PUBLIC NOTICE

The Boston Redevelopment Authority ("BRA"), pursuant to Article 80 of the Boston Zoning Code ("Code"), hereby gives notice that a Project Notification Form for Large Project Review ("PNF"), as well as a Development Plan for Planned Development Area (Development Plan), a Fact Sheet describing the proposal, and a map of the area involved, were filed by Harbinger Development LLC ("Proponent") on August 9, 2016, for the Marine Wharf project (Project) in the Raymond L. Flynn Marine Industrial Park in South Boston.

The Proponent proposes to develop a dual-branded, 320,000 square-foot, 411-room, 15-story hotel at the approximately 1.17-acre so-called Parcel A ("Project Site"), located at 660 Summer Street within the Raymond L. Flynn Marine Park ("MIP"), formerly known as the Boston Marine Industrial Park. In addition to hotel space, the Project includes ground floor retail-restaurant-services uses, as well as a single level of above-grade parking. The Project will create new open space available to the general public and pedestrian access around the Project Site, and improve connectivity to existing MIP infrastructure, including water transportation facilities located within the MIP.

The Proponent is seeking: the issuance of a Scoping Determination by the BRA pursuant to Section 80B-5.3 of the Code; approval by the BRA of the Development Plan; and authorization for the BRA to petition the Boston Zoning Commission to approve the Development Plan pursuant to Section 80C-5 of the Code. The BRA in the Scoping Determination for such PNF may waive further review pursuant to Section 80B-5.3(d) of the Code, if, after reviewing public comments, the BRA finds that such PNF adequately describes the Project's impacts. If approved by the BRA and the Boston Zoning Commission, upon its effective date the Development Plan would constitute permanent zoning for the Project Site pursuant to Sections 3-1A and 80C of the Code.

The PNF, Development Plan, Fact Sheet, and map may be reviewed in the office of the Secretary of the BRA, Room 910, Boston City Hall, 9th Floor, Boston MA 02201 between 9:00 AM and 5:00 PM, Monday through Friday, except legal holidays. Public comments on the documents, including the comments of public agencies, must be submitted in writing to Gary Uter, BRA, at the address stated above, on or before September 23, 2016.

BOSTON REDEVELOPMENT AUTHORITY
Teresa Polhemus
Executive Director/Secretary

Expanded Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

MARINE WHARF

HAMPTON INN AND HOMEWOOD SUITES BY HILTON

660 Summer Street
Boston, Massachusetts

Submitted to:

Boston Redevelopment Authority
One City Hall Square
Boston, Massachusetts 02201

Submitted by:

Harbinger Development, L.L.C.

Prepared by:

Epsilon Associates, Inc.

August 9, 2016

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Chapter 1.0

General Information

1.0 GENERAL INFORMATION

1.1 Introduction

Harbinger Development LLC (the Proponent), proposes to develop a dual-branded 411-room hotel at “Parcel A” (Project Site) located within the Raymond L. Flynn Marine Park (Marine Park), formerly known as the Boston Marine Industrial Park. The Economic Development and Industrial Corporation of Boston (EDIC) owns the Project Site, and has granted rights to the Proponent to redevelop Parcel A under a long-term ground lease.

Parcel A has a street address of 660 Summer Street, consists of approximately 50,993 square feet (sf), and is located at the Summer Street entrance to the Marine Park. Parcel A is one of two parcels in the Marine Park where development is not limited to either maritime or industrial projects. The proposed development includes the construction of a new 15-story hotel with ground floor retail-restaurant-services uses, as well as a single level of above-grade parking (the Project). The Project will create new open space available to the general public and pedestrian access around the Project Site, and improve connectivity to existing Marine Park infrastructure, including water transportation facilities located within the Marine Park.

With this transformation of the Marine Park’s Summer Street entry, the Project will provide several public benefits, including street-level commercial space open to the general public, new on-site open space, street trees and landscaping, and increased tax revenues and employment opportunities for the City of Boston.

This Expanded Project Notification Form (EPNF) is being submitted to the BRA to initiate review of the Project under Section 80B (Large Project Review) of the Boston Zoning Code. The EPNF describes the Project, its expected environmental impacts, and its benefits to the Marine Park, the Port of Boston, and the City of Boston at large.

1.2 Project Identification and Team

The Proponent has enlisted a team of professional Boston-based planners, engineers, attorneys, architects and consultants to assist with the development of the proposed Project. The Project and the Project Team are identified below:

Name:	Marine Wharf, Hampton Inn and Homewood Suites by Hilton, Boston Seaport
Location:	660 Summer Street at the Drydock Avenue entrance to the Raymond L. Flynn Marine Industrial Park in the South Boston Seaport Neighborhood.

Proponent:	Harbinger Development LLC PO Box 812111 Wellesley, MA 02482 781-992-5999 Eamon O'Marah John Matteson
Land Owner:	Economic Development and Industrial Corporation (EDIC) 22 Drydock Avenue, Suite 201 Boston, MA 02210 (617) 918-6221 Dennis Davis, Deputy Director for Industrial Development & Commercial Leasing
Architect:	Perkins + Will 225 Franklin Street Boston, MA 02110 (617) 478-0300 Robert Brown Sandra Smith Morel Orta
	Group One Partners, Inc. 21 W 3rd Street South Boston, MA 02127 (617) 268-7000 Harry Wheeler
Landscape Architect	Lemon Brooke 31 Oxbow Road Concord, MA 01742 (978)222-3700 Christian Lemon Jennifer Brooke

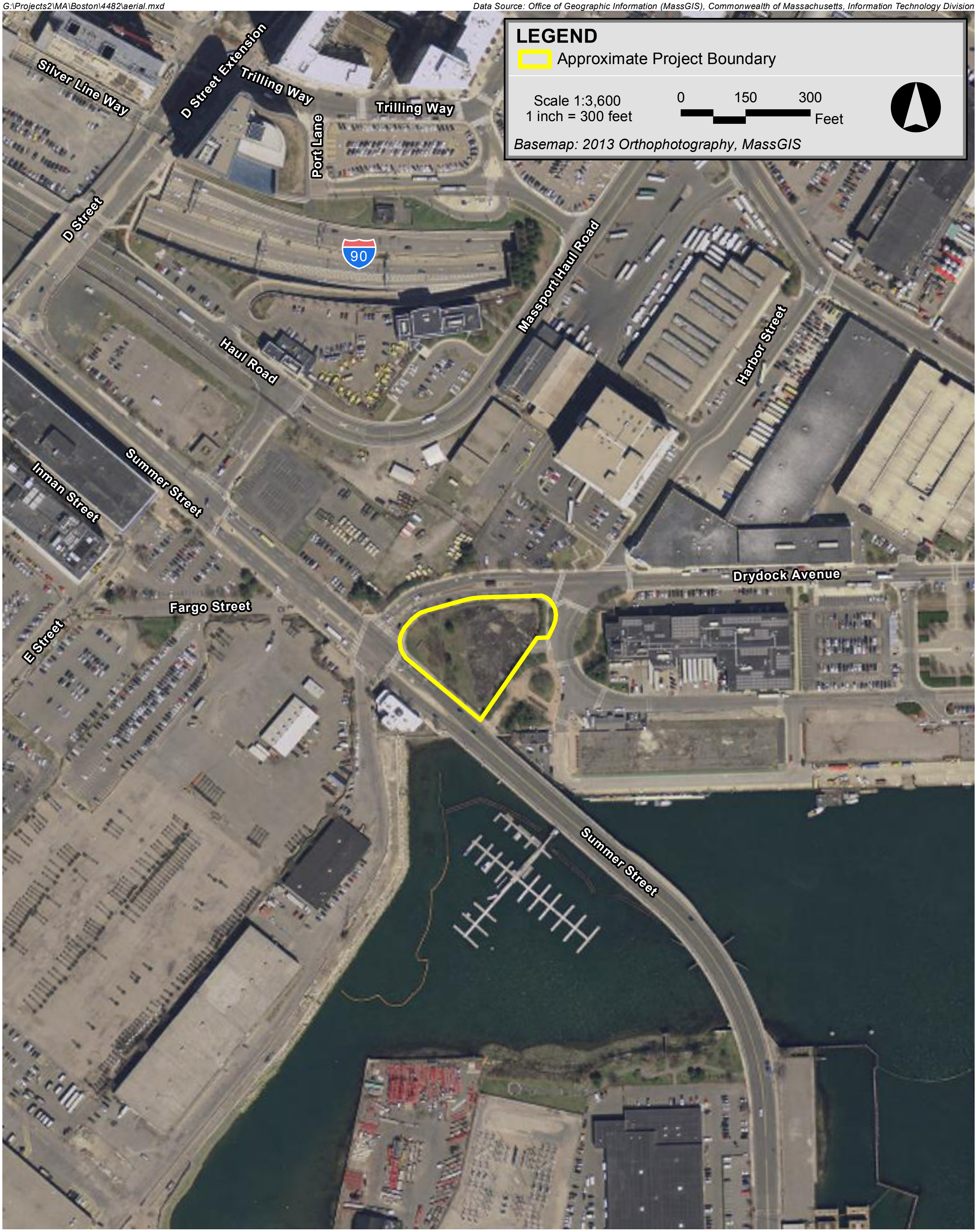
Legal Counsel:	Dalton & Finegold, LLP 183 State Street, 5th Floor Boston, MA 02109 (617) 936-7777 Jared Eigerman, Esq.
	Mel Shuman Law 189 Eliot Street Brookline, MA 02467 617-487-5228 Melvin R. Shuman
Permitting Consultant:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 David Hewett Andy Magee Erik Rexford
Transportation and Engineering:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Elizabeth Peart
MEP Engineer:	WSP Parsons Brinkerhoff 88 Black Falcon Avenue, Suite 210 Boston, MA 02210 (617) 210-1600 Jeremy Pinkham

1.3 Project Summary

The approximately 50,993 sf Project Site is located at 660 Summer Street, between Drydock Avenue and the Reserved Channel in the South Boston Seaport neighborhood of Boston (see Figure 1-1). The site is currently vacant, though it has often been used as short-term lay-down space, on an as-needed basis by the EDIC.

The proposed Project will include the construction of an approximately 320,000 sf hotel with 411 rooms, managed by two individually branded operators; Hampton Inn and Homewood Suites by Hilton. The hotel will include a mix of approximately 245 select-service hotel rooms, and 166 extended-stay hotel rooms, as well as approximately 3,500 sf

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division



Marine Wharf - Hampton Inn and Homewood Suites by Hilton   Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-1
Aerial Locus Map

of retail use. Parking for approximately 75 vehicles will be located in a second-floor garage, accessed from the hotel courtyard, off Terminal Street. The new building will be 15-stories high (approximately 160 feet).

Section 2.0 provides additional detailed information about the Project's program.

1.4 Public Benefits

The Project will provide numerous public benefits for the Marine Park, the Port of Boston, and the City of Boston as a whole, both during construction, and on an ongoing basis once in operation.

Smart Growth/Transit-Oriented Development

The Project is consistent with smart-growth and transit-oriented development principles. With multiple access points to the MBTA Silver Line, the Project supports a key objective of smart growth: focusing new development at existing nodes of transit.

The addition of both select-service and extended-stay hotel rooms at an underutilized site that is adjacent to new, more active uses, will support the expansion of the vibrant live, work, and play area that the Seaport District has become. The proposed Project's proximity to Black Falcon Terminal and Cruiseport Boston will place a variety of accommodations within walking distance to the more than 380,000 passengers who use Cruiseport Boston each year.

Improved Street and Pedestrian Environment

The Project will activate an underutilized site with enhanced streetscapes that include landscaped sidewalks and improved open spaces. The adjacent parkland owned by EDIC will become newly enlivened by improving its connections to Parcel A and the new pedestrian amenities provided there. New street lighting, signage, plantings, and public seating will enhance the currently under-defined public spaces at both locations.

Sustainable Design/Green Building

Energy conservation and other sustainable design measures are integral to the proposed Project. The Project will employ energy- and water-efficient features for mechanical, electrical, architectural, and structural systems, assemblies, and materials, where feasible. Sustainable design elements relating to building energy management systems, lighting, recycling, conservation measures, local building materials, and clean construction vehicles will be included, to the greatest extent practicable.

The Proponent is committed to building a LEED-certifiable project with a target of the Gold level, incorporating sustainable design features into the Project to preserve and protect the environment.

Increased Employment

The Project will create approximately 250 full-time equivalent (FTE) construction jobs and approximately 105 FTE permanent jobs upon stabilization.

New Property Tax

Currently, the site generates no tax revenues. The Proponent anticipates that, following stabilization and a ramp-up period paying taxes at a reduced rate, pursuant to a yet-to-be-negotiated agreement with the City of Boston Assessing Department, the Project will generate new tax revenues for the City of Boston, based on current estimates of the Project's construction costs and current property tax rates for commercial buildings.

Development Impact Project Exactions

Under Section 80B-7 of the Code, a Development Impact Project ("DIP") is required to make mitigation payments, or provide equivalent in-kind contributions, to create affordable housing and job-training programs. The Project constitutes a DIP for purposes of Section 80B-7, and will comply by paying a housing exaction of $8.47 and a jobs-creation exaction of $1.67, for each gross square foot of hotel or restaurant-retail-services floor area in excess of 100,000 square feet, minus the Project's accessory parking garage space.

1.5 Regulatory Controls and Permits

1.5.1 Zoning

The entire Project Site is located within: (i) the General Industrial District (I-2); (ii) the Restricted Parking Overlay District (RPOD); and (iii) the South Boston Parking Freeze Area Piers Zone established in accordance with 310 CMR 7.33 and Section III of the Procedures and Criteria for Issuance of Parking Freeze Permits of the City of Boston Air Pollution Control Commission. An insignificant portion of the site, at its extreme northwesterly corner, in located within the South Boston Interim Planning Overlay District (South Boston IPOD), established in accordance with Article 27P of the Boston Zoning Code. No portion of the new hotel building is proposed within the South Boston IPOD.

The Project Site is included within an area subject to multiple detailed planning and community review processes, which resulted most notably in the development of: the Final Master Plan of the Boston Marine Industrial Park (MIP Master Plan); the Port of Boston Economic Development Plan; and, the Seaport Public Realm Plan.

The Proponent may seek to establish a Planned Development Area (PDA) for the Project Site in accordance with the provisions of Sections 3-1A and 64-28 of the Code in a manner consistent with the articulated goals and purposes of the aforementioned planning initiatives.

1.5.2 Article 80 Review – Large Project Review

The Project is undergoing Large Project Review pursuant to Article 80 of the Code. As part of Large Project Review, the Proponent will make appropriate mitigation commitments.

1.5.3 Boston Civic Design Commission

Under Article 28 of the Boston Zoning Code, the Boston Civic Design Commission (BCDC) must review any new construction of over 100,000 sf, and, to the extent that a PDA plan is established, BCDC may provide review based upon applicable design guidelines. The Proponent looks forward to working with the BCDC on review of the Project.

1.5.4 Massachusetts Historical Commission

The Project Site is located within the former Boston Army Supply Base (MHC # BOS.RT), which is included in the Inventory of Historic and Archaeological Assets of the Commonwealth (Inventory), and which is determined eligible for listing in the National Register of Historic Places.

As described in Section 6.0, the Project will potentially be subject to State Register Review (950 CMR 71.00 et seq.) by the Massachusetts Historical Commission (MHC), as a result of the need for one or more state permits, or other state actions. The Proponent will initiate State Registry Review by providing MHC a copy of the Environmental Notification Form that will be filed pursuant to the Massachusetts Environmental Policy Act, as described in the following section.

1.5.5 Massachusetts Environmental Policy Act (MEPA)

As noted above, the use of Parcel A has been the subject of several planning efforts, including MEPA review as a component of the MIP Master Plan update for the Marine Park (EEA #8161). The Secretary of Energy and Environmental Affairs (EEA) issued a MEPA Certificate for the MIP Master Plan on March 16, 2000.

The proposed Project is subject to MEPA jurisdiction because the lease of the property by the EIDC to the Proponent constitutes a "Land Transfer" as defined in the MEPA regulations. The Project exceeds MEPA review thresholds requiring the filing of a Environmental Notification Form (ENF), specifically:

- A new or existing unlicensed non-water dependent use of waterways or tidelands requiring a Chapter 91 License (301 CMR 11.03 (3)(b)(5)); and
- Generation of 2,000 or more new average daily trips (adt) on roadways providing access to a single location. (301 CMR 11.03 (6)(b)(13)).

The Proponent will file an Environmental Notification Form (ENF) with the MEPA Office to initiate MEPA review. The Secretary of EEA will determine whether to require an Environmental Impact Report (EIR) based upon review of the ENF and the comments received.

1.5.6 Chapter 91

As noted above, portions of the Project are subject to review and licensing under the Massachusetts Public Waterfront Act, M.G.L. c.91, and the Waterways Regulations at 310 CMR 9.00 et seq. (together, Chapter 91). A detailed discussion of the anticipated waterways licensing requirements under Chapter 91 is provided in Section 7.0. The Proponent will submit an application for a Waterways License with Massachusetts Department of Environmental Protection (DEP).

1.5.7 Other Anticipated Permits and Approvals

Table 1-1: *Anticipated Permits and Approvals* sets forth a preliminary list of permits and approvals from governmental agencies and authorities that the Proponent expects to be required for the Project. It is possible that only some of these permits and approvals will be required, or that additional permits or approvals will be required. The Proponent may also seek state and federal funding for the Project, as well as local property-tax relief.

Table 1-1 Anticipated Permits and Approvals

Agency Name	Permit / Approval
FEDERAL	
Environmental Protection Agency	National Pollution Discharge Elimination System Construction General Permit; EPA NPDES Dewatering General Permit for Construction Dewatering Discharges (construction dewatering discharges into surface waters)
STATE	
Department of Environmental Protection	Chapter 91 Waterways License
Executive Office of Energy and Environmental Affairs (MEPA Office)	Review under the Massachusetts Environmental Policy Act
Massachusetts Historical Commission	State Register Review
Massachusetts Water Resources Authority	Construction Dewatering Permit (if required); Temporary Construction Dewatering Permit (if required); Sewer Use Discharge Permit (if required)

Table 1-1 Anticipated Permits and Approvals (Continued)

Agency Name	Permit / Approval
LOCAL	
Boston Civic Design Commission	Review and approval pursuant to Article 28 of the Boston Zoning Code
Boston Conservation Commission	Order of Conditions
Boston Fire Department	Fuel Storage Permit
Boston Inspectional Service Department	Building Permit (Long Form); Certificate of Occupancy
Boston Parks and Recreation Commission	Design Review (if required)
Boston Public Improvement Commission/ Department of Public Works	License for installation of groundwater monitoring wells; Specific Repair Approvals; Discontinuances (if required); Permit for sign, awning, hood, canopy, or marquee, or other incursion over public right of way (as required); Street Layout (as required); Tieback/Earth Excavation Approvals (if required)
Boston Public Safety Commission, Committee on Licenses	Parking Garage Permit; License for Storage of Inflammables
Boston Public Works Department	Curb Cut Permits; Street Opening Permits; Street/Sidewalk Occupancy Permits
Boston Redevelopment Authority	Review under Article 80, including Large Project Review, as required pursuant to Article 80B of the Zoning Code and PDA Plan Review, as required pursuant to Article 80C of the Zoning Code; Cooperation Agreement; Boston Residents Construction Employment Plan Agreement; Certifications of Consistency and Compliance
Boston Transportation Department	Transportation Access Plan Agreement; Review and Approval of a Construction Management Plan
Boston Water and Sewer Commission	Sewer Extension/Connection Permit; Sewer Use Discharge Permit; Site Plan Approval; Temporary Construction Dewatering Permit (if required); Cross Connection/Backflow Prevention Approval
Boston Zoning Commission	Zoning Approval subject to BRA recommendation and approval under Article 80C of the Zoning Code, including PDA Plan Approval

1.6 Consistency with Planning and District Goals

As noted above, Parcel A is subject to the MIP Master Plan of 2000, which comprises a Final Environmental Impact Report approved under the MEPA. The Project is consistent with goals stated in the MIP Master Plan. The MIP Master Plan identifies an overarching goal for the Marine Park as accommodating both "new and existing industries that can provide attractive job opportunities for Boston residents" (MIP Master Plan at page 1-1).

The MIP Master Plan also seeks "to provide sites and support for new economic development and job growth and to maintain flexibility to respond to Boston's future economy" (Id. at page 1-2). As described in the MIP Master Plan, the Parcel A "district is intended to provide new development opportunities for office and commercial uses in a limited area of the MIP in order to generate revenues for re-investment in the Park." (Id. at page 8-9.)

The Project will provide services to new innovation-oriented economic development and job-growth opportunities in a variety of industries that operate within the Marine Park. The Project will also support the expanding water-dependent operations of Black Falcon Terminal and Cruiseport Boston, particularly with hotel use. In this way, the Project will include uses that are both incidental to and supportive of water-dependent industrial uses in the Marine Park as contemplated by the MIP Master Plan. (See id. at page 8-1.)

The Project will not detract from other MIP Master Plan goals, such as maximizing locational advantages for import/export uses

1.7 Legal Information

1.7.1 Legal Judgments Adverse to the Proposed Project

The Proponent is not aware of any legal judgments or pending legal actions concerning the Project.

1.7.2 History of Tax Arrears on Property

The Proponent is not in tax arrears on any property it owns within the City of Boston.

1.7.3 Evidence of Site Control/Nature of Public Easements

At the conclusion of the EDIC offer and competitive bid process for a seventy-year leasehold interest in Parcel A, Harbinger Development LLC was granted Tentative Designation status by the BRA Director as authorized by a vote of the BRA Board on September 17, 2015. To accommodate Project pre-development planning and permitting, the Proponent's Designation status has been extended to September 30, 2016. The Proponent expects final terms of its ground lease from the EDIC to be finalized in fall 2016.

Some existing easements burden the Project Site. A site survey is included as Figure 1-2. The Project has been designed either to comply with all currently valid easements, or the Proponent will seek to amend them prior to undertaking those portions of the Project that would affect the relevant easement areas.

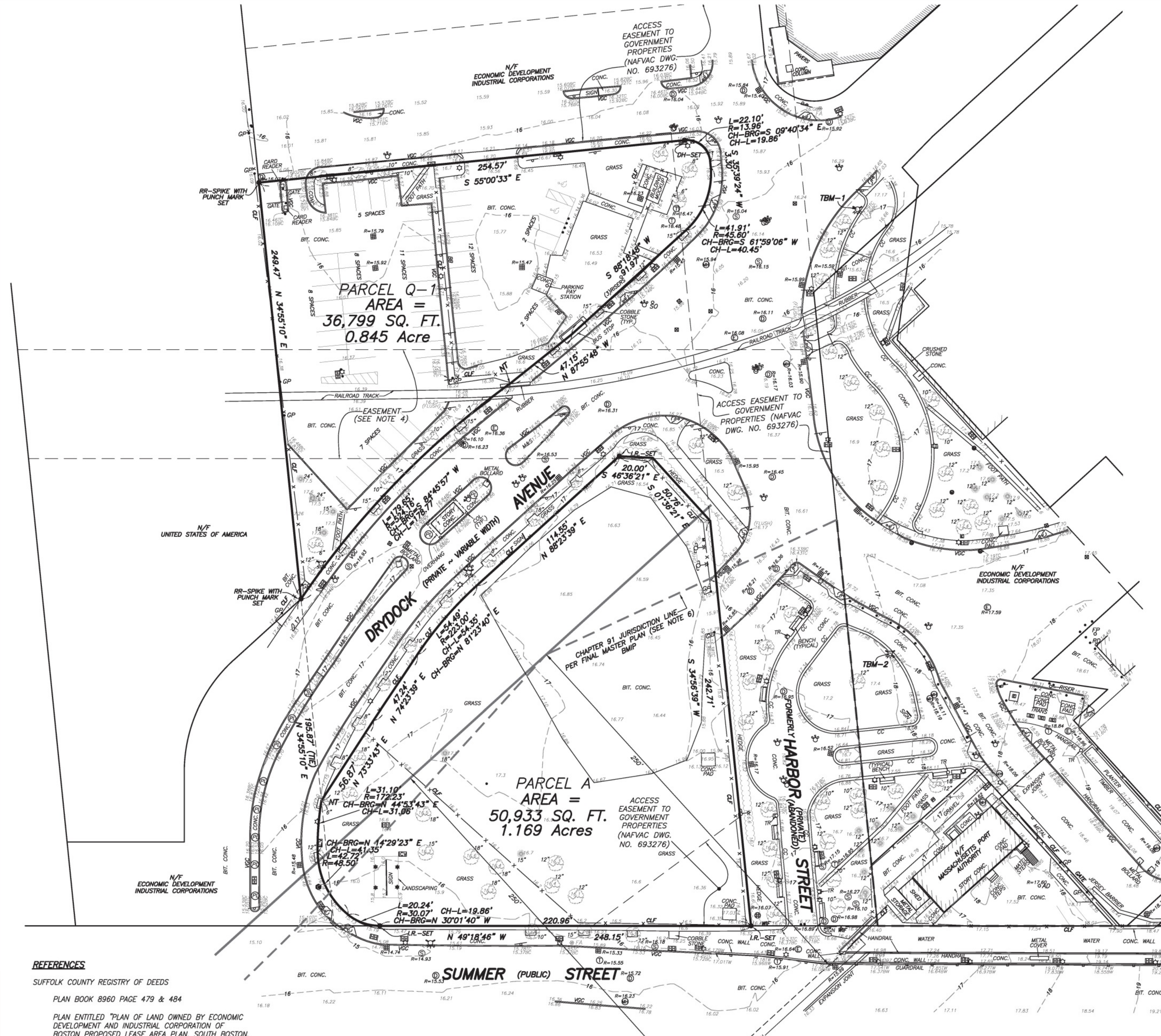
1.8 Public Participation

The Proponent filed a Letter of Intent for the Project with the BRA on January 20, 2016, beginning the Project's formal public review process. The Proponent looks forward to a comprehensive and inclusive review process, including meetings with neighbors, local groups, elected officials and other interested parties. The Proponent has already commenced outreach to a number of community and other entities, including but not limited to:

- BRA/EDIC;
- Massachusetts Department of Environmental Protection;
- Harpoon Brewery;
- The Marine Park Business Association;
- Thompson Island Outward Bound Education Center; and,
- Various elected officials representing South Boston.

1.9 Schedule

Construction of the Project is expected to commence during the middle of 2017, and take approximately 24 months to complete.



NOTES:

1) BENCH MARK INFORMATION:

BENCH MARK USED:

CENTRAL ARTERY DISK "ARTERY-70" LOCATED IN THE CONCRETE SIDEWALK ON THE WESTERN SIDE OF DRY DOCK AVENUE NEAR THE INTERSECTION WITH TIDE STREET AND OPPOSITE SECTION D OF THE BOSTON DESIGN CENTER.
ELEVATION = 110.62 (CA/T DATUM)
= 16.27 (B.C.B.)

TEMPORARY BENCH MARKS SET:

TBM-1: X-CUT ON BOLT OVER MAIN OUTLET ON HYDRANT LOCATED AT THE SOUTHERLY SIDE OF DRYDOCK AVENUE, AS SHOWN HEREON. ELEVATION = 19.36 (B.C.B.)

TBM-2: X-CUT ON LEFT BOLT OVER MAIN OUTLET OF HYDRANT LOCATED AT THE SOUTHEASTERLY SIDE OF FORMERLY HARBOR STREET, AS SHOWN HEREON.
ELEVATION = 19.83 (B.C.B.)

2) ELEVATIONS REFER TO BOSTON CITY BASE.

3) CONTOUR INTERVAL EQUALS ONE (1) FOOT.

4) EASEMENT SHOWN ON PLAN ENTITLED "BOSTON MARINE INDUSTRIAL PARK, LEASE OF PROPERTY, ECONOMIC DEVELOPMENT AND INDUSTRIAL CORPORATION OF BOSTON TO MASSACHUSETTS", DATED 11-7-1979, REVISED ON 5-22-1980, PREPARED BY MASSACHUSETTS PORT AUTHORITY.

5) THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF FELDMAN LAND SURVEYORS ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO FELDMAN LAND SURVEYORS' SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY FELDMAN LAND SURVEYORS.

6) FINAL MASTER PLAN – MARINE INDUSTRIAL PARK, PREPARED BY FORT POINT ASSOCIATES, INC. 286 CONGRESS STREET, BOSTON, MA 02210, (617) 357-7044, DATED DECEMBER 1999.

LEGEND

- OBSERVATION WELL
- SEWER MANHOLE
- DRAIN MANHOLE
- ELECTRIC MANHOLE
- TELEPHONE MANHOLE
- MANHOLE
- HYDRANT
- WATER SHUT OFF
- GAS SHUT OFF
- SO ······ SHUT OFF (UNKNOWN)
- BOSTON WATER VALVE
- CATCH BASIN
- ROUND CATCH BASIN
- TRAFFIC SIGNAL
- LIGHT POLE
- BOLLARD
- UTILITY POLE W/ LIGHT
- SIGN
- AD ······ AREA DRAIN
- ELECTRIC HANDHOLE
- EM ······ ELECTRIC METER
- HANDICAP PARKING SPACE
- DECIDUOUS TREE
- CONIFEROUS TREE
- HANDICAP RAMP
- GP ······ GATE POST
- ICV ······ IRRIGATION CONTROL VALVE
- CURB RETURN
- FA ······ FIRE ALARM
- FP ······ FLAG POLE
- TBM ······ TEMPORARY BENCH MARK
- N/F ······ NOW OR FORMERLY
- VGC ······ VERTICAL GRANITE CURB
- BB ······ BIT. CONC. BERM
- CC ······ CONCRETE CURB
- CLF ······ CHAIN LINK FENCE
- WIF ······ WROUGHT IRON FENCE
- BIT ······ BITUMINOUS
- CONC ······ CONCRETE
- T ······ TOP
- B ······ BOTTOM
- TS ······ TOP OF STEPS
- BS ······ BOTTOM OF STEPS
- TW ······ TOP OF WALL
- BW ······ BOTTOM OF WALL
- TC ······ TOP OF CURB
- BC ······ BOTTOM OF CURB
- SQ. FT. ······ SQUARE FEET
- M&S ······ MULCH & SHRUBS
- R= ······ RADIUS OR RIM ELEVATION
- L= ······ LENGTH
- CH-BRG ······ CHORD BEARING
- CH-L ······ CHORD LENGTH
- PL ······ PLANTER
- COL. ······ COLUMN
- TYP. ······ TYPICAL
- TR ······ TRASH CAN
- DH ······ DRILL HOLE
- I.R. ······ IRON ROD
- RR-SPIKE ······ RAILROAD SPIKE
- —X——X— METAL FENCE
- ——OHW—— OVERHEAD WIRES
- BMIP ······ BOSTON MARINE INDUSTRIAL PARK

I CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL FIELD SURVEY AND THE LATEST PLANS OF RECORD.

KARL A. MCCARTHY, PLS (MA# 38714) DATE

REFERENCES

SUFFOLK COUNTY REGISTRY OF DEEDS

PLAN BOOK 8960 PAGE 479 & 484

PLAN ENTITLED "PLAN OF LAND OWNED BY ECONOMIC DEVELOPMENT AND INDUSTRIAL CORPORATION OF BOSTON PROPOSED LEASE AREA PLAN, SOUTH BOSTON, MASSACHUSETTS, SUFFOLK COUNTY", DATED 3-9-94, PREPARED BY STORCH ASSOCIATES.

PLAN ENTITLED "BOSTON MARINE INDUSTRIAL PARK, LEASE OF PROPERTY, ECONOMIC DEVELOPMENT AND INDUSTRIAL CORPORATION OF BOSTON TO MASSACHUSETTS", DATED 11-7-1979, PREPARED BY MASSACHUSETTS PORT AUTHORITY.

REVISED 6-6-2016	ADDED SEAWALL LOCATION
REVISED 5-23-2016	CHAPTER 91 INFORMATION ADDED

TOPOGRAPHIC PLAN OF LAND
PARCELS A AND Q-1
OWNED BY
THE ECONOMIC DEVELOPMENT AND
INDUSTRIAL CORPORATION
(SUMMER STREET/ DRYDOCK AVENUE)
BOSTON, MASS.

SCALE: 1"=30' JULY 11, 2014

30 0 15 30 60 120

FELDMAN LAND SURVEYORS
112 SHAWMUT AVENUE PHONE: (617)357-9740
BOSTON, MASS. 02118 www.feldmansurveyors.com
FELDMAN LAND SURVEYORS

RESEARCH SMD	FIELD CHIEF FS	PROJ MGR SMD	APPROVED	SHEET NO. 1 OF 1
CALC GL	CADD GL	FIELD CHECKED	CRD FILE 14267	JOB NO. 15155

FILENAME: S:\PROJECTS\15100s\15155\DWG\15155.dwg

Chapter 2.0

Project Description

2.0 PROJECT DESCRIPTION

2.1 Existing Site and Area Context

The Project Site is currently vacant, and comprises approximately 1.17 acres, commonly known as Parcel A of the Marine Park.[1] Although Parcel A is located within the Marine Park, it has no immediate access to the adjacent Reserved Channel, and it is not located within the South Boston Designated Port Area (South Boston DPA).

Parcel A is one of two sites in the MHP where development is not limited to either maritime or industrial projects. The MIP Master Plan provides that the site's attributes, in particular its exclusion from the DPA, allow it to serve a unique role within the context of the Marine Park, in that its proposed commercial uses can generate significant economic activity and jobs that will ultimately support the water-dependent and industrial uses of the Marine Park.

Parcel A, though contemplated in the MIP Master Plan, is not subject to the BRA/EDIC-held Chapter 91 Master License (MIP Master License) for the DPA-portion of the Marine Park (DEP Waterways License No. 10233), as provided by "Special Condition #1a". The MIP Master Plan requires that jurisdictional areas of parcels not subject to the MIP Master License obtain DEP approval in a process separate from the Master Written Determination. The anticipated DEP approval process for Parcel A and the Project proposed herein is described in Section 7.0.

Parcel A is located at the Drydock Avenue entrance to the Marine Park, at the intersection of Summer Street. Parcel Q1, the only other non-maritime, non-industrial parcel in the Marine Park, is located across Drydock Avenue from the site, to the north. Northcoast Seafood and the Boston Police Department's Harbormaster and Harbor Patrol Facility are immediately east of Parcel A, across former Harbor Street. The Boston Line & Service Co. Inc. facility and the Reserved Channel Berth 10 are to the south of Parcel A. A locus map of the Project Site is presented in Figure 1-1. Figure 2-1 is an aerial photograph of the site and surrounding land uses.

The site is located close to several MBTA bus routes, most notably the MBTA Silver Line, which runs to Washington Street. MBTA bus routes 4 and 7 make stops at the Summer Street/Drydock Avenue intersection and the SL2 stops along Drydock Avenue at the Boston Design Center.

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[1] When the MIP Master Plan was adopted in 2000, the Project Site was understood to include two parcels: Parcel A and Parcel A-1. EDIC now refers to both, together, as "Parcel A."

There are seven public open spaces located within one-half-mile of the Project Site including the Marine Industrial Park Entrance Plaza (Plaza), Drydock Overlook, Pier 10 Park, Christopher Lee Playground, Thomas J. Butler Memorial Park, South Boston Maritime Park, Lawn on D, and the linear parks along the west end of the Reserved Channel.

2.2 Boston Marine Industrial Park Master Plan

The MIP Master Plan was approved by the Executive Office of Environmental Affairs (now Executive Office of Energy and Environmental Affairs) on March 16, 2000. The MIP Master Plan is intended to guide future development within the Marine Park "in a manner that ensures a strong manufacturing and water-dependent industrial base in the City of Boston." As noted above, the MIP Master Plan explicitly acknowledged the unique function of Parcels A and Q1 within the broader context of the Marine Park, in that Parcel A is positioned to host commercial uses that could generate revenues for reinvestment in the Marine Park. The Project serves that function, and is generally consistent with the planning and regulatory framework of the MIP Master Plan, by achieving the following:

- Commercial uses that generate economic activity and job generation within a predefined area of the Marine Park and at a scale commensurate with that contemplated for the Marine Park;
- Safely accommodating pedestrian access to the waterfront while minimizing undesirable conflicts with water-dependent and industrial uses;
- Enhancing the Marine Park's competitiveness in the global marketplace by supporting Black Falcon Terminal, Cruiseport Boston, and other Marine Park tenants;
- Introducing high-quality architecture and diverse architecture styles to have a transformative effect on the neighborhood;
- Enhancing the public realm with new benefits, including sidewalks with increased width, streetscape enhancements, and landscaped open spaces;
- Promoting the use of alternative modes of transportation and minimizing automotive parking on site, while providing bicycle racks, bicycle storage, and other amenities; and,
- Improving water quality by replacing surface parking lots with new buildings and open spaces that are appropriately landscaped.

Marine Wharf - Hampton Inn and Homewood Suites by Hilton **Boston, Massachusetts**

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Figure 2-1
2005 Land Use, MassGIS

2.3 Project Description

The proposed Project includes the construction of a new, approximately 320,000 square-foot hotel building. The approximately 160-foot tall, 15-story building will include up to approximately 245 select service hotel rooms, and 166 extended stay rooms, with up to approximately 3,500 sf of ground-floor retail use. Figures 2-2 to 2-4 include a Ground Floor Plan, a Typical Floor Plan, and a Building Section. Figures 2-5 through 2-7 are computer-rendered views of the Project once it is complete.

Table 2-1: *Project Program*, below, describes the Project program.

Table 2-1 Project Program

Project Element	*Approximate Dimension*
Hotel Select Service Extended Stay	297,200 sf 245 rooms 166 rooms
Hotel Amenity Space Ground Floor 14th Floor	 13,500 sf 5,800 sf
Retail – Ground Floor	3,500 sf
Total Square Footage	320,000 sf
Height	Up to 160 feet
Parking	75 (second level)

Hotel amenities include meeting spaces, restaurants, fitness center, indoor pool, and an exterior terrace on the third floor.

The Proponent recognizes the significance of Parcel A as one of two "gateways" to the Marine Park (the other at Seaport Boulevard), and has responded by designing a building and landscape program that redefines the Marine Park's Summer Street entrance. Upon completion, the proposed Project will help create the Marine Park's "sense of place" in relation to the nearby South Boston Seaport developments and the Boston Convention and Exposition Center (BCEC), by creating a bookend to the Summer Street corridor, and by improving the Marine Park's connectivity to the adjacent neighborhood.

The new building has been designed to enhance the pedestrian experience around the site: along Summer Street will be a newly tree-lined sidewalk and a generous building setback, to create an expanded pedestrian plaza between the ground-floor uses and Summer Street.

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Figure 2-2
Ground Floor Plan

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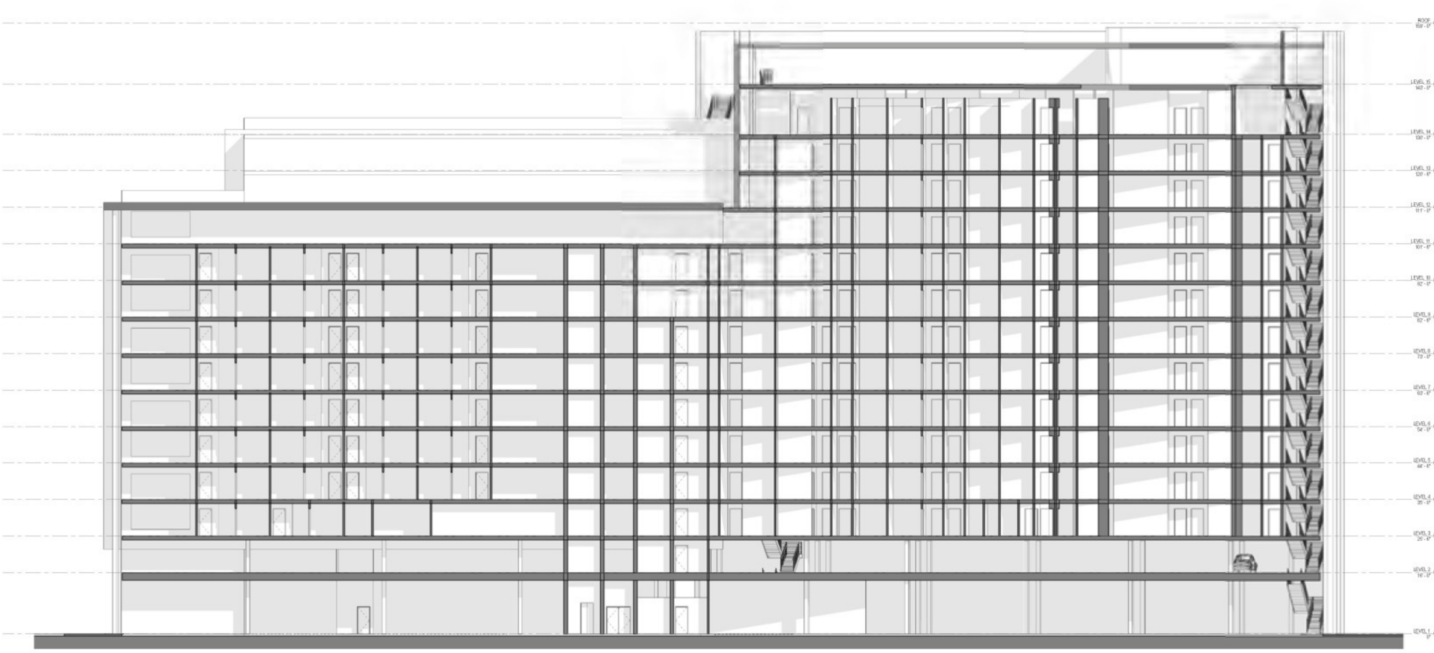
Figure 2-3
Typical Floor Plan



_EAST/WEST SECTION

_NORTH/SOUTH SECTION

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Figure 2-5

View Looking Northwest Up Summer Street

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Figure 2-6

View Looking East Toward Black Falcon Terminal

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Figure 2-7

View Looking Southeast Down Summer Street

The expanded building setback along Summer Street will also allow seasonal expansion outdoors by ground floor commercial tenants. The Project will improve pedestrian access to the Plaza from the Marine Park's Summer Street entrance considerably by replacing the existing barriers with high-quality hardscaping, lighting, and other public amenities.

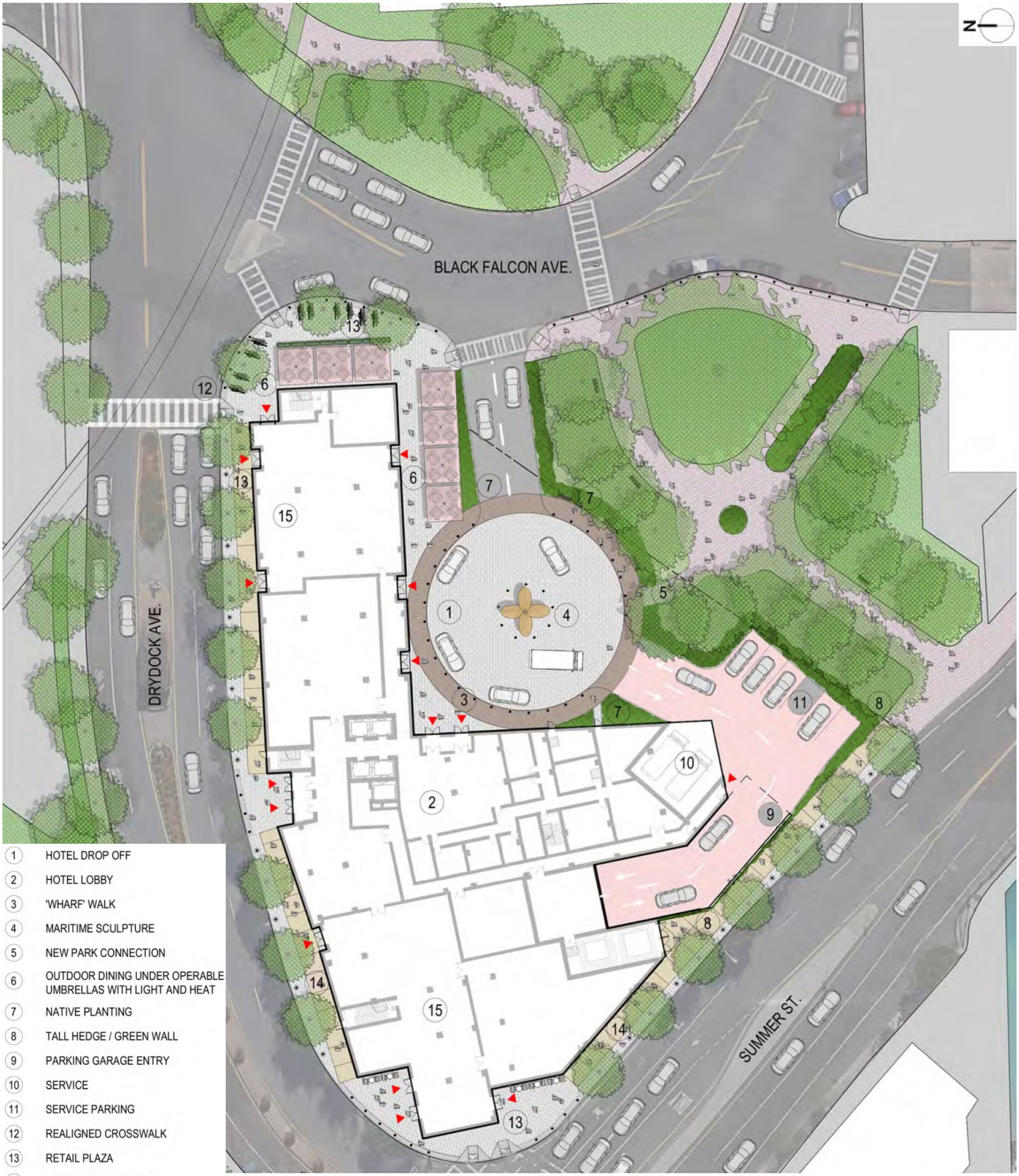
The character and dimensions of the public realm will respond to the site's particular position at the foot of the Summer Street Bridge. Not only will the public realm be expanded and enhanced along Summer Street, but a planted, pedestrian streetscape is proposed on the Drydock Avenue edge of the site. Finally, the hotel's proposed courtyard entrance on Terminal Street will facilitate easy drop-off and pick-up, away from the high traffic volumes at the intersection of Summer Street and Drydock Avenue, to the benefit of vehicles, pedestrians, and bicycles, alike.

The street-level uses, including retail, and hotel lobbies and other amenity spaces, will further enhance the pedestrian experience along the Project Site's street frontage and are designed to establish a dynamic blend of uses, thereby creating a more vibrant area that augments not only the pedestrian experience, but creates meaningful linkages within the Project Site and to adjacent parcels.

Although the Summer Street and Drydock Avenue streetscapes are meant to predominate, all edges of the new building are intended to enhance the pedestrian experience along the site. Generous walkways along both major street frontages are envisioned as linear plazas, buffered from passing vehicles by plantings creating shade. Locations for outdoor seating and other activities will relate to the adjacent commercial spaces. Both the landscaping and the building will respond to the unique place-making opportunity at Parcel A by creating a lively pedestrian realm.

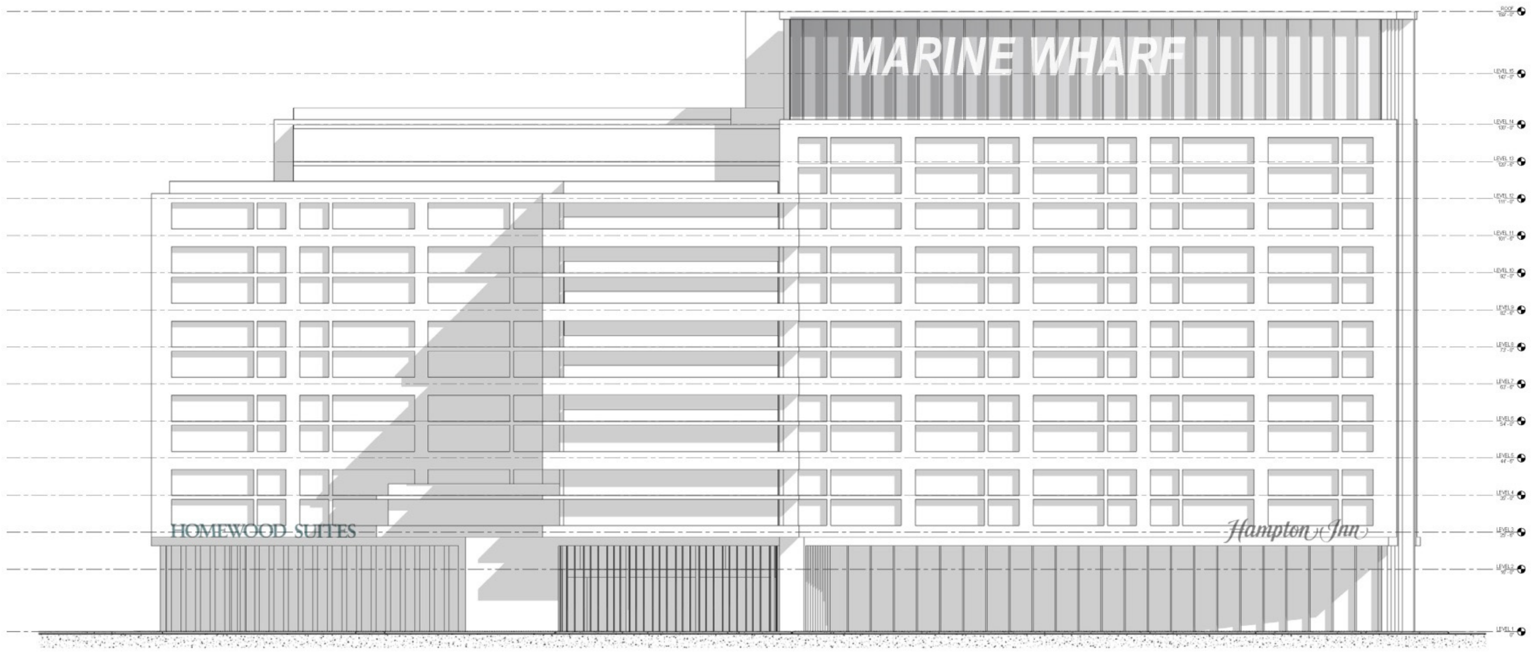
In the hotel courtyard facing Terminal Street, also proximate to ground-level commercial space, pedestrian-scaled lighting and plantings will reinforce the character of this area as shared by vehicles, pedestrians, and bicycles. The careful selection of materials will ensure the courtyard to function capably for all its users, while creating open space that can adapt to the needs of the adjacent commercial tenants. This design has the potential to create a valuable neighborhood asset, cohesive with open space throughout the Project Site, with special care given to the Project Site's connection to the Plaza. Figure 2-8 provides a Landscape Plan.

The proposed name of the project is "MARINE WHARF" and will house a dual brand hotel: Homewood Suites and Hampton Inn, both under the Hilton flag. As such, the name of the Project and the duel brands need to be displayed on the building particularly from Summer Street. Figure 2-9 is an elevation of the type and location of the signage the design team will likely propose. The design team will work with the BRA, BCDC and PIC on the development of this signage package.

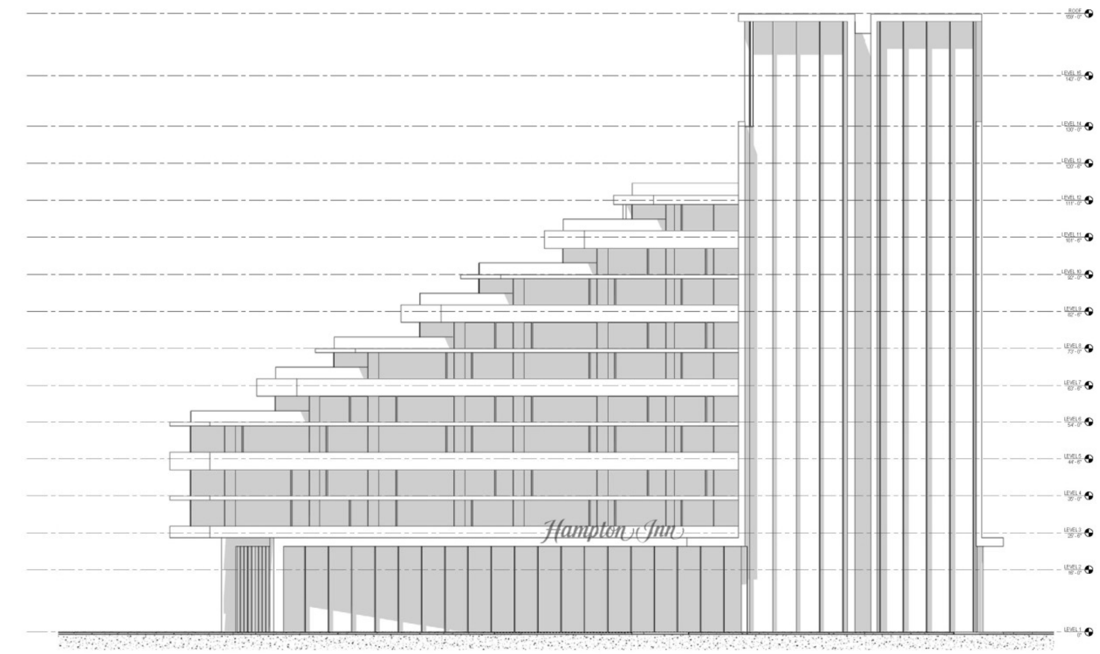


1 HOTEL DROP OFF
2 HOTEL LOBBY
3 'WHARF' WALK
4 MARITIME SCULPTURE
5 NEW PARK CONNECTION
6 OUTDOOR DINING UNDER OPERABLE UMBRELLAS WITH LIGHT AND HEAT
7 NATIVE PLANTING
8 TALL HEDGE / GREEN WALL
9 PARKING GARAGE ENTRY
10 SERVICE
11 SERVICE PARKING
12 REALIGNED CROSSWALK
13 RETAIL PLAZA
14 RETAIL STREETSCAPE
15 RETAIL

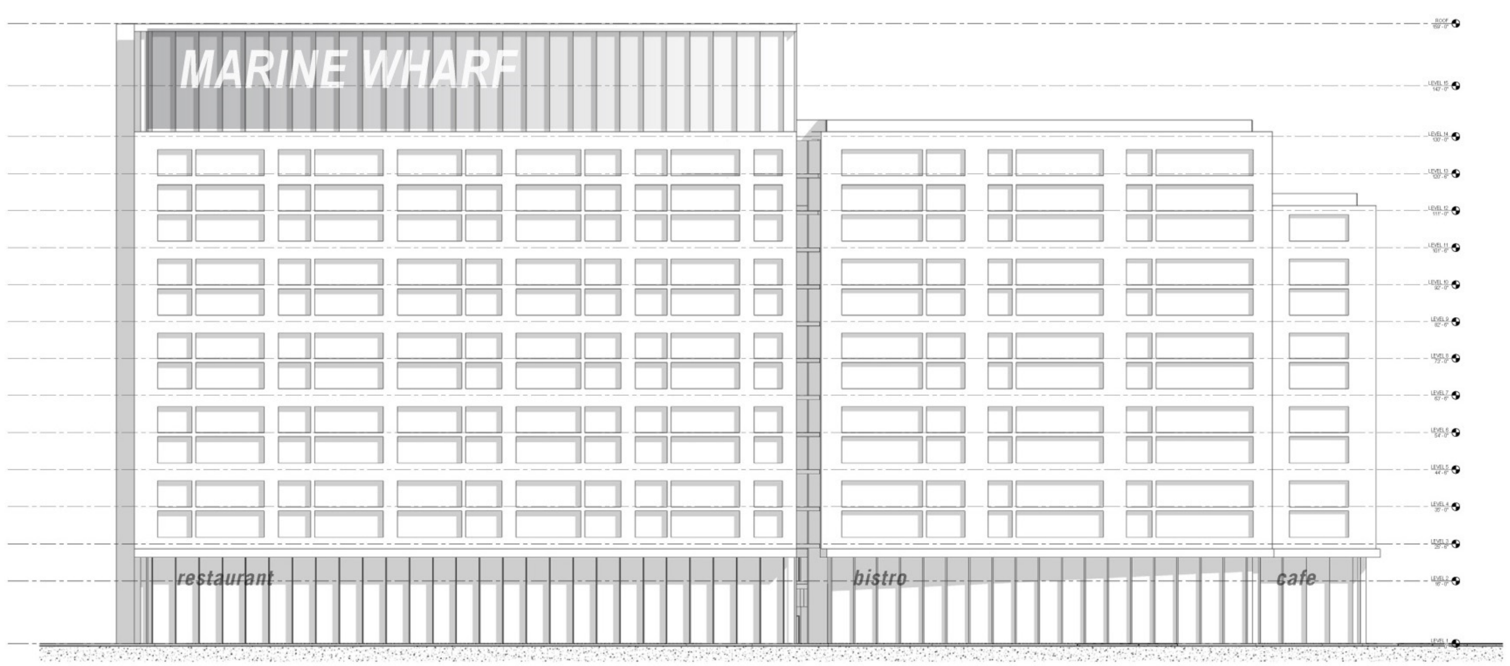
Figure 2-8
Landscape Plan



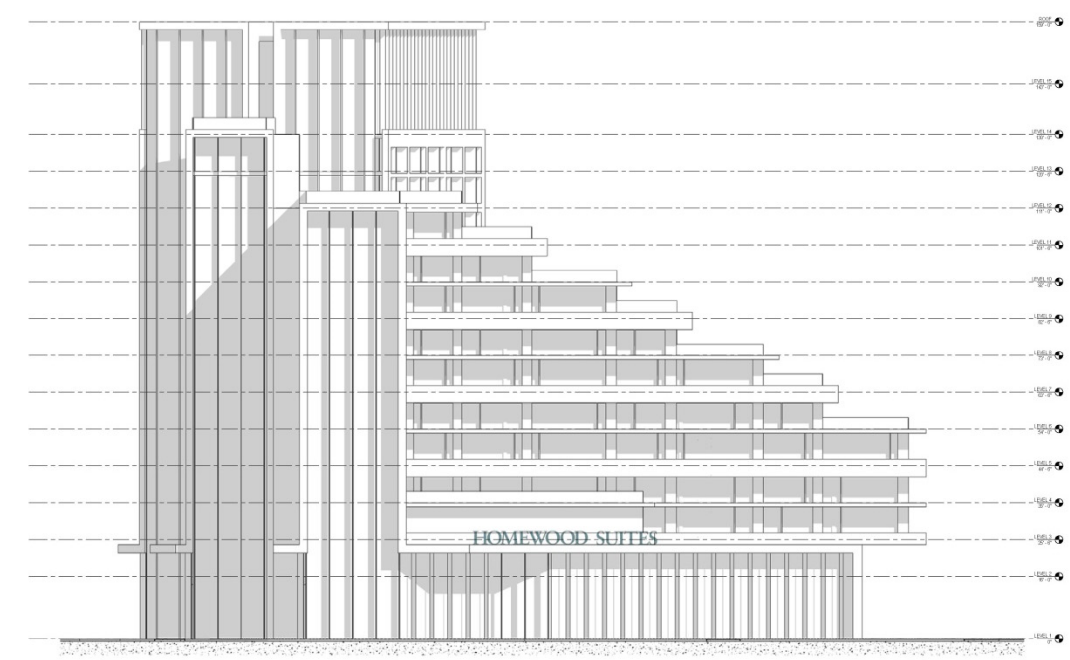
_SOUTH ELEVATION



_EAST ELEVATION



_NORTH ELEVATION



_WEST ELEVATION

Figure 2-9

Signage Elevations

2.3.1 Evolution of Design

The Project's design was shaped in large part by the site's Chapter 91 dimensional restrictions. The main "bar" of the hotel stands landward of the Chapter 91 jurisdiction line, and the structure perpendicular to this building massing steps down to comply with the Chapter 91. The building façade is intended to stand as a gateway to the Marine Industrial Park, and evokes the district with the use of simple, double-story square windows, surrounded by concrete panels.

By minimizing curb cuts, outdoor loading and service areas, and drop-off/pick-up areas along the adjacent streets, the design is intended to enhance the pedestrian experience along the Summer Street and Drydock Avenue corridors. The proposed site layout maximizes the functionality of the hotel courtyard facing Terminal Street, while minimizing user conflicts along Drydock Avenue and Summer Street.

Chapter 3.0

Traffic Analysis

3.0 TRANSPORTATION

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the proposed Project, located at Parcel A of the Raymond L. Flynn Marine Park (Marine Park), in South Boston, Massachusetts. This transportation study adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and the Article 80 Large Project Review process. It includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity. Based upon the results of the analysis contained within this chapter, the Project is expected to have minimal impact on transportation operations in the area.

3.1 Project Description

The Project Site is located at the southwesterly entry to the 191-acre MIP, and is adjacent to Summer Street and Drydock Avenue. Currently, the site is partially paved and used as an open-air staging area for construction materials and trucks. There are no buildings on the site.

The proposed development program is summarized in Table 3-1.

Table 3-1 Project Program

Land Use	Quantity
Hotel	245 keys
All Suites Hotel	166 keys
Retail	3,500 square feet
Parking	75 spaces
Loading	3 bays

3.1.1 Study Methodology

This transportation study and supporting analyses were conducted in accordance with BTD guidelines and the Article 80 Large Project Review process, and are described below.

The Existing (2016) Condition analysis includes an inventory of the existing transportation conditions such as traffic characteristics, parking, curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Existing counts for vehicles, bicycles, and pedestrians were collected at the intersections near the site. A traffic data collection effort forms the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. Long-term impacts are evaluated for the year 2023, based on a seven-year horizon from the year of the filing of this traffic study.

The No-Build (2023) Condition analysis includes general background traffic growth, traffic growth associated with specific developments (not including this Project), and transportation improvements that are planned in the vicinity of the site.

The Build (2023) Condition analysis includes a net increase in traffic volume due to the addition of Project-generated trip estimates to the traffic volumes developed as part of the No-Build (2023) Condition analysis. Expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading facilities, are identified.

The final part of the transportation study identifies measures to mitigate Project-related impacts and to address any traffic, pedestrian, bicycle, transit, safety, or construction related issues that are necessary to accommodate the Project.

An evaluation of short-term traffic impacts associated with construction activities is also provided.

3.1.2 Study Area

The study area, shown in Figure 3-1, includes the following intersections:

- Summer Street/Drydock Avenue/Pappas Way (signalized);
- Summer Street/Pumphouse Road (signalized);
- Drydock Avenue/Harbor Street/Channel Street (unsignalized).

Under future conditions, additional intersections are included in the assessment of the proposed extension of the Massport Haul Road directly into the MIP. See Section 3.3.3 for a discussion of this proposed infrastructure improvement being considered by the Massachusetts Port Authority (Massport) and the City of Boston.

3.2 Existing Conditions

This section includes descriptions of existing study area roadway geometries, intersection traffic control, peak-hour vehicular and pedestrian volumes, average daily traffic volumes, public transportation availability, parking, curb usage, and loading conditions.

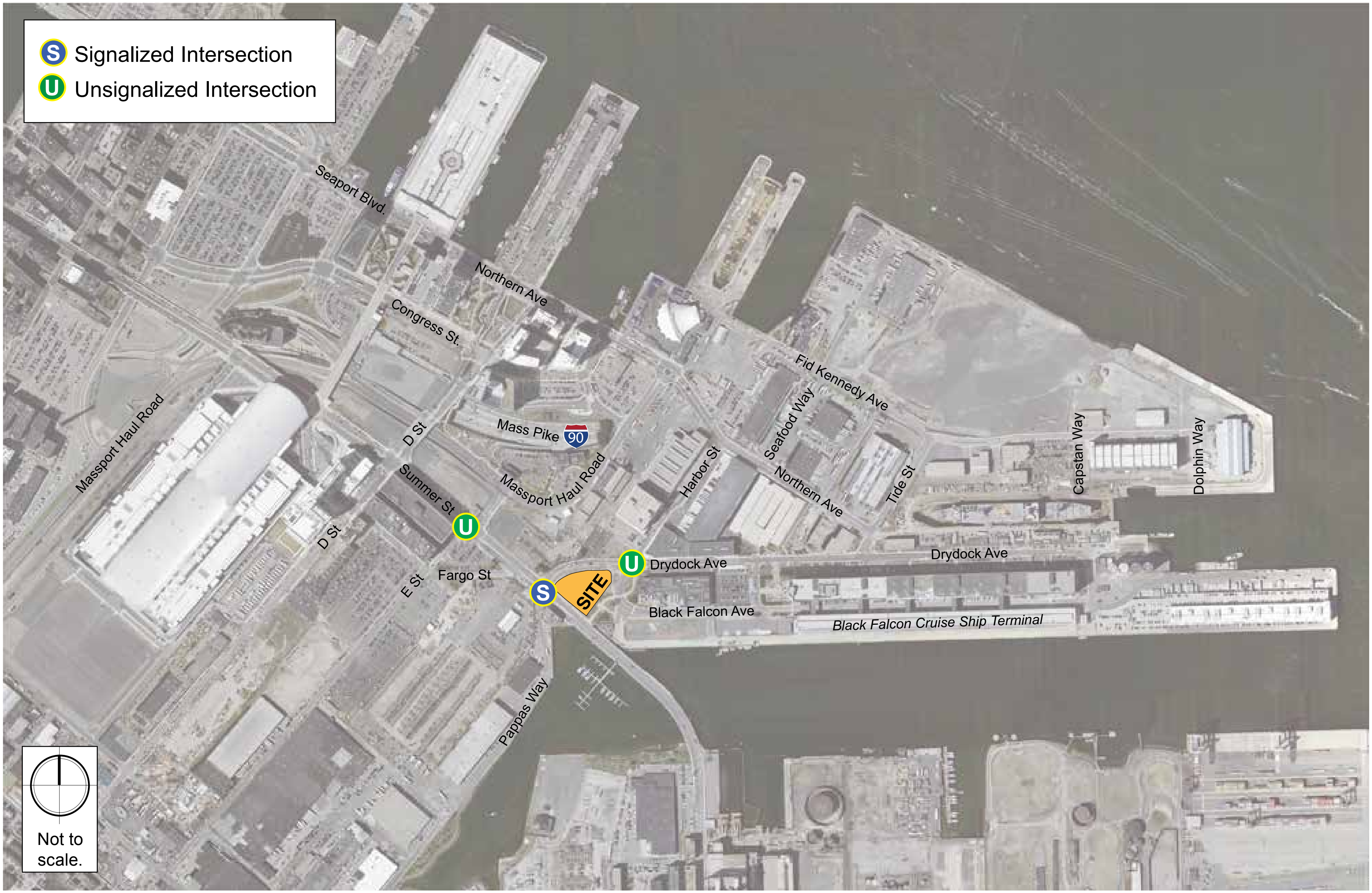


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Figure 3-1
Study Area Intersections

3.2.1 *Existing Roadway Conditions*

The study area includes the following roadways, which are categorized according to the Massachusetts Department of Transportation (MassDOT) Office of Transportation Planning functional classifications:

Summer Street is a two-way, four-lane roadway west of the Project site. Summer Street is classified as an urban principal arterial roadway under BTD jurisdiction and generally runs in an east–west direction between Washington Street in Downtown Crossing to the west and East First Street in South Boston to the east. Within the study area, on-street parking is generally restricted. There are sidewalks on both sides of the roadway.

Drydock Avenue is a two-way, two-lane roadway located north of the Project Site. Drydock Avenue is classified as a local roadway under BTD jurisdiction that generally runs in an east-west direction between Summer Street to the west and Black Falcon Avenue to the east. Within the study area, on-street parking is generally restricted. There are sidewalks on both sides of the roadway.

Pumphouse Road is a two-way, four-lane roadway located north of the Project Site. Pumphouse Road is classified as an urban principal arterial roadway under MassDOT jurisdiction that generally runs in an east-west direction between Summer Street to the west and Massport Haul Road to the east. Within the study area, on-street parking is restricted. There are sidewalks only on the right side of the roadway.

Pappas Way is a two-way, two-lane roadway located to the west of the Project Site. Pappas Way is classified as a local roadway under BTD jurisdiction and generally runs in a north-south direction between Summer Street to the north and East 1st Street to the south. Within the study area, on-street parking is restricted. There are sidewalks on both sides of the roadway.

Harbor Street/Terminal Street is a two-way, two-lane roadway located to the east of the Project Site. Harbor Street/Terminal Street is classified as local roadway under BTD jurisdiction that generally runs in a north-south direction between Northern Avenue to the north and Drydock Avenue to the south. Within the study area, on-street parking is restricted. There are sidewalks on both sides of the roadway.

Channel Street is a two-way, two-lane roadway located to the southeast of the Project Site. Channel Street is classified as local roadway under BTD jurisdiction that generally runs in a north-south direction between Northern Avenue to the north and Harbor Street to the south. Within the study area, on-street parking is restricted. There are sidewalks on both sides of the roadway.

3.2.2 Existing Intersection Conditions

Existing conditions at the study area intersections are described below.

Summer Street/Drydock Avenue/Pappas Way is a signalized intersection with four approaches under BTD jurisdiction. The Summer Street eastbound approach consists of a 12-foot wide exclusive left-turn lane, a 12-foot wide exclusive through-lane, and a 16-foot wide shared through- and right-turn lane. There is a 5-foot wide median on the eastbound approach. There is a Massachusetts Bay Transportation Authority (MBTA) bus stop adjacent to the intersection on the eastbound approach. The Summer Street westbound approach consists of a 12-foot wide exclusive left-turn pocket lane, a 12-foot wide exclusive through lane, and a 12-foot wide shared through and right-turn lane. There is a seven-foot wide median separating the two directions of travel. There is an MBTA bus stop shelter on the far side of the interaction from this approach. The Pappas Way northbound approach consists of one 15-foot wide general purpose travel lane. The Drydock Avenue southbound approach consists of a 12-foot wide shared use left-turn/through lane and a 13-foot wide left-turn lane. There is also a seven-foot-wide median separating the two directions of travel. Parking is not permitted on any of the approaches of this intersection. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Summer Street/Pumphouse Road is a signaled intersection with three approaches under BTD jurisdiction. The Summer Street eastbound approach consists of a 12-foot wide exclusive shared left-turn/through lane and a 12-foot wide exclusive through lane. There is an 11-foot wide median present at the eastbound approach. There is an MBTA bus stop adjacent to the intersection on the eastbound approach. The Summer Street westbound approach consists of two 12-foot wide exclusive through lanes and a 12-foot wide right-turn only lane. There is a 15-foot wide median present at the westbound approach. There is an MBTA bus stop shelter on the far side of the intersection from this approach. The Pumphouse Road southbound approach consists of a 12-foot wide left-turn only lane and a 12-foot wide right-turn only lane. Parking is not permitted on any of the approaches of this intersection. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Drydock Avenue/Harbor Street (Terminal Street south of Drydock Avenue) is an unsignalized intersection with four approaches. The Drydock Avenue eastbound approach consists of two 11-foot wide general use travel lanes with bike sharrows[1] present within the right lane. There is a channelized right-turn island present that is flush with the roadway. There is also a five-foot wide median that ends approximately 50 feet before the intersection. The Drydock Avenue westbound approach consists of one 10-foot wide general use lane and a bike lane. There is a MBTA bus stop on the far side of the intersection of this approach. The Terminal Street northbound approach is stop-controlled

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1 A "sharrow" is a shared lane marking, often an arrow.

and consists of one 11-foot wide shared left-turn/through lane and one 13-foot wide exclusive right-turn lane. The Harbor Street southbound approach is also stop controlled and consists of one 12-foot wide general use lane. Parking is not permitted on any of the approaches of this intersection. Crosswalks and wheelchair ramps are provided across all approaches to the intersection.

3.2.3 Existing Traffic Data

Traffic volume data was collected at two of the three study area intersections on February 4, 2016, and at the third study area intersection (Summer Street/Pappas Way/Drydock Avenue) on November 4, 2015. Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the a.m. and p.m. peak periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively). The traffic classifications included car, heavy vehicle, pedestrian, and bicycle movements. Traffic data are provided in the Traffic Appendix.

The Existing (2016) Condition weekday a.m. and p.m. peak hour traffic volumes are shown in Figures 2-2 and Figure 3-3, respectively.

3.2.4 Existing Condition Traffic Operations Analysis

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay experienced by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 9) software package was used to calculate average delay and associated LOS at the study area intersections. This software is based upon the traffic operational analysis methodology of the Transportation Research Board's 2000 Highway Capacity Manual (HCM).

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 3-2 displays the LOS criteria, where LOS A indicates the most favorable condition, with minimum traffic delay, and LOS F represents the worst condition. However, LOS E or F is often typical for a stop controlled minor street that intersects a major roadway and does not necessarily indicate that the intersection operations are poor.

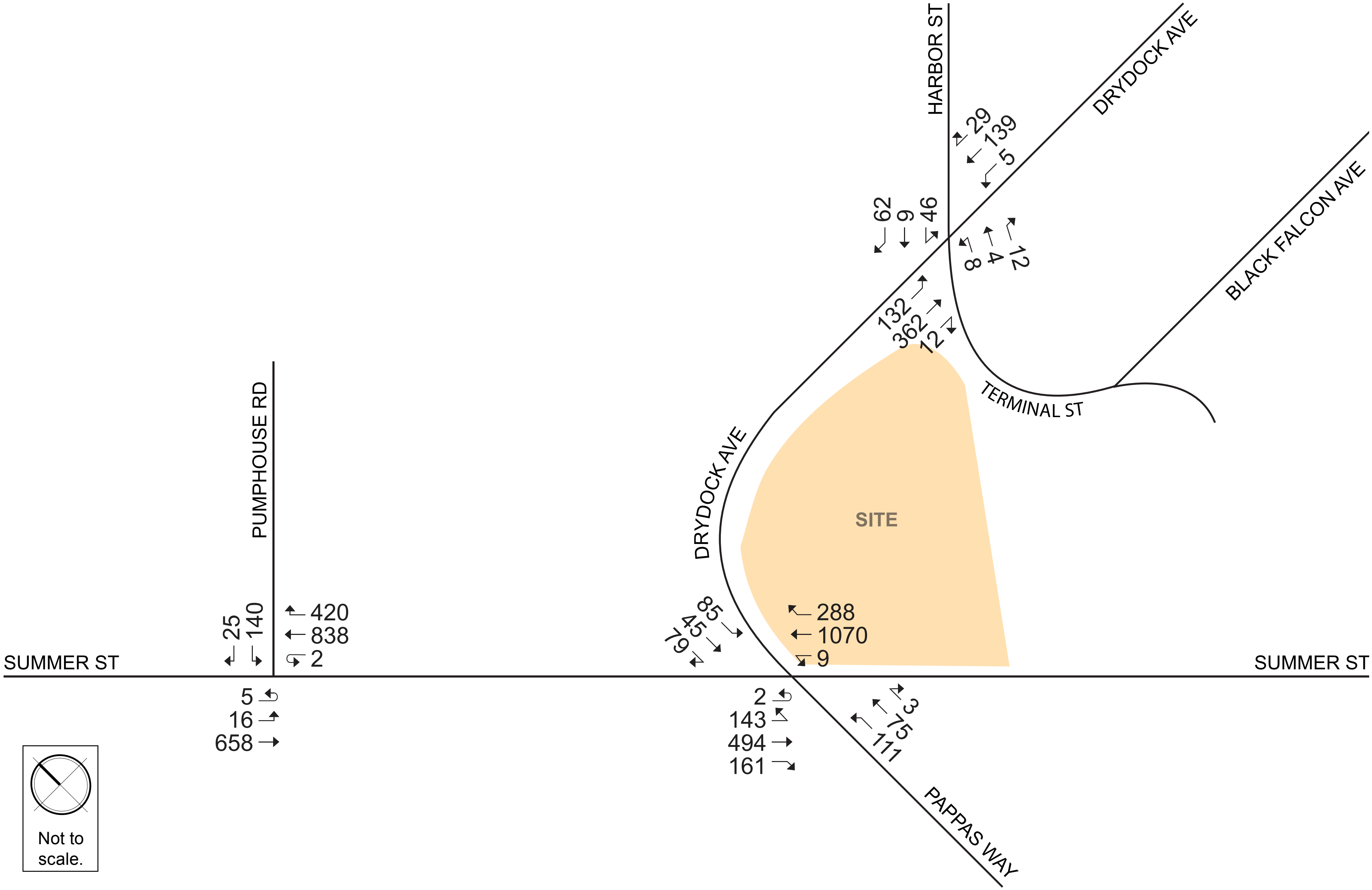

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Figure 3-2
Existing (2016) Condition Traffic Volumes, Weekday a.m. Peak Hour

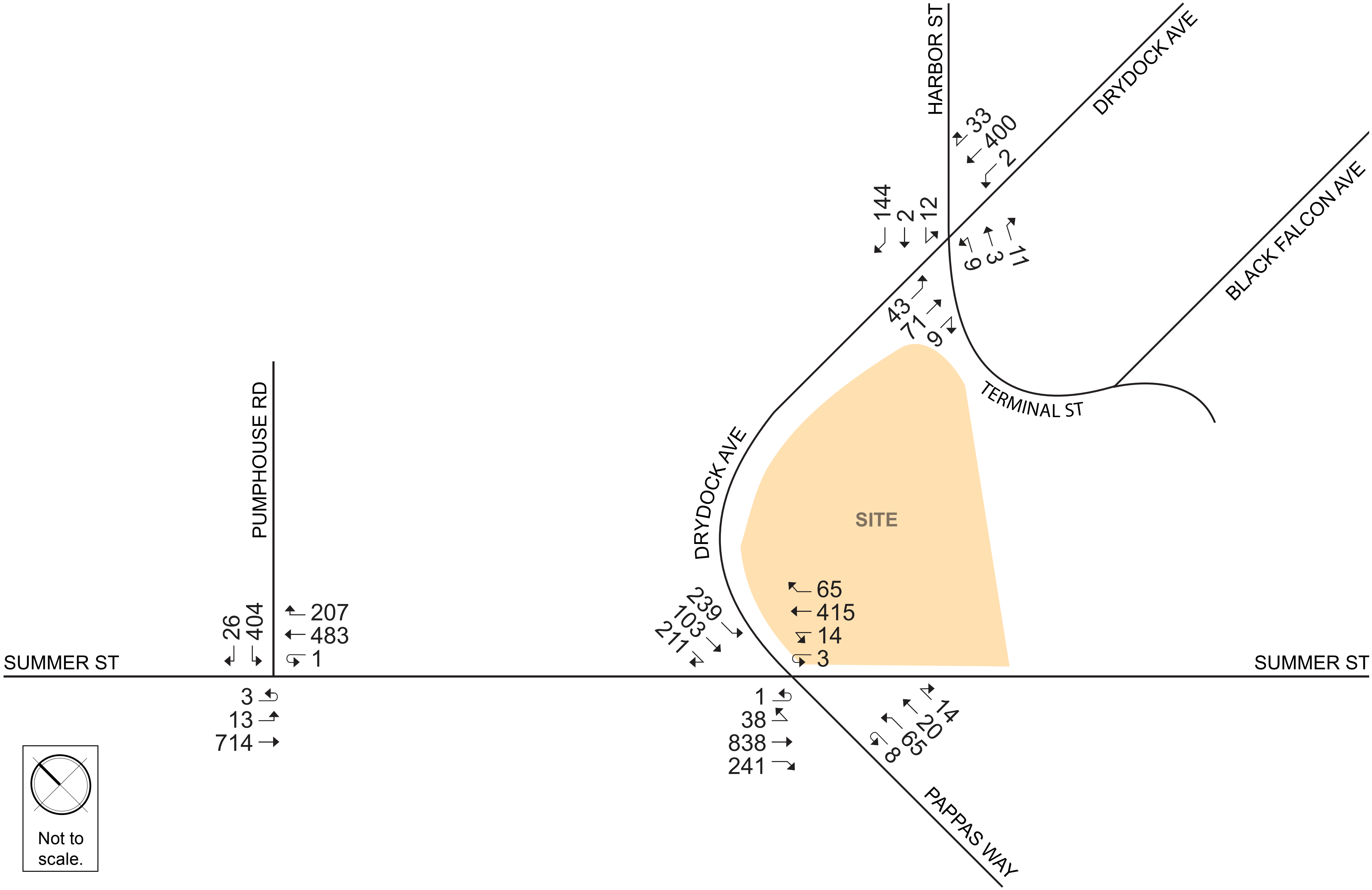

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Figure 3-3

Existing (2016) Condition Traffic Volumes, Weekday p.m. Peak Hour

Table 3-2 Vehicle Level of Service Criteria for Intersections

Level of Service (LOS)	Average Stopped Delay (sec/vet)	
	Signalized Intersections	Unsignalized Intersections
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: 2000 Highway Capacity Manual, Transportation Research Board.

In addition to delay and LOS, the estimated operational capacity and queue lengths, as described below, further quantify traffic operations at intersections.

- The volume-to-capacity (v/c) ratio is a measure of congestion at an intersection approach. A v/c ratio below one indicates that the intersection approach has adequate capacity to process the arriving traffic volumes over the course of an hour. A v/c ratio of one or greater indicates that the traffic volume on the intersection approach exceeds capacity.

- The 50th percentile queue length, measured in feet, represents the maximum queue length during a cycle of the traffic signal with typical (or median) entering traffic volumes.

- The 95th percentile queue, measured in feet, denotes the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line. This maximum queue occurs five percent, or less, of the time during the peak hour and typically does not develop during off-peak hours. Because volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a "worst case" condition. Queues at an intersection are generally below the 95th percentile length throughout most of the peak hour. It is also unlikely that 95th percentile queues for each approach to an intersection occur simultaneously.

Table 3-3 and Table 3-4 summarize the Existing (2016) Condition capacity analysis for the study area intersection during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in the Traffic Appendix to this EPNF.

As shown in Table 3-3 and Table 3-4, under the Existing (2016) Condition, all approaches operate at LOS D or better, with the exception of Summer Street/Drydock Avenue/Pappas Way as discussed below.

- Overall, the intersection of Summer Street / Drydock Avenue / Pappas Way operates at LOS D during both the a.m. and p.m. peak hours. During the a.m. peak hour, the Summer Street eastbound left-turn lane operates at LOS E and the Pappas Way northbound approach operates at LOS F. The Drydock Avenue southbound shared left-turn/through lane operates at LOS E during the a.m. and at LOS F during the p.m. peak hour.

- At Summer Street / Pumphouse Road, the overall intersection and approaches operate at LOS C or better.

- At the unsignalized intersection of Drydock Avenue / Terminal Street / Harbor Street, all movements operate at LOS D or better.

Table 3-3 Existing (2016) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**D**	**38.5**	**-**	**-**	**-**
Summer EB left	E	60.2	0.81	73	#188
Summer EB thru|thru/right	A	8.2	0.39	108	55
Summer WB left	C	28.7	0.13	4	18
Summer WB thru|thru/right	C	33.3	0.85	~562	#702
Pappas Way NB left/thru/right	F	164.5	1.17	~172	#322
Drydock SB left/thru	E	62.6	0.69	90	#178
Drydock SB right	A	7.6	0.19	0	36
Summer Street/Pumphouse Road	**A**	**9.0**	**-**	**-**	**-**
Summer EB left/thru | thru	A	7.8	0.37	56	212
Summer WB thru | thru | thru/right	A	3.6	0.50	26	m45
Pumphouse Road SB left | left/right	D	50.1	0.59	64	93
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	3.9	0.13	-	9
Drydock WB left/thru/right	A	0.3	0.01	-	0
Terminal NB left/thru	D	27.6	0.10	-	8
Terminal NB right	B	11.2	0.03	-	2
Harbor SB left/thru/right	C	19.2	0.34	-	37

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates level of service E or F.

Table 3-4 Existing (2016) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**D**	**37.2**	**-**	**-**	**-**
Summer EB left	B	17.1	0.16	20	m26
Summer EB thru|thru/right	C	29.1	0.75	393	#393
Summer WB left	D	48.1	0.28	11	#42
Summer WB thru|thru/right	C	32.2	0.46	174	230
Pappas Way NB left/thru/right	D	54.1	0.73	85	130
Drydock SB left/thru	F	81.4	1.00	~313	#401
Drydock SB right	A	3.5	0.34	0	23
Summer Street/Pumphouse Road	**C**	**24.0**	**-**	**-**	**-**
Summer EB left/thru | thru	B	13.6	0.44	107	209
Summer WB thru | thru | thru/right	B	15.4	0.35	36	200
Pumphouse Road SB left | left/right	D	51.5	0.82	192	210
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	4.9	0.05	-	4
Drydock WB left/thru/right	A	0.0	0.00	-	0
Terminal NB left/thru	D	25.3	0.08	-	7
Terminal NB right	A	9.6	0.02	-	1
Harbor SB left/thru/right	C	15.9	0.35	-	39

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates level of service E or F.

3.2.5 Existing Parking

An inventory of on-street parking and the curb regulations was conducted in the vicinity of the Project. The on-street parking predominately consists of restricted parking due to the abundant supply of off-street parking at each parcel in the area. Parking is prohibited along most streets in the study area. On-street parking regulations are mapped in Figure 3-4.

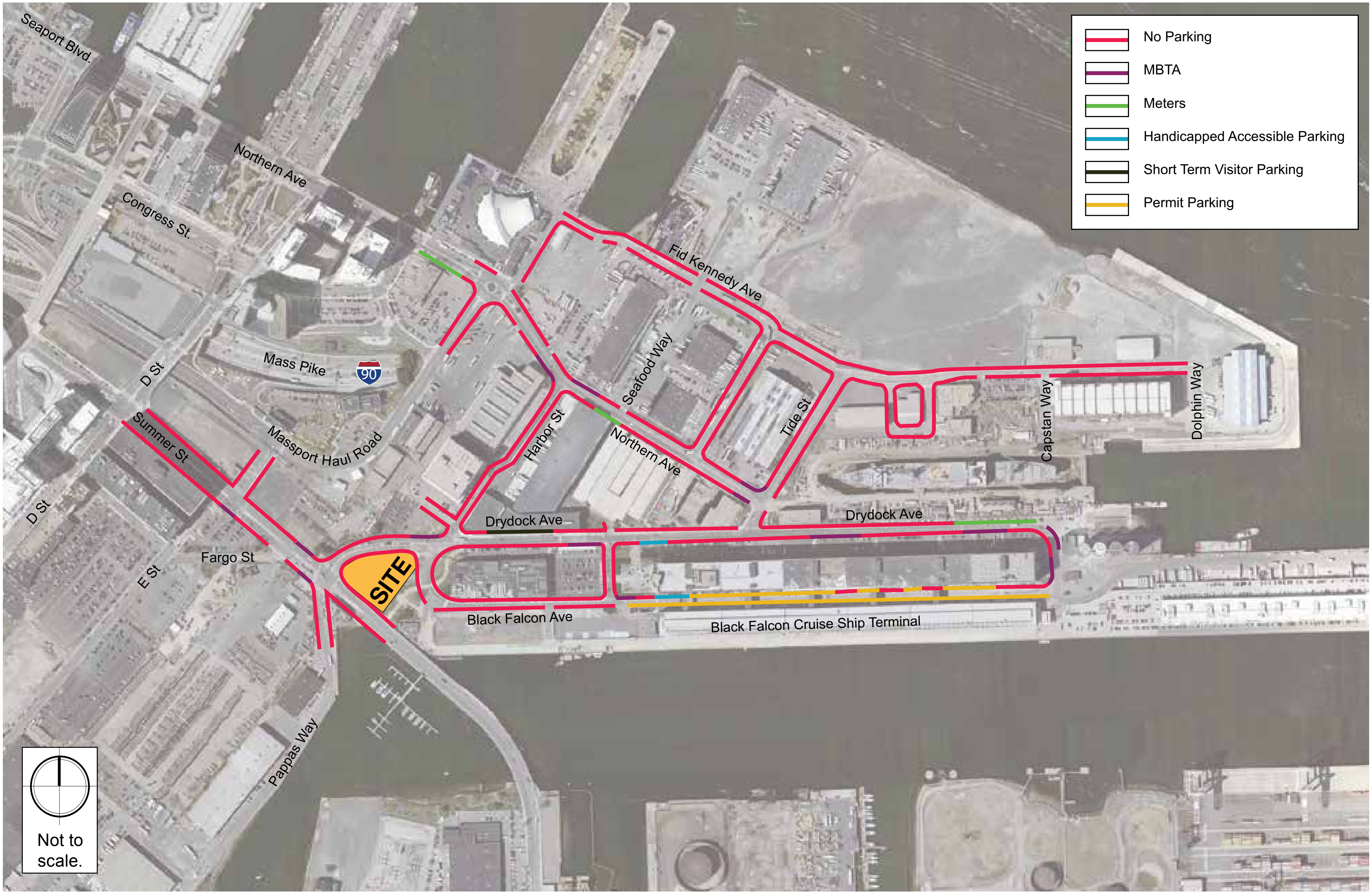

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Figure 3-4
On-Street Parking

There are approximately 7,059 public parking spaces within one-half mile, or a 15-minute walk, from the Project Site. Of these, approximately 2,150 are found in parking lots and 4,909 are in parking garages. A detailed summary of all parking lots and garages are shown in Table 3-5.

Table 3-5 Off-street Parking Lots and Garages

Parking Garages		Parking Lots	
Facility	**Capacity (spaces)**	**Facility**	**Capacity (spaces)**
VPNE – Marine Industrial Park	1,759	Boston Design Center	143
The Westin Boston Waterfront	150	SP PLUS Parking – Lot H	80
John Hancock	150	SP PLUS – Lot K	80
Park Lane Seaport Parking	150	Boston Fish Pier – West Lot	70
Seaport Garage	2,300	LAZ – 145 Northern Avenue	579
VPNE – Stilling's Street Garage	400	LAZ – 58 E Service Road	700
		LAZ – 391 Congress Street	375
		STANHOPE Congress St. Lot	40
		LAZ – 85 Northern Avenue	55
		LAZ – Parcel D	28
Parking Garage Subtotal	**4,909**	**Parking Lot Subtotal**	**2,150**
Total Public Parking Spaces: 7,059			

3.2.6 Car and Bicycle Sharing Services

Car sharing enables easy access to short-term vehicular transportation. Vehicles are rented on an hourly or daily basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location. Zipcar is the primary company in the Boston car sharing market.

Launched in July 2011, Hubway is a bicycle sharing system in Metro Boston with approximately 140 stations and 1,300 bicycles. There are currently seven Hubway locations close to the Project Site.

The nearby car sharing and bicycle locations are shown in Figure 3-5 and summarized in Table 3-6.

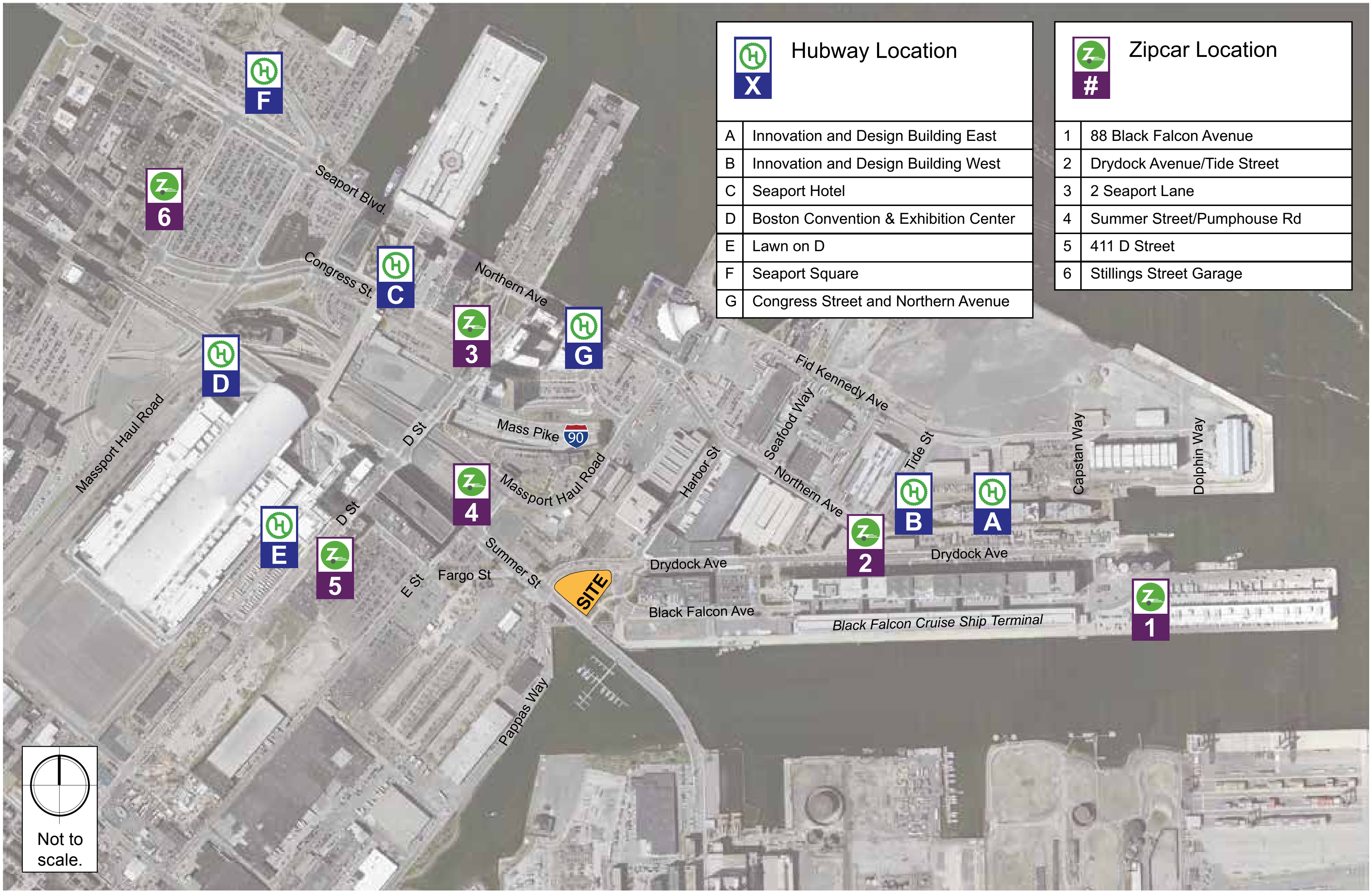

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Figure 3-5
Car and Bicycle Sharing

Table 3-6 Car and Bicycle Sharing Services

Map Identifier	Location
Zipcar Locations	
1	88 Black Falcon Avenue
2	Drydock Avenue/Tide Street – Boston Design Center
3	2 Seaport Lane
4	Summer Street/Pumphouse Road
5	411 D Street
6	Stillings Street Garage
Hubway Locations	
A	Innovation and Design Building East
B	Innovation and Design Building West
C	Seaport Hotel
D	Boston Convention & Exhibition Center
E	Lawn on D
F	Seaport Square
G	Congress Street and Northern Avenue

3.2.7 Existing Bicycle Volumes and Accommodations

In recent years, bicycle use has increased dramatically throughout the City of Boston. The site is proximate to several bicycle facilities. The City of Boston's "Bike Routes of Boston" map indicates that Drydock Avenue is designated as beginner routes suitable for all types of riders. Additionally, Summer Street, Congress Street, and D Street are designated as intermediate routes, suitable for riders with some on-road experience. Bicycle counts were conducted concurrent with the vehicular TMCs, and are presented in Figure 3-6. As shown in the figure, bicycle volumes are highest along Summer Street and Drydock Avenue.

3.2.8 Existing Pedestrian Volumes and Accommodations

In general, there are sidewalks along both sides of all roadways nearby, and they are in good condition. Crosswalks and wheelchair ramps are also provided where needed. Pedestrian counts, conducted concurrent with the TMCs at the study area intersections, are shown in Figure 3-7.

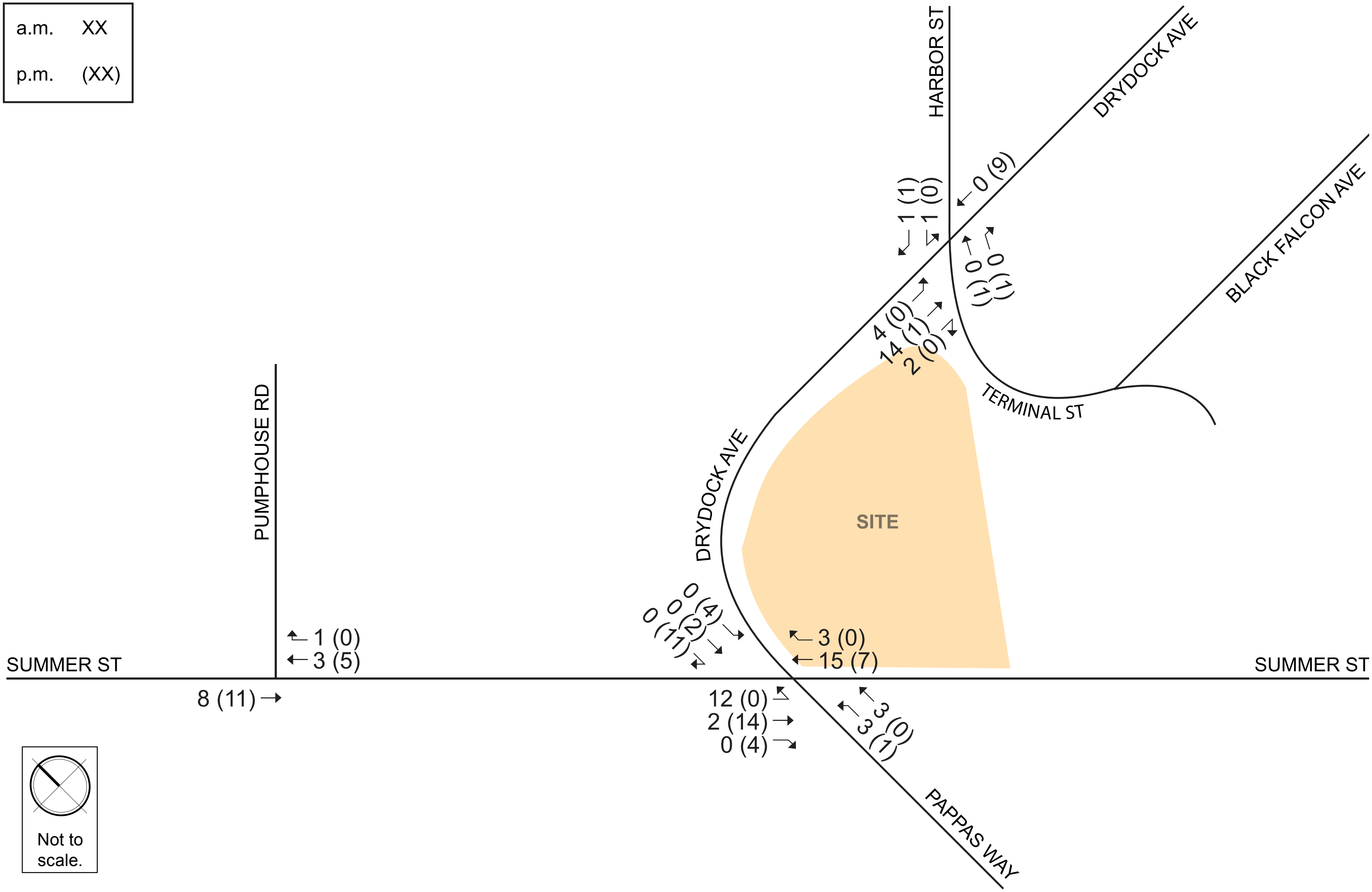

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Figure 3-6
Existing (2016) Condition Bicycle Volumes, Weekday a.m. and p.m. Peak Hours

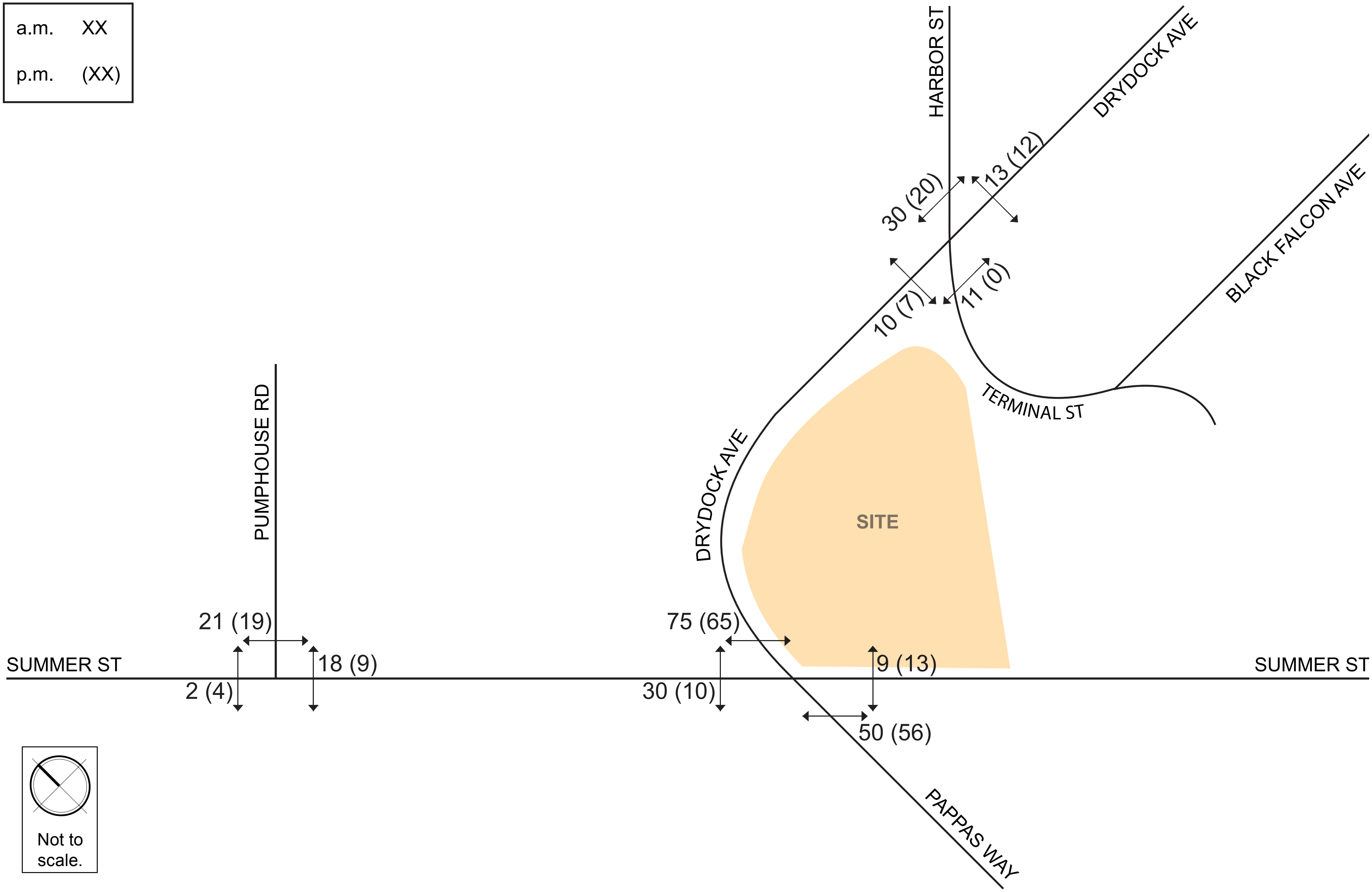

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Figure 3-7
Existing (2016) Condition Pedestrian Volumes, Weekday a.m. and p.m. Peak Hours

3.2.9 *Existing Public Transportation Services*

There are several public transportation options nearby. The Massachusetts Bay Transportation Authority's Silver Lines SL1 and SL2 Branches provide access in the vicinity of the site. Additionally, the MBTA operates two bus routes near the Project Site. Figure 3-8 shows the public transportation services near the site and Table 3-7 provides a summary of all routes.

