PUBLIC NOTICE

The Boston Redevelopment Authority d/b/a the Boston Planning & Development Agency ("BPDA"), pursuant to Article 80 of the Boston Zoning Code (“Code”), hereby gives notice that a Project Notification Form ("PNF") was filed by ICCNE LLC (the “Proponent”) on November 22, 2019 for the 2 Harbor Street Project (the “Proposed Project”) at Parcels T and T-1 within the Raymond L. Flynn Marine Park (RLFMP) in the South Boston Seaport District.

The approximately 4.36-acre site is located at the intersection of Northern Avenue and Massport Haul Road at the entrance to the RLFMP. The Ted Williams Tunnel (I-90) passes beneath the northwest portion of the site within a subsurface easement.

The proposed project will construct a new 10-story, approximately 381,000 square-foot building comprising approximately 381,000 square feet (sf)of laboratory, office, and other supporting uses, as well as 325 parking spaces in surface lots and an underground garage. The redevelopment will be known as 2 Harbor Street and will serve as a gateway linking the booming mixed-use South Boston Waterfront/Massport Commonwealth Flats area with the industrial RLFMP.

The Proponent is seeking the issuance of a Scoping Determination by the BPDA pursuant to Section 80B-5. The BPDA in the Scoping Determination for such PNF may waive further review pursuant to Section 80B-5.3(d), if, after reviewing public comments, the BPDA finds that such PNF adequately describes the Proposed Project's impacts.

The PNF may be obtained from the BPDA website – www.bostonplans.org – or may be reviewed in the Office of the Secretary of the BPDA, 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 PNF, including the comments of public agencies, should be submitted in writing to Aisling Kerr, BPDA, at the address stated above or via e-mail at aisling.kerr@boston.gov, within thirty days of the publication of this notice.

BOSTON REDEVELOPMENT AUTHORITY
D/B/A BOSTON PLANNING & DEVELOPMENT AGENCY

Teresa Polhemus
Executive Director/Secretary

EXPANDED PROJECT NOTIFICATION FORM

2 Harbor Street

Submitted to:
Boston Planning and Development Agency
One City Hall Square
Boston, MA 02201

Submitted by:
ICCNE LLC
c/o MP Boston
33 Arch Street, 25th Floor
Boston, MA 02110

Prepared by:
Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, MA 01754

In Association with:
Cosentini Associates
DeSimone Consulting Engineers
DLA Piper
Feldman Land Surveyor
Haley & Aldrich, Inc.
Handel Architects LLP
Klopfer Martin Design Group
Langan
Nauset Strategies
Nitsch Engineering
Studio Enée Architects
Vanasse Hangen & Brustlin, Inc.
VvS Architects & Consultants

November 25, 2019

Epsilon
ASSOCIATES INC.

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Chapter 1.0

Project Description

1.0 PROJECT DESCRIPTION

1.1 Introduction

ICCNE LLC (the Proponent) is the ground lessee of two parcels (designated as T and T-1), owned by the Boston Economic Development & Industrial Corporation (EDIC), in the Raymond L. Flynn Marine Park (RLMFP) in South Boston's Seaport District. The Proponent proposes to redevelop these parcels, totaling approximately 4.36-acres, with a new building comprising approximately 380,800 square feet (sf)of laboratory, office, and other supporting uses, as well as both surface and below grade parking (the proposed Project). The redevelopment will be known as *2 Harbor Street* and will serve as a gateway linking the rapidly growing mixed-use South Boston Waterfront/Massport Commonwealth Flats area with the RLFMP while building on the growth and evolution of the RLFMP itself.

2 Harbor Street represents the culmination of decades of effort by the State, City and South Boston Community to harness the benefits of commercial development to support the continuation of existing and growth of new marine industrial and industrial businesses on the waterfront.

The RLFMP is unique in that it has a mission to serve as a reserve for industrial businesses and Boston-based jobs but is also an area with underutilized land and aging infrastructure situated in the midst of one of the fastest growing commercial markets in the country. The 2017 RLFMP Master Plan Update, prepared by the EDIC/Boston Planning and Development Agency (BPDA), contemplates how best to leverage the growth associated with the new innovation economy uses in and around the RLFMP to support its underlying mission. The Plan Update recognizes that maintaining and upgrading infrastructure is vital for the RLFMP to achieve its mission.

No single source of funds, including the EDIC/BPDA, is available and able to pay for the significant infrastructure upgrades that are needed in the RLFMP. Therefore, thoughtfully planned and located commercial development within the RLFMP is intended to be an engine to fund needed transportation and utility infrastructure improvements. 2 Harbor Street is such a project, and it will marshal the benefits of the new innovation economy, tech, life sciences and cutting-edge research and development uses to support the historic and ever important mission of the RLFMP.

In addition to significant benefits to the public realm, the project will create hundreds of new permanent and construction jobs, and improved revenues for the City through additional real estate taxes, ground rent and other associated fees and assessments. The project's mix of uses, including laboratory, research and development and office will allow it to create new employment opportunities in a variety of fields and at all levels.

This Project Notification Form (PNF) is being submitted to the BPDA to initiate review of the Project under Article 80B, Large Project Review, of the Boston Zoning Code.

1.2 Existing Site

The Project site is shown on Figure 1-1. The project site forms the southeast quadrant of the roundabout intersection of Northern Avenue and the Massport Haul Road on the western edge of the RLFMP. The project site comprises two EDIC-owned parcels: Parcel T-1 to the west and Parcel T to the east. Together they total approximately 189,987 sf (4.36 acres). They are bordered to the north by Northern Avenue, to the east by Harbor Street, to the south by 12 Channel Street and Channel Street itself, and to the west by the Massport Haul Road. The Ted Williams Tunnel (I-90) passes beneath the northwest portion of the site within a subsurface easement.

Uses immediately surrounding the project site include the Rockland Trust Bank Pavilion entertainment venue on the north side of Northern Avenue and a new mixed-use development under construction on the opposite side of the Massport Haul Road. This new development, on land designated as Parcel K, will include a mix of hotel, residential, and commercial uses.

The entirety of the project site is within the RLFMP. The site is not, however, within the Designated Port Area (DPA), and only a narrow sliver along the eastern edge of the site is within the area subject to the Chapter 91 Waterways Regulations (the new building will not be within the Ch. 91 jurisdictional area). Uses within the RLFMP to the east and south of the project site include the Harpoon Brewery on the north side of Northern Avenue, Vertex Pharmaceuticals at 1 Harbor Street, the office and light industrial building at 12 Channel Street, and a vacant building and surface parking on Parcel U adjacent to the Massport Haul Road.

The site is currently occupied by a dilapidated warehouse on the eastern side of the site. The building has been condemned and will be demolished to make way for the proposed project. The remainder of the site is currently used for tractor trailer parking and storage. Figures 1-2 and 1-3 show the current condition of the site.

1.3 Project Description

1.3.1 Building Program

The proposed Project will consist of a 10-story structure containing a combination of laboratory, office, and R&D uses. The total building height from average grade will be 150 feet tall (inclusive of the mechanical penthouse). Constructed contemporaneously with the building will be landscape improvements throughout the site including a publicly accessible plaza along Northern Avenue near the intersection with the Massport Haul Road, and highly landscaped surface parking areas. Figure 1-4 presents the proposed Site Plan and Figures 1-5 through 1-7 are renderings depicting the proposed project.

G:\Projects2\MA\Boston\4830\MXD\Aerial_Zoom_20191113.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

2 Harbor Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-1

Aerial Locus Map

2 Harbor Street Boston, Massachusetts

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Figure 1-2

Site Photo Looking Southeast From Northern Ave At Haul Road

2 Harbor Street Boston, Massachusetts

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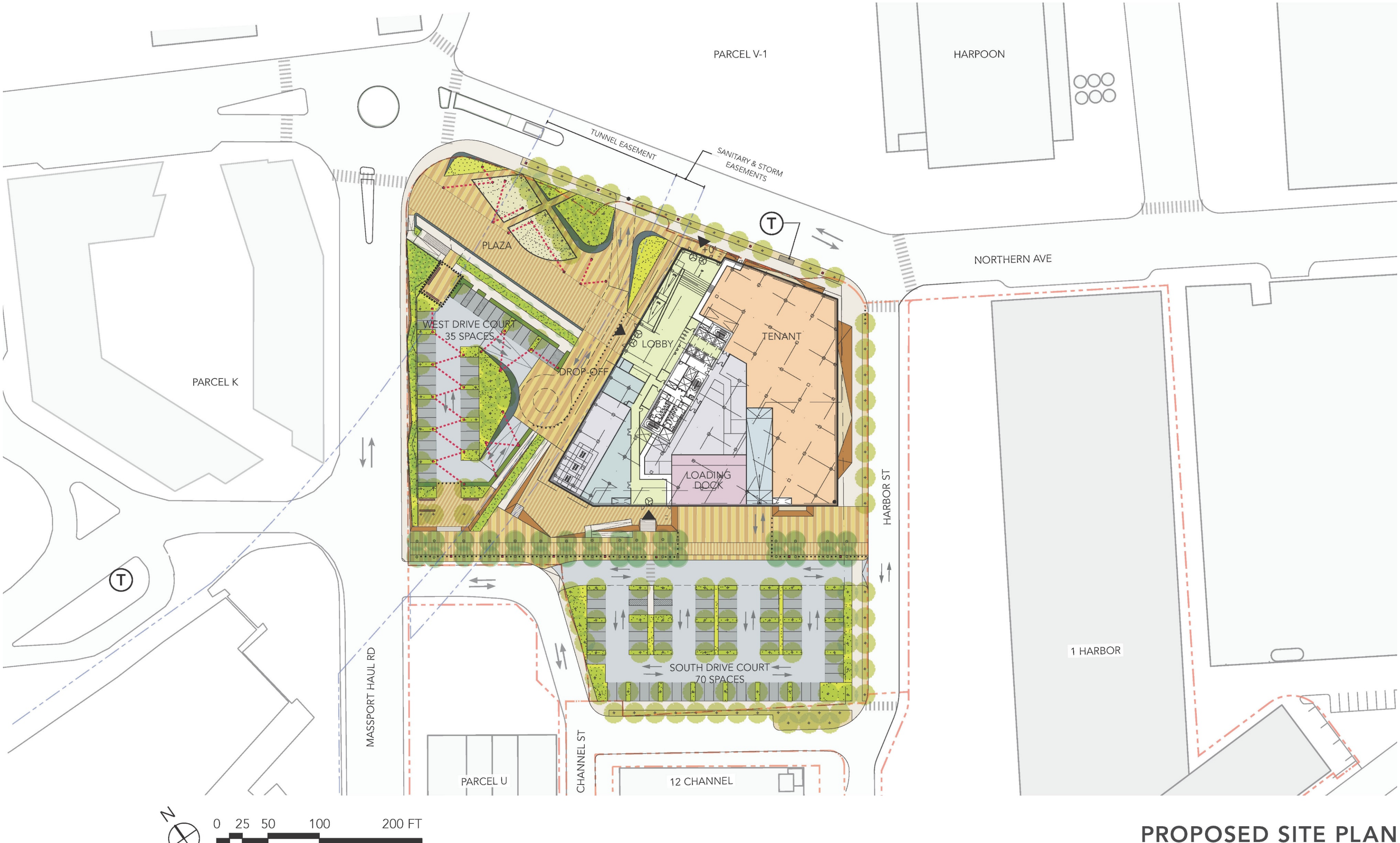
Figure 1-3

Site Photo Looking West On Harbor Street



PROPOSED SITE PLAN

2 Harbor Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-4

Proposed Site Plan

2 Harbor Street Boston, Massachusetts

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Figure 1-5

Eye Level View From Northern Avenue At Haul Road

2 Harbor Street Boston, Massachusetts

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Figure 1-6

Bird's Eye View From Northern Avenue

2 Harbor Street Boston, Massachusetts

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Figure 1-7

View Towards Boston Harbor

The building will contain: one level of below-grade parking; ground floor life sciences, supporting commercial, R&D uses, and/or service uses; and upper level laboratory, office and/or R&D uses. The Project is also anticipated to include 32,000 square feet of water-dependent industrial uses. The below grade parking level will utilize stackers, resulting in floor height suitable for future adaptive re-use. Building elevations are shown in Figures 1-8 through 1-11. Building sections and floor plans are included in Appendix A.

The total square footage of the proposed Project will be approximately 380,800 gross square feet and will have an overall Floor Area Ratio ("FAR") of 2.0.

Table 1-1 below outlines the proposed project's overall program.

Table 1-1 Proposed Building Program

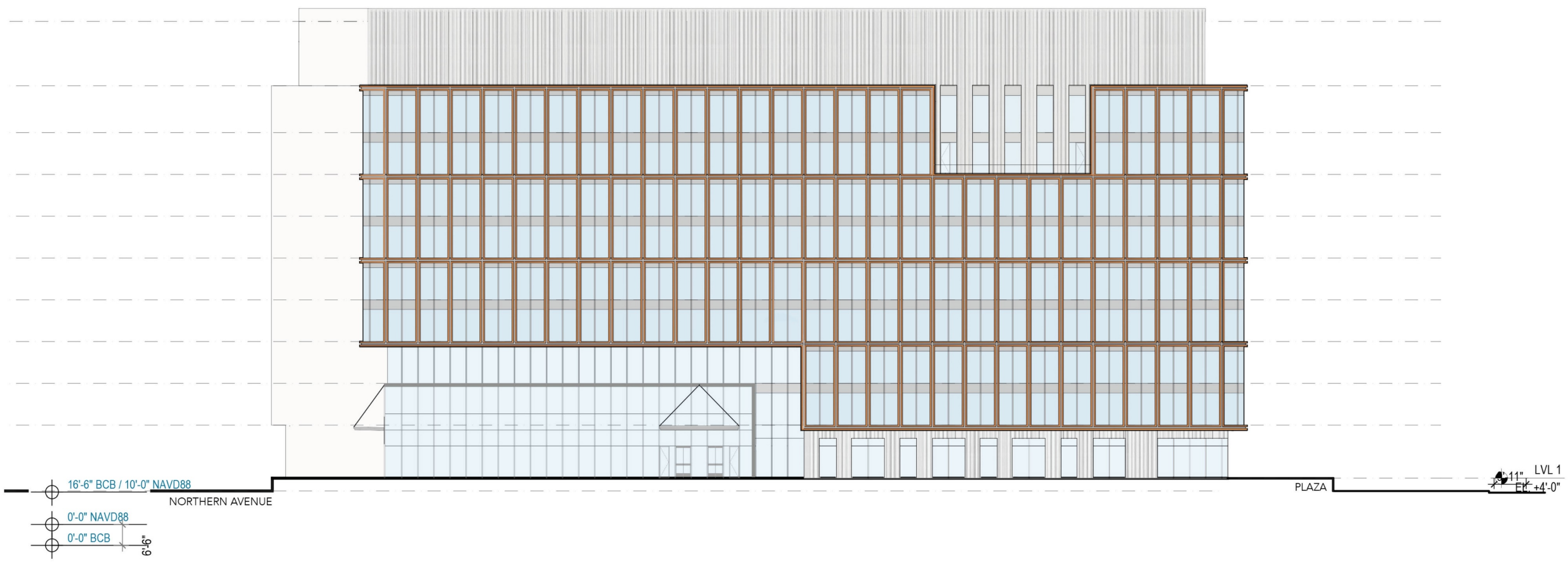
Project Element	Area (sf)
R&D/Office Back of House	371,300 9,500
Total Floor Area	**380,800**
FAR	2.0
Parking	
Surface	105
Below-Grade	220
Total	**325**
Parking Ratio (spaces per 1,000sf ZFA)	0.85

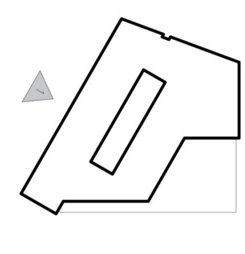
Note: The division of the number of parking spaces above- and below-grade is approximate.

The specific type and mix of office, lab, and R&D uses will be determined in response to evolving market conditions and developed in collaboration with future tenants. The project will comply with all relevant regulations for life sciences uses in the City of Boston and the Commonwealth.

1.3.2 Public Realm and Site Circulation

As the RLFMP and Commonwealth Flats neighborhoods surrounding the project site continue to evolve with an increased density of mixed-use commercial, industrial, housing, and marine-industrial uses, the public realm should reflect these changes. The proposed Project includes improvements to the roadways and sidewalks surrounding the site that will continue to support the needs of truck traffic while improving conditions for pedestrians and bicyclists and enhancing the urban environment overall.



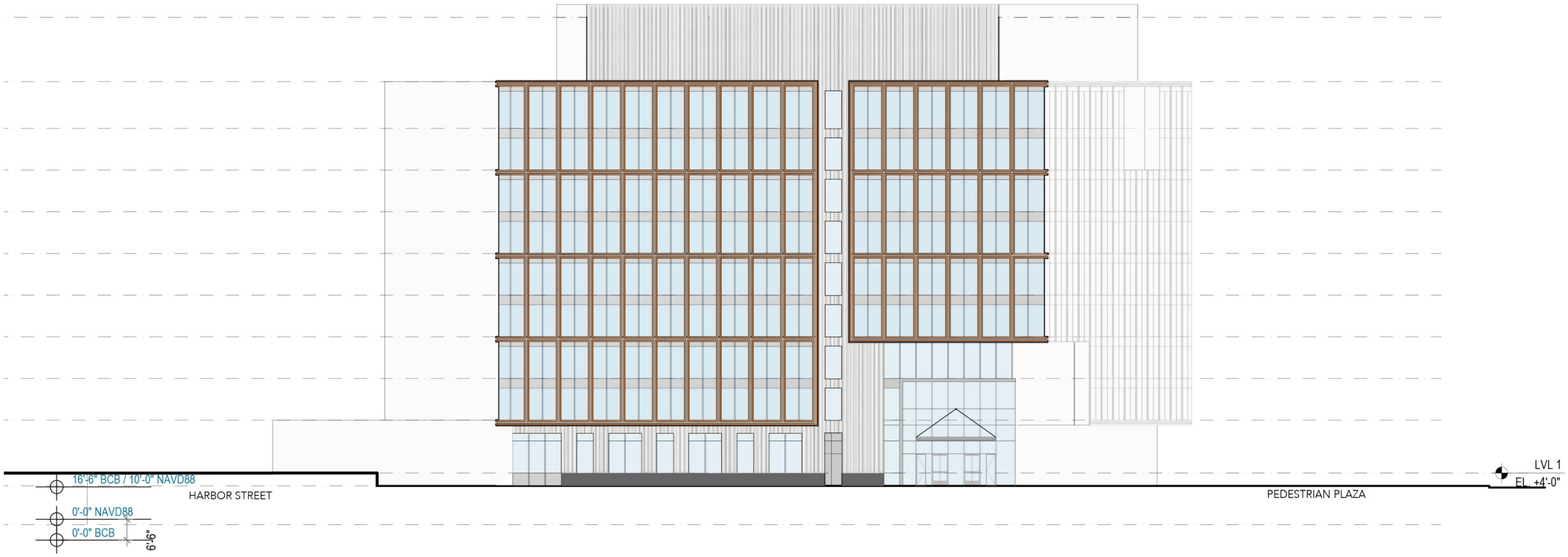


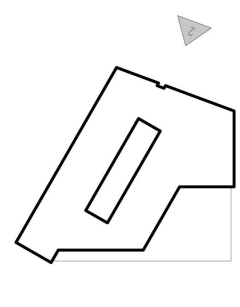
0 20' 40' 80'

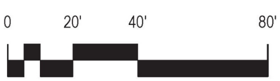
NORTHWEST BUILDING ELEVATION

Figure 1-8

Northwest Building Elevation

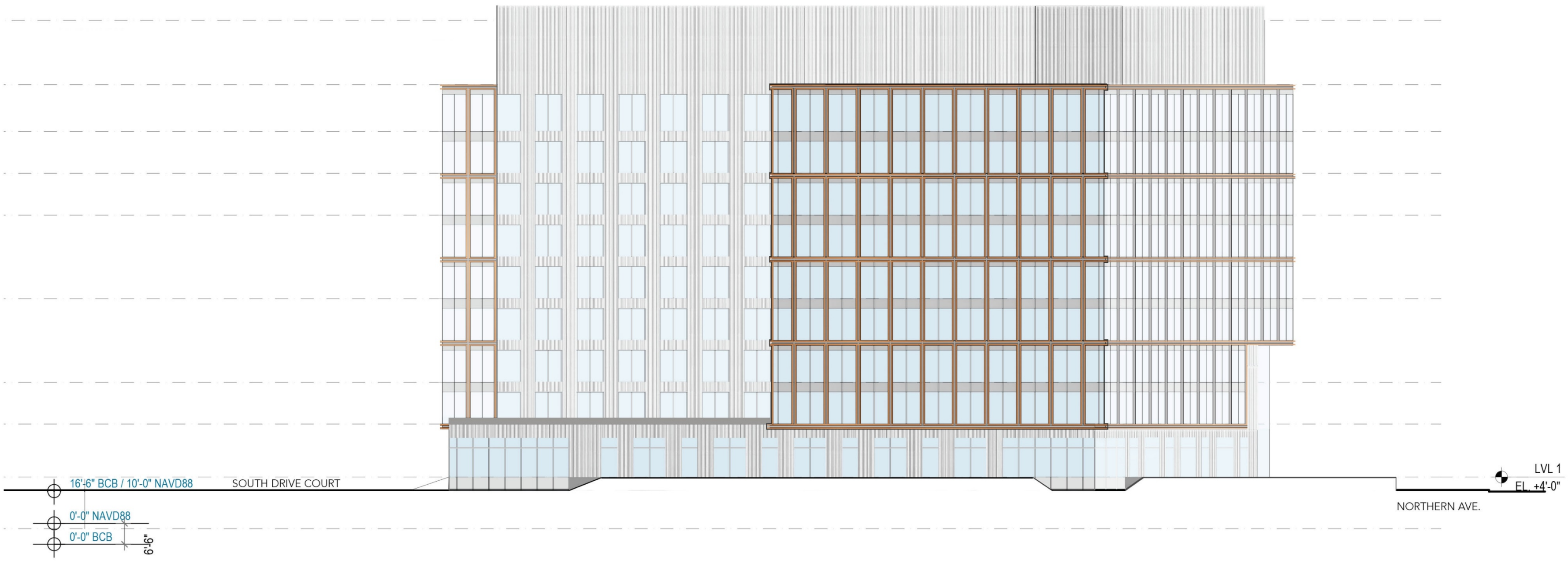


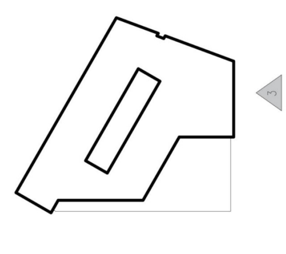


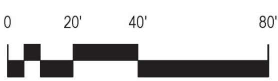


NORTHEAST BUILDING ELEVATION

2 Harbor Street Boston, Massachusetts







EAST BUILDING ELEVATION

2 Harbor Street Boston, Massachusetts

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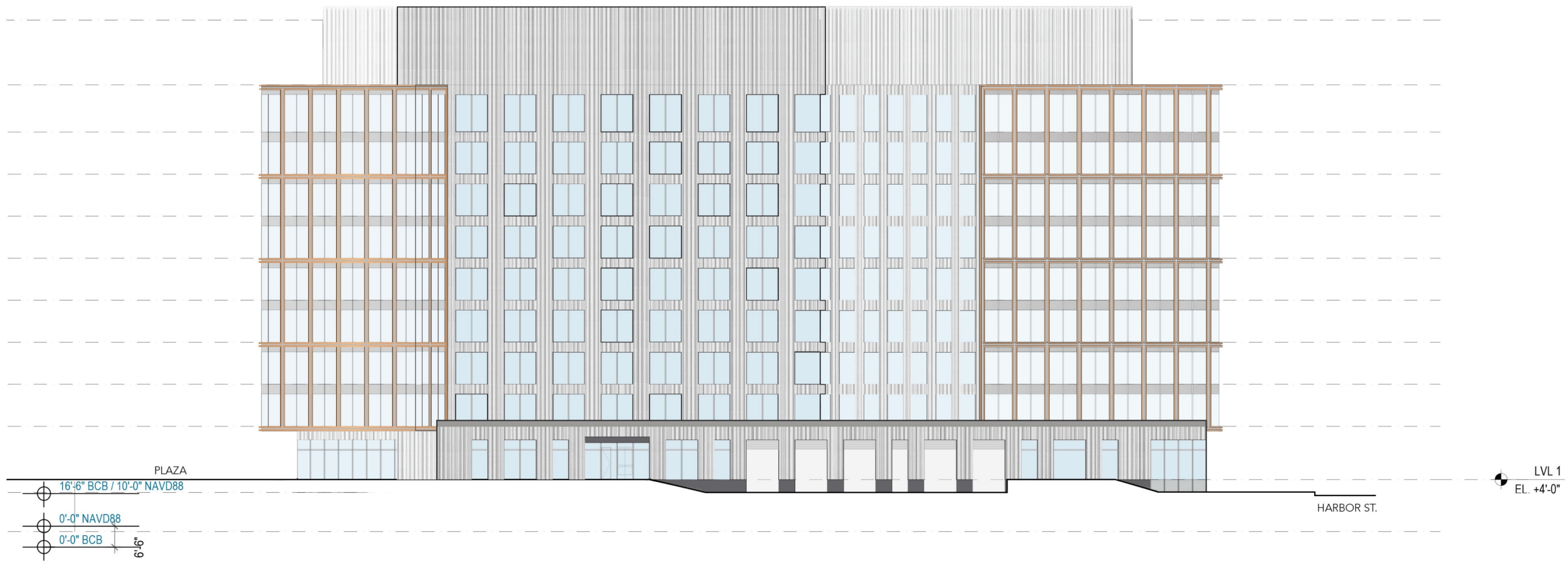
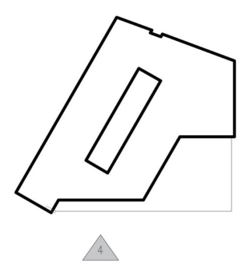
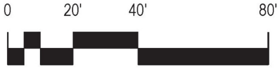
Figure 1-10

East Building Elevation







SOUTH BUILDING ELEVATION

2 Harbor Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-11

South Building Elevation

A signature publicly accessible pedestrian plaza is proposed at the gateway to the RLFMP at the intersection of Northern Avenue and the Massport Haul Road. This plaza will extend the series of open spaces along Northern Avenue that stretches across the South Boston Waterfront from Seaport Square to the RLFMP. The Project's primary building mass is set back from this gateway intersection to function as a backdrop to the plaza, and help to define the street walls along Northern Avenue and Harbor Street. This variation of heights extends the syncopated rhythm of taller street-wall defining masses interspersed with smaller-scaled pavilions and open spaces along both sides of Northern Avenue.

Throughout the Project site, attention has been given to the treatment of building edges and the general improvement of the public realm. Along Northern Avenue and Harbor Streets, the BCS Design Guidelines will be incorporated into the design of the sidewalks. Sidewalk widths will be increased to more generous dimensions. The BPDA recently issued a Request for Proposals for engineering design services to make mobility and streetscape improvements along Northern Avenue.[1] The intention of this project is to better accommodate all roadway users along Northern Avenue with special attention to improving the existing bicycle accommodations. As mentioned previously, there are currently approximately 40-50 bicycle commuter trips along Northern Avenue during the peak hours. The submitted proposals are currently under review. The Proponent is prepared to work closely with the City and the awarded design firm/team to improve the streetscape design along the Project's Northern Avenue frontage. Figures 1-12 and 1-13 present the materials that are envisioned to be used for plantings and pavers.

In recognition of Northern Avenue as an important connector throughout the South Boston Waterfront and the RLFMP, the main vehicular entry to the site will be located along this edge, near the intersection with the Massport Haul Road. There will be three main pedestrian entries: (1) along Northern Avenue; (2) from the gateway plaza; and (3) from the southern surface parking lot. All improvements will be designed to be handicap accessible and compliant with the Americans with Disabilities Act. The BPDA Accessibility Checklist is included in Appendix D. A 2-way vehicular access drive will accommodate vehicular circulation movements as well as pick-up and drop-off functions within the site, so as to minimize impacts on Northern Avenue. This internal drive will provide access from and egress onto Northern Avenue, as well as provide access to the surface parking area above the tunnel, south of the gateway plaza. The surface parking area south of the proposed building will be accessed from both Harbor Street as well as from the existing connection of Channel Street to the Massport Haul Road which will remain in place, or if removed by Massport, would solely come from Harbor Street. Access to loading and below grade parking will be from the surface parking area south of the building. Figure 1-14 presents the site circulation plan.

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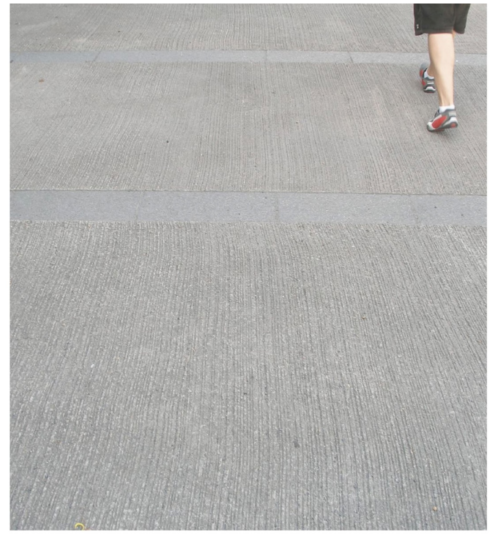
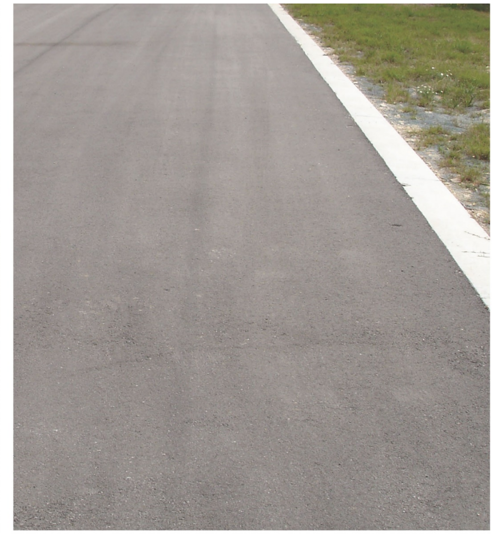
[1] BPDA RFP titled, "Engineering Design Services for CBR24834 (Project One of Three): Mobility Improvements and Streetscape Design on Northern Avenue and Tide Street."

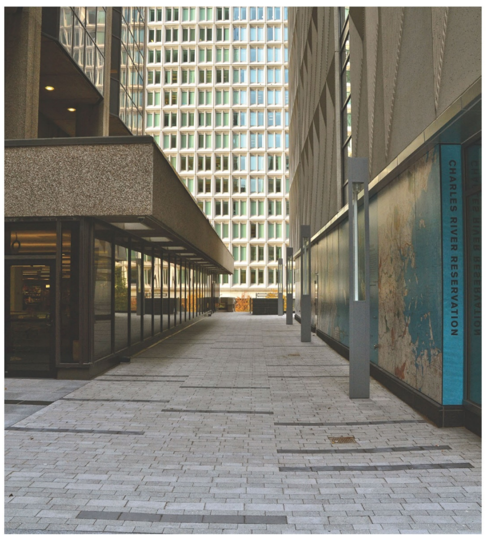
2 Harbor Street **Boston, Massachusetts**

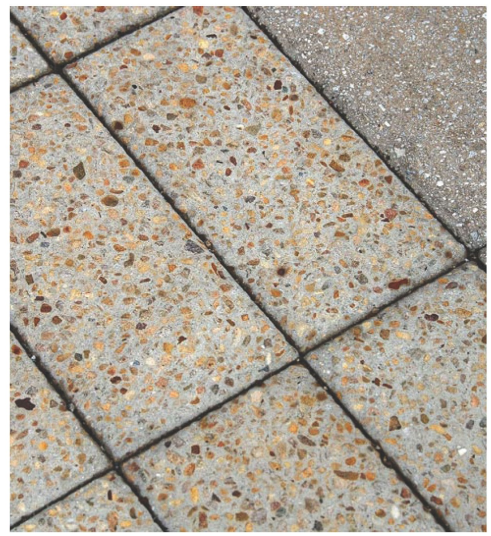
Figure 1-12

Planting Material Types









2 Harbor Street   Boston, Massachusetts

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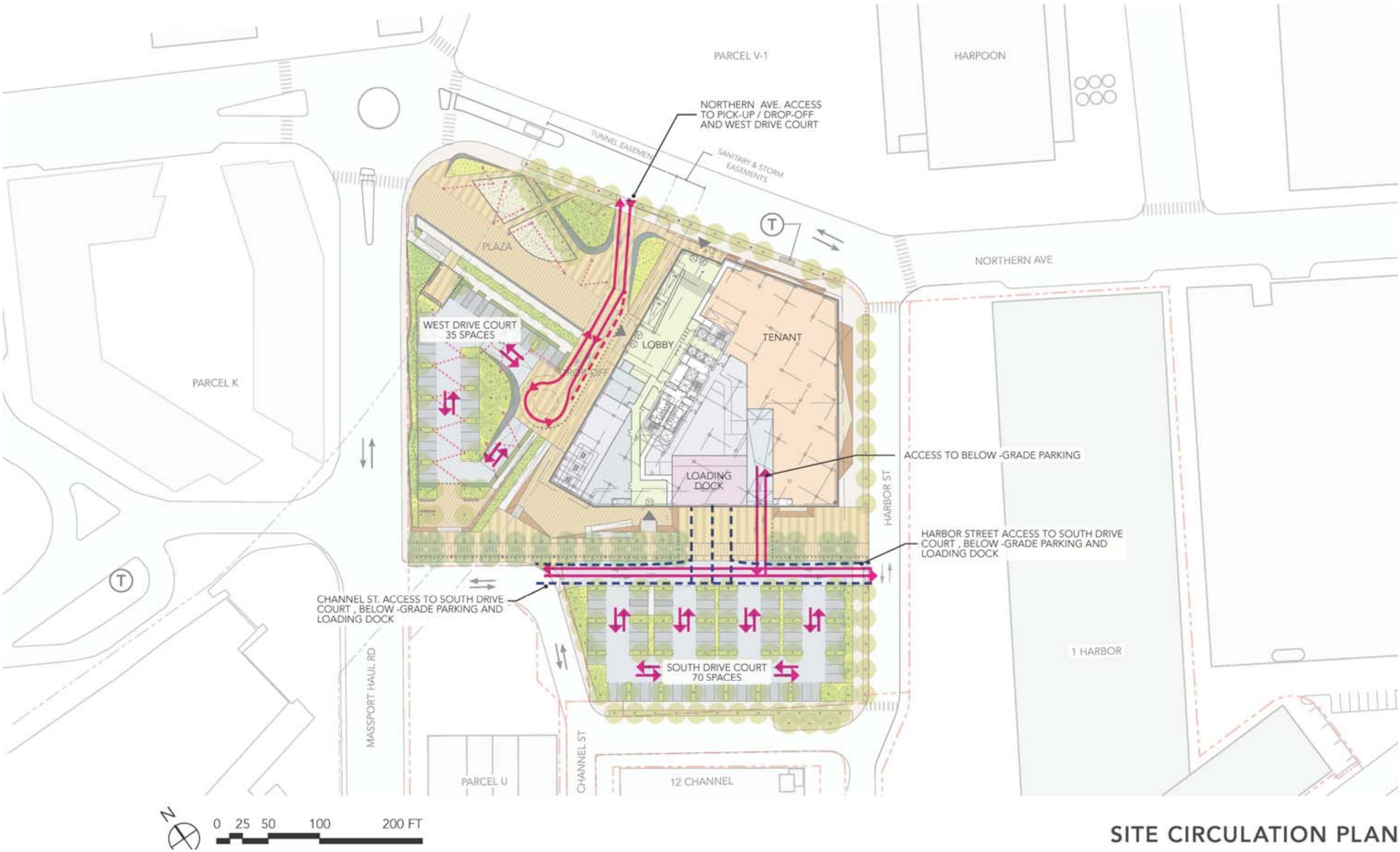
Figure 1-13

Paving Material Types



2 Harbor Street Boston, MA

Epsilon ASSOCIATES INC.

Figure 1-14
Site Circulation Plan

1.3.3 Building Materials

The proposed building is articulated as two lofted volumes – one primarily oriented towards the gateway intersection of Northern Avenue and the Massport Haul Road and the other anchoring the intersection of Northern Avenue and Harbor Street – both are cradled and anchored to the site by a dominant central volume and one-story base. The building envelope will consist primarily of a unitized curtain wall. The two lofted volumes are articulated with a gridded lattice of horizontal and vertical mental fins and panels to provide depth and to break down the building's scale. The volume oriented towards the gateway of Northern Avenue and the Massport Haul Road is notched to further help break down the scale, to provide an exterior terrace, and to frame the main lobby volume. The dominant central volume and one-story base is articulated with a faceted/corrugated metal panel façade. A highly glazed 'jewel box' lobby anchors the northwest corner of the building, highlighting the lobby's dual access points at Northern Avenue and from the gateway plaza. The selection of metal for the exterior cladding is rooted in the history of the site which once housed naval repair facility. The surrounding area was also characterized by metal framed warehouse structures. While different metal types will be explored, for the two lofted volumes, bronze anodized aluminum is being strongly considered for its vibrant coloration which changes throughout the course of the day and in response to the sun's position and intensity, and for the dominant volume and one-story podium a medium gray faceted/corrugated metal panel is being strongly considered for its contrasting coloration from the lofted volumes' lattices. The metal panel here will be faceted and/or corrugated to provide depth and visual interest in a contemporary reinterpretation of the traditional metal-clad industrial warehouse. Figure 1-14 shows the proposed curtain wall materials.

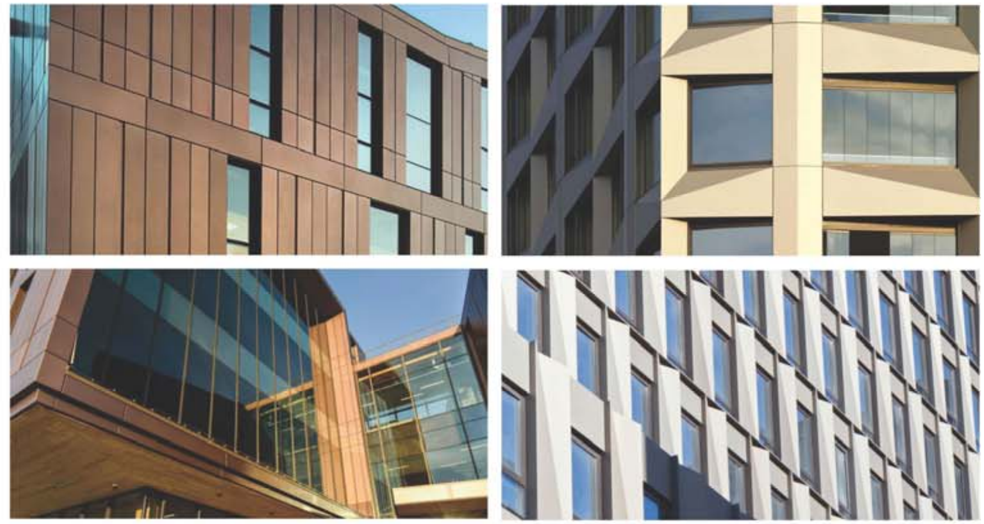
1.4 Public Benefits

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

Transportation

The Proponent intends to work with the BPDA and the BTD to further develop an appropriate set of physical/operational transportation mitigation measures for the development as the permitting/approval process for the project advances. The Proponent understands that the BPDA has a comprehensive transit planning study underway (the South Boston Seaport Strategic Transit Plan) that encompasses a much broader geographic area than what is contained within the evaluation of the Project's transportation impacts. Further, the City has embarked on a roadway improvement project along Northern Avenue that includes the section adjacent to the Project site, between the Northern Avenue/Massport Haul Road roundabout and Tide Street. The Proponent looks forward to working with the City on these two important initiatives as they advance. To help fulfill its commitment toward improving transportation conditions in the area,

ANODIZED ALUMINUM FINS/PANELS



CORRUGATED METAL PANEL

2 Harbor Street   Boston, MA

Figure 1-15

Proposed Curtain Wall Materials

the Proponent has developed a proposal to provide $400,000 in transportation mitigation funding. These funds would be used by the City to help with implementation of improvements in the Project area. These funds could be used for further planning, design or construction of nearby or adjacent roadway or transit improvements. Ideally, these funds could be put to use along the Northern Avenue corridor.

Improved Street and Pedestrian Environment

The project will activate an underutilized site with enhanced streetscapes that include new street lighting, landscaped sidewalks and improved open spaces.

Sustainable Design/Green Building

The Proponent is targeting to achieve a minimum of LEED-Gold certifiable for the project, incorporating sustainable design features into the project to preserve and protect the environment. 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. See Section 4.2 for more detail.

Increased Employment

The Project is expected to create approximately 3,000 construction jobs and approximately 1,500 people are expected to work at the project site once it is completed.

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 Proponent will comply with the provisions of the code by making the appropriate contributions with relation to the DIP uses at the project. The current formulas call for payments of $9.03 per square foot for housing and $1.78 per square foot for jobs, after the first 100,000 square feet. Therefore, with a program of approximately 380,000, the estimated payments are approximately $2,535,624 for housing and $499,824 for jobs.

1.5 Community Outreach

The Proponent has conducted early community outreach by meeting with Project abutters, local elected officials and civic leaders. The Proponent has also met with the BPDA and other City and state agencies on multiple occasions.

The Proponent is fully committed to a comprehensive community outreach process and will continue to engage the community to ensure public input on the Project. The Proponent looks forward to working with the BPDA and city agencies, local officials, the Impact Advisory Group (IAG), neighbors, and others as the design and review processes move forward.

1.6 Schedule

The Proponent expects to commence project construction in late 2020 or early 2021 and for construction to last for approximately two years.

Chapter 2.0

General Information

2.0 GENERAL INFORMATION

This chapter provides information on the project team, zoning controls that will affect the project, anticipated permits, and legal information.

2.1 Development Team

ICCNE LLC (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:	2 Harbor Street
Location:	Parcels T and T1 in the Raymond L. Flynn Marine Park, Northern Avenue, Boston, at the intersection of Northern Avenue and the Massport Haul Road
Proponent:	ICCNE LLC c/o MP Boston 33 Arch Street Boston, MA 02110 Jacob Citrin (212) 248-3111 Kevin Donahoe (857) 317-4027
Land Owner:	Economic Development and Industrial Corporation of Boston (EDIC) 22 Drydock Avenue, Suite 201 Boston, MA 02116
Architect:	Handel Architects LLP 69 Canal Street, 2nd Floor Boston, MA 02114 Blake Middleton, FAIA (212) 595-4112 Seth Riseman (617) 651-4790
Collaborating Architect:	Studio Enée Architects 460 Hillside Avenue, Suite J Needham, MA 02494 Natasha Espada, AIA (781) 858-3011 Susan Crowe Knight, AIA (781) 858-3011
Landscape Architect	Klopfer Martin Design Group 69 Canal Street, 2nd Floor Boston, MA 02111 Mark Klopfer, ASLA, AIA (617) 227-2560 Kurt Petschke (617) 227-2560

Legal Counsel:	DLA Piper 33 Arch Street, 26th Floor Boston, MA 02110 John Rattigan (617) 406-6057 Brian Awe (617) 406-6075
Transportation:	Vanasse Hangen & Brustlin 99 High Street, 10th Floor Watertown, MA David Bohn, P.E. (617) 607-2944 Christina Hodge, P.E. (617) 607-2904
Civil Engineer	Nitsch Engineering 2 Center Plaza, Suite 430 Boston, MA 02108 Christopher D. Hodney, P.E. (857) 206-8673
Geotechnical Engineer	Haley & Aldrich, Inc. 465 Medford Street, Suite 2200 Boston, MA 02129 Michael Atwood, P.E. (617) 886-7382 Lee S. Vanzler, P.E. (617) 886-7561
Surveyor	Feldman Land Surveyors 152 Hampden Street Boston, MA 02119 Paul Foley (617) 357-9740 Tim Agurkis (617) 357-9740
Community Relations	Nauset Strategies 1 Design Place, Suite 638 Boston, MA 02210 Michael Vaughan (617)523-3097
Consultant	Langan 361 Newbury Street Boston, MA 02115 Douglas L. Landry, AICP (800) 952.6426 x3050
Permitting Consultant:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Peggy Briggs (978) 897-7100 David Hewett (978) 897-7100 Erik Rexford (978) 897-7100 Katie Raymond, PE (978) 897-7100

MEP/FP Engineer	Cosentini Associates 101 Federal Street – Suite 600 Boston, MA 02110 Robert Leber, P.E. (617) 748-7800 Bob Hamilton, P.E. (617) 748-0027 Vladimir Yarmarkovich, P.E. (617) 748-7800 Randall Duke, P.E. (617) 748-7800
Sustainability Consultant	VvS | Architects & Consultants Agnes Vorbrodt, LEED AP BD+C WELL AP NCARB (617) 898-8995
Structural Engineer	DeSimone Consulting Engineers 31 Milk Street, 1016 Boston, MA 02109 Jarret Johnson, P.E. (617) 936-4492

2.2 Regulatory Controls and Permits

2.2.1 Zoning

The project is located in an I-2 General Industrial District under the South Boston base provisions of the Boston Zoning Code, and is not presently located in a Downtown or Neighborhood District. In addition, the project site is located in a Restricted Parking Overlay District. The Proponent intends to apply for the creation of a Planned Development Area (PDA) and approval of a PDA Development Plan to permit construction of the Project.

The project site is within the RLFMP, but is outside the Designated Port Area. A narrow strip along the eastern edge of the project site is within Ch. 91 jurisdiction; however no new buildings are proposed within the Ch. 91 jurisdictional limit.

2.2.2 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. The BPDA will issue a Scoping Determination in response to this PNF.

2.2.3 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.

2.2.4 Boston Landmarks Commission

In 2008, the Proponent received approval from the Boston Landmarks Commission (BLC) under Article 85 of the Boston Zoning Code to demolish the dilapidated, condemned warehouse building currently on the site. Demolition is scheduled for fall 2019. See Appendix C for a copy of the BLC approval.

2.2.5 Boston Architectural Access Board

The Project will comply with the requirements of the Architectural Access Board and the standards of the Americans with Disabilities Act. The Accessibility Checklist is included in Appendix D.

2.2.6 Massachusetts Historical Commission

The project is 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 Register 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.

2.2.7 Massachusetts Environmental Policy Act (MEPA)

The project site has been the subject of several planning efforts, including MEPA review as a component of the RLFMP Master Plan update for the Marine Park (EEA #8161). The Secretary of Energy and Environmental Affairs (EEA) issued a MEPA Certificate for the 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, and the Project exceeds one or more MEPA review thresholds.

The Proponent plans to file a Notice of Project Change (NPC) with the MEPA Office to initiate MEPA review. The NPC will compare the proposed Project to the development envisioned on parcels T and T-1 in the RLFMP Master Plan and most recent Master Plan Update.

2.2.8 Chapter 91

The proposed Project site is within filled Commonwealth Tidelands; however, these are considered Landlocked Tidelands and are not subject to the licensing provisions of Chapter 91. The site is entirely separated by interconnected public ways and more than 250 feet from any flowed tidelands and, as noted above, is located outside the DPA. In this instance, the DPA boundary establishes the extent of Landlocked Tidelands along the northerly and easterly edges of the site.

The Project parcels are addressed in the 2017 RLFMP Master Plan Update, but are not subject to the licensing provisions of Chapter 91. However, due to its location within Landlocked Tidelands, the Project requires the Secretary of the Executive Office of Energy and Environmental Affairs to issue a public benefit determination. To that end and as required by 301 CMR 13.00 et seq., during the MEPA and Article 80 processes, the Proponent will submit detailed information describing the Project's impact on the public's right to access, use, and enjoy tidelands that are protected by Chapter 91, and will identify measures that avoid, minimize, or mitigate any adverse impact on those rights.

2.3 Anticipated Permits and Approvals Required

Table 2-1 presents 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.

Table 2-1 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)
Federal Aviation Administration (FAA)	Determination of No Hazard to Air Navigation
STATE	
Executive Office of Energy and Environmental Affairs (MEPA Office)	Review under the Massachusetts Environmental Policy Act
Massachusetts Department of Transportation	Non-Vehicular Access Permit
Massachusetts Port Authority	Right of Entry Agreement (if required)
Massachusetts Historical Commission	State Register Review
Massachusetts Water Resources Authority	Construction Dewatering Permit (if required); Sewer Use Discharge Permit (if required)
LOCAL	
Boston Civic Design Commission	Review and approval pursuant to Article 28 of the Boston Zoning Code
Boston Conservation Commission	Order of Conditions

Table 2-1 Anticipated Permits and Approvals (Continued)

Agency Name	Permit / Approval
LOCAL	
Boston Fire Department	Fuel Storage Permit
Boston Inspectional Service Department	Building Permit; Certificate of Occupancy
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 Planning & Development Agency	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	Planned Development Area Development Plan Approval subject to BRA recommendation and approval under Article 80C of the Zoning Code

2.4 Consistency with Planning and District Goals

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

The 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" (MIP Master Plan, page 1-2). The project will help to meet this goal by providing new innovation-oriented economic development and job-growth opportunities in a variety of industries that operate within the Marine Park.

In March 2017, the BPDA prepared an update to the RLMP Master Plan, which was reviewed under MEPA and which received a Secretary's Certificate (dated January 19, 2018) allowing for the development of a Final Master Plan. Until such time as the Final Master Plan is completed and approved by MEPA, the 2000 Master Plan remains as the controlling document. It is worth noting, however, that the proposed Project is consistent with the Update which foresees the opportunity for additional mixed industrial-commercial development on Parcels T and T-1 that would be capable of supporting a higher revenue yield for the EDIC.

2.5 Legal Information

2.5.1 Legal Judgments or Actions Pending Concerning the Proposed Project

The Proponent is not aware of any legal judgments in effect or legal actions pending that are adverse to the Proponent's undertaking of the project.

2.5.2 History of Tax Arrears on Property Owned in Boston by the Proponent

The Proponent does not have a history or tax arrears on any property owned within the City of Boston.

2.5.3 Evidence of the Site Control/Public Easements

The Proponent leases the project site from the EDIC. The Proponent is not aware of any public easements into, through or affecting the project site other than: (i) that certain access easement granted by EDIC to the United States of America in deed dated August 7, 1989 and recorded in Book 15738, Page 231; (ii) that certain access easement granted by EDIC to Trustees of MIP Parking Facility Trust dated June 20, 1990 and recorded in Book 16366, Page 233; (iii) that certain access easement granted by EDIC to Massport dated May 20, 1999 and recorded in Book 23780, Page 328; (iv) that certain taking by the Commonwealth of Massachusetts dated June 10, 1992 and recorded in Book 17568, Page 68; and (v) typical utility easements and adjacent public rights of way. Items (i), (ii) and (iii) of the previous sentence are subject to EDIC's right to designate an alternative route and the Proponent proposes to work with the EDIC to do so.

2.6 Schedule

The Proponent expects to commence project construction in late 2020 or early 2021 and for construction to last for approximately two years.

Chapter 3.0

Transportation

3.0 TRANSPORTATION

This chapter provides an overview of the proposed Project's transportation characteristics and potential impacts, based upon an evaluation of the development program and the transportation infrastructure serving the Project site. It provides an overview of the project's transportation context, including site access, transportation infrastructure, travel characteristics, trip generation by mode, and parking. It includes an assessment of the expected effects of the Project on traffic conditions at 11 nearby intersections.

The project site is located in what is becoming acknowledged as the Eastern Seaport. The Eastern Seaport area, which encompasses the Raymond L. Flynn Marine Park (RLFMP) and other nearby properties is more industrially focused than the developing Western Seaport which is predominantly made up of commercial/office and residential uses. The roadway circulation patterns for the Project and the transportation improvements that are contemplated to serve the site are focused on the Eastern Seaport area. The Proponent recognizes and respects that the site's location is within the RLFMP, an area with considerable industrial and truck activity. This necessitates careful consideration of impacts to nearby and neighboring uses

For purposes of accessing the largest potential labor pool by public transportation (vs. by vehicle), improving connectivity to both South Station (which serves communities to the west and south) and North Station are extremely important for the Project's success and that of the larger RLFMP. The site's connections to South Station are easier due to the proximity of the Silver Line. Trips to and from North Station and the many transit connections available there are more difficult due to the lack of a direct connection that serves the site. With on-going and future improvements to better connect the Seaport with North Station, a larger number of people within a one-hour public transportation commuting time band would be able to commute to/from the site.

The low parking ratio, the proximity of the site to available public transportation (i.e. the Silver Line) and the City's desire for implementing meaningful public transportation improvements will all help to shift site users' travel patterns away from private cars and towards public transportation. It should be noted that a previous planning effort by the Project's development team identified that 2.15 million people live within a one-hour transit-based trip to the site. Within a 30-minute transit-based trip, that same effort identified 1.13 million people.

3.1 Summary of Key Findings and Benefits

- This 381,000-sf project will revitalize an underutilized parcel at the Northern Avenue gateway to the RLFMP.
- The project site is well located in relation to the local and regional highway network, proximate to the ramps serving I-90 and I-93, enabling convenient access for auto users.

- The project site is well served by multiple public transportation services, including the MBTA Silver Line and express and local bus routes, as well as a growing number of water transportation options. The Silver Line (SL2) has a stop directly adjacent to the site on Northern Avenue.

- At full build, a total of 325 vehicle parking spaces will be provided (based on a 0.85 spaces per ksf ratio), reflecting the availability of other travel modes but adequate to support the project. This value is slightly higher than the district-based parking goals/guidelines for the South Boston Waterfront with a value of 0.7 spaces per ksf[1] (with proposed MBTA improvements in place).

- It is anticipated that approximately 51 percent of the trips entering and exiting the Site will be made via transit, walking, and bicycling, and 49 percent of the Project-generated trips will be auto trips.

- The Project is expected to generate 2,198 daily auto trips (1,099 entering, 1,099 exiting), 216 morning peak hour auto trips (186 entering, 30 exiting), and 231 evening peak hour auto trips (37 entering, 194 exiting).

- The largest impact to the surrounding transportation network is expected to occur at the intersections nearest the Project site such as the roundabout at Northern Avenue and Massport Haul Road.

- In compliance with BTD guidelines, approximately 114 long- and short-term bicycle parking spaces are planned for the site at full build.

- The project will be supported by a robust Transportation Demand Management (TDM) program.

- The Proponent is committed to supporting the City's planning for, design and construction of transportation improvements in the Eastern Seaport near the site. These may be either roadway or public transportation improvements. To demonstrate this support, the Proponent is making a $400,000 transportation mitigation commitment (upon completion of the Article 80 process).

3.2 Project Description

The project is described in detail in Chapter 1, Project Description, and the proposed site plan is illustrated in Figure 3-1. The Project will consist of approximately 381,000 square feet (sf) of office/R&D space with 325 parking spaces supporting the building, as shown in Table 3-1. The following sections describe the transportation-related components of the project.

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1 https://www.boston.gov/sites/default/files/document-file-06-2017/parking_ratios_boa.pdf

Figure 3-1

Site Location

2 Harbor Street
Boston, Massachusetts

Base Map Source: Boston Planning & Development Agency

Table 3-1 Project Program

Project Element	Amount
R&D/Office	371,300 sf
Back of House	9,500 sf
Total Floor Area	**380,800**
Vehicle Parking	325 spaces
Bicycle Parking	114 Secured/Covered
	4 Outdoor

3.2.1 Site Access, Loading, and Circulation

As shown in the site plan, vehicle access will be provided by an at-grade driveway from Northern Avenue and an at-grade driveway from Harbor Street. Parking will be provided in three locations on the site. The Northern Avenue driveway will allow access to the planned 35-space surface parking lot at the front of the building (sited over the Ted Williams Tunnel). A two-way driveway from Harbor Street and Channel Street will serve a 70-space surface parking lot and a 220-space below-grade, valet-attended parking area at the rear of the building.

The main driveway off Northern Avenue will provide an off-street pick-up/drop-off area adjacent to the building's lobby for transportation network company (TNC) services, taxis, vans or carpool passengers. The off-street area has been strategically located deep in the site to encourage pick-up/drop-off activity there and not on the surrounding roadways.

The loading docks for the project will be located in the rear of the building off Harbor Street.

A new pedestrian pavilion will be created at the intersection of the Massport Haul Road and Northern Avenue roundabout to help create an improved gateway to the Raymond L. Flynn Marine Industrial Park. There will be three main pedestrian entries to the new building: (1) along Northern Avenue; (2) from the gateway plaza; and (3) from the southern surface parking lot and promenade.

3.2.2 Parking

The Project site is the former home of Boston Freight Terminals and is unoccupied and largely paved. It has approximately 30 parking spaces along Harbor Street and in marked areas on the site near Northern Avenue. Additionally, there is space on the site between the Massport Haul Road and Channel Street that is typically used by some 30+/- trucks and trailers.

The Project will be supported by three parking facilities totaling 325 spaces: 35 self-park surface lot spaces in the front of the building, 70 self-park surface lot spaces at the rear of the building, and 220 valet served stacker spaces in below-grade parking. This results in a ratio of approximately 0.85 spaces per 1,000 square feet. It should be noted that the RLFMP Master Plan Update from December 2017 proposed an approximately 570-space parking garage on Parcel T to support future build-out within the RLFMP.

3.3 2019 Existing Conditions

3.3.1 Site Access, Loading and Circulation

As shown in Figure 3-1, the Project site is located on the southern side of Northern Avenue between the Massport Haul Road to the west and Harbor Street to the east. To the south, the project site abuts a section of Channel Street, a local road providing access to the project site as well as other adjacent parcels to the south, with two connections to Harbor Street. The site has three existing vehicle access points, one each on Massport Haul Road, Northern Avenue, and Channel Street.

The eastern portion of the site (Parcel T) is occupied by a vacant distribution warehouse (the former home of Boston Freight Terminals that is scheduled for demolition). The western portion of the site (Parcel T-1) is a surface parking lot that had been used for truck parking and staging.

As shown in Figure 3-1, the project site has excellent regional and local highway access, with direct access to the Massport Haul Road; the I-90 and I-93 ramps to the west; and connections to Northern Avenue/Seaport Boulevard, Drydock Avenue, and Summer Street.

3.3.2 Roadways

The Project Site is bounded by Northern Avenue, Harbor Street, and Massport Haul Road. Channel Street passes through the Project Site from its intersection with Northern Avenue to the Massport Haul Road. Each of these streets is briefly described in the sections below. In the interest of brevity, this section does not include a description of each roadway within the defined study area; instead it focuses on those that are closest to the Project.

Northern Avenue

Northern Avenue is a two-way, northwest/southeast roadway that extends from Seaport Boulevard to Tide Street and the Dry Dock. Adjacent to the Project Site, Northern Avenue is a two-lane, two--way roadway. Northwest of the Project Site, Northern Avenue becomes a four-lane roadway with two lanes in each direction. Sidewalks are provided along the length of the road, but there are limited crosswalks at intersections.

Harbor Street

Harbor Street is a northeast/southwest roadway located to the southeast of the Project Site. Adjacent to the Site, Harbor Street is a two-lane roadway carrying two-way traffic and extending from Drydock Avenue on the southwest and Northern Avenue on the northeast. Access to

Channel Street is provided by a one-lane unnamed street running along the southwestern edge of the Project Site. Sidewalks are located on the southeastern side of the roadway, and the only crosswalk across the roadway is located at its intersection with Northern Avenue.

Massport Haul Road

Massport Haul Road is a two-lane roadway adjacent to the site, opening to four lanes west of the site beyond Pumphouse Road. Near Northern Avenue the Massport Haul Road provides two travel lanes in each direction. There are no parking meters along Haul Road, but it has been used intermittently as a location for bus layover space. with no parking on either side of the street. Sidewalks are consistently provided on the opposite side of the street, and there is a small sidewalk segment that ends at the site's curb cut on the Project side of the Massport Haul Road. Crosswalks are only present at the intersections with Northern Avenue and Pumphouse Road.

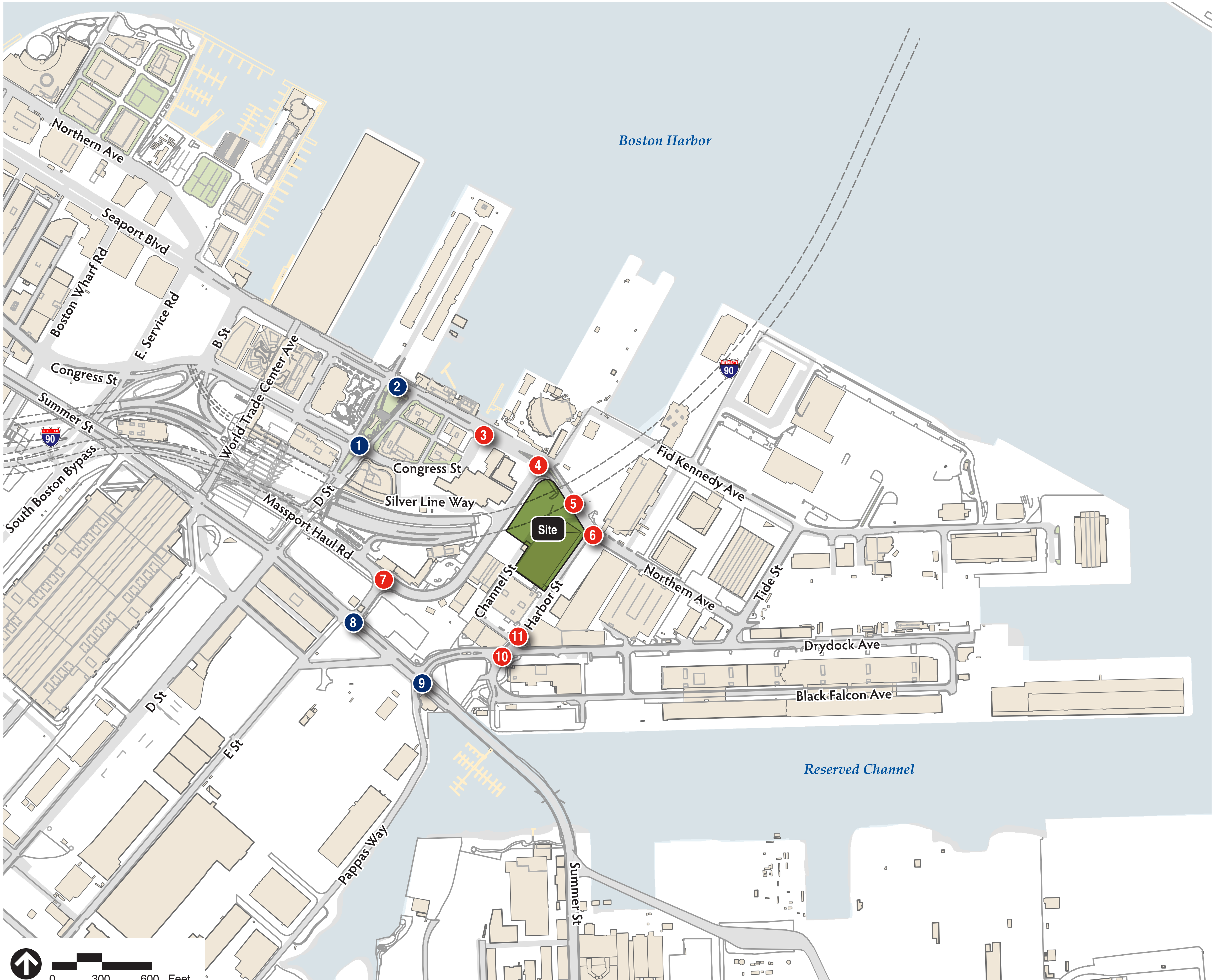
Channel Street

Channel Street is a two-way northeast- and southwest-bound roadway connecting Northern Avenue and Harbor Street. The street turns 90 degrees at the southwest and becomes a northwest- and southeast-bound road. It is connected to Harbor Street through an unnamed street on the southwestern edge of the Project Site. Approximately seven parking spaces for Boston Municipal Protective Services are provided on the northwestern side of the street along the Stavis Seafoods building and loading for neighboring buildings is accessed off the southeastern side. There are no sidewalks located on either side of the street, but crosswalks are located at the intersections with Northern Avenue and Harbor Street.

3.3.3 Study Intersections

The Project study area initially included nine intersections surrounding the immediate area. In consultation with the Boston Transportation Department (BTD), two additional intersections were added along D Street. The study area now includes the following 11 intersections, as shown in Figure 3-2. The intersections listed below, within the Eastern Seaport, are included in the analysis.

1. D Street at Congress Street *(signalized)*
2. Northern Avenue at D Street *(signalized)*
3. Northern Avenue at Congress Street *(unsignalized)*
4. Northern Avenue at Massport Haul Road *(roundabout – unsignalized)*
5. Northern Avenue at Channel Street *(unsignalized)*
6. Northern Avenue at Harbor Street *(unsignalized)*
7. Massport Haul Road at Pumphouse Road *(unsignalized)*
8. Summer Street at Pumphouse Road *(signalized)*
9. Summer Street at Drydock Avenue/Pappas Way *(signalized)*
10. Drydock Avenue at Harbor Street/Terminal Street *(unsignalized)*
11. Harbor Street at Channel Street *(unsignalized)*



Signalized Intersection
Unsignalized Intersection

1 D Street at Congress Street
2 Northern Avenue at D Street
3 Northern Avenue at Congress Street
4 Northern Avenue at Massport Haul Road
5 Northern Avenue at Channel Street
6 Northern Avenue at Harbor Street
7 Massport Haul Road at Pumphouse Road
8 Summer Street at Pumphouse Road
9 Summer Street at Drydock Avenue/Pappas Way
10 Drydock Avenue at Harbor Street/Terminal Street
11 Harbor Street at Channel Street

Figure 3-2
Proposed Study Area Intersections

2 Harbor Street
Boston, Massachusetts

Base Map Source: Boston Planning & Development Agency

Existing vehicular traffic data was collected for all study area intersections for the morning and evening weekday peak hours. Vehicle, bicycle, and pedestrian data were collected in both June and October 2019. Based on the vehicular traffic count data, the existing weekday morning peak hour for the area occurs between 8:00 AM and 9:00 AM, and the existing weekday evening peak hour occurs between 4:45 PM and 5:45 PM. Figures 3.3a and 3.3b present the 2019 existing conditions weekday peak hour traffic volumes. Traffic data collection information is provided in Appendix B.

Additionally, 72-hour Automatic Traffic Recorder (ATR) counts were completed from Tuesday, June 11, 2019, through Thursday, June 13, 2019, at two locations—Northern Avenue west of Massport Haul Road and at Massport Haul Road south of the Northern Avenue roundabout. On Northern Avenue west of Massport Haul Road, the roadway carried an average of 11,793 total daily vehicles (6,324 eastbound and 5,469 westbound) with 15 percent of the volume in both directions consisting of heavy vehicles. On the Massport Haul Road south of Northern Avenue, the roadway carried an average of 6,277 total daily vehicles (3,478 northbound and 2,799 southbound) with 15 percent of the volume consisting of heavy vehicles traveling northbound and 24 percent heavy vehicles traveling southbound.

3.3.4 Public Transportation Service

As shown in Figure 3-4, the project site is well served by public transportation, with the MBTA Silver Line Way station opposite the site on the west side of the Massport Haul Road. The Silver Line SL1, SL2, and SL3 routes pass though the station, and the SL2 has stops on Northern Avenue including an outbound stop directly adjacent to the site. Local bus Route 4 also serves these bus stops and has stops on Summer Street along with Route 7, and a water taxi stop is located at Commonwealth Pier, just over a 5-minute walk to the west.

Service information, including headways and hours of operation, is summarized in Table 3-2. It should be noted that the MBTA, through it's Better Bus Project is currently planning changes to the bus routes throughout the region, and this table does not reflect any potential changes at this time.

Figure 3-4 also shows the new ferry service between Fan Pier and Lovejoy Wharf adjacent to North Station. This service is managed by the Massachusetts Convention Center Authority (MCCA).

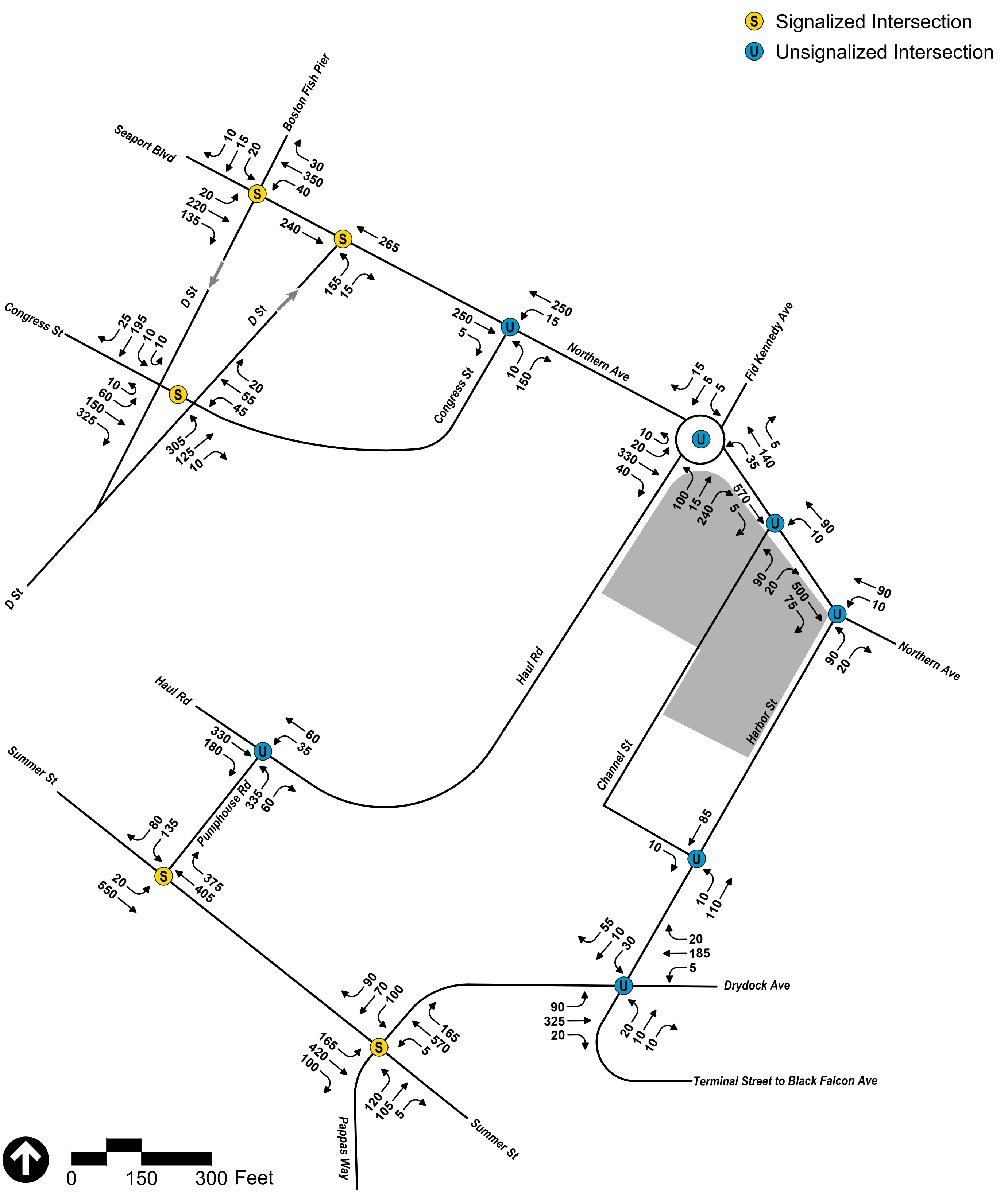


Figure 3-3a

2019 Existing Condition Vehicle Volumes
AM Peak Hour (8:00 AM - 9:00 AM)

2 Habor Street
Boston, Massachusetts

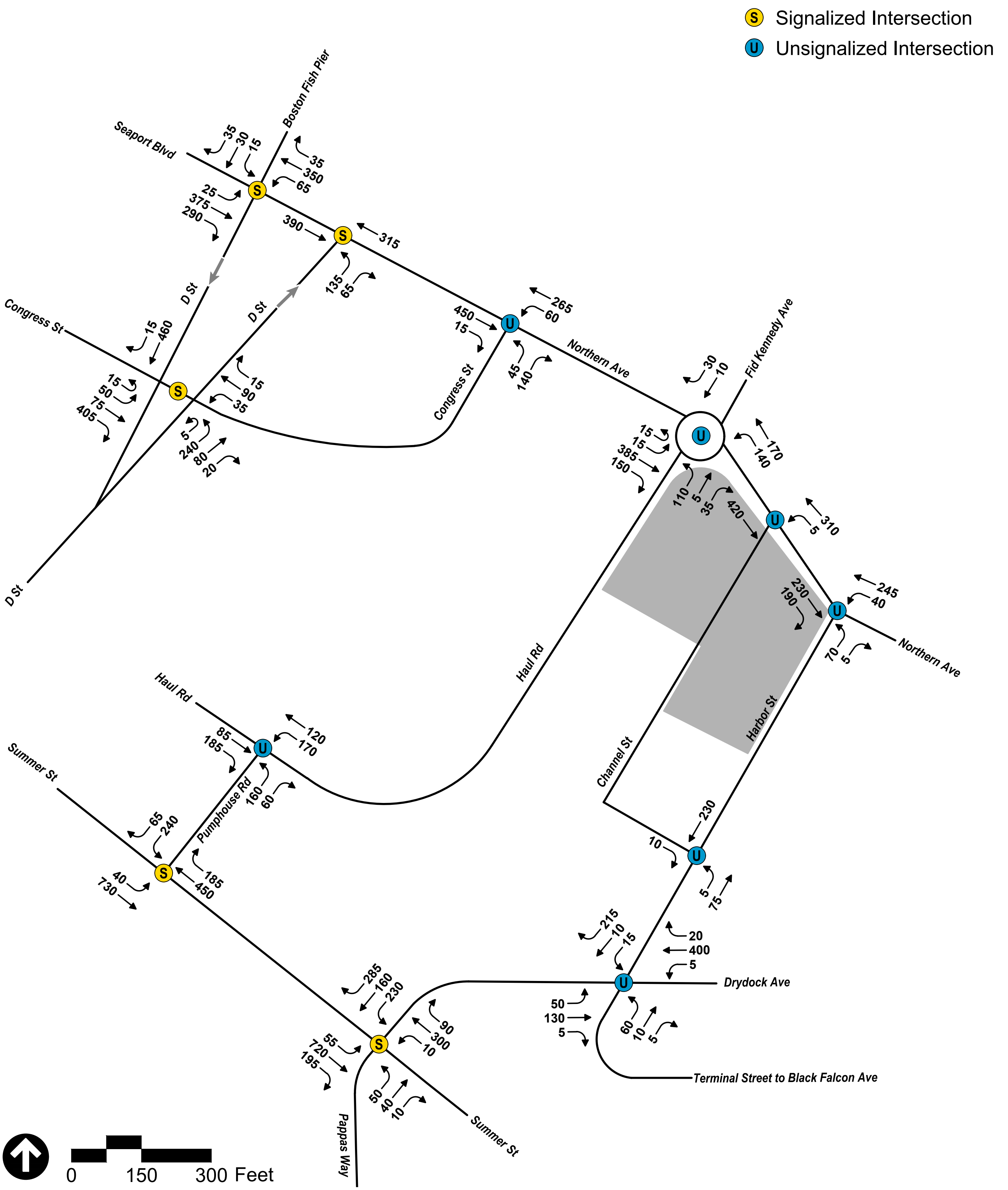


Figure 3-3b

2019 Existing Condition Vehicle Volumes
PM Peak Hour (4:45 PM - 5:45 PM)

2 Harbor Street
Boston, Massachusetts

Silver Line
4 North Station to Tide Street
7 City Point to Otis/Summer Street
448 Marblehead to Downtown Crossing (Express)
449 Marblehead to Downtown Crossing (Express)
459 Salem Depot to Downtown Crossing (Express)
Ferry Service Managed by the Massachusetts Convention Center Authority (MCCA)

Figure 3-4
Existing Public Transportation

2 Harbor Street
Boston, Massachusetts

Base Map Source: Boston Planning & Development Agency
Source: MBTA, August 2019

Table 3-2 Public Transportation Service

Transit Service	Origin-Destination	Major Stops	Nearest Stop to Project Site	Peak Hour Headway (minutes)[1]	Hours of Service[1]
MBTA Subway Services					
Silver Line 1	South Station – Logan Airport via Waterfront	Airport Terminals World Trade Center Station South Station Court House Station	Silver Line Way	≤9	Weekday: 4:17 AM – 1:24 AM Saturday: 4:46 AM – 1:37 AM Sunday: 5:46 AM – 1:37 AM
Silver Line 2	Design Center – South Station via Waterfront	Dry Dock Avenue South Station World Trade Center Station Court House Station	Northern Avenue at Harbor Street	≤6	Weekday: 4:17 AM – 1:08 AM Saturday: 4:46 AM – 1:01 AM Sunday: 5:46 AM – 1:08 AM
Silver Line 3	Chelsea Station – South Station via Airport Station	South Station Court House Station World Trade Center Station Airport Station	Silver Line Way	≤11	Weekday: 4:17 AM – 1:45 AM Saturday: 4:46 AM – 1:49 AM Sunday: 5:46 AM – 1:49 AM
MBTA Bus Services					
Route 4	North Station – Tide Street	North Station State Street Station Haymarket Station South Station	Northern Avenue opposite Harbor Street / Drydock Avenue at Harbor Street	19-26	Weekday: 6:45 AM – 7:00 PM Saturday: No Service Sunday: No Service
Route 7	City Point – Otis and Summer Streets	South Station	Summer Street at Pappas Way	2 – 4	Weekday: 5:15 AM – 10:34 PM Saturday: 5:15 AM – 10:32 PM Sunday: No Service

1 Based on the most recent schedule provided on the MBTA website as of November 2019

3.3.5 Car-Sharing and BlueBikes

As shown in Figure 3-5, car-sharing spaces (*e.g.*, Zipcar) and bike-sharing (BlueBikes) stations are available within walking distance of the Project site. There are six BlueBikes stations within one half mile; the nearest is on Northern Avenue at Legal Seafoods, one block northeast of the site.

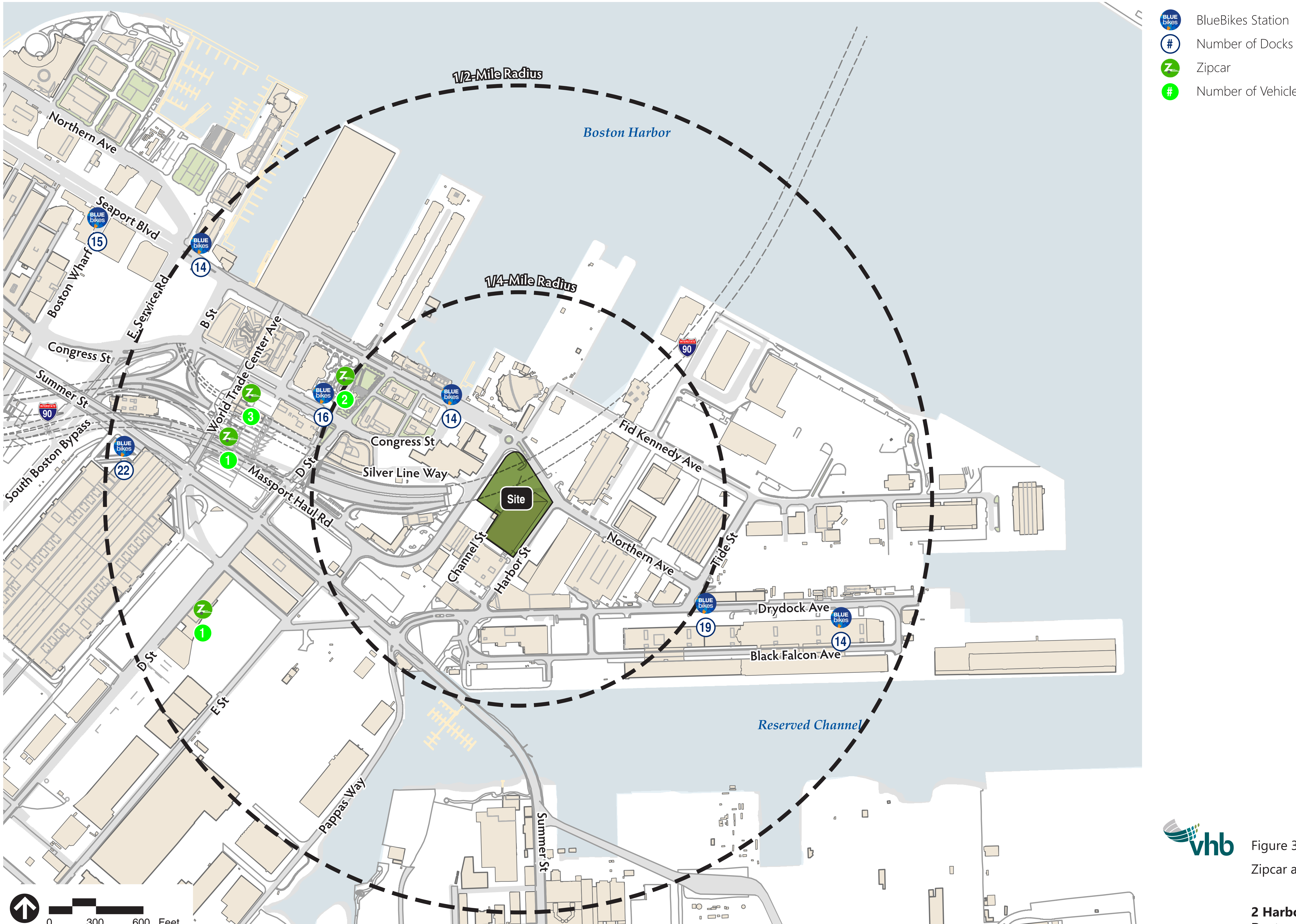


Figure 3-5
Zipcar and BlueBikes Locations

2 Harbor Street
Boston, Massachusetts

Base Map Source: Boston Planning & Development Agency
Source: Zipcar and BlueBikes System Maps, August 2019

3.3.6 Bicycle Facilities

The Project site is served by shared-lane pavement markings and bicycle lanes on many of the surrounding roadways. Shared lanes, indicated by arrows, and bicycle lanes are provided on segments of Northern Avenue, D Street, Congress Street, Summer Street, Drydock Avenue, and Harbor Street. Heading east towards the Project site, the shared lane on Northern Avenue changes to an independent, marked bicycle lane at the intersection with Channel Street and continues along past the Project site.

Bicycle volumes were collected in coordination with the vehicle turning movement volumes and are shown in Figures 3.6a and 3.6b for the morning and evening peak hours, respectively. In front of the Project site on Northern Avenue, approximately 48 bicyclists traveled eastbound toward Harbor Street and 14 bicyclists traveled westbound toward the roundabout during the morning peak hour. At this same location during the evening peak hour, nine bicyclists traveled eastbound and 36 bicyclists traveled westbound. Many of these bicycle trips are likely being made by commuters traveling to and from the office, commercial and industrial uses within the RLFMP area.

3.3.7 Pedestrian Facilities

The Project site is well served by pedestrian facilities, including sidewalks along each of the local roadways and crosswalks at all study area intersections. Crosswalks and pedestrian signals are provided at all study area signalized intersections.

Pedestrian volumes were collected in coordination with the vehicle turning movement volumes and are shown in Figures 3.7a and 3.7b for the morning and evening peak hours, respectively.

During peak times, the highest volumes of pedestrians in the study area were observed crossing the intersection of Seaport Boulevard and Northern Avenue at D Street. The intersection experiences a total of approximately 390 pedestrians in the morning peak hour and approximately 850 pedestrians in the evening peak hour. In front of the Project Site, there are relatively few pedestrians traveling along the southern side of Northern Avenue. On the opposite side of the street, however, 107 pedestrians were counted traveling east/west along Northern Avenue during the morning peak hour and 295 pedestrians were counted there during the evening peak hour.

3.3.8 On-Street Parking

The Project is located in an area where most of the roadways have restricted on-street parking within the RLFMP. As one travels closer to the western area of the South Boston Waterfront (closer to Downtown Boston) some streets offer metered or short-term on-street parking. Figure 3-8 shows the on-street parking regulations for a quarter-mile radius surrounding the Project Site. Surrounding the Project Site, there is currently no on-street parking allowed.

