914037	11/19/06	19:25	0	In Int.	Broadside	Other Motor Vehicle	West	Proceeding Straight	East	Making Left Turn	Traffic Signals and Signs	0	0
2903732	11/21/06	15:59	0	In Int.	Broadside	Other Motor Vehicle	South	Proceeding Straight	West	Proceeding Straight	Traffic Signals and Signs	1	0
2942560	11/28/06	17:50	0	In Int.	Overturned	Not Stated	East	Proceeding Straight	South	Making Left Turn	Traffic Signals and Signs	0	0
2922053	12/2/06	21:33	0	In Int.	Broadside	Other Motor Vehicle	South	Other Unsafe Turning	Not Stated	Parked	Improper Turning	1	0
3054064	12/19/06	07:04	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	1	0
3056560	2/12/07	10:45	10	East	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Stopped in Road	Unsafe Speed	0	0
3078694	3/10/07	09:37	0	In Int.	Hit Object	Fixed Object	South	Other Unsafe Turning			Unsafe Speed	0	0
3296863	7/29/07	17:51	0	In Int.	Broadside	Other Motor Vehicle	North	Proceeding Straight	East	Proceeding Straight	Traffic Signals and Signs	1	0
3359543	8/30/07	09:00	10	East	Rear-End	Other Motor Vehicle	West	Proceeding Straight	West	Stopped in Road	Unsafe Speed	0	0

APPENDIX B-6

PEAK HOUR SIGNAL WARRANT WORKSHEETS

Existing plus Project Conditions

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Existing plus Project _AM
Intersection: 11th Street / Oak Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

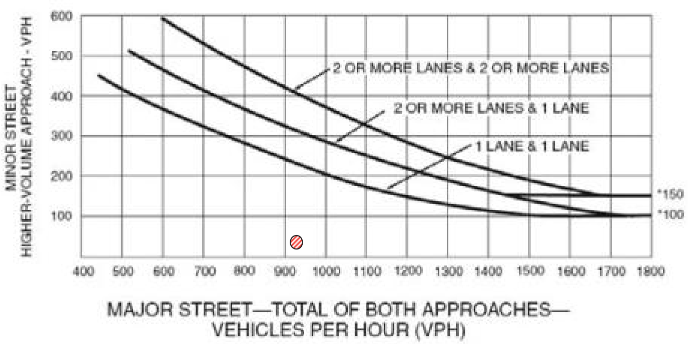
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☐ No ☒
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☒ No ☐

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		912				
Highest Approaches – Minor Street		56				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Existing plus Project _PM
Intersection: 11th Street / Oak Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

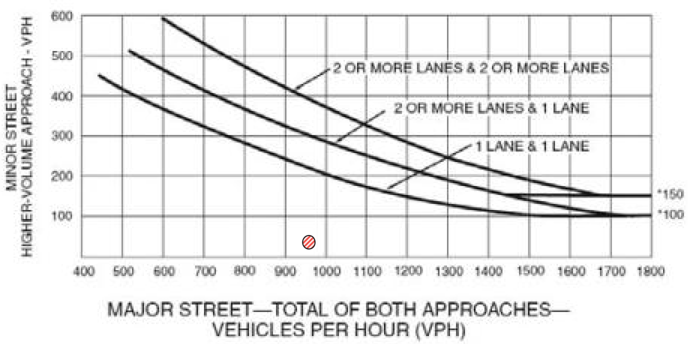
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☐ No ☒
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☒ No ☐

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		934				
Highest Approaches – Minor Street		57				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Existing plus Project _AM
Intersection: 19th Street / Jackson Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

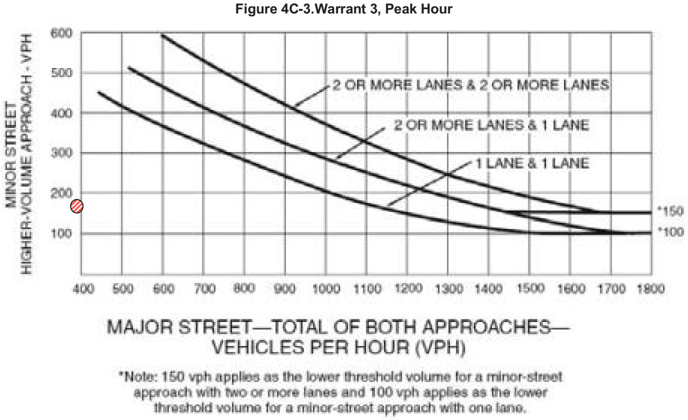
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☒

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		225				
Highest Approaches – Minor Street	170					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Existing plus Project _PM
Intersection: 19th Street / Jackson Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

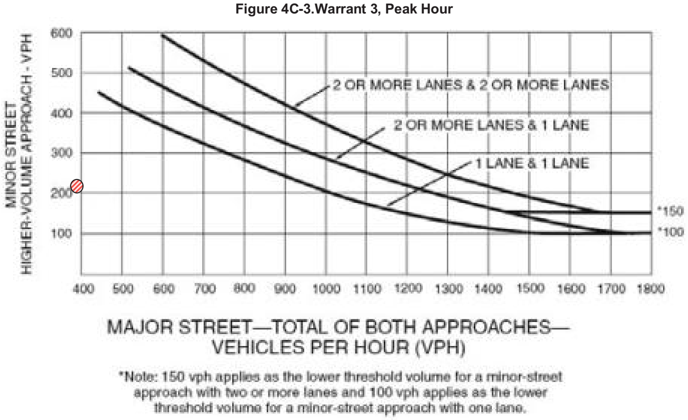
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☒

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		131				
Highest Approaches – Minor Street	205					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Existing plus Project _AM
Intersection: 19th Street / Alice Street

<u>PART A</u> or <u>PART B</u> SATISFIED YES ☐ NO ☒

<u>PART A</u> SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

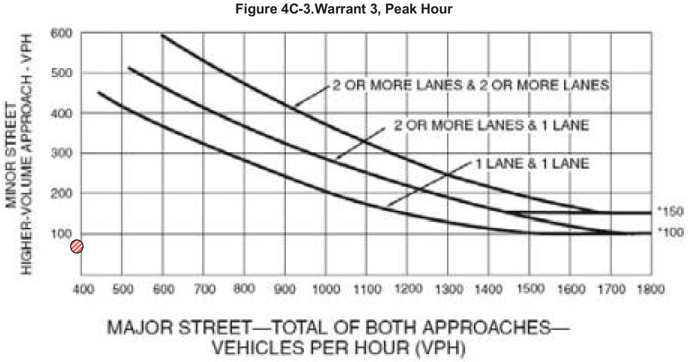
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; <u>AND</u> Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u> Yes ☐ No ☒
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☐ No ☒

<u>PART B</u> SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		294				
Highest Approaches – Minor Street	78					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Existing plus Project _PM
Intersection: 19th Street / Alice Street

<u>PART A</u> or <u>PART B</u> SATISFIED YES ☐ NO ☒

<u>PART A</u> SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

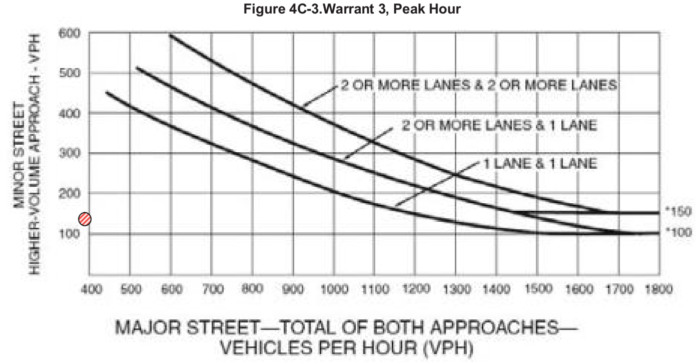
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; <u>AND</u> Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u> Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☐ No ☒

<u>PART B</u> SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		227				
Highest Approaches – Minor Street	139					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Cumulative Year 2015 Baseline plus Project Conditions

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Near Term plus Project _AM
Intersection: 11th Street / Oak Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

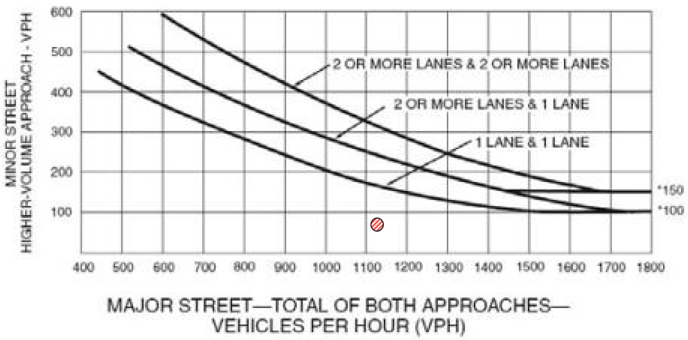
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND Yes ☐ No ☒
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☒ No ☐

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		1122				
Highest Approaches – Minor Street		69				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Near Term plus Project _PM
Intersection: 11th Street / Oak Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

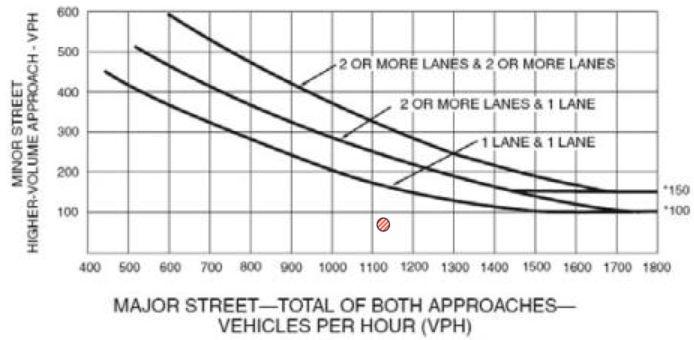
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND Yes ☐ No ☒
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☒ No ☐

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		1117				
Highest Approaches – Minor Street		71				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Near Term plus Project _AM
Intersection: 19th Street / Jackson Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

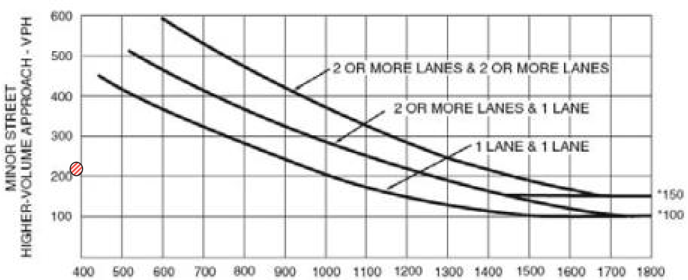
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☒

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		275				
Highest Approaches – Minor Street	208					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Near Term plus Project _PM
Intersection: 19th Street / Jackson Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

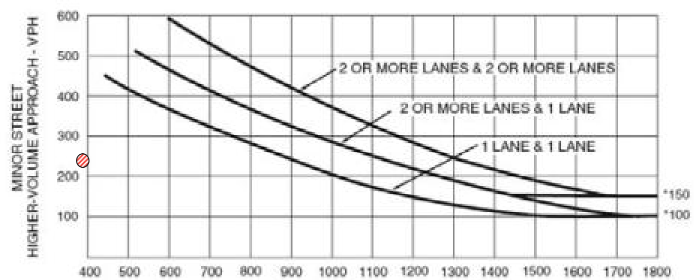
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☒

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		155				
Highest Approaches – Minor Street	228					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



MAJOR STREET—TOTAL OF BOTH APPROACHES—
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Near Term plus Project _AM
Intersection: 19th Street / Alice Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

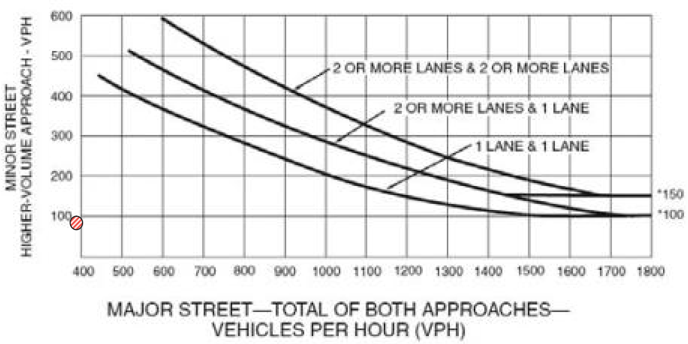
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☐ No ☒
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☒

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		337				
Highest Approaches – Minor Street	96					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Near Term plus Project _PM
Intersection: 19th Street / Alice Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

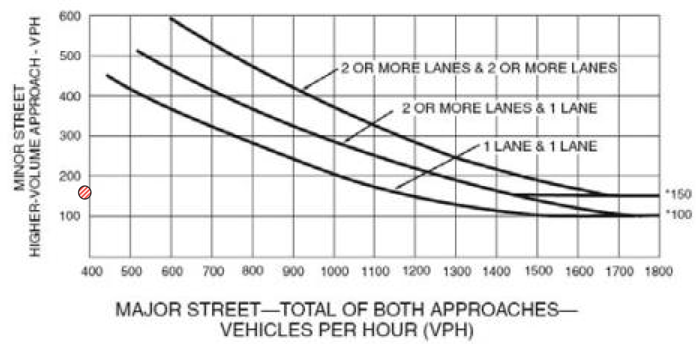
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☒

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		269				
Highest Approaches – Minor Street	155					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Cumulative Year 2030 Baseline plus Project

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Cumulative plus Project _AM
Intersection: 11th Street / Oak Street

<u>PART A</u> or <u>PART B</u> SATISFIED YES ☐ NO ☒

<u>PART A</u> SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; <u>AND</u> Yes ☐ No ☒