Table 3-7 Existing Public Transportation Service Summary

Transit Service	Description	Rush-hour Headway (minutes)*
Silver Line		
SL1 Branch	Logan Airport – South Station via Waterfront	8
SL2 Branch	Design Center – South Station via Waterfront	5
Bus Routes		
Route 4	North Station – World Trade Center via Federal Courthouse & South Station	12
Route 7	City Point – Otis & Summer Streets via Summer Street & South Station	4

* Headway is the time between buses.

3.3 No-Build Conditions

The No-Build (2023) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with background traffic growth independent of any specific project, traffic associated with other planned specific developments, and planned infrastructure improvements that will affect travel patterns throughout the study area.

3.3.1 *Background Traffic Growth*

The methodology to account for generic future background traffic growth, independent of this Project, may be affected by changes in demographics, smaller-scale development projects, or projects unforeseen at this time. Based upon a review of recent and historic traffic data collected recently, a traffic growth rate of one-half percent per year (0.5 percent), compounded annually, was used. However, to account for higher growth along the Summer Street corridor, a one percent (1 percent) annual growth rate was used.

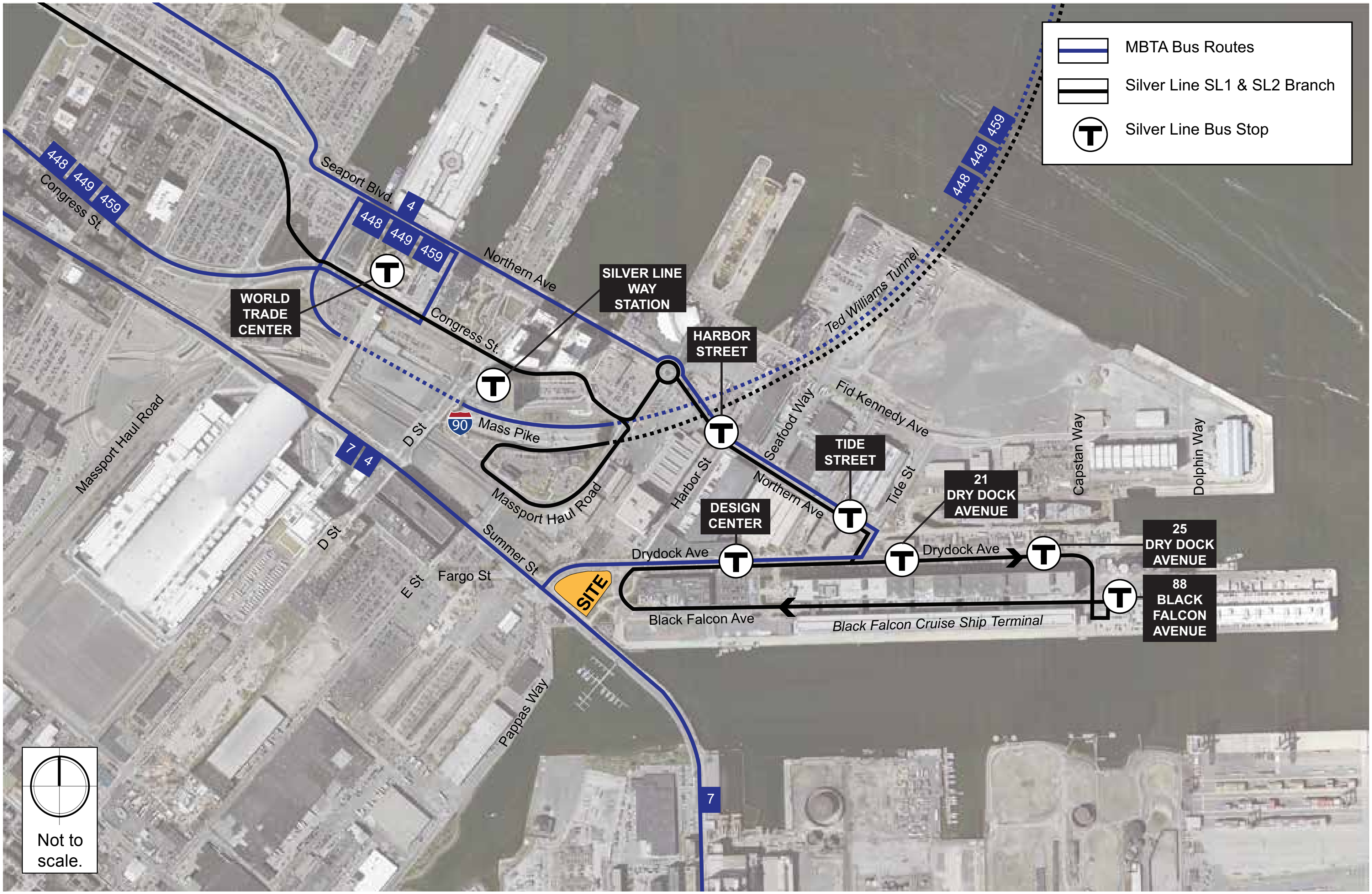

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Figure 3-8
Public Transportation

3.3.2 *Specific Development Traffic Growth*

Traffic volumes associated with the larger or closer known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. The following such projects, as approved by the BRA, were specifically accounted for in the traffic volumes for future scenarios in this study, while others were included in the general background traffic growth. The site-specific background projects are mapped on Figure 3-9:

411 D Street is a residential development consisting of 197 residential units and 129 parking spaces.

D Street Development is a mixed-use development consisting of 500 hotel rooms, 26,300 square feet of retail space, and 1,350 parking spaces, located at 401 D Street.

Waterside Place is a phased mixed-use development. Phase 1A opened in January 2014. Phase 1B will consists of approximately 315,000 square feet of retail space, 278 residential units, and 84 parking spaces. A hotel development consisting of a 505-room hotel will also take place subsequently Phase 1B.

The Residences at 399 Congress Street is a residential development consisting of a 22-story, 388-unit apartment building containing approximately 12,895 square feet of supporting ground-floor lobby, retail, and innovation/retail space, an approximately 1,540 square-foot Innovation Extended Stay and Collaboration Center. Parking for 144 vehicles (including 17 stacker spaces) will be provided in a three-level underground garage.

Boston Cargo Terminal is a development consisting of an intermodal marine industrial facility including a 4.3-acre bulk cargo facility located off Northern Avenue.

6 Tide Street is a mixed-use development consisting of 355,000 square feet of research development and manufacturing space, and 60 parking spaces, located at 316-318 Northern Avenue.

Parcel K is a mixed-use development consisting of 304 residential units, 247 hotel rooms, 16,500 square feet of office space, 20,000 square feet of retail/restaurant, and 640 parking spaces, located at the corner of Northern Avenue and Massport Haul Road.

Seaport Square Development - Parcels A, B, C, D, K, L1 Development is a mixed use development located in several parcels generally along Seaport Boulevard between Sleeper Street and the East Service Road.

Innovation and Design Building (IDB) – The IDB calls for the conversion of approximately 206,388 square feet of existing building floor area to commercial uses and associated improvements at 21-23-25 Drydock Avenue and 1 Design Center Place.

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Figure 3-9
Area Development Projects

25 Fid Kennedy Avenue – The proposed Project will consist of rehabilitating the existing building to include approximately 160,000 gross square feet of light industrial space for J.C. Cannistraro, LLC, to be used as a manufacturing and warehousing facility.

Traffic from the following other study area projects are reflected in the background growth rate:

339 D Street is a residential development consisting of 24 residential units and 30 parking spaces.

360 West Second Street is a residential development consisting of 25 residential units and 25 parking spaces.

Distillery Project is a mixed-use development consisting of residential space, commercial space, art gallery space, a greenhouse, and 147 parking spaces located at 516-524 East Second Street.

E Street Self-Storage Facility is a development consisting of approximately 100,000 square feet of self-storage space,located off E Street.

381 Congress Street is a development consisting of approximately 44 units, including 28 units of workforce and/or innovation housing, and 16 short-term rental units for nearby employers.

621 East First Street is a residential development consisting of approximately 28 units, including four affordable units, and 43 parking spaces.

3.3.3 Proposed Infrastructure Improvements

In the recent South Boston Waterfront Sustainable Transportation Plan[2], a series of short-term and longer-term transportation improvements were recommended for implementation by city and state agencies having jurisdiction in that area. One recommended option, which is currently being evaluated by Massport and the City of Boston, is the extension of the Massport Haul Road to directly serve the MIP.

Today, traffic from the Haul Road destined to the MIP must either travel through the Haul Road roundabout at Northern Avenue, or travel to Summer Street via Pumphouse Road and enter MIP via the Summer Street/Drydock Avenue intersection. The option under evaluation would create a new, four-approach intersection on the Haul Road, near the existing curve on the Haul Road, between Silver Line Way and Pumphouse Road.

[2] "South Boston Waterfront Sustainable Transportation Plan", prepared by VHB in collaboration with A Better City for Massachusetts Convention Center Authority, Massport, MassDOT, and the City of Boston (January 2015).

A new leg of Drydock Avenue would be extended west from its current intersection with Harbor Street to the new Haul Road intersection. Travel on this segment would be one-way westbound and would serve exiting traffic from MIP that is destined to either Summer Street or the Haul Road. A new, two-way road segment from Summer Street would extend north to the new intersection. The existing Drydock Avenue segment between Summer Street and Harbor Street/Terminal Street roadway would remain generally in the same location, but would become one-way eastbound into the MIP. While this option of extending the Haul Road is still being evaluated, the City requested that the study team incorporate the new intersection into the future year conditions analysis.

Two alternatives have been evaluated for No-Build and Build Conditions including "Existing Circulation" (no change to Haul Road) and "Haul Road Extension" (with the new intersection).

Under the Haul Road Extension option, the study team assumed that the new intersection of Haul Road/Haul Road Extension/Drydock Avenue would be signalized. Baseline No-Build (2023) peak hour volumes were reassigned to reflect the availability of the direct Haul Road connection. Because travel patterns near Pumphouse Road would be affected by the Haul Road Extension, the Haul Road/Pumphouse Road intersection was also evaluated under future conditions.

3.3.4 No-Build Traffic Volumes

The one-half percent per year annual growth rate (one percent per year along the Summer Street corridor), compounded annually, was applied to the Existing (2016) Condition traffic volumes, then the additional specific development traffic growth was added to develop the No-Build (2023) Condition traffic volumes.

The a.m. and p.m. peak hour traffic volumes for the No-Build (2023) Condition with Existing Circulation are shown in Figure 3-10 and Figure 3-11, respectively. Similarly, the volumes for the No-Build (2023) Condition with Haul Road Extension are shown in Figure 3-12 and Figure 3-13 for the a.m. and p.m. peak hour, respectively.

3.3.5 No-Build (2023) Condition Traffic Operations Analysis

The No-Build (2023) Condition capacity analysis uses the same methodology as the Existing (2016) Condition capacity analysis. The shaded cells in the tables indicate a decrease in LOS between the Existing (2016) Condition and the No-Build (2023) Condition into LOS E or LOS F. The results under each circulation option are presented below and detailed analysis sheets are provided in the Traffic Appendix.

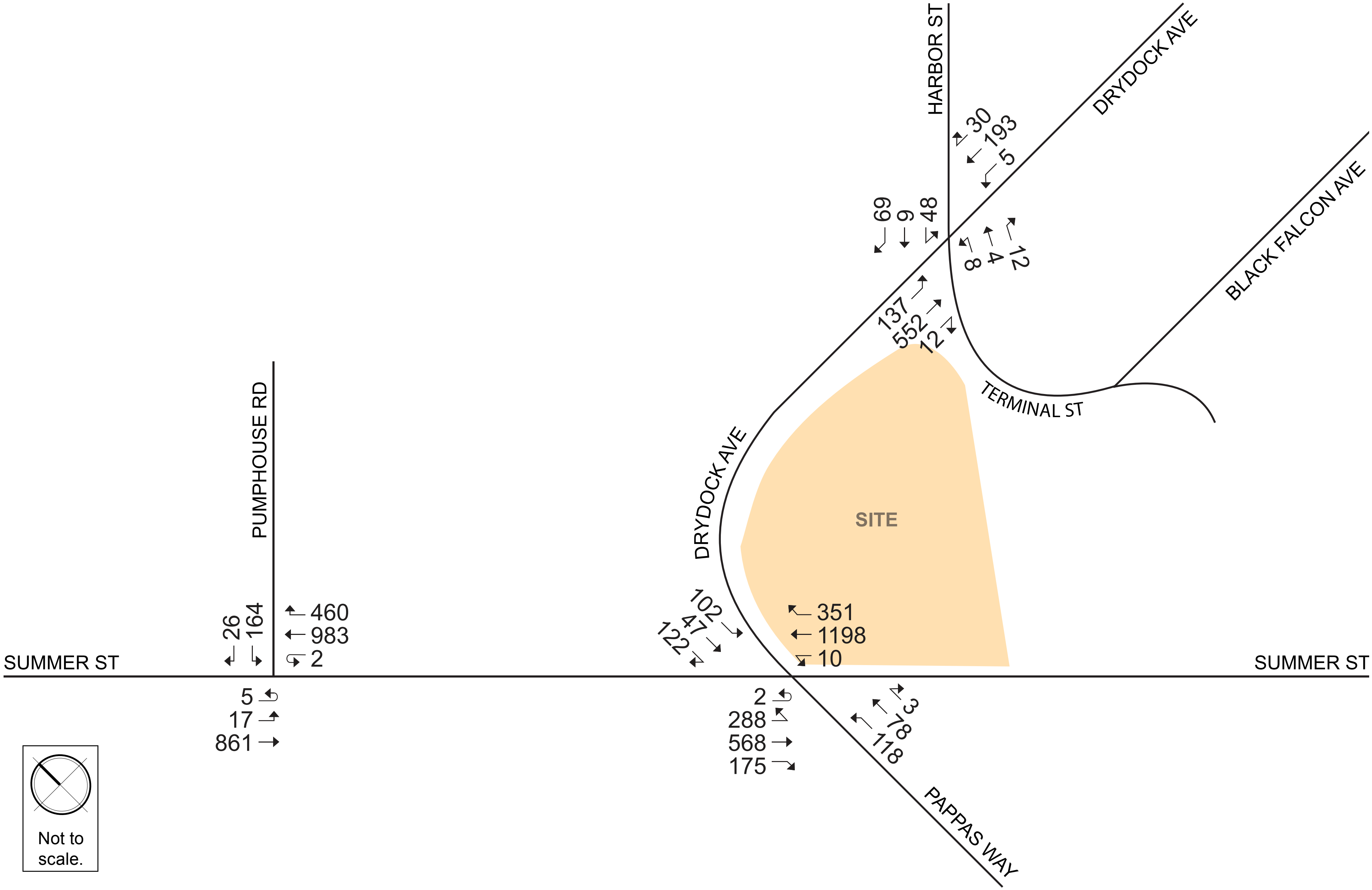

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Figure 3-10

No-Build (2023) Condition Traffic Volumes with Existing Circulation, Weekday a.m. Peak Hour

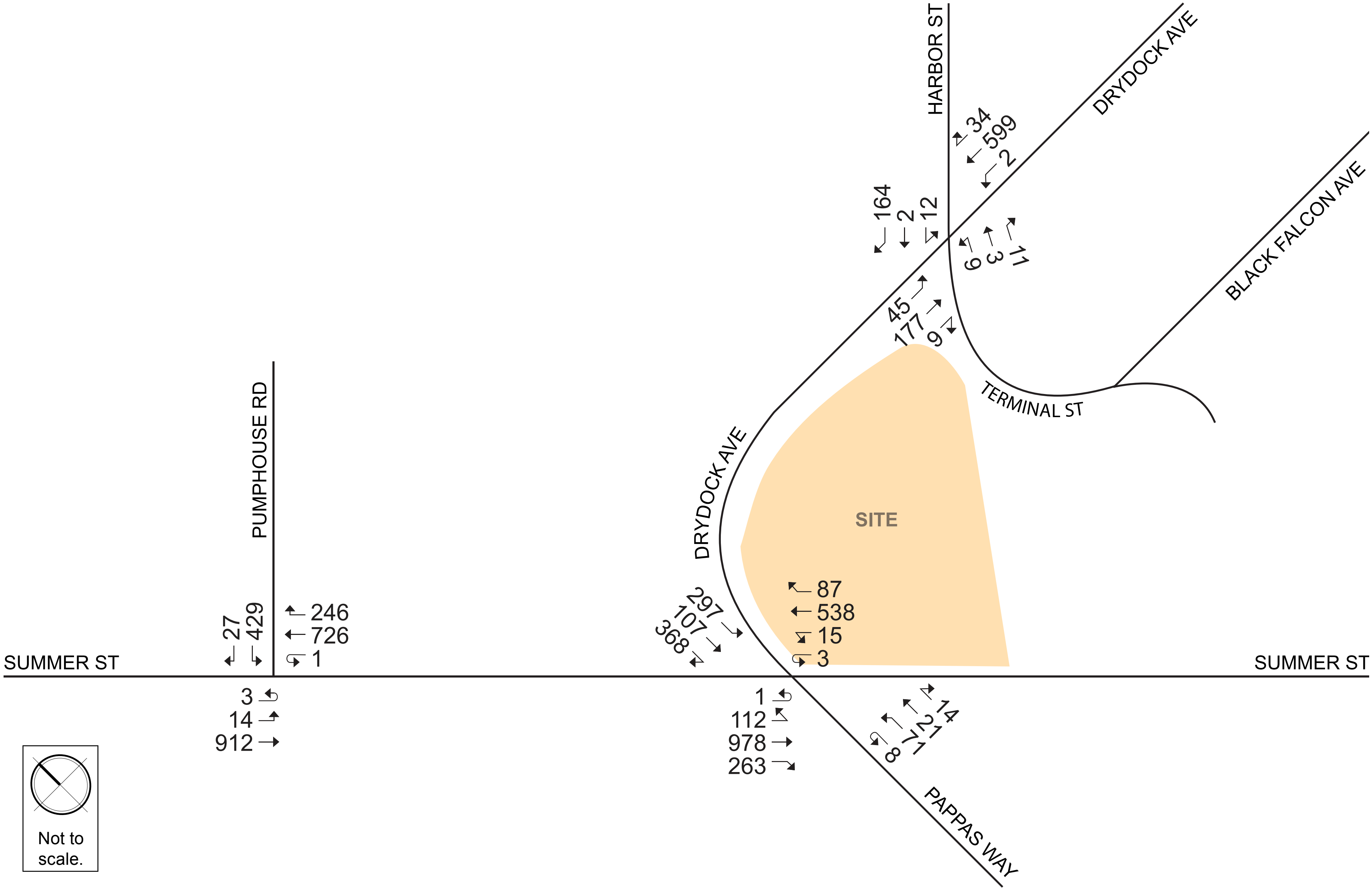

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Figure 3-11
No-Build (2023) Condition Traffic Volumes with Existing Circulation, Weekday p.m. Peak Hour

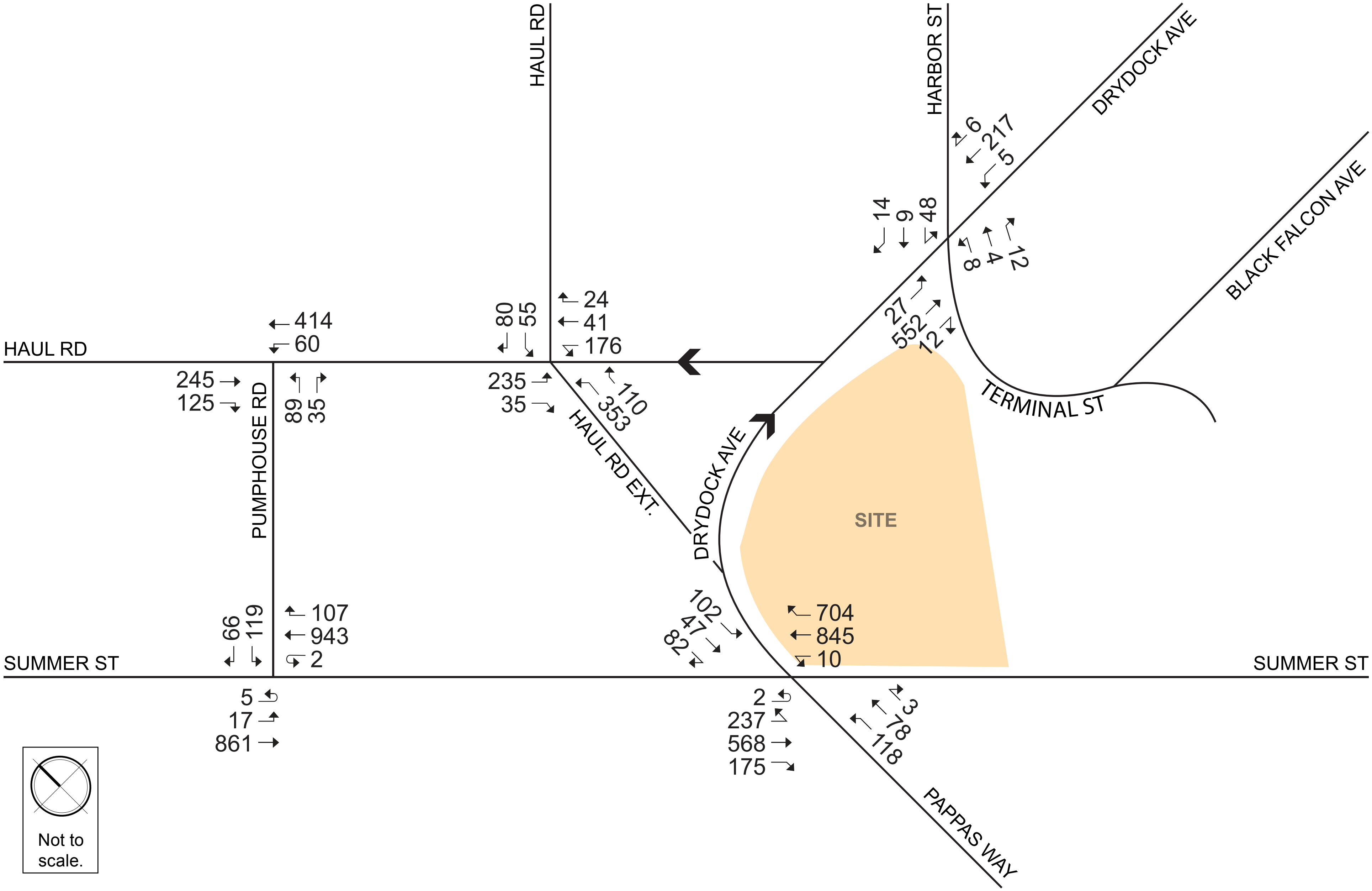

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Figure 3-12
No-Build (2023) Condition Traffic Volumes with Haul Road Extension, Weekday a.m. Peak Hour

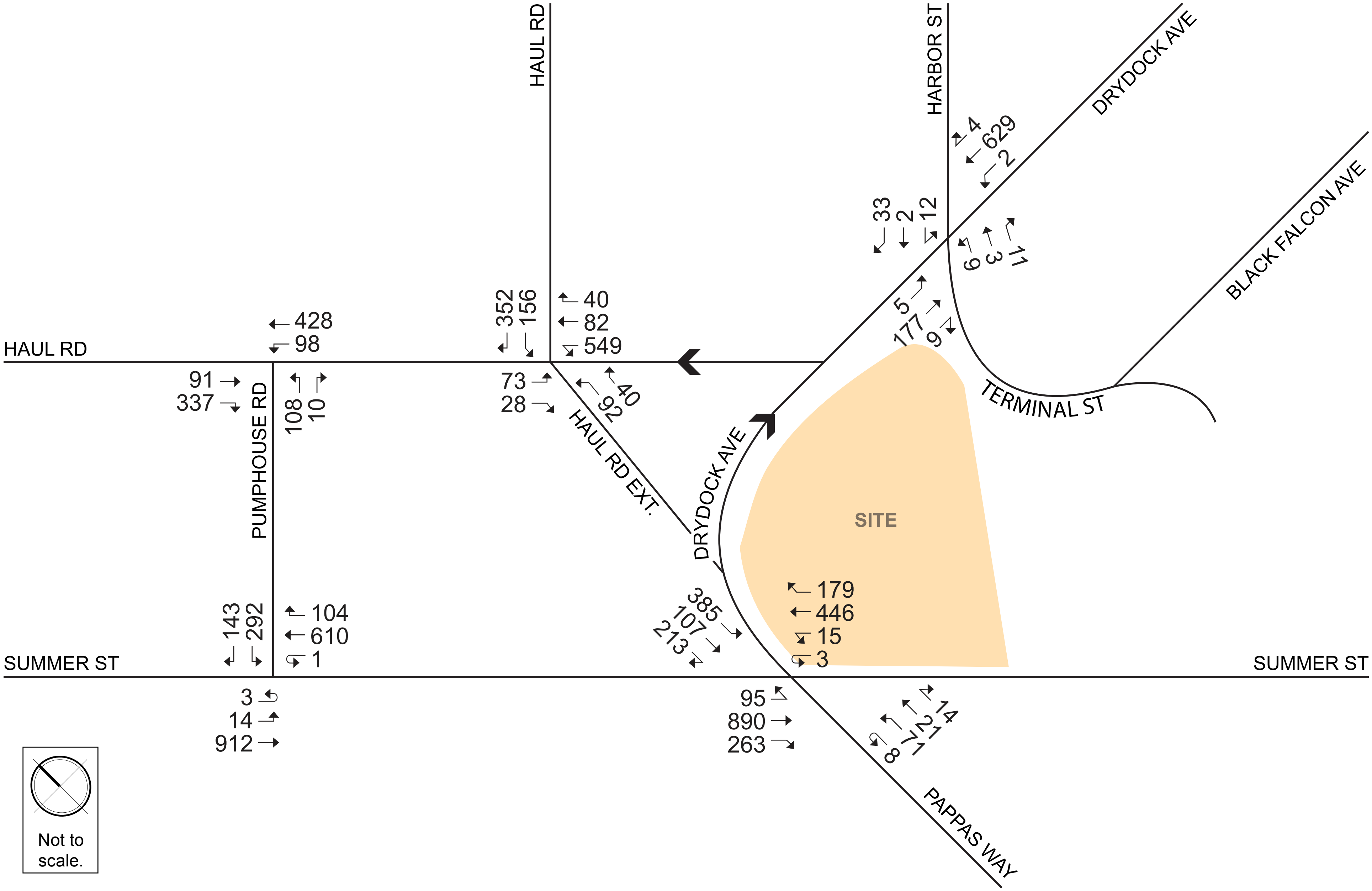

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Figure 3-13
No-Build (2023) Condition Traffic Volumes with Haul Road Extension, Weekday p.m. Peak Hour

3.3.5.1 Existing Circulation

The capacity analysis summaries for the No-Build (2023) Condition with Existing Circulation are shown in Table 3-8 and Table 3-9 for the a.m. and p.m. peak hours, respectively. Key results are presented below:

- As compared to the Existing Condition, the signalized intersection of Summer Street / Drydock Avenue / Pappas Way would worsen from LOS D to LOS E during the a.m. peak hour and would continue to operate at LOS D during the p.m. peak hour. The Summer Street eastbound left-turn lane would worsen from LOS E to LOS F during the a.m. peak hour. The Pappas Way northbound approach would worsen from LOS D to LOS F during the p.m. peak hour.

- The signalized intersection of Summer Street / Pumphouse Road would continue to operate at LOS B during the a.m. peak Hour and LOS C during the p.m. peak hour. The Pumphouse Road southbound approach, however, would worsen from LOS D to LOS E during the p.m. peak hour.

- At the unsignalized intersection of Drydock Avenue / Terminal Street / Harbor Street, the Terminal Street northbound shared left-turn/through lane would worsen from LOS D to LOS E during the a.m. peak hour and from LOS D to LOS F during the p.m. peak hour.

Table 3-8 No-Build (2023) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour – with Existing Circulation

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**E**	**77.9**			
Summer EB left	F	331.6	1.64	~296	#474
Summer EB thru|thru/right	B	10.2	0.45	127	107
Summer WB left	C	29.2	0.15	5	21
Summer WB thru|thru/right	D	46.5	0.97	~718	#859
Pappas Way NB left/thru/right	F	242.7	1.38	~201	#356
Drydock SB left/thru	E	73.1	0.79	105	#214
Drydock SB right	A	6.8	0.27	0	44
Summer Street/Pumphouse Road	**B**	**10.5**			
Summer EB left/thru | thru	A	9.2	0.48	82	300
Summer WB thru | thru | thru/right	A	4.7	0.58	40	m53
Pumphouse Road SB left | left/right	D	54.7	0.68	76	107

Table 3-8 No-Build (2023) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour – with Existing Circulation (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	3.5	0.19	-	10
Drydock WB left/thru/right	A	0.3	0.01	-	0
Terminal NB left/thru	E	46.7	0.17	-	15
Terminal NB right	B	12.5	0.03	-	3
Harbor SB left/thru/right	D	28.9	0.49	-	63

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates a decrease in level of service into LOS E or LOS F from the Existing (2016) Condition.

Table 3-9 No-Build (2023) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour – with Existing Circulation

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**D**	**54.7**			
Summer EB left	C	28.1	0.58	60	m75
Summer EB thru|thru/right	C	32.4	0.86	~514	#670
Summer WB left	D	49.1	0.30	12	#45
Summer WB thru|thru/right	D	35.1	0.60	242	310
Pappas Way NB left/thru/right	F	201.7	1.26	~133	#206
Drydock SB left/thru	F	147.1	1.21	~453	#520
Drydock SB right	A	3.9	0.52	0	19
Summer Street/Pumphouse Road	**C**	**25.0**			
Summer EB left/thru | thru	B	16.2	0.57	151	#424
Summer WB thru | thru | thru/right	B	17.1	0.49	60	m289
Pumphouse Road SB left | left/right	E	55.7	0.87	207	225
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	3.6	0.07	-	5
Drydock WB left/thru/right	A	0.0	0.00	-	0
Terminal NB left/thru	F	62.2	0.20	-	18
Terminal NB right	B	10.1	0.02	-	2
Harbor SB left/thru/right	D	27.5	0.56	-	82

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates a decrease in level of service into LOS E or LOS F from the Existing (2016) Condition.

3.3.5.2 Haul Road Extension

The analysis summaries for the No-Build (2023) Condition with Haul Road Extension are shown in Table 3-10 and Table 3-11 for the a.m. and p.m. peak hours, respectively. Key results are presented below:

- As compared to Existing Conditions, the signalized intersection of Summer Street / Drydock Avenue / Pappas Way would worsen to LOS E during the a.m. peak hour and would continue at LOS D during the p.m. peak hour. The Drydock Avenue southbound left/through lane would worsen from LOS E to LOS F during the a.m. peak hour. Under the Haul Road Extension option, this intersection would operate better than under the Existing Circulation option.

- The signalized intersection of Summer Street / Pumphouse Road would continue to operate at LOS B during the a.m. peak Hour and LOS C during the p.m. peak hour. The Pumphouse Road southbound approach, however, would worsen from LOS D to LOS E during the p.m. peak hour. These results are similar to those under the Existing Circulation option.

- At the new signalized intersection of Haul Road / Haul Road Extension / Drydock Avenue, overall operations would be LOS C during each peak hour. During each peak hour, the Haul Road eastbound left turn (to continue on the Haul Road) would operate at LOS E, while all other moves would operate of LOS D or better.

- At Haul Road / Pumphouse Road, the overall intersection and approaches would operate at LOS D or better.

- At the unsignalized intersection of Drydock Avenue / Terminal Street / Harbor Street, all moves would operate at LOS D or better, indicating that the Haul Road Extension option would provide better operation by reducing traffic volumes at this intersection.

Under No-Build (2023) Conditions, the overall traffic operations under the Haul Road Extension option would be better than compared to the Existing Circulation option.

Table 3-10 No-Build (2023) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour – with Haul Road Extension

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**E**	**62.3**	-	-	-
Summer Street EB left	F	173.2	1.25	~204	#378
Summer Street EB thru|thru/right	B	14.8	0.45	162	224
Summer Street WB left	C	30.5	0.15	5	21
Summer Street WB thru|thru/right	D	51.1	0.98	~672	#813
Pappas Way NB left/thru/right	F	197.0	1.27	~191	#345
Drydock Avenue SB left/thru	F	94.3	0.75	114	#214
Drydock Avenue SB right	A	2.2	0.18	0	0
Summer Street/Pumphouse Road	**B**	**11.0**	-	-	-
Summer Street EB left/thru | thru	A	8.2	0.46	72	287
Summer Street WB thru | thru | thru/right	A	7.8	0.40	98	m198
Pumphouse Road SB left | left/right	D	39.5	0.64	50	80
Haul Road/Haul Road Ext. /Drydock Avenue	**C**	**32.4**	-	-	-
Haul Road EB left	E	71.4	0.86	173	#298
Haul Road EB right	A	8.3	0.12	0	21
Drydock Avenue WB left/thru | thru/right	D	40.1	0.42	83	124
Haul Road Ext. NB left	C	17.2	0.57	233	m212
Haul Road Ext. NB thru	A	9.9	0.13	39	m38
Haul Road SB thru	B	13.9	0.06	21	43
Haul Road SB right	A	3.3	0.10	0	25
Haul Road/Pumphouse Road	**A**	**9.0**	-	-	-
Haul Road EB thru	B	11.8	0.26	76	121
Haul Road EB right	A	2.3	0.15	0	25
Haul Road WB left	A	1.8	0.07	4	12
Haul Road WB thru	A	3.2	0.29	37	72
Pumphouse Road NB left | left/right	C	32.9	0.46	27	54
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	0.9	0.19	-	2
Drydock WB left/thru/right	A	0.3	0.01	-	0
Terminal NB left/thru	D	25.2	0.09	-	7
Terminal NB right	B	12.5	0.03	-	3
Harbor SB left/thru/right	C	20.9	0.26	-	25

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates a decrease in level of service into LOS E or LOS F from the Existing (2016) Condition.

Table 3-11 No-Build (2023) Condition Capacity Analysis Summary, Weekday p.m. Peak hour – with Haul Road Extension

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**D**	**47.9**	-	-	-
Summer Street EB left	C	29.7	0.52	40	m73
Summer Street EB thru|thru/right	C	31.2	0.85	485	m#620
Summer Street WB left	D	47.1	0.25	10	37
Summer Street WB thru|thru/right	D	35.7	0.64	236	331
Pappas Way NB left/thru/right	D	44.9	0.61	63	143
Drydock Avenue SB left/thru	F	123.5	1.09	~419	#643
Drydock Avenue SB right	A	9.8	0.26	22	m74
Summer Street/Pumphouse Road	**C**	**22.1**	-	-	-
Summer Street EB left/thru | thru	B	14.0	0.54	134	381
Summer Street WB thru | thru | thru/right	A	5.9	0.34	36	202
Pumphouse Road SB left | left/right	E	60.8	0.89	178	197
Haul Road/Haul Road Ext. /Drydock Avenue	**C**	**26.6**	-	-	-
Haul Road EB left	E	58.1	0.50	54	101
Haul Road EB right	A	7.2	0.16	0	15
Drydock Avenue WB left/thru | thru/right	D	42.1	1.19dl	246	317
Haul Road Ext. NB left	B	12.5	0.16	44	m111
Haul Road Ext. NB thru	B	10.1	0.04	14	m32
Haul Road SB thru	B	14.6	0.17	60	107
Haul Road SB right	A	2.7	0.37	0	48
Haul Road/Pumphouse Road	**A**	**7.6**	-	-	-
Haul Road EB thru	A	6.1	0.08	17	44
Haul Road EB right	A	1.5	0.30	0	33
Haul Road WB left	A	1.8	0.10	8	18
Haul Road WB thru	A	3.6	0.30	43	78
Pumphouse Road NB left | left/right	D	45.9	0.46	38	65
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	0.6	0.07	-	1
Drydock WB left/thru/right	A	0.0	0.00	-	0
Terminal NB left/thru	C	24.8	0.06	-	5
Terminal NB right	B	10.1	0.02	-	2
Harbor SB left/thru/right	C	19.1	0.17	-	15

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates a decrease in level of service into LOS E or LOS F from the Existing (2016) Condition.

3.4 Build (2023) Conditions

The Project consists of a dual-brand hotel, including 245 hotel rooms and 166 all-suites hotel rooms, approximately 3,500 square feet of retail space, an above grade parking garage with 75 spaces, and three loading bays. The Build (2023) Condition has been analyzed for two options - Existing Circulation and Haul Road Extension - that incorporate anticipated Project-generated trips to the No-Build (2023) Condition traffic volumes.

3.4.1 Vehicle Site Access and Circulation

A site plan is shown in Figure 3-14. Vehicles arriving at the site will turn from Terminal Street onto the site and proceed either to the circular drop-off driveway or to the parking garage ramps. The circular driveway will have capacity for approximately nine (9) vehicles, and will be used primarily by taxicabs and other ride-sharing services that are picking-up or dropping-off passengers, and by hotel guests in private automobiles who are arriving on-site for the first time and checking-in. Subsequent automobile trips by hotel guests will proceed directly to the on-site parking garage via the circular driveway.

The proposed vehicle travel paths circulating into and out of the circular driveway and parking ramps have been assessed using AUTOTURN, software that allows engineers to model vehicular maneuvers, to ensure that all movements can be safely completed.

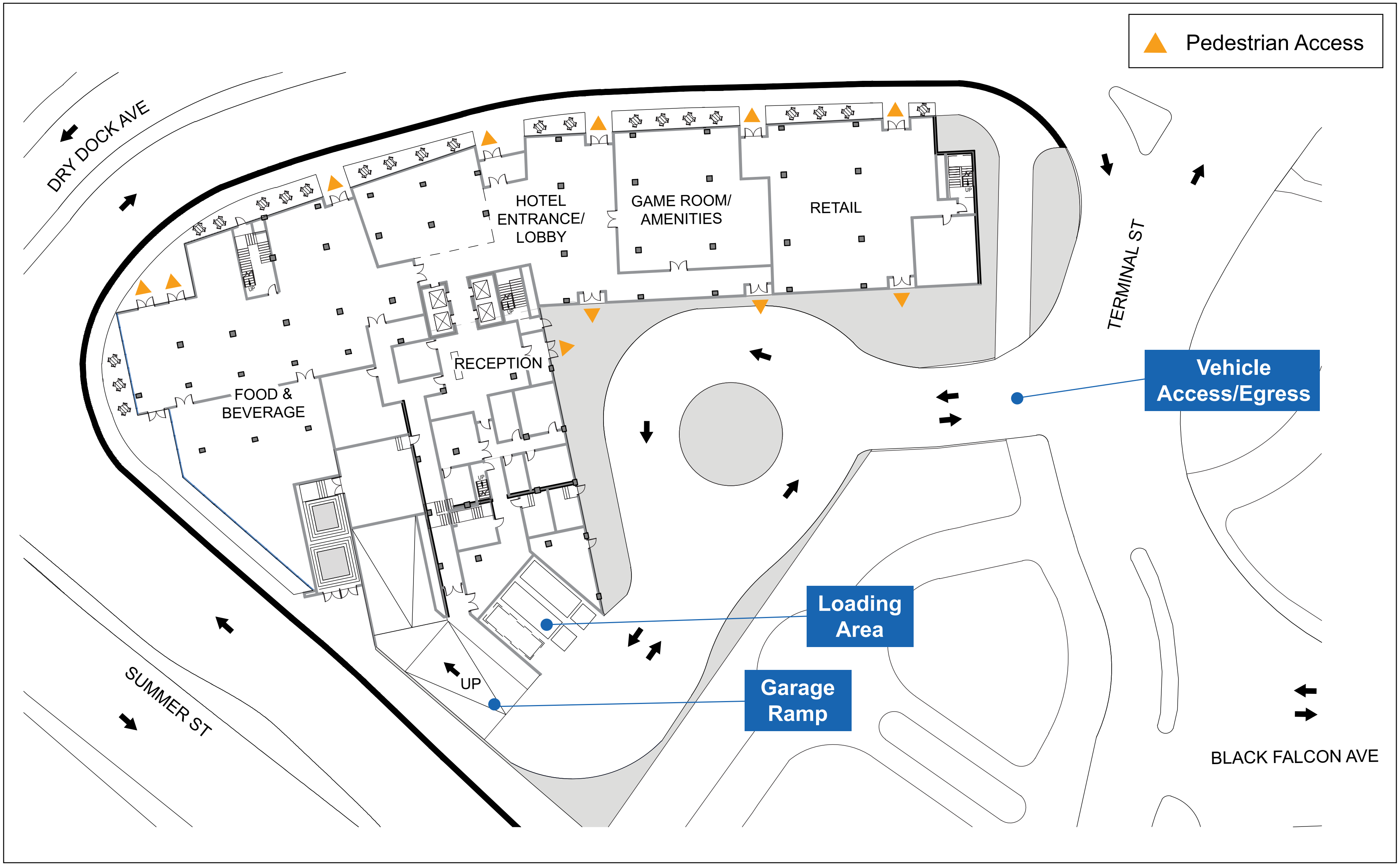
Pedestrians will enter and leave the building via doorways near the circular driveway and along Drydock Avenue.

3.4.2 Parking

BTD has set parking space goals and guidelines throughout the City to establish the parking supply to be provided with new developments. The BTD maximum guideline ratios for downtown hotels is 0.40 spaces per key, but current trend shows actual hotel parking demands are much lower. This Project, with a planned 75 spaces for 411 hotel rooms, will provide 0.18 spaces/room. Given the Project's proximity to the BCEC (one-third mile) and Massport's Cruiseport terminal (less than one-quarter mile), the associated demand for guest parking will be less than experienced at other downtown Boston hotels.

3.4.3 Loading and Service Accommodations

The Project's loading and service area is shown on the site plan in Figure 3-14. Three loading bays will be provided. Trucks will enter the site from Terminal Street and proceed into the loading bays. The proposed truck travel paths into and out of the loading bays have been assessed using AUTOTURN, software that allows engineers to model vehicular maneuvers, to ensure that all movements can be safely completed.



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3.4.4 Trip Generation Methodology

Determining the future trip generation of the Project is a complex, multi-step process that produces an estimate of vehicle trips, transit trips, and walk/bicycle trips associated with a proposed development and a specific land use program. A project's location and proximity to different travel modes determines how people will travel to and from a site.

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[3] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

To estimate the unadjusted number of vehicular trips for the Project, the following ITE land use codes (LUCs) were used:

Land Use Code 310 – Hotel. Hotels are places of lodging that provide sleeping accommodations and supporting facilities such as restaurants, cocktails lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (pool, fitness room), and/or other retail and service shops.

Land Use Code 311 – All Suites Hotel. All suites hotels are places that provide sleeping accommodations, a small restaurant and lounge and small amounts of meeting space. In general, each suite includes a sitting room and separate bedroom; limited kitchen facilities are provided within the suite.

Land Use Code 820 – Shopping Center/Retail. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. Of the ITE retail categories, this one best suits the retail component proposed within the Project.

3.4.5 Travel Mode Shares

The BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located within designated Area 13 – South Boston. The current BTD mode shares; however, do not specifically reflect the 2004 opening of Phase II of the Silver Line.

The future mode shares in the South Boston Waterfront have been discussed in the City's 1999 South Boston Transportation Study, the State's 2000 South Boston Transportation Summit, the BRA's February 1999 Seaport Public Realm Plan, and the City's August 2006

3 Trip Generation Manual, 9th Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.

Fort Point District 100 Acres Master Plan. During the last decade, major proposed development on the South Boston Waterfront has incorporated mode shares that reflect both the Silver Line service and the changing travel characteristics in this area.

The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[4]. The person trips were then distributed to different modes according to the mode shares shown in Table 3-12.

Table 3-12 Travel Mode Shares

Land Use		Walk/Bicycle Share (percent)	Transit Share (percent)	Auto Share (percent)	Vehicle Occupancy Rate
Daily					
Hotel 245 rooms	In	41	22	37	1.84
	Out	41	22	37	1.84
All Suites Hotel 166 rooms	In	41	22	37	1.84
	Out	41	22	37	1.84
Retail 3,500 square feet	In	27	34	39	1.78
	Out	27	34	39	1.78
a.m. Peak Hour					
Hotel 245 rooms	In	43	20	37	1.84
	Out	48	15	37	1.84
All Suites Hotel 166 rooms	In	43	20	37	1.84
	Out	48	15	37	1.84
Retail 3,500 square feet	In	0	62	38	1.78
	Out	15	46	39	1.78
p.m. Peak Hour					
Hotel 245 rooms	In	48	15	37	1.84
	Out	44	19	37	1.84
All Suites Hotel 166 rooms	In	48	15	37	1.84
	Out	44	19	37	1.84
Retail 3,500 square feet	In	23	25	52	1.78
	Out	23	25	52	1.78

4 Summary of Travel Trends: 2009 National Household Travel Survey; FHWA; Washington, D.C.; June 2011.

3.4.6 *Project Trip Generation*

The travel mode share percentages shown in Table 3-12 were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates. Note that vehicle trips include both automobiles and taxicabs (or other vehicle transport services). The trip generation for the Project by travel mode is shown in Table 3-13. The detailed trip generation information is provided in the Traffic Appendix.

Table 3-13 Project Trip Generation

Land Use		Walk/Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
Hotel 245 rooms	In	752	404	369
	Out	752	404	369
All Suites Hotel 166 rooms	In	305	164	150
	Out	305	164	150
Retail 3,500 square feet	In	36	45	29
	Out	36	45	29
Total	In	1,093	613	548
	Out	1,093	613	548
a.m. Peak Hour				
Hotel 245 rooms	In	61	28	29
	Out	47	15	23
All Suites Hotel 166 rooms	In	28	13	13
	Out	25	8	11
Retail 3,500 square feet	In	0	2	2
	Out	0	1	2
Total	In	89	43	44
	Out	72	24	36
p.m. Peak Hour				
Hotel 245 rooms	In	65	21	28
	Out	58	25	26
All Suites Hotel 166 rooms	In	26	8	12
	Out	30	13	14
Retail 3,500 square feet	In	3	3	3
	Out	2	3	3
Total	In	94	32	43
	Out	90	41	43

As shown in Table 3-13, the Project is expected to generate 2,186 pedestrian trips, 1,226 transit trips, and 1,096 vehicle trips throughout the day. During the a.m. peak hour, the Project is expected to generate 161 pedestrian trips (89 in and 72 out), 67 transit trips (43 in and 24 out), and 80 vehicle trips (44 in and 36 out). During the p.m. peak hour, the Project is expected to generate 184 pedestrian trips (94 in and 90 out), 73 transit trips (32 in and 41 out), and 86 vehicle trips (43 in and 43 out).

3.4.7 Vehicle Trip Distribution and Assignment

The trip distribution identifies the various travel paths for vehicles associated with the Project. Trip distribution patterns were based on BTD's origin-destination data for Area 13 (South Boston), and trip distribution patterns presented in traffic studies for nearby projects.

Separate distribution patterns were developed for the Existing Circulation option and the Haul Road Extension option. Figure 3-15 and Figure 3-16 shows the trip distribution pattern for entering and exiting vehicles, respectively, under Existing Circulation. Similarly, the distribution patterns with the Haul Road Extension option are shown in Figure 3-17 and Figure 3-18.

The Project-generated vehicle trips with Existing Circulation are shown in Figure 3-19 and Figure 3-20, for the a.m. and p.m. peak hours, respectively. Similarly, the Project-generated trips with the Haul Road Extension are shown in Figure 3-21 and Figure 3-22.

3.4.8 Build Traffic Volumes

The peak hour Project generated trips for each roadway option were assigned to the roadway network and added to the No-Build (2023) Condition volumes to develop the Build (2023) Condition volumes.

For the Existing Circulation option, Build (2023) Condition traffic volumes are shown in Figure 3-23 and Figure 3-24 for the a.m. and p.m. peak hours, respectively. Similarly, Figure 3-25 and Figure 3-26 show the Build (2023) Condition volumes with the Haul Road Extension option.

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Figure 3-15
Entering Vehicle Distribution with Existing Circulation

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Figure 3-16
Exiting Vehicle Distribution with Existing Circulation

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Figure 3-17
Entering Vehicle Distribution with Haul Road Extension

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Figure 3-18
Exiting Vehicle Distribution with Haul Road Extension

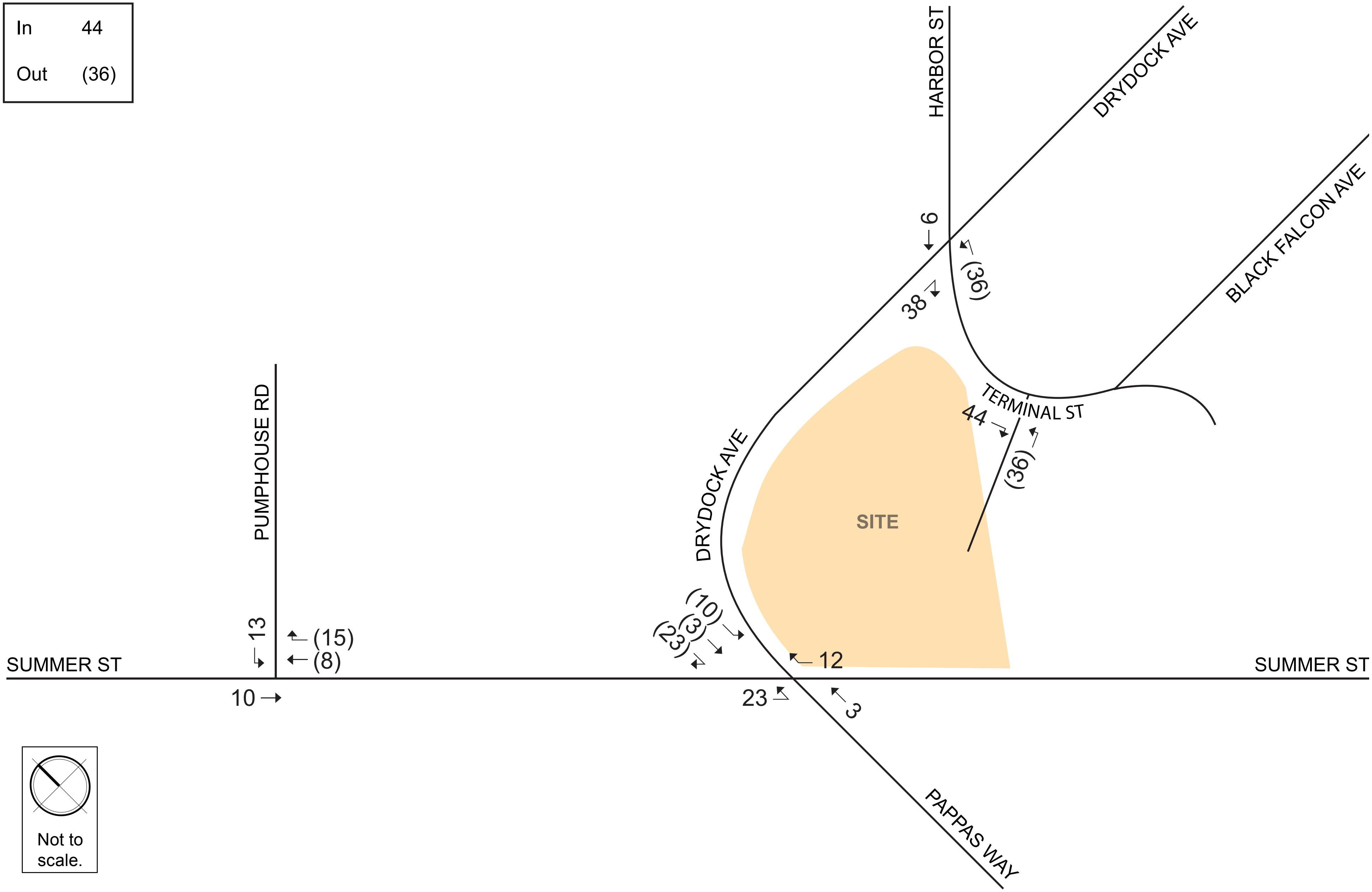

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Figure 3-19
Project-generated Vehicle Trips with Existing Circulation, Weekday a.m. Peak Hour

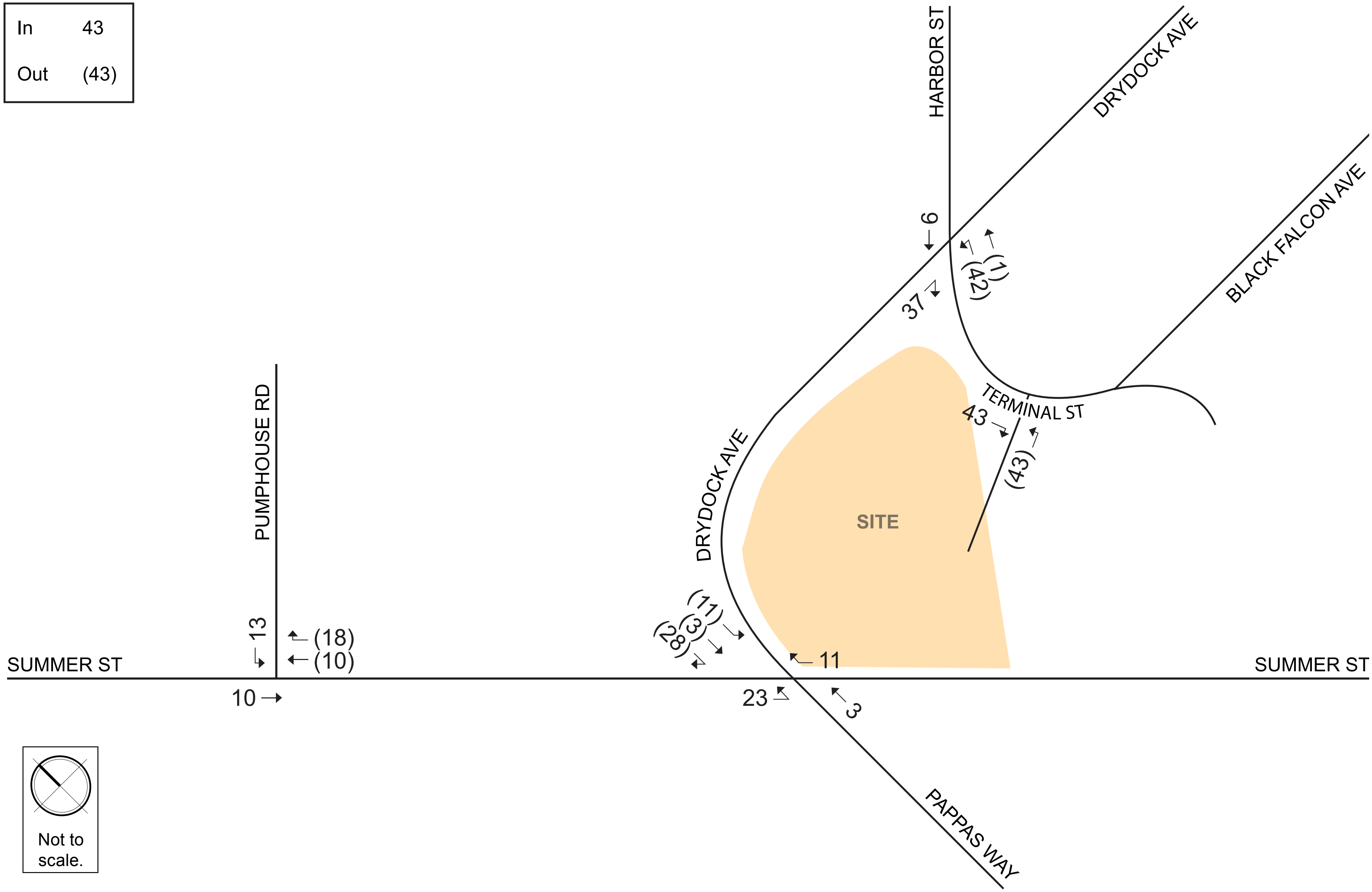

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Figure 3-20

Project-generated Vehicle Trips with Existing Circulation, Weekday p.m. Peak Hour

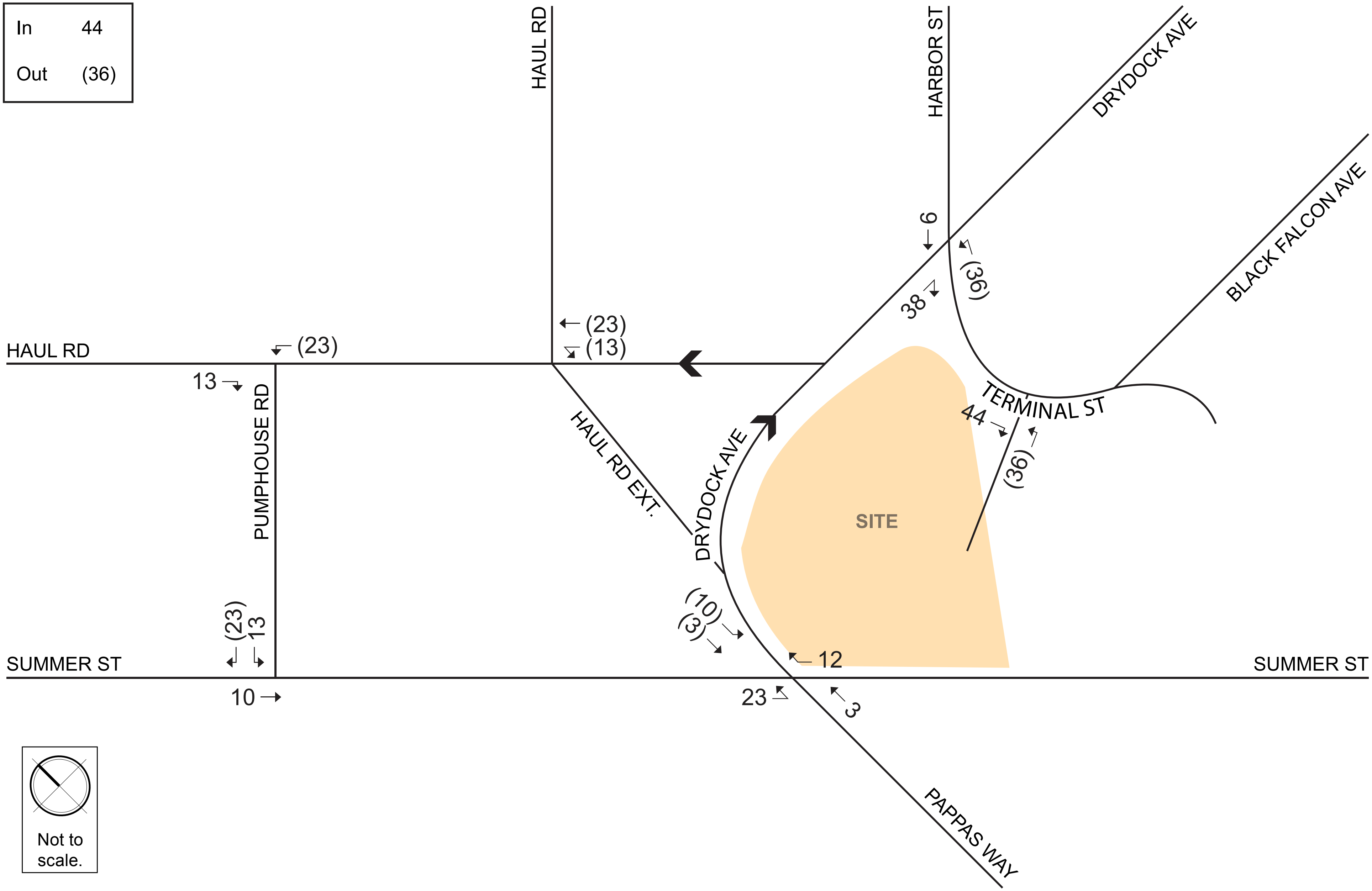

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Figure 3-21

Project-generated Vehicle Trips with Haul Road Extension, Weekday a.m. Peak Hour

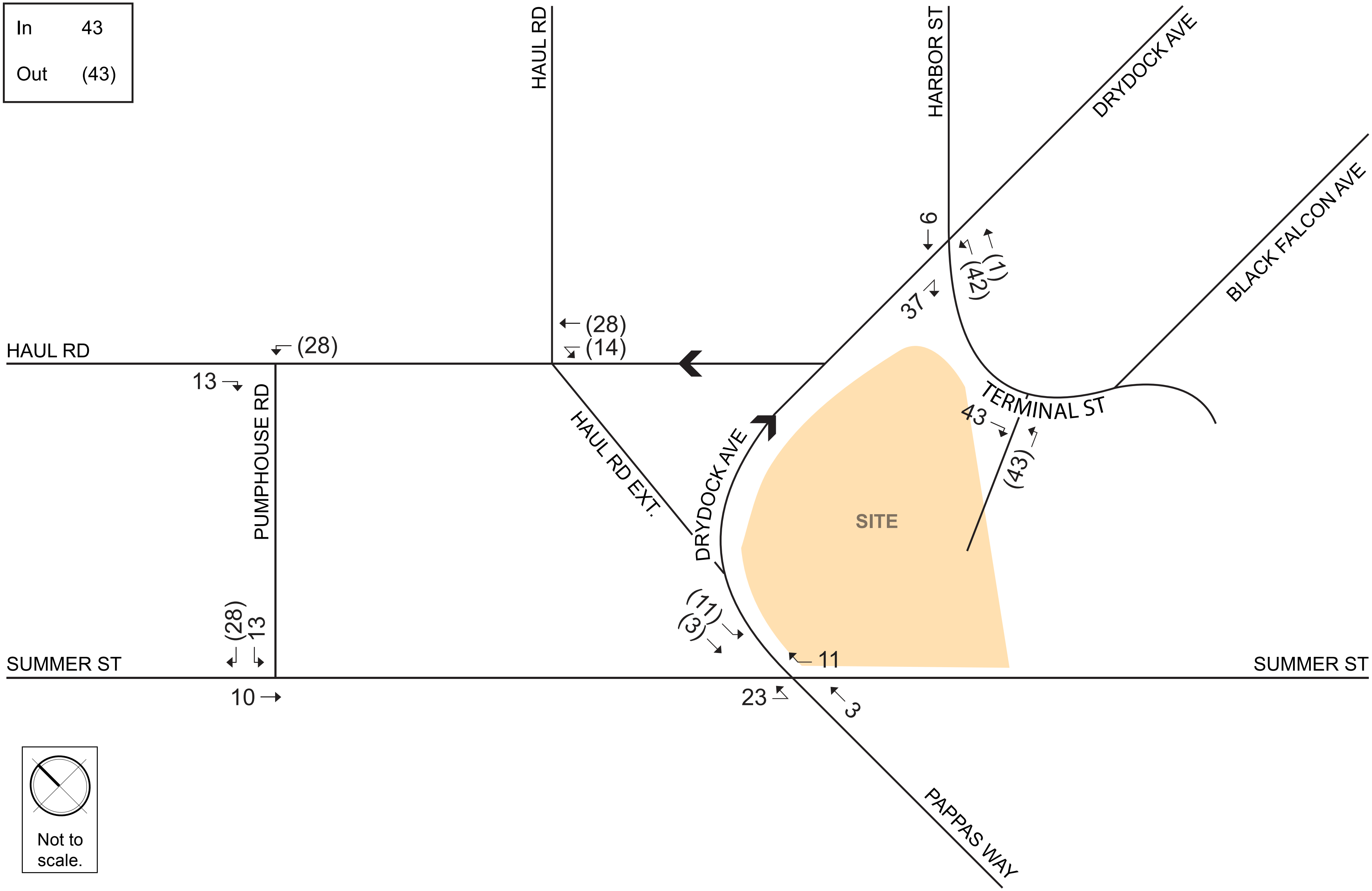

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Figure 3-22

Project-generated Vehicle Trips with Haul Road Extension, Weekday p.m. Peak Hour

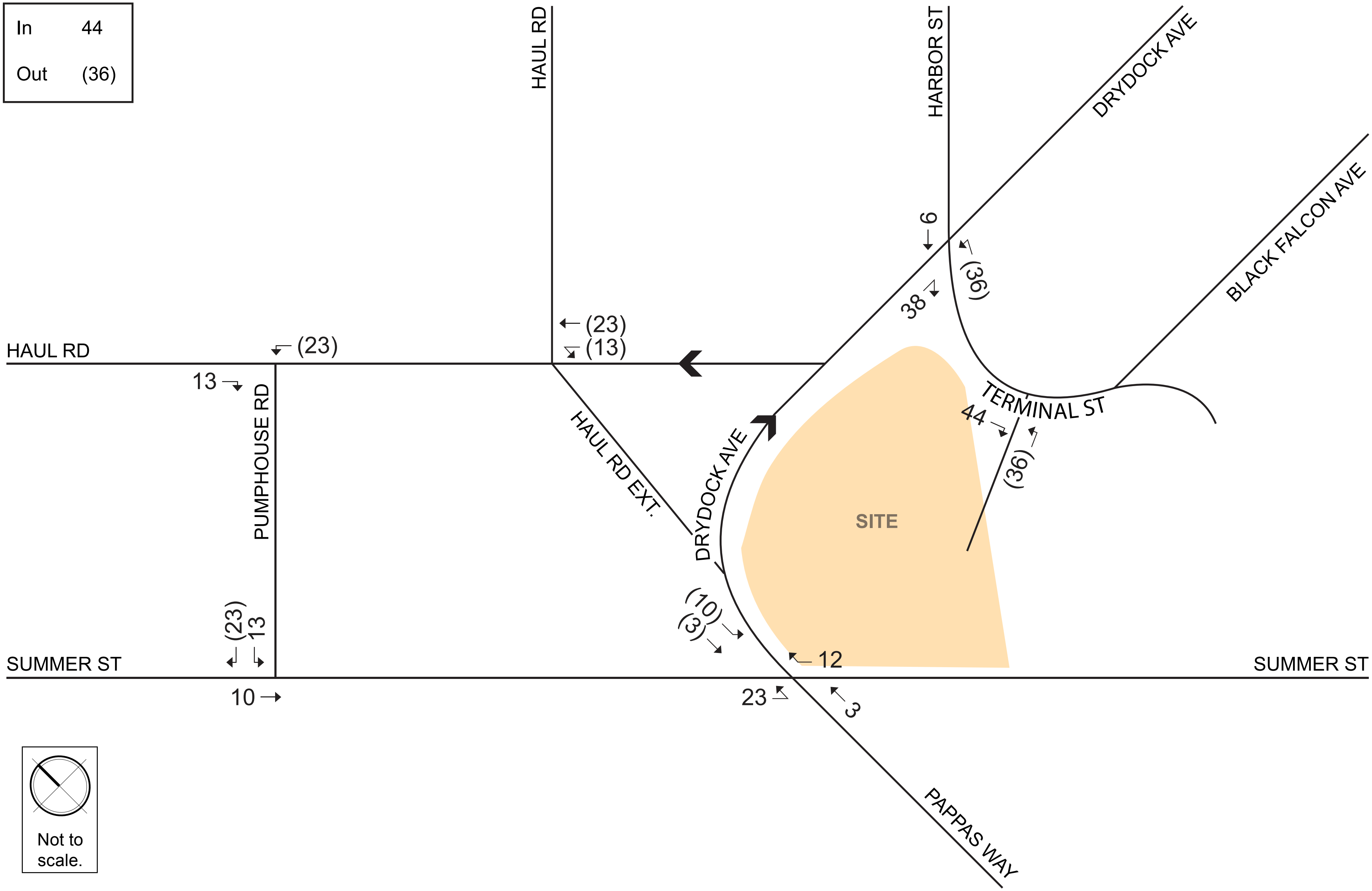

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Figure 3-21
Project-generated Vehicle Trips with Haul Road Extension, Weekday a.m. Peak Hour

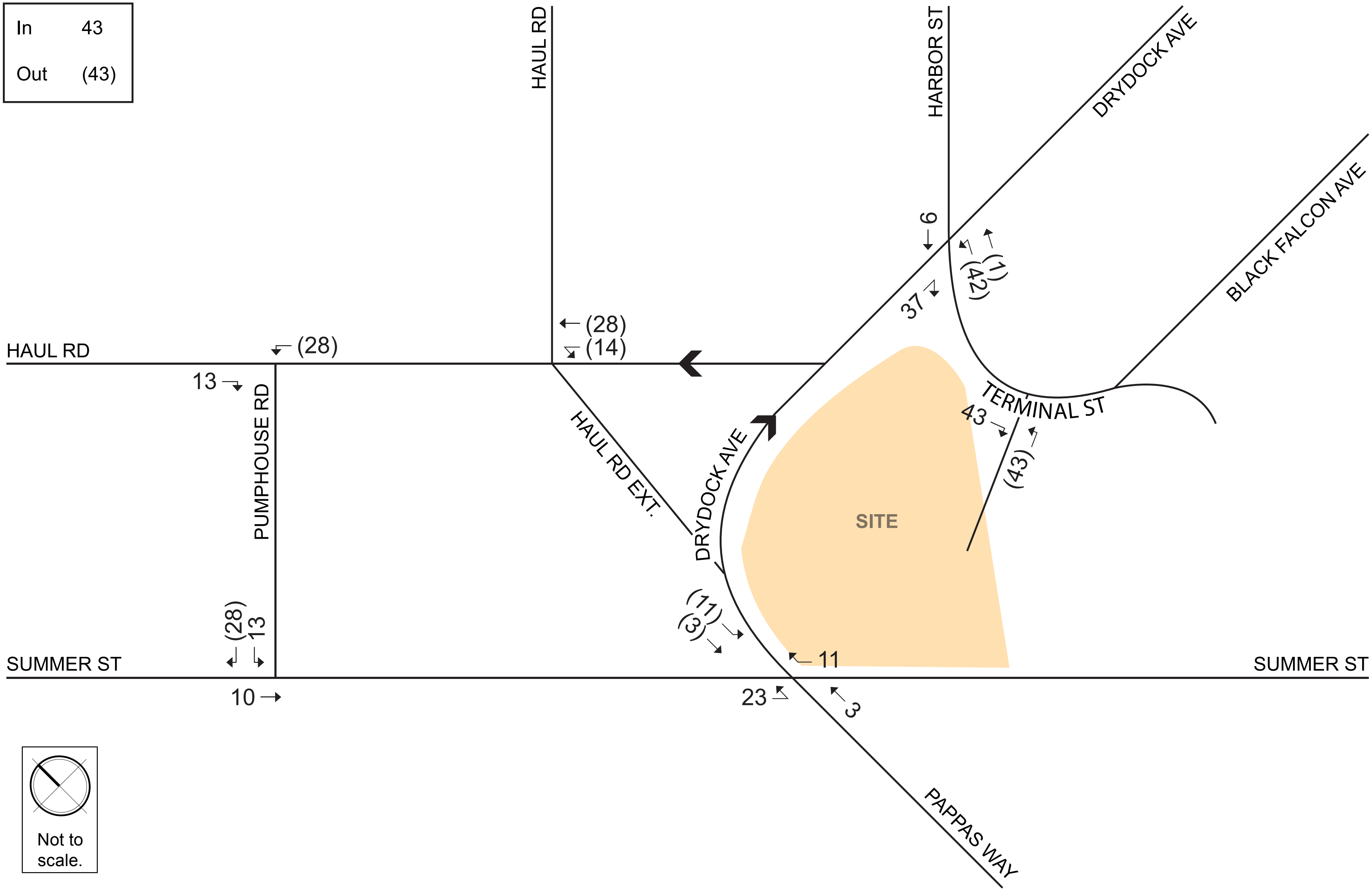

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Figure 3-22
Project-generated Vehicle Trips with Haul Road Extension, Weekday p.m. Peak Hour

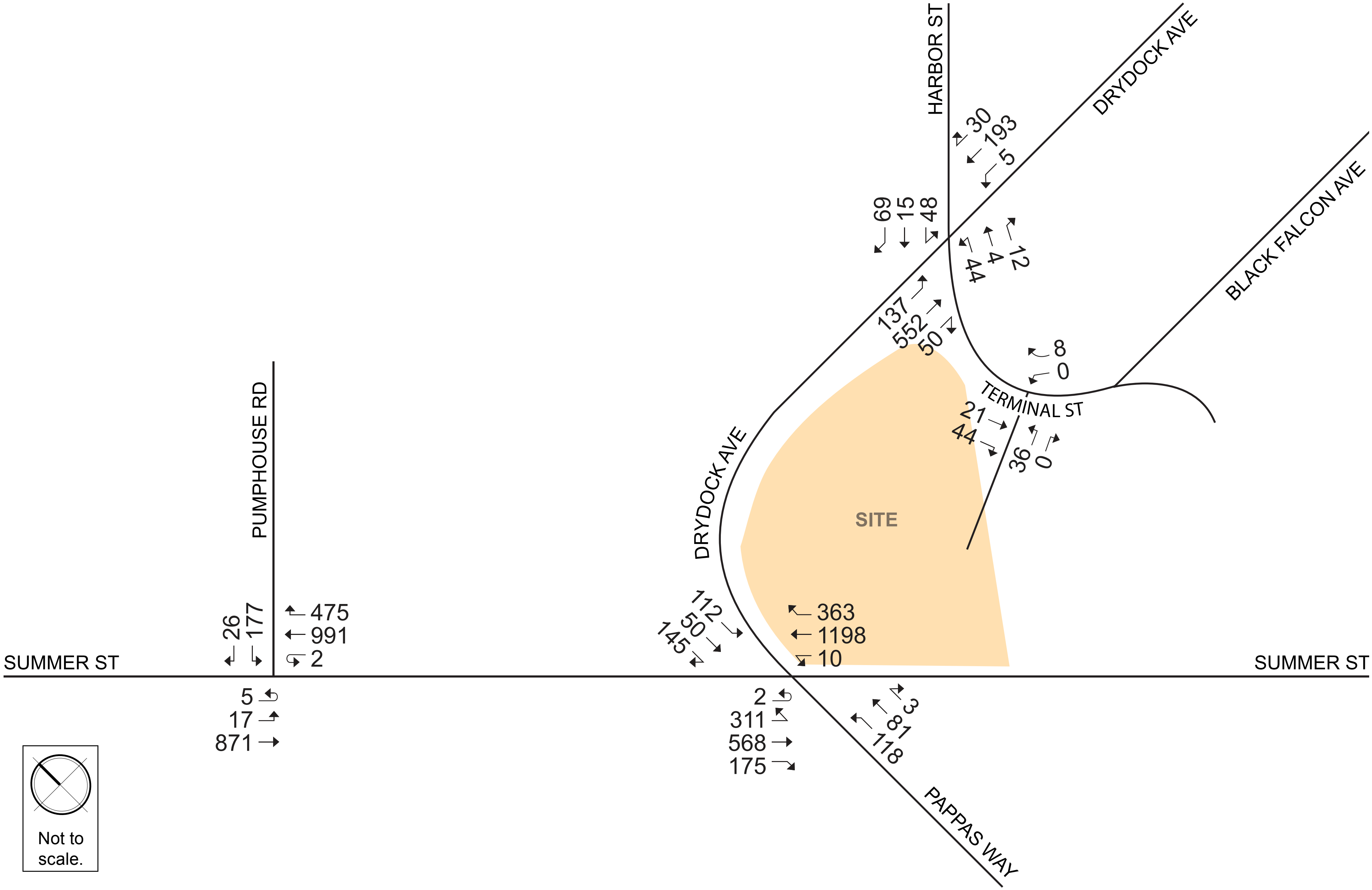

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Figure 3-23
Build (2023) Condition Traffic Volumes with Existing Circulation, Weekday a.m. Peak Hour

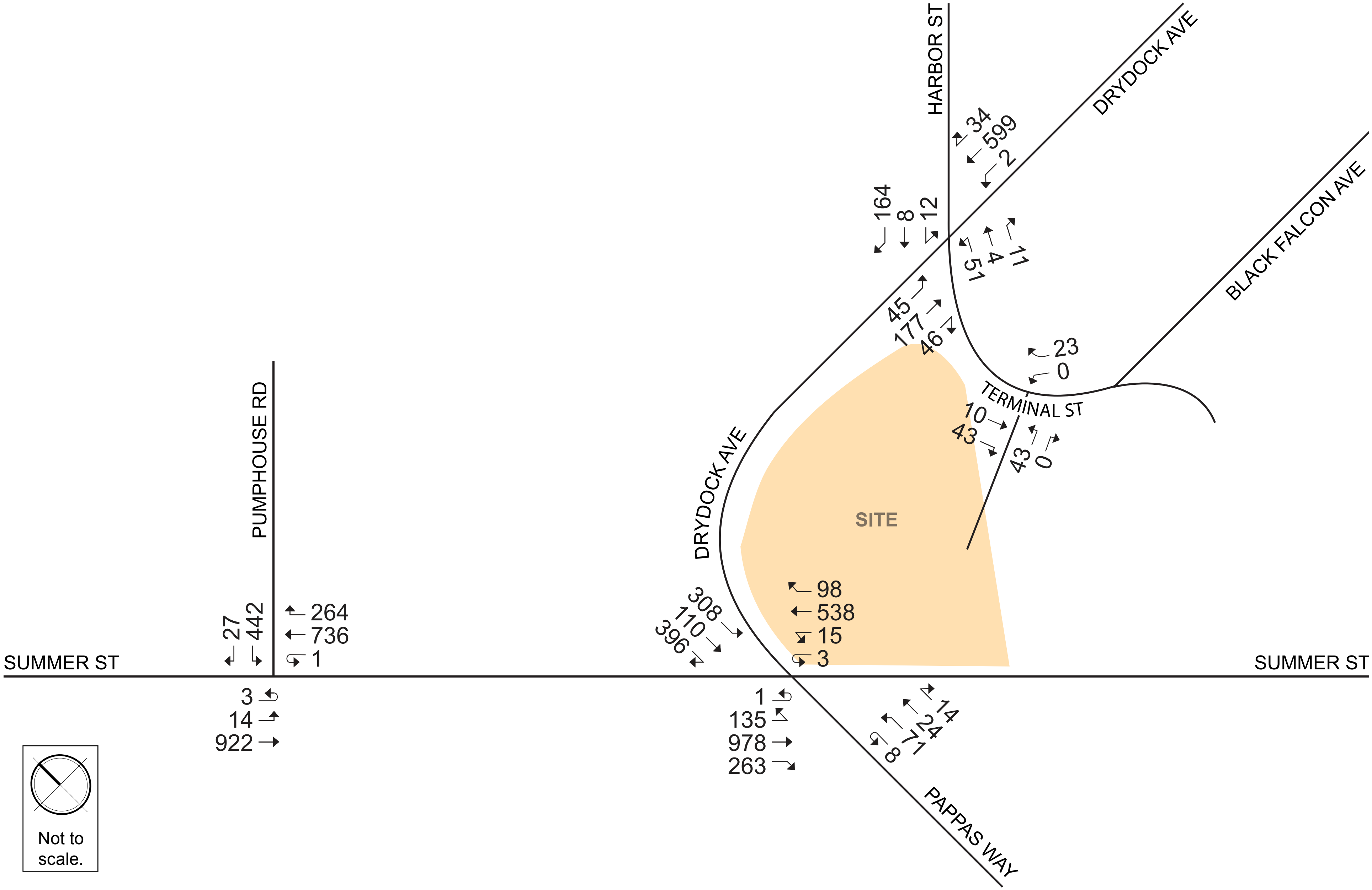

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Figure 3-24
Build (2023) Condition Traffic Volumes with Existing Circulation, Weekday p.m. Peak Hour

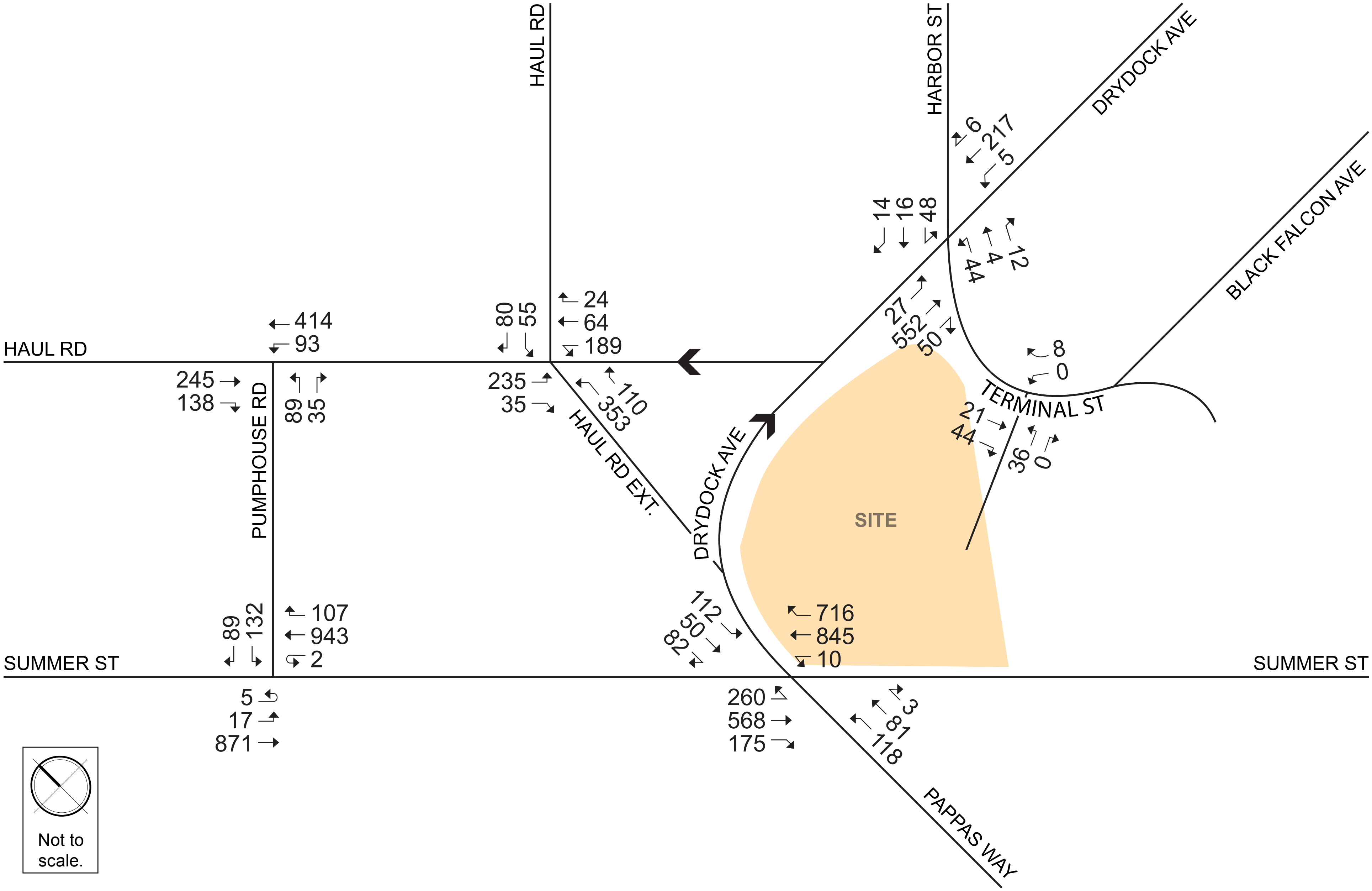

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Figure 3-25
Build (2023) Condition Traffic Volumes with Haul Road Extension, Weekday a.m. Peak Hour

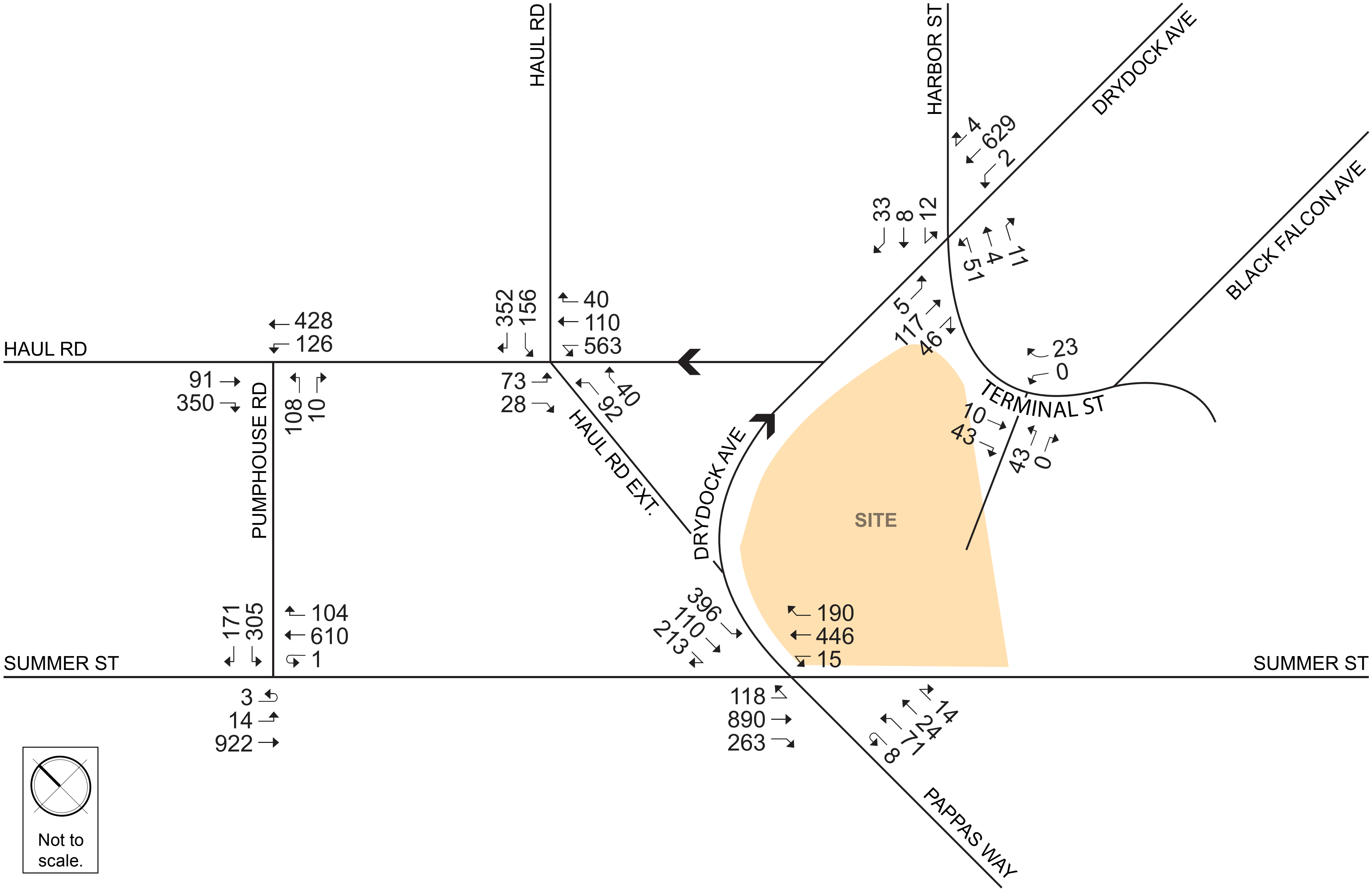

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Figure 3-26

Build (2023) Condition Traffic Volumes with Haul Road Extension, Weekday p.m. Peak Hour

3.4.9 Build Condition Traffic Operations Analysis

The Build (2023) Condition analysis uses the same methodology as the Existing (2016) Condition and No-Build (2023) Condition capacity analyses.

Table 3-14 and Table 3-15 present the Build (2023) Condition capacity analysis with the Existing Circulation, for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a decrease in LOS between the No-Build (2023) Condition and the Build (2023) Condition. The detailed analysis sheets are provided in Traffic Appendix.

3.4.9.1 Existing Circulation

Key results are presented below for the Build (2023) Condition with Existing Circulation as compared to the No-Build Condition:

- The signalized intersection of Summer Street / Drydock Avenue / Pappas Way would worsen from overall LOS E to LOS F during the a.m. peak hour, and from LOS D to LOS E during the p.m. peak hour. The Drydock Avenue southbound shared left/through lane would worsen from LOS E to LOS F during the a.m. peak hour. All other remaining movements would continue to operate at the same level of service during all peak hours.

- The signalized intersection of Summer Street / Pumphouse Road would continue to operate at overall LOS B and LOS C during the a.m. and p.m. peak hours, respectively. The Pumphouse Road southbound approach would worsen from LOS D to LOS E during the a.m. peak hour. The Summer Street approaches would continue to operate at LOS A or LOS B.

- At the unsignalized intersection of Drydock Avenue / Terminal Street / Harbor Street, the Terminal Street northbound shared left/through lane would worsen from LOS E to LOS F during the a.m. peak hour. The remaining approaches continue would continue to operate at the same level of service during both the a.m. and p.m. peak hours.

While the number of new peak hour vehicle trips added to the study area intersections is relatively small, the additional trips would cause some changes in level of service because several intersection approaches would already be operating near capacity under No-Build Conditions. As presented in Section 3.5, Mitigation Measures, making minor changes to the signal timing plan at Summer Street/Drydock Avenue/Pappas Way could improve operations under the Existing Circulation option.

Table 3-14 Build (2023) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour – with Existing Circulation

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**F**	**90.0**	**-**	**-**	**-**
Summer EB left	F	385.2	1.76	~334	#515
Summer EB thru|thru/right	B	10.2	0.45	126	108
Summer WB left	C	29.2	0.15	5	21
Summer WB thru|thru/right	D	48.9	0.98	~727	#869
Pappas Way NB left/thru/right	F	294.5	1.51	~215	#369
Drydock SB left/thru	F	85.2	0.87	116	#242
Drydock SB right	A	6.7	0.31	0	48
Summer Street/Pumphouse Road	**B**	**11.2**	**-**	**-**	**-**
Summer EB left/thru | thru	A	9.3	0.49	83	304
Summer WB thru | thru | thru/right	A	5.1	0.58	42	m56
Pumphouse Road SB left | left/right	E	57.7	0.72	82	115
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	3.5	0.21	-	10
Drydock WB left/thru/right	A	0.3	0.01	-	0
Terminal NB left/thru	F	145.7	0.84	-	109
Terminal NB right	B	12.8	0.04	-	3
Harbor SB left/thru/right	D	34.4	0.56	-	78

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates a decrease in level of service into LOS E or LOS F from the No-Build (2023) Condition.

Table 3-15 Build (2023) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour – with Existing Circulation

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**E**	**61.5**	-	-	-
Summer EB left	D	36.3	0.71	76	m#121
Summer EB thru|thru/right	C	32.3	0.86	~513	m#665
Summer WB left	D	49.1	0.30	12	#45
Summer WB thru|thru/right	D	35.3	0.61	246	#321
Pappas Way NB left/thru/right	F	277.9	1.45	~149	#223
Drydock SB left/thru	F	166.6	1.26	~481	#548
Drydock SB right	A	4.0	0.55	0	18
Summer Street/Pumphouse Road	**C**	**25.7**	-	-	-
Summer EB left/thru | thru	B	16.3	0.58	153	#437
Summer WB thru | thru | thru/right	B	17.2	0.51	64	m294
Pumphouse Road SB left | left/right	E	58.4	0.89	214	232
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	3.6	0.09	-	5
Drydock WB left/thru/right	A	0.0	0.00	-	0
Terminal NB left/thru	F	253.3	1.11	-	143
Terminal NB right	B	10.3	0.02	-	2
Harbor SB left/thru/right	D	27.5	0.56	-	82

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates a decrease in level of service into LOS E or LOS F from the No-Build (2023) Condition.

3.4.9.2 Haul Road Extension

Table 3-16 and Table 3-17 present the Build (2023) Condition capacity analysis with the proposed Haul Road extension, for the a.m. and p.m. peak hours, respectively. Key results are presented below for the Build (2023) Condition with the Haul Road Extension as compared to the No-Build Condition:

- At the signalized intersection of Summer Street / Drydock Avenue / Pappas Way, overall intersection operation would remain unchanged from No-Build Conditions during each peak hour.
- The signalized intersection of Summer Street / Pumphouse Road would continue to operate at overall LOS B and LOS C during the a.m. and p.m. peak hours, respectively, with no change to approach level of service.
- At the new signalized intersection of Haul Road / Haul Road Extension / Drydock Avenue, overall operations would continue at LOS C during each peak hour, with no change to approach level of service.
- At Haul Road / Pumphouse Road, all approaches and the overall intersection would continue to operate at LOS D or better.
- At the unsignalized intersection of Drydock Avenue / Terminal Street / Harbor Street, the Terminal Street northbound left/through movement would worsen from LOS D to LOS E during each peak hour. All other movements would remain at LOS C or better.

Overall, the traffic operations forecasted under the Haul Road Extension option are better than compared to the Existing Circulation option. As shown above, the only change in level of service under Build Conditions is the northbound Terminal Street approach at the Drydock Avenue/Terminal Street/ Harbor Street intersection, which is a minor change and not considered significant.

Table 3-16 Build (2023) Condition Capacity Analysis Summary, Weekday a.m. Peak Hour – with Haul Road Extension

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**E**	**73.8**	-	-	-
Summer EB left	F	156.8	1.22	~222	#405
Summer EB thru|thru/right	A	15.5	0.45	162	238
Summer WB left	C	31.9	0.15	5	21
Summer WB thru|thru/right	E	59.1	1.03	~705	#846
Pappas Way NB left/thru/right	F	242.7	1.38	~204	#359
Drydock SB left/thru	F	101.5	0.83	125	#243
Drydock SB right	A	2.0	0.18	0	0
Summer Street/Pumphouse Road	**B**	**11.7**	-	-	-
Summer EB left/thru | thru	A	9.2	0.48	83	304
Summer WB thru | thru | thru/right	A	8.3	0.41	108	m194
Pumphouse Road SB left | left/right	C	34.8	0.63	55	87
Haul Road/Haul Road Ext. /Drydock Avenue	**C**	**33.4**	-	-	-
Haul Road EB left	E	71.4	0.86	173	#298
Haul Road EB right	A	8.3	0.12	0	21
Drydock Avenue WB left/thru | thru/right	D	41.5	0.48	97	142
Haul Road Ext. NB left	C	18.5	0.57	250	m213
Haul Road Ext. NB thru	B	10.7	0.13	41	m38
Haul Road SB thru	B	13.9	0.06	21	43
Haul Road SB right	A	3.3	0.10	0	25
Haul Road/Pumphouse Road	**A**	**9.3**	-	-	-
Haul Road EB thru	B	14.2	0.29	84	134
Haul Road EB right	A	2.7	0.17	0	29
Haul Road WB left	A	1.8	0.10	7	17
Haul Road WB thru	A	3.2	0.29	37	72
Pumphouse Road NB left | left/right	C	32.9	0.46	27	54
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	0.9	0.21	-	2
Drydock WB left/thru/right	A	0.3	0.01	-	0
Terminal NB left/thru	E	40.7	0.42	-	46
Terminal NB right	B	12.8	0.04	-	3
Harbor SB left/thru/right	C	22.6	0.30	-	30

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates a decrease in level of service into LOS E or LOS F from the No-Build (2023) Condition.

Table 3-17 Build (2023) Condition Capacity Analysis Summary, Weekday p.m. Peak Hour – with Haul Road Extension

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
Summer Street/Drydock Avenue/Pappas Way	**D**	**49.3**	-	-	-
Summer EB left	D	36.6	0.66	51	m#105
Summer EB thru|thru/right	C	31.2	0.85	481	m#612
Summer WB left	D	47.1	0.25	10	34
Summer WB thru|thru/right	D	35.8	0.65	241	340
Pappas Way NB left/thru/right	D	49.9	0.66	68	156
Drydock SB left/thru	F	131.3	1.13	~420	#636
Drydock SB right	A	8.4	0.26	0	m68
Summer Street/Pumphouse Road	**C**	**25.2**	-	-	-
Summer EB left/thru | thru	B	14.8	0.56	142	394
Summer WB thru | thru | thru/right	A	6.3	0.35	42	86
Pumphouse Road SB left | left/right	E	68.4	0.91	190	208
Haul Road/Haul Road Ext. /Drydock Avenue	**C**	**26.6**	-	-	-
Haul Road EB left	E	58.1	0.50	54	101
Haul Road EB right	A	7.3	0.16	0	15
Drydock Avenue WB left/thru | thru/right	D	40.5	1.14dl	258	332
Haul Road Ext. NB left	B	13.2	0.16	46	m101
Haul Road Ext. NB thru	B	10.7	0.04	15	m30
Haul Road SB thru	B	15.9	0.17	63	112
Haul Road SB right	A	2.9	0.38	0	50
Haul Road/Pumphouse Road	**A**	**7.4**	-	-	-
Haul Road EB thru	A	6.2	0.08	18	44
Haul Road EB right	A	1.5	0.31	0	33
Haul Road WB left	A	1.9	0.13	10	23
Haul Road WB thru	A	3.6	0.30	43	78
Pumphouse Road NB left | left/right	D	45.9	0.46	38	65
Unsignalized Intersections					
Drydock Avenue/Terminal Street/Harbor Street	-	-	-	-	-
Drydock EB left/thru | thru/right	A	0.6	0.09	-	1
Drydock WB left/thru/right	A	0.0	0.00	-	0
Terminal NB left/thru	E	43.1	0.44	-	51
Terminal NB right	B	10.8	0.02	-	2
Harbor SB left/thru/right	C	19.9	0.20	-	18

 # = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
Grey shading indicates a decrease in level of service into LOS E or LOS F from the No-Build (2023) Condition.

3.5 Transportation Mitigation Measures

As presented above, the traffic impacts associated with the Project are relatively minor, particularly under the Haul Road Extension option. However, under the Existing Circulation option, the Summer Street/Drydock Avenue/Pappas Way intersection would operate at LOS F during the a.m. peak hour and LOS E during the p.m. peak hour.

If the Existing Circulation conditions were to be maintained (i.e. without the Haul Road Extension), then it is recommended that BTD implement signal timing changes at the Summer Street/Drydock Avenue/Pappas Way intersection. The recommended change is to allocate more green time to the Drydock Avenue and Pappas Way approaches and less time to the Summer Street approaches to reduce overall average delays, better balance the volume to capacity ratios, and generally reduce the projected queues. The resulting delays are similar to those projected under No-Build Conditions without the Project.