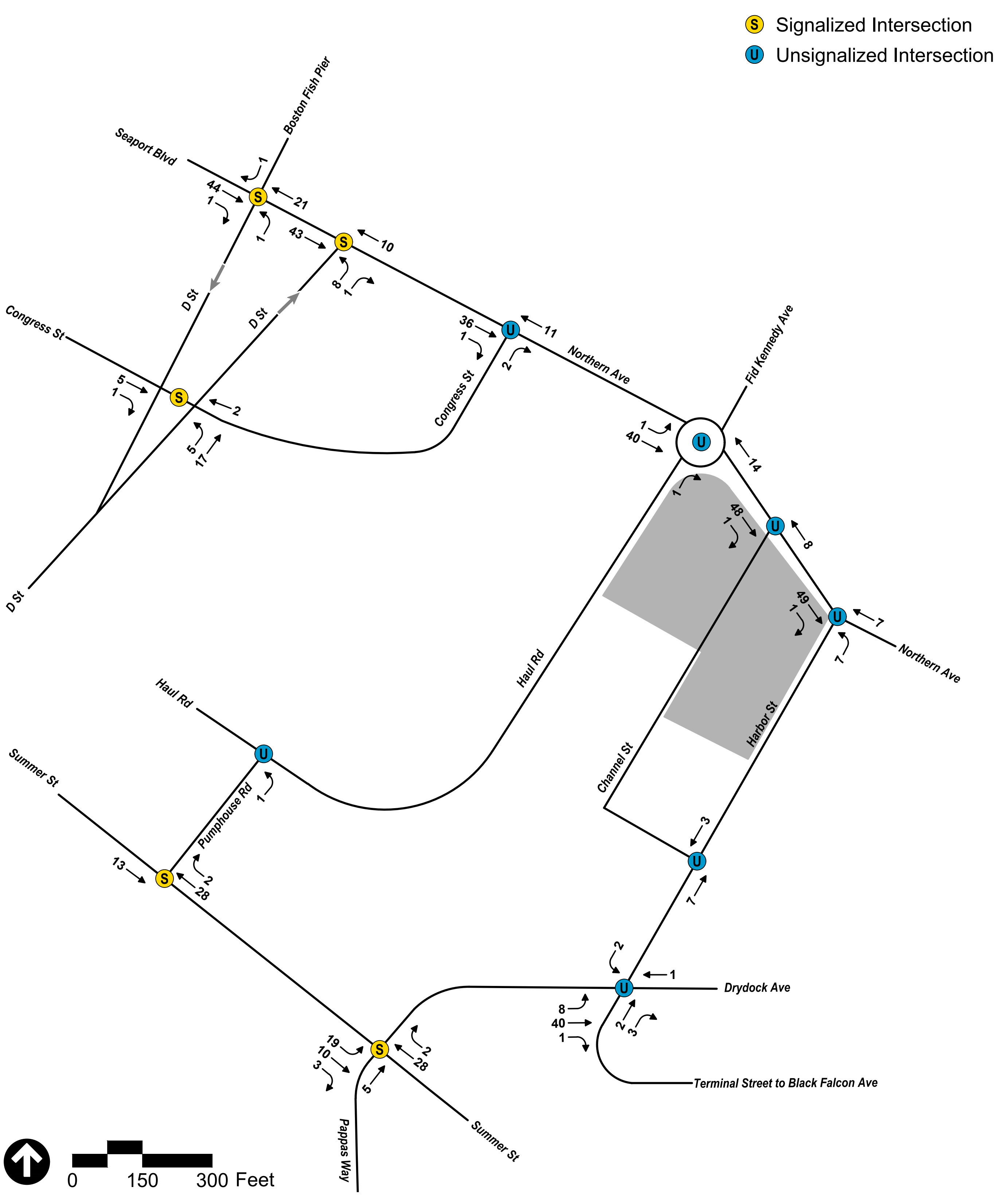


Figure 3-6a

2019 Existing Condition Bicycle Volumes
AM Peak Hour (8:00 AM - 9:00 AM)

2 Harbor Street
Boston, Massachusetts

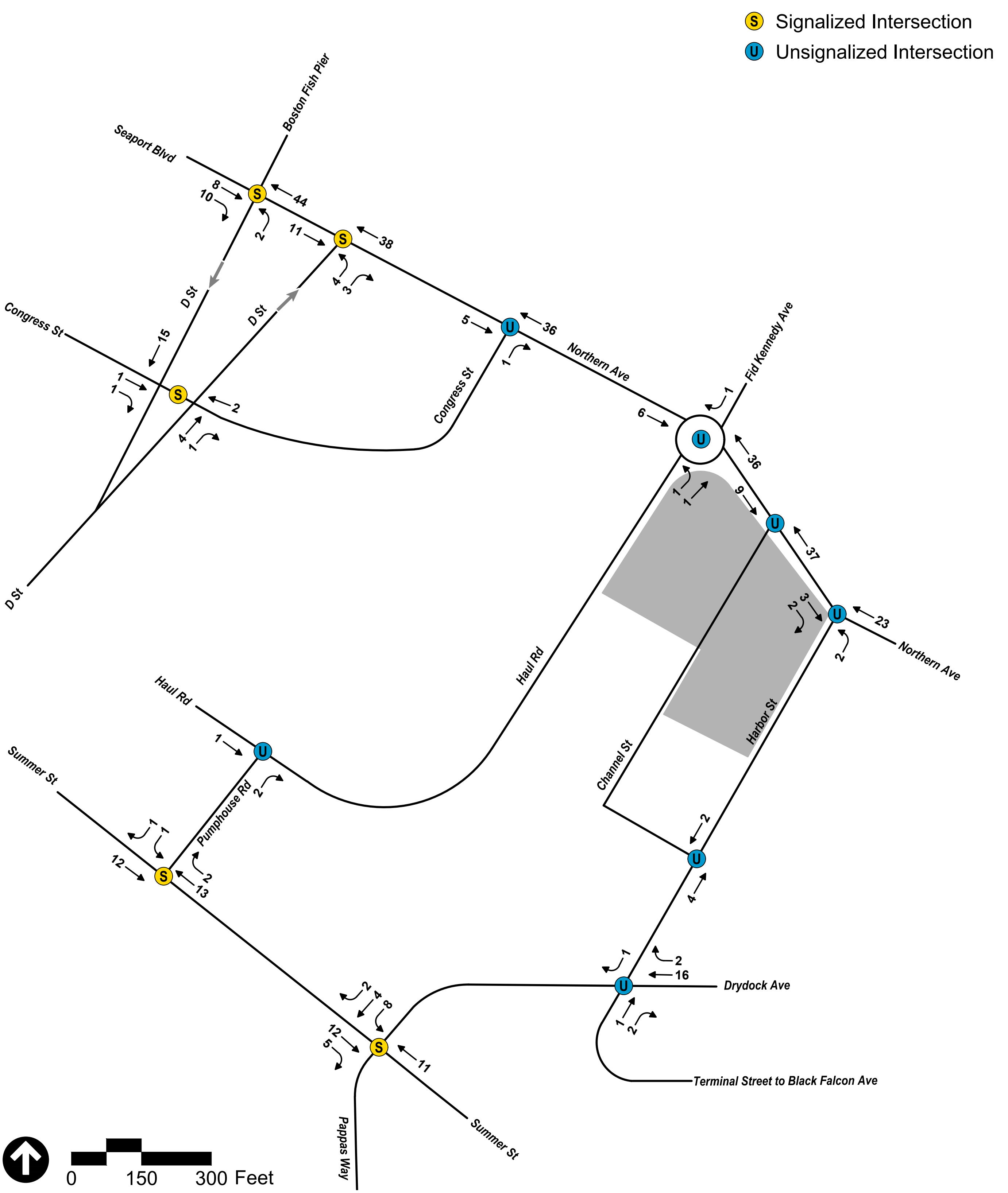


Figure 3-6b

2019 Existing Condition Bicycle Volumes
PM Peak Hour (4:45 PM - 5:45 PM)

2 Harbor Street
Boston, Massachusetts

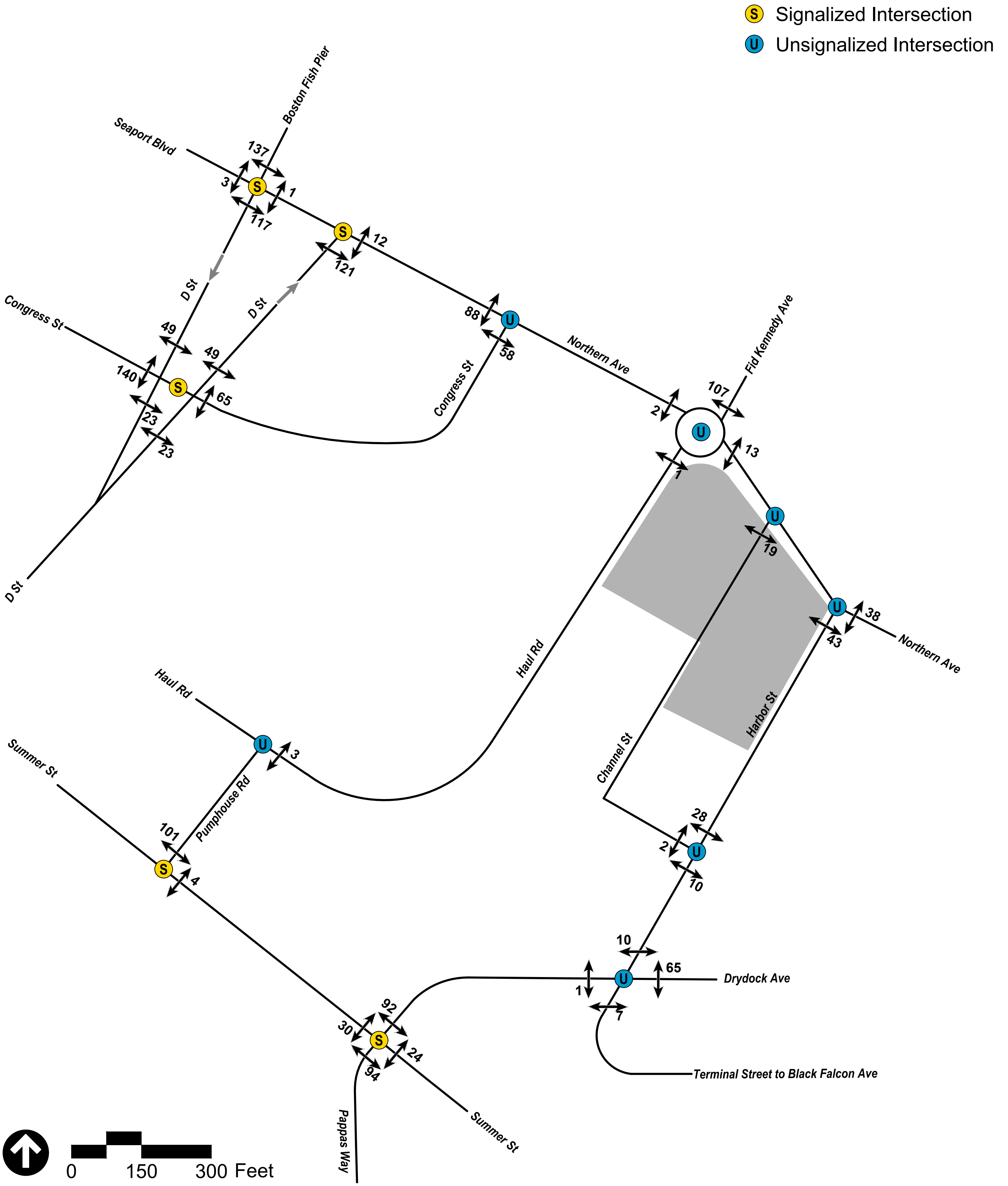


Figure 3-7a

2019 Existing Condition Pedestrian Volumes
AM Peak Hour (8:00 AM - 9:00 AM)

2 Harbor Street
Boston, Massachusetts

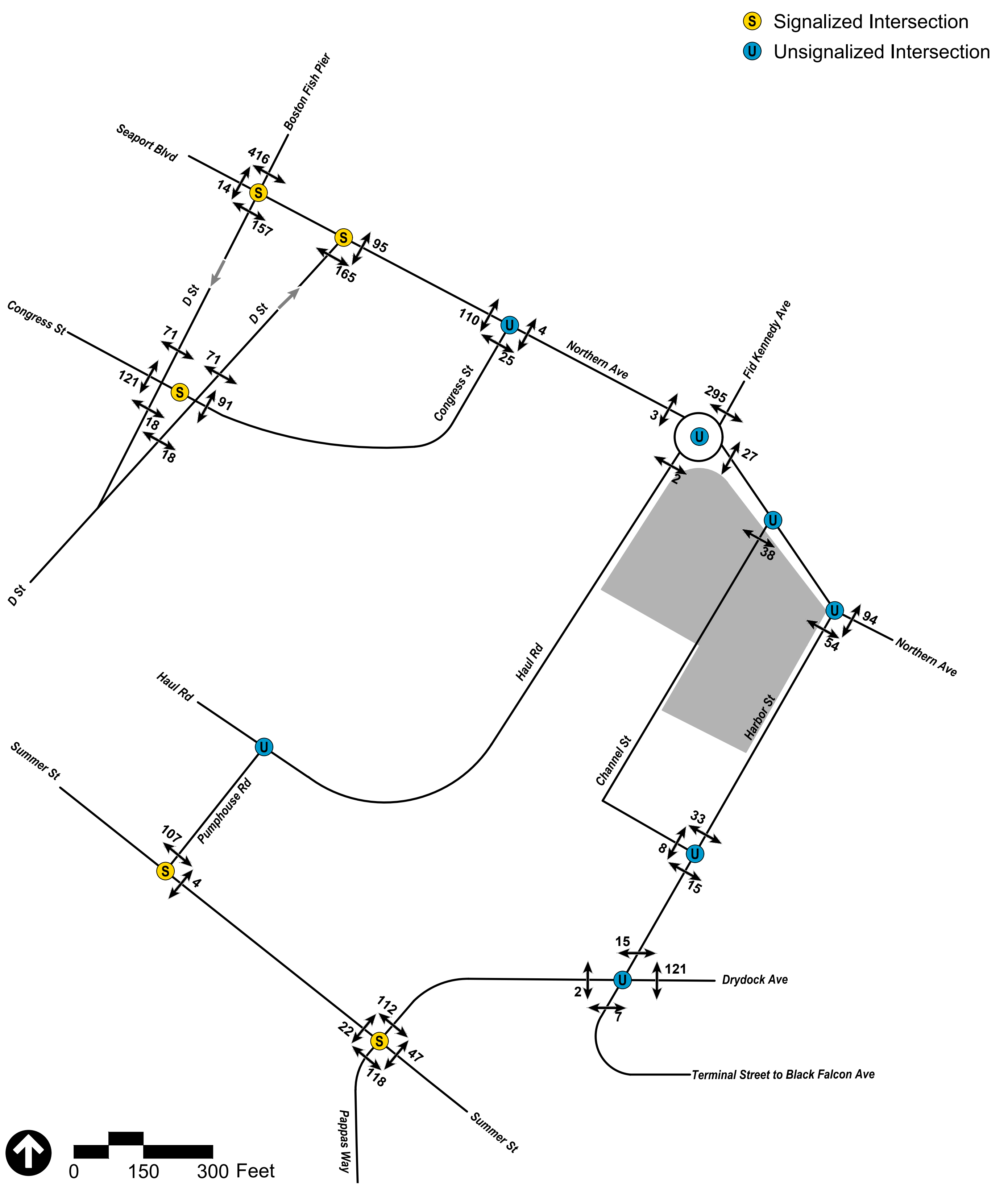


Figure 3-7b

2019 Existing Condition Pedestrian Volumes
PM Peak Hour (4:45 PM - 5:45 PM)

2 Harbor Street
Boston, Massachusetts

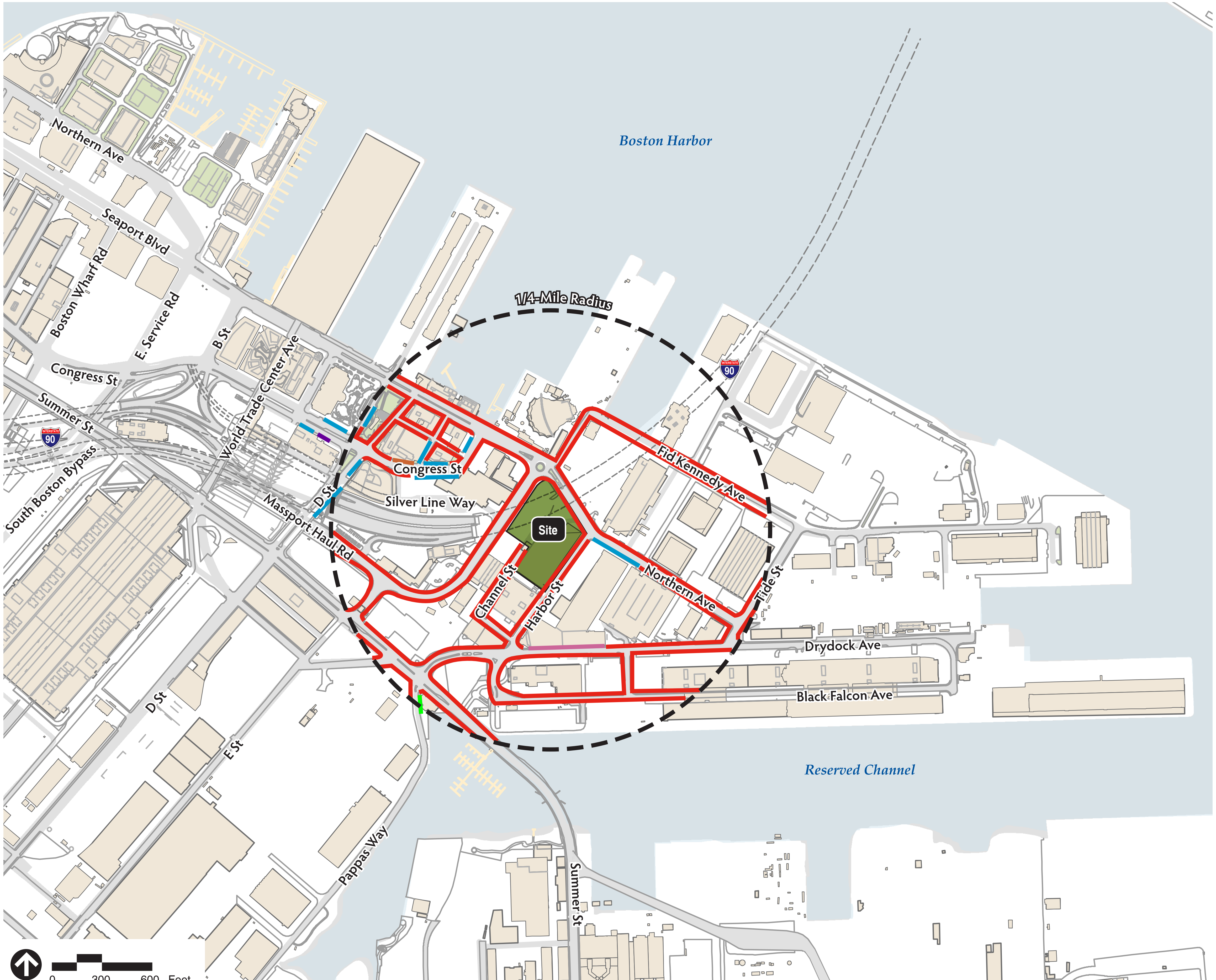


Figure 3-8
Existing Curb Use

2 Harbor Street
Boston, Massachusetts

3.3.9 *Crash Analysis*

A detailed crash analysis was conducted to identify potential vehicle crash trends and/or roadway deficiencies in the traffic study area. The most current vehicle crash data for the traffic study area intersections for the latest five years were obtained from MassDOT via the IMPACT[2] online portal for the most recent five years (2013-2017). A summary of the study area intersections vehicle crash history is presented in Table 3-3. Readers should recognize that the MassDOT database may not fully account for all crashes reported to the Boston Police Department (BPD) or Boston Emergency Medical Services (EMS).

MassDOT has six districts within Massachusetts, and the study area falls under District 6[3]. The District 6 average crash rate per million entering vehicles is 0.71 for signalized intersections and 0.52 for unsignalized intersections. Using the data from the MassDOT database only, the calculated crash rates at the study area intersections were compared to the District 6 crash rates, and none of the intersections exceed the District 6 signalized and unsignalized averages. Most are well below the District averages.

Additionally, the study area intersections were compared to the MassDOT Highway Safety Improvement Plan ("HSIP") map of the Commonwealth's top crash locations. The MassDOT data indicated that none of the study intersections were identified as HSIP-eligible locations. Overall, 45 crashes were reported for this five-year period. Twelve of these involved a personal injury, and only two involved a non-motorist (i.e., a cyclist or pedestrian).

2 https://apps.impact.dot.state.ma.us/cdp/home

3 MassDOT District 6 includes the following cities and towns as defined on the MassDOT website: Boston, Braintree, Brookline, Cambridge, Canton, Chelsea, Dedham, Dover, Milton, Needham, Newton, Quincy, Randolph, Watertown, Wellesley, Weston, Westwood, Weymouth, Winthrop.

Table 3-3 Vehicular Crash Summary (2013-2017) Based on Information Obtained from the MassDOT IMPACT Crash Portal

	D Street at Congress Street	Northern Avenue at D Street	Northern Avenue at Congress Street	Northern Avenue at Massport Haul Road	Northern Avenue at Channel Street	Northern Avenue at Harbor Street	Massport Haul Road at Pumphouse Road	Summer Street at Pumphouse Road	Summer Street at Drydock Avenue/ Pappas Way	Drydock Avenue at Harbor Street/ Terminal Street	Harbor Street at Channel Street
Signalized?	Yes	Yes	No	No	No	No	No	Yes	Yes	No	No
MassDOT Average Crash Rate	0.71	0.71	0.52	0.52	0.52	0.52	0.52	0.71	0.71	0.52	0.52
Calculated Crash Rate	0.66	0.42	0.00	0.19	0.00	0.19	0.13	0.00	0.07	0.05	0.00
Exceeds Average?	No	No	No	No	No	No	No	No	No	No	No
Year											
2013	2	2	0	0	0	0	0	0	0	0	0
2014	5	0	0	2	0	1	0	0	0	0	0
2015	6	2	0	1	0	0	1	0	0	0	0
2016	2	6	0	0	0	2	1	0	0	0	0
2017	5	2	0	1	0	0	0	0	3	1	0
Total	20	12	0	4	0	3	2	0	3	1	0
Collision Type											
Angle	5	4	0	1	0	0	1	0	1	0	0
Head-on	0	0	0	0	0	1	1	0	0	0	0
Rear-end	3	5	0	0	0	0	0	0	1	0	0
Sideswipe, opposite direction	0	2	0	0	0	0	0	0	1	0	0
Sideswipe, same direction	9	1	0	2	0	1	0	0	0	0	0
Single Vehicle Crash	3	0	0	1	0	1	0	0	0	1	0
Not reported	0	0	0	0	0	0	0	0	0	0	0
Severity											
Fatal Injury	0	0	0	0	0	0	0	0	0	0	0
Non-Fatal Injury	5	1	0	1	0	0	1	0	3	1	0
Property Damage Only	15	11	0	3	0	3	1	0	0	0	0
Not Reported	0	0	0	0	0	0	0	0	0	0	0
Time of Day											
Weekday, 7:00 AM – 9:00 AM	1	1	0	1	0	0	0	0	0	0	0
Weekday, 4:00 – 6:00 PM	2	0	0	0	0	2	0	0	0	0	0
Saturday 11:00 AM – 2:00 PM	0	1	0	0	0	0	0	0	0	0	0
Weekday, other time	12	6	0	3	0	1	2	0	1	0	0
Weekend, other time	5	4	0	0	0	0	0	0	2	1	0
Pavement Conditions											
Dry	15	10	0	4	0	2	1	0	2	1	0
Wet	2	1	0	0	0	0	1	0	0	0	0
Snow	2	1	0	0	0	1	0	0	1	0	0
Other	1	0	0	0	0	0	0	0	0	0	0
Not reported	0	0	0	0	0	0	0	0	0	0	0
Non-Motorist (Bike, Pedestrian)	1	0	0	1	0	0	0	0	0	0	0
Ambient Light											
Daylight	14	7	0	3	0	2	1	0	0	0	0
Dusk	1	0	0	0	0	0	0	0	0	0	0
Dark – lighted roadway	5	5	0	1	0	1	1	0	3	1	0
Not Reported	0	0	0	0	0	0	0	0	0	0	0
Weather Condition											
Clear	14	9	0	3	0	2	0	0	2	1	0
Clear/Cloudy	0	0	0	0	0	0	0	0	0	0	0
Cloudy	3	0	0	1	0	0	1	0	0	0	0
Cloudy/Rain	0	0	0	0	0	0	0	0	0	0	0
Cloudy/Snow	1	0	0	0	0	1	0	0	1	0	0
Rain	2	1	0	0	0	0	1	0	0	0	0
Sleet, hail (freezing rain or drizzle)	0	1	0	0	0	0	0	0	0	0	0
Not Reported	0	1	0	0	0	0	0	0	0	0	0

3.4 Future Transportation Conditions

Two future condition scenarios were evaluated for a five-year time horizon (2024) to assess the potential Project-related transportation impacts; the No-Build and Build conditions. These Future conditions are summarized in the sections below.

3.4.1 2024 No-Build Condition

The 2024 No-Build Condition was developed to evaluate future transportation conditions in the traffic study area without consideration of the Project. In accordance with BTD Guidelines, this future analysis year represents a five-year horizon (2024) from existing conditions (2019). The No-Build Condition provides insight into future traffic conditions resulting from regional growth and traffic generated by specific planned projects that are expected to impact the local roadway network.

General Background Growth

A background growth rate of one percent per year was applied to the 2019 Existing Condition traffic volumes to account for both population growth and projects that are under construction or nearing completion in the western Seaport area. This background growth rate is consistent with other traffic studies recently completed for this area of the City.

Area Development Projects

In addition to the background growth rate, traffic projections for several specific planned or approved nearby projects were also incorporated into the development of the 2024 No-Build Condition. The information outlined below was obtained generally from the BPDA's website. The following development projects were included:

- **150 Seaport Boulevard** – This proposed project involves the construction of a 22-story mixed-use development. The proposed development will include approximately 124 residential units and 10,700 square feet of restaurant space as well as 179 parking spaces.

- **NEMA Boston –** This project is currently under construction at 399 Congress Street. It is comprised of a 22-story building with 414 residential units and 144 parking spaces. Of the 414 residential units, 28 will be work/live extended-stay units. This project is expected to be completed within 2019, according to the BPDA website.

- **401 Congress Street** – This proposed project is located adjacent to Massport's South Boston Waterfront Transportation Center and MBTA's Silver Line Station. It is comprised of two separate buildings totaling 675,000 square feet: an 18-story office, retail, and public use building; and a two-story public use building. The proposed development will not have any on-site parking spaces.

- **Commonwealth Pier –** This proposed project at 200 Seaport Boulevard involves the demolition of the existing building and constructing a new building in its place. The new building will remove the current exhibition space and reduce the amount of event space to approximately 56,400 square feet. The new building will contain 635,920 square feet of office space, an increase of 134,020 square feet from the existing building, and 45,240 square feet of retail space, an increase of 33,140 square feet. It will not create additional parking spaces.

- **Innovation Square at Northern Avenue** – This proposed project is located at the intersection of Northern Avenue and Tide Street in the RLFMP and will consist of a 4-story research and development facility. The project will create 60 additional parking spaces to support the development. The first phase of this project is complete, but construction has not yet started on the remaining two buildings.

- **L Street Station –** This proposed project located at 776 Summer Street includes the redevelopment of a site formerly occupied by the Boston Edison L Street Power Station. The redevelopment is currently planned to be a 1.78 million square foot mixed-use development featuring residential, office, research and development, hotel, retail, and civic and cultural spaces. The current plans call for residential and hotel components with750 units and 344 keys, respectively. This project will also add 750 parking spaces, 120 of which will be available to area residents on evenings and weekends.

- **Marine Wharf –** This project is currently under construction and involves the development of a 15-story hotel at 660 Summer Street. The hotel's 411 rooms will be divided between Hampton Inn and Homewood Suites by Hilton, and 166 of the rooms will be extended-stay rooms. The project also includes the construction of approximately 3,500 square feet of retail space and 75 parking spaces.

- **Massport Marine Terminal Parcel 6 –** This proposed project in the RLFMP would create approximately 115,000 square feet of seafood processing facilities and approximately 101,300 square feet of parking (280 spaces).

- **Parcel Q1 –** This project is currently under construction and includes the development of a mixed-use commercial building in the RLFMP. The building will be approximately 298,700 square feet with a ground floor retail space of approximately 8,400 square feet. The project also proposes an approximately 12,900 square foot urban plaza and parking spaces for 150 vehicles.

- **Parcel K –** This project is currently under construction at the intersection of Northern Avenue and Congress Street, directly opposite the proposed Project. The development involves the construction of a mixed-use development comprised of a 293-key hotel, 304 residential units, 14,400 square feet of office space, and 17,928 square feet of retail space. Additionally, the project will create up to 420 new parking spaces.

- **Omni Boston Hotel at the Seaport –** This project located at 440 Summer Street is now under construction and is comprised of an approximately 1,054-key hotel with 120,000 square feet of meeting, convention, and banquet/event space; 8,500 square feet of spa and fitness space; and 40,000 square feet of retail and restaurant space. Approximately 400 parking spaces in Massport's South Boston Waterfront Transportation Center will be dedicated to support the project.

- **Waterside Place Phase IB –** This project is currently under construction and is the second phase of the Waterside Place development. It involves the construction of a 23-story residential building composed of 312 rental units and 2,000 square feet of retail space. This phase will also include the creation of approximately 84 new parking spaces.

The 2024 No-Build Condition peak hour traffic volumes were developed by increasing the 2019 Existing Condition volumes to include general background traffic growth, as previously described, and adding traffic volumes associated with known traffic forecasts projected for other development projects in the same area.

Figures 3.9a and 3.9b present the 2024 No-Build Condition traffic volumes for the weekday morning and evening peak hours, respectively.

3.4.2 2024 Build Condition

The 2024 Build Condition includes the 2024 No-Build Condition background traffic growth with the addition of the Project-generated trips.

Unadjusted ITE Vehicle Trips

With some exceptions, most traffic impacts of a development occur when there is a combination of the prevailing commuter traffic conditions on the roadway network and the addition of peak levels of project traffic – invariably for office and R&D developments, this occurs during the weekday morning and evening peak hours. By contrast, daily trip generation numbers are less relevant to actual impacts as they are spread over the course of a full day. However, it is important to consider daily trips for the purpose of this filing in which they serve as a proxy for potential level of traffic impact relative to the established review thresholds under the Commonwealth's MEPA guidelines.

The Institute of Transportation Engineers (ITE) Trip Generation Manual provides trip rates for each type of land use. However, the ITE trip rates are based on nation-wide data from locations which often do not reflect significant availability of alternative travel modes and public transportation services. The trips are presented initially with no adjustments for local public transportation and other non-auto modes and are referred to as unadjusted ITE trips. Two ITE Land Use Codes (LUC) - LUC 710 General Office and LUC 760 Research and Development Center - were considered as a basis for evaluating potential project impacts.

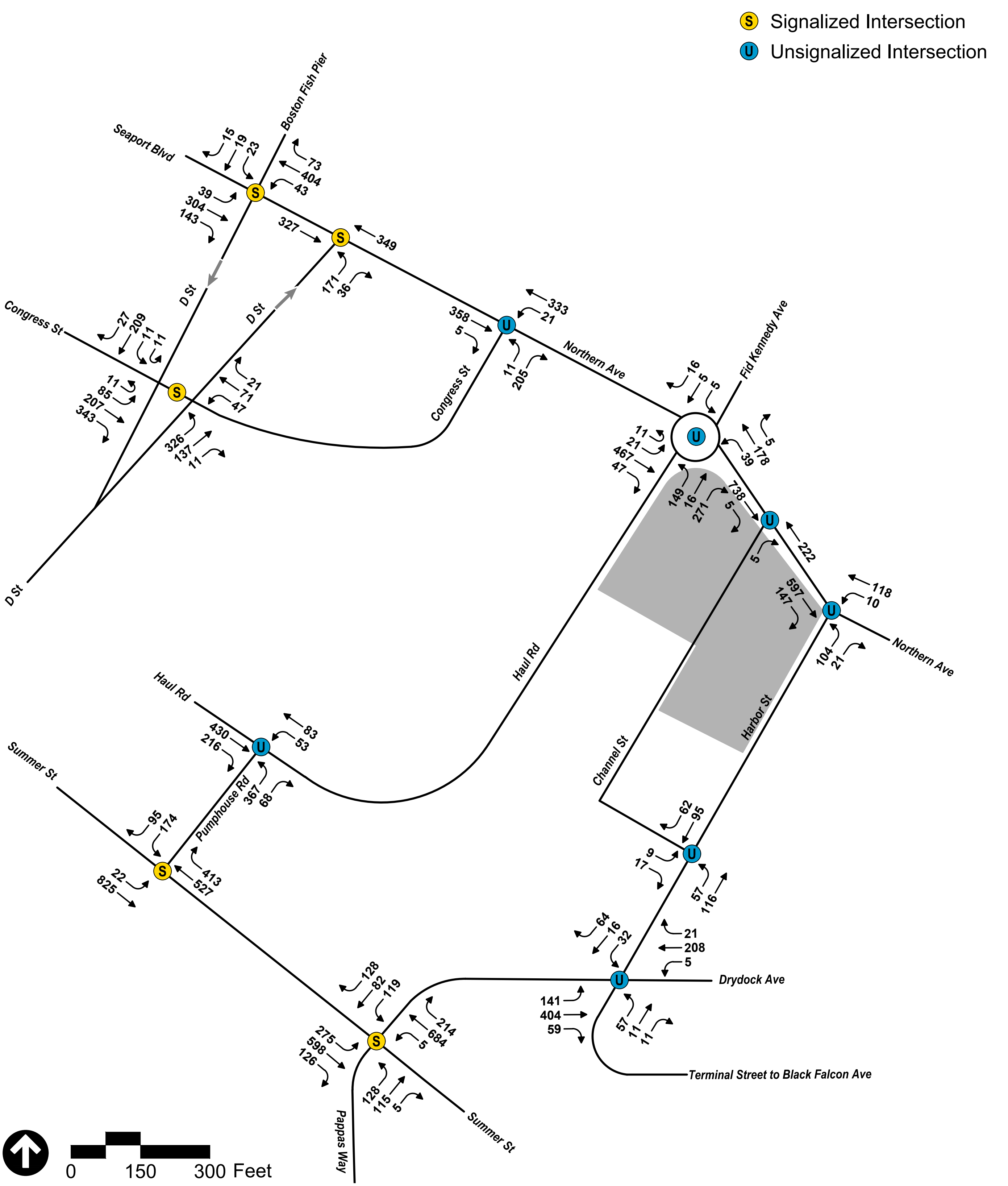


Figure 3-9a

2024 No-Build Condition Vehicle Volumes
AM Peak Hour (8:00 AM - 9:00 AM)

2 Harbor Street
Boston, Massachusetts

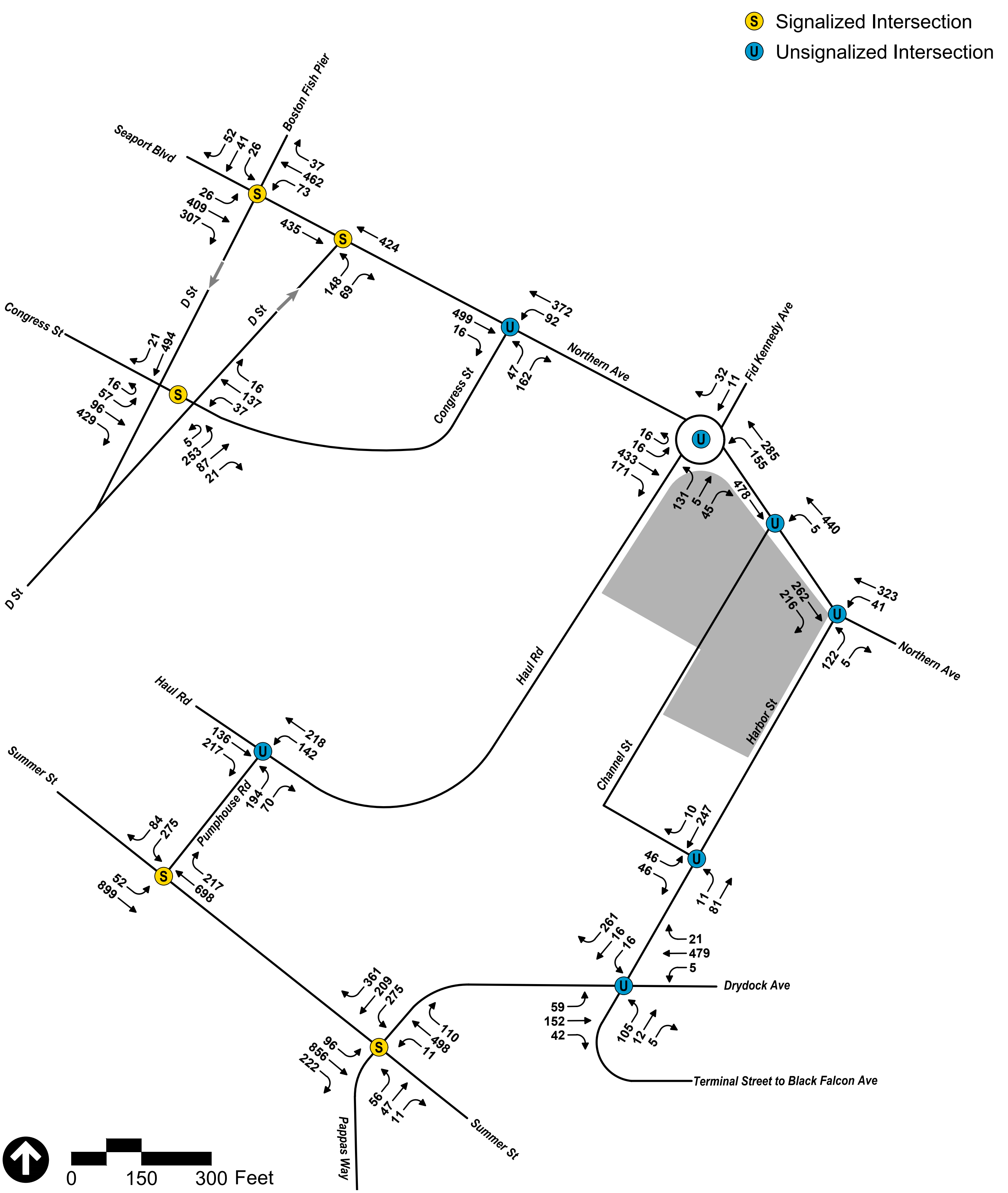


Figure 3-9b

2024 No-Build Condition Vehicle Volumes
PM Peak Hour (4:45 PM - 5:45 PM)

2 Harbor Street
Boston, Massachusetts

As lab/R&D buildings typically have a lower employee density (expressed in persons per square-foot), the associated trip generation during the peak periods is considerably lower than is typical for a general office building. To present a more conservative analysis for this transportation impact assessment, LUC 710 for General Office was used for estimating future project trips. Further, to take credit for the existing vehicle trips to the site, vehicles entering and exiting the site were removed from the network. This credit is not reflected in the trip generation—only in the traffic volumes discussed later in this chapter.

Table 3-4 presents the projected unadjusted ITE project trips for an average day (ADT) and for the weekday morning (AM) and evening (PM) peak hours.

Table 3-4 Unadjusted ITE Project Vehicle Trips

Time Period/Direction	Unadjusted ITE Project Vehicle Trips
Daily	
Enter	1,942
Exit	1,942
Total	3,884
AM Peak	
Enter	331
Exit	54
Total	385
PM Peak	
Enter	65
Exit	341
Total	406

As shown in Table 3-4, at full build, the project is projected to generate approximately 3,884 new unadjusted vehicle trips (total trips, arrive and depart) on an average day. During the weekday morning and evening peak hours, at full-build the Project is expected to generate approximately 331 and 406 unadjusted vehicle trips (total trips, arrive and depart), respectively.

As previously mentioned, unadjusted ITE trip rates do not reflect availability of other travel modes and transit service. In this case, the Project site is well-served by transit service and enjoys good walking and bicycle accessibility. Therefore, the unadjusted ITE vehicle trips for each land-use component are not representative of the actual number of vehicle trips expected to be generated by the Project. To identify the expected number of Project trips by each mode, it is necessary to first convert the unadjusted ITE vehicle trips to person trips by applying the ITE LUC 710 average vehicle occupancy (AVO) which corresponds to the studies used to calculate the office trip generation. The following ITE VOR (people per vehicle) rates were applied:

- Daily (average of AM and PM VOR) 1.31
- AM Peak Hour 1.30
- PM Peak Hour 1.32

Person trips were then adjusted to reflect the following local travel characteristics:

- Mode share by each available mode of transportation; and
- Local Average Vehicle Occupancy (AVO) – the number of persons per vehicle, calculated based on census data

Mode Share

To estimate project-related trips, mode shares for this area of the South Boston Seaport were obtained from AASHTO Census Transportation Planning Products Program (CTPP) data. The mode shares were calculated based on a five-year data set from 2012-2016 from Census Tract 606, the tract that encompasses the Project Site as shown in Figure 3-10. These mode shares were applied to the project's unadjusted daily and peak hour person trips as follows:

- Vehicle: 49 percent
- Transit: 43 percent
- Walk/Bike/Other: 8 percent

It should be noted that while the project may have a small commercial component, it is not expected to be a destination-oriented use. Although it is expected that a small commercial component of the project might attract pedestrian trips from off the site, most of these trips are expected to be drawn from people that are already in the area. These pedestrian trips will be pass-by trips or diverted/shared trips, and they are not new trips expected to be generated by the project. Therefore, for this analysis, the commercial square-footage has been included in the office square footage for this trip generation analysis.

In comparison to a development project located within the downtown Boston area, the vehicle mode shares would be lower and transit shares would be higher due to a larger number of transit options available there. As an example, the expected mode shares for the Winthrop Center tower development are 33 percent vehicle, 58 percent transit, and nine (9) percent walk/bike/other. Since the 2 Harbor Street site is farther away from the concentration of transit options available downtown, the mode shares are lower for transit and higher for vehicle trips while walk/bike/other remains about the same.

Figure 3-10

Census Tract 606 Coverage

2 Harbor Street
Boston, Massachusetts

Base Map Source: Boston Planning & Development Agency

Local Average Vehicle Occupancy

As there will be more than one person travelling in many vehicles, the number of trips by vehicle are adjusted by applying the ITE average vehicle occupancy (AVO) ratio to the number of person trips by vehicle to determine the number of vehicle trips. The local AVOs reflect the characteristics of the South Boston Waterfront where the project is located rather than the ITE AVOs used to convert unadjusted ITE vehicle trips to person trips in Section 3.5.1. Using the available census data for this region, the peak hour local AVO for office was determined to be 1.135.

Adjusted Project Trips

Based on the previously described adjustments for local travel characteristics for the project site location, the project-generated trips by mode are presented in Table 3-5.

Table 3-5 Adjusted Trip Generation

	Vehicle			Transit			Walk/Bike/Other		
	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
Entering	1,099	186	37	1,094	185	37	204	34	7
Exiting	1,099	30	194	1,094	30	194	204	6	36
Total	2,198	216	231	2,188	215	231	408	40	43

In total, following the adjustments described above, the project is expected to generate approximately 2,198 new daily vehicle trips, with 216 occurring in the morning peak hour and 231 in the evening peak hour (total trips, entering and exiting). The project is also expected to generate approximately 2,188 new daily transit trips, with 215 occurring in the morning peak hour and 231 in the evening peak hour (total trips, arrive and depart).

It should be recognized that there is a limited amount of existing trip activity created by the current parking uses at the site. An estimated 150+/- daily vehicle trips occur at the site. The counts conducted in June 2019 showed that five vehicles entered, and five vehicles exited Channel Street (the future site driveway) at Northern Avenue during the morning peak hour. During the evening peak hour, five vehicles turn onto Channel Street from Northern Avenue and no vehicles exit. These vehicle trips were removed from the traffic network in the Build Condition to take a credit for the existing vehicles entering and exiting the future site driveway during the peak hours.

The trip generation analysis summary spreadsheet in included in Appendix B.

Trip Distribution and Assignment

Trip distribution was based on BTD's guidelines for Area 13, as categorized by the Access Boston 2000-2010[4] report. The Area 13 trip distribution rates are based on the 2000 Census data where residents work and employees live. The Project-generated vehicle trips were assigned to the roadway network accordingly. A summary of the regional trip distribution results is presented in Table 3-6 and shown graphically in Figures 3.11a and 3.11b for the morning and evening peak hours, respectively.

Table 3-6 Project Trip Distribution

	AM Peak Hour		PM Peak Hour	
Corridor	**In**	**Out**	**In**	**Out**
Seaport Boulevard	28%	8%	28%	6%
I-90 Eastbound	19%	7%	19%	10%
I-90 Westbound	7%	24%	7%	26%
South Boston Bypass Road	37%	-	35%	-
Congress Street to I-93 NB	-	5%	-	8%
Congress Street to I-93 SB	-	26%	-	28%
Summer Street Northbound	5%	13%	6%	8%
Summer Street Southbound	2%	5%	3%	4%
Pappas Way	2%	12%	2%	10%
Total	**100%**	**100%**	**100%**	**100%**

Source: BTD Area 13 Trip Distribution

Because the Project will provide parking at both the front and rear of the site, two key assumptions were incorporated into the traffic analysis. The analysis assumes that approximately 60 percent of the spaces in the front lot will be filled during the morning peak hour, and the remaining entering vehicles will drive to the back lot and garage entrance via the Massport Haul Road and Harbor Street. Similarly, during the evening peak hour, it is assumed that approximately 60 percent of the vehicles parked at the front of the building will exit during the evening peak hour. The remaining exiting vehicles will exit via the rear surface lot and the garage and will continue to either Massport Haul Road or Harbor Street.

The Project-generated vehicle trips were added to the 2024 No-Build Condition traffic networks using the local trip distribution patterns described above. The Project-generated trips are shown in Figures 3.12a and 3.12b for the weekday morning and evening peak hours, respectively. The 2024 Build Condition vehicle volumes are shown in Figures 3.13a and 3.13b for the weekday morning and evening peak hours, respectively.

4 https://www.boston.gov/departments/transportation/access-boston

Figure 3-11a

Trip Distribution
AM Peak Hour

2 Harbor Street
Boston, Massachusetts

Base Map Source: Boston Planning & Development Agency

vhb

Figure 3-11b

Trip Distribution
PM Peak Hour

2 Harbor Street
Boston, Massachusetts

Base Map Source: Boston Planning & Development Agency

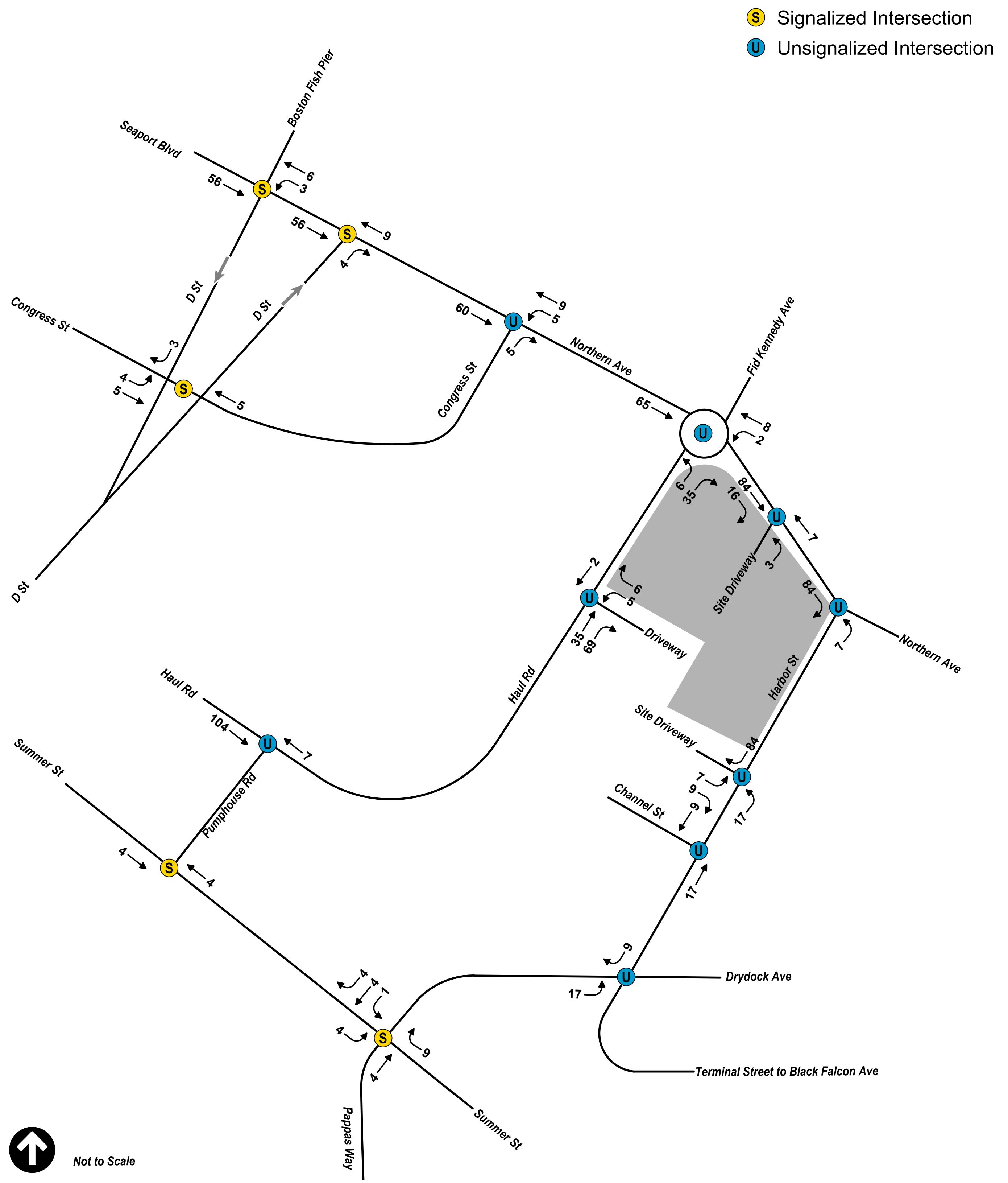


Figure 3-12a

Project-Generated Trips
AM Peak Hour (8:00 AM - 9:00 AM)

2 Harbor Street
Boston, Massachusetts

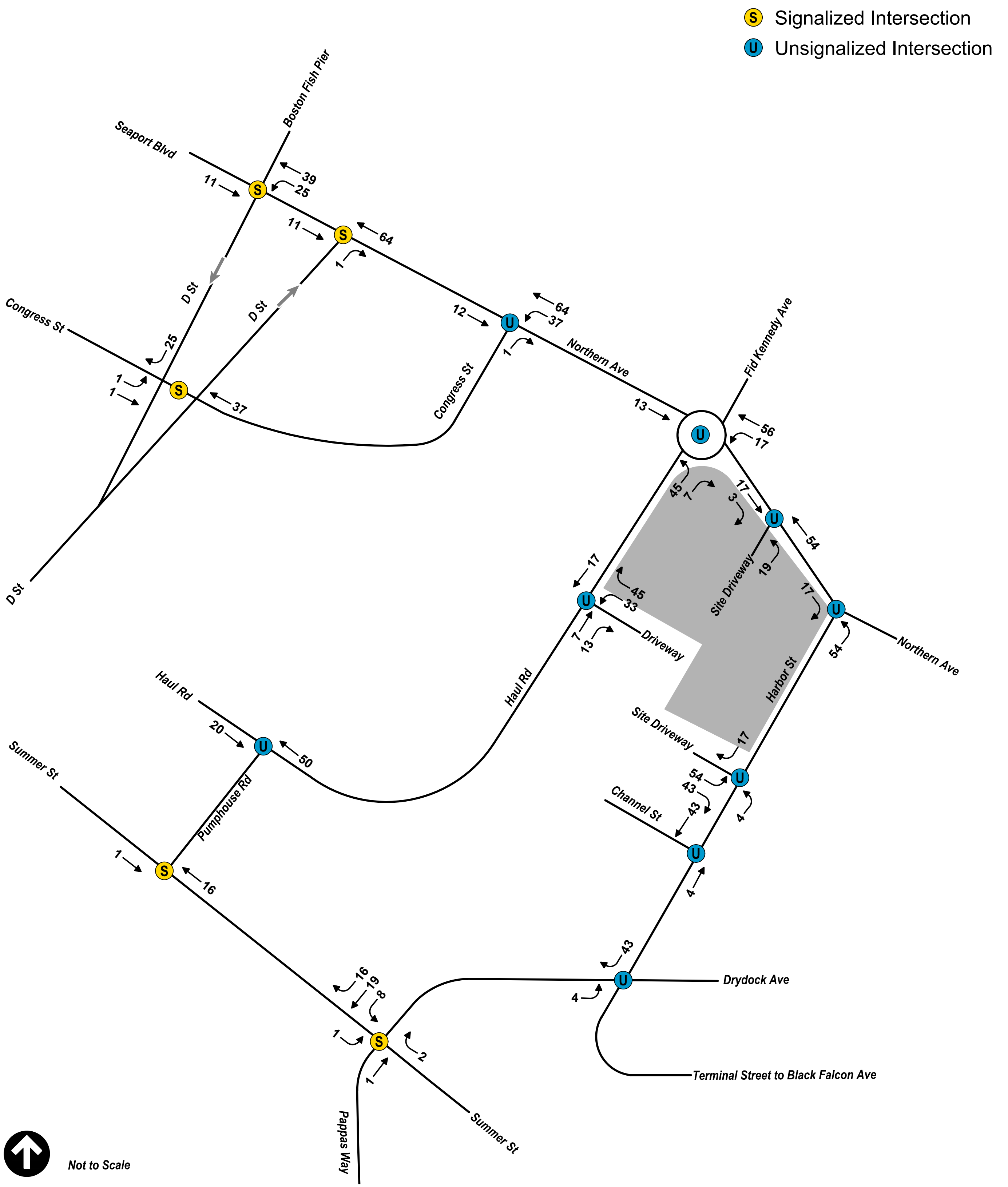


Figure 3-12b

Project-Generated Trips
PM Peak Hour (4:45 PM - 5:45 PM)

2 Harbor Street
Boston, Massachusetts

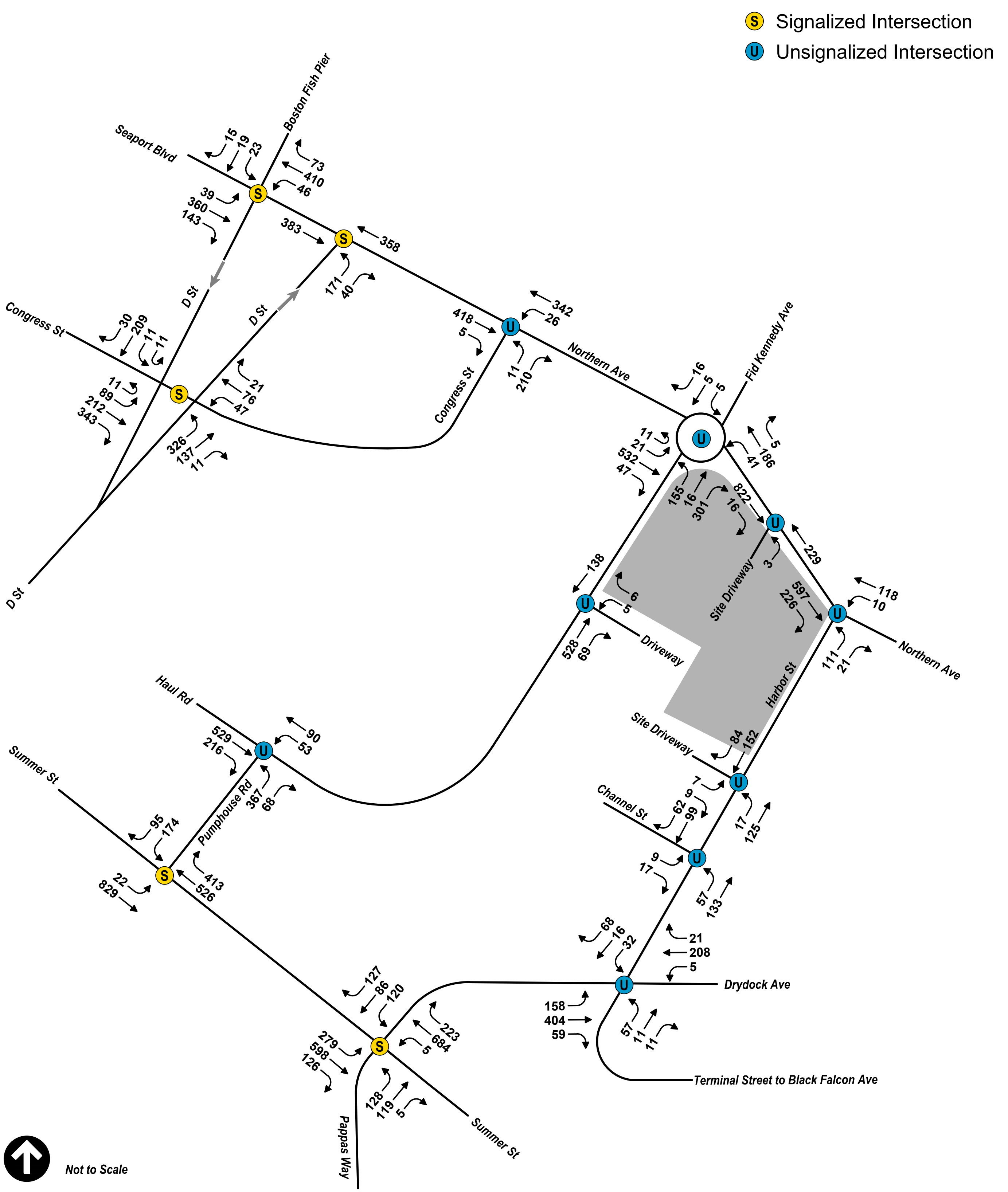


Figure 3-13a

2024 Build Condition Vehicle Volumes
AM Peak Hour (8:00 AM - 9:00 AM)

2 Harbor Street
Boston, Massachusetts

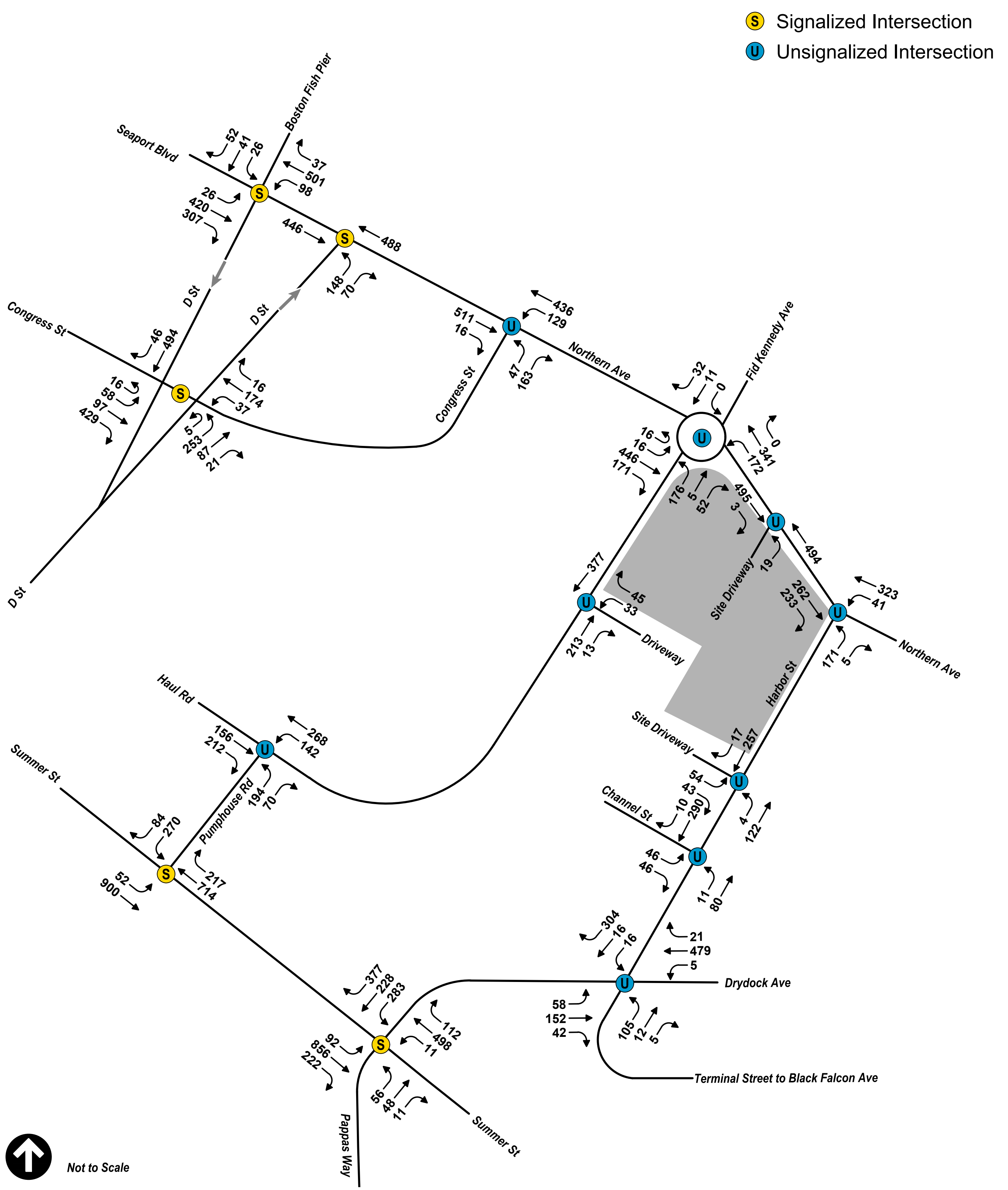


Figure 3-13b

2024 Build Condition Vehicle Volumes
PM Peak Hour (4:45 PM - 5:45 PM)

2 Harbor Street
Boston, Massachusetts

Pedestrian Environment

The Project will provide a large pedestrian plaza area at the corner of Northern Avenue and Massport Haul Road to open the space for daily use. The sidewalks along Northern Avenue and Harbor Street will be reconstructed to create a more pedestrian-friendly environment. Not only will these new pedestrian spaces and sidewalks be used by the project's tenants, but they may also be used by pedestrians traveling to nearby attractions at night or on the weekends such as the Rockland Trust Bank Pavilion, Harpoon Brewery, or many of the other nearby restaurants and residences.

Bicycle Access

The Project will provide covered and secured bicycle spaces within the building as well as outdoor, public bicycle racks around the building for visitors to the Site. Bicycle parking will conform to the City of Boston's Bicycle Parking Guidelines. At a ratio of 0.3 bikes per one thousand square feet of office, the guidelines suggest a need for a total of 114 secured/covered bicycle parking spaces to support the office use as the site. Further, the guidelines suggest that there be at least four outdoor bicycle parking spaces.

Future Bicycle Infrastructure Improvements

In October 2019, the BPDA issued a Request for Proposals ("RFP") for engineering design services entitled "Engineering Design Services for CBR24834 (Project One of Three): Mobility Improvements and Streetscape Design on Northern Avenue and Tide Street." The intention of this project is to better accommodate all roadway users along Northern Avenue with special attention to improving the existing bicycle accommodations. As mentioned previously, there are currently approximately 40-50 bicycle commuter trips along Northern Avenue during the peak hours. The submitted proposals are currently under review. The Proponent is prepared to work closely with the City and the awarded design firm/team to improve the streetscape design along the Project's Northern Avenue frontage.

Loading, Service and Deliveries

The loading activity serving the site will be located at the rear of the building with access via Channel Street and Harbor Street. The site will provide three loading docks, all at 90-degree angles to the Project's promenade at the rear of the site, as well as a trash compactor. The docks will serve a variety of vehicles with the largest likely being a WB-50 tractor-trailer. The truck maneuvers to access the loading docks will be internal to the Site and will not occur on the surrounding roadways.

3.5 Traffic Operations Analysis

Consistent with BTD Guidelines, Synchro 10 software was used to model LOS operations at the study area intersections. LOS is a qualitative measure of control delay at an intersection, providing an index to the operational qualities of a roadway or intersection.

LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS D is considered acceptable. LOS E indicates the vehicles experience significant delays, while LOS F suggests unacceptable delay for the average vehicle. LOS thresholds differ for signalized and unsignalized intersections. Longer delays at signalized intersections than at unsignalized intersections are typically considered acceptable.

Table 3-7 below presents the level of service delay threshold criteria as defined in the 2000 Highway Capacity Manual (HCM).

Table 3-7 Level of Service Criteria

Level of Service	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
LOS A	0 – 10	0 – 10
LOS B	> 10 – 20	> 10 – 15
LOS C	> 20 – 35	> 15 – 25
LOS D	> 35 – 55	> 25 – 35
LOS E	> 55 – 80	> 35 – 50
LOS F	> 80	> 50

Adjustments were made to the Synchro model to include the characteristics of each intersection, such as geometry, signal timings, heavy vehicles, bus operations, parking activity, bicycle conflicts, and pedestrian crossings. The capacity analysis results are summarized in the following sections.

3.5.1 Signalized Capacity Analysis

The LOS results of the signalized capacity analyses are summarized in Table 3-8a and 3-8b for the 2019 Existing, 2024 No-Build, and 2024 Build Condition for the morning and evening peak hours, respectively.

Table 3-8a Signalized Intersection Level of Service (LOS) Summary – Morning Peak Hour

Location	2019 Existing Conditions			2024 No-Build Conditions			2024 Build Conditions		
	v/c[1]	Delay[2]	LOS[3]	v/c	Delay	LOS	v/c	Delay	LOS
Congress Street at D Street	**0.51**	**45.0**	**D**	**0.60**	**47.5**	**D**	**0.61**	**47.8**	**D**
Congress St EB Left/U-Turn	0.15	27.2	C	0.21	28.6	C	0.23	29.0	C
Congress St EB Left/Thru/Right	0.28	28.6	C	0.40	31.0	C	0.42	31.3	C
Congress St EB Right	0.13	26.9	C	0.14	27.6	C	0.15	27.8	C
Congress St WB Left/Thru/Right	0.49	48.5	D	0.55	48.9	D	0.56	49.0	D
D St NB Left	0.74	51.8	D	0.79	54.8	D	0.79	54.8	D
D St NB Thru/Right	0.53	46.8	D	0.58	48.7	D	0.58	48.7	D
D St SB Left/Thru/Right	0.83	71.5	E	0.89	80.2	F	0.90	82.0	F
Northern Avenue at D Street and Boston Fish Pier	**0.26**	**11.7**	**B**	**0.37**	**13.2**	**B**	**0.40**	**14.0**	**B**
Northern Ave EB Left/Thru/Right	0.29	18.1	B	0.45	20.9	C	0.50	21.9	C
Northern Ave WB Left/Thru/Right	0.29	2.1	A	0.37	2.2	A	0.38	2.3	A
Boston Fish Pier SB Left/Thru/Right	0.35	42.7	D	0.43	42.8	D	0.43	42.7	D
Northern Avenue at D Street	**0.30**	**23.4**	**C**	**0.37**	**23.6**	**C**	**0.38**	**22.4**	**C**
Northern Ave EB Left/Thru/Right	0.14	3.0	A	0.20	2.2	A	0.23	2.0	A
Northern Ave WB Left/Thru/Right	0.25	17.6	B	0.34	19.4	B	0.35	19.5	B
D St NEB Left	0.82	62.9	E	0.86	69.6	E	0.86	69.6	E
D St NEB Right	0.01	37.4	D	0.03	37.0	D	0.04	37.0	D
Summer Street at Pumphouse Road	**0.43**	**18.6**	**B**	**0.64**	**22.1**	**C**	**0.64**	**22.2**	**C**
Summer St SEB Left/Thru	0.47	16.8	B	0.75	25.7	C	0.75	25.8	C
Summer NWB Thru/Right	0.44	4.6	A	0.60	6.3	A	0.60	6.3	A
Pumphouse Rd SWB Left/Right	0.80	65.8	E	0.82	60.0	E	0.82	60.0	E
Summer Street at Drydock Avenue and Pappas Way	**0.88**	**125.6**	**F**	**1.53**	**207.5**	**F**	**1.62**	**226.2**	**F**
Summer St SEB Left	0.66	24.9	C	1.33	201.0	F	1.36	214.8	F
Summer St SEB Thru/Right	0.36	7.8	A	0.50	13.3	B	0.50	13.3	B
Summer St NWB Left	0.12	24.3	C	0.12	24.5	C	0.12	24.5	C
Summer St NWB Thru/Right	0.71	30.1	C	0.87	38.7	D	0.88	39.3	D
Pappas Way NEB Left/Thru/Right	2.46	733.2	F	3.91	1392.5	F	4.22	1532.0	F
Drydock Ave SWB Left/Thru	1.35	237.3	F	1.62	353.6	F	1.67	374.5	F
Drydock Ave SWB Right	0.11	28.8	C	0.15	29.0	C	0.15	29.0	C

1 volume to capacity ratio 2 delay in seconds 3 level of service

During the morning peak hour, it is expected that the project-generated vehicle trips will have a small impact on most of the nearby signalized intersections. The background traffic growth due to other development projects are shown to have the largest impacts at the intersection of Summer Street at Drydock Avenue and Pappas Way

Table 3-8b Signalized Intersection Level of Service (LOS) Summary – Evening Peak Hour

	2019 Existing Conditions			2024 No-Build Conditions			2024 Build Conditions		
Location	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
Congress Street at D Street	**0.58**	**37.1**	**D**	**1.09**	**226.9**	**F**	**1.11**	**236.1**	**F**
Congress St EB Left/U-Turn	0.14	27.0	C	0.17	29.6	C	0.17	30.2	C
Congress St EB Left/Thru/Right	0.20	27.6	C	0.25	30.3	C	0.25	30.9	C
Congress St EB Right	0.16	27.5	C	0.17	29.7	C	0.17	30.3	C
Congress St WB Left/Thru/Right	0.57	49.2	D	0.68	49.9	D	0.70	49.9	D
D St NB Left	2.52	754.2	F	2.66	816.6	F	2.66	816.6	F
D St NB Thru/Right	0.42	46.3	D	0.46	47.3	D	0.46	47.3	D
D St SB Left/Thru/Right	1.33	212.2	F	1.44	260.7	F	1.52	295.6	F
Northern Avenue at D Street and Boston Fish Pier	**0.40**	**17.8**	**B**	**0.49**	**21.9**	**C**	**0.52**	**22.9**	**C**
Northern Ave EB Left/Thru/Right	0.54	24.1	C	0.60	25.8	C	0.62	26.4	C
Northern Ave WB Left/Thru/Right	0.36	2.7	A	0.47	4.1	A	0.56	7.6	A
Boston Fish Pier SB Left/Thru/Right	0.48	43.5	D	0.83	72.6	E	0.83	72.6	E
Northern Avenue at D Street	**0.30**	**18.8**	**B**	**0.36**	**19.6**	**B**	**0.39**	**19.9**	**B**
Northern Ave EB Left/Thru/Right	0.24	4.0	A	0.30	3.8	A	0.28	3.8	A
Northern Ave WB Left/Thru/Right	0.28	20.3	C	0.38	22.1	C	0.44	23.1	C
D St NEB Left	0.70	49.1	D	0.73	50.8	D	0.72	49.7	D
D St NEB Right	0.05	37.2	D	0.06	36.6	D	0.06	36.5	D
Summer Street at Pumphouse Road	**0.55**	**33.7**	**C**	**0.72**	**42.2**	**D**	**0.72**	**42.2**	**D**
Summer St SEB Left/Thru	0.65	23.5	C	0.90	37.4	D	0.90	37.7	D
Summer NWB Thru/Right	0.38	37.3	D	0.58	42.9	D	0.59	42.5	D
Pumphouse Rd SWB Left/Right	0.74	51.0	D	0.79	52.9	D	0.79	52.5	D
Summer Street at Drydock Avenue and Pappas Way	**0.78**	**38.0**	**D**	**0.95**	**63.9**	**E**	**0.97**	**72.5**	**E**
Summer St SEB Left	0.24	11.9	B	0.58	22.8	C	0.55	22.0	C
Summer St SEB Thru/Right	0.81	23.1	C	0.96	31.7	C	0.96	31.5	C
Summer St NWB Left	0.18	37.7	D	0.19	38.6	D	0.19	38.6	D
Summer St NWB Thru/Right	0.52	37.2	D	0.83	48.3	D	0.83	48.5	D
Pappas Way NEB Left/Thru/Right	0.49	30.9	C	0.91	85.0	F	1.09	143.6	F
Drydock Ave SWB Left/Thru	1.04	92.2	F	1.30	189.4	F	1.36	215.9	F
Drydock Ave SWB Right	0.23	18.9	B	0.29	19.5	B	0.30	19.6	B

1 volume to capacity ratio 2 delay in seconds 3 level of service

During the evening peak hour, the Project will again result in only a small increase in delay at most intersections. The intersections of Congress Street at D Street and Summer Street at Drydock Avenue and Pappas Way are both expected to decrease in performance from LOS D to LOS F and LOS E, respectively, from the 2019 Existing Condition to the 2024 No-Build Condition. With the addition of new Project trips, the intersections will not change in LOS, but they will experience increases in overall delay.

3.5.2 Unsignalized Capacity Analysis

The LOS results of the unsignalized capacity analyses are summarized in Table 3-9a and 3-9b for the 2019 Existing, 2024 No-Build, and 2024 Build Condition for the morning and evening peak hours, respectively.

Table 3-9a Unsignalized Intersection Level of Service (LOS) – Morning Peak Hour

	2019 Existing Conditions			2024 No-Build Conditions			2024 Build Conditions		
Location	v/c[1]	Delay[2]	LOS[3]	v/c	Delay	LOS	v/c	Delay	LOS
Northern Avenue at Congress Street									
Congress St NB Left/Right	0.28	12.0	B	0.38	13.3	B	0.39	13.6	B
Northern Avenue at Massport Haul Road									
Northern Ave EB Left/Thru/Right	0.50	10.7	C	0.68	16.1	C	0.77	20.4	C
Driveway WB Hard Left/Left	0.14	8.6	A	0.17	10.0	A	0.17	10.2	B
Northern Ave NWB Left/Thru/Right	0.30	8.9	A	0.39	11.0	B	0.41	11.4	B
Massport Haul Rd NEB Left/Thru/Right	0.61	17.5	B	0.89	44.2	E	1.04	81.7	F
Northern Avenue at Channel Street/Future Site Driveway									
Channel St EB Left/Right	0.02	13.8	B	0.03	16.3	C	0.05	36.6	E
Northern Avenue at Harbor Street									
Harbor St NEB Left/Right	-	9.3	A	-	9.9	A	-	10.0	B
Massport Haul Road at Pumphouse Road									
Pumphouse Rd NEB Left/Right	0.60	20.0	C	0.86	40.3	E	1.02	67.3	F
Drydock Avenue at Harbor Street and Terminal Street									
Terminal St NB Left/Thru/Right	0.24	26.4	D	1.01	174.8	F	1.14	227.9	F
Terminal St NB Right	0.02	12.4	B	0.02	13.3	B	0.02	13.3	B
Harbor St SWB Left/Thru/Right	0.34	22.6	C	0.62	48.6	E	0.69	57.6	F
Harbor Street at Channel Street									
Channel St EB Left/Right	0.03	9.3	A	0.09	10.9	B	0.09	11.0	B
Harbor Street at Site Driveway									
Site Driveway EB Left/Right	-	-	-	-	-	-	0.03	10.2	B

1 volume to capacity ratio 2 delay in seconds 3 level of service

Since unsignalized intersections have lower delay and LOS thresholds, they are more easily affected by the addition of vehicular volumes. In the 2024 No-Build Condition and 2024 Build Condition, the intersections that are affected the most during the morning peak hour are Northern Avenue at Massport Haul Road, Northern Avenue at Channel Street/Site Driveway, Massport Haul Road at Pumphouse Road, and Drydock Avenue at Harbor Street and Terminal Street. It should be noted that most of the No-Build impacts at Drydock Avenue at Harbor Street and Terminal Street are due to the added background trips associated with the Marine Wharf Hotel. The hotel will have all trips enter and exit via Terminal Street, causing added delay there.

Table 3-9b Unsignalized Intersection Level of Service (LOS) – Evening Peak Hour

	2019 Existing Conditions			2024 No-Build Conditions			2024 Build Conditions		
Location	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
Northern Avenue at Congress Street									
Congress St NB Left/Right	0.40	16.6	C	0.52	21.1	C	0.60	26.9	D
Northern Avenue at Massport Haul Road									
Northern Ave EB Left/Thru/Right	0.68	15.8	A	0.78	21.3	C	0.81	24.3	C
Driveway WB Hard Left/Left	0.10	7.6	B	0.12	9.2	A	0.14	10.5	B
Northern Ave NWB Left/Thru/Right	0.45	10.1	A	0.65	15.7	C	0.80	25.3	D
Massport Haul Rd NEB Left/Thru/Right	0.29	9.0	C	0.37	10.9	B	0.48	13.4	B
Northern Avenue at Channel Street/Future Site Driveway									
Channel St EB Left/Right	0.00	0.0	A	0.00	0.0	A	0.18	26.3	D
Northern Avenue at Harbor Street									
Harbor St NEB Left/Right	-	9.5	A	-	11.2	B	-	12.7	B
Massport Haul Road at Pumphouse Road									
Pumphouse Rd NEB Left/Right	0.28	15.4	C	0.45	21.5	C	0.51	24.9	C
Drydock Avenue at Harbor Street and Terminal Street									
Terminal St NB Left/Right	1.02	180.2	F	1.38	289.3	F	2.33	726.5	F
Terminal St NB Right	0.01	-	B	0.01	10.5	B	0.01	10.5	B
Harbor St SWB Left/Thru/Right	0.67	28.4	D	0.97	72.9	F	1.08	103.5	F
Harbor Street at Channel Street									
Channel St EB Left/Right	0.03	10.2	B	0.31	13.8	B	0.32	14.1	B
Harbor Street at Site Driveway									
Site Driveway EB Left/Right	-	-	-	-	-	-	0.16	11.7	B

1 volume to capacity ratio 2 delay in seconds 3 level of service

During the evening peak hour, the unsignalized intersections are expected to operate at better levels of service in comparison to the morning peak hour. In the 2024 No-Build Condition and 2024 Build Condition, the intersections that are impacted the most during the evening peak hour are Northern Avenue at Massport Haul Road, Northern Avenue at Channel Street/Site Driveway, and Drydock Avenue at Harbor Street and Terminal Street. Again, most of the traffic impacts at the Drydock Avenue intersection at Harbor Street and Terminal Street are due to the added background trips from the Marine Wharf Hotel.

Although the project does not currently propose any signal mitigation efforts, the Boston Transportation Department may ask for additional analysis of the existing Massport Haul Road at Northern Avenue roundabout as a fully signalized intersection. For this concept, it may be desirable to modify the lane configuration at the intersection approaches to provide left-turn lanes for movements with high left-turn volumes. Additionally, pedestrian phasing would have to be incorporated to allow the appropriate crossing times. The installation of a signal at this location would require further coordination and agreement between the City and Massport. The Proponent is prepared to be helpful in assisting both parties in considering alternative improvement options for this intersection.

3.6 Parking

3.6.1 Project Parking Supply/Demand

The Project will supply 325 spaces among the three parking locations on-site—the front surface lot, the rear surface lot, and the below-grade parking garage. This results in a parking ratio of 0.85 spaces per 1,000 square feet. Due to the nearby availability of transit options, as well as amenities within the Project Site that will promote use of public transportation, walking and cycling transportation, the need for parking will be reduced. Alternate means of travel such as taxi and TNCs will also help to limit the parking needs for this Project. As noted previously, the area is currently undergoing a comprehensive transit evaluation by the BPDA to find ways to better meet the needs of commuters in the Seaport and the Eastern Seaport. With improved transit options and reliability, these changes are expected to help reduce the Project’s demand for on-site parking in the future.

The parking supply calculations in an urban, transit-oriented location present challenges because the available parking supply methodologies are generally based on data from situations where there is low transit availability and limited alternative mode choice. This description does not accurately reflect the site’s location in the Eastern Seaport.

Based on the Institute of Transportation Engineers Parking Generation Manual (5th Edition), the approximate parking demand for the Project was calculated based on average parking rates from other similar projects and the auto mode share (the portion of people who are expected to drive to and from the site). The calculations are shown below in Table 3-10. According to this methodology, the parking demand for the project is 446 spaces. By comparison, the Project is proposing just 325 parking spaces. This limitation will help shift people's travel to public transportation, cycling and walking.

Table 3-10 ITE Parking Generation Calculated Parking Demand

Land Use	Quantity	ITE Average Parking Rate	Auto Mode Share	Calculated Parking Demand
Office/R&D	381 ksf	2.39	49%	446 spaces

3.6.2 Electric Vehicle Charging Stations

The Proponent initially intended to provide five (5) percent on-site vehicle ("EV") EV charging spaces in the garage, with an additional ten (10) percent of the parking spaces constructed as EV-ready to expand over time as the demand grows. It is understood that the City is increasing its EV parking requirements from five (5) percent initially to 25 percent of the spaces on day one, with the rest convertible to EV spaces as the demand grows. This is a very recent change in City policy and the proponent looks forward to further discussions with the City regarding compliance.

3.7 Transit Analysis

3.7.1 Current MBTA Bus Services (Existing Conditions)

Passenger Comfort Metric

The MBTA's goal is to have passengers travel in relatively comfortable conditions. The MBTA's *Service Delivery Policy* (SDP)[5] defines a passenger comfort standard as a percent of passenger travel time experienced in comfortable conditions. The SDP standard sets a minimum of 92 percent of travel time per bus passenger and target of 96 percent of travel time per bus passenger experienced in comfortable conditions.[6] In other words, recognizing that some passengers may have to stand for a portion of their bus trip, the MBTA has established that at least 92 percent of passengers' travel times should be in comfortable conditions, and ideally, at least 96 percent should be in comfortable conditions. Comfortable conditions are 140 percent or less of seated capacity during high volume (peak) periods and 125 percent or less during other periods (e.g. midday or nighttime).

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5 *Service Delivery Policy*; Massachusetts Bay Transportation Authority (MBTA); January 23, 2017.

6 The passenger comfort metric for each route is calculated and provided by the MBTA through MassDOT's Office of Performance Management and Innovation (OPMI). This metric is used to represent existing conditions but is not a metric calculated for possible future conditions. (For an assessment of passenger comfort on future conditions, a different method is used that estimates the number of bus trips that are expected to experience passenger crowding conditions above an established threshold.)

The passenger comfort values for the area's bus services are as follows:

MBTA Bus Route 4

Route 4 passengers were 100 percent comfortable based on the SDP metric (fall 2018) on weekdays.[7]

Closest stop(s) to the Project site: Northern Ave at Harbor St (approx. 400 feet/a one-minute walk)

MBTA Bus Route 7

On the Route 7, 82 percent of passenger travel is in comfortable conditions on weekdays based on the SDP metric (fall 2018), which is below both the minimum and target standards.[8]

Closest stop(s): Summer Street at Drydock Ave (approx. 0.4 miles/an eight-minute walk)

MBTA Silver Line (SL1)

On Route SL1, trips throughout the day attract at least 30 passengers per trip. Route SL1 includes a high number of passengers with luggage heading to the airport, exacerbating crowding conditions even if the maximum number of passengers per bus is not reached. Because Route SL1 serves stations where fares are collected at faregates, comfort data is not available.[9]

Closest stop(s): Silver Line Way (approx. 600 feet/two-minute walk)

MBTA Silver Line (SL2)

Because Route SL2 serves stations where fares are collected at faregates (instead of when boarding the bus), the MBTA does not have a precise calculation for route SL2's SDP crowding metric with current data. Based on direct observations and related studies, the MBTA notes that SL2 as an entire route continues to fail the SDP crowding metric, at levels below 94 percent.[10]

Closest stop(s): Silver Line Way (approx. 600 feet/two-minute walk)

Northern Ave at Harbor St (approx. 400 feet/one-minute walk)

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7 MBTA, Route 4 Better Bus Project Route Profile, December 2018, and MassDOT OPMI.

8 MBTA, Route 7 Better Bus Project Route Profile, December 2018, and MassDOT OPMI.

9 MBTA, Route SL1 Better Bus Project Route Profile, December 2018.

10 MBTA, Route SL2 Better Bus Project Route Profile, December 2018, and MassDOT OPMI (November 7, 2019).

MBTA Silver Line (SL3)

Route SL3 between Chelsea Station and South Station began operation in April 2018, and thus, the MassDOT/MBTA do not have a passenger crowding assessment for the service.[11]

Closest stop(s): Silver Line Way (approx. 600 feet/two-minute walk)

Reliability

MBTA Bus Route 4

Route 4 has average reliability compared to the MBTA system, with an overall weekday reliability of 63 percent. Only 0.3 percent of trips on Route 4 (0.3 percent) are dropped, which is acceptable under MBTA Service Standards.[12] Route 4 trips take one-five minutes longer than scheduled for most morning trips. The MBTA posits that ridership is likely also affected by significant congestion in Downtown Boston and the Seaport District.[13]

MBTA Silver Line (SL1)

Passengers using high frequency services like Route SL1 expect buses to arrive on a regular basis, and typically do not rely on published schedules. For these services, the MBTA measures reliability based on actual service frequency and the travel time for a given trip. Trips must depart their origin and serve points along the route within three minutes of the scheduled frequency.

On weekdays, SL1 trips reach only an 82 percent overall reliability because the dedicated right of way through the Silver Line Tunnel does not extend through the Ted Williams Tunnel. The limited number of dropped trips (only 0.1 percent) helps keep 81 percent of trips leaving on time. On weekends, reliability improves to 83 percent of trips on Saturdays and 86 percent of trips on Sundays matching their scheduled timetables.

MBTA Silver Line (SL2)

The MBTA measures on-time performance on high frequency routes such as Route SL2 based on the spacing of buses and arrival times at destination. Buses are on-time if the interval since the last bus is within three minutes of the scheduled interval and the overall travel time is no longer than 120 percent of the scheduled travel time.

Route SL2's overall on-time performance is much better than most MBTA routes, at 82 percent on weekdays, 83 percent on Saturdays, and 86 percent on Sundays, as shown in Table 3-11. These figures are well above the MBTA's target of 80 percent.[14]

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11 MBTA, Route SL3 Better Bus Project Route Profile, December 2018.

12 MBTA, Route 4 Better Bus Project Route Profile, December 2018, p. 8.

13 MBTA, Route 4 Better Bus Project Route Profile, December 2018, p. 10.

14 MBTA, Route SL2 Better Bus Project Route Profile, December 2018.

Table 3-11 Transit Reliability

Service Day	Origin/Mid-Route On-Time Performance	Destination On-Time Performance	Overall Reliability	Dropped Trips
Monday – Friday	84%	89%	85%	0.9%
Saturday	85%	88%	86%	-
Sunday	83%	83%	83%	-

3.7.2 *Other Transit Services*

Seaport–North Station Ferry

Currently in its one-year pilot, the Seaport–North Station Ferry connects Lovejoy Wharf (adjacent to North Station) and Fan Pier (at Valkyrie ferry terminal, next to the ICA). It runs with 20-minute frequency during peak morning and afternoon hours. The Ferry service is managed by the Massachusetts Convention Center Authority (MCCA).[15]

Closest stop: Valkyrie Ferry Terminal/Fan Pier (approx. 0.8 miles /16-minute walk)

Private Shuttles

There are multiple private shuttles in the area, including the IDB shuttle (Innovation and Design Building/Boston Design Center tenants). In recent years, the Seaport TMA has been working to consolidate the number of shuttles and number of routes that serve the area to reduce repetitive routes and shuttle congestion in the South Boston Waterfront area. The previously mentioned South Boston Seaport Strategic Transit Plan has identified the potential for a local circulator bus in the Seaport area and this appears to be a promising outcome of the study (likely one of many)

3.7.3 *Future Conditions Analysis*

The Project is expected to add transit riders primarily on the Silver Line (all three of the Transitway routes), which provides access to the Red Line and Commuter Rail service at South Station. Few riders are expected on the Route 4 bus service (connection to North Station) and the Route 7 service (connection to South Boston and an alternative connection to South Station).

Bus Passenger Comfort: Crowding Analysis

To compare existing conditions against future No-Build and Build conditions, a method outlined by the MBTA and the MassDOT Office of Performance Management and Innovation (OPMI) was applied. This method identifies the peak passenger load point (the maximum number of people on the bus at any point along the route) and compares the maximum load for each bus trip

15 www.seaportferry.com/about

against the MBTA's Service Delivery Policy (SDP)[16] passenger crowding threshold. This determines which trips operate (or are expected to operate) over capacity (exceeding the passenger crowding threshold).

The local buses serving these routes each have a seated capacity of 38 passengers and, utilizing the vehicle load standard dictated by MBTA Service Delivery Policy, have an average policy capacity (hereafter referred to as the recommended passenger crowding threshold) equal to 53.2 passengers during the peak service periods and equal to 47.5 passengers during off-peak periods. [17] (This analysis method does not apply to rapid transit service that operates in a station environment.)

The analysis method is often referred to as the peak load point analysis, because it focuses on the bus trip segment that experiences the highest passenger load, on average, for a typical weekday condition, based on the most recent MBTA data. For this analysis, the MBTA's fall 2018 composite day bus ridership is used.

By applying the change in future passenger levels (both background-generated riders and Project-generated riders) to each bus trip's peak passenger load, the impact of future ridership demand on existing bus capacity can be gauged. The results of this analysis are shown in Table 3-12 for the 2018 Existing Condition, 2024 No-Build Condition, and 2024 Build Condition.

Table 3-12 Route-Level Summary of Bus Passenger Crowding

Route	2018 Existing Condition			2024 No-Build Condition		2024 Build Condition	
	Number of Trips near/at Site	Number of Trips Exceeding Threshold	Total Passengers Over Threshold	Number of Trips Exceeding Threshold	Total Passengers Over Threshold	Number of Trips Exceeding Threshold	Total Passengers Over Threshold
Route 4 IB	18	0	0	0	0	0	0
Route 4OB	18	0	0	0	0	0	0
		Average per Trip:	0	Average per Trip:	0	Average per Trip:	3
Route 7 IB	104	-	-	1	1	1	1
Route 7 OB	84	-	-	0	0	0	0
		Average per Trip:	-	Average per Trip:	1	Average per Trip:	1

Base Year: 2018; Future Year: 2024 No-build growth equals 0.68 percent per year on local routes (based on CTPS LRTP bus ridership growth).

Silver Line: Crowding Metric

As noted earlier, the above method does not apply to evaluating crowding on the Silver Line. The SL routes operating in the Seaport already experience passenger crowding at levels that do not meet the MBTA's Service Delivery Policy for passenger comfort. This is a well-known concern, which has the attention of the MBTA and many of its partner agencies, which are actively investigating solutions to solving the capacity constraints on the Silver Line.

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16 *Service Delivery Policy*; Massachusetts Bay Transportation Authority (MBTA); January 23, 2017.

17 MBTA, Average Fleet Seating – CY2017.

3.7.4 Seaport Transit Planning

The BPDA is leading a multi-agency effort to develop a South Boston Seaport Strategic Transit Plan, taking a comprehensive look at the travel needs of the developing district.[18] The study team is evaluating the transit capacity needs (demand) through a travel demand model and using that tool to test various transit and mobility strategies. Among the potential strategies that are currently being explored are:

- New bus service: South Boston Seaport Circulator
- Expanded bus service: mid-day and off-peak service
- New bus service connections
- Dedicated transit corridors
- Micromobility

A final strategic transit plan is expected by spring 2020. The South Boston Seaport Strategic Transit Plan will identify specific recommendations to improve the operations and capacity of the transit network serving Boston's Seaport District. The Plan will recommend specific improvements in the short-term and those needed in the next 15 years and beyond. The Proponent looks forward to the completion of this study and the identification of specific public transportation improvement actions which it can support, such as the Seaport circulator bus concept.

3.8 Mitigation Measures

3.8.1 Physical and Operational Transportation Improvements

Planned public realm improvements associated with the Project include new ADA-compliant sidewalks, street furniture, and signage. The project is also proposing an important new plaza area adjacent to the intersection of Northern Avenue and Haul Road. This plaza provides a generous and comfortable pedestrian entry into the site and to the building's lobby and it also marks an important entry/gateway into the Raymond L. Flynn Marine Park (RLFMP).

The Proponent looks forward to working with the BPDA/EDIC on the coming implementation of roadway improvements along the site's Northern Avenue frontage. As noted earlier, at the time of this PNF filing, the agency was in the process of selecting a designer for these improvements along Northern Avenue between the Haul Road and Tide Street. Expected improvements include a reconfiguration of the Northern Avenue right of way to better accommodate all users – trucks, automobiles, buses, bikes and pedestrians. The Proponent very much looks forward to working

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18 www.bostonplans.org/planning/planning-initiatives/south-boston-seaport-strategic-transit-plan

with the City and the design team on the new roadway cross section and planned amenities. As an abutter to this important corridor, the Proponent is committed to actively supporting the design process.

Similarly, the Proponent also looks forward to working with the MBTA and the City on the design and location of any modifications/improvements to the bus shelter at the site. That bus shelter serves both Route 4 and SL2 – providing an important connection between the site and South Station as well as the Financial District.

As part of the design for the 2 Harbor Street site, a designated off-street pick-up/drop-off area is proposed to help reduce traffic impacts along Northern Avenue. These activities will be able to happen away from Northern Avenue and be entirely contained within the site.

On both the Harbor Street side along the eastern edge of the site, as well as along Channel Street, the southern edge of the site, the Proponent intends to continue to work with the BPDA/EDIC to incorporate appropriate design improvements for these important but lower volume corridors. Anticipated improvements include creating better definition along the site's edges, curbing, sidewalks in appropriate locations and appropriate street furniture. The extent of these improvements will continue to evolve through the BCDC design review process and through meetings with City agencies and departments.

3.8.2 Support for the Ongoing South Boston Seaport Strategic Transit Plan

The Proponent acknowledges the timely and important planning work currently underway by the Boston Transportation Department on the South Boston Seaport Strategic Transit Plan. This planning study is considering a wide array of actions and improvement alternatives that could be implemented to help improve mobility and connectivity throughout the entire Seaport District and the RLFMP.

Improving connectivity to both South Station (which serves communities to the west and south) and North Station are extremely important. The site's connections to South Station are easier due to the proximity of the Silver Line. Trips to and from North Station and the many transit connections available there are more difficult due to the lack of a direct connection that serves the site. With on-going and future improvements to better connect the Seaport with North Station, a larger number of people within a one-hour public transportation commuting time band would be able to commute to/from the site. The low parking ratio, the proximity of the site to available public transportation (i.e. the Silver Line) and the City's desire for implementing meaningful public transportation improvements will all help to shift site users travel patterns away from private cars and towards public transportation. The Proponent views this project as a true transit-oriented development.

Since the BPDA's study is ongoing and a formal set of recommendations has not yet been developed, the Proponent is prepared to work with the City as it completes the study and moves toward implementation of its findings. The Proponent expects to be a beneficiary of the improvements that will come from the planning study and looks forward to taking the appropriate next steps with the City.

3.8.3 Ferry Improvements

There continues to be keen interest in making further improvements to the Boston Harbor ferry system by many parties, including the Proponent of 2 Harbor Street. The recent ferry service implementation between from the North Station/Lovejoy Wharf area to Fan Pier is helping move people from the north to the South Boston Waterfront. Extending that service to the Eastern Seaport and the RLFMP would open the potential for greater ridership. The Proponent is very interested in seeing ferry service provided close to the site, perhaps in proximity to the Rockland Trust Bank Pavilion. Increasing service and extending it closer to the 2 Harbor site would be an attractive option for potential tenants and their staff. The Proponent is in full support of increasing the frequency and availability of public ferry service closer to the RLFMP.

3.8.4 Roadway Improvements near the Project Site

There have been multiple planning efforts regarding the plan for connecting Dry Dock Avenue to the Haul Road close to the Summer Street entry to the RLFMP. This idea was described in the RLFMP Master Plan, yet it has not advanced.

Additionally, interest has been expressed in upgrading the Northern Avenue intersection with the Massport Haul Road. The City has also expressed at least an interest in considering modifying the configuration of the roundabout at the intersection of Northern Avenue at the Haul Road. The ideas to date have revolved around eliminating the current layout and converting the location to a fully signal-controlled intersection. There is no concept plan that has been created for this intersection at this time.

The Proponent also understands that there has been dialogue/conversation involving Massport and the City regarding the possibility of formalizing a pedestrian crossing of the Massport Haul Road at Silver Line Way, essentially at the existing curb cut serving the Project site. The Project has been designed so that it is not reliant on the implementation of a crossing at this location. If the City and Massport are able to come to an agreement on whether there should or should not be a marked/improved pedestrian crossing at this location, the Proponent is prepared to be a part of that dialogue.

Finally, the BPDA/EDIC is advancing the design of improvements along Northern Avenue. Since the process is still at an early stage, the Proponent for 2 Harbor Street is prepared to work with the City and support these coming improvements.

Given all of the opportunities for potential traffic mitigation and to demonstrate support, the Proponent is prepared to make a $400,000 contribution to the city upon completion of the Article 80 process to be used for the planning, design or construction of one or more of the improvements outlined above in the Eastern Seaport.

The Proponent also recognizes that the City of Boston has recently embarked on a comprehensive transit study in the area (the South Boston Seaport Strategic Transit Plan) and looks forward to coordinating its mitigation with the study findings.

The Proponent looks forward to discussing how these funds may best be used to advance either traffic or public transportation improvements in the area near the Project.

3.8.5 Potential Traffic Signal Improvements near the Project Site

The potential for making traffic signalization timing or phasing modifications can be explored as the project advances. The goal would be to identify specific improvements that can be implemented to address both No-Build and Build conditions, resulting in improved operations at some of the study area intersections, as appropriate. It should be recognized that MassDOT and the BTD have an important ongoing initiative to implement Adaptive Signal Control Technology in the South Boston Waterfront area that is aimed at improving operations at signalized intersections through the project area.

3.8.6 Transportation Demand Management (TDM)

To supplement all the actions outlined above, an extensive TDM program is outlined in this section. Consistent with the City's goals to reduce auto-dependency, the Project and its Proponent will incorporate proactive TDM measures to encourage people to use public transportation, bikes or walking to travel to/from the site.

The following section discusses an array of TDM measures that are expected to be implemented. A description of the TDM elements is presented along with information on how those elements aid Project tenants. Measures being considered as part of the Project include:

- The Proponent will designate an on-site Transportation Coordinator. In addition to other building-related duties, the Transportation Coordinator will be responsible for:
  - Overseeing parking operations;
  - Serving as the point person for managing, communicating, and promoting the use of alternative transportation measures with building employees and staff;
  - Developing an orientation packet to inform new employees at the site about the available transportation options; and

- o Designating an individual whose responsibilities include serving as loading dock manager responsible for overseeing loading/delivery operations.

- ♦ The project will join the Seaport Transportation Management Association (TMA). The Seaport TMA's website describes the organization as a nonprofit transportation management association of employers, property managers, and land developers in the South Boston Waterfront working to improve area transportation and accessibility and incentivize sustainable commute options.

- ♦ Building management will provide transit information (through a live transit screen containing schedules, maps, and fare information in the building lobby.

- ♦ With the assistance of MassRIDES, a website application will be employed to encourage use of alternative commuting modes to provide ride matching services.

- ♦ Approximately four short-term public bicycle parking spaces will be provided. In addition, the Proponent intends to provide 114 secure enclosed bicycle parking spaces for building employees/staff.

- ♦ The Proponent will encourage its tenants to establish BlueBikes corporate memberships.

- ♦ The Proponent will offer a 50 percent transit subsidy for its on-site management and maintenance staff through the MBTA's Perq program. Further, the Proponent will encourage its tenants to offer their staffs the same benefit.

- ♦ The Proponent will encourage the building's tenants to offer a carshare corporate membership. The Proponent is also prepared to offer Zipcar parking at the site.

- ♦ Amenities for commuters who walk and bike to work will include on-site lockers and showers

- ♦ The Proponent will work with the City to install a new BlueBikes station near the site.

- ♦ The Proponent initially intended to provide five (5) percent on-site vehicle ("EV") EV charging spaces in the garage, with an additional ten (10) percent of the parking spaces constructed as EV-ready to expand over time as the demand grows. It is understood that the City is increasing its EV parking requirements from five percent initially to 25 percent of the spaces on day one, with the rest convertible to EV spaces as the demand grows. This is a very recent change in City policy and the proponent looks forward to further discussions with the City regarding compliance.