2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u> Yes ☐ No ☒

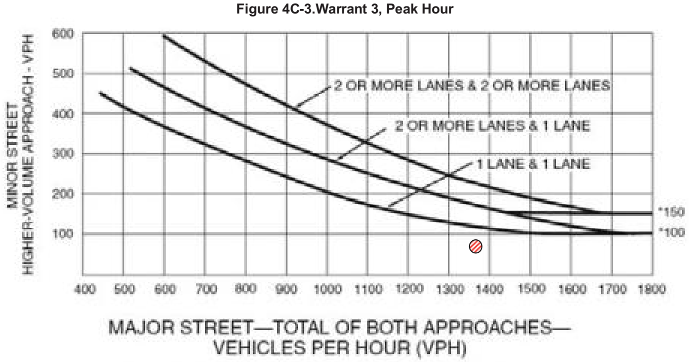
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☒ No ☐

<u>PART B</u> SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		1362				
Highest Approaches – Minor Street		83				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Cumulative plus Project _PM
Intersection: 11th Street / Oak Street

<u>PART A</u> or <u>PART B</u> SATISFIED YES ☐ NO ☒

<u>PART A</u> SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; <u>AND</u> Yes ☐ No ☒

2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; <u>AND</u> Yes ☐ No ☒

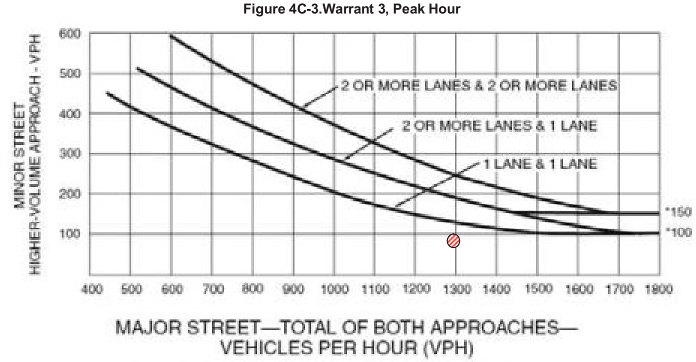
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. Yes ☒ No ☐

<u>PART B</u> SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		1295				
Highest Approaches – Minor Street		87				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Cumulative plus Project _AM
Intersection: 19th Street / Jackson Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

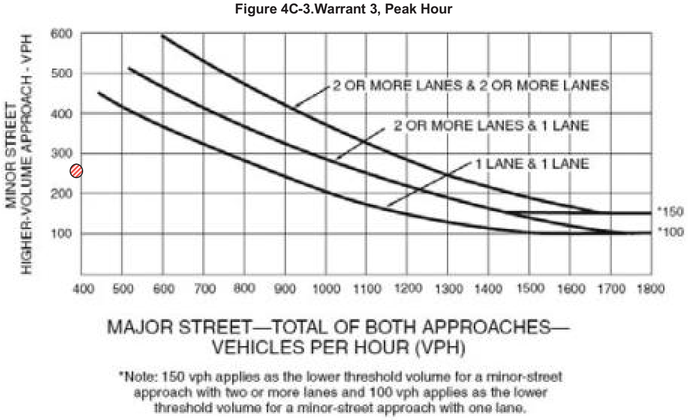
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☒ No ☐

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		333				
Highest Approaches – Minor Street	253					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Cumulative plus Project _PM
Intersection: 19th Street / Jackson Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

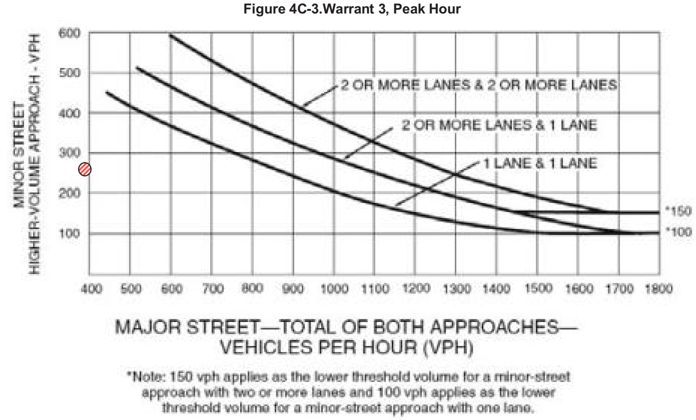
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☒ No ☐

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		190				
Highest Approaches – Minor Street	257					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Cumulative plus Project _AM
Intersection: 19th Street / Alice Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

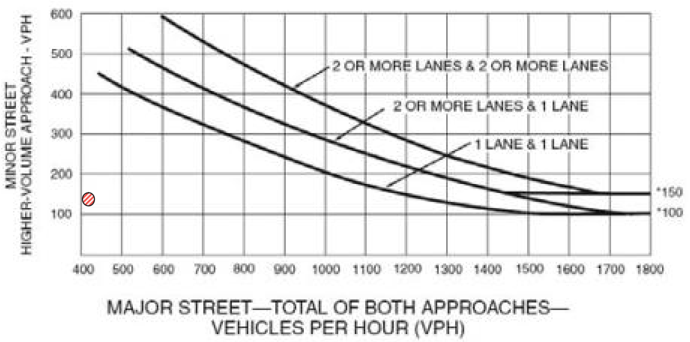
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☒

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		413				
Highest Approaches – Minor Street	116					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Traffic Signal Warrants Worksheet
Warrant 3: Peak Hour
(*from the MUTCD 2003 California Supplement*)

Scenario: Cumulative plus Project _PM
Intersection: 19th Street / Alice Street

PART A or PART B SATISFIED YES ☐ NO ☒

PART A SATISFIED YES ☐ NO ☒
(All parts 1, 2, and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☒
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes; AND — Yes ☒ No ☐
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☒

PART B SATISFIED YES ☐ NO ☒

APPROACH LANES	One	2 or More				
Both Approaches – Major Street		331				
Highest Approaches – Minor Street	174					

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume minor street approach (one direction only) for one hour (any consecutive 15 minute period) fall above the applicable curves in MUTCD Figure 4C-3.

Figure 4C-3.Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

APPENDIX B-7

SUPPLEMENTARY ANALYSES

SUPPLEMENTARY ANALYSES - PLANNED TRANSPORTATION IMPROVEMENTS

This section summarizes the supplementary analyses of future-year traffic operations assuming the planned AC Transit Bus Rapid Transit (BRT) project is completed, and briefly discusses other planned improvements which may affect transportation facilities analyzed as part of this EIR. No supplementary analyses have been conducted for the additional improvements, which include the Harrison Street / Oakland Avenue Community Transportation Plan, Broadway Retail Corridor Specific Plan, and I-880 Broadway / Jackson Street Interchange.

It should be noted that none of these improvements are fully funded and approved, and the analysis results presented here only to inform decision makers and the public.

1. AC Transit Bus Rapid Transit (BRT)

AC Transit has proposed converting the existing 1R-International Rapid into a full BRT service. The 1R currently operates with some BRT features, such as widely-spaced stops at key destinations and transfer points, vehicles designed for easy boarding and alighting, real-time schedules, and transit signal priority. However, AC Transit plans on implementing additional features for the service in the near future, including bus-only median and side-running transitways and stations along the line, completing BRT treatments for a corridor stretching from Berkeley through Downtown Oakland to San Leandro via Telegraph Avenue and International Boulevard.

In the vicinity of the project, these improvements would generally require the removal of one through lane in each direction along Telegraph Avenue, narrowing the roadway to one vehicular lane in each direction. Buses would run in a protected median, with left turn pockets for autos provided at key intersections. Along Broadway, no travel lanes would be removed and buses would operate in mixed flow lanes. Along 11th and 12th Streets in Downtown Oakland, the BRT service would operate in a side-running configuration, removing one lane of through traffic and eliminating some parking to allow for bulbouts at stations.

Although the BRT is expected to be in service in 2015, the project is only partially funded and not yet approved. As a result, implementation has not been assumed under Cumulative Year 2015 Baseline Conditions or Cumulative Year 2030 Baseline Conditions analysis scenarios presented in the 222 19th Street Transportation Study. However, supplementary analysis is provided below for Cumulative Year 2015 Baseline Conditions and Cumulative Year 2030 Baseline Conditions assuming the proposed BRT is in service. The following seven (7) study intersections, located along the BRT corridor, were analyzed:

- Outside Downtown

  22. Telegraph Avenue / 27th Street.

- Within Downtown

  4. Oak Street / 11th Street;
  5. Oak Street / 12th Street;
  8. Madison Street / 11th Street;
  9. Madison Street / 12th Street;
  14. Harrison Street / 12th Street; and,

18. Broadway / 20th Street.

Additionally, the following study roadway segment was analyzed:

- Non-Caltrans Facility
  5. Telegraph Avenue, between 20th Street and 27th Street.

It should be noted that the supplementary analysis presented here conservatively assumes the following effects to be negligible:

- Reduction in traffic volumes along the BRT corridor as a result of drivers switching to other parallel corridors due to reduced roadway capacity;
- Reduction in traffic volumes along the BRT corridor and parallel corridors as a result of drivers opting to make trips to other destinations outside of the area or deciding not to make a trip at all; and,
- Reduction in traffic volumes along the BRT corridor as a result of drivers switching to other modes, primarily the new BRT service.

Although the BRT Draft Environmental Impact Statement / Environmental Impact Report (DEIS / DEIR) provide basic screenline volume changes for the BRT corridor and adjacent parallel arterials, the actual volume changes as a result of the BRT are dependent on a multitude of factors including, but not limited to, roadway and intersection configurations and BRT service characteristics. As a result, the BRT's net effect on trip-making characteristics and driver behavior along the corridor is difficult to estimate at the microscopic level of intersections. In addition, the BRT DEIS / DEIR did not analyze all intersections being analyzed in this EIR. Given the above considerations, no changes to volumes were assumed after implementation of the BRT. This is a conservative assumption, as it is expected that the BRT would result in decreased volumes along Telegraph Avenue (and a corresponding increase in volumes along most parallel arterials in the corridor).

a. Cumulative Year 2015 Baseline plus Project Intersection Operations. Intersection LOS results for Cumulative Year 2015 Baseline Conditions and Cumulative Year Baseline 2015 plus Project Conditions are summarized in **Table 5**.

Table 5: Cumulative Year 2015 Baseline plus Project Conditions Intersection Levels of Service – With BRT

No.	Intersection	Traffic Control	Peak Hour	Cumulative 2015 Conditions LOS	Cumulative 2015 Conditions Delay	Cumulative 2015 plus Project Conditions LOS	Cumulative 2015 plus Project Conditions Delay
Outside Downtown							
22	Telegraph Avenue / 27th Street	Signalized	AM	C	25.0	C	25.3
			PM	**E**	**64.5**	**F**	**>120.0**
Within Downtown							
4	Oak Street / 11th Street(1)	OWSC	AM	B	11.1	B	11.1
			PM	B	11.1	B	11.2
5	Oak Street / 12th Street	Signalized	AM	B	14.9	B	15.0
			PM	B	14.2	B	14.4
8	Madison Street / 11th Street	Signalized	AM	B	11.0	B	11.3
			PM	A	9.9	A	9.9
9	Madison Street / 12th Street	Signalized	AM	B	13.2	B	14.4
			PM	A	9.9	A	9.9
14	Harrison Street / 12th Street	Signalized	AM	B	19.4	B	19.3
			PM	B	17.2	B	17.3
18	Broadway / 20th Street	Signalized	AM	B	14.3	B	14.8
			PM	C	21.3	C	21.7

Source: AECOM, 2009.
Bold indicates intersections operating at LOS E (outside downtown) or LOS F (outside and within downtown).
OWSC = One-Way Stop-Controlled
(1) Analyzed for worst-approach.

As shown in **Table 5**, the project is expected to slightly increase delays at several study intersections. The following intersections are expected to operate at unacceptable conditions under Cumulative Year 2015 Baseline plus Project Conditions:

- Outside Downtown

  22. Telegraph Avenue / 27th Street (PM).

Average delay at the Harrison Street / 12th Street intersection would decrease under project scenarios due to the project adding traffic to movements which are under capacity (non-critical movements) and underutilizing the green time allotted by the signal, thereby resulting in a higher vehicle throughput and reduced overall intersection average delay.

b. Cumulative Year 2015 Baseline plus Project Intersection Impacts and Mitigation Measures.

- Telegraph Avenue / 27th Street (PM)

  The intersection of Telegraph Avenue / 27th Street would operate at LOS F in the PM peak hour under Cumulative Year 2015 Baseline Conditions and Cumulative Year 2015 Baseline plus Project Conditions. Because the project would cause the intersection to degrade to worse than LOS E, the project would potentially contribute to a **significant cumulative impact** at this intersection.

  Mitigation Measure TRANS-6: Due to the high volume of traffic traveling along Telegraph Avenue in the PM peak period, any proposed mitigation measure would require the addition of one lane along Telegraph Avenue. Given that the project proposes the elimination of one travel lane in the northbound and southbound directions, there are no feasible measures to mitigate the project's impacts. Therefore, the project's impacts on this intersection are significant and unavoidable.

  Significance after Implementation of Mitigation: Significant and Unavoidable (SU).

c. Cumulative Year 2030 Baseline plus Project Intersection Operations. Intersection LOS results for Cumulative Year 2030 Baseline Conditions and Cumulative Year Baseline 2015 plus Project Conditions are summarized in **Table 6**.

Table 6: Cumulative Year 2030 Baseline plus Project Conditions Intersection Levels of Service – With BRT

No.	Intersection	Traffic Control	Peak Hour	Cumulative 2030 Conditions		Cumulative 2030 plus Project Conditions	
				LOS	Delay	LOS	Delay
Outside Downtown							
22	Telegraph Avenue / 27th Street	Signalized	AM	D	40.9	D	43.3
			PM	**F**	**>120.0**	**F**	**>120.0**
Within Downtown							
4	Oak Street / 11th Street(1)	OWSC	AM	B	11.9	B	11.9
			PM	B	11.9	B	12.0
5	Oak Street / 12th Street	Signalized	AM	B	18.1	C	20.2
			PM	B	16.3	B	16.6
8	Madison Street / 11th Street	Signalized	AM	B	11.1	B	11.5
			PM	B	11.1	B	11.1
9	Madison Street / 12th Street	Signalized	AM	E	57.8	E	58.3
			PM	B	11.4	B	11.4
14	Harrison Street / 12th Street	Signalized	AM	C	20.5	C	20.6
			PM	B	19.0	B	19.1
18	Broadway / 20th Street	Signalized	AM	B	16.1	B	16.4
			PM	D	37.4	D	37.9

Source: AECOM, 2009.
Bold indicates intersections operating at LOS E (outside downtown) or LOS F (outside and within downtown).
OWSC = One-Way Stop-Controlled
(1) Analyzed for worst-approach.