Table 3-18 and Table 3-19 show the associated operational results with and without the timing change for the a.m. and p.m. peak hour, respectively.

Table 3-18 Summer Street/Drydock Avenue/Pappas Way, Build (2023) Condition Capacity Analysis Summary, a.m. Peak Hour – with Existing Circulation

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Without timing changes					
Summer Street/Drydock Avenue/Pappas Way	**F**	**90.0**	**-**	**-**	**-**
Summer EB left	F	385.2	1.76	~334	#515
Summer EB thru|thru/right	B	10.2	0.45	126	108
Summer WB left	C	29.2	0.15	5	21
Summer WB thru|thru/right	D	48.9	0.98	~727	#869
Pappas Way NB left/thru/right	F	294.5	1.51	~215	#369
Drydock SB left/thru	F	85.2	0.87	116	#242
Drydock SB right	A	6.7	0.31	0	48
With timing changes					
Summer Street/Drydock Avenue/Pappas Way	**F**	**86.6**	**-**	**-**	**-**
Summer EB left	F	190.6	1.30	~284	#465
Summer EB thru|thru/right	B	12.3	0.46	143	155
Summer WB left	C	33.9	0.15	5	22
Summer WB thru|thru/right	F	97.1	1.13	~815	#956
Pappas Way NB left/thru/right	F	197.4	1.27	~194	#349
Drydock SB left/thru	E	69.3	0.79	114	#226
Drydock SB right	A	5.4	0.27	0	43

Table 3-19 Summer Street/Drydock Avenue/Pappas Way, Build (2023) Condition Capacity Analysis Summary, p.m. Peak Hour – with Existing Circulation

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Without timing changes s					
Summer Street/Drydock Avenue/Pappas Way	**E**	**61.5**	-	-	-
Summer EB left	D	36.3	0.71	76	m#121
Summer EB thru|thru/right	C	32.3	0.86	~513	m#665
Summer WB left	D	49.1	0.30	12	#45
Summer WB thru|thru/right	D	35.3	0.61	246	#321
Pappas Way NB left/thru/right	F	277.9	1.45	~149	#223
Drydock SB left/thru	F	166.6	1.26	~481	#548
Drydock SB right	A	4.0	0.55	0	18
With timing changes s					
Summer Street/Drydock Avenue/Pappas Way	**D**	**49.3**	-	-	-
Summer EB left	D	53.7	0.83	78	m#154
Summer EB thru|thru/right	D	40.1	0.93	~597	m#713
Summer WB left	D	50.8	0.29	12	#46
Summer WB thru|thru/right	D	38.9	0.67	256	#367
Pappas Way NB left/thru/right	F	84.9	0.92	101	#175
Drydock SB left/thru	F	117.0	1.13	~447	#511
Drydock SB right	A	3.7	0.53	0	17

The Proponent will continue to work with the City of Boston to ensure the Project efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

The Proponent is responsible for preparation of the Transportation Access Plan Agreement (TAPA), a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, travel demand management measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed. The proposed travel demand measures listed above and any additional transportation improvements to be undertaken as part of this Project will be defined and documented in the TAPA.

The Proponent will also produce a Construction Management Plan (CMP) for review and approval by BTD. The CMP will detail the schedule, staging, parking, delivery, and other associated impacts of the construction of the Project.

3.6 Transportation Demand Management

The Proponent will work with the City to develop a Travel Demand Management (TDM) program appropriate to the Project and consistent with its level of impact. TDM will be facilitated by the nature of the Project (which does not generate significant peak-hour trips) and its proximity to the Boston Convention and Exhibition Center and Massport's Cruiseport Terminal, which will be two nearby destinations for many guests of the Project.

TDM measures for the Project may include, but are not limited to, the following:

- The Proponent will require the hotel operators to designate a full-time, on-site employee as the Development's transportation coordinator. The transportation coordinator will oversee all transportation issues, including the management of vehicular operations, service and loading, parking, and TDM programs.

- The Proponent will require the hotel operators to produce an annual (or more frequent) newsletter or bulletin for employees summarizing transit, ridesharing, bicycling, alternative work schedules, and other travel options.

- The Proponent will require the hotel operators to provide information on travel alternatives for employees and guests on the hotel website and in the building lobby.

- The Proponent will encourage the hotel operators to offer a "guaranteed ride home" for employees in order to remove an obstacle to transit use and ridesharing.

- The Proponent will encourage the hotel operators to provide orientation packets to employees containing information on available transportation choices, including transit routes/schedules and nearby vehicle sharing and bicycle sharing locations.

3.7 Evaluation of Short-Term Construction Impacts

Most construction activities will be accommodated within the current site boundaries. Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a Construction Management Plan to be filed with BTD in accordance with the City's transportation maintenance plan requirements.

To minimize transportation impacts during the construction period, the following measures will be considered for the Construction Management Plan:

- Limited construction worker parking on site;

- Encouragement of worker carpooling;

- Consideration of a subsidy for MBTA passes for full-time employees; and
- Providing secure spaces on-site for workers' supplies and tools so they do not have to be brought to the site each day.

The Construction Management Plan to be executed with the City prior to commencement of construction will document all committed measures.

Chapter 4.0

Environmental Review Component

4.0 ENVIRONMENTAL PROTECTION COMPONENT

This chapter reviews the proposed Project's environmental impacts, including those related to wind, shadow, daylight, solar glare, air quality, noise, solid and hazardous waste, flooding, geotechnical impacts, as well as construction period impacts such as staging, access, and traffic.

4.1 Pedestrian Level Winds

A pedestrian area wind study was conducted by Rowan Williams Davies & Irwin Inc. (RWDI) to assess the impacts of the proposed Project on local conditions in pedestrian areas around the study site. The results and conclusions were provided in RWDI's Pedestrian Wind Consultation Report dated May 20, 2016, described below. Subsequent to the May, 20, 2016, analysis, minor changes were made to the Project's massing. The redesigned Project, described in this EPNF, was review by RWDI to determine what effects, if any, the design changes would likely have on local conditions in the pedestrian areas around the site as compared to the earlier design. RWDI engineers concluded that the refined Parcel A design will have a comparable effect on the wind conditions as the previously tested design. For this reason, RWDI is of the opinion that the results presented in its May 20, 2016, report are applicable to the design presented herein, and that additional wind impacts analysis is not warranted. RWDI's conclusions are documented in Appendix B.

The "No Build" (present conditions), "Build" (all existing buildings including the proposed Project) and "Full Build" (the proposed Project in the presence of all existing and anticipated surroundings) conditions were tested by placing specially designed wind sensors at 86 locations, chosen in consultation with the BRA, surrounding the Project Site, on a scaled model of the Project area as described more fully in Section 4.1.3. The wind analysis shows that the overall wind conditions expected in the surrounding area under the Build and Full Build Conditions are consistent with the No Build Condition. Screens and other mitigation measures are being considered and will be assessed as design continues, to minimize any Project impacts.

4.1.1 Overview

Major buildings, especially those that protrude above their surroundings, often cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings intercept these faster winds and deflect them down to the pedestrian level. The funneling of wind through gaps between buildings and the acceleration of wind around corners of buildings may also cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from the prevailing upper-level winds, resulting in no significant changes to the local pedestrian-level wind environment. The most effective way to assess potential pedestrian-level wind impacts around a proposed new building is to conduct scale model tests in a wind tunnel.

The consideration of wind in planning outdoor activity areas is important since high winds in an area tend to deter pedestrian use. For example, winds should be light or relatively light in areas where people would be sitting, such as outdoor cafes or playgrounds. For bus stops and other locations where people would be standing, somewhat higher winds can be tolerated. For frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. For infrequently used areas, the wind-comfort criteria can be relaxed even further. The actual effects of wind can range from pedestrian inconvenience, due to the blowing of dust and other loose material in a moderate breeze, to severe difficulty with walking due to the wind forces on the pedestrian.

4.1.2 Methodology

The study involved wind tunnel simulations on a model of the proposed Project and surroundings. These simulations were conducted in RWDI's boundary-layer wind tunnel at Guelph, Ontario, for the purpose of quantifying local wind-speed conditions and comparing them to the BRA's wind criteria. The model was constructed based on information provided by the Proponent and Project architect Perkins + Will. The following section includes a discussion of the methods and the results of the wind tunnel simulations. Information concerning the site and surroundings was derived from: site photographs; information on surrounding buildings and terrain; and site plans and elevations of the proposed Project. The following configurations were simulated:

- No Build Configuration: includes all existing and approved surrounding buildings; and,
- Build Configuration: includes the proposed Project, and all existing surroundings.
- Full Build Configuration: includes the proposed Project, and all existing and anticipated structures in the surrounding area.

As shown in Figures 4.1-1, 4.1-2, and 4.1-3 the wind tunnel model included the proposed development and all relevant surrounding buildings and topography around the Project Site. The mean speed profile and turbulence of the natural wind approaching the modeled area were also simulated in RWDI's boundary layer wind tunnel. The scale model was equipped with 86 specially designed wind speed sensors that were connected to the wind tunnel's data acquisition system to record the mean and fluctuating components of wind speed at a full-scale height of five feet above grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 wind directions, in ten-degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model. The results were then combined with long-term meteorological data, recorded during the years 1990 to 2015 at Boston Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

Figures 4.1-4 through 4.1-6 present "wind roses", summarizing the annual and seasonal directional distribution, or "wind climates," in the Boston area, based on the data from Logan International Airport. The wind roses, in Figures 4.1-4 and 4.1-5 are based on all observed wind readings for the given season listed below the wind rose. The right-hand side wind rose in Figure 4.1-5, for example summarize the winter (December, January, and February) wind data. In general, the prevailing winds are from the northwest, west-northwest, west, and southwest. In the case of wind speeds in excess of 20 mph, the most common wind direction is northwest and west-northwest. On an annual basis (Figure 4.1-5) the most common wind directions are those between southwest and northwest. These are also the dominant directions for strong winds.

This study involved state-of-the-art measurement and analysis techniques to predict wind conditions at the study site. Nevertheless, some uncertainty remains in predicting wind comfort, and this must be kept in mind. For example, the sensation of comfort among individuals can be quite variable. Variations in age, individual health, clothing, and other human factors can change a particular response of an individual. The comfort limits used in this report represent an average for the total population. Also, unforeseen changes in the project area, such as the construction or removal of buildings, can affect the conditions experienced at the site. Finally, the prediction of wind speeds is necessarily a statistical procedure. The wind speeds reported are for the frequency of occurrence stated (one percent of the time). Higher wind speeds will occur but on a less frequent basis.

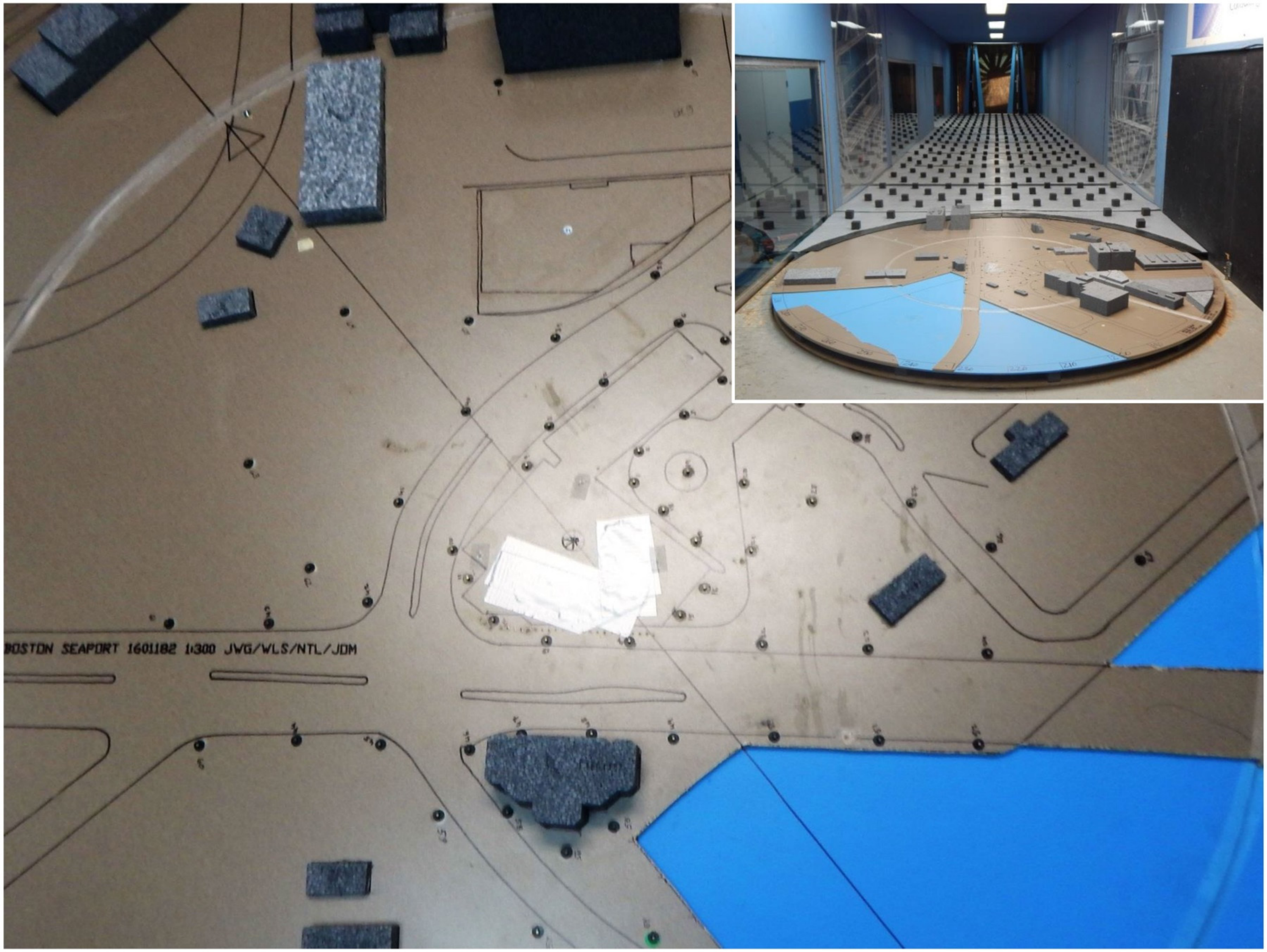


Figure 4.1-1

No Build Configuration

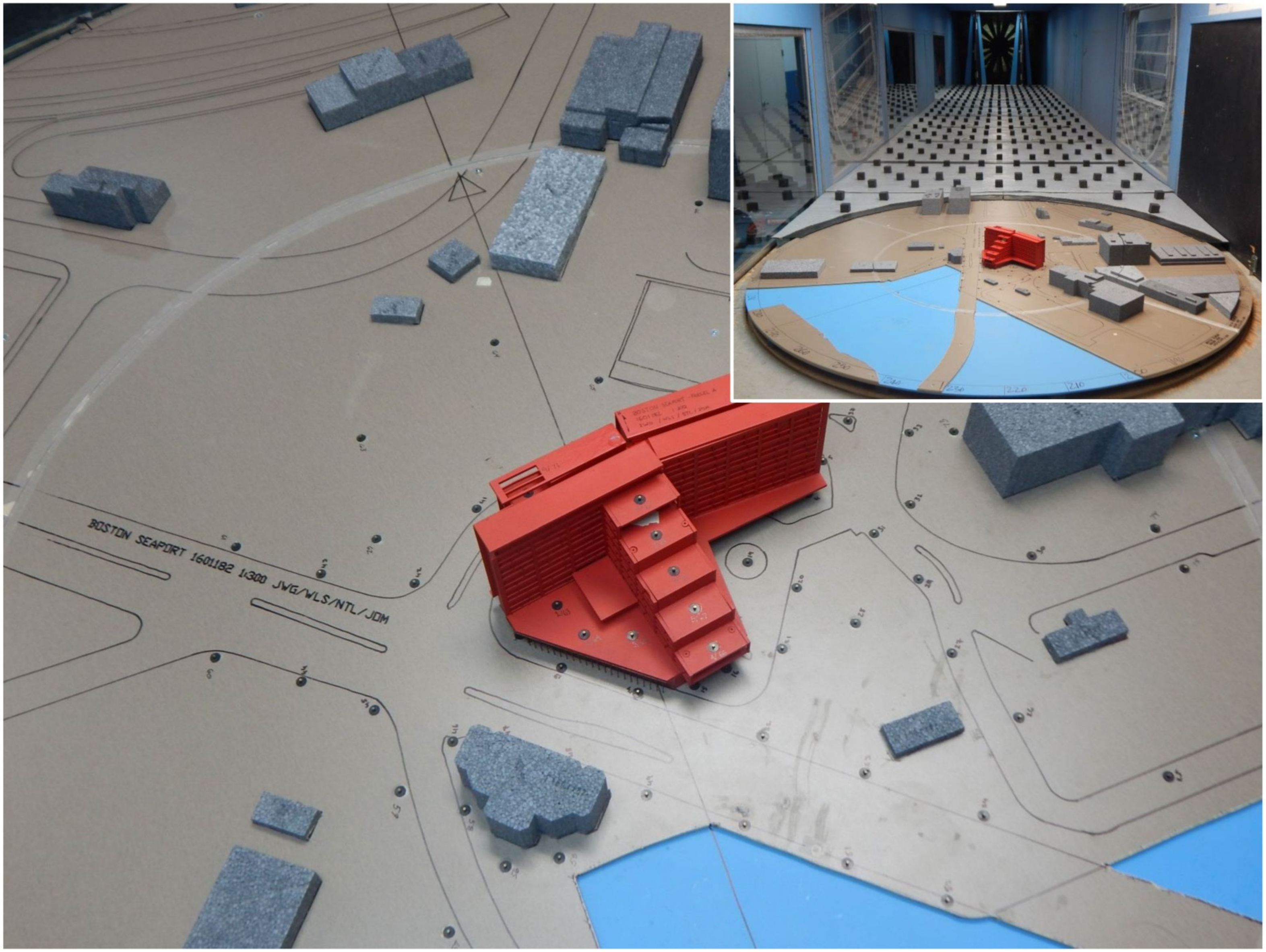


Figure 4.1-2

Build Configuration

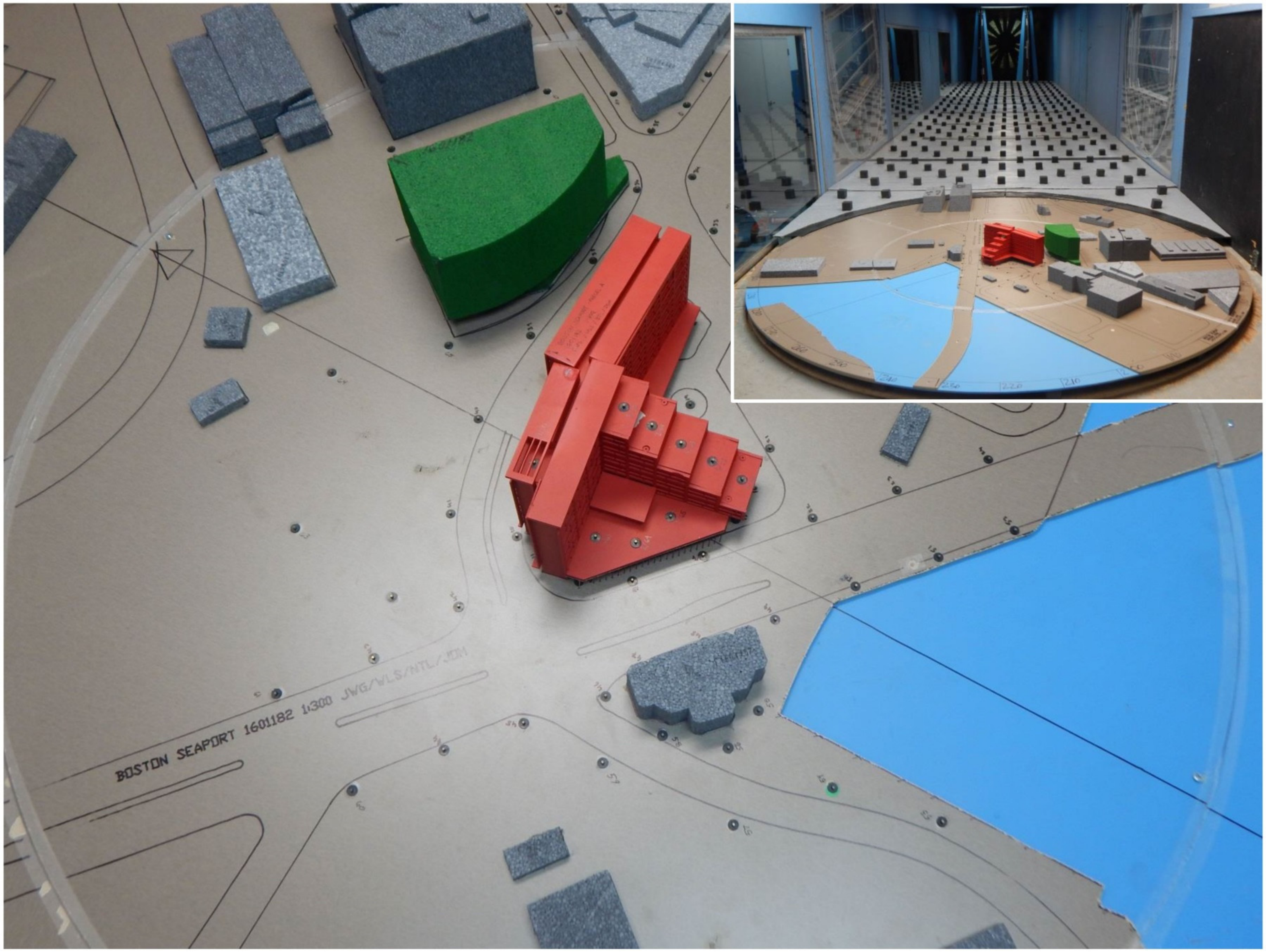
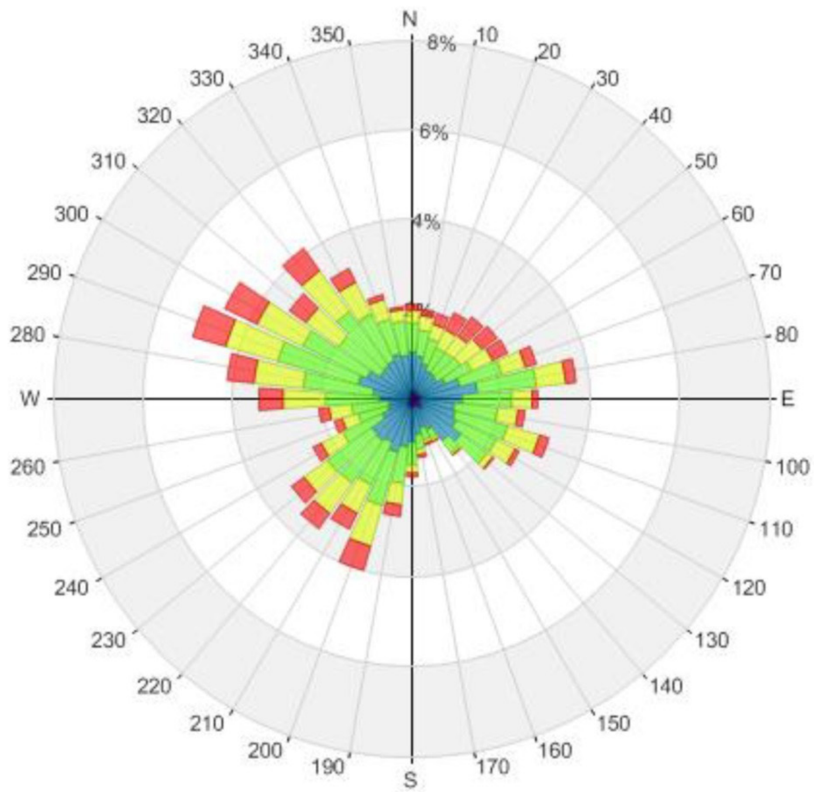
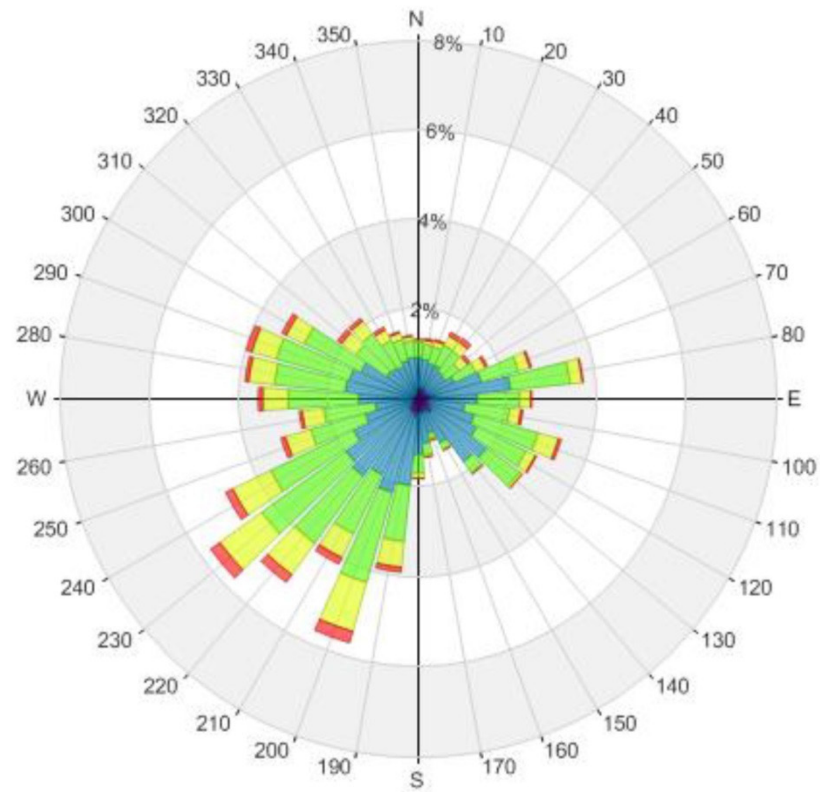


Figure 4.1-3

Full Build Configuration



Spring
(March - May)



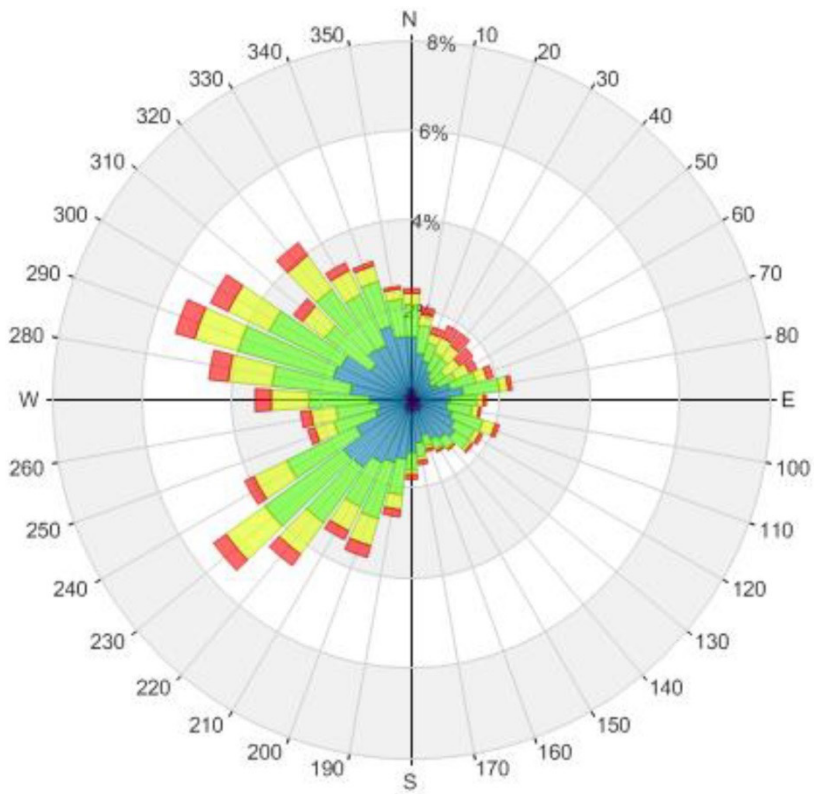
Summer
(June - August)

Wind Speed (mph)	Probability (%) Spring	Probability (%) Summer
Calm	2.3	2.6
1-5	6.2	8.5
6-10	28.2	37.9
11-15	32.9	35.2
16-20	19.9	13.0
>20	10.5	2.7

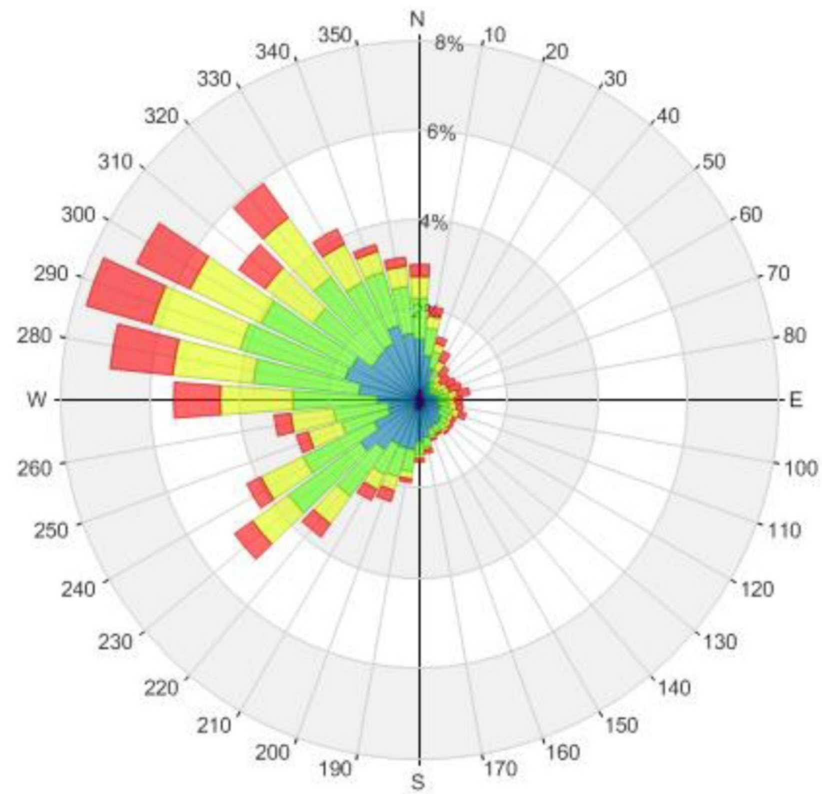
Figure 4.1-4

Directional Distribution (%) of Winds (Blowing From)

Boston Logan International Airport (1990 – 2015)



Fall
(September - November)



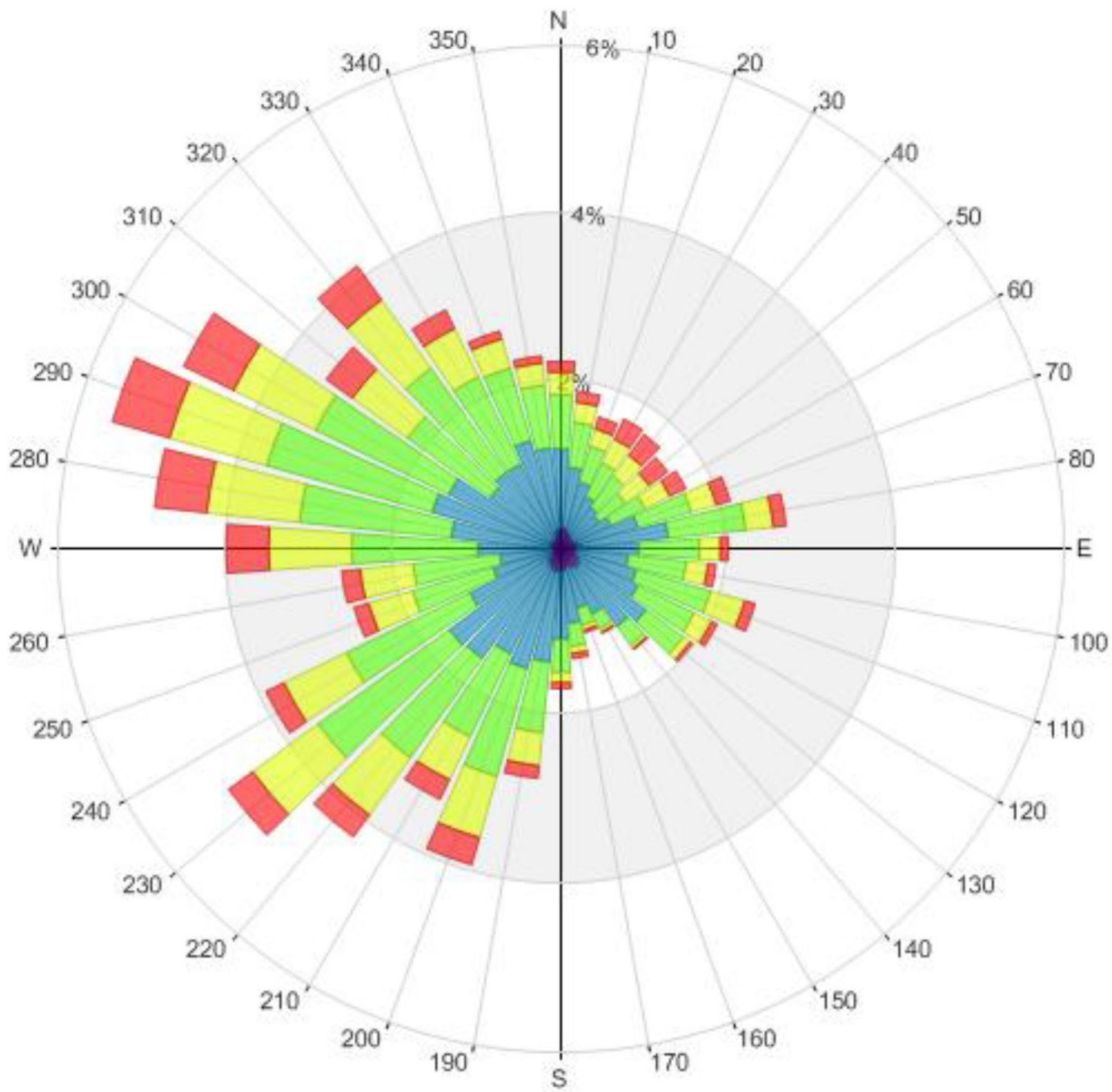
Winter
(December - February)

Wind Speed (mph)	Probability (%) Fall	Winter
Calm	2.8	2.2
1-5	7.8	6.0
6-10	33.9	27.2
11-15	33.0	31.0
16-20	15.6	20.4
>20	7.0	13.1

Figure 4.1-5

Directional Distribution (%) of Winds (Blowing From)

Boston Logan International Airport (1990 – 2015)



Annual Winds

	Wind Speed (mph)	Probability (%)
	Calm	2.5
	1-5	7.1
	6-10	31.8
	11-15	33.0
	16-20	17.2
	>20	8.3

Figure 4.1-6

Directional Distribution (%) of Winds (Blowing From)

Boston Logan International Airport (1990 – 2015)

4.1.3 Pedestrian Wind Comfort Criteria

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second set of criteria used by the BRA to determine the acceptability of specific locations is based on the work of Melbourne[1]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the one-hour mean wind speed exceeded one percent of the time (i.e., the 99-percentile mean wind speed). They are as shown in Table 4.1-1 below.

Table 4.1-1 Boston Redevelopment Authority Mean Wind Criteria*

Level of Comfort	Wind Speed
Dangerous	> 27 mph
Uncomfortable for Walking	>19 and <27 mph
Comfortable for Walking	>15 and <19 mph
Comfortable for Standing	>12 and <15 mph
Comfortable for Sitting	<12 mph

* Applicable to the hourly mean wind speed exceeded one percent of the time.

4.1.4 Test Results

Appendix B presents the mean and effective gust wind speeds for each season as well as annually. Figures 4.1-7 through 4.1-12 graphically depict the wind conditions at each wind measurement location based on the annual winds for each build scenario described above. Typically the summer and fall winds tend to be more comfortable than the annual winds, while the winter and spring winds are less comfortable than the annual winds. The following summary of pedestrian wind comfort is based on the annual winds for each configuration tested, except where noted below in the text.

In general, wind conditions suitable for walking are appropriate for sidewalks, and lower wind speeds conducive to standing are preferred at building entrances.

[1] Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions", Journal of Industrial Aerodynamics, 3 (1978) 241 - 249.

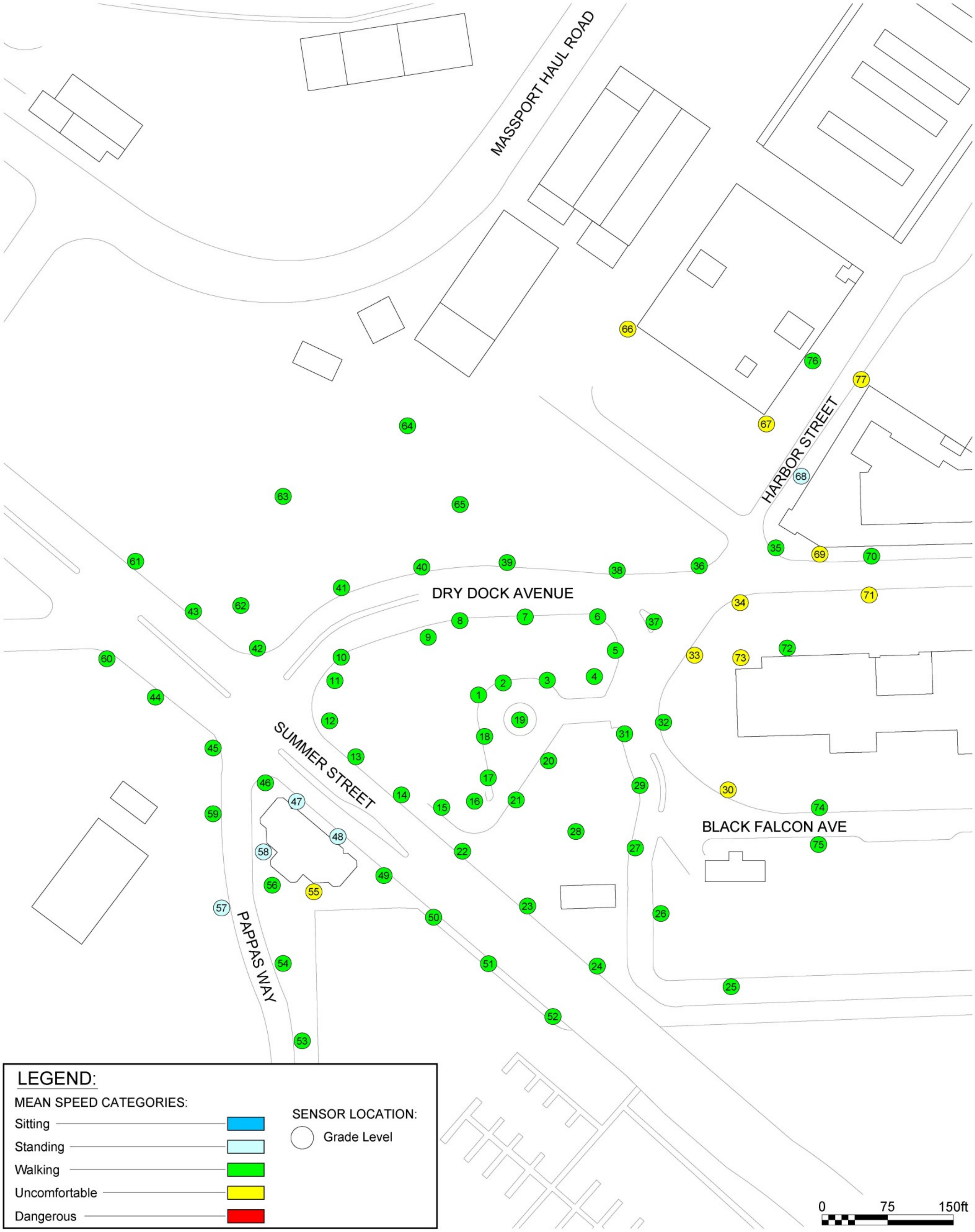


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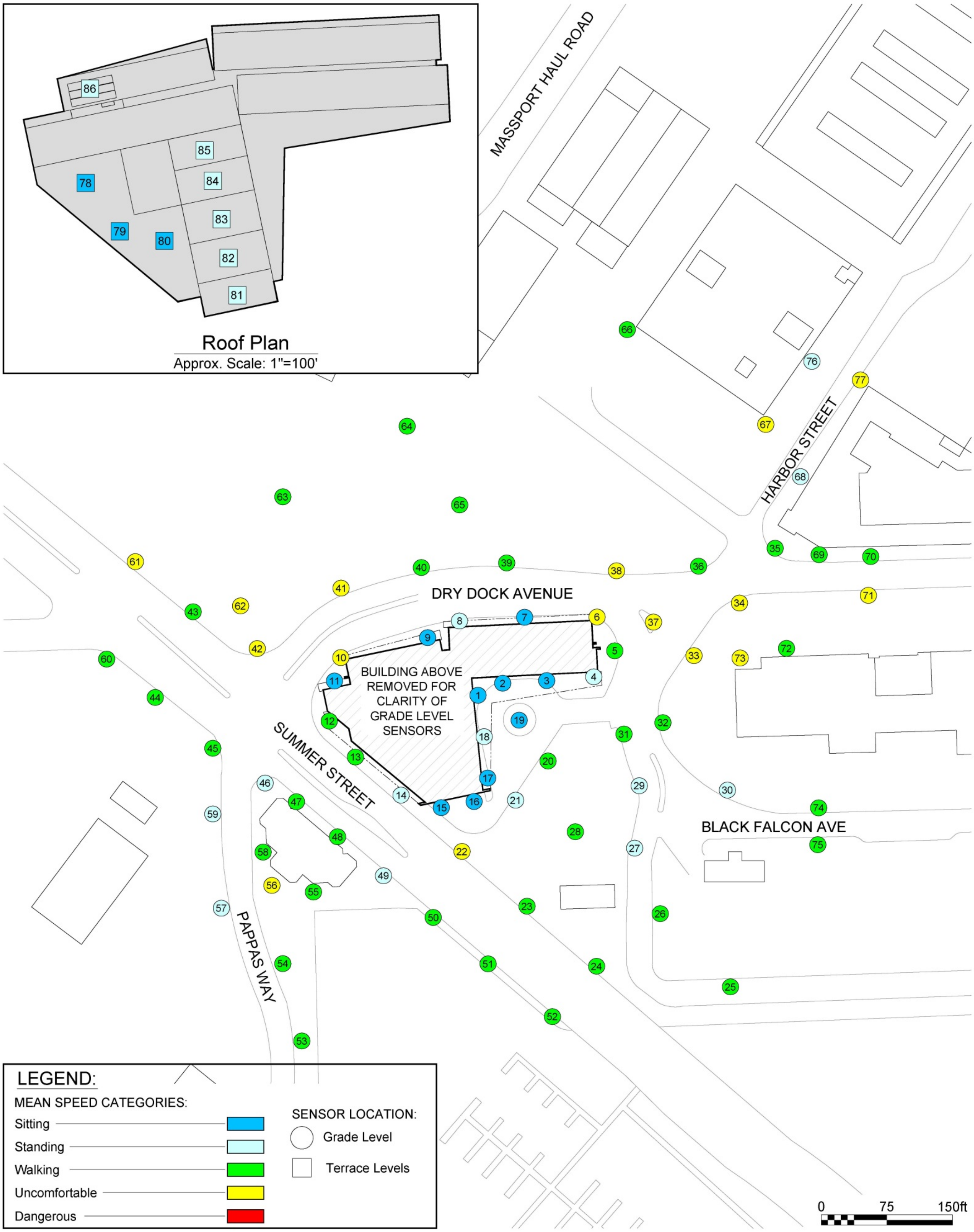
Figure 4.1-7

Pedestrian Wind Conditions – Mean Speed – No Build



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Epsilon ASSOCIATES INC.

Figure 4.1-8

Pedestrian Wind Conditions – Mean Speed – Build

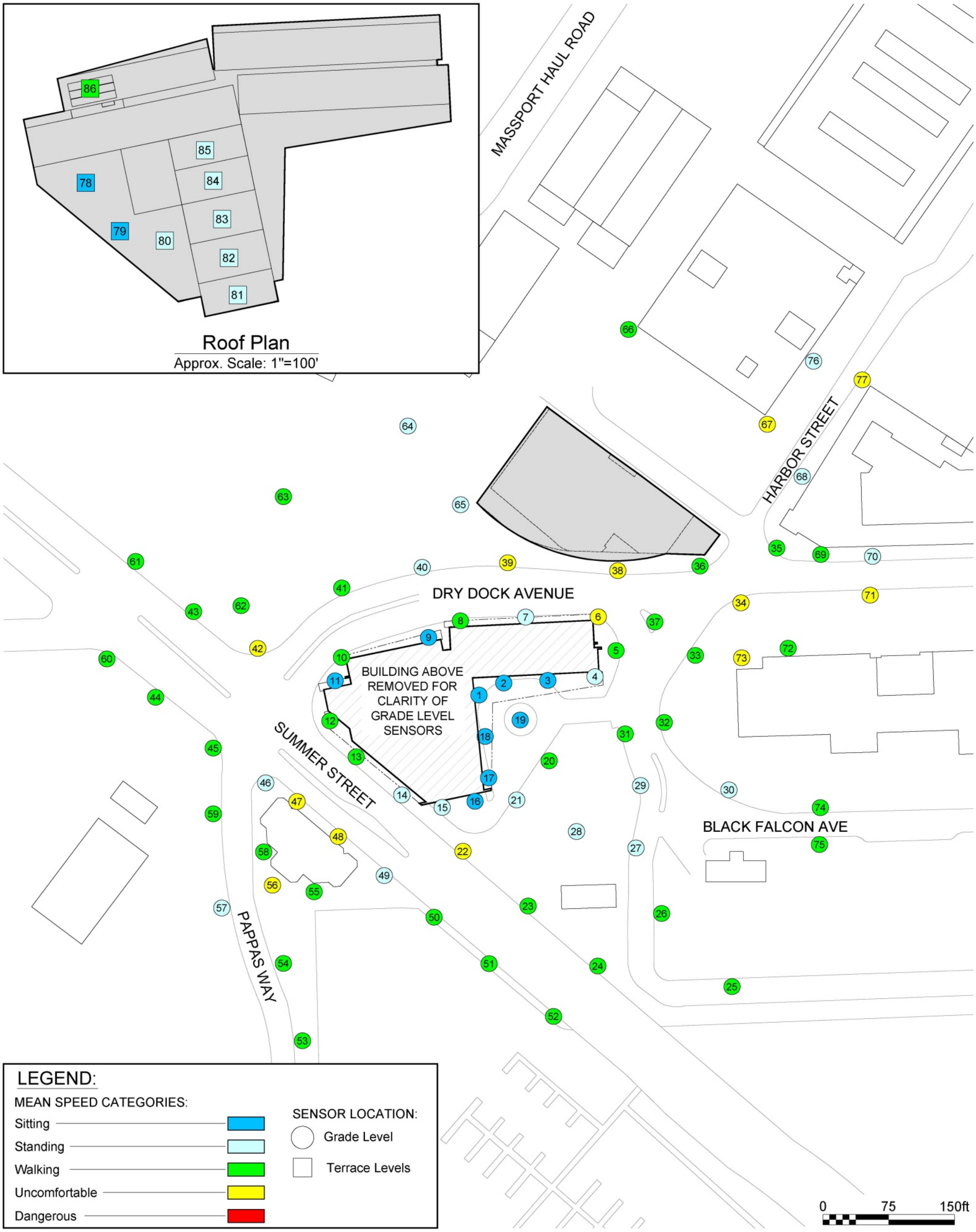

Figure 4.1-9

Pedestrian Wind Conditions – Mean Speed – Full Build

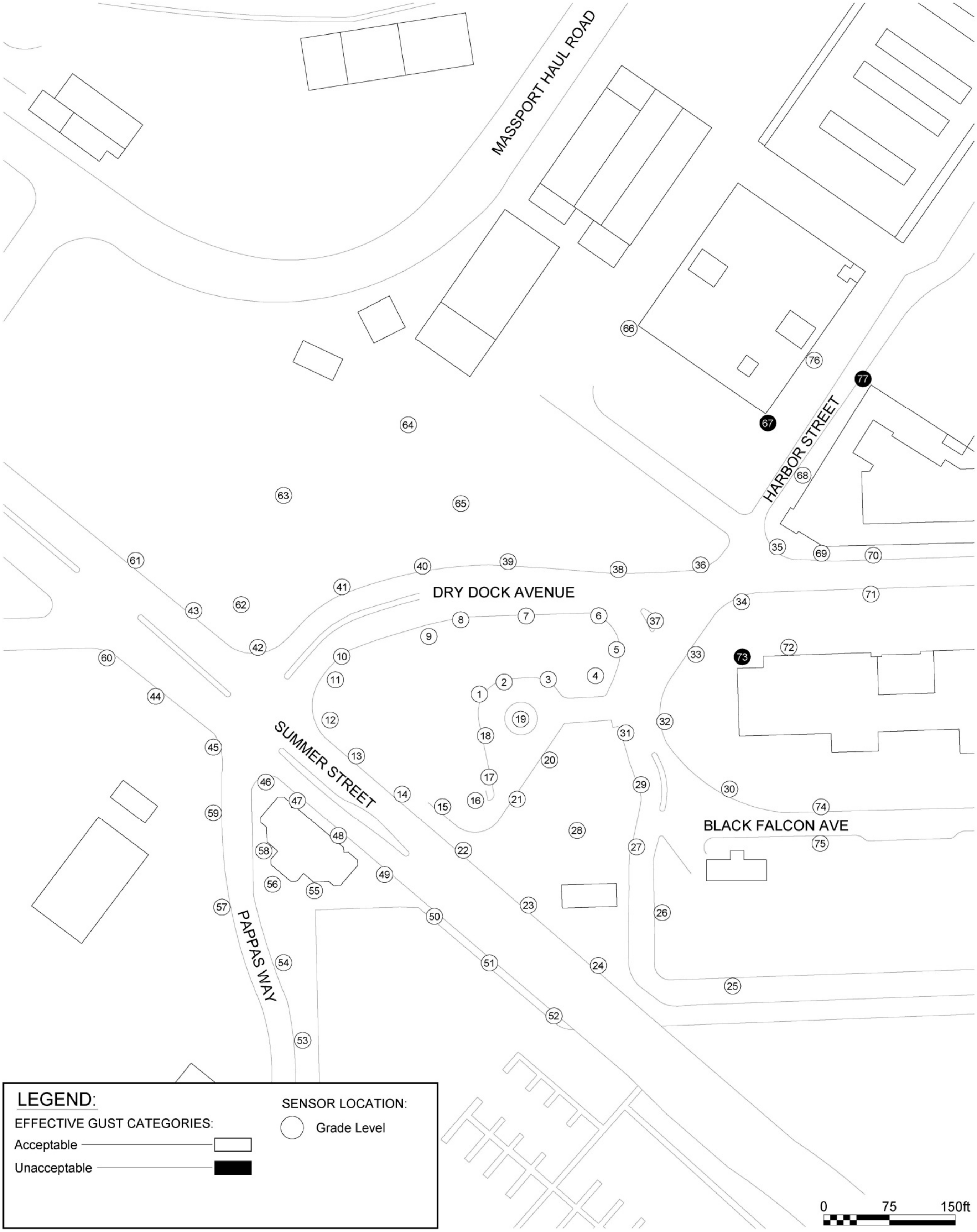

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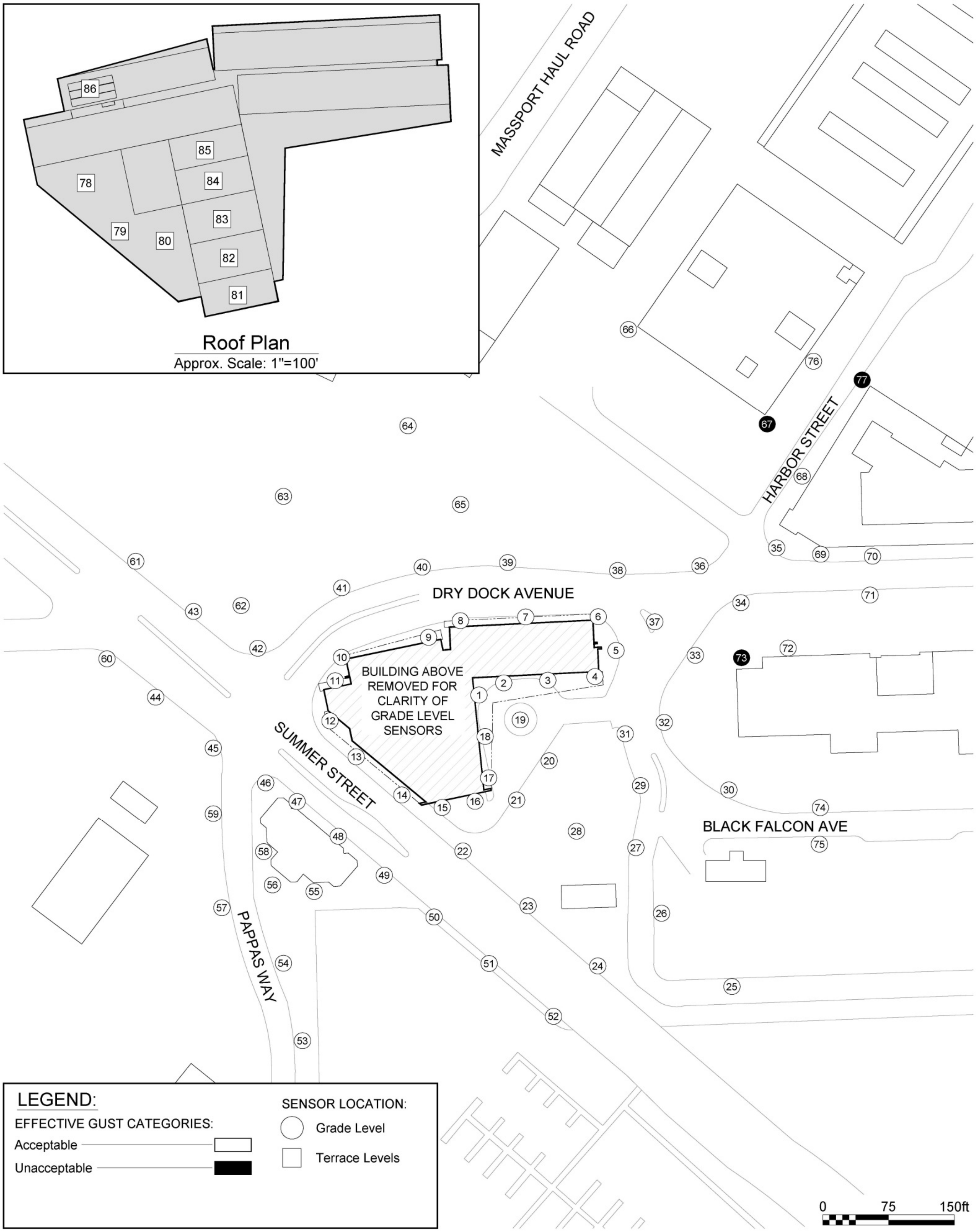
Figure 4.1-10

Pedestrian Wind Conditions – Effective Gust Speed – No Build



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Epsilon ASSOCIATES INC.

Figure 4.1-11

Pedestrian Wind Conditions – Effective Gust Speed – Build

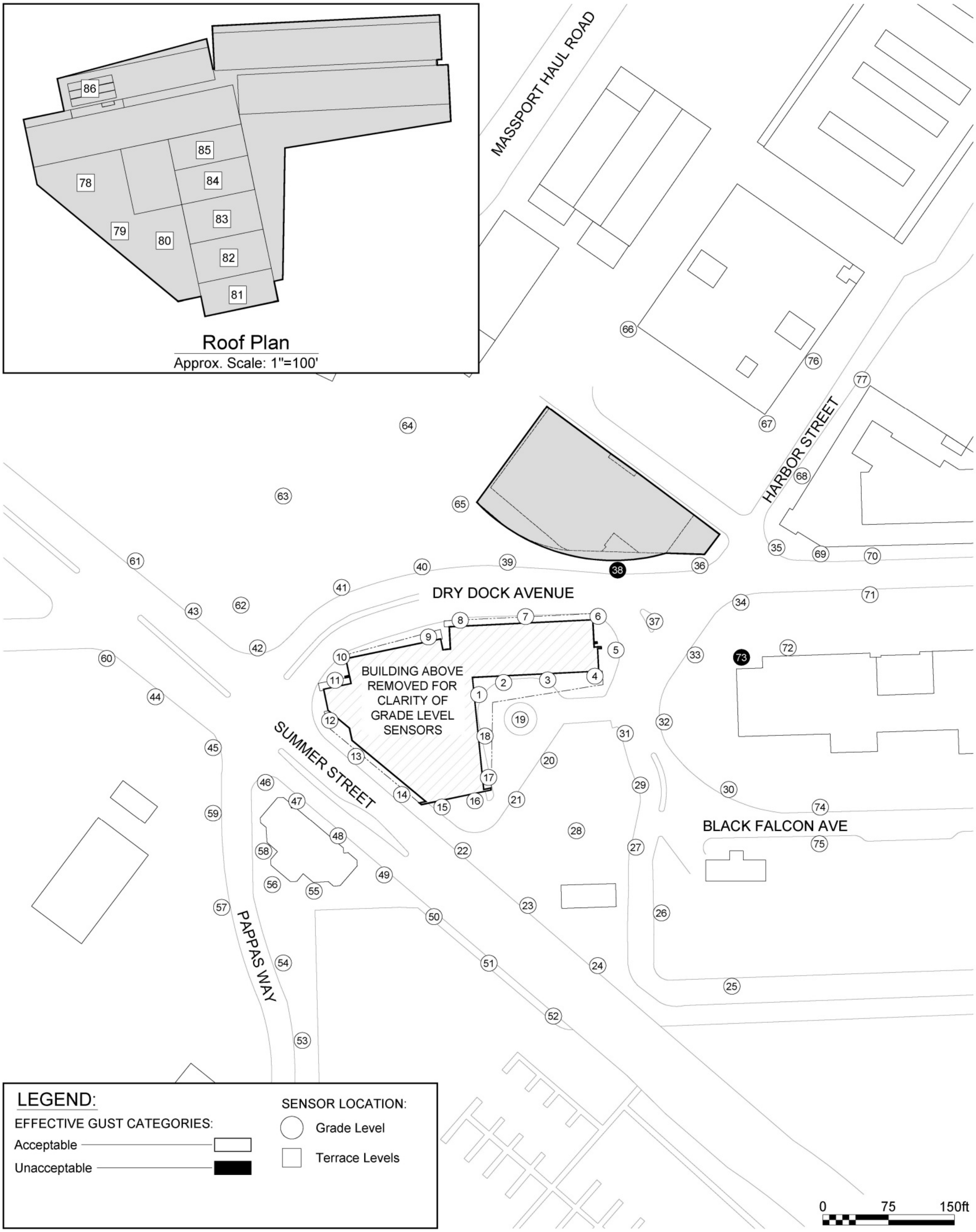

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Figure 4.1-12

Pedestrian Wind Conditions – Effective Gust Speed – Full Build

4.1.4.1 No Build Configuration

As shown in Figure 4.1-6, under the No Build Configuration, all locations were suitable for walking or better annually and seasonally, with the exception of Location 66 (located offsite), which was rated uncomfortable during the spring and winter. The effective gust criterion was met seasonally and annually at all locations.

4.1.4.2 Full Build Configuration

Building Entrances and On and Off-site Sidewalks

Wind conditions suitable for walking are acceptable for sidewalks seasonally and annually. In the winter and spring, walking conditions are also considered acceptable in courtyard areas. The preferred wind climate during the summer should be comfortable for standing in the vicinity of building entrances and courtyards.

Under the Full Build Configuration, eight (8) locations recorded increased mean wind speed, registering "uncomfortable" conditions on an annual basis. Six (6) locations recorded decreased mean wind speed registering conditions suitable for walking or standing. Grade level measurements along sidewalks and building entrances, with the exception of Locations 6, 47, 48, and 56), as well as roof-top sensors, recorded wind conditions comfortable for sitting, standing, or walking on an annual basis. These wind conditions are considered appropriate for the anticipated use of the space.

The annual effective gust criterion was unchanged at all locations in the "Build" scenario. In the "Full Build Scenario", Location 38 registered as "Unacceptable," though Locations 67 and 77 improved to "Acceptable."

Terrace (Locations 78 through 86)

It is generally desirable for wind conditions on terraces to be comfortable for sitting or standing, as pedestrians will be stationary for prolonged periods of time. During the winter season, these areas will not be in frequent use, and therefore higher winds are acceptable. Terraces are typically treated as an optional use area, whereby the occupants have the choice, based upon the weather conditions, whether they will use the terrace. Therefore, on windy days it is anticipated that the area would not be used.

Wind conditions on the terrace are predicted to be comfortable for standing (Locations 80 and 85) or sitting (Locations 78 and 79) during the annual Full Build scenario. Location 86 is predicted to be comfortable for walking.

The effective gust criterion was met seasonally and annually at all locations.

Wind conditions could be improved by including a wind control feature, such as a vertical wind screen, along the north side of the terrace.

4.2 Shadow Impacts

4.2.1 Introduction and Methodology

A shadow impact analysis was conducted to assess potential shadow impacts from the Project. The study looked at the following four times of the year:

1. Spring Equinox (March 21) at 9:00 a.m., 12:00 noon, and 3:00 p.m.
2. Summer Solstice (June 21) at 9:00 a.m., 12:00 noon, 3:00 p.m. and 6:00 p.m.
3. Autumnal Equinox (September 21) at 9:00 a.m., 12:00 noon, 3:00 p.m. and 6:00 p.m.
4. Winter Solstice (December 21) at 9:00 a.m., 12:00 noon, and 3:00 p.m.

The shadow analysis presents the existing shadow and new shadow that would be created by the Project, illustrating the likely shadow impact of the Project on existing conditions. The analysis focuses on nearby open spaces, sidewalks, and bus stops, adjacent to and in the vicinity of the Project Site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 4.2-1 to 4.2-14 at the end of this section.

The results of the analysis show that new shadow from the Project will generally be limited to nearby streets and sidewalks. New shadow is expected to be cast onto the Drydock Avenue bus stop at 3:00 PM during the Spring Equinox, Autumnal Equinox, and Winter Solstice. New shadow will also be cast onto the Plaza abutting the Project Site at 3:00 PM during the Spring, Summer Solstice and Autumnal Equinox and at 6:00 pm during the Summer Solstice and Autumnal Equinox. Finally, new shadow will be cast onto the adjacent Parcel Q1 during Winter Solstice, Spring Equinox, and Autumnal Equinox.

4.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, shadow from the Project will be cast to the northwest. Shadow from the Project will be cast across Drydock Avenue and its sidewalks, a portion of Parcel Q1, and the adjacent federally owner parcel, and portions of the Plaza on the north side of Drydock Avenue. No new shadow is expected to be cast onto open spaces or bus stops in the vicinity of the Project.

At 12:00 p.m., shadow from the Project will be cast to the north. Shadow will be cast onto Drydock Avenue and its sidewalks, and portions of Parcel Q1 and the adjacent federally owned parcel of land to the west of Q1. No new shadow is expected to be cast onto other open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., shadow from the Project will be cast to the northeast. Shadow will extend across Drydock Avenue and its sidewalks, and onto Parcel Q1 and the structure anticipated to be constructed thereon. Shadow will be cast on the MBTA bus stop at the Harbor Street and Drydock Avenue intersection.

4.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, shadow from the Project will be cast to the west, largely within the Drydock Avenue and the sidewalks along the north and west of the building. No new shadow is cast on bus stops in the vicinity of the Project.

At 12:00 p.m., shadow from the Project will be cast to the north. Again, shadow is expected to be limited to the sidewalks on Drydock Avenue adjacent to the Project Site. No new shadow will be cast onto open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., shadow from the Project is cast to the northeast. Shadow will extend into the Project courtyard, small portions of the Plaza, and Terminal Street. No new shadow is expected onto other open spaces or bus stops in the vicinity of the Project.

At 6:00 p.m., shadow from the Project is cast to the east. Shadow from the Project will extend from the Project courtyard into the Plaza, and across Terminal Street including portions of the Northcoast Seafood warehouse parcel, Boston Police Harbor Patrol parcel, and EDIC parking lot. No new shadow is shown to be cast onto other open spaces or bus stops in the vicinity of the Project.

4.2.4 Autumnal Equinox (September 21)

At 9:00 a.m. during the autumnal equinox, shadow from the Project will be cast to the northwest. Shadow from the Project will extend across Drydock Avenue and onto portions of Parcel Q1 and the federally-owned parcel. No new shadow is expected to be cast onto open spaces or bus stops in the vicinity of the Project.

At 12:00 p.m., shadow from the Project will be cast to the north. Shadow will be cast across Drydock Avenue and onto portions of Parcel Q1. No new shadow will be cast onto other open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., shadow from the Project will be cast to the northeast. Shadow will be cast onto Drydock Avenue and the intersection with Harbor Street, portions of Parcel Q1, and the bus stop at the Harbor Street and Drydock Avenue intersection.

At 6:00 p.m., much of the area is already under existing shadow. New shadow will be cast on the Plaza, Terminal Street, and portions of the Northcoast Seafood parcel and adjacent Boston Design Center parking lot and plaza. No new shadow is shown to be cast onto other open spaces or bus stops in the vicinity of the Project.

4.2.5 Winter Solstice (December 21)

The winter solstice creates the least favorable conditions for sunlight in New England. The sun angle during the winter is lower than in any other season, causing the shadows in urban areas to elongate and be cast onto large portions of the surrounding area.

At 9:00 a.m., shadow from the Project will be cast to the northwest. Shadow will be cast across Drydock Avenue and its sidewalks, Parcel Q1, and the adjacent federally owned parcel, portions of the Massport Haul Road, and the State Police E-4 Barracks. No new shadow is expected to be cast onto other open spaces or bus stops in the vicinity of the Project.

At 12:00 p.m., shadow from the Project will be cast to the north across Drydock Avenue and on portions of Parcel Q1 and the adjacent federally owner parcel. No new shadow will be cast onto other open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., shadow from the Project will be cast to the northeast across Drydock Avenue, and on portions of Harbor Street and the building at 1 Harbor Street. No new shadow is shown to be cast onto other open spaces however, new shadow will be cast on the Harbor Street bus stop.

4.2.6 Conclusions

New shadow from the Project will generally be limited to the immediately surrounding streets and sidewalks. Of the 14 time periods studied, new shadow is cast onto the Harbor Street bus stop at 3:00 PM during the Winter Solstice, Vernal Equinox, and Autumnal Equinox. New shadow will also be cast onto the Plaza. However, during many of these time periods studied, shadow is cast only onto a small portion of the Plaza abutting the Project Site.

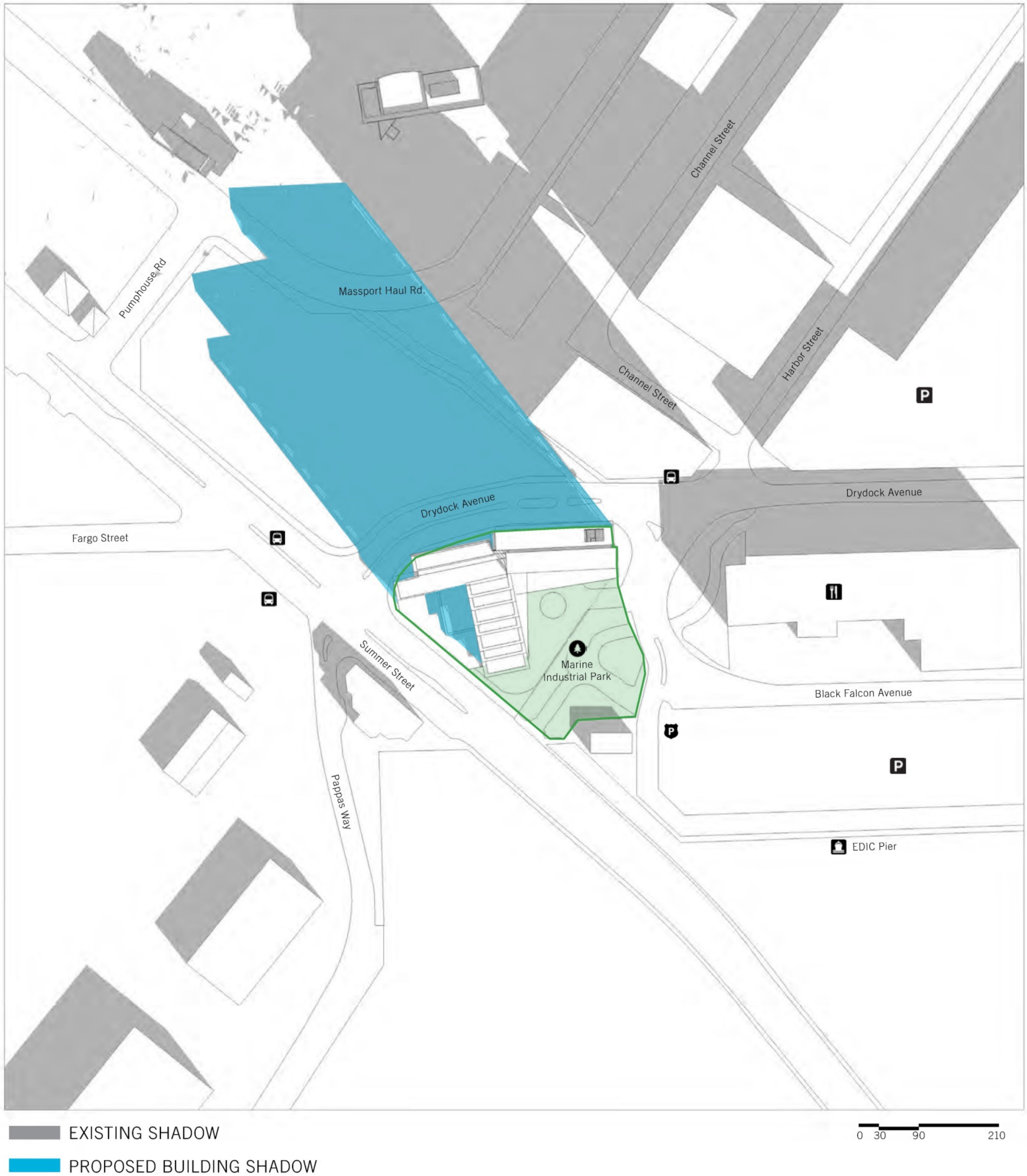
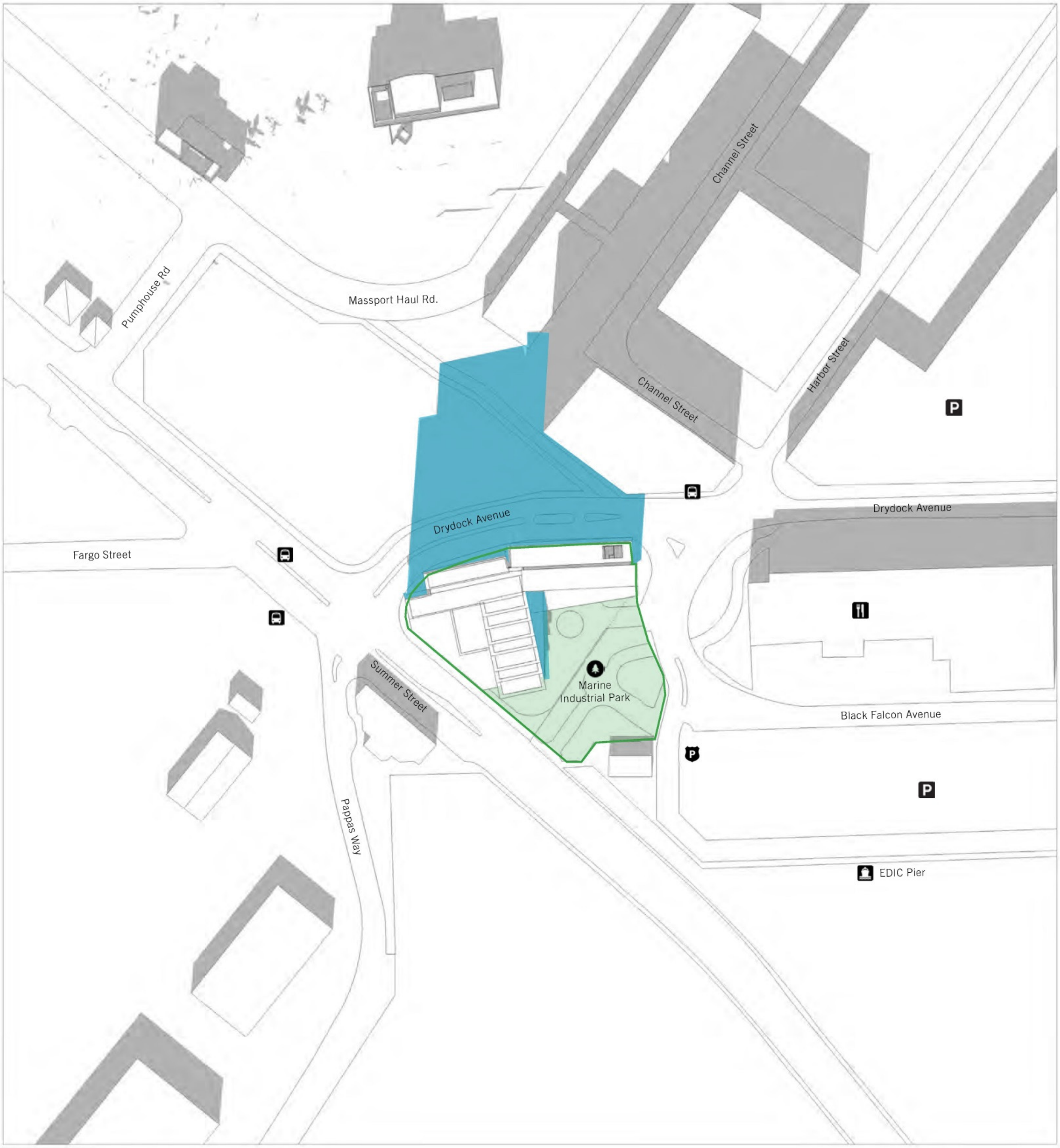


Figure 4.2-1

Shadow Study: December 21 at 9:00am



EXISTING SHADOW

PROPOSED BUILDING SHADOW

0 30 90 210

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Figure 4.2-2

Shadow Study: December 21 at 12:00pm

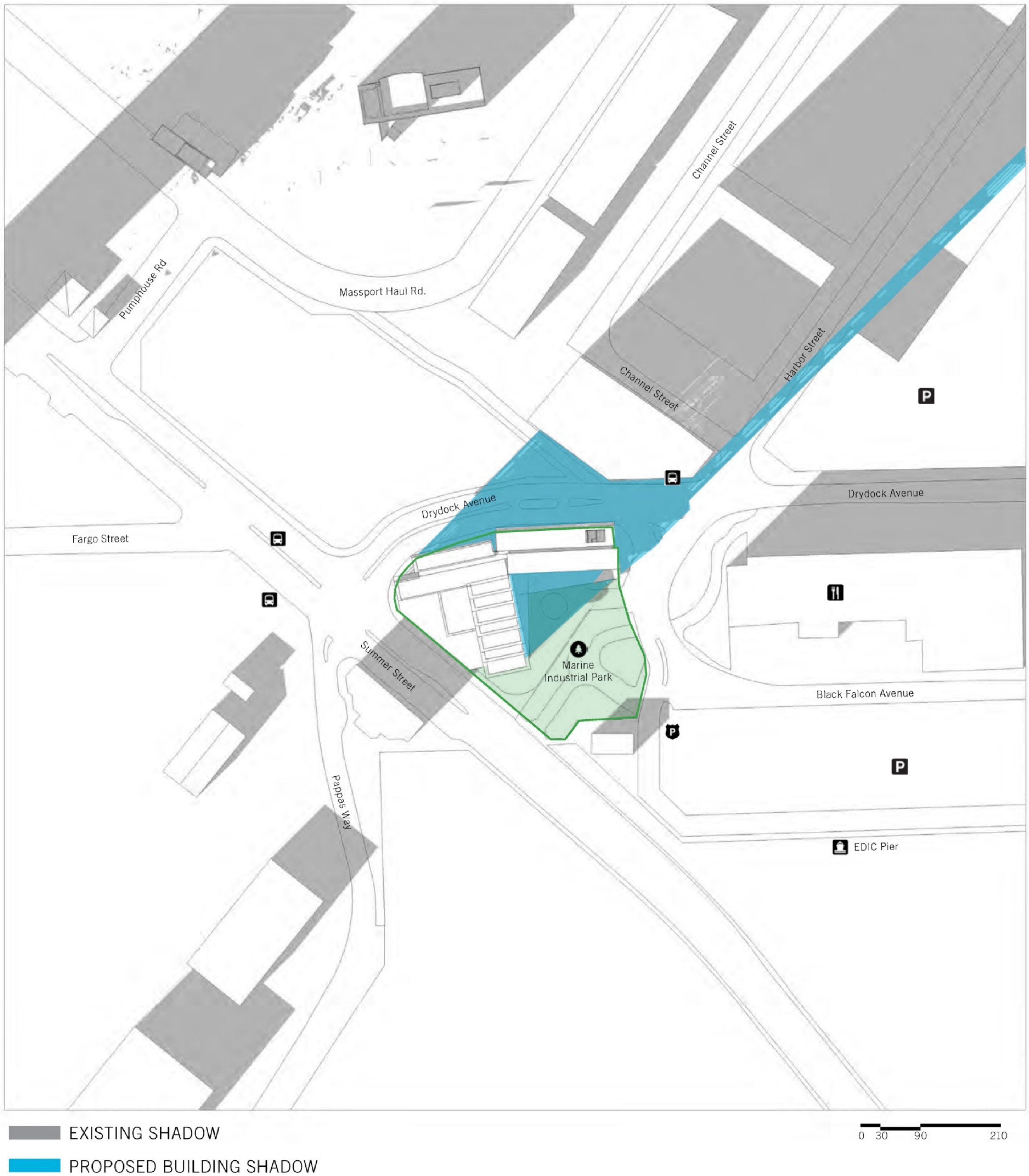

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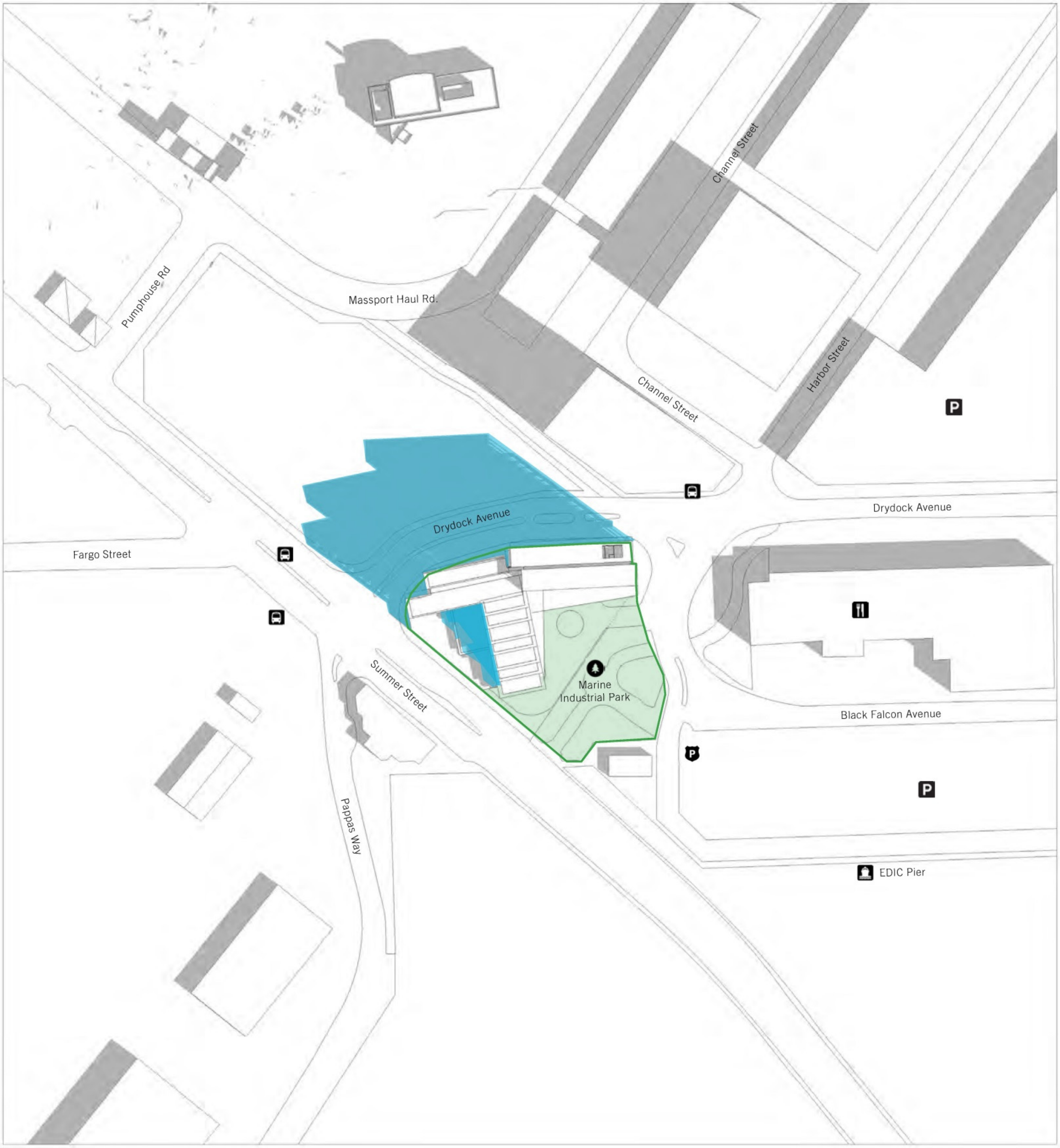
Figure 4.2-3