- ♦ The Proponent will charge market rates for on-site parking.

- ♦ Additional TDM measures will be reviewed with BTD and memorialized in the Transportation Access Plan Agreement (TAPA).

3.8.7 Monitoring Program

The Proponent is committed to conducting transportation monitoring and producing annual reports following the completion of the Project. The purpose of the City-required Transportation Monitoring and Annual Report is to provide the Boston Transportation Department a regular update on transportation-related issues, such as the Project's performance on TDM measures. Elements of the Transportation Monitoring and Annual Report would typically include counts or surveys to determine peak period travel patterns. This would typically include people who walk, use transit, and are picked up or dropped off; those who drive and park on-site; and those who drive and park off-site. The Proponent would also be expected to report on parking patterns and other issues that are relevant to the Project's transportation plan.

3.8.8 Transportation Access Plan Agreement (TAPA)

The Proponent will enter into a Transportation Access Plan Agreement (TAPA) with the BTD. The TAPA will codify and document each of the Project's transportation mitigation commitments.

The Project's mitigation commitments are the result of the detailed transportation analyses and identification of Project impacts, as documented in this chapter, and specific agreements made between the Proponent and the City of Boston. Upon the City's review and acceptance of the findings and conclusions of this transportation analysis and assessment of Project impacts, and its acceptance of the Project's commitments and TDM actions, the TAPA will be executed.

3.8.9 Construction Management Plan (CMP)

The Proponent will develop a detailed evaluation of potential short-term construction-related transportation impacts including construction vehicle traffic, parking supply and demand, and pedestrian access. Detailed Construction Management Plans ("CMPs") will be developed and submitted to the BTD and the BPDA/EDIC for their approval. These plans will detail construction vehicle routing, staging, and roadway occupancy that will require both BTD and BPDA/EDIC approval.

Construction vehicles will be necessary to move construction materials to and from the Project Site. Every effort will be made to reduce noise, control fugitive dust, and minimize other disturbances associated with construction traffic. Truck staging and laydown areas for the Project will be carefully planned. The need for specific street occupancy (lane closures) along Northern Avenue or any of the other roadways adjacent to the Project Site is not known at this time. Given the size of the site, the Proponent believes it can handle most staging on-site and not require lane closures or street occupancies other than when working in the streets.

Contractors will be encouraged to devise access plans for their personnel that de-emphasize auto use (such as seeking off-site parking, provide transit subsidies, on-site lockers for tools and equipment, etc.). Construction workers will also be encouraged to use public transportation to access the Project Site, as no new parking will be provided for them.

During the construction period, pedestrian activity adjacent to the site may be affected by sidewalk closures. A variety of measures will be considered and implemented to protect the safety of pedestrians. Temporary walkways, appropriate lighting, and new directional and informational signage to direct pedestrians around the construction sites will be provided. After construction is complete, finished pedestrian sidewalks will be permanently reconstructed to meet ADA standards. Damage as a result of construction activity will be repaired per City standards. The Proponent intends to work closely with the BPDA/EDIC to synchronize its site improvements with the City's plans for Northern Avenue reconstruction.

Chapter 4.0

Environmental Protection Component

4.0 ENVIRONMENTAL PROTECTION COMPONENT

This chapter presents an analysis of the proposed Project's environmental impacts including those related to wind, shadow, daylight, air quality, flooding, geotechnical conditions, solid and hazardous wastes, noise, and construction period impacts.

4.1 Pedestrian Level Winds

A pedestrian level wind (PLW) study was performed by Rowan Williams Davies & Irwin, Inc., (RWDI) of Guelph, Ontario to assess the effect of the proposed Project on local wind conditions in pedestrian areas on and around the Project site and to provide recommendations for minimizing adverse effects. This section summarizes the results of the wind study, and a copy of the wind study results table is included as Appendix D.

4.1.1 Background

Tall buildings, especially those that protrude above their surroundings, can cause local wind accelerations at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings tend to intercept these stronger winds and deflect them down to the pedestrian level (downwashing). The funneling of wind through gaps between buildings and the acceleration of wind around corners of buildings (corner acceleration) may also cause increases in wind speeds. 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 or even improvements 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 Proponent retained RWDI, one of the foremost international experts in the field of wind modeling, to conduct the wind tunnel modeling for the proposed Project.

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

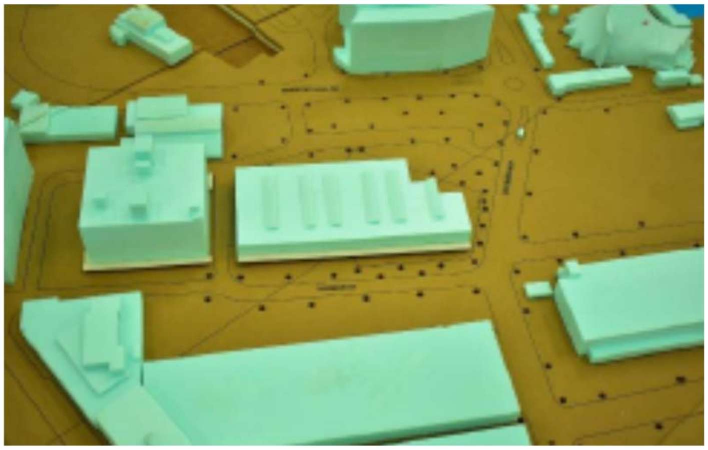
Wind assessments for the Build Condition (i.e., the proposed Project with existing surroundings) and the No-Build Condition (the existing site with warehouse to be demolished and existing surroundings) environments were carried out using a 1:300 scale model of the Project site in a boundary-layer wind tunnel. The assessment focused on critical pedestrian areas, including building entrances and public sidewalks on surrounding streets. A total of 95 wind measurement locations were examined in the wind tunnel for mean wind speed and effective gust wind speed under the No-Build and Build Conditions. The wind tunnel Build and No-Build conditions are shown on Figures 4-1 and 4-2, respectively. The wind tunnel model included all relevant surrounding buildings and topography within an approximate 1200-foot radius of the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modeled area were also simulated in RWDI's wind tunnel. The wind tunnel model was instrumented with 95 wind speed sensors to measure mean and gust speeds at a full-scale height of approximately five feet above local grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 directions in 10-degree increments. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site and reviewed by the BPDA.

The results were then combined with long-term meteorological data, recorded during the years 1995 to 2018 at Logan International Airport to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

Figures 4-3 and 4-4 depict “wind roses” that summarize the annual and seasonal wind climate in the Boston area, based on the data from Logan Airport. On an annual basis, the most common wind directions are those between north-northwest and south-southwest. West-northwest, northwest, west and northeast are the dominant wind directions for strong winds.

4.1.3 Pedestrian Wind Comfort Criteria

The Boston Planning and Development Agency (BPDA) has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BPDA 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 BPDA to determine the acceptability of specific locations is based on the work of Melbourne. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking as shown in Table 4-1. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded one percent of the time (i.e., the 99-percentile wind speeds).



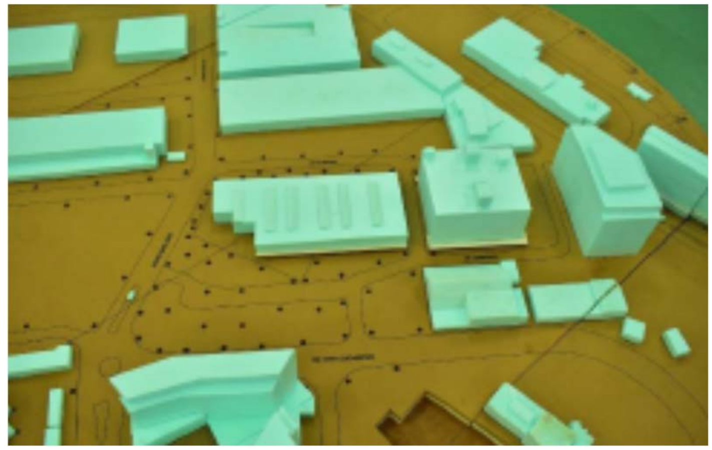


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Figure 4-1
Wind Tunnel Study Model – No Build Configuration

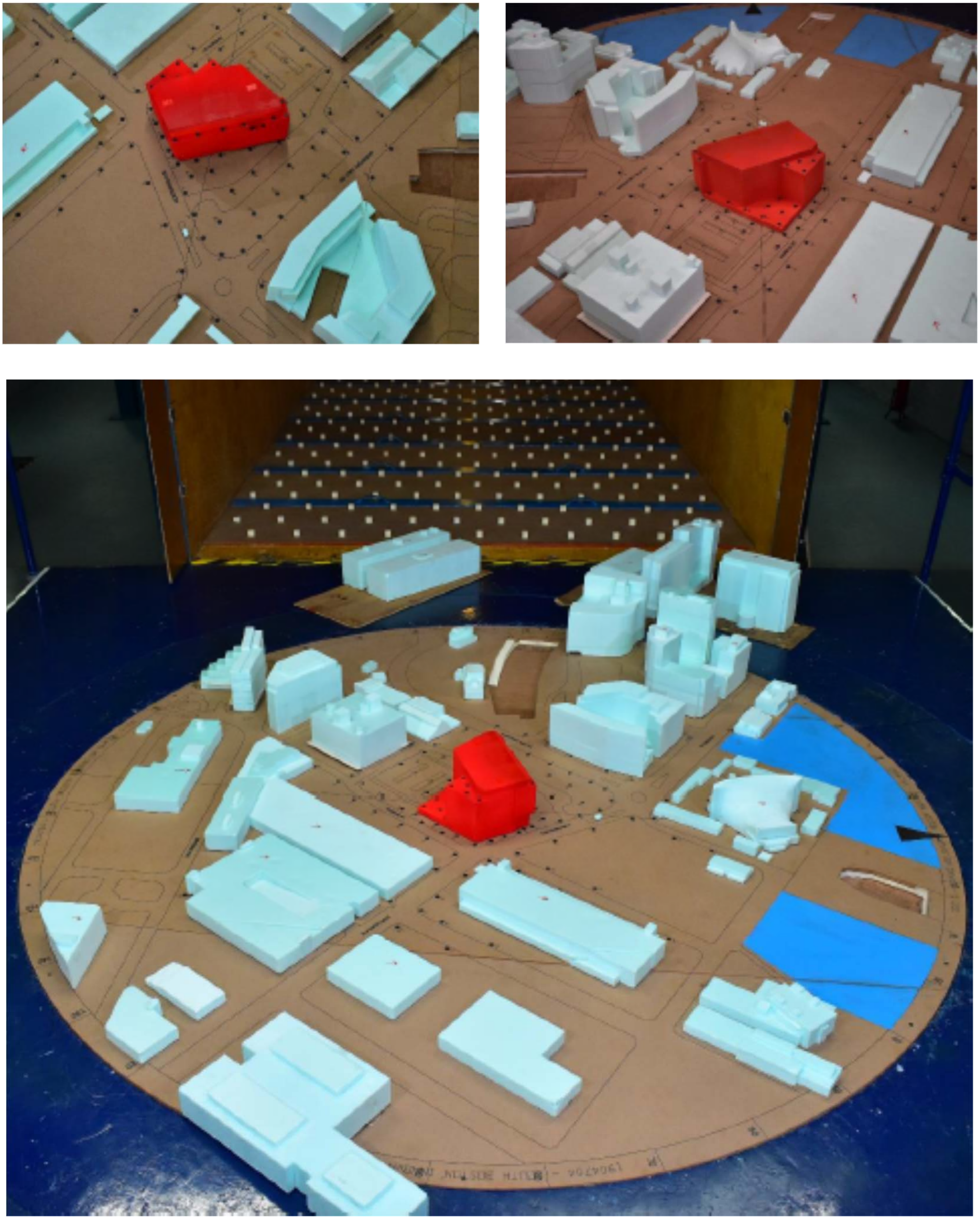

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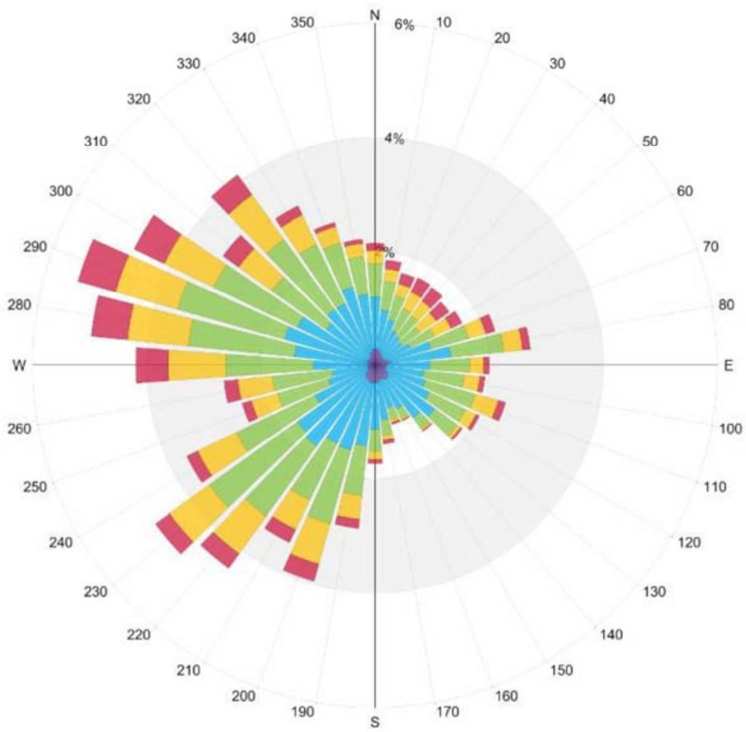
Figure 4-2

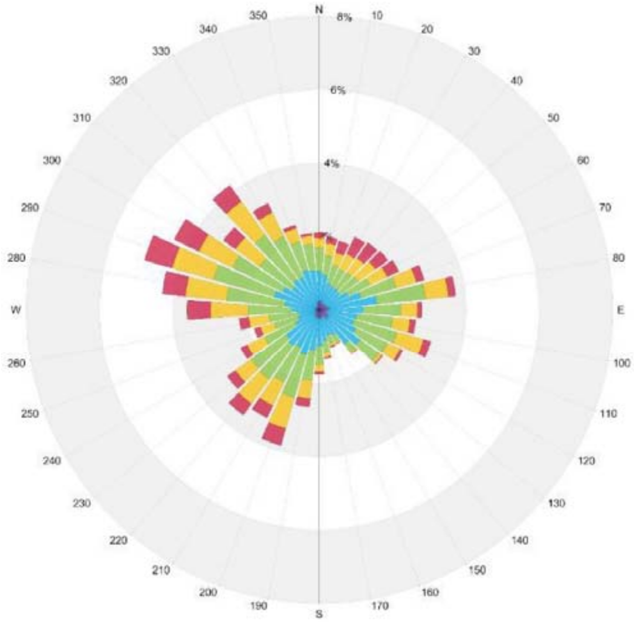
Wind Tunnel Study Model – Build Configuration



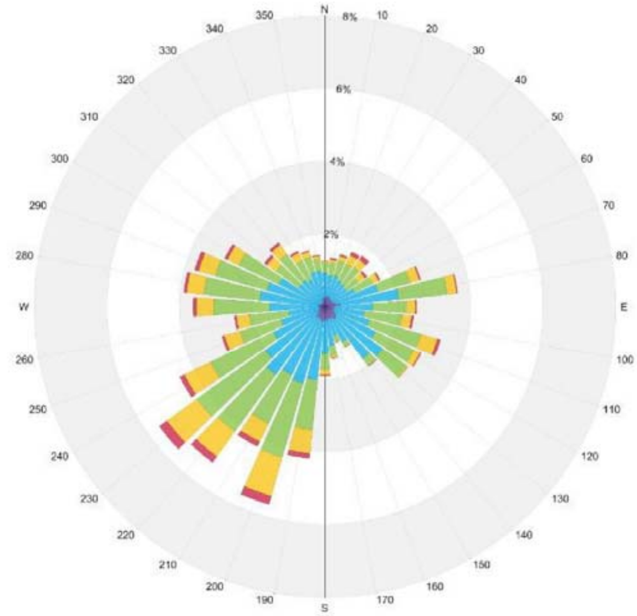
Wind Speed (mph)	Probability (%) Annual
Calm	3.0
1-5	7.9
6-10	32.5
11-15	32.4
16-20	16.3
>20	7.9

Figure 4-3

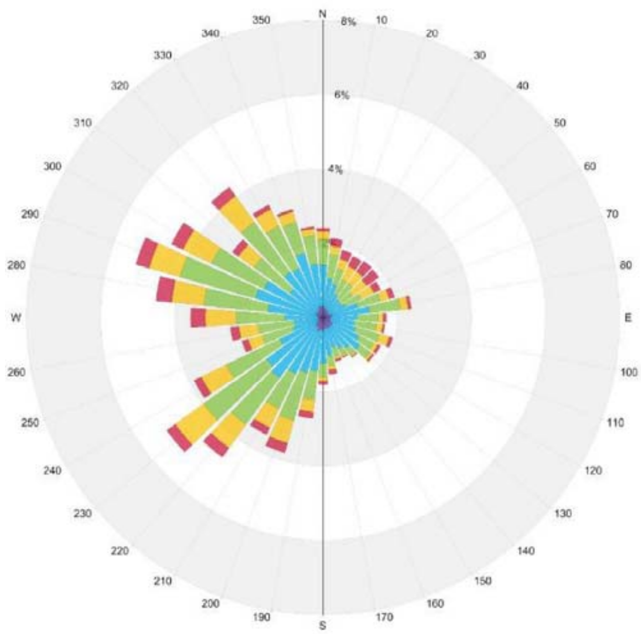
Annual Directional Distribution of Winds (1995-2018)



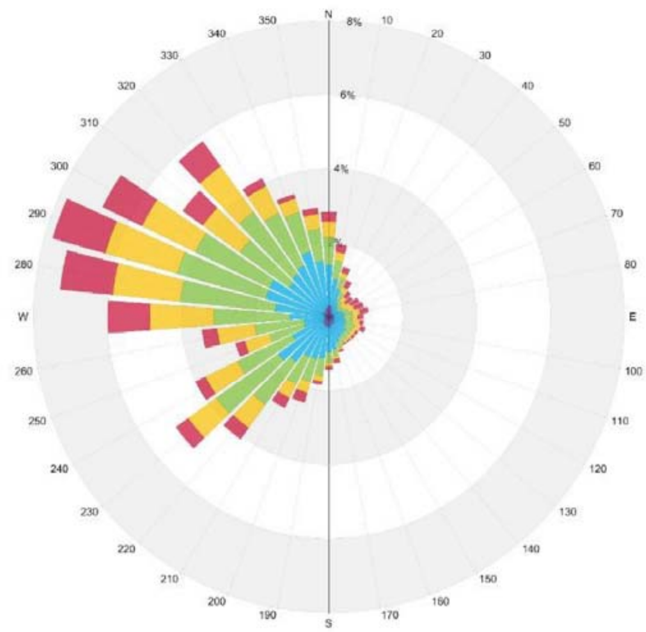
Spring (March – May)



Summer (June – August)



Fall (September – November)



Winter (December – February)

Wind Speed (mph)	Probability (%) Spring	Summer	Fall	Winter
Calm	2.8	3.0	3.4	2.6
1-5	6.8	9.4	8.7	6.5
6-10	28.9	38.8	34.6	27.9
11-15	32.3	34.4	32.0	30.9
16-20	19.2	11.8	14.5	19.7
>20	10.1	2.6	6.8	12.4

Table 4-1 Boston Planning and Development Agency (BPDA) 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

The wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BPDA effective gust velocity criterion of 31 mph. However, without any mitigation measures, this wind climate is likely to be frequently uncomfortable for more passive activities such as sitting.

4.1.4 Summary of Pedestrian Level Wind Test Results

A total of 90 locations (on and off site) were tested under the No-Build and Build Conditions for mean wind conditions.[1] Of these 90 locations, mean annual wind conditions are expected to remain unchanged at 46, to improve at 14, to worsen at 30. All of the 14 that will improve will do so by just one level in the BPDA criteria listed above in Table 4-1. Ten will change from the comfortable for walking to comfortable for standing category, and four will change from comfortable for standing to comfortable for sitting. Of the 30 locations that will worsen, 24 will shift by only one category, e.g., from the comfortable for sitting to comfortable for standing category. Five locations will change by two levels, e.g., comfortable for sitting to comfortable for walking, and one location will fall by three categories from comfortable for sitting to uncomfortable for walking. Three locations are expected to become uncomfortable. None is expected to be rated as dangerous. The results for the annualized mean wind speed analyses for the No-Build and the Build Conditions are presented in Figures 4-5 and 4-6 respectively.

With the addition of the proposed building, wind speeds are still anticipated to meet the effective gust criterion at all locations on an annual basis. On a seasonal basis, wind speeds that do not meet the effective gust criterion are expected at four locations during the spring; one location in the fall; and one location in the winter. The results for the annualized effective gust wind speed analyses for both the No-Build and the Build Conditions are presented in Figures 4-7 and 4-8, respectively. Figure 4-9 presents possible types of mitigation commonly employed to reduce wind impacts should it be determined necessary as the design progresses.

Tabulated results for mean wind speeds and effective gust wind speeds are also presented in Appendix D.

[1] Note that five locations were tested only under the Build conditions and not under the No-Build condition because they were located within the footprint of the existing warehouse on site.

LEGEND:

MEAN SPEED CATEGORIES:

- Sitting
- Standing
- Walking
- Uncomfortabl
- Dangerous

SENSOR LOCATION:

Q Grade Level

0 150 300ft

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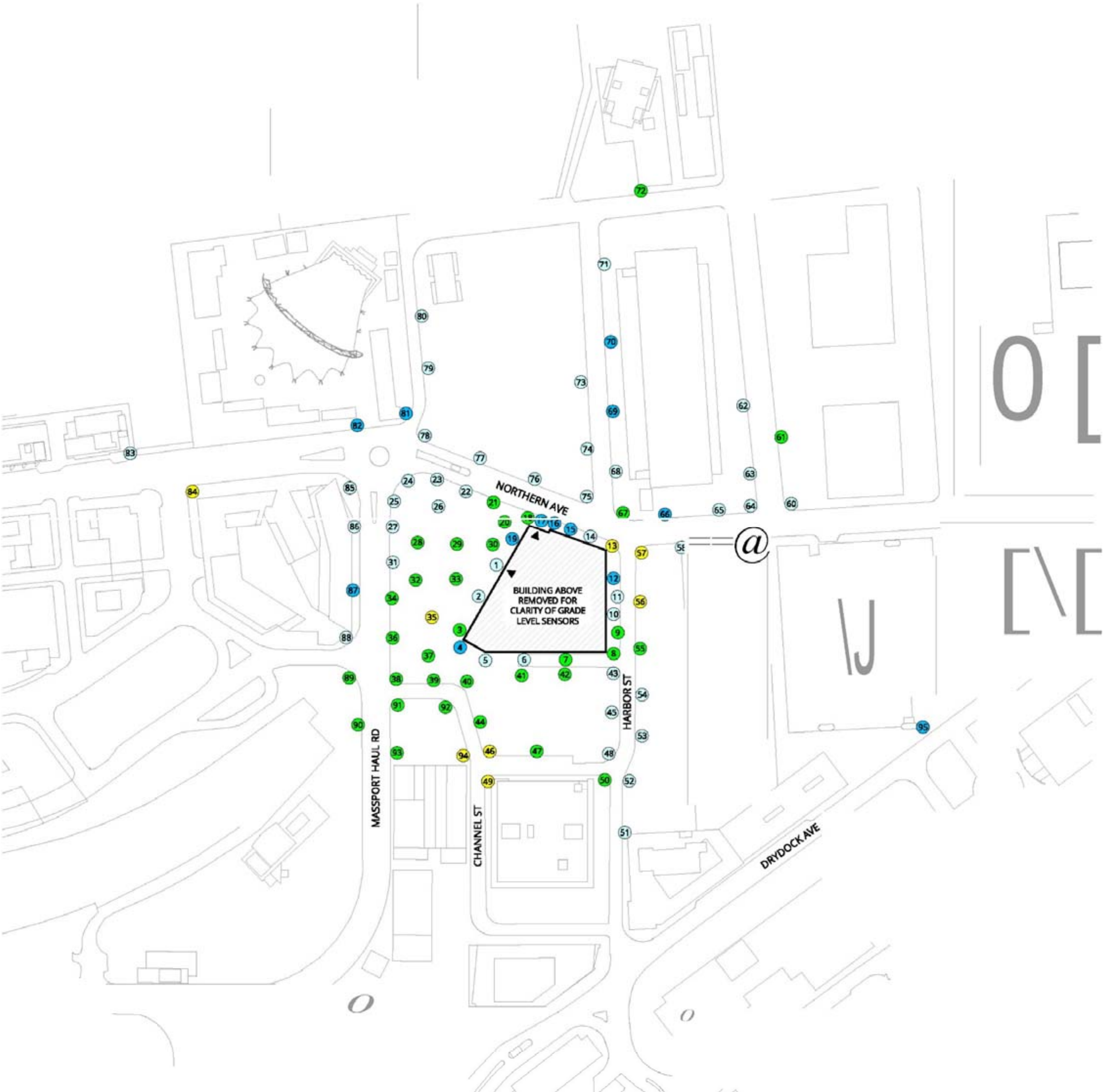
Figure 4-5

Pedestrian Wind Conditions – Mean Speed

No Build Configuration



LEGEND:

MEAN SPEED CATEGORIES:

Sitting
Standing
Walking
Uncomfortabl
Dangerous

SENSOR LOCATION:

Grade Level

Main Entrance Location

0 150 300ft

2 Harbor Street Boston, Massachusetts

Figure 4-6

Pedestrian Wind Conditions – Mean Speed

Build Configuration

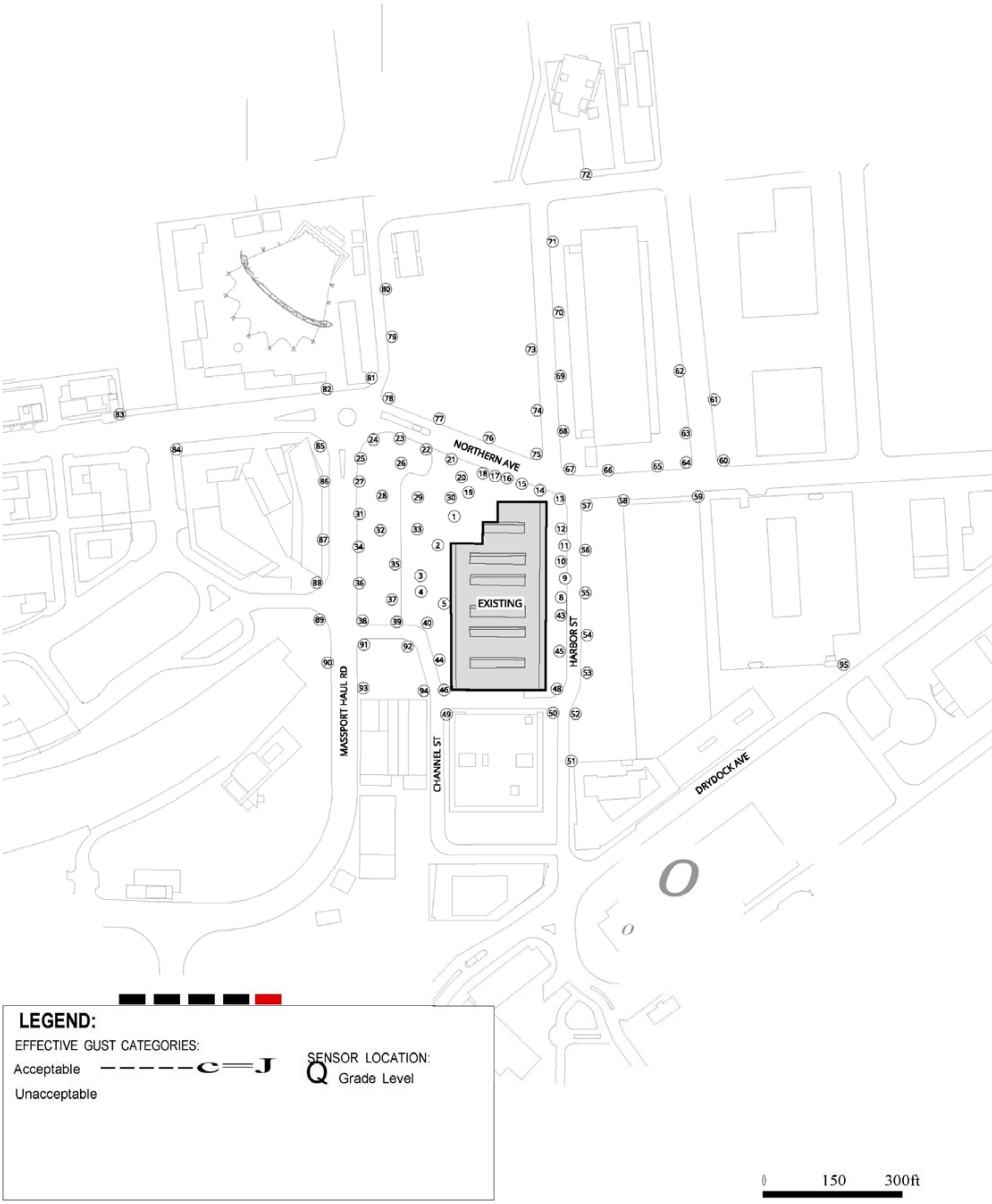


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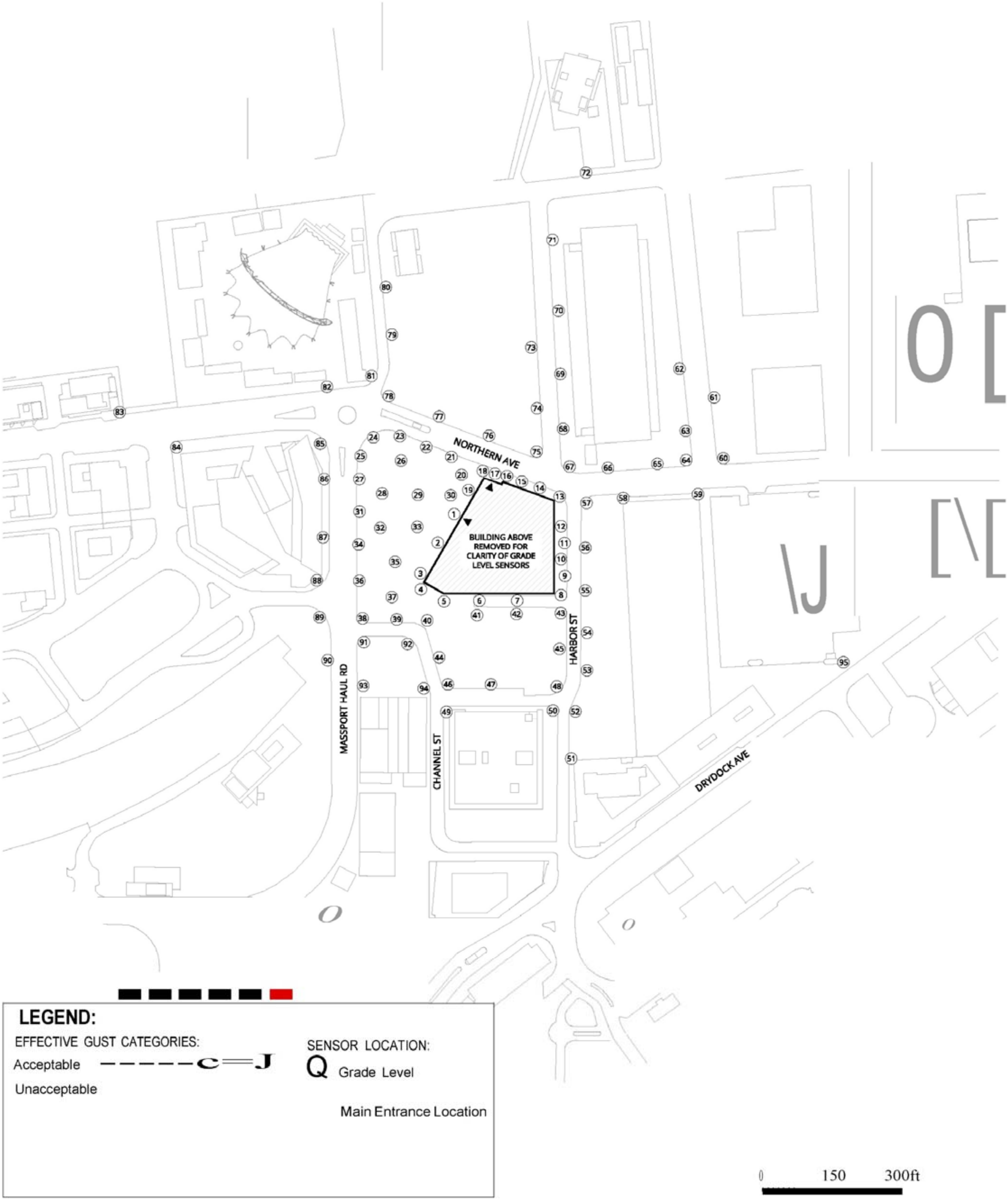
Figure 4-7

Pedestrian Wind Conditions – Effective Gust

No Build Configuration



LEGEND:

EFFECTIVE GUST CATEGORIES:

Acceptable

Unacceptable

SENSOR LOCATION:

Grade Level

Main Entrance Location

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Figure 4-8

Pedestrian Wind Conditions – Effective Gust

Build Configuration

Examples of Coniferous Landscaping (Top) and Windscreens (Bottom)

Examples of Corner Canopies

Figure 4-9
Examples of Coniferous Landscaping (Top) and Windscreens (Bottom) and Corner Canopies

No-Build Configuration

Existing mean speeds are generally comfortable for sitting or standing close to the existing building and comfortable for walking or better on and around the project site. Uncomfortable mean speeds occur at Locations 46 and 49, southwest of the existing building. These mean speeds are comfortable for the intended use and are typical for this area of Boston.

Existing wind speeds meet the effective gust criterion at all locations tested both on annual and seasonal basis.

Build Configuration

Similar mean speeds are anticipated with the addition of the proposed project to the site. An improvement in wind conditions is predicted to the north and south of the site; however, uncomfortable conditions are expected to the northeast, southwest, and west of the proposed building at a total of eight locations. Two of the locations with uncomfortable mean speeds are pre-existing and not a result from the proposed development. No dangerous wind speeds are expected at any locations. Areas of higher mean speeds to the northeast of the building stem primarily from northeasterly winds downwashing from the north and east building façades and accelerating around the northeast corner. Conditions are expected to be comfortable for sitting or standing near the building entrances, which is appropriate for the pedestrian use of the area.

With the addition of the proposed building to the site, wind speeds are still anticipated to meet the effective gust criterion at all locations on an annual basis. On a seasonal basis, wind speeds that do not meet the effective gust criterion are expected at Locations 13, 46, 56 and 57 during the spring; Location 13 in the fall; and Location 46 in the winter.

4.2 Shadow

A shadow impact analysis was conducted at three times of day (9:00 a.m., 12:00 p.m. and 3:00 p.m.) during the spring and autumnal equinoxes and the summer and winter solstices, as well as 6:00 p.m. during the summer solstice and autumnal equinox to assess potential shadow impacts from the Project.

The shadow analysis illustrates existing and anticipated new net shadow from the Project (see Figures 4-9 to 4-12). The analysis focuses on nearby open spaces, sidewalks, and bus stops in the vicinity of the Project site. The analysis shows that new shadow will be limited to the immediately surrounding area and will not be cast onto existing public open spaces.

4.2.1 Spring Equinox (March 21)

At 9:00 a.m. on the spring equinox, the proposed building will cast new shadow to the west, onto the site and sections of Massport Haul Road and the sidewalk abutting the property. At noon, shadow will be cast to the north and northwest, with new shadow cast onto the Project site and sections of Northern Avenue and its sidewalks. At 3:00 p.m., new shadow will be cast to the north and northeast, onto sections of the Project site, Northern Avenue and its sidewalks, a bus stop northeast of the Project site, and portions of properties north and northeast of the Project site.

4.2.2 Summer Solstice (June 21)

At 9:00 a.m. on the summer solstice, the proposed building will cast new shadow to the west. New shadow will mostly be limited to the Project site and small portions of Channel Street and its sidewalk. At noon, new shadow will be cast to the north and northwest, limited to a small section of the Project site. At 3:00 p.m., new shadow will be cast to the northeast, onto sections of the Project site, Northern Avenue, Harbor Street and properties north of Northern Avenue. At 6:00 p.m., new shadow will be cast to the east and northeast, onto the Project site, Northern Avenue, and sections of properties and a bus stop north of Northern Avenue and east of Harbor Street.

4.2.3 Autumnal Equinox (September 21)

At 9:00 a.m. on the autumnal equinox, the proposed building will cast new shadow to the west, onto the Project site, sections of Massport Haul Road and its sidewalks, and a small portion of Silver Line Way and its sidewalks. At noon, new shadow will be cast to the north and northwest, onto the Project site and sections of Northern Avenue and its sidewalks abutting the property. At 3:00 p.m., new shadow will be cast to the north and northeast onto sections of the Project site, Northern Avenue and its sidewalks, a bus stop northeast of the Project site, and portions of properties north of the Project site. At 6:00 p.m., new shadow will be cast onto small sections of properties north of the Project site.

4.2.4 Winter Solstice (December 21)

The low angle sun during the winter solstice creates the longest shadows of the year. At 9:00 a.m., new shadow will be cast to the northwest, onto portions of Massport Haul Road and its sidewalks, parts of the property west of Massport Haul Road, and onto sections of Northern Avenue. At noon, new shadow will be cast to the north onto the Project site, extending onto Northern Avenue and sections of a property north of Northern Avenue. At 3:00 p.m., new shadow will be cast northeast over parts of Northern Avenue, abutting properties to the north of Northern Avenue, onto sections of Fid Kennedy Avenue, and sections of properties north of Fid Kennedy Avenue.

4.2.5 Conclusion

The proposed Project will be similar in height to buildings in the vicinity and those under construction. The proposed building will be set back from the northern and western property lines, and therefore will have limited new shadow on the surrounding area. New shadow will primarily be limited to the Project site and small portions of surrounding properties and roadways and sidewalks. New shadow will also be cast on the existing bus stop at the corner of Northern Avenue and Harbor Street. No new shadow will be cast onto public open spaces.

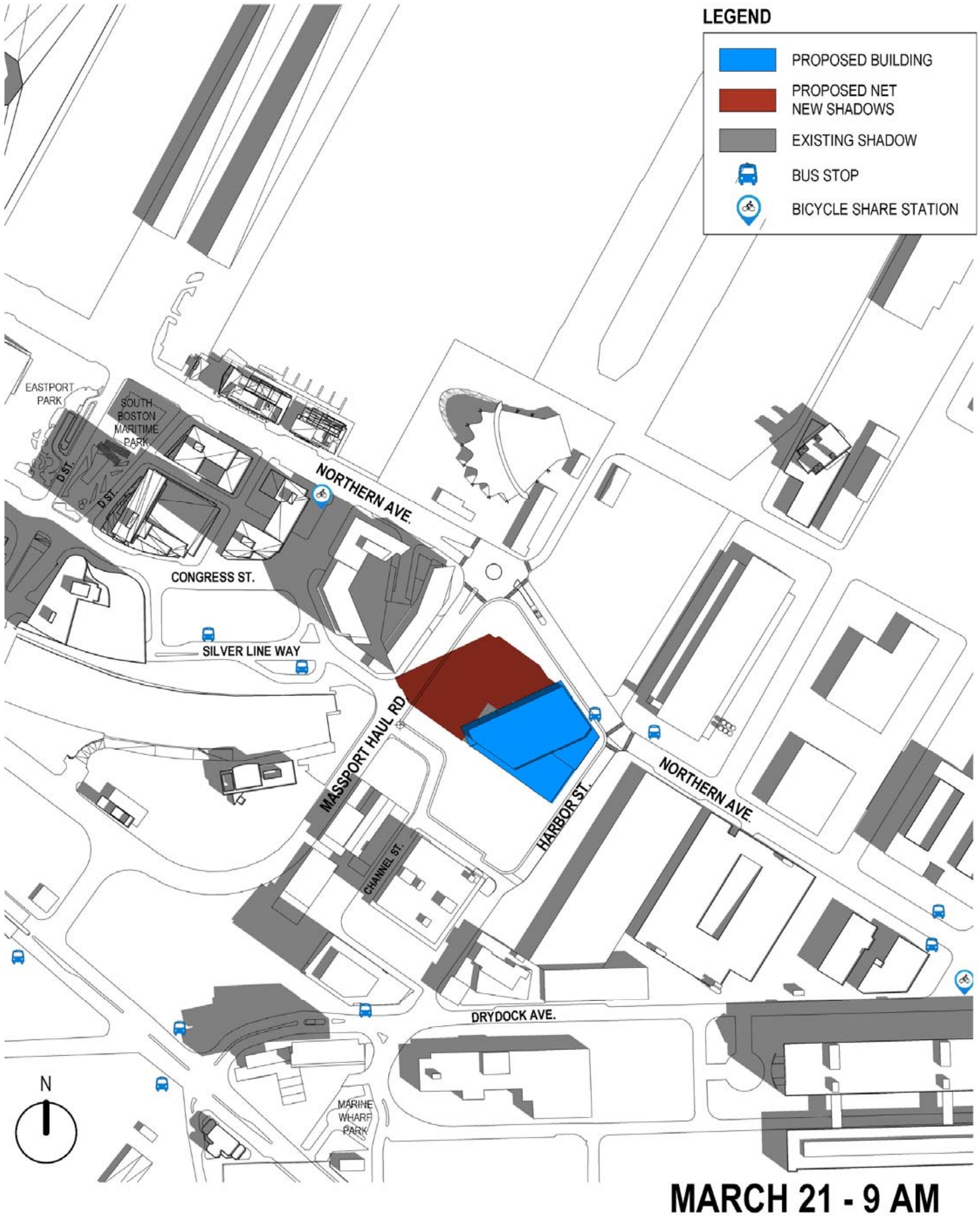

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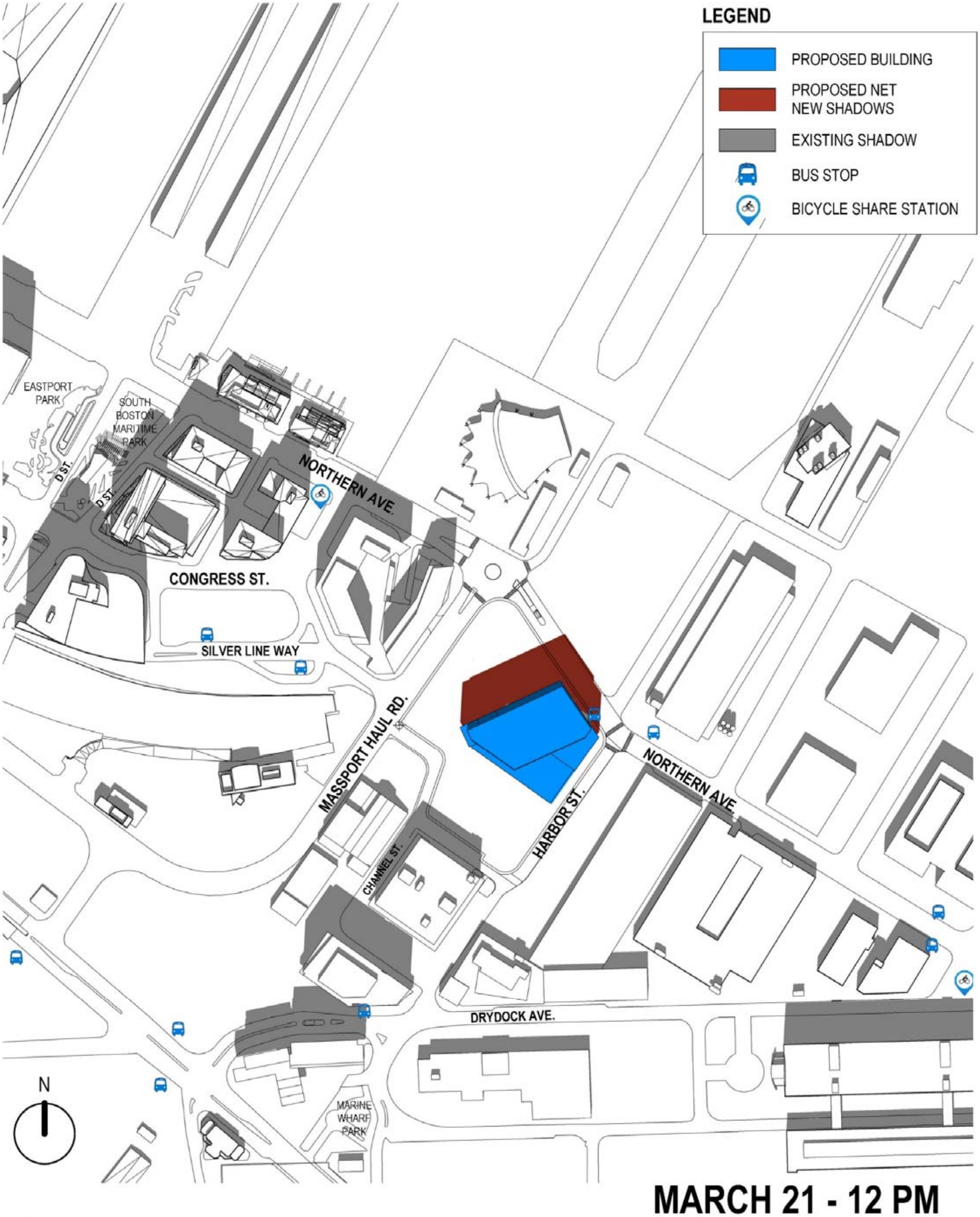
Figure 4-10
Shadow Study: March 21 – 9 AM



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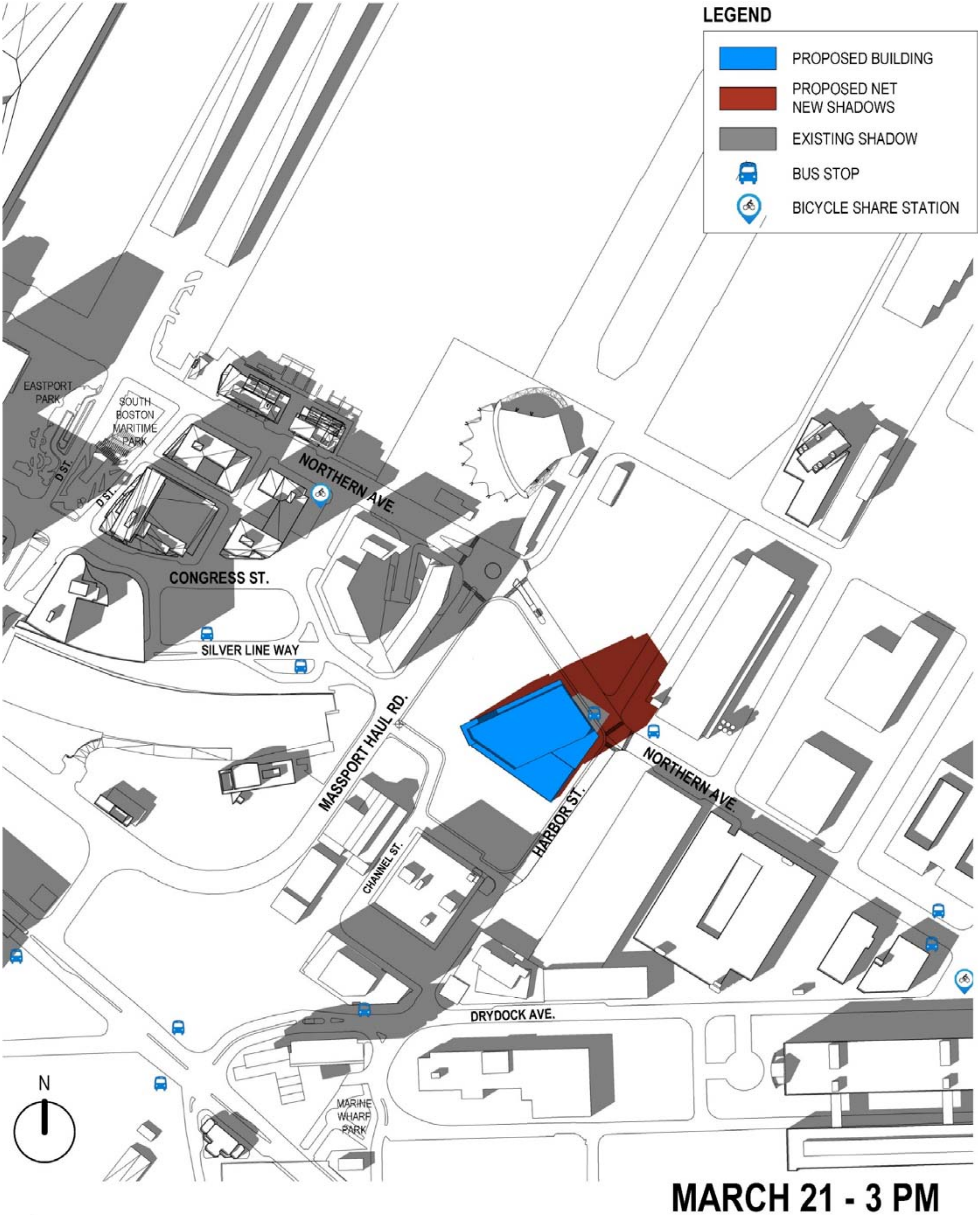

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Figure 4-12
Shadow Study: March 21 – 3 PM

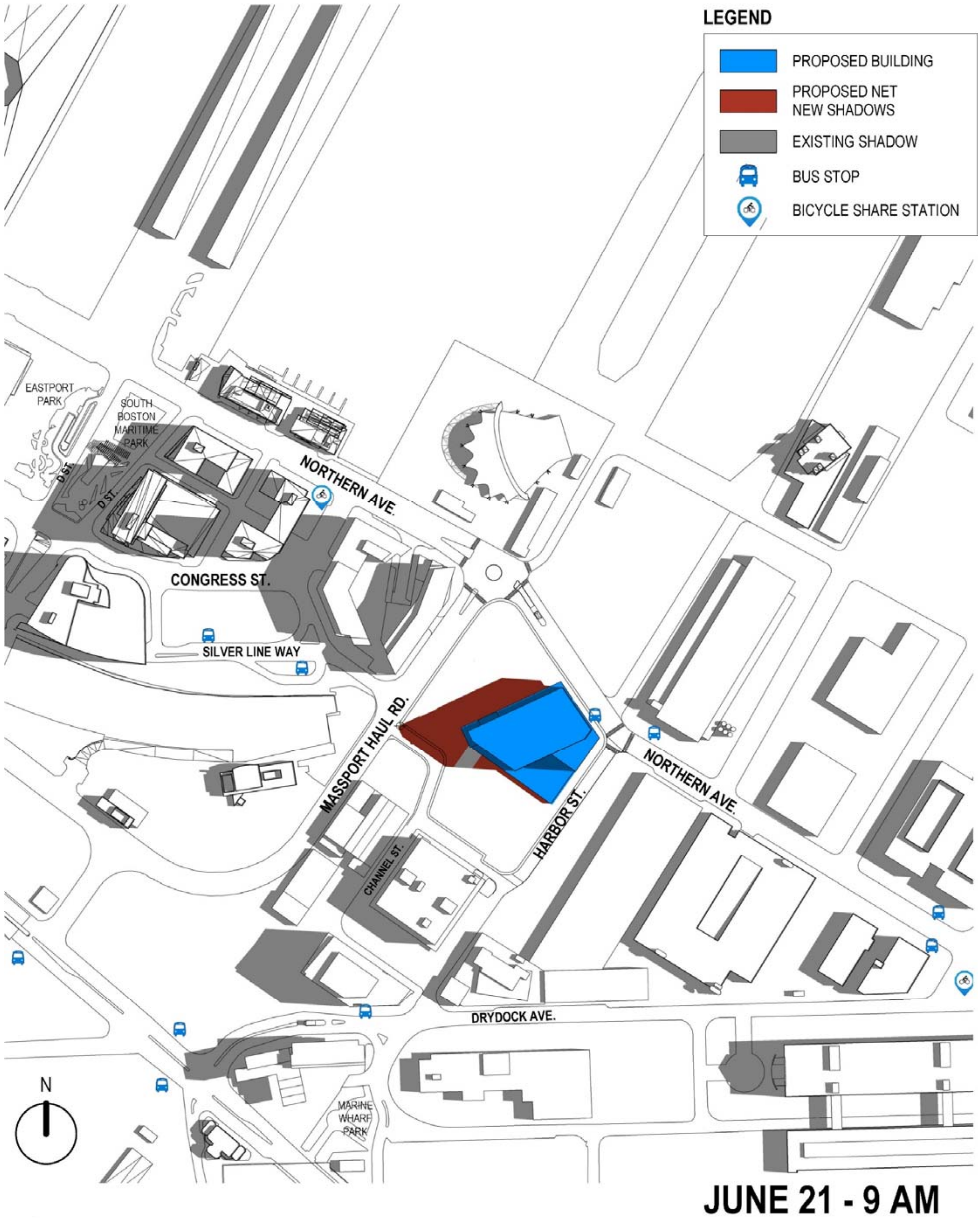

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Figure 4-13
Shadow Study: June 21 – 9 AM

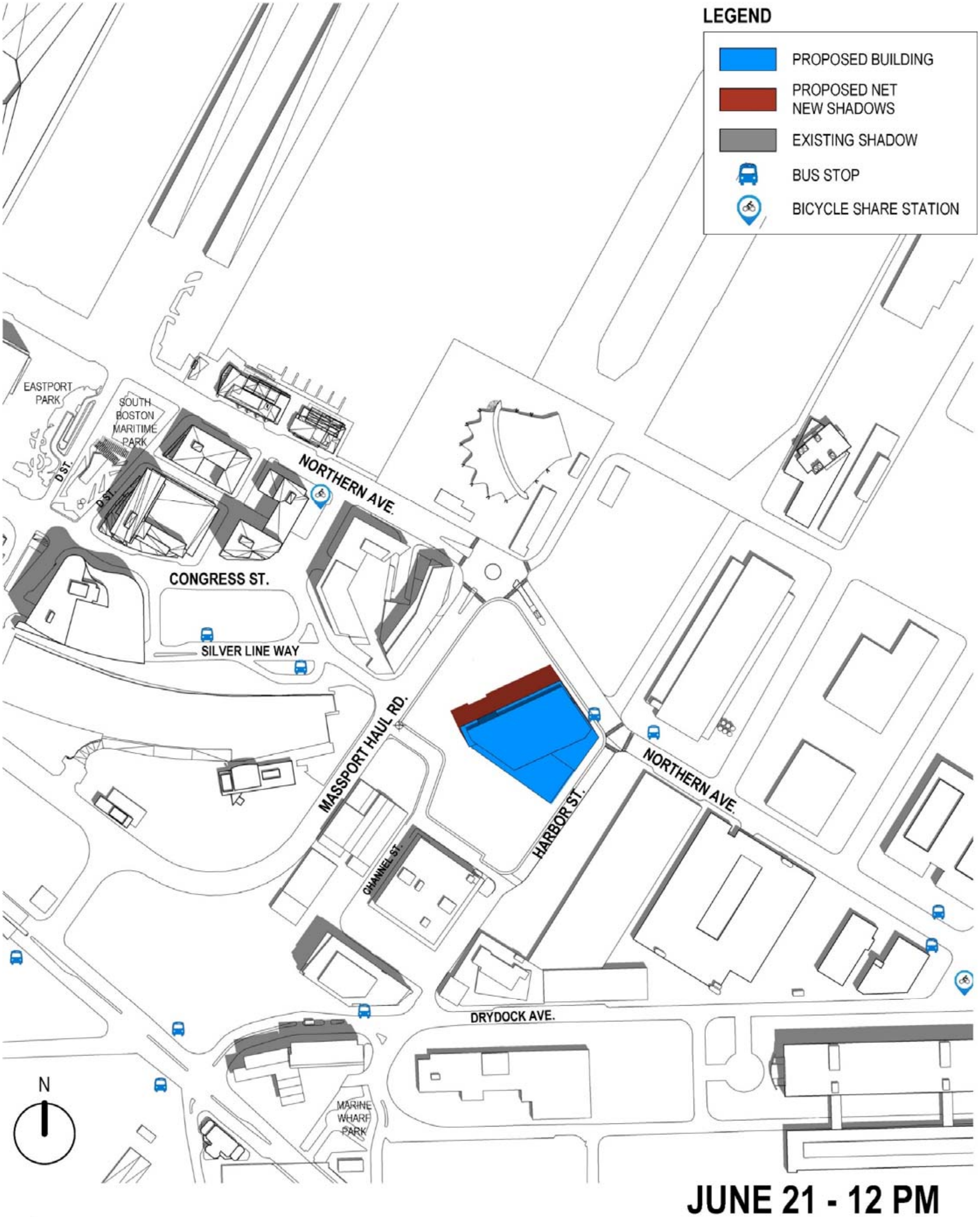

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Figure 4-14
Shadow Study: June 21 – 12 PM

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Figure 4-15

Shadow Study: June 21 – 3 PM

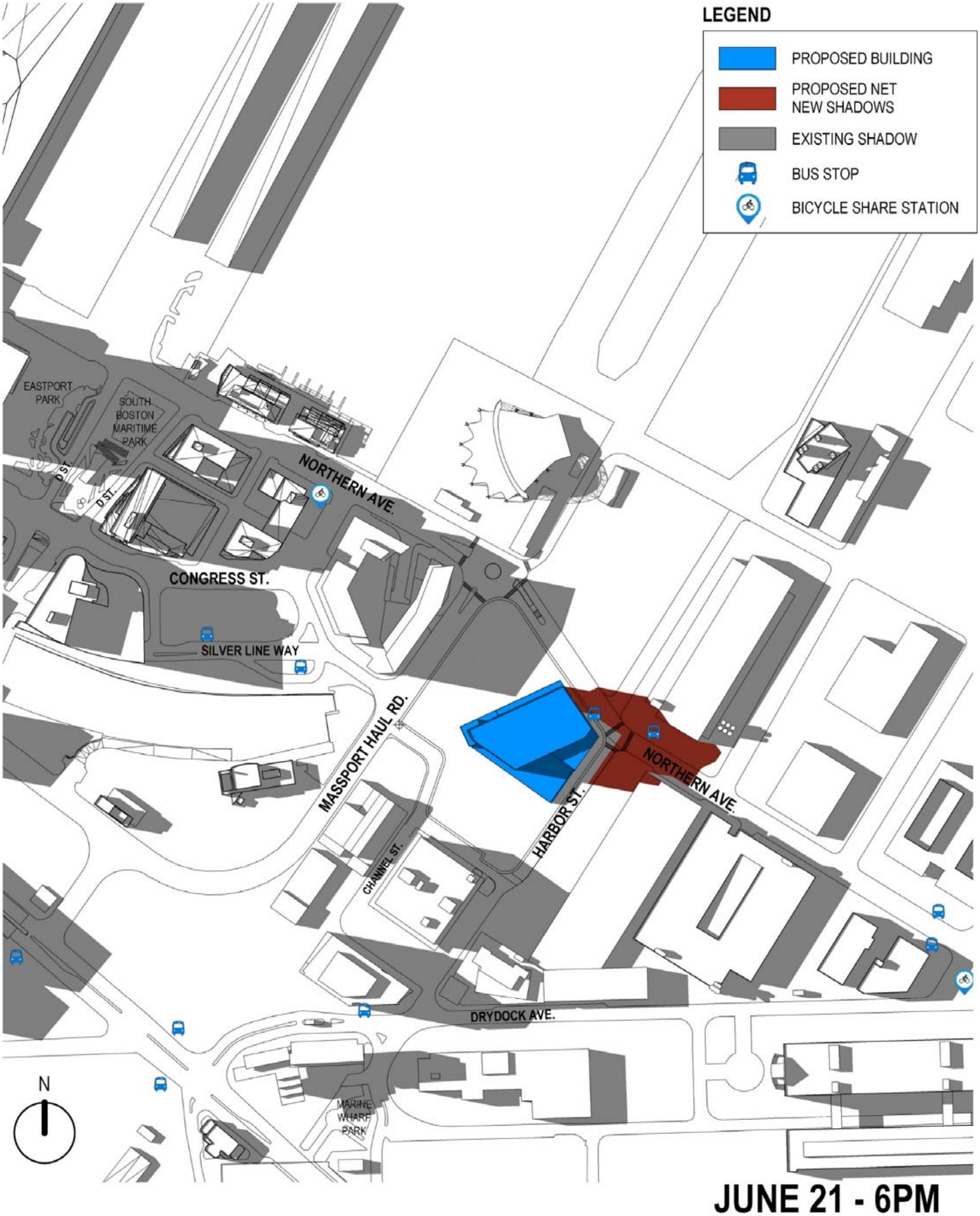

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Figure 4-16
Shadow Study: June 21 – 6 PM

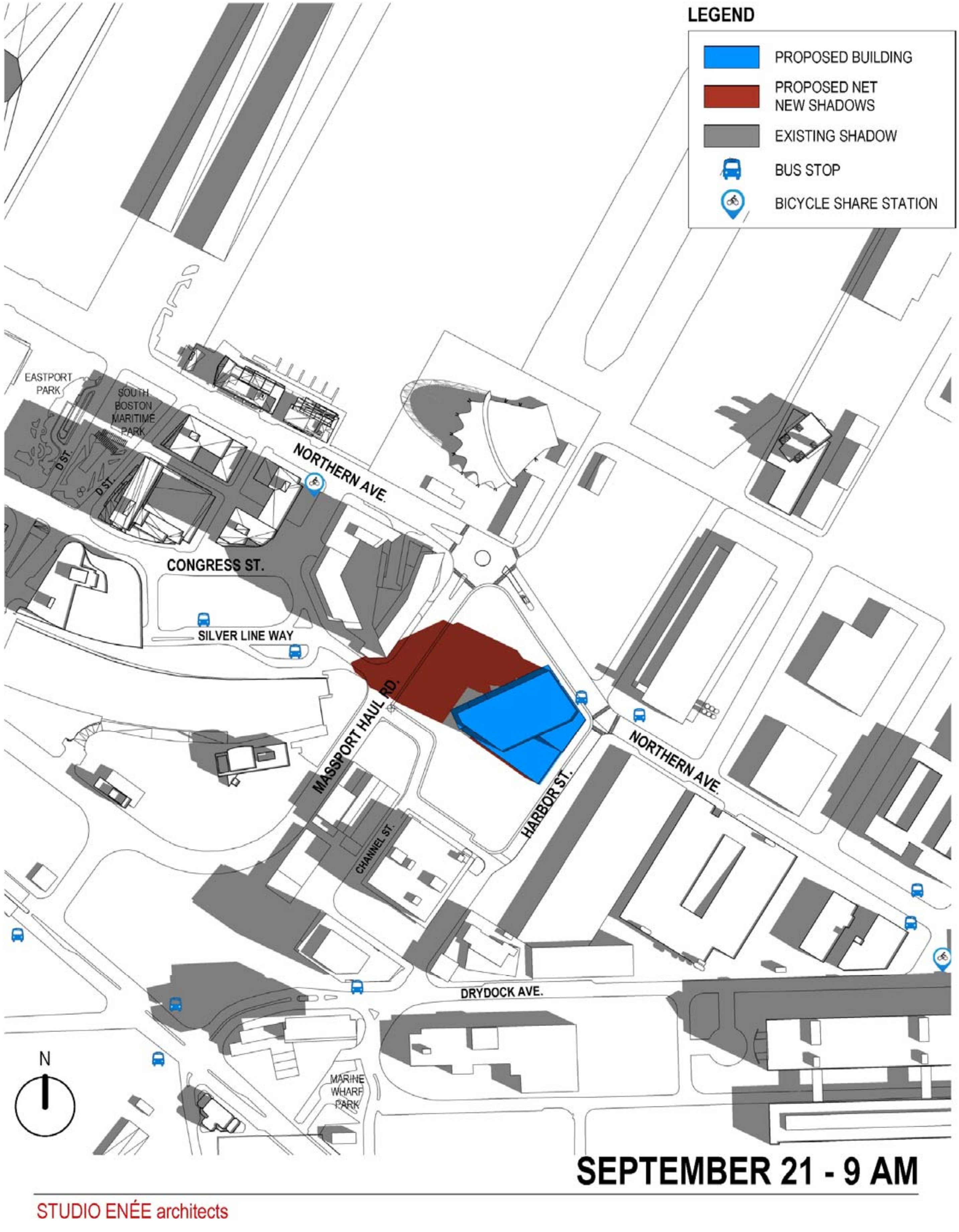

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Figure 4-17
Shadow Study: September 21 – 9 AM

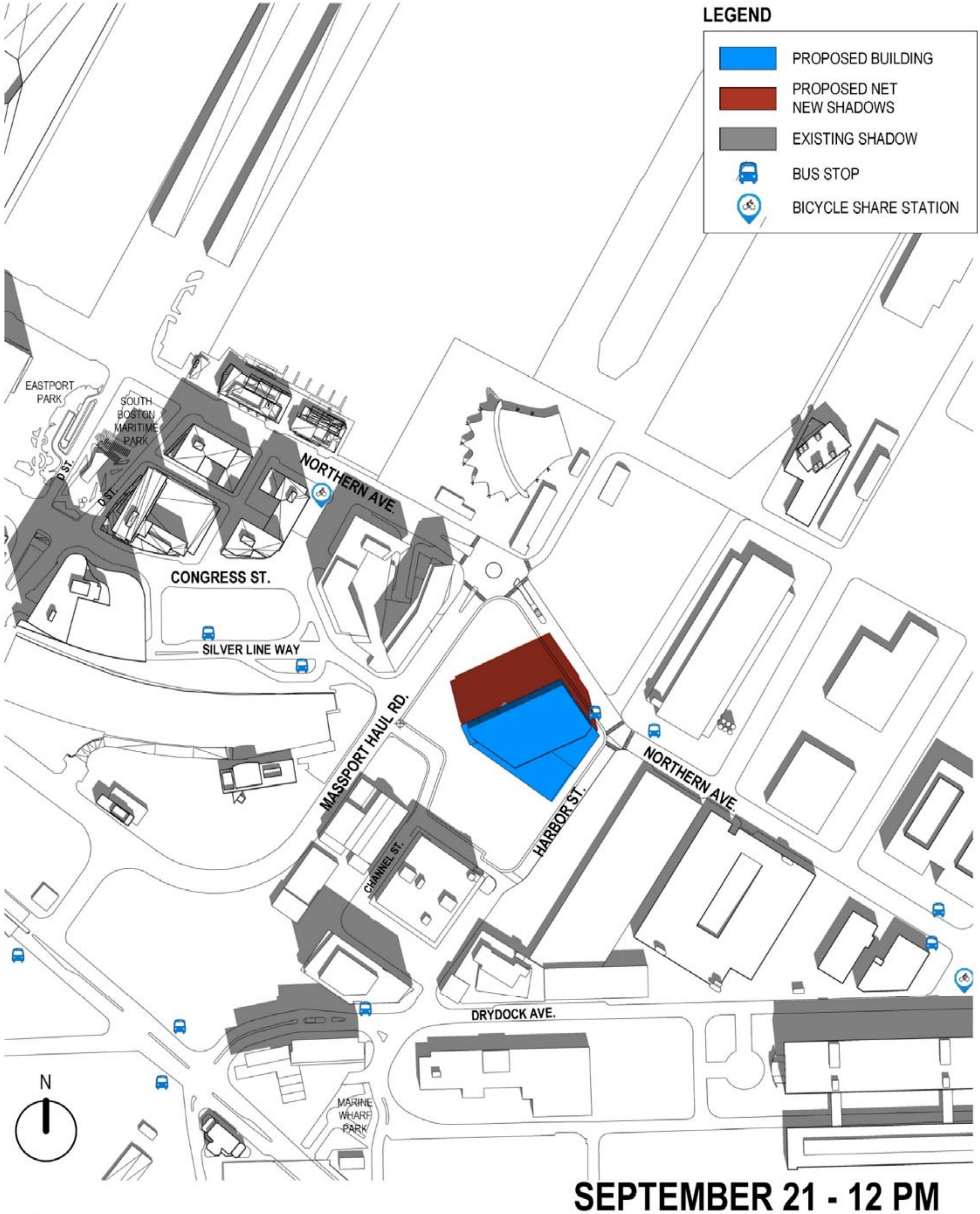

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Figure 4-18

Shadow Study: September 21 – 12 PM

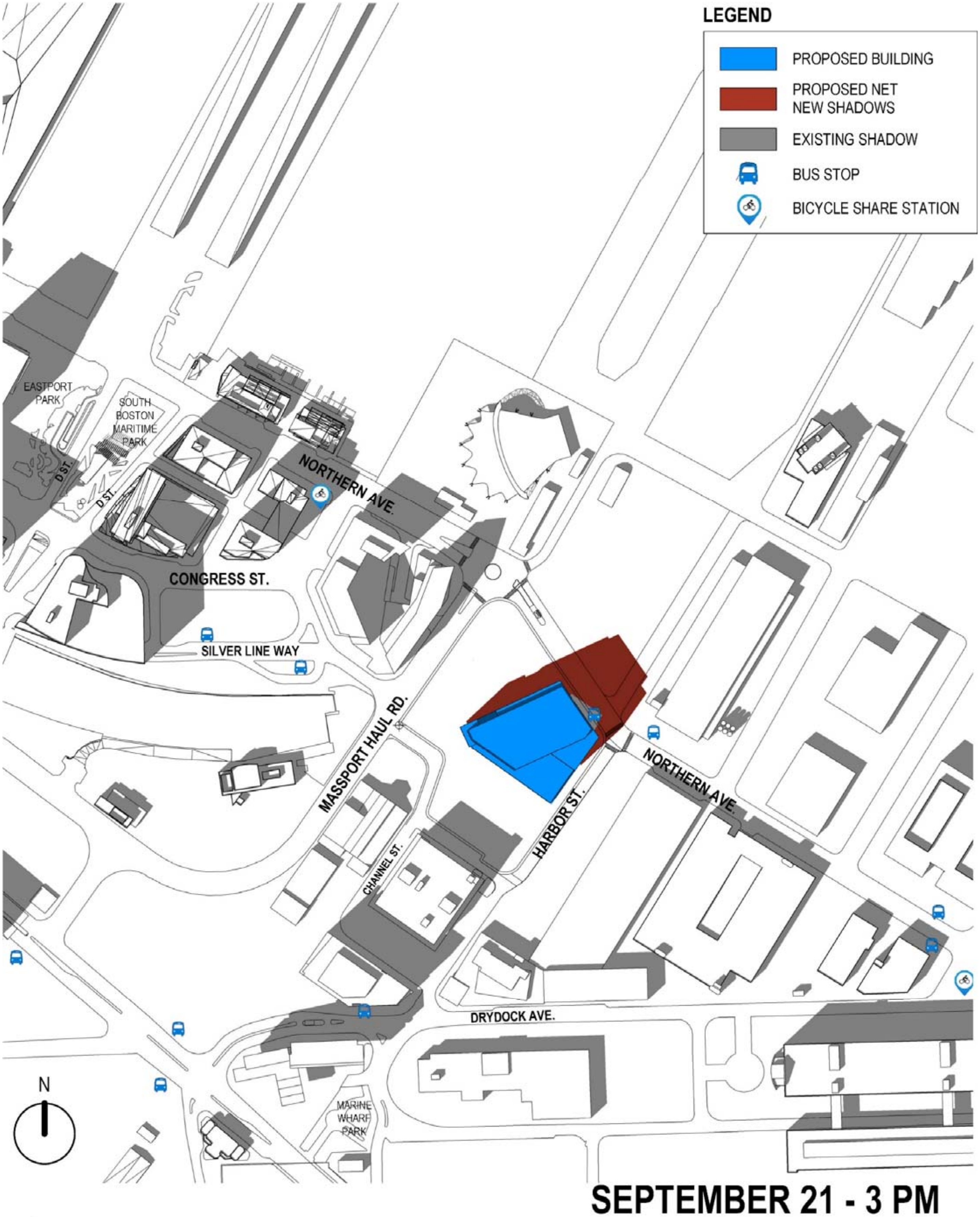

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Figure 4-19

Shadow Study: September 21 – 3 PM

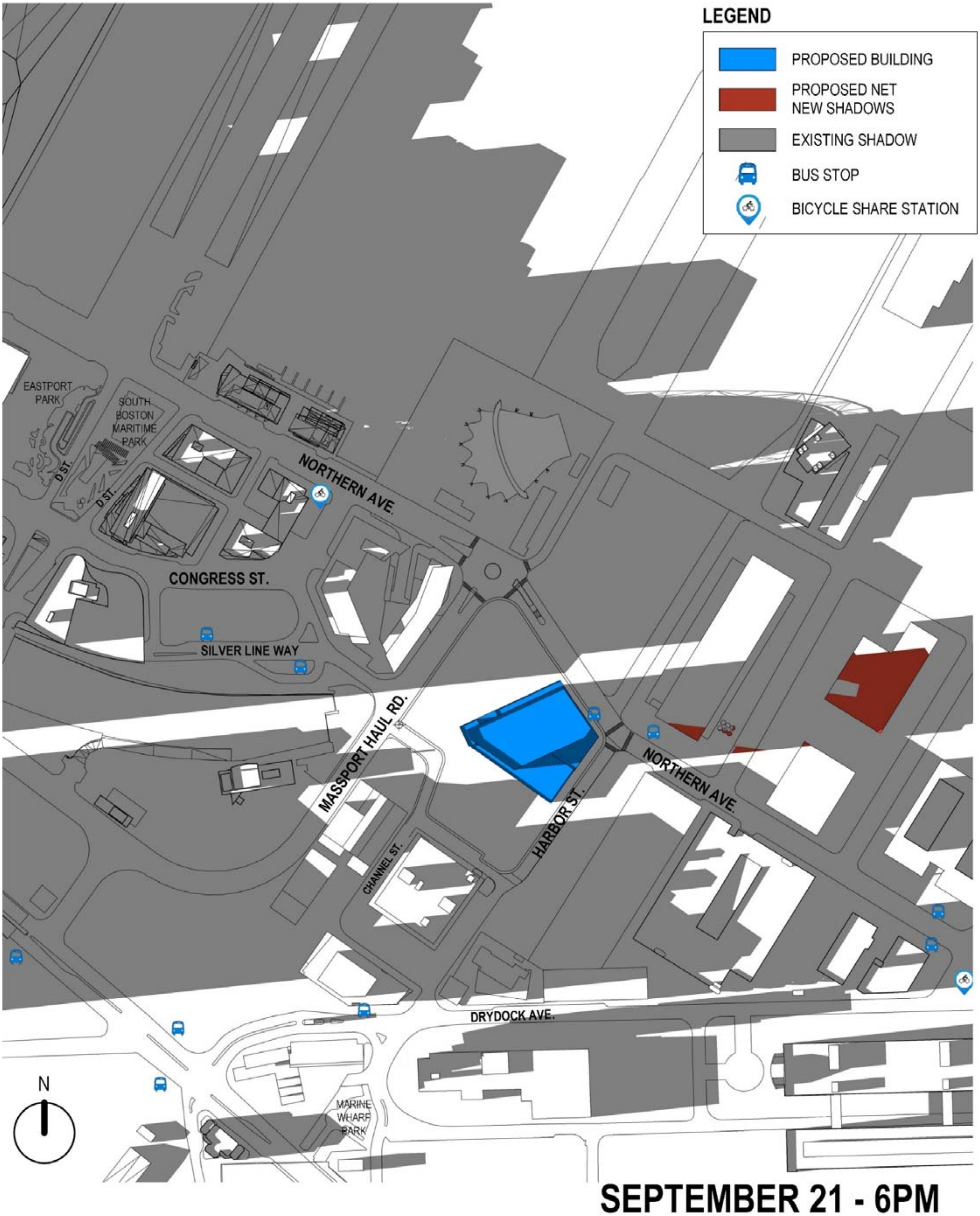

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Figure 4-20

Shadow Study: September 21 – 6 PM

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Figure 4-21
Shadow Study: December 21 – 9 AM

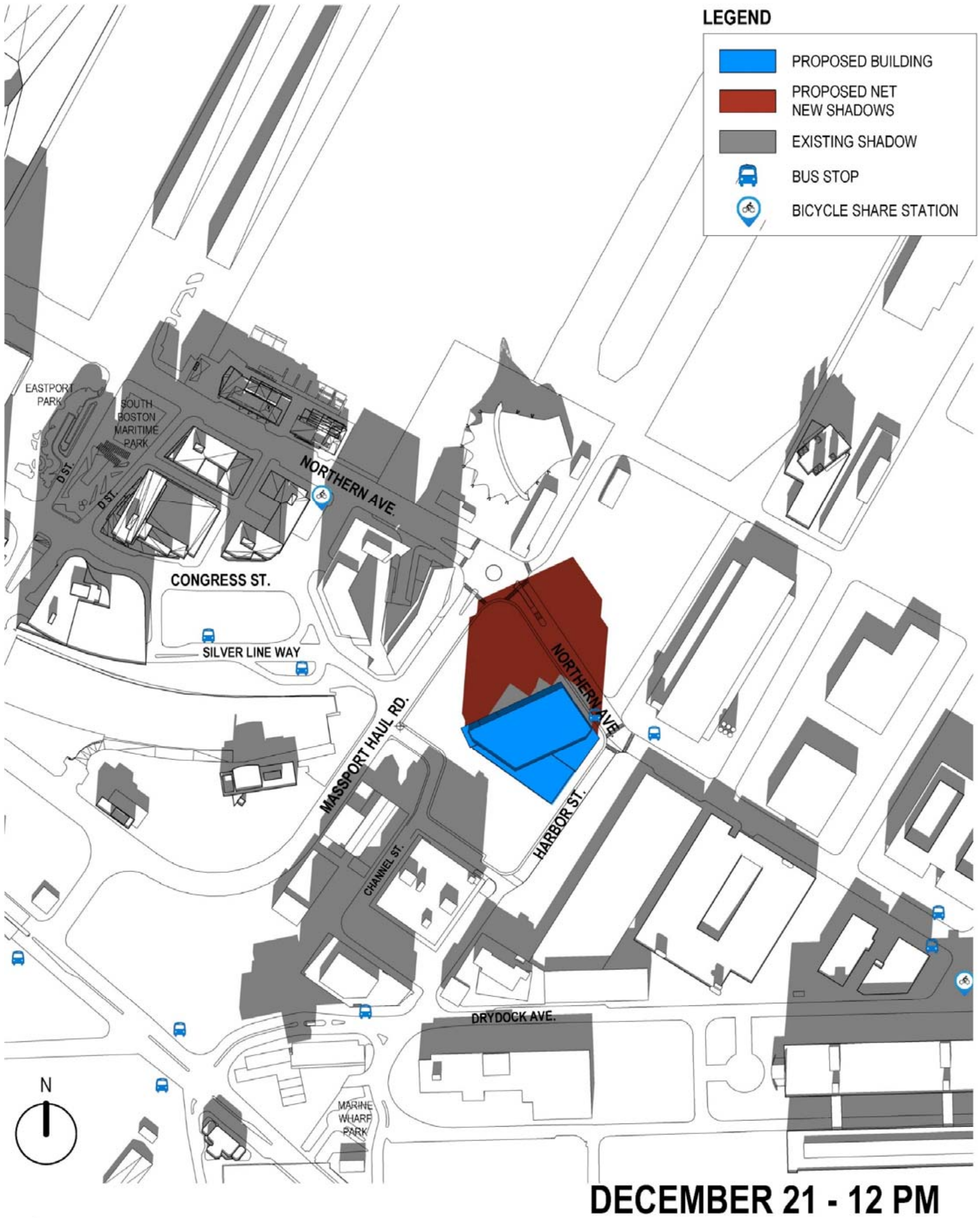

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Figure 4-22

Shadow Study: December 21 – 12 PM

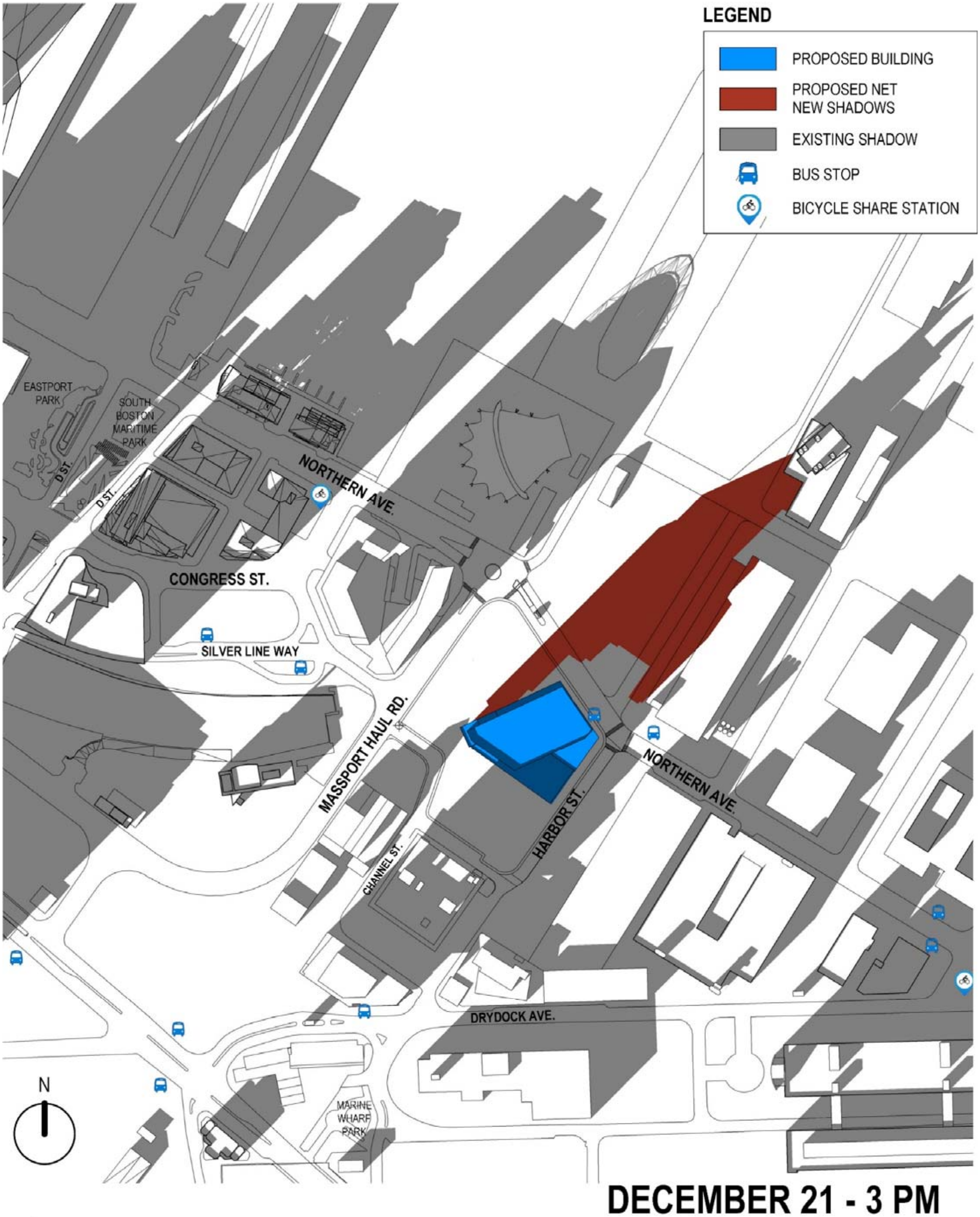

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Figure 4-23

Shadow Study: December 21 – 3 PM

4.3 Daylight Analysis

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of daylight reaching the streets and the sidewalks in the immediate vicinity of a project site.

4.3.1 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 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 0 to 100 percent based on 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.

The Project site borders three public roadways, Northern Avenue, Harbor Street, and Massport Haul Road. Therefore, viewpoints and area context points from the three roadways were selected to evaluate the daylight obstruction for the existing and proposed conditions, as well as to provide a basis of comparison to existing conditions in the surrounding area. The viewpoint and area context locations are shown on Figure 4-24 and are as follows:

- **Viewpoint 1**: View from the center of Northern Avenue facing south toward the Project site.
- **Viewpoint 2:** View from the center of Harbor Street facing west toward the Project site.
- **Viewpoint 3**: View from the center of Massport Haul Road facing east toward the Project site.
- **Area Context Viewpoint (AC1)**: View from the center of Harbor Street, facing 1 Harbor Street, east of the Project site.

---

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

- **Area Context Viewpoint (AC2)**: View from the center of Harbor Street, facing 12 Chanel Street, south of the Project site.

- **Area Context Viewpoint (AC3)**: View from the center of Northern Avenue, facing Park Lane Seaport, west of the Project site.

- **Area Context Viewpoint (AC4)**: View from the center of Massport Haul Road, Parcel K, west of the Project site.

4.3.2 Results

The results for each viewpoint are shown in Table 4-2. Figures 4-25 through 4-28 illustrate the results of the analysis.