As shown in **Table 6**, the project is expected to slightly increase delays at several study intersections. The following intersections are expected to operate at unacceptable conditions under Cumulative Year 2030 Baseline plus Project Conditions:

- Outside Downtown

  22. Telegraph Avenue / 27th Street (PM).

The project would not result in a significant impact at the following intersection:

- <u>Telegraph Avenue / 27th Street (PM)</u>
  The intersection of Telegraph Avenue / 27th Street would operate at LOS F in the PM peak hour under Cumulative Year 2030 Baseline Conditions and Cumulative Year 2030 Baseline plus Project Conditions, the addition of project-generated traffic would not cause an increase in v/c ratio above the three (3) percent threshold of significance.

d. Cumulative Year 2015 Baseline plus Project Conditions CMP and MTS Roadway Segment Level of Service. The Cumulative Year 2015 Baseline plus Project Conditions AM and PM peak hour roadway segment LOS for the study roadway segment is summarized in **Table 7.**

Table 7: Cumulative Year 2015 Baseline plus Project CMP and MTS Roadway Segment Levels of Service – With BRT

No.	Roadway Segment	Direction	Cumulative 2015 Conditions		Cumulative 2015 plus Project Conditions	
			LOS	v/c	LOS	v/c
AM Peak Hour						
5	**Telegraph Avenue** between 20th Street and 27th Street	NB	C	0.65	C	0.65
		SB	E	0.90	E	0.90
PM Peak Hour						
5	**Telegraph Avenue** between 20th Street and 27th Street	NB	**F**	**1.01**	**F**	**1.01**
		SB	D	0.78	D	0.79

Source: AECOM, 2009.
Bold indicates roadway segment operating at LOS F.

As shown in **Table 7**, the project is expected to slightly increase the v/c ratio on this study roadway segment during the PM peak hour in the southbound direction. The following roadway segment is expected to operate at unacceptable conditions (LOS F) under Cumulative Year 2015 plus Project Conditions:

- Non-Caltrans Facility
  5. Telegraph Avenue, between 20th Street and 27th Street (NB PM).

The project would not result in a significant impact on the following roadway segment:

- <u>Telegraph Avenue, between 20th Street and 27th Street (NB PM)</u>
  The increase in v/c ratio as a result of project traffic is less than the three (3) percent threshold of significance. Therefore, the project is not expected to cause significant impacts to operations on this roadway segment and no mitigation measures are required.

e. Cumulative Year 2030 Baseline plus Project Conditions CMP and MTS Roadway Segment Level of Service. The Cumulative Year 2030 Baseline plus Project Conditions AM and PM peak hour roadway segment LOS for the study roadway segment is summarized in **Table 8.**

Table 8: Cumulative Year 2030 Baseline plus Project CMP and MTS Roadway Segment Levels of Service – With BRT

No.	Roadway Segment	Direction	Cumulative 2030 Conditions		Cumulative 2030 plus Project Conditions	
			LOS	v/c	LOS	v/c
AM Peak Hour						
5	**Telegraph Avenue** between 20th Street and 27th Street	NB	D	0.76	D	0.76
		SB	**F**	**1.10**	**F**	**1.10**
PM Peak Hour						
5	**Telegraph Avenue** between 20th Street and 27th Street	NB	**F**	**1.20**	**F**	**1.20**
		SB	E	0.96	E	0.96

Source: AECOM, 2009.
Bold indicates roadway segment operating at LOS F.

As shown in **Table 8**, the project is not expected increase the v/c ratio on this study roadway segment during the AM or PM peak hours. The following roadway segment is expected to operate at unacceptable conditions (LOS F) under Cumulative Year 2030 plus Project Conditions:

- Non-Caltrans Facility
  5. Telegraph Avenue, between 20th Street and 27th Street (SB AM / NB PM).

The project would not result in a significant impact on the following roadway segment:

- <u>Telegraph Avenue, between 20th Street and 27th Street (SB AM and NB PM)</u>
  The increase in v/c ratio as a result of project traffic is less than the three (3) percent threshold of significance. Therefore, the project is not expected to cause significant impacts to operations on this roadway segment and no mitigation measures are required.

Conclusions. Based on the intersection analysis results, the project would result in significant impacts at the intersection Telegraph Avenue / 27th Street under Cumulative Year 2015 Baseline plus Project Conditions; no project-related impact was identified under Cumulative Year 2030 Baseline plus Project Conditions. Without the BRT, a significant project-related impact was identified at this intersection for Cumulative Year 2015 Baseline plus Project Conditions; no project impact was identified under Cumulative Year 2030 Baseline plus Project Conditions. As a result, assuming construction and implementation of the BRT, the project would not result in any additional impacts at the seven (7) study intersections.

Based on the roadway segment analysis results, assuming construction and implementation of the BRT, the project would not result in a significant impact at the CMP and MTS roadway segment on Telegraph Avenue, between 20th Street and 27th Street under Cumulative Year 2015 Baseline plus Project Conditions or Cumulative Year 2030 Baseline plus Project Conditions.

2. Other Planned Transportation Improvements

In addition to the above improvements for which a separate supplementary analysis was conducted, other transportation improvements in various stages of planning are discussed below.

a. Harrison Street/Oakland Avenue Community-Based Transportation Plan (CBTP) Study. The Harrison Street/Oakland Avenue Community-Based Transportation Plan (CBTP) Study is a planning effort that proposes a series of multi-modal improvements (bulbouts, sidewalks, improved crossings), bicycle improvements, transit improvements (bus bulbouts, bus stop relocations), as well as possible roadway closures and road diets. However, the CBTP Study was not included in the DEIR's assumptions of planned transportation network changes. The Harrison-Oakland couplet has not undergone environmental review, has not been approved by the City, is not a funded project, and did not have final designs at the time of preparation of the DEIR. Consistent with City practice, this study was therefore not assumed as part of the planned transportation network changes and was not assumed in the analysis.

However, the City has examined the potential effects of the Emerald Views Development Project on a street network that would include the Harrison-Oakland couplet scheme. The DEIR evaluated one intersection (Harrison Street/Grand Avenue) that was also evaluated in the CBTP Study. The findings from this DEIR and the CBTP Study for the Harrison Street /Grand Avenue intersection are summarized below and in **Table 9**.

Reasons for Different Findings. There are several reasons that the two studies would have different results:

- This DEIR analyzes future forecasted conditions based on ACCMA Model year 2030. The CBTP Study analyzed future forecasted conditions based on ACCMA Model year 2035.
- The Harrison Street/Oakland Avenue Study has assumed fundamental shifts in traffic patterns by converting one-directional traffic flow on Harrison Street and Oakland Avenue to two-way traffic flow north of I-580 and reduced travel lane capacity on these streets south of I-580.
- The two studies collected existing traffic data at different times. The existing traffic data is used as the basis for developing the 2030 traffic forecasts. So, using different existing traffic assumptions will result in different forecasts.
- The signal timing parameters between the two studies were different in the 2030 and 2035 scenarios. This EIR analysis held existing signal timing unchanged under future scenarios (as is proper), whereas the Harrison-Oakland corridor study optimized the timing for their future scenarios. The technical analyst doing the intersection analyses must make determinations regarding several signal timing parameters such as green time allocation to each traffic movement. These parameters are different between the two studies but both are within standard engineering practice.

It is particularly important to note that the proposed Project is expected to contribute less than one percent of change in the total traffic using the Harrison Street and Oakland Avenue. This level of change is negligible compared to the overall change in traffic patterns which the CBTP Study is based.

However, even with these differences the intersection analysis results are similar, indicating that conclusions drawn from the CBTP Study would also be applicable to this DEIR analysis.

Harrison Street / Grand Avenue (CBTP Study Intersection #11). The CBTP Study recommended only minor changes at this intersection, including addition of a bulbout on the northeast corner of the intersection and relocation of the nearside bus stop on the west side of Harrison Street to a farside location.

This DEIR identifies that project-generated traffic, when added to other cumulative traffic year 2030 would not adversely impact this intersection. Although this intersection would operate at LOS F under Cumulative plus Project conditions during the AM and PM peak hour, however the addition of Project-generated traffic to other cumulative traffic by year 2030, would not increase the v/c ratio by more than three percent during the AM or PM peak hour. Therefore, no impact has been identified and no mitigation measures have been recommended at this intersection in this DEIR.

The difference in LOS and delay between the DEIR and the CBTP Study is primarily due to different volumes as a result of the use of different ACCMA travel demand models. In particular, there are substantial differences in baseline volumes on the northbound left-turn, eastbound right-turn, and westbound left-turn and through movements which stem from the use of different versions of the ACCMA model.

Table 9: Proposed Project Year 2030 (With Project) and Harrison/Oakland Corridor Year 2035 (With Improvements) LOS Comparison

				Emerald Views Cumulative LOS (2030)		Harrison/Oakland Cumulative LOS (2035)	
No.	**Intersection**	**Traffic Control**	**Peak Hour**	**LOS**	**Delay**	**LOS**	**Delay**
Within Downtown							
17	Harrison Street / Grand Avenue	Signalized	AM	**F**	**> 120.0**	D	46.1
			PM	**F**	**> 120.0**	**F**	**94.6**

Sources: Dowling Associates, Harrison Street/Oakland Avenue Corridor CBTP (P08-90) Concept Plan Analysis Memorandum, September 2009; Design, Community and Environment, Harrison Street/Oakland Avenue Corridor CTP, February 2010; AECOM, 2010.
Notes:
Bold indicates intersections operating at LOS F.

Conclusions. In conclusion, while the two studies utilized different model years and have different intersection analysis results, traffic generated by the proposed project would not substantially change the characterization of traffic operations in Year 2030 as presented in this DEIR, or in Year 2035 as presented in the CBTP Study. Furthermore, this project is not responsible for implementing any of the Harrison/Oakland Avenue Study improvements for the reasons stated above.

b. Broadway Retail Corridor Specific Plan. This planning effort will outline the details for rezoning and redevelopment of the Broadway Auto Row along Broadway between 23rd Street and 29th Street. Currently occupied primarily by car dealerships and surface parking, the plan proposes to transform this stretch of Broadway into a mixed-use corridor with residential units above ground-floor retail uses. The plan would likely result in substantial changes to traffic volumes and circulation, as well as intersection, roadway, pedestrian, and transit facilities in the area. Possible transportation-related improvements being considered are improved pedestrian and bicycle facilities to improve access to transit stops and stations and enhance circulation within the area by non-auto modes. Opportunities to redesign existing transit services or implement new services such as special shuttles will also be considered and the possibility of improvements to bus stops such as shelters, information, and signage will also be evaluated. These improvements could affect the following study intersections in this EIR:

- Outside Downtown

  20. Broadway / 27th Street.

- Within Downtown

  19. Broadway / West Grand Avenue.

Because a finalized plan has not yet approved or funded, potential effects as a result of the Broadway Retail Corridor Specific Plan were not assumed under Cumulative Year 2015 Baseline Conditions and Cumulative Year 2030 Baseline Conditions scenarios.

c. **I-880 Broadway / Jackson Street Interchange.** A Caltrans Project Study Report (PSR) is currently being prepared by the Alameda County Transportation Improvement Authority (ACTIA) and the City of Alameda, improving traffic operations and circulation in the area around the I-880 Broadway / Jackson Street Interchange. Although the project is not yet fully funded, it could include any of the following elements:

- Construction of a new I-880 southbound off-ramp at Martin Luther King, Jr. Way, relieving traffic using the southbound off-ramp at Broadway;
- Reconstruction of the I-880 northbound off-ramp at Broadway to allow vehicles to directly access the Webster Tube;
- Improvements to the existing Traffic Operations System (TOS) at the Posey / Webster Tubes, I-880, and I-980; and,
- Improvements along 6th Street leading to a new I-880 northbound on-ramp at Market Street.

These elements would affect circulation patterns in the area but is not expected to affect any study intersection in this EIR.

Caltrans have submitted its comments on the Draft PSR to ACTIA, with the final PSR set for completion by late 2009. Since the project is not fully funded nor approved and it is currently unclear how the various improvements would affect operations at study intersections in this EIR located in the vicinity of the interchange, this improvement project was not assumed under Cumulative Year 2015 Baseline Conditions and Cumulative Year 2030 Baseline Conditions scenarios.