Shadow Study: December 21 at 3:00pm



EXISTING SHADOW

PROPOSED BUILDING SHADOW

Figure 4.2-4

Shadow Study: March 21 at 9:00am

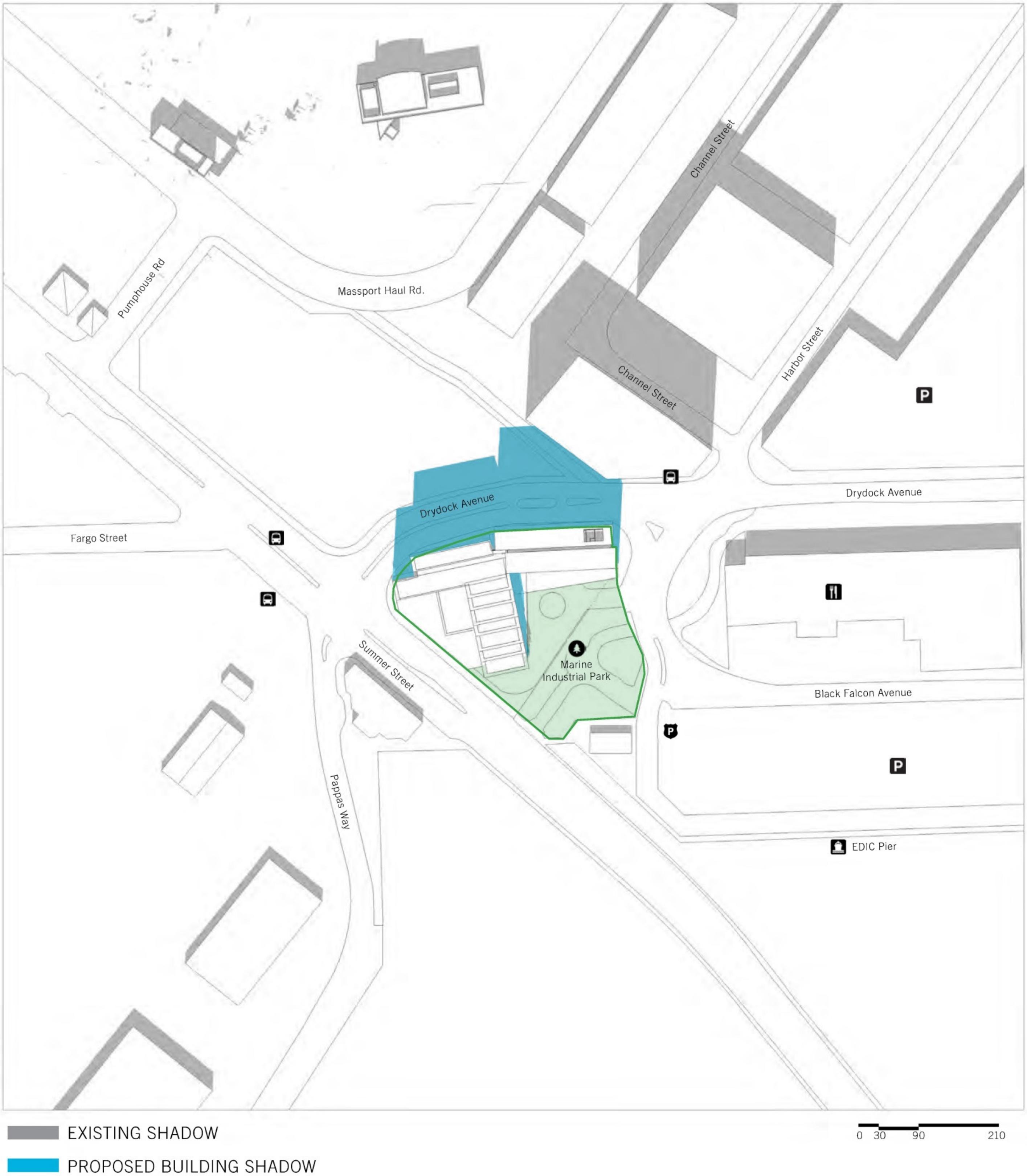


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Figure 4.2-5

Shadow Study: March 21 at 12:00pm

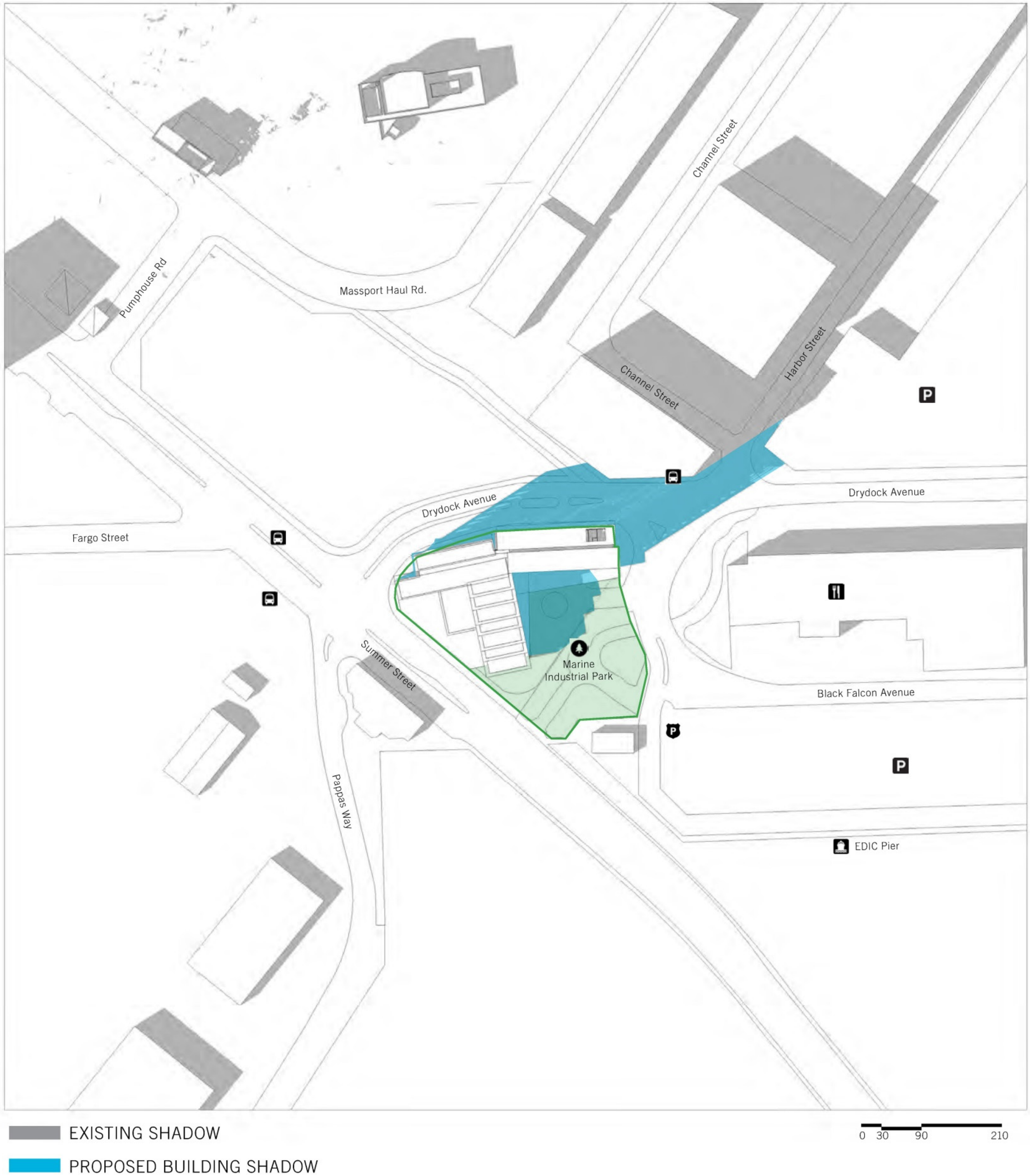

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Figure 4.2-6

Shadow Study: March 21 at 3:00pm

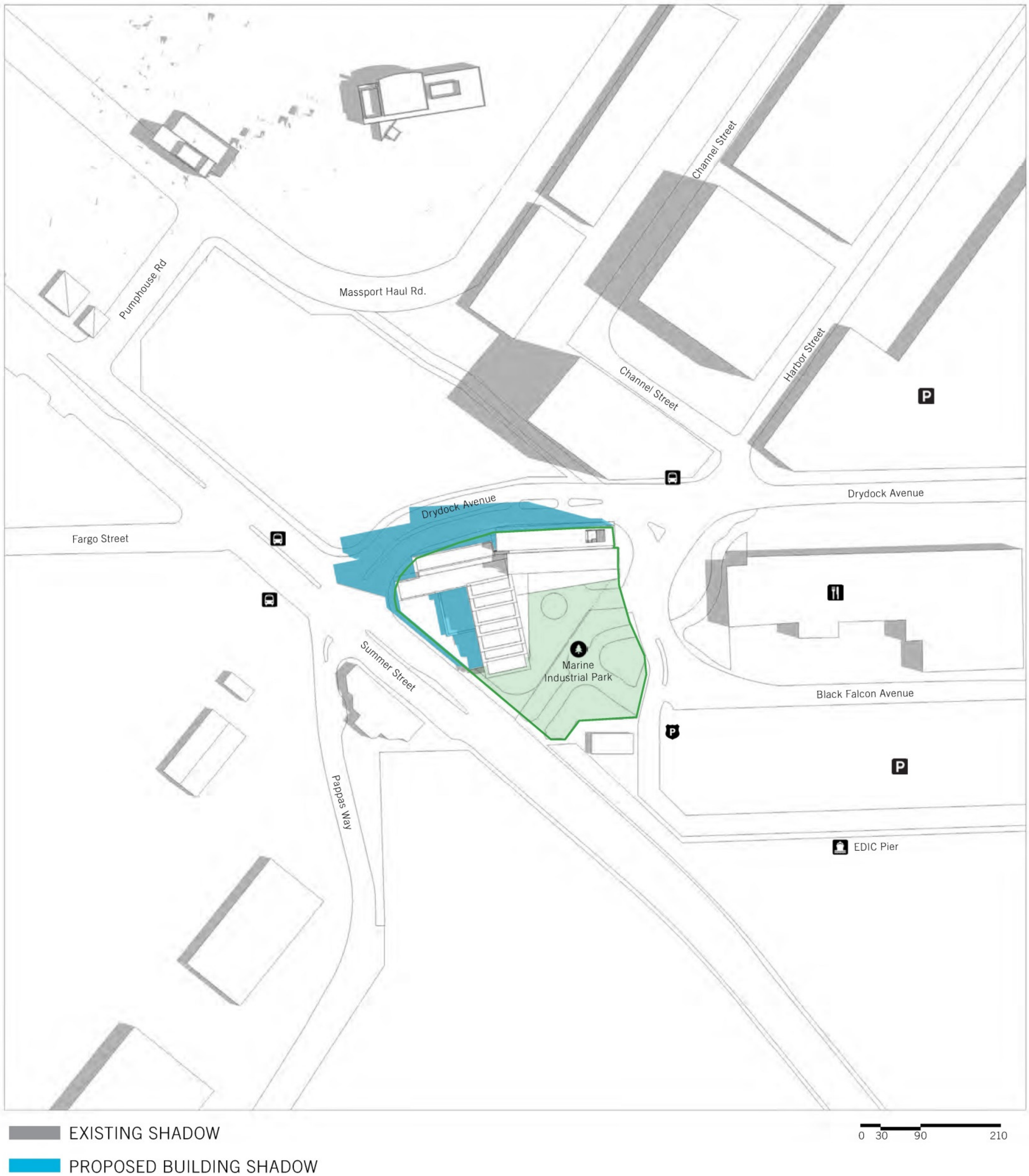

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Figure 4.2-7

Shadow Study: June 21 at 9:00am

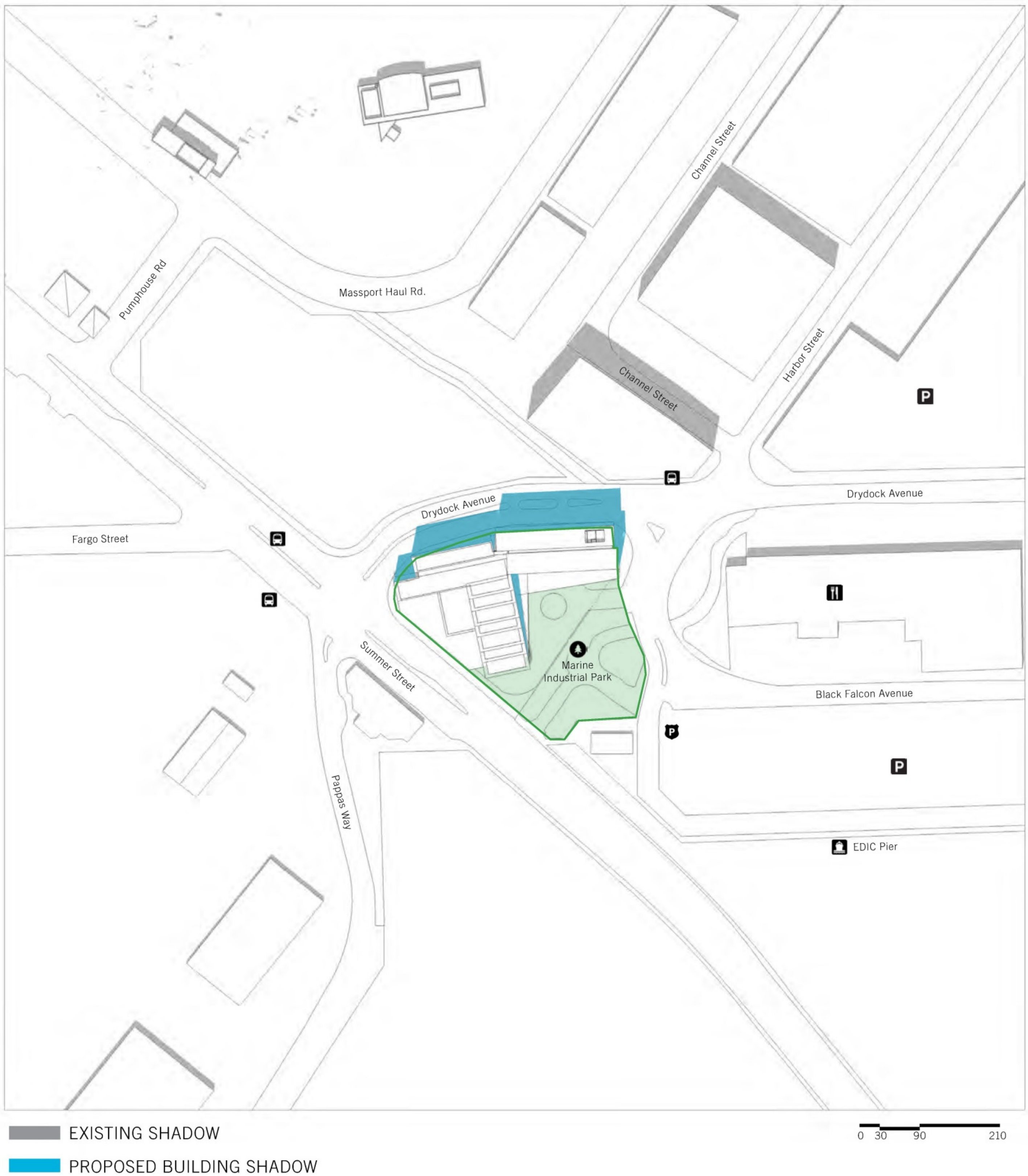

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Figure 4.2-8

Shadow Study: June 21 at 12:00pm

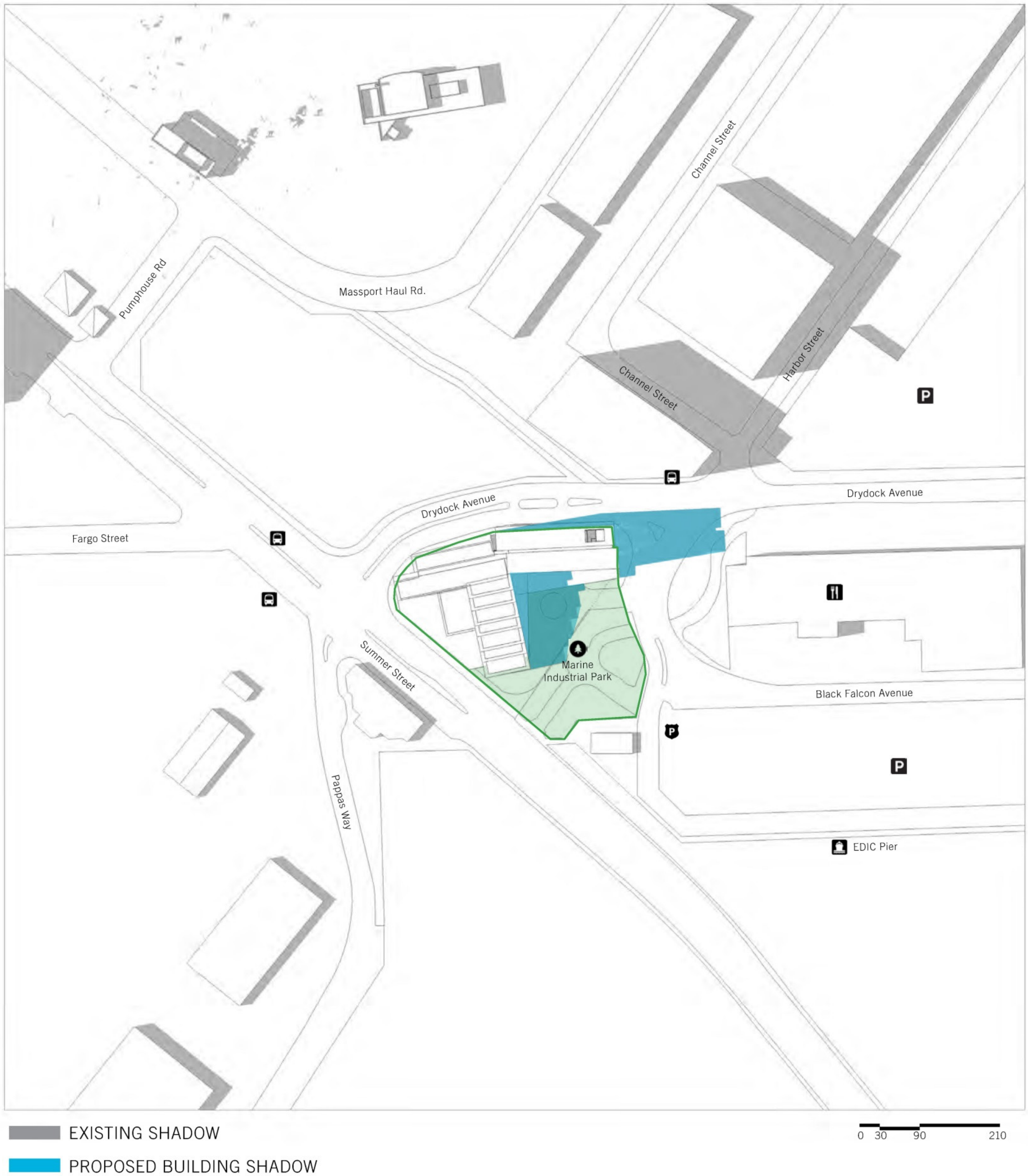

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Figure 4.2-9

Shadow Study: June 21 at 3:00pm

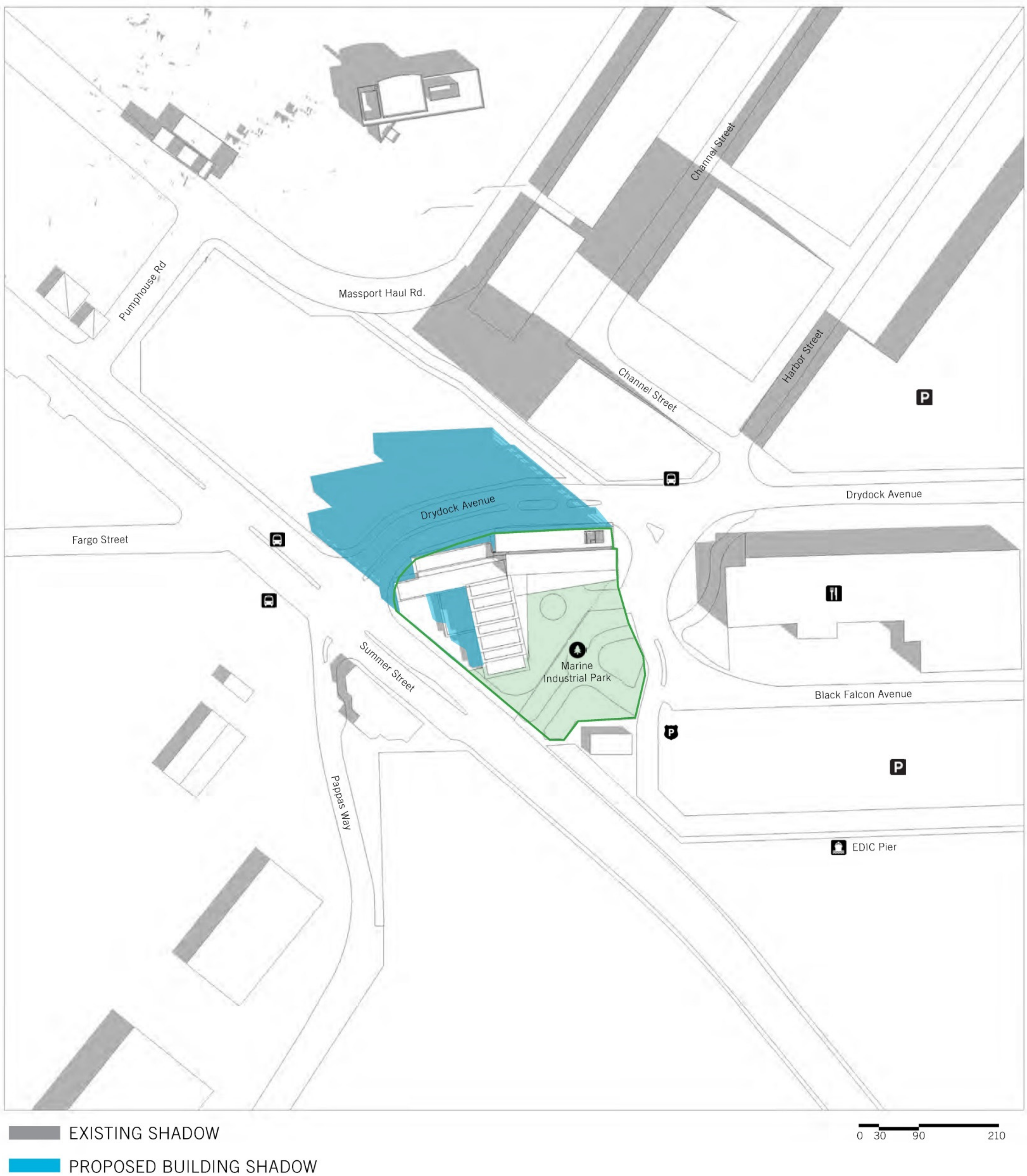

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Figure 4.2-10

Shadow Study: September 21 at 9:00am

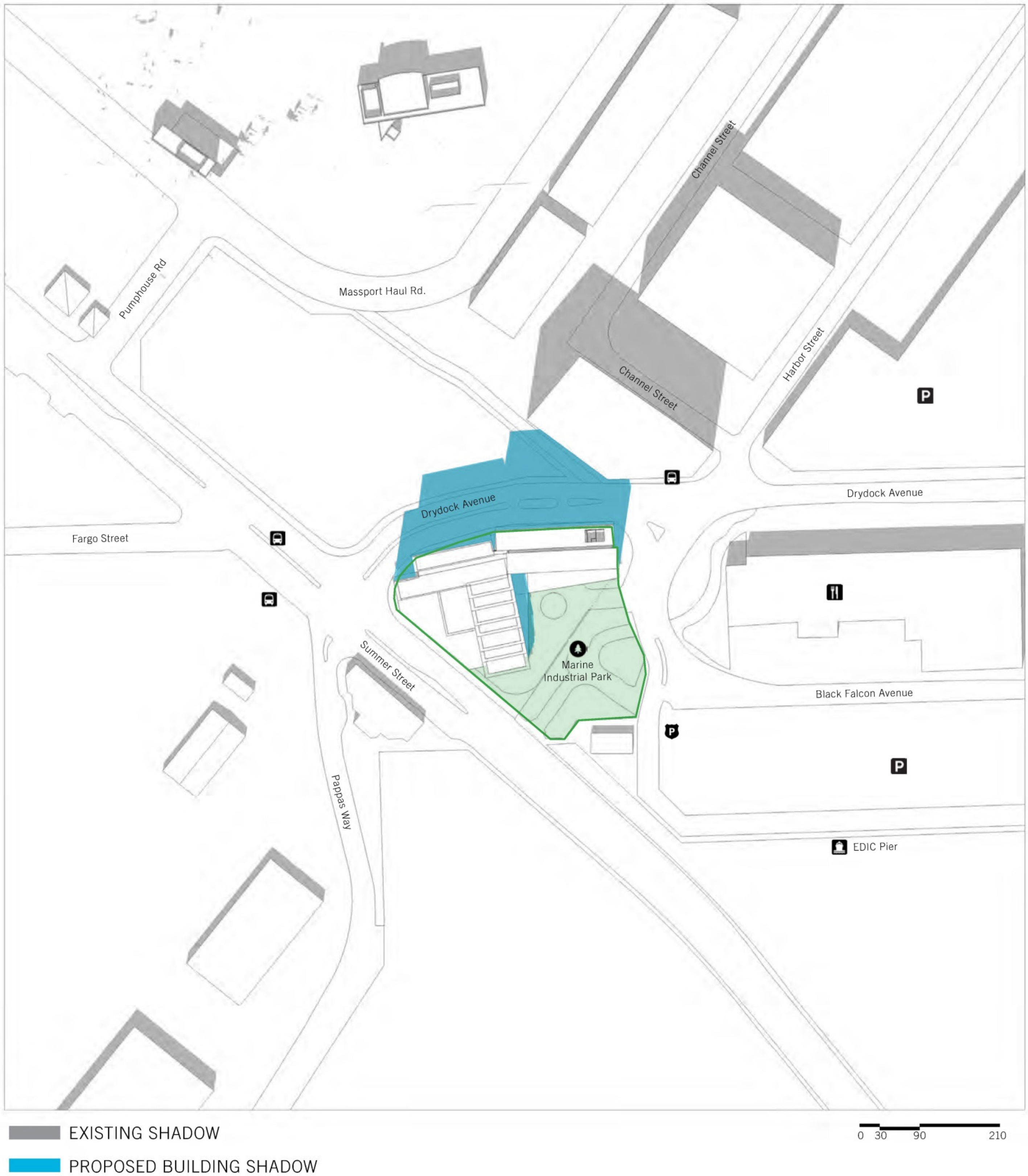

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Figure 4.2-11

Shadow Study: September 21 at 12:00pm

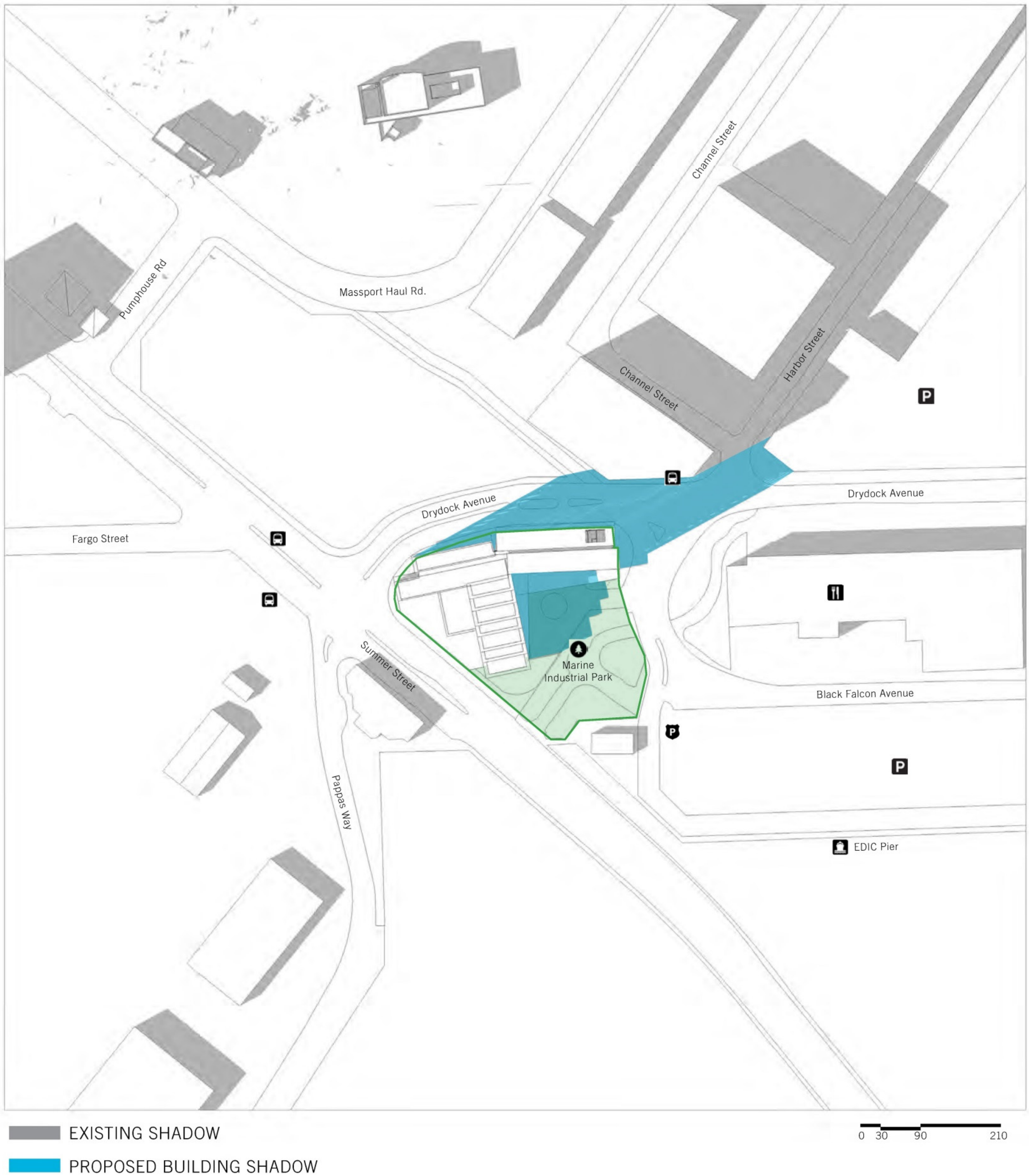

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Figure 4.2-12

Shadow Study: September 21 at 3:00pm

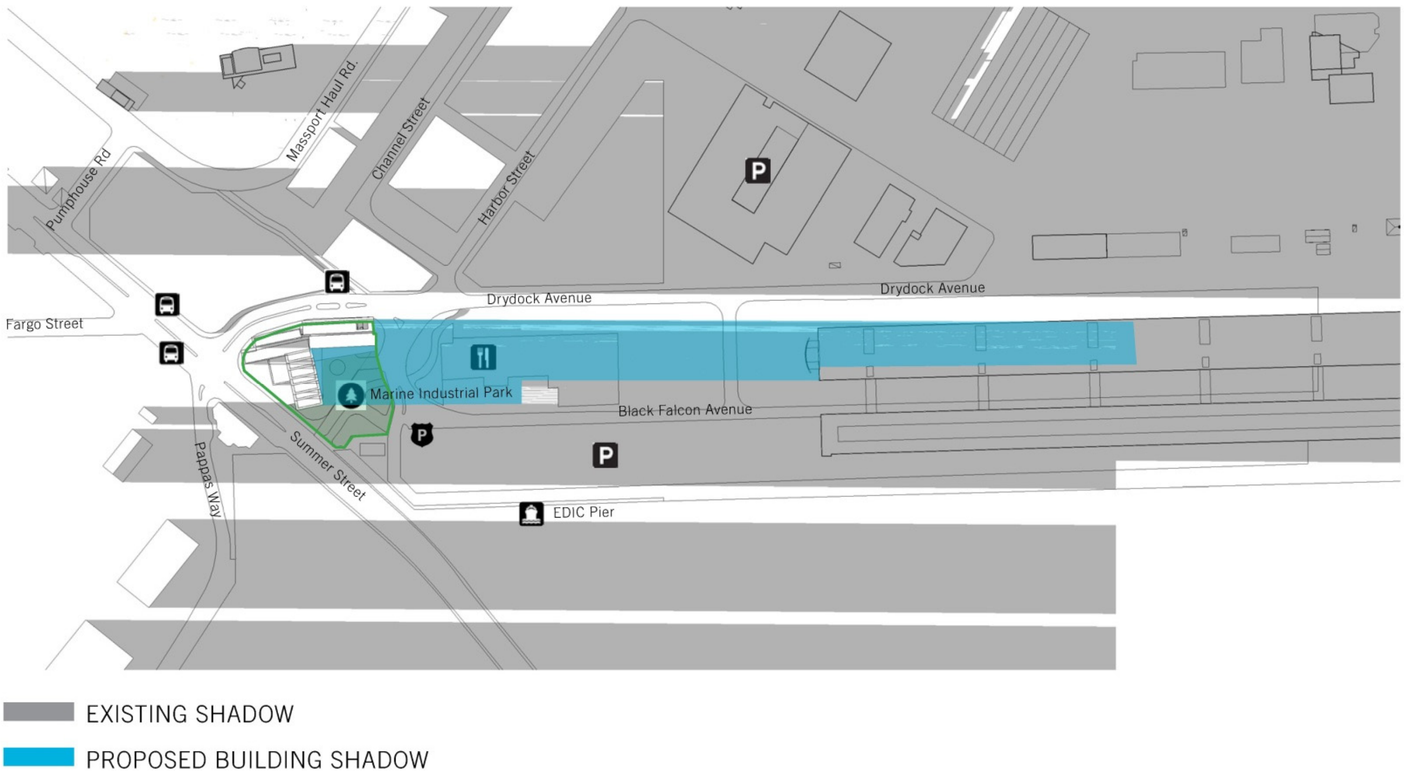

Figure 4.2-13

Shadow Study: September 21 at 6:00pm

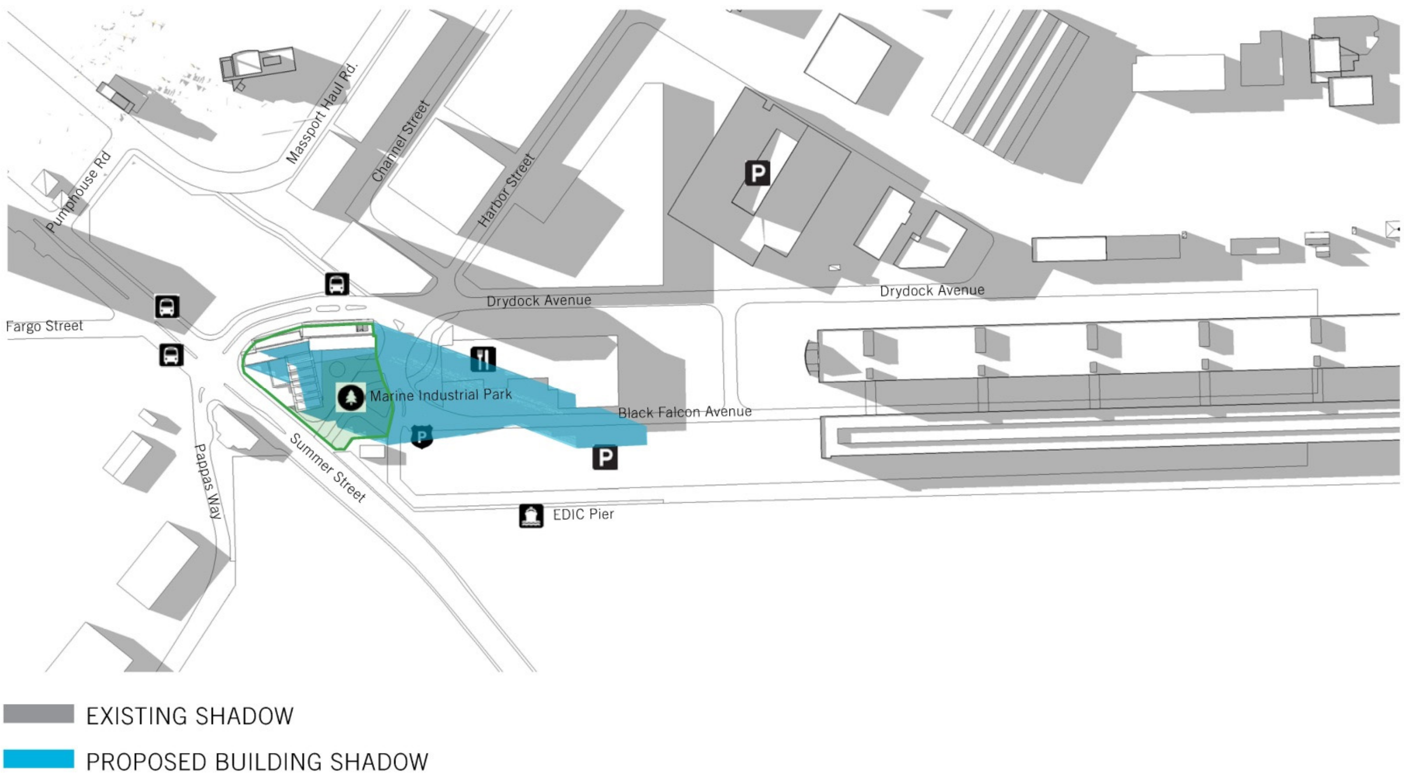

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Figure 4.2-14

Shadow Study: June 21 at 6:00pm

4.3 Daylight Analysis

4.3.1 Introduction

The purpose of the daylight analysis in this section is to estimate the extent to which the Project will affect the amount of daylight reaching the streets and the sidewalks in the immediate vicinity of a Project Site. Because the Project Site is currently undeveloped, the proposed Project will inherently increase daylight obstruction; however, the resulting conditions are typical of the area and other urban areas.

4.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[2]. This program measures the percentage of "sky dome" that is obstructed by a project, and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways, and centered on the proposed building. The façade of the building facing the viewpoint, including heights, setbacks, corners, and other features, is plotted onto a base map using lateral and elevation angles. The two-dimensional base map generated by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of zero- to 100-percent based upon the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

Because the Project Site is currently undeveloped, the analysis compares the proposed conditions to the context of the area.

Three viewpoints were chosen to evaluate the daylight obstruction for the proposed conditions, one from Drydock Avenue, one from Summer Street, and one from Terminal Street. Two area context points were considered in order to provide a basis of comparison to existing conditions in the surrounding area. The viewpoint and area context viewpoints were taken in the following locations and are shown on Figure 4.3-1.

---

[2] Method developed by Harvey Bryan and Susan Stuebing, computer program developed by Ronald Fergle, Massachusetts Institute of Technology, Cambridge, MA, September 1984.

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Figure 4.3-1

Viewpoint and Area Context Locations

- **Viewpoint 1:** View from Drydock Avenue facing south toward the Project Site
- **Viewpoint 2:** View from Summer Street facing northeast toward the Project Site
- **Viewpoint 3:** View from Terminal Street facing west toward the Project Site
- **Area Context Viewpoint AC1:** View from Drydock Avenue facing south toward the existing building at 5-11 Drydock Avenue
- **Area Context Viewpoint AC2:** View from Channel Street facing southeast toward the existing building at 12 Channel Street

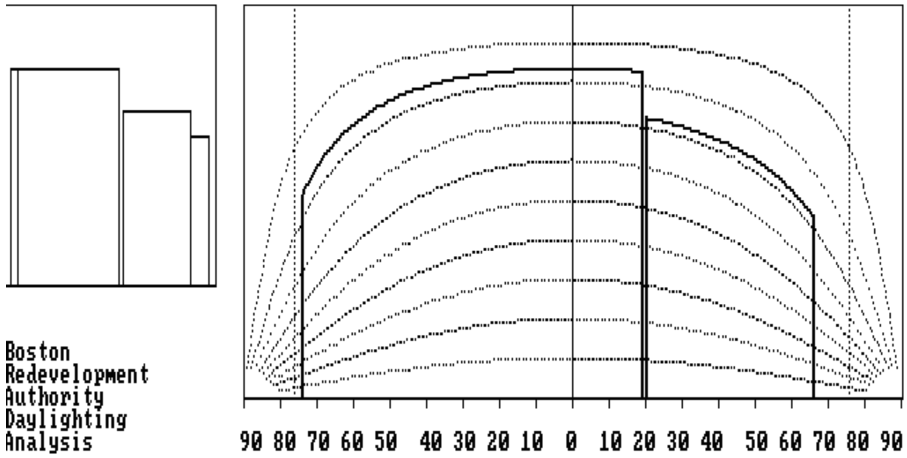
4.3.3 Results

The results for each viewpoint are described in Table 4.3-1. Figures 4.3-2 and 4.3-3 illustrate the BRADA results for each analysis.

Table 4.3-1 Daylight Analysis Results

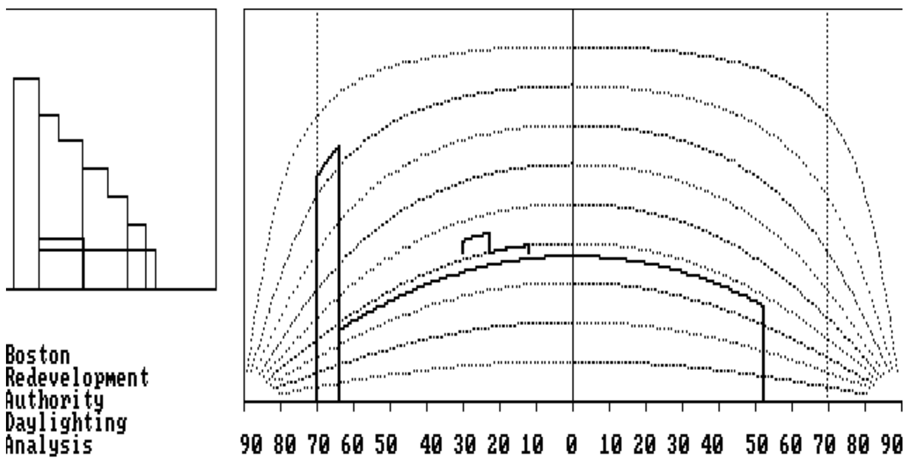
Viewpoint Locations		Daylight Obstruction (Percent)	
		Existing Conditions	Proposed Conditions
Viewpoint 1	View from Drydock Avenue facing south toward the Project Site	N/A	74.0
Viewpoint 2	View from Summer Street facing northeast toward the Project Site	N/A	39.4
Viewpoint 3	View from Terminal Street facing west toward the Project Site	N/A	13.8
Area Context Points			
AC1	View from Drydock Avenue facing south toward existing building at 5-11 Drydock Avenue	30.9	N/A
AC2	View from Channel Street facing southeast toward existing building at 12 Channel Street	36.8	N/A

Viewpoint 1: View from Drydock Avenue facing south toward the Project site



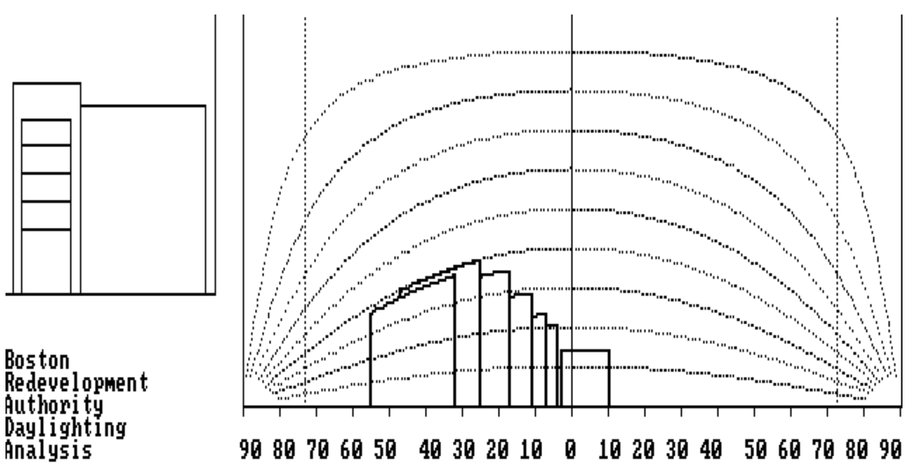
Obstruction of daylight by the building is 74.0 %

Viewpoint 2: View from Summer Street facing northeast toward the Project site



Obstruction of daylight by the building is 39.4 %

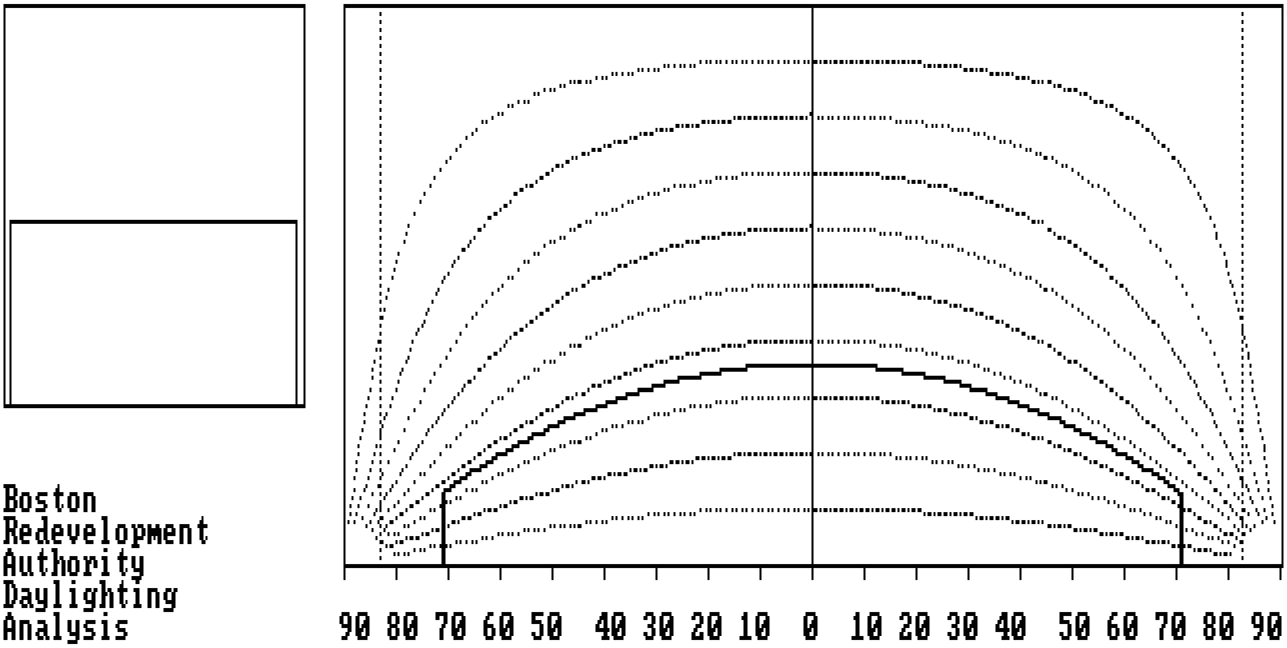
Viewpoint 3: View from Harbor Street facing west toward the Project site



Obstruction of daylight by the building is 13.8 %

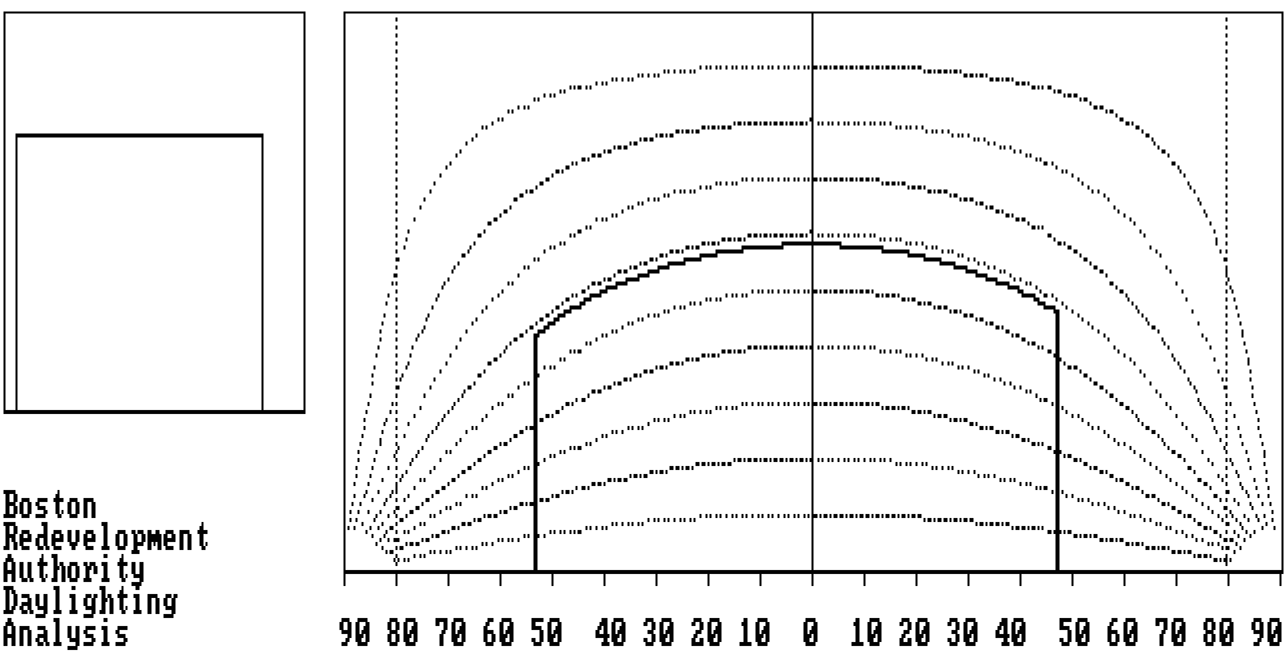
Figure 4.3-2
Proposed Conditions

AC1: View from Drydock Avenue facing south toward the building at 5-11 Drydock Avenue



Obstruction of daylight by the building is 30.9 %

AC2: View from Channel Street facing southeast toward the building at 12 Channel Street



Obstruction of daylight by the building is 36.8 %

Drydock Avenue – Viewpoint 1

Drydock Avenue runs along the northerly edge of the Project Site. Viewpoint 1 was taken from the center of Drydock Avenue looking directly south toward the Project Site. The development of the Project will result in a daylight obstruction value of 74.0 percent. This viewpoint has the highest daylight obstruction value because it is facing the largest portion of the new building. While the daylight obstruction value is higher than existing buildings in the area, it is typical of dense urban areas.

Summer Street – Viewpoint 2

Summer Street runs along the southwesterly edge of the Project Site. Viewpoint 2 was taken from the center of Summer Street looking directly northeast toward the Project Site. The development of the Project will result in a daylight obstruction value of 39.4 percent. While this is an increase over existing conditions, the daylight obstruction value is consistent with existing buildings in the area, including the Area Context buildings.

Terminal Street – Viewpoint 3

Terminal Street runs along the easterly edge of the Project Site. Viewpoint 3 was taken from the center of Terminal Street looking directly west toward the Project Site. The development of the Project will result in a minimal daylight obstruction value of 13.8 percent because of the large setback from the street. The daylight obstruction value is less than existing buildings in the area, including the Area Context buildings.

Area Context Viewpoints

The Project area currently consists of low to mid-rise industrial and office buildings and surface parking. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the two Area Context Viewpoints described above and shown on Figure 4.3-1. The daylight obstruction values ranged from 30.9 percent for AC1 to 36.8 percent for AC2.

4.3.4 Conclusions

The daylight analysis conducted for the Project describes proposed daylight obstruction conditions at the Project Site and existing conditions in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions at most viewpoints will be similar to or lower than the daylight obstruction values within the surrounding area. The daylight obstruction when viewing the Project from Drydock Avenue is higher than other buildings in the area, however, it is typical of dense urban areas. The increased daylight obstruction is a result of developing on a site that is currently used as a surface parking lot.

4.4 Solar Glare

As currently designed, the majority of the Project's exterior elevations will be glazed with low visual-reflectivity glass. The Project is not expected to cause any significant solar glare impacts on the surrounding buildings, pedestrian areas, or roadways. Building details and design elements will be presented to the BRA and the Boston Civic Design Commission as the design progresses. Should there be a design change toward using more reflective glass, then a solar glare analysis will be undertaken to evaluate whether the glazing will have any negative impacts on surrounding areas.

4.5 Air Quality Analysis

4.5.1 Introduction

A microscale air quality analysis has been conducted to determine the impact of pollutant emissions from mobile sources generated by the Project. Specifically, a microscale analysis was performed to evaluate the potential air quality impacts of carbon monoxide (CO) resulting from traffic flow around the Project area.

Stationary sources of air pollution are typically units that combust fuel. In this case, these sources consist of heating and hot water units and emergency electrical generators. Cooling towers, although not a combustion source, are a source of particulate emissions. The Proponent expects that all stationary sources (boilers, engines, etc.) will be subject to the Massachusetts Department of Environmental Protection's (DEP's) Environmental Results Program (ERP). The Proponent will complete the required applications and submittals for the equipment, as necessary.

4.5.1.1 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, U.S. Environmental Protection Agency (EPA) promulgated National Ambient Air Quality Standards (NAAQS) for these criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM-10 and PM-2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 4.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS.

NAAQS specify concentration levels for various averaging times and include both "primary" and "secondary" standards. Primary standards are intended to protect human health, whereas secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation. The more stringent of the primary or secondary standards are applied when comparing to the modeling results for a project.

The NAAQS also reflect various durations of exposure. The short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

The standards were developed by EPA to protect the human health against adverse health effects with a margin of safety.

Table 4.5-1 National Ambient Air Quality Standards

Pollutant	Averaging Period	National Ambient Air Quality Standards and Massachusetts Ambient Air Quality Standards (micrograms per cubic meter)	
		Primary	Secondary
NO_2	Annual [1]	100	Same
	1-hour [7]	188	None
SO_2	Annual [1,8]	80	None
	24-hour [2,8]	365	None
	3-hour [2]	None	1,300
	1-hour [7]	196	None
PM-10 [6]	Annual	50	Same
	24-hour [3]	150	Same
PM-2.5	Annual [4]	12	15
	24-hour [5]	35	Same
CO	8-hour [2]	10,000	Same
	1-hour [2]	40,000	Same
Ozone	8-hour [3]	147	Same
Pb	3-month [1]	1.5	Same

Notes:
[1] Not to be exceeded.
[2] Not to be exceeded more than once per year.
[3] Not to be exceeded more than an average of one day per year over three years.
[4] Not to be exceeded by the arithmetic average of the annual arithmetic averages from three successive years.
[5] Not to be exceeded based on the 98th percentile of data collection.
[6] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM-10 standard in 2006 (effective December 17, 2006). However, the annual standard remains codified in 310 CMR 6.00.
[7] Not to be exceeded. Based on the three-year average of the 98th (NO_2) or 99th (SO_2) percentile of the daily maximum one-hour concentrations.
[8]The Annual and 24-hour SO_2 standards were revoked on June 2, 2010. However, these standards remain in effect until one year after an area is designated for the one-hour standard, unless currently in nonattainment.
Source: 40 CFR 50 and 310 CMR 6.00

4.5.1.2 Background Concentrations

DEP guidance directs project proponents to use the three most recent years of available background air quality monitoring data from within 10 km of a project site. For this Project, background concentrations were determined from the closest available monitoring stations to the proposed development from the most recent air quality monitor data reported by DEP as available in its Annual Air Quality Reports for 2010 to 2012. The closest monitor is located at 175 North Street but only samples PM-2.5. The next-closest monitor is at One City Square but only samples PM-10 and PM-2.5. Kenmore Square, the third-closest location samples for the remaining criteria pollutants. All monitors are located in Boston, and consistent with DEP guidance, are within 10 km of the Project Site.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The second-highest concentration accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM-10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM-2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM-2.5 averages, the average of the highest yearly observations was used as the background concentration. A new one-hour NO_2 standard was recently promulgated. To attain this standard, the three-year average of the 98th percentile of the maximum daily one-hour concentrations must not exceed 188 $\mu g/m^3$.

A summary of the background air quality concentrations are presented in Table 4.5-2.

Table 4.5-2 Observed Ambient Air Quality Concentrations and Selected Background Levels

Pollutant	Averaging Time	Form	2010	2011	2012	Background Concentration ($\mu g/m^3$)	Location
SO_2 (1)(7)(8)	1-Hour	99th %	50.6	34.6	31.4	50.6	Kenmore Sq., Boston
	3-Hour	H2H	64.5	36.2	41.9	64.5	Kenmore Sq., Boston
	24-Hour	H2H	24.6	14.1	15.7	24.6	Kenmore Sq., Boston
	Annual	H	6.2	4.9	2.6	6.2	Kenmore Sq., Boston
PM-10	24-Hour	H2H	34	37	40	40.0	One City Sq., Boston
	Annual	H	15.9	16.8	18	18.0	One City Sq., Boston
PM-2.5	24-Hour (4)	98th %	23.9	20.9	20	21.6	174 North St, Boston
	Annual (5)	H	10.32	9.47	8.8	9.5	174 North St, Boston
NO_2 (3)	1-Hour (6)	98th %	99.5	92.1	90.2	93.9	Kenmore Sq., Boston
	Annual	H	38.3	35.9	33.4	38.3	Kenmore Sq., Boston
CO (2)	1-Hour	H2H	1710	1482	1482	1710.0	Kenmore Sq., Boston
	8-Hour	H2H	1368	1026	1026	1368.0	Kenmore Sq., Boston

Notes:
From 2010-2013 DEP Annual Data Summaries
1 SO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppb = 2.62 $\mu g/m^3$.
2 CO reported in ppm or ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1140 $\mu g/m^3$.
3 NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppb = 1.88 $\mu g/m^3$.
4 Background level for 24-hour PM-2.5 is the average concentration of the 98th percentile for three years.
5 Background level for annual PM-2.5 is the average for three years.
6 Background level for one-hour NO_2 is the average of the 98th percentile of the daily maximum one-hour values over three years.
7 The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.
8 The 2011 - 2013 SO_2 three-hour value is no longer reported by DEP. One-hour H2H used instead. 2013 24-hour value also no longer reported. Obtained from EPA AirData website.

Air quality is generally good in the area, with all of the ambient concentrations well below their respective NAAQS. For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 1.5 ppm (1,710 $\mu g/m^3$) for one-hour and 1.2 ppm (1,368 $\mu g/m^3$) for eight-hour CO.

4.5.2 Methodology

4.5.2.1 Microscale Analysis

The BRA typically requests an analysis of the effect on air quality of the increase in traffic generated by projects subject to Large Project Review. This "microscale" analysis is typically required for any intersection (including garage entrances/exits) where: 1) Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; (2) Project traffic would increase traffic volumes on nearby roadways by ten percent or more (unless the increase in traffic volume is less than 100 vehicles per hour); or (3) the Project will generate 3,000 or more new average daily trips (adt) on roadways providing access to a single location. The microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through signaled intersections. Predicted, ambient concentrations of CO for the Build and No Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period and nine ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analysis for the Project followed the procedure outlined in EPA's intersection modeling guidance.[3]

The microscale analysis has been conducted using the latest versions of EPA's MOVES and CAL3QHC programs to estimate CO concentrations at sidewalk receptor locations.

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[3] EPA, Guideline for Modeling Carbon Monoxide from Roadway Intersections; EPA-454/R-92-005, November 1992.

Baseline (2014) and future year (2019) emission factor data calculated from the MOVES model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersections.

Existing background values of CO at the nearest monitor location at Kenmore Square were obtained from DEP. CAL3QHC results were then added to background CO values of 1.5 ppm (one-hour) and 1.2 ppm (eight-hour), as provided by DEP, to determine total air quality impacts due to the Project. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and nine ppm (eight-hour).

The modeling methodology was developed in accordance with the latest DEP modeling policies and Federal modeling guidelines.[4] Modeling assumptions and backup data for results presented in this section are provided in Appendix D of this EPNF.

Intersection Selection

The traffic volumes and LOS calculations provided in Chapter 3 form the basis of evaluating the traffic data versus the microscale thresholds. Two intersections included in the traffic study meet the criteria for inclusion in the microscale analysis (described above):

- The intersection of Congress Street and North Street, and
- The intersection of Surface Road and Interstate 93 Southbound Off-ramp.

Microscale modeling was performed for the intersections based on the aforementioned methodology. The 2014 existing conditions, and the 2019 No Build and Build conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak periods.

Emissions Calculations (MOVES)

The EPA MOVES computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOVES model are based on motor vehicle operations typical of daily periods. The Commonwealth's statewide annual Inspection and Maintenance (I&M) program was included, as well as the county specific vehicle age registration distribution, fleet mix, meteorology, and other inputs. The inputs for MOVES for the existing (2014) and Build year (2019) are provided by DEP.

All link types for the modeled intersections were input into MOVES. Idle emission factors are obtained from factors for a link average speed of zero miles per hour (mph). Moving emissions are calculated based on speeds at which free-flowing vehicles travel through the intersections as stated in traffic modeling (SYNCHRO) reports. A speed of 30 mph is used

[4] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005.

for all free-flow traffic. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary) and left turns, respectively. Roadway emissions factors were obtained from MOVES using EPA guidance.[5]

Winter CO emission factors are typically higher than summer. Therefore, January weekday emission factors were conservatively used in the microscale analyses.

Receptors and Meteorology Inputs

Sets of up to 115 receptors were placed in the vicinity of the modeled intersection. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersection. The roadway links and receptor locations of the modeled intersection are presented in Figures 4.5-1 and 4.5-2.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[6], a wind speed of one meter per second, stability class D (4), and a mixing height of 1,000 meters were used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 321 centimeters was selected for both intersections.[7]

Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at intersections, worst-case meteorological conditions, and traffic input data. The one-hour concentrations were scaled by a factor of 0.7 to estimate eight-hour concentrations.[8] The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs.

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5 EPA, 2010. Using MOVES in Project-Level Carbon Monoxide Analyses. EPA-420-B-10-041

6 EPA, *Guideline for Modeling Carbon Monoxide from Roadway Intersections.* EPA-454/R-92-005, November 1992.

7 EPA, *User's Guide for CAL3QHC Version 2: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. EPA –454/R-92-006 (Revised), September 1995.

8 EPA, Screening Procedures for Estimating the Air Quality Impact of Stationary Sources; EPA-454/R-92-019, October 1992.

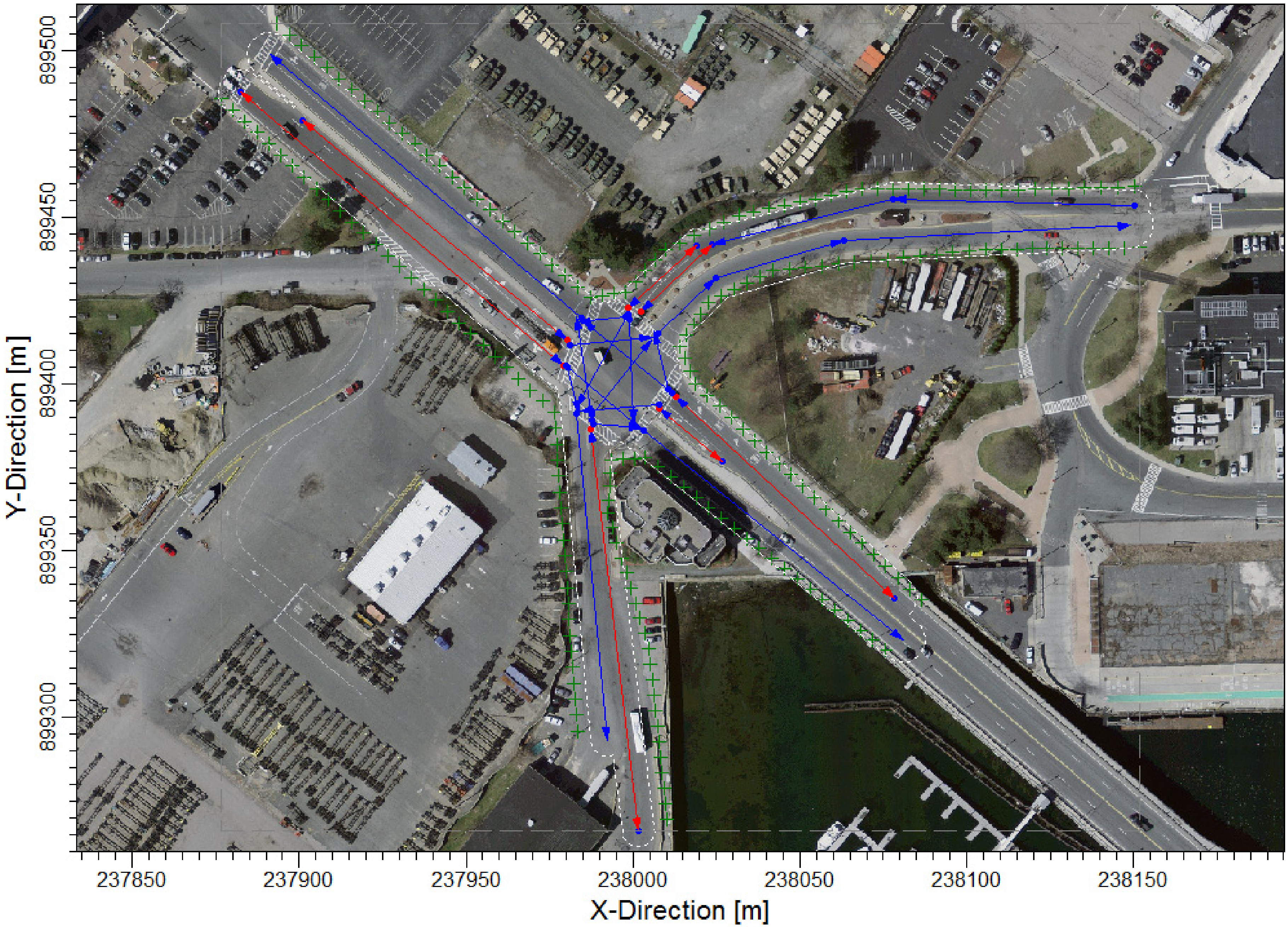

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Figure 4.5-1

Link and Receptor Locations for CAL3QHC Modeling of Intersection of Summer Street & Drydock Avenue

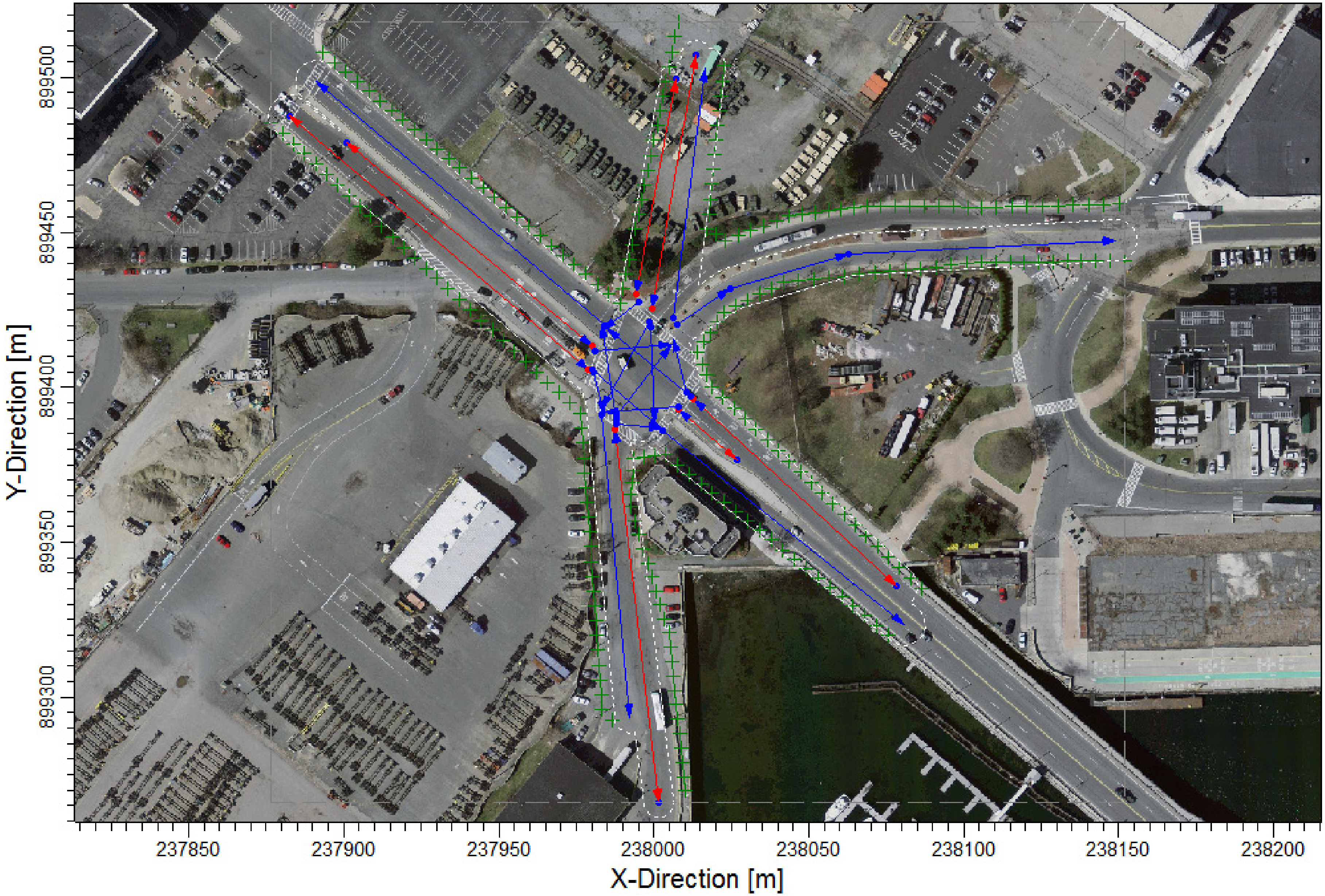

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Figure 4.5-2

Link and Receptor Locations for CAL3QHC Modeling of Reconstructed Intersection of Summer Street & Drydock Avenue

4.5.3 Air Quality Results

4.5.3.1 Microscale Analysis

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 4.5-3 through 4.5-5 for the 2014 and 2019 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.7.[9]

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the Project, for the modeled conditions (1.1 ppm) plus background (1.5 ppm) is 2.6 ppm for the 2014 existing a.m. peak case at the intersection of Congress Street and North Street. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.8 ppm) plus background (1.2 ppm) is 2.0 ppm for at the same location and scenario. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

Results of the microscale analysis show that all predicted CO concentrations are well below one-hour and eight-hour NAAQS. Therefore, it can be concluded that there are no anticipated adverse air quality impacts resulting from increased traffic in the area.

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[9] EPA, Screening Procedures for Estimating the Air Quality Impact of Stationary Sources; EPA-454/R-92-019, October 1992.

Table 4.5-3 Summary of Microscale Modeling Analysis (Existing 2014)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Surface Road and I-93 Southbound Off-ramp	AM	0.7	1.5	2.2	35
	PM	0.5	1.5	2.0	35
Congress Street and North Street	AM	1.1	1.5	2.6	35
	PM	0.8	1.5	2.3	35
8-Hour					
Surface Road and I-93 Southbound Off-ramp	AM	0.5	1.2	1.7	9
	PM	0.4	1.2	1.6	9
Congress Street and North Street	AM	0.8	1.2	2.0	9
	PM	0.6	1.2	1.8	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.7.					

Table 4.5-4 Summary of Microscale Modeling Analysis (No Build 2019)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Surface Road and I-93 Southbound Off-ramp	AM	0.5	1.5	2.0	35
	PM	0.2	1.5	1.7	35
Congress Street and North Street	AM	0.7	1.5	2.2	35
	PM	0.6	1.5	2.1	35
8-Hour					
Surface Road and I-93 Southbound Off-ramp	AM	0.4	1.2	1.6	9
	PM	0.1	1.2	1.3	9
Congress Street and North Street	AM	0.5	1.2	1.7	9
	PM	0.4	1.2	1.6	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.7.					

Table 4.5-5 Summary of Microscale Modeling Analysis (Build 2019)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Surface Road and I-93 Southbound Off-ramp	AM	0.5	1.5	2.0	35
	PM	0.3	1.5	1.8	35
Congress Street and North Street	AM	0.7	1.5	2.2	35
	PM	0.6	1.5	2.1	35
8-Hour					
Surface Road and I-93 Southbound Off-ramp	AM	0.4	1.2	1.6	9
	PM	0.2	1.2	1.4	9
Congress Street and North Street	AM	0.5	1.2	1.7	9
	PM	0.4	1.2	1.6	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.7.					

4.6 Solid and Hazardous Waste

4.6.1 Hazardous Waste

The Proponent engaged the consulting firm of Sanborn, Head & Associates, Inc. to conduct a Phase I Environmental Site Assessment (ESA) for the Project Site.[10] The ESA identified three Recognizable Environmental Conditions (RECs) in connection with the site.

Historical boring logs indicate urban fill constituents in shallow fill at the Project Site, which contain coal, ash, slag, and oily debris to depths of approximately four to five feet below ground surface. Although the presence of urban fill at the site constitutes a REC, it is expected to be generally ubiquitous and consistent with neighboring properties. Urban (historical) fill is common in Boston particularly in industrial and coastal areas.

Based on review of Sanborn Fire Insurance Maps, the Project Site was used for coal and lumber storage in the late 1800s, and based on historical plans railroads appear on the northeastern portion of the Site in the 1920s. Railroads and storage facilities associated

10 Draft Phase I Environmental Site Assessment, Sanborn Head & Associates for Harbinger Development LLC, June 3, 2016.

with railroad operations are commonly linked to contaminants including creosote (railroad ties), coal, cinders, petroleum, metals, and herbicides (used to suppress vegetation along the tracks). These historical site uses constitute a REC.

A Massachusetts Department of Environmental Protection release site identified by Release Tracking Number (RTN) 3-2809 at 660 Summer Street overlaps the Project Site. The RTN achieved regulatory closure with a Class A-3 Response Action Outcome (RAO) in December 2003; however, based on the RAO, concentrations of thallium reportedly remain in soil at the Site and are well above applicable Massachusetts Contingency Plan (MCP) Method 1 Standards. In addition, based on the RAO residual oil contamination reportedly remains in soil and groundwater immediately east of the site that has the potential to have impacted the soil and groundwater quality at the Site. As such, RTN 3-2809 constitutes a REC at the Project Site.

If soil disposal is required, the Proponent will obtain site-specific information regarding environmental conditions of excavated soils to evaluate for the presence of constituents of concern. Foundation construction for the new building may generate soil requiring off-site transport, and testing of any material to be removed from the site will be required by receiving facilities to identify chemical constituents and any contaminants present. Testing of the material will be conducted prior to construction in accordance with facility requirements.

Any material leaving the Project Site will be transported in accordance with local, state and federal requirements. Soil will be managed in accordance with appropriate DEP regulatory requirements, as necessary.

4.6.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of hotel, and restaurant-retail-services uses. Solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by building management. With the exception of household hazardous wastes typical of such developments (e.g., cleaning fluids and paint), the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials.

4.6.3 Recycling

A dedicated recyclables storage and collection program will facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills. The recycling program will be fully developed in accordance with LEED standards, as described in Chapter 5.

4.7 Noise

The primary set of noise regulations relating to a potential increase in sound levels due to the Project is the City of Boston Zoning District Noise Standards (City of Boston Code – Ordinances: Section 16–26 Unreasonable Noise and City of Boston Air Pollution Control Commission Regulations for the Control of Noise in the City of Boston). Separate regulations within the standards provide criteria to control different types of noise. Regulation 2 is applicable to the effects of the Project, as completed. Zoning District Standards are presented below in Table 4.7-1.

Table 4.7-1 City of Boston Zoning District Noise Standards, Maximum Allowable Sound Pressure Levels

Octave-band Center Frequency (Hz)	Residential Zoning District Daytime (dB)	Residential Zoning District All Other Times (dB)	Residential-Industrial Zoning District Daytime (dB)	Residential-Industrial Zoning District All Other Times (dB)	Business Zoning District Anytime (dB)	Industrial Zoning District Anytime (dB)
32	76	68	79	72	79	83
63	75	67	78	71	78	82
125	69	61	73	65	73	77
250	62	52	68	57	68	73
500	56	46	62	51	62	67
1000	50	40	56	45	56	61
2000	45	33	51	39	51	57
4000	40	28	47	34	47	53
8000	38	26	44	32	44	50
A-Weighted (dBA)	**60**	**50**	**65**	**55**	**65**	**70**

Notes:
- Noise standards are extracted from Regulation 2.5, City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976.
- All standards apply at the property line of the receiving property.
- dB and dBA based on a reference sound pressure of 20 micropascals.
- 'Daytime' refers to the period between 7:00 a.m. and 6:00 p.m. daily, excluding Sunday.

Additionally, the DEP has the authority to regulate noise under 310 CMR 7.10, which is part of the Commonwealth's air pollution control regulations. According to DEP, "unnecessary" noise is considered an air contaminant and thus prohibited by 310 CMR 7.10. The DEP administers this regulation through Noise Policy DAQC 90-001 which limits a source to a 10-dBA increase above the L_{90} ambient sound level measured at the Project property line and at the nearest residences. The DEP policy further prohibits "pure tone" conditions where the sound pressure level in one octave-band is 3 dB or more than the sound levels in each of two adjacent bands.

The mechanical equipment for the Project is expected to include rooftop equipment consisting of a two-cell cooling tower, two energy recovery units, and an emergency generator. In addition to the rooftop equipment, a loading dock exhaust fan is anticipated along the southern façade of the new building.

A preliminary review of the Project with respect to potential sound- level impacts has indicated that careful consideration will be needed regarding the selection of mechanical equipment. Acoustic screening, silencers, and/or enclosures will be included in the design as necessary to meet the local noise standards. As the design of the Project progresses, the Project team will ensure that the building's mechanical equipment will meet the City of Boston Noise Standards and 310 CMR 7.10.

4.8 Flood Hazard Zones/ Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the Project Site indicate that portions of the Project Site lie within the 100-year flood zone, and within an area of moderate wave action (Community Panels Numbered 25025C 0081 J and 25025C 0083J). Along Drydock Avenue a portion of the site is outside the special flood hazard area, with the remainder of the site designated as Zone AE. A flood elevation boundary bisects the site, indicating the southern portion of the Zone AE is at 12 feet (North American Vertical Datum – NAVD 1988) and the northern Zone AE is at 10 feet. These values convert to 18.46 and 16.46 Boston City Base (BCB), respectively. The Project is designed to comply with all applicable regulations imposed under Article 25 of the Boston Zoning Code for development in a special flood zone. The new building will be constructed with a base elevation above the 100-year flood elevation. The base grade of any adjacent open space will not be significantly elevated, but will be graded and landscaped so as to limit wave run-up. There are no below-grade structures or occupied spaces.

Wetland resource areas located on the Project Site, as defined by the Massachusetts Wetlands Protection Act (MGL c. 131, section 10) includes "Land Subject to Coastal Storm Flowage" (LSCSF). The LSCSF boundary is concurrent with the Zone AE boundary delineated by FEMA, as described above. In that Project activities will take place within LSCSF and exceptionally limited landscape work within the buffer zone to Coastal Bank, an Order of Conditions will be required from the Boston Conservation Commission. The Project will prepare and submit to the Boston Conservation Commission a Notice of Intent describing all wetland-related activities, and demonstrating that the resource areas, and more specifically, the interests of each resource area, are fully protected.

As discussed in Chapter 5, the design of the site and buildings will recognize and account for the site's location, its proximity to the Reserved Channel, and within this newly designated flood zone, as well as the potential impacts of sea-level rise.

4.9 Geotechnical Impacts

This section describes the geotechnical conditions relating to the construction of the Project and discusses the potential impacts that excavation and foundation construction may have on existing adjacent structures.

4.9.1 Subsurface Soil and Bedrock Conditions

Based on a preliminary geotechnical evaluation of the Project Site, the general soil conditions are listed below, from the ground surface down. The subsurface strata reflect the historic placement fill at the site. The filling of this area occurred over tidal marshes and shallow marine environments typical of the Boston Lowlands.

Parcel A fill material is anticipated to consist of an upper layer; generally less than 10 feet in total depth, consisting of sand, slag, wood, and other materials typical of urban fill from the early part of the 20th century, and a lower layer; likely at a depth of up to 30 feet, consisting of unconsolidated fine-grained sediments. This lower layer of fill typically comprises a non-uniform mixture of clay, silt, and sand with trace amounts of shells and woody organic material, which was created by the deposition of spoil material in this area from dredging operations within Boston Harbor. Beneath the fill, relatively thin marsh deposits consisting of organic silts and peats typical of tidal flats are likely to occur. Inorganic clay deposits, referred to commonly as "Boston Blue Clay," up to 100 feet in thickness lie beneath the peat deposits typical of this area of Boston. The clay deposits terminate in argillite bedrock of Carboniferous age.

Table 4.9-1 Subsurface Soil Conditions in the Project Area

Generalized Subsurface Strata	Approximate Thickness (ft)
Fill	3 to 30
Organic Marine	1 to 10
Marine Clay	50 to 100
Till	5 to 15

The top of bedrock is anticipated to be located approximately 60 to 155 feet below the ground surface of the Project Site.

4.9.2 Groundwater

The water table within the Project area occurs at shallow depths, anticipated to be less than 10 feet below the surface level. The tidal fluctuations are not expected to significantly affect the groundwater elevations at Parcel A due to the low permeability of the fine-grained fill soils, which limit both horizontal and vertical movement of groundwater. The granite sea wall, located south of Parcel A, likely restricts tidal-induced groundwater fluctuations at the site, as well.

The Project Site is not located within the Groundwater Conservation Overlay District (GCOD) regulated under Article 32 of the Boston Zoning Code. The proposed structure may or may not include one small, below-grade mechanical space. If the small mechanical space is constructed, the foundation walls and floor slab will be waterproofed. The Project will have no long term groundwater pumping. The new building will not cause the groundwater to raise, pond, or be lowered in the surrounding area.

4.9.3 Foundation Considerations

The proposed building will not have any basement levels. The building foundations are anticipated to consist of the following: end-bearing, driven- pile foundations, or rock-socketed caissons, and soil=bearing footings in low rise or other moderate-load areas.

4.10 Construction Impacts

4.10.1 Introduction

A Construction Management Plan (CMP) in compliance with the City's Construction Management Program will be submitted to the Boston Transportation Department (BTD) once final plans are developed and the construction schedule is fixed. The construction contractor will be required to comply with the details and conditions of the approved CMP.

Proper pre-planning with the City, neighborhood, and MIP users will be essential to the successful construction of the Project. Construction methodologies, which ensure public safety and protect nearby businesses, will be employed. Techniques such as barricades, walkways, and signage will be used. The CMP will include routing plans for trucking and deliveries, plans for the protection of existing utilities, and control of noise and dust.

During the construction phase of the Project, the Proponent will provide the name, telephone number, and address of a contact person to communicate with on issues related to the construction.

The Proponent intends to follow the guidelines of the City of Boston and the DEP, which direct the evaluation and mitigation of construction impacts.

4.10.2 Construction Methodology/Public Safety

Construction methodologies that ensure public safety and protect nearby property users will be employed. Techniques such as barricades and signage will be used. Construction management and scheduling will minimize impacts on the surrounding environment, and will include plans for construction worker commuting and parking, routing plans for trucking and deliveries, and the control of noise and dust.

As the design of the Project progresses, the Proponent will meet with BTD to discuss the specific location of barricades, the need for lane closures, pedestrian walkways, and truck queuing areas. Secure fencing, signage, and covered walkways may be employed to ensure the safety and efficiency of all pedestrian and vehicular traffic flows. In addition, sidewalk areas and walkways near construction activities will be well marked and lighted to protect pedestrians and ensure their safety. Public safety for pedestrians on abutting sidewalks will also include covered pedestrian walkways when appropriate. If required by BTD and the Boston Police Department, police details will be provided to facilitate traffic flow. These measures will be incorporated into the CMP which will be submitted to BTD for approval prior to the commencement of construction work.

4.10.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in the middle of 2017 and last for approximately 24 months.

Typical construction hours will be from 7:00 a.m. to 6:00 p.m., Monday through Friday, with most shifts ordinarily ending at 3:30 p.m. No substantial sound-generating activity will occur before 7:00 a.m. If longer hours, additional shifts, or Saturday work is required, the construction manager will place a work permit request to the Boston Air Pollution Control Commission and BTD in advance. It is noted that some activities such as finishing activities could run beyond 6:00 p.m. to ensure the structural integrity of the finished product; certain components must be completed in a single pour, and placement of concrete cannot be interrupted.

4.10.4 Construction Staging/Access

Access to the site and construction staging areas will be provided in the CMP.

Although specific construction and staging details have not been finalized, the Proponent and its construction management consultant will work to ensure that staging areas will be located to minimize impacts to pedestrian and vehicular flow. Secure fencing and barricades will be used to isolate construction areas from pedestrian traffic adjacent to the site. Construction procedures will be designed to meet all Occupational Safety and Health Administration (OSHA) safety standards for specific site-construction activities.

4.10.5 Construction Mitigation

The Proponent will follow City and DEP guidelines which will direct the evaluation and mitigation of construction impacts. As part of this process, the Proponent and construction team will evaluate the Commonwealth's Clean Air Construction Initiative.

As noted above, a CMP will be submitted to BTD for review and approval prior to issuance of a Building Permit. The CMP will include detailed information on specific construction mitigation measures and construction methodologies to minimize impacts to abutters and the local community. The CMP will also define truck routes which will help in minimizing the impact of trucks on City and neighborhood streets.

"Don't Dump - Drains to Inner Boston Harbor" plaques will be installed at storm drains that are replaced or installed as part of the Project.

4.10.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 250 full-time equivalent (FTE) construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 50 percent of the total employee work hours be for Boston residents, at least 25 percent of total employee work hours be for minorities and at least ten percent of the total employee work hours be for women. The Proponent will enter into jobs agreements with the City of Boston regarding this commitment.

To reduce vehicle trips to and from the construction site, minimal construction worker parking will be available at the site and all workers will be strongly encouraged to use public transportation and ridesharing options. The general contractors will work aggressively to ensure that construction workers are well informed of the public transportation options serving the area. Space on-site will be made available for workers' supplies and tools so they do not have to be brought to the site each day.

4.10.7 Construction Truck Routes and Deliveries

Truck traffic will vary throughout the construction period, depending on the activity. The construction team will manage deliveries to the site during morning and afternoon peak hours in a manner that minimizes disruption to traffic flow on adjacent streets. Construction truck routes to and from the site for contractor personnel, supplies, materials, and removal of excavations required for the development will be coordinated with BTD. Traffic logistics and routing will be planned to minimize community impacts. Truck access during construction will be determined by the BTD as part of the CMP. These routes will be mandated as a part of all subcontractors' contracts for the development. The construction team will provide subcontractors and vendors with Construction Vehicle & Delivery Truck Route Brochures in advance of construction activity.

4.10.8 Construction Air Quality

Short-term air quality impacts from fugitive dust may be expected during excavation and the early phases of construction. Plans for controlling fugitive dust during demolition, excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks. The construction contract will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts, pursuant to Large Project Review by the BRA. These measures are expected to include:

- Using wetting agents on areas of exposed soil on a scheduled basis;
- Using covered trucks;
- Minimizing spoils on the construction site;
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

The Proponent will also take steps to minimize diesel emissions during construction by taking the following steps:

- Encouraging the contractor to use construction equipment with engines manufactured to Tier 4 federal emission standards or which have been retrofitted with best available control technology to reduce exhaust emissions.
- Using of Low Sulfur Diesel for all trucks with construction machinery.
- Turning off idling equipment. Idling will be limited to five minutes whenever possible. "No Idling" signs will be included at the loading, delivery, pick-up and drop-off areas.

4.10.9 Construction Noise

The Proponent is committed to mitigating noise impacts from the construction of the Project. Increased community sound levels, however, are an inherent consequence of construction activities. Construction work will comply with the requirements of the City of Boston Noise Ordinance, as noted earlier in this chapter. Every reasonable effort will be made to minimize the noise impact of construction activities.

Mitigation measures are expected to include:

- Instituting a proactive program to ensure compliance with the City of Boston noise limitation policy;
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;
- Replacing specific construction operations and techniques by less noisy ones where feasible;
- Selecting the quietest of alternative items of equipment where feasible;
- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Turning off idling equipment; and
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

4.10.10 Construction Vibration

All means and methods for performing work at the Project Site will be evaluated for potential vibration impacts on adjoining property, utilities, and adjacent existing structures. Acceptable vibration criteria will be established prior to construction, and vibration will be monitored, if required, during construction to ensure compliance with the agreed-upon standard.

4.10.11 Construction Waste

The Proponent will take an active role with regard to the reprocessing and recycling of construction waste, consistent with the LEED-certifiability of the Project. The disposal contract will include specific requirements that will ensure that construction procedures allow for the necessary segregation, reprocessing, reuse, and recycling of materials when possible. The Proponent has set a goal of diverting 75 percent of Project-generated construction waste from landfills. For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per DEP Regulations for Solid Waste Facilities, 310 CMR 16.00. This requirement will be specified in the disposal contract. Construction will be conducted so that materials that may be recycled are segregated from those materials not recyclable to enable disposal at an approved solid waste facility.

4.10.12 Protection of Utilities

Existing public and private infrastructure located within the public right-of-way will be protected during construction. The installation of proposed utilities within the public way will be in accordance with the MWRA, BWSC, Boston Public Works, Dig Safe, and the governing utility company requirements. All necessary permits will be obtained before the commencement of the specific utility installation. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer and drain facilities will be reviewed by BWSC as part of its site plan review process.

4.10.13 Rodent Control

A rodent extermination certificate will be filed with each building permit application for the Project. Rodent inspection monitoring and treatment will be carried out before, during, and at the completion of all construction work for each phase of the Project, in compliance with the City's requirements.

4.10.14 Wildlife Habitat

The Project Site is in an established urban neighborhood. There is no significant wildlife habitat on the Project Site.

Chapter 5.0

Sustainable Design and Climate Change Preparedness

5.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

5.1 Sustainable Design

To comply with Article 37 of the Boston Zoning Code, the Proponent intends to measure the results of the Project's sustainability initiatives using the framework of the Leadership in Energy and Environmental Design (LEED) rating system developed by the US Green Building Council (USGBC). As new construction for hotel, retail and restaurant uses, the Project will use the LEED V3 NC 2009 (New Construction) to show compliance with Article 37. The LEED rating system tracks the sustainable features of a project by calculating point scores (credits) in the following categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Innovation in Design.

The goal of the design team is to focus on an integrated design approach to meet the following goals:

- LEED 2009 for New Construction and Major Renovations. No decision has been made, however, as to whether the project will be registered with the USGBC.
- Energy performance targeting a 20- to 25-percent reduction below the ASHRAE 90.1-2007 baseline based on use.
- Water consumption at least 30 percent below the prescribed baseline in LEED Version 3.
- Using local and low-toxicity materials wherever possible and incorporating reflective roofs and paving materials. Perkins+Will, the Project's executive architect, maintains a lengthy precautionary list of environmentally unfriendly and hazardous materials, and endeavors to eliminate any such materials from project specifications.

A LEED checklist is included at the end of this chapter, and shows the credits the Project anticipates achieving. The checklist will be updated regularly as the design develops and engineering assumptions are substantiated. At present, 64 points have been targeted, which would place the Project within the LEED "Gold" category. Please note that this is an initial credit checklist and applicable credits may change as the project design advances.

Sustainable Sites

SS Prerequisite 1, Construction Activity Pollution Prevention. The Project will implement a full erosion and sedimentation control plan; this plan will conform to the requirements of 2003 EPA Construction General Permit and local standards...

SS Credit 2, Development Density and Community Connectivity. The Project complies with Option 2, Community Connectivity. There are residential areas and many basic services, including banks, coffee shops, retail stores, parks, restaurants, design center, performance pavilion, cruise terminal, and fitness centers, within a half-mile of the Project.

SS Credit 4.1, Alternative Transportation-Public Transportation Access. The Project meets the requirement of this credit. The project is located within one-quarter mile of two bus stops, with one stop across the street from the site, at the intersection of Summer Street and Drydock Avenue.

SS Credit 4.2, Alternative Transportation- Bicycle Storage and Changing Rooms. The Project will provide bike storage for five percent of full-time equivalent employees with bike racks within 200 yards of the building entrance. The Project will also provide a shower and changing facility for the full-time equivalent employees.

SS Credit 4.3, Low Emitting and Fuel Efficient Vehicles. The Project will place an electric charging station within the on-site parking garage for two cars.

SS Credit 4.4, Alternative Transportation- Parking Capacity. The Project will provide three preferred parking spaces for car or van pools..

SS Credit 6.1, Storm Water Design - Quantity Control. The Project will meet the criteria for storm water quantity control for a previously developed site with existing imperviousness greater than 50 percent. The Project will decrease the storm water runoff by 25 percent from the two- year 24-hour design storm. The Project will recharge a one-inch storm event to the fullest extent practical most likely with a below slab infiltration pipe or a storage tank with injection wells.

SS Credit 6.2, Storm Water Design - Quality Control. The Project will meet the criteria for storm water quality control by capturing and treating 90 percent of the average annual rainfall using acceptable best management practices (BMPs). The BMPs used to treat the runoff will remove 80 percent of the total suspended solids (TSS).

SS Credit 7.1, Heat Island Effect- Non-Roof. As the site plan for the Project illustrates, the site will have sidewalks on two sides of its three sides and a landscaped courtyard. The Project will use pedestrian-oriented hardscape materials that will be light-colored with a compliant SRI value of 29 or higher. Street trees will provide shading on the two sidewalks and in the interior landscaping at the courtyard.

SS Credit 7.2, Heat Island Effect – Roof. The Project will achieve the roof credit by having a combined roofing system that consists of a highly reflective, SRI membrane roof system and a highly reflective metal roof with an initial SRI of 82. Nearly 90 percent of the roof areas will have SRI surfaces.

Water Efficiency

WE Prerequisite 1, Water Use Reduction- 20 *percent* Reduction. The Project will comply with the minimum potable water consumption reduction of 20 *percent* less water used when compared to a baseline case by using low-flow and efficient plumbing fixtures (not including irrigation).

WE Credit 1.1, Water Efficient Landscaping. The Project will not include a permanent irrigation system beyond a maximum two-year establishment period, beginning with the Project's opening.

WE Credit 3.1, Water Use Reduction. The Project is designed to achieve extra credit by reducing the potable water consumption by at least 30 percent compared to a baseline case by using low-flow and efficient plumbing fixtures (not including irrigation).

Energy and Atmosphere

EA Prerequisite 1, Fundamental Commissioning of the Building Energy Systems. The Project will have a commissioning authority (CA) that will fulfill the requirements of the prerequisite. The CA's services will include review of the Owner's Project Requirements (OPR) and Basis of Design (BOD) documents, development of a commissioning plan, incorporation of a commissioning specification section into the construction documents and verification through startup observation and functional testing that the installed systems are operating in accordance with the OPR, BOD, and construction documents. These listed services apply to the HVAC system, lighting controls, and domestic hot water heating.

EA Prerequisite 2, Minimum Energy Performance. The Project will comply with the minimum energy performance improvement of 18 percent compared to the ASHRAE 90.1-2007 baseline standard.

EA Prerequisite 3, Fundamental Refrigerant Management. The Project will not use chlorofluorocarbon (CFC)-based refrigerants in the HVAC&R systems.

EA Credit 1, Optimize Energy Performance. The Project will at least achieve a minimum energy performance improvement of 20-25 percent compared to the ASHRAE 90.1-2007 baseline standard for use and a 15 percent improvement based on energy cost. This is achieved by using an energy-efficient building envelope, lighting systems, and HVAC systems.

EA Credit 2, On Site Renewable Energy. The project is exploring the installation of solar PV panels on the high roofs of the hotel. This has been listed as a maybe in the LEED scorecard. The Proponent hopes to produce on site at least three percent of the building's electric energy use.

EA Credit 3, Enhanced Commissioning. As noted above, the Project will have a third party Commissioning Agent which will fulfill the requirements of the credit.

EA Credit 4, Enhanced Refrigerant Management. The Project will select refrigerants for the HVAC&R systems that minimize or eliminate the emissions of compounds that contribute to ozone depletion and climate change.

Materials and Resources

MR Prerequisite 1, Storage and Collection of Recyclables. The Project will provide recycling areas for paper, corrugated cardboard, glass, plastics, and metals for uses on site.

MR Credit 2, Construction Waste Management. The Project will recycle/salvage nonhazardous construction and demolition debris for a minimum of 75 percent of the total construction and demolition debris. The construction manager for the Project will develop and implement a construction waste management plan (CWMP).

MR Credit 4, Recycled Content. The Project will use materials with recycled content such that the sum of the postconsumer recycled content plus one-half of the pre-consumer content constitutes at least 20 percent based on cost of the total material value in the Project. This is based on specification divisions 03-10, 31, 32 (furniture may be included at the Proponent's discretion) and excludes mechanical, electrical plumbing, elevators and other specialty items.

MR Credit 5, Regional Materials. The Project will use building materials or products that have been extracted, harvested or recovered, as well as manufactured within 500 miles of the site for a minimum of 20 percent, based on cost, of the total materials value. This is based upon specification divisions 03-10, 31, 32 (furniture may be included at the Proponent's discretion) and excludes mechanical, electrical plumbing, elevators and other specialty items.

MR Credit 7, Certified Wood. The Project will use wood materials and products, certified by the Forest Stewardship council (FSC) that constitute at least 50 percent based on cost of the total new wood material value in the Project. Only permanently installed wood products and materials are included in this credit (formwork, scaffolding, bracing, etc. are not included). This is based upon specification divisions 03-10, 31, 32 (furniture may be included at the Proponent's discretion).

Indoor Environmental Quality

Prerequisite, Minimum Indoor Air Quality Performance. The Project will comply with ASHRAE 62.1-2007 for mechanically and naturally ventilated spaces. The ASHRAE spreadsheet will be filled out to indicate the minimum outside air OA compliance for the ventilation zones has been met. There will be HVAC units that perform the majority of the common area ventilation by delivering 100-,percent outside air to all corridors on every level; this positively pressurizes the building to prevent air from leaking in, and prevents air in the hotel rooms from leaking out into the corridors.

IEQ Credit 1, Outdoor Air Delivery Monitoring. The Project will install monitoring systems to ensure that ventilation systems maintain design minimum requirements. The monitoring equipment will be configured to generate an alarm when the airflow values or carbon dioxide levels vary by 10 percent or more from the design values via a building automation system alarm to the building operator. The CO2 monitors will be tied to the building BMS system.

IEQ Prerequisite 2, Environmental Tobacco Smoke Control. The Project will comply with the prerequisite requirements by prohibiting smoking within all areas of the building and within 25 feet of any entry or air intake with exterior signage.

IEQ Credit 3.1, Construction IAQ Management Plan- During Construction. The Construction Manager will develop and implement an indoor air quality IAQ Management Plan for the construction phase of the Project that will comply with the SMACNA 008-2008 Guidelines, protect on-site absorptive materials from moisture, and will use the appropriate filtration media for permanently installed air handlers used during construction.

IEQ Credit 3.2, Construction IAQ Management Plan- Before Occupancy. The Construction Manager will develop and implement an IAQ Management Plan after all finishes have been installed and the building has been completely cleaned but before initial occupancy. At the contractor's option either a flush out or air testing path will be chosen to meet the credit requirements.

IEQ Credit 4.1, Low-Emitting Materials - Adhesives & Sealants. The Project will use adhesives and sealants that comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168 and Green Seal Standard GS-36. The volatile organic compound (VOC) limits stated in these standards will not be exceeded for all of the adhesives and sealants used inside of the weatherproofing system and applied on-site. The contractor will submit Material Safety Data Sheets (MSDS) highlighting the VOC content (g/L) for verification in the construction administration process.

IEQ Credit 4.2, Low-Emitting Materials - Paints & Coatings. The Project will use paints and coatings applied to interior walls and ceilings that do not exceed the VOC content limits established in the Green Seal Standard GS-11 for paints and primers; Green Seal Standard GS-03 for anticorrosive paints; and the South Coast Air Quality Management District (SCAQMD) Rule #1113 for finishes, stains, and sealers. The contractor will submit MSDS highlighting the VOC content (g/L) for verification in the construction administration process.

IE Credit 4.3, Low-Emitting Materials - Flooring Systems. All flooring within the Project will comply with the following as applicable to the Project scope:

- All carpet installed in the building interior will meet the testing and product requirements of the Carpet and Rug Institute Green Label Plus 1 program.
- All carpet cushion installed in the building interior must meet the requirements of the Carpet and Rug Institute Green Label program.
- All carpet adhesive will have less than 50 g/L VOC.
- All hard surface flooring will meet the requirements of the FloorScore2 standard as shown with testing by an independent third-party.
- Concrete, wood, bamboo and cork floor finishes such as sealer, stain and finish will meet the requirements of the South Coast Air Quality Management District Rule 1113, Architectural Coatings, and effective January 1, 2004.

IEQ Credit 4.4, Low-Emitting Materials - Composite Wood & Agrifiber Products. The Project will not use composite wood and agrifiber products that contain urea-formaldehyde resins inside the weatherproofing system. Laminate adhesives used to fabricate on site and shop applied composite wood and agrifiber assemblies will not contain added urea-formaldehyde resins. Materials considered fixtures, furniture and equipment (FF&E) are excluded from this calculation. The contractor will submit a manufacturer letter or Material Safety Data Sheets highlighting the laminating adhesives used for verification in the construction administration process.

IEQ Credit 5, Indoor Chemical and Pollutant Source Control. For this Project entry pollutants and later cross contamination will employ the following strategies:

- Janitors' closets or housekeeping rooms where chemicals are stored are provided with ventilation; the room will be negatively pressurized in order to prevent any odors from leaking out. Also, all janitors' closet doors will be constructed to reduce the leakage, and the wall around each closet will have full height walls or be tight to a hard ceiling.
- All air handlers will be equipped with a MERV 13 air filter to reduce dust and particles in the air supply.
- At every main, high-volume entryway there will be special floor mats to prevent outside materials from being carried into the building. Each of these mats will be cleaned on a regular basis...

IEQ Credit 6.1, Controllability of Systems – Lighting. The Project will provide individual lighting controls for at least 90 percent of the building occupants. All hotel rooms will have lighting switches. The retail component is being built as shell and core space.

IEQ Credit 6.2, Controllability of Systems – Thermal Comfort. The Project will provide thermal comfort controls for at least 50 percent of the building occupants. Each hotel room will have a main thermostat control. All regularly-occupied common areas will have thermostat controls. The retail component constitutes less than 50 percent of the occupants.

IEQ Credit 7.1, Thermal Comfort-Design. The Project will design heating, ventilating and air conditioning systems and the building envelope to meet the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy. The design compliance will be in accordance with the prescribed documentation standards.

IEQ Credit 7.2, Thermal Comfort-Verification. The Project will meet this credit with operable windows and heat pump systems with individual thermostat controls.

IEQ Credit 8.2, Daylight and Views. The Project will provide at least 90 percent of all regularly occupied spaces with access to outdoor views. Of these spaces with access to views, a direct line of sight will be achieved via vision glazing (between 2′-6″ and 7′- 6″ above finish floor), and there will be no obstructions above 42 inches.

Innovation in Design

It is anticipated that several points will be achieved in the Innovation & Design category.

ID Credit 1.1, Green Housekeeping Program. The Project will establish a program for cleaning supplies for the hotel and a mandate in any retail agreements with commercial tenants that their cleaning products be eco-friendly. The policy that will be developed will include cleaning products, disinfectants, metal polishes, floor finishes, strippers, disposable janitorial paper products and trash bags, and hand soaps in addition to hotel bathroom amenities.

ID Credit 1.2, Sustainable Education. The Project will establish an educational program that is actively instructional. The following elements will be included in the educational program:

- ♦ A comprehensive signage program built into the building's spaces to educate the occupants and visitors of the benefits of green buildings. This program may include LCD screen showing BMS and monitoring of energy savings.
- ♦ Signage identifying various water and energy saving devices.
- ♦ An educational outreach program including a guided tour focusing on sustainable design, operations and maintenance using the Project as an example.

ID Credit 1.3, Energy Star Appliances. The Project will provide Energy Star appliances in the hotel, including equipment, lamping, etc. and prescribe in any agreements with commercial tenants, to the extent that Energy Star appliances are available that they be used. Energy Star appliances will be installed in all the extended stay kitchenettes.

ID Credit 1.4, Green Landscaping. The Project will provide a program of organic landscape maintenance.

ID Credit 1.5, Trash Composting. The Project will establish a dedicated composting container for both the hotel and any restaurants on site.

ID Credit 2, LEED Accredited Professional. The Project complies with the credit requirements of having at least one LEED Accredited Professional (LEED AP) on the Project team.

Regional Priority

The regional priority (RP) credits are additional points that identify credits that have environmental importance for a geographic region. The credits are assigned by an area's zip code. The Project's zip code is 02210, and the available RP credits include SSc3, SSc6.1, SSc7.1, SSc7.2, EAc2, EAc2, and Mrc1.1. The Proponent anticipates that several points will be achieved in the Regional Priority category.

1. RP Credit 1.2, SS Credit 6.1, Storm water Design- Quantity Control.
2. RP Credit 1.36, SS Credit 7.1, Heat Island Effect- Roof- Non Roof.
3. RP Credit 1.4, SS Credit 7.2, Heat Island Effect- Roof.

LEED 2009 for New Construction and Major Renovations

Project Checklist

Parcel A Hotel August 1, 2016

Sustainable Sites — Possible Points: 26

Y	?	N			
20	1	4		**Sustainable Sites**	**26**
Y			Prereq 1	Construction Activity Pollution Prevention	
		1	Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
1			Credit 4.4	Alternative Transportation—Parking Capacity	2
		1	Credit 5.1	Site Development—Protect or Restore Habitat	1
		1	Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
	1		Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y	?	N			
7	3			**Water Efficiency**	**10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
4			Credit 1	Water Efficient Landscaping	2 to 4
	2		Credit 2	Innovative Wastewater Technologies	2
3	1		Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y	?	N			
8	7	20		**Energy and Atmosphere**	**35**
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
4		15	Credit 1	Optimize Energy Performance	1 to 19
	2	5	Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
	3		Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y	?	N			
7	1	6		**Materials and Resources**	**14**
Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
	1	1	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2			Credit 4	Recycled Content	1 to 2
2			Credit 5	Regional Materials	1 to 2
		1	Credit 6	Rapidly Renewable Materials	1
1			Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y	?	N			
13	2			**Indoor Environmental Quality**	**15**
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
	1		Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
1			Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
1			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

Y	?	N			
6				**Innovation and Design Process**	**6**
1			Credit 1.1	Innovation in Design: Green Housekeeping	1
1			Credit 1.2	Innovation in Design: Sustainable Education	1
1			Credit 1.3	Innovation In Desing: Green Landscaping	1
1			Credit 1.4	Innovation In Design: Energy Star Appliances	1
1			Credit 1.5	Innovation in Design: Composting Trash	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

Y	?	N			
3				**Regional Priority Credits**	**4**
1			Credit 1.1	Heat Island Effect Roof	1
1			Credit 1.2	Heat Island Non Roof	1
1			Credit 1.3	Regional Priority: Storm Water Design Quality Control	1
			Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

Y	?	N		
64	14	30	**Total**	**110**

Certified 40 to 49 points   Silver 50 to 59 points   Gold 60 to 79 points   Platinum 80 to 110

5.2 Climate Change Preparedness

Projects subject to Section 80B, Large Project Review are required to complete the Climate Change Preparedness Checklist. Climate change conditions considered by the Project team include sea-level rise, higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe freezing rain and heavy rainfall events, and increased wind gusts.

The expected life of the Project is anticipated to be approximately 50 years. Therefore, the Proponent planned for climate change conditions projected at a 50-year time span. A copy of the completed checklist is included in Appendix D.

5.2.1 Extreme Heat Events

The Intergovernmental Panel on Climate Change (IPCC) has predicted that in Massachusetts the number of days with temperatures greater than 90°F will increase from the current five-to-twenty days annually, to thirty-to-sixty days annually[1].

The Project design will include measures to adapt to these conditions, including planting street trees, constructing a high performance building envelope and including operable windows where possible. Additional adaptation techniques may including:

- Installing operable windows where possible;
- Using Energy Recovery Ventilation to reduce cooling loads;
- External shading devices; and
- Specifying high reflective paving materials and high albedo roof tops to minimize the heat island effect; and

Energy modeling for the Project has not yet been completed; however, as indicated on the LEED Checklist, the Proponent will strive to reduce the Project's overall energy demand and greenhouse gas emissions that contribute to global warming. The Project's proposed TDM program described in Section 3.6 will also help to lessen fossil fuel consumption.

[1] IPCC (Intergovernmental Panel on Climate Change), 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Avery, M. Tignor, and H. L. Miller (eds.)]. Cambridge University Press, Cambridge, UK, and New York, 996 pp.

5.2.2 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponent will take measures to minimize stormwater runoff at the Project Site, and protect the Project's mechanical equipment, as necessary. The Project has been designed to reduce the existing peak rates and volumes of stormwater runoff from the site, and to promote runoff recharge to the greatest extent practicable. The performance capabilities of the proposed stormwater management systems are anticipated to significantly improve the site's infiltration capacity. Stormwater measures will include:

- Decreasing stormwater runoff from the two-year 24-hour design storm;
- Providing landscaped areas on the site;
- Directing stormwater runoff from the roof to a subsurface recharge system on-site; and
- Ensuring wastewater and stormwater back flow prevention.

5.2.3 Drought Conditions

Although more intense rain storms are predicted, extended periods of drought are also predicted due to climate change. Under the high emissions scenario, the occurrence of droughts lasting one to three months could go up by as much as 75 percent over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions, the landscape design will incorporate native and adaptive plant materials. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies. In public areas, sensor operated faucets and toilets will be installed.

5.2.4 Sea Level Rise

According to the IPCC, if the sea level continues to rise at historic rates, the sea level in Massachusetts as a whole will rise by one foot by the year 2100. Sea level rise (SLR) could, however, reach approximately six feet by 2100 when using higher emissions scenarios to model climate change impacts. As described in "Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery" recently released by MassDOT (the "MassDOT Report"), "one of the challenges presented by the wide range of SLR projections is the inability to assign likelihood to any particular [SLR] scenario."[2] An estimate of SLR for the year 2070 suggests Mean Higher-High Water (MHHW) could

[2] Massachusetts Department of Transportation, et al. "MassDOT-FHWA Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery." November 2015.

increase by approximately four feet, resulting in a MHHW level of approximately 15.2 feet Boston City Base (BCB).

Alone, MHHW of approximately 15.23 feet BCB would have no impact on the Project site; however, as shown in the MassDOT Report, combined with storm surge, flooding would be anticipated to occur at the Project site.[3] Nor'easters and tropical storms occurring along the Eastern seaboard would have the potential to induce these flood condition in the Boston area. Currently, hurricanes occur less frequently than Nor'easters; however, in the future according to the MassDOT Report, it is anticipated that there will be roughly the same number of tropical storms impacting the Boston area as Nor'easters. In addition, the intensity of storms is anticipated to increase. The risks of each type of storm differ: hurricanes are typically shorter in duration, but are more intense and typically create a larger storm surge; Nor'easters are longer in duration, but likely create a smaller storm surge. For this reason, a hurricane would need to impact Boston within a short window to create flooding as shown in the MassDOT Report, while Nor'easters are more likely to create flooding given that they have a higher probability of impacting the area during the rising tide and high tide.

Using the Boston Harbor Flood Risk Model, the MassDOT Report shows that in 2070, the Project site has up to a 50 percent chance of flooding annually, and the MassDOT report anticipates flood depth associate with a 2070 100-year flood (onepercent chance of flooding annually) of up to approximately 4.0 feet in the Project area. Therefore the Proponent is studying a number of potential mitigation and preparedness measures, including:

- Placing essential mechanical equipment above the future flood level;
- Water-tight utility conduits;
- Wastewater backflow prevention;
- Resilient materials on the first floor that can either withstand flooding or easily be replaced; and
- Potentially allowing for the ground floor to be raised.

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3 The MassDOT Report, funded by the Federal Highway Administration, studied the impact of sea level rise and future storm impacts related to climate change on the Central Artery in Boston. As part of this project, a hydrodynamic model was developed for Boston Harbor, including inland areas that cover portions of Boston, including the Project site. The report states that the model is able to provide site-specific information about the risk of potential future flooding in the years 2030, 2070 and 2100 related to storm events, in particular Nor'easters and tropical cyclones (i.e., hurricanes).

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

Parcel A is one of two parcels in the Marine Park at which development is not limited to either maritime or industrial projects. The site is currently vacant, though it has often been used as short-term lay-down space on an as-needed basis by EDIC.

The Marine Park was largely created through dredging and filling projects in the 19th and 20th centuries, and has been and continues to be an important maritime facility in Boston with docks, wharves, and rail access. The majority of the buildings and structures within the Marine Park were built between 1914 and the mid-1940s as part of the South Boston Naval Annex and South Boston Army Base, which operated there between 1920 and 1974. These buildings were robust warehouses and processing centers capable of supporting military equipment, vehicles, and ammunition for deployment around the world. By the 1970s, shipping had declined and the United States government closed the facility in 1974. The EDIC acquired the Marine Park in two transactions between 1977 and 1983 with the intent to promote economic growth and maritime industrial development.

In the 1990s, following the completion of the Central Artery/Tunnel Project, and the establishment of the MBTA Silver Line connecting downtown Boston to the Reserved Channel, new growth began in this area. Numerous projects over the last 25 years, including residential, hotel, entertainment, and civic projects, have changed the character of the Marine Park and the surrounding South Boston Seaport area. The Marine Park today contains a variety of marine-related, industrial, and light industrial businesses, as well as new commercial enterprises and design showrooms. In February 2016, the Marine Park was renamed to honor the legacy of former U.S. ambassador and Boston mayor Raymond L. Flynn.

6.1 Historic Resources in the Project Vicinity

6.1.1 Historic Resources of the Project Site

The Project Site is located within the former Boston Army Supply Base (MHC # BOS.RT), which is included in the Inventory of Historic and Archaeological Assets of the Commonwealth (Inventory) and has been determined to be eligible for listing in the National Register of Historic Places. There are no buildings on the site.

6.1.2 Historic Resources in the Vicinity of the Project Site

The site is in the immediate vicinity of several buildings associated with the World War II development phase of the Boston Army Supply Base. Additionally, review of Massachusetts Historical Commission files indicates there are three other inventoried historic resources within one-quarter mile of the Project site, specifically: C Street Industrial Area (MHC

#BOS.RU); the Summer (L) Street Bridge over the Reserved Channel;[1] and the King Terminal (MHC #BOS.RV). The historic resources within one-quarter mile of the Project site are shown in Figure 6-1, Historic Resources, and listed in Table 6-1.

Table 6-1 Historic Resources within and in the Vicinity of the Project Site

No.	Historic Resource	Address	Designation*
1	Boston Army Supply Base Area	South Boston	MHC Inventory, NRDOE
2	Summer (L) Street Bridge (no longer extant)	Summer Street	MHC Inventory
3	King Terminal	East First Street, K Street, Summer Street, and Power House Street	MHC Inventory

*Designation Legend

NRIND	Individually listed on the National Register of Historic Places
NRDIS	National Register of Historic Places historic district
NRDOE	Determined eligible for inclusion in the National Register of Historic Places
NHL	National Historic Landmark
LHD	Local Historic District
LL	Local Landmark
MHC	Inventory Listing

6.2 Archaeological Resources Within the Project Site

The Project Site is within filled land that has been previously disturbed by the construction of the Boston Army Supply Base. No previously identified archaeological resources are located within the site, and no impacts to archaeological resources are expected.

6.3 Impacts to Historic Resources

Although the Project Site is located within the former Boston Army Supply Base (MHC # BOS.RT), which is included in the Inventory and determined eligible for listing in the National Register of Historic Places, the Project is not anticipated to have adverse visual impacts to the former Boston Army Supply Base. The Project will bring new energy and dramatically improve the character of the pedestrian environment on this currently lifeless block. The Proponent recognizes the significance of Parcel A as one of two "gateways" to the Marine Park (the other at Seaport Boulevard/Northern Avenue), and has responded by

[1] The Summer (L) Street Bridge was actually replaced by what is now the Massachusetts Department of Transportation in 2003, but it remains listed on the MHC Inventory.

Number	MHCN	Historic Name
1	BOS.RU	C Street Industrial Area
2	BOS.RT	Boston Army Supply Base
3	BOS.RV	King Terminal

Marine Wharf - Hampton Inn and Homewood Suites by Hilton Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 6-1
Historic Resources Map

designing a building and landscape program that serves to redefine the Marine Park's Summer Street entrance. Upon completion, the proposed Project will help create the Marine Park's "sense of place" in relation to the nearby South Boston Seaport developments and the Boston Convention and Exposition Center by creating a bookend to the Summer Street corridor and by improving the Marine Park's connectivity to the adjacent neighborhood. The new building has been designed to enhance the pedestrian experience around the site and the proposed building setback along Summer Street will also provide ample space for seasonal use of the Summer Street plaza by ground-floor, retail/commercial tenants. The Project will improve pedestrian access to the Plaza from the Marine Park's Summer Street entrance considerably by replacing the existing barriers with high-quality hardscaping, lighting, and other public amenities.

6.3.1 Shadow Impacts to Historic Resources

A shadow impact analysis was undertaken to show the anticipated impacts from the Project. The analysis consisted of a standard shadow study done for March 21, June 21, September 21, and December 21, at 9:00 a.m., 12:00 p.m. and 3:00 p.m., as well as 6:00 p.m. for June 21 and September 21.

As illustrated in the shadow study diagrams (Figures 4.2-1 to 4.2-14), during isolated time periods the Project will cast minimal net new shadow on areas of Drydock Avenue, Massport Haul Road, and Channel Street within the former Boston Army Supply Base. New shadow on two historic resources; Building P-28 and Building 32 within the former Boston Army Supply Base is limited to new shadow at 12:00PM and 3:00PM on December 21. Building P-28, located at 11 Channel Street, was constructed in 1918 as a small one-story, flat-roofed, concrete frame utilitarian structure. Building 32, located at 12 Channel Street, was constructed ca 1940 and 1942. This flat roofed warehouse is nine-stories tall and constructed of reinforced-concrete-frame with brick spandrels and industrial steel windows. The unadorned structure is a typical example of a concrete-frame warehouse building of the period. Net new shadow created to these two historic resources is not significant.

6.4 Status of Project Reviews with Historical Agencies

The Project will potentially be subject to State Register Review (950 CMR 71) as a result of the need for one or more state permits. or other state actions. The Proponent will submit a copy of the ENF filed with EEA to the MHC to initiate the State Register Review process.

6.4.1 Boston Landmarks Commission Article 80 Review

The submission of this PNF initiates review of the Project by the Boston Landmarks Commission (BLC) under the City's Article 80 Review process.