Table 4-2 Daylight Analysis Results

Viewpoint Locations		**Existing Conditions**	**Proposed Conditions**
Viewpoint 1	View from the center of Northern Avenue facing south toward the Project site.	7.6%	27.1%
Viewpoint 2	View from the center of Harbor Street facing west toward the Project site.	32.9%	21.2%
Viewpoint 3	View from the center of Massport Haul Road facing east toward the Project site.	4.6%	11.1%
Area Context Points			
AC1	View from the center of Harbor Street, facing 1 Harbor Street, east of the Project site.	13.4%	N/A
AC2	View from the center of Harbor Street, facing 12 Chanel Street, south of the Project site.	53.8%	N/A
AC3	View from the center of Northern Avenue, facing Park Lane Seaport, west of the Project site.	72.8%	N/A
AC4	View from the center of Massport Haul Road, Parcel K, west of the Project site.	80.3%	N/A

2 Harbor Street Boston, Massachusetts

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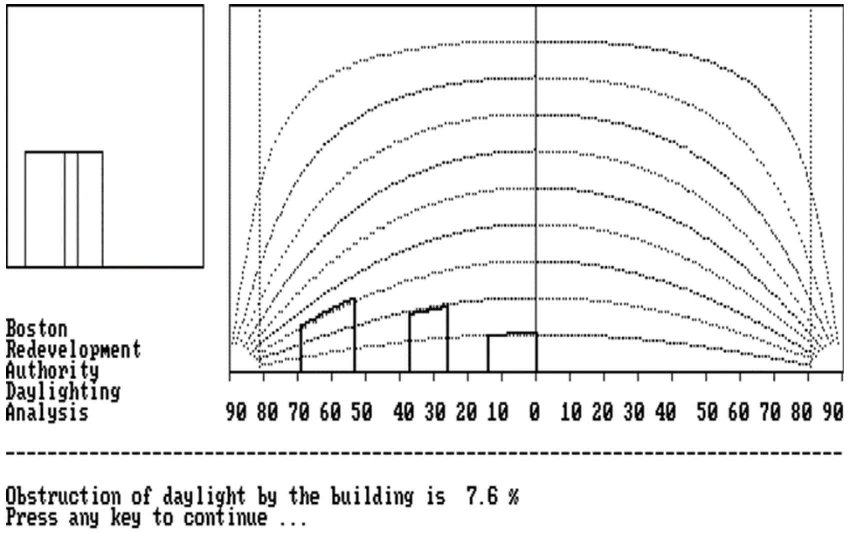
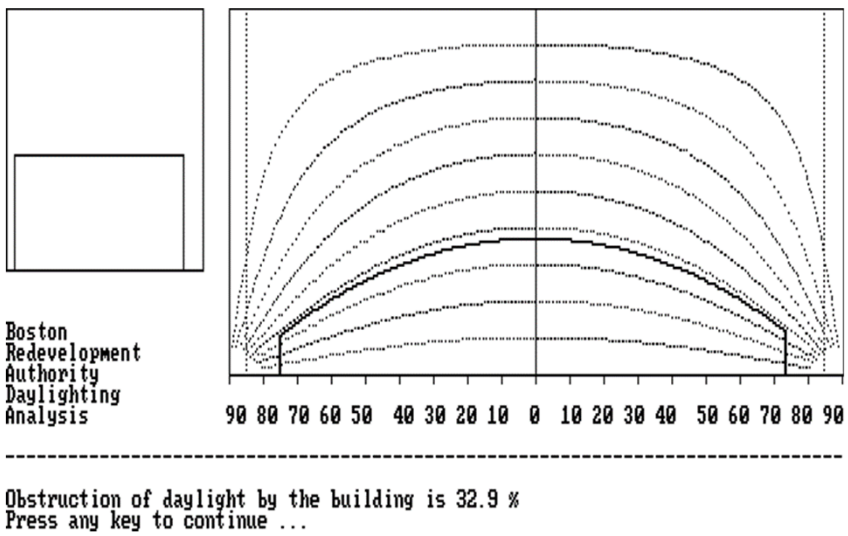
Figure 4-24
Viewpoint and Area Context Locations

Viewpoint 1: From Northern Avenue



Viewpoint 2: From Harbor Street



Viewpoint 3: From Massport Haul Road

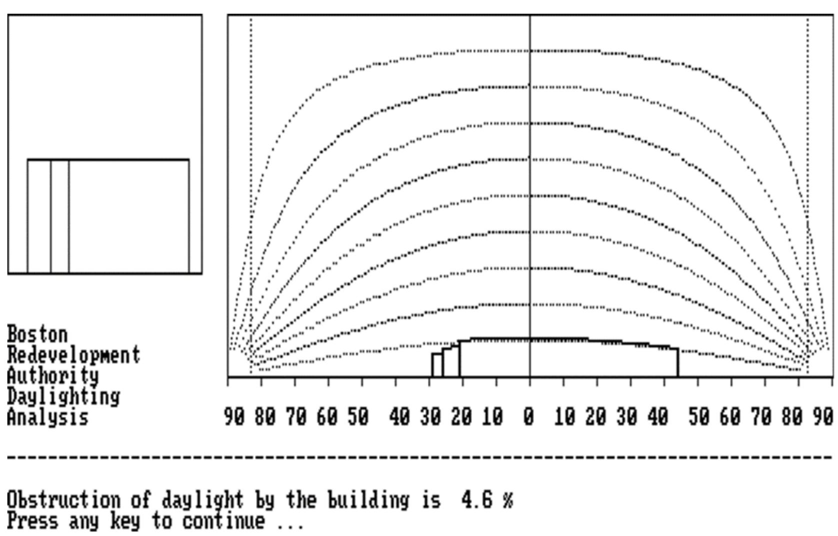
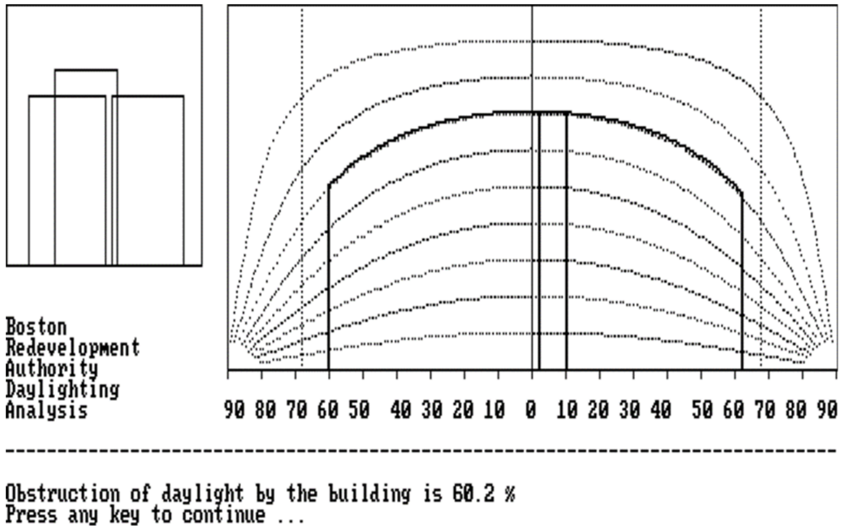
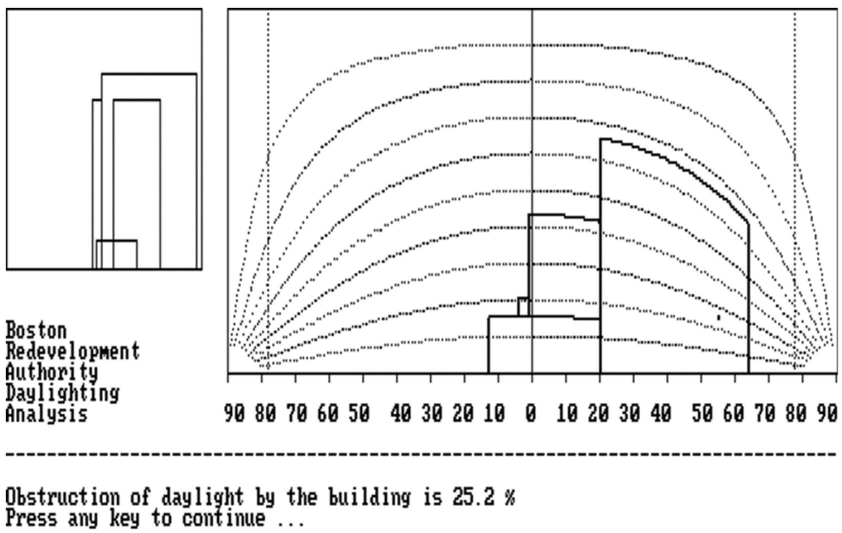


Figure 4-25
Existing Conditions

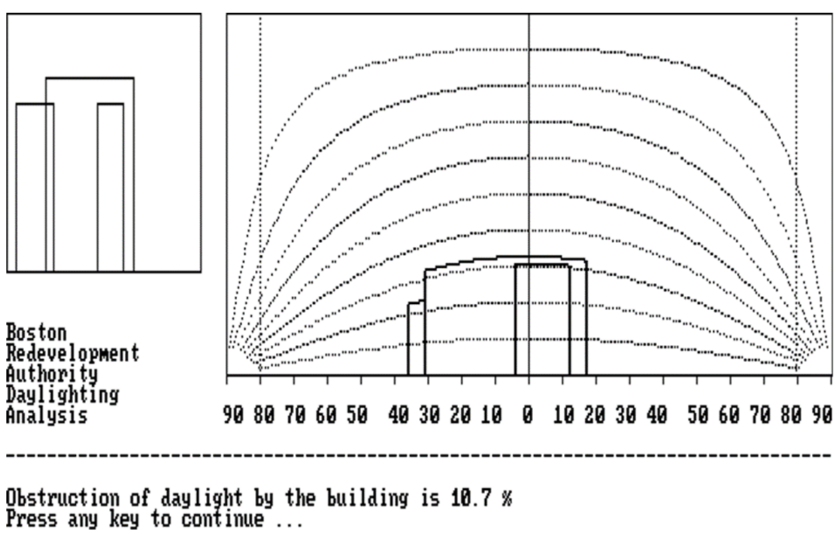
Viewpoint 1: From Northern Avenue



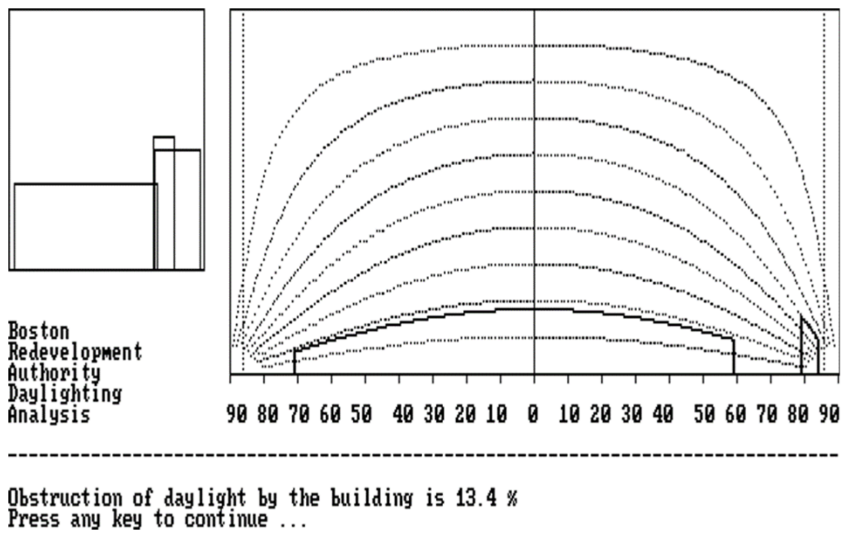
Viewpoint 2: From Harbor Street



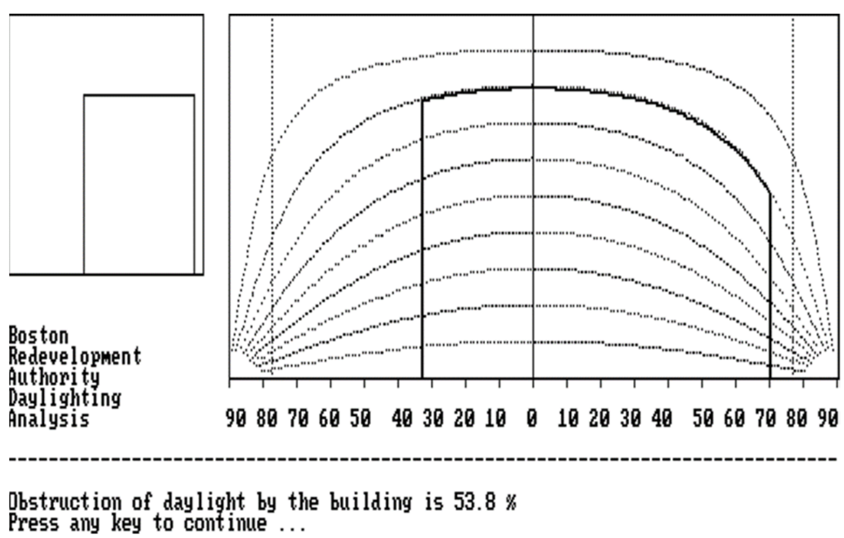
Viewpoint 3: From Massport Haul Road



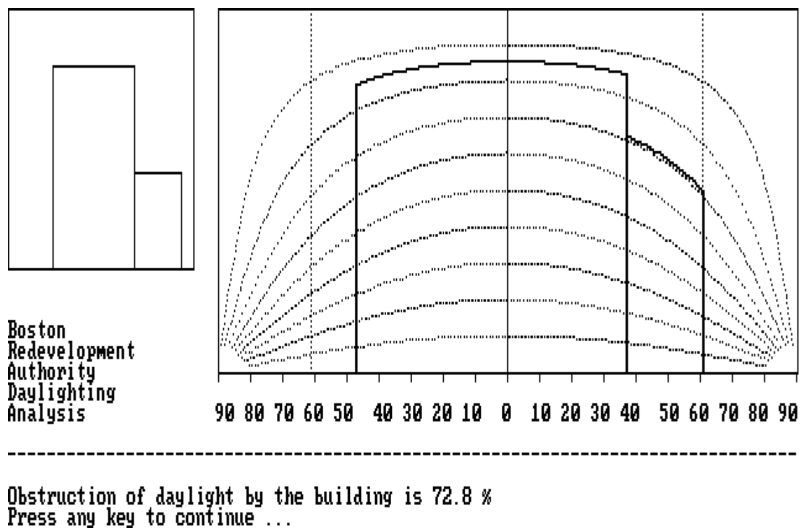
Area Context Viewpoint 1: 1 Harbor Street



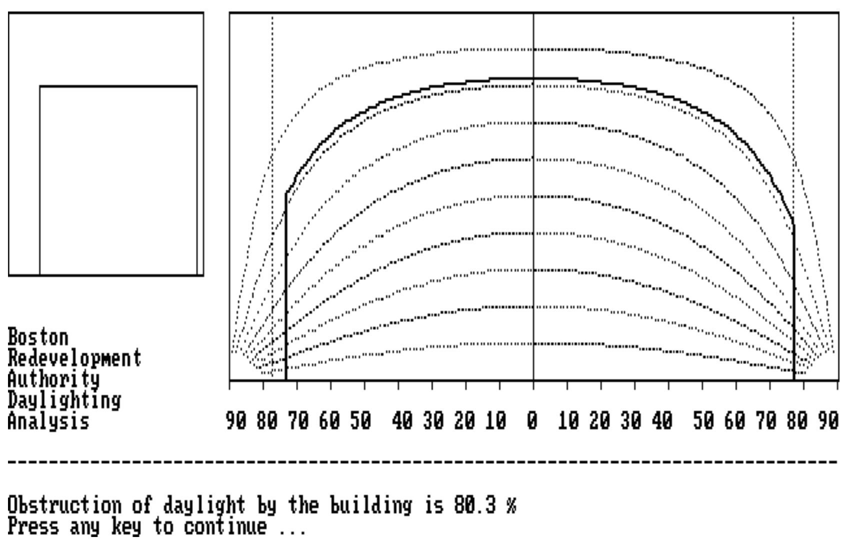
Area Context Viewpoint 2: 12 Chanel Street



Area Context Viewpoint 3: Park Lane Seaport



Area Context Viewpoint 4: Parcel K



Northern Avenue – Viewpoint 1

Northern Avenue runs along the northern edge of the Project site. Viewpoint 1 was taken from the center of Northern Avenue facing south toward the Project site. The proposed building is set back from the street, minimizing the Project's impact on the sky dome. The development of the Project will increase the daylight obstruction value to 27.1 percent.

Harbor Street – Viewpoint 2

Harbor Street runs along the eastern edge of the Project site. Viewpoint 2 was taken from the center of Harbor Street facing west toward the Project site. The proposed building is set back from the street, minimizing the Project's impact on the sky dome. The development of the Project will decrease the daylight obstruction value to 21.2%.

Massport Haul Road – Viewpoint 3

Massport Haul Road runs along the western edge of the Project site. Viewpoint 3 was taken from the center of Massport Haul Road facing east toward the Project site. The proposed building is set back from the street, minimizing its impact on the sky dome. The development of the Project will increase the daylight obstruction value to 11.1 percent.

Area Context Viewpoints

The surrounding area consists primarily of industrial, commercial and residential buildings of varying heights (one to seventeen floors) and several surface parking lots. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for four Area Context viewpoints described above. The daylight obstruction values ranged from 13.4 percent at AC1 to 80.3 percent at AC4.

4.3.3 Conclusion

The results of the BRADA analysis show that the Project will result in slightly increased daylight obstruction over existing conditions because the existing building on the site is significantly lower in height than the proposed building. However, along Harbor Street, daylight obstruction will decrease from 32.9 percent to 21.2 percent due to the increased setback of the proposed building. Whereas the existing building runs along the property line against Harbor Street, the proposed Project will occupy a smaller section along the property line, widen sidewalk along Harbor Street and set back levels above the ground floor, creating a more open feel to the design and less skydome obstruction. These configurations to increase open space and building height setbacks to reduce the bulkiness of the building will decrease daylight obstruction along Harbor Street.

The Seaport continues to grow rapidly, with new developments currently under construction and those underway designed to be of similar or taller heights than the proposed building. Therefore, the resulting conditions will be similar or lower to daylight obstruction values of surrounding developments.

4.4 Solar Glare

The proposed Project is not anticipated to include reflective glass or other reflective materials on the building facades that would result in adverse impacts from reflected solar glare from the Project.

4.5 Air Quality

4.5.1 Introduction

The BPDA requires that proposed projects evaluate the air quality in the local area and assess any adverse air quality impacts attributable to a project. The BPDA guidelines state that impacts from stationary sources (boilers, engines) and mobile sources (vehicles) must be addressed.

The Project does not generate enough traffic to require a mesoscale vehicle emissions quantification analysis. However, the Project creates new trips through local intersections operating at LOS D or worse. Therefore, a microscale analysis of carbon monoxide has been completed to provide information on the Project's impact to air quality from mobile sources.

Any new stationary sources will be reviewed by the Massachusetts Department of Environmental Protection (MassDEP) during permitting under the Environmental Results Program, as required. It is expected that all stationary sources will be small, and any impacts from stationary sources would be minimal.

4.5.2 National Ambient Air Quality Standards and Background Concentrations

Background air quality concentrations and federal air quality standards were utilized to conduct the microscale analysis mentioned above. Federal National Ambient Air Quality Standards (NAAQS) were developed by the U.S. Environmental Protection Agency (EPA) to protect the human health against adverse health effects with a margin of safety. The modeling methodologies were developed in accordance with the latest Massachusetts Department of Environmental Protection (MassDEP) modeling policies and Federal modeling guidelines.[3] The following sections outline the NAAQS standards and detail the sources of background air quality data.

---

[3] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

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, EPA promulgated NAAQS for the following criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM10 and PM2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb).[4] The NAAQS are listed in Table 4-3. The Commonwealth recently promulgated amendments to the Massachusetts Ambient Air Quality Standards (MAAQS) to be identical to NAAQS.[5].

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 were applied when comparing to the modeling results for this Project.

The NAAQS also reflect various durations of exposure. The non-probabilistic 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.

Table 4-3 National (NAAQS) and Massachusetts (MAAQS) Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS/MAAQS ($\mu g/m^3$)	
		Primary	Secondary
NO_2	Annual (1)	100	Same
	1-hour (2)	188	None
SO_2	3-hour (3)	None	1300
	1-hour (4)	196	None
PM2.5	Annual (1)	12	15
	24-hour (5)	35	Same
PM10	24-hour (3)	150	Same
CO	8-hour (3)	10,000	Same
	1-hour (3)	40,000	Same
Ozone	8-hour (6)	147	Same
Pb	3-month (1)	1.5	Same

Source: http://www.epa.gov/ttn/naaqs/criteria.html and 310 CMR 6.04
(1) Not to be exceeded.
(2) 98th percentile of one-hour daily maximum concentrations, averaged over three years.
(3) Not to be exceeded more than once per year.
(4) 99th percentile of one-hour daily maximum concentrations, averaged over three years.
(5) 98th percentile, averaged over three years.
(6) Annual fourth-highest daily maximum eight-hour concentration, averaged over three years.

4 40 CFR 50, National Primary And Secondary Ambient Air Quality Standards, Nov. 25, 1971.
5 310 CMR 6.04, June 14, 2019

Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP in their Annual Air Quality Reports was obtained for 2015 to 2017. The three-hour SO_2 values are no longer reported in the annual reports. Data for this pollutant and averaging time combination was obtained from the EPA's AirData website.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM2.5 standard, the 3-year average of the 98th percentile of 24-hour concentrations must not exceed 35 μg/m^3. For annual PM2.5 averages, the average of the highest yearly observations was used as the background concentration. To attain the one-hour NO_2 standard, the three-year average of the 98th percentile of the maximum daily one-hour concentrations must not exceed 188 μg/m^3.

Background concentrations were determined from the closest available monitoring stations to the proposed development. All pollutants are not monitored at every station, so data from multiple locations are necessary. The closest monitor is at 174 North Street (1.7 miles northwest), which only monitors PM2.5. The remaining monitored values from Harrison Avenue (2.65 miles west-southwest) are presented. A summary of the background air quality concentrations is presented in Table 4-4. The values were obtained from MassDEP's annual Air Quality Reports and U.S. EPA's AirData website.

Table 4-4 Observed Ambient Air Quality Concentrations and Selected Background Levels

Pollutant	Averaging Period	Form	Background Concentration (μg/m³)	NAAQS	Percent of NAAQS
SO_2 (1)(5)	1-Hr (4)	99th %	10.9	196.0	6%
	3-Hr	H2H	13.4	1300.0	1%
PM_{10} (7)	24-Hr	H2H	29.0	150.0	19%
$PM_{2.5}$	24-Hr (4)	98th %	15.1	35.0	43%
	Annual (4)	H	6.9	12.0	58%
NO_2 (3)	1-Hr (4)	98th %	89.6	188.0	48%
	Annual	H	24.8	100.0	25%
CO (2)(6)	1-Hr	H2H	2750.4	40000.0	7%
	8-Hr	H2H	1439.4	10000.0	14%

Notes:
From MassDEP Air Quality Reports and EPA's Airdata Website
(1) SO_2 reported ppb. Converted to μg/m^3 using factor of 1 ppm = 2.62 μg/m^3.
(2) CO reported in ppm. Converted to μg/m^3 using factor of 1 ppm = 1146 μg/m^3.
(3) NO_2 reported in ppb. Converted to μg/m^3 using factor of 1 ppm = 1.88 μg/m^3.
(4) Background level is the average concentration of the three years.
(5) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.
(6) CO monitor at Kenmore Square was deactivated in January 2015. Harrison Avenue monitor used for 2015 and 2016.
(7) PM10 monitor at Kenmore Square was deactivated in 2016. Harrison Avenue monitor used for 2016 and 2017.

Air quality in the vicinity of the Project site is generally good, with all local background concentrations found to be well below the NAAQS.

4.5.3 Mobile Sources

Mobile sources of air pollution include emissions from gasoline, diesel, and natural gas fueled vehicle traffic. Emissions from mobile sources have continually decreased as engine technology and efficiency have been improved.

Methodology

As described above, a "microscale" analysis is typically requested for any intersection 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 on roadways providing access to a single location. The microscale analysis involves modeling of 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 1-hour averaging period, and 9 ppm for an 8-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 microscale analysis has been conducted using the latest versions of EPA's MOVES and CAL3QHC programs to estimate CO concentrations at sidewalk receptor locations. Existing (2019) and future year (2024) 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. The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[6]

[6] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

Existing background values of CO at the nearest monitor location at Harrison Avenue were obtained from MassDEP. CAL3QHC results were then added to background CO values of 2.4 ppm (1-hour) and 1.3 ppm (8-hour), as provided by MassDEP, to determine total air quality impacts due to the Project. These values were compared to the NAAQS for CO of 35 ppm (1-hour) and 9 ppm (8-hour).

Intersection Selection

One signalized intersection included in the traffic study meets the conditions described at the beginning of this section. The traffic volumes and LOS calculations provided in Chapter 2 form the basis of evaluating the traffic data versus the microscale thresholds. The only intersection meeting the criteria was the intersection of Brighton Avenue and Linden Street.

Microscale modeling was performed for these intersections based on the aforementioned methodology. The 2019 Existing and 2024 No-Build and Build conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak.

It can be reasonably concluded that if the worst performing intersections (with respect to LOS) do not cause a condition of air pollution, then better performing intersections also do not cause a condition of air pollution.

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 (2019) and future year (2024) are provided by MassDEP.

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 intersection as stated in traffic modeling (Synchro) reports. A speed of 25 mph is used for all free-flow traffic, consistent with the City of Boston speed limit. 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.[7]

Winter CO emission factors are typically higher than summer. Therefore, January weekday emission factors were conservatively used in the microscale analysis. With the influx of cleaner vehicles, future year emission rates are always lower than present year. The emission factors are presented in Table 4-5.

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[7] U.S. EPA, 2010. Using MOVES in Project-Level Carbon Monoxide Analyses. EPA-420-B-10-041

Table 4-5 MOVES Carbon Monoxide Emission Factors

Carbon Monoxide Only		Units	2019	2024
Free Flow	25 mph	g/VMT	2.99	2.23
Right Turns	10 mph	g/VMT	4.67	3.43
Left Turns	15 mph	g/VMT	4.02	2.99
Queues	Idle	g/Veh-hr	10.46	5.64

Notes: Winter CO emission factors are higher than summer and are conservatively used

Urban Unrestricted Roadway type used

Receptors & Meteorology Inputs

Sets of up to 220 receptors were placed in the vicinity of the modeled intersection. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersections. The roadway links and receptor locations of the modeled intersection are presented in Figures 4-29 and 4-30.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[8], 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°, at every 10° were selected. A surface roughness length of 321 centimeters was selected and is consistent with the city land use environment near the Project.[9]

Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at signalized intersections, worst-case meteorological conditions, and traffic input data. The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs.

For use in the microscale analysis, background concentrations of CO in ppm were required for the three scenarios. The corresponding maximum background concentrations in ppm were 2.4 ppm (2,750 µg/m3) for 1-hour and 1.3 ppm (1,439 µg/m3) for 8-hour CO.

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

[9] U.S. 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.

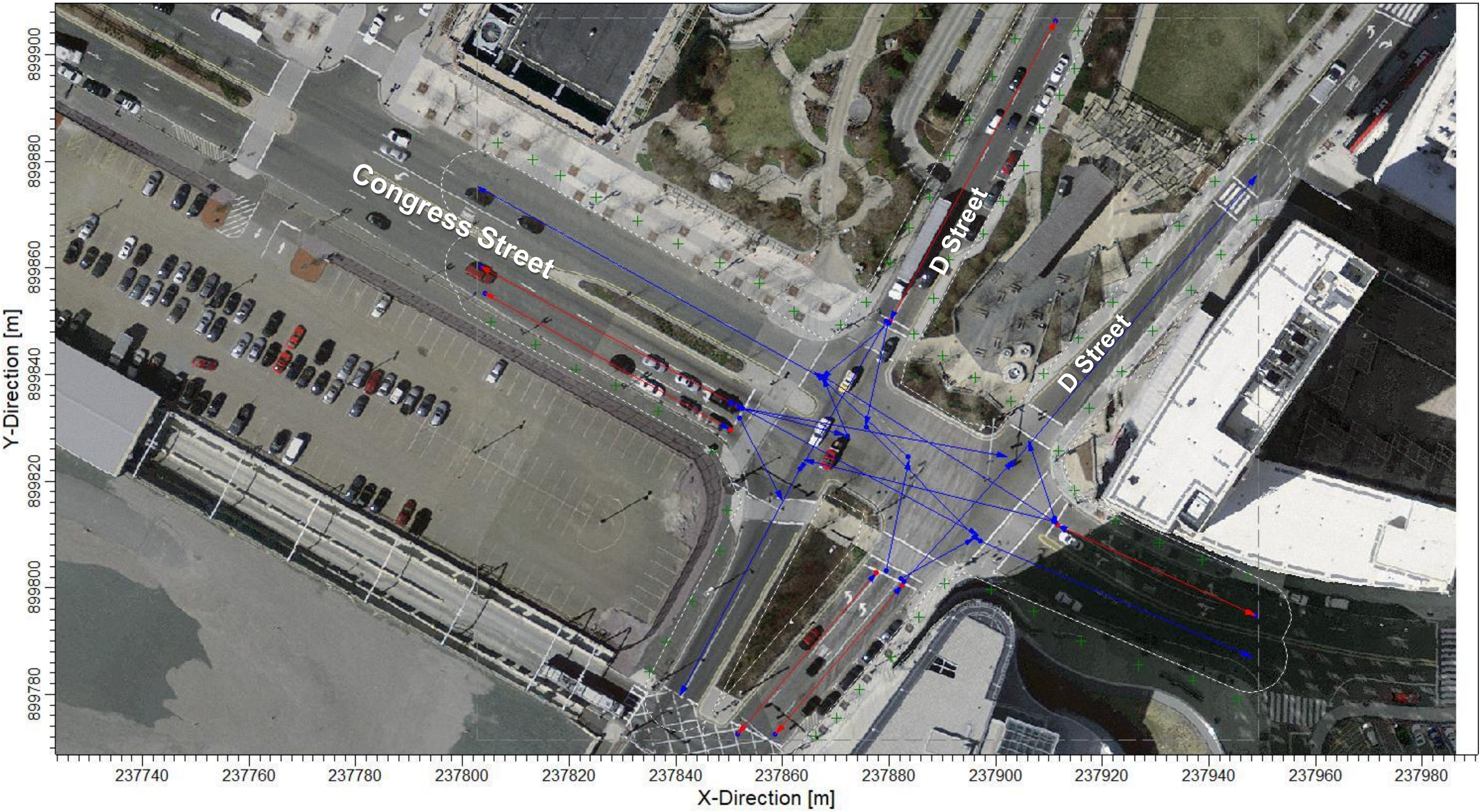
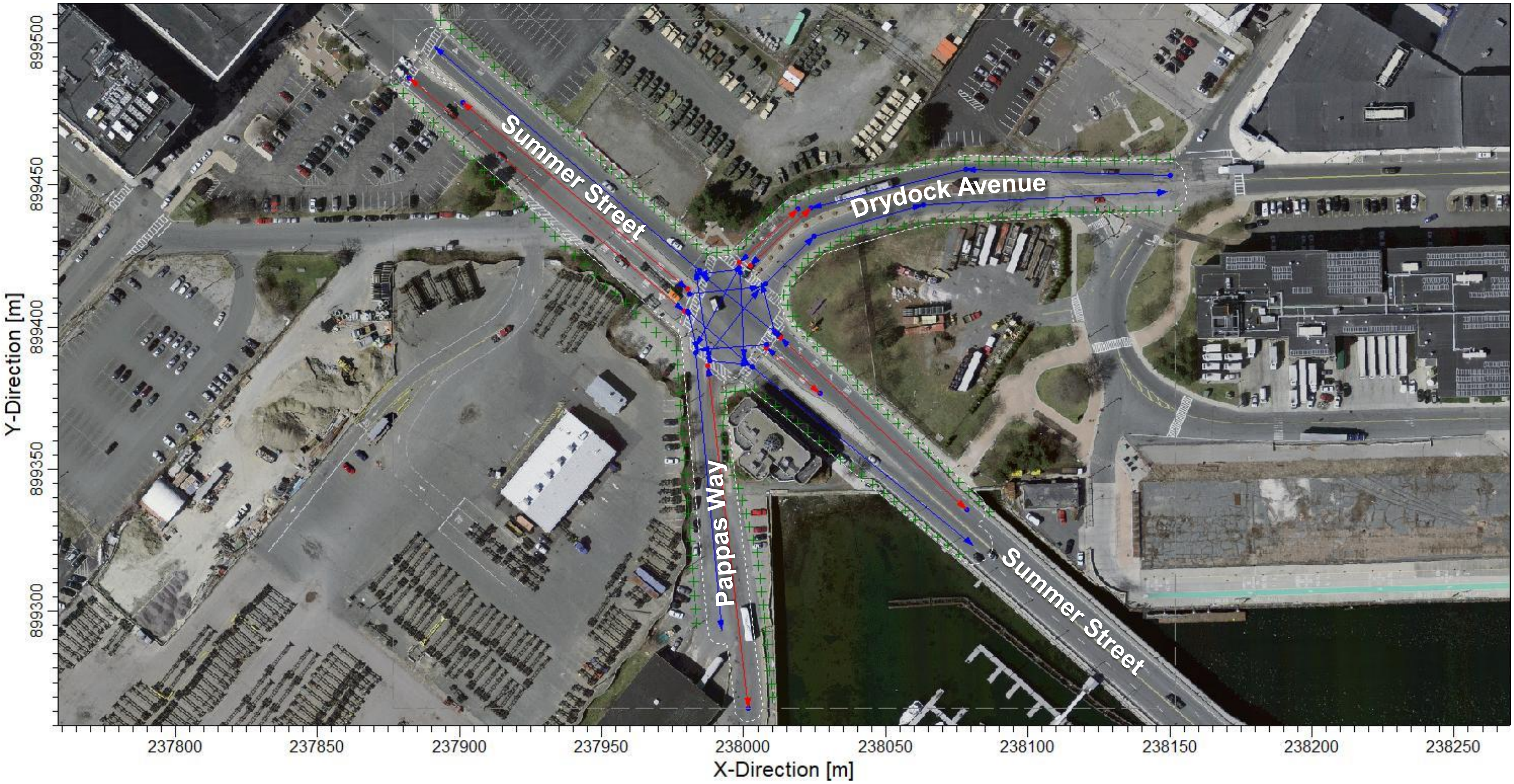


Figure 4-29

Intersection of D Street and Congress Street



2 Harbor Street Boston, Massachusetts

Figure 4-30

Intersection of Pappas Street, Drydock Street, and Summer Street

Mobile Source Air Quality Results

The results of the maximum 1-hour predicted CO concentrations from CAL3QHC are provided in Tables 4-6 through 4-8 for the 2019 Existing, 2024 No-Build, and 2024 Build scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.9.[10]

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 1-hour traffic-related concentration predicted in the area of the Project for the future modeled conditions (0.3 ppm) plus background (2.4 ppm) is 2.7 ppm. The highest 8-hour traffic-related concentration predicted in the area of the Project for the future modeled conditions (0.3 ppm) plus background (1.3 ppm) is 1.6 ppm. All concentrations are well below the 1-hour NAAQS of 35 ppm and the 8-hour NAAQS of 9 ppm. T

There is no discernable change to the modeled concentrations from the No-Build to Build cases; therefore, no adverse air quality impacts are anticipated to result from Project induced increased traffic.

Table 4-6 Summary of Microscale Modeling Analysis (Existing 2019)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
D Street and Congress Street	AM	0.3	2.4	2.7	35
	PM	0.4	2.4	2.8	35
Pappas Street, Drydock Street, and Summer Street	AM	0.3	2.4	2.7	35
	PM	0.3	2.4	2.7	35
8-Hour					
D Street and Congress Street	AM	0.3	1.3	1.6	9
	PM	0.4	1.3	1.7	9
Pappas Street, Drydock Street, and Summer Street	AM	0.3	1.3	1.6	9
	PM	0.3	1.3	1.6	9

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.

10 U.S. EPA, AERSCREEN User's Guide; EPA-454/B-11-001, March 2011.

Table 4-7 Summary of Microscale Modeling Analysis (No-Build 2024)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
D Street and Congress Street	AM	0.2	2.4	2.6	35
	PM	0.3	2.4	2.7	35
Pappas Street, Drydock Street, and Summer Street	AM	0.2	2.4	2.6	35
	PM	0.3	2.4	2.7	35
8-Hour					
D Street and Congress Street	AM	0.2	1.3	1.5	9
	PM	0.3	1.3	1.6	9
Pappas Street, Drydock Street, and Summer Street	AM	0.2	1.3	1.5	9
	PM	0.3	1.3	1.6	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

Table 4-8 Summary of Microscale Modeling Analysis (Build 2024)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
D Street and Congress Street	AM	0.2	2.4	2.6	35
	PM	0.3	2.4	2.7	35
Pappas Street, Drydock Street, and Summer Street	AM	0.2	2.4	2.6	35
	PM	0.3	2.4	2.7	35
8-Hour					
D Street and Congress Street	AM	0.2	1.3	1.5	9
	PM	0.3	1.3	1.6	9
Pappas Street, Drydock Street, and Summer Street	AM	0.2	1.3	1.5	9
	PM	0.3	1.3	1.6	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

4.5.4 Stationary Sources

Stationary sources of air pollution are typically units that combust fuel. In this case, these sources likely consist of heating and hot water units and emergency electrical generators. Cooling towers, although not a combustion source, are a source of particulate emissions. There is a small underground garage which will be vented according to Boston building codes.

It is expected that the majority of stationary sources (boilers, engines, etc.) may be subject to the MassDEP's Environmental Results Program (ERP). The Proponent will complete the required applications and submittals for the equipment, as necessary.

4.6 Flood Hazard Zones/Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the site located in the City of Boston - Community Panel Number 25025C0081J indicates the FEMA Flood Zone Designations for the site area. The map shows that the Project Site is within three different flood zones. Most of the Site is within Zone AE (El. 10 NAVD88 datum or El. 16.46 feet Boston City Base (BCB)), a portion is within Zone X having a 0.2 percent Annual Chance Flood Hazard, and a small portion along the Massport Haul Road is within Zone X, Area of Minimal Flood Hazard.

The project will raise the site elevation by approximately four feet to 20.5 BCB which is equivalent to the City's 2070 Sea Level Rise Design Flood Elevation (SLR DFE). Critical equipment will be raised to 21.5 BCB or above.

The Project will include either or both built-in or rapidly deployable flood barriers to prevent flood waters from entering into areas that cannot feasibly be raised such as that to the underground parking garage.

4.7 Geotechnical/Groundwater

4.7.1 Subsurface Soil Conditions

Grades across the Project site are relatively level, ranging from approximately El. 15 to El. 17 Boston City Base (BCB) Datum. Beneath the existing paved parking on the site are easements for the Central Artery Tunnel (CA/T) and BWSC sanitary and storm drain utilities.

Test borings were conducted at the site in the 1990s in association with the CA/T and in July 2019 by the Proponent. Table 4-9 presents the sequence of general subsurface units in order of increasing depth below ground surface at the Project Site.

Table 4-9 Subsurface Conditions

Stratum/Subsurface Unit	Top of Stratum Elevation (BCB)	Est. Stratum Thickness (ft)
Miscellaneous Fill	El. 15 to El. 17	18 to 24
Organic Soils	El. -2 to El. -9	5 to 16
Marine Deposits (Clay)	El. -13 to El. -19	43 to 70
Glacial Deposits	El. -61 to El. -89	2 to 10
Bedrock	El. -71 to El. -94	---

A test pit exploration program was also conducted in July 2019 to determine the depth to the top of the CA/T and to assess the composition of the soils placed as backfill above the CA/T. The test pit explorations indicated the depth to the top of the CA/T within the limits of the project site range from about 4.4 feet (at the west end) to 7.9 feet (at the east end) below existing site grades, which corresponds to about El. 12.5 to El. 8.4 BCB, and which is generally consistent with records provided by the MassDOT to the Proponent.

4.7.2 Groundwater

Groundwater levels were measured in July 2019 during test boring program and estimated to be about eight to ten feet below existing grade, which corresponds to about El. 6 to El. 8 BCB. The Project site is not located within the Groundwater Conservation Overlay District (GCOD).

Groundwater levels are anticipated to fluctuate with tidal changes, season, precipitation, nearby construction activities, nearby below-grade structures (e.g., CA/T structure) and other environmental factors.

4.7.3 Potential Impacts and Mitigation Measures

In general, potential impacts during excavation and foundation construction include temporary lowering of area groundwater levels, ground vibrations, noise, and ground movements outside the limits of the garage excavation. The foundation design and construction will be conducted to control and limit potential adverse impacts, particularly the CA/T and other to adjacent structures, and to groundwater levels.

Mitigation measures will be incorporated into the design and construction of the Project to limit potential adverse impacts to the CA/T and to other adjacent areas, including the following:

The Project team will conduct studies, prepare designs and specifications, and monitor the contractor's performance for conformance to the Project's contract documents with specific attention to protecting nearby structures and facilities, and preventing groundwater lowering. Selection and design of the foundation piles and excavation support system will be made with careful attention to mitigating adverse temporary and long-term effects outside the site.

- Performance criteria will be established in the Project specifications for the pile foundations and lateral excavation support system with respect to ground vibrations, movements, water tightness and the construction sequence of the below grade portion of the work. The contractor will be required to plan, employ, and modify as necessary, construction methods and take all necessary steps during the work to protect nearby structures and utilities.

- Instrumentation will be installed and monitored before and during the below grade portion of the work to observe the performance of the excavation, portions of the CA/T, adjacent structures and utilities, and area groundwater levels.

4.8 Solid and Hazardous Waste

4.8.1 Existing Hazardous Waste Conditions

Considering the historic fill placement and previous development at the site, the potential exists that the surficial fill materials could contain elevated concentrations of chemical constituents which may exceed applicable threshold values and require reporting to the Massachusetts Department of Environmental Protection (MassDEP) under the Massachusetts Contingency Plan (MCP) 30 CMR 40.0000. If reported, the site becomes a Listed Disposal Site under the MCP subject to Response Actions under a mandated timeline.

As part of the recent (July 2019) subsurface explorations, a limited, preliminary characterization of the environmental soil quality at the project site was conducted. Levels of benzo(a)pyrene were detected in soil because of the presence of ash and cinders noted at the exploration locations. However, the detected concentrations are considered to be exempt from reporting under the Massachusetts Contingency Plan (MCP) at 310CMR 40.0317(9).

Additional soil and groundwater chemical testing will be required prior to construction to characterize soils and groundwater for disposal and/or for obtaining construction dewatering permits. If the additional testing encounters a reporting condition, as is common for urban sites, a Licensed Site Professional (LSP) will be engaged and MassDEP will be notified and the appropriate studies performed as required under the MCP. Off-site soils disposal will be managed and documented per MassDOT and MCP requirements. Material Shipping Records, Bills of Lading and/or other records will be used as appropriate for tracking soil disposal.

4.8.1.1 Operational Solid and Hazardous Wastes

The project will generate solid waste typical of offices. Approximately 495tons/1000sf/year of solid waste is estimated to be produced. Solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by building management.

The project will include recycling areas for items such as paper, plastic, glass and cans.

The final tenant mix for the Property is not known at this time, but the Proponent anticipates that any laboratory/research and development/office use of the Project will generate the types and quantities of waste common to most laboratory research facilities. All future tenants of the Property will be required to handle any and all hazardous materials in accordance with all applicable environmental laws, prudent environmental practice, and good scientific/medical practice. This may include obtaining a waste water permit, as necessary, from the MWRA for effluent discharged from a research laboratory. Certain effluent from research laboratories is required to be contained, monitored, and treated in a pH neutralization process per MWRA requirements prior to being discharged to the sewer system.

4.9 Noise

4.9.1 Noise Regulations

The City of Boston has both a noise ordinance and noise regulations.

Chapter 16 §26 of the Boston Municipal Code sets the general standard for noise that is unreasonable or excessive: louder than 50 decibels between the hours of 11:00 p.m. and 7:00 a.m., or louder than 70 decibels at all other hours. The Boston Air Pollution Control Commission (APCC) has adopted regulations based on the City’s ordinance – *Regulations for the Control of Noise in the City of Boston*, which distinguish among residential, business, and industrial districts in the City. In particular, APCC Regulation 2 is applicable to the sounds from the proposed Project.

Table 4-10 presents the “Zoning District Noise Standards” contained in Regulation 2.5 of the APCC “Regulations for the Control of Noise in the City of Boston,” adopted December 17, 1976. These maximum allowable sound pressure levels apply at the line of the receiving property.

Table 4-10 City Noise Standards, Maximum Allowable Sound Pressure Levels

Octave-band Center	Residential Zoning District		Residential Industrial Zoning District		Business Zoning District	Industrial Zoning District
Frequency (Hz)	Daytime (dB)	All Other Times (dB)	Daytime (dB)	All Other Times (dB)	Anytime (dB)	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:

1. Noise standards from Regulation 2.5 “Zoning District Noise Standards”, City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976.
2. All standards apply at the property line of the receiving property.
3. dB and dBA based on a reference pressure of 20 micropascals.
4. Daytime refers to the period between 7:00 a.m. and 6:00 p.m. daily, except Sunday.

Additionally, the MassDEP has the authority to regulate noise under 310 CMR 7.10, which is part of the Commonwealth’s air pollution control regulations. According to MassDEP, “unnecessary” noise is considered an air contaminant and thus prohibited by 310 CMR 7.10. The MassDEP administers this regulation through Noise Policy DAQC 90-001 which limits a source to a 10-dBA increase above the L90 ambient sound level measured at the Project property line and at the nearest residences. The MassDEP 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.

4.9.2 Existing Conditions

A background noise level survey was conducted to characterize the existing “baseline” acoustical environment in the vicinity of the Project. Existing noise sources around the Project include: vehicular, bus and truck traffic along local streets, pedestrian traffic, mechanical and ventilation noise from surrounding structures, trucks loading from a nearby loading dock, construction noise from distant projects, overhead planes and helicopters, birds, and the general city soundscape.

4.9.3 Noise Monitoring Methodology

Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Therefore, daytime measurements were scheduled to avoid peak traffic conditions. Sound level measurements were made on Thursday, November 14, 2019 during the daytime (11:00 a.m. to 1:00 p.m.) and on Friday, November 15, 2019 during the nighttime hours (12:00 a.m. to 1:45 a.m.). All measurements were 20 minutes in duration.

Sound levels were measured at publicly accessible locations at a height of five feet above ground level, under low wind conditions, and with dry roadway surfaces. Wind speed, temperature, and humidity measurements were made with a Kestrel 3000 Pocket Wind Meter, which is equipped with an electronic wind speed indicator, temperature thermistor, and humidity sensor. Unofficial observations about meteorology or land use in the community were made solely to characterize the existing sound levels in the area and to estimate the noise sensitivity at properties near the Project.

4.9.4 Noise Monitoring Locations

The selection of the noise monitoring locations was based upon a review of zoning and land use in the Project Area. Four noise monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. These measurement locations are depicted on Figure 4-31 and described below.

- **Location 1** is located on the sidewalk in front of 1 Harbor street, southeast of the Project. This location is representative of the closest receptors southeast of the Project.

- **Location 2** is located on the sidewalk to the west of 306 Northern Ave at Harpoon Brewery, north of the Project. This location is representative of the closest receptors north of the Project.

- **Location 3** is located on the sidewalk to east of the parking lot/ loading dock at 1101 Haul Road, west of the Project This location represents the Silverline bus terminal adjacent to the western property line, along with the closest receptors immediately west of the Project.

- **Location 4** is located on the northern sidewalk of Channel Street, in front of AA Central Service Committee of Eastern Mass south of the Project. This location is representative of the closest receptors south of the Project.

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

2 Harbor Street   Boston, Massachusetts

Epsilon
ASSOCIATES INC.

Figure 4-31
Sound Monitoring Locations

4.9.5 Noise Monitoring Equipment

A Larson Davis Model 831 sound level meter equipped with a PCB PRM831 preamplifier, a PCB 377B20 half-inch microphone, and manufacturer-provided windscreen was used to collect background sound pressure level data. This instrumentation meets the "Type 1 - Precision" requirements set forth in ANSI S1.4 for acoustical measuring devices. The measurement equipment was calibrated in the field before and after the surveys with a Larson Davis CAL200 acoustical calibrator which meets the standards of IEC 942 Class 1L and ANSI S1.40-1984. Statistical descriptors (e.g., L_{eq}, L_{90}, etc.) were measured for each 20-minute sampling period, with octave-band sound levels corresponding to the same data set processed for the broadband levels.

4.9.6 Measured Background Sound Levels

Baseline noise monitoring results are presented in Table 4-11 and summarized below:

- The daytime residual background (L_{90}) measurements ranged from 61 to 71 dBA;
- The nighttime residual background (L_{90}) measurements ranged from 52 to 68 dBA;
- The daytime equivalent level (L_{eq}) measurements ranged from 70 to 73 dBA;
- The nighttime equivalent level (L_{eq}) measurements ranged from 62 to 68 dBA.

Table 4-11 Summary of Measured Background Sound Levels – November 14, 2019 (Daytime) & November 15, 2019 (Nighttime)

Location	Period	Start Time	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{90} Sound Pressure Level by Octave-Band Center Frequency (Hz)									
								31.5	63	125	250	500	1000	2000	4000	8000	16000
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB	dB
1	Day	12:00 PM	No data collected – meter malfunction														
2	Day	11:34 AM	70	90	73	67	61	67	67	64	59	57	57	51	42	32	25
3	Day	12:07 PM	70	84	73	67	61	67	68	65	59	56	57	52	41	32	25
4	Day	12:39 PM	73	87	73	72	71	67	72	69	67	69	67	63	56	44	32
1	Night	12:00 AM	62	79	64	59	58	61	70	66	56	54	52	50	41	32	23
2	Night	12:24 AM	63	78	66	57	52	61	64	59	50	49	48	41	29	21	23
3	Night	12:50 AM	63	83	64	56	55	62	62	59	52	50	50	45	36	32	26
4	Night	1:13 AM	68	74	68	68	68	63	65	66	63	62	63	61	55	43	25

Note: Sound pressure levels are rounded to the nearest whole decibel.

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Thursday, November 14, 2019	37°F	37%	Cloudy	SW @ 2-3 mph
Nighttime	Friday, November 15, 2019	42°F	57%	Cloudy	SW @ 2-4 mph

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	2155
Microphone	Larson Davis	377B20	112256
Preamp	Larson Davis	PRM831	16478
Calibrator	Larson Davis	Cal200	13675

4.9.7 Future Conditions – Overview of Potential Project Noise Sources

While the details of the mechanical equipment associated with the Project have not yet been precisely determined, steady operational noise from stationary sources will primarily be generated by rooftop equipment including: a cooling tower, rooftop, garage, and loading dock exhaust fans, make-up air units and an emergency generator.

At this time, the mechanical equipment and noise controls are conceptual in nature and, during the final design phase of the Project, will be specified to meet the applicable City of Boston and MassDEP noise limits. Reasonable efforts will be made, if necessary, to minimize noise impacts from the Project using routinely employed methods of noise control, including the:

- Selection of “low-noise” equipment models;
- Fitting of inlet and discharge vents with duct silencers;
- Addition of perforated baskets in the exhaust and supply fan segments of the Energy Recover Units (ERUs);
- Installation of screening barriers to provide shielding where appropriate;
- Use of sound-attenuating enclosures and/or acoustical blankets on continuously operating equipment with outdoor exposure;
- Siting of noisy equipment at locations that protect sensitive receptors by shielding or with increased distance, and/or;
- Limiting any routine testing of the emergency generator to daytime periods.

In summary, the proposed Project, with appropriate noise control, is not expected to result in any adverse noise impacts at nearby sensitive receptors. Short-term, intermittent increases in noise levels will occur during Project construction. However, every reasonable effort will be made to minimize the noise impacts and ensure the Project complies with the requirements of the City of Boston noise ordinance.

4.10 Construction Impacts

The proximity of city streets and abutting commercial properties to the site will require careful scheduling of material removal and delivery. Planning with the City and abutters will be essential to the successful development of the project.

A Construction Management Plan (CMP) will be submitted to the BTD for review and approval prior to issuance of a building permit. The CMP will define truck routes which will help in minimizing the impact of trucks on local streets.

Construction methodologies that ensure public safety and protect nearby businesses will be employed. Techniques such as barricades, walkways, painted lines, and signage will be used as necessary. Construction management and scheduling including plans for construction worker commuting and parking, routing plans and scheduling for trucking and deliveries, protection of existing utilities, maintenance of fire access, and control of noise and dust will minimize impacts on the surrounding environment.

Throughout project construction, a secure perimeter will be maintained to protect the public from construction activities.

4.10.1 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 excavation and construction include mechanical street sweeping, wetting portions of the Project site during periods of high wind, and careful removal of debris by covered trucks. The construction contract will provide for several strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts. 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.

In addition to measures to control earth material particulate dust, the contractor will also strive to minimize diesel emissions during construction. Specific measures to be taken to reduce diesel emissions and other construction related air quality impacts include the following measures:

- Using equipment retrofitted with diesel emissions control devices. The Proponent will specify during the procurement of the Subcontractors, that the majority of the heavy equipment operating on the Site be retrofitted with diesel emissions control devices;
- Maintaining an “idle free” work zone of fossil fuel trucks and equipment by providing supplemental hoisting and pumping equipment along with “just-in-time” delivery methods. On-site idling will be limited to five minutes. “Do Not Idle” signs will be posted at appropriate locations;

- By locating combustion engines away from sensitive receptors such as fresh air intakes, air conditioners and windows; and

- Using Ultra Low Sulfur Diesel for all trucks and construction machinery as required by the U.S. EPA.

4.10.2 Construction Noise

The Proponent is committed to mitigating noise impacts from the construction of the project. Periodic 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. Every reasonable effort will be made to minimize the noise impact of construction activities, including:

- 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.

4.10.3 Construction Waste Management

The Proponent is committed to minimizing construction waste. A comprehensive Construction Waste Management Plan (CWMP) will be developed for the Project to document the implementation of waste management controls and systems for the duration of the construction process. The CWMP is one component of an overall project objective to achieve LEED Gold Certification. This CWMP is a requirement of the construction specifications.

The CWMP calls for as much waste materials as economically feasible to be reused, salvaged, or recycled. Waste disposal in landfills is to be minimized to the greatest extent practicable. The contractor will monitor and track materials being recycled and disposed of to achieve 75 percent recycled materials by weight. For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per MassDEP Regulations for Solid Waste Facilities, 310 CMR 16.00. This requirement will be specified in the disposal contract.

4.11 Rodent Control

A rodent extermination certificate will be filed with the building permit application to the City. Rodent inspection monitoring and treatment will be carried out before, during, and at the completion of all construction work for the project, in compliance with the City's requirements. Rodent extermination prior to work commencement will consist of treatment of areas throughout the Project site.

4.12 Wildlife Habitat

The Project site is currently developed and within a fully developed urban area and, as such, the project will not impact wildlife habitats as designated on the National Heritage and Endangered Species Priority Habitats of Rare Species and Estimated Habitats of Rare Wildlife maps.

Chapter 5.0

Sustainability and Climate Preparedness

5.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

Sustainability, well-being and resiliency are key priorities for the proposed project. The Proponent will pursue LEED Gold certifiability and study the integration of principles from other certification programs, including WELL and Passive House. The project design will include numerous strategies aimed at meeting the more extreme weather conditions foreseen for the upcoming decades. Energy and water conservation, responsible resource selection, and environmentally friendly site design will be enhanced by features geared at occupant wellbeing and comfort.

5.1 Green Building

As required by Article 37 of the Code, the Project will show certifiability under the Leadership in Energy and Environmental Design (LEED) V4 Building Design and Construction (BD+C) rating system for Core and Shell projects. Where beneficial to the project, LEED V4.1 credits may be substituted as is permitted by U.S. Green Building Council (USGBC). The Project seeks to leverage the many benefits of its site location, including minimizing parking needs; encouraging the use of public transportation; and seeking construction, operating methods, and materials to minimize the Project’s environmental impact and provide for a high-quality experience for the buildings’ users. The project may seek LEED Certification. A description of the Project’s approach to showing compliance with LEED is provided in this section. The design team is currently targeting 60 points, which would earn LEED Gold if all identified credit points are attained. The LEED strategy will continue to be evaluated as the design progresses, and some credits may be added, while others may be determined to be unachievable. A preliminary LEED checklist is presented.

The approach to achieve certifiability under the LEEDv4 BD+C rating system is described below.

5.1.1 Integrative Process

The proposed project design is being guided by design, engineering, and ownership team meetings as well as advanced site analysis which will result in a planned building that is expected to produce significant energy and water savings while reducing the initial construction costs and improving occupant comfort. Simple box modeling will be conducted during the Schematic Design phase with an aim to target approximately 11-13 percent energy savings as compared to ASHRAE 90.1-2010 standard. The water savings are projected at 35-40 percent potable water savings.

5.1.2 Location and Transportation

The project is located on a previously developed site and is surrounded by existing buildings and infrastructure, providing easy access to multiple services and public transportation options (providing over 140 daily weekday trips). The project will study providing new pedestrian crosswalks to improve connectivity (possibly to the Silver Line Way mass transit stop, which

LEED v4 for BD+C: Core and Shell

Project Checklist

Project Name: 2 Harbor

Date: 11/20/2019

Y	?	N			
1			Credit	Integrative Process	1

Y	?	N		Location and Transportation	20
16	1	3		**Location and Transportation**	**20**
			Credit	LEED for Neighborhood Development Location	20
2			Credit	Sensitive Land Protection	2
		3	Credit	High Priority Site	3
6			Credit	Surrounding Density and Diverse Uses	6
6			Credit	Access to Quality Transit	6
1			Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1

Y	?	N		Sustainable Sites	11
8	1	2		**Sustainable Sites**	**11**
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
		2	Credit	Site Development - Protect or Restore Habitat	2
	1		Credit	Open Space	1
3			Credit	Rainwater Management	3
2			Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1
1			Credit	Tenant Design and Construction Guidelines	1

Y	?	N		Water Efficiency	11
6	1	4		**Water Efficiency**	**11**
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
2			Credit	Outdoor Water Use Reduction	2
3	1	2	Credit	Indoor Water Use Reduction	6
		2	Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

Y	?	N		Energy and Atmosphere	33
10	3	20		**Energy and Atmosphere**	**33**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
3	1	2	Credit	Enhanced Commissioning	6
5	1	12	Credit	Optimize Energy Performance	18
	1		Credit	Advanced Energy Metering	1
		2	Credit	Demand Response	2
		3	Credit	Renewable Energy Production	3
		1	Credit	Enhanced Refrigerant Management	1
2			Credit	Green Power and Carbon Offsets	2

Y	?	N		Materials and Resources	14
4	1	9		**Materials and Resources**	**14**
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
		6	Credit	Building Life-Cycle Impact Reduction	6
1		1	Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
	1	1	Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1		1	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

Y	?	N		Indoor Environmental Quality	10
7	3	0		**Indoor Environmental Quality**	**10**
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
3			Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
	3		Credit	Daylight	3
1			Credit	Quality Views	1

Y	?	N		Innovation	6
6	0	0		**Innovation**	**6**
5			Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

Y	?	N		Regional Priority	4
2	0	2		**Regional Priority**	**4**
		1	Credit	Regional Priority: Renewable energy production Required Point Threshold:	1
		1	Credit	Regional Priority: Optimize energy performance Required Point Threshold:	1
1			Credit	Regional Priority: Rainwater management; Required Point Threshold: 2	1
1			Credit	Regional Priority: Indoor water use reduction Required Point Threshold: 4	1

Y	?	N			
60	10	40		**TOTALS**	Possible Points: **110**

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 11

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could increase available daily rides to over 350 weekday rides per day). Building occupants choosing to walk or bike to the building will be provided with storage, changing and shower facilities. The project has a bike score of 71.

Over 2/3 of new parking will be provided under the building reducing the heat island effect and allowing the project to maximize vegetated and pedestrian oriented open space. The garage will include preferred parking spaces for the building occupants driving low-emitting and fuel-efficient vehicles, carpools and/or those who need an opportunity to re-charge their electric vehicles.

5.1.3 Sustainable Sites

Construction will meet all applicable federal, state and local environmental regulations. An Erosion and Sedimentation Control Plan will be implemented, monitored, and documented.

Stormwater infrastructure will meet the BWSC and BPDA requirements to retain the first 1.25 inches of stormwater onsite. The project is considering installation of on-site vegetation to allow for water retention during storm through infiltration, although infiltration opportunities are limited due to the location over tunnel.

The sidewalks and plazas will consist of light-colored materials to reduce the heat island effect. Street and plaza trees will provide shade and a pleasant experience for pedestrians and cyclists. The proposed project is considering installation of a cool roof and light-colored decking. The proposed project is also studying opportunities for building-mounted PV. Exterior lighting will be limited to preserve energy and prevent light pollution, while also providing on-site safety.

5.1.4 Water Efficiency

All vegetation planned for the project will be drought-resistant and, where possible, native. Potable water demand will be reduced by using sustainable practices such as proper species selection, drip irrigation and/or moisture sensors.

The building will be designed with the goal of being at least 35-40 percent more efficient than the LEED water baseline. Water efficient toilets will be specified, and all plumbing fixtures, including kitchen and bathroom faucets and showers, will be specified as ultra-low flow. Any installed appliances will also be water-saving.

5.1.5 Energy Efficiency

The project will implement building commissioning, including verification of systems submittals, equipment testing, and report all results back to the owner. The design will be energy efficient, featuring a building envelope with high performance glazing, high wall and roof R-values, and reduced infiltration. Building mechanical equipment will include efficient heating and cooling systems and reduced lighting power density. The building will have a full Energy Management and Control System (EMCS) and designed to be least 11-13 percent more efficient than the LEED energy baseline (ASHRAE 90.1-2010) by cost.

All building heating, ventilation, air conditioning, and refrigeration (HVAC&R) systems will be free from chlorofluorocarbons. Additionally, the project will explore procuring renewable energy certificates and carbon offsets to further mitigate the environmental impact of the building and support renewable energy production.

5.1.6 Materials and Resources

The project will institute a robust Construction Waste Management plan that includes tracing for all waste materials leaving the site. At least 75 percent of demolition and construction waste and at least four material streams will be recycled, with the potential for a higher landfill diversion rate due to project location and experience of the construction team. The material selection will focus on sustainable materials with high recycled content and/or regionally sourced as available, including steel, concrete, fenestration and glazing, and building finishes and sustainably harvested wood.

As the design progresses, the available solutions will be analyzed to fulfill the USGBC's requirements for Building Product Disclosure and Optimization (BPDO), including environmental product declarations and material ingredients.

The project will include dedicated areas to collect single-stream recycling items (including glass, plastic, metal/cans, paper, and cardboard), consistent with the City of Boston and LEED requirements. Additional waste management options will be provided for safe collection and disposal of batteries and electronic waste.

5.1.7 Indoor Environmental Quality

The project will emphasize the selection of systems and material solutions that will provide superior indoor air quality for building occupants. ASHRAE 62.1 specifies minimum ventilation rates and other measures intended to provide indoor air quality that is acceptable to human occupants and that minimizes adverse health effects. Enhanced indoor quality strategies will include an entryway system, interior cross-contamination prevention, advanced filtration and/or carbon dioxide monitoring.

The finishes selection will include zero and low volatile organic compound (VOC) products, including paints, coatings, adhesives, and sealants. Any selected flooring materials, including hardwood, laminate, and carpet will be non/low-emitting and tested or certified to the appropriate LEED-accepted standards. Finish cabinetry and millwork will not contain added urea formaldehyde and will be tested to ensure ultra-low formaldehyde emissions. Ceiling and wall products will be tested to comply with appropriate LEED emissions standards.

The general contractor will be required to implement an Indoor Air Quality Management Plan, including strategies such as protection of absorptive materials from moisture, appropriate storage of materials, good practices for construction scheduling, verification of selected finish materials, prevention of moisture/condensation and mold, elimination of dust from construction activities, and proper handling of any required HVAC equipment/ductwork. All proposed materials and finishes will be presented for verification and acceptance to the sustainability consultant to ensure compliance with LEED-requirements.

The project will be smoke-free during construction and post occupancy. To minimize and control the entry of pollutants into buildings and subsequent cross-contamination of regularly occupied areas, the buildings will feature walk off mats, local exhaust systems and self-closing doors where required by LEED.

The building will feature large expanse windows designed for optimal daylighting and views to the outdoors. Appropriate, high performance glazing will be selected to maximize light, reduce heat gain and glare and provide unobstructed views. The project will study the integration of smart building systems by the tenants to allow for controllability of lighting and temperature, allowing building occupants to make adjustments to suit their needs.

5.1.8 Innovation in Design and Regional Priority

The project may implement numerous Innovation in Design strategies including an occupant education campaign, green cleaning, exemplary performance credits and/or potentially a few pilot credits, such as lead risk reduction, green training for contractors, as well as social equity within design and construction team. Available Pilot Credits, Regional Priority Credits and Boston Green Credits are current being researched and considered.

5.2 Solar PV Analysis

The project team is evaluating the local generation of electricity with the use of photovoltaic panels. Given the limitations posed by the FAA height limit and the need for significant mechanical equipment at the roof level to support the lab occupancy, the use of the main roof for photovoltaic panels is not viable. At the ground plane, the northwest corner of the site will receive significant shading throughout the year from the proposed building and is not viable for the efficient use of photovoltaics. The proposed character of the parking area at the southern portion of the site is based on significant tree canopies and other vegetation to turn a 'surface parking lot' into a desirable 'landscaped drive court' which is in conflict with the application of photovoltaics. Additionally, this area is somewhat shaded by the existing 12 Channel Street building. The team has identified three potential applications (referred to as Scenario #1, #2, & #3) for the use of solar on specific portions of the 2nd floor amenity roof and a portion of the upper roof positioned to the south/southeast of the mechanical equipment zone. The design team will continue to evaluate these potential applications including gaining a better understanding of the real cost of installation given the specific configuration and limitation of this site. Refer to Figures 5-1 and 5-2 for the location of each area as well as the calculated potential solar output of panels which could be installed in each location.

5.3 Geothermal Feasibility Analysis

The design team will examine the possibility of configuring the building to use an all-electric system for the building Heating Ventilating and Air Conditioning system. Such a system would deploy standing column (open loop) geothermal wells to provide heating and cooling. Each standing column well could be expected to produce between 20 and 25 tons of cooling (and equivalent heating capacity) capacity for the building. In addition to providing appropriate spacing to achieve the required heat transfer, the wells would need to be located so as not to conflict with site constraints both on the site as it exists now as well as those imposed by the development. The constraints would include the Ted Williams tunnel which passes underneath the northwest portion of the site, piles beneath the existing building which will be abandoned in place at the southern portion of the site, existing utility easements on the site, and the proposed building footprint with parking below grade. In addition, the layout must take into account the installation of piping from each well to a mechanical room located within the proposed building as well as the ability to service the wells in the future.

The Proponent will continue design studies to examine the feasibility, capital cost, operating costs, and energy savings that would be realized to make a determination on whether and how such a system might be deployed.

5.4 Zero Carbon Building Assessment

In response to the recent BPDA's Zero Carbon Building Assessment memo, the design team is engaged in a study of how building envelope and building system efficiency coupled with local production of renewable energy (as preliminarily discussed above for PV and geothermal) can allow the team to prepare a strategy that provides a pathway to zero net energy. The team is evaluating a range of strategies which will be studied to understand the impact on building program and configuration, capital cost, energy savings (using the currently developed energy model) and long term maintenance and operations costs. Potential strategies will be evaluated on a life cycle basis over a 20 - 30 year time frame. The study outcome will include a roadmap for how the building can be configured to allow for evolution over time to an ultimate goal of carbon neutrality.

The preliminary assessment is discussed below and follows the outline of the Zero Carbon Building Assessment as provided by the BPDA.

Scenario #1 - Second Floor Trellis Solar Installation 884 SF

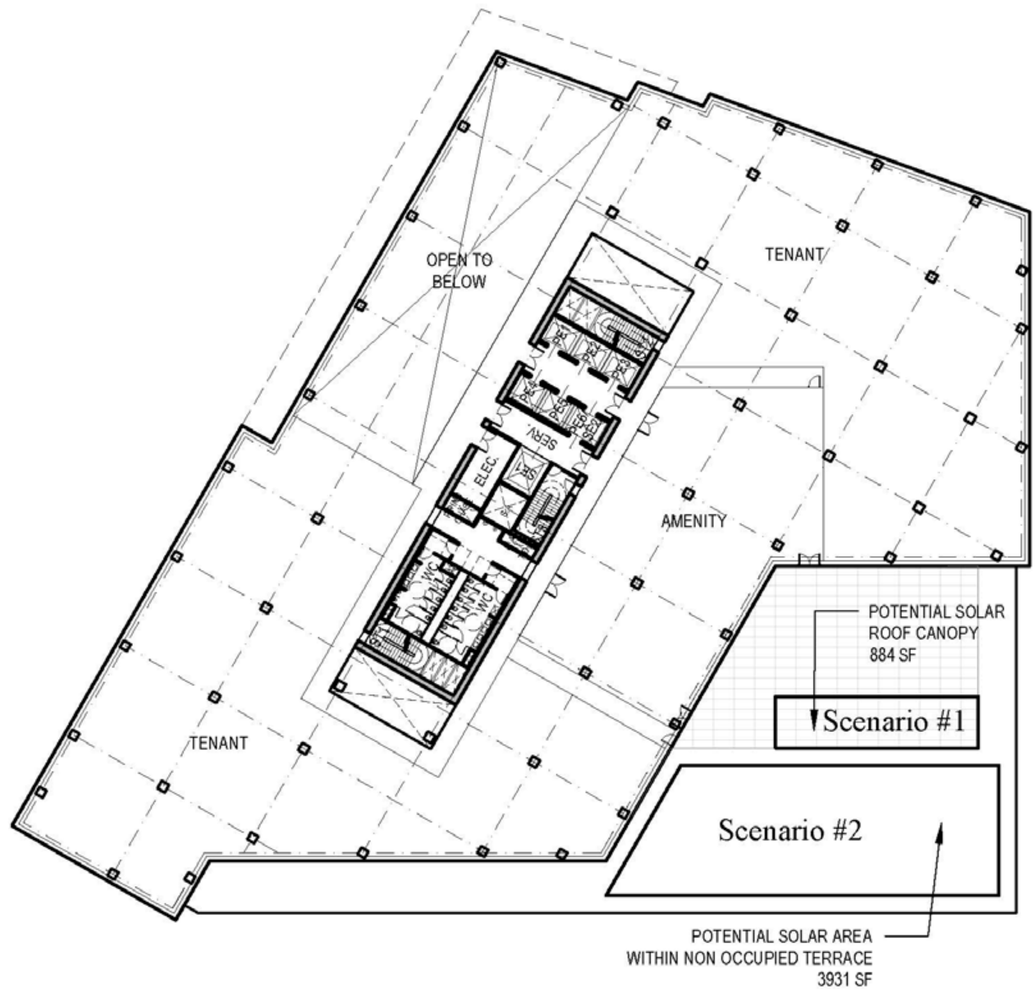
Location and Station Information	Installation Location	2 Harbor Street Boston MA
	Weather Data Source	Lat, Lon 42.33, -71.02
	Lattitude	42.33 N
	Longitude	71.02 W
	PV Area	884 SF
PV System Specifications	DC System Size	12.0 kW
	Array Type	Fixed (Roof Mounted)
	Arrary Tilt	20 Degree
	Arrary Azimuth	180 Degree
	System Losses	14.8%
	Inverter Efficiency	96%
	Retail Electricity Rate	0.138 $/kWh

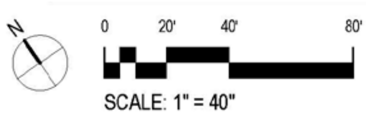
Results	**Month**	**Solar Radiation**	**AC Energy (kWh)**	**Energy Value (USD)**
	January	3	920	$127.00
	February	3.86	1,041	$144.00
	March	4.67	1,372	$190.00
	April	5.36	1,434	$199.00
	May	5.74	1,565	$217.00
	June	5.97	1,537	$213.00
	July	6.2	1,610	$223.00
	August	5.83	1,529	$212.00
	September	5.19	1,340	$185.00
	October	3.7	1,020	$141.00
	November	2.85	811	$112.00
	December	2.54	760	$105.00
Total			14,939	$2,068.00

Scenario #2 - Second Floor Roof Solar Installation 3,990 SF

Location and Station Information	Installation Location	2 Harbor Street Boston MA
	Weather Data Source	Lat, Lon 42.33, -71.02
	Lattitude	42.33 N
	Longitude	71.02 W
	PV Area	3,990 SF
PV System Specifications	DC System Size	54.4 kW
	Array Type	Fixed (Roof Mounted)
	Arrary Tilt	20 Degree
	Arrary Azimuth	180 Degree
	System Losses	14.8%
	Inverter Efficiency	96%
	Retail Electricity Rate	0.138 $/kWh

Results	**Month**	**Solar Radiation**	**AC Energy (kWh)**	**Energy Value (USD)**
	January	3	4,171	$577.00
	February	3.86	4,718	$653.00
	March	4.67	6,221	$861.00
	April	5.36	6,502	$900.00
	May	5.74	7,095	$982.00
	June	5.97	6,968	$964.00
	July	6.2	7,299	$1,010.00
	August	5.83	6,931	$959.00
	September	5.19	6,075	$841.00
	October	3.7	4,625	$640.00
	November	2.85	3,676	$509.00
	December	2.54	3,445	$477.00
Total			67,726	$9,373.00





2 Harbor Street Boston, MA

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Figure 5-1
Solar PV Study Scenarios 1 and 2

Scenario #3 - Upper Roof Solar Installation 3,300 SF

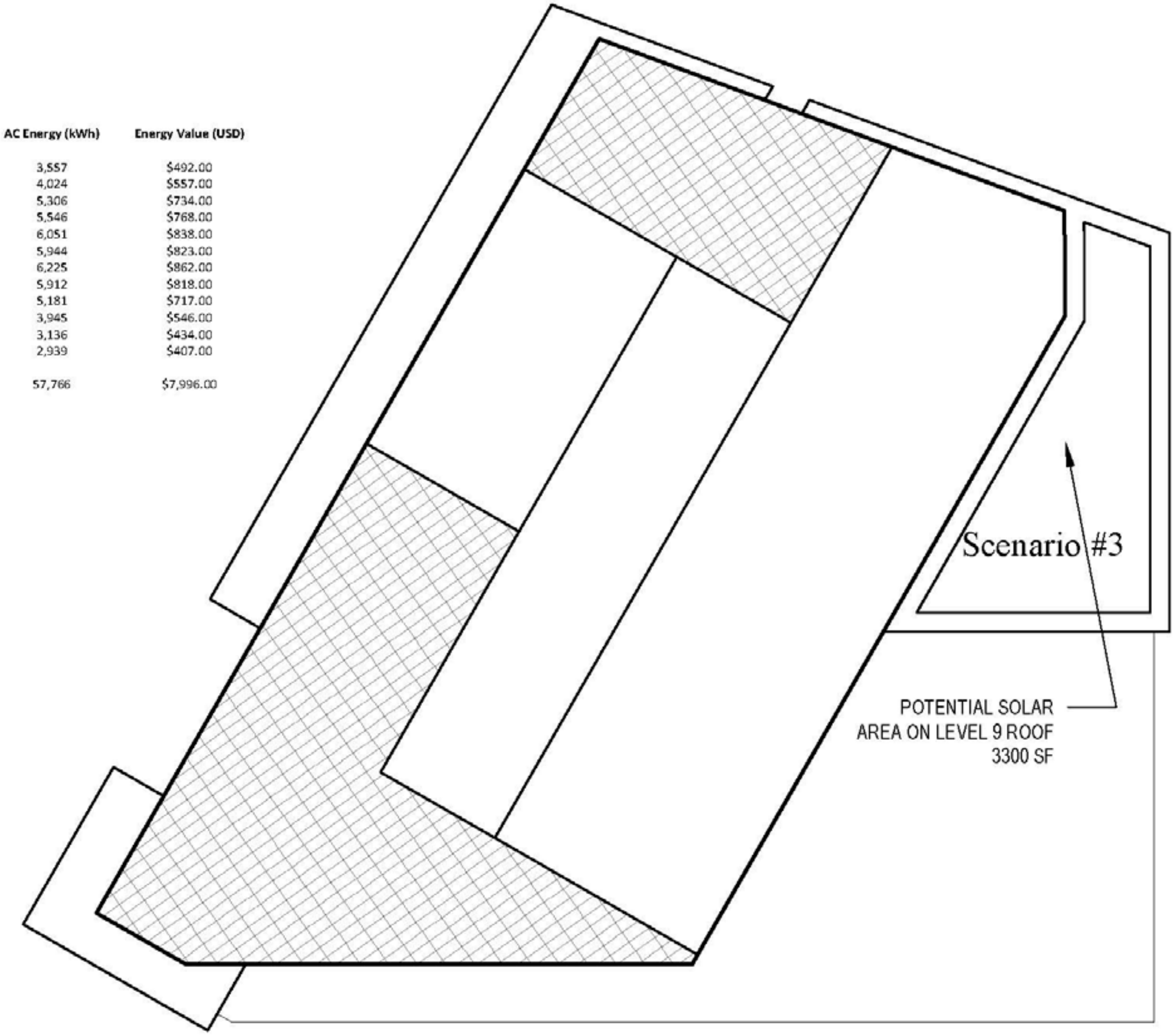
Location and Station Information

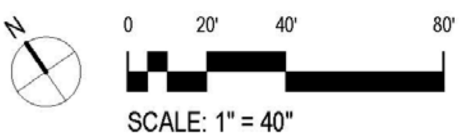
Installation Location	2 Harbor Street Boston MA
Weather Data Source	Lat, Lon 42.33, -71.02
Lattitude	42.33 N
Longitude	71.02 W
PV Area	3,300 SF

PV System Specifications

DC System Size	46.4 kW
Array Type	Fixed (Roof Mounted)
Arrary Tilt	20 Degree
Arrary Azimuth	180 Degree
System Losses	14.8%
Inverter Efficiency	96%
Retail Electricity Rate	0.138 $/kWh

Results	Month	Solar Radiation	AC Energy (kWh)	Energy Value (USD)
	January	3	3,557	$492.00
	February	3.86	4,024	$557.00
	March	4.67	5,306	$734.00
	April	5.36	5,546	$768.00
	May	5.74	6,051	$838.00
	June	5.97	5,944	$823.00
	July	6.2	6,225	$862.00
	August	5.83	5,912	$818.00
	September	5.19	5,181	$717.00
	October	3.7	3,945	$546.00
	November	2.85	3,136	$434.00
	December	2.54	2,939	$407.00
Total			57,766	$7,996.00





2 Harbor Street Boston, MA

5.4.1 Building Energy Loads

The Project building meets the updated code requirement to have energy consumption a minimum of 10 percent below an ASHRAE 90.1-2013 baseline with C406 improvements). As currently designed, the estimated annual energy cost for the Project is reduced by approximately 10.5 percent compared to the baseline, while site energy use is reduced by approximately 43.9 percent. With the proposed design, the energy consumption of the overall Project is expected to result in an estimated GHG emissions of 3,491 tons per year, which represents an approximately 30 percent reduction from the baseline.

5.4.2 Available On-Site Renewable Energy

The design team has made a preliminary analysis of the potential for solar PV and geothermal on-site energy production as described above in Sections 5.2 and 5.3, respectively. Both options have considerable challenges due to space limitations on the Project site.

5.4.3 Off-site Renewables, Clean Energy Sources and Credits

To achieve zero carbon, Project emissions would need to be offset. The Proponent will evaluate potential renewable energy credits (RECs) and other measures that could make the building zero carbon.

5.4.4 First and Life Cycle Cost Assessment

The GHG mitigation measures included in the energy modeling come with a cost premium. Incentives and operational savings will be weighed against the additional cost to implement each of the measures. The Proponent is obtaining costs associated with these measures. Once added costs are determined, the alternative that makes the most fiscal, design, construction, operation, and environmental sense will be selected.

5.5 Climate Change Adaptability

5.5.1 Introduction

Resiliency will be an important aspect of the project – the planned strategies will allow for mitigation of potential effects of climate change such as sea level rise, more intense rain events, drought conditions, and increased number of high-heat days. The project currently plans for improved energy efficiency to reduce reliance on fossil fuel and greenhouse gas emissions, strategic placement of the building systems and equipment to avoid potential flood damage, placing the base building level at higher elevation to prepare for the rising sea levels, responsive building management system, selection of native drought-resistant landscaping as well as the use of ultra-low flow and low flush plumbing fixtures.

A copy of the completed Climate Resiliency Checklist is included in Appendix D. Responses may be updated as the project design progresses.

5.5.2 *Sea Level Rise*

The project will raise the site elevation by approximately four feet to El. 20.5 BCB which is equivalent to the City's 2070 Sea Level Rise Design Flood Elevation (SLR DFE). Critical equipment will be raised an additional foot to 21.5 BCB.

5.5.3 *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, using high reflectance roofing materials, and constructing a high performance building envelope.

5.5.4 *Rain Events*

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. Recognizing this potential, the Proponent will take measures to minimize stormwater runoff 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 promote runoff recharge to the greatest extent practicable.

5.5.5 *Drought Conditions*

Although more intense rainstorms 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 is anticipated to incorporate native and adaptive plant materials and high efficiency irrigation systems will be installed. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies.

[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.

Chapter 6.0

Urban Design

6.0 URBAN DESIGN

6.1 Project Setting

The project site is located in a transitional area at the intersection of the emerging higher-density residential and commercial mixed-use South Boston Waterfront/ Massport Commonwealth Flats area and the more industrial and lower density RLFMP. The project site is separated from the mixed-use waterfront by the Massport Haul Road, a critical link in the region's commercial vehicle and truck circulation network. Northern Avenue, an important district connector, forms the northern boundary of the project site. While currently configured to primarily accommodate the needs of commercial vehicular traffic, Northern Avenue is emerging as an important link for both commercial and non-commercial vehicles, mass transit (both public buses and private shuttles) as well as for pedestrians and bicyclists. Similarly, Harbor Street, a critical link between Northern and Drydock Avenues, is transitioning from a primarily commercial vehicle corridor, into a multi-modal and multi-purpose street.

6.2 Building Massing Relationships

A signature publicly accessible plaza is located at the gateway to the RLFMP along Northern Avenue near the intersection with the Massport Haul Road. This plaza extends a series of open spaces stretching across the South Boston Waterfront from Seaport Square to the RLFMP along both sides of Northern Avenue. The primary building mass is set back from this gateway plaza, acts as a backdrop to this publicly accessible plaza, and helps to define street walls along Northern Avenue and Harbor Street. This variation of heights extends the syncopated rhythm of taller street-wall defining masses interspersed with smaller scaled pavilions and open spaces along both sides of Northern Avenue. The angled segment of Northern Avenue adjacent to the site makes the proposed project highly visible from both the east and the west.

The size and scale of the building mass on Harbor Street is generally consistent with buildings further south on Harbor Street including 12 Channel Street, the Skanska building, and the Parcel A hotel, helping to complete this emerging urban spine.

The 20-foot to 25-foot setback along Harbor Street creates a more generous public realm on the west side of Harbor Street to improve the pedestrian experience between Northern and Drydock Avenues.

6.3 Materials

The building is articulated as two lofted volumes – one primarily oriented towards the gateway intersection of Northern Avenue and the Massport Haul Road and the other anchoring the intersection of Northern Avenue and Harbor Street – both cradled and anchored to the site by a dominant central volume and one-story base. The building envelope will consist primarily of a unitized curtain wall. The two lofted volumes are articulated with a gridded lattice of horizontal and vertical mental fins and panels to provide depth and to break down the building's scale. The volume oriented towards the gateway of Northern Avenue and the Massport Haul Road is notched to further help break down the scale, to provide an exterior terrace, and to frame the main lobby volume. The dominant central volume and one-story base is articulated with a faceted/corrugated metal panel façade. A heavily glazed 'jewel box' lobby anchors the northwest corner of the building, highlighting the lobby's dual access points at Northern Avenue and from the gateway plaza. The selection of metal panel for the exterior cladding is rooted in the history of the site which once housed naval repair facility. The surrounding area was also characterized by metal framed warehouse structures. While different metal types will be explored, for the two lofted volumes, bronze anodized aluminum is being strongly considered for its vibrant coloration which changes throughout the course of the day and in response to the sun's position and intensity, and for the dominant volume and one-story podium a medium gray faceted/corrugated metal panel is being strongly considered for its contrasting coloration from the lofted volumes' lattices. The metal panel here will be faceted and/or corrugated to provide depth and visual interest in a contemporary reinterpretation of the traditional metal-clad industrial warehouse.

Chapter 7.0

Historic and Archaeological Resources

7.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This Chapter describes the historic and archaeological resources located on and in the vicinity of the Project Site.

7.1 Project Site

The project site is located in South Boston's Seaport district and is situated within the Raymond L. Flynn Marine Park (RLFMP). The site comprises two parcels: Parcel T-1 to the west and Parcel T to the east. The parcels are bound by Northern Avenue to the north, Harbor Street to the east, 12 Channel Street and Channel Street itself to the south, and the Massport Haul Road to the west. The Ted Williams Tunnel (I-90) passes beneath the northwest portion of the site within a subsurface easement. The project site includes an existing two-story steel warehouse building.

7.1.1 Historic Resources on the Project Site

The Project site is located within the former South Boston Naval Annex/Boston Army Supply Base area (MHC# BOS.RT), which is included in the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth ("the Inventory"). The South Boston Naval Annex/Boston Army Supply Base area has been determined eligible for listing in the National Register of Historic Places by the MHC and is the subject of a pending National Register nomination currently under review by the MHC. However, the Project site is not currently listed in either the State or the National Registers of Historic Places.

The South Boston Naval Annex/Boston Army Supply Base area contains early and mid-twentieth century military industrial buildings and structures. The South Boston Naval Annex was initially developed in the early twentieth century by the Commonwealth of Massachusetts in an effort to spur the maritime economy and was further developed as a World War II-era ship repair and maintenance facility associated with the Charlestown Navy Yard. The Annex closed in 1974 and the majority of the area was transferred to the City of Boston Economic Development Industrial Corporation (EDIC) and State of Massachusetts (Massport) for future development and continued use as a shipyard for commercial vessels. The adjacent Boston Army Supply Base was developed in response to the United States entry into World War I and the need to provide military shipping facilities. Completed only after the end of the War, the base was used primarily for the return of troops and supplies and temporary storage. The base was later made available for private uses and a portion is now within the RLFMP.

The site includes one property, located on Parcel T: the Boston Army Supply Base Building 19 (MHC# BOS.12946). Parcel T-1 is vacant. Building 19 was constructed in 1941 for the Navy by the Sawyer Construction Company. The warehouse structure is a two-story steel-frame structure on a raised concrete foundation. The building has a combination of flush board and metal cladding with eight over eight double hung windows, some of which are boarded over.

Enclosed loading docks are located on the east and west sides of the building sheltered by metal shed roofs. Large overhead doors are located at the northern end of the building on the west elevation. Six saw tooth ventilators are located along the tar and gravel roof.

Citing the building's lack of significance, in 2008 the Boston Landmarks Commission (BLC) granted approval under Article 85 of the Boston Zoning Code to demolish the warehouse building currently on the site.

7.1.2 Historic Resources within the Vicinity of the Project Site

The site is in the immediate vicinity of several buildings associated with the South Boston Naval Annex/Boston Army Supply Base. Additionally, the proposed Project is located within the vicinity of additional historic resources listed in the State and National Registers of Historic Places and the Inventory.

Table 7-1 lists State and National Register listed properties and historic districts and inventoried areas located within a quarter-mile radius of the project site. Figure 7-1 depicts the locations of these properties and historic districts.

Table 7-1 Historic Resources

No.	Historic Resource	Address	Designation*
1	Commonwealth Pier Six	212-234 Northern Avenue	NRDIS
2	South Boston Naval Annex/Boston Army Supply Base Area	South Boston	INV
3	C Street Industrial Area	South Boston	INV

Designation Legend:
NRDIS National Register of Historic Places historic district
INV Included in the Inventory of Historic and Archaeological Assets of the Commonwealth

7.1.3 Archaeological Resources on the Project Site

A review of the MHC's online archaeological base maps conducted on September 4, 2019 revealed no known recorded archaeological sites within the Project Site. The Site consists of previously filled and disturbed land. Due to previous ground disturbance activities and other improvements, including the construction of the existing building on the Site and other activities, it is unlikely that the Project Site contains significant archaeological resources.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

2 Harbor Street **Boston, Massachusetts**

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Figure 7-1

Historic Resources Map

7.2 Impacts to Historic Resources

Potential urban design and shadow impacts of the new construction on historic resources have been considered and are summarized below.

7.2.1 Demolition of Historic Resources

The Boston Army Supply Base Building 19 (MHC# BOS.12946), constructed in 1941 will be demolished. As noted above, due in part to the building's lack of significance the BLC approved the demolition of the building in 2008 under Article 85 of the Boston Zoning Code. The Project Site is located within the former South Boston Naval Annex/Boston Army Supply Base area (MHC# BOS.RT), which is included in the Inventory and is the subject of a pending National Register nomination currently under review by the MHC.

7.2.2 Urban Design

The Project involves the construction of a 10-story building comprising approximately 381,000 square feet of laboratory, office, and research and development space. Surface and below grade parking will also be constructed. The design of the building is responsive to both the historically industrial military character of the RLFMP as well as recent mixed-used construction in the adjacent South Boston Waterfront area.

A signature public plaza will be constructed at the northwest corner of the site, which serves as a prominent gateway to the RLFMP. The plaza will have frontage along Northern Avenue and extends open spaces stretching from Seaport Square to the RLFMP.

The proposed building will be constructed on an irregular footprint primarily oriented facing towards the Seaport District and downtown with frontage along Harbor Street to the east and Northern Avenue to the north. The building features two lofted volumes – one primarily oriented towards the gateway intersection of Northern Avenue and the Massport Haul Road and the other anchoring the intersection of Northern Avenue and Harbor Street. A gridded lattice of horizontal and vertical metal fins provides depth and breaks down the building's scale. A highly glazed 'jewel box' lobby will anchor the northwest corner of the building. The selection of metal for the exterior cladding is rooted in the history of the site and surrounding area which were historically characterized by metal framed warehouses. The first-floor podium will be faceted or corrugated metal, providing further depth and visual interest and will serve as a contemporary reference to area industrial architecture.

Parking will be located to the south of the gateway plaza and will be accessed by an internal drive from Northern Avenue. An additional surface parking area will be located to the south of the proposed building and will have entrances from Northern Avenue and an existing connection between Channel Street and the Massport Haul Road. Access to below grade parking will be from this south parking area.

Public realm improvements include street trees, plantings, and street furniture. Improvements to the roadways and sidewalks surrounding the project will continue to support the needs of truck traffic while enhancing conditions for additional pedestrians and cyclists.

7.3 Shadow Impacts

Shadow impact analyses were conducted to demonstrate the anticipated impacts from the Project. These consisted of standard shadow studies 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 at 6:00 p.m. during the summer solstice and vernal equinox.

As discussed in Section 4.1.2, the shadow analysis for the Project demonstrates that net new shadow will be limited in extent and duration. New shadow from the Project will largely be limited to the streets and sidewalks adjacent to the Site, and no new shadow will be cast onto State or National Register listed resources in the vicinity of the Site.

The results of these shadow studies are included in Section 4. 2 and shown in Figures 4-9 through 4-12

7.4 Wind Impacts

The Project entails the construction of a ten story building. Pedestrian wind safety and comfort studies demonstrate that within the surrounding area, wind conditions at pedestrian level will be substantially unchanged. An improvement in wind conditions is predicted to the north and south of the site. A limited number of locations surrounding the building will see higher wind speeds, however, these conditions may be ameliorated by the introduction of canopies, windscreens, and landscaping interventions.

The results of these wind studies are included in Section 4.1 and shown in Figures 4-1 through 4-8.

Chapter 8.0

Infrastructure Systems Component

8.0 INFRASTRUCTURE SYSTEMS COMPONENT

This Chapter discusses the proposed Project's sanitary wastewater system, water demand, stormwater management, and other utilities.

8.1 Sanitary Wastewater System

8.1.1 Existing Sanitary Wastewater System

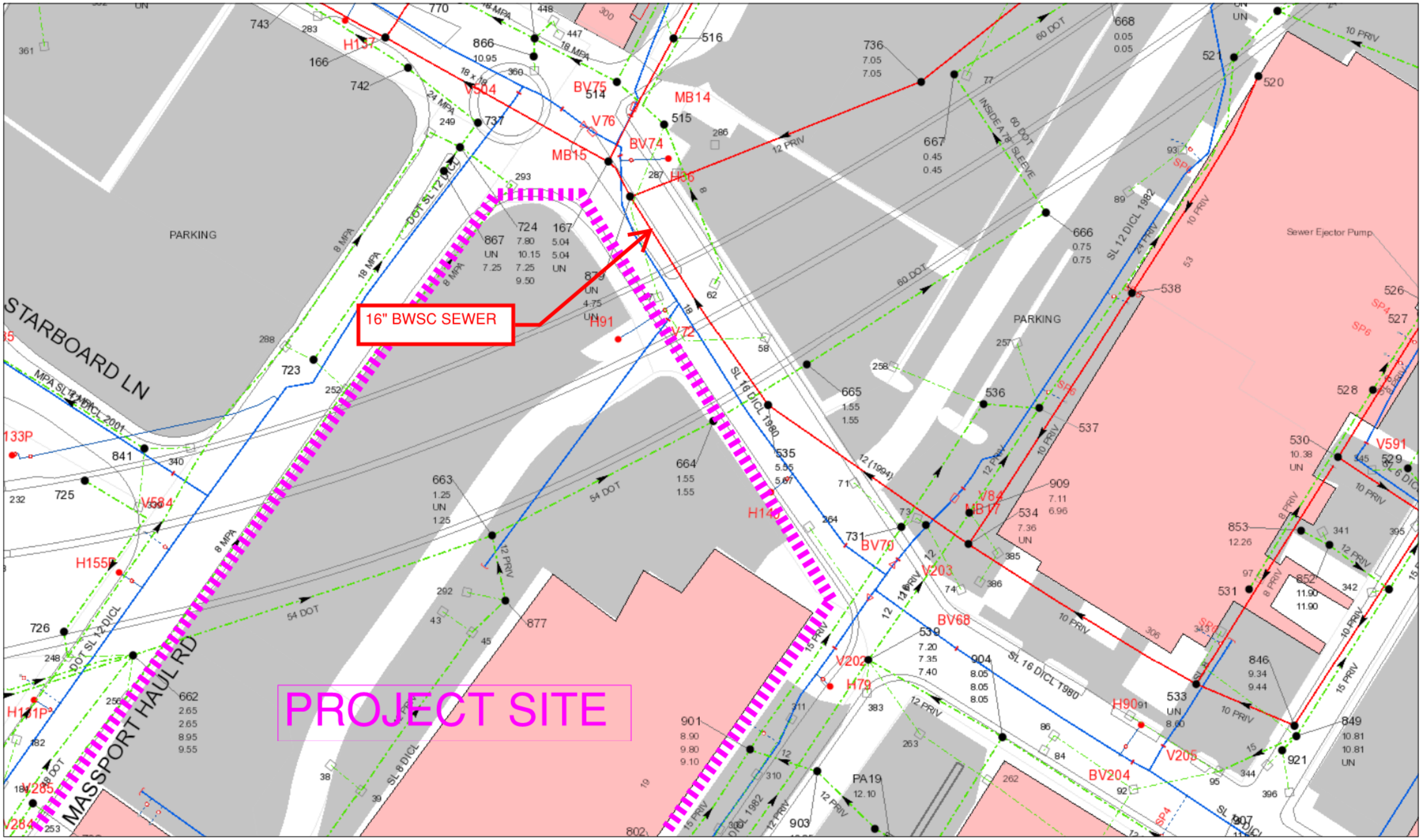
The sanitary wastewater system in the vicinity of the project site is owned, operated, and maintained by Boston Water and Sewer Commission (BWSC). It is depicted on Figure 8-1. There is an existing 16-inch sewer line located beneath Northern Avenue adjacent to the project site. The sewer flows northwest through the Seaport District, eventually flowing to the Deer Island Waste Water Treatment Plant.

8.1.2 Wastewater Generation

The proposed project's sewage generation rates were estimated using 310 CMR 15.00, The State Environmental Code Regulating Septic Systems (Title 5). 310 CMR 15.203 lists typical generation values. For Lab, the value is 75 gallons per 1,000 square feet. Therefore, based on approximately 748,350 sf of lab space, wastewater generation is estimated to be 56,125 gallons per day. These generation values are generally conservative and actual volumes are likely to be less.

8.1.3 Sewage Capacity and Impacts

The proposed project's impact to the BWSC system in Northern Avenue was analyzed. The existing sewer system capacity calculations are presented in Table 8-1.



BOSTON WATER AND SEWER

0 30 60 120 180 240 Feet

harbor st at northern ave

2 Harbor Street Boston, MA

Epsilon ASSOCIATES INC.

Figure 8-1
Existing Sewer System

Table 8-1 Sewer Hydraulic Capacity Analysis

Manhole (BWSC Number)	Distance (feet)	Invert Elevation (up)	Invert Elevation (down)	Slope (%)	Diameter (inches)	Manning's Number	Flow Capacity (cfs)	Flow Capacity (MGD)
534 to 535	187	7.60	5.70	1.0%	12	0.013	3.59	2.32
535 to 879	193	5.60	4.60	0.5%	18	0.013	7.56	4.89
879 to 167 *	32	4.60	4.80	0.1%	18	0.013	3.32	2.15
167 to 166	268	5.07	4.75	0.1%	18	0.013	3.63	2.35

Note: 1. Manhole numbers taken from BWSC Sewer System GIS
2. Flow Calculations based on Manning Equation
3. All pipes assumed to be vitrified clay, to be conservative
4. *BWSC plans indicate a reverse direction of flow in a 32-foot length segment. This was accounted for in the hydraulic capacity analysis calculations by setting the slope to one percent.

8.1.4 Proposed Conditions

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. The proposed project is expected to generate approximately 28,540 gallons of wastewater per day. Approval for the net increase in flow will come from BWSC.

The sewer services for the building will connect to the 18-inch sewer in Northern Avenue. As shown in Table 8-2, the minimum hydraulic capacity of that line is 2.15 million gallons per day (MGD) or 3.32 cfs. Based on an average daily flow estimate for the proposed project of 28,540 GPD or 0.044 cfs; and with a factor of safety of 10 (total estimate = 0.044 cfs x 10 = 0.44 cfs), no capacity problems are expected.

Because the project will increase in flows by more than 15,000 gpd, it will be required to contribute an Inflow and Infiltration (I/I) mitigation fee to BWSC. This fee will be finalized during the BWSC site plan review process based on the building program at that time.

All improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's site plan review process. This process includes a comprehensive design review of the proposed service connections, an assessment of project demands and system capacity, and the establishment of service accounts.

8.2 Water Supply

8.2.1 Existing Water Service

Water for the proposed project site is provided by the BWSC. There are six different water systems within the city, and these provide service to portions of the city based on ground surface elevation. All of the nearby water supply lines are within the southern low water system, including the following:

- There is a 12-inch southern low water main beneath Massport Haul Road.
- There is a 16-inch southern low water main beneath Northern Avenue.
- There is an 8-inch southern low water main that branches south from Northern Ave and is capped near Channel Street.
- There is a 12-inch southern low water main beneath Harbor Street.