APPENDIX B-8

SUPPLEMENTARY ANALYSES LEVEL OF SERVICE CALCULATION WORKSHEETS

Intersection LOS Calculation Worksheets
AC Transit Bus Rapid Transit (BRT)

Cumulative Year 2015 Baseline Conditions

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
4: 11th Street & Oak Street
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	69	0	0	1113	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	75	0	0	1124	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	293	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	293	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	100	100			
cM capacity (veh/h)	667	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	75	281	281	281	281
Volume Left	75	0	0	0	0
Volume Right	0	0	0	0	0
cSH	667	1700	1700	1700	1700
Volume to Capacity	0.11	0.17	0.17	0.17	0.17
Queue Length 95th (ft)	9	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
5: 12th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1758	81	338	824	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		4.0				
Lane Util. Factor					0.91	1.00		0.86				
Frpb, ped/bikes					1.00	0.93		1.00				
Flpb, ped/bikes					1.00	1.00		0.98				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.99				
Satd. Flow (prot)					5085	1467		6164				
Flt Permitted					1.00	1.00		0.99				
Satd. Flow (perm)					5085	1467		6164				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1812	88	363	896	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	8	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1812	80	0	1256	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type						Perm	Perm					
Protected Phases					6			4				
Permitted Phases						6	4					
Actuated Green, G (s)					29.9	29.9		20.6				
Effective Green, g (s)					29.9	29.9		20.6				
Actuated g/C Ratio					0.50	0.50		0.34				
Clearance Time (s)					5.5	5.5		4.0				
Lane Grp Cap (vph)					2534	731		2116				
v/s Ratio Prot					c0.36							
v/s Ratio Perm						0.05		0.20				
v/c Ratio					0.72	0.11		0.59				
Uniform Delay, d1					11.7	8.0		16.2				
Progression Factor					1.00	1.00		1.00				
Incremental Delay, d2					1.8	0.3		1.2				
Delay (s)					13.5	8.3		17.5				
Level of Service					B	A		B				
Approach Delay (s)		0.0			13.2			17.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	415	149	0	0	0	0	0	0	42	807	0
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	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.95								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		5085	1503								5068	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		5085	1503								5068	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	0	451	162	0	0	0	0	0	0	46	849	0
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	451	118	0	0	0	0	0	0	0	885	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type			Perm							Perm		
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								26.0	
Effective Green, g (s)		23.0	23.0								26.0	
Actuated g/C Ratio		0.38	0.38								0.43	
Clearance Time (s)		5.5	5.5								5.5	
Lane Grp Cap (vph)		1949	576								2196	
v/s Ratio Prot		c0.09										
v/s Ratio Perm			0.08								0.17	
v/c Ratio		0.23	0.20								0.40	
Uniform Delay, d1		12.5	12.4								11.7	
Progression Factor		0.75	0.60								1.01	
Incremental Delay, d2		0.3	0.8								0.4	
Delay (s)		9.6	8.2								12.2	
Level of Service		A	A								B	
Approach Delay (s)		9.2			0.0			0.0			12.2	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline AM
9: 12th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	434	1569	0	0	0	0	0	450	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.91						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					4992						4927	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					4992						4927	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	0	0	472	1618	0	0	0	0	0	459	90
RTOR Reduction (vph)	0	0	0	0	88	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	2002	0	0	0	0	0	546	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2163						2176	
v/s Ratio Prot											c0.11	
v/s Ratio Perm					0.40							
v/c Ratio					0.93						0.25	
Uniform Delay, d1					16.1						10.5	
Progression Factor					0.47						1.00	
Incremental Delay, d2					6.2						0.3	
Delay (s)					13.8						10.8	
Level of Service					B						B	
Approach Delay (s)		0.0			13.8			0.0			10.8	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	61.7%	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	0	0	63	1026	95	149	609	0	0	108	52
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	
Lane Util. Factor					0.91			0.95			1.00	
Frt					0.99			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					5011			3505			1780	
Flt Permitted					1.00			0.85			1.00	
Satd. Flow (perm)					5011			2997			1780	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	68	1115	103	162	662	0	0	117	57
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	1269	0	0	824	0	0	166	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					1796			1573			935	
v/s Ratio Prot											0.09	
v/s Ratio Perm					0.25			c0.27				
v/c Ratio					0.71			0.52			0.18	
Uniform Delay, d1					16.5			9.3			7.5	
Progression Factor					1.54			1.00			1.00	
Incremental Delay, d2					1.0			1.3			0.4	
Delay (s)					26.5			10.6			7.9	
Level of Service					C			B			A	
Approach Delay (s)		0.0			26.5			10.6			7.9	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	160	61	48	154	111	60	476	71	67	410	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			5.0			5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.91	
Frpb, ped/bikes		1.00	0.93	1.00	0.95			0.99			1.00	
Flpb, ped/bikes		1.00	1.00	0.93	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.94			0.98			0.99	
Flt Protected		1.00	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1855	1473	1642	1657			3408			4978	
Flt Permitted		0.98	1.00	0.63	1.00			0.86			0.79	
Satd. Flow (perm)		1829	1473	1095	1657			2954			3962	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	174	66	52	167	121	65	512	77	73	446	28
RTOR Reduction (vph)	0	0	42	0	44	0	0	17	0	0	10	0
Lane Group Flow (vph)	0	183	24	52	244	0	0	637	0	0	537	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm		Perm	Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Effective Green, g (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Actuated g/C Ratio		0.37	0.37	0.37	0.37			0.48			0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0			5.0			5.0	
Lane Grp Cap (vph)		671	540	402	608			1481			1189	
v/s Ratio Prot					c0.15			c0.05				
v/s Ratio Perm		0.10	0.02	0.05				c0.16			0.14	
v/c Ratio		0.27	0.04	0.13	0.40			0.43			0.45	
Uniform Delay, d1		13.4	12.2	12.6	14.1			10.1			17.0	
Progression Factor		0.93	0.87	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.0	0.1	0.7	2.0			0.9			1.2	
Delay (s)		13.4	10.7	13.3	16.1			11.0			18.2	
Level of Service		B	B	B	B			B			B	
Approach Delay (s)		12.7			15.7			11.0			18.2	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	78.5%	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)	360	392	145	45	263	112	87	375	23	48	356	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1863	1546	1763	1863	1520	1763	1842		1765	1774	
Flt Permitted	0.40	1.00	1.00	0.47	1.00	1.00	0.16	1.00		0.29	1.00	
Satd. Flow (perm)	745	1863	1546	873	1863	1520	303	1842		539	1774	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	426	158	49	286	122	91	408	25	52	387	151
RTOR Reduction (vph)	0	0	85	0	0	78	0	3	0	0	18	0
Lane Group Flow (vph)	391	426	73	49	286	44	91	430	0	52	520	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	47.4	39.1	39.1	34.8	31.0	31.0	28.6	28.6		28.6	28.6	
Effective Green, g (s)	47.4	39.1	39.1	34.8	31.0	31.0	28.6	28.6		28.6	28.6	
Actuated g/C Ratio	0.56	0.46	0.46	0.41	0.36	0.36	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	559	857	711	397	679	554	102	620		181	597	
v/s Ratio Prot	c0.10	0.23		0.01	0.15			0.23			0.29	
v/s Ratio Perm	c0.29		0.05	0.04		0.03	c0.30			0.10		
v/c Ratio	0.70	0.50	0.10	0.12	0.42	0.08	0.89	0.69		0.29	0.87	
Uniform Delay, d1	11.8	16.1	13.0	15.3	20.3	17.7	26.7	24.4		20.7	26.5	
Progression Factor	1.00	1.00	1.00	0.78	0.73	0.58	1.03	1.02		1.00	1.00	
Incremental Delay, d2	3.1	2.1	0.3	0.1	1.9	0.3	52.3	2.5		0.3	12.8	
Delay (s)	14.9	18.1	13.3	12.0	16.7	10.5	79.8	27.4		21.0	39.3	
Level of Service	B	B	B	B	B	B	E	C		C	D	
Approach Delay (s)		16.1			14.5			36.5			37.7	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	71	0	0	1084	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	77	0	0	1178	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	301	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	301	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	100	100			
cM capacity (veh/h)	663	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	77	295	295	295	295
Volume Left	77	0	0	0	0
Volume Right	0	0	0	0	0
cSH	663	1700	1700	1700	1700
Volume to Capacity	0.12	0.17	0.17	0.17	0.17
Queue Length 95th (ft)	10	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	26.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1054	62	283	989	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		4.0				
Lane Util. Factor					0.91	1.00		0.86				
Frpb, ped/bikes					1.00	0.94		1.00				
Flpb, ped/bikes					1.00	1.00		0.97				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.99				
Satd. Flow (prot)					5085	1484		6163				
Flt Permitted					1.00	1.00		0.99				
Satd. Flow (perm)					5085	1484		6163				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.92	0.92	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	1109	67	308	1030	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	4	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1109	63	0	1314	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type						Perm	Perm					
Protected Phases					6			4				
Permitted Phases						6	4					
Actuated Green, G (s)					29.9	29.9		20.6				
Effective Green, g (s)					29.9	29.9		20.6				
Actuated g/C Ratio					0.50	0.50		0.34				
Clearance Time (s)					5.5	5.5		4.0				
Lane Grp Cap (vph)					2534	740		2116				
v/s Ratio Prot					c0.22							
v/s Ratio Perm						0.04		0.21				
v/c Ratio					0.44	0.09		0.62				
Uniform Delay, d1					9.7	7.9		16.4				
Progression Factor					1.00	1.00		1.00				
Incremental Delay, d2					0.6	0.2		1.4				
Delay (s)					10.2	8.1		17.8				
Level of Service					B	A		B				
Approach Delay (s)		0.0			10.1			17.8			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
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	1010	201	0	0	0	0	0	0	51	956	0
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	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.96								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		5085	1527								5068	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		5085	1527								5068	
Peak-hour factor, PHF	0.25	0.96	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.93	0.25
Adj. Flow (vph)	0	1052	218	0	0	0	0	0	0	55	1028	0
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	1052	193	0	0	0	0	0	0	0	1073	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type			Perm							Perm		
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								26.0	
Effective Green, g (s)		23.0	23.0								26.0	
Actuated g/C Ratio		0.38	0.38								0.43	
Clearance Time (s)		5.5	5.5								5.5	
Lane Grp Cap (vph)		1949	585								2196	
v/s Ratio Prot		c0.21										
v/s Ratio Perm			0.13								0.21	
v/c Ratio		0.54	0.33								0.49	
Uniform Delay, d1		14.4	13.1								12.2	
Progression Factor		0.79	0.66								0.55	
Incremental Delay, d2		1.1	1.5								0.7	
Delay (s)		12.4	10.1								7.5	
Level of Service		B	B								A	
Approach Delay (s)		12.0			0.0			0.0			7.5	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	48.2%	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)	0	0	0	258	977	0	0	0	0	0	780	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.91						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					4976						5029	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					4976						5029	
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.97	0.25	0.25	0.25	0.25	0.25	0.92	0.92
Adj. Flow (vph)	0	0	0	280	1007	0	0	0	0	0	848	51
RTOR Reduction (vph)	0	0	0	0	40	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	0	0	0	1247	0	0	0	0	0	888	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2156						2221	
v/s Ratio Prot											c0.18	
v/s Ratio Perm					0.25							
v/c Ratio					0.58						0.40	
Uniform Delay, d1					12.9						11.4	
Progression Factor					0.58						1.00	
Incremental Delay, d2					1.0						0.5	
Delay (s)					8.4						11.9	
Level of Service					A						B	
Approach Delay (s)		0.0			8.4			0.0			11.9	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
14: 12th Street & Harrison
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	47	660	80	130	492	0	0	67	25
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	
Lane Util. Factor					0.91			0.95			0.95	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4993			3503			3396	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					4993			3056			3396	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	51	717	87	141	535	0	0	73	27
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	0	832	0	0	676	0	0	87	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					1789			1604			1783	
v/s Ratio Prot											0.03	
v/s Ratio Perm					0.17			c0.22				
v/c Ratio					0.47			0.42			0.05	
Uniform Delay, d1					14.8			8.7			6.9	
Progression Factor					1.61			1.00			1.00	
Incremental Delay, d2					0.7			0.8			0.1	
Delay (s)					24.6			9.5			7.0	
Level of Service					C			A			A	
Approach Delay (s)		0.0			24.6			9.5			7.0	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
18: 20th Street & Broadway
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	162	99	63	294	124	109	804	117	45	568	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			5.0			5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.91	
Frpb, ped/bikes		1.00	0.90	1.00	0.96			0.99			0.99	
Flpb, ped/bikes		1.00	1.00	0.92	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.96			0.98			0.99	
Flt Protected		0.99	1.00	0.95	1.00			0.99			1.00	
Satd. Flow (prot)		1844	1430	1621	1711			3405			4971	
Flt Permitted		0.92	1.00	0.61	1.00			0.72			0.80	
Satd. Flow (perm)		1712	1430	1037	1711			2470			4011	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	26	176	108	68	320	135	118	874	123	49	617	42
RTOR Reduction (vph)	0	0	68	0	25	0	0	16	0	0	12	0
Lane Group Flow (vph)	0	202	40	68	430	0	0	1099	0	0	696	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm		Perm	Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Effective Green, g (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Actuated g/C Ratio		0.37	0.37	0.37	0.37			0.48			0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0			5.0			5.0	
Lane Grp Cap (vph)		628	524	380	627			1303			1203	
v/s Ratio Prot					c0.25			c0.10				
v/s Ratio Perm		0.12	0.03	0.07				c0.31			0.17	
v/c Ratio		0.32	0.08	0.18	0.69			0.84			0.58	
Uniform Delay, d1		13.6	12.4	12.9	16.1			13.5			17.8	
Progression Factor		1.59	3.26	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.3	0.3	1.0	6.0			6.8			2.0	
Delay (s)		23.0	40.6	13.9	22.1			20.3			19.8	
Level of Service		C	D	B	C			C			B	
Approach Delay (s)		29.1			21.0			20.3			19.8	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline PM
22: 27th Street & Telegraph Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	415	140	66	660	117	210	506	48	139	480	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1534	1769	1863	1552	1764	3482		1763	3257	
Flt Permitted	0.12	1.00	1.00	0.34	1.00	1.00	0.18	1.00		0.35	1.00	
Satd. Flow (perm)	227	1863	1534	636	1863	1552	339	3482		654	3257	
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)	234	451	152	72	717	127	228	550	52	151	522	397
RTOR Reduction (vph)	0	0	93	0	0	81	0	9	0	0	162	0
Lane Group Flow (vph)	234	451	59	72	717	46	228	593	0	151	757	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	33.1	33.1	33.7	28.3	28.3	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	33.1	33.1	33.7	28.3	28.3	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.40	0.33	0.33	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	300	725	597	324	620	517	132	1352		254	1264	
v/s Ratio Prot	c0.09	0.24		0.01	c0.38			0.17			0.23	
v/s Ratio Perm	0.30		0.04	0.07		0.03	c0.67			0.23		
v/c Ratio	0.78	0.62	0.10	0.22	1.16	0.09	1.73	0.44		0.59	0.60	
Uniform Delay, d1	18.1	20.9	16.5	16.7	28.4	19.5	26.0	19.2		20.7	20.7	
Progression Factor	1.00	1.00	1.00	1.56	1.40	2.59	0.72	0.73		1.00	1.00	
Incremental Delay, d2	11.4	4.0	0.3	0.1	86.3	0.3	353.3	0.1		2.5	0.5	
Delay (s)	29.5	24.9	16.8	26.2	126.2	50.8	372.0	14.0		23.2	21.2	
Level of Service	C	C	B	C	F	D	F	B		C	C	
Approach Delay (s)		24.7			107.9			112.4			21.5	
Approach LOS		C			F			F			C	

Intersection Summary			
HCM Average Control Delay	64.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2030 Baseline Conditions

HCM Unsignalized Intersection Capacity Analysis
4: 11th Street & Oak Street

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	83	0	0	1353	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	90	0	0	1367	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	354	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	354	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	612	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	90	342	342	342	342
Volume Left	90	0	0	0	0
Volume Right	0	0	0	0	0
cSH	612	1700	1700	1700	1700
Volume to Capacity	0.15	0.20	0.20	0.20	0.20
Queue Length 95th (ft)	13	0	0	0	0
Control Delay (s)	11.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	30.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
5: 12th St. & Oak St.