6.4.2 Massachusetts Historical Commission

The MHC has review authority over projects requiring state funding, licensing, permitting and/or approvals that may have direct or indirect impacts to properties listed in the State Register of Historic Places. As stated above, the Proponent will submit a copy of the ENF to be filed with EEA to the MHC to initiate the State Register Review process.

Chapter 7.0

Tidelands

7.0 TIDELANDS

7.1 Introduction

The Project Site consists of an approximately 50,933 square foot parcel located within the Marine Park, but entirely outside of the South Boston Designated Port Area. As described above, the proposed Project includes a 15-story, 411-key, dual-branded hotel with a central, ground-level vehicle and pedestrian courtyard, second-level parking for approximately 75 vehicles, and a ground floor area consisting entirely of Facilities of Public Accommodation or uses accessory thereto. Exterior facilities of public accommodation are also proposed.

The entire Parcel A Project Site is located on filled tidelands; however, as discussed below, only a portion of the parcel lies within the area subject to licensing under Chapter 91. The remainder of the site is considered landlocked and is not subject to Chapter 91 licensing.

7.2 Tidelands History

The Project Site and surrounding lands are located over formerly flowed tidelands that were filled in accordance with various legislative authorizations issued in the late 19th and early 20th centuries. More specifically, the Project Site is located within a portion of filled tidelands commonly referred to as the "South Boston Flats" or the "Commonwealth Flats." This area of present-day South Boston was incrementally filled throughout the second half of the 19th century and early part of the 20th century following legislative authorization. Chapter 326 of the Acts of 1868 authorized the Harbor and Land Commission to contract for the filling and improvement or any portion of the South Boston Flats, pursuant to Chapter 81 of the Acts of 1866, and subsequent legislative amendments. Historic maps indicate that by the time of the filing of the 1910 report to the Legislature by the Harbor and Land Commission, the area now known as Parcel A had been filled solid, and portions of the site likely leased to the Metropolitan Coal Company and the Boston Molasses Company. Subsequent historic maps accompanying reports to the Legislature by the Harbor and Land Commission indicate that additional incremental filling of the South Boston Flats continued to occur as areas of Boston Harbor were dredged and the present-day shoreline of South Boston was established, including that of the nearby Reserved Channel.

In 1920, the U.S. Government purchased from the Commonwealth of Massachusetts a significant area of the South Boston Flats, which area became known as the South Boston Naval Annex. The Project Site was at that time a part of the Naval Annex. At the same time, the U.S. Army purchased land from the Commonwealth for the South Boston Army Base. The Army Base was located immediately adjacent to Parcel A, extending eastward through the current Marine Park and Black Falcon Terminal.

By 1974 the South Boston Naval Annex was closed by the US Government, and between 1977 and 1983 control of the 191 acres of the combined former Naval Annex and South

Boston Army Base was granted to the EDIC, thus creating the Boston Marine Industrial Park. Recognizing the significance of the economic activity, job generation, business opportunity, port-related operations, public services, and public access afforded by the Marine Park, its importance as a highly productive asset to the South Boston community, the Port of Boston, the City at large, and the Commonwealth, the BRA and EDIC developed and produced a Master Plan to serve as the framework for future development at the Marine Park. The Secretary of Environmental Affairs formally approved the MIP Master Plan in December 1999.

7.3 Chapter 91 Jurisdiction

The Parcel A site is positioned at a unique location. Because it is outside of the DPA and yet serves as the Summer Street gateway to the Marine Park, the site is more closely related to the adjacent Seaport District than the Marine Park. The site does not abut or have direct access to the Reserved Channel watersheet and the Chapter 91 licensing jurisdiction has been inconsistently described in prior planning initiatives. The above-refernced 1999 MIP Master Plan (and subsequent Chapter 91 Master License), for example, identified a jurisdictional line approximately bisecting the parcel, whereas much later "Presumptive Line jurisdictional mapping performed by the Massachusetts Office of Coastal Zone Management and currently utilized by DEP identified the seaward edge of Drydock Avenue as the extent of the local Chapter 91 licensing jurisdiction.

In order to more precisely establish the extent of Chapter 91 licensing jurisdiction, consistent with 310 CMR 9.02 and 310 CMR 9.04, and to address an apparent discrepancy in Presumptive Line mapping conducted by the Massachusetts Office of Coastal Zone Management for the DEP in the immediate area of the Parcel A site, the Proponent has performed an extensive analysis and, on June 30, 2016, submitted a Request for Determination of Applicability (RDA) with DEP to confirm the extent of Chapter 91 licensing jurisdiction on the site. This RDA presented evidence that the site was formerly separated from the Reserved Channel shoreline by a public way, strongly suggesting a Chapter 91 licensing jurisdictional line more in agreement with that line indicated in the MIP Master Plan than the more recent Presumptive Line mapping. Under this scenario, activities on that portion of the site located within 250 feet of the Reserved Channel shoreline will be subject to Chapter 91 licensing, while the remainder of the site will be deemed "Landlocked Tidelands" and not subject to Chapter 91 licensing.

Regardless of the foregoing inconsistencies, at least a portion of the Project will be subject to Chapter 91 licensing review, and the Proponent will be submitting a Waterways License Application once DEP has issued their Determination at the conclusion of the RDA process. To that end, the Project has been designed to fully comply with the Chapter 91 regulations.

7.4 Consistency with Waterways Regulations

7.4.1 Environmental Protection Standards

The Chapter 91 regulations at 310 CMR 9.33 state that all projects must comply with the applicable environmental regulatory programs of the Commonwealth. Regulatory programs specifically applicable to this Project, and the status of the Project with respect to those programs, are summarized below.

The Massachusetts Environmental Policy Act (MEPA). The Project is initiating review under MEPA with the filing of an Environmental Notification Form (ENF).

The Massachusetts Wetlands Protection Act. A portion of the Project site lies within 100 feet of the seawall lining the Reserved Channel. Under the Massachusetts Wetlands Protection Act, seawalls are deemed Coastal Bank and. In that work is likely to occur on that portion of the site within 100 feet of the bank of the Reserved Channel, a Notice of Intent will be filed with the City of Boston Conservation Commission for work within the buffer zone of a Coastal Bank.

Massachusetts Historical Commission Act. The Project is subject to review by the Massachusetts Historical Commission (MHC). MHC review will be initiated with the filing of the ENF for the Project.

Coastal Zone Management Consistency Review. The Project's compliance with the Coastal Zone Management Act is reviewed at Section 7.4.5, below. A final Coastal Zone Management Consistency Statement will be included with the Project's Chapter 91 license application.

7.4.2 Conservation of Capacity for Water-dependent Use

Under Chapter 91, hotels are defined as nonwater-dependent facilities, in that their location is not dependent upon being located on or near the water. To ensure that non-water dependent use projects on tidelands do not unreasonably diminish the capacity of tidelands to accommodate future water-dependent uses, the Waterways Regulations establish minimum dimensional and use standards for such projects. The proposed Project has been designed to meet the standards for non-water dependent uses and structures on filled tidelands. To the greatest extent practicable, the proposed structures, open space, and uses have also been designed to ensure the utility and adaptability of the site by preventing incompatibility with the adjacent Designated Port Area (DPA). Indeed, the Project is intended to serve a critical support role for nearby DPA uses and users.

Open Space – Consistent with the requirements of 310 CMR 9.51(3)(d), the proposed Project provides one square foot of open space for each square foot of building footprint within Chapter 91 licensing jurisdiction and containing non-water dependent uses. The proposed Project includes an extensive public realm program including public amenities commensurate with a project of this standard. The building footprint occupies approximately 17,300 square feet and approximately 33,600 square feet of the Project Site have been committed to open space as described in 310 CMR 9.00 et seq.

Project Height – The southern portions of the building with Chapter 91 jurisdiction have been designed to comply with 310 CMR 9.51(3)(e), which provides that the maximum building height for non-water dependent uses is 55 feet within 100 feet landward of the existing high mark. Each additional foot of landward separation from the high water mark provides for an additional one-half foot in building height. The building elevation sloping toward the Reserved Channel has been designed to accommodate the foregoing Chapter 91 standard.

7.4.3 Activation of Commonwealth Tidelands for Public Use

The Project site is owned by the EDIC and will be leased to the Project Proponent. Tidelands owned by the Commonwealth, or its political subdivisions, or quasi-public agencies or authorities are deemed Commonwealth Tidelands. Under Chapter 91, the ground floor of all buildings and structures on Commonwealth Tidelands must be devoted to water-dependent uses, or facilities of public accommodation, defined to include hotels, public restaurants, retail facilities, and entertainment facilities available to the transient public on a regular basis.

By Chapter 91 regulatory definition, the proposed hotel is a Facility of Public Accommodation. The ground floor will be devoted primarily to facilities directly related to the hotel. The remainder of the ground floor will be occupied by associated uses, such as retail outlets and restaurants, which are similarly defined as facilities of public accommodation. As such, the Project will be fully compliant with the Chapter 91 use limitations for Commonwealth Tidelands.

7.4.4 Public Benefits of the Proposed Use

The proposed Project creates and/or enhances a number of public benefits. Key among these is the support and enhancement of the maritime and industrial character of the Marine Park and the South Boston waterfront. The proximity of the proposed Project to the established Marine Park uses, in addition to Black Falcon Terminal and Cruiseport Boston, makes Parcel A an ideal location for the proposed uses, all of which constitute facilities of public accommodation as defined under the Waterways Regulations (FPAs). The Project intends to support the diverse business activity throughout the Marine Park and adjacent Seaport District by offering transient accommodations available to the general public. The Project will additionally allow ground-level uses for much-needed accessory retail and food businesses serving the Marine Park and Cruiseport, in general. These uses are consistent with the Master Plan.

7.4.5 Management and Maintenance Plan for Public Amenities and Open Space

As described above, the Project requires a Chapter 91 License and will comply with the open space and FPA management and maintenance provisions of any future License issued by DEP.

7.4.6 Consistency with Coastal Zone Management Policies

The proposed Project is located within the boundaries of the coastal zone as determined by the regulations of the Massachusetts Coastal Zone Management Program. Per the Chapter 91 regulations, nonwater-dependent use projects located in the coastal zone must be consistent with all policies of the Massachusetts Coastal Zone Management Program.

The Project complies with the applicable policies of the Massachusetts Coastal Zone Management (MCZM) Program and will be constructed and operated in a manner consistent with the MCZM Program. A summary of the applicable regulatory and non-regulatory MCZM policies and a draft review of the Project's consistency with these policies is presented below.

Water Quality

Water Quality Policy #1 - Ensure that point-source discharges in or affecting the coastal zone are consistent with federally approved state effluent limitations and water quality standards.

No new point source discharges are proposed with the Project. The existing stormwater management system will be upgraded so as to comply with the DEP Stormwater Management Policy and will satisfy regulatory requirements set forth by DEP under the Massachusetts Wetland Protection Act and by the USEPA under the US Clean Water Act (33 U.S.C. 1341 *et seq.*)[1]. Implementation of the stormwater management system, in conjunction with the implementation of BMPs and observance of the DEP Policy, is anticipated to result in an improvement to existing site conditions.

Water Quality Policy #2 - Ensure that nonpoint pollution controls promote the attainment of state surface water quality standards in the coastal zone.

The nonpoint discharge associated with the Parcel A site is stormwater runoff. Currently, the Project Site consists of a large area of heavily compacted soils and impervious

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1 Redevelopment of previously developed sites must meet the Stormwater Management Standards to the "maximum extent practicable". If it is not practicable to meet all the Standards, new (retrofitted or expanded) stormwater management systems must be designed to improve existing conditions. (DEP Wetlands Protection Program Policy, Issued November 18, 1996).

pavement. Because stormwater management will be greatly enhanced by the Project, post development volume and rate of stormwater runoff is anticipated to be less than existing conditions. In addition, a Stormwater Pollution Prevention Plan (SWPPP) will be implemented in accordance with the NPDES Stormwater Construction General Permit. These measures will ensure compliance with this policy.

Water Quality Policy #3 – Ensure that activities in or affecting the coastal zone, conform to applicable state and federal requirements governing subsurface waste discharges.

This policy is not applicable, because no subsurface waste discharge is proposed. The Project will be serviced by sanitary sewer with regional treatment provided by the Massachusetts Water Resource Authority.

Habitat

Habitat Policy #1 – Protect wetland areas including salt marshes, shellfish beds, dunes, beaches, barrier beaches, salt ponds, ell grass beds, and freshwater wetlands for their role as natural habitats.

The Project will include work in or proximate to land subject to coastal storm flowage, coastal bank (the seawall), land subject to tidal action, land under the ocean, and fish run. All work performed proximate to these areas will be completed so as to preserve their function and value. The Project will be subject to review by the Boston Conservation Commission under the Massachusetts Wetlands Protection Act and will be designed and constructed so as to comply with the associated resource protection measures.

Habitat Policy #2 – Restore degraded or former wetland resources in coastal areas and ensure that activities in coastal areas do no further wetland degradation but instead take advantage of opportunities to engage in wetland restoration.

The Project will not result in damage to any coastal resources, and does not, therefore, propose any wetland restoration. However, improvements to stormwater management will result in an improvement in the quality of stormwater flowing from the site.

Protected Areas

Protected Areas Policy #1 – Preserve, restore and enhance complexes of coastal resources of regional or statewide significance through the Areas of Critical Environmental Concern program.

The Project is not located within an Area of Critical Environmental Concern; therefore, this policy does not apply.

Protected Areas Policy #2 – Protect state and locally designated scenic rivers and state classified scenic rivers in the coastal zone.

The Project is not located within any state or locally designated scenic river; therefore, this policy does not apply.

<u>Protected Areas Policy #3</u> – Ensure that proposed developments in or near designated or registered historic districts or sites respect the preservation intent of the designation and that potential adverse effects are minimized.

The Project is being designed in consideration of local historic resources. The MEPA ENF will serve as the Massachusetts Historic Commission Project Notification Form for the Project and is being submitted to the Massachusetts Historic Commission for concurrence that the Project is unlikely to affect significant historic or archaeological resources.

<u>Coastal Hazards</u>

<u>Coastal Hazard Policy #1</u> – Preserve, protect, restore, and enhance the beneficial functions of storm damage prevention and flood control provided by natural coastal landforms, such as dunes, beaches, barrier beaches, coastal banks, land subject to coastal storm flowage, salt marshes, and land under the ocean.

There are no coastal dunes, barrier beaches or salt marshes on or adjacent to the Project Site. The proposed Project completely avoids impacts to coastal bank, land under the ocean, and any such nearby resources and will therefore maintain their beneficial functions of storm damage prevention and flood control.

<u>Coastal Hazard Policy #2</u> – Ensure construction in water bodies and contiguous land areas will minimize interference with water circulation and sediment transport. Approve permits for flood or erosion control projects only when it has been determined that there will be no significant adverse effects on the project site or adjacent or downcoast areas.

The Project does not include work in the adjacent waters of Boston Harbor; therefore, this policy does not apply.

<u>Coastal Hazard Policy #3</u> – Ensure that state and federally funded public works projects proposed for location within the coastal zone will: (1) not exacerbate existing hazards or damage natural buffers or other natural resources, (2) be reasonably safe from flood and erosion related damage, (3) not promote growth and development in hazard-prone or buffer areas, especially in velocity zones and ACECs, and (4) not be used on Coastal Barrier Resource Units for new or substantial reconstruction of structures in a manner inconsistent with the Coastal Barrier Resource/Improvements Acts.

The proposed Project is not a state or federally funded public works project; therefore this policy does not apply.

<u>Coastal Hazard Policy #4</u> – Prioritize public funds for acquisition of hazardous coastal areas for conservation or recreation use, and relocation of structures out of coastal high hazard

areas, giving due consideration to the effects of coastal hazards at the location to the use and manageability of the area.

The Project does not involve the use of public funds; therefore, this policy does not apply.

Port and Harbor Infrastructure

Ports Policy #1 – Ensure that dredging and disposal of dredged material minimize adverse effects on water quality, physical processes, marine productivity and public health.

Dredging is not proposed as part of the Project; therefore, this policy does not apply.

Ports Policy #2 – Obtain the widest possible public benefit from channel dredging, ensuring that designated ports and developed harbors are given highest priority in the allocation of federal and state dredging funds. Ensure that this dredging is consistent with marine environment policies.

Dredging is not proposed as part of the Project; therefore, this policy does not apply.

Ports Policy #3 – Preserve and enhance the capacity of Designated Port Areas (DPAs) to accommodate water-dependent industrial uses, and prevent the exclusion of such uses from tidelands and any other DPA lands over which a state agency exerts control by virtue of ownership, regulatory authority, or other legal jurisdiction.

Although the Project is not located within the South Boston DPA and does not involve water-dependent industrial uses, the completed Project will serve to enhance the operational capacity of the adjacent DPA and its water-dependent users.

Ports Management Principal #1 – Encourage, through technical and financial assistance, expansion of water dependent uses in designated ports and developed harbors, re-development of urban waterfronts, and expansion of visual access.

The Project Site is currently used primarily as auxiliary laydown space for non-water dependent uses and, consequently, the Project will not displace any water-dependent uses. Ultimately, the Project Site will be developed in compliance with Chapter 91, the MIP Master Plan, and the Boston Zoning Code.

Public Access

Public Access Management Principle #1 – Improve public access to coastal recreation facilities and alleviate auto traffic and parking problems through improvements in public transportation. Link existing coastal recreation sites to each other or to nearby coastal inland facilities via trails for bicyclists, hikers, and equestrians, and via rivers for boaters.

The Project will serve to enhance public waterfront access and increase recreational opportunities in the Project area. The Proponent is committed to improving extensive areas of public open space immediately adjacent to the Project Site. The Project improves the site's pedestrian permeability and publicly accessible links between Summer Street and Drydock Avenue, through the adjacent public park and to the water's edge along the Reserved Channel.

The improved public open space and expansion of pedestrian connections through and around the site will also create direct links to planned and operating water transportation facilities operating from the Reserved Channel.

Public Access Management Principle #2 - Increase capacity of existing recreation areas by facilitating multiple uses and by improving management, maintenance and public support facilities. Resolve conflicting uses whenever possible through improved management rather than through exclusion of uses.

As noted above, the Project will result in the expansion of pedestrian connections through the Project Site and will greatly improve the management and maintenance of the adjacent Plaza. The seaward portions of the site will be largely open to the public in their entirety and, hence, conflicts in uses associated with exclusions are not anticipated.

Public Access Management Principle #3 – Provide technical assistance to developers of private recreational facilities and sites that increase public access to the shoreline.

The proposed enhancements to the adjacent park are expected to result in a considerable increase in public access to the waterfront. Proposed ground-level facilities of public accommodation and other amenities will result in increased pedestrian volumes and the Proponent is supportive of other facilities that augment public access to the shoreline in the vicinity of the Project Site.

Public Access Management Principle #4 – Expand existing recreation facilities and acquire and develop new public areas for coastal recreational activities. Give highest priority to expansions or new acquisitions in regions of high need or limited site availability. Assure that both transportation access and the recreational facilities are compatible with social and environmental characteristics of surrounding communities.

As noted above, the proposed Project will result in a considerable increase in public access to the waterfront, particularly through the adjacent park. These benefits will accrue to the site occupants, the adjacent properties, and the South Boston neighborhood. Public access to the water and the improvements to the quality of the site from an environmental standpoint are believed to be highly compatible with social and environmental characteristics of surrounding communities.

Energy

Energy Policy #1 – *For coastally dependent energy facilities, consider siting in alternative coastal locations. For non-coastally dependent energy facilities, consider siting in areas outside of the coastal zone. Weigh the environmental and safety impacts of locating proposed energy facilities at alternative sites.*

The Project is not an energy facility; therefore this policy does not apply.

Energy Management Principle #1 – *Encourage energy conservation and the use of alternative sources such as solar and wind power in order to assist in meeting the energy needs of the Commonwealth.*

The Project plans to optimize energy efficiency through an integrated approach to the building's envelope design and building systems. See Chapter 5 for details.

As part of the schematic design phase, the building orientation, massing, and materials have been designed to address, to the greatest extent practicable, optimal solar orientation, daylighting, and potential heat gain and loss.

Ocean Resources

Ocean Resources Policy #1 – *Support the development of environmentally sustainable aquaculture, both for commercial and enhancement (public shellfish stocking) purposes. Ensure that the review process regulating aquaculture facility sites (and access routes to those areas) protects ecologically significant resources (salt marshes, dunes, beaches, barrier beaches, and salt ponds) and minimizes adverse impacts upon the coastal and marine environment.*

The proposed Project does not include development of aquaculture; therefore, this policy does not apply.

Ocean Resources Policy #2 – *Extraction of marine minerals will be considered in areas of state jurisdiction, except where prohibited by the MA Ocean Sanctuaries Act, where and when the protection of fisheries, air and marine water quality, marine resources, navigation and recreation can be assured.*

The proposed Project will not involve the extraction of marine minerals; therefore, this policy does not apply.

Ocean Resources Policy #3 – *Accommodate offshore sand and gravel mining needs in areas and in ways that will not adversely affect shoreline areas due to alteration of wave* *direction and dynamics, marine resources and navigation. Mining of sand and gravel, when and where permitted, will be primarily for the purpose of beach nourishment.*

The Project does not entail either offshore sand and gravel mining or beach nourishment; therefore, this policy does not apply.

Growth Management

Growth Management Principle #1 – Encourage, through technical assistance and review of publicly funded development, compatibility of proposed development with local community character and scenic resources.

The Project has been designed in consideration of, and compliance with, Chapter 91, the MIP Master Plan, and the Boston Zoning Code. The Proponent proposes to develop a hotel, with associated amenities, including restaurants and meeting rooms. Virtually all of the open space between the Project Site and the Terminal Street will be open to and readily accessible by the public. As noted above, such public access to the water and the improvements to the quality of the site from an environmental standpoint are believed to be highly compatible with social and environmental characteristics of surrounding communities.

Growth Management Principle #2 – Ensure that state and federally funded transportation and wastewater projects primarily serve existing developed areas, assigning highest priority to projects that meet the needs of urban and community development centers.

The Project is not a state or federally funded infrastructure project; therefore, this policy does not apply.

Growth Management Principle #3 – Encourage the revitalization and enhancement of existing development centers in the coastal zone through technical assistance and federal and state financial support for residential, commercial and industrial development.

As per above, the Project has been designed in consideration of, and compliance with, Chapter 91, the MIP Master Plan, and the Boston Zoning Code, and thereby in support of the surrounding urban environment.

Chapter 8.0

Infrastructure

8.0 INFRASTRUCTURE

The following sections describe the existing sewer, water, and drainage systems surrounding the site and explain how these systems will service the Project. The analysis also discusses anticipated Project-related impacts on the utilities and identifies mitigation measures being proposed to address them. The Project is in the early design stages and as a more definitive design evolves the Proponent will coordinate with the various utility companies to ensure full services for the new development.

Required Permits/Approvals for the Project may include approvals from Massachusetts Department of Environmental Protection (MassDEP), the U.S. Environmental Protection Agency (USEPA) and the Boston Conservation Commission. A Boston Water and Sewer Commission (BWSC) Site Plan and General Service Application will be required for the proposed new water and sewer connections. In addition, a Stormwater Pollution Prevention Plan (SWPPP) will be submitted specifying best management practices (BMPs) for protecting the existing stormwater drainage system during construction.

A Drainage Discharge Permit Application is required from BWSC for any construction dewatering. The appropriate approvals from MassDEP and the USEPA will also be sought.

8.1 Sanitary Sewer System

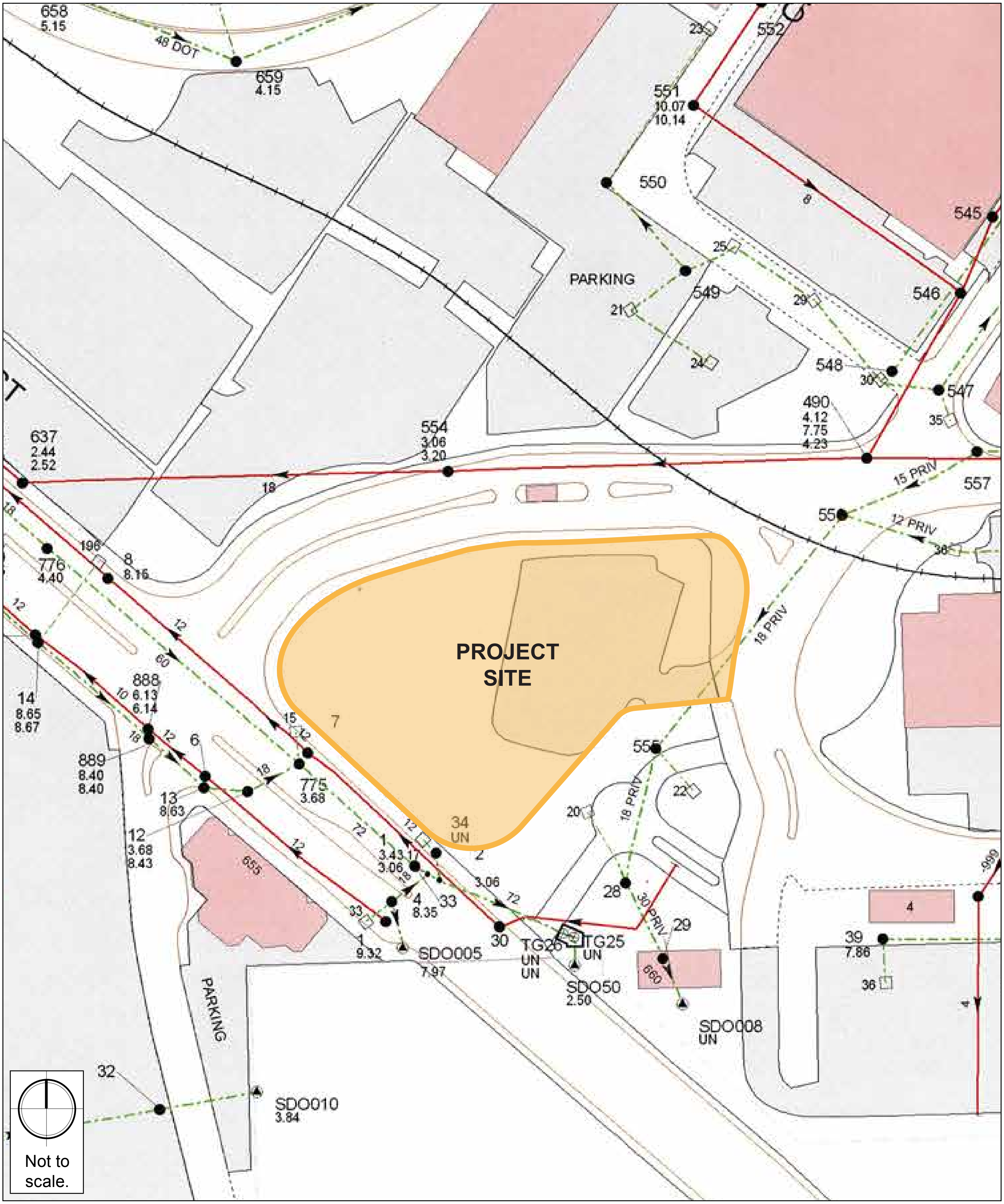
8.1.1 Existing Sanitary Sewer System

The Boston Water and Sewer Commission ("BWSC") record drawings indicate that the sanitary sewer system in the Project area (See Figure 8-1, Existing Sewer System) is owned and maintained by BWSC. BWSC record drawings indicate an existing 12-inch sanitary sewer line runs northwest along Summer Street to the southwest of the Project. BWSC record drawings also indicate an existing 18-inch sanitary sewer line as it runs west along Drydock Avenue north of the Site.

8.1.2 Estimated Project Wastewater Generation

The Project will generate an estimated 62,885 gallons per day (gpd) based on design sewer flows provided in 310 CMR 15.000-The State Environmental Code, Title 5, and the proposed building program as summarized in Table 8-1.

Based on the proposed estimated sanitary flow, which is greater than 15,000 gpd, BWSC will require the removal of infiltration/inflow (I/I) at a minimum 4:1 ratio of I/I removed to wastewater generated.



Marine Wharf **Boston, Massachusetts**

HOWARD STEIN HUDSON
Engineers + Planners

Figure 8-1
Existing BWSC Sewer System

Table 8-1 Project Wastewater Generation

Use	Number	Sewage Generation Rate	Total gpd
Hotel	411 keys	110 gpd/bedroom	45,210
Retail	3,500 square feet	50 gpd per 1,000 square feet	175
Restaurant(s)	500 seats[1]	35 gpd seat	17,500
Meeting Space[1]	4,517 square feet	-	0
Total Estimated Project Sewage Generation			**62,885 gpd**

[1] Number of seats based on approximately 20 square feet of Project Program square footage per seat.

[2] Meeting space will be used by hotel guest only and is therefore not included in the wastewater generation calculation

8.1.3 Sanitary Sewer Connections

The proposed sanitary sewer line from the new building will likely connect to the BWSC's sewer line in Summer Street. Incidental runoff from the second floor parking level will flow through a gas and oil separator prior to being piped to the sanitary sewer service. Gas and oil separators will conform to BWSC and MWRA standards.

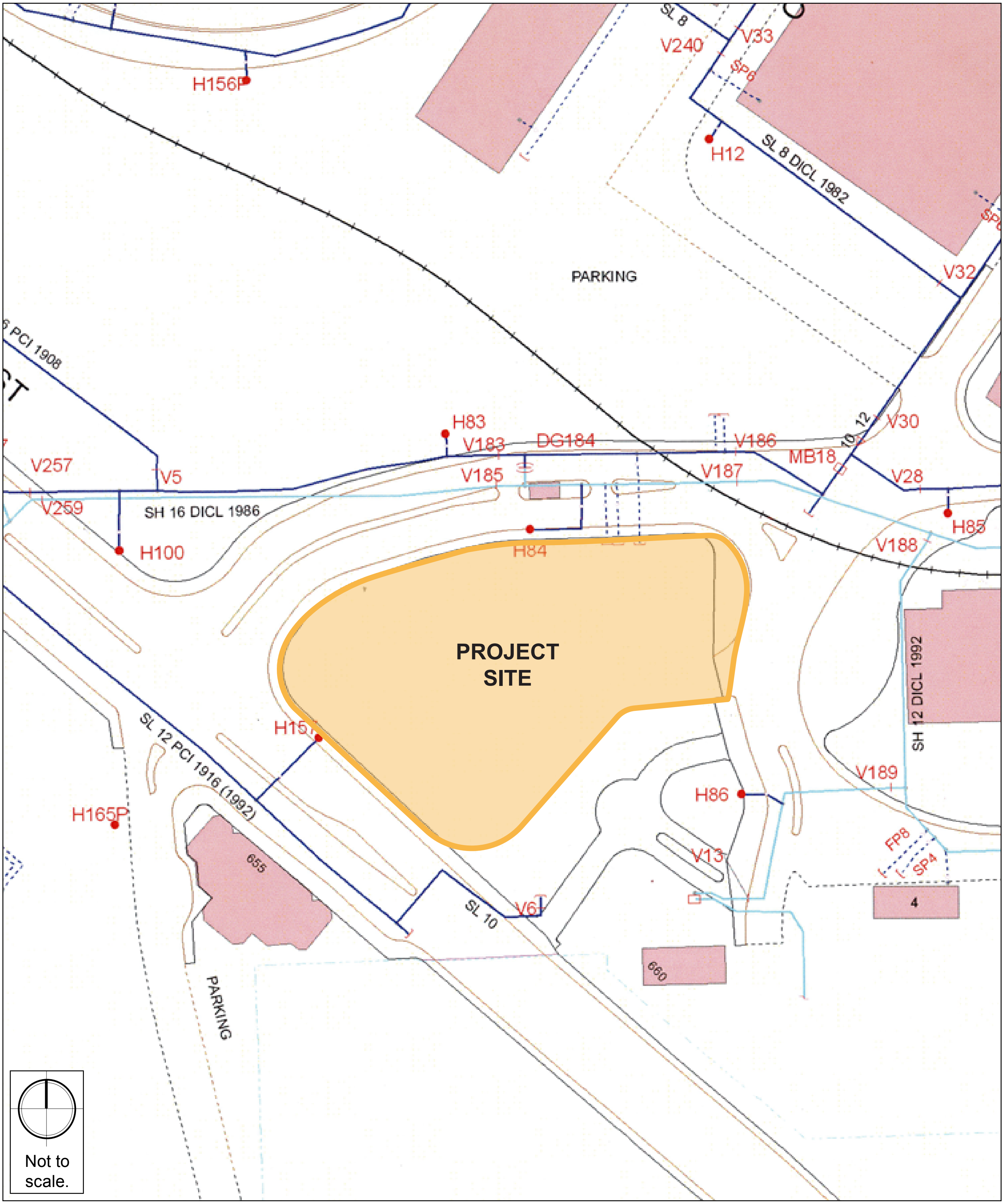
8.1.4 Wastewater Flow Mitigation

To help conserve water and reduce the amount of wastewater generated by the Project, the Proponent will investigate the use of water conservation devices such as low-flow toilets and urinal, flow-restricting faucets, and sensor operated sinks, toilets, and urinals consistent with the Proponent's compliance at the LEED Certifiable threshold and in compliance with all pertinent Boston Zoning Code and State Building Code requirements. See Chapter 5 for more detail.

8.2 Water Supply System

8.2.1 Existing Water Service

The water-distribution system near the Project area is owned and maintained BWSC (See Figure 8-2, Existing Water System.) BWSC record drawings indicate there is a 12-inch ductile iron cement-lined (DICL) water main and a 16-inch DICL water main installed in Drydock Avenue. There is also an a 12-inch pitted cast iron (PCI) water main installed in Summer Street.



Marine Wharf   **Boston, Massachusetts**

Figure 8-2
Existing BWSC Water System

The 12-inch DICL main and 12-inch PCI main are part of the Southern Low service network and were installed in 1982. The 16-inch main is part of the Southern High service network, and was installed in 1986.

Fire hydrants are located in Drydock Avenue, Summer Street, and Terminal Street to the north, west, and southeast of the Site. It appears that these hydrants will provide sufficient coverage for the Project. The Proponent will design appropriate domestic and fire protection lines and confirm the fire hydrant coverage for the Project with the consultation of BWSC and the Boston Fire Department (BFD) during the detailed design phase.

8.2.2 Proposed Water Service

The Proponent expects the Project will be serviced via the 12-inch DICL water main in Drydock Avenue. Separate new domestic water and fire protection services will be required. The fire protection service will be provided with a backflow prevention device that will be approved though BWSC's Enforcement Section. The location of hydrants and siamese connections will be reviewed by BWSC and BFD during the design development phase of the Project. Water meters will be of a type approved by BWSC and tied into the BWSC's Automatic Meter Reading (AMR) System. Fixture counts and water meter sizing information will be provided and services will be designed and coordinated with the BWSC as part of the Site Plan review process and General Service Application.

8.2.3 Anticipated Water Consumption

The estimated water consumption is based on the Project's estimated sewage generation, plus a factor to account for consumption, system losses, and other usages to estimate an average water demand. The total estimated water demand is 69,173 gpd. The water for the Project will be supplied by BWSC. More detailed water use and meter sizing calculations will be submitted to BWSC as part of the Site Plan approval process.

8.2.4 Water Supply Conservation and Mitigation

To help conserve water used by the Project, the Proponent will investigate the use of water conservation devices such as low-flow toilets and urinals, flow-restricting faucets, and sensor operated sinks, toilets, and urinals consistent with the Proponent's compliance at the LEED Certifiable threshold and in compliance with all pertinent Boston Zoning Code and State Building Code requirements. See Section 5.0 for additional detail.

8.3 Storm Drainage System

8.3.1 Existing Stormwater Drainage System

The Project site consists of a vacant lot with an existing paved surface parking lot and lawn area surrounded by trees. According to record drawings, the storm drainage system within the Marina Industrial Park is privately owned and maintained by EDIC. The existing storm drainage system in Summer Street is owned and maintained by BWSC. Both systems convey stormwater runoff to the Reserve Channel and Boston Harbor (See Figure 8-1.)

8.3.2 Proposed Stormwater Drainage System

The proposed stormwater management system will connect to EDIC's privately owned system and therefore will be designed in accordance with MassDEP Storm Water Management Standards. The stormwater management system will provide pretreatment and infiltration, if feasible, prior to discharging stormwater to the drainage system. Due to the location of the site and its proximity to sea level, it may not be possible to infiltrate the storm water runoff into the surrounding ground.

8.3.3 Water Quality and Construction Stormwater Management

The Project will not impact the water quality of nearby water bodies. The Project proposes a stormwater management program, designed in compliance with MassDEP Storm Water Management Standards requirements, which will provide pretreatment and infiltration, if feasible, prior to discharging stormwater to the drainage system. An operation and maintenance plan will be developed to support the long-term functionality of the proposed stormwater management system.

A pollution prevention plan will be prepared for use during construction including during demolition activity. Stormwater pollution prevention measures will include good housekeeping such as properly storing materials, spill prevention and response plans, and proper storage and disposal of solid wastes. Erosion and sediment controls will be used during construction to protect adjacent properties, the storm drain system, and the nearby surface waters. The construction contractor will be responsible for controlling dust using street sweeping and watering if necessary.

8.3.4 City of Boston Groundwater Overlay District

A review of City of Boston Zoning maps indicates that the Project site is not located within a City of Boston Groundwater Conservation Overlay District.

8.3.5 Flood Zones

The existing Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the Project site indicates portions of the site are located within the 100-year flood zone (FIRM, Suffolk County, Massachusetts; Panel 0081J, Map Number 25025C0081J, Map

Revised March 16, 2016). The design of the site and buildings will recognize and account for the site's location proximate to the harbor and within this newly designated flood zone, as well as the potential impacts of sea level rise.

8.5 Telephone and Cable Systems

Verizon, Comcast, and RCN provide cable and telephone services in the Project area. It is anticipated that cable service to the proposed buildings will be underground from Drydock Avenue.

8.6 Natural Gas System

National Grid provides natural gas in the Project area. National Grid owns and maintains a 16-inch, carbon steel gas main in Summer Street and Terminal Street. The gas main crosses through the southerly corner of the Project Site, and up along its easterly side adjacent to Terminal Street. The actual size and location of the building services will be coordinated with National Grid.

8.7 Utility Protection During Construction

The construction contractor will notify utility companies and call "Dig Safe" prior to excavation. During construction, infrastructure will be protected using sheeting and shoring, temporary relocations, and construction staging as required. The construction contractor will be required to coordinate all protection measures, temporary supports, and temporary shutdowns of all utilities with the appropriate utility owners and/or agencies. The construction contractor will also be required to provide adequate notification to the utility owner prior to any work commencing on its utility equipment. In addition, in the event a utility cannot be maintained in service during switch over to a temporary or permanent system, the construction contractor will be required to coordinate the shutdown with the utility owners and Project Site abutters to minimize impacts and inconveniences.

Chapter 9.0

Coordination

9.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

9.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board, and will be designated to comply with the standards of the Americans with Disabilities Act. See Appendix E for the Accessibility Checklist.

9.2 Massachusetts Environmental Policy Act (MEPA)

The proposed Project is subject to MEPA jurisdiction because the lease of the property by EDIC to the Proponent constitutes a "Land Transfer" as defined in the MEPA regulations. The Project exceeds MEPA review thresholds requiring the filing of a Environmental Notification Form (ENF), specifically:

- ♦ A new or existing unlicensed non-water dependent use of waterways or tidelands requiring a Chapter 91 License (301 CMR 11.03 (3)(b)(5)); and
- ♦ Generation of 2,000 or more new adt on roadways providing access to a single location. (301 CMR 11.03 (6)(b)(13)).

The Proponent will file an Environmental Notification Form (ENF) with the MEPA Office to initiate MEPA review. The Secretary of EEA will determine whether to require an Environmental Impact Report (EIR) based on review of the ENF and the comments received.

9.3 Massachusetts Historical Commission

As described in Section 6.0, the Project will potentially be subject to State Register Review (950 CMR 71.00 et seq.) as a result of the need for one or more state permits, or other state actions. The Proponent will initiate Massachusetts Historical Commission review by providing MHC a copy of the ENF that will be filed pursuant to MEPA Act as described in the previous section.

9.4 Boston Civic Design Commission

Because the Project is subject to Large Project Review under Boston Zoning Code Section 80B, it will also be subject to review by the Boston Civic Design Commission (BCDC) under the provisions of Article 28 of that code. The BRA will submit this PNF to the BCDC to initiate such review.

9.5 Massachusetts Department of Environmental Protection

A portion of the Project Site is subject to review under the Public Waterfront Act, M.G.L. c 91 and 310 CMR 9.00 et seq, as administered by the Massachusetts Department of Environmental Protection. The Proponent has initiated jurisdictional review with DEP's Waterways Regulation Program, and anticipates filing a Waterways License Application at the conclusion of the jurisdictional review process.

9.6 Boston Conservation Commission

Certain Project activities will take place in areas subject to the Massachusetts Wetlands Protection Act, M.G.L c. 131 § 40 and 310 CMR 10.00 et seq. An Order of Conditions will be required from the Boston Conservation Commission. The Project will prepare and submit to the Boston Conservation Commission a Notice of Intent describing all wetland-related activities, and demonstrating that the resource areas, and more specifically, the interests of each resource area, are fully protected.

Appendix A

Traffic Data

Appendix A – Transportation

Vehicle, Pedestrian, and Bicycle Counts

Synchro Intersection Level of Service Reports

- Existing (2016) Condition
- No-Build (2021) Condition
- No-Build (2021) Condition with Haul Road Extension
- Build (2021) Condition
- Build (2021) Condition with Haul Road Extension

Trip Generation

Vehicle, Pedestrian, and Bicycle Counts

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 1

Groups Printed- Cars - Trucks

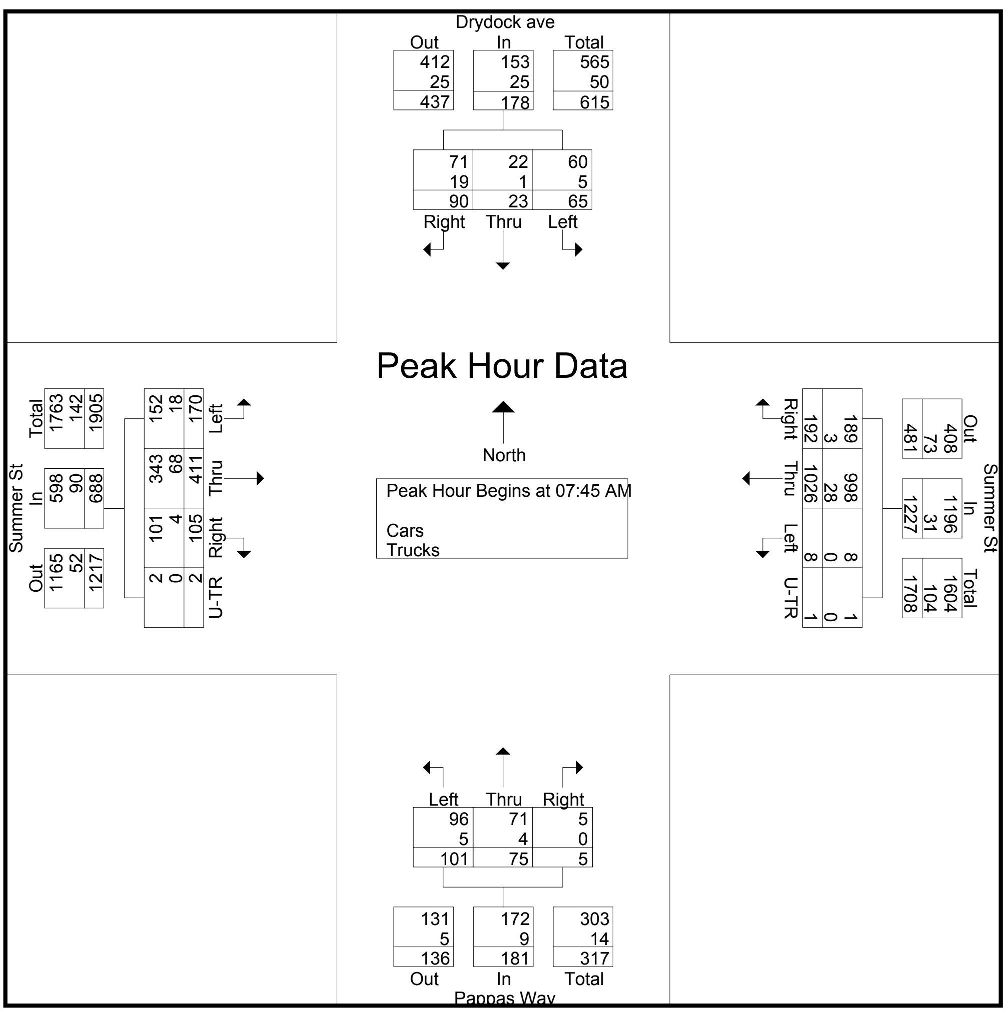
	Drydock ave From North			Summer St From East				Pappas Way From South			Summer St From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-TR	Left	Thru	Right	Left	Thru	Right	U-TR	Int. Total
07:00 AM	16	6	20	3	228	41	0	33	8	4	32	91	22	0	504
07:15 AM	15	7	24	1	230	44	0	35	12	3	29	92	19	0	511
07:30 AM	15	11	19	4	275	41	0	36	11	1	24	105	15	1	558
07:45 AM	22	3	16	1	274	43	0	27	12	0	42	99	32	1	572
Total	68	27	79	9	1007	169	0	131	43	8	127	387	88	2	2145
08:00 AM	15	8	22	1	248	50	0	24	21	0	45	109	26	0	569
08:15 AM	15	6	22	3	273	54	0	24	21	2	25	96	24	0	565
08:30 AM	13	6	30	3	231	45	1	26	21	3	58	107	23	1	568
08:45 AM	9	4	26	1	184	49	0	27	11	1	39	99	29	0	479
Total	52	24	100	8	936	198	1	101	74	6	167	411	102	1	2181
Grand Total	120	51	179	17	1943	367	1	232	117	14	294	798	190	3	4326
Apprch %	34.3	14.6	51.1	0.7	83.5	15.8	0	63.9	32.2	3.9	22.9	62.1	14.8	0.2	
Total %	2.8	1.2	4.1	0.4	44.9	8.5	0	5.4	2.7	0.3	6.8	18.4	4.4	0.1	
Cars	110	46	135	17	1896	360	1	218	111	14	264	683	183	3	4041
% Cars	91.7	90.2	75.4	100	97.6	98.1	100	94	94.9	100	89.8	85.6	96.3	100	93.4
Trucks	10	5	44	0	47	7	0	14	6	0	30	115	7	0	285
% Trucks	8.3	9.8	24.6	0	2.4	1.9	0	6	5.1	0	10.2	14.4	3.7	0	6.6

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015

	Drydock ave From North				Summer St From East					Pappas Way From South				Summer St From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:45 AM																			
07:45 AM	22	3	16	41	1	274	43	0	318	27	12	0	39	42	99	32	1	174	572
08:00 AM	15	8	22	45	1	248	50	0	299	24	21	0	45	45	109	26	0	180	569
08:15 AM	15	6	22	43	3	273	54	0	330	24	21	2	47	25	96	24	0	145	565
08:30 AM	13	6	30	49	3	231	45	1	280	26	21	3	50	58	107	23	1	189	568
Total Volume	65	23	90	178	8	1026	192	1	1227	101	75	5	181	170	411	105	2	688	2274
% App. Total	36.5	12.9	50.6		0.7	83.6	15.6	0.1		55.8	41.4	2.8		24.7	59.7	15.3	0.3		
PHF	.739	.719	.750	.908	.667	.936	.889	.250	.930	.935	.893	.417	.905	.733	.943	.820	.500	.910	.994
Cars	60	22	71	153	8	998	189	1	1196	96	71	5	172	152	343	101	2	598	2119
% Cars	92.3	95.7	78.9	86.0	100	97.3	98.4	100	97.5	95.0	94.7	100	95.0	89.4	83.5	96.2	100	86.9	93.2
Trucks	5	1	19	25	0	28	3	0	31	5	4	0	9	18	68	4	0	90	155
% Trucks	7.7	4.3	21.1	14.0	0	2.7	1.6	0	2.5	5.0	5.3	0	5.0	10.6	16.5	3.8	0	13.1	6.8

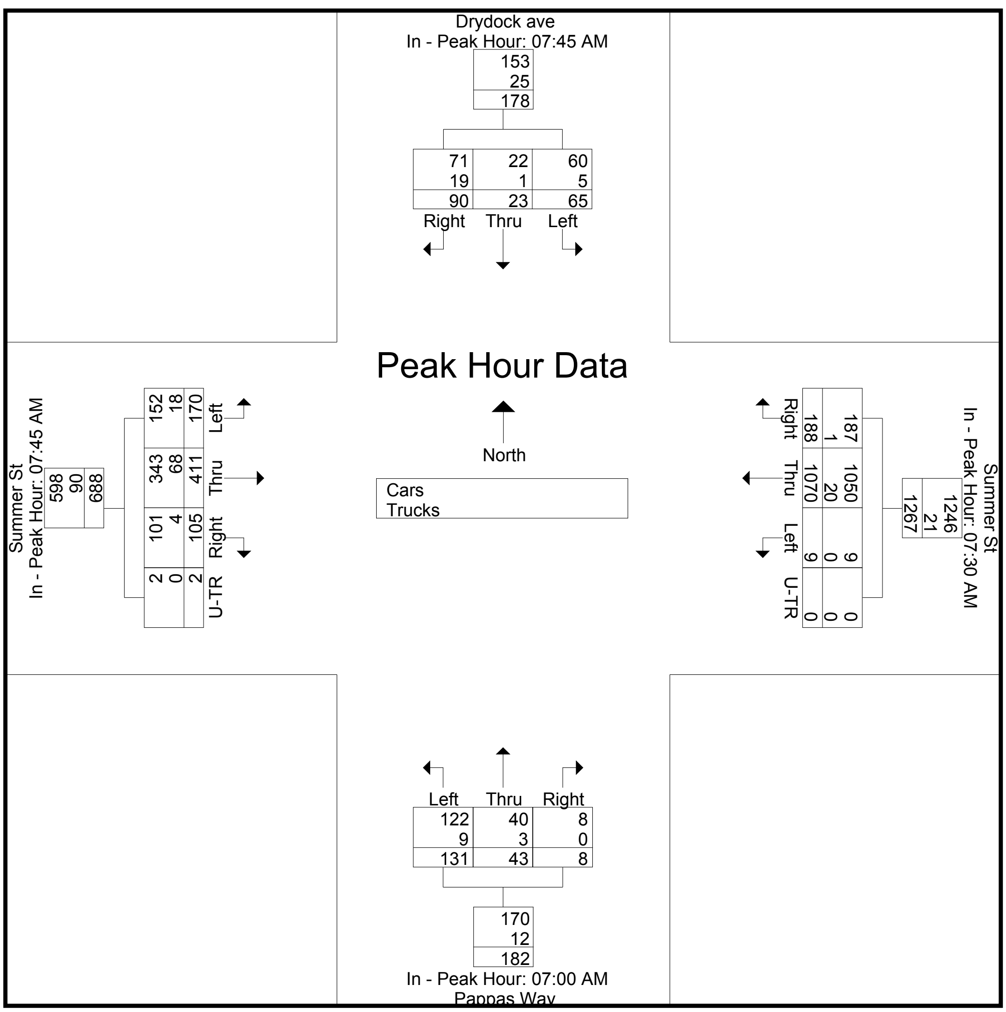


Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015

	Drydock ave From North				Summer St From East					Pappas Way From South				Summer St From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																			
Peak Hour for Each Approach Begins at:																			
	07:45 AM				07:30 AM					07:00 AM				07:45 AM					
+0 mins.	22	3	16	41	4	275	41	0	320	33	8	4	45	42	99	32	1	174	
+15 mins.	15	8	22	45	1	274	43	0	318	35	12	3	50	45	109	26	0	180	
+30 mins.	15	6	22	43	1	248	50	0	299	36	11	1	48	25	96	24	0	145	
+45 mins.	13	6	30	49	3	273	54	0	330	27	12	0	39	58	107	23	1	189	
Total Volume	65	23	90	178	9	1070	188	0	1267	131	43	8	182	170	411	105	2	688	
% App. Total	36.5	12.9	50.6		0.7	84.5	14.8	0		72	23.6	4.4		24.7	59.7	15.3	0.3		
PHF	.739	.719	.750	.908	.563	.973	.870	.000	.960	.910	.896	.500	.910	.733	.943	.820	.500	.910	
Cars	60	22	71	153	9	1050	187	0	1246	122	40	8	170	152	343	101	2	598	
% Cars	92.3	95.7	78.9	86	100	98.1	99.5	0	98.3	93.1	93	100	93.4	89.4	83.5	96.2	100	86.9	
Trucks	5	1	19	25	0	20	1	0	21	9	3	0	12	18	68	4	0	90	
% Trucks	7.7	4.3	21.1	14	0	1.9	0.5	0	1.7	6.9	7	0	6.6	10.6	16.5	3.8	0	13.1	



Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 1

Groups Printed- Cars

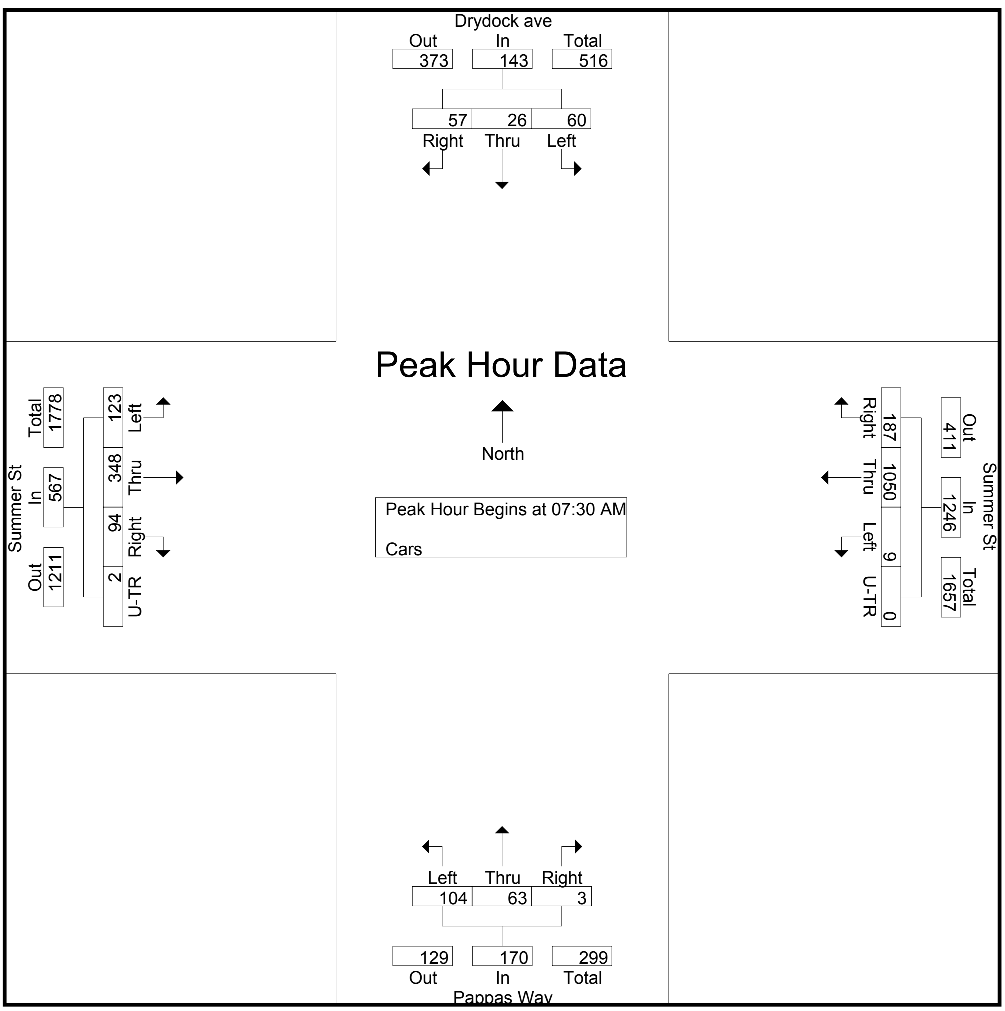
	Drydock ave From North			Summer St From East				Pappas Way From South			Summer St From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-TR	Left	Thru	Right	Left	Thru	Right	U-TR	Int. Total
07:00 AM	15	3	15	3	224	38	0	33	8	4	28	82	20	0	473
07:15 AM	14	7	18	1	223	44	0	31	10	3	26	81	19	0	477
07:30 AM	12	10	10	4	273	41	0	31	11	1	22	92	15	1	523
07:45 AM	21	3	11	1	267	43	0	27	11	0	39	83	30	1	537
Total	62	23	54	9	987	166	0	122	40	8	115	338	84	2	2010
08:00 AM	12	7	18	1	244	49	0	23	20	0	39	90	25	0	528
08:15 AM	15	6	18	3	266	54	0	23	21	2	23	83	24	0	538
08:30 AM	12	6	24	3	221	43	1	23	19	3	51	87	22	1	516
08:45 AM	9	4	21	1	178	48	0	27	11	1	36	85	28	0	449
Total	48	23	81	8	909	194	1	96	71	6	149	345	99	1	2031
Grand Total	110	46	135	17	1896	360	1	218	111	14	264	683	183	3	4041
Apprch %	37.8	15.8	46.4	0.7	83.4	15.8	0	63.6	32.4	4.1	23.3	60.3	16.2	0.3	
Total %	2.7	1.1	3.3	0.4	46.9	8.9	0	5.4	2.7	0.3	6.5	16.9	4.5	0.1	

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 2

	Drydock ave From North				Summer St From East					Pappas Way From South				Summer St From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:30 AM																			
07:30 AM	12	10	10	32	4	273	41	0	318	31	11	1	43	22	92	15	1	130	523
07:45 AM	21	3	11	35	1	267	43	0	311	27	11	0	38	39	83	30	1	153	537
08:00 AM	12	7	18	37	1	244	49	0	294	23	20	0	43	39	90	25	0	154	528
08:15 AM	15	6	18	39	3	266	54	0	323	23	21	2	46	23	83	24	0	130	538
Total Volume	60	26	57	143	9	1050	187	0	1246	104	63	3	170	123	348	94	2	567	2126
% App. Total	42	18.2	39.9		0.7	84.3	15	0		61.2	37.1	1.8		21.7	61.4	16.6	0.4		
PHF	.714	.650	.792	.917	.563	.962	.866	.000	.964	.839	.750	.375	.924	.788	.946	.783	.500	.920	.988

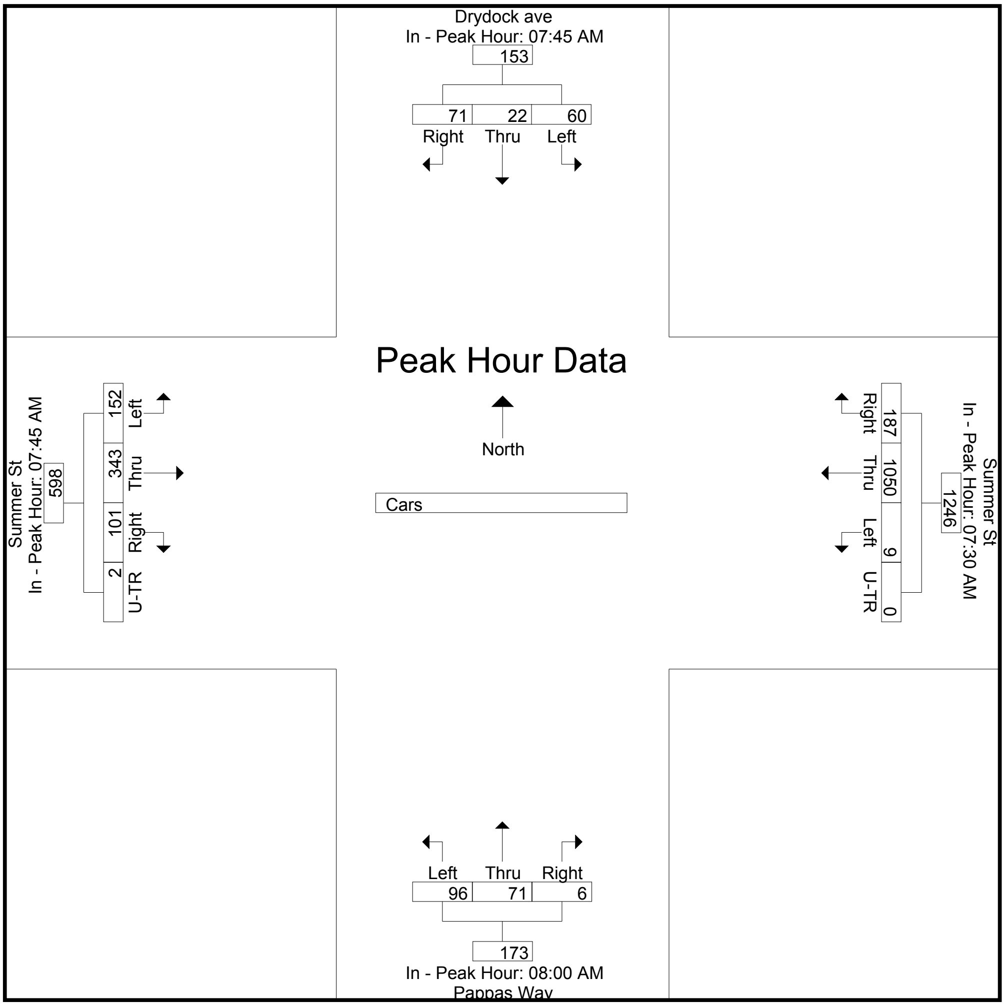


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total
	07:45 AM				07:30 AM					08:00 AM				07:45 AM				
+0 mins.	21	3	11	35	4	273	41	0	318	23	20	0	43	39	83	30	1	153
+15 mins.	12	7	18	37	1	267	43	0	311	23	21	2	46	39	90	25	0	154
+30 mins.	15	6	18	39	1	244	49	0	294	23	19	3	45	23	83	24	0	130
+45 mins.	12	6	24	42	3	266	54	0	323	27	11	1	39	51	87	22	1	161
Total Volume	60	22	71	153	9	1050	187	0	1246	96	71	6	173	152	343	101	2	598
% App. Total	39.2	14.4	46.4		0.7	84.3	15	0		55.5	41	3.5		25.4	57.4	16.9	0.3	
PHF	.714	.786	.740	.911	.563	.962	.866	.000	.964	.889	.845	.500	.940	.745	.953	.842	.500	.929

Accurate Counts
978-664-2565

N/S Street	: Drydock Ave / Pappas Way	File Name	: 13162001
E/W Street	: Summer Street	Site Code	: 13162001
City/State	: South Boston, MA	Start Date	: 11/4/2015
Weather	: Clear	Page No	: 3



Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 1

Groups Printed- Trucks

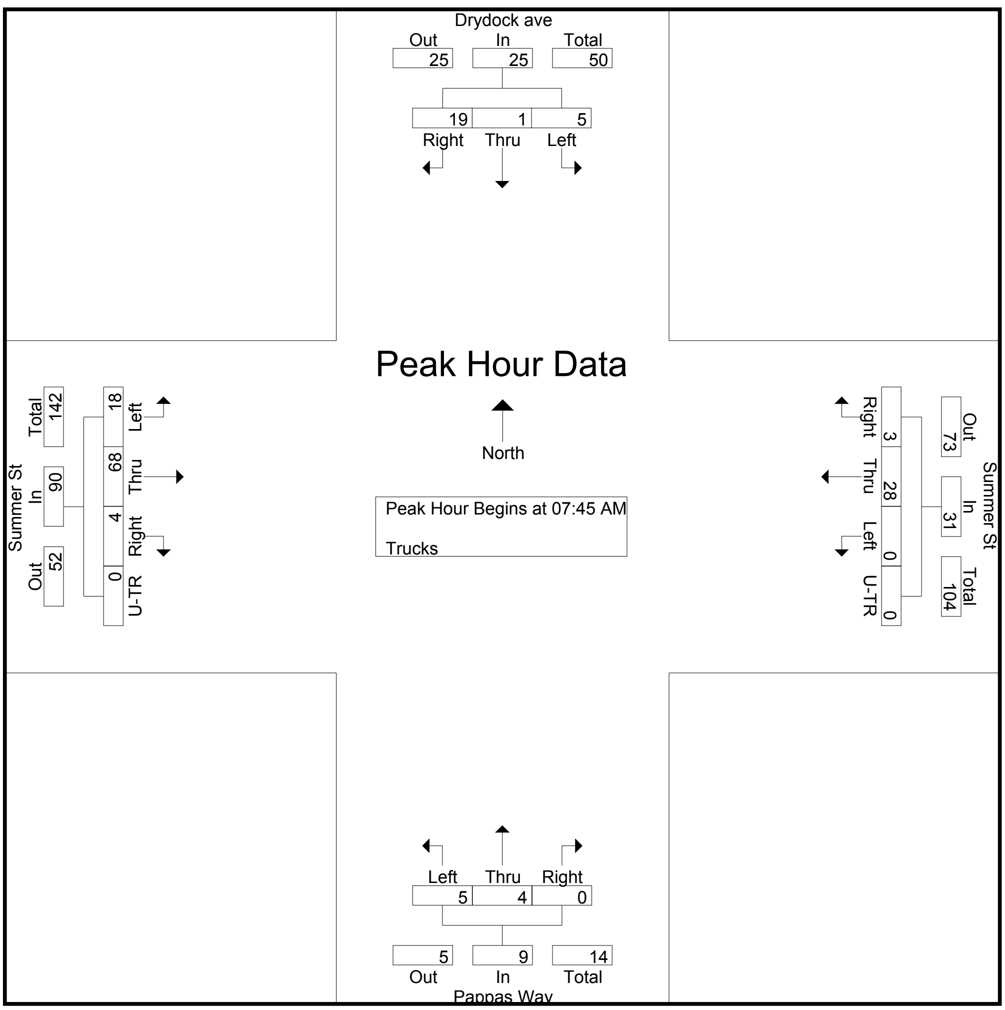
	Drydock ave From North			Summer St From East				Pappas Way From South			Summer St From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-TR	Left	Thru	Right	Left	Thru	Right	U-TR	Int. Total
07:00 AM	1	3	5	0	4	3	0	0	0	0	4	9	2	0	31
07:15 AM	1	0	6	0	7	0	0	4	2	0	3	11	0	0	34
07:30 AM	3	1	9	0	2	0	0	5	0	0	2	13	0	0	35
07:45 AM	1	0	5	0	7	0	0	0	1	0	3	16	2	0	35
Total	6	4	25	0	20	3	0	9	3	0	12	49	4	0	135
08:00 AM	3	1	4	0	4	1	0	1	1	0	6	19	1	0	41
08:15 AM	0	0	4	0	7	0	0	1	0	0	2	13	0	0	27
08:30 AM	1	0	6	0	10	2	0	3	2	0	7	20	1	0	52
08:45 AM	0	0	5	0	6	1	0	0	0	0	3	14	1	0	30
Total	4	1	19	0	27	4	0	5	3	0	18	66	3	0	150
Grand Total	10	5	44	0	47	7	0	14	6	0	30	115	7	0	285
Apprch %	16.9	8.5	74.6	0	87	13	0	70	30	0	19.7	75.7	4.6	0	
Total %	3.5	1.8	15.4	0	16.5	2.5	0	4.9	2.1	0	10.5	40.4	2.5	0	

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 2

	Drydock ave From North				Summer St From East					Pappas Way From South				Summer St From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 07:45 AM																			
07:45 AM	1	0	5	6	0	7	0	0	7	0	1	0	1	3	16	2	0	21	35
08:00 AM	3	1	4	8	0	4	1	0	5	1	1	0	2	6	19	1	0	26	41
08:15 AM	0	0	4	4	0	7	0	0	7	1	0	0	1	2	13	0	0	15	27
08:30 AM	1	0	6	7	0	10	2	0	12	3	2	0	5	7	20	1	0	28	52
Total Volume	5	1	19	25	0	28	3	0	31	5	4	0	9	18	68	4	0	90	155
% App. Total	20	4	76		0	90.3	9.7	0		55.6	44.4	0		20	75.6	4.4	0		
PHF	.417	.250	.792	.781	.000	.700	.375	.000	.646	.417	.500	.000	.450	.643	.850	.500	.000	.804	.745



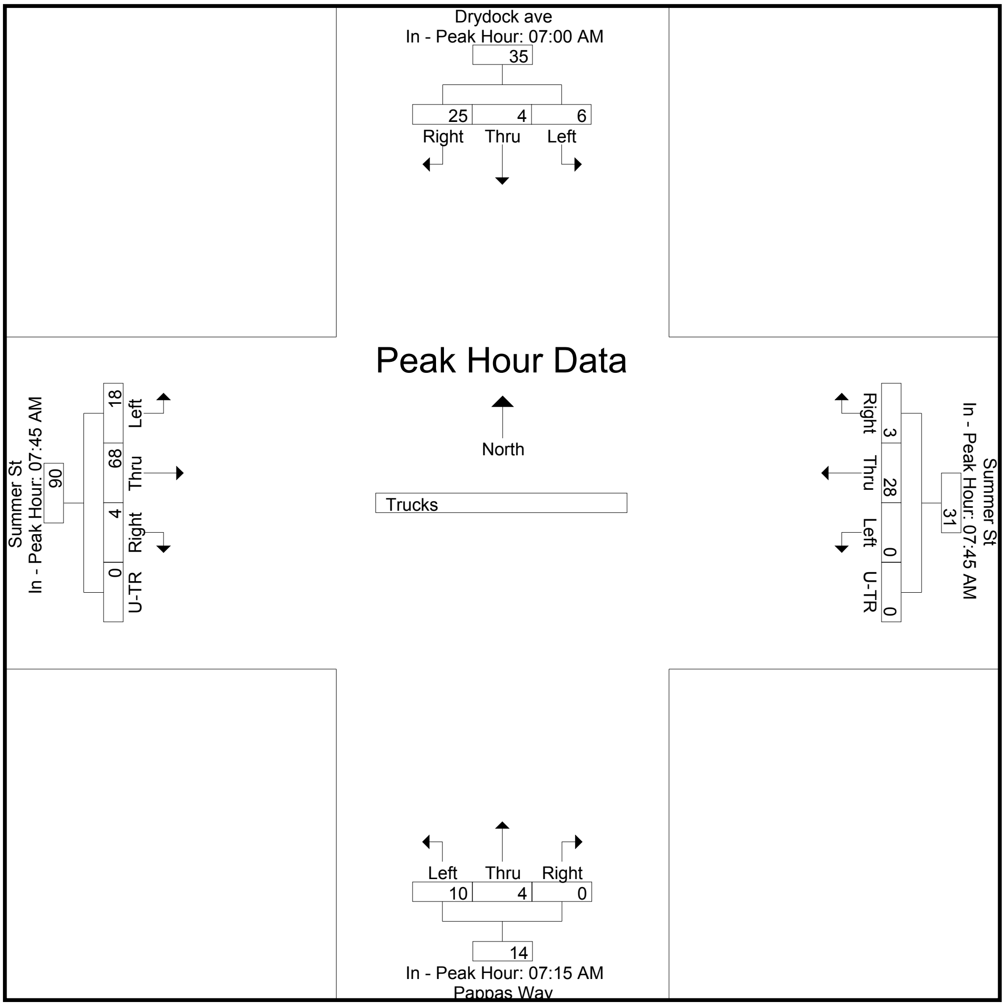
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:45 AM					07:15 AM				07:45 AM				
+0 mins.	1	3	5	9	0	7	0	0	7	4	2	0	6	3	16	2	0	21
+15 mins.	1	0	6	7	0	4	1	0	5	5	0	0	5	6	19	1	0	26
+30 mins.	3	1	9	13	0	7	0	0	7	0	1	0	1	2	13	0	0	15
+45 mins.	1	0	5	6	0	10	2	0	12	1	1	0	2	7	20	1	0	28
Total Volume	6	4	25	35	0	28	3	0	31	10	4	0	14	18	68	4	0	90
% App. Total	17.1	11.4	71.4		0	90.3	9.7	0		71.4	28.6	0		20	75.6	4.4	0	
PHF	.500	.333	.694	.673	.000	.700	.375	.000	.646	.500	.500	.000	.583	.643	.850	.500	.000	.804

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 1

Groups Printed- Bikes Peds

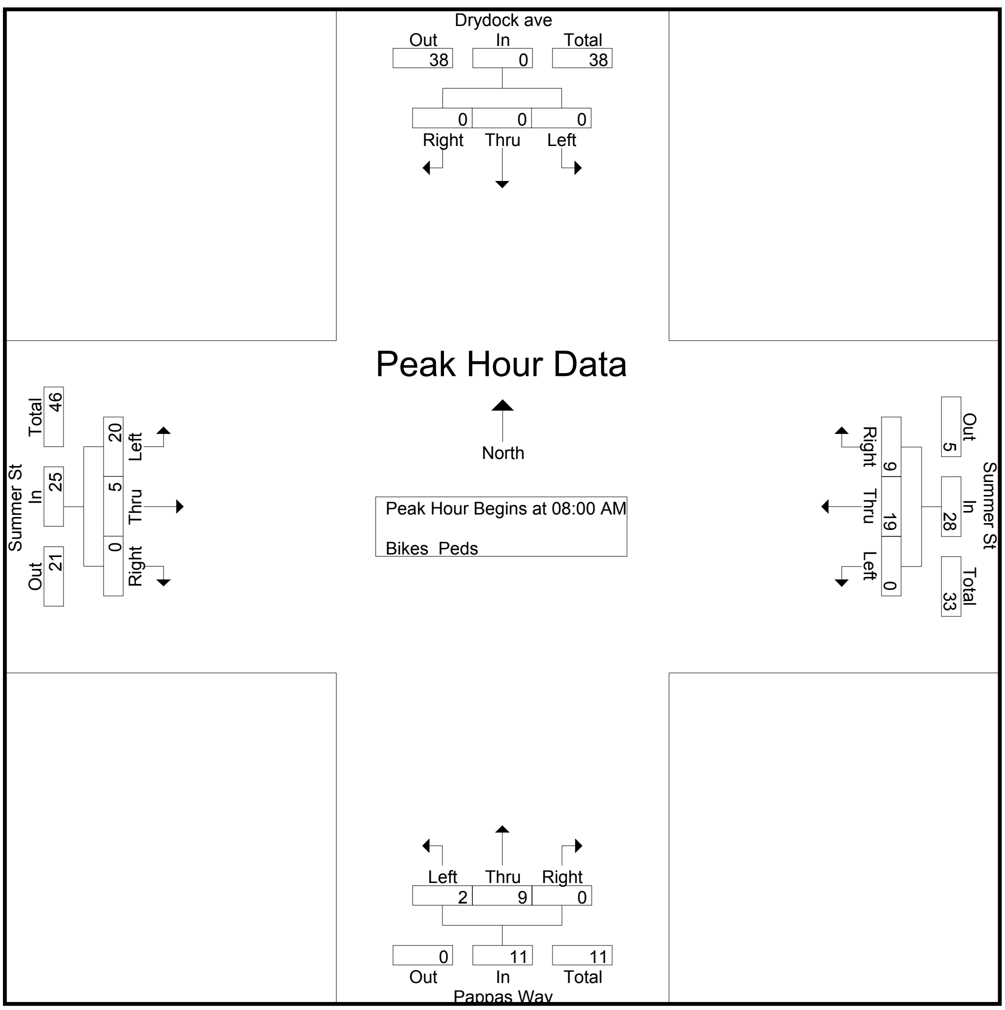
	Drydock ave From North				Summer St From East				Pappas Way From South				Summer St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	6	0	4	2	0	0	0	0	3	0	0	0	1	10	6	16
07:15 AM	0	0	0	13	0	1	1	1	0	1	0	8	0	0	0	2	24	3	27
07:30 AM	0	0	0	13	0	6	0	1	1	1	0	11	1	0	0	2	27	9	36
07:45 AM	0	0	0	25	0	1	0	1	0	0	0	12	5	0	0	11	49	6	55
Total	0	0	0	57	0	12	3	3	1	2	0	34	6	0	0	16	110	24	134
08:00 AM	0	0	0	25	0	1	0	2	1	1	0	11	1	0	0	10	48	4	52
08:15 AM	0	0	0	12	0	7	3	5	1	1	0	16	5	2	0	7	40	19	59
08:30 AM	0	0	0	12	0	4	1	5	0	5	0	8	5	1	0	4	29	16	45
08:45 AM	0	0	0	18	0	7	5	5	0	2	0	9	9	2	0	8	40	25	65
Total	0	0	0	67	0	19	9	17	2	9	0	44	20	5	0	29	157	64	221
Grand Total	0	0	0	124	0	31	12	20	3	11	0	78	26	5	0	45	267	88	355
Apprch %	0	0	0		0	72.1	27.9		21.4	78.6	0		83.9	16.1	0				
Total %	0	0	0		0	35.2	13.6		3.4	12.5	0		29.5	5.7	0		75.2	24.8	

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 2

	Drydock ave From North				Summer St From East				Pappas Way From South				Summer St From West				
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 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	1	0	1	1	1	0	2	1	0	0	1	4
08:15 AM	0	0	0	0	0	7	3	10	1	1	0	2	5	2	0	7	19
08:30 AM	0	0	0	0	0	4	1	5	0	5	0	5	5	1	0	6	16
08:45 AM	0	0	0	0	0	7	5	12	0	2	0	2	9	2	0	11	25
Total Volume	0	0	0	0	0	19	9	28	2	9	0	11	20	5	0	25	64
% App. Total	0	0	0		0	67.9	32.1		18.2	81.8	0		80	20	0		
PHF	.000	.000	.000	.000	.000	.679	.450	.583	.500	.450	.000	.550	.556	.625	.000	.568	.640



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				08:00 AM				08:00 AM				08:00 AM			
+0 mins.	0	0	0	0	0	1	0	1	1	1	0	2	1	0	0	1
+15 mins.	0	0	0	0	0	7	3	10	1	1	0	2	5	2	0	7
+30 mins.	0	0	0	0	0	4	1	5	0	5	0	5	5	1	0	6
+45 mins.	0	0	0	0	0	7	5	12	0	2	0	2	9	2	0	11
Total Volume	0	0	0	0	0	19	9	28	2	9	0	11	20	5	0	25
% App. Total	0	0	0		0	67.9	32.1		18.2	81.8	0		80	20	0	
PHF	.000	.000	.000	.000	.000	.679	.450	.583	.500	.450	.000	.550	.556	.625	.000	.568

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
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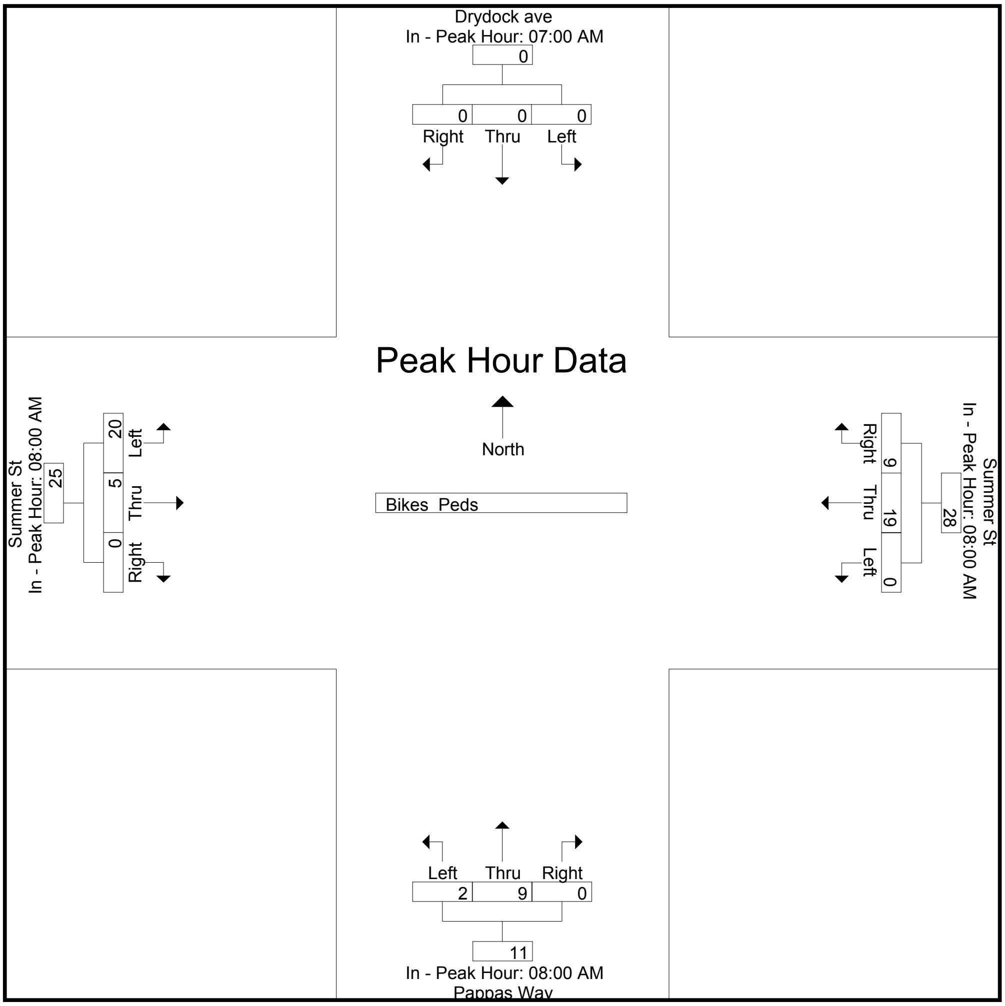

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 1

Groups Printed- Cars - Trucks

	Drydock ave From North			Summer St From East				Pappas Way From South			Summer St From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-TR	Left	Thru	Right	Left	Thru	Right	U-TR	Int. Total
04:00 PM	40	21	63	4	120	14	0	14	8	1	19	185	43	0	532
04:15 PM	52	14	41	1	99	16	0	19	5	0	23	165	42	1	478
04:30 PM	64	25	54	0	105	25	0	20	5	2	15	187	34	0	536
04:45 PM	44	21	66	0	116	16	0	20	7	6	14	187	37	0	534
Total	200	81	224	5	440	71	0	73	25	9	71	724	156	1	2080
05:00 PM	81	40	49	5	100	27	2	21	9	2	6	177	53	0	572
05:15 PM	46	21	59	3	105	16	0	12	3	4	11	208	72	0	560
05:30 PM	60	27	44	3	108	14	1	10	6	5	11	217	61	0	567
05:45 PM	52	15	29	3	82	8	0	12	1	3	10	236	55	1	507
Total	239	103	181	14	395	65	3	55	19	14	38	838	241	1	2206
Grand Total	439	184	405	19	835	136	3	128	44	23	109	1562	397	2	4286
Apprch %	42.7	17.9	39.4	1.9	84.1	13.7	0.3	65.6	22.6	11.8	5.3	75.5	19.2	0.1	
Total %	10.2	4.3	9.4	0.4	19.5	3.2	0.1	3	1	0.5	2.5	36.4	9.3	0	
Cars	438	178	386	19	804	133	3	124	43	23	91	1533	390	2	4167
% Cars	99.8	96.7	95.3	100	96.3	97.8	100	96.9	97.7	100	83.5	98.1	98.2	100	97.2
Trucks	1	6	19	0	31	3	0	4	1	0	18	29	7	0	119
% Trucks	0.2	3.3	4.7	0	3.7	2.2	0	3.1	2.3	0	16.5	1.9	1.8	0	2.8

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
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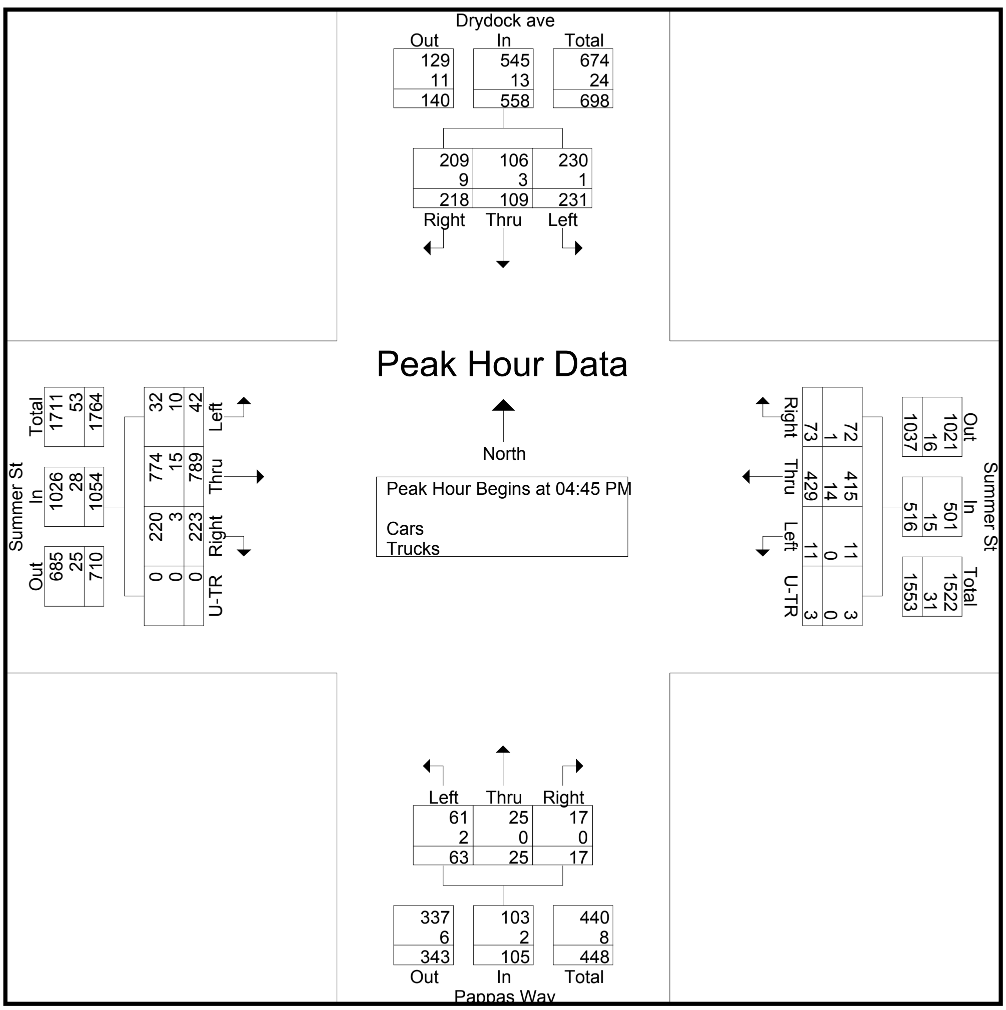
	Drydock ave From North				Summer St From East					Pappas Way From South				Summer St From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 04:45 PM																			
04:45 PM	44	21	66	131	0	116	16	0	132	20	7	6	33	14	187	37	0	238	534
05:00 PM	81	40	49	170	5	100	27	2	134	21	9	2	32	6	177	53	0	236	572
05:15 PM	46	21	59	126	3	105	16	0	124	12	3	4	19	11	208	72	0	291	560
05:30 PM	60	27	44	131	3	108	14	1	126	10	6	5	21	11	217	61	0	289	567
Total Volume	231	109	218	558	11	429	73	3	516	63	25	17	105	42	789	223	0	1054	2233
% App. Total	41.4	19.5	39.1		2.1	83.1	14.1	0.6		60	23.8	16.2		4	74.9	21.2	0		
PHF	.713	.681	.826	.821	.550	.925	.676	.375	.963	.750	.694	.708	.795	.750	.909	.774	.000	.905	.976
Cars	230	106	209	545	11	415	72	3	501	61	25	17	103	32	774	220	0	1026	2175
% Cars	99.6	97.2	95.9	97.7	100	96.7	98.6	100	97.1	96.8	100	100	98.1	76.2	98.1	98.7	0	97.3	97.4
Trucks	1	3	9	13	0	14	1	0	15	2	0	0	2	10	15	3	0	28	58
% Trucks	0.4	2.8	4.1	2.3	0	3.3	1.4	0	2.9	3.2	0	0	1.9	23.8	1.9	1.3	0	2.7	2.6



Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
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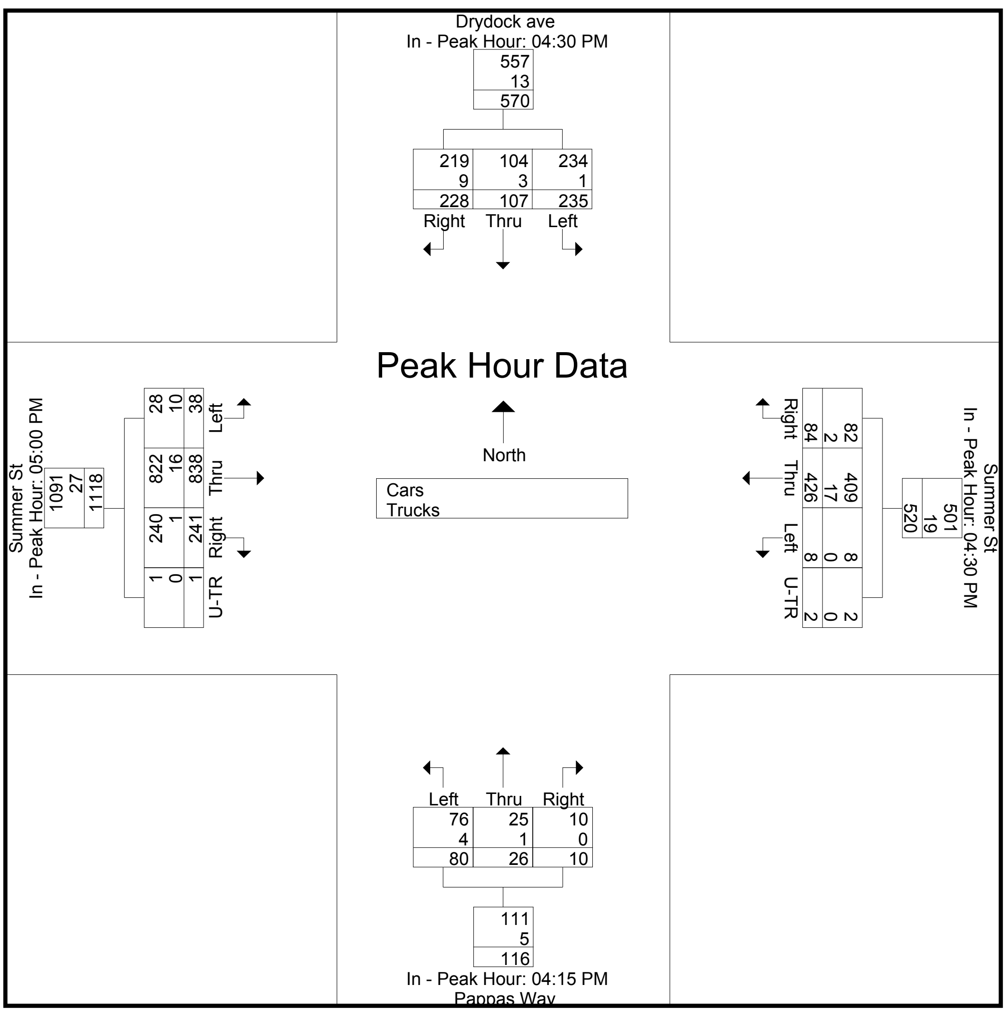
	Drydock ave From North				Summer St From East					Pappas Way From South				Summer St From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																			
Peak Hour for Each Approach Begins at:																			
	04:30 PM				04:30 PM					04:15 PM				05:00 PM					
+0 mins.	64	25	54	143	0	105	25	0	130	19	5	0	24	6	177	53	0	236	
+15 mins.	44	21	66	131	0	116	16	0	132	20	5	2	27	11	208	72	0	291	
+30 mins.	81	40	49	170	5	100	27	2	134	20	7	6	33	11	217	61	0	289	
+45 mins.	46	21	59	126	3	105	16	0	124	21	9	2	32	10	236	55	1	302	
Total Volume	235	107	228	570	8	426	84	2	520	80	26	10	116	38	838	241	1	1118	
% App. Total	41.2	18.8	40		1.5	81.9	16.2	0.4		69	22.4	8.6		3.4	75	21.6	0.1		
PHF	.725	.669	.864	.838	.400	.918	.778	.250	.970	.952	.722	.417	.879	.864	.888	.837	.250	.925	
Cars	234	104	219	557	8	409	82	2	501	76	25	10	111	28	822	240	1	1091	
% Cars	99.6	97.2	96.1	97.7	100	96	97.6	100	96.3	95	96.2	100	95.7	73.7	98.1	99.6	100	97.6	
Trucks	1	3	9	13	0	17	2	0	19	4	1	0	5	10	16	1	0	27	
% Trucks	0.4	2.8	3.9	2.3	0	4	2.4	0	3.7	5	3.8	0	4.3	26.3	1.9	0.4	0	2.4	



Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 1

Groups Printed- Cars

	Drydock ave From North			Summer St From East				Pappas Way From South			Summer St From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-TR	Left	Thru	Right	Left	Thru	Right	U-TR	Int. Total
04:00 PM	40	19	59	4	116	13	0	14	8	1	15	178	43	0	510
04:15 PM	52	13	40	1	97	16	0	17	5	0	22	162	41	1	467
04:30 PM	64	25	51	0	98	24	0	20	4	2	14	186	31	0	519
04:45 PM	43	19	62	0	110	16	0	19	7	6	12	185	35	0	514
Total	199	76	212	5	421	69	0	70	24	9	63	711	150	1	2010
05:00 PM	81	39	48	5	99	26	2	20	9	2	4	174	53	0	562
05:15 PM	46	21	58	3	102	16	0	12	3	4	9	203	71	0	548
05:30 PM	60	27	41	3	104	14	1	10	6	5	7	212	61	0	551
05:45 PM	52	15	27	3	78	8	0	12	1	3	8	233	55	1	496
Total	239	102	174	14	383	64	3	54	19	14	28	822	240	1	2157
Grand Total	438	178	386	19	804	133	3	124	43	23	91	1533	390	2	4167
Apprch %	43.7	17.8	38.5	2	83.8	13.9	0.3	65.3	22.6	12.1	4.5	76	19.3	0.1	
Total %	10.5	4.3	9.3	0.5	19.3	3.2	0.1	3	1	0.6	2.2	36.8	9.4	0	

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
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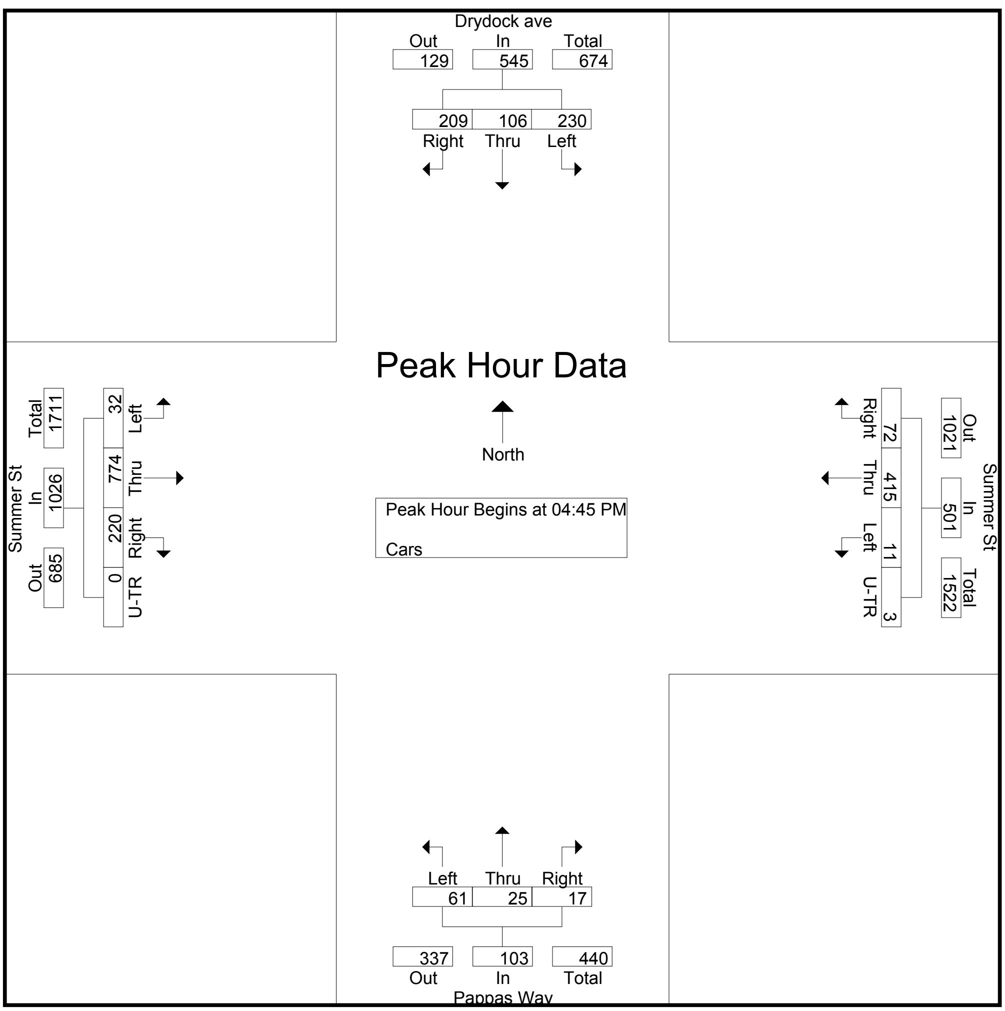
	Drydock ave From North				Summer St From East					Pappas Way From South				Summer St From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 04:45 PM																			
04:45 PM	43	19	62	124	0	110	16	0	126	19	7	6	32	12	185	35	0	232	514
05:00 PM	81	39	48	168	5	99	26	2	132	20	9	2	31	4	174	53	0	231	562
05:15 PM	46	21	58	125	3	102	16	0	121	12	3	4	19	9	203	71	0	283	548
05:30 PM	60	27	41	128	3	104	14	1	122	10	6	5	21	7	212	61	0	280	551
Total Volume	230	106	209	545	11	415	72	3	501	61	25	17	103	32	774	220	0	1026	2175
% App. Total	42.2	19.4	38.3		2.2	82.8	14.4	0.6		59.2	24.3	16.5		3.1	75.4	21.4	0		
PHF	.710	.679	.843	.811	.550	.943	.692	.375	.949	.763	.694	.708	.805	.667	.913	.775	.000	.906	.968



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM					04:15 PM				05:00 PM				
+0 mins.	64	25	51	140	0	98	24	0	122	17	5	0	22	4	174	53	0	231
+15 mins.	43	19	62	124	0	110	16	0	126	20	4	2	26	9	203	71	0	283
+30 mins.	81	39	48	168	5	99	26	2	132	19	7	6	32	7	212	61	0	280
+45 mins.	46	21	58	125	3	102	16	0	121	20	9	2	31	8	233	55	1	297
Total Volume	234	104	219	557	8	409	82	2	501	76	25	10	111	28	822	240	1	1091
% App. Total	42	18.7	39.3		1.6	81.6	16.4	0.4		68.5	22.5	9		2.6	75.3	22	0.1	
PHF	.722	.667	.883	.829	.400	.930	.788	.250	.949	.950	.694	.417	.867	.778	.882	.845	.250	.918