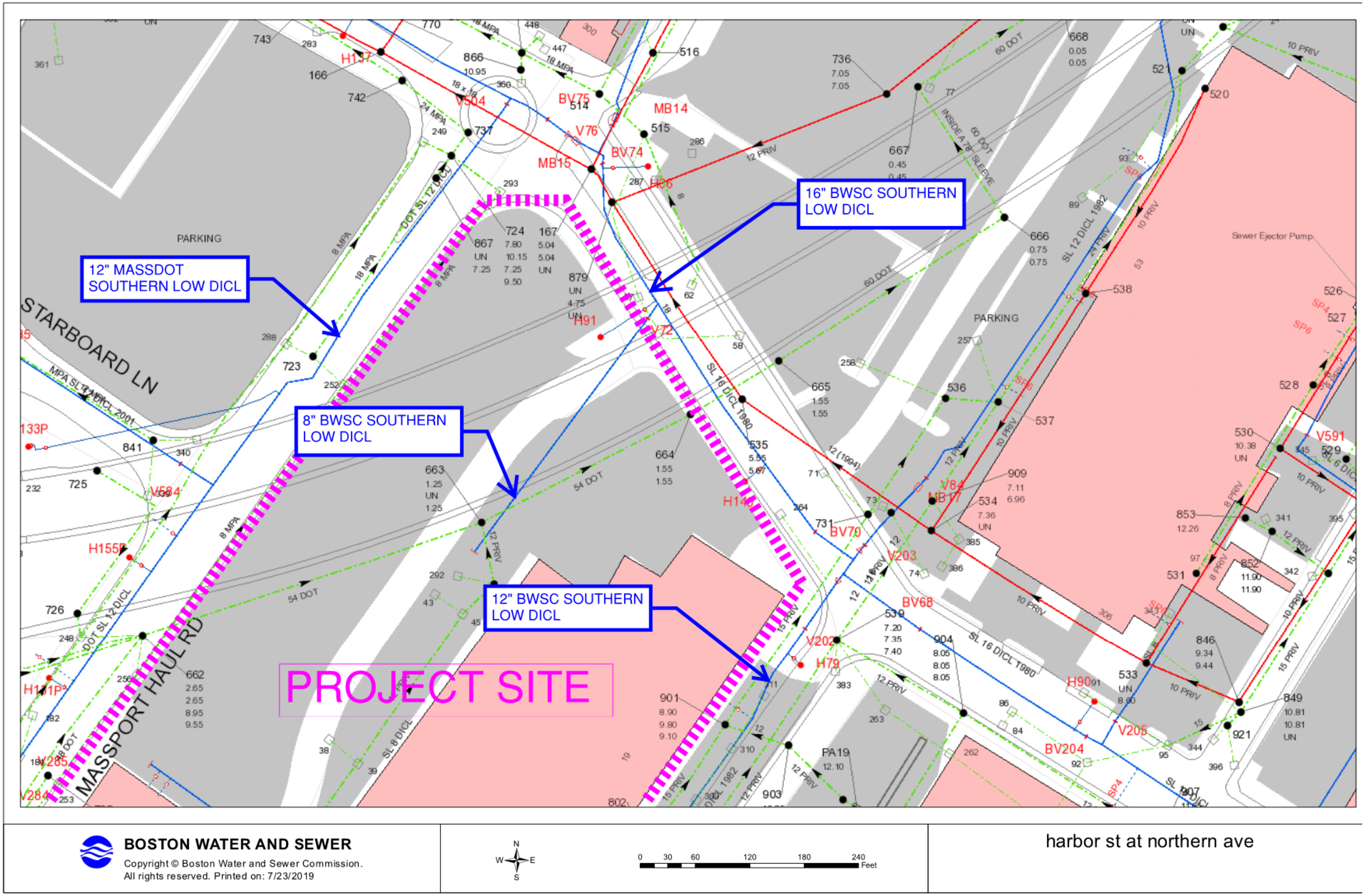
The existing water system is illustrated in Figure 8-2.

8.2.2 Anticipated Water Consumption

The proposed project's water demand estimate for domestic services is based on the estimated sewage generation, described above. A conservative factor of 1.1 (ten percent) is applied to the estimated average daily wastewater flows to account for consumption, system losses, and other usages to estimate an average daily water demand. Using this formula, the proposed project's water demand is calculated to be approximately 31,394 gpd.

The proposed project will include mitigation measures to reduce water consumption. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed. See Section xx for a more complete description of proposed water conservation measures.

All new water services will be installed in accordance with the latest local, state, and federal codes and standards. Backflow preventers will be installed at both domestic and fire protection service connections. New meters will be installed with Meter Transmitter Units (MTU's) as part of the Boston Water and Sewer Commission's Automatic Meter Reading (AMR) system.



2 Harbor Street   Boston, MA

Figure 8-2
Existing Water System

8.2.3 Proposed Conditions

The domestic water services for the proposed project are will likely be connected to the 8-inch southern low water main that is capped underneath the site, the 16-inch southern low in Northern Avenue, or the 12-inch southern low in Harbor Street. The fire protection services for the proposed project will likely connect to either the 12-inch southern low water main in Harbor Street or the 16-inch southern low water main in Northern Avenue. No water capacity problems are anticipated within this system as a result of the proposed project's construction.

The domestic and fire protection water service connections required by the proposed project will meet the applicable City and State codes and standards, including cross-connection backflow prevention. Compliance with the standards for the domestic water system service connection will be reviewed as part of BWSC's Site Plan Review Process. This review includes, but is not limited to, sizing of domestic water and fire protection services, calculation of meter sizing, backflow prevention design, and location of hydrants and Siamese connections that conform to BWSC and Boston Fire Department requirements.

8.3 Stormwater Management System

8.3.1 Existing Storm Drainage System

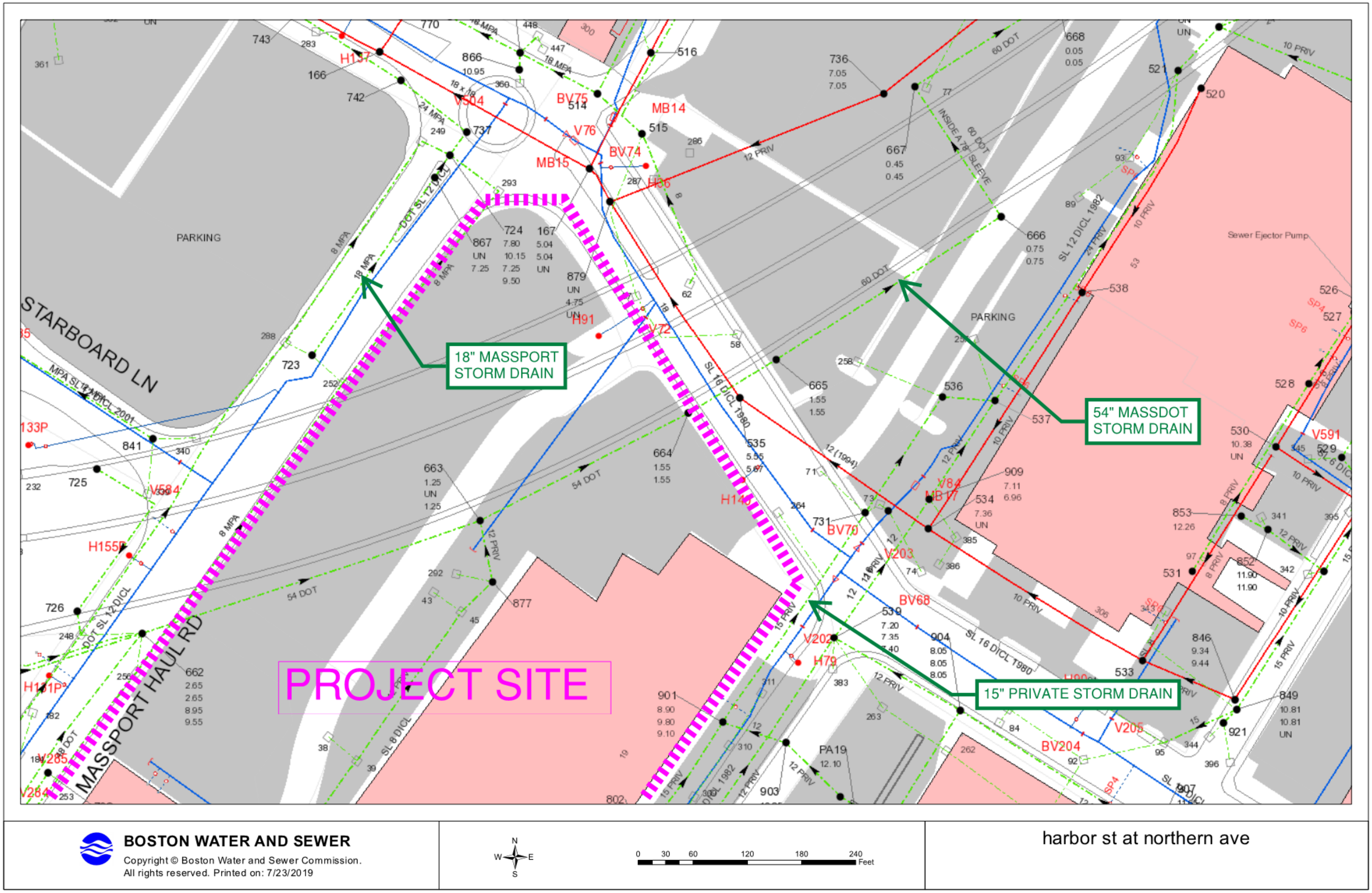
As shown on Figure 8-3, there are storm drains located beneath Harbor Street, Massport Haul Road, and alongside the Ted Williams Tunnel adjacent to the project site.

- There is a 15-inch private storm drain beneath Harbor Street which flows in a northerly direction;
- There is an 18-inch Massport storm drain beneath Massport Haul Road which flows in a northerly direction; and
- There is a 54-inch MassDOT storm drain running alongside the Ted Williams Tunnel which flows in a northerly direction.

8.3.2 Proposed Storm Drainage System

The existing BWSC sewer system adjacent to the site discharges to the Deer Island Waste Water Treatment Plant. If this system were separated in the future, this site would fall within the Boston Harbor watershed. The existing BWSC storm drain system is illustrated in Figure 8-2.

The proposed project will result in a net decrease in impervious area. The existing site is nearly 100 percent impervious. The proposed project will incorporate open space and landscaping. At a minimum, the proposed project will maintain the existing peak rates and volumes of runoff. The first 1.25-inches of stormwater over site impervious areas will be captured and retained onsite. This stormwater will be either infiltrated or reused in the building over a 72-hour period.



2 Harbor Street Boston, MA

Epsilon ASSOCIATES INC.

Figure 8-3

Existing Storm Drain System

All improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC Site Plan review process. This process includes a comprehensive design review of the proposed service connections, assessment of project demands and system capacity, and establishment of service accounts.

8.3.3 MassDEP Stormwater Management Standards

The project will be designed to comply with MassDEP's stormwater management standards, as outlined below.

Standard #1: No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Compliance: The proposed design will comply with this Standard. No new untreated stormwater will be directly discharged to, nor will erosion be caused to wetlands or waters of the Commonwealth as a result of stormwater discharges related to the proposed project.

Standard #2: Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

Compliance: The proposed design will comply with this Standard. The existing discharge rate will be met or decreased as a result of the improvements associated with the proposed project.

Standard #3: Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post development site should approximate the annual recharge from the pre-development or existing site conditions, based on soil types.

Compliance: The proposed project will comply with this standard to the maximum extent practicable.

Standard #4: For new development, stormwater management systems must be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when: Suitable nonstructural practices for source control and pollution prevention are implemented; Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and Stormwater management BMPs are maintained as designed.

Compliance: The proposed design will comply with this standard. Within the project's limit of work, there will be mostly roof and pedestrian areas. Any paved areas that would contribute unwanted sediments or pollutants to the existing storm drain system will be served by deep sump, hooded catch basins and conveyed through water quality units before discharging into the storm drainage system.

Standard #5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If, through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L.c. 21, §§ 26-53 and the regulations promulgated there under at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Compliance: The proposed design will comply with this standard. The proposed project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, page 1-6). The project complies with this standard.

Standard #6: Stormwater discharge to critical areas must utilize certain stormwater management BMPs approved for critical areas. Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold-water fisheries and recharge areas for public water supplies.

Compliance: The proposed design will comply with this Standard. The project will not discharge stormwater to a critical area.

Standard #7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Compliance: The proposed project is a redevelopment. The proposed design will comply with this Standard.

Standard #8: Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.

Compliance: The project will comply with this standard. Sedimentation and erosion controls will be incorporated as part of the design of the project and employed during construction.

Standard 9: A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Compliance: The project will comply with this standard. An O&M Plan including long-term BMP operation requirements will be prepared for the project and will assure proper maintenance and functioning of the stormwater management system.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

Compliance: The project will comply with this standard. There will be no illicit connections.

8.4 Electrical Service

Eversource owns and maintains the electrical transmission system in the vicinity of the project site. The electrical power supply design and loads for the buildings will be coordinated with Eversource during the design phase. The Proponent is investigating energy conservation measures, including energy efficient lighting and heating and cooling systems for the project.

8.5 Telephone and Cable Systems

Comcast provides cable and telephone services in the project area. Services will be coordinated during the design phase. Note the Broadband Checklist is included in Appendix H.

8.6 Natural Gas Systems

National Grid provides natural gas in the project area. The actual size and location of the building services will be coordinated with National Grid.

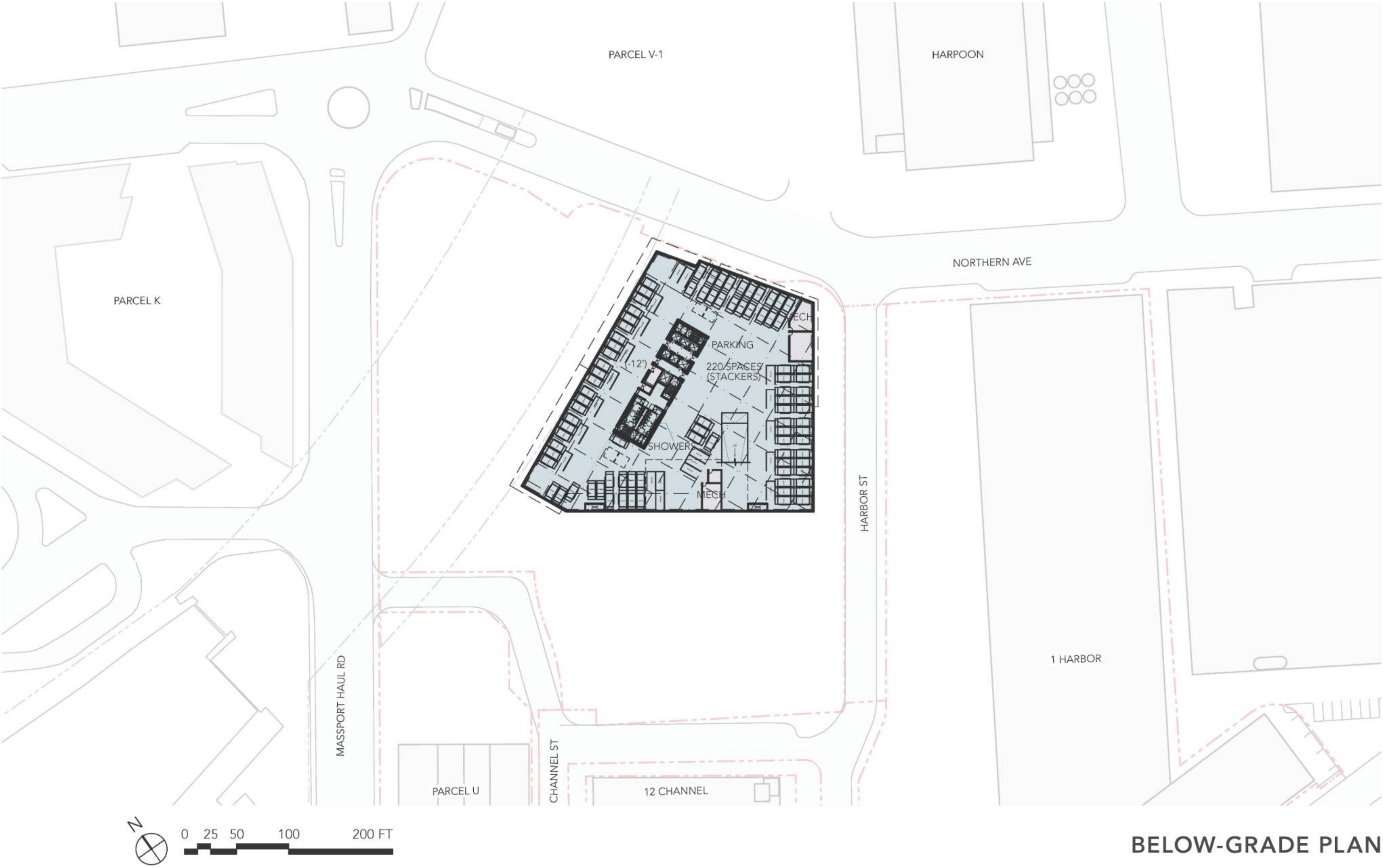
8.7 Utility Protection During Construction

The project construction contractor will notify utility companies and register with "Dig Safe" prior to excavation. During construction, infrastructure will be protected using sheeting and shoring, temporary relocations, and construction staging as required. The project 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.

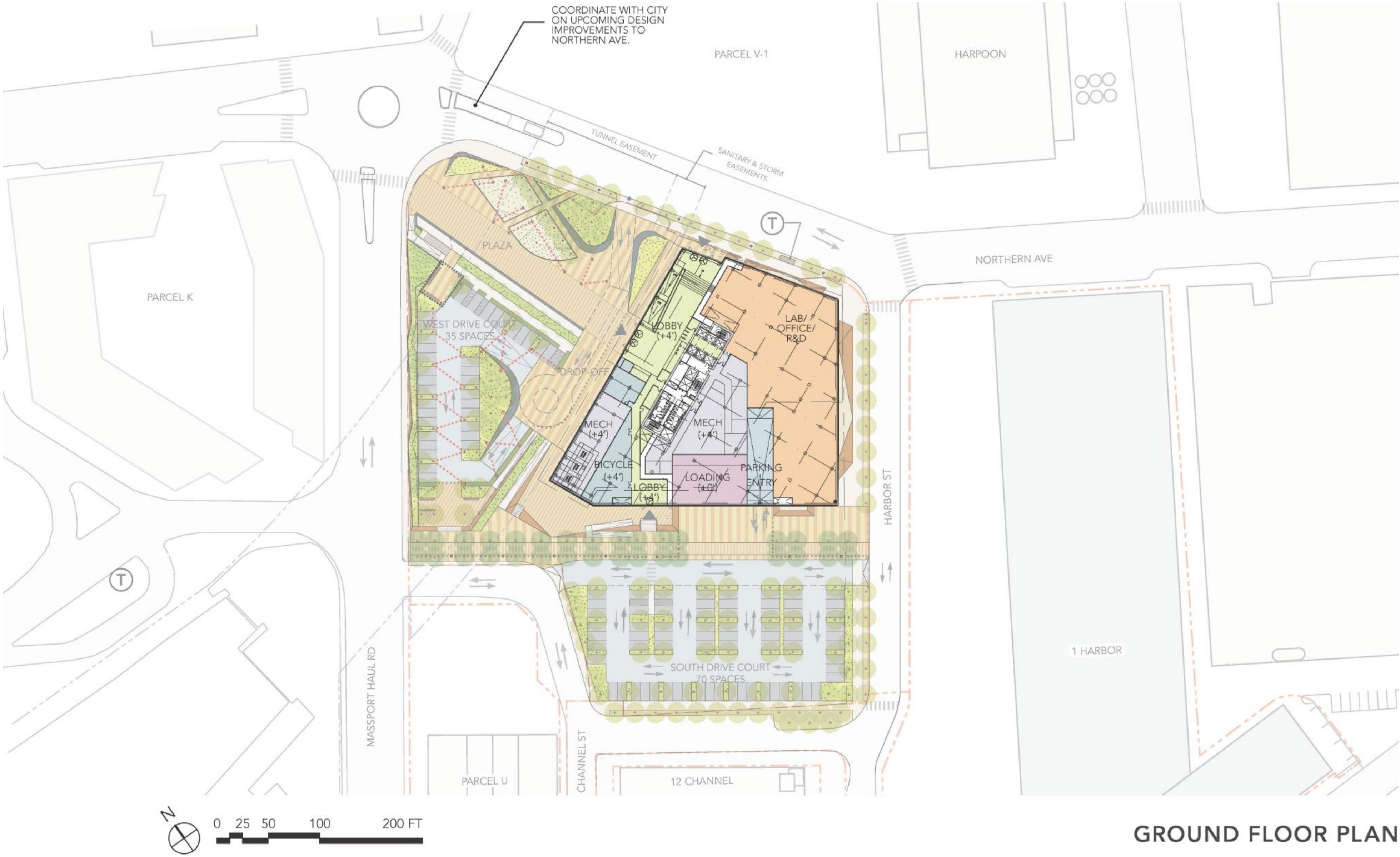
The project construction contractor will also be required to provide adequate notification to the utility owner prior to any work commencing on their utility. In addition, in the event a utility cannot be maintained in service during switch over to a temporary or permanent system, the project construction contractor will be required to coordinate the shutdown with the utility owners and abutters to minimize impacts and inconveniences.

Appendix A

Floor Plans and Building Sections

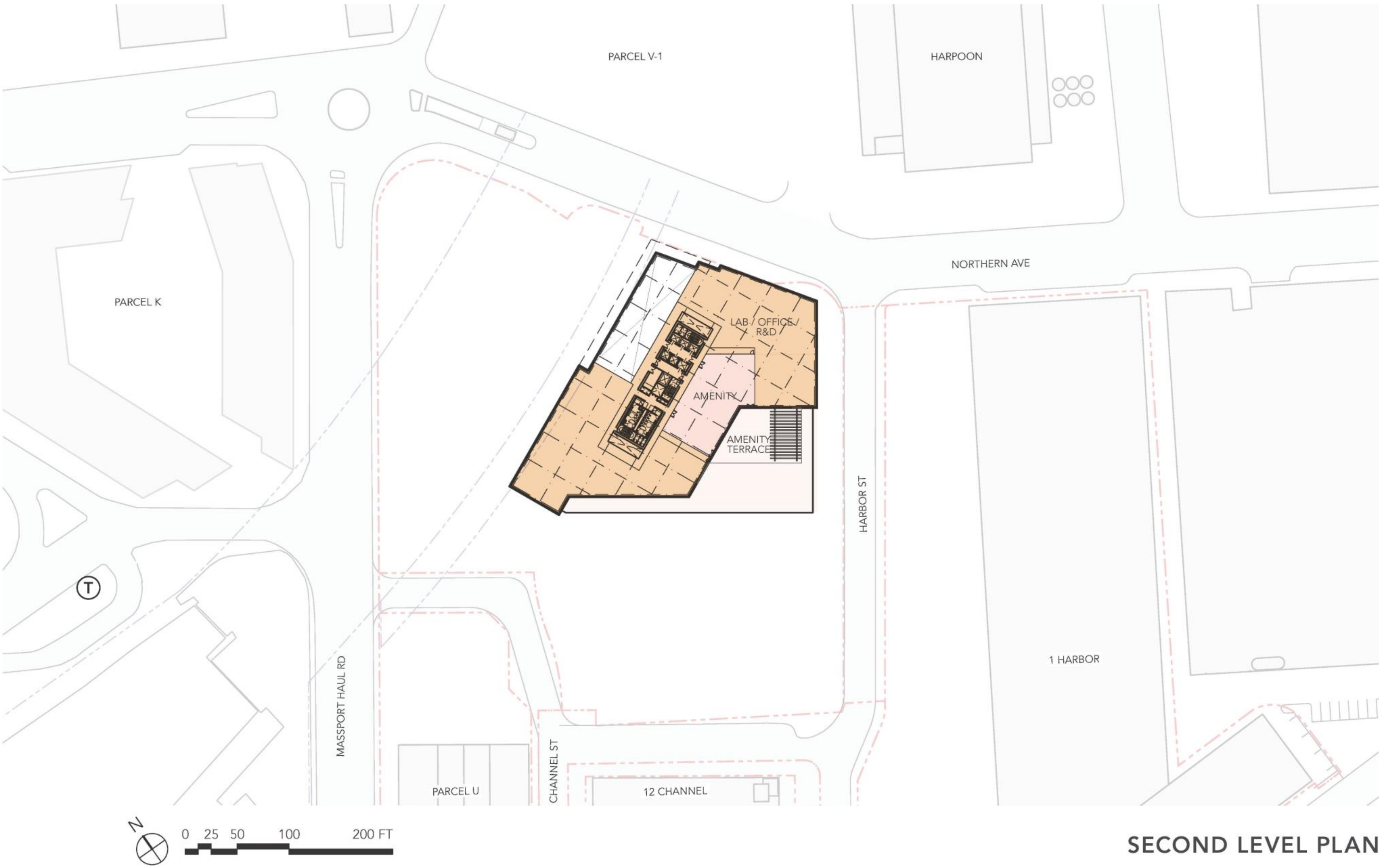


BELOW-GRADE PLAN



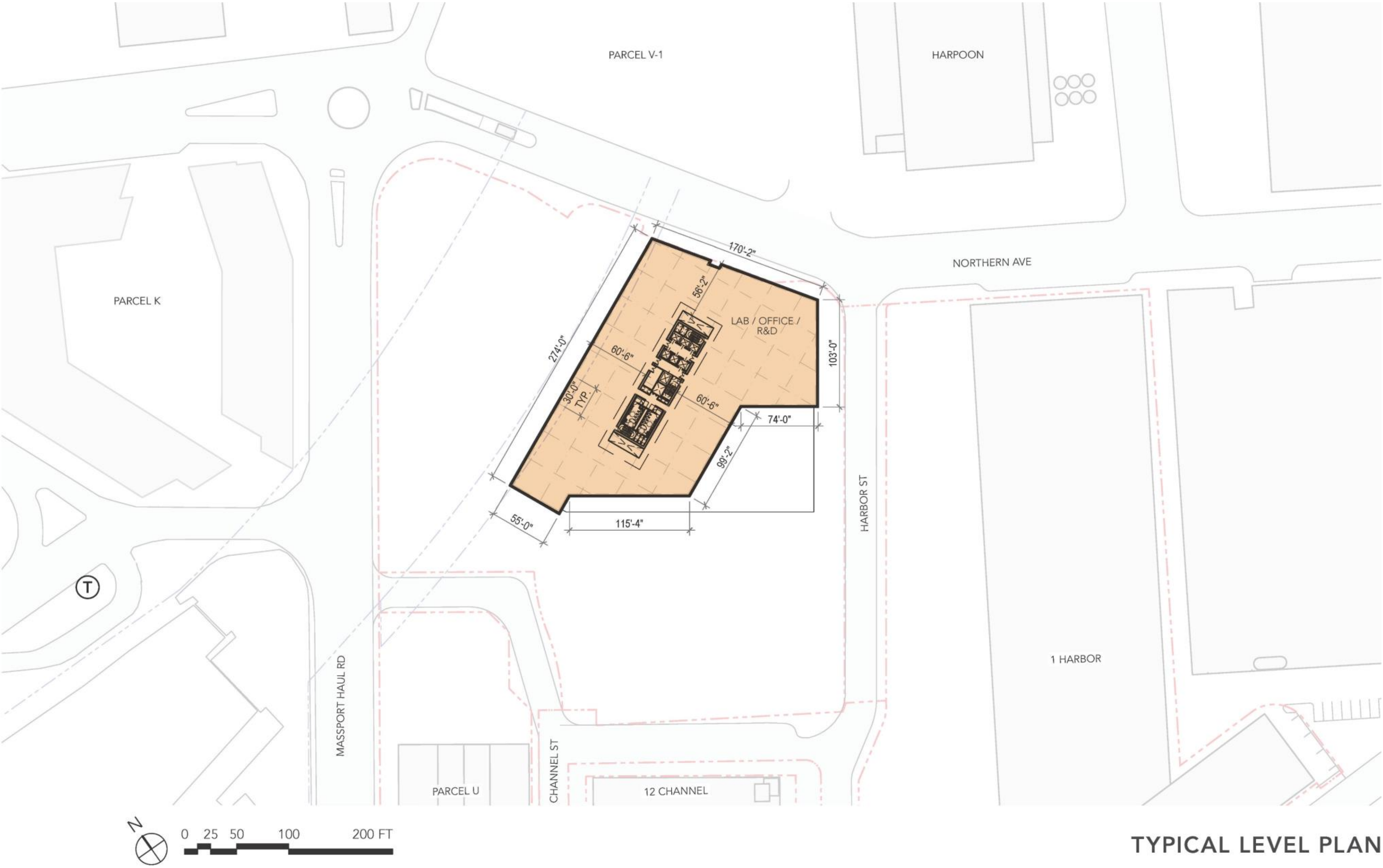
GROUND FLOOR PLAN

2 Harbor Street Boston, MA

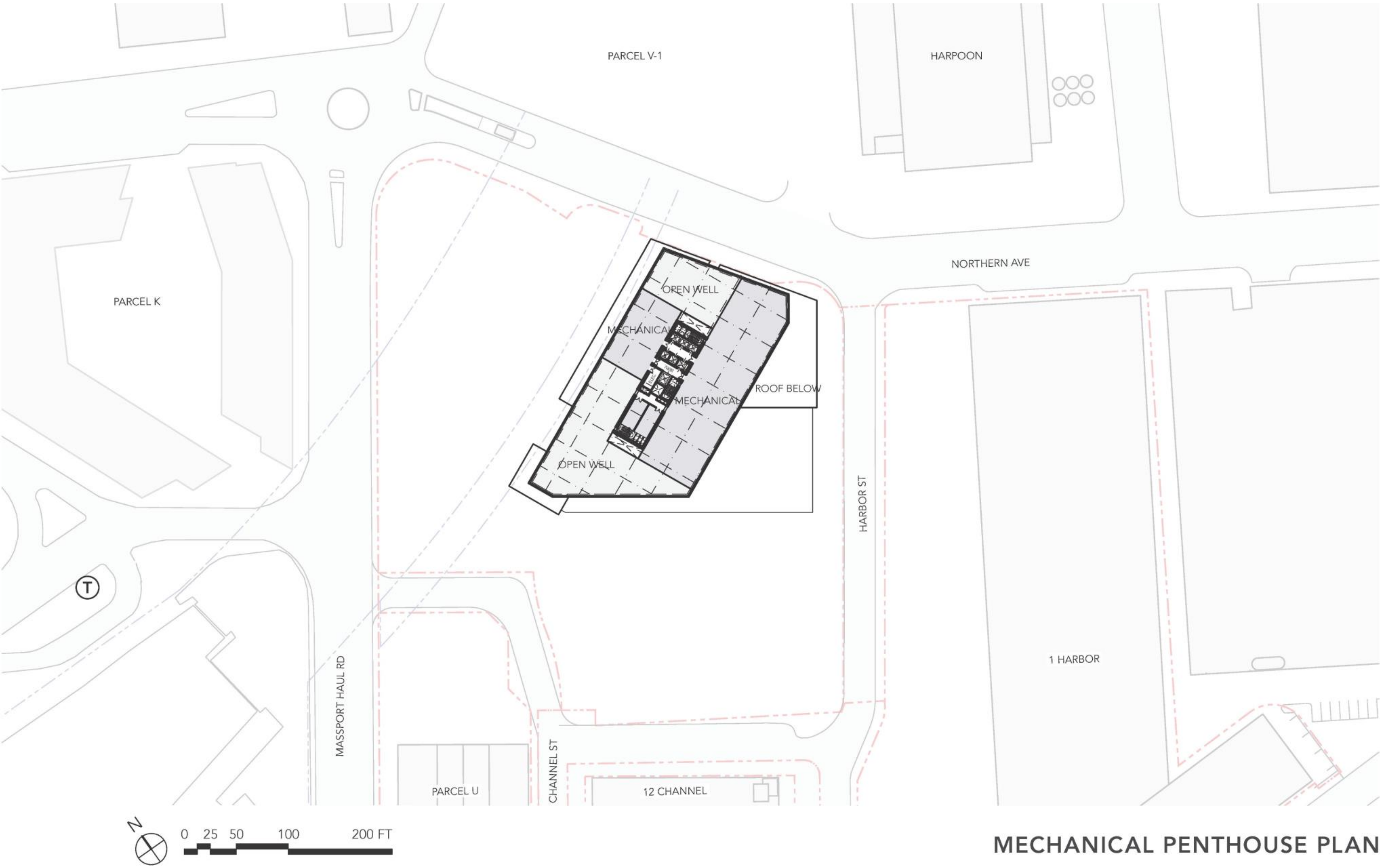


SECOND LEVEL PLAN

2 Harbor Street Boston, MA



TYPICAL LEVEL PLAN



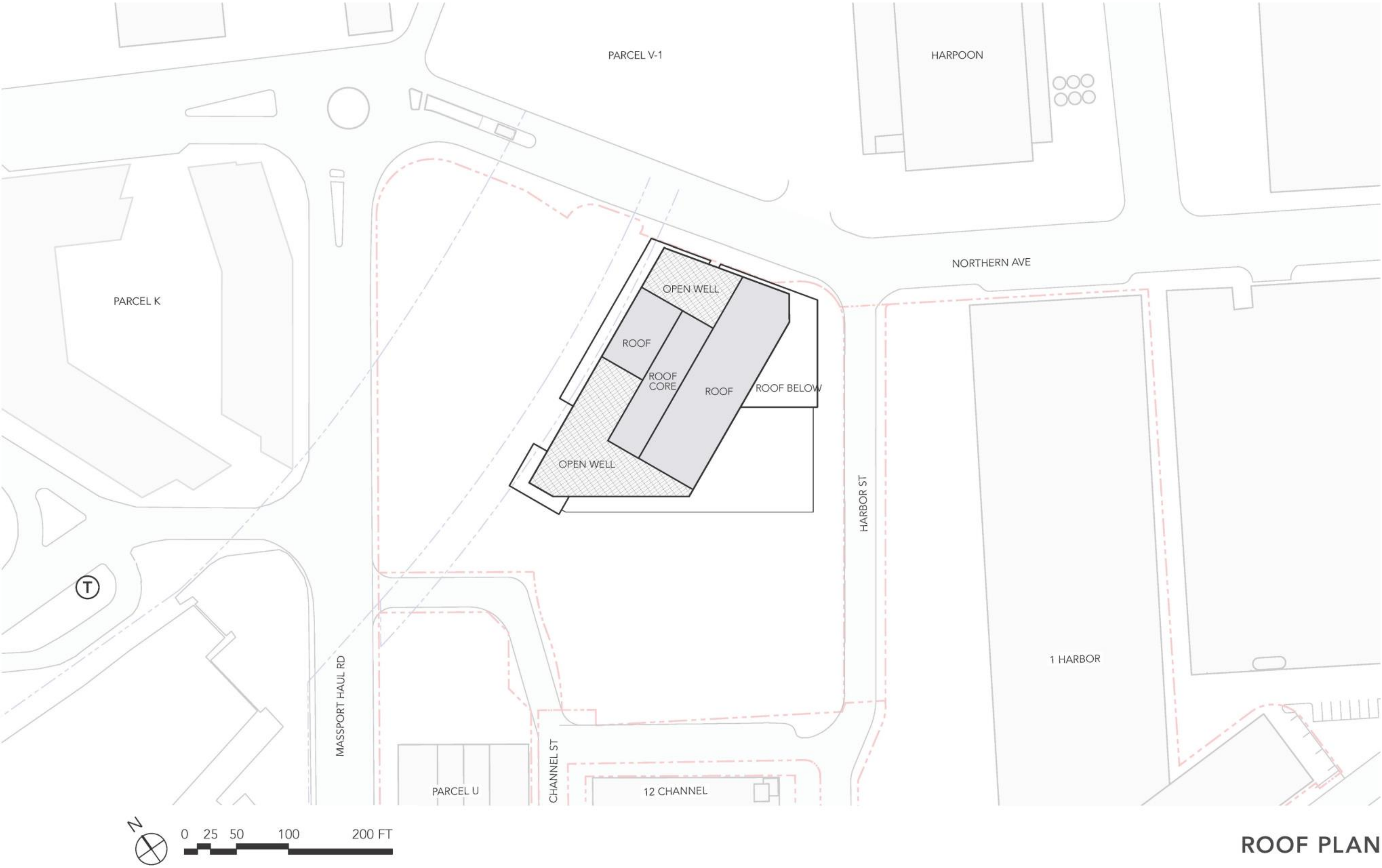
MECHANICAL PENTHOUSE PLAN

2 Harbor Street Boston, MA

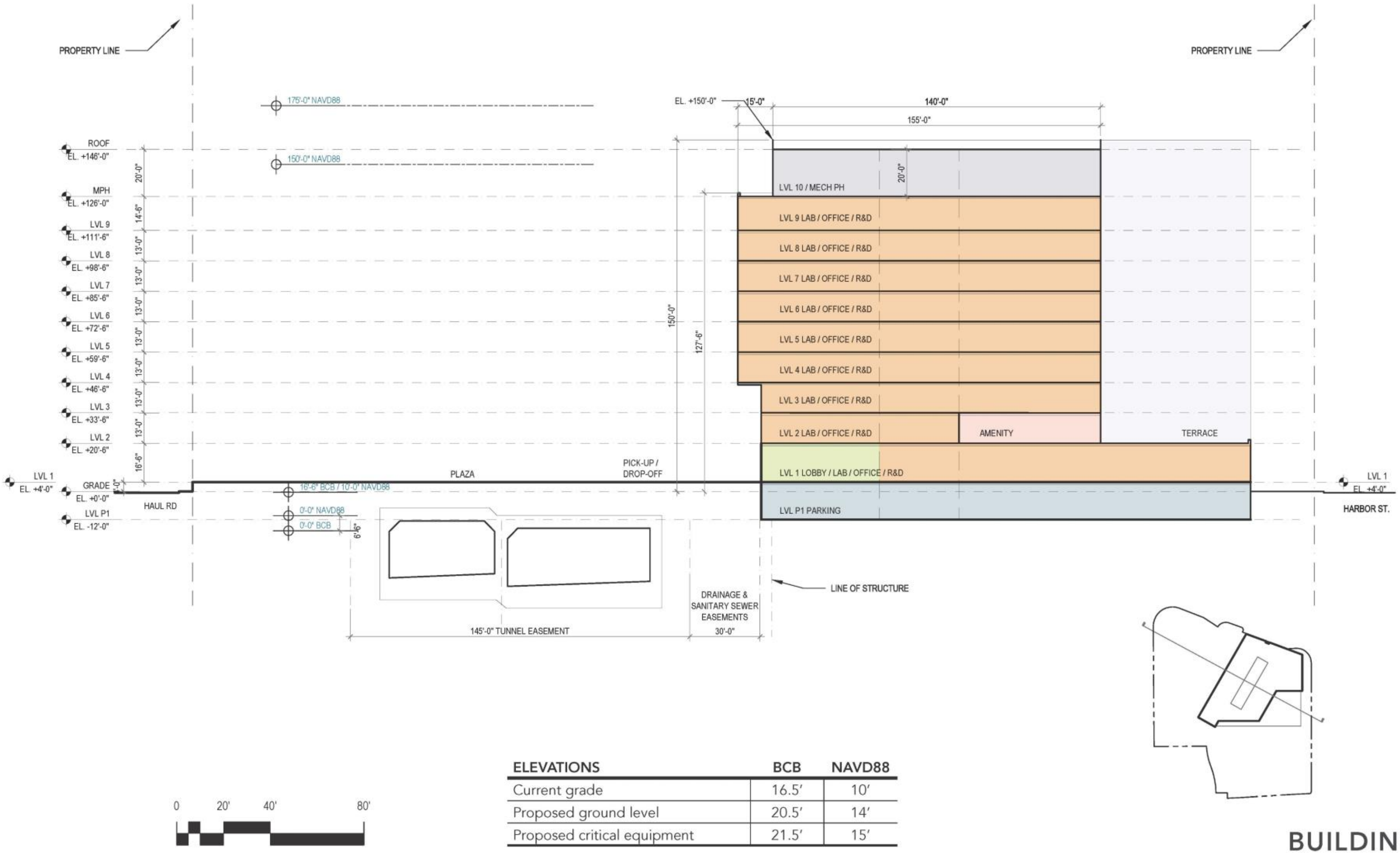
Epsilon ASSOCIATES INC.

Appendix A

A-5 Mechanical Penthouse Plan

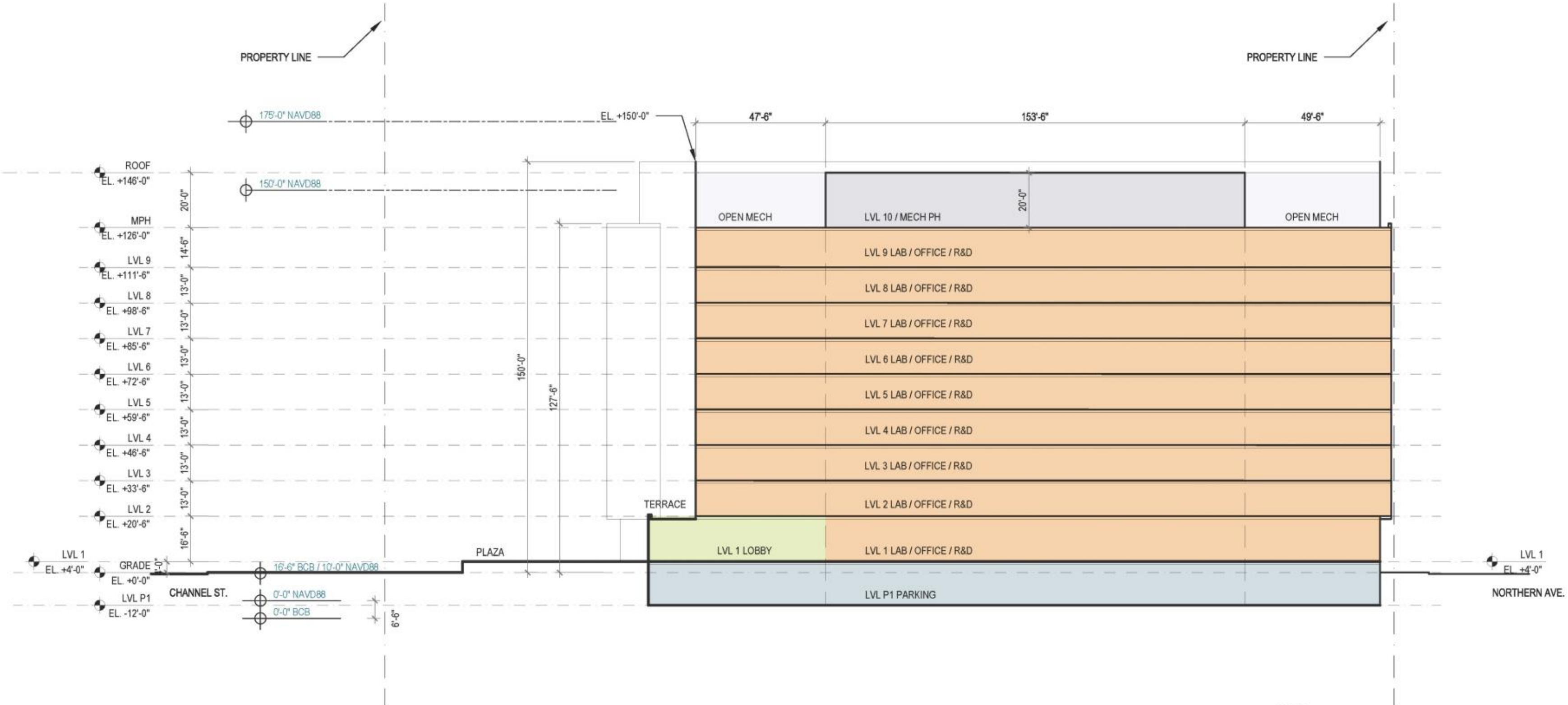

PARCEL V-1
HARPOON
PARCEL K
NORTHERN AVE
OPEN WELL
ROOF
ROOF CORE
ROOF
ROOF BELOW
OPEN WELL
HARBOR ST
1 HARBOR
MASSPORT HAUL RD
PARCEL U
CHANNEL ST
12 CHANNEL
N
0 25 50 100 200 FT

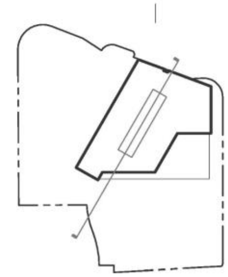
ROOF PLAN

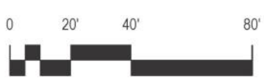


ELEVATIONS	BCB	NAVD88
Current grade	16.5′	10′
Proposed ground level	20.5′	14′
Proposed critical equipment	21.5′	15′

BUILDING SECTION A







ELEVATIONS	BCB	NAVD88
Current grade	16.5′	10′
Proposed ground level	20.5′	14′
Proposed critical equipment	21.5′	15′

BUILDING SECTION B

Appendix B

Transportation

Traffic Counts - TMCs and ATRs

Trip Generation Spreadsheet

Synchro & Sidra Results:

- 2019 Existing Conditions
- 2024 No-Build Conditions
- 2024 Build Conditions

Crash Rate Worksheets

Client: Christina Hodge, PE
Project #: 489_081_VHB
BTD #: Location 1
Location: Seaport, Boston, MA
Street 1: D Street
Street 2: Congress Street
Count Date: 10/15/2019
Day of Week: Tuesday
Weather: Mostly Sunny, 60°F

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PO BOX 1723, Framingham, MA 01701
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DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

PASSENGER CARS & HEAVY VEHICLES COMBINED

	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	61	17	3	0	0	23	4	3	12	30	68	0	6	12	8
7:15 AM	0	97	19	4	0	0	30	5	4	3	35	74	0	6	14	3
7:30 AM	0	114	28	2	0	0	49	8	2	11	29	66	0	10	16	2
7:45 AM	0	96	29	6	0	0	41	5	2	7	43	81	0	13	11	3
8:00 AM	0	73	36	1	1	0	53	2	1	18	37	79	0	14	13	6
8:15 AM	1	80	25	2	4	4	47	8	3	12	36	92	0	9	11	5
8:30 AM	0	61	30	3	7	5	40	7	2	12	34	83	0	15	17	5
8:45 AM	0	89	35	4	0	0	55	8	5	16	42	71	0	9	16	4

	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	42	19	1	3	0	81	3	7	11	25	109	0	9	19	5
4:15 PM	0	64	21	3	0	1	112	3	1	11	24	130	0	16	11	5
4:30 PM	0	70	20	4	0	1	100	8	2	8	16	113	0	12	12	4
4:45 PM	1	65	14	3	1	1	91	2	3	16	19	97	0	7	21	4
5:00 PM	0	72	22	7	0	0	120	5	4	7	20	106	0	8	23	3
5:15 PM	3	55	15	2	1	1	118	4	4	14	22	108	0	14	28	4
5:30 PM	3	49	27	7	0	0	129	6	4	15	14	92	0	7	18	6
5:45 PM	1	36	17	1	0	2	112	6	6	12	27	109	0	9	13	4

AM PEAK HOUR	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
8:00 AM to 9:00 AM	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**303**	**126**	**10**	**12**	**9**	**195**	**25**	**11**	**58**	**149**	**325**	**0**	**47**	**57**	**20**
PHF	**0.86**				**0.96**				**0.95**				**0.84**			
HV %	**100.0%**	**21.5%**	**10.3%**	**10.0%**	**0.0%**	**0.0%**	**8.7%**	**20.0%**	**0.0%**	**10.3%**	**12.1%**	**6.5%**	**0.0%**	**4.3%**	**7.0%**	**5.0%**

PM PEAK HOUR	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
5:00 PM to 6:00 PM	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	7	**212**	**81**	**17**	**1**	**3**	**479**	**21**	**18**	**48**	**83**	**415**	**0**	**38**	**82**	**17**
PHF	**0.78**				**0.93**				**0.92**				**0.74**			
HV %	**0.0%**	**3.8%**	**2.5%**	**5.9%**	**0.0%**	**0.0%**	**1.0%**	**4.8%**	**0.0%**	**2.1%**	**20.5%**	**2.2%**	**0.0%**	**5.3%**	**3.7%**	**0.0%**

Client:	Christina Hodge, PE
Project #:	489_081_VHB
BTD #:	Location 1
Location:	Seaport, Boston, MA
Street 1:	D Street
Street 2:	Congress Street
Count Date:	10/15/2019
Day of Week:	Tuesday
Weather:	Mostly Sunny, 60°F

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HEAVY VEHICLES

	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	4	3	1	0	0	4	1	1	2	1	8	0	1	0	2
7:15 AM	0	5	4	0	0	0	2	1	0	1	5	4	0	0	2	0
7:30 AM	0	8	5	0	0	0	3	0	0	3	8	6	0	1	0	0
7:45 AM	0	15	5	1	0	0	8	2	0	1	11	4	0	1	0	1
8:00 AM	0	17	3	0	0	0	7	1	0	1	7	4	0	0	2	1
8:15 AM	1	13	1	0	0	0	4	1	0	1	2	6	0	2	1	0
8:30 AM	0	18	3	1	0	0	2	2	0	1	4	6	0	0	0	0
8:45 AM	0	17	6	0	0	0	4	1	0	3	5	5	0	0	1	0

	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	6	3	0	1	0	0	0	0	0	6	5	0	0	0	0
4:15 PM	0	4	0	0	0	0	1	1	0	0	5	7	0	1	0	0
4:30 PM	0	2	0	0	0	1	2	0	0	0	3	0	0	0	0	0
4:45 PM	0	0	3	1	0	1	1	1	0	0	4	0	0	0	1	0
5:00 PM	0	3	0	0	0	0	1	1	0	0	4	3	0	1	1	0
5:15 PM	0	2	1	0	0	0	2	0	0	0	3	2	0	1	2	0
5:30 PM	0	1	0	1	0	0	1	0	0	0	4	2	0	0	0	0
5:45 PM	0	2	1	0	0	0	1	0	0	1	6	2	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**63**	**12**	**2**	**0**	**0**	**21**	**6**	**0**	**4**	**24**	**20**	**0**	**3**	**3**	**2**
PHF	**0.89**				**0.68**				**0.75**				**0.67**			

PM PEAK HOUR 4:00 PM to 5:00 PM	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**12**	**6**	**1**	**1**	**2**	**4**	**2**	**0**	**0**	**18**	**12**	**0**	**1**	**1**	**0**
PHF	**0.53**				**0.75**				**0.63**				**0.50**			

Client: Christina Hodge, PE
Project #: 489_081_VHB
BTD #: Location 1
Location: Seaport, Boston, MA
Street 1: D Street
Street 2: Congress Street
Count Date: 10/15/2019
Day of Week: Tuesday
Weather: Mostly Sunny, 60°F

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PEDESTRIANS & BICYCLES

	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	1	0	4	0	0	0	13	0	1	0	14	0	0	0	2
7:15 AM	3	0	0	6	0	0	0	10	0	0	0	28	0	0	0	12
7:30 AM	0	0	0	4	0	0	0	21	0	0	0	19	0	0	0	11
7:45 AM	2	4	0	2	0	0	0	7	0	0	0	27	0	0	0	6
8:00 AM	0	4	0	6	0	0	0	12	0	0	0	25	0	0	0	15
8:15 AM	4	5	0	3	0	0	0	16	0	1	0	39	0	2	0	19
8:30 AM	1	4	0	8	0	0	0	9	0	2	0	34	0	0	0	22
8:45 AM	0	4	0	6	0	0	0	12	0	2	1	42	0	0	0	9

	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	0	1	0	7	0	3	0	20	0	0	0	21	0	0	0	12
4:15 PM	0	3	0	3	0	1	0	9	0	0	0	23	0	0	0	12
4:30 PM	0	0	0	2	0	0	0	9	0	0	1	25	0	0	0	10
4:45 PM	0	1	0	4	0	3	0	11	0	0	0	13	0	0	0	17
5:00 PM	0	2	1	6	0	1	0	28	0	0	0	28	0	0	0	25
5:15 PM	0	0	0	5	0	6	0	16	0	1	0	40	0	0	0	21
5:30 PM	0	1	0	3	0	5	0	16	0	0	1	40	0	0	0	28
5:45 PM	0	1	0	8	0	1	0	22	0	1	2	35	0	0	0	31

AM PEAK HOUR[1] 8:00 AM to 9:00 AM	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	5	17	0	23	0	0	0	49	0	5	1	140	0	2	0	65

PM PEAK HOUR[1] 5:00 PM to 6:00 PM	D Street Northbound				D Street Southbound				Congress Street Eastbound				Congress Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	4	1	22	0	13	0	82	0	2	3	143	0	0	0	105

[1] *Peak hours corresponds to vehicular peak hours.*

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 1A
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	D Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	6	1	4	0	7	59	26	0	6	57	7
7:15 AM	0	0	0	0	0	6	6	4	0	8	57	27	0	7	56	7
7:30 AM	0	0	0	0	0	5	3	5	0	2	44	43	0	4	62	6
7:45 AM	0	0	0	0	0	4	1	1	0	6	48	49	0	9	86	8
8:00 AM	0	0	0	0	0	8	5	2	0	6	49	28	0	5	76	7
8:15 AM	0	0	0	0	0	4	4	3	0	4	59	30	0	8	85	8
8:30 AM	0	0	0	0	0	3	4	3	0	4	56	46	0	13	98	5
8:45 AM	0	0	0	0	0	6	1	0	0	7	56	29	0	14	90	9

	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	3	4	4	0	4	86	70	0	17	72	4
4:15 PM	0	0	0	0	0	3	3	5	0	3	90	71	0	10	75	4
4:30 PM	0	0	0	0	0	5	8	8	1	3	76	78	0	16	78	8
4:45 PM	0	0	0	0	0	3	3	5	0	6	84	68	0	12	88	5
5:00 PM	0	0	0	0	0	4	14	8	0	4	98	73	0	16	90	14
5:15 PM	0	0	0	0	0	6	3	12	0	6	101	70	0	22	84	11
5:30 PM	0	0	0	0	0	2	10	11	0	10	93	81	0	14	88	6
5:45 PM	0	0	0	0	0	4	3	6	0	4	94	69	0	19	70	6

AM PEAK HOUR 7:45 AM to 8:45 AM	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**19**	**14**	**9**	**0**	**20**	**212**	**153**	**0**	**35**	**345**	**28**
PHF	**0.00**				**0.70**				**0.91**				**0.88**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**47.4%**	**35.7%**	**22.2%**	**0.0%**	**20.0%**	**13.7%**	**0.7%**	**0.0%**	**5.7%**	**13.0%**	**82.1%**

PM PEAK HOUR 5:00 PM to 6:00 PM	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**16**	**30**	**37**	**0**	**24**	**386**	**293**	**0**	**71**	**332**	**37**
PHF	**0.00**				**0.80**				**0.96**				**0.92**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**6.3%**	**3.3%**	**5.4%**	**0.0%**	**4.2%**	**4.9%**	**2.4%**	**0.0%**	**5.6%**	**8.4%**	**8.1%**

Client:	#REF!
Project #:	394_072_VHB
BTD #:	Location 1A
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	D Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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HEAVY VEHICLES

	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	3	0	1	0	1	15	0	0	2	8	2
7:15 AM	0	0	0	0	0	1	1	0	0	2	11	1	0	1	15	3
7:30 AM	0	0	0	0	0	4	0	2	0	0	9	0	0	3	12	7
7:45 AM	0	0	0	0	0	3	0	1	0	0	13	0	0	0	11	4
8:00 AM	0	0	0	0	0	3	2	0	0	2	5	0	0	1	12	6
8:15 AM	0	0	0	0	0	1	1	0	0	2	5	1	0	0	9	6
8:30 AM	0	0	0	0	0	2	2	1	0	0	6	0	0	1	13	7
8:45 AM	0	0	0	0	0	2	1	0	0	0	8	0	0	2	10	8

	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	1	1	2	0	0	3	0	0	1	7	1
4:15 PM	0	0	0	0	0	2	1	1	0	0	1	3	0	2	9	2
4:30 PM	0	0	0	0	0	0	0	0	0	0	8	2	0	0	5	1
4:45 PM	0	0	0	0	0	0	0	1	0	0	5	4	0	2	6	3
5:00 PM	0	0	0	0	0	0	1	1	0	0	8	0	0	1	10	2
5:15 PM	0	0	0	0	0	1	0	0	0	0	5	1	0	2	8	1
5:30 PM	0	0	0	0	0	0	0	0	0	1	4	2	0	0	7	0
5:45 PM	0	0	0	0	0	0	0	1	0	0	2	4	0	1	3	0

AM PEAK HOUR 7:00 AM to 8:00 AM	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**11**	**1**	**4**	**0**	**3**	**48**	**1**	**0**	**6**	**46**	**16**
PHF	**0.00**				**0.67**				**0.81**				**0.77**			

PM PEAK HOUR 4:15 PM to 5:15 PM	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**2**	**2**	**3**	**0**	**0**	**22**	**9**	**0**	**5**	**30**	**8**
PHF	**0.00**				**0.44**				**0.78**				**0.83**			

Client:	#REF!
Project #:	394_072_VHB
BTD #:	Location 1A
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	D Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	18	0	0	0	22	0	2	0	1	0	3	0	0
7:15 AM	0	0	0	24	0	0	0	28	0	5	1	0	0	3	0	0
7:30 AM	0	0	0	28	0	0	0	30	0	3	0	1	0	4	0	0
7:45 AM	0	0	0	30	0	0	0	33	0	6	0	0	0	10	0	0
8:00 AM	0	0	0	32	0	0	0	35	0	8	0	0	0	3	0	0
8:15 AM	1	0	0	27	0	0	0	31	0	11	1	1	0	6	0	0
8:30 AM	0	0	0	30	0	0	0	34	0	17	0	0	0	5	0	0
8:45 AM	0	0	0	28	0	0	1	37	0	8	0	2	0	7	0	1

	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	0	0	0	27	0	0	0	62	0	5	0	1	0	16	0	0
4:15 PM	0	0	0	32	0	0	0	76	0	0	0	1	0	14	0	0
4:30 PM	0	0	0	37	0	0	0	84	0	2	5	2	0	4	0	0
4:45 PM	0	0	0	39	0	0	0	92	0	0	4	4	0	15	0	0
5:00 PM	2	0	0	36	0	0	0	108	0	2	2	2	0	10	0	0
5:15 PM	0	0	0	40	0	0	0	114	0	2	1	3	0	13	0	0
5:30 PM	0	0	0	42	0	0	0	102	0	4	3	5	0	6	0	0
5:45 PM	0	0	0	38	0	0	0	118	0	5	0	7	0	12	0	0

AM PEAK HOUR[1] 7:45 AM to 8:45 AM	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	1	0	0	119	0	0	0	133	0	42	1	1	0	24	0	0

PM PEAK HOUR[1] 5:00 PM to 6:00 PM	D Street Northbound				Boston Fish Pier Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	2	0	0	156	0	0	0	442	0	13	6	17	0	41	0	0

[1] *Peak hours corresponds to vehicular peak hours.*

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 1B
Location: Seaport, Boston, MA
Street 1: Northern Avenue
Street 2: D Street
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	D Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	22	0	1	0	0	0	0	0	0	65	0	0	0	48	0
7:15 AM	0	30	0	9	0	0	0	0	0	0	63	0	0	0	40	0
7:30 AM	0	27	0	6	0	0	0	0	0	0	49	0	0	0	45	0
7:45 AM	0	36	0	7	0	0	0	0	0	0	52	0	0	0	67	0
8:00 AM	0	35	0	5	0	0	0	0	0	0	57	0	0	0	53	0
8:15 AM	0	37	0	1	0	0	0	0	0	0	63	0	0	0	64	0
8:30 AM	0	41	0	3	0	0	0	0	0	0	59	0	0	0	75	0
8:45 AM	0	40	0	5	0	0	0	0	0	0	62	0	0	0	73	0

	D Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	23	0	4	0	0	0	0	0	0	89	0	0	0	70	0
4:15 PM	0	24	0	9	0	0	0	0	0	0	93	0	0	0	65	0
4:30 PM	0	30	0	2	0	0	0	0	0	0	81	0	0	0	72	0
4:45 PM	0	32	0	14	0	0	0	0	0	0	87	0	0	0	73	0
5:00 PM	0	35	0	12	0	0	0	0	0	0	102	0	1	0	85	0
5:15 PM	0	34	0	15	0	0	0	0	0	0	107	0	0	0	83	0
5:30 PM	0	33	0	22	0	0	0	0	0	0	95	0	0	0	75	0
5:45 PM	0	27	0	16	0	0	0	0	0	0	98	0	0	0	68	0

AM PEAK HOUR 8:00 AM to 9:00 AM	D Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**153**	**0**	**14**	**0**	**0**	**0**	**0**	**0**	**0**	**241**	**0**	**0**	**0**	**265**	**0**
PHF	**0.93**				**0.00**				**0.96**				**0.88**			
HV %	**0.0%**	**7.8%**	**0.0%**	**14.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**14.5%**	**0.0%**	**0.0%**	**0.0%**	**21.5%**	**0.0%**

PM PEAK HOUR 5:00 PM to 6:00 PM	D Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**129**	**0**	**65**	**0**	**0**	**0**	**0**	**0**	**0**	**402**	**0**	**1**	**0**	**311**	**0**
PHF	**0.88**				**0.00**				**0.94**				**0.91**			
HV %	**0.0%**	**3.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.7%**	**0.0%**	**0.0%**	**0.0%**	**8.7%**	**0.0%**

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 1B
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	D Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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HEAVY VEHICLES

	D Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	3	0	0	0	0	0	0	0	0	16	0	0	0	8	0
7:15 AM	0	4	0	1	0	0	0	0	0	0	11	0	0	0	15	0
7:30 AM	0	8	0	3	0	0	0	0	0	0	12	0	0	0	14	0
7:45 AM	0	2	0	1	0	0	0	0	0	0	15	0	0	0	11	0
8:00 AM	0	4	0	0	0	0	0	0	0	0	9	0	0	0	15	0
8:15 AM	0	1	0	1	0	0	0	0	0	0	7	0	0	0	12	0
8:30 AM	0	2	0	1	0	0	0	0	0	0	9	0	0	0	16	0
8:45 AM	0	5	0	0	0	0	0	0	0	0	10	0	0	0	14	0

	D Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	3	0	1	0	0	0	0	0	0	4	0	0	0	7	0
4:15 PM	0	1	0	1	0	0	0	0	0	0	4	0	0	0	11	0
4:30 PM	0	1	0	6	0	0	0	0	0	0	8	0	0	0	5	0
4:45 PM	0	5	0	0	0	0	0	0	0	0	5	0	0	0	8	0
5:00 PM	0	2	0	0	0	0	0	0	0	0	7	0	0	0	9	0
5:15 PM	0	2	0	0	0	0	0	0	0	0	6	0	0	0	8	0
5:30 PM	0	1	0	0	0	0	0	0	0	0	4	0	0	0	6	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0

AM PEAK HOUR 7:15 AM to 8:15 AM	D Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**18**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**47**	**0**	**0**	**0**	**55**	**0**
PHF	**0.52**				**0.00**				**0.78**				**0.92**			

PM PEAK HOUR 4:15 PM to 5:15 PM	D Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**9**	**0**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**0**	**0**	**33**	**0**
PHF	**0.57**				**0.00**				**0.75**				**0.75**			

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 1B
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	D Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

	D Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	1	0	0	16		0	0	0	0		0	2	0	0		0	2	0	5	
7:15 AM	1	0	0	25		0	0	0	0		0	6	0	0		0	2	0	4	
7:30 AM	3	0	0	27		0	0	0	0		0	2	0	0		0	1	0	6	
7:45 AM	6	0	0	29		0	0	0	0		0	7	0	0		0	4	0	3	
8:00 AM	1	0	0	32		0	0	0	0		0	8	0	0		0	2	0	2	
8:15 AM	3	0	0	28		0	0	0	0		0	12	0	0		0	3	0	3	
8:30 AM	2	0	1	31		0	0	0	0		0	14	0	0		0	2	0	4	
8:45 AM	2	0	0	30		0	0	0	0		0	9	0	0		0	3	0	3	

	D Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	28		0	0	0	0		0	5	0	0		0	14	0	20	
4:15 PM	1	0	0	33		0	0	0	0		0	0	0	0		0	11	0	18	
4:30 PM	3	0	0	36		0	0	0	0		0	1	0	0		0	4	0	25	
4:45 PM	0	0	0	40		0	0	0	0		0	1	0	0		0	13	0	24	
5:00 PM	2	0	2	38		0	0	0	0		0	2	0	0		0	7	0	22	
5:15 PM	2	0	1	42		0	0	0	0		0	3	0	0		0	12	0	26	
5:30 PM	0	0	0	45		0	0	0	0		0	5	0	0		0	6	0	23	
5:45 PM	1	0	0	41		0	0	0	0		0	5	0	0		0	11	0	25	

AM PEAK HOUR[1]	D Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
8:00 AM to 9:00 AM	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	8	0	1	121		0	0	0	0		0	43	0	0		0	10	0	12	

PM PEAK HOUR[1]	D Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
5:00 PM to 6:00 PM	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	5	0	3	166		0	0	0	0		0	15	0	0		0	36	0	96	

[1] Peak hours corresponds to vehicular peak hours.

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 2
Location: Seaport, Boston, MA
Street 1: Northern Avenue
Street 2: Congress Street
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

BOSTON TRAFFIC DATA
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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Congress Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	2	0	32	0	0	0	0	0	0	66	0	0	1	46	0
7:15 AM	0	2	0	33	0	0	0	0	0	0	72	0	0	3	38	0
7:30 AM	0	6	0	30	0	0	0	0	0	0	55	2	0	2	42	0
7:45 AM	0	8	0	25	0	0	0	0	0	0	58	1	0	5	58	0
8:00 AM	0	2	0	34	0	0	0	0	1	0	60	1	0	1	52	0
8:15 AM	0	3	0	29	0	0	0	0	0	0	63	1	0	2	61	0
8:30 AM	0	0	0	42	0	0	0	0	0	0	62	0	1	2	71	0
8:45 AM	0	4	0	44	0	0	0	0	1	0	63	3	0	8	68	0

	Congress Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	8	0	14	0	0	0	0	3	0	87	3	1	7	59	0
4:15 PM	0	9	0	17	0	0	0	0	0	0	99	3	0	9	58	0
4:30 PM	0	6	0	16	0	0	0	0	0	0	83	2	0	11	66	0
4:45 PM	0	11	0	42	0	0	0	0	0	0	97	4	0	14	64	0
5:00 PM	0	10	0	37	0	0	0	0	2	0	111	2	0	16	72	0
5:15 PM	0	13	0	39	0	0	0	0	3	0	108	8	0	14	67	0
5:30 PM	0	12	0	23	0	0	0	0	2	0	110	3	0	17	61	0
5:45 PM	0	13	0	26	0	0	0	0	0	0	106	8	0	11	55	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Congress Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**9**	**0**	**149**	**0**	**0**	**0**	**0**	**2**	**0**	**248**	**5**	**1**	**13**	**252**	**0**
PHF	**0.82**				**0.00**				**0.95**				**0.88**			
HV %	**0.0%**	**0.0%**	**0.0%**	**12.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**18.1%**	**0.0%**	**0.0%**	**30.8%**	**23.4%**	**0.0%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Congress Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**46**	**0**	**141**	**0**	**0**	**0**	**0**	**7**	**0**	**426**	**17**	**0**	**61**	**264**	**0**
PHF	**0.88**				**0.00**				**0.95**				**0.92**			
HV %	**0.0%**	**8.7%**	**0.0%**	**7.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**5.4%**	**5.9%**	**0.0%**	**3.3%**	**9.8%**	**0.0%**

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 2
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	Congress Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

BOSTON TRAFFIC DATA
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HEAVY VEHICLES

	Congress Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	2	0	0	0	0	0	0	14	1	0	1	11	0
7:15 AM	0	1	0	5	0	0	0	0	0	0	13	0	0	0	10	0
7:30 AM	0	1	0	4	0	0	0	0	0	0	16	0	0	0	13	0
7:45 AM	0	0	0	5	0	0	0	0	0	0	14	0	0	1	11	0
8:00 AM	0	0	0	3	0	0	0	0	0	0	12	0	0	1	13	0
8:15 AM	0	0	0	4	0	0	0	0	0	0	10	0	0	0	15	0
8:30 AM	0	0	0	8	0	0	0	0	0	0	11	0	0	2	16	0
8:45 AM	0	0	0	3	0	0	0	0	0	0	12	0	0	1	15	0

	Congress Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	2	0	0	0	0	0	0	6	0	0	1	6	0
4:15 PM	0	0	0	5	0	0	0	0	0	0	4	0	0	1	9	0
4:30 PM	0	0	0	2	0	0	0	0	0	0	9	1	0	0	7	0
4:45 PM	0	1	0	5	0	0	0	0	0	0	6	1	0	1	8	0
5:00 PM	0	2	0	3	0	0	0	0	0	0	7	0	0	1	7	0
5:15 PM	0	1	0	2	0	0	0	0	0	0	5	0	0	0	6	0
5:30 PM	0	0	0	1	0	0	0	0	0	0	5	0	0	0	5	0
5:45 PM	0	1	0	2	0	0	0	0	0	0	3	0	0	0	3	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Congress Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**47**	**0**	**0**	**4**	**55**	**0**
PHF	**0.63**				**0.00**				**0.84**				**0.82**			

PM PEAK HOUR 4:15 PM to 5:15 PM	Congress Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**3**	**0**	**15**	**0**	**0**	**0**	**0**	**0**	**0**	**26**	**2**	**0**	**3**	**31**	**0**
PHF	**0.75**				**0.00**				**0.70**				**0.85**			

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 2
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	Congress Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

	Congress Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	5		0	0	0	0		0	2	0	7		0	3	0	0	
7:15 AM	0	0	0	7		0	0	0	0		0	5	0	9		0	1	0	0	
7:30 AM	0	0	1	8		0	0	0	0		0	2	0	12		0	2	0	0	
7:45 AM	0	0	0	9		0	0	0	0		0	6	0	14		0	4	0	0	
8:00 AM	0	0	1	10		0	0	0	0		0	7	0	17		0	1	0	0	
8:15 AM	0	0	0	12		0	0	0	0		0	11	1	20		0	3	0	0	
8:30 AM	0	0	1	16		0	0	0	0		0	10	0	23		0	3	0	0	
8:45 AM	0	0	0	20		0	0	0	0		0	8	0	28		0	4	0	0	

	Congress Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	5		0	0	0	0		0	5	0	20		0	14	0	3	
4:15 PM	0	0	0	6		0	0	0	0		0	0	0	22		0	12	0	0	
4:30 PM	0	0	0	4		0	0	0	0		0	1	0	24		0	3	0	1	
4:45 PM	0	0	0	7		0	0	0	0		0	0	0	27		0	13	0	2	
5:00 PM	0	0	0	6		0	0	0	0		0	1	1	28		0	7	0	0	
5:15 PM	0	0	0	8		0	0	0	0		0	1	0	26		0	10	0	1	
5:30 PM	0	0	1	4		0	0	0	0		0	2	0	29		0	6	0	1	
5:45 PM	0	0	0	5		0	0	0	0		0	4	1	25		0	11	0	0	

AM PEAK HOUR[1] 8:00 AM to 9:00 AM	Congress Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	2	58		0	0	0	0		0	36	1	88		0	11	0	0	

PM PEAK HOUR[1] 4:45 PM to 5:45 PM	Congress Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	1	25		0	0	0	0		0	4	1	110		0	36	0	4	

[1] *Peak hours corresponds to vehicular peak hours.*

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 3
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue (at Rotary)
Street 2:	Massport Haul Road
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Massport Haul Road Northbound				Drvieway (no street name) Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	13	2	19	0	0	2	4	1	11	73	13	0	7	29	1
7:15 AM	0	16	2	37	0	4	0	4	7	4	78	16	1	8	14	5
7:30 AM	0	13	3	44	0	0	1	2	2	3	68	12	0	10	27	2
7:45 AM	1	22	0	54	0	1	3	6	2	3	70	8	0	13	33	0
8:00 AM	0	24	1	56	0	0	1	3	2	4	73	15	0	7	24	2
8:15 AM	1	26	4	62	0	2	0	4	1	3	79	9	1	9	32	2
8:30 AM	1	25	3	65	0	1	2	2	3	7	88	7	0	8	44	1
8:45 AM	0	23	5	59	0	0	0	6	5	4	87	11	0	10	42	0

	Massport Haul Road Northbound				Drvieway (no street name) Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	1	15	3	11	0	0	6	4	5	2	64	31	0	40	43	1
4:15 PM	2	11	2	7	0	2	2	4	6	3	81	26	0	34	46	2
4:30 PM	3	12	2	6	0	1	5	11	2	2	72	23	1	31	52	0
4:45 PM	1	23	0	5	0	0	4	6	2	3	108	26	2	35	47	0
5:00 PM	1	28	2	6	0	0	2	6	4	6	91	47	0	41	50	1
5:15 PM	0	22	1	12	0	0	3	7	8	2	93	44	0	34	44	0
5:30 PM	1	37	1	10	0	1	3	10	3	3	92	35	0	30	28	0
5:45 PM	2	22	0	12	0	0	2	3	8	2	90	32	0	31	33	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Massport Haul Road Northbound				Drvieway (no street name) Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	2	**98**	**13**	**242**	**0**	**3**	**3**	**15**	**11**	**18**	**327**	**42**	**1**	**34**	**142**	**5**
PHF	**0.94**				**0.88**				**0.93**				**0.86**			
HV %	**50.0%**	**9.2%**	**38.5%**	**12.8%**	**0.0%**	**66.7%**	**66.7%**	**20.0%**	**54.5%**	**16.7%**	**15.6%**	**11.9%**	**0.0%**	**55.9%**	**31.0%**	**20.0%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Massport Haul Road Northbound				Drvieway (no street name) Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	3	**110**	**4**	**33**	**0**	**1**	**12**	**29**	**17**	**14**	**384**	**152**	**2**	**140**	**169**	**1**
PHF	**0.77**				**0.75**				**0.96**				**0.85**			
HV %	**33.3%**	**0.9%**	**0.0%**	**24.2%**	**0.0%**	**0.0%**	**8.3%**	**3.4%**	**35.3%**	**21.4%**	**4.9%**	**3.9%**	**0.0%**	**15.0%**	**11.8%**	**0.0%**

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 3
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue (at Rotary)
Street 2:	Massport Haul Road
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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HEAVY VEHICLES

	Massport Haul Road Northbound				Drvieway (no street name) Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	1	1	9	0	0	1	3	1	1	13	0	0	5	7	0
7:15 AM	0	0	2	10	0	0	0	4	0	0	15	4	0	6	6	1
7:30 AM	0	1	0	12	0	2	3	1	1	1	19	0	0	7	10	1
7:45 AM	0	3	1	7	0	0	0	2	1	0	17	0	0	2	7	0
8:00 AM	0	3	1	9	0	0	1	0	2	0	14	0	0	4	8	1
8:15 AM	0	2	1	7	0	1	1	0	2	0	11	2	0	6	11	0
8:30 AM	1	2	3	7	0	1	0	2	2	1	14	2	0	5	12	0
8:45 AM	0	2	0	8	0	0	0	1	0	2	12	1	0	4	13	0

	Massport Haul Road Northbound				Drvieway (no street name) Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	2	1	4	0	0	0	0	1	0	5	2	0	5	4	0
4:15 PM	0	1	0	3	0	0	0	2	1	0	6	2	0	10	6	0
4:30 PM	1	1	1	2	0	0	0	1	0	0	9	1	0	9	5	0
4:45 PM	0	1	0	2	0	0	0	0	1	2	4	4	0	5	7	0
5:00 PM	1	0	0	2	0	0	0	1	2	0	7	0	0	7	5	0
5:15 PM	0	0	0	1	0	0	0	0	2	1	3	1	0	5	4	0
5:30 PM	0	0	0	3	0	0	1	0	1	0	5	1	0	4	4	0
5:45 PM	0	0	1	1	0	0	0	1	0	0	4	1	0	5	2	0

AM PEAK HOUR 7:15 AM to 8:15 AM	Massport Haul Road Northbound				Drvieway (no street name) Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**7**	**4**	**38**	**0**	**2**	**4**	**7**	**4**	**1**	**65**	**4**	**0**	**19**	**31**	**3**
PHF	**0.94**				**0.54**				**0.88**				**0.74**			

PM PEAK HOUR 4:15 PM to 5:15 PM	Massport Haul Road Northbound				Drvieway (no street name) Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	2	**3**	**1**	**9**	**0**	**0**	**0**	**4**	**4**	**2**	**26**	**7**	**0**	**31**	**23**	**0**
PHF	**0.75**				**0.50**				**0.89**				**0.84**			

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 3
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue (at Rotary)
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Count Date:	6/12/2019
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PEDESTRIANS & BICYCLES

	Massport Haul Road Northbound					Drvieway (no street name) Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	1		0	0	1	15		0	2	0	2		0	2	0	2	
7:15 AM	0	0	0	0		0	0	0	17		0	5	0	0		0	0	0	1	
7:30 AM	0	0	0	0		0	0	0	20		0	3	0	1		0	2	0	1	
7:45 AM	0	0	0	1		0	0	0	24		0	4	0	0		0	4	0	2	
8:00 AM	0	0	1	0		0	0	0	22		0	10	0	0		0	0	0	3	
8:15 AM	0	0	0	0		0	0	0	27		1	13	0	1		0	3	0	2	
8:30 AM	0	0	0	1		0	0	0	28		0	10	0	1		0	3	0	3	
8:45 AM	0	0	0	0		0	0	0	30		0	7	0	0		0	8	0	5	

	Massport Haul Road Northbound					Drvieway (no street name) Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	1	0	0	0		0	0	0	24		0	2	0	1		0	11	0	13	
4:15 PM	0	0	0	2		0	0	0	35		0	2	0	0		0	12	0	9	
4:30 PM	0	0	0	1		0	0	0	48		0	1	0	1		0	1	0	10	
4:45 PM	1	1	0	0		0	0	0	62		0	1	0	2		0	11	0	8	
5:00 PM	0	0	0	1		0	0	0	85		0	1	0	0		0	7	0	6	
5:15 PM	0	0	0	0		0	0	1	78		0	3	0	1		0	13	0	7	
5:30 PM	0	0	0	1		0	0	0	70		0	1	0	0		0	5	0	6	
5:45 PM	0	0	0	0		0	0	0	68		0	5	0	1		1	12	0	7	

AM PEAK HOUR[1]	Massport Haul Road Northbound					Drvieway (no street name) Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
8:00 AM to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
9:00 AM	0	0	1	1		0	0	0	107		1	40	0	2		0	14	0	13	

PM PEAK HOUR[1]	Massport Haul Road Northbound					Drvieway (no street name) Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
4:45 PM to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:45 PM	1	1	0	2		0	0	1	295		0	6	0	3		0	36	0	27	

[1] *Peak hours corresponds to vehicular peak hours.*

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 4
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	Channel Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

BOSTON TRAFFIC DATA
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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Channel Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	1	0	0	0	0	0	0	89	3	0	2	37	0
7:15 AM	0	1	0	2	0	0	0	0	0	0	120	0	0	1	27	0
7:30 AM	0	1	0	2	0	0	0	0	1	0	110	1	0	0	37	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	122	3	0	0	46	0
8:00 AM	0	0	0	1	0	0	0	0	0	0	128	1	0	0	33	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	143	1	0	0	44	0
8:30 AM	0	1	0	1	0	0	0	0	0	0	154	0	0	1	52	0
8:45 AM	0	0	0	1	0	0	0	0	1	0	144	1	0	1	51	0

	Channel Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	1	0	0	0	0	0	0	1	0	74	0	0	0	82	0
4:15 PM	0	2	0	0	0	0	0	0	0	0	88	2	0	1	80	0
4:30 PM	0	1	0	0	0	0	0	0	0	0	79	1	1	1	83	0
4:45 PM	0	0	0	1	0	0	0	0	0	0	114	1	0	0	84	0
5:00 PM	0	1	0	0	0	0	0	0	0	0	97	0	1	2	91	0
5:15 PM	0	0	0	0	0	0	0	0	1	0	104	0	0	1	77	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	102	1	1	1	58	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	101	1	0	0	64	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Channel Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**0**	**3**	**0**	**0**	**0**	**0**	**1**	**0**	**569**	**3**	**0**	**2**	**180**	**0**
PHF	**0.50**				**0.00**				**0.93**				**0.86**			
HV %	**0.0%**	**100.0%**	**0.0%**	**33.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**14.9%**	**0.0%**	**0.0%**	**50.0%**	**44.4%**	**0.0%**

PM PEAK HOUR 4:30 PM to 5:30 PM	Channel Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**394**	**2**	**2**	**4**	**335**	**0**
PHF	**0.75**				**0.00**				**0.86**				**0.91**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**9.1%**	**0.0%**	**0.0%**	**25.0%**	**13.7%**	**0.0%**

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 4
Location: Seaport, Boston, MA
Street 1: Northern Avenue
Street 2: Channel Street
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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HEAVY VEHICLES

	Channel Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	0	0	0	24	0	0	0	15	0
7:15 AM	0	0	0	1	0	0	0	0	0	0	25	1	0	0	20	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	32	0	0	0	21	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	23	1	0	0	21	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	26	0	0	0	13	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	19	0	0	0	22	0
8:30 AM	0	1	0	1	0	0	0	0	0	0	21	0	0	0	18	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	19	0	0	1	27	0

	Channel Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	10	1	0	0	15	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	10	0	0	1	13	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	8	0	0	0	12	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	13	0	0	0	12	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	5	0	0	0	9	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	12	0	0	0	8	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	7	0

AM PEAK HOUR 7:00 AM to 8:00 AM	Channel Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**104**	**2**	**0**	**0**	**77**	**0**
PHF	**0.25**				**0.00**				**0.83**				**0.92**			

PM PEAK HOUR 4:15 PM to 5:15 PM	Channel Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**41**	**1**	**0**	**1**	**52**	**0**
PHF	**0.25**				**0.00**				**0.81**				**0.88**			

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 4
Location: Seaport, Boston, MA
Street 1: Northern Avenue
Street 2: Channel Street
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

	Channel Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	4		0	0	0	0		0	2	0	0		0	2	0	0	
7:15 AM	0	0	0	3		0	0	0	0		0	6	0	0		0	0	0	0	
7:30 AM	0	0	0	5		0	0	0	0		0	2	0	0		0	1	0	0	
7:45 AM	0	0	0	4		0	0	0	0		0	7	0	0		0	1	0	0	
8:00 AM	0	0	0	4		0	0	0	0		0	8	0	0		0	0	0	0	
8:15 AM	0	0	0	6		0	0	0	0		0	13	0	0		0	2	0	0	
8:30 AM	0	0	0	5		0	0	0	0		0	16	1	0		0	1	0	0	
8:45 AM	0	0	0	4		0	0	0	0		0	11	0	0		0	5	0	0	

	Channel Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	8		0	0	0	0		0	2	0	0		0	6	0	0	
4:15 PM	0	0	0	6		0	0	0	0		0	0	0	0		0	7	0	0	
4:30 PM	0	0	0	9		0	0	0	0		0	1	0	0		0	1	0	0	
4:45 PM	0	0	0	11		0	0	0	0		0	1	0	0		0	13	0	0	
5:00 PM	0	0	0	10		0	0	0	0		0	1	0	0		0	8	0	0	
5:15 PM	0	0	0	9		0	0	0	0		0	3	0	0		0	9	0	0	
5:30 PM	0	0	0	8		0	0	0	0		0	4	0	0		0	7	0	0	
5:45 PM	0	0	0	9		0	0	0	0		0	6	0	0		0	11	0	0	

AM PEAK HOUR[1] 8:00 AM to 9:00 AM	Channel Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	0	19		0	0	0	0		0	48	1	0		0	8	0	0	

PM PEAK HOUR[1] 4:30 PM to 5:30 PM	Channel Street Northbound					Southbound					Northern Avenue Eastbound					Northern Avenue Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	0	39		0	0	0	0		0	6	0	0		0	31	0	0	

[1] Peak hours corresponds to vehicular peak hours.