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	2132	98	410	1002	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		4.0				
Lane Util. Factor					0.91	1.00		0.86				
Frpb, ped/bikes					1.00	0.93		1.00				
Flpb, ped/bikes					1.00	1.00		0.98				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.99				
Satd. Flow (prot)					5085	1467		6164				
Flt Permitted					1.00	1.00		0.99				
Satd. Flow (perm)					5085	1467		6164				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2198	107	441	1089	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	4	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2198	103	0	1529	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type						Perm	Perm					
Protected Phases					6			4				
Permitted Phases						6	4					
Actuated Green, G (s)					29.9	29.9		20.6				
Effective Green, g (s)					29.9	29.9		20.6				
Actuated g/C Ratio					0.50	0.50		0.34				
Clearance Time (s)					5.5	5.5		4.0				
Lane Grp Cap (vph)					2534	731		2116				
v/s Ratio Prot					c0.43							
v/s Ratio Perm						0.07		0.25				
v/c Ratio					0.87	0.14		0.72				
Uniform Delay, d1					13.3	8.1		17.2				
Progression Factor					1.00	1.00		1.00				
Incremental Delay, d2					4.3	0.4		2.2				
Delay (s)					17.6	8.5		19.4				
Level of Service					B	A		B				
Approach Delay (s)		0.0			17.2			19.4			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: 11th Street & Madison Street

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	504	180	0	0	0	0	0	0	64	980	0
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	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.95								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		5085	1503								5064	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		5085	1503								5064	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	0	548	196	0	0	0	0	0	0	70	1032	0
RTOR Reduction (vph)	0	0	25	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	548	171	0	0	0	0	0	0	0	1090	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type			Perm							Perm		
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								26.0	
Effective Green, g (s)		23.0	23.0								26.0	
Actuated g/C Ratio		0.38	0.38								0.43	
Clearance Time (s)		5.5	5.5								5.5	
Lane Grp Cap (vph)		1949	576								2194	
v/s Ratio Prot		0.11										
v/s Ratio Perm			c0.11								0.22	
v/c Ratio		0.28	0.30								0.50	
Uniform Delay, d1		12.8	12.9								12.3	
Progression Factor		0.73	0.66								0.94	
Incremental Delay, d2		0.4	1.3								0.6	
Delay (s)		9.7	9.8								12.1	
Level of Service		A	A								B	
Approach Delay (s)		9.7			0.0			0.0			12.1	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: 12th St. & Madison Street

Cumulative 2030 Baseline AM
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	526	1903	0	0	0	0	0	603	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.91						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					4992						4935	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					4992						4935	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	0	0	572	1962	0	0	0	0	0	615	113
RTOR Reduction (vph)	0	0	0	0	84	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	2450	0	0	0	0	0	727	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2163						2180	
v/s Ratio Prot											c0.15	
v/s Ratio Perm					0.49							
v/c Ratio					1.13						0.33	
Uniform Delay, d1					17.0						11.0	
Progression Factor					0.48						1.00	
Incremental Delay, d2					63.0						0.4	
Delay (s)					71.2						11.4	
Level of Service					E						B	
Approach Delay (s)		0.0			71.2			0.0			11.4	
Approach LOS		A			E			A			B	

Intersection Summary			
HCM Average Control Delay	57.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
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)	0	0	0	76	1246	115	180	739	0	0	131	63
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	
Lane Util. Factor					0.91			0.95			1.00	
Frt					0.99			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					5011			3505			1781	
Flt Permitted					1.00			0.83			1.00	
Satd. Flow (perm)					5011			2944			1781	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	83	1354	125	196	803	0	0	142	68
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	1545	0	0	999	0	0	207	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					1796			1546			935	
v/s Ratio Prot											0.12	
v/s Ratio Perm					0.31			c0.34				
v/c Ratio					0.86			0.65			0.22	
Uniform Delay, d1					17.9			10.2			7.7	
Progression Factor					1.50			1.00			1.00	
Incremental Delay, d2					0.6			2.1			0.5	
Delay (s)					27.3			12.3			8.2	
Level of Service					C			B			A	
Approach Delay (s)		0.0			27.3			12.3			8.2	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	74.6%	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)	10	226	77	61	196	141	76	606	97	80	522	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			5.0			5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.91	
Frpb, ped/bikes		1.00	0.93	1.00	0.95			0.99			1.00	
Flpb, ped/bikes		1.00	1.00	0.94	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.94			0.98			0.99	
Flt Protected		1.00	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1857	1473	1661	1658			3405			4983	
Flt Permitted		0.98	1.00	0.54	1.00			0.80			0.76	
Satd. Flow (perm)		1827	1473	938	1658			2750			3792	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	246	84	66	213	153	83	652	105	87	567	36
RTOR Reduction (vph)	0	0	53	0	43	0	0	19	0	0	10	0
Lane Group Flow (vph)	0	257	31	66	323	0	0	821	0	0	680	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm		Perm	Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Effective Green, g (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Actuated g/C Ratio		0.37	0.37	0.37	0.37			0.48			0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0			5.0			5.0	
Lane Grp Cap (vph)		670	540	344	608			1406			1138	
v/s Ratio Prot					c0.19			c0.07				
v/s Ratio Perm		0.14	0.02	0.07				c0.21			0.18	
v/c Ratio		0.38	0.06	0.19	0.53			0.58			0.60	
Uniform Delay, d1		14.0	12.3	12.9	14.9			11.2			17.9	
Progression Factor		0.93	0.94	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.5	0.2	1.2	3.3			1.8			2.3	
Delay (s)		14.5	11.7	14.2	18.2			12.9			20.2	
Level of Service		B	B	B	B			B			C	
Approach Delay (s)		13.8			17.6			12.9			20.2	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	87.6%	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)	437	459	173	55	315	136	104	455	28	59	420	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1863	1546	1767	1863	1519	1765	1843		1766	1772	
Flt Permitted	0.30	1.00	1.00	0.30	1.00	1.00	0.13	1.00		0.24	1.00	
Satd. Flow (perm)	566	1863	1546	556	1863	1519	233	1843		452	1772	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	475	499	188	60	342	148	108	495	30	64	457	183
RTOR Reduction (vph)	0	0	114	0	0	100	0	2	0	0	17	0
Lane Group Flow (vph)	475	499	74	60	342	48	108	523	0	64	623	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	33.4	33.4	32.6	27.5	27.5	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	33.4	33.4	32.6	27.5	27.5	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.38	0.32	0.32	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	442	732	607	286	603	491	90	716		175	688	
v/s Ratio Prot	c0.14	0.27		0.01	0.18			0.28			0.35	
v/s Ratio Perm	c0.40		0.05	0.07		0.03	c0.46			0.14		
v/c Ratio	1.07	0.68	0.12	0.21	0.57	0.10	1.20	0.73		0.37	0.91	
Uniform Delay, d1	18.9	21.4	16.4	17.4	23.8	20.1	26.0	22.2		18.5	24.5	
Progression Factor	1.00	1.00	1.00	0.81	0.72	0.56	1.03	1.03		1.00	1.00	
Incremental Delay, d2	64.2	5.1	0.4	0.1	3.7	0.4	149.5	2.6		0.5	15.1	
Delay (s)	83.1	26.5	16.9	14.2	20.9	11.5	176.2	25.5		19.0	39.7	
Level of Service	F	C	B	B	C	B	F	C		B	D	
Approach Delay (s)		48.1			17.7			51.2			37.8	
Approach LOS		D			B			D			D	

Intersection Summary			
HCM Average Control Delay	40.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: 11th Street & Oak Street

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	87	0	0	1262	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	95	0	0	1372	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	349	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	619	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	95	343	343	343	343
Volume Left	95	0	0	0	0
Volume Right	0	0	0	0	0
cSH	619	1700	1700	1700	1700
Volume to Capacity	0.15	0.20	0.20	0.20	0.20
Queue Length 95th (ft)	13	0	0	0	0
Control Delay (s)	11.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
5: 12th Street & Oak St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1289	76	436	1152	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		4.0				
Lane Util. Factor					0.91	1.00		0.86				
Frpb, ped/bikes					1.00	0.94		1.00				
Flpb, ped/bikes					1.00	1.00		0.97				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.99				
Satd. Flow (prot)					5085	1484		6107				
Flt Permitted					1.00	1.00		0.99				
Satd. Flow (perm)					5085	1484		6107				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.92	0.92	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	1357	83	474	1200	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	2	0	12	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1357	81	0	1662	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type						Perm	Perm					
Protected Phases					6			4				
Permitted Phases						6	4					
Actuated Green, G (s)					29.9	29.9		20.6				
Effective Green, g (s)					29.9	29.9		20.6				
Actuated g/C Ratio					0.50	0.50		0.34				
Clearance Time (s)					5.5	5.5		4.0				
Lane Grp Cap (vph)					2534	740		2097				
v/s Ratio Prot					c0.27							
v/s Ratio Perm						0.05		0.27				
v/c Ratio					0.54	0.11		0.79				
Uniform Delay, d1					10.3	8.0		17.8				
Progression Factor					1.00	1.00		1.00				
Incremental Delay, d2					0.8	0.3		3.2				
Delay (s)					11.1	8.3		20.9				
Level of Service					B	A		C				
Approach Delay (s)		0.0			11.0			20.9			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: 11th Street & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1295	246	0	0	0	0	0	0	60	1100	0
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	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.96								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		5085	1527								5068	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		5085	1527								5068	
Peak-hour factor, PHF	0.25	0.96	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.93	0.25
Adj. Flow (vph)	0	1349	267	0	0	0	0	0	0	65	1183	0
RTOR Reduction (vph)	0	0	15	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	1349	252	0	0	0	0	0	0	0	1244	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type			Perm							Perm		
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								26.0	
Effective Green, g (s)		23.0	23.0								26.0	
Actuated g/C Ratio		0.38	0.38								0.43	
Clearance Time (s)		5.5	5.5								5.5	
Lane Grp Cap (vph)		1949	585								2196	
v/s Ratio Prot		c0.27										
v/s Ratio Perm			0.17								0.25	
v/c Ratio		0.69	0.43								0.57	
Uniform Delay, d1		15.5	13.7								12.8	
Progression Factor		0.78	0.68								0.53	
Incremental Delay, d2		2.0	2.3								0.9	
Delay (s)		14.2	11.6								7.7	
Level of Service		B	B								A	
Approach Delay (s)		13.7			0.0			0.0			7.7	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: 12th Street & Madison Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	316	1195	0	0	0	0	0	895	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.91						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					4976						5026	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					4976						5026	
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.97	0.25	0.25	0.25	0.25	0.25	0.92	0.92
Adj. Flow (vph)	0	0	0	343	1232	0	0	0	0	0	973	62
RTOR Reduction (vph)	0	0	0	0	27	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	1548	0	0	0	0	0	1026	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2156						2220	
v/s Ratio Prot											c0.20	
v/s Ratio Perm					0.31							
v/c Ratio					0.72						0.46	
Uniform Delay, d1					14.0						11.7	
Progression Factor					0.64						1.00	
Incremental Delay, d2					1.7						0.7	
Delay (s)					10.6						12.4	
Level of Service					B						B	
Approach Delay (s)		0.0			10.6			0.0			12.4	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	57.1%	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)	0	0	0	58	808	97	145	551	0	0	75	28
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	
Lane Util. Factor					0.91			0.95			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4994			3503			1795	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					4994			3039			1795	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	63	878	105	158	599	0	0	82	30
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	0	1024	0	0	757	0	0	98	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					1790			1595			942	
v/s Ratio Prot											0.05	
v/s Ratio Perm					0.20			c0.25				
v/c Ratio					0.57			0.47			0.10	
Uniform Delay, d1					15.5			9.0			7.2	
Progression Factor					1.67			1.00			1.00	
Incremental Delay, d2					0.9			1.0			0.2	
Delay (s)					26.8			10.0			7.4	
Level of Service					C			B			A	
Approach Delay (s)		0.0			26.8			10.0			7.4	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
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)	29	197	122	78	331	141	127	932	135	52	656	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			5.0			5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.91	
Frpb, ped/bikes		1.00	0.90	1.00	0.96			0.99			0.99	
Flpb, ped/bikes		1.00	1.00	0.92	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.96			0.98			0.99	
Flt Protected		0.99	1.00	0.95	1.00			0.99			1.00	
Satd. Flow (prot)		1845	1430	1634	1711			3409			4970	
Flt Permitted		0.80	1.00	0.55	1.00			0.65			0.77	
Satd. Flow (perm)		1484	1430	947	1711			2237			3862	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	32	214	133	85	360	153	138	1013	142	57	713	50
RTOR Reduction (vph)	0	0	84	0	25	0	0	16	0	0	12	0
Lane Group Flow (vph)	0	246	49	85	488	0	0	1277	0	0	808	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm		Perm	Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Effective Green, g (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Actuated g/C Ratio		0.37	0.37	0.37	0.37			0.48			0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0			5.0			5.0	
Lane Grp Cap (vph)		544	524	347	627			1218			1159	
v/s Ratio Prot					c0.29			c0.12				
v/s Ratio Perm		0.17	0.03	0.09				c0.38			0.21	
v/c Ratio		0.45	0.09	0.24	0.78			1.05			0.70	
Uniform Delay, d1		14.4	12.5	13.2	16.8			15.5			18.6	
Progression Factor		1.54	3.36	1.00	1.00			1.00			1.00	
Incremental Delay, d2		2.5	0.3	1.7	9.2			39.5			3.5	
Delay (s)		24.8	42.2	14.9	26.0			55.0			22.1	
Level of Service		C	D	B	C			D			C	
Approach Delay (s)		30.9			24.5			55.0			22.1	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	108.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	256	493	166	78	734	139	238	619	59	170	588	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1534	1769	1863	1531	1770	1833		1770	1714	
Flt Permitted	0.12	1.00	1.00	0.24	1.00	1.00	0.12	1.00		0.12	1.00	
Satd. Flow (perm)	232	1863	1534	444	1863	1531	226	1833		226	1714	
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	536	180	85	798	151	259	673	64	185	639	486
RTOR Reduction (vph)	0	0	111	0	0	71	0	4	0	0	32	0
Lane Group Flow (vph)	278	536	69	85	798	80	259	733	0	185	1093	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	32.8	32.8	33.3	27.6	27.6	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	32.8	32.8	33.3	27.6	27.6	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.39	0.32	0.32	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	315	719	592	263	605	497	88	712		88	665	
v/s Ratio Prot	c0.11	0.29		0.02	c0.43			0.40			0.64	
v/s Ratio Perm	0.33		0.05	0.11		0.05	c1.15			0.82		
v/c Ratio	0.88	0.75	0.12	0.32	1.32	0.16	2.94	1.03		2.10	1.64	
Uniform Delay, d1	20.9	22.5	16.8	17.7	28.7	20.5	26.0	26.0		26.0	26.0	
Progression Factor	1.00	1.00	1.00	1.53	1.37	2.00	0.75	0.75		1.00	1.00	
Incremental Delay, d2	23.3	6.9	0.4	0.2	152.9	0.6	891.7	33.2		532.4	296.1	
Delay (s)	44.2	29.4	17.2	27.2	192.2	41.5	911.3	52.6		558.4	322.1	
Level of Service	D	C	B	C	F	D	F	D		F	F	
Approach Delay (s)		31.3			156.6			275.9			355.5	
Approach LOS		C			F			F			F	