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
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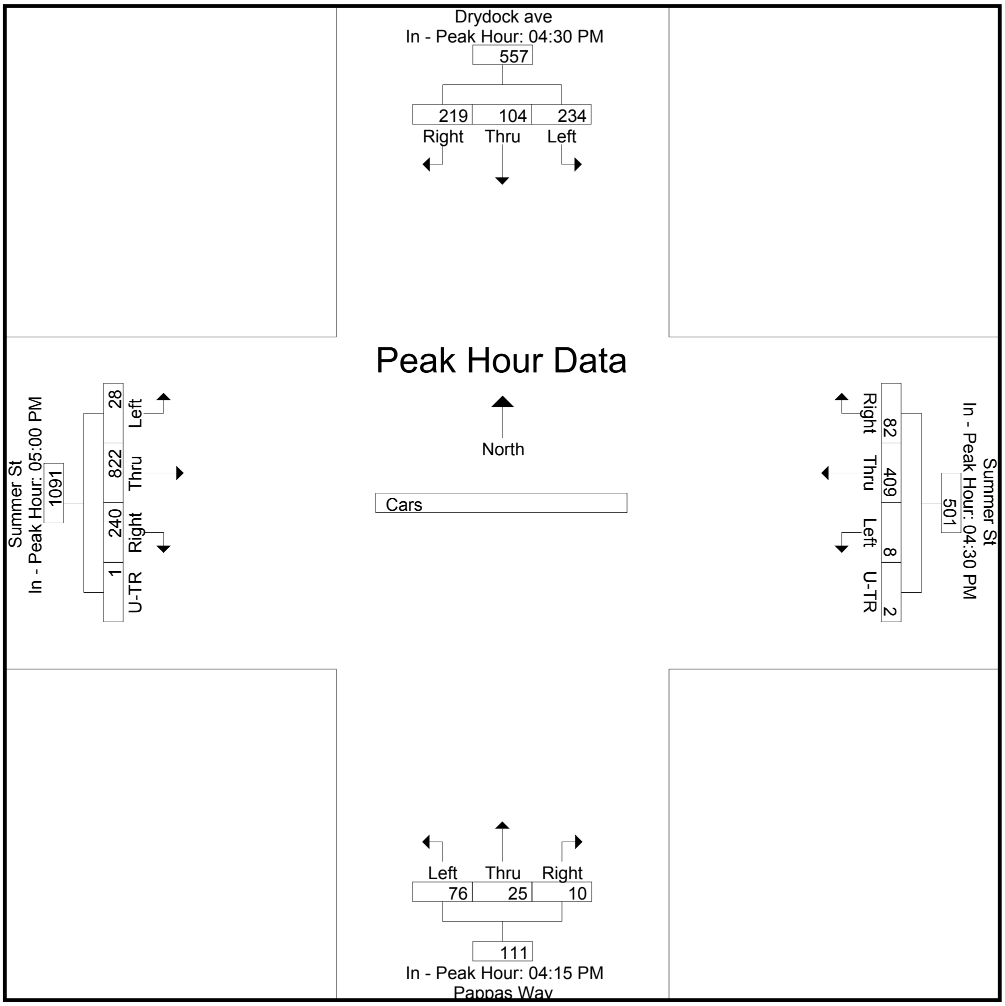

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
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Groups Printed- Trucks

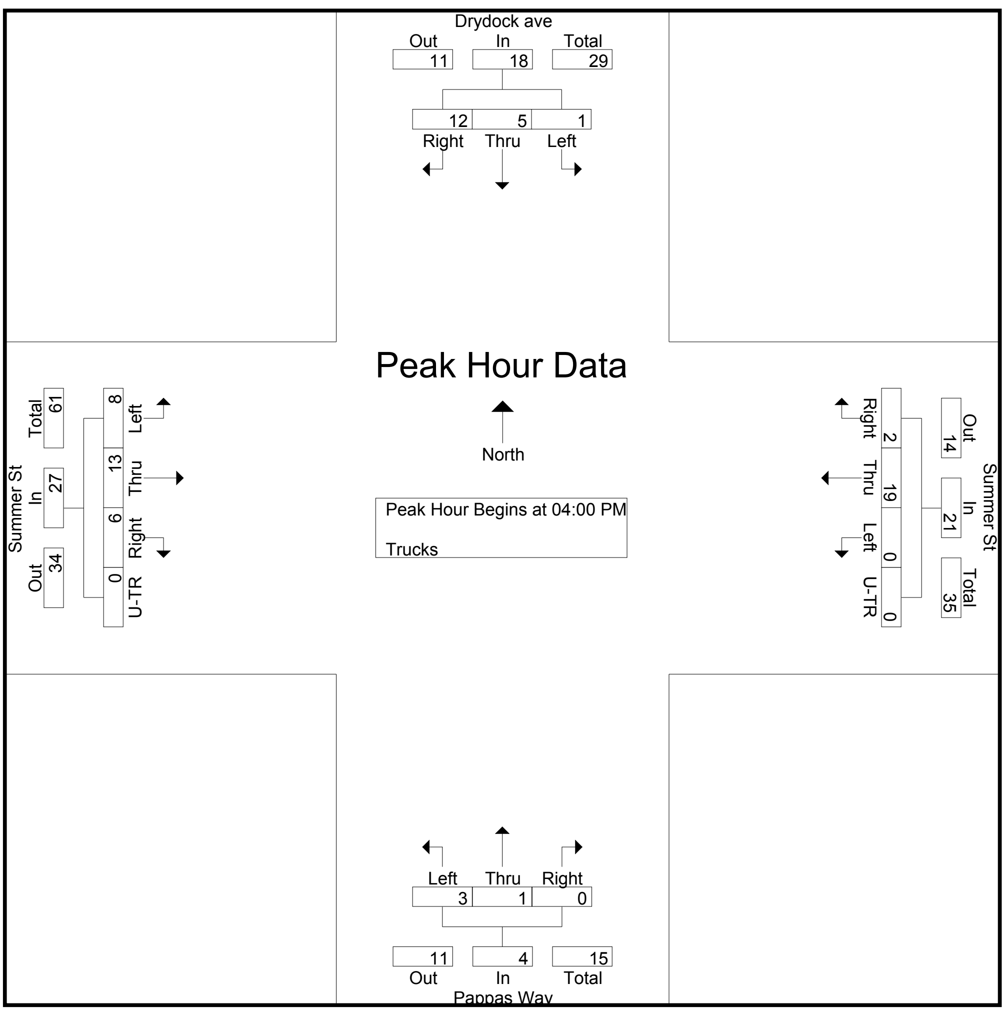
	Drydock ave From North			Summer St From East				Pappas Way From South			Summer St From West				
Start Time	Left	Thru	Right	Left	Thru	Right	U-TR	Left	Thru	Right	Left	Thru	Right	U-TR	Int. Total
04:00 PM	0	2	4	0	4	1	0	0	0	0	4	7	0	0	22
04:15 PM	0	1	1	0	2	0	0	2	0	0	1	3	1	0	11
04:30 PM	0	0	3	0	7	1	0	0	1	0	1	1	3	0	17
04:45 PM	1	2	4	0	6	0	0	1	0	0	2	2	2	0	20
Total	1	5	12	0	19	2	0	3	1	0	8	13	6	0	70
05:00 PM	0	1	1	0	1	1	0	1	0	0	2	3	0	0	10
05:15 PM	0	0	1	0	3	0	0	0	0	0	2	5	1	0	12
05:30 PM	0	0	3	0	4	0	0	0	0	0	4	5	0	0	16
05:45 PM	0	0	2	0	4	0	0	0	0	0	2	3	0	0	11
Total	0	1	7	0	12	1	0	1	0	0	10	16	1	0	49
Grand Total	1	6	19	0	31	3	0	4	1	0	18	29	7	0	119
Apprch %	3.8	23.1	73.1	0	91.2	8.8	0	80	20	0	33.3	53.7	13	0	
Total %	0.8	5	16	0	26.1	2.5	0	3.4	0.8	0	15.1	24.4	5.9	0	

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015

	Drydock ave From North				Summer St From East					Pappas Way From South				Summer St From West					
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																			
Peak Hour for Entire Intersection Begins at 04:00 PM																			
04:00 PM	0	2	4	6	0	4	1	0	5	0	0	0	0	4	7	0	0	11	22
04:15 PM	0	1	1	2	0	2	0	0	2	2	0	0	2	1	3	1	0	5	11
04:30 PM	0	0	3	3	0	7	1	0	8	0	1	0	1	1	1	3	0	5	17
04:45 PM	1	2	4	7	0	6	0	0	6	1	0	0	1	2	2	2	0	6	20
Total Volume	1	5	12	18	0	19	2	0	21	3	1	0	4	8	13	6	0	27	70
% App. Total	5.6	27.8	66.7		0	90.5	9.5	0		75	25	0		29.6	48.1	22.2	0		
PHF	.250	.625	.750	.643	.000	.679	.500	.000	.656	.375	.250	.000	.500	.500	.464	.500	.000	.614	.795



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	U-TR	App. Total
	04:00 PM				04:00 PM					04:15 PM				04:45 PM				
+0 mins.	0	2	4	6	0	4	1	0	5	2	0	0	2	2	2	2	0	6
+15 mins.	0	1	1	2	0	2	0	0	2	0	1	0	1	2	3	0	0	5
+30 mins.	0	0	3	3	0	7	1	0	8	1	0	0	1	2	5	1	0	8
+45 mins.	1	2	4	7	0	6	0	0	6	1	0	0	1	4	5	0	0	9
Total Volume	1	5	12	18	0	19	2	0	21	4	1	0	5	10	15	3	0	28
% App. Total	5.6	27.8	66.7		0	90.5	9.5	0		80	20	0		35.7	53.6	10.7	0	
PHF	.250	.625	.750	.643	.000	.679	.500	.000	.656	.500	.250	.000	.625	.625	.750	.375	.000	.778

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
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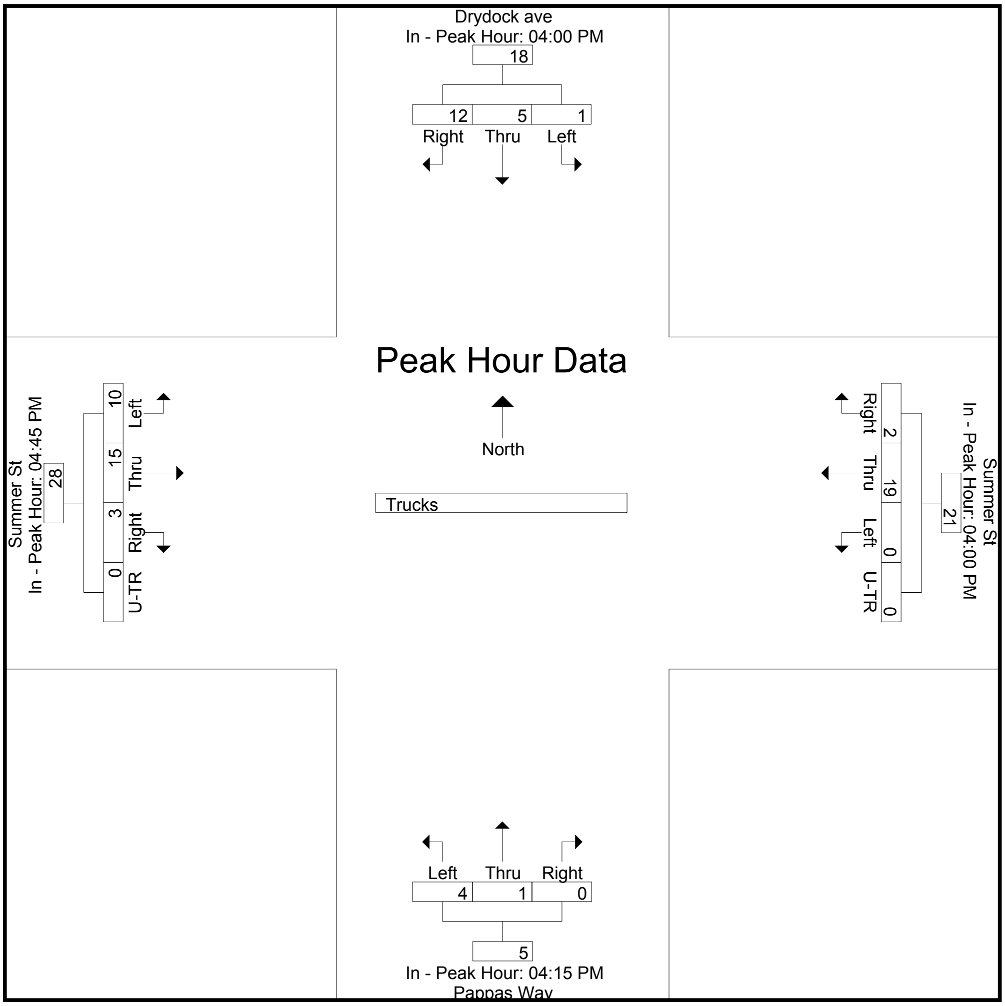

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
Page No : 1

Groups Printed- Bikes Peds

	Drydock ave From North				Summer St From East				Pappas Way From South				Summer St From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	3	4	0	1	0	1	0	1	0	9	1	1	0	2	16	7	23
04:15 PM	0	0	3	7	0	3	0	5	0	0	0	6	1	1	0	3	21	8	29
04:30 PM	0	1	1	3	0	0	0	2	0	0	0	8	0	2	0	5	18	4	22
04:45 PM	0	1	3	3	0	0	0	1	0	0	0	8	0	0	1	3	15	5	20
Total	0	2	10	17	0	4	0	9	0	1	0	31	2	4	1	13	70	24	94
05:00 PM	1	1	1	10	0	1	0	5	0	0	0	13	0	6	1	4	32	11	43
05:15 PM	1	0	2	18	0	0	0	5	1	0	0	14	0	4	0	1	38	8	46
05:30 PM	2	0	3	22	0	3	0	2	0	0	0	15	0	2	0	0	39	10	49
05:45 PM	0	1	5	15	0	3	0	1	0	0	0	14	0	2	3	5	35	14	49
Total	4	2	11	65	0	7	0	13	1	0	0	56	0	14	4	10	144	43	187
Grand Total	4	4	21	82	0	11	0	22	1	1	0	87	2	18	5	23	214	67	281
Apprch %	13.8	13.8	72.4		0	100	0		50	50	0		8	72	20				
Total %	6	6	31.3		0	16.4	0		1.5	1.5	0		3	26.9	7.5		76.2	23.8	

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015
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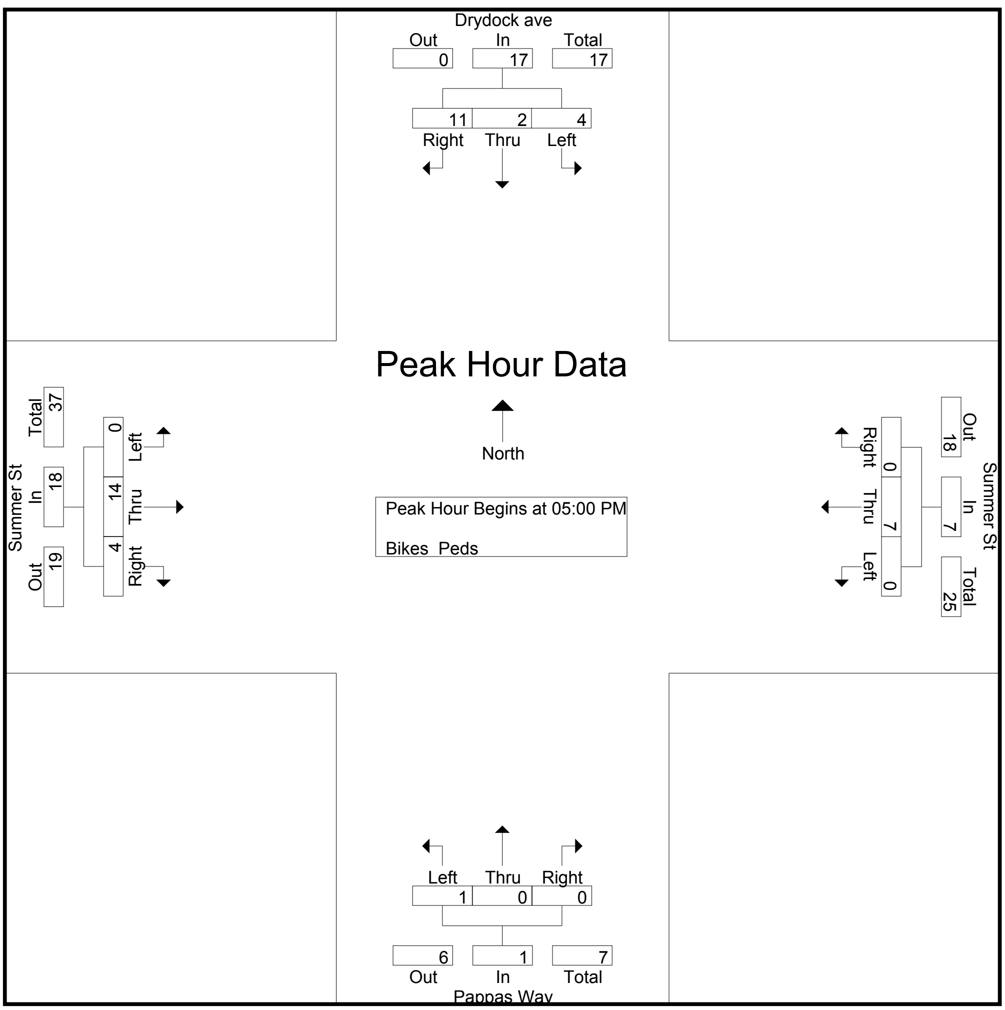
	Drydock ave From North				Summer St From East				Pappas Way From South				Summer St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	1	1	1	3	0	1	0	1	0	0	0	0	0	6	1	7	11
05:15 PM	1	0	2	3	0	0	0	0	1	0	0	1	0	4	0	4	8
05:30 PM	2	0	3	5	0	3	0	3	0	0	0	0	0	2	0	2	10
05:45 PM	0	1	5	6	0	3	0	3	0	0	0	0	0	2	3	5	14
Total Volume	4	2	11	17	0	7	0	7	1	0	0	1	0	14	4	18	43
% App. Total	23.5	11.8	64.7		0	100	0		100	0	0		0	77.8	22.2		
PHF	.500	.500	.550	.708	.000	.583	.000	.583	.250	.000	.000	.250	.000	.583	.333	.643	.768

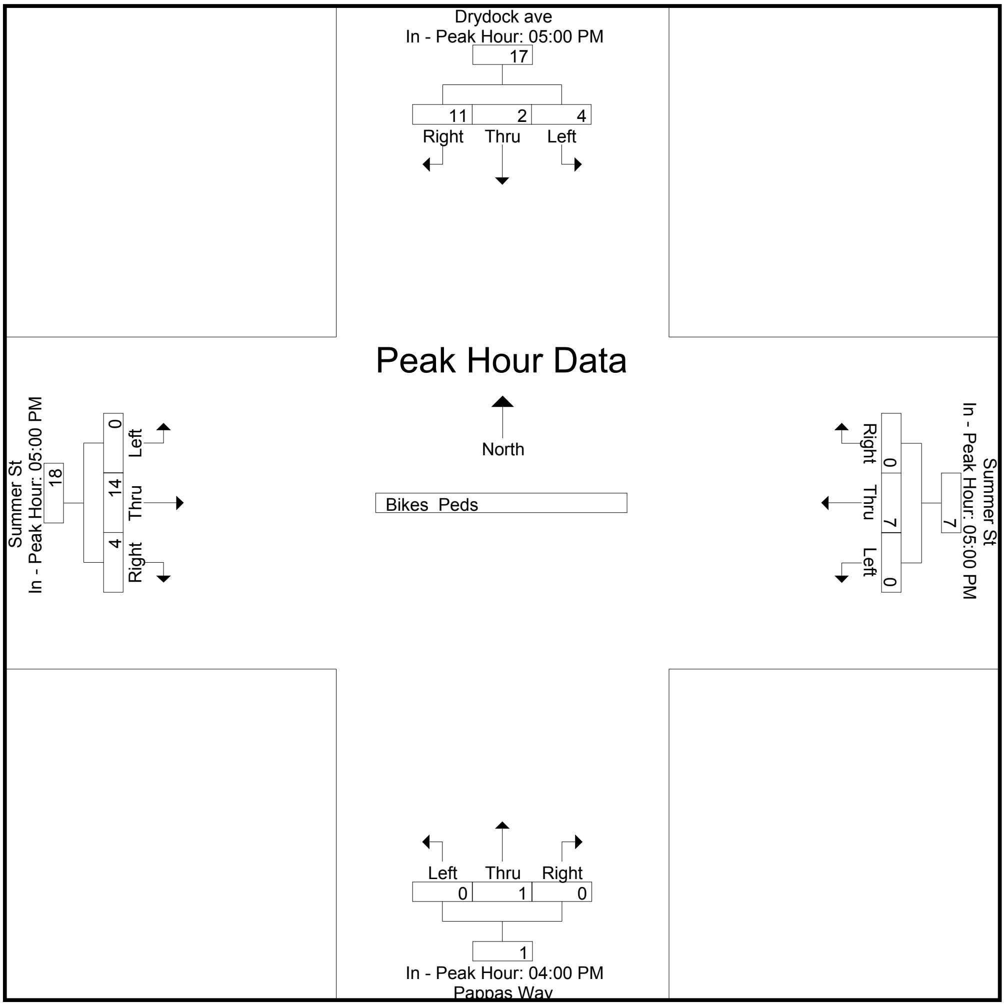


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																
Peak Hour for Each Approach Begins at:																
	05:00 PM				05:00 PM				04:00 PM				05:00 PM			
+0 mins.	1	1	1	3	0	1	0	1	0	1	0	1	0	6	1	7
+15 mins.	1	0	2	3	0	0	0	0	0	0	0	0	0	4	0	4
+30 mins.	2	0	3	5	0	3	0	3	0	0	0	0	0	2	0	2
+45 mins.	0	1	5	6	0	3	0	3	0	0	0	0	0	2	3	5
Total Volume	4	2	11	17	0	7	0	7	0	1	0	1	0	14	4	18
% App. Total	23.5	11.8	64.7		0	100	0		0	100	0		0	77.8	22.2	
PHF	.500	.500	.550	.708	.000	.583	.000	.583	.000	.250	.000	.250	.000	.583	.333	.643

Accurate Counts
978-664-2565

N/S Street : Drydock Ave / Pappas Way
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Clear

File Name : 13162001
Site Code : 13162001
Start Date : 11/4/2015



Accurate Counts

978-664-2565

N/S Street : Pumphouse Road
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 1

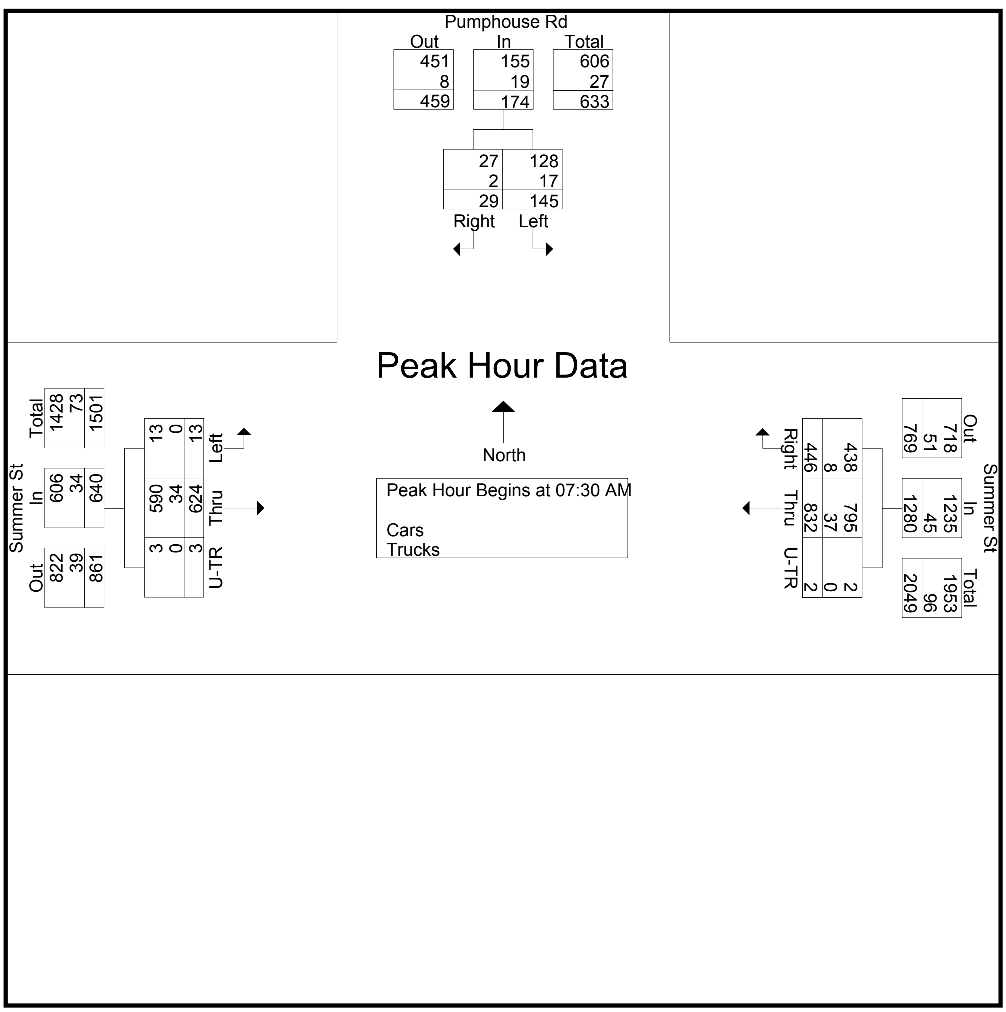
Groups Printed- Cars - Trucks

	Pumphouse Rd From North		Summer St From East			Summer St From West			
Start Time	Left	Right	Thru	Right	U-TR	Left	Thru	U-TR	Int. Total
07:00 AM	32	4	158	98	0	0	128	0	420
07:15 AM	28	8	171	108	0	3	126	1	445
07:30 AM	40	7	219	144	1	2	147	1	561
07:45 AM	23	10	204	108	1	2	146	0	494
Total	123	29	752	458	2	7	547	2	1920
08:00 AM	39	5	207	104	0	2	170	2	529
08:15 AM	43	7	202	90	0	7	161	0	510
08:30 AM	35	3	225	106	1	5	181	3	559
08:45 AM	31	9	195	66	0	5	144	0	450
Total	148	24	829	366	1	19	656	5	2048
Grand Total	271	53	1581	824	3	26	1203	7	3968
Apprch %	83.6	16.4	65.7	34.2	0.1	2.1	97.3	0.6	
Total %	6.8	1.3	39.8	20.8	0.1	0.7	30.3	0.2	
Cars	236	49	1497	797	3	26	1139	7	3754
% Cars	87.1	92.5	94.7	96.7	100	100	94.7	100	94.6
Trucks	35	4	84	27	0	0	64	0	214
% Trucks	12.9	7.5	5.3	3.3	0	0	5.3	0	5.4

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016

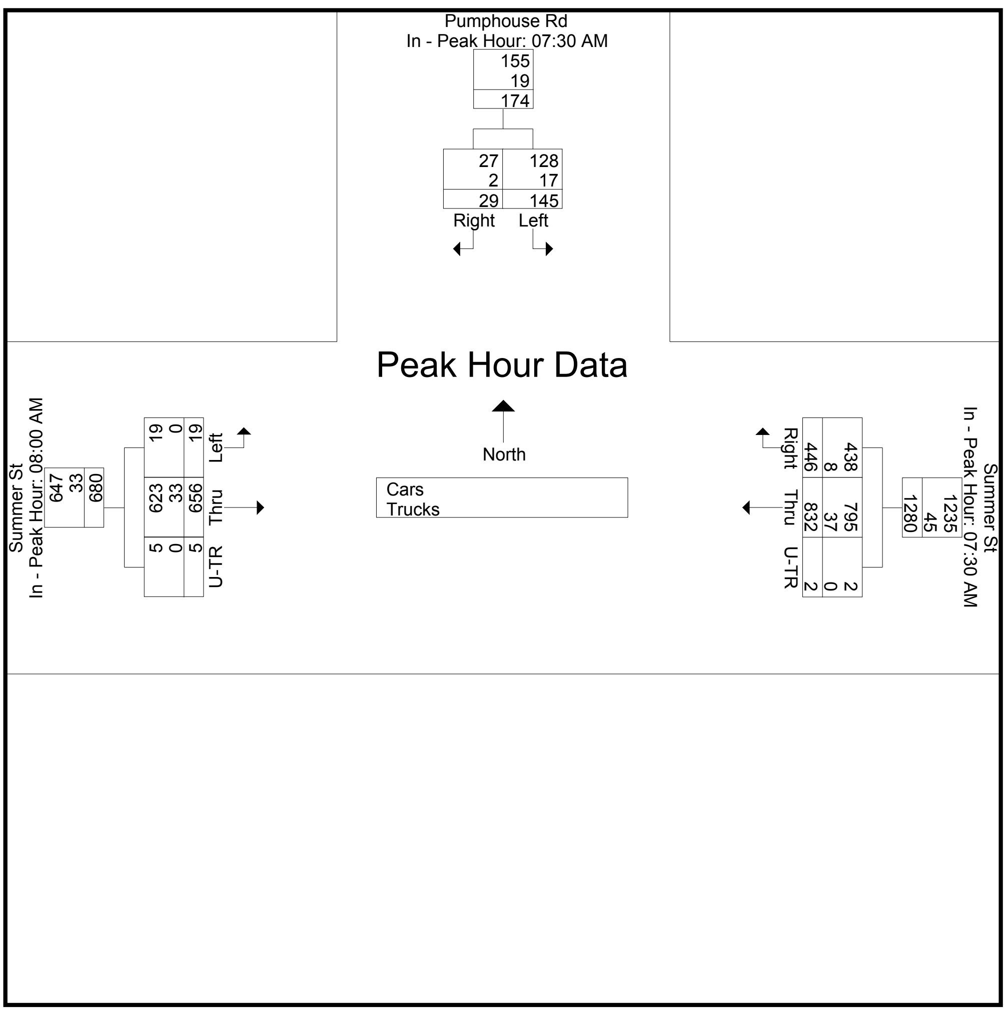
	Pumphouse Rd From North			Summer St From East				Summer St From West				
Start Time	Left	Right	App. Total	Thru	Right	U-TR	App. Total	Left	Thru	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:30 AM												
07:30 AM	40	7	47	219	144	1	364	2	147	1	150	561
07:45 AM	23	10	33	204	108	1	313	2	146	0	148	494
08:00 AM	39	5	44	207	104	0	311	2	170	2	174	529
08:15 AM	43	7	50	202	90	0	292	7	161	0	168	510
Total Volume	145	29	174	832	446	2	1280	13	624	3	640	2094
% App. Total	83.3	16.7		65	34.8	0.2		2	97.5	0.5		
PHF	.843	.725	.870	.950	.774	.500	.879	.464	.918	.375	.920	.933
Cars	128	27	155	795	438	2	1235	13	590	3	606	1996
% Cars	88.3	93.1	89.1	95.6	98.2	100	96.5	100	94.6	100	94.7	95.3
Trucks	17	2	19	37	8	0	45	0	34	0	34	98
% Trucks	11.7	6.9	10.9	4.4	1.8	0	3.5	0	5.4	0	5.3	4.7



Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016

	Pumphouse Rd From North			Summer St From East				Summer St From West				
Start Time	Left	Right	App. Total	Thru	Right	U-TR	App. Total	Left	Thru	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Each Approach Begins at:												
	07:30 AM			07:30 AM				08:00 AM				
+0 mins.	40	7	47	219	144	1	364	2	170	2	174	
+15 mins.	23	10	33	204	108	1	313	7	161	0	168	
+30 mins.	39	5	44	207	104	0	311	5	181	3	189	
+45 mins.	43	7	50	202	90	0	292	5	144	0	149	
Total Volume	145	29	174	832	446	2	1280	19	656	5	680	
% App. Total	83.3	16.7		65	34.8	0.2		2.8	96.5	0.7		
PHF	.843	.725	.870	.950	.774	.500	.879	.679	.906	.417	.899	
Cars	128	27	155	795	438	2	1235	19	623	5	647	
% Cars	88.3	93.1	89.1	95.6	98.2	100	96.5	100	95	100	95.1	
Trucks	17	2	19	37	8	0	45	0	33	0	33	
% Trucks	11.7	6.9	10.9	4.4	1.8	0	3.5	0	5	0	4.9	



Accurate Counts
978-664-2565

N/S Street : Pumphouse Road
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 1

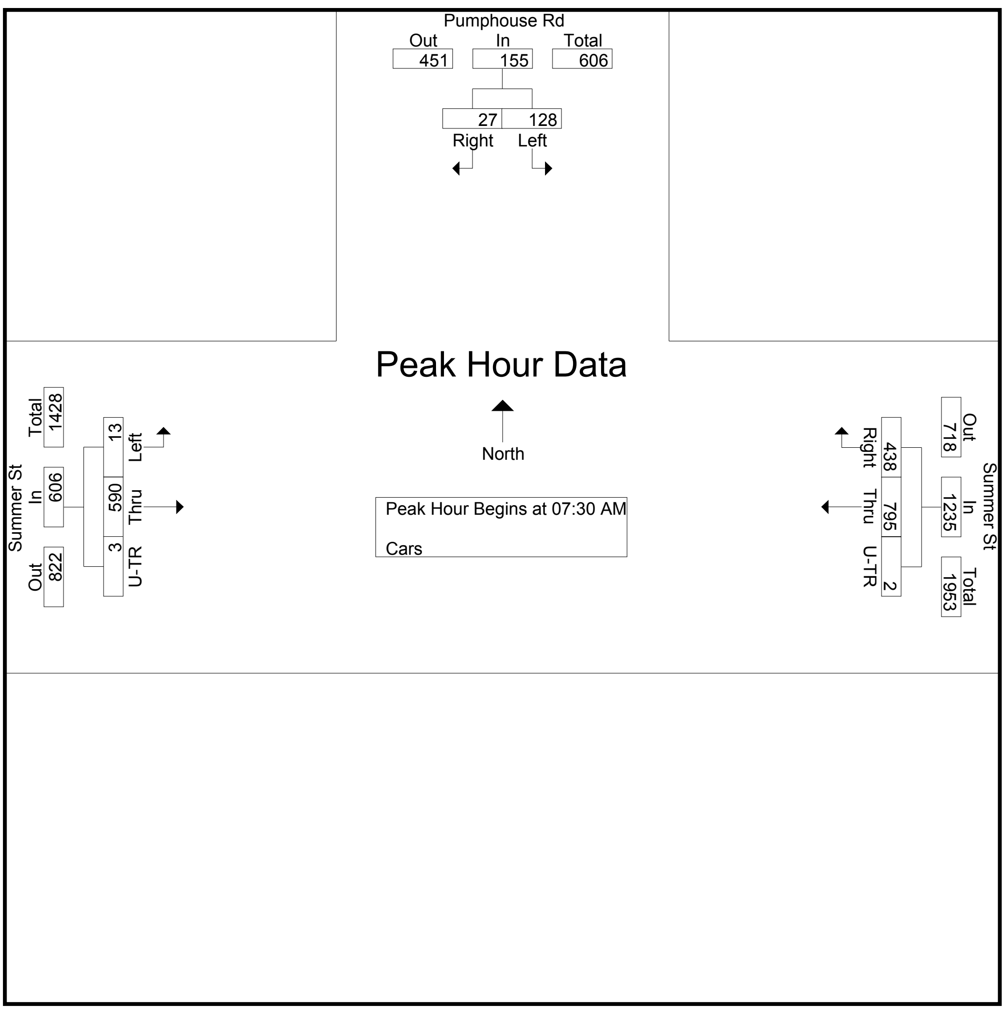
Groups Printed- Cars

	Pumphouse Rd From North		Summer St From East			Summer St From West			
Start Time	Left	Right	Thru	Right	U-TR	Left	Thru	U-TR	Int. Total
07:00 AM	30	3	152	95	0	0	123	0	403
07:15 AM	25	8	162	106	0	3	119	1	424
07:30 AM	36	6	212	142	1	2	136	1	536
07:45 AM	20	10	194	108	1	2	138	0	473
Total	111	27	720	451	2	7	516	2	1836
08:00 AM	34	4	196	100	0	2	161	2	499
08:15 AM	38	7	193	88	0	7	155	0	488
08:30 AM	29	3	209	98	1	5	171	3	519
08:45 AM	24	8	179	60	0	5	136	0	412
Total	125	22	777	346	1	19	623	5	1918
Grand Total	236	49	1497	797	3	26	1139	7	3754
Apprch %	82.8	17.2	65.2	34.7	0.1	2.2	97.2	0.6	
Total %	6.3	1.3	39.9	21.2	0.1	0.7	30.3	0.2	

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 2

	Pumphouse Rd From North			Summer St From East				Summer St From West				
Start Time	Left	Right	App. Total	Thru	Right	U-TR	App. Total	Left	Thru	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 07:30 AM												
07:30 AM	36	6	42	212	142	1	355	2	136	1	139	536
07:45 AM	20	10	30	194	108	1	303	2	138	0	140	473
08:00 AM	34	4	38	196	100	0	296	2	161	2	165	499
08:15 AM	38	7	45	193	88	0	281	7	155	0	162	488
Total Volume	128	27	155	795	438	2	1235	13	590	3	606	1996
% App. Total	82.6	17.4		64.4	35.5	0.2		2.1	97.4	0.5		
PHF	.842	.675	.861	.938	.771	.500	.870	.464	.916	.375	.918	.931

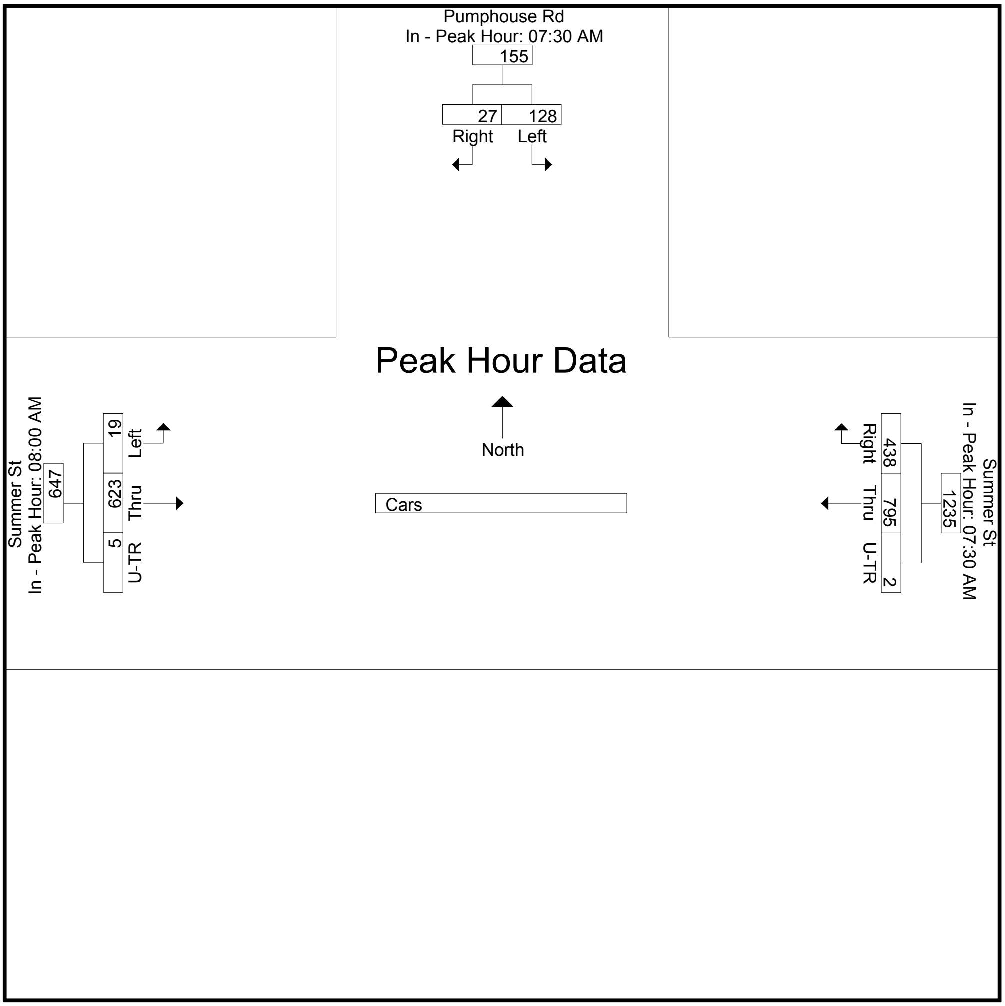


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:30 AM				08:00 AM			
+0 mins.	36	6	42	212	142	1	355	2	161	2	165
+15 mins.	20	10	30	194	108	1	303	7	155	0	162
+30 mins.	34	4	38	196	100	0	296	5	171	3	179
+45 mins.	38	7	45	193	88	0	281	5	136	0	141
Total Volume	128	27	155	795	438	2	1235	19	623	5	647
% App. Total	82.6	17.4		64.4	35.5	0.2		2.9	96.3	0.8	
PHF	.842	.675	.861	.938	.771	.500	.870	.679	.911	.417	.904

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Pumphouse Road
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016

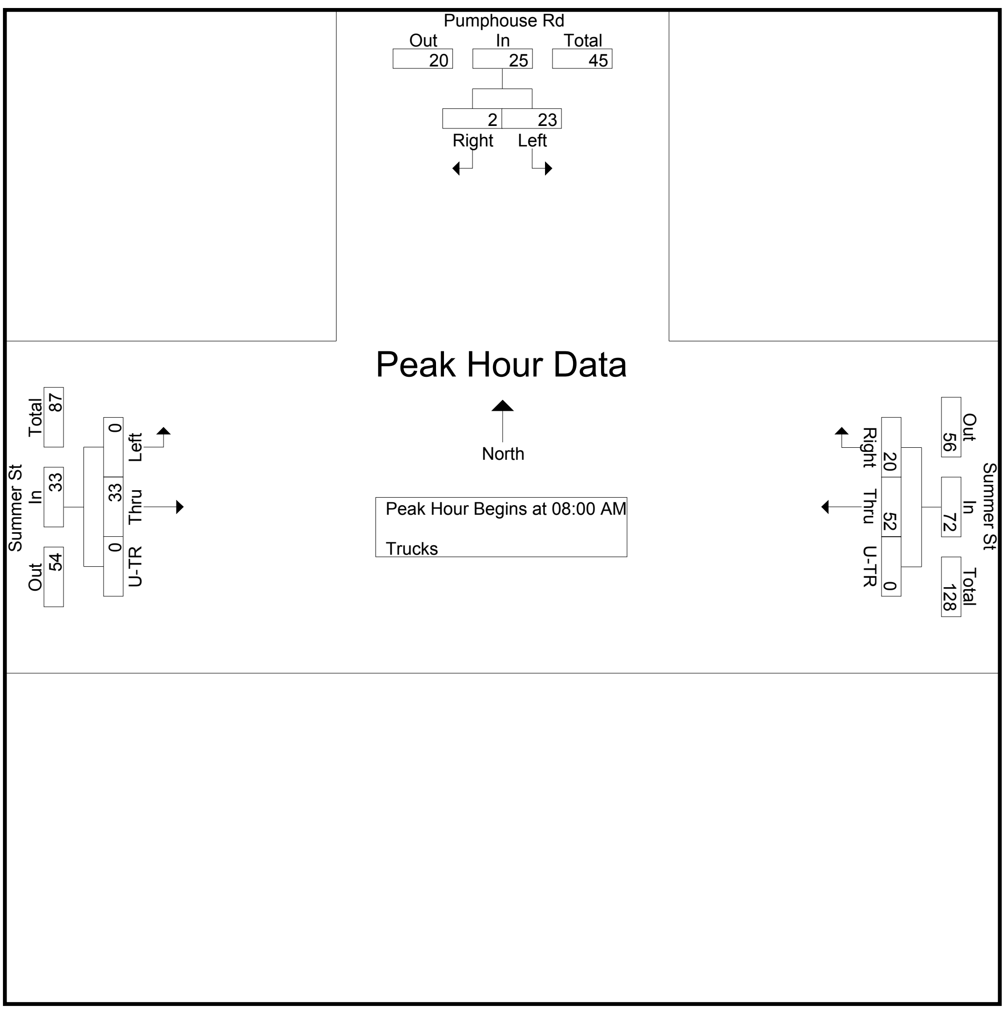
Groups Printed- Trucks

	Pumphouse Rd From North		Summer St From East			Summer St From West			
Start Time	Left	Right	Thru	Right	U-TR	Left	Thru	U-TR	Int. Total
07:00 AM	2	1	6	3	0	0	5	0	17
07:15 AM	3	0	9	2	0	0	7	0	21
07:30 AM	4	1	7	2	0	0	11	0	25
07:45 AM	3	0	10	0	0	0	8	0	21
Total	12	2	32	7	0	0	31	0	84
08:00 AM	5	1	11	4	0	0	9	0	30
08:15 AM	5	0	9	2	0	0	6	0	22
08:30 AM	6	0	16	8	0	0	10	0	40
08:45 AM	7	1	16	6	0	0	8	0	38
Total	23	2	52	20	0	0	33	0	130
Grand Total	35	4	84	27	0	0	64	0	214
Apprch %	89.7	10.3	75.7	24.3	0	0	100	0	
Total %	16.4	1.9	39.3	12.6	0	0	29.9	0	

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 2

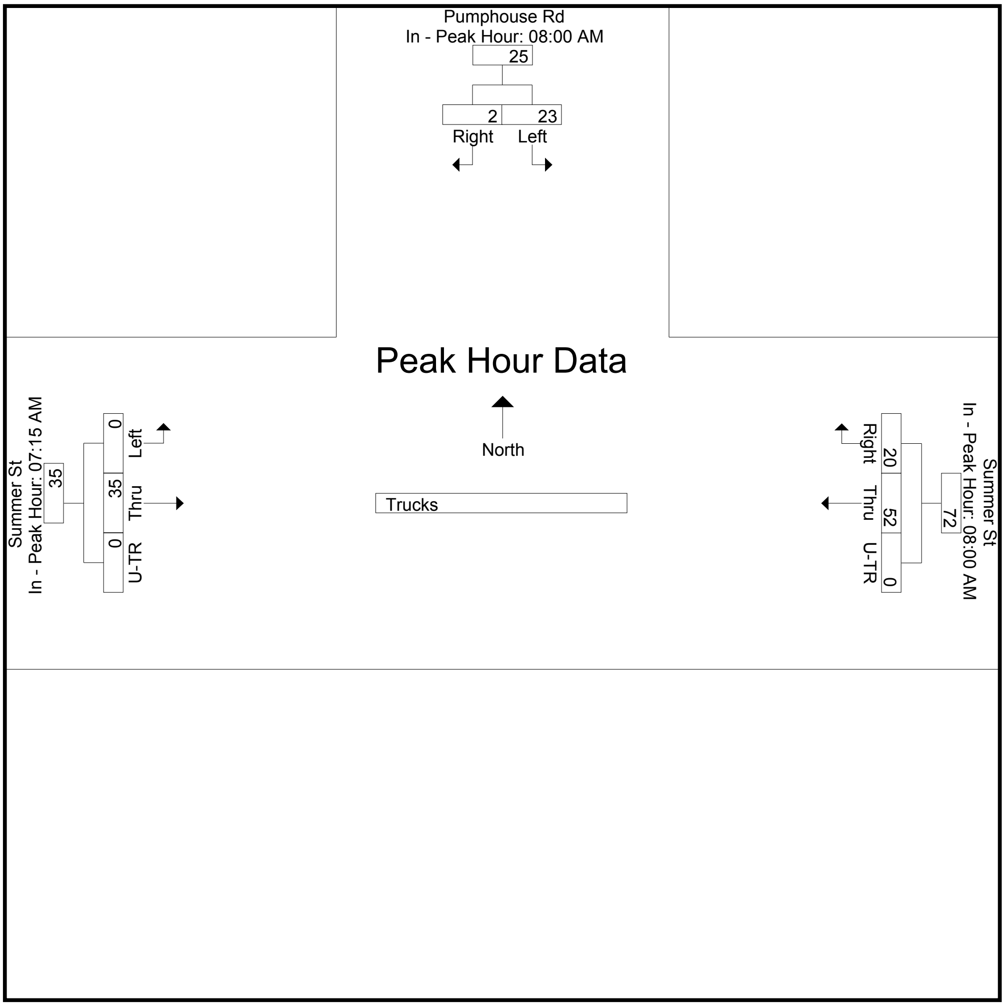
	Pumphouse Rd From North			Summer St From East				Summer St From West				
Start Time	Left	Right	App. Total	Thru	Right	U-TR	App. Total	Left	Thru	U-TR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 08:00 AM												
08:00 AM	5	1	6	11	4	0	15	0	9	0	9	30
08:15 AM	5	0	5	9	2	0	11	0	6	0	6	22
08:30 AM	6	0	6	16	8	0	24	0	10	0	10	40
08:45 AM	7	1	8	16	6	0	22	0	8	0	8	38
Total Volume	23	2	25	52	20	0	72	0	33	0	33	130
% App. Total	92	8		72.2	27.8	0		0	100	0		
PHF	.821	.500	.781	.813	.625	.000	.750	.000	.825	.000	.825	.813



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			08:00 AM				07:15 AM			
+0 mins.	5	1	6	11	4	0	15	0	7	0	7
+15 mins.	5	0	5	9	2	0	11	0	11	0	11
+30 mins.	6	0	6	16	8	0	24	0	8	0	8
+45 mins.	7	1	8	16	6	0	22	0	9	0	9
Total Volume	23	2	25	52	20	0	72	0	35	0	35
% App. Total	92	8		72.2	27.8	0		0	100	0	
PHF	.821	.500	.781	.813	.625	.000	.750	.000	.795	.000	.795

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016



Accurate Counts
978-664-2565

N/S Street : Pumphouse Road
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 1

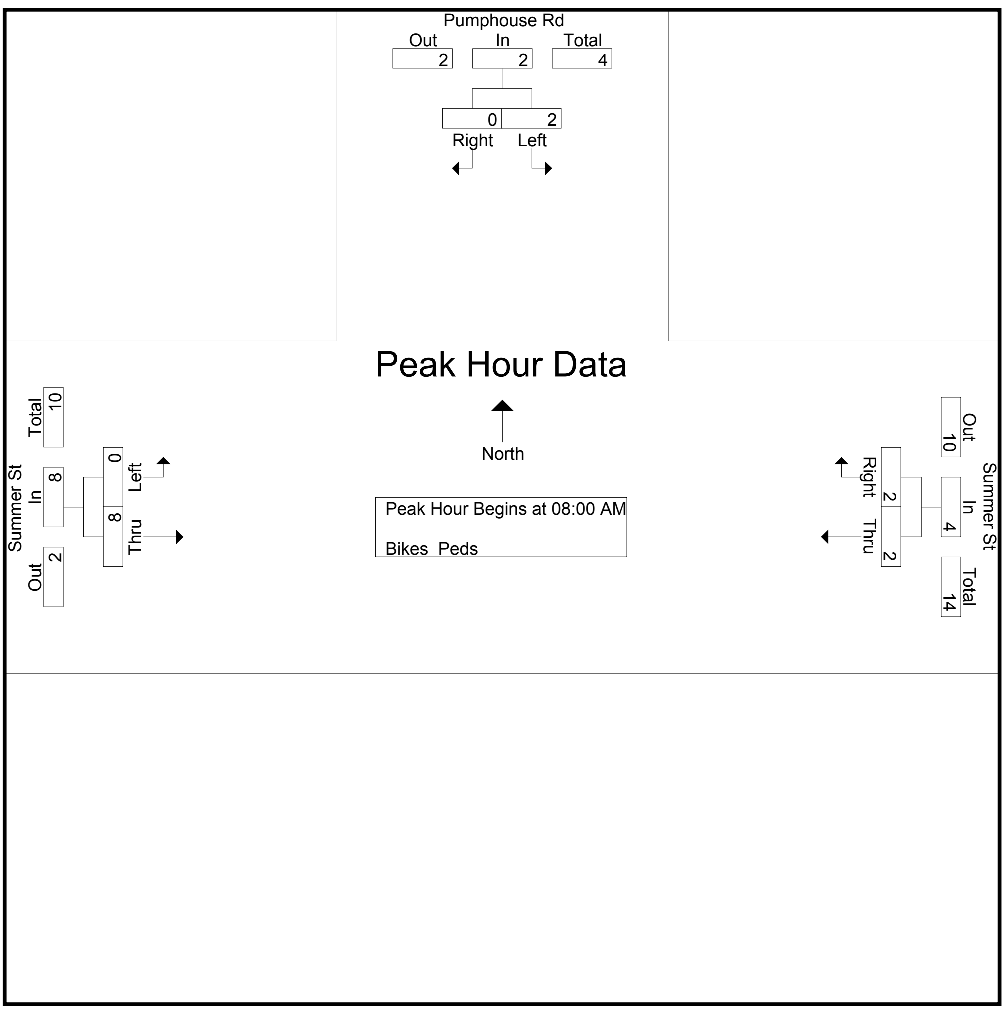
Groups Printed- Bikes Peds

	Pumphouse Rd From North			Summer St From East			Summer St From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	1	0	0	4	0	0	0	5	0	5
07:15 AM	0	0	2	1	0	3	0	0	0	5	1	6
07:30 AM	0	0	2	0	0	2	0	1	0	4	1	5
07:45 AM	0	0	4	1	0	3	0	1	0	7	2	9
Total	0	0	9	2	0	12	0	2	0	21	4	25
08:00 AM	0	0	7	2	0	7	0	1	0	14	3	17
08:15 AM	0	0	2	0	1	2	0	3	1	5	4	9
08:30 AM	0	0	8	0	0	6	0	3	1	15	3	18
08:45 AM	2	0	3	0	1	0	0	1	0	3	4	7
Total	2	0	20	2	2	15	0	8	2	37	14	51
Grand Total	2	0	29	4	2	27	0	10	2	58	18	76
Apprch %	100	0		66.7	33.3		0	100				
Total %	11.1	0		22.2	11.1		0	55.6		76.3	23.7	

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016

	Pumphouse Rd From North			Summer St From East			Summer St From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	0	0	0	2	0	2	0	1	1	3
08:15 AM	0	0	0	0	1	1	0	3	3	4
08:30 AM	0	0	0	0	0	0	0	3	3	3
08:45 AM	2	0	2	0	1	1	0	1	1	4
Total Volume	2	0	2	2	2	4	0	8	8	14
% App. Total	100	0		50	50		0	100		
PHF	.250	.000	.250	.250	.500	.500	.000	.667	.667	.875

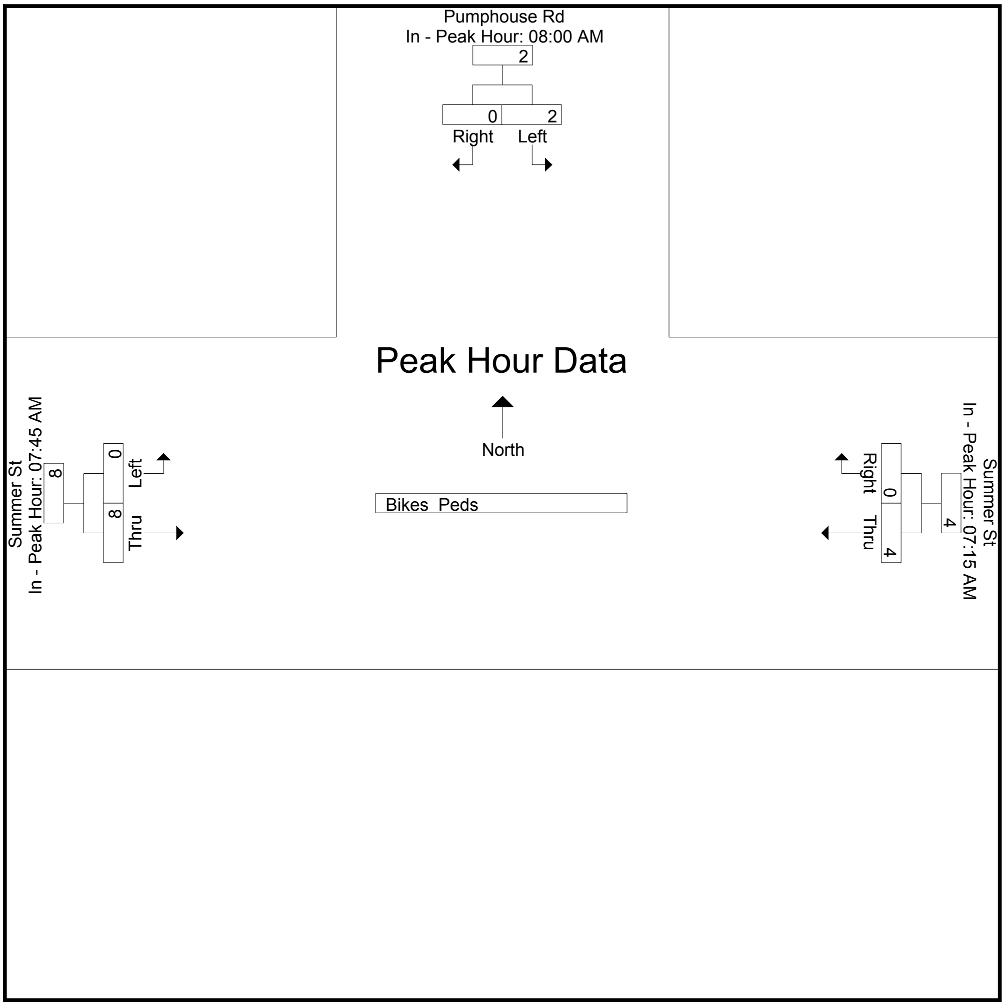


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			07:15 AM			07:45 AM		
+0 mins.	0	0	0	1	0	1	0	1	1
+15 mins.	0	0	0	0	0	0	0	1	1
+30 mins.	0	0	0	1	0	1	0	3	3
+45 mins.	2	0	2	2	0	2	0	3	3
Total Volume	2	0	2	4	0	4	0	8	8
% App. Total	100	0		100	0		0	100	
PHF	.250	.000	.250	.500	.000	.500	.000	.667	.667

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Pumphouse Road
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 1

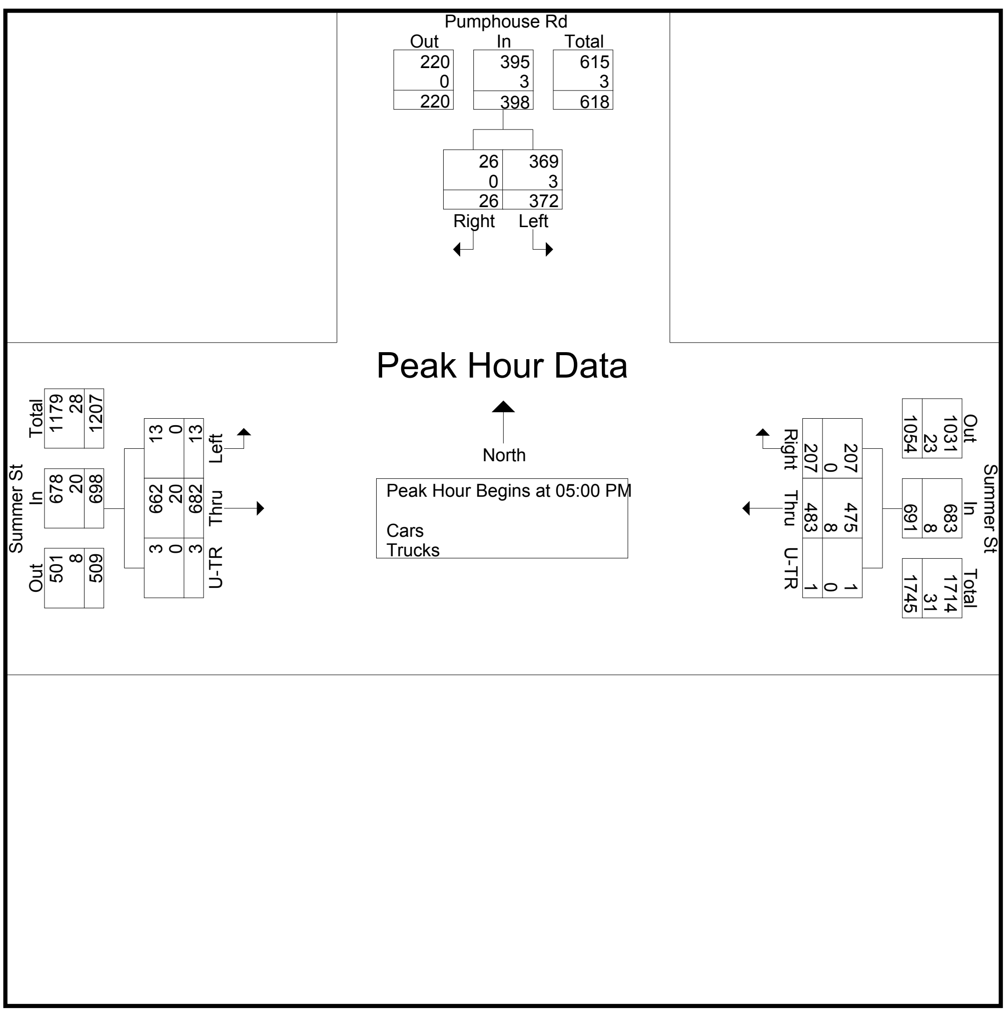
Groups Printed- Cars - Trucks

	Pumphouse Rd From North		Summer St From East			Summer St From West			
Start Time	Left	Right	Thru	Right	U-TR	Left	Thru	U-TR	Int. Total
04:00 PM	50	4	120	62	1	2	176	0	415
04:15 PM	78	11	94	51	0	5	155	0	394
04:30 PM	68	12	142	50	1	3	191	0	467
04:45 PM	48	8	115	32	0	2	161	0	366
Total	244	35	471	195	2	12	683	0	1642
05:00 PM	90	5	136	66	0	4	172	2	475
05:15 PM	60	13	139	43	1	3	189	0	448
05:30 PM	123	6	111	53	0	3	159	0	455
05:45 PM	99	2	97	45	0	3	162	1	409
Total	372	26	483	207	1	13	682	3	1787
Grand Total	616	61	954	402	3	25	1365	3	3429
Apprch %	91	9	70.2	29.6	0.2	1.8	98	0.2	
Total %	18	1.8	27.8	11.7	0.1	0.7	39.8	0.1	
Cars	598	61	917	384	2	24	1318	3	3307
% Cars	97.1	100	96.1	95.5	66.7	96	96.6	100	96.4
Trucks	18	0	37	18	1	1	47	0	122
% Trucks	2.9	0	3.9	4.5	33.3	4	3.4	0	3.6

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 2

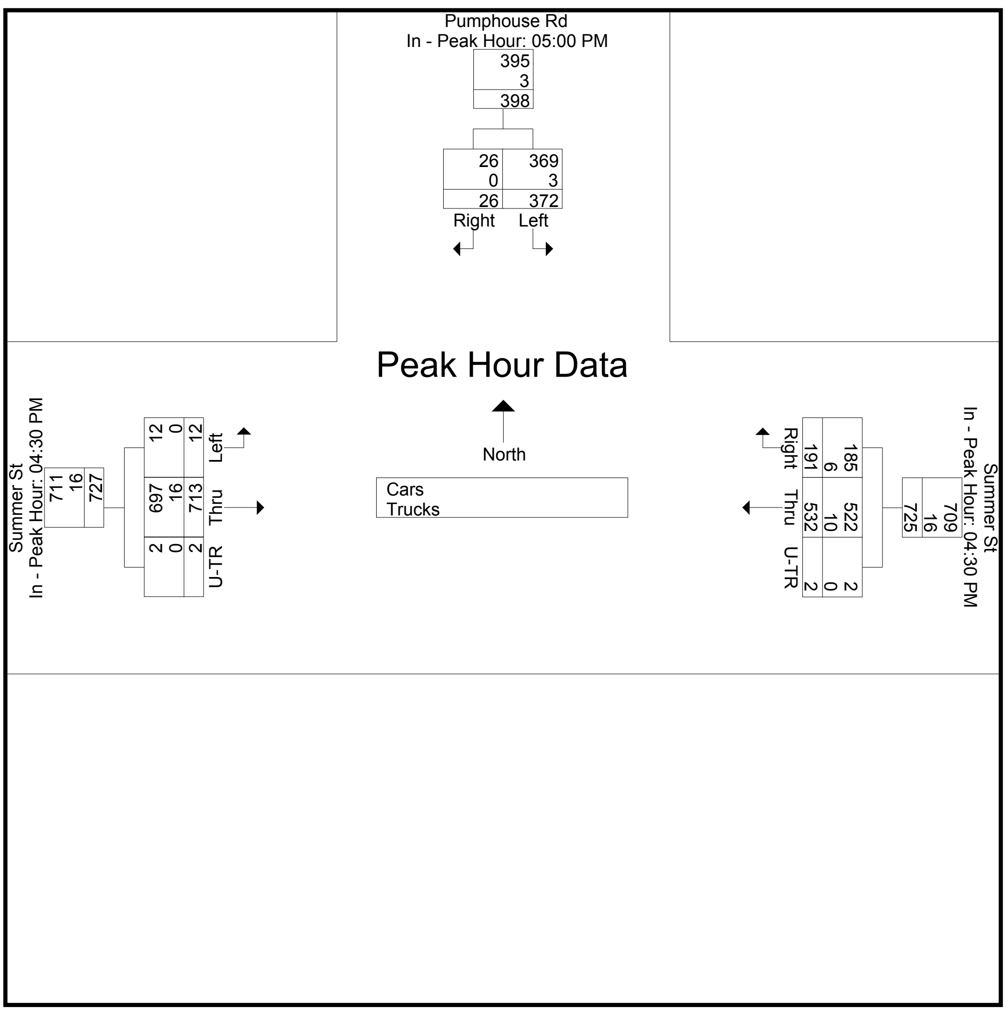
	Pumphouse Rd From North			Summer St From East				Summer St From West				
Start Time	Left	Right	App. Total	Thru	Right	U-TR	App. Total	Left	Thru	U-TR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 05:00 PM												
05:00 PM	90	5	95	136	66	0	202	4	172	2	178	475
05:15 PM	60	13	73	139	43	1	183	3	189	0	192	448
05:30 PM	123	6	129	111	53	0	164	3	159	0	162	455
05:45 PM	99	2	101	97	45	0	142	3	162	1	166	409
Total Volume	372	26	398	483	207	1	691	13	682	3	698	1787
% App. Total	93.5	6.5		69.9	30	0.1		1.9	97.7	0.4		
PHF	.756	.500	.771	.869	.784	.250	.855	.813	.902	.375	.909	.941
Cars	369	26	395	475	207	1	683	13	662	3	678	1756
% Cars	99.2	100	99.2	98.3	100	100	98.8	100	97.1	100	97.1	98.3
Trucks	3	0	3	8	0	0	8	0	20	0	20	31
% Trucks	0.8	0	0.8	1.7	0	0	1.2	0	2.9	0	2.9	1.7



Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 3

	Pumphouse Rd			Summer St				Summer St				
	From North			From East				From West				
Start Time	Left	Right	App. Total	Thru	Right	U-TR	App. Total	Left	Thru	U-TR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Each Approach Begins at:												
	05:00 PM			04:30 PM				04:30 PM				
+0 mins.	90	5	95	142	50	1	193	3	191	0	194	
+15 mins.	60	13	73	115	32	0	147	2	161	0	163	
+30 mins.	123	6	129	136	66	0	202	4	172	2	178	
+45 mins.	99	2	101	139	43	1	183	3	189	0	192	
Total Volume	372	26	398	532	191	2	725	12	713	2	727	
% App. Total	93.5	6.5		73.4	26.3	0.3		1.7	98.1	0.3		
PHF	.756	.500	.771	.937	.723	.500	.897	.750	.933	.250	.937	
Cars	369	26	395	522	185	2	709	12	697	2	711	
% Cars	99.2	100	99.2	98.1	96.9	100	97.8	100	97.8	100	97.8	
Trucks	3	0	3	10	6	0	16	0	16	0	16	
% Trucks	0.8	0	0.8	1.9	3.1	0	2.2	0	2.2	0	2.2	



Accurate Counts
978-664-2565

N/S Street : Pumphouse Road
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 1

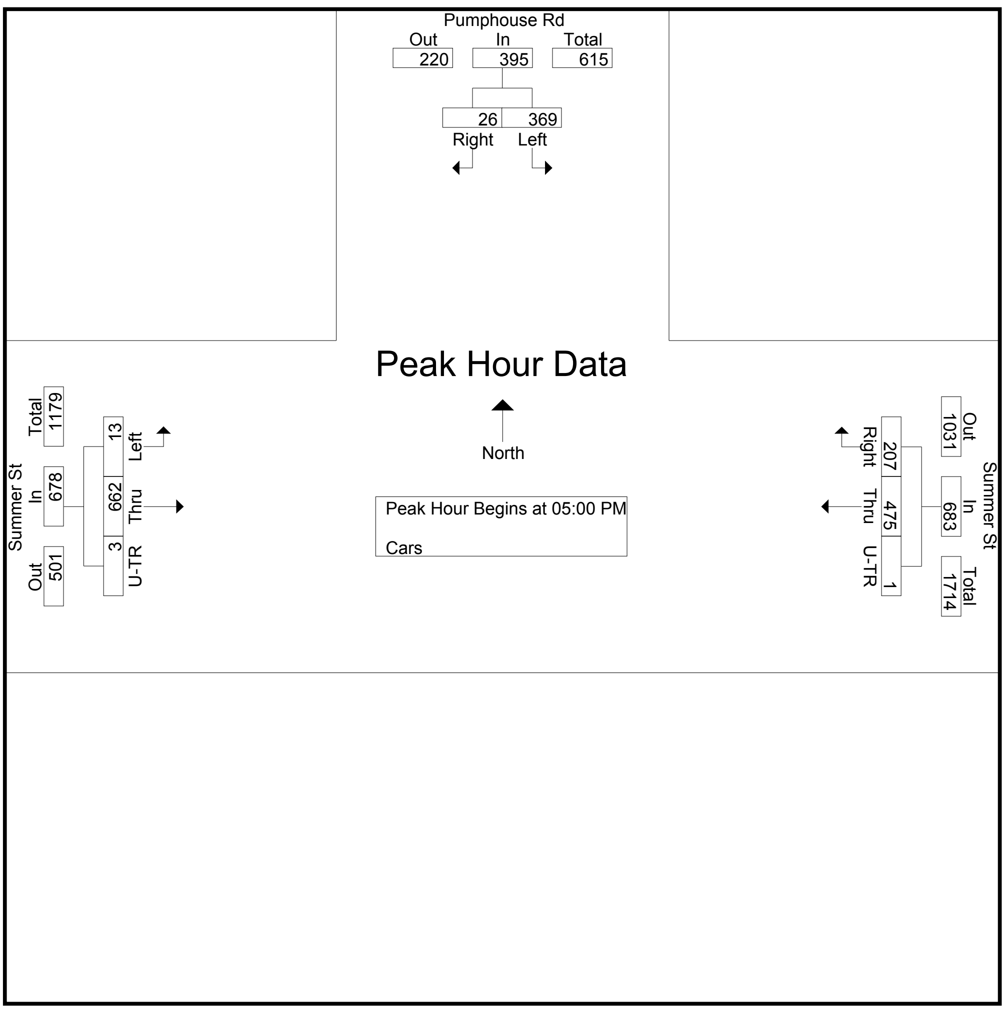
Groups Printed- Cars

	Pumphouse Rd From North		Summer St From East			Summer St From West			
Start Time	Left	Right	Thru	Right	U-TR	Left	Thru	U-TR	Int. Total
04:00 PM	37	4	104	53	0	1	162	0	361
04:15 PM	76	11	89	48	0	5	151	0	380
04:30 PM	68	12	139	46	1	3	186	0	455
04:45 PM	48	8	110	30	0	2	157	0	355
Total	229	35	442	177	1	11	656	0	1551
05:00 PM	89	5	134	66	0	4	169	2	469
05:15 PM	60	13	139	43	1	3	185	0	444
05:30 PM	123	6	107	53	0	3	153	0	445
05:45 PM	97	2	95	45	0	3	155	1	398
Total	369	26	475	207	1	13	662	3	1756
Grand Total	598	61	917	384	2	24	1318	3	3307
Apprch %	90.7	9.3	70.4	29.5	0.2	1.8	98	0.2	
Total %	18.1	1.8	27.7	11.6	0.1	0.7	39.9	0.1	

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 2

	Pumphouse Rd From North			Summer St From East				Summer St From West				
Start Time	Left	Right	App. Total	Thru	Right	U-TR	App. Total	Left	Thru	U-TR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 05:00 PM												
05:00 PM	89	5	94	134	66	0	200	4	169	2	175	469
05:15 PM	60	13	73	139	43	1	183	3	185	0	188	444
05:30 PM	123	6	129	107	53	0	160	3	153	0	156	445
05:45 PM	97	2	99	95	45	0	140	3	155	1	159	398
Total Volume	369	26	395	475	207	1	683	13	662	3	678	1756
% App. Total	93.4	6.6		69.5	30.3	0.1		1.9	97.6	0.4		
PHF	.750	.500	.766	.854	.784	.250	.854	.813	.895	.375	.902	.936



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM			04:30 PM				04:30 PM			
+0 mins.	89	5	94	139	46	1	186	3	186	0	189
+15 mins.	60	13	73	110	30	0	140	2	157	0	159
+30 mins.	123	6	129	134	66	0	200	4	169	2	175
+45 mins.	97	2	99	139	43	1	183	3	185	0	188
Total Volume	369	26	395	522	185	2	709	12	697	2	711
% App. Total	93.4	6.6		73.6	26.1	0.3		1.7	98	0.3	
PHF	.750	.500	.766	.939	.701	.500	.886	.750	.937	.250	.940

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
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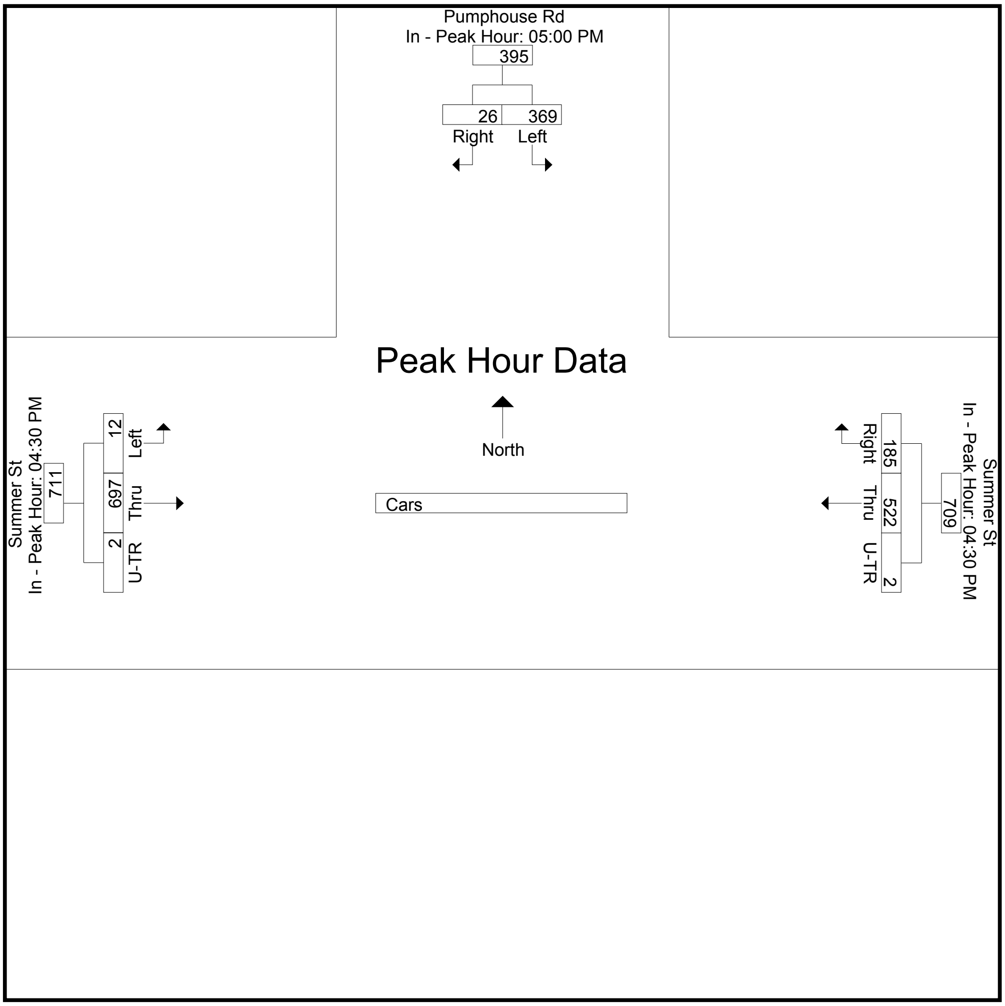


Accurate Counts
978-664-2565

N/S Street : Pumphouse Road
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 1

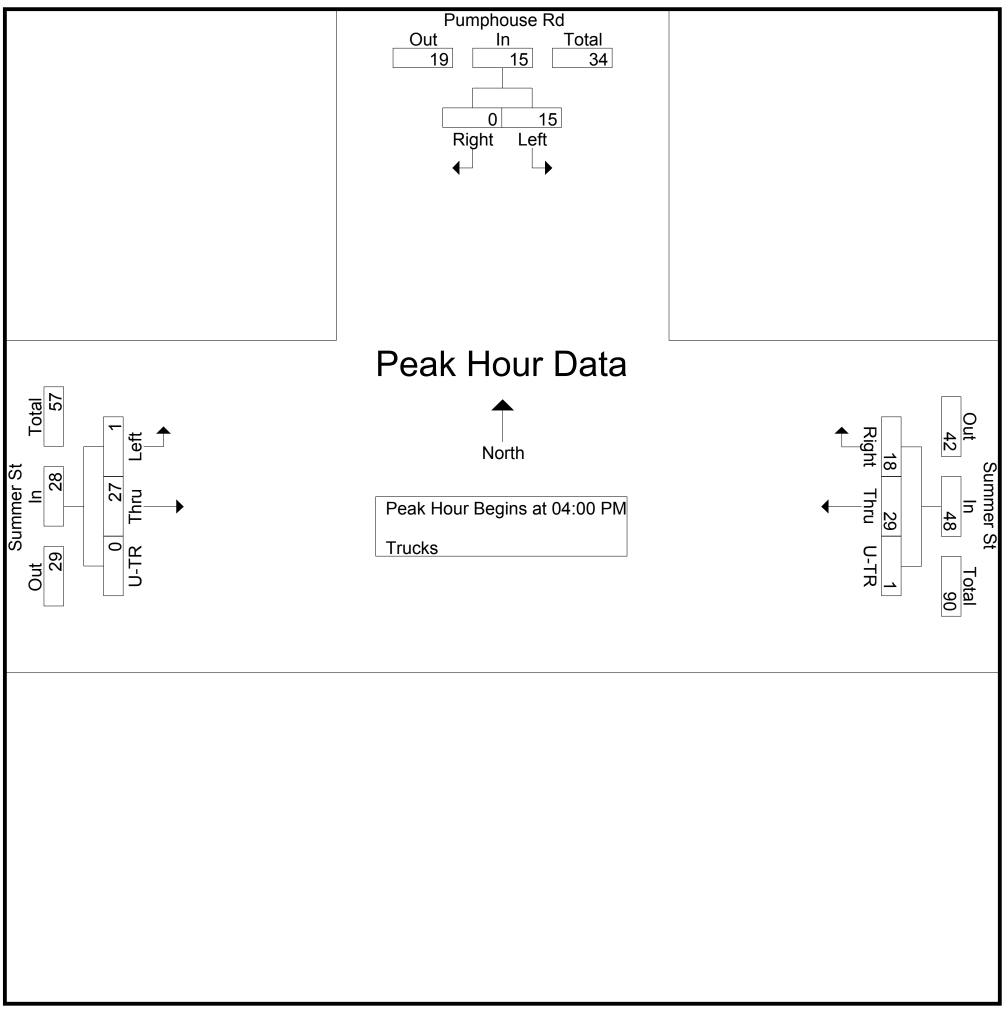
Groups Printed- Trucks

	Pumphouse Rd From North		Summer St From East			Summer St From West			
Start Time	Left	Right	Thru	Right	U-TR	Left	Thru	U-TR	Int. Total
04:00 PM	13	0	16	9	1	1	14	0	54
04:15 PM	2	0	5	3	0	0	4	0	14
04:30 PM	0	0	3	4	0	0	5	0	12
04:45 PM	0	0	5	2	0	0	4	0	11
Total	15	0	29	18	1	1	27	0	91
05:00 PM	1	0	2	0	0	0	3	0	6
05:15 PM	0	0	0	0	0	0	4	0	4
05:30 PM	0	0	4	0	0	0	6	0	10
05:45 PM	2	0	2	0	0	0	7	0	11
Total	3	0	8	0	0	0	20	0	31
Grand Total	18	0	37	18	1	1	47	0	122
Apprch %	100	0	66.1	32.1	1.8	2.1	97.9	0	
Total %	14.8	0	30.3	14.8	0.8	0.8	38.5	0	

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 2

	Pumphouse Rd From North			Summer St From East				Summer St From West				
Start Time	Left	Right	App. Total	Thru	Right	U-TR	App. Total	Left	Thru	U-TR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1												
Peak Hour for Entire Intersection Begins at 04:00 PM												
04:00 PM	13	0	13	16	9	1	26	1	14	0	15	54
04:15 PM	2	0	2	5	3	0	8	0	4	0	4	14
04:30 PM	0	0	0	3	4	0	7	0	5	0	5	12
04:45 PM	0	0	0	5	2	0	7	0	4	0	4	11
Total Volume	15	0	15	29	18	1	48	1	27	0	28	91
% App. Total	100	0		60.4	37.5	2.1		3.6	96.4	0		
PHF	.288	.000	.288	.453	.500	.250	.462	.250	.482	.000	.467	.421

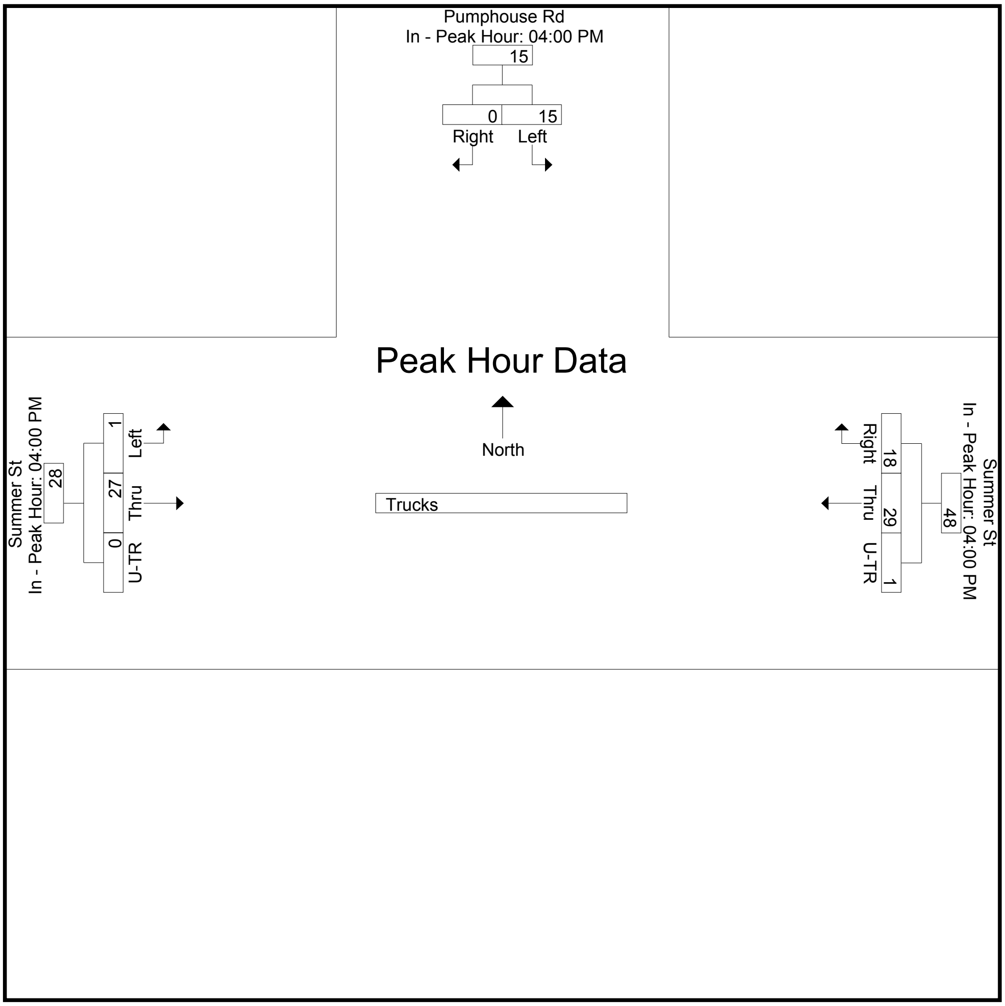


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM				04:00 PM			
+0 mins.	13	0	13	16	9	1	26	1	14	0	15
+15 mins.	2	0	2	5	3	0	8	0	4	0	4
+30 mins.	0	0	0	3	4	0	7	0	5	0	5
+45 mins.	0	0	0	5	2	0	7	0	4	0	4
Total Volume	15	0	15	29	18	1	48	1	27	0	28
% App. Total	100	0		60.4	37.5	2.1		3.6	96.4	0	
PHF	.288	.000	.288	.453	.500	.250	.462	.250	.482	.000	.467

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Pumphouse Road
E/W Street : Summer Street
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 1

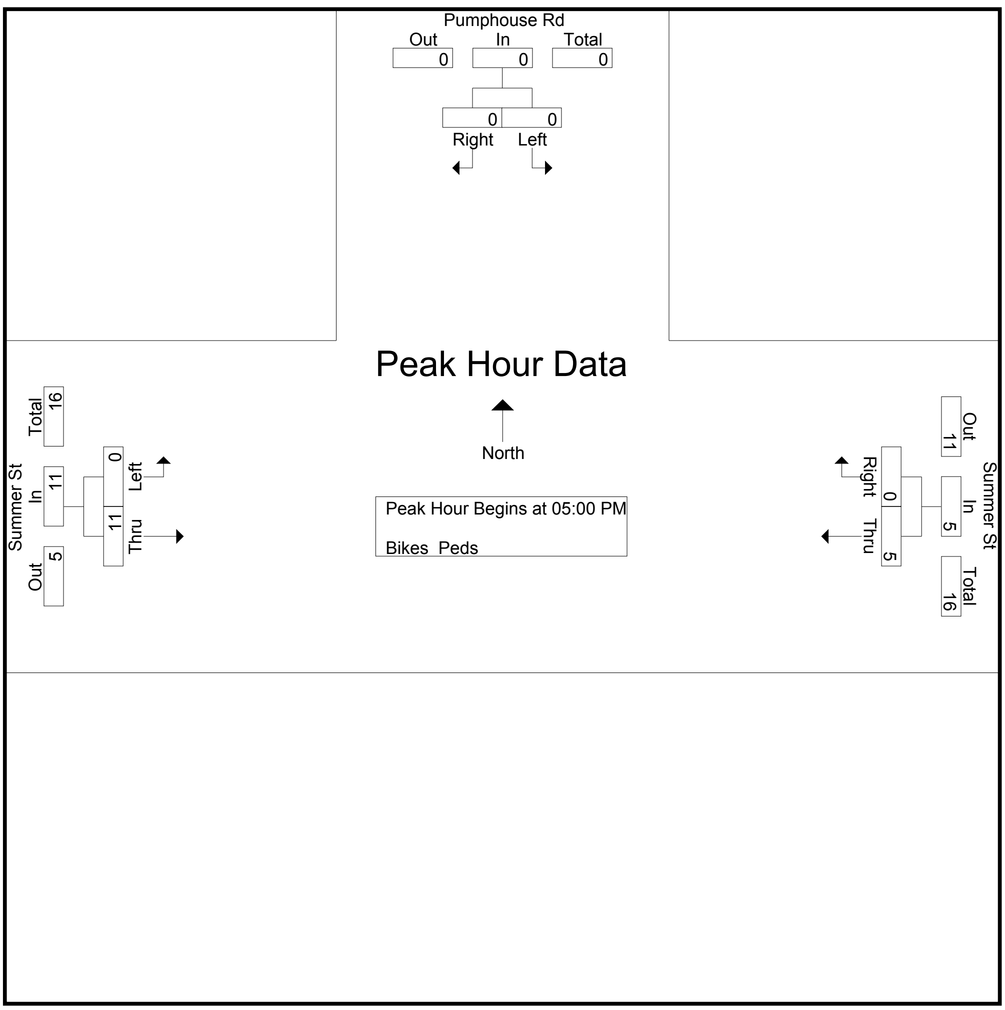
Groups Printed- Bikes Peds

	Pumphouse Rd From North			Summer St From East			Summer St From West					
Start Time	Left	Right	Peds	Thru	Right	Peds	Left	Thru	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	1	1	0	2	0	3	0	3	4	7
04:15 PM	0	0	5	1	0	2	0	1	0	7	2	9
04:30 PM	0	0	2	2	0	0	0	1	2	4	3	7
04:45 PM	0	0	5	0	0	0	0	1	0	5	1	6
Total	0	0	13	4	0	4	0	6	2	19	10	29
05:00 PM	0	0	10	3	0	3	0	2	2	15	5	20
05:15 PM	0	0	5	0	0	4	0	3	1	10	3	13
05:30 PM	0	0	3	0	0	2	0	3	1	6	3	9
05:45 PM	0	0	1	2	0	0	0	3	0	1	5	6
Total	0	0	19	5	0	9	0	11	4	32	16	48
Grand Total	0	0	32	9	0	13	0	17	6	51	26	77
Apprch %	0	0		100	0		0	100				
Total %	0	0		34.6	0		0	65.4		66.2	33.8	

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 2

	Pumphouse Rd From North			Summer St From East			Summer St From West			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	0	0	0	3	0	3	0	2	2	5
05:15 PM	0	0	0	0	0	0	0	3	3	3
05:30 PM	0	0	0	0	0	0	0	3	3	3
05:45 PM	0	0	0	2	0	2	0	3	3	5
Total Volume	0	0	0	5	0	5	0	11	11	16
% App. Total	0	0		100	0		0	100		
PHF	.000	.000	.000	.417	.000	.417	.000	.917	.917	.800

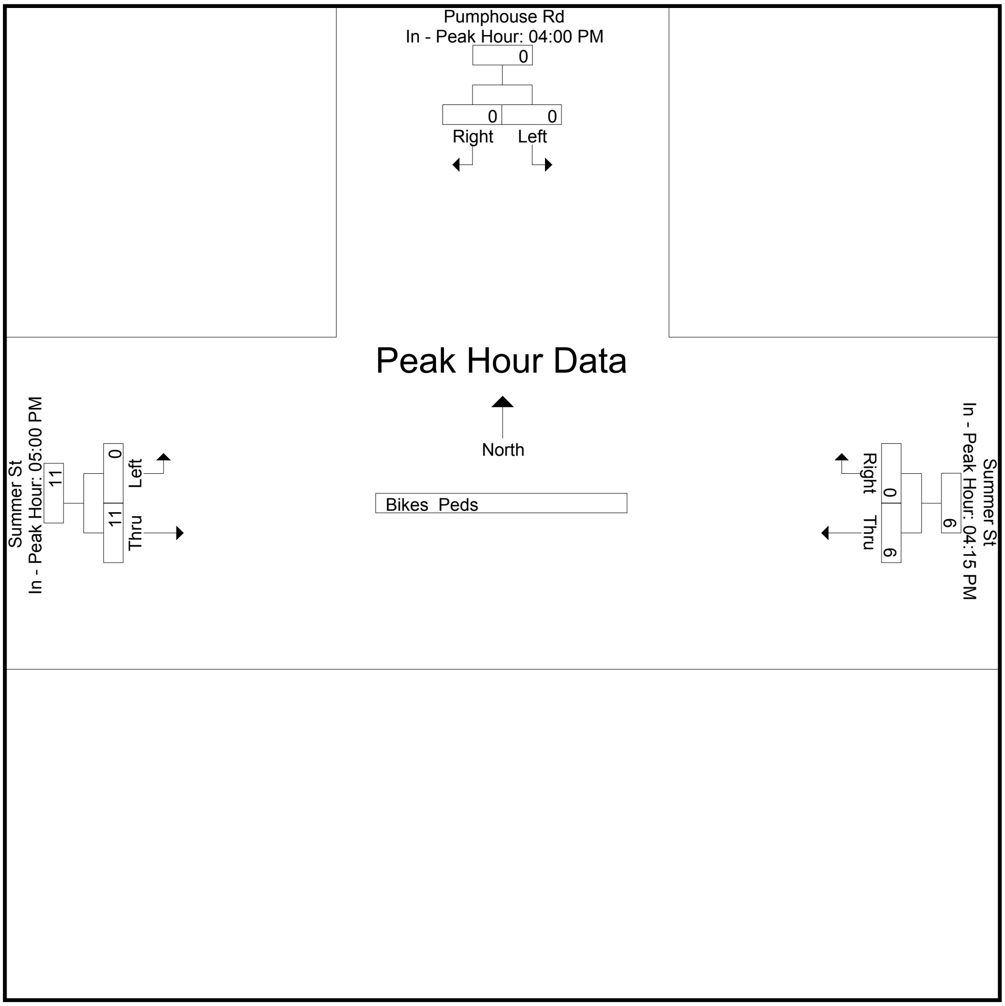


Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:15 PM			05:00 PM		
+0 mins.	0	0	0	1	0	1	0	2	2
+15 mins.	0	0	0	2	0	2	0	3	3
+30 mins.	0	0	0	0	0	0	0	3	3
+45 mins.	0	0	0	3	0	3	0	3	3
Total Volume	0	0	0	6	0	6	0	11	11
% App. Total	0	0		100	0		0	100	
PHF	.000	.000	.000	.500	.000	.500	.000	.917	.917

Accurate Counts
978-664-2565

File Name : 16002001
Site Code : 16002001
Start Date : 2/4/2016
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Harbor St / Terminal St
E/W Street : Drydock Ave / Channel St
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
Page No : 1

Groups Printed- Cars - Trucks

	Harbor St From North				Drydock Ave From East				Terminal St From South				Drydock Ave From West				Channel St From Northwest				
Start Time	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Int. Total
07:00 AM	2	1	10	0	0	11	1	5	3	0	0	3	2	26	45	1	1	2	0	1	114
07:15 AM	7	1	13	1	4	15	0	8	4	0	1	3	1	23	60	3	1	0	0	2	147
07:30 AM	10	4	8	1	1	27	1	6	0	0	0	4	5	17	53	0	2	1	0	2	142
07:45 AM	8	0	13	0	2	39	1	10	1	1	2	1	0	31	96	5	2	1	1	5	219
Total	27	6	44	2	7	92	3	29	8	1	3	11	8	97	254	9	6	4	1	10	622
08:00 AM	13	2	12	0	1	24	1	3	4	0	0	5	0	23	81	3	1	2	1	1	177
08:15 AM	8	0	20	0	2	33	0	9	1	0	1	3	2	33	90	2	1	3	1	0	209
08:30 AM	13	1	10	1	0	43	1	4	2	0	1	3	3	40	95	3	3	0	1	3	227
08:45 AM	5	1	13	0	0	30	1	8	4	0	1	5	0	30	116	4	1	3	0	3	225
Total	39	4	55	1	3	130	3	24	11	0	3	16	5	126	382	12	6	8	3	7	838
Grand Total	66	10	99	3	10	222	6	53	19	1	6	27	13	223	636	21	12	12	4	17	1460
Apprch %	37.1	5.6	55.6	1.7	3.4	76.3	2.1	18.2	35.8	1.9	11.3	50.9	1.5	25	71.2	2.4	26.7	26.7	8.9	37.8	
Total %	4.5	0.7	6.8	0.2	0.7	15.2	0.4	3.6	1.3	0.1	0.4	1.8	0.9	15.3	43.6	1.4	0.8	0.8	0.3	1.2	
Cars	65	7	85	2	8	203	6	53	17	1	5	6	13	216	624	20	10	11	4	15	1371
% Cars	98.5	70	85.9	66.7	80	91.4	100	100	89.5	100	83.3	22.2	100	96.9	98.1	95.2	83.3	91.7	100	88.2	93.9
Trucks	1	3	14	1	2	19	0	0	2	0	1	21	0	7	12	1	2	1	0	2	89
% Trucks	1.5	30	14.1	33.3	20	8.6	0	0	10.5	0	16.7	77.8	0	3.1	1.9	4.8	16.7	8.3	0	11.8	6.1

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
Page No : 2

	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest					
Start Time	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 08:00 AM																										
08:00 AM	13	2	12	0	27	1	24	1	3	29	4	0	0	5	9	0	23	81	3	107	1	2	1	1	5	177
08:15 AM	8	0	20	0	28	2	33	0	9	44	1	0	1	3	5	2	33	90	2	127	1	3	1	0	5	209
08:30 AM	13	1	10	1	25	0	43	1	4	48	2	0	1	3	6	3	40	95	3	141	3	0	1	3	7	227
08:45 AM	5	1	13	0	19	0	30	1	8	39	4	0	1	5	10	0	30	116	4	150	1	3	0	3	7	225
Total Volume	39	4	55	1	99	3	130	3	24	160	11	0	3	16	30	5	126	382	12	525	6	8	3	7	24	838
% App. Total	39.4	4	55.6	1		1.9	81.2	1.9	15		36.7	0	10	53.3		1	24	72.8	2.3		25	33.3	12.5	29.2		
PHF	.750	.500	.688	.250	.884	.375	.756	.750	.667	.833	.688	.000	.750	.800	.750	.417	.788	.823	.750	.875	.500	.667	.750	.583	.857	.923
Cars	38	4	45	0	87	3	119	3	24	149	9	0	2	5	16	5	122	372	12	511	5	7	3	5	20	783
% Cars	97.4	100	81.8	0	87.9	100	91.5	100	100	93.1	81.8	0	66.7	31.3	53.3	100	96.8	97.4	100	97.3	83.3	87.5	100	71.4	83.3	93.4
Trucks	1	0	10	1	12	0	11	0	0	11	2	0	1	11	14	0	4	10	0	14	1	1	0	2	4	55
% Trucks	2.6	0	18.2	100	12.1	0	8.5	0	0	6.9	18.2	0	33.3	68.8	46.7	0	3.2	2.6	0	2.7	16.7	12.5	0	28.6	16.7	6.6

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
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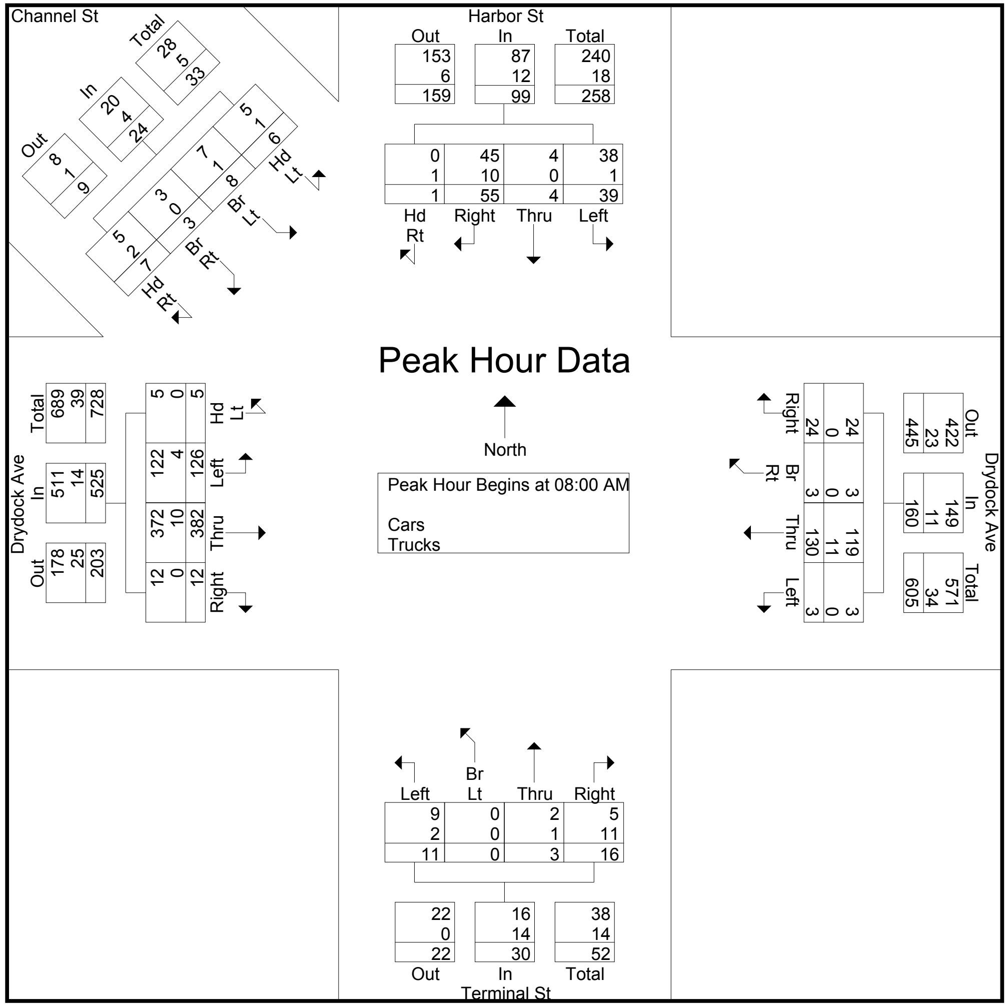