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 5
Location: Seaport, Boston, MA
Street 1: Northern Avenue
Street 2: Harbor Street
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Harbor Street								Northern Avenue				Northern Avenue			
	Northbound				Southbound				Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	17	0	3	0	0	0	0	0	0	78	12	0	3	22	0
7:15 AM	0	18	0	5	0	0	0	0	0	0	105	17	0	3	10	0
7:30 AM	0	19	0	4	0	0	0	0	0	0	98	14	0	2	18	0
7:45 AM	0	21	0	3	0	0	0	0	0	0	106	16	0	2	25	0
8:00 AM	0	12	0	4	0	0	0	0	0	0	114	15	0	3	21	0
8:15 AM	0	22	0	5	0	0	0	0	0	0	125	18	0	2	22	0
8:30 AM	0	30	0	4	0	0	0	0	0	0	133	22	0	3	23	0
8:45 AM	0	26	0	7	0	0	0	0	0	0	128	17	0	2	26	0

	Harbor Street								Northern Avenue				Northern Avenue			
	Northbound				Southbound				Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	16	0	1	0	0	0	0	0	0	43	31	0	8	66	0
4:15 PM	0	22	0	1	0	0	0	0	0	0	53	35	0	7	59	0
4:30 PM	0	15	0	4	0	0	0	0	0	0	46	34	0	10	70	0
4:45 PM	0	19	0	1	0	0	0	0	0	0	75	40	0	9	65	0
5:00 PM	0	20	0	2	0	0	0	0	0	0	61	37	0	8	74	0
5:15 PM	0	15	0	2	0	0	0	0	0	0	44	60	0	13	63	0
5:30 PM	0	17	0	1	0	0	0	0	0	0	52	51	0	10	43	0
5:45 PM	0	12	0	4	0	0	0	0	0	0	53	48	0	7	52	0

AM PEAK HOUR	Harbor Street								Northern Avenue				Northern Avenue			
8:00 AM	Northbound				Southbound				Eastbound				Westbound			
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
9:00 AM	**0**	**90**	**0**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**500**	**72**	**0**	**10**	**92**	**0**
PHF	**0.81**				**0.00**				**0.92**				**0.91**			
HV %	**0.0%**	**7.8%**	**0.0%**	**30.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**15.4%**	**12.5%**	**0.0%**	**70.0%**	**72.8%**	**0.0%**

PM PEAK HOUR	Harbor Street								Northern Avenue				Northern Avenue			
4:30 PM	Northbound				Southbound				Eastbound				Westbound			
to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
5:30 PM	**0**	**69**	**0**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**226**	**171**	**0**	**40**	**272**	**0**
PHF	**0.89**				**0.00**				**0.86**				**0.95**			
HV %	**0.0%**	**5.8%**	**0.0%**	**44.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**14.2%**	**5.3%**	**0.0%**	**7.5%**	**16.5%**	**0.0%**

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 5
Location:	Seaport, Boston, MA
Street 1:	Northern Avenue
Street 2:	Harbor Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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HEAVY VEHICLES

	Harbor Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	6	0	0	0	0	0	0	0	0	17	3	0	0	13	0
7:15 AM	0	3	0	0	0	0	0	0	0	0	19	5	0	1	15	0
7:30 AM	0	2	0	0	0	0	0	0	0	0	22	5	0	0	16	0
7:45 AM	0	4	0	1	0	0	0	0	0	0	25	5	0	0	14	0
8:00 AM	0	1	0	0	0	0	0	0	0	0	21	3	0	1	11	0
8:15 AM	0	2	0	3	0	0	0	0	0	0	19	2	0	1	17	0
8:30 AM	0	3	0	1	0	0	0	0	0	0	17	3	0	4	18	0
8:45 AM	0	1	0	2	0	0	0	0	0	0	20	1	0	1	21	0

	Harbor Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	7	1	0	1	11	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	8	4	0	1	13	0
4:30 PM	0	1	0	1	0	0	0	0	0	0	8	2	0	1	14	0
4:45 PM	0	1	0	2	0	0	0	0	0	0	9	2	0	0	10	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	10	4	0	2	13	0
5:15 PM	0	2	0	1	0	0	0	0	0	0	5	1	0	0	8	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	11	3	0	0	9	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	2	1	0	2	6	0

AM PEAK HOUR 7:00 AM to 8:00 AM	Harbor Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**15**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**83**	**18**	**0**	**1**	**58**	**0**
PHF	**0.67**				**0.00**				**0.84**				**0.92**			

PM PEAK HOUR 4:15 PM to 5:15 PM	Harbor Street Northbound				Southbound				Northern Avenue Eastbound				Northern Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**35**	**12**	**0**	**4**	**50**	**0**
PHF	**0.50**				**0.00**				**0.84**				**0.90**			

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 5
Location: Seaport, Boston, MA
Street 1: Northern Avenue
Street 2: Harbor Street
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

	Harbor Street								Northern Avenue				Northern Avenue			
	Northbound				Southbound				Eastbound				Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	2	0	0	8	0	0	0	0	0	1	0	0	0	2	0	4
7:15 AM	0	0	0	7	0	0	0	0	0	5	0	0	0	0	0	4
7:30 AM	1	0	0	8	0	0	0	0	0	2	0	0	0	1	0	5
7:45 AM	3	0	0	9	0	0	0	0	0	7	1	0	0	0	0	6
8:00 AM	1	0	0	8	0	0	0	0	0	9	0	0	0	0	0	9
8:15 AM	2	0	0	10	0	0	0	0	0	13	0	0	0	1	0	8
8:30 AM	2	0	0	11	0	0	0	0	0	15	1	0	0	1	0	10
8:45 AM	2	0	0	14	0	0	0	0	0	12	0	0	0	5	0	11

	Harbor Street								Northern Avenue				Northern Avenue			
	Northbound				Southbound				Eastbound				Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	4	0	0	11	0	0	0	0	0	2	0	1	0	5	0	12
4:15 PM	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	15
4:30 PM	0	0	0	12	0	0	0	0	0	1	0	0	0	1	0	18
4:45 PM	3	0	0	15	0	0	0	0	0	0	0	0	0	10	0	23
5:00 PM	0	0	0	14	0	0	0	0	0	1	0	0	0	4	0	25
5:15 PM	0	0	0	13	0	0	0	0	0	1	0	0	0	7	0	22
5:30 PM	2	0	0	12	0	0	0	0	0	1	2	0	0	2	0	24
5:45 PM	0	0	0	14	0	0	0	0	0	2	4	0	0	10	0	26

AM PEAK HOUR[1]	Harbor Street								Northern Avenue				Northern Avenue			
8:00 AM	Northbound				Southbound				Eastbound				Westbound			
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
9:00 AM	7	0	0	43	0	0	0	0	0	49	1	0	0	7	0	38

PM PEAK HOUR[1]	Harbor Street								Northern Avenue				Northern Avenue			
4:30 PM	Northbound				Southbound				Eastbound				Westbound			
to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
5:30 PM	3	0	0	54	0	0	0	0	0	3	0	0	0	22	0	88

[1] *Peak hours corresponds to vehicular peak hours.*

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 6
Location: Seaport, Boston, MA
Street 1: Massport Haul Road
Street 2: Pumphouse Road
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

BOSTON TRAFFIC DATA
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Office: 978-746-1259
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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Pumphouse Road Northbound				Southbound				Massport Haul Road Eastbound				Massport Haul Road Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	96	0	10	0	0	0	0	0	0	35	46	0	13	14	0
7:15 AM	0	118	0	7	0	0	0	0	0	0	48	55	0	8	16	0
7:30 AM	0	112	0	8	0	0	0	0	0	0	52	47	0	12	19	0
7:45 AM	0	105	0	12	0	0	0	0	0	0	64	57	0	9	12	0
8:00 AM	0	74	0	9	0	0	0	0	0	0	72	54	0	14	14	0
8:15 AM	0	110	0	17	0	0	0	0	0	0	75	44	0	10	15	0
8:30 AM	0	85	0	15	0	0	0	0	0	0	95	45	0	8	13	0
8:45 AM	0	66	0	17	0	0	0	0	0	0	89	35	0	3	18	0

	Pumphouse Road Northbound				Southbound				Massport Haul Road Eastbound				Massport Haul Road Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	61	0	14	0	0	0	0	0	0	16	30	0	19	49	0
4:15 PM	2	54	0	9	0	0	0	0	0	0	13	39	0	22	41	0
4:30 PM	0	46	0	12	0	0	0	0	0	0	14	48	0	24	36	0
4:45 PM	3	37	0	13	0	0	0	0	0	0	17	47	0	23	38	0
5:00 PM	0	43	0	14	0	0	0	0	0	0	23	41	0	37	51	0
5:15 PM	1	41	0	16	0	0	0	0	0	0	19	45	0	36	42	0
5:30 PM	0	38	0	18	0	0	0	0	0	0	28	46	0	26	39	0
5:45 PM	0	44	0	11	0	0	0	0	0	0	25	44	0	25	35	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Pumphouse Road Northbound				Southbound				Massport Haul Road Eastbound				Massport Haul Road Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**374**	**0**	**53**	**0**	**0**	**0**	**0**	**0**	**0**	**306**	**200**	**0**	**41**	**54**	**0**
PHF	**0.84**				**0.00**				**0.90**				**0.85**			
HV %	**0.0%**	**10.7%**	**0.0%**	**9.4%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**11.4%**	**12.5%**	**0.0%**	**7.3%**	**59.3%**	**0.0%**

PM PEAK HOUR 5:00 PM to 6:00 PM	Pumphouse Road Northbound				Southbound				Massport Haul Road Eastbound				Massport Haul Road Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**166**	**0**	**59**	**0**	**0**	**0**	**0**	**0**	**0**	**95**	**176**	**0**	**124**	**167**	**0**
PHF	**0.97**				**0.00**				**0.92**				**0.83**			
HV %	**0.0%**	**3.6%**	**0.0%**	**1.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**10.5%**	**4.5%**	**0.0%**	**3.2%**	**11.4%**	**0.0%**

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 6
Location: Seaport, Boston, MA
Street 1: Massport Haul Road
Street 2: Pumphouse Road
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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HEAVY VEHICLES

	Pumphouse Road Northbound				Southbound				Massport Haul Road Eastbound				Massport Haul Road Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	8	0	0	0	0	0	0	0	0	11	10	0	0	9	0
7:15 AM	0	7	0	2	0	0	0	0	0	0	8	7	0	0	12	0
7:30 AM	0	7	0	1	0	0	0	0	0	0	13	7	0	0	10	0
7:45 AM	0	9	0	0	0	0	0	0	0	0	14	5	0	1	9	0
8:00 AM	0	10	0	1	0	0	0	0	0	0	6	3	0	1	7	0
8:15 AM	0	9	0	1	0	0	0	0	0	0	5	7	0	1	9	0
8:30 AM	0	12	0	3	0	0	0	0	0	0	10	10	0	0	7	0
8:45 AM	0	5	0	0	0	0	0	0	0	0	4	8	0	1	8	0

	Pumphouse Road Northbound				Southbound				Massport Haul Road Eastbound				Massport Haul Road Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	4	0	2	0	0	0	0	0	0	2	5	0	2	8	0
4:15 PM	0	6	0	0	0	0	0	0	0	0	2	5	0	2	13	0
4:30 PM	0	6	0	1	0	0	0	0	0	0	2	1	0	1	7	0
4:45 PM	0	2	0	1	0	0	0	0	0	0	3	2	0	3	5	0
5:00 PM	0	2	0	0	0	0	0	0	0	0	3	1	0	1	2	0
5:15 PM	0	1	0	0	0	0	0	0	0	0	3	3	0	2	7	0
5:30 PM	0	1	0	0	0	0	0	0	0	0	1	4	0	1	4	0
5:45 PM	0	2	0	1	0	0	0	0	0	0	3	0	0	0	6	0

AM PEAK HOUR 7:00 AM to 8:00 AM	Pumphouse Road Northbound				Southbound				Massport Haul Road Eastbound				Massport Haul Road Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**31**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**46**	**29**	**0**	**1**	**40**	**0**
PHF	**0.94**				**0.00**				**0.89**				**0.85**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Pumphouse Road Northbound				Southbound				Massport Haul Road Eastbound				Massport Haul Road Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**18**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**13**	**0**	**8**	**33**	**0**
PHF	**0.79**				**0.00**				**0.79**				**0.68**			

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 6
Location: Seaport, Boston, MA
Street 1: Massport Haul Road
Street 2: Pumphouse Road
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

	Pumphouse Road										Massport Haul Road					Massport Haul Road				
	Northbound					Southbound					Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
7:15 AM	0	0	2	0		0	0	0	0		0	0	0	0		0	0	0	0	
7:30 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
7:45 AM	1	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
8:00 AM	1	0	0	0		0	0	0	0		0	0	0	0		0	0	0	1	
8:15 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
8:30 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	2	
8:45 AM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	

	Pumphouse Road										Massport Haul Road					Massport Haul Road				
	Northbound					Southbound					Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	0		0	0	0	0		0	0	0	0		1	0	0	0	
4:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
4:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	1	
4:45 PM	0	0	2	0		0	0	0	0		0	1	0	0		0	0	0	0	
5:00 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
5:15 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
5:30 PM	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	
5:45 PM	0	0	0	0		0	0	0	0		0	0	0	0		1	0	0	0	

AM PEAK HOUR[1]	Pumphouse Road										Massport Haul Road					Massport Haul Road				
7:45 AM	Northbound					Southbound					Eastbound					Westbound				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:45 AM	2	0	0	0		0	0	0	0		0	0	0	0		0	0	0	3	

PM PEAK HOUR[1]	Pumphouse Road										Massport Haul Road					Massport Haul Road				
5:00 PM	Northbound					Southbound					Eastbound					Westbound				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
6:00 PM	0	0	0	0		0	0	0	0		0	0	0	0		1	0	0	0	

[1] *Peak hours corresponds to vehicular peak hours.*

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 8
Location: Seaport, Boston, MA
Street 1: Summer Street
Street 2: Pumphouse Road
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Northbound				Pumphouse Road Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	32	0	27	1	2	94	0	0	0	121	104
7:15 AM	0	0	0	0	0	33	0	30	4	2	114	0	0	0	128	123
7:30 AM	0	0	0	0	0	31	0	28	2	3	136	0	0	0	122	117
7:45 AM	0	0	0	0	0	32	0	34	0	1	142	0	0	0	95	116
8:00 AM	0	0	0	0	0	42	0	26	0	2	139	0	1	0	116	82
8:15 AM	0	0	0	0	0	34	0	20	0	8	148	0	0	0	97	119
8:30 AM	0	0	0	0	0	32	0	21	1	3	130	0	3	0	98	97
8:45 AM	0	0	0	0	0	24	0	14	0	7	133	0	1	0	93	76

	Northbound				Pumphouse Road Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	44	0	5	0	10	163	0	0	0	84	65
4:15 PM	0	0	0	0	0	47	0	16	0	5	158	0	1	0	97	60
4:30 PM	0	0	0	0	0	50	0	22	0	9	151	0	0	0	107	49
4:45 PM	0	0	0	0	0	52	0	21	0	13	179	0	1	0	101	40
5:00 PM	0	0	0	0	0	58	0	20	0	11	188	0	0	0	117	46
5:15 PM	0	0	0	0	0	69	0	14	0	9	182	0	2	0	109	49
5:30 PM	0	0	0	0	0	59	0	13	0	6	177	0	0	0	123	50
5:45 PM	0	0	0	0	0	54	0	15	0	4	143	0	0	0	101	51

AM PEAK HOUR 7:15 AM to 8:15 AM	Northbound				Pumphouse Road Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**138**	**0**	**118**	**6**	**8**	**531**	**0**	**1**	**0**	**461**	**438**
PHF	**0.00**				**0.94**				**0.95**				**0.90**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**17.4%**	**0.0%**	**7.6%**	**0.0%**	**25.0%**	**12.8%**	**0.0%**	**0.0%**	**0.0%**	**18.7%**	**7.1%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Northbound				Pumphouse Road Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**238**	**0**	**68**	**0**	**39**	**726**	**0**	**3**	**0**	**450**	**185**
PHF	**0.00**				**0.92**				**0.96**				**0.92**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**11.3%**	**0.0%**	**4.4%**	**0.0%**	**5.1%**	**5.4%**	**0.0%**	**0.0%**	**0.0%**	**5.8%**	**2.2%**

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 8
Location: Seaport, Boston, MA
Street 1: Summer Street
Street 2: Pumphouse Road
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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HEAVY VEHICLES

					Pumphouse Road				Summer Street				Summer Street			
	Northbound				Southbound				Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	12	0	1	0	1	21	0	0	0	12	7
7:15 AM	0	0	0	0	0	6	0	3	0	1	17	0	0	0	17	7
7:30 AM	0	0	0	0	0	6	0	4	0	0	19	0	0	0	20	8
7:45 AM	0	0	0	0	0	7	0	1	0	0	14	0	0	0	24	7
8:00 AM	0	0	0	0	0	5	0	1	0	1	18	0	0	0	25	9
8:15 AM	0	0	0	0	0	5	0	0	0	0	20	0	0	0	26	9
8:30 AM	0	0	0	0	0	13	0	1	0	2	17	0	0	0	20	13
8:45 AM	0	0	0	0	0	11	0	2	0	0	18	0	0	0	17	8

					Pumphouse Road				Summer Street				Summer Street			
	Northbound				Southbound				Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	7	0	0	0	1	11	0	0	0	18	4
4:15 PM	0	0	0	0	0	3	0	3	0	1	11	0	0	0	9	4
4:30 PM	0	0	0	0	0	5	0	4	0	1	9	0	0	0	12	6
4:45 PM	0	0	0	0	0	6	0	1	0	1	12	0	0	0	8	2
5:00 PM	0	0	0	0	0	9	0	1	0	0	9	0	0	0	7	1
5:15 PM	0	0	0	0	0	8	0	0	0	1	8	0	0	0	5	0
5:30 PM	0	0	0	0	0	4	0	1	0	0	10	0	0	0	6	1
5:45 PM	0	0	0	0	0	2	0	2	0	1	7	0	0	0	5	1

					Pumphouse Road				Summer Street				Summer Street			
AM PEAK HOUR 8:00 AM to 9:00 AM	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**34**	**0**	**4**	**0**	**3**	**73**	**0**	**0**	**0**	**88**	**39**
PHF	**0.00**				**0.68**				**0.95**				**0.91**			

					Pumphouse Road				Summer Street				Summer Street			
PM PEAK HOUR 4:00 PM to 5:00 PM	Northbound				Southbound				Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**21**	**0**	**8**	**0**	**4**	**43**	**0**	**0**	**0**	**47**	**16**
PHF	**0.00**				**0.81**				**0.90**				**0.72**			

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 8
Location:	Seaport, Boston, MA
Street 1:	Summer Street
Street 2:	Pumphouse Road
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

						Pumphouse Road					Summer Street					Summer Street				
	Northbound					Southbound					Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	0		0	0	0	16		0	0	0	0		0	2	0	0	
7:15 AM	0	0	0	0		0	0	0	18		1	2	0	0		0	4	2	0	
7:30 AM	0	0	0	0		0	0	0	17		0	2	0	0		0	8	0	1	
7:45 AM	0	0	0	0		0	0	0	21		0	2	0	0		0	5	1	0	
8:00 AM	0	0	0	0		0	0	0	22		0	3	0	0		0	10	1	2	
8:15 AM	0	0	0	0		0	0	0	25		0	2	0	0		0	5	0	1	
8:30 AM	0	0	0	0		0	0	0	28		0	4	0	0		0	6	0	0	
8:45 AM	0	0	0	0		0	0	0	26		0	4	0	0		0	7	1	1	

						Pumphouse Road					Summer Street					Summer Street				
	Northbound					Southbound					Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	0		1	0	0	20		0	1	0	0		0	4	0	4	
4:15 PM	0	0	0	0		0	0	0	21		0	1	0	0		0	3	0	1	
4:30 PM	0	0	0	0		0	0	0	23		0	3	0	0		0	5	0	0	
4:45 PM	0	0	0	0		1	0	0	22		0	2	0	0		0	3	2	2	
5:00 PM	0	0	0	0		0	0	0	25		0	4	0	0		0	5	0	0	
5:15 PM	0	0	0	0		0	0	1	28		0	3	0	0		0	2	0	1	
5:30 PM	0	0	0	0		0	0	0	32		0	3	0	0		0	3	0	1	
5:45 PM	0	0	0	0		0	0	0	30		0	4	0	0		0	3	0	0	

AM PEAK HOUR[1]						Pumphouse Road					Summer Street					Summer Street				
7:15 AM	Northbound					Southbound					Eastbound					Westbound				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:15 AM	0	0	0	0		0	0	0	78		1	9	0	0		0	27	4	3	

PM PEAK HOUR[1]						Pumphouse Road					Summer Street					Summer Street				
4:45 PM	Northbound					Southbound					Eastbound					Westbound				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:45 PM	0	0	0	0		1	0	1	107		0	12	0	0		0	13	2	4	

[1] *Peak hours corresponds to vehicular peak hours.*

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 9
Location: Seaport, Boston, MA
Street 1: Summer Street
Street 2: Dry Dock Avenue/Pappas Way
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
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www.BostonTrafficData.com

PASSENGER CARS & HEAVY VEHICLES COMBINED

	Pappas Way Northbound				Dry Dock Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	36	7	0	0	17	5	10	1	21	74	30	0	2	178	35
7:15 AM	0	39	14	0	0	19	6	12	0	31	77	39	0	1	200	32
7:30 AM	0	26	10	1	0	14	13	14	1	25	119	22	0	0	198	29
7:45 AM	0	31	18	0	0	24	14	18	1	23	117	33	0	1	161	38
8:00 AM	0	28	19	2	0	13	12	20	0	31	131	20	0	1	151	42
8:15 AM	0	39	22	1	0	26	17	15	0	25	132	25	0	3	162	45
8:30 AM	0	27	30	1	0	29	23	21	1	47	84	33	0	0	149	37
8:45 AM	0	26	36	0	0	32	15	36	0	62	75	21	0	1	108	40

	Pappas Way Northbound				Dry Dock Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	19	6	3	0	52	25	57	1	24	136	46	0	3	72	17
4:15 PM	0	14	4	3	0	55	28	34	0	11	157	38	0	1	110	24
4:30 PM	0	10	15	2	0	53	34	59	0	18	124	59	0	0	87	18
4:45 PM	0	12	7	1	0	54	41	53	0	13	185	34	0	6	77	26
5:00 PM	0	10	16	3	0	53	40	78	0	17	182	47	0	0	75	27
5:15 PM	0	17	8	1	0	65	37	80	0	15	183	55	0	3	63	22
5:30 PM	0	11	7	5	0	58	40	76	0	10	168	58	0	0	86	14
5:45 PM	0	18	4	5	0	47	33	64	0	13	142	42	0	1	70	13

AM PEAK HOUR 7:45 AM to 8:45 AM	Pappas Way Northbound				Dry Dock Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**125**	**89**	**4**	**0**	**92**	**66**	**74**	**2**	**126**	**464**	**111**	**0**	**5**	**623**	**162**
PHF	**0.88**				**0.79**				**0.97**				**0.94**			
HV %	**0.0%**	**5.6%**	**3.4%**	**0.0%**	**0.0%**	**4.3%**	**13.6%**	**35.1%**	**0.0%**	**15.9%**	**13.6%**	**11.7%**	**0.0%**	**40.0%**	**15.2%**	**3.7%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Pappas Way Northbound				Dry Dock Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**50**	**38**	**10**	**0**	**230**	**158**	**287**	**0**	**55**	**718**	**194**	**0**	**9**	**301**	**89**
PHF	**0.84**				**0.93**				**0.96**				**0.92**			
HV %	**0.0%**	**2.0%**	**5.3%**	**0.0%**	**0.0%**	**0.9%**	**1.9%**	**7.3%**	**0.0%**	**27.3%**	**4.3%**	**9.8%**	**0.0%**	**0.0%**	**6.0%**	**1.1%**

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 9
Location:	Seaport, Boston, MA
Street 1:	Summer Street
Street 2:	Dry Dock Avenue/Pappas Way
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

BOSTON TRAFFIC DATA

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HEAVY VEHICLES

	Pappas Way Northbound				Dry Dock Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	3	0	0	0	2	0	12	0	9	19	1	0	0	6	2
7:15 AM	0	5	0	0	0	3	0	8	0	3	13	2	0	0	9	0
7:30 AM	0	7	0	0	0	3	1	9	0	3	18	1	0	0	19	0
7:45 AM	0	5	0	0	0	1	1	2	0	3	10	3	0	1	23	2
8:00 AM	0	2	2	0	0	2	3	10	0	5	15	3	0	1	25	0
8:15 AM	0	0	0	0	0	1	2	8	0	8	16	3	0	0	26	1
8:30 AM	0	0	1	0	0	0	3	6	0	4	22	4	0	0	21	3
8:45 AM	0	0	0	0	0	1	0	9	0	5	18	1	0	0	17	1

	Pappas Way Northbound				Dry Dock Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	1	0	0	0	1	1	6	0	3	13	5	0	1	18	0
4:15 PM	0	0	0	0	0	0	2	4	0	1	7	3	0	2	10	0
4:30 PM	0	1	0	1	0	1	0	4	0	1	6	1	0	0	14	0
4:45 PM	0	0	1	0	0	0	0	5	0	5	10	6	0	0	7	0
5:00 PM	0	1	0	0	0	0	2	8	0	2	6	2	0	0	4	0
5:15 PM	0	0	1	0	0	1	1	2	0	8	7	5	0	0	3	1
5:30 PM	0	0	0	0	0	1	0	6	0	0	8	6	0	0	4	0
5:45 PM	0	1	0	0	0	0	0	4	0	4	6	2	0	0	5	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Pappas Way Northbound				Dry Dock Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**2**	**3**	**0**	**0**	**4**	**8**	**33**	**0**	**22**	**71**	**11**	**0**	**1**	**89**	**5**
PHF	**0.31**				**0.75**				**0.87**				**0.88**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Pappas Way Northbound				Dry Dock Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**2**	**1**	**1**	**0**	**2**	**3**	**19**	**0**	**10**	**36**	**15**	**0**	**3**	**49**	**0**
PHF	**0.50**				**0.75**				**0.73**				**0.68**			

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 9
Location:	Seaport, Boston, MA
Street 1:	Summer Street
Street 2:	Dry Dock Avenue/Pappas Way
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

BOSTON
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PEDESTRIANS & BICYCLES

	Pappas Way Northbound					Dry Dock Avenue Southbound					Summer Street Eastbound					Summer Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	0	0	14		0	0	0	10		1	0	0	4		0	2	0	2	
7:15 AM	0	0	0	18		0	0	0	17		4	2	0	5		0	4	0	5	
7:30 AM	0	0	0	21		0	0	0	24		1	1	1	6		0	9	1	6	
7:45 AM	0	0	0	26		0	1	0	23		6	2	0	7		0	6	1	5	
8:00 AM	0	0	0	24		0	0	0	20		6	2	2	9		0	10	0	4	
8:15 AM	0	5	0	25		0	0	0	26		7	1	1	8		0	5	0	5	
8:30 AM	0	0	0	22		0	0	0	21		0	4	0	6		0	7	0	7	
8:45 AM	0	0	0	23		0	0	0	25		6	3	0	7		0	6	2	8	

	Pappas Way Northbound					Dry Dock Avenue Southbound					Summer Street Eastbound					Summer Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	19		0	1	2	22		1	2	1	3		0	5	3	8	
4:15 PM	0	0	0	23		0	1	1	23		0	1	1	4		0	0	0	10	
4:30 PM	0	0	0	25		0	1	1	26		2	3	4	3		0	3	0	13	
4:45 PM	0	0	0	27		0	0	0	25		0	4	0	4		0	5	0	11	
5:00 PM	0	0	0	30		0	1	1	28		0	2	3	7		0	4	0	12	
5:15 PM	0	0	0	28		0	1	3	30		0	4	2	5		0	0	0	10	
5:30 PM	0	0	0	33		2	2	4	29		0	2	0	6		0	2	0	14	
5:45 PM	1	1	0	30		5	1	2	32		0	5	0	4		0	1	1	11	

AM PEAK HOUR[1] 7:45 AM to 8:45 AM	Pappas Way Northbound					Dry Dock Avenue Southbound					Summer Street Eastbound					Summer Street Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	5	0	97		0	1	0	90		19	9	3	30		0	28	1	21	

PM PEAK HOUR[1] 4:45 PM to 5:45 PM	Pappas Way Northbound					Dry Dock Avenue Southbound					Summer Street Eastbound					Summer Street Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	0	0	118		2	4	8	112		0	12	5	22		0	11	0	47	

[1] *Peak hours corresponds to vehicular peak hours.*

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 10
Location: Seaport, Boston, MA
Street 1: Harbor Street
Street 2: Dry Dock Avenue
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Harbor Street Northbound				Harbor Street Southbound				Dry Dock Avenue Eastbound				Dry Dock Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	1	6	2	2	0	3	1	14	0	19	40	4	0	0	12	4
7:15 AM	0	3	3	4	0	4	7	10	0	15	60	2	0	0	24	6
7:30 AM	0	4	1	2	0	6	2	11	1	18	43	2	0	2	25	4
7:45 AM	0	4	2	5	0	7	1	18	1	21	53	4	0	0	33	8
8:00 AM	0	1	2	2	0	10	3	12	0	15	71	6	0	1	32	5
8:15 AM	0	9	0	3	0	9	2	13	0	24	64	4	0	0	36	6
8:30 AM	0	3	3	2	0	6	3	18	0	25	85	4	0	1	52	6
8:45 AM	0	7	4	2	0	7	2	11	0	26	106	6	0	1	65	2

	Harbor Street Northbound				Harbor Street Southbound				Dry Dock Avenue Eastbound				Dry Dock Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	23	3	5	0	1	1	37	0	10	36	1	0	1	74	5
4:15 PM	0	14	2	1	0	2	1	41	0	16	22	1	0	0	62	7
4:30 PM	0	17	1	4	0	3	1	49	0	18	31	2	0	2	80	3
4:45 PM	0	13	4	2	0	2	3	47	0	12	32	2	0	2	88	3
5:00 PM	0	21	1	1	0	6	3	40	0	19	38	3	0	0	110	3
5:15 PM	0	8	3	1	0	3	4	67	0	8	37	0	0	0	107	6
5:30 PM	0	19	4	2	0	5	0	60	1	10	20	0	0	1	94	5
5:45 PM	0	10	5	1	0	5	1	49	1	5	22	2	0	0	84	5

AM PEAK HOUR 8:00 AM to 9:00 AM	Harbor Street Northbound				Harbor Street Southbound				Dry Dock Avenue Eastbound				Dry Dock Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**20**	**9**	**9**	**0**	**32**	**10**	**54**	**0**	**90**	**326**	**20**	**0**	**3**	**185**	**19**
PHF	**0.73**				**0.89**				**0.79**				**0.76**			
HV %	**0.0%**	**20.0%**	**11.1%**	**33.3%**	**0.0%**	**6.3%**	**20.0%**	**27.8%**	**0.0%**	**10.0%**	**6.1%**	**10.0%**	**0.0%**	**0.0%**	**14.1%**	**21.1%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Harbor Street Northbound				Harbor Street Southbound				Dry Dock Avenue Eastbound				Dry Dock Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**61**	**12**	**6**	**0**	**16**	**10**	**214**	**1**	**49**	**127**	**5**	**0**	**3**	**399**	**17**
PHF	**0.79**				**0.81**				**0.76**				**0.93**			
HV %	**0.0%**	**1.6%**	**0.0%**	**33.3%**	**0.0%**	**12.5%**	**10.0%**	**1.9%**	**0.0%**	**8.2%**	**13.4%**	**0.0%**	**0.0%**	**0.0%**	**5.5%**	**5.9%**

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 10
Location:	Seaport, Boston, MA
Street 1:	Harbor Street
Street 2:	Dry Dock Avenue
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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HEAVY VEHICLES

	Harbor Street Northbound				Harbor Street Southbound				Dry Dock Avenue Eastbound				Dry Dock Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	3	1	1	0	0	0	2	0	5	6	1	0	0	9	1
7:15 AM	0	2	0	0	0	0	0	2	0	0	3	0	0	0	7	1
7:30 AM	0	1	0	1	0	1	0	5	0	0	3	0	0	1	5	0
7:45 AM	0	0	1	1	0	0	0	2	0	2	3	1	0	0	2	2
8:00 AM	0	1	0	1	0	1	1	6	0	2	4	1	0	0	8	1
8:15 AM	0	1	0	0	0	0	0	4	0	5	6	0	0	0	5	1
8:30 AM	0	1	0	1	0	1	0	4	0	2	5	1	0	0	5	1
8:45 AM	0	1	1	1	0	0	1	1	0	0	5	0	0	0	8	1

	Harbor Street Northbound				Harbor Street Southbound				Dry Dock Avenue Eastbound				Dry Dock Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	2	0	0	0	4	0	0	3	1	0	0	5	1
4:15 PM	0	1	0	0	0	1	0	3	0	0	1	0	0	0	3	1
4:30 PM	0	0	0	0	0	0	0	3	0	0	3	0	0	0	3	1
4:45 PM	0	1	0	1	0	0	0	0	0	2	4	0	0	0	4	0
5:00 PM	0	0	0	0	0	1	0	3	0	0	5	0	0	0	9	0
5:15 PM	0	0	0	1	0	0	1	1	0	2	8	0	0	0	2	0
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	7	1
5:45 PM	0	0	0	0	0	0	0	2	0	1	3	0	0	0	2	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Harbor Street Northbound				Harbor Street Southbound				Dry Dock Avenue Eastbound				Dry Dock Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**4**	**1**	**3**	**0**	**2**	**2**	**15**	**0**	**9**	**20**	**2**	**0**	**0**	**26**	**4**
PHF	**0.67**				**0.59**				**0.70**				**0.83**			

PM PEAK HOUR 4:30 PM to 5:30 PM	Harbor Street Northbound				Harbor Street Southbound				Dry Dock Avenue Eastbound				Dry Dock Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**0**	**2**	**0**	**1**	**1**	**7**	**0**	**4**	**20**	**0**	**0**	**0**	**18**	**1**
PHF	**0.38**				**0.56**				**0.60**				**0.53**			

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 10
Location:	Seaport, Boston, MA
Street 1:	Harbor Street
Street 2:	Dry Dock Avenue
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

	Harbor Street Northbound					Harbor Street Southbound					Dry Dock Avenue Eastbound					Dry Dock Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	1	0	0	3		0	0	1	3		1	2	0	0		0	0	0	10	
7:15 AM	0	0	1	4		1	0	0	2		0	6	0	1		0	0	0	12	
7:30 AM	0	0	0	2		0	1	0	3		2	2	0	0		0	0	0	11	
7:45 AM	0	1	0	3		0	0	1	3		2	7	0	0		0	0	0	13	
8:00 AM	0	0	1	3		0	0	0	3		1	7	0	1		0	0	0	14	
8:15 AM	0	2	0	2		2	0	0	2		2	13	1	0		0	1	0	17	
8:30 AM	0	0	1	1		0	0	0	3		2	10	0	0		0	0	0	18	
8:45 AM	0	0	1	1		0	0	0	2		3	10	0	0		0	0	0	16	

	Harbor Street Northbound					Harbor Street Southbound					Dry Dock Avenue Eastbound					Dry Dock Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	0	0	1		0	1	0	2		3	1	0	0		0	4	0	10	
4:15 PM	0	0	0	2		0	0	0	3		0	0	0	0		0	5	0	15	
4:30 PM	0	0	2	1		0	0	0	3		0	2	0	0		0	1	0	17	
4:45 PM	0	1	0	1		0	0	0	5		0	0	0	0		0	0	1	18	
5:00 PM	0	0	0	1		0	0	0	4		0	0	0	2		0	3	0	22	
5:15 PM	0	0	0	3		0	0	0	3		0	0	0	0		0	5	0	45	
5:30 PM	0	0	2	2		0	0	1	3		0	0	0	0		0	8	1	36	
5:45 PM	0	0	1	2		0	0	2	2		2	0	0	0		0	4	0	32	

AM PEAK HOUR[1] 8:00 AM to 9:00 AM	Harbor Street Northbound					Harbor Street Southbound					Dry Dock Avenue Eastbound					Dry Dock Avenue Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	2	3	7		2	0	0	10		8	40	1	1		0	1	0	65	

PM PEAK HOUR[1] 4:45 PM to 5:45 PM	Harbor Street Northbound					Harbor Street Southbound					Dry Dock Avenue Eastbound					Dry Dock Avenue Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	1	2	7		0	0	1	15		0	0	0	2		0	16	2	121	

[1] *Peak hours corresponds to vehicular peak hours.*

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 11
Location:	Seaport, Boston, MA
Street 1:	Harbor Street
Street 2:	Channel Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Harbor Street Northbound				Harbor Street Southbound				Channel Street Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	2	23	0	0	0	15	0	0	0	0	3	0	0	0	0
7:15 AM	0	0	24	0	0	0	20	0	0	0	0	1	0	0	0	0
7:30 AM	0	1	22	0	0	0	16	0	0	1	0	3	0	0	0	0
7:45 AM	0	7	24	0	0	0	20	1	0	0	0	6	0	0	0	0
8:00 AM	0	3	19	0	0	0	18	0	0	0	0	7	0	0	0	0
8:15 AM	0	3	27	0	0	0	23	1	0	0	0	1	0	0	0	0
8:30 AM	0	1	33	0	0	0	25	0	0	1	0	2	0	0	0	0
8:45 AM	0	1	31	0	0	0	19	0	0	0	0	1	0	0	0	0

	Harbor Street Northbound				Harbor Street Southbound				Channel Street Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	1	17	0	0	0	38	1	0	2	0	1	0	0	0	0
4:15 PM	0	2	23	0	0	0	42	0	0	0	0	2	0	0	0	0
4:30 PM	0	2	20	0	0	0	48	1	0	0	0	5	0	0	0	0
4:45 PM	0	0	19	0	0	0	49	0	0	1	0	3	0	0	0	0
5:00 PM	0	1	22	0	0	0	44	1	0	0	0	5	0	0	0	0
5:15 PM	0	0	17	0	0	0	73	0	0	0	0	1	0	0	0	0
5:30 PM	0	2	18	0	0	0	65	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	15	0	0	0	54	1	0	1	0	1	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Harbor Street Northbound				Harbor Street Southbound				Channel Street Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**14**	**103**	**0**	**0**	**0**	**86**	**2**	**0**	**1**	**0**	**16**	**0**	**0**	**0**	**0**
PHF	**0.86**				**0.88**				**0.61**				**0.00**			
HV %	**0.0%**	**7.1%**	**16.5%**	**0.0%**	**0.0%**	**0.0%**	**22.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**6.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 4:45 PM to 5:45 PM	Harbor Street Northbound				Harbor Street Southbound				Channel Street Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**3**	**76**	**0**	**0**	**0**	**231**	**1**	**0**	**1**	**0**	**9**	**0**	**0**	**0**	**0**
PHF	**0.86**				**0.79**				**0.50**				**0.00**			
HV %	**0.0%**	**33.3%**	**6.6%**	**0.0%**	**0.0%**	**0.0%**	**3.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	David A. Bohn, PE, ENV SP
Project #:	394_072_VHB
BTD #:	Location 11
Location:	Seaport, Boston, MA
Street 1:	Harbor Street
Street 2:	Channel Street
Count Date:	6/12/2019
Day of Week:	Wednesday
Weather:	Mostly Sunny, 75°F

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HEAVY VEHICLES

	Harbor Street Northbound				Harbor Street Southbound				Channel Street Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	7	0	0	0	2	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0
7:45 AM	0	1	6	0	0	0	2	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	2	0	0	0	8	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	6	0	0	0	4	0	0	0	0	1	0	0	0	0
8:30 AM	0	0	3	0	0	0	5	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0

	Harbor Street Northbound				Harbor Street Southbound				Channel Street Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	1	1	0	0	0	4	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0
5:30 PM	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Harbor Street Northbound				Harbor Street Southbound				Channel Street Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**17**	**0**	**0**	**0**	**19**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
PHF	**0.64**				**0.59**				**0.25**				**0.00**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Harbor Street Northbound				Harbor Street Southbound				Channel Street Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**5**	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.75**				**0.69**				**0.00**				**0.00**			

Client: David A. Bohn, PE, ENV SP
Project #: 394_072_VHB
BTD #: Location 11
Location: Seaport, Boston, MA
Street 1: Harbor Street
Street 2: Channel Street
Count Date: 6/12/2019
Day of Week: Wednesday
Weather: Mostly Sunny, 75°F

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PEDESTRIANS & BICYCLES

	Harbor Street Northbound					Harbor Street Southbound					Channel Street Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	2	0	3		0	1	0	1		0	0	0	3		0	0	0	0	
7:15 AM	0	0	0	2		0	1	0	2		0	0	0	0		0	0	0	0	
7:30 AM	0	2	0	3		0	1	0	4		0	0	0	1		0	0	0	0	
7:45 AM	0	3	0	3		0	1	0	7		0	0	0	1		0	0	0	0	
8:00 AM	0	1	0	3		0	0	0	10		0	0	0	0		0	0	0	0	
8:15 AM	0	1	0	2		0	2	0	6		0	0	0	1		0	0	0	0	
8:30 AM	0	3	0	3		0	1	0	5		0	0	0	0		0	0	0	0	
8:45 AM	0	2	0	2		0	0	0	7		0	0	0	1		0	0	0	0	

	Harbor Street Northbound					Harbor Street Southbound					Channel Street Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	3	0	2		0	0	0	2		0	0	0	2		0	0	0	0	
4:15 PM	0	0	0	3		0	1	0	4		0	0	0	1		0	0	0	0	
4:30 PM	0	0	0	3		0	0	0	8		0	0	0	1		0	0	0	0	
4:45 PM	0	3	0	5		0	0	0	10		0	0	0	2		0	0	0	0	
5:00 PM	0	0	0	4		0	0	0	11		0	0	0	2		0	0	0	0	
5:15 PM	0	0	0	3		0	0	0	7		0	0	0	3		0	0	0	0	
5:30 PM	0	1	0	3		0	2	0	5		0	0	0	1		0	0	0	0	
5:45 PM	0	2	0	2		0	1	0	6		0	0	0	2		0	0	0	0	

AM PEAK HOUR[1] 7:45 AM to 8:45 AM	Harbor Street Northbound					Harbor Street Southbound					Channel Street Eastbound					Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	8	0	11		0	4	0	28		0	0	0	2		0	0	0	0	

PM PEAK HOUR[1] 4:45 PM to 5:45 PM	Harbor Street Northbound					Harbor Street Southbound					Channel Street Eastbound					Westbound				
	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
	0	4	0	15		0	2	0	33		0	0	0	8		0	0	0	0	

[1] *Peak hours corresponds to vehicular peak hours.*

Volume Report

Job 394_072_VHB_ATR 1
Area Seaport, Boston, MA
Location Northern Avenue, west of Massport Haul Road

BOSTON
TRAFFIC DATA
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Tuesday, June 11, 2019

Time	EB Vehicles & Trucks		EB Trucks		WB Vehicles & Trucks		WB Trucks	
0000	15		0		17		1	
0015	13		1		14		0	
0030	5		0		9		2	
0045	12	45	0	1	9	49	0	3
0100	6		1		9		1	
0115	3		1		6		0	
0130	4		2		13		3	
0145	2	15	2	6	3	31	1	5
0200	5		3		7		7	
0215	8		1		11		1	
0230	6		2		2		0	
0245	2	21	1	7	1	21	0	8
0300	5		2		5		1	
0315	6		0		2		0	
0330	11		3		4		1	
0345	9	31	3	8	3	14	1	3
0400	9		4		9		5	
0415	7		2		5		3	
0430	20		7		4		2	
0445	29	65	5	18	7	25	2	12
0500	37		10		11		3	
0515	54		8		16		5	
0530	101		7		30		7	
0545	121	313	7	32	34	91	9	24
0600	93		10		25		12	
0615	87		14		27		13	
0630	82		27		42		10	
0645	96	358	13	64	44	138	19	54
0700	88		22		46		21	
0715	79		19		59		24	
0730	88		18		63		21	
0745	81	336	18	77	48	216	18	84
0800	114		24		97		18	
0815	112		17		130		16	
0830	103		10		111		18	
0845	134	463	11	62	136	474	22	74
0900	125		19		112		15	
0915	119		16		95		24	
0930	104		18		74		21	
0945	128	476	15	68	69	350	14	74
1000	99		10		72		20	
1015	87		20		63		15	
1030	74		25		74		23	
1045	77	337	23	78	84	293	21	79
1100	81		17		88		14	
1115	77		21		54		17	
1130	74		28		90		17	
1145	65	297	27	93	83	315	23	71

Time	EB Vehicles & Trucks		EB Trucks		WB Vehicles & Trucks		WB Trucks	
1200	69		28		77		20	
1215	63		25		65		21	
1230	68		27		68		26	
1245	68	268	21	101	79	289	16	83
1300	59		22		66		19	
1315	58		24		61		22	
1330	57		15		73		17	
1345	73	247	19	80	76	276	12	70
1400	74		13		105		17	
1415	68		16		72		17	
1430	76		15		82		11	
1445	71	289	24	68	78	337	17	62
1500	78		20		108		13	
1515	88		13		78		12	
1530	82		8		83		16	
1545	99	347	11	52	82	351	13	54
1600	98		10		98		15	
1615	126		7		84		12	
1630	125		15		89		2	
1645	136	485	7	39	91	362	8	37
1700	130		7		107		9	
1715	117		9		112		3	
1730	121		2		115		12	
1745	128	496	6	24	94	428	5	29
1800	143		4		127		7	
1815	141		5		115		2	
1830	121		12		111		9	
1845	135	540	6	27	105	458	3	21
1900	134		9		161		5	
1915	82		5		94		8	
1930	78		6		79		4	
1945	54	348	8	28	75	409	2	19
2000	41		5		52		4	
2015	52		5		51		1	
2030	49		5		60		2	
2045	38	180	1	16	49	212	2	9
2100	31		6		48		2	
2115	37		8		72		2	
2130	54		3		52		1	
2145	53	175	2	19	70	242	1	6
2200	46		6		69		2	
2215	34		1		62		4	
2230	47		2		101		1	
2245	21	148	6	15	75	307	1	8
2300	52		2		106		1	
2315	60		3		99		1	
2330	25		1		53		2	
2345	17	154	1	7	29	287	0	4
Total	**6434**		**990**		**5975**		**893**	

Volume Report

Job 394_072_VHB_ATR 1
Area Seaport, Boston, MA
Location Northern Avenue, west of Massport Haul Road

BOSTON TRAFFIC DATA
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Wednesday, June 12, 2019

Time	EB Vehicles & Trucks		EB Trucks		WB Vehicles & Trucks		WB Trucks	
0000	14		1		33		0	
0015	14		0		31		3	
0030	10		2		16		0	
0045	9	47	1	4	27	107	0	3
0100	7		1		22		0	
0115	4		0		4		1	
0130	10		4		6		0	
0145	3	24	2	7	14	46	0	1
0200	4		1		4		0	
0215	4		1		6		2	
0230	2		1		5		1	
0245	3	13	1	4	4	19	0	3
0300	6		3		2		1	
0315	9		4		7		0	
0330	11		2		4		0	
0345	17	43	3	12	4	17	1	2
0400	15		5		4		3	
0415	12		4		5		1	
0430	19		1		7		3	
0445	37	83	3	13	10	26	3	10
0500	40		3		20		3	
0515	73		5		20		5	
0530	112		12		22		5	
0545	111	336	7	27	38	100	7	20
0600	74		8		28		12	
0615	90		8		26		13	
0630	91		18		39		14	
0645	97	352	14	48	44	137	16	55
0700	98		16		47		12	
0715	105		18		41		10	
0730	85		20		44		13	
0745	83	371	19	73	63	195	12	47
0800	94		15		53		14	
0815	92		14		63		15	
0830	105		19		74		18	
0845	107	398	15	63	76	266	16	63
0900	121		18		79		15	
0915	85		22		68		17	
0930	105		20		69		20	
0945	89	400	16	76	72	288	22	74
1000	89		24		69		25	
1015	72		26		60		17	
1030	77		19		51		21	
1045	84	322	18	87	77	257	12	75
1100	72		19		72		18	
1115	76		24		53		17	
1130	78		17		64		23	
1145	74	300	24	84	60	249	14	72

Time	EB Vehicles & Trucks		EB Trucks		WB Vehicles & Trucks		WB Trucks	
1200	72		17		85		19	
1215	63		24		80		24	
1230	82		32		76		14	
1245	80	297	21	94	74	315	19	76
1300	79		21		88		20	
1315	63		15		107		16	
1330	63		23		65		18	
1345	55	260	20	79	84	344	15	69
1400	99		23		82		12	
1415	75		8		83		11	
1430	68		16		102		7	
1445	71	313	21	68	93	360	16	46
1500	76		18		129		6	
1515	81		14		94		16	
1530	84		8		62		23	
1545	105	346	9	49	69	354	12	57
1600	102		8		67		7	
1615	116		9		67		10	
1630	99		11		77		7	
1645	139	456	11	39	78	289	9	33
1700	148		10		88		8	
1715	147		7		81		6	
1730	133		6		78		5	
1745	132	560	5	28	66	313	3	22
1800	116		8		82		7	
1815	126		6		93		5	
1830	95		7		97		14	
1845	87	424	6	27	90	362	4	30
1900	92		6		90		4	
1915	78		3		98		1	
1930	83		4		74		4	
1945	48	301	5	18	60	322	1	10
2000	44		5		56		1	
2015	42		2		53		3	
2030	35		2		68		1	
2045	32	153	2	11	50	227	1	6
2100	33		3		36		0	
2115	32		1		41		0	
2130	38		4		42		0	
2145	23	126	3	11	47	166	2	2
2200	40		5		53		2	
2215	33		2		58		0	
2230	46		3		36		0	
2245	30	149	4	14	53	200	1	3
2300	26		1		44		1	
2315	18		2		34		0	
2330	32		1		30		1	
2345	21	97	2	6	26	134	1	3
Total	**6171**		**942**		**5093**		**782**	

Volume Report

Job 394_072_VHB_ATR 1
Area Seaport, Boston, MA
Location Northern Avenue, west of Massport Haul Road

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

Thursday, June 13, 2019

Time	EB Vehicles & Trucks		EB Trucks		WB Vehicles & Trucks		WB Trucks	
0000	21		2		26		2	
0015	16		1		29		1	
0030	13		2		18		1	
0045	5	55	0	5	15	88	0	4
0100	15		3		28		1	
0115	10		1		14		0	
0130	9		2		15		3	
0145	9	43	0	6	14	71	2	6
0200	8		3		4		2	
0215	4		0		5		0	
0230	13		1		10		0	
0245	6	31	3	7	9	28	0	2
0300	3		1		5		2	
0315	10		4		1		0	
0330	13		4		4		1	
0345	11	37	4	13	3	13	1	4
0400	11		4		5		1	
0415	8		2		8		2	
0430	26		6		7		4	
0445	43	88	5	17	11	31	5	12
0500	49		5		9		4	
0515	62		11		15		4	
0530	109		10		35		7	
0545	97	317	6	32	36	95	14	29
0600	93		14		38		7	
0615	85		10		31		9	
0630	91		15		42		10	
0645	73	342	20	59	36	147	21	47
0700	64		22		53		12	
0715	75		20		48		22	
0730	67		20		52		15	
0745	80	286	18	80	60	213	18	67
0800	90		21		61		23	
0815	101		13		85		16	
0830	125		20		80		18	
0845	105	421	23	77	78	304	19	76
0900	120		20		88		13	
0915	100		17		92		36	
0930	114		15		72		18	
0945	104	438	16	68	72	324	12	79
1000	117		26		79		19	
1015	82		18		70		24	
1030	88		23		77		18	
1045	91	378	20	87	82	308	16	77
1100	70		27		72		16	
1115	73		28		61		21	
1130	77		21		75		16	
1145	73	293	19	95	84	292	22	75

Time	EB Vehicles & Trucks		EB Trucks		WB Vehicles & Trucks		WB Trucks	
1200	96		10		72		22	
1215	106		20		86		15	
1230	106		21		93		15	
1245	84	392	20	71	73	324	18	70
1300	93		11		85		17	
1315	97		19		83		25	
1330	73		12		93		19	
1345	98	361	5	47	83	344	11	72
1400	86		10		117		19	
1415	81		12		115		8	
1430	86		24		80		11	
1445	90	343	11	57	87	399	12	50
1500	107		5		120		9	
1515	71		13		72		11	
1530	94		13		75		9	
1545	110	382	8	39	90	357	11	40
1600	88		12		94		6	
1615	124		13		88		11	
1630	109		9		87		10	
1645	108	429	9	43	81	350	8	35
1700	139		13		88		8	
1715	134		6		100		6	
1730	154		7		79		7	
1745	125	552	7	33	72	339	7	28
1800	103		4		115		5	
1815	126		7		90		4	
1830	123		7		94		5	
1845	108	460	8	26	82	381	3	17
1900	87		3		76		2	
1915	85		10		75		2	
1930	54		4		54		3	
1945	52	278	2	19	54	259	0	7
2000	40		4		41		0	
2015	60		3		53		2	
2030	30		2		43		2	
2045	33	163	6	15	61	198	2	6
2100	32		6		58		2	
2115	25		1		37		3	
2130	25		6		56		1	
2145	21	103	2	15	50	201	3	9
2200	22		5		40		2	
2215	28		6		49		2	
2230	34		2		31		3	
2245	22	106	1	14	42	162	2	9
2300	13		3		20		2	
2315	24		2		28		2	
2330	17		1		30		1	
2345	14	68	3	9	32	110	0	5
Total	**6366**		**934**		**5338**		**826**	

Volume Report

Job 394_072_VHB_ATR 2
Area Seaport, Boston, MA
Location Massport Haul Road, south of Northern Avenue

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

Tuesday, June 11, 2019

Time	NB Vehicles & Trucks		NB Trucks		SB Vehicles & Trucks		SB Trucks	
0000	1		0		4		1	
0015	1		0		7		3	
0030	5		1		4		2	
0045	3	10	2	3	7	22	3	9
0100	1		1		7		2	
0115	2		0		3		2	
0130	7		2		0		0	
0145	2	12	0	3	3	13	1	5
0200	6		3		4		1	
0215	5		0		2		0	
0230	1		1		6		0	
0245	1	13	0	4	2	14	1	2
0300	4		1		3		0	
0315	3		2		1		1	
0330	2		1		3		1	
0345	3	12	0	4	5	12	1	3
0400	2		1		1		1	
0415	7		0		3		2	
0430	8		0		4		2	
0445	18	35	5	6	7	15	3	8
0500	16		3		4		2	
0515	31		4		4		2	
0530	30		8		13		6	
0545	43	120	4	19	25	46	9	19
0600	36		8		15		7	
0615	35		4		9		8	
0630	43		9		20		11	
0645	53	167	7	28	21	65	12	38
0700	50		10		22		9	
0715	47		10		10		6	
0730	65		6		19		9	
0745	60	222	9	35	13	64	12	36
0800	102		7		21		14	
0815	113		4		24		11	
0830	138		9		31		7	
0845	146	499	6	26	40	116	14	46
0900	119		5		44		5	
0915	104		8		35		11	
0930	119		6		30		10	
0945	91	433	4	23	29	138	9	35
1000	81		7		30		8	
1015	60		10		17		12	
1030	63		16		27		10	
1045	80	284	13	46	33	107	7	37
1100	64		9		23		18	
1115	38		11		28		11	
1130	46		12		27		13	
1145	56	204	15	47	23	101	7	49

Time	NB Vehicles & Trucks		NB Trucks		SB Vehicles & Trucks		SB Trucks	
1200	43		10		28		15	
1215	53		15		32		11	
1230	26		15		20		13	
1245	34	156	12	52	31	111	13	52
1300	27		10		32		13	
1315	39		11		16		10	
1330	36		8		35		14	
1345	31	133	9	38	41	124	8	45
1400	42		10		52		4	
1415	27		11		60		10	
1430	24		13		55		11	
1445	28	121	11	45	54	221	8	33
1500	35		5		68		14	
1515	23		5		56		2	
1530	24		6		46		9	
1545	36	118	7	23	48	218	6	31
1600	28		6		78		10	
1615	32		8		65		6	
1630	41		4		66		8	
1645	52	153	2	20	78	287	6	30
1700	52		4		91		4	
1715	56		1		94		12	
1730	78		3		89		8	
1745	62	248	3	11	71	345	12	36
1800	94		2		75		4	
1815	77		3		53		8	
1830	106		4		59		10	
1845	117	394	1	10	47	234	12	34
1900	86		2		45		10	
1915	59		3		34		10	
1930	44		4		38		8	
1945	38	227	3	12	36	153	4	32
2000	20		2		11		7	
2015	24		1		23		9	
2030	30		0		29		6	
2045	28	102	2	5	14	77	6	28
2100	17		2		13		7	
2115	27		2		17		5	
2130	25		0		26		6	
2145	34	103	2	6	16	72	5	23
2200	17		1		24		5	
2215	31		2		23		5	
2230	40		1		31		5	
2245	40	128	1	5	36	114	3	18
2300	47		1		103		5	
2315	25		2		40		3	
2330	24		1		15		3	
2345	12	108	1	5	6	164	4	15
Total	**4002**		**476**		**2833**		**664**	

Volume Report

Job 394_072_VHB_ATR 2
Area Seaport, Boston, MA
Location Massport Haul Road, south of Northern Avenue

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

Wednesday, June 12, 2019

Time	NB Vehicles & Trucks		NB Trucks		SB Vehicles & Trucks		SB Trucks		Time	NB Vehicles & Trucks		NB Trucks		SB Vehicles & Trucks		SB Trucks	
0000	10		0		4		1		1200	32		9		24		14	
0015	10		3		5		2		1215	37		12		29		15	
0030	3		1		4		0		1230	36		12		28		15	
0045	3	26	1	5	11	24	5	8	1245	40	145	16	49	33	114	20	64
0100	5		0		10		4		1300	37		14		21		20	
0115	3		1		2		1		1315	31		10		28		20	
0130	2		0		4		2		1330	35		8		33		12	
0145	6	16	0	1	3	19	2	9	1345	26	129	13	45	41	123	11	63
0200	2		1		6		1		1400	37		13		59		12	
0215	2		1		2		1		1415	34		13		62		7	
0230	2		0		2		1		1430	32		11		60		11	
0245	1	7	1	3	1	11	0	3	1445	33	136	10	47	62	243	14	44
0300	1		0		1		0		1500	39		8		69		11	
0315	3		1		3		2		1515	32		10		57		7	
0330	5		1		6		3		1530	18		5		49		8	
0345	4	13	0	2	4	14	1	6	1545	23	112	4	27	53	228	5	31
0400	3		1		3		1		1600	30		8		72		7	
0415	5		1		4		1		1615	22		7		62		12	
0430	11		4		3		1		1630	23		6		57		11	
0445	17	36	7	13	4	14	2	5	1645	29	104	5	26	62	253	9	39
0500	15		7		5		1		1700	37		6		89		8	
0515	32		6		9		4		1715	35		3		78		6	
0530	33		6		18		5		1730	49		7		66		5	
0545	54	134	10	29	21	53	7	17	1745	36	157	3	19	65	298	6	25
0600	31		4		21		10		1800	32		1		63		8	
0615	40		10		11		9		1815	25		6		68		7	
0630	45		11		19		7		1830	51		4		56		12	
0645	49	165	10	35	16	67	9	35	1845	45	153	3	14	50	237	7	34
0700	34		11		20		6		1900	40		5		56		10	
0715	55		12		24		11		1915	43		1		48		9	
0730	60		13		22		8		1930	34		4		39		10	
0745	77	226	11	47	22	88	2	27	1945	26	143	2	12	29	172	10	39
0800	81		13		22		5		2000	20		0		29		11	
0815	93		10		19		9		2015	23		2		24		7	
0830	94		13		16		9		2030	35		2		21		6	
0845	87	355	10	46	21	78	6	29	2045	18	96	2	6	21	95	5	29
0900	96		13		26		8		2100	12		2		14		4	
0915	85		12		22		8		2115	17		2		16		7	
0930	55		8		17		10		2130	12		0		11		6	
0945	65	301	10	43	15	80	9	35	2145	16	57	3	7	10	51	6	23
1000	64		17		17		7		2200	21		0		11		6	
1015	57		9		13		8		2215	21		4		18		5	
1030	52		12		23		13		2230	19		1		22		8	
1045	63	236	9	47	29	82	15	43	2245	24	85	0	5	19	70	5	24
1100	47		12		22		14		2300	25		0		22		7	
1115	31		17		25		7		2315	11		0		12		4	
1130	44		13		18		12		2330	18		1		15		2	
1145	39	161	13	55	28	93	13	46	2345	10	64	1	2	16	65	6	19
									Total	**3057**		**585**		**2572**		**697**	

Volume Report

Job 394_072_VHB_ATR 2
Area Seaport, Boston, MA
Location Massport Haul Road, south of Northern Avenue

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

Thursday, June 13, 2019

Time	NB Vehicles & Trucks		NB Trucks		SB Vehicles & Trucks		SB Trucks			Time	NB Vehicles & Trucks		NB Trucks		SB Vehicles & Trucks		SB Trucks	
0000	6		1		12		6			1200	53		15		24		8	
0015	10		0		7		3			1215	63		6		34		7	
0030	8		2		3		1			1230	53		10		35		18	
0045	8	32	0	3	4	26	2	12		1245	43	212	10	41	44	137	10	43
0100	8		1		3		2			1300	32		14		32		16	
0115	6		1		5		2			1315	45		18		38		16	
0130	7		1		7		0			1330	32		14		35		9	
0145	4	25	1	4	2	17	4	8		1345	29	138	5	51	54	159	6	47
0200	2		0		8		1			1400	26		7		70		8	
0215	1		0		1		0			1415	23		9		87		7	
0230	6		3		10		1			1430	41		8		68		6	
0245	3	12	1	4	4	23	1	3		1445	32	122	9	33	66	291	6	27
0300	3		2		1		0			1500	44		4		74		5	
0315	2		0		3		0			1515	27		6		45		6	
0330	2		1		3		2			1530	20		9		50		10	
0345	6	13	0	3	1	8	0	2		1545	41	132	6	25	70	239	8	29
0400	6		3		4		2			1600	28		4		67		11	
0415	3		2		3		2			1615	33		5		71		6	
0430	9		3		1		0			1630	34		3		81		8	
0445	14	32	8	16	6	14	4	8		1645	28	123	4	16	71	290	4	29
0500	11		8		8		2			1700	38		3		94		9	
0515	26		8		9		3			1715	36		2		43		9	
0530	53		5		18		4			1730	43		2		106		1	
0545	37	127	9	30	20	55	9	18		1745	25	142	3	10	91	334	8	27
0600	50		6		25		8			1800	48		4		79		5	
0615	39		7		15		4			1815	56		4		86		8	
0630	57		9		17		6			1830	60		2		66		14	
0645	49	195	11	33	14	71	5	23		1845	66	230	4	14	67	298	1	28
0700	44		7		15		6			1900	34		3		55		9	
0715	46		12		17		5			1915	22		2		79		7	
0730	67		15		21		12			1930	23		1		52		11	
0745	77	234	12	46	17	70	6	29		1945	24	103	0	6	36	222	4	31
0800	78		15		25		19			2000	20		1		28		4	
0815	86		12		32		8			2015	24		2		29		9	
0830	101		11		36		12			2030	21		1		26		3	
0845	83	348	8	46	26	119	12	51		2045	24	89	2	6	19	102	4	20
0900	145		8		28		16			2100	14		6		30		2	
0915	120		6		21		10			2115	18		3		17		4	
0930	89		14		32		9			2130	28		1		17		3	
0945	70	424	11	39	28	109	11	46		2145	24	84	2	12	10	74	6	15
1000	80		7		37		16			2200	8		6		22		1	
1015	56		5		22		12			2215	17		3		9		3	
1030	54		18		20		17			2230	14		3		20		6	
1045	65	255	15	45	33	112	18	63		2245	17	56	2	14	11	62	6	16
1100	63		9		21		12			2300	12		1		12		4	
1115	40		14		31		13			2315	21		0		14		5	
1130	39		11		22		10			2330	15		3		11		2	
1145	47	189	10	44	38	112	9	44		2345	11	59	0	4	12	49	6	17
										Total	**3376**		**545**		**2993**		**636**	

2 Harbor Street
Trip Generation Estimate - ITE 10th Edition
VHB, Inc.
10/8/2019

	Size	Trip Rate	Less Capture	Unadjusted Vehicle Trips	VOR	Person Trips	Transit Share	Walk/Other Share	Vehicle Share	Local VOR	Transit Trips	Walk/Other Trips	Adjusted Vehicle Trips
Daily Office		10.19		3,884		5,088					2,188	408	2,198
In	381.0	5.10		1,942	1.31	2,544	43%	8%	49%	1.135	1,094	204	1,099
Out	ksf	5.10		1,942	1.31	2,544	43%	8%	49%	1.135	1,094	204	1,099
Total Daily				3,884							2,188	408	2,198
In				1,942							1,094	204	1,099
Out				1,942							1,094	204	1,099
AM Office		1.01		385		500					215	40	216
In	381.0	0.87		331	1.3	430	43%	8%	49%	1.135	185	34	186
Out	ksf	0.14		54	1.3	70	43%	8%	49%	1.135	30	6	30
Total AM Peak Hour				385							215	40	216
In				331							185	34	186
Out				54							30	6	30
PM Office		1.06		406		536					231	43	231
In	381.0	0.17		65	1.32	86	43%	8%	49%	1.135	37	7	37
Out	ksf	0.89		341	1.32	450	43%	8%	49%	1.135	194	36	194
Total PM Peak Hour				406							231	43	231
In				65							37	7	37
Out				341							194	36	194

Notes:
LUC 710 - Office, regression
ITE VOR Rates for AM and PM Peak hour, Average of those two values for Daily VOR
Mode Split: 2012 - 2016 AASHTO Census Tract 606 Place of Work (POW)

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	10	60	150	325	45	55	20	305	125	10	20	195
Future Volume (vph)	10	60	150	325	45	55	20	305	125	10	20	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	12	13	12	11	12	12	12	14
Lane Util. Factor	0.95	0.91	0.86	0.91	0.95	0.95	0.95	0.97	1.00	1.00	0.95	0.95
Ped Bike Factor		0.88	0.96			1.00			1.00			0.96
Frt			0.923	0.850		0.975			0.989			0.984
Flt Protected		0.950	0.999			0.981		0.950				0.996
Satd. Flow (prot)	0	1360	2385	1289	0	3035	0	2518	1531	0	0	2923
Flt Permitted		0.950	0.999			0.981		0.950				0.996
Satd. Flow (perm)	0	1196	2380	1289	0	3035	0	2518	1531	0	0	2923
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)			171	218		18			3			9
Link Speed (mph)			30			30			30			30
Link Distance (ft)			258			501			127			194
Travel Time (s)			5.9			11.4			2.9			4.4
Confl. Peds. (#/hr)		49		23								
Confl. Bikes (#/hr)				5			2			17		
Peak Hour Factor	0.92	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.96	0.96
Heavy Vehicles (%)	2%	10%	12%	6%	4%	7%	5%	21%	10%	10%	56%	9%
Adj. Flow (vph)	11	63	158	342	54	65	24	355	145	12	21	203
Shared Lane Traffic (%)		10%		50%								
Lane Group Flow (vph)	0	68	335	171	0	143	0	355	157	0	0	250
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			14			12			50			22
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.10	1.14	1.10	1.14	1.19	1.14	1.14	1.14	1.05
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Number of Detectors	1	1	2	1	1	2		1	2		1	2
Detector Template	Left	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru
Leading Detector (ft)	20	20	100	20	20	100		20	100		20	100
Trailing Detector (ft)	0	0	0	0	0	0		0	0		0	0
Detector 1 Position(ft)	0	0	0	0	0	0		0	0		0	0
Detector 1 Size(ft)	20	20	6	20	20	6		20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94			94			94
Detector 2 Size(ft)			6			6			6			6
Detector 2 Type			Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)			0.0			0.0			0.0			0.0
Turn Type	Split	Split	NA	Prot	Split	NA		Split	NA		Split	NA

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	25
Future Volume (vph)	25
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	140
Confl. Bikes (#/hr)	
Peak Hour Factor	0.96
Heavy Vehicles (%)	0%
Adj. Flow (vph)	26
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.14
Turning Speed (mph)	9
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT
Protected Phases	1	1	1	1	4	4
Permitted Phases						
Detector Phase	1	1	1	1	4	4
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	17.0	17.0
Total Split (s)	39.0	39.0	39.0	39.0	22.0	22.0
Total Split (%)	35.5%	35.5%	35.5%	35.5%	20.0%	20.0%
Maximum Green (s)	31.0	31.0	31.0	31.0	14.0	14.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0
Total Lost Time (s)		8.0	8.0	8.0		8.0
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	4.0	4.0	4.0	4.0		
Pedestrian Calls (#/hr)	70	70	70	70		
Act Effct Green (s)		35.6	35.6	35.6		9.4
Actuated g/C Ratio		0.32	0.32	0.32		0.09
v/c Ratio		0.15	0.38	0.30		0.52
Control Delay		28.5	15.2	3.0		48.5
Queue Delay		0.0	0.0	0.0		0.0
Total Delay		28.5	15.2	3.0		48.5
LOS		C	B	A		D
Approach Delay			13.2			48.5
Approach LOS			B			D

Lane Group	WBR	NBL	NBT	NBR	SBL	SBT
Protected Phases		2	2		3	3
Permitted Phases						
Detector Phase		2	2		3	3
Switch Phase						
Minimum Initial (s)		8.0	8.0		8.0	8.0
Minimum Split (s)		27.0	27.0		18.0	18.0
Total Split (s)		30.0	30.0		19.0	19.0
Total Split (%)		27.3%	27.3%		17.3%	17.3%
Maximum Green (s)		21.0	21.0		11.0	11.0
Yellow Time (s)		4.0	4.0		3.0	3.0
All-Red Time (s)		5.0	5.0		5.0	5.0
Lost Time Adjust (s)		0.0	0.0			0.0
Total Lost Time (s)		9.0	9.0			8.0
Lead/Lag		Lag	Lag		Lag	Lag
Lead-Lag Optimize?						
Vehicle Extension (s)		2.0	2.0		2.0	2.0
Recall Mode		Max	Max		Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		10.0	10.0		2.0	2.0
Pedestrian Calls (#/hr)		70	70		70	70
Act Effct Green (s)		21.0	21.0			11.0
Actuated g/C Ratio		0.19	0.19			0.10
v/c Ratio		0.74	0.53			0.83
Control Delay		52.3	46.9			70.5
Queue Delay		0.0	0.0			0.0
Total Delay		52.3	46.9			70.5
LOS		D	D			E
Approach Delay			50.7			70.5
Approach LOS			D			E

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 37 (34%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 39.2 — Intersection LOS: D
Intersection Capacity Utilization 62.1% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: D St & Congress St

Lane Group	SBR
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Recall Mode	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	68	335	171	143	355	157	250
v/c Ratio	0.15	0.38	0.30	0.52	0.74	0.53	0.83
Control Delay	28.5	15.2	3.0	48.5	52.3	46.9	70.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.5	15.2	3.0	48.5	52.3	46.9	70.5
Queue Length 50th (ft)	37	48	0	45	122	99	89
Queue Length 95th (ft)	79	95	26	71	166	159	#159
Internal Link Dist (ft)		178		421		47	114
Turn Bay Length (ft)							
Base Capacity (vph)	439	886	564	401	480	294	300
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	0.15	0.38	0.30	0.36	0.74	0.53	0.83

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	10	60	150	325	45	55	20	305	125	10	20	195
Future Volume (vph)	10	60	150	325	45	55	20	305	125	10	20	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	12	13	12	11	12	12	12	14
Total Lost time (s)		8.0	8.0	8.0		8.0		9.0	9.0			8.0
Lane Util. Factor		0.91	0.86	0.91		0.95		0.97	1.00			0.95
Frpb, ped/bikes		1.00	0.96	1.00		1.00		1.00	1.00			0.96
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00			1.00
Frt		1.00	0.92	0.85		0.97		1.00	0.99			0.98
Flt Protected		0.95	1.00	1.00		0.98		0.95	1.00			1.00
Satd. Flow (prot)		1360	2387	1289		3035		2518	1530			2923
Flt Permitted		0.95	1.00	1.00		0.98		0.95	1.00			1.00
Satd. Flow (perm)		1360	2387	1289		3035		2518	1530			2923
Peak-hour factor, PHF	0.92	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.96	0.96
Adj. Flow (vph)	11	63	158	342	54	65	24	355	145	12	21	203
RTOR Reduction (vph)	0	0	116	116	0	16	0	0	2	0	0	8
Lane Group Flow (vph)	0	68	219	55	0	127	0	355	155	0	0	242
Confl. Peds. (#/hr)		49		23								
Confl. Bikes (#/hr)				5			2			17		
Heavy Vehicles (%)	2%	10%	12%	6%	4%	7%	5%	21%	10%	10%	56%	9%
Turn Type	Split	Split	NA	Prot	Split	NA		Split	NA		Split	NA
Protected Phases	1	1	1	1	4	4		2	2		3	3
Permitted Phases												
Actuated Green, G (s)		35.6	35.6	35.6		9.4		21.0	21.0			11.0
Effective Green, g (s)		35.6	35.6	35.6		9.4		21.0	21.0			11.0
Actuated g/C Ratio		0.32	0.32	0.32		0.09		0.19	0.19			0.10
Clearance Time (s)		8.0	8.0	8.0		8.0		9.0	9.0			8.0
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0			2.0
Lane Grp Cap (vph)		440	772	417		259		480	292			292
v/s Ratio Prot		0.05	c0.09	0.04		c0.04		c0.14	0.10			c0.08
v/s Ratio Perm												
v/c Ratio		0.15	0.28	0.13		0.49		0.74	0.53			0.83
Uniform Delay, d1		26.5	27.7	26.3		48.0		41.9	40.1			48.6
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00			1.00
Incremental Delay, d2		0.7	0.9	0.7		0.5		9.8	6.7			22.9
Delay (s)		27.2	28.6	26.9		48.5		51.8	46.8			71.5
Level of Service		C	C	C		D		D	D			E
Approach Delay (s)			28.0			48.5			50.2			71.5
Approach LOS			C			D			D			E

Intersection Summary			
HCM 2000 Control Delay	45.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	25
Future Volume (vph)	25
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	26
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	140
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

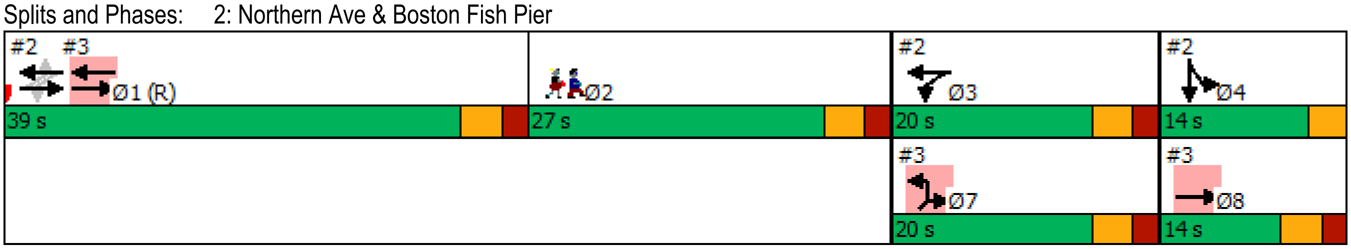
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	220	135	30	350	40	0	0	0	20	15	10
Future Volume (vph)	20	220	135	30	350	40	0	0	0	20	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	12	12	12	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.947			0.986						0.967	
Flt Protected		0.997			0.996						0.976	
Satd. Flow (prot)	0	2979	0	0	2906	0	0	0	0	0	1322	0
Flt Permitted		0.914			0.912						0.976	
Satd. Flow (perm)	0	2731	0	0	2661	0	0	0	0	0	1322	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		108			15						13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		158			154			160			130	
Travel Time (s)		3.6			3.5			3.6			3.0	
Confl. Bikes (#/hr)			44			21						
Peak Hour Factor	0.88	0.88	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.72	0.92	0.72
Heavy Vehicles (%)	19%	11%	2%	2%	11%	1%	2%	2%	2%	38%	2%	13%
Adj. Flow (vph)	23	250	147	33	389	44	0	0	0	28	16	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	0	0	466	0	0	0	0	0	58	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.05	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2					1	2	
Detector Template	Left	Thru		Left	Thru					Left	Thru	
Leading Detector (ft)	20	100		20	100					20	100	
Trailing Detector (ft)	0	0		0	0					0	0	
Detector 1 Position(ft)	0	0		0	0					0	0	
Detector 1 Size(ft)	20	6		20	6					20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	

Lane Group	Ø2	Ø7	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Number of Detectors			
Detector Template			
Leading Detector (ft)			
Trailing Detector (ft)			
Detector 1 Position(ft)			
Detector 1 Size(ft)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(ft)			
Detector 2 Size(ft)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	2	7	8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	1			1								
Detector Phase	1	1		1	1 3					4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0		5.0						3.5	3.5	
Minimum Split (s)	21.0	21.0		10.0						8.0	8.0	
Total Split (s)	39.0	39.0		20.0						14.0	14.0	
Total Split (%)	39.0%	39.0%		20.0%						14.0%	14.0%	
Maximum Green (s)	34.0	34.0		15.0						11.0	11.0	
Yellow Time (s)	3.0	3.0		3.0						3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0						0.0	0.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.0									3.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0						2.0	2.0	
Recall Mode	C-Max	C-Max		None						None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		45.9			59.5						9.9	
Actuated g/C Ratio		0.46			0.60						0.10	
v/c Ratio		0.32			0.29						0.41	
Control Delay		15.3			1.5						43.1	
Queue Delay		0.0			0.2						0.0	
Total Delay		15.3			1.8						43.1	
LOS		B			A						D	
Approach Delay		15.3			1.8						43.1	
Approach LOS		B			A						D	

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 19 (19%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 10.3	Intersection LOS: B
Intersection Capacity Utilization 41.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Northern Ave & Boston Fish Pier



Lane Group	Ø2	Ø7	Ø8
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	3.0	1.0
Minimum Split (s)	22.0	8.0	6.0
Total Split (s)	27.0	20.0	14.0
Total Split (%)	27%	20%	14%
Maximum Green (s)	22.0	15.0	9.0
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag		
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	None	None	None
Walk Time (s)	7.0		
Flash Dont Walk (s)	10.0		
Pedestrian Calls (#/hr)	98		
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	420	466	58
v/c Ratio	0.32	0.29	0.41
Control Delay	15.3	1.5	43.1
Queue Delay	0.0	0.2	0.0
Total Delay	15.3	1.8	43.1
Queue Length 50th (ft)	71	0	27
Queue Length 95th (ft)	107	0	67
Internal Link Dist (ft)	78	74	50
Turn Bay Length (ft)			
Base Capacity (vph)	1310	1662	156
Starvation Cap Reductn	0	546	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.32	0.42	0.37

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	220	135	30	350	40	0	0	0	20	15	10
Future Volume (vph)	20	220	135	30	350	40	0	0	0	20	15	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0			5.0						3.0	
Lane Util. Factor		0.95			0.95						1.00	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.95			0.99						0.97	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		2988			2908						1324	
Flt Permitted		0.91			0.91						0.98	
Satd. Flow (perm)		2740			2662						1324	
Peak-hour factor, PHF	0.88	0.88	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.72	0.92	0.72
Adj. Flow (vph)	23	250	147	33	389	44	0	0	0	28	16	14
RTOR Reduction (vph)	0	60	0	0	6	0	0	0	0	0	12	0
Lane Group Flow (vph)	0	360	0	0	460	0	0	0	0	0	46	0
Confl. Bikes (#/hr)			44			21						
Heavy Vehicles (%)	19%	11%	2%	2%	11%	1%	2%	2%	2%	38%	2%	13%
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	
Permitted Phases	1			1								
Actuated Green, G (s)		44.9			58.5						9.9	
Effective Green, g (s)		44.9			58.5						9.9	
Actuated g/C Ratio		0.45			0.58						0.10	
Clearance Time (s)		5.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1230			1590						131	
v/s Ratio Prot					c0.04						c0.03	
v/s Ratio Perm		c0.13			0.13							
v/c Ratio		0.29			0.29						0.35	
Uniform Delay, d1		17.5			10.4						42.1	
Progression Factor		1.00			0.20						1.00	
Incremental Delay, d2		0.6			0.0						0.6	
Delay (s)		18.1			2.1						42.7	
Level of Service		B			A						D	
Approach Delay (s)		18.1			2.1			0.0			42.7	
Approach LOS		B			A			A			D	

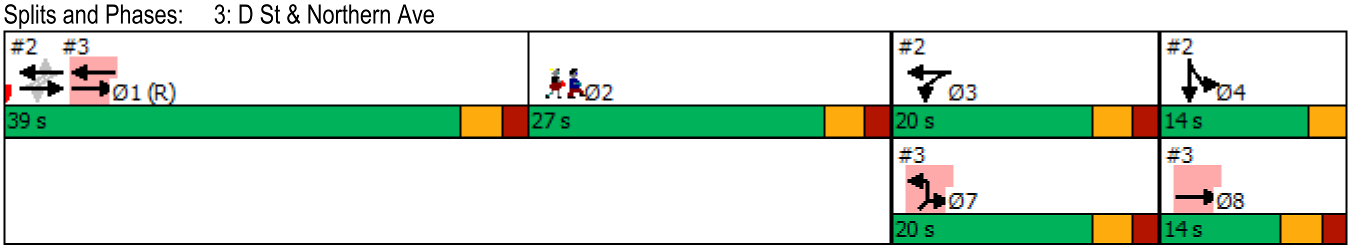
Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Lane Configurations										
Traffic Volume (vph)	240	0	0	265	155	15				
Future Volume (vph)	240	0	0	265	155	15				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	14	12	12	12	12	11				
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00				
Ped Bike Factor										
Frt						0.850				
Flt Protected					0.950					
Satd. Flow (prot)	3014	0	0	2663	1504	1232				
Flt Permitted					0.950					
Satd. Flow (perm)	3014	0	0	2663	1504	1232				
Right Turn on Red		Yes				Yes				
Satd. Flow (RTOR)						16				
Link Speed (mph)	30			30	30					
Link Distance (ft)	154			475	227					
Travel Time (s)	3.5			10.8	5.2					
Confl. Bikes (#/hr)		43								
Peak Hour Factor	0.96	0.96	0.88	0.88	0.93	0.93				
Heavy Vehicles (%)	15%	0%	0%	22%	8%	14%				
Adj. Flow (vph)	250	0	0	301	167	16				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	250	0	0	301	167	16				
Enter Blocked Intersection	No	No	No	No	No	No				
Lane Alignment	Left	Right	Left	Left	Left	Right				
Median Width(ft)	0			0	12					
Link Offset(ft)	0			0	0					
Crosswalk Width(ft)	16			16	16					
Two way Left Turn Lane										
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.19				
Turning Speed (mph)		9	15		15	9				
Number of Detectors	2			2	1	1				
Detector Template	Thru			Thru	Left	Right				
Leading Detector (ft)	100			100	20	20				
Trailing Detector (ft)	0			0	0	0				
Detector 1 Position(ft)	0			0	0	0				
Detector 1 Size(ft)	6			6	20	20				
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex				
Detector 1 Channel										
Detector 1 Extend (s)	0.0			0.0	0.0	0.0				
Detector 1 Queue (s)	0.0			0.0	0.0	0.0				
Detector 1 Delay (s)	0.0			0.0	0.0	0.0				
Detector 2 Position(ft)	94			94						
Detector 2 Size(ft)	6			6						
Detector 2 Type	Cl+Ex			Cl+Ex						
Detector 2 Channel										
Detector 2 Extend (s)	0.0			0.0						
Turn Type	NA			NA	Prot	Prot				
Protected Phases	1 8			1	7	7	2	3	4	8

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Permitted Phases										
Detector Phase	1 8			1	7	7				
Switch Phase										
Minimum Initial (s)				16.0	3.0	3.0	5.0	5.0	3.5	1.0
Minimum Split (s)				21.0	8.0	8.0	22.0	10.0	8.0	6.0
Total Split (s)				39.0	20.0	20.0	27.0	20.0	14.0	14.0
Total Split (%)				39.0%	20.0%	20.0%	27%	20%	14%	14%
Maximum Green (s)				34.0	15.0	15.0	22.0	15.0	11.0	9.0
Yellow Time (s)				3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0				
Total Lost Time (s)				5.0	5.0	5.0				
Lead/Lag				Lead			Lag			
Lead-Lag Optimize?										
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode				C-Max	None	None	None	None	None	None
Walk Time (s)							7.0			
Flash Dont Walk (s)							10.0			
Pedestrian Calls (#/hr)							98			
Act Effct Green (s)	58.8			45.9	13.6	13.6				
Actuated g/C Ratio	0.59			0.46	0.14	0.14				
v/c Ratio	0.14			0.25	0.82	0.09				
Control Delay	3.6			19.7	71.9	18.1				
Queue Delay	0.4			0.0	0.0	0.0				
Total Delay	4.0			19.7	71.9	18.1				
LOS	A			B	E	B				
Approach Delay	4.0			19.7	67.2					
Approach LOS	A			B	E					

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 19 (19%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 26.2	Intersection LOS: C
Intersection Capacity Utilization 31.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: D St & Northern Ave



Lane Group	EBT	WBT	NEL	NER
Lane Group Flow (vph)	250	301	167	16
v/c Ratio	0.14	0.25	0.82	0.09
Control Delay	3.6	19.7	71.9	18.1
Queue Delay	0.4	0.0	0.0	0.0
Total Delay	4.0	19.7	71.9	18.1
Queue Length 50th (ft)	12	67	103	0
Queue Length 95th (ft)	13	98	#204	19
Internal Link Dist (ft)	74	395	147	
Turn Bay Length (ft)				
Base Capacity (vph)	1713	1221	225	198
Starvation Cap Reductn	1011	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.25	0.74	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	240	0	0	265	155	15
Future Volume (vph)	240	0	0	265	155	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	12	12	12	11
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3014			2663	1504	1232
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3014			2663	1504	1232
Peak-hour factor, PHF	0.96	0.96	0.88	0.88	0.93	0.93
Adj. Flow (vph)	250	0	0	301	167	16
RTOR Reduction (vph)	0	0	0	0	0	14
Lane Group Flow (vph)	250	0	0	301	167	2
Confl. Bikes (#/hr)		43				
Heavy Vehicles (%)	15%	0%	0%	22%	8%	14%
Turn Type	NA			NA	Prot	Prot
Protected Phases	1 8			1	7	7
Permitted Phases						
Actuated Green, G (s)	57.8			44.9	13.6	13.6
Effective Green, g (s)	57.8			44.9	13.6	13.6
Actuated g/C Ratio	0.58			0.45	0.14	0.14
Clearance Time (s)				5.0	5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0
Lane Grp Cap (vph)	1742			1195	204	167
v/s Ratio Prot	c0.08			c0.11	c0.11	0.00
v/s Ratio Perm						
v/c Ratio	0.14			0.25	0.82	0.01
Uniform Delay, d1	9.7			17.1	42.0	37.4
Progression Factor	0.31			1.00	1.00	1.00
Incremental Delay, d2	0.0			0.5	20.9	0.0
Delay (s)	3.0			17.6	62.9	37.4
Level of Service	A			B	E	D
Approach Delay (s)	3.0			17.6	60.6	
Approach LOS	A			B	E	

Intersection Summary			
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	250	5	15	250	10	150
Future Volume (vph)	250	5	15	250	10	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt	0.997				0.873	
Flt Protected				0.997	0.997	
Satd. Flow (prot)	2993	0	0	1957	1338	0
Flt Permitted				0.997	0.997	
Satd. Flow (perm)	2993	0	0	1957	1338	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	475			419	295	
Travel Time (s)	10.8			9.5	6.7	
Confl. Peds. (#/hr)		58	58		88	
Confl. Bikes (#/hr)		36				
Peak Hour Factor	0.95	0.95	0.85	0.85	0.82	0.82
Heavy Vehicles (%)	15%	38%	57%	66%	0%	12%
Adj. Flow (vph)	263	5	18	294	12	183
Shared Lane Traffic (%)						
Lane Group Flow (vph)	268	0	0	312	195	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 37.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	250	5	15	250	10	150
Future Volume (Veh/h)	250	5	15	250	10	150
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.85	0.85	0.82	0.82
Hourly flow rate (vph)	263	5	18	294	12	183
Pedestrians	88				58	
Lane Width (ft)	14.0				12.0	
Walking Speed (ft/s)	3.5				3.5	
Percent Blockage	10				6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	475					
pX, platoon unblocked			1.00		1.00	1.00
vC, conflicting volume			326		594	192
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			316		585	181
tC, single (s)			5.2		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.8		3.5	3.4
p0 queue free %			98		97	76
cM capacity (veh/h)			870		371	753

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	175	93	116	196	195
Volume Left	0	0	18	0	12
Volume Right	0	5	0	0	183
cSH	1700	1700	870	1700	708
Volume to Capacity	0.10	0.05	0.02	0.12	0.28
Queue Length 95th (ft)	0	0	2	0	28
Control Delay (s)	0.0	0.0	1.6	0.0	12.0
Lane LOS			A		B
Approach Delay (s)	0.0		0.6		12.0
Approach LOS					B

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBT	EBR	EBR2	WBL2	WBL	WBT	NWL2	NWL	NWR	NEL	NER
Lane Configurations												
Traffic Volume (vph)	10	20	330	40	5	5	15	35	140	5	100	15
Future Volume (vph)	10	20	330	40	5	5	15	35	140	5	100	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	12	15	12	12	16	12	15	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.875							0.996		0.903	
Flt Protected		0.999				0.950			0.954		0.986	
Satd. Flow (prot)	0	1426	0	0	0	1070	0	0	1358	0	1483	0
Flt Permitted		0.999				0.950			0.954		0.986	
Satd. Flow (perm)	0	1426	0	0	0	1070	0	0	1358	0	1483	0
Link Speed (mph)		30					30		30		30	
Link Distance (ft)		419					320		218		339	
Travel Time (s)		9.5					7.3		5.0		7.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.88	0.88	0.88	0.86	0.86	0.86	0.94	0.94
Heavy Vehicles (%)	2%	17%	16%	12%	67%	67%	20%	56%	31%	20%	9%	38%
Adj. Flow (vph)	11	22	355	43	6	6	17	41	163	6	106	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	431	0	0	0	12	17	0	210	0	377	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Right	Right	Left	Left	Left	Left	Left	Right	Left	Right
Median Width(ft)		15					15		16		15	
Link Offset(ft)		0					0		0		0	
Crosswalk Width(ft)		16					16		16		16	
Two way Left Turn Lane												
Headway Factor	1.14	1.01	1.14	1.14	1.14	1.01	1.14	1.14	0.97	1.14	1.01	1.14
Turning Speed (mph)	9		9	9	15	15		15	15	9	15	9
Sign Control		Yield					Yield		Yield		Yield	

Intersection Summary

Area Type: CBD

Control Type: Roundabout

Intersection Capacity Utilization Err% ICU Level of Service H

Analysis Period (min) 15

Lane Group	NER2
Lane Configurations	
Traffic Volume (vph)	240
Future Volume (vph)	240
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.94
Heavy Vehicles (%)	13%
Adj. Flow (vph)	255
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.14
Turning Speed (mph)	9
Sign Control	

Intersection Summary

Movement	EBU	EBT	EBR	EBR2	WBL2	WBL	WBT	NWL2	NWL	NWR	NEL	NER
Right Turn Channelized												
Traffic Volume (veh/h)	10	20	330	40	5	5	15	35	140	5	100	15
Future Volume (veh/h)	10	20	330	40	5	5	15	35	140	5	100	15
Peak Hour Factor	0.93	0.93	0.93	0.93	0.88	0.88	0.88	0.86	0.86	0.86	0.94	0.94
Hourly flow rate (vph)	11	22	355	43	6	6	17	41	163	6	106	16
Approach Volume (veh/h)		431					29		210		377	
Crossing Volume (veh/h)		53					321		155		394	
High Capacity (veh/h)		1329					1076		1227		1016	
High v/c (veh/h)		0.32					0.03		0.17		0.37	
Low Capacity (veh/h)		1110					882		1018		828	
Low v/c (veh/h)		0.39					0.03		0.21		0.46	

Intersection Summary			
Maximum v/c High	0.37		
Maximum v/c Low	0.46		
Intersection Capacity Utilization	Err%	ICU Level of Service	H

Movement	NER2
Right Turn Channelized	
Traffic Volume (veh/h)	240
Future Volume (veh/h)	240
Peak Hour Factor	0.94
Hourly flow rate (vph)	255
Approach Volume (veh/h)	
Crossing Volume (veh/h)	
High Capacity (veh/h)	
High v/c (veh/h)	
Low Capacity (veh/h)	
Low v/c (veh/h)	

Intersection Summary

Lane Group	EBL	EBR	NBL	SER	SER2
Lane Configurations					
Traffic Volume (vph)	0	5	180	570	5
Future Volume (vph)	0	5	180	570	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	16
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					
Frt	0.865			0.865	
Flt Protected			0.950		
Satd. Flow (prot)	1112	0	1279	1288	0
Flt Permitted			0.950		
Satd. Flow (perm)	1112	0	1279	1288	0
Link Speed (mph)	30		30	30	
Link Distance (ft)	349		289	218	
Travel Time (s)	7.9		6.6	5.0	
Confl. Peds. (#/hr)					19
Confl. Bikes (#/hr)					48
Peak Hour Factor	0.50	0.50	0.86	0.93	0.93
Heavy Vehicles (%)	100%	33%	44%	15%	0%
Adj. Flow (vph)	0	10	209	613	5
Shared Lane Traffic (%)					
Lane Group Flow (vph)	10	0	209	618	0
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right
Median Width(ft)	12		16	0	
Link Offset(ft)	0		0	0	
Crosswalk Width(ft)	16		16	16	
Two way Left Turn Lane					
Headway Factor	1.14	1.14	0.97	1.14	0.97
Turning Speed (mph)	15	9	15	9	9
Sign Control	Stop		Free	Free	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 42.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	SER	SER2
Lane Configurations					
Traffic Volume (veh/h)	0	5	180	570	5
Future Volume (Veh/h)	0	5	180	570	5
Sign Control	Stop		Free	Free	
Grade	0%		0%	0%	
Peak Hour Factor	0.50	0.50	0.86	0.93	0.93
Hourly flow rate (vph)	0	10	209	613	5
Pedestrians	19				
Lane Width (ft)	12.0				
Walking Speed (ft/s)	3.5				
Percent Blockage	2				
Right turn flare (veh)					
Median type			None	None	
Median storage veh)					
Upstream signal (ft)					
pX, platoon unblocked					
vC, conflicting volume	844	634			
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
vCu, unblocked vol	844	634			
tC, single (s)	7.4	6.5			
tC, 2 stage (s)					
tF (s)	4.4	3.6			
p0 queue free %	100	98			
cM capacity (veh/h)	227	420			

Direction, Lane #	EB 1	NB 1	SE 1
Volume Total	10	209	618
Volume Left	0	0	0
Volume Right	10	0	5
cSH	420	740	1700
Volume to Capacity	0.02	0.00	0.36
Queue Length 95th (ft)	2	0	0
Control Delay (s)	13.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	10	90	500	75	90	20
Future Volume (vph)	10	90	500	75	90	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	16	14	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.878		0.982		0.975	
Flt Protected	0.995		0.958		0.961	
Satd. Flow (prot)	1666	0	1601	0	1525	0
Flt Permitted	0.995		0.958		0.961	
Satd. Flow (perm)	1666	0	1601	0	1525	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	311		289		787	
Travel Time (s)	7.1		6.6		17.9	
Confl. Peds. (#/hr)	43			54		38
Confl. Bikes (#/hr)				43		
Peak Hour Factor	0.83	0.83	0.92	0.92	0.81	0.81
Heavy Vehicles (%)	16%	0%	16%	0%	8%	30%
Adj. Flow (vph)	12	108	543	82	111	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	120	0	625	0	136	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	16		16		14	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.14	0.97	0.97	1.05	1.14
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Stop		Stop		Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 64.9%	ICU Level of Service C
Analysis Period (min) 15	

Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Sign Control	Stop		Stop		Stop	
Traffic Volume (vph)	10	90	500	75	90	20
Future Volume (vph)	10	90	500	75	90	20
Peak Hour Factor	0.83	0.83	0.92	0.92	0.81	0.81
Hourly flow rate (vph)	12	108	543	82	111	25

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total (vph)	120	625	136
Volume Left (vph)	12	543	0
Volume Right (vph)	108	0	25
Hadj (s)	-0.49	0.41	0.09
Departure Headway (s)	5.3	4.8	5.1
Degree Utilization, x	0.18	0.84	0.19
Capacity (veh/h)	631	625	672
Control Delay (s)	9.4	27.4	9.3
Approach Delay (s)	9.4	27.4	9.3
Approach LOS	A	D	A

Intersection Summary			
Delay	22.2		
Level of Service	C		
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	330	180	35	60	335	60
Future Volume (vph)	330	180	35	60	335	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Frt		0.850			0.977	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	1583	1275	1490	1125	2901	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	1583	1275	1490	1125	2901	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	301			349	314	
Travel Time (s)	6.8			7.9	7.1	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.77	0.77
Heavy Vehicles (%)	8%	14%	9%	52%	11%	9%
Adj. Flow (vph)	363	198	40	69	435	78
Shared Lane Traffic (%)						
Lane Group Flow (vph)	363	198	40	69	513	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	26	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 45.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	330	180	35	60	335	60
Future Volume (Veh/h)	330	180	35	60	335	60
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.77	0.77
Hourly flow rate (vph)	363	198	40	69	435	78
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			561		512	363
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			561		512	363
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			96		10	88
cM capacity (veh/h)			976		486	666

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2
Volume Total	363	198	40	69	290	223
Volume Left	0	0	40	0	290	145
Volume Right	0	198	0	0	0	78
cSH	1700	1700	976	1700	486	537
Volume to Capacity	0.21	0.12	0.04	0.04	0.60	0.42
Queue Length 95th (ft)	0	0	3	0	96	51
Control Delay (s)	0.0	0.0	8.8	0.0	22.8	16.4
Lane LOS			A		C	C
Approach Delay (s)	0.0		3.2		20.0	
Approach LOS					C	

Intersection Summary			
Average Delay	9.0		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Lane Configurations							
Traffic Volume (vph)	20	550	405	375	135	80	
Future Volume (vph)	20	550	405	375	135	80	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	11	12	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Ped Bike Factor			0.99				
Frt			0.928		0.944		
Flt Protected		0.998			0.970		
Satd. Flow (prot)	0	2772	3554	0	2571	0	
Flt Permitted		0.904			0.970		
Satd. Flow (perm)	0	2511	3554	0	2571	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			245		96		
Link Speed (mph)		30	30		30		
Link Distance (ft)		543	505		314		
Travel Time (s)		12.3	11.5		7.1		
Confl. Bikes (#/hr)				28			
Peak Hour Factor	0.92	0.92	0.91	0.91	0.78	0.78	
Heavy Vehicles (%)	15%	13%	22%	10%	26%	5%	
Adj. Flow (vph)	22	598	445	412	173	103	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	620	857	0	276	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(ft)		12	12		24		
Link Offset(ft)		0	0		0		
Crosswalk Width(ft)		16	16		16		
Two way Left Turn Lane							
Headway Factor	1.14	1.19	1.19	1.14	1.14	1.14	
Turning Speed (mph)	15			9	15	9	
Number of Detectors	1	2	2		1		
Detector Template	Left	Thru	Thru		Left		
Leading Detector (ft)	20	100	100		20		
Trailing Detector (ft)	0	0	0		0		
Detector 1 Position(ft)	0	0	0		0		
Detector 1 Size(ft)	20	6	6		20		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0		0.0		
Detector 1 Queue (s)	0.0	0.0	0.0		0.0		
Detector 1 Delay (s)	0.0	0.0	0.0		0.0		
Detector 2 Position(ft)		94	94				
Detector 2 Size(ft)		6	6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		3.0
Minimum Split (s)	12.0		17.0		16.0		30.0
Total Split (s)	13.0		49.0		18.0		30.0
Total Split (%)	11.8%		44.5%		16.4%		27%
Maximum Green (s)	6.0		42.0		10.5		23.0
Yellow Time (s)	4.0		4.0		3.5		3.0
All-Red Time (s)	3.0		3.0		4.0		4.0
Lost Time Adjust (s)			0.0		0.0		
Total Lost Time (s)			7.0		7.5		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							16.0
Pedestrian Calls (#/hr)							26
Act Effct Green (s)		60.4	54.4		10.1		
Actuated g/C Ratio		0.55	0.49		0.09		
v/c Ratio		0.45	0.46		0.85		
Control Delay		17.6	3.6		56.4		
Queue Delay		0.0	0.0		0.0		
Total Delay		17.6	3.6		56.4		
LOS		B	A		E		
Approach Delay		17.6	3.6		56.4		
Approach LOS		B	A		E		

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 22 (20%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 52.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Summer St & Pumphouse Rd

Lane Group	SET	NWT	SWL
Lane Group Flow (vph)	620	857	276
v/c Ratio	0.45	0.46	0.85
Control Delay	17.6	3.6	56.4
Queue Delay	0.0	0.0	0.0
Total Delay	17.6	3.6	56.4
Queue Length 50th (ft)	143	24	65
Queue Length 95th (ft)	190	m39	#92
Internal Link Dist (ft)	463	425	234
Turn Bay Length (ft)			
Base Capacity (vph)	1392	1881	334
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.45	0.46	0.83

Intersection Summary
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.