Intersection Summary			
HCM Average Control Delay	215.4	HCM Level of Service	F
HCM Volume to Capacity ratio	2.01		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	140.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2015 Baseline plus Project Conditions

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM
4: 11th Street & Oak Street
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	69	0	0	1122	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	75	0	0	1133	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	295	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	295	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	100	100			
cM capacity (veh/h)	665	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	75	283	283	283	283
Volume Left	75	0	0	0	0
Volume Right	0	0	0	0	0
cSH	665	1700	1700	1700	1700
Volume to Capacity	0.11	0.17	0.17	0.17	0.17
Queue Length 95th (ft)	9	0	0	0	0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.1	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM
5: 12th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1758	81	338	833	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		4.0				
Lane Util. Factor					0.91	1.00		0.86				
Frpb, ped/bikes					1.00	0.93		1.00				
Flpb, ped/bikes					1.00	1.00		0.98				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.99				
Satd. Flow (prot)					5085	1467		6165				
Flt Permitted					1.00	1.00		0.99				
Satd. Flow (perm)					5085	1467		6165				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1812	88	363	905	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	8	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1812	80	0	1265	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type						Perm	Perm					
Protected Phases					6			4				
Permitted Phases						6	4					
Actuated Green, G (s)					29.9	29.9		20.6				
Effective Green, g (s)					29.9	29.9		20.6				
Actuated g/C Ratio					0.50	0.50		0.34				
Clearance Time (s)					5.5	5.5		4.0				
Lane Grp Cap (vph)					2534	731		2117				
v/s Ratio Prot					c0.36							
v/s Ratio Perm						0.05		0.21				
v/c Ratio					0.72	0.11		0.60				
Uniform Delay, d1					11.7	8.0		16.3				
Progression Factor					1.00	1.00		1.00				
Incremental Delay, d2					1.8	0.3		1.3				
Delay (s)					13.5	8.3		17.5				
Level of Service					B	A		B				
Approach Delay (s)		0.0			13.2			17.5			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	415	149	0	0	0	0	0	0	42	833	0
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	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.95								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		5085	1503								5068	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		5085	1503								5068	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	0	451	162	0	0	0	0	0	0	46	877	0
RTOR Reduction (vph)	0	0	41	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	451	121	0	0	0	0	0	0	0	913	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type			Perm							Perm		
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								26.0	
Effective Green, g (s)		23.0	23.0								26.0	
Actuated g/C Ratio		0.38	0.38								0.43	
Clearance Time (s)		5.5	5.5								5.5	
Lane Grp Cap (vph)		1949	576								2196	
v/s Ratio Prot		c0.09										
v/s Ratio Perm			0.08								0.18	
v/c Ratio		0.23	0.21								0.42	
Uniform Delay, d1		12.5	12.4								11.8	
Progression Factor		0.75	0.60								1.04	
Incremental Delay, d2		0.3	0.8								0.5	
Delay (s)		9.6	8.3								12.7	
Level of Service		A	A								B	
Approach Delay (s)		9.3			0.0			0.0			12.7	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project AM
9: 12th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	476	1569	0	0	0	0	0	450	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.91						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					4986						4927	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					4986						4927	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	0	0	517	1618	0	0	0	0	0	459	90
RTOR Reduction (vph)	0	0	0	0	96	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	2039	0	0	0	0	0	546	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2161						2176	
v/s Ratio Prot											c0.11	
v/s Ratio Perm					0.41							
v/c Ratio					0.94						0.25	
Uniform Delay, d1					16.3						10.5	
Progression Factor					0.47						1.00	
Incremental Delay, d2					7.6						0.3	
Delay (s)					15.3						10.8	
Level of Service					B						B	
Approach Delay (s)		0.0			15.3			0.0			10.8	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

14: 12th St. & Harrison

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	63	1032	95	149	609	0	0	108	52
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	
Lane Util. Factor					0.91			0.95			1.00	
Frt					0.99			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					5011			3505			1780	
Flt Permitted					1.00			0.85			1.00	
Satd. Flow (perm)					5011			2997			1780	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	68	1122	103	162	662	0	0	117	57
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	7	0
Lane Group Flow (vph)	0	0	0	0	1276	0	0	824	0	0	167	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					1796			1573			935	
v/s Ratio Prot											0.09	
v/s Ratio Perm					0.25			c0.27				
v/c Ratio					0.71			0.52			0.18	
Uniform Delay, d1					16.6			9.3			7.5	
Progression Factor					1.54			1.00			1.00	
Incremental Delay, d2					1.0			1.3			0.4	
Delay (s)					26.5			10.6			7.9	
Level of Service					C			B			A	
Approach Delay (s)		0.0			26.5			10.6			7.9	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

18: 20th Street & Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	202	64	50	167	139	63	499	86	68	430	27
Ideal 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			5.0			5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.91	
Frpb, ped/bikes		1.00	0.93	1.00	0.95			0.99			1.00	
Flpb, ped/bikes		1.00	1.00	0.93	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.93			0.98			0.99	
Flt Protected		1.00	1.00	0.95	1.00			1.00			0.99	
Satd. Flow (prot)		1856	1473	1654	1641			3396			4981	
Flt Permitted		0.98	1.00	0.57	1.00			0.86			0.79	
Satd. Flow (perm)		1829	1473	995	1641			2928			3937	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	220	70	54	182	151	68	537	93	74	467	29
RTOR Reduction (vph)	0	0	44	0	50	0	0	20	0	0	10	0
Lane Group Flow (vph)	0	230	26	54	283	0	0	678	0	0	560	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm		Perm	Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Effective Green, g (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Actuated g/C Ratio		0.37	0.37	0.37	0.37			0.48			0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0			5.0			5.0	
Lane Grp Cap (vph)		671	540	365	602			1470			1181	
v/s Ratio Prot					c0.17			c0.05				
v/s Ratio Perm		0.13	0.02	0.05				c0.17			0.14	
v/c Ratio		0.34	0.05	0.15	0.47			0.46			0.47	
Uniform Delay, d1		13.8	12.2	12.7	14.5			10.3			17.1	
Progression Factor		0.93	0.87	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.3	0.2	0.9	2.6			1.0			1.4	
Delay (s)		14.1	10.9	13.6	17.2			11.3			18.5	
Level of Service		B	B	B	B			B			B	
Approach Delay (s)		13.3			16.7			11.3			18.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

22: 27th Street & Telegraph Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	360	392	145	45	289	112	87	380	23	48	357	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1863	1546	1763	1863	1520	1763	1843		1765	1774	
Flt Permitted	0.37	1.00	1.00	0.48	1.00	1.00	0.16	1.00		0.28	1.00	
Satd. Flow (perm)	685	1863	1546	882	1863	1520	300	1843		527	1774	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	391	426	158	49	314	122	91	413	25	52	388	151
RTOR Reduction (vph)	0	0	85	0	0	78	0	3	0	0	18	0
Lane Group Flow (vph)	391	426	73	49	314	44	91	435	0	52	521	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	47.4	39.1	39.1	34.5	30.7	30.7	28.6	28.6		28.6	28.6	
Effective Green, g (s)	47.4	39.1	39.1	34.5	30.7	30.7	28.6	28.6		28.6	28.6	
Actuated g/C Ratio	0.56	0.46	0.46	0.41	0.36	0.36	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	538	857	711	397	673	549	101	620		177	597	
v/s Ratio Prot	c0.10	0.23		0.01	0.17			0.24			0.29	
v/s Ratio Perm	c0.30		0.05	0.04		0.03	c0.30			0.10		
v/c Ratio	0.73	0.50	0.10	0.12	0.47	0.08	0.90	0.70		0.29	0.87	
Uniform Delay, d1	12.1	16.1	13.0	15.5	20.9	17.9	26.9	24.5		20.8	26.5	
Progression Factor	1.00	1.00	1.00	0.76	0.71	0.52	1.02	1.01		1.00	1.00	
Incremental Delay, d2	4.1	2.1	0.3	0.0	2.3	0.3	55.0	2.7		0.3	12.9	
Delay (s)	16.3	18.1	13.3	11.7	17.1	9.7	82.4	27.5		21.1	39.4	
Level of Service	B	B	B	B	B	A	F	C		C	D	
Approach Delay (s)		16.6			14.7			36.9			37.8	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
4: 11th Street & Oak Street
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	71	0	0	1117	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	77	0	0	1214	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	310	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	100	100			
cM capacity (veh/h)	655	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	77	304	304	304	304
Volume Left	77	0	0	0	0
Volume Right	0	0	0	0	0
cSH	655	1700	1700	1700	1700
Volume to Capacity	0.12	0.18	0.18	0.18	0.18
Queue Length 95th (ft)	10	0	0	0	0
Control Delay (s)	11.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.2	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
5: 12th Street & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1054	62	283	1022	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		4.0				
Lane Util. Factor					0.91	1.00		0.86				
Frpb, ped/bikes					1.00	0.94		1.00				
Flpb, ped/bikes					1.00	1.00		0.97				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.99				
Satd. Flow (prot)					5085	1484		6169				
Flt Permitted					1.00	1.00		0.99				
Satd. Flow (perm)					5085	1484		6169				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.92	0.92	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	1109	67	308	1065	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	3	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1109	64	0	1349	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type						Perm	Perm					
Protected Phases					6			4				
Permitted Phases						6	4					
Actuated Green, G (s)					29.9	29.9		20.6				
Effective Green, g (s)					29.9	29.9		20.6				
Actuated g/C Ratio					0.50	0.50		0.34				
Clearance Time (s)					5.5	5.5		4.0				
Lane Grp Cap (vph)					2534	740		2118				
v/s Ratio Prot					c0.22							
v/s Ratio Perm						0.04		0.22				
v/c Ratio					0.44	0.09		0.64				
Uniform Delay, d1					9.7	7.9		16.6				
Progression Factor					1.00	1.00		1.00				
Incremental Delay, d2					0.6	0.2		1.5				
Delay (s)					10.2	8.1		18.0				
Level of Service					B	A		B				
Approach Delay (s)		0.0			10.1			18.0			0.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1010	201	0	0	0	0	0	0	51	969	0
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	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.96								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		5085	1527								5068	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		5085	1527								5068	
Peak-hour factor, PHF	0.25	0.96	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.93	0.25
Adj. Flow (vph)	0	1052	218	0	0	0	0	0	0	55	1042	0
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	0	0	10	0
Lane Group Flow (vph)	0	1052	195	0	0	0	0	0	0	0	1087	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type			Perm							Perm		
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								26.0	
Effective Green, g (s)		23.0	23.0								26.0	
Actuated g/C Ratio		0.38	0.38								0.43	
Clearance Time (s)		5.5	5.5								5.5	
Lane Grp Cap (vph)		1949	585								2196	
v/s Ratio Prot		c0.21										
v/s Ratio Perm			0.13								0.21	
v/c Ratio		0.54	0.33								0.50	
Uniform Delay, d1		14.4	13.1								12.3	
Progression Factor		0.79	0.66								0.55	
Incremental Delay, d2		1.1	1.5								0.7	
Delay (s)		12.4	10.1								7.4	
Level of Service		B	B								A	
Approach Delay (s)		12.0			0.0			0.0			7.4	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2015 Baseline plus Project PM
9: 12th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	258	977	0	0	0	0	0	793	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.91						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					4976						5030	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					4976						5030	
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.97	0.25	0.25	0.25	0.25	0.25	0.92	0.92
Adj. Flow (vph)	0	0	0	280	1007	0	0	0	0	0	862	51
RTOR Reduction (vph)	0	0	0	0	39	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	0	0	0	1248	0	0	0	0	0	902	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2156						2222	
v/s Ratio Prot											c0.18	
v/s Ratio Perm					0.25							
v/c Ratio					0.58						0.41	
Uniform Delay, d1					12.9						11.4	
Progression Factor					0.58						1.00	
Incremental Delay, d2					1.0						0.6	
Delay (s)					8.4						11.9	
Level of Service					A						B	
Approach Delay (s)		0.0			8.4			0.0			11.9	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