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

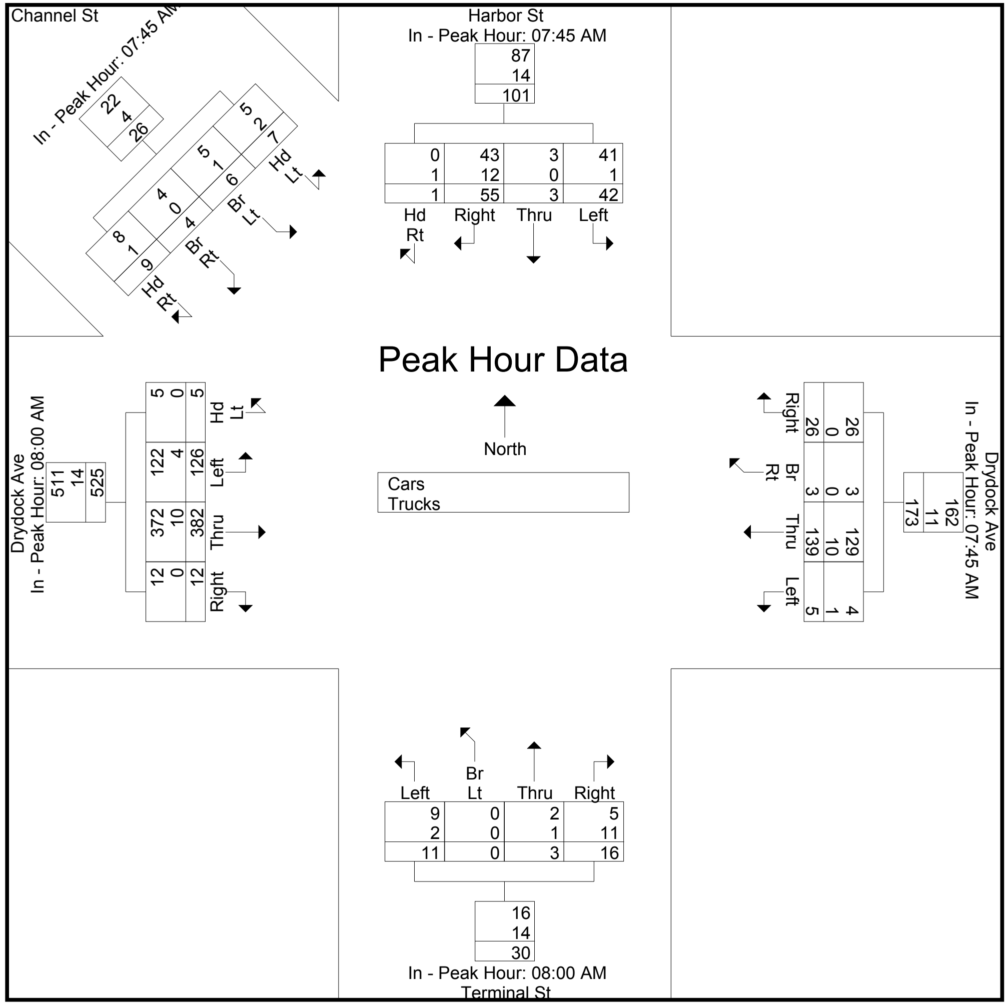
Peak Hour for Each Approach Begins at:

	07:45 AM					07:45 AM					08:00 AM					08:00 AM					07:45 AM				
+0 mins.	8	0	13	0	21	2	39	1	10	52	4	0	0	5	9	0	23	81	3	107	2	1	1	5	9
+15 mins.	13	2	12	0	27	1	24	1	3	29	1	0	1	3	5	2	33	90	2	127	1	2	1	1	5
+30 mins.	8	0	20	0	28	2	33	0	9	44	2	0	1	3	6	3	40	95	3	141	1	3	1	0	5
+45 mins.	13	1	10	1	25	0	43	1	4	48	4	0	1	5	10	0	30	116	4	150	3	0	1	3	7
Total Volume	42	3	55	1	101	5	139	3	26	173	11	0	3	16	30	5	126	382	12	525	7	6	4	9	26
% App. Total	41.6	3	54.5	1		2.9	80.3	1.7	15		36.7	0	10	53.3		1	24	72.8	2.3		26.9	23.1	15.4	34.6	
PHF	.808	.375	.688	.250	.902	.625	.808	.750	.650	.832	.688	.000	.750	.800	.750	.417	.788	.823	.750	.875	.583	.500	1.000	.450	.722

Accurate Counts

978-664-2565

Cars	41	3	43	0	87	4	129	3	26	162	9	0	2	5	16	5	122	372	12	511	5	5	4	8	22
% Cars	97.6	100	78.2	0	86.1	80	92.8	100	100	93.6	81.8	0	66.7	31.2	53.3	100	96.8	97.4	100	97.3	71.4	83.3	100	88.9	84.6
Trucks	1	0	12	1	14	1	10	0	0	11	2	0	1	11	14	0	4	10	0	14	2	1	0	1	4
% Trucks	2.4	0	21.8	100	13.9	20	7.2	0	0	6.4	18.2	0	33.3	68.8	46.7	0	3.2	2.6	0	2.7	28.6	16.7	0	11.1	15.4



Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
Page No : 5

Groups Printed- Cars

	Harbor St From North				Drydock Ave From East				Terminal St From South				Drydock Ave From West				Channel St From Northwest				
Start Time	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Int. Total
07:00 AM	2	0	9	0	0	9	1	5	3	0	0	0	2	24	45	1	1	2	0	1	105
07:15 AM	7	1	13	1	4	13	0	8	4	0	1	0	1	23	60	3	1	0	0	2	142
07:30 AM	10	2	7	1	0	25	1	6	0	0	0	1	5	17	53	0	2	1	0	2	133
07:45 AM	8	0	11	0	1	37	1	10	1	1	2	0	0	30	94	4	1	1	1	5	208
Total	27	3	40	2	5	84	3	29	8	1	3	1	8	94	252	8	5	4	1	10	588
08:00 AM	13	2	8	0	1	21	1	3	2	0	0	2	0	22	78	3	0	1	1	1	159
08:15 AM	7	0	16	0	2	31	0	9	1	0	1	1	2	32	88	2	1	3	1	0	197
08:30 AM	13	1	8	0	0	40	1	4	2	0	0	0	3	40	93	3	3	0	1	2	214
08:45 AM	5	1	13	0	0	27	1	8	4	0	1	2	0	28	113	4	1	3	0	2	213
Total	38	4	45	0	3	119	3	24	9	0	2	5	5	122	372	12	5	7	3	5	783
Grand Total	65	7	85	2	8	203	6	53	17	1	5	6	13	216	624	20	10	11	4	15	1371
Apprch %	40.9	4.4	53.5	1.3	3	75.2	2.2	19.6	58.6	3.4	17.2	20.7	1.5	24.7	71.5	2.3	25	27.5	10	37.5	
Total %	4.7	0.5	6.2	0.1	0.6	14.8	0.4	3.9	1.2	0.1	0.4	0.4	0.9	15.8	45.5	1.5	0.7	0.8	0.3	1.1	

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
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	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest					
Start Time	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 08:00 AM																										
08:00 AM	13	2	8	0	23	1	21	1	3	26	2	0	0	2	4	0	22	78	3	103	0	1	1	1	3	159
08:15 AM	7	0	16	0	23	2	31	0	9	42	1	0	1	1	3	2	32	88	2	124	1	3	1	0	5	197
08:30 AM	13	1	8	0	22	0	40	1	4	45	2	0	0	0	2	3	40	93	3	139	3	0	1	2	6	214
08:45 AM	5	1	13	0	19	0	27	1	8	36	4	0	1	2	7	0	28	113	4	145	1	3	0	2	6	213
Total Volume	38	4	45	0	87	3	119	3	24	149	9	0	2	5	16	5	122	372	12	511	5	7	3	5	20	783
% App. Total	43.7	4.6	51.7	0		2	79.9	2	16.1		56.2	0	12.5	31.2		1	23.9	72.8	2.3		25	35	15	25		
PHF	.731	.500	.703	.000	.946	.375	.744	.750	.667	.828	.563	.000	.500	.625	.571	.417	.763	.823	.750	.881	.417	.583	.750	.625	.833	.915

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
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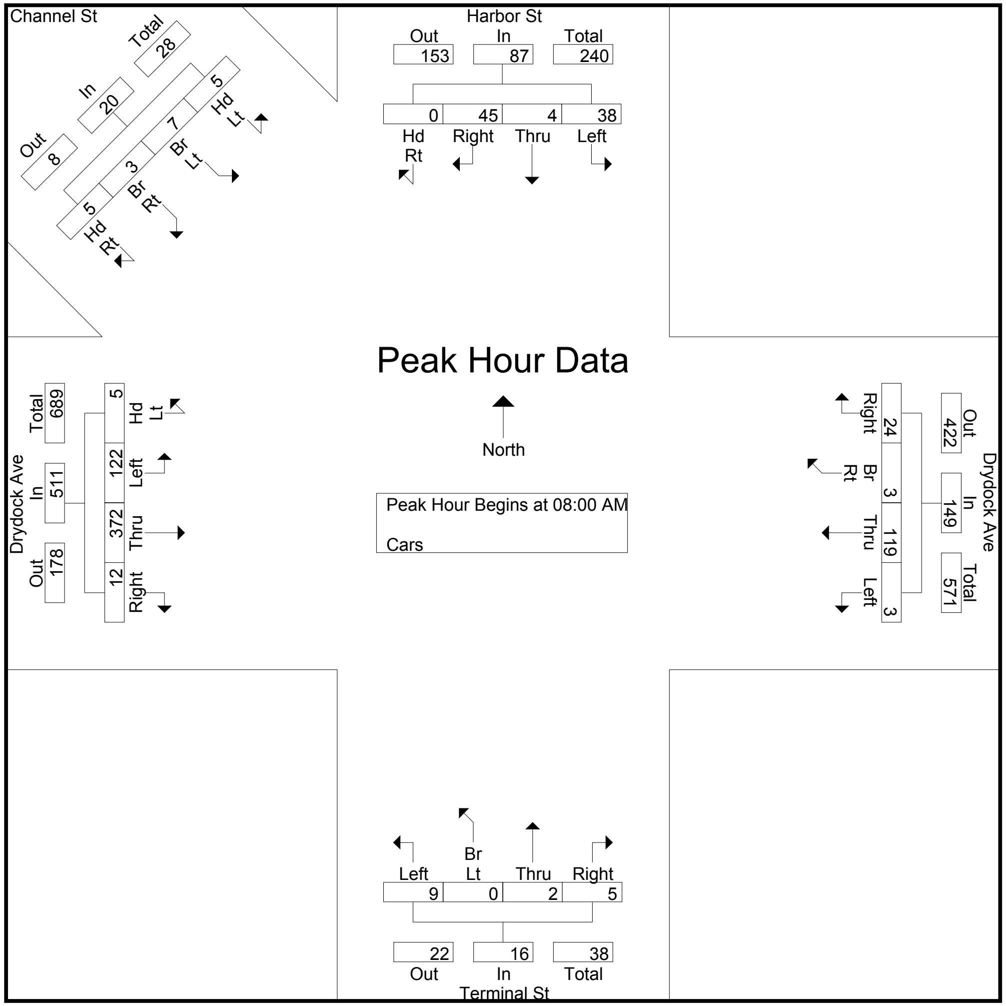

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:45 AM					07:45 AM					08:00 AM					08:00 AM					07:45 AM				
+0 mins.	8	0	11	0	19	1	37	1	10	49	2	0	0	2	4	0	22	78	3	103	1	1	1	5	8
+15 mins.	13	2	8	0	23	1	21	1	3	26	1	0	1	1	3	2	32	88	2	124	0	1	1	1	3
+30 mins.	7	0	16	0	23	2	31	0	9	42	2	0	0	0	2	3	40	93	3	139	1	3	1	0	5
+45 mins.	13	1	8	0	22	0	40	1	4	45	4	0	1	2	7	0	28	113	4	145	3	0	1	2	6
Total Volume	41	3	43	0	87	4	129	3	26	162	9	0	2	5	16	5	122	372	12	511	5	5	4	8	22
% App. Total	47.1	3.4	49.4	0		2.5	79.6	1.9	16		56.2	0	12.5	31.2		1	23.9	72.8	2.3		22.7	22.7	18.2	36.4	
PHF	.788	.375	.672	.000	.946	.500	.806	.750	.650	.827	.563	.000	.500	.625	.571	.417	.763	.823	.750	.881	.417	.417	1.000	.400	.688

Accurate Counts

978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
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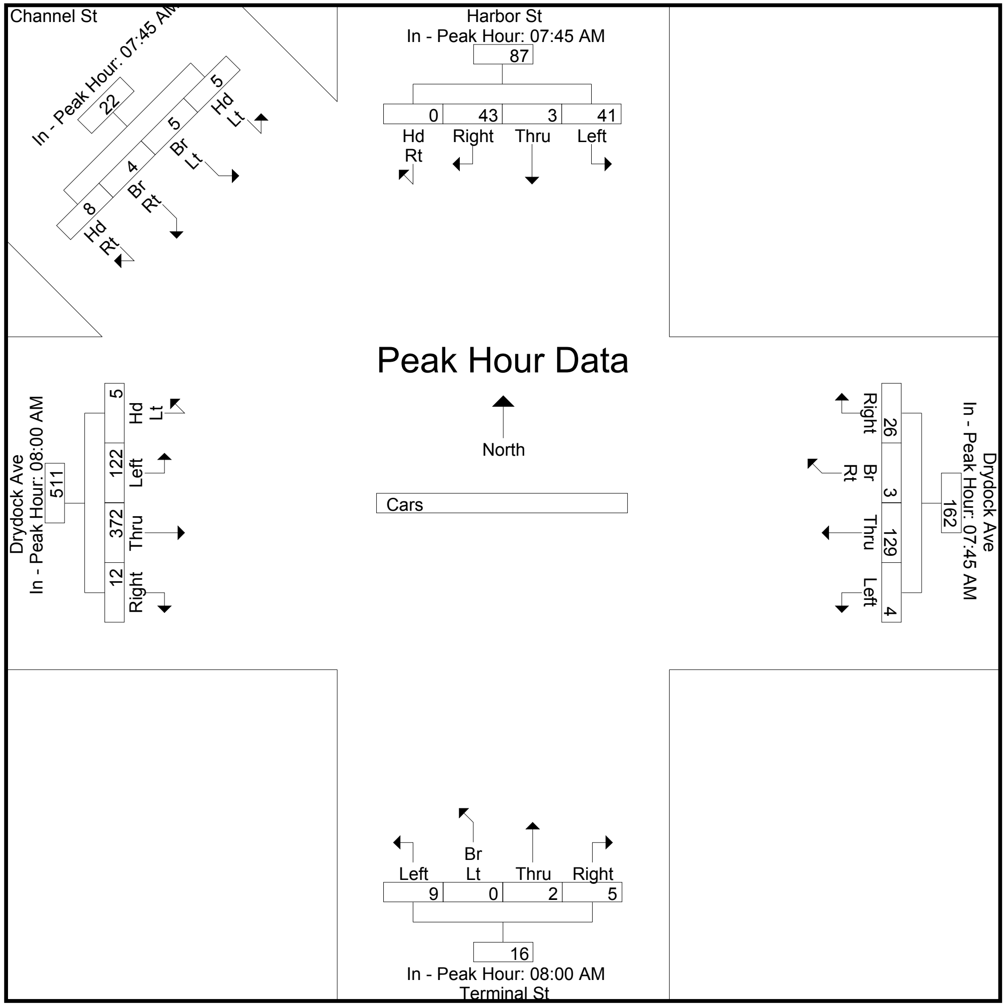

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
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Groups Printed- Trucks

	Harbor St From North				Drydock Ave From East				Terminal St From South				Drydock Ave From West				Channel St From Northwest				
Start Time	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Int. Total
07:00 AM	0	1	1	0	0	2	0	0	0	0	0	3	0	2	0	0	0	0	0	0	9
07:15 AM	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	5
07:30 AM	0	2	1	0	1	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	9
07:45 AM	0	0	2	0	1	2	0	0	0	0	0	1	0	1	2	1	1	0	0	0	11
Total	0	3	4	0	2	8	0	0	0	0	0	10	0	3	2	1	1	0	0	0	34
08:00 AM	0	0	4	0	0	3	0	0	2	0	0	3	0	1	3	0	1	1	0	0	18
08:15 AM	1	0	4	0	0	2	0	0	0	0	0	2	0	1	2	0	0	0	0	0	12
08:30 AM	0	0	2	1	0	3	0	0	0	0	1	3	0	0	2	0	0	0	0	1	13
08:45 AM	0	0	0	0	0	3	0	0	0	0	0	3	0	2	3	0	0	0	0	1	12
Total	1	0	10	1	0	11	0	0	2	0	1	11	0	4	10	0	1	1	0	2	55
Grand Total	1	3	14	1	2	19	0	0	2	0	1	21	0	7	12	1	2	1	0	2	89
Apprch %	5.3	15.8	73.7	5.3	9.5	90.5	0	0	8.3	0	4.2	87.5	0	35	60	5	40	20	0	40	
Total %	1.1	3.4	15.7	1.1	2.2	21.3	0	0	2.2	0	1.1	23.6	0	7.9	13.5	1.1	2.2	1.1	0	2.2	

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
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	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest					
Start Time	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 08:00 AM																										
08:00 AM	0	0	4	0	4	0	3	0	0	3	2	0	0	3	5	0	1	3	0	4	1	1	0	0	2	18
08:15 AM	1	0	4	0	5	0	2	0	0	2	0	0	0	2	2	0	1	2	0	3	0	0	0	0	0	12
08:30 AM	0	0	2	1	3	0	3	0	0	3	0	0	1	3	4	0	0	2	0	2	0	0	0	1	1	13
08:45 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	3	3	0	2	3	0	5	0	0	0	1	1	12
Total Volume	1	0	10	1	12	0	11	0	0	11	2	0	1	11	14	0	4	10	0	14	1	1	0	2	4	55
% App. Total	8.3	0	83.3	8.3		0	100	0	0		14.3	0	7.1	78.6		0	28.6	71.4	0		25	25	0	50		
PHF	.250	.000	.625	.250	.600	.000	.917	.000	.000	.917	.250	.000	.250	.917	.700	.000	.500	.833	.000	.700	.250	.250	.000	.500	.500	.764

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
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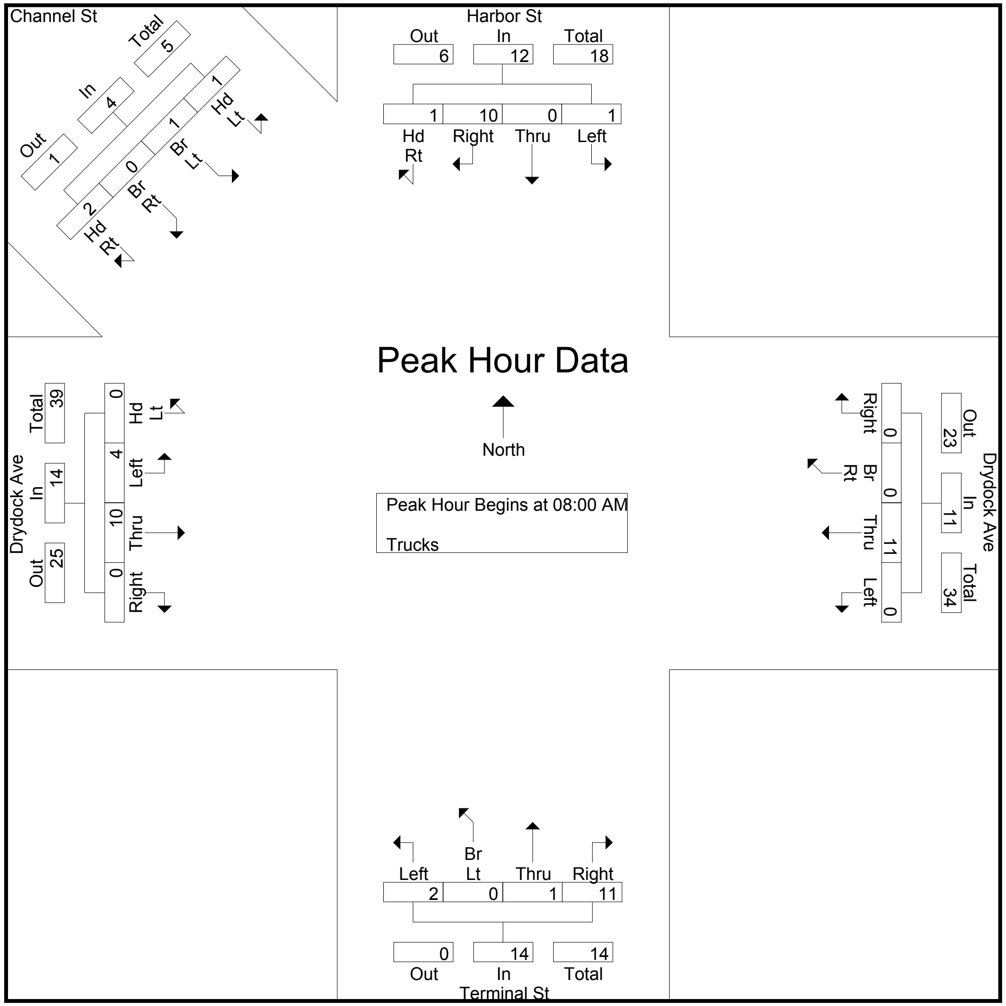

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM					07:15 AM					08:00 AM					08:00 AM					07:45 AM				
+0 mins.	0	2	1	0	3	0	2	0	0	2	2	0	0	3	5	0	1	3	0	4	1	0	0	0	1
+15 mins.	0	0	2	0	2	1	2	0	0	3	0	0	0	2	2	0	1	2	0	3	1	1	0	0	2
+30 mins.	0	0	4	0	4	1	2	0	0	3	0	0	1	3	4	0	0	2	0	2	0	0	0	0	0
+45 mins.	1	0	4	0	5	0	3	0	0	3	0	0	0	3	3	0	2	3	0	5	0	0	0	1	1
Total Volume	1	2	11	0	14	2	9	0	0	11	2	0	1	11	14	0	4	10	0	14	2	1	0	1	4
% App. Total	7.1	14.3	78.6	0		18.2	81.8	0	0		14.3	0	7.1	78.6		0	28.6	71.4	0		50	25	0	25	
PHF	.250	.250	.688	.000	.700	.500	.750	.000	.000	.917	.250	.000	.250	.917	.700	.000	.500	.833	.000	.700	.500	.250	.000	.250	.500

Accurate Counts
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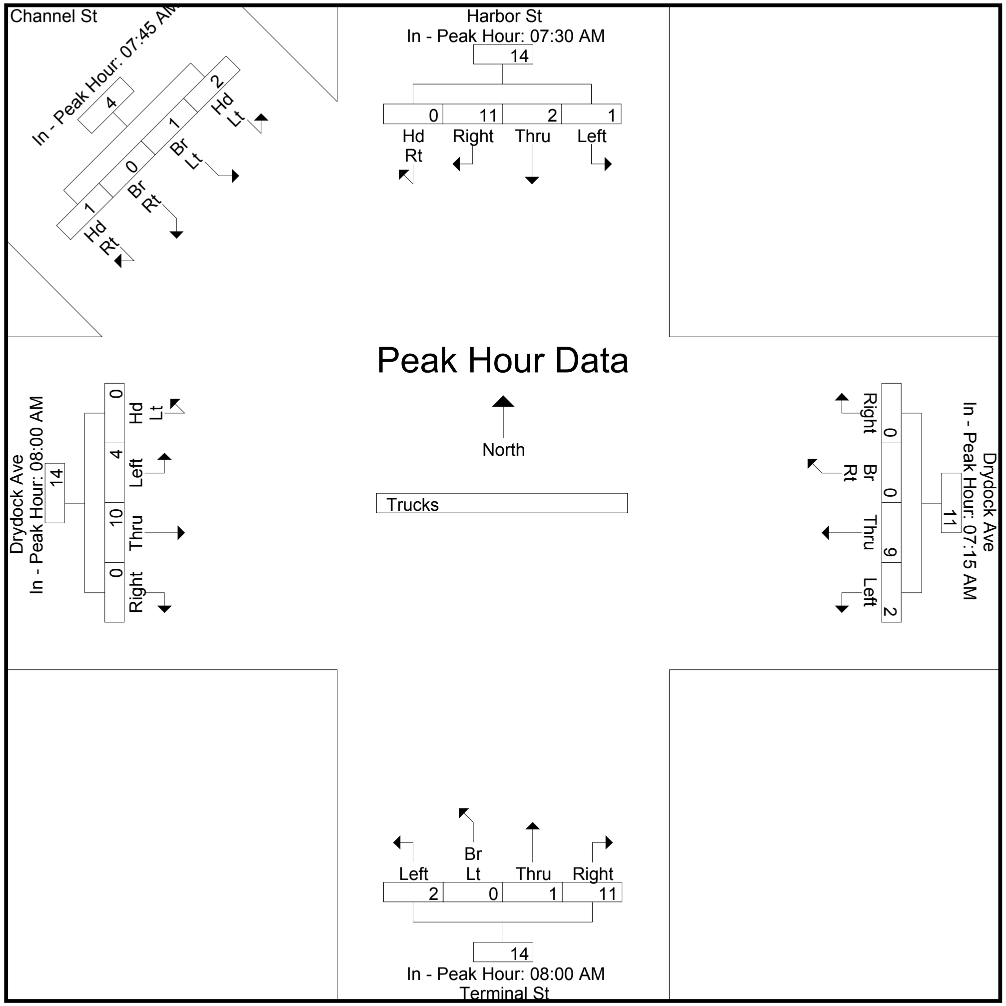

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
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Groups Printed- Bikes Peds

	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest							
Start Time	Left	Thru	Right	Hd Rt	Peds	Left	Thru	Br Rt	Right	Peds	Left	Br Lt	Thru	Right	Peds	Hd Lt	Left	Thru	Right	Peds	Hd Lt	Br Lt	Br Rt	Hd Rt	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	0	7	0	0	0	0	1	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	11	0	11
07:15 AM	0	0	0	0	3	0	0	0	0	1	0	0	0	0	1	0	0	1	0	2	0	0	0	0	0	7	1	8
07:30 AM	0	0	0	0	6	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	9	0	9
07:45 AM	0	0	0	0	6	0	0	0	0	2	0	0	0	0	3	0	0	2	0	3	0	0	0	0	1	15	2	17
Total	0	0	0	0	22	0	0	0	0	6	0	0	0	0	6	0	0	3	0	7	0	0	0	0	1	42	3	45
08:00 AM	0	0	0	0	11	0	0	0	0	3	0	0	0	0	1	0	1	2	1	2	0	0	0	0	0	17	4	21
08:15 AM	1	0	1	0	5	0	0	0	0	4	0	0	0	0	3	0	1	4	1	3	0	0	0	0	0	15	8	23
08:30 AM	0	0	0	0	8	0	0	0	0	4	0	0	0	0	4	0	2	6	0	2	0	0	0	0	0	18	8	26
08:45 AM	0	0	0	0	6	0	0	0	0	2	0	0	0	0	3	0	0	3	0	1	0	0	0	0	0	12	3	15
Total	1	0	1	0	30	0	0	0	0	13	0	0	0	0	11	0	4	15	2	8	0	0	0	0	0	62	23	85
Grand Total	1	0	1	0	52	0	0	0	0	19	0	0	0	0	17	0	4	18	2	15	0	0	0	0	1	104	26	130
Apprch %	50	0	50	0		0	0	0	0		0	0	0	0		0	16.7	75	8.3		0	0	0	0				
Total %	3.8	0	3.8	0		0	0	0	0		0	0	0	0		0	15.4	69.2	7.7		0	0	0	0		80	20	

Accurate Counts
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	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest					
Start Time	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 08:00 AM																										
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	4	0	0	0	0	0	4
08:15 AM	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	1	4	1	6	0	0	0	0	0	8
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0	8	0	0	0	0	0	8
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	3
Total Volume	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	4	15	2	21	0	0	0	0	0	23
% App. Total	50	0	50	0		0	0	0	0		0	0	0	0		0	19	71.4	9.5		0	0	0	0		
PHF	.250	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.625	.500	.656	.000	.000	.000	.000	.000	.719

Accurate Counts
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File Name : 16002002
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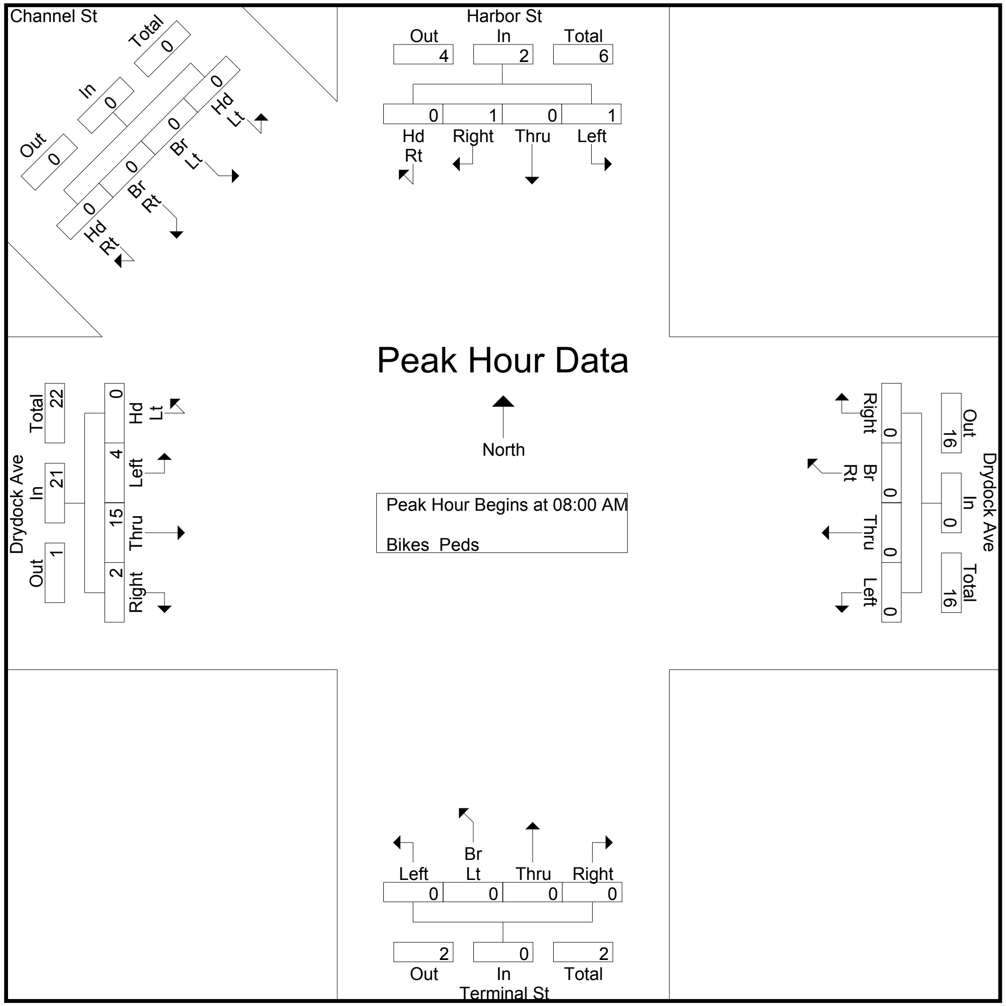

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:30 AM					07:00 AM					07:00 AM					08:00 AM					07:00 AM				
+0 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	4	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	6	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0	8	0	0	0	0	0
+45 mins.	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0
Total Volume	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	4	15	2	21	0	0	0	0	0
% App. Total	50	0	50	0		0	0	0	0		0	0	0	0		0	19	71.4	9.5		0	0	0	0	
PHF	.250	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.625	.500	.656	.000	.000	.000	.000	.000

Accurate Counts
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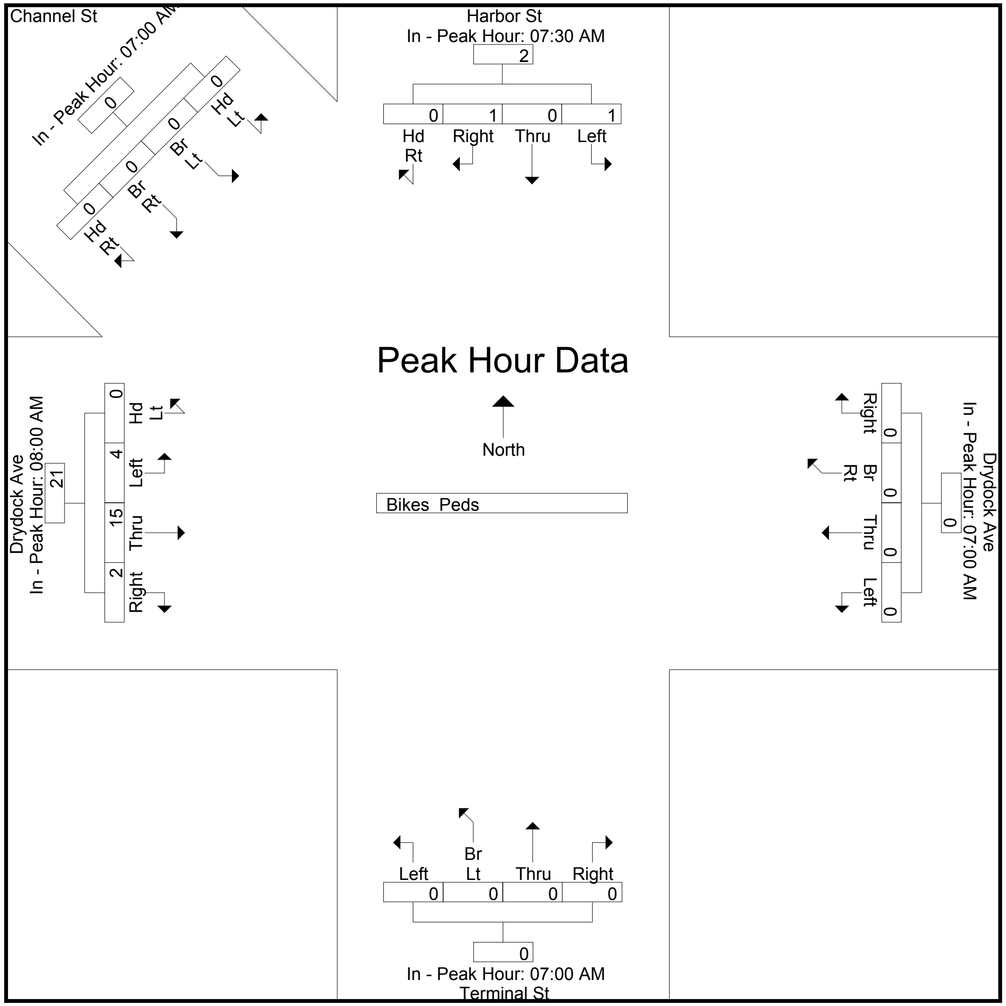

Accurate Counts
978-664-2565

N/S Street : Harbor St / Terminal St
E/W Street : Drydock Ave / Channel St
City/State : South Boston, MA
Weather : Cloudy

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
Page No : 1

Groups Printed- Cars - Trucks

	Harbor St From North				Drydock Ave From East				Terminal St From South				Drydock Ave From West				Channel St From Northwest				
Start Time	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Int. Total
04:00 PM	6	0	34	1	1	81	1	4	9	1	3	1	2	19	18	0	2	1	0	0	184
04:15 PM	2	2	39	2	0	69	0	5	4	0	1	1	4	19	19	4	0	0	0	2	173
04:30 PM	3	0	28	1	0	89	2	8	2	0	2	3	1	15	20	2	0	0	0	9	185
04:45 PM	2	0	31	1	0	81	1	10	3	0	0	3	3	13	20	1	1	0	0	3	173
Total	13	2	132	5	1	320	4	27	18	1	6	8	10	66	77	7	3	1	0	14	715
05:00 PM	0	0	31	0	1	117	2	10	2	0	1	2	1	9	24	2	1	1	0	2	206
05:15 PM	4	1	35	0	0	114	1	8	2	0	0	3	0	6	12	2	0	1	0	3	192
05:30 PM	1	0	36	0	1	103	0	7	4	0	1	3	0	11	24	4	0	0	0	0	195
05:45 PM	5	1	35	0	0	66	1	4	1	0	1	3	0	16	11	1	0	0	0	2	147
Total	10	2	137	0	2	400	4	29	9	0	3	11	1	42	71	9	1	2	0	7	740
Grand Total	23	4	269	5	3	720	8	56	27	1	9	19	11	108	148	16	4	3	0	21	1455
Apprch %	7.6	1.3	89.4	1.7	0.4	91.5	1	7.1	48.2	1.8	16.1	33.9	3.9	38.2	52.3	5.7	14.3	10.7	0	75	
Total %	1.6	0.3	18.5	0.3	0.2	49.5	0.5	3.8	1.9	0.1	0.6	1.3	0.8	7.4	10.2	1.1	0.3	0.2	0	1.4	
Cars	17	3	266	5	3	709	8	55	26	1	9	2	11	102	135	16	4	2	0	19	1393
% Cars	73.9	75	98.9	100	100	98.5	100	98.2	96.3	100	100	10.5	100	94.4	91.2	100	100	66.7	0	90.5	95.7
Trucks	6	1	3	0	0	11	0	1	1	0	0	17	0	6	13	0	0	1	0	2	62
% Trucks	26.1	25	1.1	0	0	1.5	0	1.8	3.7	0	0	89.5	0	5.6	8.8	0	0	33.3	0	9.5	4.3

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
Start Date : 2/4/2016
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	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest					
Start Time	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:45 PM																										
04:45 PM	2	0	31	1	34	0	81	1	10	92	3	0	0	3	6	3	13	20	1	37	1	0	0	3	4	173
05:00 PM	0	0	31	0	31	1	117	2	10	130	2	0	1	2	5	1	9	24	2	36	1	1	0	2	4	206
05:15 PM	4	1	35	0	40	0	114	1	8	123	2	0	0	3	5	0	6	12	2	20	0	1	0	3	4	192
05:30 PM	1	0	36	0	37	1	103	0	7	111	4	0	1	3	8	0	11	24	4	39	0	0	0	0	0	195
Total Volume	7	1	133	1	142	2	415	4	35	456	11	0	2	11	24	4	39	80	9	132	2	2	0	8	12	766
% App. Total	4.9	0.7	93.7	0.7		0.4	91	0.9	7.7		45.8	0	8.3	45.8		3	29.5	60.6	6.8		16.7	16.7	0	66.7		
PHF	.438	.250	.924	.250	.888	.500	.887	.500	.875	.877	.688	.000	.500	.917	.750	.333	.750	.833	.563	.846	.500	.500	.000	.667	.750	.930
Cars	5	1	133	1	140	2	407	4	34	447	10	0	2	2	14	4	37	73	9	123	2	1	0	8	11	735
% Cars	71.4	100	100	100	98.6	100	98.1	100	97.1	98.0	90.9	0	100	18.2	58.3	100	94.9	91.3	100	93.2	100	50.0	0	100	91.7	96.0
Trucks	2	0	0	0	2	0	8	0	1	9	1	0	0	9	10	0	2	7	0	9	0	1	0	0	1	31
% Trucks	28.6	0	0	0	1.4	0	1.9	0	2.9	2.0	9.1	0	0	81.8	41.7	0	5.1	8.8	0	6.8	0	50.0	0	0	8.3	4.0

File Name : 16002002
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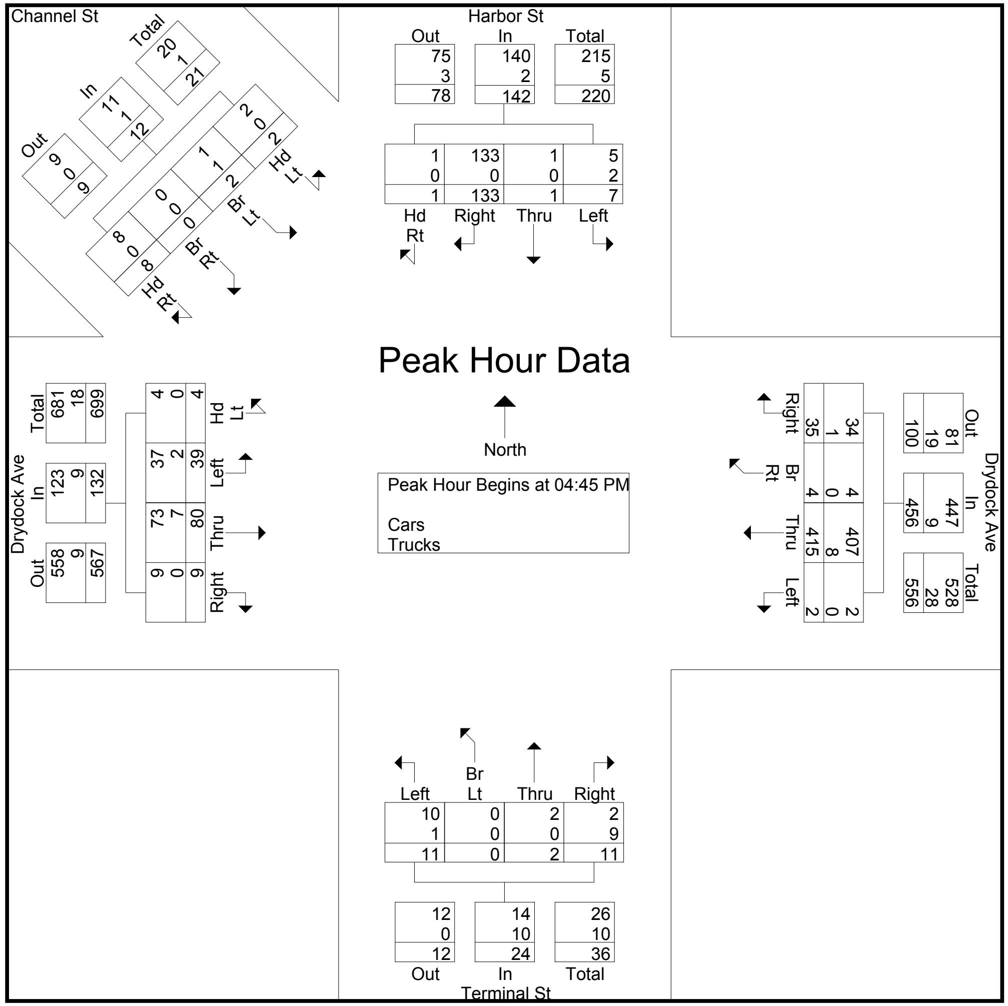

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM					04:45 PM					04:00 PM					04:00 PM					04:30 PM				
+0 mins.	6	0	34	1	41	0	81	1	10	92	9	1	3	1	14	2	19	18	0	39	0	0	0	9	9
+15 mins.	2	2	39	2	45	1	117	2	10	130	4	0	1	1	6	4	19	19	4	46	1	0	0	3	4
+30 mins.	3	0	28	1	32	0	114	1	8	123	2	0	2	3	7	1	15	20	2	38	1	1	0	2	4
+45 mins.	2	0	31	1	34	1	103	0	7	111	3	0	0	3	6	3	13	20	1	37	0	1	0	3	4
Total Volume	13	2	132	5	152	2	415	4	35	456	18	1	6	8	33	10	66	77	7	160	2	2	0	17	21
% App. Total	8.6	1.3	86.8	3.3		0.4	91	0.9	7.7		54.5	3	18.2	24.2		6.2	41.2	48.1	4.4		9.5	9.5	0	81	
PHF	.542	.250	.846	.625	.844	.500	.887	.500	.875	.877	.500	.250	.500	.667	.589	.625	.868	.963	.438	.870	.500	.500	.000	.472	.583

Accurate Counts

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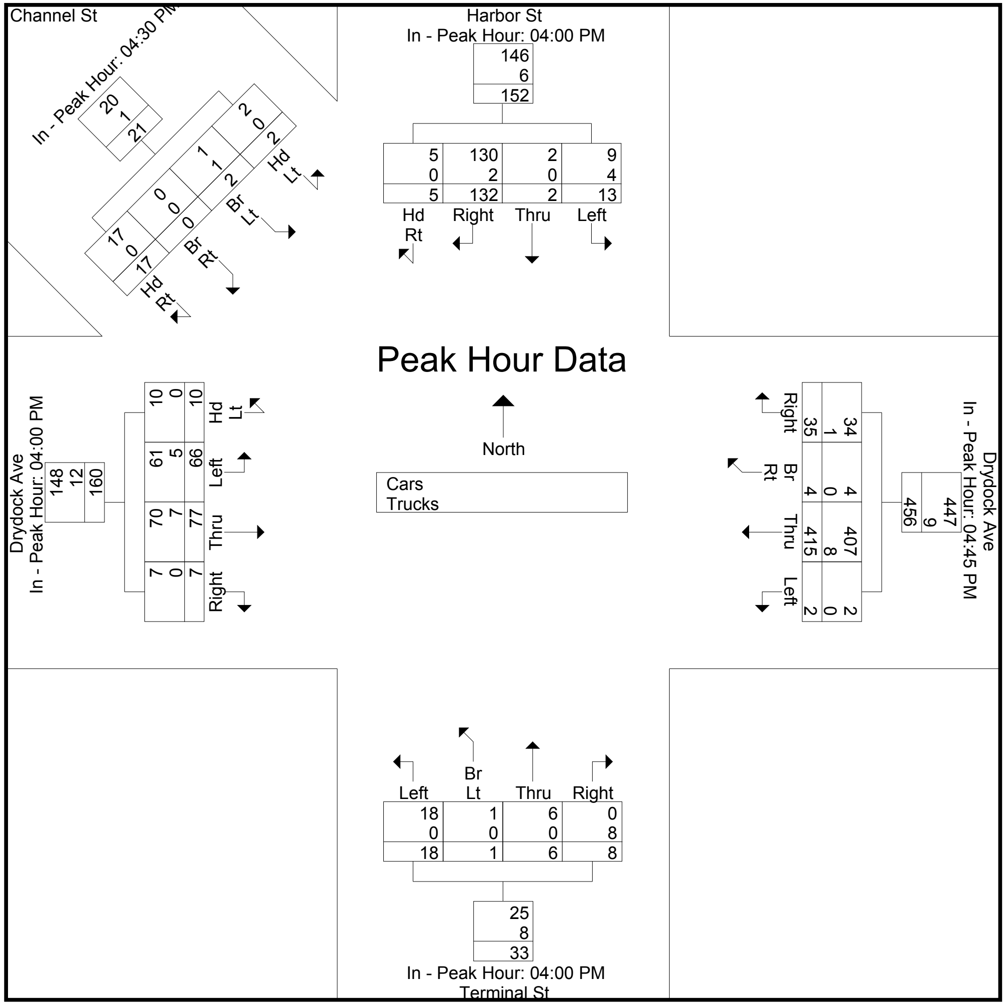
Cars	9	2	130	5	146	2	407	4	34	447	18	1	6	0	25	10	61	70	7	148	2	1	0	17	20
% Cars	69.2	100	98.5	100	96.1	100	98.1	100	97.1	98	100	100	100	0	75.8	100	92.4	90.9	100	92.5	100	50	0	100	95.2
Trucks	4	0	2	0	6	0	8	0	1	9	0	0	0	8	8	0	5	7	0	12	0	1	0	0	1
% Trucks	30.8	0	1.5	0	3.9	0	1.9	0	2.9	2	0	0	0	100	24.2	0	7.6	9.1	0	7.5	0	50	0	0	4.8



Accurate Counts
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Groups Printed- Cars

	Harbor St From North				Drydock Ave From East				Terminal St From South				Drydock Ave From West				Channel St From Northwest				
Start Time	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Int. Total
04:00 PM	4	0	33	1	1	80	1	4	9	1	3	0	2	15	17	0	2	1	0	0	174
04:15 PM	0	2	38	2	0	68	0	5	4	0	1	0	4	19	18	4	0	0	0	0	165
04:30 PM	3	0	28	1	0	89	2	8	2	0	2	0	1	15	18	2	0	0	0	9	180
04:45 PM	2	0	31	1	0	78	1	10	3	0	0	0	3	12	17	1	1	0	0	3	163
Total	9	2	130	5	1	315	4	27	18	1	6	0	10	61	70	7	3	1	0	12	682
05:00 PM	0	0	31	0	1	113	2	10	2	0	1	0	1	9	22	2	1	0	0	2	197
05:15 PM	2	1	35	0	0	114	1	7	2	0	0	0	0	5	11	2	0	1	0	3	184
05:30 PM	1	0	36	0	1	102	0	7	3	0	1	2	0	11	23	4	0	0	0	0	191
05:45 PM	5	0	34	0	0	65	1	4	1	0	1	0	0	16	9	1	0	0	0	2	139
Total	8	1	136	0	2	394	4	28	8	0	3	2	1	41	65	9	1	1	0	7	711
Grand Total	17	3	266	5	3	709	8	55	26	1	9	2	11	102	135	16	4	2	0	19	1393
Apprch %	5.8	1	91.4	1.7	0.4	91.5	1	7.1	68.4	2.6	23.7	5.3	4.2	38.6	51.1	6.1	16	8	0	76	
Total %	1.2	0.2	19.1	0.4	0.2	50.9	0.6	3.9	1.9	0.1	0.6	0.1	0.8	7.3	9.7	1.1	0.3	0.1	0	1.4	

Accurate Counts
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	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest					
Start Time	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:45 PM																										
04:45 PM	2	0	31	1	34	0	78	1	10	89	3	0	0	0	3	3	12	17	1	33	1	0	0	3	4	163
05:00 PM	0	0	31	0	31	1	113	2	10	126	2	0	1	0	3	1	9	22	2	34	1	0	0	2	3	197
05:15 PM	2	1	35	0	38	0	114	1	7	122	2	0	0	0	2	0	5	11	2	18	0	1	0	3	4	184
05:30 PM	1	0	36	0	37	1	102	0	7	110	3	0	1	2	6	0	11	23	4	38	0	0	0	0	0	191
Total Volume	5	1	133	1	140	2	407	4	34	447	10	0	2	2	14	4	37	73	9	123	2	1	0	8	11	735
% App. Total	3.6	0.7	95	0.7		0.4	91.1	0.9	7.6		71.4	0	14.3	14.3		3.3	30.1	59.3	7.3		18.2	9.1	0	72.7		
PHF	.625	.250	.924	.250	.921	.500	.893	.500	.850	.887	.833	.000	.500	.250	.583	.333	.771	.793	.563	.809	.500	.250	.000	.667	.688	.933

Accurate Counts
978-664-2565

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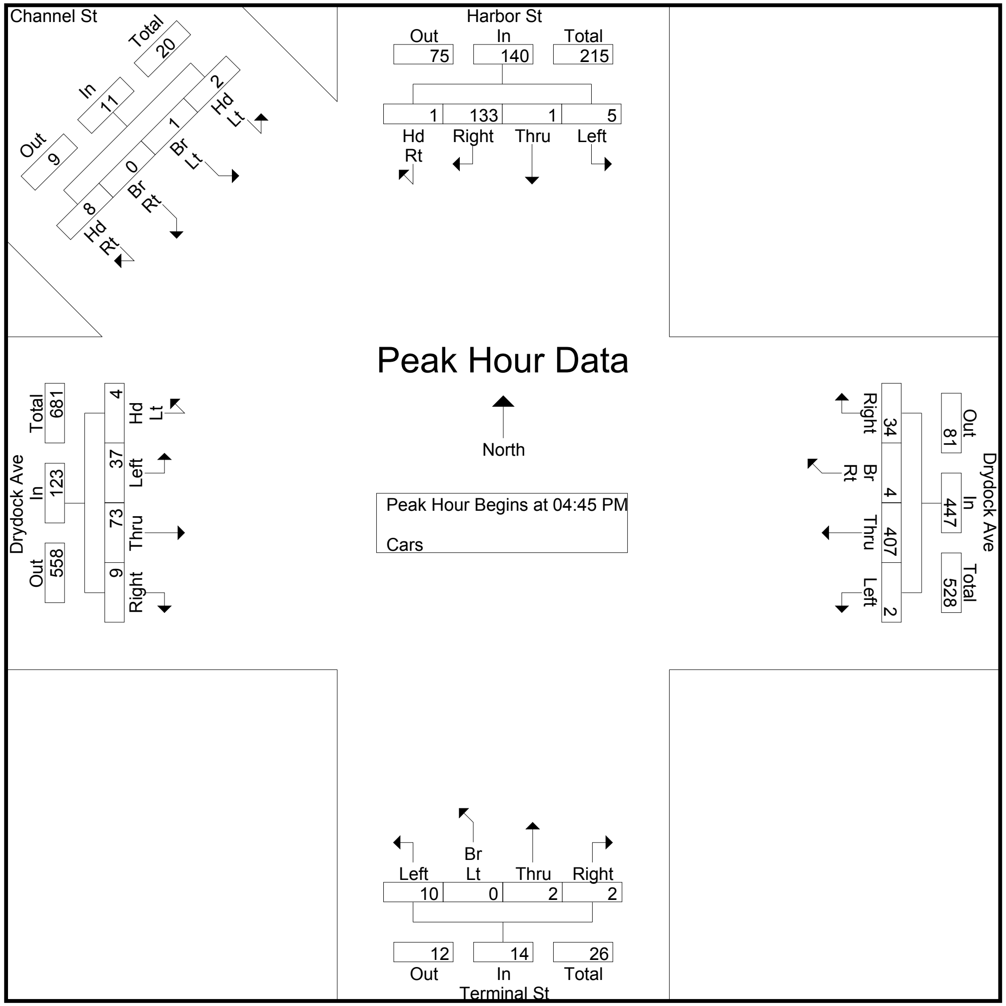

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM					04:45 PM					04:00 PM					04:00 PM					04:30 PM				
+0 mins.	4	0	33	1	38	0	78	1	10	89	9	1	3	0	13	2	15	17	0	34	0	0	0	9	9
+15 mins.	0	2	38	2	42	1	113	2	10	126	4	0	1	0	5	4	19	18	4	45	1	0	0	3	4
+30 mins.	3	0	28	1	32	0	114	1	7	122	2	0	2	0	4	1	15	18	2	36	1	0	0	2	3
+45 mins.	2	0	31	1	34	1	102	0	7	110	3	0	0	0	3	3	12	17	1	33	0	1	0	3	4
Total Volume	9	2	130	5	146	2	407	4	34	447	18	1	6	0	25	10	61	70	7	148	2	1	0	17	20
% App. Total	6.2	1.4	89	3.4		0.4	91.1	0.9	7.6		72	4	24	0		6.8	41.2	47.3	4.7		10	5	0	85	
PHF	.563	.250	.855	.625	.869	.500	.893	.500	.850	.887	.500	.250	.500	.000	.481	.625	.803	.972	.438	.822	.500	.250	.000	.472	.556

Accurate Counts
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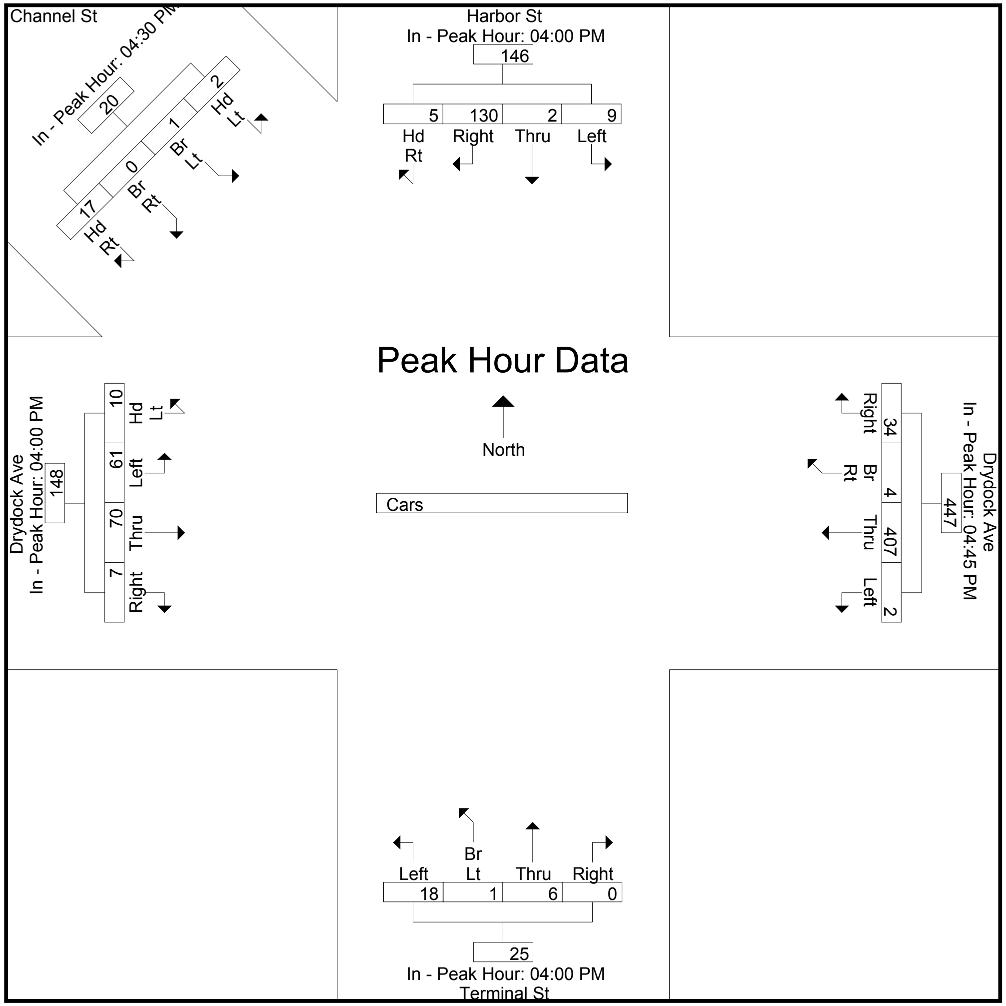

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
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Groups Printed- Trucks

	Harbor St From North				Drydock Ave From East				Terminal St From South				Drydock Ave From West				Channel St From Northwest				
Start Time	Left	Thru	Right	Hd Rt	Left	Thru	Br Rt	Right	Left	Br Lt	Thru	Right	Hd Lt	Left	Thru	Right	Hd Lt	Br Lt	Br Rt	Hd Rt	Int. Total
04:00 PM	2	0	1	0	0	1	0	0	0	0	0	1	0	4	1	0	0	0	0	0	10
04:15 PM	2	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	2	8
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0	0	0	0	0	5
04:45 PM	0	0	0	0	0	3	0	0	0	0	0	3	0	1	3	0	0	0	0	0	10
Total	4	0	2	0	0	5	0	0	0	0	0	8	0	5	7	0	0	0	0	2	33
05:00 PM	0	0	0	0	0	4	0	0	0	0	0	2	0	0	2	0	0	1	0	0	9
05:15 PM	2	0	0	0	0	0	0	1	0	0	0	3	0	1	1	0	0	0	0	0	8
05:30 PM	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0	4
05:45 PM	0	1	1	0	0	1	0	0	0	0	0	3	0	0	2	0	0	0	0	0	8
Total	2	1	1	0	0	6	0	1	1	0	0	9	0	1	6	0	0	1	0	0	29
Grand Total	6	1	3	0	0	11	0	1	1	0	0	17	0	6	13	0	0	1	0	2	62
Apprch %	60	10	30	0	0	91.7	0	8.3	5.6	0	0	94.4	0	31.6	68.4	0	0	33.3	0	66.7	
Total %	9.7	1.6	4.8	0	0	17.7	0	1.6	1.6	0	0	27.4	0	9.7	21	0	0	1.6	0	3.2	

Accurate Counts
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	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest					
Start Time	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 04:00 PM																										
04:00 PM	2	0	1	0	3	0	1	0	0	1	0	0	0	1	1	0	4	1	0	5	0	0	0	0	0	10
04:15 PM	2	0	1	0	3	0	1	0	0	1	0	0	0	1	1	0	0	1	0	1	0	0	0	2	2	8
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	2	0	2	0	0	0	0	0	5
04:45 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	3	3	0	1	3	0	4	0	0	0	0	0	10
Total Volume	4	0	2	0	6	0	5	0	0	5	0	0	0	8	8	0	5	7	0	12	0	0	0	2	2	33
% App. Total	66.7	0	33.3	0		0	100	0	0		0	0	0	100		0	41.7	58.3	0		0	0	0	100		
PHF	.500	.000	.500	.000	.500	.000	.417	.000	.000	.417	.000	.000	.000	.667	.667	.000	.313	.583	.000	.600	.000	.000	.000	.250	.250	.825

Accurate Counts
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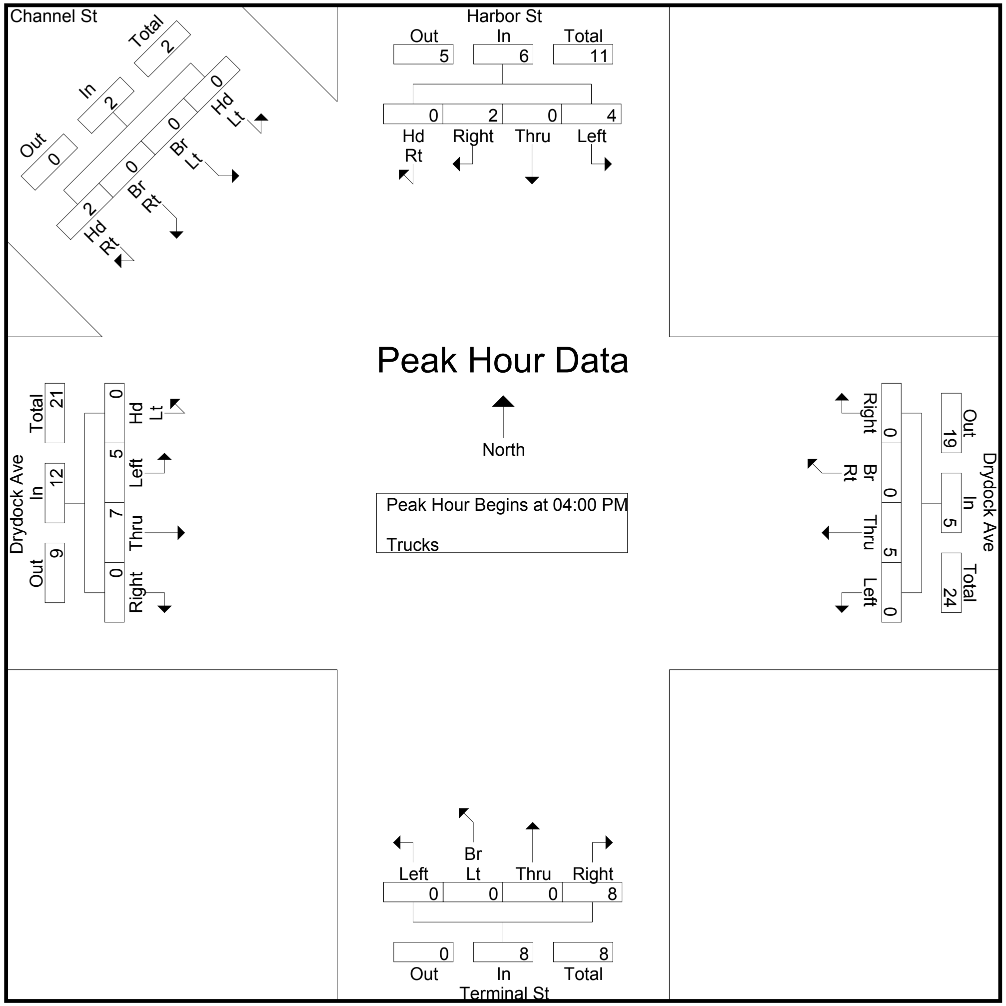

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	04:00 PM					04:45 PM					04:30 PM					04:00 PM					04:15 PM				
+0 mins.	2	0	1	0	3	0	3	0	0	3	0	0	0	3	3	0	4	1	0	5	0	0	0	2	2
+15 mins.	2	0	1	0	3	0	4	0	0	4	0	0	0	3	3	0	0	1	0	1	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2	0	0	2	0	2	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	1	0	0	1	0	0	0	3	3	0	1	3	0	4	0	1	0	0	1
Total Volume	4	0	2	0	6	0	8	0	1	9	0	0	0	11	11	0	5	7	0	12	0	1	0	2	3
% App. Total	66.7	0	33.3	0		0	88.9	0	11.1		0	0	0	100		0	41.7	58.3	0		0	33.3	0	66.7	
PHF	.500	.000	.500	.000	.500	.000	.500	.000	.250	.563	.000	.000	.000	.917	.917	.000	.313	.583	.000	.600	.000	.250	.000	.250	.375

Accurate Counts
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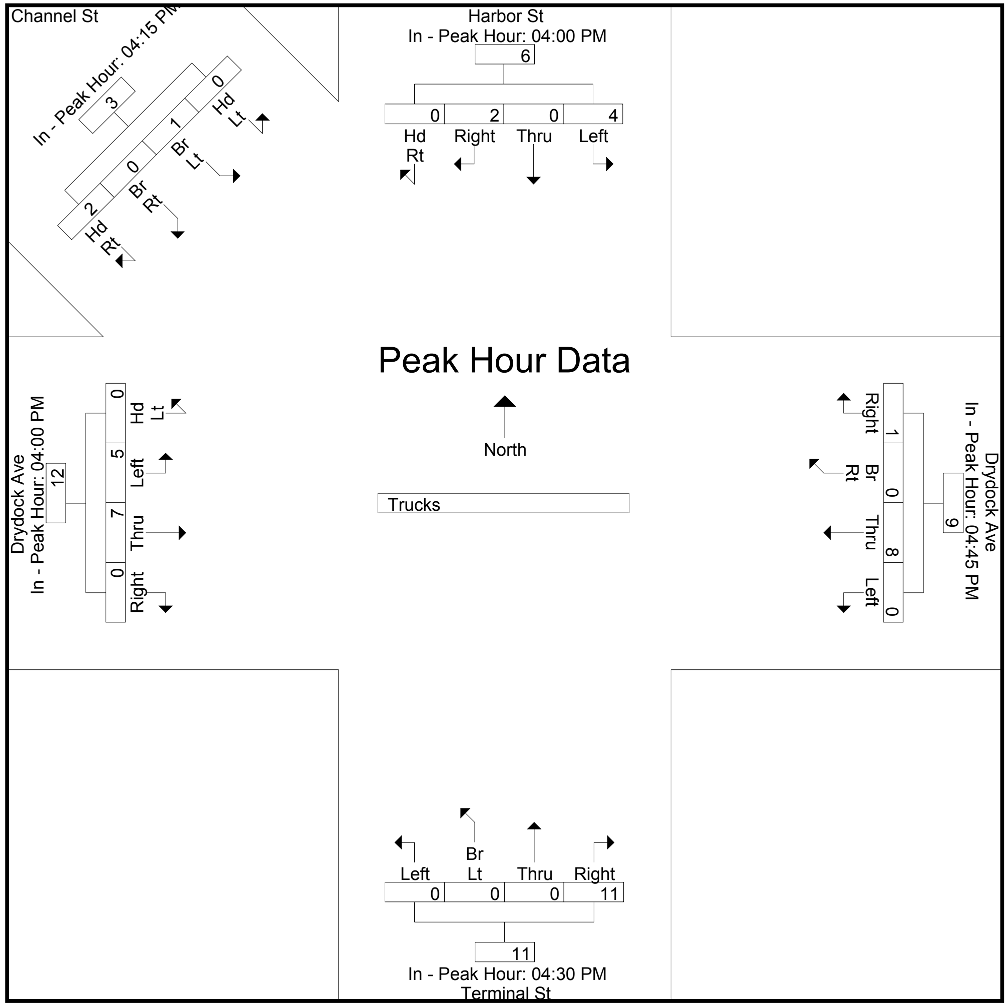

Accurate Counts
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Groups Printed- Bikes Peds

	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest							
Start Time	Left	Thru	Right	Hd Rt	Peds	Left	Thru	Br Rt	Right	Peds	Left	Br Lt	Thru	Right	Peds	Hd Lt	Left	Thru	Right	Peds	Hd Lt	Br Lt	Br Rt	Hd Rt	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	0	4
04:15 PM	0	0	0	0	5	0	1	0	0	1	0	0	0	0	0	0	0	1	0	2	0	1	0	0	0	8	3	11
04:30 PM	0	0	0	0	7	0	1	0	0	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	10	1	11
04:45 PM	0	0	1	0	9	0	1	0	0	2	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	14	2	16
Total	0	0	1	0	24	0	3	0	0	3	0	0	0	0	3	0	0	1	0	6	0	1	0	0	0	36	6	42
05:00 PM	0	0	0	0	6	0	2	0	0	8	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	15	2	17
05:15 PM	0	0	1	0	4	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	3	9
05:30 PM	0	0	0	0	4	0	1	0	0	1	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	7	2	9
05:45 PM	0	0	0	0	6	0	4	0	0	2	0	0	1	1	0	0	0	0	0	4	0	0	0	0	0	12	6	18
Total	0	0	1	0	20	0	9	0	0	12	0	0	1	1	0	0	0	1	0	7	0	0	0	0	1	40	13	53
Grand Total	0	0	2	0	44	0	12	0	0	15	0	0	1	1	3	0	0	2	0	13	0	1	0	0	1	76	19	95
Apprch %	0	0	100	0		0	100	0	0		0	0	50	50		0	0	100	0		0	100	0	0				
Total %	0	0	10.5	0		0	63.2	0	0		0	0	5.3	5.3		0	0	10.5	0		0	5.3	0	0		80	20	

Accurate Counts
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	Harbor St From North					Drydock Ave From East					Terminal St From South					Drydock Ave From West					Channel St From Northwest					
Start Time	Left	Thru	Right	Hd Rt	App. Total	Left	Thru	Br Rt	Right	App. Total	Left	Br Lt	Thru	Right	App. Total	Hd Lt	Left	Thru	Right	App. Total	Hd Lt	Br Lt	Br Rt	Hd Rt	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																										
Peak Hour for Entire Intersection Begins at 05:00 PM																										
05:00 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
05:15 PM	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:30 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	4	0	0	4	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	6
Total Volume	0	0	1	0	1	0	9	0	0	9	0	0	1	1	2	0	0	1	0	1	0	0	0	0	0	13
% App. Total	0	0	100	0		0	100	0	0		0	0	50	50		0	0	100	0		0	0	0	0		
PHF	.000	.000	.250	.000	.250	.000	.563	.000	.000	.563	.000	.000	.250	.250	.250	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.542

Accurate Counts
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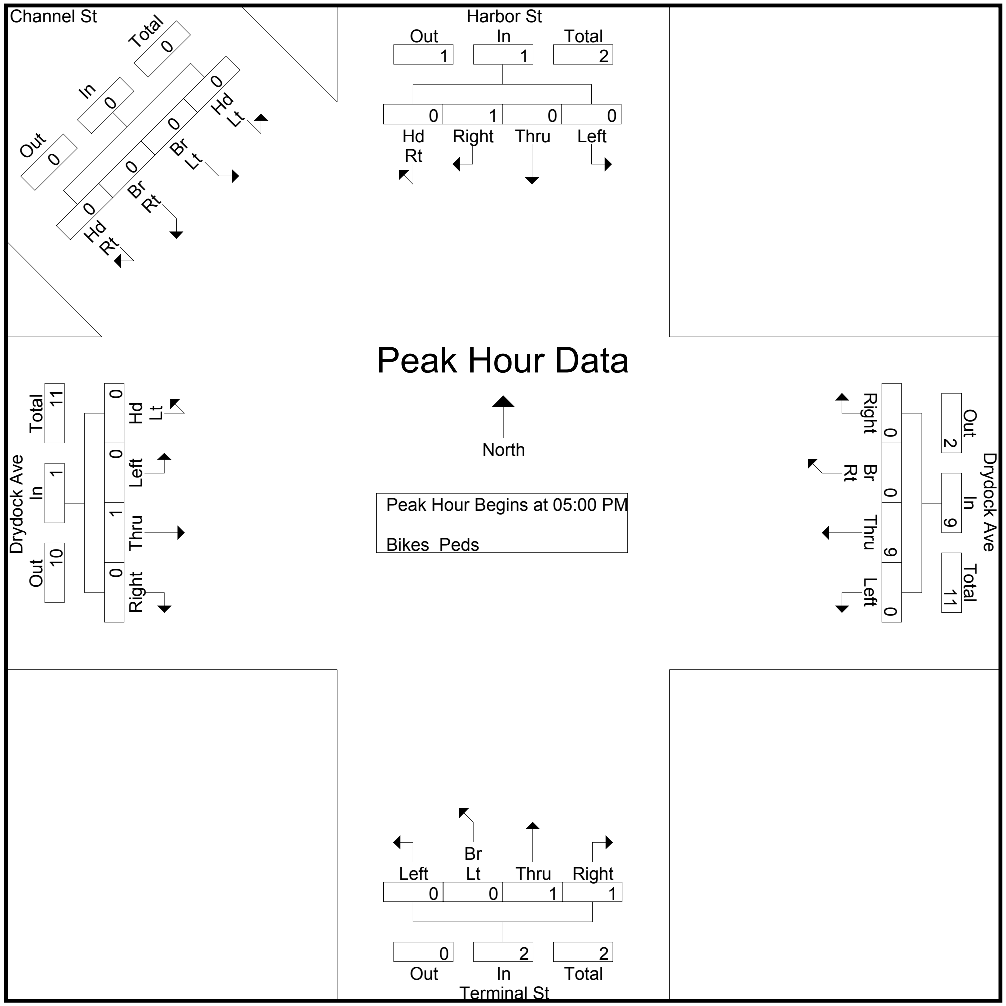

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM					05:00 PM					05:00 PM					04:00 PM					04:00 PM				
+0 mins.	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1
+30 mins.	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	1	0	1	0	4	0	0	4	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	2	0	2	0	9	0	0	9	0	0	1	1	2	0	0	1	0	1	0	1	0	0	1
% App. Total	0	0	100	0		0	100	0	0		0	0	50	50		0	0	100	0		0	100	0	0	
PHF	.000	.000	.500	.000	.500	.000	.563	.000	.000	.563	.000	.000	.250	.250	.250	.000	.000	.250	.000	.250	.000	.250	.000	.000	.250

Accurate Counts
978-664-2565

File Name : 16002002
Site Code : 16002002
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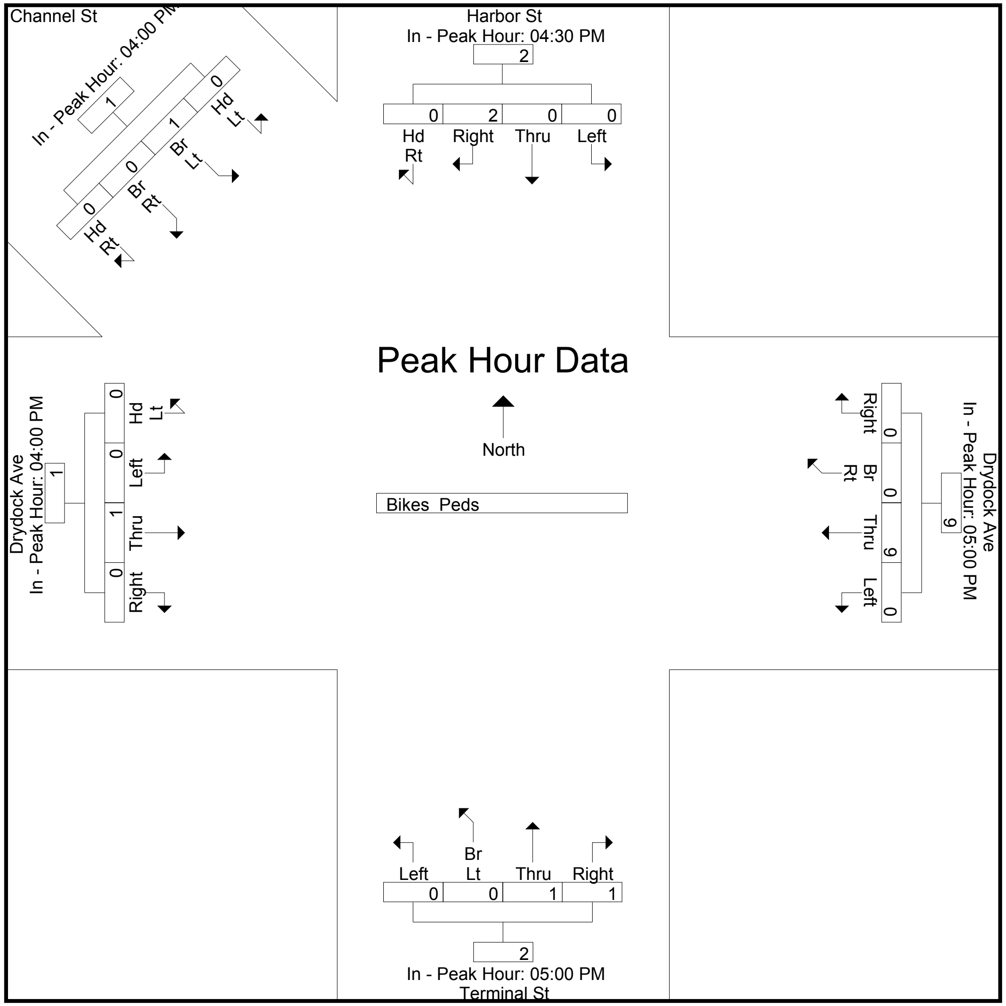


Synchro Intersection Level of Service Reports

- Existing (2016) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	143	494	161	9	1070	288	111	75	3	85	45	79	
Future Volume (vph)	143	494	161	9	1070	288	111	75	3	85	45	79	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	11	12	11	12	12	12	13	12	12	12	13	
Storage Length (ft)	0		0	75		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			1.00			1.00					
Frt		0.963			0.968			0.998				0.850	
Flt Protected	0.950			0.950				0.972			0.968		
Satd. Flow (prot)	1532	2983	0	1745	3418	0	0	1818	0	0	1688	1304	
Flt Permitted	0.077			0.077				0.596			0.686		
Satd. Flow (perm)	124	2983	0	141	3418	0	0	1115	0	0	1196	1304	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		61			36			1				81	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		524			821			949			546		
Travel Time (s)		11.9			18.7			21.6			12.4		
Confl. Bikes (#/hr)			2			15			3				
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.93	0.93	0.93	0.97	0.97	0.97	
Heavy Vehicles (%)	10%	15%	3%	0%	2%	1%	6%	3%	0%	10%	7%	28%	
Adj. Flow (vph)	161	555	181	9	1115	300	119	81	3	88	46	81	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	161	736	0	9	1415	0	0	203	0	0	134	81	
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pm+ov	
Protected Phases	4	1 4			1			3			3	4	2
Permitted Phases	1			1			3			3		3	
Detector Phase	4	1 4		1	1		3	3		3	3	4	
Switch Phase													
Minimum Initial (s)	8.0			8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	15.0			48.0	48.0		22.0	22.0		22.0	22.0	15.0	25.0
Total Split (%)	13.6%			43.6%	43.6%		20.0%	20.0%		20.0%	20.0%	13.6%	23%
Maximum Green (s)	10.0			43.0	43.0		17.0	17.0		17.0	17.0	10.0	23.0
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			-1.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			4.0	5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None			C-Max	C-Max		None	None		None	None	None	None
Walk Time (s)													8.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	63.0	68.0		53.0	53.0			17.0			18.0	32.0	
Actuated g/C Ratio	0.57	0.62		0.48	0.48			0.15			0.16	0.29	
v/c Ratio	0.81	0.39		0.13	0.85			1.17			0.69	0.19	
Control Delay	60.2	8.2		28.7	33.3			164.5			62.6	7.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0	
Total Delay	60.2	8.2		28.7	33.3			164.5			62.6	7.6	
LOS	E	A		C	C			F			E	A	
Approach Delay		17.5			33.3			164.5			41.9		
Approach LOS		B			C			F			D		
Queue Length 50th (ft)	73	108		4	~562			~172			90	0	
Queue Length 95th (ft)	#188	55		18	#702			#322			#178	36	
Internal Link Dist (ft)		444			741			869			466		
Turn Bay Length (ft)				75									
Base Capacity (vph)	198	1867		68	1665			173			195	436	
Starvation Cap Reductn	0	0		0	0			0			0	0	
Spillback Cap Reductn	0	0		0	0			0			0	0	
Storage Cap Reductn	0	0		0	0			0			0	0	
Reduced v/c Ratio	0.81	0.39		0.13	0.85			1.17			0.69	0.19	

Intersection Summary	
Area Type:	Other
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 13 (12%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 38.5	Intersection LOS: D
Intersection Capacity Utilization 76.1%	ICU Level of Service D
Analysis Period (min) 15	

~ 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.

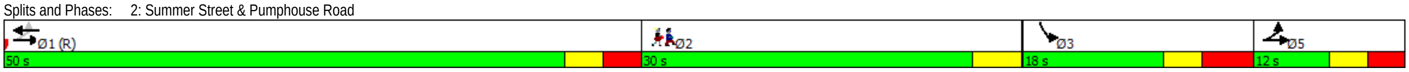
Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	16	658	838	420	140	25	
Future Volume (vph)	16	658	838	420	140	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.950		0.977		
Flt Protected		0.999			0.959		
Satd. Flow (prot)	0	3095	4109	0	2763	0	
Flt Permitted		0.903			0.959		
Satd. Flow (perm)	0	2797	4109	0	2763	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			141		15		
Link Speed (mph)		30	30		30		
Link Distance (ft)		419	524		268		
Travel Time (s)		9.5	11.9		6.1		
Peak Hour Factor	0.91	0.91	0.94	0.94	0.83	0.83	
Heavy Vehicles (%)	0%	5%	5%	3%	14%	4%	
Adj. Flow (vph)	18	723	891	447	169	30	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	741	1338	0	199	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		50.0		18.0		30.0
Total Split (%)	10.9%		45.5%		16.4%		27%
Maximum Green (s)	6.0		44.0		11.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)		78.0	70.0		13.0		
Actuated g/C Ratio		0.71	0.64		0.12		
v/c Ratio		0.37	0.50		0.59		
Control Delay		7.8	3.1		50.1		
Queue Delay		0.0	0.5		0.0		
Total Delay		7.8	3.6		50.1		
LOS		A	A		D		
Approach Delay		7.8	3.6		50.1		
Approach LOS		A	A		D		
Queue Length 50th (ft)		56	26		64		
Queue Length 95th (ft)		212	m45		93		
Internal Link Dist (ft)		339	444		188		
Turn Bay Length (ft)							
Base Capacity (vph)		2004	2666		339		
Starvation Cap Reductn		0	757		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.37	0.70		0.59		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 22 (20%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 9.0 Intersection LOS: A
Intersection Capacity Utilization 47.1% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Summer Street & Pumphouse Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	132	362	12	5	139	29	8	4	12	46	9	62
Future Volume (Veh/h)	132	362	12	5	139	29	8	4	12	46	9	62
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.83	0.83	0.83	0.69	0.69	0.69	0.90	0.90	0.90
Hourly flow rate (vph)	147	402	13	6	167	35	12	6	17	51	10	69
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546										
pX, platoon unblocked												
vC, conflicting volume	202			402			973	916	208	712	892	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	202			402			973	916	208	712	892	184
tC, single (s)	4.1			4.1			7.7	6.5	8.5	7.9	7.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.7	4.5	3.3
p0 queue free %	89			99			92	98	97	80	95	92
cM capacity (veh/h)	1367			1168			156	243	600	251	184	829

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	348	214	208	18	17	130
Volume Left	147	0	6	12	0	51
Volume Right	0	13	35	0	17	69
cSH	1367	1700	1168	177	600	381
Volume to Capacity	0.11	0.13	0.01	0.10	0.03	0.34
Queue Length 95th (ft)	9	0	0	8	2	37
Control Delay (s)	3.9	0.0	0.3	27.6	11.2	19.2
Lane LOS	A		A	D	B	C
Approach Delay (s)	2.4		0.3	19.6		19.2
Approach LOS				C		C

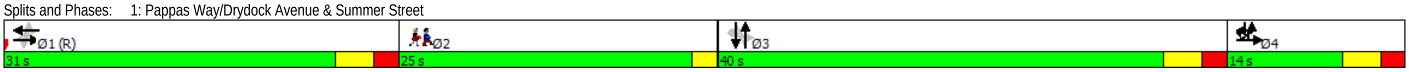
Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations		↰	↑↱			↰	↑↱				✥			↰↑	↱	
Traffic Volume (vph)	1	38	838	241	3	14	415	65	8	65	20	14	239	103	211	
Future Volume (vph)	1	38	838	241	3	14	415	65	8	65	20	14	239	103	211	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	11	12	12	11	12	12	12	12	13	12	12	12	13	
Storage Length (ft)		0		0		75		0		0		0	0		0	
Storage Lanes		1		0		1		0		0		0	0		1	
Taper Length (ft)		25				25				25			25			
Lane Util. Factor	0.95	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99				1.00								0.99	
Frt			0.967				0.980				0.982				0.850	
Flt Protected		0.950				0.950					0.967			0.966		
Satd. Flow (prot)	0	1343	3298	0	0	1739	3431	0	0	0	1862	0	0	1830	1605	
Flt Permitted		0.325				0.110					0.307			0.715		
Satd. Flow (perm)	0	459	3298	0	0	201	3431	0	0	0	591	0	0	1354	1584	
Right Turn on Red				Yes				Yes				Yes			Yes	
Satd. Flow (RTOR)			38				15				7				274	
Link Speed (mph)			30				30				30			30		
Link Distance (ft)			524				821				949			558		
Travel Time (s)			11.9				18.7				21.6			12.7		
Confl. Bikes (#/hr)				14				7							2	
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.89	0.89	0.89	0.75	0.75	0.75	0.75	0.77	0.77	0.77	
Heavy Vehicles (%)	2%	26%	2%	0%	2%	0%	3%	2%	2%	0%	0%	0%	0%	1%	4%	
Adj. Flow (vph)	1	41	901	259	3	16	466	73	11	87	27	19	310	134	274	
Shared Lane Traffic (%)																
Lane Group Flow (vph)	0	42	1160	0	0	19	539	0	0	0	144	0	0	444	274	
Turn Type	D.P+P	D.P+P	NA		Perm	Perm	NA		Perm	Perm	NA		Perm	NA	pm+ov	
Protected Phases	4!	4	1 4				1				3			3	4!	2
Permitted Phases	1	1			1	1			3	3			3		3	
Detector Phase	4	4	1 4		1	1	1		3	3	3		3	3	4	
Switch Phase																
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	13.0			13.0	13.0	13.0		13.0	13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	14.0	14.0			31.0	31.0	31.0		40.0	40.0	40.0		40.0	40.0	14.0	25.0
Total Split (%)	12.7%	12.7%			28.2%	28.2%	28.2%		36.4%	36.4%	36.4%		36.4%	36.4%	12.7%	23%
Maximum Green (s)	9.0	9.0			26.0	26.0	26.0		35.0	35.0	35.0		35.0	35.0	9.0	23.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0				-1.0	-1.0				-1.0			-1.0	0.0	
Total Lost Time (s)		5.0				4.0	4.0				4.0			4.0	5.0	
Lead/Lag	Lag	Lag			Lead	Lead	Lead		Lead	Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None	None			C-Min	C-Min	C-Min		None	None	None		None	None	None	None
Walk Time (s)																8.0
Flash Dont Walk (s)																15.0
Pedestrian Calls (#/hr)																30
Act Effct Green (s)		45.0	51.0			37.0	37.0				36.0			36.0	44.0	
Actuated g/C Ratio		0.41	0.46			0.34	0.34				0.33			0.33	0.40	
v/c Ratio		0.16	0.75			0.28	0.46				0.73			1.00	0.34	
Control Delay		17.1	28.9			48.1	32.2				54.1			81.4	3.5	
Queue Delay		0.0	0.2			0.0	0.0				0.0			0.0	0.0	
Total Delay		17.1	29.1			48.1	32.2				54.1			81.4	3.5	
LOS		B	C			D	C				D			F	A	
Approach Delay			28.6				32.7				54.1			51.7		
Approach LOS			C				C				D			D		
Queue Length 50th (ft)		20	393			11	174				85			~313	0	
Queue Length 95th (ft)		m26	#393			#42	230				130			#401	23	
Internal Link Dist (ft)			444				741				869			478		
Turn Bay Length (ft)						75										
Base Capacity (vph)		260	1549			67	1163				198			443	799	
Starvation Cap Reductn		0	44			0	0				0			0	0	
Spillback Cap Reductn		0	0			0	0				0			0	0	
Storage Cap Reductn		0	0			0	0				0			0	0	
Reduced v/c Ratio		0.16	0.77			0.28	0.46				0.73			1.00	0.34	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 37.2 Intersection LOS: D
Intersection Capacity Utilization 60.8% ICU Level of Service B
Analysis Period (min) 15
~ 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.
! Phase conflict between lane groups.

Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	13	714	483	207	404	26	
Future Volume (vph)	13	714	483	207	404	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.955		0.991		
Flt Protected		0.999			0.955		
Satd. Flow (prot)	0	3153	4250	0	3110	0	
Flt Permitted		0.938			0.955		
Satd. Flow (perm)	0	2960	4250	0	3110	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			104		6		
Link Speed (mph)		30	30		30		
Link Distance (ft)		424	524		271		
Travel Time (s)		9.6	11.9		6.2		
Peak Hour Factor	0.90	0.90	0.85	0.85	0.77	0.77	
Heavy Vehicles (%)	0%	3%	2%	0%	1%	0%	
Adj. Flow (vph)	14	793	568	244	525	34	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	807	812	0	559	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		39.0		29.0		30.0
Total Split (%)	10.9%		35.5%		26.4%		27%
Maximum Green (s)	6.0		33.0		22.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							10
Act Effct Green (s)		67.0	59.0		24.0		
Actuated g/C Ratio		0.61	0.54		0.22		
v/c Ratio		0.44	0.35		0.82		
Control Delay		13.6	15.4		51.5		
Queue Delay		0.0	0.0		0.0		
Total Delay		13.6	15.4		51.5		
LOS		B	B		D		
Approach Delay		13.6	15.4		51.5		
Approach LOS		B	B		D		
Queue Length 50th (ft)		107	36		192		
Queue Length 95th (ft)		290	200		210		
Internal Link Dist (ft)		344	444		191		
Turn Bay Length (ft)							
Base Capacity (vph)		1817	2327		683		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		22	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.45	0.35		0.82		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 3 (3%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 24.0 Intersection LOS: C
Intersection Capacity Utilization 53.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Summer Street & Pumphouse Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	71	9	2	400	33	9	3	11	12	2	144
Future Volume (Veh/h)	43	71	9	2	400	33	9	3	11	12	2	144
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.75	0.75	0.75	0.89	0.89	0.89
Hourly flow rate (vph)	51	84	11	2	455	38	12	4	15	13	2	162
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546										
pX, platoon unblocked												
vC, conflicting volume	493			84			832	688	48	639	664	474
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	493			84			832	688	48	639	664	474
tC, single (s)	4.2			4.1			7.7	6.5	8.5	8.1	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.8	4.0	3.3
p0 queue free %	95			100			93	99	98	96	99	70
cM capacity (veh/h)	1046			1526			168	353	802	291	364	542

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	93	53	495	16	15	177
Volume Left	51	0	2	12	0	13
Volume Right	0	11	38	0	15	162
cSH	1046	1700	1526	193	802	507
Volume to Capacity	0.05	0.03	0.00	0.08	0.02	0.35
Queue Length 95th (ft)	4	0	0	7	1	39
Control Delay (s)	4.9	0.0	0.0	25.3	9.6	15.9
Lane LOS	A		A	D	A	C
Approach Delay (s)	3.1		0.0	17.7		15.9
Approach LOS				C		C

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

- No-Build (2021) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	288	568	175	10	1198	351	118	78	3	102	47	122	
Future Volume (vph)	288	568	175	10	1198	351	118	78	3	102	47	122	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	11	12	11	12	12	12	13	12	12	12	13	
Storage Length (ft)	0		0	75		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			1.00			1.00					
Frt		0.965			0.966			0.998				0.850	
Flt Protected	0.950			0.950				0.971			0.967		
Satd. Flow (prot)	1532	2987	0	1745	3411	0	0	1816	0	0	1685	1304	
Flt Permitted	0.077			0.077				0.536			0.678		
Satd. Flow (perm)	124	2987	0	141	3411	0	0	1003	0	0	1181	1304	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		56			41			1				126	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		524			821			949			546		
Travel Time (s)		11.9			18.7			21.6			12.4		
Confl. Bikes (#/hr)			2			15			3				
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.93	0.93	0.93	0.97	0.97	0.97	
Heavy Vehicles (%)	10%	15%	3%	0%	2%	1%	6%	3%	0%	10%	7%	28%	
Adj. Flow (vph)	324	638	197	10	1248	366	127	84	3	105	48	126	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	324	835	0	10	1614	0	0	214	0	0	153	126	
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pm+ov	
Protected Phases	4	1 4			1			3			3	4	2
Permitted Phases	1			1			3			3		3	
Detector Phase	4	1 4		1	1		3	3		3	3	4	
Switch Phase													
Minimum Initial (s)	8.0			8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	15.0			48.0	48.0		22.0	22.0		22.0	22.0	15.0	25.0
Total Split (%)	13.6%			43.6%	43.6%		20.0%	20.0%		20.0%	20.0%	13.6%	23%
Maximum Green (s)	10.0			43.0	43.0		17.0	17.0		17.0	17.0	10.0	23.0
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			-1.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			4.0	5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None			C-Max	C-Max		None	None		None	None	None	None
Walk Time (s)													8.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	63.0	68.0		53.0	53.0			17.0			18.0	32.0	
Actuated g/C Ratio	0.57	0.62		0.48	0.48			0.15			0.16	0.29	
v/c Ratio	1.64	0.45		0.15	0.97			1.38			0.79	0.27	
Control Delay	331.6	10.2		29.2	45.7			242.7			73.1	6.8	
Queue Delay	0.0	0.0		0.0	0.8			0.0			0.0	0.0	
Total Delay	331.6	10.2		29.2	46.5			242.7			73.1	6.8	
LOS	F	B		C	D			F			E	A	
Approach Delay		100.1			46.4			242.7			43.2		
Approach LOS		F			D			F			D		
Queue Length 50th (ft)	~296	127		5	~718			~201			105	0	
Queue Length 95th (ft)	#474	107		21	#859			#356			#214	44	
Internal Link Dist (ft)		444			741			869			466		
Turn Bay Length (ft)				75									
Base Capacity (vph)	198	1867		68	1664			155			193	468	
Starvation Cap Reductn	0	0		0	0			0			0	0	
Spillback Cap Reductn	0	0		0	10			0			0	0	
Storage Cap Reductn	0	0		0	0			0			0	0	
Reduced v/c Ratio	1.64	0.45		0.15	0.98			1.38			0.79	0.27	

Intersection Summary

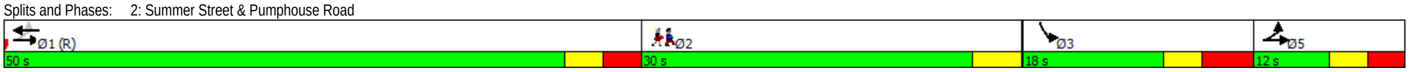
Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 13 (12%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.64
Intersection Signal Delay: 77.9 Intersection LOS: E
Intersection Capacity Utilization 90.3% ICU Level of Service E
Analysis Period (min) 15
~ 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.

Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	17	861	983	460	164	26	
Future Volume (vph)	17	861	983	460	164	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.952		0.980		
Flt Protected		0.999			0.959		
Satd. Flow (prot)	0	3094	4116	0	2768	0	
Flt Permitted		0.899			0.959		
Satd. Flow (perm)	0	2784	4116	0	2768	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			132		13		
Link Speed (mph)		30	30		30		
Link Distance (ft)		419	524		268		
Travel Time (s)		9.5	11.9		6.1		
Peak Hour Factor	0.91	0.91	0.94	0.94	0.83	0.83	
Heavy Vehicles (%)	0%	5%	5%	3%	14%	4%	
Adj. Flow (vph)	19	946	1046	489	198	31	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	965	1535	0	229	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		50.0		18.0		30.0
Total Split (%)	10.9%		45.5%		16.4%		27%
Maximum Green (s)	6.0		44.0		11.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)		78.0	70.0		13.0		
Actuated g/C Ratio		0.71	0.64		0.12		
v/c Ratio		0.48	0.58		0.68		
Control Delay		9.2	3.9		54.7		
Queue Delay		0.0	0.8		0.0		
Total Delay		9.2	4.7		54.7		
LOS		A	A		D		
Approach Delay		9.2	4.7		54.7		
Approach LOS		A	A		D		
Queue Length 50th (ft)		82	40		76		
Queue Length 95th (ft)		300	m53		107		
Internal Link Dist (ft)		339	444		188		
Turn Bay Length (ft)							
Base Capacity (vph)		1996	2667		338		
Starvation Cap Reductn		0	743		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.48	0.80		0.68		

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 22 (20%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 10.5	Intersection LOS: B
Intersection Capacity Utilization 54.1%	ICU Level of Service A
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 2: Summer Street & Pumphouse Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	552	12	5	193	30	8	4	12	48	9	69
Future Volume (Veh/h)	137	552	12	5	193	30	8	4	12	48	9	69
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.83	0.83	0.83	0.69	0.69	0.69	0.90	0.90	0.90
Hourly flow rate (vph)	152	613	13	6	233	36	12	6	17	53	10	77
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546										
pX, platoon unblocked												
vC, conflicting volume	269			613			1268	1204	313	894	1180	251
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			613			1268	1204	313	894	1180	251
tC, single (s)	4.1			4.1			7.7	6.5	8.5	7.9	7.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.7	4.5	3.3
p0 queue free %	88			99			86	96	97	70	91	90
cM capacity (veh/h)	1292			976			88	163	495	178	115	752

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	458	320	275	18	17	140
Volume Left	152	0	6	12	0	53
Volume Right	0	13	36	0	17	77
cSH	1292	1700	976	104	495	287
Volume to Capacity	0.12	0.19	0.01	0.17	0.03	0.49
Queue Length 95th (ft)	10	0	0	15	3	63
Control Delay (s)	3.5	0.0	0.3	46.7	12.5	28.9
Lane LOS	A		A	E	B	D
Approach Delay (s)	2.1		0.3	30.1		28.9
Approach LOS				D		D

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations		↰	↑↱			↰	↑↱				✣			↶	↱	
Traffic Volume (vph)	1	112	978	263	3	15	538	87	8	71	21	14	297	107	368	
Future Volume (vph)	1	112	978	263	3	15	538	87	8	71	21	14	297	107	368	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	11	12	12	11	12	12	12	12	13	12	12	12	13	
Storage Length (ft)		0		0		75		0		0		0	0		0	
Storage Lanes		1		0		1		0		0		0	0		1	
Taper Length (ft)		25				25				25			25			
Lane Util. Factor	0.95	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99				1.00								0.99	
Frt			0.968				0.979				0.983				0.850	
Flt Protected		0.950				0.950					0.967			0.965		
Satd. Flow (prot)	0	1339	3302	0	0	1740	3427	0	0	0	1864	0	0	1829	1605	
Flt Permitted		0.220				0.110					0.186			0.702		
Satd. Flow (perm)	0	310	3302	0	0	201	3427	0	0	0	358	0	0	1330	1584	
Right Turn on Red				Yes				Yes				Yes			Yes	
Satd. Flow (RTOR)			35				16				7				478	
Link Speed (mph)			30				30				30			30		
Link Distance (ft)			524				821				949			558		
Travel Time (s)			11.9				18.7				21.6			12.7		
Confl. Bikes (#/hr)				14				7							2	
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.89	0.89	0.89	0.75	0.75	0.75	0.75	0.77	0.77	0.77	
Heavy Vehicles (%)	2%	26%	2%	0%	2%	0%	3%	2%	2%	0%	0%	0%	0%	1%	4%	
Adj. Flow (vph)	1	120	1052	283	3	17	604	98	11	95	28	19	386	139	478	
Shared Lane Traffic (%)																
Lane Group Flow (vph)	0	121	1335	0	0	20	702	0	0	0	153	0	0	525	478	
Turn Type	D.P+P	D.P+P	NA		Perm	Perm	NA		Perm	Perm	NA		Perm	NA	pm+ov	
Protected Phases	4!	4	1 4				1				3			3	4!	2
Permitted Phases	1	1			1	1			3	3			3		3	
Detector Phase	4	4	1 4		1	1	1		3	3	3		3	3	4	
Switch Phase																
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	13.0			13.0	13.0	13.0		13.0	13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	14.0	14.0			31.0	31.0	31.0		40.0	40.0	40.0		40.0	40.0	14.0	25.0
Total Split (%)	12.7%	12.7%			28.2%	28.2%	28.2%		36.4%	36.4%	36.4%		36.4%	36.4%	12.7%	23%
Maximum Green (s)	9.0	9.0			26.0	26.0	26.0		35.0	35.0	35.0		35.0	35.0	9.0	23.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0				-1.0	-1.0				-1.0			-1.0	0.0	
Total Lost Time (s)		5.0				4.0	4.0				4.0			4.0	5.0	
Lead/Lag	Lag	Lag			Lead	Lead	Lead		Lead	Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None	None			C-Max	C-Max	C-Max		None	None	None		None	None	None	None
Walk Time (s)																8.0
Flash Dont Walk (s)																15.0
Pedestrian Calls (#/hr)																30
Act Effct Green (s)		45.0	51.0			37.0	37.0				36.0			36.0	44.0	
Actuated g/C Ratio		0.41	0.46			0.34	0.34				0.33			0.33	0.40	
v/c Ratio		0.58	0.86			0.30	0.60				1.26			1.21	0.52	
Control Delay		28.1	31.9			49.1	35.1				201.7			147.1	3.9	
Queue Delay		0.0	0.5			0.0	0.0				0.0			0.0	0.0	
Total Delay		28.1	32.4			49.1	35.1				201.7			147.1	3.9	
LOS		C	C			D	D				F			F	A	
Approach Delay			32.0				35.5				201.7			78.9		
Approach LOS			C				D				F			E		
Queue Length 50th (ft)		60	~514			12	242				~133			~453	0	
Queue Length 95th (ft)		m75	#670			#45	310				#206			#520	19	
Internal Link Dist (ft)			444				741				869			478		
Turn Bay Length (ft)						75										
Base Capacity (vph)		210	1549			67	1163				121			435	922	
Starvation Cap Reductn		0	37			0	0				0			0	0	
Spillback Cap Reductn		0	0			0	0				0			0	0	
Storage Cap Reductn		0	0			0	0				0			0	0	
Reduced v/c Ratio		0.58	0.88			0.30	0.60				1.26			1.21	0.52	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.26
Intersection Signal Delay: 54.7 — Intersection LOS: D
Intersection Capacity Utilization 78.0% — ICU Level of Service D
Analysis Period (min) 15
~ 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.
! Phase conflict between lane groups.

Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street

Ø1 (R)	Ø2	Ø3	Ø4
31 s	25 s	40 s	14 s

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	14	912	726	246	429	27	
Future Volume (vph)	14	912	726	246	429	27	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.962		0.991		
Flt Protected		0.999			0.955		
Satd. Flow (prot)	0	3153	4277	0	3110	0	
Flt Permitted		0.928			0.955		
Satd. Flow (perm)	0	2929	4277	0	3110	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			82		5		
Link Speed (mph)		30	30		30		
Link Distance (ft)		424	524		271		
Travel Time (s)		9.6	11.9		6.2		
Peak Hour Factor	0.90	0.90	0.85	0.85	0.77	0.77	
Heavy Vehicles (%)	0%	3%	2%	0%	1%	0%	
Adj. Flow (vph)	16	1013	854	289	557	35	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	1029	1143	0	592	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		39.0		29.0		30.0
Total Split (%)	10.9%		35.5%		26.4%		27%
Maximum Green (s)	6.0		33.0		22.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							10
Act Effct Green (s)		67.0	59.0		24.0		
Actuated g/C Ratio		0.61	0.54		0.22		
v/c Ratio		0.57	0.49		0.87		
Control Delay		16.1	17.1		55.7		
Queue Delay		0.1	0.0		0.0		
Total Delay		16.2	17.1		55.7		
LOS		B	B		E		
Approach Delay		16.2	17.1		55.7		
Approach LOS		B	B		E		
Queue Length 50th (ft)		151	60		207		
Queue Length 95th (ft)		#424	m289		225		
Internal Link Dist (ft)		344	444		191		
Turn Bay Length (ft)							
Base Capacity (vph)		1800	2331		682		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		146	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.62	0.49		0.87		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 3 (3%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 25.0 Intersection LOS: C
Intersection Capacity Utilization 61.1% ICU Level of Service B
Analysis Period (min) 15
\# 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.

Splits and Phases: 2: Summer Street & Pumphouse Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	177	9	2	599	34	9	3	11	12	2	164
Future Volume (Veh/h)	45	177	9	2	599	34	9	3	11	12	2	164
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.75	0.75	0.75	0.89	0.89	0.89
Hourly flow rate (vph)	53	208	11	2	681	39	12	4	15	13	2	184
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546										
pX, platoon unblocked												
vC, conflicting volume	720			208			1209	1044	110	932	1018	700
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	720			208			1209	1044	110	932	1018	700
tC, single (s)	4.2			4.1			7.7	6.5	8.5	8.1	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.8	4.0	3.3
p0 queue free %	94			100			81	98	98	92	99	52
cM capacity (veh/h)	858			1375			65	216	717	169	224	386

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	157	115	722	16	15	199
Volume Left	53	0	2	12	0	13
Volume Right	0	11	39	0	15	184
cSH	858	1700	1375	79	717	354
Volume to Capacity	0.06	0.07	0.00	0.20	0.02	0.56
Queue Length 95th (ft)	5	0	0	18	2	82
Control Delay (s)	3.6	0.0	0.0	62.2	10.1	27.5
Lane LOS	A		A	F	B	D
Approach Delay (s)	2.1		0.0	37.0		27.5
Approach LOS				E		D

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

- No-Build (2021) Condition with Haul Road Extension

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	237	568	175	10	845	704	118	78	3	102	47	82	
Future Volume (vph)	237	568	175	10	845	704	118	78	3	102	47	82	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	11	12	11	12	12	12	13	12	12	12	13	
Storage Length (ft)	0		0	75		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			0.99			1.00					
Frt		0.965			0.932			0.998				0.850	
Flt Protected	0.950			0.950				0.971			0.967		
Satd. Flow (prot)	1532	2987	0	1745	3282	0	0	1816	0	0	1685	1304	
Flt Permitted	0.080			0.080				0.551			0.677		
Satd. Flow (perm)	129	2987	0	147	3282	0	0	1031	0	0	1179	1304	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		55			217			1				85	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		524			821			949			176		
Travel Time (s)		11.9			18.7			21.6			4.0		
Confl. Bikes (#/hr)			2			15			3				
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.93	0.93	0.93	0.97	0.97	0.97	
Heavy Vehicles (%)	10%	15%	3%	0%	2%	1%	6%	3%	0%	10%	7%	28%	
Adj. Flow (vph)	266	638	197	10	880	733	127	84	3	105	48	85	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	266	835	0	10	1613	0	0	214	0	0	153	85	
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pm+ov	
Protected Phases	4	1 4			1			3			3	4	2
Permitted Phases	1			1			3			3		3	
Detector Phase	4	1 4		1	1		3	3		3	3	4	
Switch Phase													
Minimum Initial (s)	8.0			8.0	8.0		8.0	8.0		8.0	8.0	8.0	5.0
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	16.0			46.0	46.0		23.0	23.0		23.0	23.0	16.0	25.0
Total Split (%)	14.5%			41.8%	41.8%		20.9%	20.9%		20.9%	20.9%	14.5%	23%
Maximum Green (s)	11.0			41.0	41.0		18.0	18.0		18.0	18.0	11.0	23.0
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			-1.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			4.0	5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None			C-Max	C-Max		None	None		None	None	None	None
Walk Time (s)													8.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	62.0	67.0		51.0	51.0			18.0			19.0	34.0	
Actuated g/C Ratio	0.56	0.61		0.46	0.46			0.16			0.17	0.31	
v/c Ratio	1.25	0.45		0.15	0.98			1.27			0.75	0.18	
Control Delay	173.2	14.8		30.5	46.6			197.0			94.3	2.2	
Queue Delay	0.1	0.0		0.0	4.5			0.0			0.0	0.0	
Total Delay	173.3	14.8		30.5	51.1			197.0			94.3	2.2	
LOS	F	B		C	D			F			F	A	
Approach Delay		53.1			51.0			197.0			61.4		
Approach LOS		D			D			F			E		
Queue Length 50th (ft)	~204	162		5	~672			~191			114	0	
Queue Length 95th (ft)	#378	224		21	#813			#345			#214	0	
Internal Link Dist (ft)		444			741			869			96		
Turn Bay Length (ft)				75									
Base Capacity (vph)	213	1840		68	1638			169			203	461	
Starvation Cap Reductn	0	0		0	0			0			0	0	
Spillback Cap Reductn	1	0		0	34			0			0	0	
Storage Cap Reductn	0	0		0	0			0			0	0	
Reduced v/c Ratio	1.25	0.45		0.15	1.01			1.27			0.75	0.18	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.27
Intersection Signal Delay: 62.3 Intersection LOS: E
Intersection Capacity Utilization 89.1% ICU Level of Service E
Analysis Period (min) 15
~ 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.

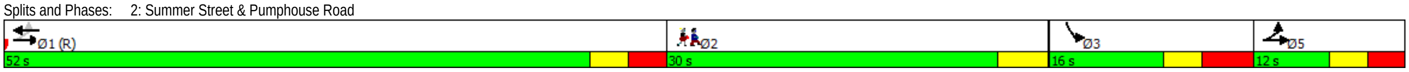
Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	17	861	943	107	119	66	
Future Volume (vph)	17	861	943	107	119	66	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.985		0.946		
Flt Protected		0.999			0.969		
Satd. Flow (prot)	0	3094	4242	0	2754	0	
Flt Permitted		0.920			0.969		
Satd. Flow (perm)	0	2849	4242	0	2754	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			22		80		
Link Speed (mph)		30	30		30		
Link Distance (ft)		419	524		304		
Travel Time (s)		9.5	11.9		6.9		
Peak Hour Factor	0.91	0.91	0.94	0.94	0.83	0.83	
Heavy Vehicles (%)	0%	5%	5%	3%	14%	4%	
Adj. Flow (vph)	19	946	1003	114	143	80	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	965	1117	0	223	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		52.0		16.0		30.0
Total Split (%)	10.9%		47.3%		14.5%		27%
Maximum Green (s)	6.0		46.0		9.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)		80.0	72.0		11.0		
Actuated g/C Ratio		0.73	0.65		0.10		
v/c Ratio		0.46	0.40		0.64		
Control Delay		8.2	7.8		39.5		
Queue Delay		0.0	0.0		0.0		
Total Delay		8.2	7.8		39.5		
LOS		A	A		D		
Approach Delay		8.2	7.8		39.5		
Approach LOS		A	A		D		
Queue Length 50th (ft)		72	98		50		
Queue Length 95th (ft)		287	m198		80		
Internal Link Dist (ft)		339	444		224		
Turn Bay Length (ft)							
Base Capacity (vph)		2090	2784		347		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.46	0.40		0.64		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 22 (20%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 11.0 Intersection LOS: B
Intersection Capacity Utilization 54.1% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Summer Street & Pumphouse Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	0	35	176	41	24	353	110	0	0	55	80
Future Volume (vph)	235	0	35	176	41	24	353	110	0	0	55	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.985							0.850
Flt Protected	0.950				0.965		0.950					
Satd. Flow (prot)	1703	0	1524	0	3237	0	1703	1792	0	0	1792	1524
Flt Permitted	0.950				0.965		0.718					
Satd. Flow (perm)	1703	0	1524	0	3237	0	1287	1792	0	0	1792	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50		9							87
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		358			378			270			262	
Travel Time (s)		8.1			8.6			6.1			6.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Adj. Flow (vph)	255	0	38	191	45	26	384	120	0	0	60	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	0	38	0	262	0	384	120	0	0	60	87
Turn Type	Prot		Prot	Perm	NA		Perm	NA			NA	Perm
Protected Phases	3		3		2			1			1	
Permitted Phases				2			1					1
Detector Phase	3		3	2	2		1	1			1	1
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)	22.0		22.0	25.0	25.0		60.0	60.0			60.0	60.0
Total Split (s)	25.0		25.0	25.0	25.0		60.0	60.0			60.0	60.0
Total Split (%)	22.7%		22.7%	22.7%	22.7%		54.5%	54.5%			54.5%	54.5%
Maximum Green (s)	21.0		21.0	21.0	21.0		56.0	56.0			56.0	56.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0		4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode	None		None	Max	Max		C-Max	C-Max			C-Max	C-Max
Walk Time (s)	7.0		7.0	10.0	10.0		45.0	45.0			45.0	45.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0		0	0			0	0
Act Effct Green (s)	19.1		19.1		21.0		57.9	57.9			57.9	57.9
Actuated g/C Ratio	0.17		0.17		0.19		0.53	0.53			0.53	0.53
v/c Ratio	0.86		0.12		0.42		0.57	0.13			0.06	0.10
Control Delay	71.4		8.3		40.1		17.2	9.9			13.9	3.3
Queue Delay	0.0		0.0		0.0		2.9	0.0			0.0	0.0
Total Delay	71.4		8.3		40.1		20.1	9.9			13.9	3.3
LOS	E		A		D		C	A			B	A
Approach Delay		63.2			40.1			17.7			7.6	
Approach LOS		E			D			B			A	
Queue Length 50th (ft)	173		0		83		233	39			21	0
Queue Length 95th (ft)	#298		21		124		m212	m38			43	25
Internal Link Dist (ft)		278			298			190			182	
Turn Bay Length (ft)												
Base Capacity (vph)	325		331		625		677	943			943	843
Starvation Cap Reductn	0		0		0		189	0			0	0
Spillback Cap Reductn	0		0		0		0	0			0	0
Storage Cap Reductn	0		0		0		0	0			0	0
Reduced v/c Ratio	0.78		0.11		0.42		0.79	0.13			0.06	0.10

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 20 (18%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 32.4 Intersection LOS: C
Intersection Capacity Utilization 52.6% ICU Level of Service A
Analysis Period (min) 15
\# 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.

Splits and Phases: 3: Haul Road & Drydock Avenue

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	245	125	60	414	89	35
Future Volume (vph)	245	125	60	414	89	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Frt		0.850			0.958	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	1863	1583	1770	1863	3341	0
Flt Permitted			0.557		0.965	
Satd. Flow (perm)	1863	1583	1038	1863	3341	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		136			38	
Link Speed (mph)	30			30	30	
Link Distance (ft)	114			358	304	
Travel Time (s)	2.6			8.1	6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	136	65	450	97	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	266	136	65	450	135	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	1		3	1 3	2	
Permitted Phases		1	1			
Detector Phase	1	1	3	1 3	2	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	22.0	22.0	8.0		22.0	
Total Split (s)	53.0	53.0	12.0		25.0	
Total Split (%)	58.9%	58.9%	13.3%		27.8%	
Maximum Green (s)	49.0	49.0	8.0		21.0	
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead			Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Recall Mode	C-Max	C-Max	Max		None	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	11.0	11.0			11.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	49.0	49.0	71.0	75.0	7.0	
Actuated g/C Ratio	0.54	0.54	0.79	0.83	0.08	
v/c Ratio	0.26	0.15	0.07	0.29	0.46	
Control Delay	11.8	2.3	1.8	2.3	32.9	
Queue Delay	0.0	0.0	0.0	0.9	0.0	
Total Delay	11.8	2.3	1.8	3.2	32.9	
LOS	B	A	A	A	C	
Approach Delay	8.6			3.1	32.9	
Approach LOS	A			A	C	
Queue Length 50th (ft)	76	0	4	37	27	
Queue Length 95th (ft)	121	25	12	72	54	
Internal Link Dist (ft)	34			278	224	
Turn Bay Length (ft)						
Base Capacity (vph)	1014	923	996	1551	808	
Starvation Cap Reductn	0	0	0	796	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.26	0.15	0.07	0.60	0.17	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 75 (83%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 9.0 — Intersection LOS: A
Intersection Capacity Utilization 32.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: Pumphouse Road & Haul Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	552	12	5	217	6	8	4	12	48	9	14
Future Volume (Veh/h)	27	552	12	5	217	6	8	4	12	48	9	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.83	0.83	0.83	0.69	0.69	0.69	0.90	0.90	0.90
Hourly flow rate (vph)	30	613	13	6	261	7	12	6	17	53	10	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	268			613			977	960	313	663	950	264
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	268			613			977	960	313	663	950	264
tC, single (s)	4.1			4.1			7.7	6.5	8.5	7.9	7.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.7	4.5	3.3
p0 queue free %	98			99			93	98	97	82	95	98
cM capacity (veh/h)	1293			976			176	251	495	290	184	737

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	336	320	274	18	17	79
Volume Left	30	0	6	12	0	53
Volume Right	0	13	7	0	17	16
cSH	1293	1700	976	196	495	305
Volume to Capacity	0.02	0.19	0.01	0.09	0.03	0.26
Queue Length 95th (ft)	2	0	0	7	3	25
Control Delay (s)	0.9	0.0	0.3	25.2	12.5	20.9
Lane LOS	A		A	D	B	C
Approach Delay (s)	0.5		0.3	19.1		20.9
Approach LOS				C		C

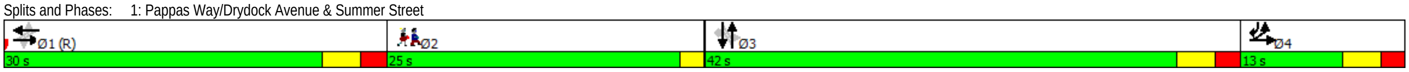
Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	95	890	263	15	446	179	71	21	14	385	107	213	
Future Volume (vph)	95	890	263	15	446	179	71	21	14	385	107	213	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	11	12	11	12	12	12	13	12	12	12	13	
Storage Length (ft)	0		0	75		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			0.99			1.00					
Frt		0.966			0.957			0.982				0.850	
Flt Protected	0.950			0.950				0.968			0.962		
Satd. Flow (prot)	1337	3303	0	1745	3338	0	0	1863	0	0	1824	1605	
Flt Permitted	0.221			0.117				0.281			0.710		
Satd. Flow (perm)	311	3303	0	215	3338	0	0	541	0	0	1346	1605	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		38			51			7				220	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		524			821			949			176		
Travel Time (s)		11.9			18.7			21.6			4.0		
Confl. Bikes (#/hr)			2			15			3				
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.93	0.93	0.93	0.97	0.97	0.97	
Heavy Vehicles (%)	26%	2%	0%	0%	3%	2%	0%	0%	0%	0%	1%	4%	
Adj. Flow (vph)	102	957	283	17	501	201	76	23	15	397	110	220	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	102	1240	0	17	702	0	0	114	0	0	507	220	
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pm+ov	
Protected Phases	4	1 4			1			3			3	4	2
Permitted Phases	1			1			3			3		3	
Detector Phase	4	1 4		1	1		3	3		3	3	4	
Switch Phase													
Minimum Initial (s)	8.0			8.0	8.0		8.0	8.0		8.0	8.0	8.0	5.0
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	13.0			30.0	30.0		42.0	42.0		42.0	42.0	13.0	25.0
Total Split (%)	11.8%			27.3%	27.3%		38.2%	38.2%		38.2%	38.2%	11.8%	23%
Maximum Green (s)	8.0			25.0	25.0		37.0	37.0		37.0	37.0	8.0	23.0
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			-1.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			4.0	5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None			C-Max	C-Max		Max	Max		Max	Max	None	None
Walk Time (s)													8.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	43.0	48.0		35.0	35.0			37.0			38.0	50.0	
Actuated g/C Ratio	0.39	0.44		0.32	0.32			0.34			0.35	0.45	
v/c Ratio	0.52	0.85		0.25	0.64			0.61			1.09	0.26	
Control Delay	29.7	31.2		47.1	35.7			44.9			123.5	9.8	
Queue Delay	0.0	0.1		0.0	0.0			0.0			2.9	0.0	
Total Delay	29.7	31.2		47.1	35.7			44.9			126.4	9.8	
LOS	C	C		D	D			D			F	A	
Approach Delay		31.1			35.9			44.9			91.1		
Approach LOS		C			D			D			F		
Queue Length 50th (ft)	40	~485		10	236			63			~419	22	
Queue Length 95th (ft)	m73	m#620		#37	#331			#143			#634	m74	
Internal Link Dist (ft)		444			741			869			96		
Turn Bay Length (ft)				75									
Base Capacity (vph)	195	1462		68	1097			186			464	849	
Starvation Cap Reductn	0	5		0	0			0			7	0	
Spillback Cap Reductn	0	0		0	0			0			0	0	
Storage Cap Reductn	0	0		0	0			0			0	0	
Reduced v/c Ratio	0.52	0.85		0.25	0.64			0.61			1.11	0.26	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 47.9 Intersection LOS: D
Intersection Capacity Utilization 84.4% ICU Level of Service E
Analysis Period (min) 15
~ 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.

Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	14	912	610	104	292	143	
Future Volume (vph)	14	912	610	104	292	143	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.978		0.951		
Flt Protected		0.999			0.968		
Satd. Flow (prot)	0	3153	4339	0	3034	0	
Flt Permitted		0.937			0.968		
Satd. Flow (perm)	0	2957	4339	0	3034	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			33		72		
Link Speed (mph)		30	30		30		
Link Distance (ft)		419	524		304		
Travel Time (s)		9.5	11.9		6.9		
Peak Hour Factor	0.90	0.90	0.85	0.85	0.77	0.77	
Heavy Vehicles (%)	0%	3%	2%	0%	1%	0%	
Adj. Flow (vph)	16	1013	718	122	379	186	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	1029	840	0	565	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		42.0		26.0		30.0
Total Split (%)	10.9%		38.2%		23.6%		27%
Maximum Green (s)	6.0		36.0		19.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							10
Act Effct Green (s)		70.0	62.0		21.0		
Actuated g/C Ratio		0.64	0.56		0.19		
v/c Ratio		0.54	0.34		0.89		
Control Delay		13.9	5.9		55.0		
Queue Delay		0.1	0.0		5.9		
Total Delay		14.0	5.9		60.8		
LOS		B	A		E		
Approach Delay		14.0	5.9		60.8		
Approach LOS		B	A		E		
Queue Length 50th (ft)		134	36		178		
Queue Length 95th (ft)		381	84		197		
Internal Link Dist (ft)		339	444		224		
Turn Bay Length (ft)							
Base Capacity (vph)		1896	2459		637		
Starvation Cap Reductn		0	0		44		
Spillback Cap Reductn		130	0		3		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.58	0.34		0.95		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 3 (3%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 22.1 Intersection LOS: C
Intersection Capacity Utilization 60.8% ICU Level of Service B
Analysis Period (min) 15

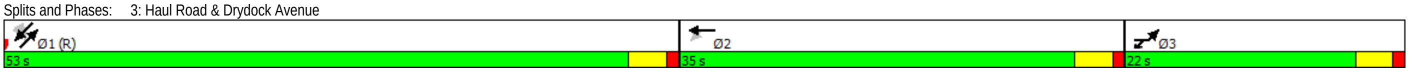
Splits and Phases: 2: Summer Street & Pumphouse Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	73	0	28	549	82	40	92	40	0	0	156	352
Future Volume (vph)	73	0	28	549	82	40	92	40	0	0	156	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.991							0.850
Flt Protected	0.950				0.961		0.950					
Satd. Flow (prot)	1770	0	1583	0	3371	0	1770	1863	0	0	1863	1583
Flt Permitted	0.950				0.961		0.635					
Satd. Flow (perm)	1770	0	1583	0	3371	0	1183	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50		6							383
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		358			378			270			262	
Travel Time (s)		8.1			8.6			6.1			6.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	0	30	597	89	43	100	43	0	0	170	383
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	0	30	0	729	0	100	43	0	0	170	383
Turn Type	Prot		Prot	Perm	NA		Perm	NA			NA	Perm
Protected Phases	3		3		2			1			1	
Permitted Phases				2			1					1
Detector Phase	3		3	2	2		1	1			1	1
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)	22.0		22.0	34.0	34.0		51.0	51.0			51.0	51.0
Total Split (s)	22.0		22.0	35.0	35.0		53.0	53.0			53.0	53.0
Total Split (%)	20.0%		20.0%	31.8%	31.8%		48.2%	48.2%			48.2%	48.2%
Maximum Green (s)	18.0		18.0	31.0	31.0		49.0	49.0			49.0	49.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0		4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode	None		None	Max	Max		C-Max	C-Max			C-Max	C-Max
Walk Time (s)	7.0		7.0	19.0	19.0		36.0	36.0			36.0	36.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0		0	0			0	0
Act Effct Green (s)	9.9		9.9		31.0		59.5	59.5			59.5	59.5
Actuated g/C Ratio	0.09		0.09		0.28		0.54	0.54			0.54	0.54
v/c Ratio	0.50		0.16		1.19dl		0.16	0.04			0.17	0.37
Control Delay	58.1		7.2		42.1		12.5	10.1			14.6	2.7
Queue Delay	0.0		0.1		0.2		0.0	0.0			0.2	0.0
Total Delay	58.1		7.3		42.3		12.5	10.1			14.8	2.7
LOS	E		A		D		B	B			B	A
Approach Delay		44.1			42.3			11.7			6.4	
Approach LOS		D			D			B			A	
Queue Length 50th (ft)	54		0		246		44	14			60	0
Queue Length 95th (ft)	101		15		317		m111	m32			107	48
Internal Link Dist (ft)		278			298			190			182	
Turn Bay Length (ft)												
Base Capacity (vph)	289		300		954		639	1007			1007	1032
Starvation Cap Reductn	0		0		0		0	0			0	0
Spillback Cap Reductn	0		54		20		0	0			380	0
Storage Cap Reductn	0		0		0		0	0			0	0
Reduced v/c Ratio	0.27		0.12		0.78		0.16	0.04			0.27	0.37

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 30 (27%), Referenced to phase 1:NESW, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 26.6 Intersection LOS: C
Intersection Capacity Utilization 68.9% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 3: Haul Road & Drydock Avenue



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	91	337	98	428	108	10
Future Volume (vph)	91	337	98	428	108	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Frt		0.850			0.987	
Flt Protected			0.950		0.956	
Satd. Flow (prot)	1863	1583	1770	1863	3410	0
Flt Permitted			0.693		0.956	
Satd. Flow (perm)	1863	1583	1291	1863	3410	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		366			9	
Link Speed (mph)	30			30	30	
Link Distance (ft)	114			358	304	
Travel Time (s)	2.6			8.1	6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	366	107	465	117	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	99	366	107	465	128	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	1		3	1 3	2	
Permitted Phases		1	1			
Detector Phase	1	1	3	1 3	2	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	44.0	44.0	9.0		22.0	
Total Split (s)	62.0	62.0	13.0		25.0	
Total Split (%)	62.0%	62.0%	13.0%		25.0%	
Maximum Green (s)	58.0	58.0	9.0		21.0	
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead			Lag	
Lead-Lag Optimize?	Yes	Yes			Yes	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Recall Mode	C-Max	C-Max	None		None	
Walk Time (s)	29.0	29.0			7.0	
Flash Dont Walk (s)	11.0	11.0			11.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	69.4	69.4	80.1	84.1	7.9	
Actuated g/C Ratio	0.69	0.69	0.80	0.84	0.08	
v/c Ratio	0.08	0.30	0.10	0.30	0.46	
Control Delay	6.1	1.5	1.8	2.3	45.9	
Queue Delay	0.0	0.0	0.0	1.2	0.0	
Total Delay	6.1	1.5	1.8	3.6	45.9	
LOS	A	A	A	A	D	
Approach Delay	2.5			3.3	45.9	
Approach LOS	A			A	D	
Queue Length 50th (ft)	17	0	8	43	38	
Queue Length 95th (ft)	44	33	18	78	65	
Internal Link Dist (ft)	34			278	224	
Turn Bay Length (ft)						
Base Capacity (vph)	1293	1211	1093	1546	723	
Starvation Cap Reductn	0	0	0	832	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.08	0.30	0.10	0.65	0.18	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 83 (83%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 7.6 Intersection LOS: A
Intersection Capacity Utilization 33.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: Pumphouse Road & Haul Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	177	9	2	629	4	6	3	11	12	2	33
Future Volume (Veh/h)	5	177	9	2	629	4	6	3	11	12	2	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.75	0.75	0.75	0.89	0.89	0.89
Hourly flow rate (vph)	6	208	11	2	715	5	8	4	15	13	2	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	720			208			985	950	110	854	942	718
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	720			208			985	950	110	854	942	718
tC, single (s)	4.2			4.1			7.7	6.5	8.5	8.1	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.8	4.0	3.3
p0 queue free %	99			100			95	98	98	94	99	90
cM capacity (veh/h)	858			1375			172	260	717	203	263	376

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	110	115	722	12	15	52
Volume Left	6	0	2	8	0	13
Volume Right	0	11	5	0	15	37
cSH	858	1700	1375	193	717	306
Volume to Capacity	0.01	0.07	0.00	0.06	0.02	0.17
Queue Length 95th (ft)	1	0	0	5	2	15
Control Delay (s)	0.6	0.0	0.0	24.8	10.1	19.1
Lane LOS	A		A	C	B	C
Approach Delay (s)	0.3		0.0	16.7		19.1
Approach LOS				C		C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

- Build (2021) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	311	568	175	10	1198	363	118	81	3	112	50	145	
Future Volume (vph)	311	568	175	10	1198	363	118	81	3	112	50	145	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	11	12	11	12	12	12	13	12	12	12	13	
Storage Length (ft)	0		0	75		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			1.00			1.00					
Frt		0.965			0.965			0.998				0.850	
Flt Protected	0.950			0.950				0.972			0.967		
Satd. Flow (prot)	1532	2987	0	1745	3407	0	0	1818	0	0	1685	1304	
Flt Permitted	0.077			0.077				0.496			0.672		
Satd. Flow (perm)	124	2987	0	141	3407	0	0	928	0	0	1171	1304	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		56			42			1				149	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		524			821			949			546		
Travel Time (s)		11.9			18.7			21.6			12.4		
Confl. Bikes (#/hr)			2			15			3				
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.93	0.93	0.93	0.97	0.97	0.97	
Heavy Vehicles (%)	10%	15%	3%	0%	2%	1%	6%	3%	0%	10%	7%	28%	
Adj. Flow (vph)	349	638	197	10	1248	378	127	87	3	115	52	149	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	349	835	0	10	1626	0	0	217	0	0	167	149	
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pm+ov	
Protected Phases	4	1 4			1			3			3	4	2
Permitted Phases	1			1			3			3		3	
Detector Phase	4	1 4		1	1		3	3		3	3	4	
Switch Phase													
Minimum Initial (s)	8.0			8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	15.0			48.0	48.0		22.0	22.0		22.0	22.0	15.0	25.0
Total Split (%)	13.6%			43.6%	43.6%		20.0%	20.0%		20.0%	20.0%	13.6%	23%
Maximum Green (s)	10.0			43.0	43.0		17.0	17.0		17.0	17.0	10.0	23.0
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			-1.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			4.0	5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None			C-Max	C-Max		None	None		None	None	None	None
Walk Time (s)													8.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	63.0	68.0		53.0	53.0			17.0			18.0	32.0	
Actuated g/C Ratio	0.57	0.62		0.48	0.48			0.15			0.16	0.29	
v/c Ratio	1.76	0.45		0.15	0.98			1.51			0.87	0.31	
Control Delay	385.2	10.2		29.2	47.3			294.5			85.2	6.7	
Queue Delay	0.0	0.0		0.0	1.6			0.0			0.0	0.0	
Total Delay	385.2	10.2		29.2	48.9			294.5			85.2	6.7	
LOS	F	B		C	D			F			F	A	
Approach Delay		120.7			48.7			294.5			48.2		
Approach LOS		F			D			F			D		
Queue Length 50th (ft)	~334	126		5	~727			~215			116	0	
Queue Length 95th (ft)	#515	108		21	#869			#369			#242	48	
Internal Link Dist (ft)		444			741			869			466		
Turn Bay Length (ft)				75									
Base Capacity (vph)	198	1867		68	1663			144			191	485	
Starvation Cap Reductn	0	0		0	0			0			0	0	
Spillback Cap Reductn	0	0		0	16			0			0	0	
Storage Cap Reductn	0	0		0	0			0			0	0	
Reduced v/c Ratio	1.76	0.45		0.15	0.99			1.51			0.87	0.31	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 13 (12%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.76
Intersection Signal Delay: 90.0 Intersection LOS: F
Intersection Capacity Utilization 92.1% ICU Level of Service F
Analysis Period (min) 15
~ 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.

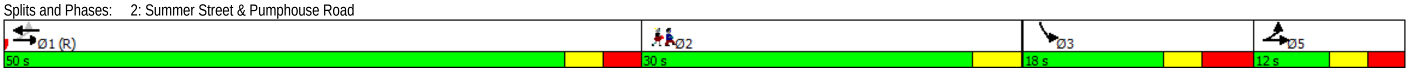
Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	17	871	990	475	177	26	
Future Volume (vph)	17	871	990	475	177	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.951		0.981		
Flt Protected		0.999			0.958		
Satd. Flow (prot)	0	3094	4113	0	2766	0	
Flt Permitted		0.898			0.958		
Satd. Flow (perm)	0	2781	4113	0	2766	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			135		12		
Link Speed (mph)		30	30		30		
Link Distance (ft)		419	524		268		
Travel Time (s)		9.5	11.9		6.1		
Peak Hour Factor	0.91	0.91	0.94	0.94	0.83	0.83	
Heavy Vehicles (%)	0%	5%	5%	3%	14%	4%	
Adj. Flow (vph)	19	957	1053	505	213	31	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	976	1558	0	244	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		50.0		18.0		30.0
Total Split (%)	10.9%		45.5%		16.4%		27%
Maximum Green (s)	6.0		44.0		11.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)		78.0	70.0		13.0		
Actuated g/C Ratio		0.71	0.64		0.12		
v/c Ratio		0.49	0.58		0.72		
Control Delay		9.3	4.2		57.7		
Queue Delay		0.0	0.9		0.0		
Total Delay		9.3	5.1		57.7		
LOS		A	A		E		
Approach Delay		9.3	5.1		57.7		
Approach LOS		A	A		E		
Queue Length 50th (ft)		83	42		82		
Queue Length 95th (ft)		304	m56		115		
Internal Link Dist (ft)		339	444		188		
Turn Bay Length (ft)							
Base Capacity (vph)		1994	2666		337		
Starvation Cap Reductn		0	738		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.49	0.81		0.72		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 22 (20%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 11.2 Intersection LOS: B
Intersection Capacity Utilization 54.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Summer Street & Pumphouse Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	552	50	5	193	30	44	4	12	48	16	69
Future Volume (Veh/h)	137	552	50	5	193	30	44	4	12	48	16	69
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.83	0.83	0.83	0.69	0.69	0.69	0.90	0.90	0.90
Hourly flow rate (vph)	152	613	56	6	233	36	64	6	17	53	18	77
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546										
pX, platoon unblocked												
vC, conflicting volume	269			613			1294	1226	334	894	1180	251
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			613			1294	1226	334	894	1180	251
tC, single (s)	4.1			4.1			7.7	6.5	8.5	7.9	7.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.7	4.5	3.3
p0 queue free %	88			99			20	96	96	70	84	90
cM capacity (veh/h)	1292			976			80	158	476	178	115	752

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	458	362	275	70	17	148
Volume Left	152	0	6	64	0	53
Volume Right	0	56	36	0	17	77
cSH	1292	1700	976	83	476	265
Volume to Capacity	0.12	0.21	0.01	0.84	0.04	0.56
Queue Length 95th (ft)	10	0	0	109	3	78
Control Delay (s)	3.5	0.0	0.3	145.7	12.8	34.4
Lane LOS	A		A	F	B	D
Approach Delay (s)	1.9		0.3	119.7		34.4
Approach LOS				F		D

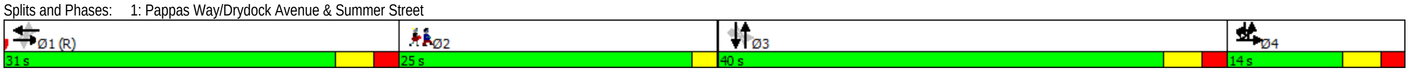
Intersection Summary			
Average Delay	12.9		
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations		↰	↑↱			↰	↑↱				✥			↰↑	↱	
Traffic Volume (vph)	1	135	978	263	3	15	538	98	8	71	24	14	308	110	396	
Future Volume (vph)	1	135	978	263	3	15	538	98	8	71	24	14	308	110	396	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	10	11	12	12	11	12	12	12	12	13	12	12	12	13	
Storage Length (ft)		0		0		75		0		0		0	0		0	
Storage Lanes		1		0		1		0		0		0	0		1	
Taper Length (ft)		25				25				25			25			
Lane Util. Factor	0.95	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99				1.00								0.99	
Frt			0.968				0.977				0.984				0.850	
Flt Protected		0.950				0.950					0.967			0.964		
Satd. Flow (prot)	0	1339	3302	0	0	1740	3420	0	0	0	1866	0	0	1827	1605	
Flt Permitted		0.213				0.110					0.164			0.698		
Satd. Flow (perm)	0	300	3302	0	0	201	3420	0	0	0	316	0	0	1323	1584	
Right Turn on Red				Yes				Yes				Yes			Yes	
Satd. Flow (RTOR)			35				18				7				514	
Link Speed (mph)			30				30				30			30		
Link Distance (ft)			524				821				949			558		
Travel Time (s)			11.9				18.7				21.6			12.7		
Confl. Bikes (#/hr)				14				7							2	
Peak Hour Factor	0.92	0.93	0.93	0.93	0.92	0.89	0.89	0.89	0.75	0.75	0.75	0.75	0.77	0.77	0.77	
Heavy Vehicles (%)	2%	26%	2%	0%	2%	0%	3%	2%	2%	0%	0%	0%	0%	1%	4%	
Adj. Flow (vph)	1	145	1052	283	3	17	604	110	11	95	32	19	400	143	514	
Shared Lane Traffic (%)																
Lane Group Flow (vph)	0	146	1335	0	0	20	714	0	0	0	157	0	0	543	514	
Turn Type	D.P+P	D.P+P	NA		Perm	Perm	NA		Perm	Perm	NA		Perm	NA	pm+ov	
Protected Phases	4!	4	1 4				1				3			3	4!	2
Permitted Phases	1	1			1	1			3	3			3		3	
Detector Phase	4	4	1 4		1	1	1		3	3	3		3	3	4	
Switch Phase																
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	13.0			13.0	13.0	13.0		13.0	13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	14.0	14.0			31.0	31.0	31.0		40.0	40.0	40.0		40.0	40.0	14.0	25.0
Total Split (%)	12.7%	12.7%			28.2%	28.2%	28.2%		36.4%	36.4%	36.4%		36.4%	36.4%	12.7%	23%
Maximum Green (s)	9.0	9.0			26.0	26.0	26.0		35.0	35.0	35.0		35.0	35.0	9.0	23.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0				-1.0	-1.0				-1.0			-1.0	0.0	
Total Lost Time (s)		5.0				4.0	4.0				4.0			4.0	5.0	
Lead/Lag	Lag	Lag			Lead	Lead	Lead		Lead	Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None	None			C-Min	C-Min	C-Min		None	None	None		None	None	None	None
Walk Time (s)																8.0
Flash Dont Walk (s)																15.0
Pedestrian Calls (#/hr)																30
Act Effct Green (s)		45.0	51.0			37.0	37.0				36.0			36.0	44.0	
Actuated g/C Ratio		0.41	0.46			0.34	0.34				0.33			0.33	0.40	
v/c Ratio		0.71	0.86			0.30	0.61				1.45			1.26	0.55	
Control Delay		36.3	31.8			49.1	35.3				277.9			166.6	4.0	
Queue Delay		0.0	0.5			0.0	0.0				0.0			0.0	0.0	
Total Delay		36.3	32.3			49.1	35.3				277.9			166.6	4.0	
LOS		D	C			D	D				F			F	A	
Approach Delay			32.7				35.7				277.9			87.5		
Approach LOS			C				D				F			F		
Queue Length 50th (ft)		76	~513			12	246				~149			~481	0	
Queue Length 95th (ft)		m#121	m#665			#45	#318				#223			#546	18	
Internal Link Dist (ft)			444				741				869			478		
Turn Bay Length (ft)						75										
Base Capacity (vph)		207	1549			67	1162				108			432	943	
Starvation Cap Reductn		0	39			0	0				0			0	0	
Spillback Cap Reductn		0	0			0	0				0			0	0	
Storage Cap Reductn		0	0			0	0				0			0	0	
Reduced v/c Ratio		0.71	0.88			0.30	0.61				1.45			1.26	0.55	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 23 (21%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.45
Intersection Signal Delay: 61.5 Intersection LOS: E
Intersection Capacity Utilization 79.4% ICU Level of Service D
Analysis Period (min) 15
~ 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.
! Phase conflict between lane groups.

Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	14	922	736	264	442	27	
Future Volume (vph)	14	922	736	264	442	27	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.960		0.991		
Flt Protected		0.999			0.955		
Satd. Flow (prot)	0	3153	4269	0	3110	0	
Flt Permitted		0.927			0.955		
Satd. Flow (perm)	0	2925	4269	0	3110	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			86		5		
Link Speed (mph)		30	30		30		
Link Distance (ft)		424	524		271		
Travel Time (s)		9.6	11.9		6.2		
Peak Hour Factor	0.90	0.90	0.85	0.85	0.77	0.77	
Heavy Vehicles (%)	0%	3%	2%	0%	1%	0%	
Adj. Flow (vph)	16	1024	866	311	574	35	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	1040	1177	0	609	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		39.0		29.0		30.0
Total Split (%)	10.9%		35.5%		26.4%		27%
Maximum Green (s)	6.0		33.0		22.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							10
Act Effct Green (s)		67.0	59.0		24.0		
Actuated g/C Ratio		0.61	0.54		0.22		
v/c Ratio		0.58	0.51		0.89		
Control Delay		16.2	17.1		58.4		
Queue Delay		0.1	0.0		0.0		
Total Delay		16.3	17.1		58.4		
LOS		B	B		E		
Approach Delay		16.3	17.1		58.4		
Approach LOS		B	B		E		
Queue Length 50th (ft)		153	64		214		
Queue Length 95th (ft)		#437	m294		232		
Internal Link Dist (ft)		344	444		191		
Turn Bay Length (ft)							
Base Capacity (vph)		1797	2329		682		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		144	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.63	0.51		0.89		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 3 (3%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 25.7 Intersection LOS: C
Intersection Capacity Utilization 61.8% ICU Level of Service B
Analysis Period (min) 15
\# 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.

Splits and Phases: 2: Summer Street & Pumphouse Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	177	46	2	599	34	51	4	11	12	8	164
Future Volume (Veh/h)	45	177	46	2	599	34	51	4	11	12	8	164
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.75	0.75	0.75	0.89	0.89	0.89
Hourly flow rate (vph)	53	208	54	2	681	39	68	5	15	13	9	184
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		546										
pX, platoon unblocked												
vC, conflicting volume	720			208			1234	1065	131	932	1018	700
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	720			208			1234	1065	131	932	1018	700
tC, single (s)	4.2			4.1			7.7	6.5	8.5	8.1	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.8	4.0	3.3
p0 queue free %	94			100			0	98	98	92	96	52
cM capacity (veh/h)	858			1375			61	210	690	168	224	386

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	157	158	722	73	15	206
Volume Left	53	0	2	68	0	13
Volume Right	0	54	39	0	15	184
cSH	858	1700	1375	64	690	347
Volume to Capacity	0.06	0.09	0.00	1.15	0.02	0.59
Queue Length 95th (ft)	5	0	0	146	2	91
Control Delay (s)	3.6	0.0	0.0	268.7	10.3	29.5
Lane LOS	A		A	F	B	D
Approach Delay (s)	1.8		0.0	224.6		29.5
Approach LOS				F		D

Intersection Summary			
Average Delay	19.9		
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

- Build (2021) Condition with Haul Road Extension

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	260	568	175	10	845	716	118	81	3	112	50	82	
Future Volume (vph)	260	568	175	10	845	716	118	81	3	112	50	82	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	11	12	11	12	12	12	13	12	12	12	13	
Storage Length (ft)	0		0	75		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			0.99			1.00					
Frt		0.965			0.931			0.998				0.850	
Flt Protected	0.950			0.950				0.972			0.967		
Satd. Flow (prot)	1532	2987	0	1745	3277	0	0	1818	0	0	1685	1304	
Flt Permitted	0.083			0.083				0.513			0.671		
Satd. Flow (perm)	134	2987	0	152	3277	0	0	960	0	0	1169	1304	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		55			215			1				85	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		524			821			949			176		
Travel Time (s)		11.9			18.7			21.6			4.0		
Confl. Bikes (#/hr)			2			15			3				
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.93	0.93	0.93	0.97	0.97	0.97	
Heavy Vehicles (%)	10%	15%	3%	0%	2%	1%	6%	3%	0%	10%	7%	28%	
Adj. Flow (vph)	292	638	197	10	880	746	127	87	3	115	52	85	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	292	835	0	10	1626	0	0	217	0	0	167	85	
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pm+ov	
Protected Phases	4	1 4			1			3			3	4	2
Permitted Phases	1			1			3			3		3	
Detector Phase	4	1 4		1	1		3	3		3	3	4	
Switch Phase													
Minimum Initial (s)	8.0			8.0	8.0		8.0	8.0		8.0	8.0	8.0	5.0
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	18.0			44.0	44.0		23.0	23.0		23.0	23.0	18.0	25.0
Total Split (%)	16.4%			40.0%	40.0%		20.9%	20.9%		20.9%	20.9%	16.4%	23%
Maximum Green (s)	13.0			39.0	39.0		18.0	18.0		18.0	18.0	13.0	23.0
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			-1.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			4.0	5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None			C-Max	C-Max		None	None		None	None	None	None
Walk Time (s)													8.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	62.0	67.0		49.0	49.0			18.0			19.0	36.0	
Actuated g/C Ratio	0.56	0.61		0.45	0.45			0.16			0.17	0.33	
v/c Ratio	1.22	0.45		0.15	1.03			1.38			0.83	0.18	
Control Delay	156.8	15.5		31.9	59.1			242.7			101.5	2.0	
Queue Delay	0.1	0.0		0.0	8.3			0.0			0.0	0.0	
Total Delay	156.8	15.5		31.9	67.4			242.7			101.5	2.0	
LOS	F	B		C	E			F			F	A	
Approach Delay		52.1			67.2			242.7			67.9		
Approach LOS		D			E			F			E		
Queue Length 50th (ft)	~222	162		5	~705			~204			125	0	
Queue Length 95th (ft)	#405	238		21	#846			#359			#243	0	
Internal Link Dist (ft)		444			741			869			96		
Turn Bay Length (ft)				75									
Base Capacity (vph)	240	1840		67	1578			157			201	483	
Starvation Cap Reductn	0	0		0	0			0			0	0	
Spillback Cap Reductn	1	0		0	34			0			0	0	
Storage Cap Reductn	0	0		0	0			0			0	0	
Reduced v/c Ratio	1.22	0.45		0.15	1.05			1.38			0.83	0.18	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.38
Intersection Signal Delay: 73.8 Intersection LOS: E
Intersection Capacity Utilization 90.9% ICU Level of Service E
Analysis Period (min) 15
~ 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.

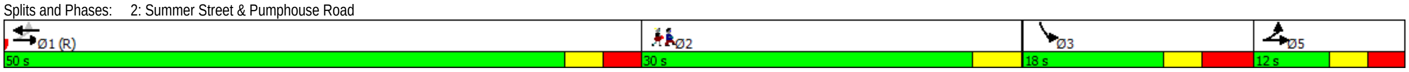
Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	17	871	943	107	132	89	
Future Volume (vph)	17	871	943	107	132	89	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.985		0.940		
Flt Protected		0.999			0.971		
Satd. Flow (prot)	0	3094	4242	0	2753	0	
Flt Permitted		0.920			0.971		
Satd. Flow (perm)	0	2849	4242	0	2753	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			22		107		
Link Speed (mph)		30	30		30		
Link Distance (ft)		419	524		304		
Travel Time (s)		9.5	11.9		6.9		
Peak Hour Factor	0.91	0.91	0.94	0.94	0.83	0.83	
Heavy Vehicles (%)	0%	5%	5%	3%	14%	4%	
Adj. Flow (vph)	19	957	1003	114	159	107	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	976	1117	0	266	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		50.0		18.0		30.0
Total Split (%)	10.9%		45.5%		16.4%		27%
Maximum Green (s)	6.0		44.0		11.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)		78.0	70.0		13.0		
Actuated g/C Ratio		0.71	0.64		0.12		
v/c Ratio		0.48	0.41		0.63		
Control Delay		9.2	8.3		34.8		
Queue Delay		0.0	0.0		0.0		
Total Delay		9.2	8.3		34.8		
LOS		A	A		C		
Approach Delay		9.2	8.3		34.8		
Approach LOS		A	A		C		
Queue Length 50th (ft)		83	108		55		
Queue Length 95th (ft)		304	m194		87		
Internal Link Dist (ft)		339	444		224		
Turn Bay Length (ft)							
Base Capacity (vph)		2038	2707		419		
Starvation Cap Reductn		0	0		0		
Spillback Cap Reductn		0	0		0		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.48	0.41		0.63		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 22 (20%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 11.7 Intersection LOS: B
Intersection Capacity Utilization 55.0% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Summer Street & Pumphouse Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	0	35	189	64	24	353	110	0	0	55	80
Future Volume (vph)	235	0	35	189	64	24	353	110	0	0	55	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.987							0.850
Flt Protected	0.950				0.967		0.950					
Satd. Flow (prot)	1703	0	1524	0	3250	0	1703	1792	0	0	1792	1524
Flt Permitted	0.950				0.967		0.718					
Satd. Flow (perm)	1703	0	1524	0	3250	0	1287	1792	0	0	1792	1524
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50		8							87
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		358			378			270			262	
Travel Time (s)		8.1			8.6			6.1			6.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Adj. Flow (vph)	255	0	38	205	70	26	384	120	0	0	60	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	255	0	38	0	301	0	384	120	0	0	60	87
Turn Type	Prot		Prot	Perm	NA		Perm	NA			NA	Perm
Protected Phases	3		3		2			1			1	
Permitted Phases				2			1					1
Detector Phase	3		3	2	2		1	1			1	1
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)	22.0		22.0	25.0	25.0		60.0	60.0			60.0	60.0
Total Split (s)	25.0		25.0	25.0	25.0		60.0	60.0			60.0	60.0
Total Split (%)	22.7%		22.7%	22.7%	22.7%		54.5%	54.5%			54.5%	54.5%
Maximum Green (s)	21.0		21.0	21.0	21.0		56.0	56.0			56.0	56.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0		4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode	None		None	Max	Max		C-Max	C-Max			C-Max	C-Max
Walk Time (s)	7.0		7.0	10.0	10.0		45.0	45.0			45.0	45.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0		0	0			0	0
Act Effct Green (s)	19.1		19.1		21.0		57.9	57.9			57.9	57.9
Actuated g/C Ratio	0.17		0.17		0.19		0.53	0.53			0.53	0.53
v/c Ratio	0.86		0.12		0.48		0.57	0.13			0.06	0.10
Control Delay	71.4		8.3		41.5		18.5	10.7			13.9	3.3
Queue Delay	0.0		0.0		0.0		2.9	0.0			0.0	0.0
Total Delay	71.4		8.3		41.5		21.4	10.7			13.9	3.3
LOS	E		A		D		C	B			B	A
Approach Delay		63.2			41.5			18.9			7.6	
Approach LOS		E			D			B			A	
Queue Length 50th (ft)	173		0		97		250	41			21	0
Queue Length 95th (ft)	#298		21		142		m213	m38			43	25
Internal Link Dist (ft)		278			298			190			182	
Turn Bay Length (ft)												
Base Capacity (vph)	325		331		626		677	943			943	843
Starvation Cap Reductn	0		0		0		189	0			0	0
Spillback Cap Reductn	0		0		0		0	0			0	0
Storage Cap Reductn	0		0		0		0	0			0	0
Reduced v/c Ratio	0.78		0.11		0.48		0.79	0.13			0.06	0.10

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 20 (18%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 33.4 Intersection LOS: C
Intersection Capacity Utilization 52.6% ICU Level of Service A
Analysis Period (min) 15
\# 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.

Splits and Phases: 3: Haul Road & Drydock Avenue

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	245	138	93	414	89	35
Future Volume (vph)	245	138	93	414	89	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Frt		0.850			0.958	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	1863	1583	1770	1863	3341	0
Flt Permitted			0.545		0.965	
Satd. Flow (perm)	1863	1583	1015	1863	3341	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		150			38	
Link Speed (mph)	30			30	30	
Link Distance (ft)	114			358	304	
Travel Time (s)	2.6			8.1	6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	150	101	450	97	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	266	150	101	450	135	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	1		3	1 3	2	
Permitted Phases		1	1			
Detector Phase	1	1	3	1 3	2	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	
Minimum Split (s)	22.0	22.0	8.0		22.0	
Total Split (s)	49.0	49.0	16.0		25.0	
Total Split (%)	54.4%	54.4%	17.8%		27.8%	
Maximum Green (s)	45.0	45.0	12.0		21.0	
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead			Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Recall Mode	C-Max	C-Max	Max		None	
Walk Time (s)	7.0	7.0			7.0	
Flash Dont Walk (s)	11.0	11.0			11.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	45.0	45.0	71.0	75.0	7.0	
Actuated g/C Ratio	0.50	0.50	0.79	0.83	0.08	
v/c Ratio	0.29	0.17	0.10	0.29	0.46	
Control Delay	14.2	2.7	1.8	2.3	32.9	
Queue Delay	0.0	0.0	0.0	0.9	0.0	
Total Delay	14.2	2.7	1.8	3.2	32.9	
LOS	B	A	A	A	C	
Approach Delay	10.0			3.0	32.9	
Approach LOS	B			A	C	
Queue Length 50th (ft)	84	0	7	37	27	
Queue Length 95th (ft)	134	29	17	72	54	
Internal Link Dist (ft)	34			278	224	
Turn Bay Length (ft)						
Base Capacity (vph)	931	866	1018	1551	808	
Starvation Cap Reductn	0	0	0	796	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.29	0.17	0.10	0.60	0.17	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 75 (83%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 9.3 Intersection LOS: A
Intersection Capacity Utilization 32.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: Pumphouse Road & Haul Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	552	50	5	217	6	44	4	12	48	15	14
Future Volume (Veh/h)	27	552	50	5	217	6	44	4	12	48	15	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.83	0.83	0.83	0.69	0.69	0.69	0.90	0.90	0.90
Hourly flow rate (vph)	30	613	56	6	261	7	64	6	17	53	17	16
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	268			613			1002	981	334	663	950	264
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	268			613			1002	981	334	663	950	264
tC, single (s)	4.1			4.1			7.7	6.5	8.5	7.9	7.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.7	4.5	3.3
p0 queue free %	98			99			61	98	96	82	91	98
cM capacity (veh/h)	1293			976			164	244	476	290	184	737

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	336	362	274	70	17	86
Volume Left	30	0	6	64	0	53
Volume Right	0	56	7	0	17	16
cSH	1293	1700	976	169	476	289
Volume to Capacity	0.02	0.21	0.01	0.42	0.04	0.30
Queue Length 95th (ft)	2	0	0	46	3	30
Control Delay (s)	0.9	0.0	0.3	40.7	12.8	22.6
Lane LOS	A		A	E	B	C
Approach Delay (s)	0.4		0.3	35.3		22.6
Approach LOS				E		C

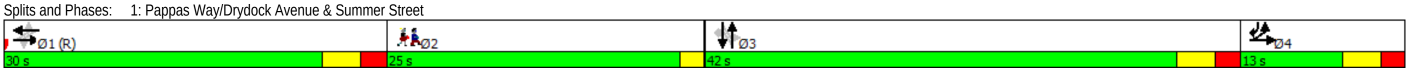
Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	49.3%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	118	890	263	15	446	190	71	24	14	396	110	213	
Future Volume (vph)	118	890	263	15	446	190	71	24	14	396	110	213	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	11	12	11	12	12	12	13	12	12	12	13	
Storage Length (ft)	0		0	75		0	0		0	0		0	
Storage Lanes	1		0	1		0	0		0	0		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			0.99			1.00					
Frt		0.966			0.955			0.983				0.850	
Flt Protected	0.950			0.950				0.969			0.962		
Satd. Flow (prot)	1337	3303	0	1745	3330	0	0	1867	0	0	1824	1605	
Flt Permitted	0.213			0.117				0.265			0.707		
Satd. Flow (perm)	300	3303	0	215	3330	0	0	511	0	0	1340	1605	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		38			55			7				220	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		524			821			949			176		
Travel Time (s)		11.9			18.7			21.6			4.0		
Confl. Bikes (#/hr)			2			15			3				
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.93	0.93	0.93	0.97	0.97	0.97	
Heavy Vehicles (%)	26%	2%	0%	0%	3%	2%	0%	0%	0%	0%	1%	4%	
Adj. Flow (vph)	127	957	283	17	501	213	76	26	15	408	113	220	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	127	1240	0	17	714	0	0	117	0	0	521	220	
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pm+ov	
Protected Phases	4	1 4			1			3			3	4	2
Permitted Phases	1			1			3			3		3	
Detector Phase	4	1 4		1	1		3	3		3	3	4	
Switch Phase													
Minimum Initial (s)	8.0			8.0	8.0		8.0	8.0		8.0	8.0	8.0	5.0
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	13.0	25.0
Total Split (s)	13.0			30.0	30.0		42.0	42.0		42.0	42.0	13.0	25.0
Total Split (%)	11.8%			27.3%	27.3%		38.2%	38.2%		38.2%	38.2%	11.8%	23%
Maximum Green (s)	8.0			25.0	25.0		37.0	37.0		37.0	37.0	8.0	23.0
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	3.0	2.0
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	0.0
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			-1.0	0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			4.0	5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Recall Mode	None			C-Max	C-Max		Max	Max		Max	Max	None	None
Walk Time (s)													8.0
Flash Dont Walk (s)													15.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	43.0	48.0		35.0	35.0			37.0			38.0	50.0	
Actuated g/C Ratio	0.39	0.44		0.32	0.32			0.34			0.35	0.45	
v/c Ratio	0.66	0.85		0.25	0.65			0.66			1.13	0.26	
Control Delay	36.6	31.1		47.1	35.8			49.9			131.3	8.4	
Queue Delay	0.0	0.1		0.0	0.0			0.0			0.0	0.0	
Total Delay	36.6	31.2		47.1	35.8			49.9			131.3	8.4	
LOS	D	C		D	D			D			F	A	
Approach Delay		31.7			36.0			49.9			94.8		
Approach LOS		C			D			D			F		
Queue Length 50th (ft)	51	~481		10	241			66			~420	15	
Queue Length 95th (ft)	m#105	m#612		#37	#340			#157			#636	m68	
Internal Link Dist (ft)		444			741			869			96		
Turn Bay Length (ft)				75									
Base Capacity (vph)	192	1462		68	1097			176			462	849	
Starvation Cap Reductn	0	5		0	0			0			0	0	
Spillback Cap Reductn	0	0		0	0			0			0	0	
Storage Cap Reductn	0	0		0	0			0			0	0	
Reduced v/c Ratio	0.66	0.85		0.25	0.65			0.66			1.13	0.26	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 49.3 Intersection LOS: D
Intersection Capacity Utilization 85.7% ICU Level of Service E
Analysis Period (min) 15
~ 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.

Splits and Phases: 1: Pappas Way/Drydock Avenue & Summer Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2
Lane Configurations							
Traffic Volume (vph)	14	922	610	104	305	171	
Future Volume (vph)	14	922	610	104	305	171	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	11	11	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Frt			0.978		0.946		
Flt Protected		0.999			0.969		
Satd. Flow (prot)	0	3153	4339	0	3022	0	
Flt Permitted		0.937			0.969		
Satd. Flow (perm)	0	2957	4339	0	3022	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			32		94		
Link Speed (mph)		30	30		30		
Link Distance (ft)		419	524		304		
Travel Time (s)		9.5	11.9		6.9		
Peak Hour Factor	0.90	0.90	0.85	0.85	0.77	0.77	
Heavy Vehicles (%)	0%	3%	2%	0%	1%	0%	
Adj. Flow (vph)	16	1024	718	122	396	222	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	1040	840	0	618	0	
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		8.0
Minimum Split (s)	12.0		18.0		16.0		30.0
Total Split (s)	12.0		41.0		27.0		30.0
Total Split (%)	10.9%		37.3%		24.5%		27%
Maximum Green (s)	6.0		35.0		20.0		26.0
Yellow Time (s)	3.0		3.0		3.0		4.0
All-Red Time (s)	3.0		3.0		4.0		0.0
Lost Time Adjust (s)			-2.0		-2.0		
Total Lost Time (s)			4.0		5.0		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0		2.0		2.0
Recall Mode	None		C-Max		Max		None
Walk Time (s)							7.0
Flash Dont Walk (s)							19.0
Pedestrian Calls (#/hr)							10
Act Effct Green (s)		69.0	61.0		22.0		
Actuated g/C Ratio		0.63	0.55		0.20		
v/c Ratio		0.56	0.35		0.91		
Control Delay		14.7	6.3		55.4		
Queue Delay		0.1	0.0		12.9		
Total Delay		14.8	6.3		68.4		
LOS		B	A		E		
Approach Delay		14.8	6.3		68.4		
Approach LOS		B	A		E		
Queue Length 50th (ft)		142	42		190		
Queue Length 95th (ft)		394	86		208		
Internal Link Dist (ft)		339	444		224		
Turn Bay Length (ft)							
Base Capacity (vph)		1869	2420		679		
Starvation Cap Reductn		0	0		61		
Spillback Cap Reductn		124	0		4		
Storage Cap Reductn		0	0		0		
Reduced v/c Ratio		0.60	0.35		1.00		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 3 (3%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 25.2 Intersection LOS: C
Intersection Capacity Utilization 62.5% ICU Level of Service B
Analysis Period (min) 15

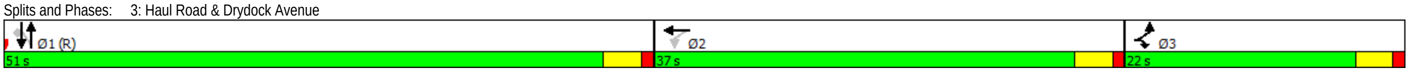
Splits and Phases: 2: Summer Street & Pumphouse Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	0	28	563	110	40	92	40	0	0	156	352
Future Volume (vph)	73	0	28	563	110	40	92	40	0	0	156	352
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.992							0.850
Flt Protected	0.950				0.962		0.950					
Satd. Flow (prot)	1770	0	1583	0	3377	0	1770	1863	0	0	1863	1583
Flt Permitted	0.950				0.962		0.632					
Satd. Flow (perm)	1770	0	1583	0	3377	0	1177	1863	0	0	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50		6							383
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		358			378			270			262	
Travel Time (s)		8.1			8.6			6.1			6.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	0	30	612	120	43	100	43	0	0	170	383
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	0	30	0	775	0	100	43	0	0	170	383
Turn Type	Prot		Prot	Perm	NA		Perm	NA			NA	Perm
Protected Phases	3		3		2			1			1	
Permitted Phases				2			1					1
Detector Phase	3		3	2	2		1	1			1	1
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	8.0
Minimum Split (s)	22.0		22.0	34.0	34.0		51.0	51.0			51.0	51.0
Total Split (s)	22.0		22.0	37.0	37.0		51.0	51.0			51.0	51.0
Total Split (%)	20.0%		20.0%	33.6%	33.6%		46.4%	46.4%			46.4%	46.4%
Maximum Green (s)	18.0		18.0	33.0	33.0		47.0	47.0			47.0	47.0
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	3.0
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0		4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0			2.0	2.0
Recall Mode	None		None	Max	Max		C-Max	C-Max			C-Max	C-Max
Walk Time (s)	7.0		7.0	19.0	19.0		36.0	36.0			36.0	36.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0		11.0	11.0			11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0		0	0			0	0
Act Effct Green (s)	9.9		9.9		33.0		57.5	57.5			57.5	57.5
Actuated g/C Ratio	0.09		0.09		0.30		0.52	0.52			0.52	0.52
v/c Ratio	0.50		0.16		1.14dl		0.16	0.04			0.17	0.38
Control Delay	58.1		7.2		40.5		13.2	10.7			15.7	2.9
Queue Delay	0.0		0.1		0.4		0.0	0.0			0.2	0.0
Total Delay	58.1		7.3		40.9		13.2	10.7			15.9	2.9
LOS	E		A		D		B	B			B	A
Approach Delay		44.1			40.9			12.4			6.9	
Approach LOS		D			D			B			A	
Queue Length 50th (ft)	54		0		258		46	15			63	0
Queue Length 95th (ft)	101		15		332		m101	m30			112	50
Internal Link Dist (ft)		278			298			190			182	
Turn Bay Length (ft)												
Base Capacity (vph)	289		300		1017		615	973			973	1010
Starvation Cap Reductn	0		0		0		0	0			0	0
Spillback Cap Reductn	0		52		40		0	0			297	0
Storage Cap Reductn	0		0		0		0	0			0	0
Reduced v/c Ratio	0.27		0.12		0.79		0.16	0.04			0.25	0.38

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 30 (27%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 26.6 Intersection LOS: C
Intersection Capacity Utilization 69.7% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 3: Haul Road & Drydock Avenue



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	91	350	126	428	108	10
Future Volume (vph)	91	350	126	428	108	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Frt		0.850			0.987	
Flt Protected			0.950		0.956	
Satd. Flow (prot)	1863	1583	1770	1863	3410	0
Flt Permitted			0.693		0.956	
Satd. Flow (perm)	1863	1583	1291	1863	3410	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		380			9	
Link Speed (mph)	30			30	30	
Link Distance (ft)	114			358	304	
Travel Time (s)	2.6			8.1	6.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	380	137	465	117	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	99	380	137	465	128	0
Turn Type	NA	Perm	D.P+P	NA	Prot	
Protected Phases	1		3	1 3	2	
Permitted Phases		1	1			
Detector Phase	1	1	3	1 3	2	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0		5.0	
Minimum Split (s)	44.0	44.0	9.0		22.0	
Total Split (s)	62.0	62.0	13.0		25.0	
Total Split (%)	62.0%	62.0%	13.0%		25.0%	
Maximum Green (s)	58.0	58.0	9.0		21.0	
Yellow Time (s)	3.0	3.0	3.0		3.0	
All-Red Time (s)	1.0	1.0	1.0		1.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	
Total Lost Time (s)	4.0	4.0	4.0		4.0	
Lead/Lag	Lead	Lead			Lag	
Lead-Lag Optimize?	Yes	Yes			Yes	
Vehicle Extension (s)	2.0	2.0	2.0		2.0	
Recall Mode	C-Max	C-Max	None		None	
Walk Time (s)	29.0	29.0			7.0	
Flash Dont Walk (s)	11.0	11.0			11.0	
Pedestrian Calls (#/hr)	0	0			0	
Act Effct Green (s)	69.2	69.2	80.1	84.1	7.9	
Actuated g/C Ratio	0.69	0.69	0.80	0.84	0.08	
v/c Ratio	0.08	0.31	0.13	0.30	0.46	
Control Delay	6.2	1.5	1.9	2.3	45.9	
Queue Delay	0.0	0.0	0.0	1.2	0.0	
Total Delay	6.2	1.5	1.9	3.6	45.9	
LOS	A	A	A	A	D	
Approach Delay	2.5			3.2	45.9	
Approach LOS	A			A	D	
Queue Length 50th (ft)	18	0	10	43	38	
Queue Length 95th (ft)	44	33	23	78	65	
Internal Link Dist (ft)	34			278	224	
Turn Bay Length (ft)						
Base Capacity (vph)	1289	1212	1094	1546	723	
Starvation Cap Reductn	0	0	0	832	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.08	0.31	0.13	0.65	0.18	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 83 (83%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 7.4 Intersection LOS: A
Intersection Capacity Utilization 35.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 4: Pumphouse Road & Haul Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	177	46	2	629	4	51	4	11	12	8	33
Future Volume (Veh/h)	5	177	46	2	629	4	51	4	11	12	8	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.75	0.75	0.75	0.89	0.89	0.89
Hourly flow rate (vph)	6	208	54	2	715	5	68	5	15	13	9	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	720			208			1010	971	131	855	942	718
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	720			208			1010	971	131	855	942	718
tC, single (s)	4.2			4.1			7.7	6.5	8.5	8.1	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	4.1	3.8	4.0	3.3
p0 queue free %	99			100			58	98	98	94	97	90
cM capacity (veh/h)	858			1375			161	253	690	202	263	376

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1
Volume Total	110	158	722	73	15	59
Volume Left	6	0	2	68	0	13
Volume Right	0	54	5	0	15	37
cSH	858	1700	1375	165	690	300
Volume to Capacity	0.01	0.09	0.00	0.44	0.02	0.20
Queue Length 95th (ft)	1	0	0	51	2	18
Control Delay (s)	0.6	0.0	0.0	43.1	10.3	19.9
Lane LOS	A		A	E	B	C
Approach Delay (s)	0.2		0.0	37.5		19.9
Approach LOS				E		C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

Trip Generation

Marine Wharf
Trip Generation Assessment
Proposed Program
HOWARD STEIN HUDSON
19-May-2016

Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Assumed National Vehicle Occupancy Rate[1]	Unadjusted Person-Trips	Internal Capture Person-Trips[2]	Non-Primary Person-Trips	Primary Person Trips	Transit Share[3]	Transit Person-Trips	Walk/Bike/ Other Share[3]	Walk/ Bike/ Other Trips	Auto Share[3]	Auto Person-Trips	% Taxi[4]	Private Auto Person-Trips	Taxi Person-Trips	Assumed Local Auto Occupancy Rate[5]	Assumed Local Auto Occupancy Rate for Taxis[5]	Total Adjusted Private Auto Trips	Total Adjusted Taxi Trips	Total Adjusted Auto (Private + Taxi) Trips
Daily Peak Hour																								
Hotel[6]	245	Total		8.17	2,002	1.84	**3,684**	16	16	**3,670**	22%	**808**	41%	**1,504**	37%	**1,358**	30%	950	408	1.84	1.84	**516**	**222**	**738**
	rooms	In	50%	4.09	1,001	1.84	**1,842**	9	9	**1,835**	22%	**404**	41%	**752**	37%	**679**	30%	475	204	1.84	1.84	**258**	**111**	**369**
		Out	50%	4.09	1,001	1.84	**1,842**	7	7	**1,835**	22%	**404**	41%	**752**	37%	**679**	30%	475	204	1.84	1.84	**258**	**111**	**369**
All Suites Hotel[7]	166	Total		4.90	814	1.84	**1,498**	11	11	**1,488**	22%	**328**	41%	**610**	37%	**550**	30%	386	166	1.84	1.84	**210**	**90**	**300**
	rooms	In	50%	2.45	407	1.84	**749**	6	6	**744**	22%	**164**	41%	**305**	37%	**275**	30%	193	83	1.84	1.84	**105**	**45**	**150**
		Out	50%	2.45	407	1.84	**749**	5	5	**744**	22%	**164**	41%	**305**	37%	**275**	30%	193	83	1.84	1.84	**105**	**45**	**150**
Retail[8]	3.50	Total		42.70	150	1.78	**268**	2	2	**266**	34%	**90**	27%	**72**	39%	**104**	30%	72	32	1.78	1.78	**40**	**18**	**58**
	KSF	In	50%	21.35	75	1.78	**134**	1	1	**133**	34%	**45**	27%	**36**	39%	**52**	30%	36	16	1.78	1.78	**20**	**9**	**29**
		Out	50%	21.35	75	1.78	**134**	1	1	**133**	34%	**45**	27%	**36**	39%	**52**	30%	36	16	1.78	1.78	**20**	**9**	**29**
Total		Total			**2,966**		5,450	**29**	29	**5,424**		**1,226**		**2,186**		**2,012**		**1,408**	**606**			**766**	**330**	**1,096**
		In			**1,483**		2,725	**16**	16	**2,712**		**613**		**1,093**		**1,006**		**704**	**303**			**383**	**165**	**548**
		Out			**1,483**		2,725	**13**	13	**2,712**		**613**		**1,093**		**1,006**		**704**	**303**			**383**	**165**	**548**
AM Peak Hour																								
Hotel[6]	245	Total		0.53	130	1.84	**240**	0	0	**240**		**43**		**108**		**89**	30%	62	27	1.84	1.84	**34**	**15**	**49**
	rooms	In	59%	0.31	77	1.84	**142**	0	0	**142**	20%	**28**	43%	**61**	37%	**53**	30%	37	16	1.84	1.84	**20**	**9**	**29**
		Out	41%	0.22	53	1.84	**98**	0	0	**98**	15%	**15**	48%	**47**	37%	**36**	30%	25	11	1.84	1.84	**14**	**6**	**20**
All Suites Hotel[7]	166	Total		0.38	63	1.84	**116**	0	0	**116**		**21**		**53**		**42**	30%	29	13	1.84	1.84	**16**	**7**	**23**
	rooms	In	55%	0.21	35	1.84	**64**	0	0	**64**	20%	**13**	43%	**28**	37%	**23**	30%	16	7	1.84	1.84	**9**	**4**	**13**
		Out	45%	0.17	28	1.84	**52**	0	0	**52**	15%	**8**	48%	**25**	37%	**19**	30%	13	6	1.84	1.84	**7**	**3**	**10**
Retail[8]	3.5	Total		0.96	3	1.78	**6**	0	0	**6**		**3**		**0**		**3**	30%	2	1	1.78	1.78	**2**	**1**	**3**
	KSF	In	62%	0.60	2	1.78	**4**	0	0	**4**	62%	**2**	0%	**0**	38%	**2**	30%	1	1	1.78	1.78	**1**	**1**	**2**
		Out	38%	0.36	1	1.78	**2**	0	0	**2**	46%	**1**	15%	**0**	39%	**1**	30%	1	0	1.78	1.78	**1**	**0**	**1**
Total		Total			**196**		**362**	**0**	0	**362**		**67**		**161**		**134**		**93**	**41**			**52**	**28**	**80**
		In			**114**		**210**	**0**	0	**210**		**43**		**89**		**78**		**54**	**24**			**30**	**14**	**44**
		Out			**82**		**152**	**0**	0	**152**		**24**		**72**		**56**		**39**	**17**			**22**	**14**	**36**
PM Peak Hour																								
Hotel[6]	245	Total		0.60	147	1.84	**270**	1	1	**269**		**46**		**123**		**100**	30%	70	30	1.84	1.84	**38**	**16**	**54**
	rooms	In	51%	0.31	75	1.84	**138**	1	1	**137**	15%	**21**	48%	**65**	37%	**51**	30%	36	15	1.84	1.84	**20**	**8**	**28**
		Out	49%	0.29	72	1.84	**132**	0	0	**132**	19%	**25**	44%	**58**	37%	**49**	30%	34	15	1.84	1.84	**18**	**8**	**26**
All Suites Hotel[7]	166	Total		0.40	67	1.84	**123**	1	1	**122**		**21**		**56**		**45**	30%	32	14	1.84	1.84	**18**	**7**	**25**
	rooms	In	45%	0.18	30	1.84	**55**	1	1	**54**	15%	**8**	48%	**26**	37%	**20**	30%	14	6	1.84	1.84	**8**	**3**	**11**
		Out	55%	0.22	37	1.84	**68**	0	0	**68**	19%	**13**	44%	**30**	37%	**25**	30%	18	8	1.84	1.84	**10**	**4**	**14**
Retail[8]	3.5	Total		3.71	13	1.78	**23**	2	2	**21**		**6**		**5**		**10**	30%	8	4	1.78	1.78	**4**	**2**	**6**
	KSF	In	48%	1.78	6	1.78	**11**	0	0	**11**	25%	**3**	23%	**3**	52%	**5**	30%	4	2	1.78	1.78	**2**	**1**	**3**
		Out	52%	1.93	7	1.78	**12**	2	2	**10**	25%	**3**	23%	**2**	52%	**5**	30%	4	2	1.78	1.78	**2**	**1**	**3**
Total		Total			**227**		**416**	**4**	4	**412**		**73**		**184**		**155**		**110**	**48**			**60**	**26**	**86**
		In			**111**		**204**	**2**	2	**202**		**32**		**94**		**76**		**54**	**23**			**30**	**13**	**43**
		Out			**116**		**212**	**2**	2	**210**		**41**		**90**		**79**		**56**	**25**			**30**	**13**	**43**

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Based on ITE Trip Generation Handbook, 3rd Edition method
3. Mode shares based on peak-hour BTD Data for Area 13 & Seaport Square Study
4. Vehicle Trips = 70% Private Auto and 30% Taxi. Taxi trip rate based on CTPS Taxi activity rates for Hotel lane use, as adopted by Central Artery/Tunnel Project
5. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates
6. ITE Trip Generation Manual, 9th Edition, LUC 310 (Hotel), average rate
7. ITE Trip Generation Manual, 9th Edition, LUC 311 (All Suites Hotel), average rate
8. ITE Trip Generation Manual, 9th Edition, LUC 820 (Shopping Center), average rate

Appendix B

Rowan Williams Davies & Irwin Inc. (RWDI) Opinion Letter

Tel: 519.823.1311
Fax: 519.823.1316

Rowan Williams Davies & Irwin Inc.
650 Woodlawn Road West
Guelph, Ontario, Canada
N1K 1B8

CONSULTING ENGINEERS
& SCIENTISTS

July 28, 2016

Eamon C. O'Marah
Managing Partner
Harbinger Development, LLC
445 Washington Street
Wellesley, MA 02481
781-992-5999
eomarah@harbingerdev.com

Re: Boston Seaport – Parcel A
Boston, MA
RWDI Reference No. 1601182

Dear Mr. O'Marah,

In May, RWDI performed a wind tunnel study for the Parcel A project located in Boston Massachusetts to assess the impact that the project would have on the existing local pedestrian wind conditions. The results and conclusions were provided in RWDI's Pedestrian Wind Consultation Report dated May 20, 2016. Since that time, the design of the Parcel A project has been modified as shown in the drawings received from Perkins+Will on July 15, 2016. RWDI has reviewed these changes and feels that this updated design will have a similar impact on the wind conditions as the previously tested design. For this reason, RWDI is of the opinion that the results presented in the May 20th report are applicable to the updated design and a retest is not required.

Should you have any questions, please feel free to contact us at any time.

Yours very truly,

ROWAN WILLIAMS DAVIES & IRWIN Inc.

J Gilmour

Jordan Gilmour, P.Eng.
Associate / Senior Project Manager

JWG/jls

Appendix C

Air Quality Analysis - Modeling Assumptions and Backup Data

AIR QUALITY APPENDIX

Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 3.5 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale air quality analysis.

Motor Vehicle Emissions

The EPA MOVES computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2016 and 2023 for speed limits of idle, 10, 15, and 30 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

Carbon Monoxide Only

		2016	**2023**
Free Flow	30 mph	2.697	1.844
Right Turns	10 mph	4.447	2.956
Left Turns	15 mph	3.823	2.586
Queues	Idle	9.997	4.102

Notes: Winter CO emission factors are higher than Summer and are conservatively used
Urban Unrestricted Roadway type used

CAL3QHC

For the intersection studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOVES. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness (z_0) of 321 cm was used for the intersection. Idle emission rates for queue links were based on 0 mph emission rates derived in MOVES. Emission rates for speeds of 10, 15, and 30 mph were used for right turn, left turn, and free flow links, respectively.

Parcel A
Background Concentrations

POLLUTANT	AVERAGING TIME	Form	2012	2013	2014	Units	ppm/ppb to $\mu g/m^3$ Conversion Factor	2012-2014 Background Concentration ($\mu g/m^3$)	Location
SO_2 (1)(6)	1-Hour (5)	99th %	12	14	28	ppb	2.62	47.2	531A E. 1st St., Boston
	3-Hour	H2H	10.6	16.3	24.3	ppb	2.62	63.7	531A E. 1st St., Boston
	24-Hour	H2H	4.5	6.5	8.1	ppb	2.62	21.2	531A E. 1st St., Boston
	Annual	H	1.65	1.53	1.74	ppb	2.62	4.6	531A E. 1st St., Boston
PM-10	24-Hour	H2H	32.0	34	61	$\mu g/m^3$	1	61	Harrison Ave., Boston
	Annual	H	14.2	15.1	13.9	$\mu g/m^3$	1	15.1	Harrison Ave., Boston
PM-2.5	24-Hour (4)	98th %	20.9	19.9	14.5	$\mu g/m^3$	1	18.4	174 North St, Boston
	Annual (4)	H	9.5	8.8	7.1	$\mu g/m^3$	1	8.5	174 North St, Boston
NO_2 (3)	1-Hour (5)	98th %	43	47	62	ppb	1.88	95.3	531A E. 1st St., Boston
	Annual	H	9.7	12.2	14	ppb	1.88	26.3	531A E. 1st St., Boston
CO (2)	1-Hour	H2H	2.2	1.9	1.7	ppm	1146	2474.2	Harrison Ave., Boston
	8-Hour	H2H	1.9	1.2	1.3	ppm	1146	2177.4	Harrison Ave., Boston
Ozone (4)	8-Hour	H4H	0.062	0.059	0.054	ppm	1963	121.7	Harrison Ave., Boston
Lead	Rolling 3-Month	H	0.014	0.006	0.014	$\mu g/m^3$	1	0.014	Harrison Ave., Boston

Notes:
From 2012-2014 EPA's AirData Website
1 SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.
2 CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.
3 NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.
4 O_3 reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1963 $\mu g/m^3$.
5 Background level is the average concentration of the three years.
6 The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

Due to excessive size CAL3QHC, and MOVES input and output files are available on digital media upon request.

Appendix D

Climate Change Checklist

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at http://www.cityofboston.gov/climate

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/)
3. Army Corps of Engineers guidance on sea level rise (http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf)
4. Proceeding of the National Academy of Science, “Global sea level rise linked to global temperature”, Vermeer and Rahmstorf, 2009 (http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf)
5. “Hotspot of accelerated sea-level rise on the Atlantic coast of North America”, Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 (http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf)
6. “Building Resilience in Boston”: Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 (http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf)

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond “Yes” to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current Climate Change Preparedness & Resiliency Checklist.

A.1 - Project Information

Project Name:	Marine Wharf, Hampton Inn and Homewood Suites by Hilton
Project Address Primary:	660 Summer Street Boston, MA
Project Address Additional:	660 Summer Street Boston, MA
Project Contact (name / Title / Company / email / phone):	Eamon O'Marah, Harbinger Development LLC, 781-992-5999

A.2 - Team Description

Owner / Developer:	Harbinger Development
Architect:	Perkins + Will
Engineer (building systems):	WSP/Parsons Brinkerhoff
Sustainability / LEED:	Perkins + Will
Permitting:	Epsilon Associates
Construction Management:	Suffolk Construction
Climate Change Expert:	

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

☑ PNF / Expanded PNF Submission	☐ Draft / Final Project Impact Report Submission	☐ BRA Board Approved	☐ Notice of Project Change
☐ Planned Development Area	☐ BRA Final Design Approved	☐ Under Construction	☐ Construction just completed:

A.4 - Building Classification and Description

List the principal Building Uses:	Retail/ hotel
List the First Floor Uses:	*Retail, hotel lobby*

What is the principal Construction Type – select most appropriate type?

☐ Wood Frame	☐ Masonry	☐ Steel Frame	☑ Concrete

Describe the building?

Site Area:	*50,933 SF*	Building Area:	*320,000 SF*
Building Height:	*160 Ft.*	Number of Stories:	*15 Flrs.*
First Floor Elevation (reference Boston City Base):	*17.50 Elev.*	Are there below grade spaces/levels, if yes how many:	☑ *No / Number of Levels*

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:	☑ New Construction	☐ Core & Shell	☐ Healthcare	☐ Schools
	☐ Retail	☐ Homes Midrise	☐ Homes	☑ Other Hospitality
Select LEED Outcome:	☐ Certified	☐ Silver	☑ Gold	☐ Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	*Yes / No*	Certified:	*Yes / No*

A.6 - Building Energy-

What are the base and peak operating energy loads for the building?

Electric:	*300 (kW)*	Heating:	*7.0 (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*1000 (kWh/SF)*	Cooling:	*(Tons/hr)*

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	*400 (kW)*	Heating:	*0.1 (MMBtu/hr)*
		Cooling:	*6 (Tons/hr)*

What is nature and source of your back-up / emergency generators?

Electrical Generation:	*400 (kW)*		Fuel Source:	*Diesel*
System Type and Number of Units:	☑ Combustion Engine	☐ Gas Turbine	☐ Combine Heat and Power	*1(Units)*

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 - Analysis

What is the full expected life of the project?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:	☐ 10 Years	☑ 25 Years	☐ 50 Years	☐ 75 Years

What time span of future Climate Conditions was considered?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

7/91 Deg.	Based on ASHRAE Fundamentals 2013 99.6% heating; 0.4% cooling

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

95 Deg.	*5 Days*	*6 Events / yr.*

What Drought characteristics will be used for project planning – Duration and Frequency?

30-90 Days	*0.2 Events / yr.*

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

45 Inches / yr.	*4 Inches*	*0.5 Events / yr.*

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

130 Peak Wind	*10 Hours*	*0.25 Events / yr.*

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:	***12.0%***
How is performance determined:	ASHRAE 90.1-2013 Appendix G eQuest Model

What specific measures will the project employ to reduce building energy consumption?

Select all appropriate:	☑ High performance building envelop	☐ High performance lighting & controls	☑ Building day lighting	☑ EnergyStar equip. / appliances
	☑ High performance HVAC equipment	☑ Energy recovery ventilation	☐ No active cooling	☐ No active heating
Describe any added measures:				

What are the insulation (R) values for building envelop elements?

Roof:	*R = 25*	Walls / Curtain Wall Assembly:	*R = 13BATTS + R8 continuous insulation*
Foundation:	*R = 15*	Basement / Slab:	*R =10*
Windows:	*R = / U =0.4*	Doors:	*R = / U =0.7*

What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure?

	☐ On-site clean energy / CHP system(s)	☐ Building-wide power dimming	☐ Thermal energy storage systems	☐ Ground source heat pump
	☐ On-site Solar PV	☐ On-site Solar Thermal	☐ Wind power	☐ None
Describe any added measures:	Provision for Solar Panels on high roofs			

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems?

Select all appropriate:				
	☑ Connected to local distributed electrical	☐ Building will be Smart Grid ready	☐ Connected to distributed steam, hot, chilled water	☐ Distributed thermal energy ready

Will the building remain operable without utility power for an extended period?

	Yes / *No*	If yes, for how long:	*2 Days*
If Yes, is building "Islandable?	No		
If Yes, describe strategies:	Emergency power, emergency lighting, water will be available for toilet flushing.		

Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure:

Select all appropriate:				
	☑ Solar oriented – longer south walls	☐ Prevailing winds oriented	☐ External shading devices	☐ Tuned glazing,
	☐ Building cool zones	☐ Operable windows	☐ Natural ventilation	☐ Building shading
	☐ Potable water for drinking / food preparation	☐ Potable water for sinks / sanitary systems	☐ Waste water storage capacity	☐ High Performance Building Envelop
Describe any added measures:	The team has not yet decided on operable sash as it will depend on the operator.			

What measures will the project employ to reduce urban heat-island effect?

Select all appropriate:				
	☑ High reflective paving materials	☑ Shade trees & shrubs	☑ High reflective roof materials	☐ Vegetated roofs
Describe other strategies:				

What measures will the project employ to accommodate rain events and more rain fall?

Select all appropriate:				
	☐ On-site retention systems & ponds	☐ Infiltration galleries & areas	☐ Vegetated water capture systems	☐ Vegetated roofs
Describe other strategies:				

What measures will the project employ to accommodate extreme storm events and high winds?

Select all appropriate:				
	☑ Hardened building structure & elements	☑ Buried utilities & hardened infrastructure	☐ Hazard removal & protective landscapes	☐ Soft & permeable surfaces (water infiltration)
Describe other strategies:	No basement, Transformers, switchgear, fire pump, fuel oil storage pump located on first floor located above the flood plain. Generator located on roof.			

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

Yes / No

Describe site conditions?

Site Elevation – Low/High Points:	*Boston City Base 15 to 17.4 Elev.(Ft.)*
Building Proximity to Water:	*100 Ft.*

Is the site or building located in any of the following?

Coastal Zone:	*Yes / No*	Velocity Zone:	*Yes / No*
Flood Zone:	*Yes / No*	Area Prone to Flooding:	*Yes / No*

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs:	*Yes / No*	Future floodplain delineation updates:	*Yes / No*

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

0 Ft.

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. Otherwise you have completed the questionnaire; thank you!

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise:	*3 Ft.*	Frequency of storms:	*0.25 per year*

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:	*16.46 and 18.46 Boston City Base Elev.(Ft.)*	First Floor Elevation:	*17.5 and 19.0 Boston City Base Elev. (Ft.)*

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

	Yes / No	If Yes, to what elevation	*Boston City Base Elev. (Ft.)*
If Yes, describe:			

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

☑ Transformer located above flood plane	☑ Water tight utility conduits	☐ Waste water back flow prevention	☐ Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Yes / $\boxed{No}$

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

$\boxed{Yes}$ / No	If yes, to what height above 100 Year Floodplain:	*Boston City Base 17.5 and 19.0 Elev. (Ft.)*

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

	$\boxed{Yes}$ / No
If Yes, describe:	There will be trees along Dry Dock Avenue, Summer Street and a landscaped courtyard.

Will the building remain occupiable without utility power during an extended period of inundation:

Building will have an emergency generator and is also located above the flood plain.	$\boxed{Yes}$ / No	If Yes, for how long:	*2 days*

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:	$\boxed{Yes}$ / No	☑ Hardened / Resilient Ground Floor Construction	☐ Temporary shutters and or barricades	☑ Resilient site design, materials and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:	Yes / $\boxed{No}$	☐ Surrounding site elevation can be raised	☐ Building ground floor can be raised	☐ Construction been engineered
Describe additional strategies:	The major portion of the first floor is already designed to be above the flood plain. Critical equipment are all designed to be above the 18.46 flood plain. Refer to attached exhibit.			

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:	$\boxed{Yes}$ / No	☑ Solar PV	☐ Solar Thermal	☐ Clean Energy / CHP System(s)
		☐ Potable water	☐ Wastewater	☐ Back up energy

		storage	storage	systems & fuel
Describe any specific or additional strategies:	We will make the high roofs reinforced for future PV array.			

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

Appendix E

Accessibility Checklist

Accessibility Checklist
(to be added to the BRA Development Review Guidelines)

In 2009, a nine-member Advisory Board was appointed to the Commission for Persons with Disabilities in an effort to reduce architectural, procedural, attitudinal, and communication barriers affecting persons with disabilities in the City of Boston. These efforts were instituted to work toward creating universal access in the built environment.

In line with these priorities, the Accessibility Checklist aims to support the inclusion of people with disabilities. In order to complete the Checklist, you must provide specific detail, including descriptions, diagrams and data, of the universal access elements that will ensure all individuals have an equal experience that includes full participation in the built environment throughout the proposed buildings and open space.

In conformance with this directive, all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding the following:

- improvements for pedestrian and vehicular circulation and access;
- encourage new buildings and public spaces to be designed to enhance and preserve Boston's system of parks, squares, walkways, and active shopping streets;
- ensure that persons with disabilities have full access to buildings open to the public;
- afford such persons the educational, employment, and recreational opportunities available to all citizens; and
- preserve and increase the supply of living space accessible to persons with disabilities.

We would like to thank you in advance for your time and effort in advancing best practices and progressive approaches to expand accessibility throughout Boston's built environment.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
    a. http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
    a. http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Boston Complete Street Guidelines
    a. http://bostoncompletestreets.org/
4. City of Boston Mayors Commission for Persons with Disabilities Advisory Board
    a. http://www.cityofboston.gov/Disability
5. City of Boston – Public Works Sidewalk Reconstruction Policy
    a. http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
6. Massachusetts Office On Disability Accessible Parking Requirements
    a. www.mass.gov/anf/docs/mod/hp-parking-regulations-mod.doc
7. MBTA Fixed Route Accessible Transit Stations
    a. http://www.mbta.com/about_the_mbta/accessibility/

Project Information

Project Name:	Marine Wharf, Hampton Inn and Homewood Suites by Hilton
Project Address Primary:	660 Summer Street Boston, MA
Project Address Additional:	660 Summer Street, Boston, MA
Project Contact (name / Title / Company / email / phone):	Eamon O'Marah, Harbinger Development LLC, 781-992-5999

Team Description

Owner / Developer:	Harbinger Development
Architect:	Perkins + Will
Engineer (building systems):	WSP/Parsons Brinkerhoff
Sustainability / LEED:	Perkins + Will
Permitting:	Epsilon Associates
Construction Management:	Suffolk Construction

Project Permitting and Phase

At what phase is the project – at time of this questionnaire?

☑ PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BRA Board Approved
BRA Design Approved	Under Construction	Construction just completed:

Building Classification and Description

What are the principal Building Uses - select all appropriate uses?

Residential – One to Three Unit	Residential - Multi-unit, Four +	Institutional	Education
Commercial **Hotel**	Office	**Retail**	Assembly
Laboratory / Medical	Manufacturing / Industrial	Mercantile	Storage, Utility and Other

First Floor Uses (List): *Retail, Hotel Lobby and Back of House*

What is the Construction Type – select most appropriate type?

Wood Frame	Masonry	Steel Frame	**Concrete**

Describe the building?

Site Area:	*50, 933SF*	Building Area:	*280,000SF*
Building Height:	*130Ft.*	Number of Stories:	*13Flrs.*
First Floor Elevation:	*17.5 and 18.5 Elev.*	Are there below grade spaces:	*Yes / **No***

Assessment of Existing Infrastructure for Accessibility:

This section explores the proximity to accessible transit lines and proximate institutions such as, but not limited to hospitals, elderly and disabled housing, and general neighborhood information. The proponent should identify how the area surrounding the development is accessible for people with mobility impairments and should analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.

Provide a description of the development neighborhood and identifying characteristics.	The Boston Marine Industrial Park includes a wide range of marine-related industrial and light-industrial businesses, including ship repair, seafood shipping and processing, and cruise port operations. The district also includes R&D laboratory space, general office, parking structures and transportation infrastructure. Together with the distinctive maritime infrastructure, the site is strategically positioned between Logan Airport and highway systems.

List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	Silver Line Subway Route SL2 (Design Center - South Station via Waterfront).
List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	No hospitals, public housing, elderly and disabled housing developments or educational facilities in the immediate area of this industrial district.
Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	No. No nearby government buildings, libraries, community centers or recreational facilities.

Surrounding Site Conditions – Existing:

This section identifies the current condition of the sidewalks and pedestrian ramps around the development site.

Are there sidewalks and pedestrian ramps existing at the development site?	Yes
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	Concrete sidewalks, concrete ramps. Fair condition.
Are the sidewalks and pedestrian ramps existing-to-remain? **If yes,** have the sidewalks and pedestrian ramps been verified as compliant? **If yes,** please provide surveyors report.	The Project will replace all sidewalks and ramps on the project site.
Is the development site within a historic district? **If yes,** please identify.	NO

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	Yes
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	Boulevard
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	Summer Street: 12.0‘ and 14.0’ sidewalk zone 6” curb, 1-6” green,scape zone, 10.0’ or12.0’ pedestrian zone Dry Dock Avenue: 14.0’ sidewalk zone 6” curb, 1-6” green,scape zone, 10.0’ or 12.0’ pedestrian zone See attached exhibit for location of frontage zones
List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way?	Light colored pervious concrete.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	N/A
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	Yes The sidewalk along Dry Dock Avenue. Refer to attached exhibit.

If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	The café areas will be a minimum of 6'. Refer to attached exhibit.

Proposed Accessible Parking:

See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability Handicap Parking Regulations.

What is the total number of parking spaces provided at the development site parking lot or garage?	75 parking spaces are located on the second floor.
What is the total number of accessible spaces provided at the development site?	3
Will any on street accessible parking spaces be required? If yes, has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?	N/A
Where is accessible visitor parking located?	Second floor parking deck
Has a drop-off area been identified? If yes, will it be accessible?	Yes, the drop off zone will be accessible. The hotel drop off zone faces the interior courtyard. Parts of the curb will be depressed for accessibility.
Include a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations. Please include route distances.	See attached exhibit.

Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to accommodate persons of all abilities that allow for universal access to entryways, common spaces and the visit-ability* of neighbors.

**Visit-ability – Neighbors ability to access and visit with neighbors without architectural barrier limitations*

Provide a diagram of the accessible route connections through the site.	See attached exhibit.
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	Hotel lobby entrance will be a flush accessible flush entry with swinging doors as will all of the retail entrances.
Are the accessible entrance and the standard entrance integrated?	Yes
If no above, what is the reason?	
Will there be a roof deck or outdoor courtyard space? If yes, include diagram of the accessible route.	Yes, there are multiple roof terraces. The floor slab will be depressed so that there is a flush condition at the entrance/egress doors.
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	The signage package will not be designed until there is a Hotel Operator involved with the Project.

Accessible Units: (If applicable)

In order to facilitate access to housing opportunities this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing choice.

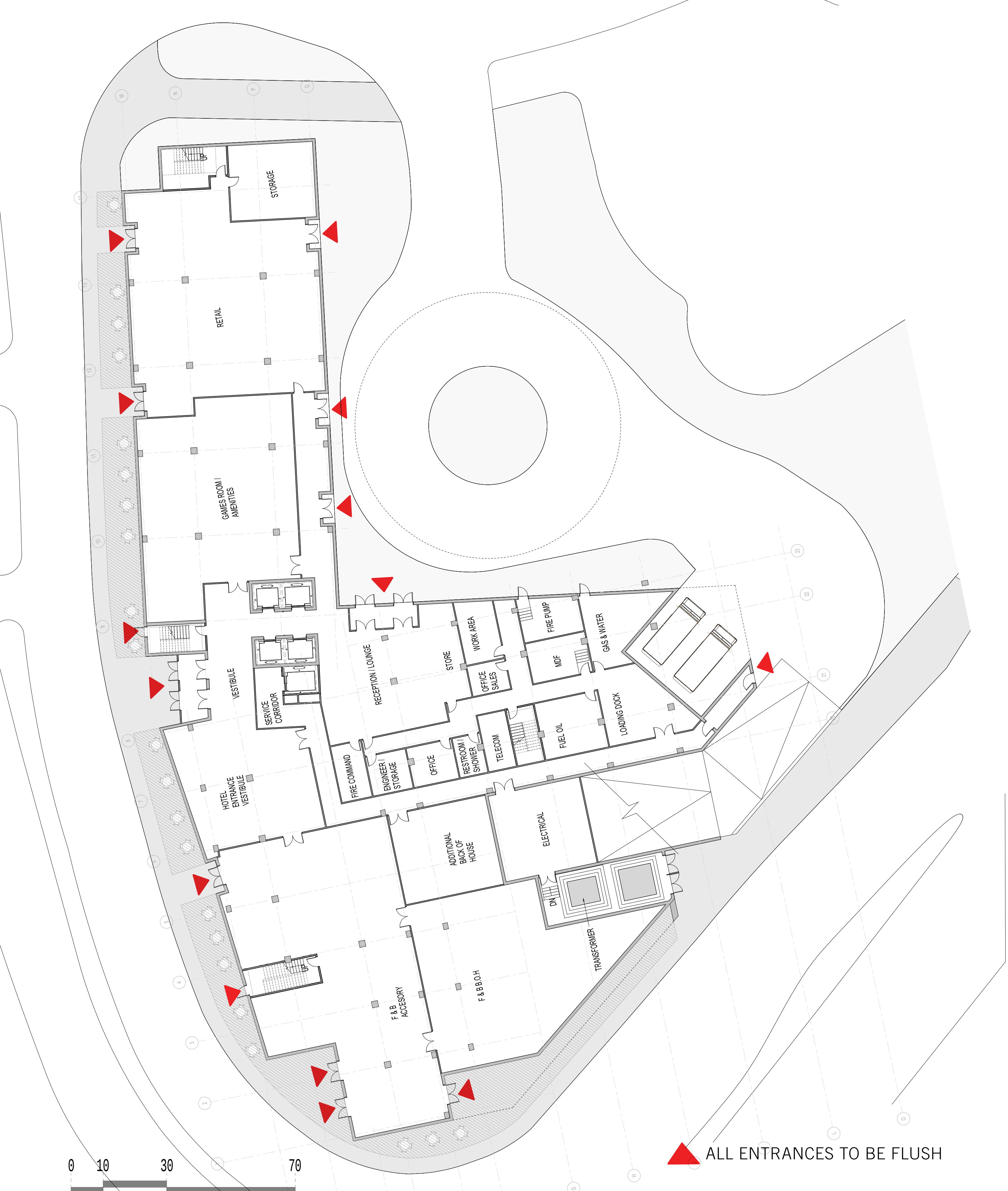
What is the total number of proposed units for the development?	N/A

How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	N/A
How many accessible units are being proposed?	N/A
Please provide plan and diagram of the accessible units.	N/A
How many accessible units will also be affordable? If none, please describe reason.	N/A
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. **If yes,** please provide reason.	N/A
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	N/A
Did the Advisory Board vote to support this project? **If no,** what recommendations did the Advisory Board give to make this project more accessible?	N/A

Thank you for completing the Accessibility Checklist!

For questions or comments about this checklist or accessibility practices, please contact:

kathryn.quigley@boston.gov | Mayors Commission for Persons with Disabilities



_GROUND FLOOR

_ACCESSIBILITY