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	20	550	405	375	135	80
Future Volume (vph)	20	550	405	375	135	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12
Total Lost time (s)		7.0	7.0		7.5	
Lane Util. Factor		0.95	0.91		0.97	
Frpb, ped/bikes		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.93		0.94	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		2773	3559		2570	
Flt Permitted		0.90	1.00		0.97	
Satd. Flow (perm)		2511	3559		2570	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.78	0.78
Adj. Flow (vph)	22	598	445	412	173	103
RTOR Reduction (vph)	0	0	130	0	87	0
Lane Group Flow (vph)	0	620	727	0	189	0
Confl. Bikes (#/hr)				28		
Heavy Vehicles (%)	15%	13%	22%	10%	26%	5%
Turn Type	D.P+P	NA	NA		Prot	
Protected Phases	5	1 5	1		3	
Permitted Phases	1					
Actuated Green, G (s)		57.6	51.6		10.1	
Effective Green, g (s)		57.6	51.6		10.1	
Actuated g/C Ratio		0.52	0.47		0.09	
Clearance Time (s)			7.0		7.5	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)		1329	1669		235	
v/s Ratio Prot		c0.03	0.20		c0.07	
v/s Ratio Perm		c0.22				
v/c Ratio		0.47	0.44		0.80	
Uniform Delay, d1		16.5	19.5		49.0	
Progression Factor		1.00	0.22		1.00	
Incremental Delay, d2		0.3	0.3		16.8	
Delay (s)		16.8	4.6		65.8	
Level of Service		B	A		E	
Approach Delay (s)		16.8	4.6		65.8	
Approach LOS		B	A		E	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

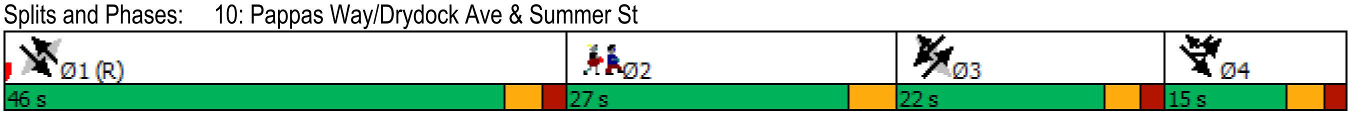
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	165	420	100	5	570	165	120	105	5	100	70	90
Future Volume (vph)	165	420	100	5	570	165	120	105	5	100	70	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	365		0	65		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		0.971			0.966			0.997				0.850
Flt Protected	0.950			0.950				0.975			0.971	
Satd. Flow (prot)	1438	2709	0	1354	2758	0	0	1622	0	0	1547	1069
Flt Permitted	0.222			0.087				0.391			0.658	
Satd. Flow (perm)	336	2709	0	124	2758	0	0	651	0	0	1049	1069
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			39			1				115
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			502			340			534	
Travel Time (s)		11.5			11.4			7.7			12.1	
Confl. Bikes (#/hr)			10			28			5			
Peak Hour Factor	0.94	0.94	0.94	0.88	0.88	0.88	0.93	0.93	0.93	0.78	0.78	0.78
Heavy Vehicles (%)	13%	17%	11%	20%	16%	3%	2%	3%	0%	4%	12%	36%
Adj. Flow (vph)	176	447	106	6	648	188	129	113	5	128	90	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	176	553	0	6	836	0	0	247	0	0	218	115
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Detector Phase	4	1 4		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	
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	15.0			46.0	46.0		22.0	22.0		22.0	22.0	
Total Split (%)	13.6%			41.8%	41.8%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	10.0			41.0	41.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	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	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	56.4	61.4		46.7	46.7			17.0			17.0	31.7
Actuated g/C Ratio	0.51	0.56		0.42	0.42			0.15			0.15	0.29
v/c Ratio	0.66	0.36		0.12	0.70			2.45			1.35	0.30
Control Delay	29.8	8.5		29.8	30.7			701.6			228.2	7.7
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	29.8	8.5		29.8	30.7			701.6			228.2	7.7
LOS	C	A		C	C			F			F	A
Approach Delay		13.7			30.6			701.6			152.0	
Approach LOS		B			C			F			F	

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 13 (12%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 2.45	
Intersection Signal Delay: 120.7	Intersection LOS: F
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Pappas Way/Drydock Ave & Summer St



Lane Group	Ø2
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	25%
Maximum Green (s)	23.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	60
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NET	SWT	SWR
Lane Group Flow (vph)	176	553	6	836	247	218	115
v/c Ratio	0.66	0.36	0.12	0.70	2.45	1.35	0.30
Control Delay	29.8	8.5	29.8	30.7	701.6	228.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	8.5	29.8	30.7	701.6	228.2	7.7
Queue Length 50th (ft)	38	34	3	262	~292	~202	0
Queue Length 95th (ft)	m#86	m50	14	332	#456	#290	28
Internal Link Dist (ft)		425		422	260	454	
Turn Bay Length (ft)	365		65				
Base Capacity (vph)	273	1512	52	1193	101	162	392
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	0.64	0.37	0.12	0.70	2.45	1.35	0.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	165	420	100	5	570	165	120	105	5	100	70	90
Future Volume (vph)	165	420	100	5	570	165	120	105	5	100	70	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.97			1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	1.00
Satd. Flow (prot)	1438	2710		1354	2760			1622			1548	1069
Flt Permitted	0.22	1.00		0.09	1.00			0.39			0.66	1.00
Satd. Flow (perm)	335	2710		124	2760			651			1049	1069
Peak-hour factor, PHF	0.94	0.94	0.94	0.88	0.88	0.88	0.93	0.93	0.93	0.78	0.78	0.78
Adj. Flow (vph)	176	447	106	6	648	188	129	113	5	128	90	115
RTOR Reduction (vph)	0	17	0	0	23	0	0	1	0	0	0	82
Lane Group Flow (vph)	176	536	0	6	813	0	0	246	0	0	218	33
Confl. Bikes (#/hr)			10			28			5			
Heavy Vehicles (%)	13%	17%	11%	20%	16%	3%	2%	3%	0%	4%	12%	36%
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	55.6	60.6		45.9	45.9			17.0			17.0	31.7
Effective Green, g (s)	55.6	60.6		45.9	45.9			17.0			17.0	31.7
Actuated g/C Ratio	0.51	0.55		0.42	0.42			0.15			0.15	0.29
Clearance Time (s)	5.0			5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.0			2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	266	1492		51	1151			100			162	308
v/s Ratio Prot	c0.06	0.20			c0.29							0.03
v/s Ratio Perm	0.28			0.05				c0.38			0.21	
v/c Ratio	0.66	0.36		0.12	0.71			2.46			1.35	0.11
Uniform Delay, d1	17.0	13.8		19.6	26.5			46.5			46.5	28.8
Progression Factor	1.22	0.56		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	4.1	0.0		4.7	3.7			686.7			190.8	0.1
Delay (s)	24.9	7.8		24.3	30.1			733.2			237.3	28.8
Level of Service	C	A		C	C			F			F	C
Approach Delay (s)		11.9			30.1			733.2			165.3	
Approach LOS		B			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	125.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	90	325	20	5	185	20	20	10	10	30	10	55
Future Volume (vph)	90	325	20	5	185	20	20	10	10	30	10	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.987		0.946		0.850		0.922	
Flt Protected		0.989			0.999		0.969				0.979	
Satd. Flow (prot)	0	1582	1321	0	1475	0	1336	0	1038	0	1284	0
Flt Permitted		0.989			0.999		0.969				0.979	
Satd. Flow (perm)	0	1582	1321	0	1475	0	1336	0	1038	0	1284	0
Link Speed (mph)		30			30		30				30	
Link Distance (ft)		534			438		201				121	
Travel Time (s)		12.1			10.0		4.6				2.8	
Confl. Peds. (#/hr)	10		7	7		15	1		65	65	7	1
Confl. Bikes (#/hr)			40			1			2			
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.73	0.73	0.73	0.89	0.89	0.89
Heavy Vehicles (%)	10%	6%	10%	0%	14%	21%	20%	11%	33%	6%	20%	28%
Adj. Flow (vph)	114	411	25	7	243	26	27	14	14	34	11	62
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	0	525	25	0	276	0	42	0	13	0	107	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)		0			0		12				12	
Link Offset(ft)		0			0		0				0	
Crosswalk Width(ft)		16			16		16				16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15	9	9	15	15	9
Sign Control		Free			Free		Stop				Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 69.5%	ICU Level of Service C
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (veh/h)	90	325	20	5	185	20	20	10	10	30	10	55
Future Volume (Veh/h)	90	325	20	5	185	20	20	10	10	30	10	55
Sign Control		Free			Free		Stop				Stop	
Grade		0%			0%		0%				0%	
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.73	0.73	0.73	0.89	0.89	0.89
Hourly flow rate (vph)	114	411	25	7	243	26	27	14	14	34	11	62
Pedestrians		1			65		7				15	
Lane Width (ft)		12.0			12.0		12.0				12.0	
Walking Speed (ft/s)		3.5			3.5		3.5				3.5	
Percent Blockage		0			6		1				1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		534										
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	284			418			984	944	483	1010	931	272
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	284			369			961	919	437	988	905	272
tC, single (s)	4.2			4.1			7.3	6.6	6.5	7.2	6.7	6.5
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.7	4.1	3.6	3.6	4.2	3.6
p0 queue free %	91			99			84	94	97	79	95	91
cM capacity (veh/h)	1216			1141			166	221	498	166	218	697

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SW 1
Volume Total	525	25	276	46	9	107
Volume Left	114	0	7	27	0	34
Volume Right	0	25	26	5	9	62
cSH	1216	1700	1141	194	498	310
Volume to Capacity	0.09	0.01	0.01	0.24	0.02	0.34
Queue Length 95th (ft)	8	0	0	22	1	37
Control Delay (s)	2.6	0.0	0.3	29.2	12.4	22.6
Lane LOS	A		A	D	B	C
Approach Delay (s)	2.5		0.3	26.4		22.6
Approach LOS				D		C

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	0	10	10	110	85	0
Future Volume (vph)	0	10	10	110	85	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected				0.996		
Satd. Flow (prot)	1357	0	0	1534	1402	0
Flt Permitted				0.996		
Satd. Flow (perm)	1357	0	0	1534	1402	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			121	787	
Travel Time (s)	5.2			2.8	17.9	
Confl. Peds. (#/hr)	28	10	2			28
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.43	0.43	0.87	0.87	0.86	0.86
Heavy Vehicles (%)	0%	9%	0%	12%	22%	0%
Adj. Flow (vph)	0	23	11	126	99	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	0	0	137	99	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 26.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	0	10	10	110	85	0
Future Volume (Veh/h)	0	10	10	110	85	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.43	0.43	0.87	0.87	0.86	0.86
Hourly flow rate (vph)	0	23	11	126	99	0
Pedestrians	28			10	28	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	3			1	3	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	303	137	127			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	303	137	127			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	100	97	99			
cM capacity (veh/h)	651	861	1432			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	23	137	99
Volume Left	0	11	0
Volume Right	23	0	0
cSH	861	1432	1700
Volume to Capacity	0.03	0.01	0.06
Queue Length 95th (ft)	2	1	0
Control Delay (s)	9.3	0.7	0.0
Lane LOS	A	A	
Approach Delay (s)	9.3	0.7	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	26.5%	ICU Level of Service	A
Analysis Period (min)	15		

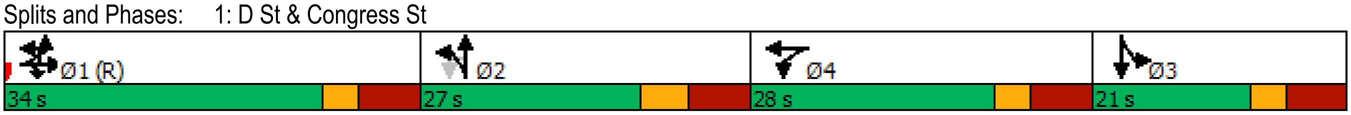
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	15	50	75	405	35	90	15	5	240	80	20	0
Future Volume (vph)	15	50	75	405	35	90	15	5	240	80	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	12	13	12	12	11	12	12	12
Lane Util. Factor	0.95	0.91	0.86	0.91	0.95	0.95	0.95	1.00	0.97	1.00	1.00	0.95
Ped Bike Factor			0.99			1.00				0.99		
Frt			0.893	0.850		0.984				0.969		
Flt Protected		0.950	0.999			0.988			0.950			
Satd. Flow (prot)	0	1478	2435	1340	0	3131	0	0	2988	1584	0	0
Flt Permitted		0.950	0.999			0.988			0.222			
Satd. Flow (perm)	0	1478	2435	1340	0	3131	0	0	698	1584	0	0
Right Turn on Red				Yes			Yes				Yes	
Satd. Flow (RTOR)			220	220		10				10		
Link Speed (mph)			30			30				30		
Link Distance (ft)			258			501				127		
Travel Time (s)			5.9			11.4				2.9		
Confl. Bikes (#/hr)				1			2				4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.78	0.78	0.78	0.92	0.85	0.85	0.85	0.89
Heavy Vehicles (%)	0%	0%	20%	2%	6%	4%	0%	0%	2%	5%	0%	50%
Adj. Flow (vph)	16	54	82	440	45	115	19	5	282	94	24	0
Shared Lane Traffic (%)		10%		50%								
Lane Group Flow (vph)	0	65	307	220	0	179	0	0	287	118	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left
Median Width(ft)			14			12				50		
Link Offset(ft)			0			0				0		
Crosswalk Width(ft)			16			16				16		
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.10	1.14	1.10	1.14	1.14	1.19	1.14	1.14	1.14
Turning Speed (mph)	9	15		9	15		9	9	15		9	15
Number of Detectors	1	1	2	1	1	2		1	1	2		1
Detector Template	Left	Left	Thru	Right	Left	Thru		Left	Left	Thru		Left
Leading Detector (ft)	20	20	100	20	20	100		20	20	100		20
Trailing Detector (ft)	0	0	0	0	0	0		0	0	0		0
Detector 1 Position(ft)	0	0	0	0	0	0		0	0	0		0
Detector 1 Size(ft)	20	20	6	20	20	6		20	20	6		20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 2 Position(ft)			94			94				94		
Detector 2 Size(ft)			6			6				6		
Detector 2 Type			Cl+Ex			Cl+Ex				Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)			0.0			0.0				0.0		
Turn Type	Split	Split	NA	Prot	Split	NA		Perm	Split	NA		
Protected Phases	1	1	1	1	4	4			2	2		3

Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	460	15
Future Volume (vph)	460	15
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	14	12
Lane Util. Factor	0.95	0.95
Ped Bike Factor	1.00	
Frt	0.995	
Flt Protected		
Satd. Flow (prot)	3398	0
Flt Permitted		
Satd. Flow (perm)	3398	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	2	
Link Speed (mph)	30	
Link Distance (ft)	194	
Travel Time (s)	4.4	
Confl. Bikes (#/hr)		15
Peak Hour Factor	0.89	0.89
Heavy Vehicles (%)	1%	12%
Adj. Flow (vph)	517	17
Shared Lane Traffic (%)		
Lane Group Flow (vph)	534	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	22	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.05	1.14
Turning Speed (mph)		9
Number of Detectors	2	
Detector Template	Thru	
Leading Detector (ft)	100	
Trailing Detector (ft)	0	
Detector 1 Position(ft)	0	
Detector 1 Size(ft)	6	
Detector 1 Type	Cl+Ex	
Detector 1 Channel		
Detector 1 Extend (s)	0.0	
Detector 1 Queue (s)	0.0	
Detector 1 Delay (s)	0.0	
Detector 2 Position(ft)	94	
Detector 2 Size(ft)	6	
Detector 2 Type	Cl+Ex	
Detector 2 Channel		
Detector 2 Extend (s)	0.0	
Turn Type	NA	
Protected Phases	3	

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Permitted Phases								2				
Detector Phase	1	1	1	1	4	4		2	2	2		3
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	20.0	20.0	20.0	20.0	16.0	16.0		26.0	26.0	26.0		17.0
Total Split (s)	34.0	34.0	34.0	34.0	28.0	28.0		27.0	27.0	27.0		21.0
Total Split (%)	30.9%	30.9%	30.9%	30.9%	25.5%	25.5%		24.5%	24.5%	24.5%		19.1%
Maximum Green (s)	26.0	26.0	26.0	26.0	20.0	20.0		18.0	18.0	18.0		13.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0		3.0
All-Red Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0			0.0	0.0		
Total Lost Time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead		Lag	Lag	Lag		Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None		Max	Max	Max		Max
Walk Time (s)	7.0	7.0	7.0	7.0				7.0	7.0	7.0		7.0
Flash Dont Walk (s)	4.0	4.0	4.0	4.0				10.0	10.0	10.0		2.0
Pedestrian Calls (#/hr)	75	75	75	75				75	75	75		75
Act Effct Green (s)		35.5	35.5	35.5		10.5			18.0	18.0		
Actuated g/C Ratio		0.32	0.32	0.32		0.10			0.16	0.16		
v/c Ratio		0.14	0.33	0.38		0.58			2.52	0.44		
Control Delay		28.4	9.8	6.0		52.4			729.8	43.8		
Queue Delay		0.0	0.0	0.0		0.0			0.0	0.0		
Total Delay		28.4	9.8	6.0		52.4			729.8	43.8		
LOS		C	A	A		D			F	D		
Approach Delay			10.4			52.4				529.9		
Approach LOS			B			D				F		

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 39 (35%), Referenced to phase 1:EBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 2.52	
Intersection Signal Delay: 197.5	Intersection LOS: F
Intersection Capacity Utilization 75.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: D St & Congress St



Lane Group	SBT	SBR
Permitted Phases		
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	8.0	
Minimum Split (s)	17.0	
Total Split (s)	21.0	
Total Split (%)	19.1%	
Maximum Green (s)	13.0	
Yellow Time (s)	3.0	
All-Red Time (s)	5.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	8.0	
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	
Recall Mode	Max	
Walk Time (s)	7.0	
Flash Dont Walk (s)	2.0	
Pedestrian Calls (#/hr)	75	
Act Effct Green (s)	13.0	
Actuated g/C Ratio	0.12	
v/c Ratio	1.33	
Control Delay	201.3	
Queue Delay	0.0	
Total Delay	201.3	
LOS	F	
Approach Delay	201.3	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	65	307	220	179	287	118	534
v/c Ratio	0.14	0.33	0.38	0.58	2.52	0.44	1.33
Control Delay	28.4	9.8	6.0	52.4	729.8	43.8	201.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	9.8	6.0	52.4	729.8	43.8	201.3
Queue Length 50th (ft)	35	25	0	61	~174	69	~258
Queue Length 95th (ft)	75	65	61	81	#244	119	#364
Internal Link Dist (ft)		178		421		47	114
Turn Bay Length (ft)							
Base Capacity (vph)	476	934	581	577	114	267	403
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	0.14	0.33	0.38	0.31	2.52	0.44	1.33

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	15	50	75	405	35	90	15	5	240	80	20	0
Future Volume (vph)	15	50	75	405	35	90	15	5	240	80	20	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	12	13	12	12	11	12	12	12
Total Lost time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Lane Util. Factor		0.91	0.86	0.91		0.95			0.97	1.00		
Frpb, ped/bikes		1.00	0.99	1.00		1.00			1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00			1.00	1.00		
Frt		1.00	0.89	0.85		0.98			1.00	0.97		
Flt Protected		0.95	1.00	1.00		0.99			0.95	1.00		
Satd. Flow (prot)		1478	2434	1340		3129			2988	1585		
Flt Permitted		0.95	1.00	1.00		0.99			0.22	1.00		
Satd. Flow (perm)		1478	2434	1340		3129			699	1585		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.78	0.78	0.78	0.92	0.85	0.85	0.85	0.89
Adj. Flow (vph)	16	54	82	440	45	115	19	5	282	94	24	0
RTOR Reduction (vph)	0	0	149	149	0	9	0	0	0	8	0	0
Lane Group Flow (vph)	0	65	158	71	0	170	0	0	287	110	0	0
Confl. Bikes (#/hr)				1			2				4	
Heavy Vehicles (%)	0%	0%	20%	2%	6%	4%	0%	0%	2%	5%	0%	50%
Turn Type	Split	Split	NA	Prot	Split	NA		Perm	Split	NA		
Protected Phases	1	1	1	1	4	4			2	2		3
Permitted Phases								2				
Actuated Green, G (s)		35.5	35.5	35.5		10.5			18.0	18.0		
Effective Green, g (s)		35.5	35.5	35.5		10.5			18.0	18.0		
Actuated g/C Ratio		0.32	0.32	0.32		0.10			0.16	0.16		
Clearance Time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Vehicle Extension (s)		2.0	2.0	2.0		2.0			2.0	2.0		
Lane Grp Cap (vph)		476	785	432		298			114	259		
v/s Ratio Prot		0.04	c0.06	0.05		c0.05				0.07		
v/s Ratio Perm									c0.41			
v/c Ratio		0.14	0.20	0.16		0.57			2.52	0.42		
Uniform Delay, d1		26.4	27.0	26.6		47.6			46.0	41.3		
Progression Factor		1.00	1.00	1.00		1.00			1.00	1.00		
Incremental Delay, d2		0.6	0.6	0.8		1.6			708.2	5.0		
Delay (s)		27.0	27.6	27.5		49.2			754.2	46.3		
Level of Service		C	C	C		D			F	D		
Approach Delay (s)			27.5			49.2				547.9		
Approach LOS			C			D				F		

Intersection Summary			
HCM 2000 Control Delay	210.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	460	15
Future Volume (vph)	460	15
Ideal Flow (vphpl)	1900	1900
Lane Width	14	12
Total Lost time (s)	8.0	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	1.00	
Flt Protected	1.00	
Satd. Flow (prot)	3399	
Flt Permitted	1.00	
Satd. Flow (perm)	3399	
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	517	17
RTOR Reduction (vph)	2	0
Lane Group Flow (vph)	532	0
Confl. Bikes (#/hr)		15
Heavy Vehicles (%)	1%	12%
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Actuated Green, G (s)	13.0	
Effective Green, g (s)	13.0	
Actuated g/C Ratio	0.12	
Clearance Time (s)	8.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	401	
v/s Ratio Prot	c0.16	
v/s Ratio Perm		
v/c Ratio	1.33	
Uniform Delay, d1	48.5	
Progression Factor	1.00	
Incremental Delay, d2	163.7	
Delay (s)	212.2	
Level of Service	F	
Approach Delay (s)	212.2	
Approach LOS	F	

Intersection Summary

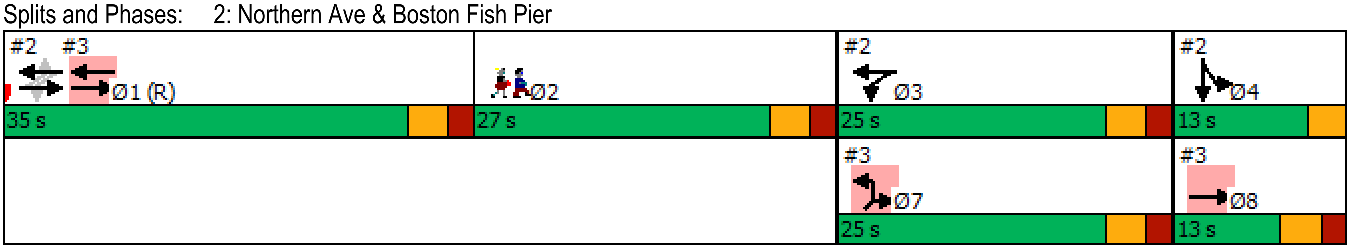
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	375	290	65	350	35	0	0	0	15	30	35
Future Volume (vph)	25	375	290	65	350	35	0	0	0	15	30	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	12	12	12	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.937			0.988						0.940	
Flt Protected		0.998			0.993						0.991	
Satd. Flow (prot)	0	3085	0	0	2900	0	0	0	0	0	1516	0
Flt Permitted		0.923			0.759						0.991	
Satd. Flow (perm)	0	2854	0	0	2216	0	0	0	0	0	1516	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		187			12						32	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		158			154			160			130	
Travel Time (s)		3.6			3.5			3.6			3.0	
Confl. Bikes (#/hr)			8			44						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.78	0.78	0.78
Heavy Vehicles (%)	4%	6%	2%	8%	9%	17%	2%	2%	2%	7%	3%	6%
Adj. Flow (vph)	27	399	309	69	372	37	0	0	0	19	38	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	735	0	0	478	0	0	0	0	0	102	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.05	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2					1	2	
Detector Template	Left	Thru		Left	Thru					Left	Thru	
Leading Detector (ft)	20	100		20	100					20	100	
Trailing Detector (ft)	0	0		0	0					0	0	
Detector 1 Position(ft)	0	0		0	0					0	0	
Detector 1 Size(ft)	20	6		20	6					20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	

Lane Group	Ø2	Ø7	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Number of Detectors			
Detector Template			
Leading Detector (ft)			
Trailing Detector (ft)			
Detector 1 Position(ft)			
Detector 1 Size(ft)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(ft)			
Detector 2 Size(ft)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	2	7	8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	1			1								
Detector Phase	1	1		1	1 3					4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0		5.0						3.5	3.5	
Minimum Split (s)	21.0	21.0		10.0						6.5	6.5	
Total Split (s)	35.0	35.0		25.0						13.0	13.0	
Total Split (%)	35.0%	35.0%		25.0%						13.0%	13.0%	
Maximum Green (s)	30.0	30.0		20.0						10.0	10.0	
Yellow Time (s)	3.0	3.0		3.0						3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0						0.0	0.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.0									3.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0						2.0	2.0	
Recall Mode	C-Max	C-Max		None						None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		40.9			55.0						10.0	
Actuated g/C Ratio		0.41			0.55						0.10	
v/c Ratio		0.58			0.36						0.57	
Control Delay		19.5			2.0						43.0	
Queue Delay		0.0			0.2						0.0	
Total Delay		19.5			2.2						43.0	
LOS		B			A						D	
Approach Delay		19.5			2.2						43.0	
Approach LOS		B			A						D	

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 47 (47%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 15.0	Intersection LOS: B
Intersection Capacity Utilization 53.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Northern Ave & Boston Fish Pier



Lane Group	Ø2	Ø7	Ø8
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	3.0	1.0
Minimum Split (s)	22.0	8.0	6.0
Total Split (s)	27.0	25.0	13.0
Total Split (%)	27%	25%	13%
Maximum Green (s)	22.0	20.0	8.0
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag		
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	None	None	None
Walk Time (s)	7.0		
Flash Dont Walk (s)	10.0		
Pedestrian Calls (#/hr)	212		
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	735	478	102
v/c Ratio	0.58	0.36	0.57
Control Delay	19.5	2.0	43.0
Queue Delay	0.0	0.2	0.0
Total Delay	19.5	2.2	43.0
Queue Length 50th (ft)	138	5	43
Queue Length 95th (ft)	220	13	81
Internal Link Dist (ft)	78	74	50
Turn Bay Length (ft)			
Base Capacity (vph)	1276	1490	180
Starvation Cap Reductn	0	348	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.58	0.42	0.57

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	375	290	65	350	35	0	0	0	15	30	35
Future Volume (vph)	25	375	290	65	350	35	0	0	0	15	30	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0			5.0						3.0	
Lane Util. Factor		0.95			0.95						1.00	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.94			0.99						0.94	
Flt Protected		1.00			0.99						0.99	
Satd. Flow (prot)		3088			2901						1516	
Flt Permitted		0.92			0.76						0.99	
Satd. Flow (perm)		2855			2218						1516	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.78	0.78	0.78
Adj. Flow (vph)	27	399	309	69	372	37	0	0	0	19	38	45
RTOR Reduction (vph)	0	111	0	0	5	0	0	0	0	0	29	0
Lane Group Flow (vph)	0	624	0	0	473	0	0	0	0	0	73	0
Confl. Bikes (#/hr)			8			44						
Heavy Vehicles (%)	4%	6%	2%	8%	9%	17%	2%	2%	2%	7%	3%	6%
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	
Permitted Phases	1			1								
Actuated Green, G (s)		40.9			55.0						10.0	
Effective Green, g (s)		40.9			55.0						10.0	
Actuated g/C Ratio		0.41			0.55						0.10	
Clearance Time (s)		5.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1167			1316						151	
v/s Ratio Prot					c0.05						c0.05	
v/s Ratio Perm		c0.22			0.15							
v/c Ratio		0.54			0.36						0.48	
Uniform Delay, d1		22.4			12.6						42.6	
Progression Factor		1.00			0.21						1.00	
Incremental Delay, d2		1.8			0.1						0.9	
Delay (s)		24.1			2.7						43.5	
Level of Service		C			A						D	
Approach Delay (s)		24.1			2.7			0.0			43.5	
Approach LOS		C			A			A			D	

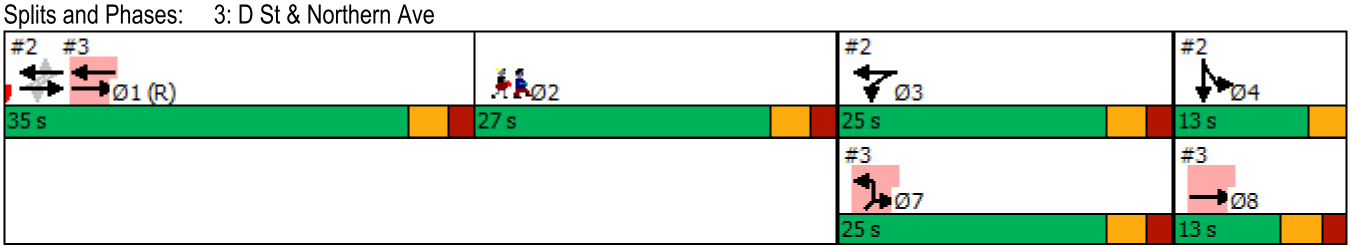
Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Lane Configurations										
Traffic Volume (vph)	390	0	0	315	135	65				
Future Volume (vph)	390	0	0	315	135	65				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	14	12	12	12	12	11				
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00				
Ped Bike Factor										
Frt						0.850				
Flt Protected					0.950					
Satd. Flow (prot)	3269	0	0	2981	1518	1405				
Flt Permitted					0.950					
Satd. Flow (perm)	3269	0	0	2981	1518	1405				
Right Turn on Red		Yes				Yes				
Satd. Flow (RTOR)						72				
Link Speed (mph)	30			30	30					
Link Distance (ft)	154			475	227					
Travel Time (s)	3.5			10.8	5.2					
Confl. Bikes (#/hr)		11								
Peak Hour Factor	0.91	0.91	0.92	0.92	0.90	0.90				
Heavy Vehicles (%)	6%	0%	0%	9%	7%	0%				
Adj. Flow (vph)	429	0	0	342	150	72				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	429	0	0	342	150	72				
Enter Blocked Intersection	No	No	No	No	No	No				
Lane Alignment	Left	Right	Left	Left	Left	Right				
Median Width(ft)	0			0	12					
Link Offset(ft)	0			0	0					
Crosswalk Width(ft)	16			16	16					
Two way Left Turn Lane										
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.19				
Turning Speed (mph)		9	15		15	9				
Number of Detectors	2			2	1	1				
Detector Template	Thru			Thru	Left	Right				
Leading Detector (ft)	100			100	20	20				
Trailing Detector (ft)	0			0	0	0				
Detector 1 Position(ft)	0			0	0	0				
Detector 1 Size(ft)	6			6	20	20				
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex				
Detector 1 Channel										
Detector 1 Extend (s)	0.0			0.0	0.0	0.0				
Detector 1 Queue (s)	0.0			0.0	0.0	0.0				
Detector 1 Delay (s)	0.0			0.0	0.0	0.0				
Detector 2 Position(ft)	94			94						
Detector 2 Size(ft)	6			6						
Detector 2 Type	Cl+Ex			Cl+Ex						
Detector 2 Channel										
Detector 2 Extend (s)	0.0			0.0						
Turn Type	NA			NA	Prot	Prot				
Protected Phases	1 8			1	7	7	2	3	4	8

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Permitted Phases										
Detector Phase	1 8			1	7	7				
Switch Phase										
Minimum Initial (s)				16.0	3.0	3.0	5.0	5.0	3.5	1.0
Minimum Split (s)				21.0	8.0	8.0	22.0	10.0	6.5	6.0
Total Split (s)				35.0	25.0	25.0	27.0	25.0	13.0	13.0
Total Split (%)				35.0%	25.0%	25.0%	27%	25%	13%	13%
Maximum Green (s)				30.0	20.0	20.0	22.0	20.0	10.0	8.0
Yellow Time (s)				3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0				
Total Lost Time (s)				5.0	5.0	5.0				
Lead/Lag				Lead			Lag			
Lead-Lag Optimize?										
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode				C-Max	None	None	None	None	None	None
Walk Time (s)							7.0			
Flash Dont Walk (s)							10.0			
Pedestrian Calls (#/hr)							212			
Act Effct Green (s)	53.9			40.9	14.1	14.1				
Actuated g/C Ratio	0.54			0.41	0.14	0.14				
v/c Ratio	0.24			0.28	0.70	0.28				
Control Delay	4.5			21.5	57.5	11.4				
Queue Delay	0.6			0.0	0.0	0.0				
Total Delay	5.2			21.5	57.5	11.4				
LOS	A			C	E	B				
Approach Delay	5.2			21.5	42.5					
Approach LOS	A			C	D					

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 47 (47%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 19.2	Intersection LOS: B
Intersection Capacity Utilization 30.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: D St & Northern Ave



Lane Group	EBT	WBT	NEL	NER
Lane Group Flow (vph)	429	342	150	72
v/c Ratio	0.24	0.28	0.70	0.28
Control Delay	4.5	21.5	57.5	11.4
Queue Delay	0.6	0.0	0.0	0.0
Total Delay	5.2	21.5	57.5	11.4
Queue Length 50th (ft)	22	75	92	0
Queue Length 95th (ft)	27	121	150	37
Internal Link Dist (ft)	74	395	147	
Turn Bay Length (ft)				
Base Capacity (vph)	1760	1218	303	338
Starvation Cap Reductn	948	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.53	0.28	0.50	0.21

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	390	0	0	315	135	65
Future Volume (vph)	390	0	0	315	135	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	12	12	12	11
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3269			2981	1518	1405
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3269			2981	1518	1405
Peak-hour factor, PHF	0.91	0.91	0.92	0.92	0.90	0.90
Adj. Flow (vph)	429	0	0	342	150	72
RTOR Reduction (vph)	0	0	0	0	0	62
Lane Group Flow (vph)	429	0	0	342	150	10
Confl. Bikes (#/hr)		11				
Heavy Vehicles (%)	6%	0%	0%	9%	7%	0%
Turn Type	NA			NA	Prot	Prot
Protected Phases	1 8			1	7	7
Permitted Phases						
Actuated Green, G (s)	53.9			40.9	14.1	14.1
Effective Green, g (s)	53.9			40.9	14.1	14.1
Actuated g/C Ratio	0.54			0.41	0.14	0.14
Clearance Time (s)				5.0	5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0
Lane Grp Cap (vph)	1761			1219	214	198
v/s Ratio Prot	c0.13			c0.11	c0.10	0.01
v/s Ratio Perm						
v/c Ratio	0.24			0.28	0.70	0.05
Uniform Delay, d1	12.2			19.7	40.9	37.2
Progression Factor	0.33			1.00	1.00	1.00
Incremental Delay, d2	0.0			0.6	8.2	0.0
Delay (s)	4.0			20.3	49.1	37.2
Level of Service	A			C	D	D
Approach Delay (s)	4.0			20.3	45.3	
Approach LOS	A			C	D	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	450	15	60	265	45	140
Future Volume (vph)	450	15	60	265	45	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt	0.995				0.898	
Flt Protected				0.991	0.988	
Satd. Flow (prot)	3289	0	0	2962	1402	0
Flt Permitted				0.991	0.988	
Satd. Flow (perm)	3289	0	0	2962	1402	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	475			419	295	
Travel Time (s)	10.8			9.5	6.7	
Confl. Peds. (#/hr)		25	25		110	4
Confl. Bikes (#/hr)		5				
Peak Hour Factor	0.95	0.95	0.92	0.92	0.88	0.88
Heavy Vehicles (%)	5%	0%	3%	10%	9%	8%
Adj. Flow (vph)	474	16	65	288	51	159
Shared Lane Traffic (%)						
Lane Group Flow (vph)	490	0	0	353	210	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	450	15	60	265	45	140
Future Volume (Veh/h)	450	15	60	265	45	140
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.92	0.92	0.88	0.88
Hourly flow rate (vph)	474	16	65	288	51	159
Pedestrians	110			4	25	
Lane Width (ft)	14.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	12			0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	475					
pX, platoon unblocked			0.95		0.95	0.95
vC, conflicting volume			515		891	274
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			381		777	127
tC, single (s)			4.2		7.0	7.1
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.4
p0 queue free %			94		79	80
cM capacity (veh/h)			1081		244	813

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	316	174	161	192	210
Volume Left	0	0	65	0	51
Volume Right	0	16	0	0	159
cSH	1700	1700	1081	1700	519
Volume to Capacity	0.19	0.10	0.06	0.11	0.40
Queue Length 95th (ft)	0	0	5	0	49
Control Delay (s)	0.0	0.0	3.8	0.0	16.6
Lane LOS			A		C
Approach Delay (s)	0.0		1.7		16.6
Approach LOS					C

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

LANE SUMMARY

Site: 1 [EX-PM]

Northern Avenue at Haul Road/Marine Industrial Park
2019 Existing Conditions
Weekday Evening Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Haul Road													
Lane 1[d]	195	6.3	669	0.291	100	9.0	LOS A	1.1	28.2	Full	1600	0.0	0.0
Approach	195	6.3		0.291		9.0	LOS A	1.1	28.2				
East: Northern Avenue													
Lane 1[d]	366	13.3	821	0.446	100	10.1	LOS B	1.9	53.3	Full	1600	0.0	0.0
Approach	366	13.3		0.446		10.1	LOS B	1.9	53.3				
NorthEast: Marine Industrial Park													
Lane 1[d]	55	4.1	559	0.098	100	7.6	LOS A	0.3	7.5	Full	1600	0.0	0.0
Approach	55	4.1		0.098		7.6	LOS A	0.3	7.5				
West: Northern Avenue													
Lane 1[d]	589	6.0	868	0.678	100	15.8	LOS C	8.6	225.8	Full	1600	0.0	0.0
Approach	589	6.0		0.678		15.8	LOS C	8.6	225.8				
Intersection	1204	8.2		0.678		12.6	LOS B	8.6	225.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Siegloch M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Movement	EBL	EBR	NBL2	NBL	SER
Lane Configurations					
Traffic Volume (veh/h)	0	0	5	310	420
Future Volume (Veh/h)	0	0	5	310	420
Sign Control	Stop			Free	Free
Grade	0%			0%	0%
Peak Hour Factor	0.50	0.50	0.84	0.84	0.91
Hourly flow rate (vph)	0	0	6	369	462
Pedestrians	38				
Lane Width (ft)	12.0				
Walking Speed (ft/s)	3.5				
Percent Blockage	4				
Right turn flare (veh)					
Median type				None	None
Median storage veh)					
Upstream signal (ft)					
pX, platoon unblocked					
vC, conflicting volume	881	500	500		
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
vCu, unblocked vol	881	500	500		
tC, single (s)	6.4	6.2	4.1		
tC, 2 stage (s)					
tF (s)	3.5	3.3	2.2		
p0 queue free %	100	100	99		
cM capacity (veh/h)	306	554	1036		

Direction, Lane #	EB 1	NB 1	SE 1
Volume Total	0	375	462
Volume Left	0	6	0
Volume Right	0	0	0
cSH	1700	1036	1700
Volume to Capacity	0.00	0.01	0.27
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.2	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	0.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	40	245	230	190	70	5
Future Volume (vph)	40	245	230	190	70	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	16	14	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.884		0.939		0.991	
Flt Protected	0.993		0.973		0.956	
Satd. Flow (prot)	1486	0	1603	0	1612	0
Flt Permitted	0.993		0.973		0.956	
Satd. Flow (perm)	1486	0	1603	0	1612	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	311		289		787	
Travel Time (s)	7.1		6.6		17.9	
Confl. Peds. (#/hr)	54			54		94
Confl. Bikes (#/hr)				3		
Peak Hour Factor	0.87	0.87	0.91	0.91	0.88	0.88
Heavy Vehicles (%)	5%	16%	15%	5%	4%	50%
Adj. Flow (vph)	46	282	253	209	80	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	328	0	462	0	86	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	16		16		14	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.14	0.97	0.97	1.05	1.14
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Stop		Stop		Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 71.2% ICU Level of Service C

Analysis Period (min) 15

Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Sign Control	Stop		Stop		Stop	
Traffic Volume (vph)	40	245	230	190	70	5
Future Volume (vph)	40	245	230	190	70	5
Peak Hour Factor	0.87	0.87	0.91	0.91	0.88	0.88
Hourly flow rate (vph)	46	282	253	209	80	6

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total (vph)	328	462	86
Volume Left (vph)	46	253	0
Volume Right (vph)	282	0	6
Hadj (s)	-0.24	0.29	0.08
Departure Headway (s)	5.1	5.2	5.6
Degree Utilization, x	0.47	0.67	0.13
Capacity (veh/h)	658	666	591
Control Delay (s)	12.6	18.3	9.5
Approach Delay (s)	12.6	18.3	9.5
Approach LOS	B	C	A

Intersection Summary			
Delay	15.3		
Level of Service	C		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	85	185	120	170	160	60
Future Volume (vph)	85	185	120	170	160	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Ped Bike Factor						
Frt		0.850			0.959	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	1474	1127	1593	1449	2668	0
Flt Permitted			0.950		0.965	
Satd. Flow (perm)	1474	1127	1593	1449	2668	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	301			349	314	
Travel Time (s)	6.8			7.9	7.1	
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.90	0.90	0.83	0.83	0.97	0.97
Heavy Vehicles (%)	16%	29%	2%	18%	23%	8%
Adj. Flow (vph)	94	206	145	205	165	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	94	206	145	205	227	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	26	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 27.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	85	185	120	170	160	60
Future Volume (Veh/h)	85	185	120	170	160	60
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.83	0.83	0.97	0.97
Hourly flow rate (vph)	94	206	145	205	165	62
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			300		589	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			300		589	94
tC, single (s)			4.1		6.6	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			89		57	93
cM capacity (veh/h)			1261		387	947

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2
Volume Total	94	206	145	205	110	117
Volume Left	0	0	145	0	110	55
Volume Right	0	206	0	0	0	62
cSH	1700	1700	1261	1700	387	564
Volume to Capacity	0.06	0.12	0.11	0.12	0.28	0.21
Queue Length 95th (ft)	0	0	10	0	29	19
Control Delay (s)	0.0	0.0	8.2	0.0	17.9	13.0
Lane LOS			A		C	B
Approach Delay (s)	0.0		3.4		15.4	
Approach LOS					C	

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Lane Configurations							
Traffic Volume (vph)	40	730	450	185	240	65	
Future Volume (vph)	40	730	450	185	240	65	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	11	12	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Ped Bike Factor			0.99				
Frt			0.956		0.968		
Flt Protected		0.997			0.962		
Satd. Flow (prot)	0	2982	4088	0	2821	0	
Flt Permitted		0.873			0.962		
Satd. Flow (perm)	0	2611	4088	0	2821	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			94		29		
Link Speed (mph)		30	30		30		
Link Distance (ft)		543	505		314		
Travel Time (s)		12.3	11.5		7.1		
Confl. Bikes (#/hr)				13			
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	5%	5%	6%	2%	11%	4%	
Adj. Flow (vph)	42	760	489	201	261	71	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	802	690	0	332	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(ft)		12	12		24		
Link Offset(ft)		0	0		0		
Crosswalk Width(ft)		16	16		16		
Two way Left Turn Lane							
Headway Factor	1.14	1.19	1.19	1.14	1.14	1.14	
Turning Speed (mph)	15			9	15	9	
Number of Detectors	1	2	2		1		
Detector Template	Left	Thru	Thru		Left		
Leading Detector (ft)	20	100	100		20		
Trailing Detector (ft)	0	0	0		0		
Detector 1 Position(ft)	0	0	0		0		
Detector 1 Size(ft)	20	6	6		20		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0		0.0		
Detector 1 Queue (s)	0.0	0.0	0.0		0.0		
Detector 1 Delay (s)	0.0	0.0	0.0		0.0		
Detector 2 Position(ft)		94	94				
Detector 2 Size(ft)		6	6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		3.0
Minimum Split (s)	12.0		17.0		15.5		30.0
Total Split (s)	13.0		38.0		29.0		30.0
Total Split (%)	11.8%		34.5%		26.4%		27%
Maximum Green (s)	6.0		31.0		21.5		23.0
Yellow Time (s)	4.0		4.0		3.5		3.0
All-Red Time (s)	3.0		3.0		4.0		4.0
Lost Time Adjust (s)			0.0		0.0		
Total Lost Time (s)			7.0		7.5		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							16.0
Pedestrian Calls (#/hr)							28
Act Effct Green (s)		54.3	48.3		16.2		
Actuated g/C Ratio		0.49	0.44		0.15		
v/c Ratio		0.61	0.37		0.75		
Control Delay		25.9	35.7		51.7		
Queue Delay		0.0	0.0		0.0		
Total Delay		25.9	35.7		51.7		
LOS		C	D		D		
Approach Delay		25.9	35.7		51.7		
Approach LOS		C	D		D		

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 3 (3%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 34.3	Intersection LOS: C
Intersection Capacity Utilization 65.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: Summer St & Pumphouse Rd

Lane Group	SET	NWT	SWL
Lane Group Flow (vph)	802	690	332
v/c Ratio	0.61	0.37	0.75
Control Delay	25.9	35.7	51.7
Queue Delay	0.0	0.0	0.0
Total Delay	25.9	35.7	51.7
Queue Length 50th (ft)	219	150	107
Queue Length 95th (ft)	#343	200	148
Internal Link Dist (ft)	463	425	234
Turn Bay Length (ft)			
Base Capacity (vph)	1308	1846	574
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.61	0.37	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	40	730	450	185	240	65
Future Volume (vph)	40	730	450	185	240	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12
Total Lost time (s)		7.0	7.0		7.5	
Lane Util. Factor		0.95	0.91		0.97	
Frpb, ped/bikes		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.96		0.97	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		2983	4094		2821	
Flt Permitted		0.87	1.00		0.96	
Satd. Flow (perm)		2610	4094		2821	
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	760	489	201	261	71
RTOR Reduction (vph)	0	0	55	0	25	0
Lane Group Flow (vph)	0	802	635	0	307	0
Confl. Bikes (#/hr)				13		
Heavy Vehicles (%)	5%	5%	6%	2%	11%	4%
Turn Type	D.P+P	NA	NA		Prot	
Protected Phases	5	1 5	1		3	
Permitted Phases	1					
Actuated Green, G (s)		51.5	45.5		16.2	
Effective Green, g (s)		51.5	45.5		16.2	
Actuated g/C Ratio		0.47	0.41		0.15	
Clearance Time (s)			7.0		7.5	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)		1242	1693		415	
v/s Ratio Prot		c0.04	0.16		c0.11	
v/s Ratio Perm		c0.27				
v/c Ratio		0.65	0.38		0.74	
Uniform Delay, d1		22.3	22.4		44.9	
Progression Factor		1.00	1.64		1.00	
Incremental Delay, d2		1.2	0.6		6.1	
Delay (s)		23.5	37.3		51.0	
Level of Service		C	D		D	
Approach Delay (s)		23.5	37.3		51.0	
Approach LOS		C	D		D	

Intersection Summary			
HCM 2000 Control Delay	33.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

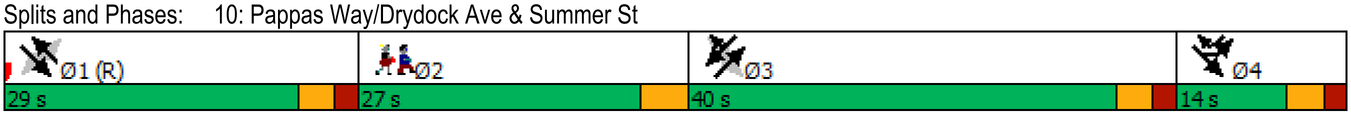
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	55	720	195	10	300	90	50	40	10	230	160	285
Future Volume (vph)	55	720	195	10	300	90	50	40	10	230	160	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	365		0	65		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							
Frt		0.968			0.965			0.986				0.850
Flt Protected	0.950			0.950				0.976			0.971	
Satd. Flow (prot)	1279	2966	0	1624	2974	0	0	1598	0	0	1637	1358
Flt Permitted	0.390			0.140				0.457			0.754	
Satd. Flow (perm)	525	2966	0	239	2974	0	0	748	0	0	1271	1358
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			33			5				306
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			502			340			534	
Travel Time (s)		11.5			11.4			7.7			12.1	
Confl. Bikes (#/hr)			12			11						4
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93
Heavy Vehicles (%)	27%	4%	10%	0%	6%	1%	2%	5%	0%	1%	2%	7%
Adj. Flow (vph)	57	750	203	11	326	98	60	48	12	247	172	306
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	953	0	11	424	0	0	120	0	0	419	306
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Detector Phase	4	1 4		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	
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	14.0			29.0	29.0		40.0	40.0		40.0	40.0	
Total Split (%)	12.7%			26.4%	26.4%		36.4%	36.4%		36.4%	36.4%	
Maximum Green (s)	9.0			24.0	24.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	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	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	38.4	43.4		29.4	29.4			35.0			35.0	49.0
Actuated g/C Ratio	0.35	0.39		0.27	0.27			0.32			0.32	0.45
v/c Ratio	0.23	0.80		0.17	0.52			0.50			1.04	0.40
Control Delay	13.6	25.5		43.7	36.3			37.6			92.6	3.7
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	13.6	25.5		43.7	36.3			37.6			92.6	3.7
LOS	B	C		D	D			D			F	A
Approach Delay		24.8			36.5			37.6			55.1	
Approach LOS		C			D			D			E	

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 23 (21%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 37.3	Intersection LOS: D
Intersection Capacity Utilization 82.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 10: Pappas Way/Drydock Ave & Summer St



Lane Group	Ø2
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	25%
Maximum Green (s)	23.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	75
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NET	SWT	SWR
Lane Group Flow (vph)	57	953	11	424	120	419	306
v/c Ratio	0.23	0.80	0.17	0.52	0.50	1.04	0.40
Control Delay	13.6	25.5	43.7	36.3	37.6	92.6	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	25.5	43.7	36.3	37.6	92.6	3.7
Queue Length 50th (ft)	17	88	6	132	65	~319	0
Queue Length 95th (ft)	m25	#134	25	187	116	#514	49
Internal Link Dist (ft)		425		422	260	454	
Turn Bay Length (ft)	365		65				
Base Capacity (vph)	245	1190	64	818	241	404	774
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	0.23	0.80	0.17	0.52	0.50	1.04	0.40

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	55	720	195	10	300	90	50	40	10	230	160	285
Future Volume (vph)	55	720	195	10	300	90	50	40	10	230	160	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.97			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	1.00
Satd. Flow (prot)	1279	2967		1624	2977			1598			1638	1358
Flt Permitted	0.39	1.00		0.14	1.00			0.46			0.75	1.00
Satd. Flow (perm)	524	2967		239	2977			748			1272	1358
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93
Adj. Flow (vph)	57	750	203	11	326	98	60	48	12	247	172	306
RTOR Reduction (vph)	0	21	0	0	24	0	0	3	0	0	0	170
Lane Group Flow (vph)	57	932	0	11	400	0	0	117	0	0	419	136
Confl. Bikes (#/hr)			12			11						4
Heavy Vehicles (%)	27%	4%	10%	0%	6%	1%	2%	5%	0%	1%	2%	7%
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	37.6	42.6		28.6	28.6			35.0			35.0	49.0
Effective Green, g (s)	37.6	42.6		28.6	28.6			35.0			35.0	49.0
Actuated g/C Ratio	0.34	0.39		0.26	0.26			0.32			0.32	0.45
Clearance Time (s)	5.0			5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.0			2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	240	1149		62	774			238			404	604
v/s Ratio Prot	0.02	c0.31			0.13							0.10
v/s Ratio Perm	0.06			0.05				0.16			c0.33	
v/c Ratio	0.24	0.81		0.18	0.52			0.49			1.04	0.23
Uniform Delay, d1	25.1	30.1		31.6	34.8			30.3			37.5	18.8
Progression Factor	0.47	0.65		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	0.1	3.4		6.2	2.5			0.6			54.7	0.1
Delay (s)	11.9	23.1		37.7	37.2			30.9			92.2	18.9
Level of Service	B	C		D	D			C			F	B
Approach Delay (s)		22.5			37.3			30.9			61.3	
Approach LOS		C			D			C			E	

Intersection Summary			
HCM 2000 Control Delay	38.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	50	130	5	5	400	20	60	10	5	15	10	215
Future Volume (vph)	50	130	5	5	400	20	60	10	5	15	10	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.994		0.977		0.850		0.879	
Flt Protected		0.986			0.999		0.959				0.995	
Satd. Flow (prot)	0	1511	1454	0	1603	0	1570	0	1038	0	1452	0
Flt Permitted		0.986			0.999		0.959				0.995	
Satd. Flow (perm)	0	1511	1454	0	1603	0	1570	0	1038	0	1452	0
Link Speed (mph)		30			30		30				30	
Link Distance (ft)		534			438		201				121	
Travel Time (s)		12.1			10.0		4.6				2.8	
Confl. Peds. (#/hr)	15		7	7		15		15	121	121	7	2
Confl. Bikes (#/hr)						16			1			
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.79	0.79	0.79	0.81	0.81	0.81
Heavy Vehicles (%)	8%	13%	0%	0%	6%	6%	2%	0%	33%	13%	10%	2%
Adj. Flow (vph)	66	171	7	7	526	26	76	13	6	19	12	265
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	0	237	7	0	559	0	90	0	5	0	296	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)		0			0		12				12	
Link Offset(ft)		0			0		0				0	
Crosswalk Width(ft)		16			16		16				16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15	9	9	15	15	9
Sign Control		Free			Free		Stop				Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 79.4%	ICU Level of Service D
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (veh/h)	50	130	5	5	400	20	60	10	5	15	10	215
Future Volume (Veh/h)	50	130	5	5	400	20	60	10	5	15	10	215
Sign Control		Free			Free		Stop				Stop	
Grade		0%			0%		0%				0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.79	0.79	0.79	0.81	0.81	0.81
Hourly flow rate (vph)	66	171	7	7	526	26	76	13	6	19	12	265
Pedestrians		2			121		7				15	
Lane Width (ft)		12.0			12.0		12.0				12.0	
Walking Speed (ft/s)		3.5			3.5		3.5				3.5	
Percent Blockage		0			12		1				1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		534										
pX, platoon unblocked												
vC, conflicting volume	567			178			1136	891	299	1004	878	556
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	567			178			1136	891	299	1004	878	556
tC, single (s)	4.2			4.1			7.1	6.5	6.5	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.6	3.6	4.1	3.3
p0 queue free %	93			100			3	95	99	88	95	49
cM capacity (veh/h)	962			1401			78	257	592	162	252	522

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SW 1
Volume Total	237	7	559	91	4	296
Volume Left	66	0	7	76	0	19
Volume Right	0	7	26	2	4	265
cSH	962	1700	1401	89	592	440
Volume to Capacity	0.07	0.00	0.00	1.02	0.01	0.67
Queue Length 95th (ft)	6	0	0	149	1	121
Control Delay (s)	3.0	0.0	0.2	187.6	11.1	28.4
Lane LOS	A		A	F	B	D
Approach Delay (s)	2.9		0.2	180.2		28.4
Approach LOS				F		D

Intersection Summary			
Average Delay	22.0		
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	0	10	5	75	230	0
Future Volume (vph)	0	10	5	75	230	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected				0.997		
Satd. Flow (prot)	1479	0	0	1569	1660	0
Flt Permitted				0.997		
Satd. Flow (perm)	1479	0	0	1569	1660	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			121	787	
Travel Time (s)	5.2			2.8	17.9	
Confl. Peds. (#/hr)	33	15	8			8
Confl. Bikes (#/hr)						2
Peak Hour Factor	0.50	0.50	0.86	0.86	0.79	0.79
Heavy Vehicles (%)	0%	0%	33%	7%	3%	0%
Adj. Flow (vph)	0	20	6	87	291	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	0	93	291	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 27.4%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	0	10	5	75	230	0
Future Volume (Veh/h)	0	10	5	75	230	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	0	20	6	87	291	0
Pedestrians	8			15	33	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	1			1	3	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	431	314	299			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	431	314	299			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.5			
p0 queue free %	100	97	99			
cM capacity (veh/h)	559	715	1097			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	20	93	291
Volume Left	0	6	0
Volume Right	20	0	0
cSH	715	1097	1700
Volume to Capacity	0.03	0.01	0.17
Queue Length 95th (ft)	2	0	0
Control Delay (s)	10.2	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	10.2	0.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	11	85	207	343	47	71	21	326	137	11	22	209
Future Volume (vph)	11	85	207	343	47	71	21	326	137	11	22	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	12	13	12	11	12	12	12	14
Lane Util. Factor	0.95	0.91	0.86	0.91	0.95	0.95	0.95	0.97	1.00	1.00	0.95	0.95
Ped Bike Factor		0.89	0.96			1.00			1.00			0.96
Frt			0.934	0.850		0.977			0.989			0.984
Flt Protected		0.950	0.999			0.983		0.950				0.996
Satd. Flow (prot)	0	1357	2419	1289	0	3044	0	2518	1531	0	0	2921
Flt Permitted		0.950	0.999			0.983		0.950				0.996
Satd. Flow (perm)	0	1201	2413	1289	0	3044	0	2518	1531	0	0	2921
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)			139	218		15			3			9
Link Speed (mph)			30			30			30			30
Link Distance (ft)			258			501			127			194
Travel Time (s)			5.9			11.4			2.9			4.4
Confl. Peds. (#/hr)		49		23								
Confl. Bikes (#/hr)				5			2			17		
Peak Hour Factor	0.92	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.96	0.96
Heavy Vehicles (%)	2%	10%	12%	6%	4%	7%	5%	21%	10%	10%	56%	9%
Adj. Flow (vph)	12	89	218	361	56	85	25	379	159	13	23	218
Shared Lane Traffic (%)		10%		49%								
Lane Group Flow (vph)	0	92	404	184	0	166	0	379	172	0	0	269
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			14			12			50			22
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.10	1.14	1.10	1.14	1.19	1.14	1.14	1.14	1.05
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Number of Detectors	1	1	2	1	1	2		1	2		1	2
Detector Template	Left	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru
Leading Detector (ft)	20	20	100	20	20	100		20	100		20	100
Trailing Detector (ft)	0	0	0	0	0	0		0	0		0	0
Detector 1 Position(ft)	0	0	0	0	0	0		0	0		0	0
Detector 1 Size(ft)	20	20	6	20	20	6		20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94			94			94
Detector 2 Size(ft)			6			6			6			6
Detector 2 Type			Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)			0.0			0.0			0.0			0.0
Turn Type	Split	Split	NA	Prot	Split	NA		Split	NA		Split	NA

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	27
Future Volume (vph)	27
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	140
Confl. Bikes (#/hr)	
Peak Hour Factor	0.96
Heavy Vehicles (%)	0%
Adj. Flow (vph)	28
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.14
Turning Speed (mph)	9
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Protected Phases	1	1	1	1	4	4		2	2		3	3
Permitted Phases												
Detector Phase	1	1	1	1	4	4		2	2		3	3
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	8.0	8.0		8.0	8.0		8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	17.0	17.0		27.0	27.0		18.0	18.0
Total Split (s)	39.0	39.0	39.0	39.0	22.0	22.0		30.0	30.0		19.0	19.0
Total Split (%)	35.5%	35.5%	35.5%	35.5%	20.0%	20.0%		27.3%	27.3%		17.3%	17.3%
Maximum Green (s)	31.0	31.0	31.0	31.0	14.0	14.0		21.0	21.0		11.0	11.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	3.0
All-Red Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0	0.0			0.0
Total Lost Time (s)		8.0	8.0	8.0		8.0		9.0	9.0			8.0
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead		Lag	Lag		Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None		Max	Max		Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0				7.0	7.0		7.0	7.0
Flash Dont Walk (s)	4.0	4.0	4.0	4.0				10.0	10.0		2.0	2.0
Pedestrian Calls (#/hr)	70	70	70	70				70	70		70	70
Act Effct Green (s)		34.9	34.9	34.9		10.1		21.0	21.0			11.0
Actuated g/C Ratio		0.32	0.32	0.32		0.09		0.19	0.19			0.10
v/c Ratio		0.21	0.47	0.33		0.56		0.79	0.59			0.90
Control Delay		30.0	21.7	3.9		50.8		55.5	48.9			79.2
Queue Delay		0.0	0.0	0.0		0.0		0.0	0.0			0.0
Total Delay		30.0	21.7	3.9		50.8		55.5	48.9			79.2
LOS		C	C	A		D		E	D			E
Approach Delay			18.0			50.8			53.4			79.2
Approach LOS			B			D			D			E

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 37 (34%), Referenced to phase 1:EBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 42.9	Intersection LOS: D
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: D St & Congress St

Lane Group	SBR
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Recall Mode	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	92	404	184	166	379	172	269
v/c Ratio	0.21	0.47	0.33	0.56	0.79	0.59	0.90
Control Delay	30.0	21.7	3.9	50.8	55.5	48.9	79.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	21.7	3.9	50.8	55.5	48.9	79.2
Queue Length 50th (ft)	51	84	0	54	132	110	97
Queue Length 95th (ft)	103	143	36	81	#178	173	#176
Internal Link Dist (ft)		178		421		47	114
Turn Bay Length (ft)							
Base Capacity (vph)	430	861	557	400	480	294	300
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	0.21	0.47	0.33	0.41	0.79	0.59	0.90

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	11	85	207	343	47	71	21	326	137	11	22	209
Future Volume (vph)	11	85	207	343	47	71	21	326	137	11	22	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	12	13	12	11	12	12	12	14
Total Lost time (s)		8.0	8.0	8.0		8.0		9.0	9.0			8.0
Lane Util. Factor		0.91	0.86	0.91		0.95		0.97	1.00			0.95
Frpb, ped/bikes		1.00	0.96	1.00		1.00		1.00	1.00			0.96
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00			1.00
Frt		1.00	0.93	0.85		0.98		1.00	0.99			0.98
Flt Protected		0.95	1.00	1.00		0.98		0.95	1.00			1.00
Satd. Flow (prot)		1357	2420	1289		3046		2518	1531			2921
Flt Permitted		0.95	1.00	1.00		0.98		0.95	1.00			1.00
Satd. Flow (perm)		1357	2420	1289		3046		2518	1531			2921
Peak-hour factor, PHF	0.92	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.96	0.96
Adj. Flow (vph)	12	89	218	361	56	85	25	379	159	13	23	218
RTOR Reduction (vph)	0	0	95	126	0	14	0	0	2	0	0	8
Lane Group Flow (vph)	0	92	309	58	0	152	0	379	170	0	0	261
Confl. Peds. (#/hr)		49		23								
Confl. Bikes (#/hr)				5			2			17		
Heavy Vehicles (%)	2%	10%	12%	6%	4%	7%	5%	21%	10%	10%	56%	9%
Turn Type	Split	Split	NA	Prot	Split	NA		Split	NA		Split	NA
Protected Phases	1	1	1	1	4	4		2	2		3	3
Permitted Phases												
Actuated Green, G (s)		34.9	34.9	34.9		10.1		21.0	21.0			11.0
Effective Green, g (s)		34.9	34.9	34.9		10.1		21.0	21.0			11.0
Actuated g/C Ratio		0.32	0.32	0.32		0.09		0.19	0.19			0.10
Clearance Time (s)		8.0	8.0	8.0		8.0		9.0	9.0			8.0
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0			2.0
Lane Grp Cap (vph)		430	767	408		279		480	292			292
v/s Ratio Prot		0.07	c0.13	0.05		c0.05		c0.15	0.11			c0.09
v/s Ratio Perm												
v/c Ratio		0.21	0.40	0.14		0.55		0.79	0.58			0.89
Uniform Delay, d1		27.5	29.4	26.9		47.8		42.4	40.5			48.9
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00			1.00
Incremental Delay, d2		1.1	1.6	0.7		1.2		12.4	8.2			31.3
Delay (s)		28.6	31.0	27.6		48.9		54.8	48.7			80.2
Level of Service		C	C	C		D		D	D			F
Approach Delay (s)			29.7			48.9			52.9			80.2
Approach LOS			C			D			D			F

Intersection Summary			
HCM 2000 Control Delay	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	27
Future Volume (vph)	27
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	28
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	140
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	304	143	43	404	73	0	0	0	23	19	15
Future Volume (vph)	39	304	143	43	404	73	0	0	0	23	19	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	12	12	12	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			0.99							
Frt		0.957			0.979						0.962	
Flt Protected		0.996			0.996						0.979	
Satd. Flow (prot)	0	2993	0	0	2895	0	0	0	0	0	1334	0
Flt Permitted		0.863			0.881						0.979	
Satd. Flow (perm)	0	2593	0	0	2561	0	0	0	0	0	1334	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			26						16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		158			154			160			130	
Travel Time (s)		3.6			3.5			3.6			3.0	
Confl. Bikes (#/hr)			44			21						
Peak Hour Factor	0.88	0.88	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.72	0.92	0.72
Heavy Vehicles (%)	19%	11%	2%	2%	11%	1%	2%	2%	2%	38%	2%	13%
Adj. Flow (vph)	44	345	155	47	449	81	0	0	0	32	21	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	544	0	0	577	0	0	0	0	0	74	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.05	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2					1	2	
Detector Template	Left	Thru		Left	Thru					Left	Thru	
Leading Detector (ft)	20	100		20	100					20	100	
Trailing Detector (ft)	0	0		0	0					0	0	
Detector 1 Position(ft)	0	0		0	0					0	0	
Detector 1 Size(ft)	20	6		20	6					20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	

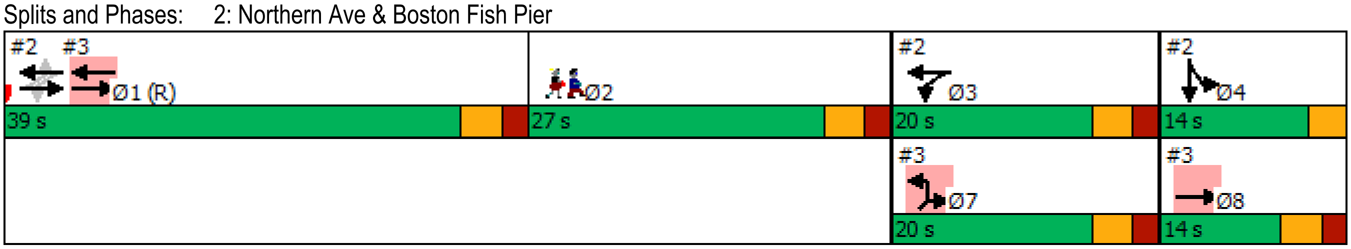
Lane Group	Ø2	Ø7	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Number of Detectors			
Detector Template			
Leading Detector (ft)			
Trailing Detector (ft)			
Detector 1 Position(ft)			
Detector 1 Size(ft)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(ft)			
Detector 2 Size(ft)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	2	7	8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	1			1								
Detector Phase	1	1		1	1 3					4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0		5.0						3.5	3.5	
Minimum Split (s)	21.0	21.0		10.0						8.0	8.0	
Total Split (s)	39.0	39.0		20.0						14.0	14.0	
Total Split (%)	39.0%	39.0%		20.0%						14.0%	14.0%	
Maximum Green (s)	34.0	34.0		15.0						11.0	11.0	
Yellow Time (s)	3.0	3.0		3.0						3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0						0.0	0.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.0									3.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0						2.0	2.0	
Recall Mode	C-Max	C-Max		None						None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		44.8			59.0						10.4	
Actuated g/C Ratio		0.45			0.59						0.10	
v/c Ratio		0.45			0.37						0.49	
Control Delay		20.1			1.8						45.0	
Queue Delay		0.0			0.2						0.0	
Total Delay		20.1			1.9						45.0	
LOS		C			A						D	
Approach Delay		20.1			1.9						45.0	
Approach LOS		C			A						D	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 19 (19%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 12.9 — Intersection LOS: B
Intersection Capacity Utilization 47.3% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Northern Ave & Boston Fish Pier



Lane Group	Ø2	Ø7	Ø8
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	3.0	1.0
Minimum Split (s)	22.0	8.0	6.0
Total Split (s)	27.0	20.0	14.0
Total Split (%)	27%	20%	14%
Maximum Green (s)	22.0	15.0	9.0
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag		
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	None	None	None
Walk Time (s)	7.0		
Flash Dont Walk (s)	10.0		
Pedestrian Calls (#/hr)	98		
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	544	577	74
v/c Ratio	0.45	0.37	0.49
Control Delay	20.1	1.8	45.0
Queue Delay	0.0	0.2	0.0
Total Delay	20.1	1.9	45.0
Queue Length 50th (ft)	120	1	35
Queue Length 95th (ft)	166	m0	81
Internal Link Dist (ft)	78	74	50
Turn Bay Length (ft)			
Base Capacity (vph)	1197	1592	160
Starvation Cap Reductn	0	348	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.45	0.46	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	304	143	43	404	73	0	0	0	23	19	15
Future Volume (vph)	39	304	143	43	404	73	0	0	0	23	19	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0			5.0						3.0	
Lane Util. Factor		0.95			0.95						1.00	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.96			0.98						0.96	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		2999			2896						1334	
Flt Permitted		0.86			0.88						0.98	
Satd. Flow (perm)		2599			2562						1334	
Peak-hour factor, PHF	0.88	0.88	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.72	0.92	0.72
Adj. Flow (vph)	44	345	155	47	449	81	0	0	0	32	21	21
RTOR Reduction (vph)	0	37	0	0	11	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	507	0	0	566	0	0	0	0	0	60	0
Confl. Bikes (#/hr)			44			21						
Heavy Vehicles (%)	19%	11%	2%	2%	11%	1%	2%	2%	2%	38%	2%	13%
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	
Permitted Phases	1			1								
Actuated Green, G (s)		43.8			58.0						10.4	
Effective Green, g (s)		43.8			58.0						10.4	
Actuated g/C Ratio		0.44			0.58						0.10	
Clearance Time (s)		5.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1138			1533						138	
v/s Ratio Prot					c0.05						c0.04	
v/s Ratio Perm		c0.20			0.16							
v/c Ratio		0.45			0.37						0.43	
Uniform Delay, d1		19.6			11.2						42.0	
Progression Factor		1.00			0.19						1.00	
Incremental Delay, d2		1.3			0.0						0.8	
Delay (s)		20.9			2.2						42.8	
Level of Service		C			A						D	
Approach Delay (s)		20.9			2.2			0.0			42.8	
Approach LOS		C			A			A			D	

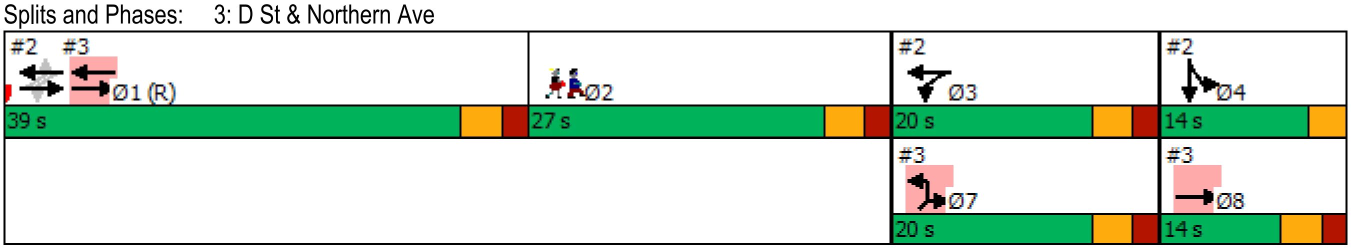
Intersection Summary			
HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Lane Configurations										
Traffic Volume (vph)	327	0	0	349	171	36				
Future Volume (vph)	327	0	0	349	171	36				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	14	12	12	12	12	11				
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00				
Ped Bike Factor										
Frt						0.850				
Flt Protected					0.950					
Satd. Flow (prot)	3014	0	0	2663	1504	1232				
Flt Permitted					0.950					
Satd. Flow (perm)	3014	0	0	2663	1504	1232				
Right Turn on Red		Yes				Yes				
Satd. Flow (RTOR)						39				
Link Speed (mph)	30			30	30					
Link Distance (ft)	154			475	227					
Travel Time (s)	3.5			10.8	5.2					
Confl. Bikes (#/hr)		43								
Peak Hour Factor	0.96	0.96	0.88	0.88	0.93	0.93				
Heavy Vehicles (%)	15%	0%	0%	22%	8%	14%				
Adj. Flow (vph)	341	0	0	397	184	39				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	341	0	0	397	184	39				
Enter Blocked Intersection	No	No	No	No	No	No				
Lane Alignment	Left	Right	Left	Left	Left	Right				
Median Width(ft)	0			0	12					
Link Offset(ft)	0			0	0					
Crosswalk Width(ft)	16			16	16					
Two way Left Turn Lane										
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.19				
Turning Speed (mph)		9	15		15	9				
Number of Detectors	2			2	1	1				
Detector Template	Thru			Thru	Left	Right				
Leading Detector (ft)	100			100	20	20				
Trailing Detector (ft)	0			0	0	0				
Detector 1 Position(ft)	0			0	0	0				
Detector 1 Size(ft)	6			6	20	20				
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex				
Detector 1 Channel										
Detector 1 Extend (s)	0.0			0.0	0.0	0.0				
Detector 1 Queue (s)	0.0			0.0	0.0	0.0				
Detector 1 Delay (s)	0.0			0.0	0.0	0.0				
Detector 2 Position(ft)	94			94						
Detector 2 Size(ft)	6			6						
Detector 2 Type	Cl+Ex			Cl+Ex						
Detector 2 Channel										
Detector 2 Extend (s)	0.0			0.0						
Turn Type	NA			NA	Prot	Prot				
Protected Phases	1 8			1	7	7	2	3	4	8

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Permitted Phases										
Detector Phase	1 8			1	7	7				
Switch Phase										
Minimum Initial (s)				16.0	3.0	3.0	5.0	5.0	3.5	1.0
Minimum Split (s)				21.0	8.0	8.0	22.0	10.0	8.0	6.0
Total Split (s)				39.0	20.0	20.0	27.0	20.0	14.0	14.0
Total Split (%)				39.0%	20.0%	20.0%	27%	20%	14%	14%
Maximum Green (s)				34.0	15.0	15.0	22.0	15.0	11.0	9.0
Yellow Time (s)				3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0				
Total Lost Time (s)				5.0	5.0	5.0				
Lead/Lag				Lead			Lag			
Lead-Lag Optimize?										
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode				C-Max	None	None	None	None	None	None
Walk Time (s)							7.0			
Flash Dont Walk (s)							10.0			
Pedestrian Calls (#/hr)							98			
Act Effct Green (s)	58.2			44.8	14.2	14.2				
Actuated g/C Ratio	0.58			0.45	0.14	0.14				
v/c Ratio	0.19			0.33	0.86	0.19				
Control Delay	2.7			21.1	77.2	14.4				
Queue Delay	0.3			0.0	0.0	0.0				
Total Delay	3.0			21.1	77.2	14.4				
LOS	A			C	E	B				
Approach Delay	3.0			21.1	66.2					
Approach LOS	A			C	E					

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 19 (19%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 25.1	Intersection LOS: C
Intersection Capacity Utilization 32.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: D St & Northern Ave



Lane Group	EBT	WBT	NEL	NER
Lane Group Flow (vph)	341	397	184	39
v/c Ratio	0.19	0.33	0.86	0.19
Control Delay	2.7	21.1	77.2	14.4
Queue Delay	0.3	0.0	0.0	0.0
Total Delay	3.0	21.1	77.2	14.4
Queue Length 50th (ft)	10	93	115	0
Queue Length 95th (ft)	11	131	#231	30
Internal Link Dist (ft)	74	395	147	
Turn Bay Length (ft)				
Base Capacity (vph)	1742	1192	225	217
Starvation Cap Reductn	863	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.39	0.33	0.82	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	327	0	0	349	171	36
Future Volume (vph)	327	0	0	349	171	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	12	12	12	11
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3014			2663	1504	1232
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3014			2663	1504	1232
Peak-hour factor, PHF	0.96	0.96	0.88	0.88	0.93	0.93
Adj. Flow (vph)	341	0	0	397	184	39
RTOR Reduction (vph)	0	0	0	0	0	33
Lane Group Flow (vph)	341	0	0	397	184	6
Confl. Bikes (#/hr)		43				
Heavy Vehicles (%)	15%	0%	0%	22%	8%	14%
Turn Type	NA			NA	Prot	Prot
Protected Phases	1 8			1	7	7
Permitted Phases						
Actuated Green, G (s)	57.2			43.8	14.2	14.2
Effective Green, g (s)	57.2			43.8	14.2	14.2
Actuated g/C Ratio	0.57			0.44	0.14	0.14
Clearance Time (s)				5.0	5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0
Lane Grp Cap (vph)	1724			1166	213	174
v/s Ratio Prot	c0.11			c0.15	c0.12	0.00
v/s Ratio Perm						
v/c Ratio	0.20			0.34	0.86	0.03
Uniform Delay, d1	10.3			18.6	42.0	37.0
Progression Factor	0.21			1.00	1.00	1.00
Incremental Delay, d2	0.0			0.8	27.6	0.0
Delay (s)	2.2			19.4	69.6	37.0
Level of Service	A			B	E	D
Approach Delay (s)	2.2			19.4	63.9	
Approach LOS	A			B	E	

Intersection Summary			
HCM 2000 Control Delay	23.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	358	5	21	333	11	205
Future Volume (vph)	358	5	21	333	11	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt	0.998				0.872	
Flt Protected				0.997	0.998	
Satd. Flow (prot)	3000	0	0	1958	1336	0
Flt Permitted				0.997	0.998	
Satd. Flow (perm)	3000	0	0	1958	1336	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	475			419	295	
Travel Time (s)	10.8			9.5	6.7	
Confl. Peds. (#/hr)		58	58		88	
Confl. Bikes (#/hr)		36				
Peak Hour Factor	0.95	0.95	0.85	0.85	0.82	0.82
Heavy Vehicles (%)	15%	38%	57%	66%	0%	12%
Adj. Flow (vph)	377	5	25	392	13	250
Shared Lane Traffic (%)						
Lane Group Flow (vph)	382	0	0	417	263	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 48.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	358	5	21	333	11	205
Future Volume (Veh/h)	358	5	21	333	11	205
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.85	0.85	0.82	0.82
Hourly flow rate (vph)	377	5	25	392	13	250
Pedestrians	88				58	
Lane Width (ft)	14.0				12.0	
Walking Speed (ft/s)	3.5				3.5	
Percent Blockage	10				6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	475					
pX, platoon unblocked			0.97		0.97	0.97
vC, conflicting volume			440		772	249
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			370		710	173
tC, single (s)			5.2		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.8		3.5	3.4
p0 queue free %			97		96	66
cM capacity (veh/h)			802		299	744

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	251	131	156	261	263
Volume Left	0	0	25	0	13
Volume Right	0	5	0	0	250
cSH	1700	1700	802	1700	693
Volume to Capacity	0.15	0.08	0.03	0.15	0.38
Queue Length 95th (ft)	0	0	2	0	44
Control Delay (s)	0.0	0.0	1.8	0.0	13.3
Lane LOS			A		B
Approach Delay (s)	0.0		0.7		13.3
Approach LOS					B

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

LANE SUMMARY

Site: 1 [NB-AM]

Northern Avenue at Haul Road/Marine Industrial Park
2024 No-Build Conditions
Weekday Morning Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Haul Road													
Lane 1[d]	464	12.6	523	0.887	100	44.2	LOS E	12.2	335.0	Full	1600	0.0	0.0
Approach	464	12.6		0.887		44.2	LOS E	12.2	335.0				
East: Northern Avenue													
Lane 1[d]	258	35.1	656	0.394	100	11.0	LOS B	1.2	40.0	Full	1600	0.0	0.0
Approach	258	35.1		0.394		11.0	LOS B	1.2	40.0				
NorthEast: Marine Industrial Park													
Lane 1[d]	79	38.1	473	0.167	100	10.0	LOS A	0.4	13.4	Full	1600	0.0	0.0
Approach	79	38.1		0.167		10.0	LOS A	0.4	13.4				
West: Northern Avenue													
Lane 1[d]	587	16.5	859	0.683	100	16.1	LOS C	4.1	115.5	Full	1600	0.0	0.0
Approach	587	16.5		0.683		16.1	LOS C	4.1	115.5				
Intersection	1388	19.9		0.887		24.2	LOS C	12.2	335.0				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Siegloch M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Lane Group	EBL	EBR	NBL	SER	SER2
Lane Configurations					
Traffic Volume (vph)	0	5	222	738	5
Future Volume (vph)	0	5	222	738	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	16
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					
Frt	0.865			0.865	
Flt Protected			0.950		
Satd. Flow (prot)	1112	0	1279	1287	0
Flt Permitted			0.950		
Satd. Flow (perm)	1112	0	1279	1287	0
Link Speed (mph)	30		30	30	
Link Distance (ft)	349		289	218	
Travel Time (s)	7.9		6.6	5.0	
Confl. Peds. (#/hr)					19
Confl. Bikes (#/hr)					48
Peak Hour Factor	0.50	0.50	0.86	0.93	0.93
Heavy Vehicles (%)	100%	33%	44%	15%	0%
Adj. Flow (vph)	0	10	258	794	5
Shared Lane Traffic (%)					
Lane Group Flow (vph)	10	0	258	799	0
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right
Median Width(ft)	12		16	0	
Link Offset(ft)	0		0	0	
Crosswalk Width(ft)	16		16	16	
Two way Left Turn Lane					
Headway Factor	1.14	1.14	0.97	1.14	0.97
Turning Speed (mph)	15	9	15	9	9
Sign Control	Stop		Free	Free	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 54.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	SER	SER2
Lane Configurations					
Traffic Volume (veh/h)	0	5	222	738	5
Future Volume (Veh/h)	0	5	222	738	5
Sign Control	Stop		Free	Free	
Grade	0%		0%	0%	
Peak Hour Factor	0.50	0.50	0.86	0.93	0.93
Hourly flow rate (vph)	0	10	258	794	5
Pedestrians	19				
Lane Width (ft)	12.0				
Walking Speed (ft/s)	3.5				
Percent Blockage	2				
Right turn flare (veh)					
Median type			None	None	
Median storage veh)					
Upstream signal (ft)					
pX, platoon unblocked					
vC, conflicting volume	1074	816			
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
vCu, unblocked vol	1074	816			
tC, single (s)	7.4	6.5			
tC, 2 stage (s)					
tF (s)	4.4	3.6			
p0 queue free %	100	97			
cM capacity (veh/h)	159	327			

Direction, Lane #	EB 1	NB 1	SE 1
Volume Total	10	258	799
Volume Left	0	0	0
Volume Right	10	0	5
cSH	327	624	1700
Volume to Capacity	0.03	0.00	0.47
Queue Length 95th (ft)	2	0	0
Control Delay (s)	16.3	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.3	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	10	118	597	147	104	21
Future Volume (vph)	10	118	597	147	104	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	16	14	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.876		0.973		0.977	
Flt Protected	0.996		0.961		0.960	
Satd. Flow (prot)	1670	0	1606	0	1531	0
Flt Permitted	0.996		0.961		0.960	
Satd. Flow (perm)	1670	0	1606	0	1531	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	311		289		787	
Travel Time (s)	7.1		6.6		17.9	
Confl. Peds. (#/hr)	43			54		38
Confl. Bikes (#/hr)				43		
Peak Hour Factor	0.83	0.83	0.92	0.92	0.81	0.81
Heavy Vehicles (%)	16%	0%	16%	0%	8%	30%
Adj. Flow (vph)	12	142	649	160	128	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	154	0	809	0	154	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	16		16		14	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.14	0.97	0.97	1.05	1.14
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Stop		Stop		Stop	

Intersection Summary	
Area Type:	CBD
Control Type: Unsignalized	
Intersection Capacity Utilization 78.2%	ICU Level of Service D
Analysis Period (min) 15	

Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Sign Control	Stop		Stop		Stop	
Traffic Volume (vph)	10	118	597	147	104	21
Future Volume (vph)	10	118	597	147	104	21
Peak Hour Factor	0.83	0.83	0.92	0.92	0.81	0.81
Hourly flow rate (vph)	12	142	649	160	128	26

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total (vph)	154	809	154
Volume Left (vph)	12	649	0
Volume Right (vph)	142	0	26
Hadj (s)	-0.52	0.38	0.10
Departure Headway (s)	5.5	5.0	5.3
Degree Utilization, x	0.24	1.11	0.23
Capacity (veh/h)	633	715	657
Control Delay (s)	10.2	89.4	9.9
Approach Delay (s)	10.2	89.4	9.9
Approach LOS	B	F	A

Intersection Summary			
Delay	67.6		
Level of Service	F		
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	430	216	53	83	367	68
Future Volume (vph)	430	216	53	83	367	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Frt		0.850			0.977	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	1583	1275	1490	1125	2902	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	1583	1275	1490	1125	2902	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	301			349	314	
Travel Time (s)	6.8			7.9	7.1	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.77	0.77
Heavy Vehicles (%)	8%	14%	9%	52%	11%	9%
Adj. Flow (vph)	473	237	61	95	477	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	473	237	61	95	565	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	26	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 52.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	430	216	53	83	367	68
Future Volume (Veh/h)	430	216	53	83	367	68
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.77	0.77
Hourly flow rate (vph)	473	237	61	95	477	88
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			710		690	473
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			710		690	473
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			93		0	85
cM capacity (veh/h)			858		369	577

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2
Volume Total	473	237	61	95	318	247
Volume Left	0	0	61	0	318	159
Volume Right	0	237	0	0	0	88
cSH	1700	1700	858	1700	369	424
Volume to Capacity	0.28	0.14	0.07	0.06	0.86	0.58
Queue Length 95th (ft)	0	0	6	0	204	90
Control Delay (s)	0.0	0.0	9.5	0.0	52.4	24.7
Lane LOS			A		F	C
Approach Delay (s)	0.0		3.7		40.3	
Approach LOS					E	

Intersection Summary			
Average Delay	16.3		
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Lane Configurations							
Traffic Volume (vph)	22	825	527	413	174	95	
Future Volume (vph)	22	825	527	413	174	95	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	11	12	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Ped Bike Factor			0.99				
Frt			0.934		0.947		
Flt Protected		0.999			0.969		
Satd. Flow (prot)	0	2775	3566	0	2567	0	
Flt Permitted		0.902			0.969		
Satd. Flow (perm)	0	2506	3566	0	2567	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			209		79		
Link Speed (mph)		30	30		30		
Link Distance (ft)		543	505		314		
Travel Time (s)		12.3	11.5		7.1		
Confl. Bikes (#/hr)				28			
Peak Hour Factor	0.92	0.92	0.91	0.91	0.78	0.78	
Heavy Vehicles (%)	15%	13%	22%	10%	26%	5%	
Adj. Flow (vph)	24	897	579	454	223	122	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	921	1033	0	345	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(ft)		12	12		24		
Link Offset(ft)		0	0		0		
Crosswalk Width(ft)		16	16		16		
Two way Left Turn Lane							
Headway Factor	1.14	1.19	1.19	1.14	1.14	1.14	
Turning Speed (mph)	15			9	15	9	
Number of Detectors	1	2	2		1		
Detector Template	Left	Thru	Thru		Left		
Leading Detector (ft)	20	100	100		20		
Trailing Detector (ft)	0	0	0		0		
Detector 1 Position(ft)	0	0	0		0		
Detector 1 Size(ft)	20	6	6		20		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0		0.0		
Detector 1 Queue (s)	0.0	0.0	0.0		0.0		
Detector 1 Delay (s)	0.0	0.0	0.0		0.0		
Detector 2 Position(ft)		94	94				
Detector 2 Size(ft)		6	6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		3.0
Minimum Split (s)	12.0		17.0		16.0		30.0
Total Split (s)	13.0		49.0		18.0		30.0
Total Split (%)	11.8%		44.5%		16.4%		27%
Maximum Green (s)	6.0		42.0		10.5		23.0
Yellow Time (s)	4.0		4.0		3.5		3.0
All-Red Time (s)	3.0		3.0		4.0		4.0
Lost Time Adjust (s)			0.0		0.0		
Total Lost Time (s)			7.0		7.5		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							16.0
Pedestrian Calls (#/hr)							26
Act Effct Green (s)		56.0	50.0		14.5		
Actuated g/C Ratio		0.51	0.45		0.13		
v/c Ratio		0.71	0.60		0.85		
Control Delay		25.6	5.0		57.4		
Queue Delay		0.0	0.0		0.0		
Total Delay		25.6	5.0		57.4		
LOS		C	A		E		
Approach Delay		25.6	5.0		57.4		
Approach LOS		C	A		E		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 22 (20%), Referenced to phase 1:NWSE, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 21.1 Intersection LOS: C
Intersection Capacity Utilization 63.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 9: Summer St & Pumphouse Rd

Lane Group	SET	NWT	SWL
Lane Group Flow (vph)	921	1033	345
v/c Ratio	0.71	0.60	0.85
Control Delay	25.6	5.0	57.4
Queue Delay	0.0	0.0	0.0
Total Delay	25.6	5.0	57.4
Queue Length 50th (ft)	246	31	~113
Queue Length 95th (ft)	320	m50	#161
Internal Link Dist (ft)	463	425	234
Turn Bay Length (ft)			
Base Capacity (vph)	1291	1735	406
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.71	0.60	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	22	825	527	413	174	95
Future Volume (vph)	22	825	527	413	174	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12
Total Lost time (s)		7.0	7.0		7.5	
Lane Util. Factor		0.95	0.91		0.97	
Frpb, ped/bikes		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.93		0.95	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		2774	3569		2566	
Flt Permitted		0.90	1.00		0.97	
Satd. Flow (perm)		2506	3569		2566	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.78	0.78
Adj. Flow (vph)	24	897	579	454	223	122
RTOR Reduction (vph)	0	0	119	0	69	0
Lane Group Flow (vph)	0	921	914	0	276	0
Confl. Bikes (#/hr)				28		
Heavy Vehicles (%)	15%	13%	22%	10%	26%	5%
Turn Type	D.P+P	NA	NA		Prot	
Protected Phases	5	1 5	1		3	
Permitted Phases	1					
Actuated Green, G (s)		53.2	47.2		14.5	
Effective Green, g (s)		53.2	47.2		14.5	
Actuated g/C Ratio		0.48	0.43		0.13	
Clearance Time (s)			7.0		7.5	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)		1226	1531		338	
v/s Ratio Prot		c0.04	0.26		c0.11	
v/s Ratio Perm		c0.32				
v/c Ratio		0.75	0.60		0.82	
Uniform Delay, d1		23.0	24.1		46.5	
Progression Factor		1.00	0.25		1.00	
Incremental Delay, d2		2.6	0.2		13.5	
Delay (s)		25.7	6.3		60.0	
Level of Service		C	A		E	
Approach Delay (s)		25.7	6.3		60.0	
Approach LOS		C	A		E	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

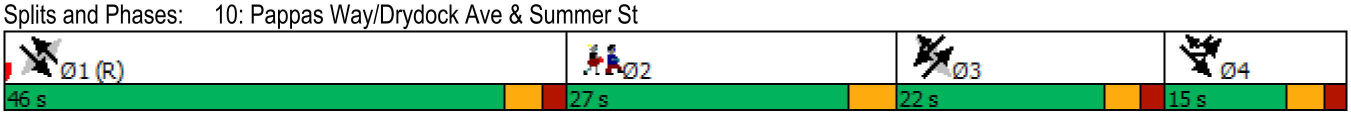
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	275	598	126	5	684	214	128	115	5	119	82	128
Future Volume (vph)	275	598	126	5	684	214	128	115	5	119	82	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	365		0	65		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		1.00			0.99			1.00				
Frt		0.974			0.964			0.997				0.850
Flt Protected	0.950			0.950				0.975			0.971	
Satd. Flow (prot)	1438	2716	0	1354	2755	0	0	1622	0	0	1548	1069
Flt Permitted	0.143			0.088				0.268			0.648	
Satd. Flow (perm)	216	2716	0	125	2755	0	0	446	0	0	1033	1069
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			43			1				164
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			502			340			534	
Travel Time (s)		11.5			11.4			7.7			12.1	
Confl. Bikes (#/hr)			10			28			5			
Peak Hour Factor	0.94	0.94	0.94	0.88	0.88	0.88	0.93	0.93	0.93	0.78	0.78	0.78
Heavy Vehicles (%)	13%	17%	11%	20%	16%	3%	2%	3%	0%	4%	12%	36%
Adj. Flow (vph)	293	636	134	6	777	243	138	124	5	153	105	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	770	0	6	1020	0	0	267	0	0	258	164
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Detector Phase	4	1 4		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	
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	15.0			46.0	46.0		22.0	22.0		22.0	22.0	
Total Split (%)	13.6%			41.8%	41.8%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	10.0			41.0	41.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	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	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	56.4	61.4		46.4	46.4			17.0			17.0	32.0
Actuated g/C Ratio	0.51	0.56		0.42	0.42			0.15			0.15	0.29
v/c Ratio	1.32	0.50		0.12	0.86			3.87			1.62	0.38
Control Delay	192.2	14.6		29.8	38.6			1340.1			339.0	7.5
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	192.2	14.6		29.8	38.6			1340.1			339.0	7.5
LOS	F	B		C	D			F			F	A
Approach Delay		63.6			38.6			1340.1			210.2	
Approach LOS		E			D			F			F	