14: 12th Street & Harrison

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	47	663	80	130	492	0	0	67	25
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	
Lane Util. Factor					0.91			0.95			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4993			3503			1795	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					4993			3061			1795	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	51	721	87	141	535	0	0	73	27
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	13	0
Lane Group Flow (vph)	0	0	0	0	836	0	0	676	0	0	87	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					1789			1607			942	
v/s Ratio Prot											0.05	
v/s Ratio Perm					0.17			c0.22				
v/c Ratio					0.47			0.42			0.09	
Uniform Delay, d1					14.8			8.7			7.1	
Progression Factor					1.61			1.00			1.00	
Incremental Delay, d2					0.7			0.8			0.2	
Delay (s)					24.6			9.5			7.3	
Level of Service					C			A			A	
Approach Delay (s)		0.0			24.6			9.5			7.3	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

18: 20th Street & Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	162	99	63	296	135	109	804	117	50	568	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			5.0			5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.91	
Frpb, ped/bikes		1.00	0.90	1.00	0.96			0.99			0.99	
Flpb, ped/bikes		1.00	1.00	0.92	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.95			0.98			0.99	
Flt Protected		0.99	1.00	0.95	1.00			0.99			1.00	
Satd. Flow (prot)		1844	1430	1621	1703			3410			4988	
Flt Permitted		0.91	1.00	0.61	1.00			0.72			0.79	
Satd. Flow (perm)		1698	1430	1037	1703			2468			3965	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	26	176	108	68	322	147	118	874	123	54	617	42
RTOR Reduction (vph)	0	0	68	0	27	0	0	16	0	0	11	0
Lane Group Flow (vph)	0	202	40	68	442	0	0	1099	0	0	702	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm		Perm	Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Effective Green, g (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Actuated g/C Ratio		0.37	0.37	0.37	0.37			0.48			0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0			5.0			5.0	
Lane Grp Cap (vph)		623	524	380	624			1303			1190	
v/s Ratio Prot					c0.26			c0.10				
v/s Ratio Perm		0.12	0.03	0.07				c0.31			0.18	
v/c Ratio		0.32	0.08	0.18	0.71			0.84			0.59	
Uniform Delay, d1		13.7	12.4	12.9	16.3			13.5			17.9	
Progression Factor		1.65	3.47	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.3	0.3	1.0	6.7			6.8			2.1	
Delay (s)		23.8	43.2	13.9	22.9			20.3			20.0	
Level of Service		C	D	B	C			C			C	
Approach Delay (s)		30.6			21.8			20.3			20.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

22: 27th Street & Telegraph Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	415	140	66	673	117	210	508	48	139	485	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1534	1769	1863	1531	1770	1833		1765	1715	
Flt Permitted	0.12	1.00	1.00	0.34	1.00	1.00	0.12	1.00		0.16	1.00	
Satd. Flow (perm)	227	1863	1534	636	1863	1531	226	1833		301	1715	
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)	234	451	152	72	732	127	228	552	52	151	527	397
RTOR Reduction (vph)	0	0	93	0	0	79	0	4	0	0	32	0
Lane Group Flow (vph)	234	451	59	72	732	48	228	600	0	151	892	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	33.1	33.1	33.7	28.3	28.3	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	33.1	33.1	33.7	28.3	28.3	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.40	0.33	0.33	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	300	725	597	324	620	510	88	712		117	666	
v/s Ratio Prot	c0.09	0.24		0.01	c0.39			0.33			0.52	
v/s Ratio Perm	0.30		0.04	0.07		0.03	c1.01			0.50		
v/c Ratio	0.78	0.62	0.10	0.22	1.18	0.09	2.59	0.84		1.29	1.34	
Uniform Delay, d1	18.1	20.9	16.5	16.7	28.4	19.5	26.0	23.6		26.0	26.0	
Progression Factor	1.00	1.00	1.00	1.57	1.41	2.55	0.72	0.69		1.00	1.00	
Incremental Delay, d2	11.4	4.0	0.3	0.1	95.9	0.3	739.4	6.4		180.3	162.8	
Delay (s)	29.5	24.9	16.8	26.3	135.9	50.2	758.1	22.6		206.3	188.8	
Level of Service	C	C	B	C	F	D	F	C		F	F	
Approach Delay (s)		24.7			115.8			224.2			191.3	
Approach LOS		C			F			F			F	

Intersection Summary			
HCM Average Control Delay	141.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.78		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	123.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Cumulative Year 2030 Baseline plus Project Conditions

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
4: 11th Street & Oak Street
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	83	0	0	1362	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.99	0.92	0.92
Hourly flow rate (vph)	90	0	0	1376	0	0
Pedestrians	12					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	356	12	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	356	12	12			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	610	1055	1589			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	90	344	344	344	344
Volume Left	90	0	0	0	0
Volume Right	0	0	0	0	0
cSH	610	1700	1700	1700	1700
Volume to Capacity	0.15	0.20	0.20	0.20	0.20
Queue Length 95th (ft)	13	0	0	0	0
Control Delay (s)	11.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.9	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	31.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
5: 12th St. & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	2132	98	410	1011	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5			4.0				
Lane Util. Factor					0.91			0.86				
Frpb, ped/bikes					1.00			1.00				
Flpb, ped/bikes					1.00			0.98				
Frt					0.99			1.00				
Flt Protected					1.00			0.99				
Satd. Flow (prot)					5033			6165				
Flt Permitted					1.00			0.99				
Satd. Flow (perm)					5033			6165				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	2198	107	441	1099	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	2301	0	0	1539	0	0	0	0
Confl. Peds. (#/hr)	102		102	84		84	84		84	168		168
Confl. Bikes (#/hr)			1									1
Turn Type							Perm					
Protected Phases					6			4				
Permitted Phases							4					
Actuated Green, G (s)					29.9			20.6				
Effective Green, g (s)					29.9			20.6				
Actuated g/C Ratio					0.50			0.34				
Clearance Time (s)					5.5			4.0				
Lane Grp Cap (vph)					2508			2117				
v/s Ratio Prot					c0.46							
v/s Ratio Perm								0.25				
v/c Ratio					0.92			0.73				
Uniform Delay, d1					13.9			17.2				
Progression Factor					1.00			1.00				
Incremental Delay, d2					6.8			2.2				
Delay (s)					20.7			19.5				
Level of Service					C			B				
Approach Delay (s)		0.0			20.7			19.5			0.0	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	504	180	0	0	0	0	0	0	64	1006	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5									5.5	
Lane Util. Factor		0.91									0.91	
Frpb, ped/bikes		0.99									1.00	
Flpb, ped/bikes		1.00									1.00	
Frt		0.96									1.00	
Flt Protected		1.00									1.00	
Satd. Flow (prot)		4819									5064	
Flt Permitted		1.00									1.00	
Satd. Flow (perm)		4819									5064	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92
Adj. Flow (vph)	0	548	196	0	0	0	0	0	0	70	1059	0
RTOR Reduction (vph)	0	22	0	0	0	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	722	0	0	0	0	0	0	0	0	1117	0
Confl. Peds. (#/hr)	32		32	21		21	23		23	17		17
Confl. Bikes (#/hr)			10			10			2			3
Turn Type										Perm		
Protected Phases		2									4	
Permitted Phases										4		
Actuated Green, G (s)		23.0									26.0	
Effective Green, g (s)		23.0									26.0	
Actuated g/C Ratio		0.38									0.43	
Clearance Time (s)		5.5									5.5	
Lane Grp Cap (vph)		1847									2194	
v/s Ratio Prot		c0.15										
v/s Ratio Perm											0.22	
v/c Ratio		0.39									0.51	
Uniform Delay, d1		13.4									12.4	
Progression Factor		0.76									0.92	
Incremental Delay, d2		0.6									0.6	
Delay (s)		10.8									12.0	
Level of Service		B									B	
Approach Delay (s)		10.8			0.0			0.0			12.0	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project AM
9: 12th St. & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	526	1903	0	0	0	0	0	629	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.91						0.91	
Frpb, ped/bikes					1.00						0.99	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.98	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					4992						4940	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					4992						4940	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92	0.92	0.98	0.92
Adj. Flow (vph)	0	0	0	572	1962	0	0	0	0	0	642	113
RTOR Reduction (vph)	0	0	0	0	78	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	2456	0	0	0	0	0	754	0
Confl. Peds. (#/hr)	48		48	30		30	54		54	27		27
Confl. Bikes (#/hr)			9			5			4			1
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2163						2182	
v/s Ratio Prot											c0.15	
v/s Ratio Perm					0.49							
v/c Ratio					1.14						0.35	
Uniform Delay, d1					17.0						11.0	
Progression Factor					0.49						1.00	
Incremental Delay, d2					63.9						0.4	
Delay (s)					72.3						11.5	
Level of Service					E						B	
Approach Delay (s)		0.0			72.3			0.0			11.5	
Approach LOS		A			E			A			B	

Intersection Summary			
HCM Average Control Delay	58.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	71.1%	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)	0	0	0	76	1252	115	180	739	0	0	131	63
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	
Lane Util. Factor					0.91			0.95			1.00	
Frt					0.99			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					5011			3505			1781	
Flt Permitted					1.00			0.83			1.00	
Satd. Flow (perm)					5011			2944			1781	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	83	1361	125	196	803	0	0	142	68
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	0	0	0	1552	0	0	999	0	0	207	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					1796			1546			935	
v/s Ratio Prot											0.12	
v/s Ratio Perm					0.31			c0.34				
v/c Ratio					0.86			0.65			0.22	
Uniform Delay, d1					17.9			10.2			7.7	
Progression Factor					1.50			1.00			1.00	
Incremental Delay, d2					0.6			2.1			0.5	
Delay (s)					27.4			12.3			8.2	
Level of Service					C			B			A	
Approach Delay (s)		0.0			27.4			12.3			8.2	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	74.7%	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)	10	226	77	61	201	164	81	606	97	80	522	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			5.0			5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.91	
Frpb, ped/bikes		1.00	0.93	1.00	0.95			0.99			1.00	
Flpb, ped/bikes		1.00	1.00	0.94	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.93			0.98			0.99	
Flt Protected		1.00	1.00	0.95	1.00			0.99			0.99	
Satd. Flow (prot)		1857	1473	1661	1643			3405			4983	
Flt Permitted		0.98	1.00	0.54	1.00			0.79			0.76	
Satd. Flow (perm)		1825	1473	938	1643			2695			3788	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	246	84	66	218	178	88	652	105	87	567	36
RTOR Reduction (vph)	0	0	53	0	49	0	0	19	0	0	10	0
Lane Group Flow (vph)	0	257	31	66	347	0	0	826	0	0	680	0
Confl. Peds. (#/hr)	58		58	99		99	72		72	49		49
Confl. Bikes (#/hr)			7			33			10			6
Turn Type	Perm		Perm	Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Effective Green, g (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Actuated g/C Ratio		0.37	0.37	0.37	0.37			0.48			0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0			5.0			5.0	
Lane Grp Cap (vph)		669	540	344	602			1385			1136	
v/s Ratio Prot					c0.21			c0.07				
v/s Ratio Perm		0.14	0.02	0.07				c0.22			0.18	
v/c Ratio		0.38	0.06	0.19	0.58			0.60			0.60	
Uniform Delay, d1		14.0	12.3	12.9	15.3			11.3			17.9	
Progression Factor		0.93	0.94	1.00	1.00			1.00			1.00	
Incremental Delay, d2		1.5	0.2	1.2	4.0			1.9			2.3	
Delay (s)		14.5	11.7	14.2	19.3			13.2			20.3	
Level of Service		B	B	B	B			B			C	
Approach Delay (s)		13.8			18.5			13.2			20.3	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	89.6%	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)	437	459	173	55	341	136	104	460	28	59	421	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	1863	1546	1767	1863	1519	1765	1843		1766	1772	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.12	1.00		0.24	1.00	
Satd. Flow (perm)	506	1863	1546	556	1863	1519	231	1843		442	1772	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	475	499	188	60	371	148	108	500	30	64	458	183
RTOR Reduction (vph)	0	0	114	0	0	100	0	2	0	0	17	0
Lane Group Flow (vph)	475	499	74	60	371	48	108	528	0	64	624	0
Confl. Peds. (#/hr)	1		1	8		8	12		12	6		6
Confl. Bikes (#/hr)			2			5			27			6
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	33.4	33.4	32.6	27.5	27.5	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	33.4	33.4	32.6	27.5	27.5	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.38	0.32	0.32	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	419	732	607	286	603	491	90	716		172	688	
v/s Ratio Prot	c0.15	0.27		0.01	0.20			0.29			0.35	
v/s Ratio Perm	c0.43		0.05	0.07		0.03	c0.47			0.14		
v/c Ratio	1.13	0.68	0.12	0.21	0.62	0.10	1.20	0.74		0.37	0.91	
Uniform Delay, d1	18.4	21.4	16.4	17.4	24.3	20.1	26.0	22.3		18.6	24.5	
Progression Factor	1.00	1.00	1.00	0.70	0.61	0.19	1.02	1.02		1.00	1.00	
Incremental Delay, d2	85.7	5.1	0.4	0.1	4.5	0.4	148.6	2.8		0.5	15.3	
Delay (s)	104.1	26.5	16.9	12.3	19.4	4.2	175.2	25.6		19.1	39.8	
Level of Service	F	C	B	B	B	A	F	C		B	D	
Approach Delay (s)		56.6			14.8			50.9			38.0	
Approach LOS		E			B			D			D	

Intersection Summary			
HCM Average Control Delay	43.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	96.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
4: 11th Street & Oak Street
222 19th Street Transportation Study

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	87	0	0	1295	0	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.25	0.92	0.25	0.25
Hourly flow rate (vph)	95	0	0	1408	0	0
Pedestrians	6					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				1055	320	
pX, platoon unblocked						
vC, conflicting volume	358	6	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358	6	6			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	611	1069	1605			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	NB 4
Volume Total	95	352	352	352	352
Volume Left	95	0	0	0	0
Volume Right	0	0	0	0	0
cSH	611	1700	1700	1700	1700
Volume to Capacity	0.15	0.21	0.21	0.21	0.21
Queue Length 95th (ft)	14	0	0	0	0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.0	0.0			
Approach LOS	B				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
5: 12th Street & Oak St.
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	0	1289	76	436	1185	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					5.5	5.5		4.0				
Lane Util. Factor					0.91	1.00		0.86				
Frpb, ped/bikes					1.00	0.94		1.00				
Flpb, ped/bikes					1.00	1.00		0.97				
Frt					1.00	0.85		1.00				
Flt Protected					1.00	1.00		0.99				
Satd. Flow (prot)					5085	1484		6113				
Flt Permitted					1.00	1.00		0.99				
Satd. Flow (perm)					5085	1484		6113				
Peak-hour factor, PHF	0.25	0.25	0.25	0.25	0.95	0.92	0.92	0.96	0.25	0.25	0.25	0.25
Adj. Flow (vph)	0	0	0	0	1357	83	474	1234	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	2	0	12	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	1357	81	0	1696	0	0	0	0
Confl. Peds. (#/hr)	121		121	69		69	118		118	84		84
Confl. Bikes (#/hr)			3									15
Turn Type						Perm	Perm					
Protected Phases					6			4				
Permitted Phases						6	4					
Actuated Green, G (s)					29.9	29.9		20.6				
Effective Green, g (s)					29.9	29.9		20.6				
Actuated g/C Ratio					0.50	0.50		0.34				
Clearance Time (s)					5.5	5.5		4.0				
Lane Grp Cap (vph)					2534	740		2099				
v/s Ratio Prot					c0.27							
v/s Ratio Perm						0.05		0.28				
v/c Ratio					0.54	0.11		0.81				
Uniform Delay, d1					10.3	8.0		17.9				
Progression Factor					1.00	1.00		1.00				
Incremental Delay, d2					0.8	0.3		3.5				
Delay (s)					11.1	8.3		21.4				
Level of Service					B	A		C				
Approach Delay (s)		0.0			11.0			21.4			0.0	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
8: 11th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1295	246	0	0	0	0	0	0	60	1113	0
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	
Lane Util. Factor		0.91	1.00								0.91	
Frpb, ped/bikes		1.00	0.96								1.00	
Flpb, ped/bikes		1.00	1.00								1.00	
Frt		1.00	0.85								1.00	
Flt Protected		1.00	1.00								1.00	
Satd. Flow (prot)		5085	1527								5068	
Flt Permitted		1.00	1.00								1.00	
Satd. Flow (perm)		5085	1527								5068	
Peak-hour factor, PHF	0.25	0.96	0.92	0.25	0.25	0.25	0.25	0.25	0.25	0.92	0.93	0.25
Adj. Flow (vph)	0	1349	267	0	0	0	0	0	0	65	1197	0
RTOR Reduction (vph)	0	0	14	0	0	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	1349	253	0	0	0	0	0	0	0	1258	0
Confl. Peds. (#/hr)	20		20	30		30	12		12	17		17
Confl. Bikes (#/hr)			5			7			3			
Turn Type			Perm							Perm		
Protected Phases		2									4	
Permitted Phases			2							4		
Actuated Green, G (s)		23.0	23.0								26.0	
Effective Green, g (s)		23.0	23.0								26.0	
Actuated g/C Ratio		0.38	0.38								0.43	
Clearance Time (s)		5.5	5.5								5.5	
Lane Grp Cap (vph)		1949	585								2196	
v/s Ratio Prot		c0.27										
v/s Ratio Perm			0.17								0.25	
v/c Ratio		0.69	0.43								0.57	
Uniform Delay, d1		15.5	13.7								12.8	
Progression Factor		0.78	0.68								0.53	
Incremental Delay, d2		2.0	2.3								0.9	
Delay (s)		14.2	11.6								7.7	
Level of Service		B	B								A	
Approach Delay (s)		13.7			0.0			0.0			7.7	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
9: 12th Street & Madison Street
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	316	1195	0	0	0	0	0	908	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					3.5						4.0	
Lane Util. Factor					0.91						0.91	
Frpb, ped/bikes					1.00						1.00	
Flpb, ped/bikes					0.99						1.00	
Frt					1.00						0.99	
Flt Protected					0.99						1.00	
Satd. Flow (prot)					4976						5027	
Flt Permitted					0.99						1.00	
Satd. Flow (perm)					4976						5027	
Peak-hour factor, PHF	0.25	0.25	0.25	0.92	0.97	0.25	0.25	0.25	0.25	0.25	0.92	0.92
Adj. Flow (vph)	0	0	0	343	1232	0	0	0	0	0	987	62
RTOR Reduction (vph)	0	0	0	0	26	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	1550	0	0	0	0	0	1040	0
Confl. Peds. (#/hr)	32		32	47		47	36		36	29		29
Confl. Bikes (#/hr)			3			13			9			2
Turn Type				Perm								
Protected Phases					6						4	
Permitted Phases				6								
Actuated Green, G (s)					26.0						26.5	
Effective Green, g (s)					26.0						26.5	
Actuated g/C Ratio					0.43						0.44	
Clearance Time (s)					3.5						4.0	
Lane Grp Cap (vph)					2156						2220	
v/s Ratio Prot											c0.21	
v/s Ratio Perm					0.31							
v/c Ratio					0.72						0.47	
Uniform Delay, d1					14.0						11.8	
Progression Factor					0.64						1.00	
Incremental Delay, d2					1.7						0.7	
Delay (s)					10.6						12.5	
Level of Service					B						B	
Approach Delay (s)		0.0			10.6			0.0			12.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
14: 12th Street &
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	58	811	97	145	551	0	0	75	28
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	
Lane Util. Factor					0.91			0.95			1.00	
Frt					0.98			1.00			0.96	
Flt Protected					1.00			0.99			1.00	
Satd. Flow (prot)					4994			3503			1795	
Flt Permitted					1.00			0.86			1.00	
Satd. Flow (perm)					4994			3039			1795	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	63	882	105	158	599	0	0	82	30
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	0	0	0	1028	0	0	757	0	0	98	0
Turn Type				Perm			Perm					
Protected Phases					6			4			4	
Permitted Phases				6			4					
Actuated Green, G (s)					21.5			31.5			31.5	
Effective Green, g (s)					21.5			31.5			31.5	
Actuated g/C Ratio					0.36			0.52			0.52	
Clearance Time (s)					3.5			3.5			3.5	
Lane Grp Cap (vph)					1790			1595			942	
v/s Ratio Prot											0.05	
v/s Ratio Perm					0.21			c0.25				
v/c Ratio					0.57			0.47			0.10	
Uniform Delay, d1					15.6			9.0			7.2	
Progression Factor					1.66			1.00			1.00	
Incremental Delay, d2					0.9			1.0			0.2	
Delay (s)					26.8			10.0			7.4	
Level of Service					C			B			A	
Approach Delay (s)		0.0			26.8			10.0			7.4	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
18: 20th Street & Broadway
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	29	197	122	78	333	152	127	932	135	57	656	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			5.0			5.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			0.95			0.91	
Frpb, ped/bikes		1.00	0.90	1.00	0.96			0.99			0.99	
Flpb, ped/bikes		1.00	1.00	0.92	1.00			1.00			1.00	
Frt		1.00	0.85	1.00	0.95			0.98			0.99	
Flt Protected		0.99	1.00	0.95	1.00			0.99			1.00	
Satd. Flow (prot)		1845	1430	1634	1703			3413			4988	
Flt Permitted		0.78	1.00	0.55	1.00			0.65			0.76	
Satd. Flow (perm)		1439	1430	947	1703			2234			3803	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.95	0.92	0.92	0.92
Adj. Flow (vph)	32	214	133	85	362	165	138	1013	142	62	713	50
RTOR Reduction (vph)	0	0	84	0	27	0	0	16	0	0	12	0
Lane Group Flow (vph)	0	246	49	85	500	0	0	1277	0	0	813	0
Confl. Peds. (#/hr)	74		74	120		120	85		85	65		65
Confl. Bikes (#/hr)			30			13			10			6
Turn Type	Perm		Perm	Perm			Prot			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8						6		
Actuated Green, G (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Effective Green, g (s)		22.0	22.0	22.0	22.0			29.0			18.0	
Actuated g/C Ratio		0.37	0.37	0.37	0.37			0.48			0.30	
Clearance Time (s)		4.0	4.0	4.0	4.0			5.0			5.0	
Lane Grp Cap (vph)		528	524	347	624			1217			1141	
v/s Ratio Prot					c0.29			c0.12				
v/s Ratio Perm		0.17	0.03	0.09				c0.38			0.21	
v/c Ratio		0.47	0.09	0.24	0.80			1.05			0.71	
Uniform Delay, d1		14.5	12.5	13.2	17.0			15.5			18.7	
Progression Factor		1.59	3.51	1.00	1.00			1.00			1.00	
Incremental Delay, d2		2.8	0.3	1.7	10.4			39.7			3.8	
Delay (s)		25.8	44.1	14.9	27.4			55.2			22.5	
Level of Service		C	D	B	C			E			C	
Approach Delay (s)		32.2			25.7			55.2			22.5	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis — Cumulative 2030 Baseline plus Project PM
22: 27th Street & Telegraph Avenue
222 19th Street Transportation Study

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	256	493	166	78	734	139	238	621	59	170	593	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	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		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1534	1769	1863	1531	1770	1833		1770	1715	
Flt Permitted	0.12	1.00	1.00	0.24	1.00	1.00	0.12	1.00		0.12	1.00	
Satd. Flow (perm)	232	1863	1534	444	1863	1531	226	1833		226	1715	
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	536	180	85	798	151	259	675	64	185	645	486
RTOR Reduction (vph)	0	0	111	0	0	70	0	4	0	0	32	0
Lane Group Flow (vph)	278	536	69	85	798	81	259	735	0	185	1099	0
Confl. Peds. (#/hr)	4		4	1		1	17		17	10		10
Confl. Bikes (#/hr)			4			10			17			28
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.0	32.8	32.8	33.3	27.6	27.6	33.0	33.0		33.0	33.0	
Effective Green, g (s)	43.0	32.8	32.8	33.3	27.6	27.6	33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.51	0.39	0.39	0.39	0.32	0.32	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5		5.5	5.5	
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)	315	719	592	263	605	497	88	712		88	666	
v/s Ratio Prot	c0.11	0.29		0.02	c0.43			0.40			0.64	
v/s Ratio Perm	0.33		0.05	0.11		0.05	c1.15			0.82		
v/c Ratio	0.88	0.75	0.12	0.32	1.32	0.16	2.94	1.03		2.10	1.65	
Uniform Delay, d1	20.9	22.5	16.8	17.7	28.7	20.5	26.0	26.0		26.0	26.0	
Progression Factor	1.00	1.00	1.00	1.54	1.38	2.02	0.75	0.75		1.00	1.00	
Incremental Delay, d2	23.3	6.9	0.4	0.2	152.8	0.6	891.6	33.9		532.4	299.4	
Delay (s)	44.2	29.4	17.2	27.5	192.4	42.0	911.2	53.4		558.4	325.4	
Level of Service	D	C	B	C	F	D	F	D		F	F	
Approach Delay (s)		31.3			156.9			276.0			358.1	
Approach LOS		C			F			F			F	

Intersection Summary			
HCM Average Control Delay	216.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.01		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	141.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Roadway LOS Calculation Worksheets

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	2015					
						AM Peak Hour			PM Peak Hour		
						LOS	Volume	v/c	LOS	Volume	v/c
Other MTS	Telegraph between 20th St. and 27th St.	NB	900	1	900	C	582	0.65	F	913	1.01
		SB	900	1	900	E	814	0.90	D	703	0.78

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	2030					
						AM Peak Hour			PM Peak Hour		
						LOS	Volume	v/c	LOS	Volume	v/c
Other MTS	Telegraph between 20th St. and 27th St.	NB	900	1	900	D	688	0.76	F	1,080	1.20
		SB	900	1	900	F	988	1.10	E	861	0.96

Type	Segment	Direction	Capacity (vphpl)	Lanes	Capacity (vph)	2015 + Project					
						AM Peak Hour			PM Peak Hour		
						LOS	Volume	v/c	LOS	Volume	v/c
Other MTS	Telegraph between 20th St. and 27th St.	NB	900	1	900	C	582	0.65	F	913	1.01
		SB	900	1	900	E	814	0.90	D	708	0.79

Type	Segment	Direction	Capacity (vphpl)	Lanes	2030 + Project					
					AM Peak Hour			PM Peak Hour		
					LOS	Volume	v/c	LOS	Volume	v/c
Other MTS	Telegraph between 20th St. and 27th St.	NB	900	1	D	688	0.76	F	1,080	1.20
		SB	900	1	F	988	1.10	E	866	0.96

APPENDIX B-9

ACCMA MODEL INPUTS

2030 AM Peak Hour

Year 2005 AM Peak Hour

2030 PM Peak Hour