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 13 (12%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 3.87	
Intersection Signal Delay: 199.3	Intersection LOS: F
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 10: Pappas Way/Drydock Ave & Summer St



Lane Group	Ø2
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	25%
Maximum Green (s)	23.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	60
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NET	SWT	SWR
Lane Group Flow (vph)	293	770	6	1020	267	258	164
v/c Ratio	1.32	0.50	0.12	0.86	3.87	1.62	0.38
Control Delay	192.2	14.6	29.8	38.6	1340.1	339.0	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	192.2	14.6	29.8	38.6	1340.1	339.0	7.5
Queue Length 50th (ft)	~213	83	3	355	~347	~262	0
Queue Length 95th (ft)	m#366	m173	14	#483	#515	#352	31
Internal Link Dist (ft)		425		422	260	454	
Turn Bay Length (ft)	365		65				
Base Capacity (vph)	222	1530	52	1186	69	159	427
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	1.32	0.50	0.12	0.86	3.87	1.62	0.38

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	275	598	126	5	684	214	128	115	5	119	82	128
Future Volume (vph)	275	598	126	5	684	214	128	115	5	119	82	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.96			1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.97	1.00
Satd. Flow (prot)	1438	2716		1354	2757			1623			1548	1069
Flt Permitted	0.14	1.00		0.09	1.00			0.27			0.65	1.00
Satd. Flow (perm)	217	2716		125	2757			446			1032	1069
Peak-hour factor, PHF	0.94	0.94	0.94	0.88	0.88	0.88	0.93	0.93	0.93	0.78	0.78	0.78
Adj. Flow (vph)	293	636	134	6	777	243	138	124	5	153	105	164
RTOR Reduction (vph)	0	15	0	0	25	0	0	1	0	0	0	116
Lane Group Flow (vph)	293	755	0	6	995	0	0	266	0	0	258	48
Confl. Bikes (#/hr)			10			28			5			
Heavy Vehicles (%)	13%	17%	11%	20%	16%	3%	2%	3%	0%	4%	12%	36%
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	55.6	60.6		45.6	45.6			17.0			17.0	32.0
Effective Green, g (s)	55.6	60.6		45.6	45.6			17.0			17.0	32.0
Actuated g/C Ratio	0.51	0.55		0.41	0.41			0.15			0.15	0.29
Clearance Time (s)	5.0			5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.0			2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	220	1496		51	1142			68			159	310
v/s Ratio Prot	c0.12	0.28			0.36							0.04
v/s Ratio Perm	c0.55			0.05				c0.60			0.25	
v/c Ratio	1.33	0.50		0.12	0.87			3.91			1.62	0.15
Uniform Delay, d1	21.0	15.4		19.8	29.5			46.5			46.5	29.0
Progression Factor	1.56	0.86		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	168.3	0.1		4.7	9.2			1346.0			307.1	0.1
Delay (s)	201.0	13.3		24.5	38.7			1392.5			353.6	29.0
Level of Service	F	B		C	D			F			F	C
Approach Delay (s)		65.0			38.6			1392.5			227.5	
Approach LOS		E			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	207.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	141	404	59	5	208	21	57	11	11	32	16	64
Future Volume (vph)	141	404	59	5	208	21	57	11	11	32	16	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.988		0.973		0.850		0.923	
Flt Protected		0.987			0.999		0.961				0.979	
Satd. Flow (prot)	0	1577	1321	0	1476	0	1345	0	1038	0	1282	0
Flt Permitted		0.987			0.999		0.961				0.979	
Satd. Flow (perm)	0	1577	1321	0	1476	0	1345	0	1038	0	1282	0
Link Speed (mph)		30			30		30				30	
Link Distance (ft)		534			438		201				121	
Travel Time (s)		12.1			10.0		4.6				2.8	
Confl. Peds. (#/hr)	10		7	7		15	1		65	65	7	1
Confl. Bikes (#/hr)			40			1			2			
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.73	0.73	0.73	0.89	0.89	0.89
Heavy Vehicles (%)	10%	6%	10%	0%	14%	21%	20%	11%	33%	6%	20%	28%
Adj. Flow (vph)	178	511	75	7	274	28	78	15	15	36	18	72
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	0	689	75	0	309	0	95	0	13	0	126	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)		0			0		12				12	
Link Offset(ft)		0			0		0				0	
Crosswalk Width(ft)		16			16		16				16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15	9	9	15	15	9
Sign Control		Free			Free		Stop				Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (veh/h)	141	404	59	5	208	21	57	11	11	32	16	64
Future Volume (Veh/h)	141	404	59	5	208	21	57	11	11	32	16	64
Sign Control		Free			Free		Stop				Stop	
Grade		0%			0%		0%				0%	
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.73	0.73	0.73	0.89	0.89	0.89
Hourly flow rate (vph)	178	511	75	7	274	28	78	15	15	36	18	72
Pedestrians		1			65		7				15	
Lane Width (ft)		12.0			12.0		12.0				12.0	
Walking Speed (ft/s)		3.5			3.5		3.5				3.5	
Percent Blockage		0			6		1				1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		534										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	317			518			1258	1205	583	1272	1191	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			398			1229	1169	471	1244	1153	304
tC, single (s)	4.2			4.1			7.3	6.6	6.5	7.2	6.7	6.5
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.7	4.1	3.6	3.6	4.2	3.6
p0 queue free %	85			99			11	89	97	62	87	89
cM capacity (veh/h)	1182			1037			88	137	443	94	135	668

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SW 1
Volume Total	689	75	309	98	10	126
Volume Left	178	0	7	78	0	36
Volume Right	0	75	28	5	10	72
cSH	1182	1700	1037	97	443	202
Volume to Capacity	0.15	0.04	0.01	1.01	0.02	0.62
Queue Length 95th (ft)	13	0	1	153	2	90
Control Delay (s)	3.6	0.0	0.3	174.8	13.3	48.6
Lane LOS	A		A	F	B	E
Approach Delay (s)	3.2		0.3	159.8		48.6
Approach LOS				F		E

Intersection Summary			
Average Delay	19.8		
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	9	17	57	116	95	62
Future Volume (vph)	9	17	57	116	95	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.911				0.947	
Flt Protected	0.983			0.984		
Satd. Flow (prot)	1446	0	0	1558	1429	0
Flt Permitted	0.983			0.984		
Satd. Flow (perm)	1446	0	0	1558	1429	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			121	787	
Travel Time (s)	5.2			2.8	17.9	
Confl. Peds. (#/hr)	28	10	2			28
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.43	0.43	0.87	0.87	0.86	0.86
Heavy Vehicles (%)	0%	9%	0%	12%	22%	0%
Adj. Flow (vph)	21	40	66	133	110	72
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	0	199	182	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary		
Area Type:	CBD	
Control Type: Unsignalized		
Intersection Capacity Utilization 38.8%		ICU Level of Service A
Analysis Period (min) 15		

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	9	17	57	116	95	62
Future Volume (Veh/h)	9	17	57	116	95	62
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.43	0.43	0.87	0.87	0.86	0.86
Hourly flow rate (vph)	21	40	66	133	110	72
Pedestrians	28			10	28	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	3			1	3	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	467	184	210			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	467	184	210			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	96	95	95			
cM capacity (veh/h)	502	810	1336			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	61	199	182
Volume Left	21	66	0
Volume Right	40	0	72
cSH	669	1336	1700
Volume to Capacity	0.09	0.05	0.11
Queue Length 95th (ft)	7	4	0
Control Delay (s)	10.9	2.9	0.0
Lane LOS	B	A	
Approach Delay (s)	10.9	2.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	16	57	96	429	37	157	16	5	253	87	21	0
Future Volume (vph)	16	57	96	429	37	157	16	5	253	87	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	12	13	12	12	11	12	12	12
Lane Util. Factor	0.95	0.91	0.86	0.91	0.95	0.95	0.95	1.00	0.97	1.00	1.00	0.95
Ped Bike Factor			0.99			1.00				0.99		
Frt			0.898	0.850		0.988				0.970		
Flt Protected		0.950	0.999			0.991			0.950			
Satd. Flow (prot)	0	1478	2435	1340	0	3156	0	0	2988	1586	0	0
Flt Permitted		0.950	0.999			0.991			0.222			
Satd. Flow (perm)	0	1478	2435	1340	0	3156	0	0	698	1586	0	0
Right Turn on Red				Yes			Yes				Yes	
Satd. Flow (RTOR)			233	233		7				10		
Link Speed (mph)			30			30				30		
Link Distance (ft)			258			501				127		
Travel Time (s)			5.9			11.4				2.9		
Confl. Bikes (#/hr)				1			2				4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.78	0.78	0.78	0.92	0.85	0.85	0.85	0.89
Heavy Vehicles (%)	0%	0%	20%	2%	6%	4%	0%	0%	2%	5%	0%	50%
Adj. Flow (vph)	17	62	104	466	47	201	21	5	298	102	25	0
Shared Lane Traffic (%)		10%		50%								
Lane Group Flow (vph)	0	73	343	233	0	269	0	0	303	127	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left
Median Width(ft)			14			12				50		
Link Offset(ft)			0			0				0		
Crosswalk Width(ft)			16			16				16		
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.10	1.14	1.10	1.14	1.14	1.19	1.14	1.14	1.14
Turning Speed (mph)	9	15		9	15		9	9	15		9	15
Number of Detectors	1	1	2	1	1	2		1	1	2		1
Detector Template	Left	Left	Thru	Right	Left	Thru		Left	Left	Thru		Left
Leading Detector (ft)	20	20	100	20	20	100		20	20	100		20
Trailing Detector (ft)	0	0	0	0	0	0		0	0	0		0
Detector 1 Position(ft)	0	0	0	0	0	0		0	0	0		0
Detector 1 Size(ft)	20	20	6	20	20	6		20	20	6		20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 2 Position(ft)			94			94				94		
Detector 2 Size(ft)			6			6				6		
Detector 2 Type			Cl+Ex			Cl+Ex				Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)			0.0			0.0				0.0		
Turn Type	Split	Split	NA	Prot	Split	NA		Perm	Split	NA		
Protected Phases	1	1	1	1	4	4			2	2		3

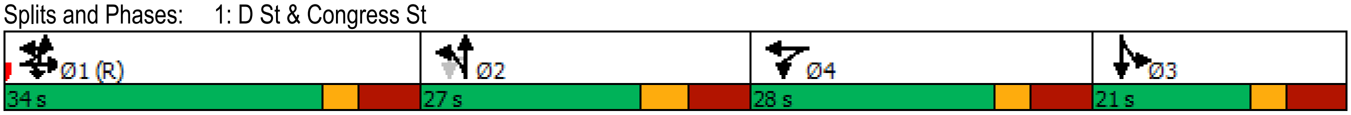
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	494	21
Future Volume (vph)	494	21
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	14	12
Lane Util. Factor	0.95	0.95
Ped Bike Factor	1.00	
Frt	0.994	
Flt Protected		
Satd. Flow (prot)	3390	0
Flt Permitted		
Satd. Flow (perm)	3390	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	3	
Link Speed (mph)	30	
Link Distance (ft)	194	
Travel Time (s)	4.4	
Confl. Bikes (#/hr)		15
Peak Hour Factor	0.89	0.89
Heavy Vehicles (%)	1%	12%
Adj. Flow (vph)	555	24
Shared Lane Traffic (%)		
Lane Group Flow (vph)	579	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	22	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.05	1.14
Turning Speed (mph)		9
Number of Detectors	2	
Detector Template	Thru	
Leading Detector (ft)	100	
Trailing Detector (ft)	0	
Detector 1 Position(ft)	0	
Detector 1 Size(ft)	6	
Detector 1 Type	Cl+Ex	
Detector 1 Channel		
Detector 1 Extend (s)	0.0	
Detector 1 Queue (s)	0.0	
Detector 1 Delay (s)	0.0	
Detector 2 Position(ft)	94	
Detector 2 Size(ft)	6	
Detector 2 Type	Cl+Ex	
Detector 2 Channel		
Detector 2 Extend (s)	0.0	
Turn Type	NA	
Protected Phases	3	

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Permitted Phases								2				
Detector Phase	1	1	1	1	4	4		2	2	2		3
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	20.0	20.0	20.0	20.0	16.0	16.0		26.0	26.0	26.0		17.0
Total Split (s)	34.0	34.0	34.0	34.0	28.0	28.0		27.0	27.0	27.0		21.0
Total Split (%)	30.9%	30.9%	30.9%	30.9%	25.5%	25.5%		24.5%	24.5%	24.5%		19.1%
Maximum Green (s)	26.0	26.0	26.0	26.0	20.0	20.0		18.0	18.0	18.0		13.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0		3.0
All-Red Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0			0.0	0.0		
Total Lost Time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead		Lag	Lag	Lag		Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None		Max	Max	Max		Max
Walk Time (s)	7.0	7.0	7.0	7.0				7.0	7.0	7.0		7.0
Flash Dont Walk (s)	4.0	4.0	4.0	4.0				10.0	10.0	10.0		2.0
Pedestrian Calls (#/hr)	75	75	75	75				75	75	75		75
Act Effct Green (s)		32.5	32.5	32.5		13.5			18.0	18.0		
Actuated g/C Ratio		0.30	0.30	0.30		0.12			0.16	0.16		
v/c Ratio		0.17	0.39	0.42		0.69			2.66	0.48		
Control Delay		31.4	11.8	6.7		53.9			791.1	45.0		
Queue Delay		0.0	0.0	0.0		0.0			0.0	0.0		
Total Delay		31.4	11.8	6.7		53.9			791.1	45.0		
LOS		C	B	A		D			F	D		
Approach Delay			12.2			53.9				570.8		
Approach LOS			B			D				F		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 39 (35%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 2.66
Intersection Signal Delay: 213.0 Intersection LOS: F
Intersection Capacity Utilization 77.9% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: D St & Congress St



Lane Group	SBT	SBR
Permitted Phases		
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	8.0	
Minimum Split (s)	17.0	
Total Split (s)	21.0	
Total Split (%)	19.1%	
Maximum Green (s)	13.0	
Yellow Time (s)	3.0	
All-Red Time (s)	5.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	8.0	
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	
Recall Mode	Max	
Walk Time (s)	7.0	
Flash Dont Walk (s)	2.0	
Pedestrian Calls (#/hr)	75	
Act Effct Green (s)	13.0	
Actuated g/C Ratio	0.12	
v/c Ratio	1.44	
Control Delay	246.3	
Queue Delay	0.0	
Total Delay	246.3	
LOS	F	
Approach Delay	246.3	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	73	343	233	269	303	127	579
v/c Ratio	0.17	0.39	0.42	0.69	2.66	0.48	1.44
Control Delay	31.4	11.8	6.7	53.9	791.1	45.0	246.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	11.8	6.7	53.9	791.1	45.0	246.3
Queue Length 50th (ft)	41	33	0	94	~186	76	~294
Queue Length 95th (ft)	87	80	68	113	#258	128	#402
Internal Link Dist (ft)		178		421		47	114
Turn Bay Length (ft)							
Base Capacity (vph)	436	883	560	579	114	267	403
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	0.17	0.39	0.42	0.46	2.66	0.48	1.44

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	16	57	96	429	37	157	16	5	253	87	21	0
Future Volume (vph)	16	57	96	429	37	157	16	5	253	87	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	12	13	12	12	11	12	12	12
Total Lost time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Lane Util. Factor		0.91	0.86	0.91		0.95			0.97	1.00		
Frpb, ped/bikes		1.00	0.99	1.00		1.00			1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00			1.00	1.00		
Frt		1.00	0.90	0.85		0.99			1.00	0.97		
Flt Protected		0.95	1.00	1.00		0.99			0.95	1.00		
Satd. Flow (prot)		1478	2436	1340		3158			2988	1586		
Flt Permitted		0.95	1.00	1.00		0.99			0.22	1.00		
Satd. Flow (perm)		1478	2436	1340		3158			699	1586		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.78	0.78	0.78	0.92	0.85	0.85	0.85	0.89
Adj. Flow (vph)	17	62	104	466	47	201	21	5	298	102	25	0
RTOR Reduction (vph)	0	0	164	164	0	6	0	0	0	8	0	0
Lane Group Flow (vph)	0	73	179	69	0	263	0	0	303	119	0	0
Confl. Bikes (#/hr)				1			2				4	
Heavy Vehicles (%)	0%	0%	20%	2%	6%	4%	0%	0%	2%	5%	0%	50%
Turn Type	Split	Split	NA	Prot	Split	NA		Perm	Split	NA		
Protected Phases	1	1	1	1	4	4			2	2		3
Permitted Phases								2				
Actuated Green, G (s)		32.5	32.5	32.5		13.5			18.0	18.0		
Effective Green, g (s)		32.5	32.5	32.5		13.5			18.0	18.0		
Actuated g/C Ratio		0.30	0.30	0.30		0.12			0.16	0.16		
Clearance Time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Vehicle Extension (s)		2.0	2.0	2.0		2.0			2.0	2.0		
Lane Grp Cap (vph)		436	719	395		387			114	259		
v/s Ratio Prot		0.05	c0.07	0.05		c0.08				0.07		
v/s Ratio Perm									c0.43			
v/c Ratio		0.17	0.25	0.17		0.68			2.66	0.46		
Uniform Delay, d1		28.7	29.5	28.8		46.2			46.0	41.6		
Progression Factor		1.00	1.00	1.00		1.00			1.00	1.00		
Incremental Delay, d2		0.8	0.8	1.0		3.7			770.6	5.7		
Delay (s)		29.6	30.3	29.7		49.9			816.6	47.3		
Level of Service		C	C	C		D			F	D		
Approach Delay (s)			30.0			49.9				589.4		
Approach LOS			C			D				F		

Intersection Summary			
HCM 2000 Control Delay	226.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	494	21
Future Volume (vph)	494	21
Ideal Flow (vphpl)	1900	1900
Lane Width	14	12
Total Lost time (s)	8.0	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3389	
Flt Permitted	1.00	
Satd. Flow (perm)	3389	
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	555	24
RTOR Reduction (vph)	3	0
Lane Group Flow (vph)	576	0
Confl. Bikes (#/hr)		15
Heavy Vehicles (%)	1%	12%
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Actuated Green, G (s)	13.0	
Effective Green, g (s)	13.0	
Actuated g/C Ratio	0.12	
Clearance Time (s)	8.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	400	
v/s Ratio Prot	c0.17	
v/s Ratio Perm		
v/c Ratio	1.44	
Uniform Delay, d1	48.5	
Progression Factor	1.00	
Incremental Delay, d2	212.2	
Delay (s)	260.7	
Level of Service	F	
Approach Delay (s)	260.7	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	409	307	73	462	37	0	0	0	26	41	52
Future Volume (vph)	26	409	307	73	462	37	0	0	0	26	41	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	12	12	12	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.938			0.990						0.941	
Flt Protected		0.998			0.994						0.989	
Satd. Flow (prot)	0	3088	0	0	2913	0	0	0	0	0	1513	0
Flt Permitted		0.915			0.723						0.989	
Satd. Flow (perm)	0	2831	0	0	2119	0	0	0	0	0	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		183			10						31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		158			154			160			130	
Travel Time (s)		3.6			3.5			3.6			3.0	
Confl. Bikes (#/hr)			8			44						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.78	0.78	0.78
Heavy Vehicles (%)	4%	6%	2%	8%	9%	17%	2%	2%	2%	7%	3%	6%
Adj. Flow (vph)	28	435	327	78	491	39	0	0	0	33	53	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	790	0	0	608	0	0	0	0	0	153	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.05	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2					1	2	
Detector Template	Left	Thru		Left	Thru					Left	Thru	
Leading Detector (ft)	20	100		20	100					20	100	
Trailing Detector (ft)	0	0		0	0					0	0	
Detector 1 Position(ft)	0	0		0	0					0	0	
Detector 1 Size(ft)	20	6		20	6					20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	

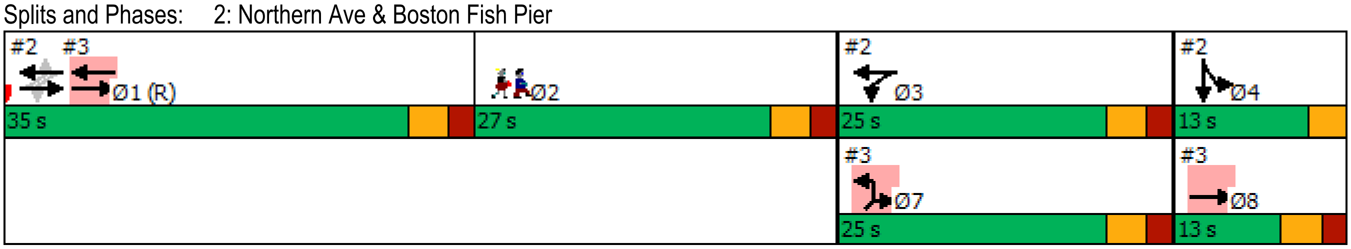
Lane Group	Ø2	Ø7	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Number of Detectors			
Detector Template			
Leading Detector (ft)			
Trailing Detector (ft)			
Detector 1 Position(ft)			
Detector 1 Size(ft)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(ft)			
Detector 2 Size(ft)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	2	7	8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	1			1								
Detector Phase	1	1		1	1 3					4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0		5.0						3.5	3.5	
Minimum Split (s)	21.0	21.0		10.0						6.5	6.5	
Total Split (s)	35.0	35.0		25.0						13.0	13.0	
Total Split (%)	35.0%	35.0%		25.0%						13.0%	13.0%	
Maximum Green (s)	30.0	30.0		20.0						10.0	10.0	
Yellow Time (s)	3.0	3.0		3.0						3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0						0.0	0.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.0									3.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0						2.0	2.0	
Recall Mode	C-Max	C-Max		None						None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		40.2			55.0						10.0	
Actuated g/C Ratio		0.40			0.55						0.10	
v/c Ratio		0.63			0.47						0.85	
Control Delay		21.5			3.2						74.5	
Queue Delay		0.0			0.1						0.0	
Total Delay		21.5			3.3						74.5	
LOS		C			A						E	
Approach Delay		21.5			3.3						74.5	
Approach LOS		C			A						E	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 47 (47%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 19.6 Intersection LOS: B
Intersection Capacity Utilization 61.4% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Northern Ave & Boston Fish Pier



Lane Group	Ø2	Ø7	Ø8
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	3.0	1.0
Minimum Split (s)	22.0	8.0	6.0
Total Split (s)	27.0	25.0	13.0
Total Split (%)	27%	25%	13%
Maximum Green (s)	22.0	20.0	8.0
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag		
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	None	None	None
Walk Time (s)	7.0		
Flash Dont Walk (s)	10.0		
Pedestrian Calls (#/hr)	212		
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	790	608	153
v/c Ratio	0.63	0.47	0.85
Control Delay	21.5	3.2	74.5
Queue Delay	0.0	0.1	0.0
Total Delay	21.5	3.3	74.5
Queue Length 50th (ft)	161	20	78
Queue Length 95th (ft)	247	30	#149
Internal Link Dist (ft)	78	74	50
Turn Bay Length (ft)			
Base Capacity (vph)	1246	1437	179
Starvation Cap Reductn	0	187	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.63	0.49	0.85

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	409	307	73	462	37	0	0	0	26	41	52
Future Volume (vph)	26	409	307	73	462	37	0	0	0	26	41	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0			5.0						3.0	
Lane Util. Factor		0.95			0.95						1.00	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.94			0.99						0.94	
Flt Protected		1.00			0.99						0.99	
Satd. Flow (prot)		3091			2914						1513	
Flt Permitted		0.92			0.72						0.99	
Satd. Flow (perm)		2834			2121						1513	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.78	0.78	0.78
Adj. Flow (vph)	28	435	327	78	491	39	0	0	0	33	53	67
RTOR Reduction (vph)	0	109	0	0	5	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	681	0	0	604	0	0	0	0	0	125	0
Confl. Bikes (#/hr)			8			44						
Heavy Vehicles (%)	4%	6%	2%	8%	9%	17%	2%	2%	2%	7%	3%	6%
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	
Permitted Phases	1			1								
Actuated Green, G (s)		40.2			55.0						10.0	
Effective Green, g (s)		40.2			55.0						10.0	
Actuated g/C Ratio		0.40			0.55						0.10	
Clearance Time (s)		5.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1139			1283						151	
v/s Ratio Prot					c0.07						c0.08	
v/s Ratio Perm		c0.24			0.19							
v/c Ratio		0.60			0.47						0.83	
Uniform Delay, d1		23.5			13.7						44.2	
Progression Factor		1.00			0.29						1.00	
Incremental Delay, d2		2.3			0.1						28.4	
Delay (s)		25.8			4.1						72.6	
Level of Service		C			A						E	
Approach Delay (s)		25.8			4.1			0.0			72.6	
Approach LOS		C			A			A			E	

Intersection Summary			
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

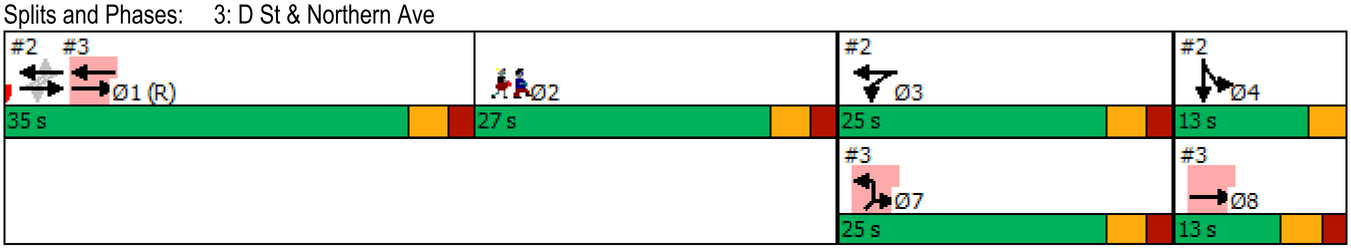
Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Lane Configurations										
Traffic Volume (vph)	435	0	0	424	148	69				
Future Volume (vph)	435	0	0	424	148	69				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	14	12	12	12	12	11				
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00				
Ped Bike Factor										
Frt						0.850				
Flt Protected					0.950					
Satd. Flow (prot)	3269	0	0	2981	1518	1405				
Flt Permitted					0.950					
Satd. Flow (perm)	3269	0	0	2981	1518	1405				
Right Turn on Red		Yes				Yes				
Satd. Flow (RTOR)						77				
Link Speed (mph)	30			30	30					
Link Distance (ft)	154			475	227					
Travel Time (s)	3.5			10.8	5.2					
Confl. Bikes (#/hr)		11								
Peak Hour Factor	0.91	0.91	0.92	0.92	0.90	0.90				
Heavy Vehicles (%)	6%	0%	0%	9%	7%	0%				
Adj. Flow (vph)	478	0	0	461	164	77				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	478	0	0	461	164	77				
Enter Blocked Intersection	No	No	No	No	No	No				
Lane Alignment	Left	Right	Left	Left	Left	Right				
Median Width(ft)	0			0	12					
Link Offset(ft)	0			0	0					
Crosswalk Width(ft)	16			16	16					
Two way Left Turn Lane										
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.19				
Turning Speed (mph)		9	15		15	9				
Number of Detectors	2			2	1	1				
Detector Template	Thru			Thru	Left	Right				
Leading Detector (ft)	100			100	20	20				
Trailing Detector (ft)	0			0	0	0				
Detector 1 Position(ft)	0			0	0	0				
Detector 1 Size(ft)	6			6	20	20				
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex				
Detector 1 Channel										
Detector 1 Extend (s)	0.0			0.0	0.0	0.0				
Detector 1 Queue (s)	0.0			0.0	0.0	0.0				
Detector 1 Delay (s)	0.0			0.0	0.0	0.0				
Detector 2 Position(ft)	94			94						
Detector 2 Size(ft)	6			6						
Detector 2 Type	Cl+Ex			Cl+Ex						
Detector 2 Channel										
Detector 2 Extend (s)	0.0			0.0						
Turn Type	NA			NA	Prot	Prot				
Protected Phases	1 8			1	7	7	2	3	4	8

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Permitted Phases										
Detector Phase	1 8			1	7	7				
Switch Phase										
Minimum Initial (s)				16.0	3.0	3.0	5.0	5.0	3.5	1.0
Minimum Split (s)				21.0	8.0	8.0	22.0	10.0	6.5	6.0
Total Split (s)				35.0	25.0	25.0	27.0	25.0	13.0	13.0
Total Split (%)				35.0%	25.0%	25.0%	27%	25%	13%	13%
Maximum Green (s)				30.0	20.0	20.0	22.0	20.0	10.0	8.0
Yellow Time (s)				3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0				
Total Lost Time (s)				5.0	5.0	5.0				
Lead/Lag				Lead			Lag			
Lead-Lag Optimize?										
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode				C-Max	None	None	None	None	None	None
Walk Time (s)							7.0			
Flash Dont Walk (s)							10.0			
Pedestrian Calls (#/hr)							212			
Act Effct Green (s)	53.2			40.2	14.8	14.8				
Actuated g/C Ratio	0.53			0.40	0.15	0.15				
v/c Ratio	0.28			0.39	0.73	0.28				
Control Delay	4.3			23.3	58.7	10.9				
Queue Delay	0.9			0.0	0.0	0.0				
Total Delay	5.2			23.3	58.7	10.9				
LOS	A			C	E	B				
Approach Delay	5.2			23.3	43.4					
Approach LOS	A			C	D					

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 47 (47%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 20.1 Intersection LOS: C
Intersection Capacity Utilization 30.8% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: D St & Northern Ave



Lane Group	EBT	WBT	NEL	NER
Lane Group Flow (vph)	478	461	164	77
v/c Ratio	0.28	0.39	0.73	0.28
Control Delay	4.3	23.3	58.7	10.9
Queue Delay	0.9	0.0	0.0	0.0
Total Delay	5.2	23.3	58.7	10.9
Queue Length 50th (ft)	22	107	101	0
Queue Length 95th (ft)	m27	164	162	38
Internal Link Dist (ft)	74	395	147	
Turn Bay Length (ft)				
Base Capacity (vph)	1737	1197	303	342
Starvation Cap Reductn	932	0	0	0
Spillback Cap Reductn	0	6	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.59	0.39	0.54	0.23

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑↑			↑↑	↰	↱
Traffic Volume (vph)	435	0	0	424	148	69
Future Volume (vph)	435	0	0	424	148	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	12	12	12	11
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3269			2981	1518	1405
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3269			2981	1518	1405
Peak-hour factor, PHF	0.91	0.91	0.92	0.92	0.90	0.90
Adj. Flow (vph)	478	0	0	461	164	77
RTOR Reduction (vph)	0	0	0	0	0	66
Lane Group Flow (vph)	478	0	0	461	164	11
Confl. Bikes (#/hr)		11				
Heavy Vehicles (%)	6%	0%	0%	9%	7%	0%
Turn Type	NA			NA	Prot	Prot
Protected Phases	1 8			1	7	7
Permitted Phases						
Actuated Green, G (s)	53.2			40.2	14.8	14.8
Effective Green, g (s)	53.2			40.2	14.8	14.8
Actuated g/C Ratio	0.53			0.40	0.15	0.15
Clearance Time (s)				5.0	5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0
Lane Grp Cap (vph)	1739			1198	224	207
v/s Ratio Prot	c0.15			c0.15	c0.11	0.01
v/s Ratio Perm						
v/c Ratio	0.27			0.38	0.73	0.06
Uniform Delay, d1	12.8			21.2	40.7	36.6
Progression Factor	0.30			1.00	1.00	1.00
Incremental Delay, d2	0.0			0.9	10.1	0.0
Delay (s)	3.8			22.1	50.8	36.6
Level of Service	A			C	D	D
Approach Delay (s)	3.8			22.1	46.3	
Approach LOS	A			C	D	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	499	16	92	372	47	162
Future Volume (vph)	499	16	92	372	47	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt	0.995				0.895	
Flt Protected				0.990	0.989	
Satd. Flow (prot)	3289	0	0	2961	1399	0
Flt Permitted				0.990	0.989	
Satd. Flow (perm)	3289	0	0	2961	1399	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	475			419	295	
Travel Time (s)	10.8			9.5	6.7	
Confl. Peds. (#/hr)		25	25		110	4
Confl. Bikes (#/hr)		5				
Peak Hour Factor	0.95	0.95	0.92	0.92	0.88	0.88
Heavy Vehicles (%)	5%	0%	3%	10%	9%	8%
Adj. Flow (vph)	525	17	100	404	53	184
Shared Lane Traffic (%)						
Lane Group Flow (vph)	542	0	0	504	237	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 54.7%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	499	16	92	372	47	162
Future Volume (Veh/h)	499	16	92	372	47	162
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.92	0.92	0.88	0.88
Hourly flow rate (vph)	525	17	100	404	53	184
Pedestrians	110			4	25	
Lane Width (ft)	14.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	12			0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	475					
pX, platoon unblocked			0.94		0.94	0.94
vC, conflicting volume			567		1070	300
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			403		940	118
tC, single (s)			4.2		7.0	7.1
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.4
p0 queue free %			90		71	77
cM capacity (veh/h)			1047		181	814

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	350	192	235	269	237
Volume Left	0	0	100	0	53
Volume Right	0	17	0	0	184
cSH	1700	1700	1047	1700	457
Volume to Capacity	0.21	0.11	0.10	0.16	0.52
Queue Length 95th (ft)	0	0	8	0	73
Control Delay (s)	0.0	0.0	4.3	0.0	21.1
Lane LOS			A		C
Approach Delay (s)	0.0		2.0		21.1
Approach LOS					C

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

LANE SUMMARY

Site: 1 [NB-PM]

Northern Avenue at Haul Road/Marine Industrial Park
2024 No-Build Conditions
Weekday Evening Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Haul Road													
Lane 1[d]	235	6.7	631	0.373	100	10.9	LOS B	1.6	41.7	Full	1600	0.0	0.0
Approach	235	6.7		0.373		10.9	LOS B	1.6	41.7				
East: Northern Avenue													
Lane 1[d]	519	13.0	798	0.650	100	15.7	LOS C	6.7	185.7	Full	1600	0.0	0.0
Approach	519	13.0		0.650		15.7	LOS C	6.7	185.7				
NorthEast: Marine Industrial Park													
Lane 1[d]	59	4.2	479	0.122	100	9.2	LOS A	0.4	9.7	Full	1600	0.0	0.0
Approach	59	4.2		0.122		9.2	LOS A	0.4	9.7				
West: Northern Avenue													
Lane 1[d]	662	5.9	850	0.779	100	21.3	LOS C	15.4	402.4	Full	1600	0.0	0.0
Approach	663	5.9		0.779		21.3	LOS C	15.4	402.4				
Intersection	1475	8.5		0.779		17.2	LOS C	15.4	402.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Siegloch M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Movement	EBL	EBR	NBL2	NBL	SER
Lane Configurations					
Traffic Volume (veh/h)	0	0	5	440	478
Future Volume (Veh/h)	0	0	5	440	478
Sign Control	Stop			Free	Free
Grade	0%			0%	0%
Peak Hour Factor	0.50	0.50	0.84	0.84	0.91
Hourly flow rate (vph)	0	0	6	524	525
Pedestrians	38				
Lane Width (ft)	12.0				
Walking Speed (ft/s)	3.5				
Percent Blockage	4				
Right turn flare (veh)					
Median type				None	None
Median storage veh)					
Upstream signal (ft)					
pX, platoon unblocked					
vC, conflicting volume	1099	563	563		
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
vCu, unblocked vol	1099	563	563		
tC, single (s)	6.4	6.2	4.1		
tC, 2 stage (s)					
tF (s)	3.5	3.3	2.2		
p0 queue free %	100	100	99		
cM capacity (veh/h)	227	510	982		

Direction, Lane #	EB 1	NB 1	SE 1
Volume Total	0	530	525
Volume Left	0	6	0
Volume Right	0	0	0
cSH	1700	982	1700
Volume to Capacity	0.00	0.01	0.31
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.2	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	0.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	41	323	262	216	122	5
Future Volume (vph)	41	323	262	216	122	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	16	14	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.880		0.939		0.994	
Flt Protected	0.994		0.973		0.954	
Satd. Flow (prot)	1477	0	1603	0	1633	0
Flt Permitted	0.994		0.973		0.954	
Satd. Flow (perm)	1477	0	1603	0	1633	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	311		289		787	
Travel Time (s)	7.1		6.6		17.9	
Confl. Peds. (#/hr)	54			54		94
Confl. Bikes (#/hr)				3		
Peak Hour Factor	0.87	0.87	0.91	0.91	0.88	0.88
Heavy Vehicles (%)	5%	16%	15%	5%	4%	50%
Adj. Flow (vph)	47	371	288	237	139	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	418	0	525	0	145	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	16		16		14	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.14	0.97	0.97	1.05	1.14
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Stop		Stop		Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 80.5%	ICU Level of Service D
Analysis Period (min) 15	

Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Sign Control	Stop		Stop		Stop	
Traffic Volume (vph)	41	323	262	216	122	5
Future Volume (vph)	41	323	262	216	122	5
Peak Hour Factor	0.87	0.87	0.91	0.91	0.88	0.88
Hourly flow rate (vph)	47	371	288	237	139	6

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total (vph)	418	525	145
Volume Left (vph)	47	288	0
Volume Right (vph)	371	0	6
Hadj (s)	-0.26	0.29	0.08
Departure Headway (s)	5.6	5.7	6.2
Degree Utilization, x	0.65	0.83	0.25
Capacity (veh/h)	615	525	527
Control Delay (s)	18.2	31.0	11.2
Approach Delay (s)	18.2	31.0	11.2
Approach LOS	C	D	B

Intersection Summary			
Delay	23.4		
Level of Service	C		
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	136	217	142	218	194	70
Future Volume (vph)	136	217	142	218	194	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Ped Bike Factor						
Frt		0.850			0.960	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	1474	1127	1593	1449	2668	0
Flt Permitted			0.950		0.965	
Satd. Flow (perm)	1474	1127	1593	1449	2668	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	301			349	314	
Travel Time (s)	6.8			7.9	7.1	
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.90	0.90	0.83	0.83	0.97	0.97
Heavy Vehicles (%)	16%	29%	2%	18%	23%	8%
Adj. Flow (vph)	151	241	171	263	200	72
Shared Lane Traffic (%)						
Lane Group Flow (vph)	151	241	171	263	272	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	26	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 35.3%	ICU Level of Service A
Analysis Period (min) 15	

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	136	217	142	218	194	70
Future Volume (Veh/h)	136	217	142	218	194	70
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.83	0.83	0.97	0.97
Hourly flow rate (vph)	151	241	171	263	200	72
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			392		756	151
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			392		756	151
tC, single (s)			4.1		6.6	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			85		33	92
cM capacity (veh/h)			1167		296	880

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2
Volume Total	151	241	171	263	133	139
Volume Left	0	0	171	0	133	67
Volume Right	0	241	0	0	0	72
cSH	1700	1700	1167	1700	296	452
Volume to Capacity	0.09	0.14	0.15	0.15	0.45	0.31
Queue Length 95th (ft)	0	0	13	0	55	32
Control Delay (s)	0.0	0.0	8.6	0.0	26.7	16.4
Lane LOS			A		D	C
Approach Delay (s)	0.0		3.4		21.5	
Approach LOS					C	

Intersection Summary			
Average Delay	6.7		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Lane Configurations							
Traffic Volume (vph)	52	899	698	217	275	84	
Future Volume (vph)	52	899	698	217	275	84	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	11	12	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Ped Bike Factor			0.99				
Frt			0.964		0.965		
Flt Protected		0.997			0.963		
Satd. Flow (prot)	0	2982	4119	0	2819	0	
Flt Permitted		0.788			0.963		
Satd. Flow (perm)	0	2357	4119	0	2819	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			71		34		
Link Speed (mph)		30	30		30		
Link Distance (ft)		543	505		314		
Travel Time (s)		12.3	11.5		7.1		
Confl. Bikes (#/hr)				13			
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	5%	5%	6%	2%	11%	4%	
Adj. Flow (vph)	54	936	759	236	299	91	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	990	995	0	390	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(ft)		12	12		24		
Link Offset(ft)		0	0		0		
Crosswalk Width(ft)		16	16		16		
Two way Left Turn Lane							
Headway Factor	1.14	1.19	1.19	1.14	1.14	1.14	
Turning Speed (mph)	15			9	15	9	
Number of Detectors	1	2	2		1		
Detector Template	Left	Thru	Thru		Left		
Leading Detector (ft)	20	100	100		20		
Trailing Detector (ft)	0	0	0		0		
Detector 1 Position(ft)	0	0	0		0		
Detector 1 Size(ft)	20	6	6		20		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0		0.0		
Detector 1 Queue (s)	0.0	0.0	0.0		0.0		
Detector 1 Delay (s)	0.0	0.0	0.0		0.0		
Detector 2 Position(ft)		94	94				
Detector 2 Size(ft)		6	6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		3.0
Minimum Split (s)	12.0		17.0		15.5		30.0
Total Split (s)	13.0		38.0		29.0		30.0
Total Split (%)	11.8%		34.5%		26.4%		27%
Maximum Green (s)	6.0		31.0		21.5		23.0
Yellow Time (s)	4.0		4.0		3.5		3.0
All-Red Time (s)	3.0		3.0		4.0		4.0
Lost Time Adjust (s)			0.0		0.0		
Total Lost Time (s)			7.0		7.5		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							16.0
Pedestrian Calls (#/hr)							28
Act Effct Green (s)		52.7	46.7		17.8		
Actuated g/C Ratio		0.48	0.42		0.16		
v/c Ratio		0.85	0.56		0.80		
Control Delay		36.7	43.1		53.3		
Queue Delay		0.0	0.0		0.0		
Total Delay		36.7	43.1		53.3		
LOS		D	D		D		
Approach Delay		36.7	43.1		53.3		
Approach LOS		D	D		D		

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 3 (3%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 42.1	Intersection LOS: D
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Summer St & Pumphouse Rd

Lane Group	SET	NWT	SWL
Lane Group Flow (vph)	990	995	390
v/c Ratio	0.85	0.56	0.80
Control Delay	36.7	43.1	53.3
Queue Delay	0.0	0.0	0.0
Total Delay	36.7	43.1	53.3
Queue Length 50th (ft)	~359	247	125
Queue Length 95th (ft)	#576	m302	174
Internal Link Dist (ft)	463	425	234
Turn Bay Length (ft)			
Base Capacity (vph)	1162	1787	578
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.85	0.56	0.67

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	52	899	698	217	275	84
Future Volume (vph)	52	899	698	217	275	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12
Total Lost time (s)		7.0	7.0		7.5	
Lane Util. Factor		0.95	0.91		0.97	
Frpb, ped/bikes		1.00	1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.96		0.96	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		2983	4124		2819	
Flt Permitted		0.79	1.00		0.96	
Satd. Flow (perm)		2357	4124		2819	
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	936	759	236	299	91
RTOR Reduction (vph)	0	0	43	0	28	0
Lane Group Flow (vph)	0	990	952	0	362	0
Confl. Bikes (#/hr)				13		
Heavy Vehicles (%)	5%	5%	6%	2%	11%	4%
Turn Type	D.P+P	NA	NA		Prot	
Protected Phases	5	1 5	1		3	
Permitted Phases	1					
Actuated Green, G (s)		49.9	43.9		17.8	
Effective Green, g (s)		49.9	43.9		17.8	
Actuated g/C Ratio		0.45	0.40		0.16	
Clearance Time (s)			7.0		7.5	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)		1103	1645		456	
v/s Ratio Prot		c0.05	0.23		c0.13	
v/s Ratio Perm		c0.36				
v/c Ratio		0.90	0.58		0.79	
Uniform Delay, d1		27.7	25.8		44.3	
Progression Factor		1.00	1.62		1.00	
Incremental Delay, d2		9.7	1.1		8.6	
Delay (s)		37.4	42.9		52.9	
Level of Service		D	D		D	
Approach Delay (s)		37.4	42.9		52.9	
Approach LOS		D	D		D	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

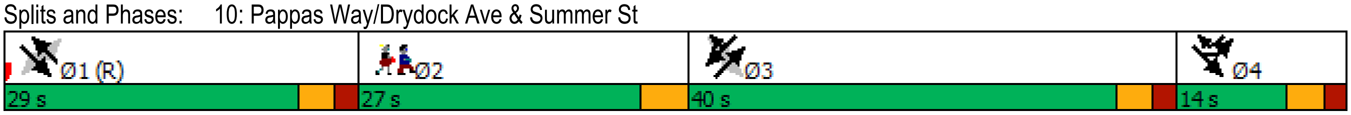
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	96	856	222	11	498	110	56	47	11	275	209	361
Future Volume (vph)	96	856	222	11	498	110	56	47	11	275	209	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	365		0	65		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							
Frt		0.969			0.973			0.987				0.850
Flt Protected	0.950			0.950				0.976			0.972	
Satd. Flow (prot)	1279	2971	0	1624	2995	0	0	1599	0	0	1639	1358
Flt Permitted	0.197			0.140				0.279			0.748	
Satd. Flow (perm)	265	2971	0	239	2995	0	0	457	0	0	1261	1358
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			22			5				388
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			502			340			534	
Travel Time (s)		11.5			11.4			7.7			12.1	
Confl. Bikes (#/hr)			12			11						4
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93
Heavy Vehicles (%)	27%	4%	10%	0%	6%	1%	2%	5%	0%	1%	2%	7%
Adj. Flow (vph)	100	892	231	12	541	120	67	56	13	296	225	388
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	1123	0	12	661	0	0	136	0	0	521	388
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Detector Phase	4	1 4		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	
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	14.0			29.0	29.0		40.0	40.0		40.0	40.0	
Total Split (%)	12.7%			26.4%	26.4%		36.4%	36.4%		36.4%	36.4%	
Maximum Green (s)	9.0			24.0	24.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	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	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	38.4	43.4		29.4	29.4			35.0			35.0	49.0
Actuated g/C Ratio	0.35	0.39		0.27	0.27			0.32			0.32	0.45
v/c Ratio	0.57	0.94		0.19	0.81			0.92			1.30	0.47
Control Delay	28.6	33.2		44.5	47.8			92.7			184.9	4.0
Queue Delay	0.0	0.3		0.0	0.0			0.0			0.0	0.0
Total Delay	28.6	33.5		44.5	47.8			92.7			184.9	4.0
LOS	C	C		D	D			F			F	A
Approach Delay		33.1			47.7			92.7			107.7	
Approach LOS		C			D			F			F	

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 23 (21%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.30	
Intersection Signal Delay: 62.2	Intersection LOS: E
Intersection Capacity Utilization 93.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 10: Pappas Way/Drydock Ave & Summer St



Lane Group	Ø2
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	25%
Maximum Green (s)	23.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	75
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NET	SWT	SWR
Lane Group Flow (vph)	100	1123	12	661	136	521	388
v/c Ratio	0.57	0.94	0.19	0.81	0.92	1.30	0.47
Control Delay	28.6	33.2	44.5	47.8	92.7	184.9	4.0
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	33.5	44.5	47.8	92.7	184.9	4.0
Queue Length 50th (ft)	28	~129	7	238	89	~472	0
Queue Length 95th (ft)	m45	#588	28	#365	#194	#680	54
Internal Link Dist (ft)		425		422	260	454	
Turn Bay Length (ft)	365		65				
Base Capacity (vph)	175	1191	64	816	148	401	820
Starvation Cap Reductn	0	4	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	0.57	0.95	0.19	0.81	0.92	1.30	0.47

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	96	856	222	11	498	110	56	47	11	275	209	361
Future Volume (vph)	96	856	222	11	498	110	56	47	11	275	209	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.97			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	1.00
Satd. Flow (prot)	1279	2973		1624	2996			1599			1639	1358
Flt Permitted	0.20	1.00		0.14	1.00			0.28			0.75	1.00
Satd. Flow (perm)	266	2973		239	2996			457			1261	1358
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93
Adj. Flow (vph)	100	892	231	12	541	120	67	56	13	296	225	388
RTOR Reduction (vph)	0	20	0	0	16	0	0	3	0	0	0	215
Lane Group Flow (vph)	100	1103	0	12	645	0	0	133	0	0	521	173
Confl. Bikes (#/hr)			12			11						4
Heavy Vehicles (%)	27%	4%	10%	0%	6%	1%	2%	5%	0%	1%	2%	7%
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	37.6	42.6		28.6	28.6			35.0			35.0	49.0
Effective Green, g (s)	37.6	42.6		28.6	28.6			35.0			35.0	49.0
Actuated g/C Ratio	0.34	0.39		0.26	0.26			0.32			0.32	0.45
Clearance Time (s)	5.0			5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.0			2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	173	1151		62	778			145			401	604
v/s Ratio Prot	0.05	c0.37			0.22							0.13
v/s Ratio Perm	0.15			0.05				0.29			c0.41	
v/c Ratio	0.58	0.96		0.19	0.83			0.91			1.30	0.29
Uniform Delay, d1	27.0	32.8		31.7	38.4			36.1			37.5	19.4
Progression Factor	0.78	0.62		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	1.6	11.4		6.8	9.9			48.9			151.9	0.1
Delay (s)	22.8	31.7		38.6	48.3			85.0			189.4	19.5
Level of Service	C	C		D	D			F			F	B
Approach Delay (s)		30.9			48.1			85.0			116.9	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	63.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	59	152	42	5	479	21	105	12	5	16	16	261
Future Volume (vph)	59	152	42	5	479	21	105	12	5	16	16	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.994		0.984		0.850		0.880	
Flt Protected		0.986			0.999		0.957				0.995	
Satd. Flow (prot)	0	1511	1454	0	1603	0	1579	0	1038	0	1453	0
Flt Permitted		0.986			0.999		0.957				0.995	
Satd. Flow (perm)	0	1511	1454	0	1603	0	1579	0	1038	0	1453	0
Link Speed (mph)		30			30		30				30	
Link Distance (ft)		534			438		201				121	
Travel Time (s)		12.1			10.0		4.6				2.8	
Confl. Peds. (#/hr)	15		7	7		15		15	121	121	7	2
Confl. Bikes (#/hr)						16			1			
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.79	0.79	0.79	0.81	0.81	0.81
Heavy Vehicles (%)	8%	13%	0%	0%	6%	6%	2%	0%	33%	13%	10%	2%
Adj. Flow (vph)	78	200	55	7	630	28	133	15	6	20	20	322
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	0	278	55	0	665	0	149	0	5	0	362	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)		0			0		12				12	
Link Offset(ft)		0			0		0				0	
Crosswalk Width(ft)		16			16		16				16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15	9	9	15	15	9
Sign Control		Free			Free		Stop				Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 89.1% ICU Level of Service E

Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (veh/h)	59	152	42	5	479	21	105	12	5	16	16	261
Future Volume (Veh/h)	59	152	42	5	479	21	105	12	5	16	16	261
Sign Control		Free			Free		Stop				Stop	
Grade		0%			0%		0%				0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.79	0.79	0.79	0.81	0.81	0.81
Hourly flow rate (vph)	78	200	55	7	630	28	133	15	6	20	20	322
Pedestrians		2			121		7				15	
Lane Width (ft)		12.0			12.0		12.0				12.0	
Walking Speed (ft/s)		3.5			3.5		3.5				3.5	
Percent Blockage		0			12		1				1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		534										
pX, platoon unblocked												
vC, conflicting volume	673			207			1355	1050	328	1164	1036	661
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	673			207			1355	1050	328	1164	1036	661
tC, single (s)	4.2			4.1			*4.0	*5.0	*5.0	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.6	3.6	4.1	3.3
p0 queue free %	91			99			0	95	99	84	90	29
cM capacity (veh/h)	877			1367			100	315	654	124	199	455

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SW 1
Volume Total	278	55	665	150	4	362
Volume Left	78	0	7	133	0	20
Volume Right	0	55	28	2	4	322
cSH	877	1700	1367	109	654	373
Volume to Capacity	0.09	0.03	0.01	1.38	0.01	0.97
Queue Length 95th (ft)	7	0	0	262	0	274
Control Delay (s)	3.4	0.0	0.1	289.3	10.5	72.9
Lane LOS	A		A	F	B	F
Approach Delay (s)	2.8		0.1	282.1		72.9
Approach LOS				F		F

Intersection Summary			
Average Delay	46.8		
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		

* User Entered Value

Lane Group	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	46	46	11	81	247	10
Future Volume (vph)	46	46	11	81	247	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.932				0.995	
Flt Protected	0.976			0.994		
Satd. Flow (prot)	1555	0	0	1543	1654	0
Flt Permitted	0.976			0.994		
Satd. Flow (perm)	1555	0	0	1543	1654	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			121	787	
Travel Time (s)	5.2			2.8	17.9	
Confl. Peds. (#/hr)	33	15	8			8
Confl. Bikes (#/hr)						2
Peak Hour Factor	0.50	0.50	0.86	0.86	0.79	0.79
Heavy Vehicles (%)	0%	0%	33%	7%	3%	0%
Adj. Flow (vph)	92	92	13	94	313	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	184	0	0	107	326	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 31.1%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	46	46	11	81	247	10
Future Volume (Veh/h)	46	46	11	81	247	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	92	92	13	94	313	13
Pedestrians	8			15	33	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	1			1	3	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	480	342	334			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	480	342	334			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.5			
p0 queue free %	82	87	99			
cM capacity (veh/h)	520	689	1063			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	184	107	326
Volume Left	92	13	0
Volume Right	92	0	13
cSH	593	1063	1700
Volume to Capacity	0.31	0.01	0.19
Queue Length 95th (ft)	33	1	0
Control Delay (s)	13.8	1.1	0.0
Lane LOS	B	A	
Approach Delay (s)	13.8	1.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	11	89	212	343	47	76	21	326	137	11	22	209
Future Volume (vph)	11	89	212	343	47	76	21	326	137	11	22	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	12	13	12	11	12	12	12	14
Lane Util. Factor	0.95	0.91	0.86	0.91	0.95	0.95	0.95	0.97	1.00	1.00	0.95	0.95
Ped Bike Factor		0.88	0.96			1.00			1.00			0.96
Frt			0.936	0.850		0.978			0.989			0.983
Flt Protected		0.950	0.999			0.984		0.950				0.996
Satd. Flow (prot)	0	1356	2425	1289	0	3049	0	2518	1531	0	0	2911
Flt Permitted		0.950	0.999			0.984		0.950				0.996
Satd. Flow (perm)	0	1199	2419	1289	0	3049	0	2518	1531	0	0	2911
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)			127	218		14			3			10
Link Speed (mph)			30			30			30			30
Link Distance (ft)			258			501			127			194
Travel Time (s)			5.9			11.4			2.9			4.4
Confl. Peds. (#/hr)		49		23								
Confl. Bikes (#/hr)				5			2			17		
Peak Hour Factor	0.92	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.96	0.96
Heavy Vehicles (%)	2%	10%	12%	6%	4%	7%	5%	21%	10%	10%	56%	9%
Adj. Flow (vph)	12	94	223	361	56	90	25	379	159	13	23	218
Shared Lane Traffic (%)		10%		48%								
Lane Group Flow (vph)	0	97	405	188	0	171	0	379	172	0	0	272
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			14			12			50			22
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.10	1.14	1.10	1.14	1.19	1.14	1.14	1.14	1.05
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Number of Detectors	1	1	2	1	1	2		1	2		1	2
Detector Template	Left	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru
Leading Detector (ft)	20	20	100	20	20	100		20	100		20	100
Trailing Detector (ft)	0	0	0	0	0	0		0	0		0	0
Detector 1 Position(ft)	0	0	0	0	0	0		0	0		0	0
Detector 1 Size(ft)	20	20	6	20	20	6		20	6		20	6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Detector 2 Position(ft)			94			94			94			94
Detector 2 Size(ft)			6			6			6			6
Detector 2 Type			Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)			0.0			0.0			0.0			0.0
Turn Type	Split	Split	NA	Prot	Split	NA		Split	NA		Split	NA

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	30
Future Volume (vph)	30
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	140
Confl. Bikes (#/hr)	
Peak Hour Factor	0.96
Heavy Vehicles (%)	0%
Adj. Flow (vph)	31
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.14
Turning Speed (mph)	9
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Protected Phases	1	1	1	1	4	4		2	2		3	3
Permitted Phases												
Detector Phase	1	1	1	1	4	4		2	2		3	3
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	8.0	8.0		8.0	8.0		8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	17.0	17.0		27.0	27.0		18.0	18.0
Total Split (s)	39.0	39.0	39.0	39.0	22.0	22.0		30.0	30.0		19.0	19.0
Total Split (%)	35.5%	35.5%	35.5%	35.5%	20.0%	20.0%		27.3%	27.3%		17.3%	17.3%
Maximum Green (s)	31.0	31.0	31.0	31.0	14.0	14.0		21.0	21.0		11.0	11.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		4.0	4.0		3.0	3.0
All-Red Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0		0.0	0.0			0.0
Total Lost Time (s)		8.0	8.0	8.0		8.0		9.0	9.0			8.0
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead		Lag	Lag		Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None		Max	Max		Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0				7.0	7.0		7.0	7.0
Flash Dont Walk (s)	4.0	4.0	4.0	4.0				10.0	10.0		2.0	2.0
Pedestrian Calls (#/hr)	70	70	70	70				70	70		70	70
Act Effct Green (s)		34.7	34.7	34.7		10.3		21.0	21.0			11.0
Actuated g/C Ratio		0.32	0.32	0.32		0.09		0.19	0.19			0.10
v/c Ratio		0.23	0.48	0.34		0.57		0.79	0.59			0.91
Control Delay		30.4	22.9	4.2		51.1		55.5	48.9			80.7
Queue Delay		0.0	0.0	0.0		0.0		0.0	0.0			0.0
Total Delay		30.4	22.9	4.2		51.1		55.5	48.9			80.7
LOS		C	C	A		D		E	D			F
Approach Delay			18.9			51.1			53.4			80.7
Approach LOS			B			D			D			F

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 37 (34%), Referenced to phase 1:EBTL, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 43.4	Intersection LOS: D
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: D St & Congress St

Lane Group	SBR
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Recall Mode	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	97	405	188	171	379	172	272
v/c Ratio	0.23	0.48	0.34	0.57	0.79	0.59	0.91
Control Delay	30.4	22.9	4.2	51.1	55.5	48.9	80.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	22.9	4.2	51.1	55.5	48.9	80.7
Queue Length 50th (ft)	54	89	0	56	132	110	97
Queue Length 95th (ft)	108	149	39	83	#178	173	#178
Internal Link Dist (ft)		178		421		47	114
Turn Bay Length (ft)							
Base Capacity (vph)	427	851	555	400	480	294	300
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	0.23	0.48	0.34	0.43	0.79	0.59	0.91

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	11	89	212	343	47	76	21	326	137	11	22	209
Future Volume (vph)	11	89	212	343	47	76	21	326	137	11	22	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	12	13	12	11	12	12	12	14
Total Lost time (s)		8.0	8.0	8.0		8.0		9.0	9.0			8.0
Lane Util. Factor		0.91	0.86	0.91		0.95		0.97	1.00			0.95
Frpb, ped/bikes		1.00	0.96	1.00		1.00		1.00	1.00			0.96
Flpb, ped/bikes		1.00	1.00	1.00		1.00		1.00	1.00			1.00
Frt		1.00	0.94	0.85		0.98		1.00	0.99			0.98
Flt Protected		0.95	1.00	1.00		0.98		0.95	1.00			1.00
Satd. Flow (prot)		1356	2425	1289		3048		2518	1531			2910
Flt Permitted		0.95	1.00	1.00		0.98		0.95	1.00			1.00
Satd. Flow (perm)		1356	2425	1289		3048		2518	1531			2910
Peak-hour factor, PHF	0.92	0.95	0.95	0.95	0.84	0.84	0.84	0.86	0.86	0.86	0.96	0.96
Adj. Flow (vph)	12	94	223	361	56	90	25	379	159	13	23	218
RTOR Reduction (vph)	0	0	87	129	0	13	0	0	2	0	0	9
Lane Group Flow (vph)	0	97	318	59	0	158	0	379	170	0	0	263
Confl. Peds. (#/hr)		49		23								
Confl. Bikes (#/hr)				5			2			17		
Heavy Vehicles (%)	2%	10%	12%	6%	4%	7%	5%	21%	10%	10%	56%	9%
Turn Type	Split	Split	NA	Prot	Split	NA		Split	NA		Split	NA
Protected Phases	1	1	1	1	4	4		2	2		3	3
Permitted Phases												
Actuated Green, G (s)		34.7	34.7	34.7		10.3		21.0	21.0			11.0
Effective Green, g (s)		34.7	34.7	34.7		10.3		21.0	21.0			11.0
Actuated g/C Ratio		0.32	0.32	0.32		0.09		0.19	0.19			0.10
Clearance Time (s)		8.0	8.0	8.0		8.0		9.0	9.0			8.0
Vehicle Extension (s)		2.0	2.0	2.0		2.0		2.0	2.0			2.0
Lane Grp Cap (vph)		427	764	406		285		480	292			291
v/s Ratio Prot		0.07	c0.13	0.05		c0.05		c0.15	0.11			c0.09
v/s Ratio Perm												
v/c Ratio		0.23	0.42	0.15		0.56		0.79	0.58			0.90
Uniform Delay, d1		27.8	29.7	27.0		47.7		42.4	40.5			49.0
Progression Factor		1.00	1.00	1.00		1.00		1.00	1.00			1.00
Incremental Delay, d2		1.2	1.7	0.8		1.3		12.4	8.2			33.0
Delay (s)		29.0	31.3	27.8		49.0		54.8	48.7			82.0
Level of Service		C	C	C		D		D	D			F
Approach Delay (s)			30.0			49.0			52.9			82.0
Approach LOS			C			D			D			F

Intersection Summary			
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	30
Future Volume (vph)	30
Ideal Flow (vphpl)	1900
Lane Width	12
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.96
Adj. Flow (vph)	31
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	140
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	0%
Turn Type	
Protected Phases	
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	
Approach LOS	

Intersection Summary

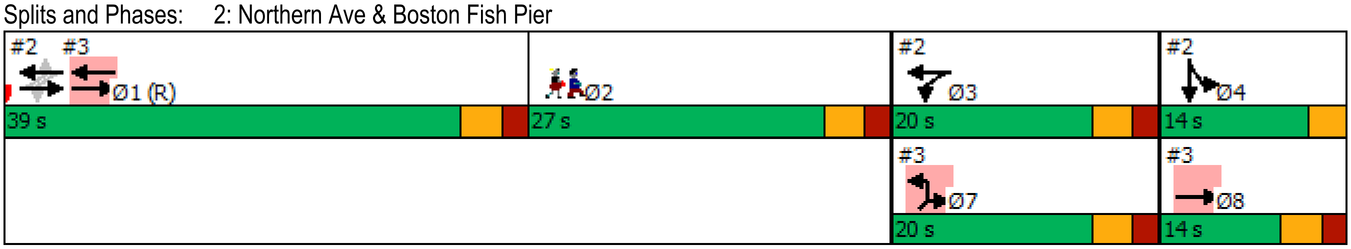
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	360	143	46	410	73	0	0	0	23	19	15
Future Volume (vph)	39	360	143	46	410	73	0	0	0	23	19	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	12	12	12	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.962			0.979						0.962	
Flt Protected		0.996			0.996						0.979	
Satd. Flow (prot)	0	3007	0	0	2896	0	0	0	0	0	1334	0
Flt Permitted		0.869			0.867						0.979	
Satd. Flow (perm)	0	2623	0	0	2521	0	0	0	0	0	1334	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51			25						16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		158			154			160			130	
Travel Time (s)		3.6			3.5			3.6			3.0	
Confl. Bikes (#/hr)			44			21						
Peak Hour Factor	0.88	0.88	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.72	0.92	0.72
Heavy Vehicles (%)	19%	11%	2%	2%	11%	1%	2%	2%	2%	38%	2%	13%
Adj. Flow (vph)	44	409	155	50	456	81	0	0	0	32	21	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	608	0	0	587	0	0	0	0	0	74	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.05	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2					1	2	
Detector Template	Left	Thru		Left	Thru					Left	Thru	
Leading Detector (ft)	20	100		20	100					20	100	
Trailing Detector (ft)	0	0		0	0					0	0	
Detector 1 Position(ft)	0	0		0	0					0	0	
Detector 1 Size(ft)	20	6		20	6					20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	

Lane Group	Ø2	Ø7	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Number of Detectors			
Detector Template			
Leading Detector (ft)			
Trailing Detector (ft)			
Detector 1 Position(ft)			
Detector 1 Size(ft)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(ft)			
Detector 2 Size(ft)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	2	7	8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	1			1								
Detector Phase	1	1		1	1 3					4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0		5.0						3.5	3.5	
Minimum Split (s)	21.0	21.0		10.0						8.0	8.0	
Total Split (s)	39.0	39.0		20.0						14.0	14.0	
Total Split (%)	39.0%	39.0%		20.0%						14.0%	14.0%	
Maximum Green (s)	34.0	34.0		15.0						11.0	11.0	
Yellow Time (s)	3.0	3.0		3.0						3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0						0.0	0.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.0									3.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0						2.0	2.0	
Recall Mode	C-Max	C-Max		None						None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		44.7			58.9						10.5	
Actuated g/C Ratio		0.45			0.59						0.10	
v/c Ratio		0.51			0.38						0.48	
Control Delay		21.8			1.8						44.8	
Queue Delay		0.0			0.2						0.0	
Total Delay		21.8			2.0						44.8	
LOS		C			A						D	
Approach Delay		21.8			2.0						44.8	
Approach LOS		C			A						D	

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 19 (19%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 49.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Northern Ave & Boston Fish Pier



Lane Group	Ø2	Ø7	Ø8
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	3.0	1.0
Minimum Split (s)	22.0	8.0	6.0
Total Split (s)	27.0	20.0	14.0
Total Split (%)	27%	20%	14%
Maximum Green (s)	22.0	15.0	9.0
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag		
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	None	None	None
Walk Time (s)	7.0		
Flash Dont Walk (s)	10.0		
Pedestrian Calls (#/hr)	98		
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	608	587	74
v/c Ratio	0.51	0.38	0.48
Control Delay	21.8	1.8	44.8
Queue Delay	0.0	0.2	0.0
Total Delay	21.8	2.0	44.8
Queue Length 50th (ft)	144	2	35
Queue Length 95th (ft)	194	m0	81
Internal Link Dist (ft)	78	74	50
Turn Bay Length (ft)			
Base Capacity (vph)	1201	1572	160
Starvation Cap Reductn	0	317	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.51	0.47	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	360	143	46	410	73	0	0	0	23	19	15
Future Volume (vph)	39	360	143	46	410	73	0	0	0	23	19	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0			5.0						3.0	
Lane Util. Factor		0.95			0.95						1.00	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.96			0.98						0.96	
Flt Protected		1.00			1.00						0.98	
Satd. Flow (prot)		3012			2897						1334	
Flt Permitted		0.87			0.87						0.98	
Satd. Flow (perm)		2628			2524						1334	
Peak-hour factor, PHF	0.88	0.88	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.72	0.92	0.72
Adj. Flow (vph)	44	409	155	50	456	81	0	0	0	32	21	21
RTOR Reduction (vph)	0	29	0	0	11	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	579	0	0	576	0	0	0	0	0	60	0
Confl. Bikes (#/hr)			44			21						
Heavy Vehicles (%)	19%	11%	2%	2%	11%	1%	2%	2%	2%	38%	2%	13%
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	
Permitted Phases	1			1								
Actuated Green, G (s)		43.7			57.9						10.5	
Effective Green, g (s)		43.7			57.9						10.5	
Actuated g/C Ratio		0.44			0.58						0.10	
Clearance Time (s)		5.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1148			1514						140	
v/s Ratio Prot					c0.05						c0.04	
v/s Ratio Perm		c0.22			0.17							
v/c Ratio		0.50			0.38						0.43	
Uniform Delay, d1		20.3			11.4						41.9	
Progression Factor		1.00			0.20						1.00	
Incremental Delay, d2		1.6			0.1						0.8	
Delay (s)		21.9			2.3						42.7	
Level of Service		C			A						D	
Approach Delay (s)		21.9			2.3			0.0			42.7	
Approach LOS		C			A			A			D	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Lane Configurations										
Traffic Volume (vph)	383	0	0	358	171	40				
Future Volume (vph)	383	0	0	358	171	40				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	14	12	12	12	12	11				
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00				
Ped Bike Factor										
Frt						0.850				
Flt Protected					0.950					
Satd. Flow (prot)	3014	0	0	2663	1504	1232				
Flt Permitted					0.950					
Satd. Flow (perm)	3014	0	0	2663	1504	1232				
Right Turn on Red		Yes				Yes				
Satd. Flow (RTOR)						43				
Link Speed (mph)	30			30	30					
Link Distance (ft)	154			475	227					
Travel Time (s)	3.5			10.8	5.2					
Confl. Bikes (#/hr)		43								
Peak Hour Factor	0.96	0.96	0.88	0.88	0.93	0.93				
Heavy Vehicles (%)	15%	0%	0%	22%	8%	14%				
Adj. Flow (vph)	399	0	0	407	184	43				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	399	0	0	407	184	43				
Enter Blocked Intersection	No	No	No	No	No	No				
Lane Alignment	Left	Right	Left	Left	Left	Right				
Median Width(ft)	0			0	12					
Link Offset(ft)	0			0	0					
Crosswalk Width(ft)	16			16	16					
Two way Left Turn Lane										
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.19				
Turning Speed (mph)		9	15		15	9				
Number of Detectors	2			2	1	1				
Detector Template	Thru			Thru	Left	Right				
Leading Detector (ft)	100			100	20	20				
Trailing Detector (ft)	0			0	0	0				
Detector 1 Position(ft)	0			0	0	0				
Detector 1 Size(ft)	6			6	20	20				
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex				
Detector 1 Channel										
Detector 1 Extend (s)	0.0			0.0	0.0	0.0				
Detector 1 Queue (s)	0.0			0.0	0.0	0.0				
Detector 1 Delay (s)	0.0			0.0	0.0	0.0				
Detector 2 Position(ft)	94			94						
Detector 2 Size(ft)	6			6						
Detector 2 Type	Cl+Ex			Cl+Ex						
Detector 2 Channel										
Detector 2 Extend (s)	0.0			0.0						
Turn Type	NA			NA	Prot	Prot				
Protected Phases	1 8			1	7	7	2	3	4	8

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Permitted Phases										
Detector Phase	1 8			1	7	7				
Switch Phase										
Minimum Initial (s)				16.0	3.0	3.0	5.0	5.0	3.5	1.0
Minimum Split (s)				21.0	8.0	8.0	22.0	10.0	8.0	6.0
Total Split (s)				39.0	20.0	20.0	27.0	20.0	14.0	14.0
Total Split (%)				39.0%	20.0%	20.0%	27%	20%	14%	14%
Maximum Green (s)				34.0	15.0	15.0	22.0	15.0	11.0	9.0
Yellow Time (s)				3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0				
Total Lost Time (s)				5.0	5.0	5.0				
Lead/Lag				Lead			Lag			
Lead-Lag Optimize?										
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode				C-Max	None	None	None	None	None	None
Walk Time (s)							7.0			
Flash Dont Walk (s)							10.0			
Pedestrian Calls (#/hr)							98			
Act Effct Green (s)	58.2			44.7	14.2	14.2				
Actuated g/C Ratio	0.58			0.45	0.14	0.14				
v/c Ratio	0.23			0.34	0.86	0.20				
Control Delay	2.4			21.2	77.2	14.1				
Queue Delay	0.4			0.0	0.0	0.0				
Total Delay	2.8			21.2	77.2	14.1				
LOS	A			C	E	B				
Approach Delay	2.8			21.2	65.2					
Approach LOS	A			C	E					

Intersection Summary

Area Type: CBD

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

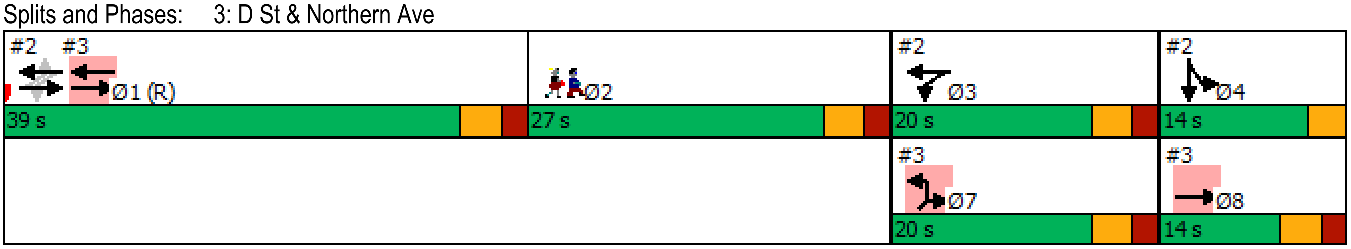
Maximum v/c Ratio: 0.86

Intersection Signal Delay: 23.8 — Intersection LOS: C

Intersection Capacity Utilization 32.2% — ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: D St & Northern Ave



Lane Group	EBT	WBT	NEL	NER
Lane Group Flow (vph)	399	407	184	43
v/c Ratio	0.23	0.34	0.86	0.20
Control Delay	2.4	21.2	77.2	14.1
Queue Delay	0.4	0.0	0.0	0.0
Total Delay	2.8	21.2	77.2	14.1
Queue Length 50th (ft)	10	96	115	0
Queue Length 95th (ft)	11	133	#231	31
Internal Link Dist (ft)	74	395	147	
Turn Bay Length (ft)				
Base Capacity (vph)	1739	1190	225	221
Starvation Cap Reductn	826	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.34	0.82	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑↑			↑↑	↰	↱
Traffic Volume (vph)	383	0	0	358	171	40
Future Volume (vph)	383	0	0	358	171	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	12	12	12	11
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3014			2663	1504	1232
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3014			2663	1504	1232
Peak-hour factor, PHF	0.96	0.96	0.88	0.88	0.93	0.93
Adj. Flow (vph)	399	0	0	407	184	43
RTOR Reduction (vph)	0	0	0	0	0	37
Lane Group Flow (vph)	399	0	0	407	184	6
Confl. Bikes (#/hr)		43				
Heavy Vehicles (%)	15%	0%	0%	22%	8%	14%
Turn Type	NA			NA	Prot	Prot
Protected Phases	1 8			1	7	7
Permitted Phases						
Actuated Green, G (s)	57.2			43.7	14.2	14.2
Effective Green, g (s)	57.2			43.7	14.2	14.2
Actuated g/C Ratio	0.57			0.44	0.14	0.14
Clearance Time (s)				5.0	5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0
Lane Grp Cap (vph)	1724			1163	213	174
v/s Ratio Prot	c0.13			c0.15	c0.12	0.00
v/s Ratio Perm						
v/c Ratio	0.23			0.35	0.86	0.04
Uniform Delay, d1	10.6			18.7	42.0	37.0
Progression Factor	0.19			1.00	1.00	1.00
Incremental Delay, d2	0.0			0.8	27.6	0.0
Delay (s)	2.0			19.5	69.6	37.0
Level of Service	A			B	E	D
Approach Delay (s)	2.0			19.5	63.4	
Approach LOS	A			B	E	

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	418	5	26	342	11	210
Future Volume (vph)	418	5	26	342	11	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt	0.998				0.872	
Flt Protected				0.996	0.998	
Satd. Flow (prot)	3001	0	0	1957	1336	0
Flt Permitted				0.996	0.998	
Satd. Flow (perm)	3001	0	0	1957	1336	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	475			419	295	
Travel Time (s)	10.8			9.5	6.7	
Confl. Peds. (#/hr)		58	58		88	
Confl. Bikes (#/hr)		36				
Peak Hour Factor	0.95	0.95	0.85	0.85	0.82	0.82
Heavy Vehicles (%)	15%	38%	57%	66%	0%	12%
Adj. Flow (vph)	440	5	31	402	13	256
Shared Lane Traffic (%)						
Lane Group Flow (vph)	445	0	0	433	269	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary		
Area Type:	CBD	
Control Type: Unsignalized		
Intersection Capacity Utilization 49.7%		ICU Level of Service A
Analysis Period (min) 15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	418	5	26	342	11	210
Future Volume (Veh/h)	418	5	26	342	11	210
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.85	0.85	0.82	0.82
Hourly flow rate (vph)	440	5	31	402	13	256
Pedestrians	88				58	
Lane Width (ft)	14.0				12.0	
Walking Speed (ft/s)	3.5				3.5	
Percent Blockage	10				6	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	475					
pX, platoon unblocked			0.96		0.96	0.96
vC, conflicting volume			503		852	280
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			399		762	167
tC, single (s)			5.2		6.8	7.1
tC, 2 stage (s)						
tF (s)			2.8		3.5	3.4
p0 queue free %			96		95	65
cM capacity (veh/h)			766		271	741

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	293	152	165	268	269
Volume Left	0	0	31	0	13
Volume Right	0	5	0	0	256
cSH	1700	1700	766	1700	684
Volume to Capacity	0.17	0.09	0.04	0.16	0.39
Queue Length 95th (ft)	0	0	3	0	47
Control Delay (s)	0.0	0.0	2.2	0.0	13.6
Lane LOS			A		B
Approach Delay (s)	0.0		0.8		13.6
Approach LOS					B

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBT	EBR	EBR2	WBL2	WBL	WBT	NWL2	NWL	NWR	NEL	NER
Lane Configurations												
Traffic Volume (vph)	11	21	532	47	5	5	16	41	186	5	155	16
Future Volume (vph)	11	21	532	47	5	5	16	41	186	5	155	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	15	12	12	12	15	12	12	16	12	15	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.872							0.997		0.909	
Flt Protected		0.999				0.950			0.953		0.984	
Satd. Flow (prot)	0	1419	0	0	0	1070	0	0	1362	0	1495	0
Flt Permitted		0.999				0.950			0.953		0.984	
Satd. Flow (perm)	0	1419	0	0	0	1070	0	0	1362	0	1495	0
Link Speed (mph)		30					30		30		30	
Link Distance (ft)		419					320		218		485	
Travel Time (s)		9.5					7.3		5.0		11.0	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.88	0.88	0.88	0.86	0.86	0.86	0.94	0.94
Heavy Vehicles (%)	2%	17%	16%	12%	67%	67%	20%	56%	31%	20%	9%	38%
Adj. Flow (vph)	12	23	572	51	6	6	18	48	216	6	165	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	658	0	0	0	12	18	0	270	0	502	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Right	Right	Left	Left	Left	Left	Left	Right	Left	Right
Median Width(ft)		15					15		16		15	
Link Offset(ft)		0					0		0		0	
Crosswalk Width(ft)		16					16		16		16	
Two way Left Turn Lane												
Headway Factor	1.14	1.01	1.14	1.14	1.14	1.01	1.14	1.14	0.97	1.14	1.01	1.14
Turning Speed (mph)	9		9	9	15	15		15	15	9	15	9
Sign Control		Yield					Yield		Yield		Yield	

Intersection Summary	
Area Type: CBD	
Control Type: Roundabout	
Intersection Capacity Utilization Err%	ICU Level of Service H
Analysis Period (min) 15	

Lane Group	NER2
Lane Configurations	
Traffic Volume (vph)	301
Future Volume (vph)	301
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.94
Heavy Vehicles (%)	13%
Adj. Flow (vph)	320
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.14
Turning Speed (mph)	9
Sign Control	

Intersection Summary

Movement	EBU	EBT	EBR	EBR2	WBL2	WBL	WBT	NWL2	NWL	NWR	NEL	NER
Right Turn Channelized												
Traffic Volume (veh/h)	11	21	532	47	5	5	16	41	186	5	155	16
Future Volume (veh/h)	11	21	532	47	5	5	16	41	186	5	155	16
Peak Hour Factor	0.93	0.93	0.93	0.93	0.88	0.88	0.88	0.86	0.86	0.86	0.94	0.94
Hourly flow rate (vph)	12	23	572	51	6	6	18	48	216	6	165	17
Approach Volume (veh/h)		658					30		270		502	
Crossing Volume (veh/h)		60					441		217		613	
High Capacity (veh/h)		1321					978		1168		853	
High v/c (veh/h)		0.50					0.03		0.23		0.59	
Low Capacity (veh/h)		1104					794		965		683	
Low v/c (veh/h)		0.60					0.04		0.28		0.74	

Intersection Summary			
Maximum v/c High	0.59		
Maximum v/c Low	0.74		
Intersection Capacity Utilization	Err%	ICU Level of Service	H

Movement	NER2
Right Turn Channelized	
Traffic Volume (veh/h)	301
Future Volume (veh/h)	301
Peak Hour Factor	0.94
Hourly flow rate (vph)	320
Approach Volume (veh/h)	
Crossing Volume (veh/h)	
High Capacity (veh/h)	
High v/c (veh/h)	
Low Capacity (veh/h)	
Low v/c (veh/h)	

Intersection Summary

Lane Group	EBL	EBR	NBL	SER	SER2
Lane Configurations					
Traffic Volume (vph)	3	0	229	822	16
Future Volume (vph)	3	0	229	822	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	16	12	16
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor					
Frt				0.865	
Flt Protected	0.950		0.950		
Satd. Flow (prot)	812	0	1279	1289	0
Flt Permitted	0.950		0.950		
Satd. Flow (perm)	812	0	1279	1289	0
Link Speed (mph)	30		30	30	
Link Distance (ft)	217		289	218	
Travel Time (s)	4.9		6.6	5.0	
Confl. Peds. (#/hr)					19
Confl. Bikes (#/hr)					48
Peak Hour Factor	0.50	0.50	0.86	0.93	0.93
Heavy Vehicles (%)	100%	33%	44%	15%	0%
Adj. Flow (vph)	6	0	266	884	17
Shared Lane Traffic (%)					
Lane Group Flow (vph)	6	0	266	901	0
Enter Blocked Intersection	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Right
Median Width(ft)	12		16	0	
Link Offset(ft)	0		0	0	
Crosswalk Width(ft)	16		16	16	
Two way Left Turn Lane					
Headway Factor	1.14	1.14	0.97	1.14	0.97
Turning Speed (mph)	15	9	15	9	9
Sign Control	Stop		Free	Free	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 61.0%	ICU Level of Service B
Analysis Period (min) 15	

Movement	EBL	EBR	NBL	SER	SER2
Lane Configurations					
Traffic Volume (veh/h)	3	0	229	822	16
Future Volume (Veh/h)	3	0	229	822	16
Sign Control	Stop		Free	Free	
Grade	0%		0%	0%	
Peak Hour Factor	0.50	0.50	0.86	0.93	0.93
Hourly flow rate (vph)	6	0	266	884	17
Pedestrians	19				
Lane Width (ft)	12.0				
Walking Speed (ft/s)	3.5				
Percent Blockage	2				
Right turn flare (veh)					
Median type			None	None	
Median storage veh)					
Upstream signal (ft)					
pX, platoon unblocked					
vC, conflicting volume	1178	912			
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
vCu, unblocked vol	1178	912			
tC, single (s)	7.4	6.5			
tC, 2 stage (s)					
tF (s)	4.4	3.6			
p0 queue free %	96	100			
cM capacity (veh/h)	135	287			

Direction, Lane #	EB 1	NB 1	SE 1
Volume Total	6	266	901
Volume Left	6	0	0
Volume Right	0	0	17
cSH	135	567	1700
Volume to Capacity	0.04	0.00	0.53
Queue Length 95th (ft)	3	0	0
Control Delay (s)	33.0	0.0	0.0
Lane LOS	D		
Approach Delay (s)	33.0	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	10	118	597	226	111	21
Future Volume (vph)	10	118	597	226	111	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	16	14	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.876		0.963		0.978	
Flt Protected	0.996		0.965		0.960	
Satd. Flow (prot)	1670	0	1614	0	1536	0
Flt Permitted	0.996		0.965		0.960	
Satd. Flow (perm)	1670	0	1614	0	1536	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	311		289		450	
Travel Time (s)	7.1		6.6		10.2	
Confl. Peds. (#/hr)	43			54		38
Confl. Bikes (#/hr)				43		
Peak Hour Factor	0.83	0.83	0.92	0.92	0.81	0.81
Heavy Vehicles (%)	16%	0%	16%	0%	8%	30%
Adj. Flow (vph)	12	142	649	246	137	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	154	0	895	0	163	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	16		16		14	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.14	0.97	0.97	1.05	1.14
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Stop		Stop		Stop	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 84.0%	ICU Level of Service E
Analysis Period (min) 15	

Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Sign Control	Stop		Stop		Stop	
Traffic Volume (vph)	10	118	597	226	111	21
Future Volume (vph)	10	118	597	226	111	21
Peak Hour Factor	0.83	0.83	0.92	0.92	0.81	0.81
Hourly flow rate (vph)	12	142	649	246	137	26

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total (vph)	154	895	163
Volume Left (vph)	12	649	0
Volume Right (vph)	142	0	26
Hadj (s)	-0.52	0.34	0.10
Departure Headway (s)	5.5	4.9	5.3
Degree Utilization, x	0.24	1.23	0.24
Capacity (veh/h)	631	723	657
Control Delay (s)	10.3	131.7	10.0
Approach Delay (s)	10.3	131.7	10.0
Approach LOS	B	F	B

Intersection Summary			
Delay	99.9		
Level of Service	F		
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	529	216	53	90	367	68
Future Volume (vph)	529	216	53	90	367	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Frt		0.850			0.977	
Flt Protected			0.950		0.959	
Satd. Flow (prot)	1583	1275	1490	1125	2902	0
Flt Permitted			0.950		0.959	
Satd. Flow (perm)	1583	1275	1490	1125	2902	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	301			349	314	
Travel Time (s)	6.8			7.9	7.1	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.77	0.77
Heavy Vehicles (%)	8%	14%	9%	52%	11%	9%
Adj. Flow (vph)	581	237	61	103	477	88
Shared Lane Traffic (%)						
Lane Group Flow (vph)	581	237	61	103	565	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	26	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 58.3% ICU Level of Service B

Analysis Period (min) 15

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	529	216	53	90	367	68
Future Volume (Veh/h)	529	216	53	90	367	68
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.87	0.87	0.77	0.77
Hourly flow rate (vph)	581	237	61	103	477	88
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			818		806	581
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			818		806	581
tC, single (s)			4.2		6.5	6.3
tC, 2 stage (s)						
tF (s)			2.3		3.6	3.4
p0 queue free %			92		0	82
cM capacity (veh/h)			781		313	501

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2
Volume Total	581	237	61	103	318	247
Volume Left	0	0	61	0	318	159
Volume Right	0	237	0	0	0	88
cSH	1700	1700	781	1700	313	361
Volume to Capacity	0.34	0.14	0.08	0.06	1.02	0.68
Queue Length 95th (ft)	0	0	6	0	281	121
Control Delay (s)	0.0	0.0	10.0	0.0	93.1	34.0
Lane LOS			B		F	D
Approach Delay (s)	0.0		3.7		67.3	
Approach LOS					F	

Intersection Summary			
Average Delay	25.0		
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Lane Configurations							
Traffic Volume (vph)	22	829	526	413	174	95	
Future Volume (vph)	22	829	526	413	174	95	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	11	12	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Ped Bike Factor			0.99				
Frt			0.934		0.947		
Flt Protected		0.999			0.969		
Satd. Flow (prot)	0	2775	3566	0	2567	0	
Flt Permitted		0.902			0.969		
Satd. Flow (perm)	0	2506	3566	0	2567	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			209		79		
Link Speed (mph)		30	30		30		
Link Distance (ft)		543	505		314		
Travel Time (s)		12.3	11.5		7.1		
Confl. Bikes (#/hr)				28			
Peak Hour Factor	0.92	0.92	0.91	0.91	0.78	0.78	
Heavy Vehicles (%)	15%	13%	22%	10%	26%	5%	
Adj. Flow (vph)	24	901	578	454	223	122	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	925	1032	0	345	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(ft)		12	12		24		
Link Offset(ft)		0	0		0		
Crosswalk Width(ft)		16	16		16		
Two way Left Turn Lane							
Headway Factor	1.14	1.19	1.19	1.14	1.14	1.14	
Turning Speed (mph)	15			9	15	9	
Number of Detectors	1	2	2		1		
Detector Template	Left	Thru	Thru		Left		
Leading Detector (ft)	20	100	100		20		
Trailing Detector (ft)	0	0	0		0		
Detector 1 Position(ft)	0	0	0		0		
Detector 1 Size(ft)	20	6	6		20		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0		0.0		
Detector 1 Queue (s)	0.0	0.0	0.0		0.0		
Detector 1 Delay (s)	0.0	0.0	0.0		0.0		
Detector 2 Position(ft)		94	94				
Detector 2 Size(ft)		6	6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		3.0
Minimum Split (s)	12.0		17.0		16.0		30.0
Total Split (s)	13.0		49.0		18.0		30.0
Total Split (%)	11.8%		44.5%		16.4%		27%
Maximum Green (s)	6.0		42.0		10.5		23.0
Yellow Time (s)	4.0		4.0		3.5		3.0
All-Red Time (s)	3.0		3.0		4.0		4.0
Lost Time Adjust (s)			0.0		0.0		
Total Lost Time (s)			7.0		7.5		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							16.0
Pedestrian Calls (#/hr)							26
Act Effct Green (s)		56.0	50.0		14.5		
Actuated g/C Ratio		0.51	0.45		0.13		
v/c Ratio		0.72	0.59		0.85		
Control Delay		25.7	5.0		57.4		
Queue Delay		0.0	0.0		0.0		
Total Delay		25.7	5.0		57.4		
LOS		C	A		E		
Approach Delay		25.7	5.0		57.4		
Approach LOS		C	A		E		

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 22 (20%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 21.2	Intersection LOS: C
Intersection Capacity Utilization 64.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 9: Summer St & Pumphouse Rd

Lane Group	SET	NWT	SWL
Lane Group Flow (vph)	925	1032	345
v/c Ratio	0.72	0.59	0.85
Control Delay	25.7	5.0	57.4
Queue Delay	0.0	0.0	0.0
Total Delay	25.7	5.0	57.4
Queue Length 50th (ft)	248	32	~113
Queue Length 95th (ft)	321	m50	#161
Internal Link Dist (ft)	463	425	234
Turn Bay Length (ft)			
Base Capacity (vph)	1291	1735	406
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.72	0.59	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	22	829	526	413	174	95
Future Volume (vph)	22	829	526	413	174	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12
Total Lost time (s)		7.0	7.0		7.5	
Lane Util. Factor		0.95	0.91		0.97	
Frpb, ped/bikes		1.00	0.99		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.93		0.95	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		2775	3569		2566	
Flt Permitted		0.90	1.00		0.97	
Satd. Flow (perm)		2507	3569		2566	
Peak-hour factor, PHF	0.92	0.92	0.91	0.91	0.78	0.78
Adj. Flow (vph)	24	901	578	454	223	122
RTOR Reduction (vph)	0	0	119	0	69	0
Lane Group Flow (vph)	0	925	913	0	276	0
Confl. Bikes (#/hr)				28		
Heavy Vehicles (%)	15%	13%	22%	10%	26%	5%
Turn Type	D.P+P	NA	NA		Prot	
Protected Phases	5	1 5	1		3	
Permitted Phases	1					
Actuated Green, G (s)		53.2	47.2		14.5	
Effective Green, g (s)		53.2	47.2		14.5	
Actuated g/C Ratio		0.48	0.43		0.13	
Clearance Time (s)			7.0		7.5	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)		1227	1531		338	
v/s Ratio Prot		c0.04	0.26		c0.11	
v/s Ratio Perm		c0.32				
v/c Ratio		0.75	0.60		0.82	
Uniform Delay, d1		23.1	24.1		46.5	
Progression Factor		1.00	0.25		1.00	
Incremental Delay, d2		2.7	0.2		13.5	
Delay (s)		25.8	6.3		60.0	
Level of Service		C	A		E	
Approach Delay (s)		25.8	6.3		60.0	
Approach LOS		C	A		E	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

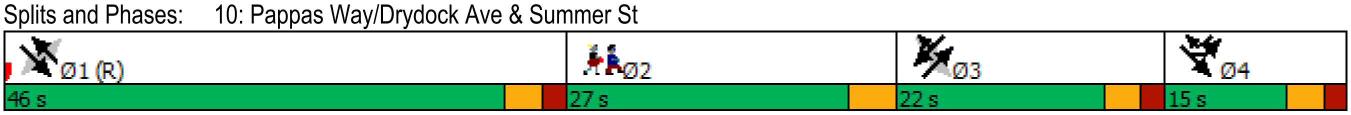
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	279	598	126	5	684	223	128	119	5	120	86	127
Future Volume (vph)	279	598	126	5	684	223	128	119	5	120	86	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	365		0	65		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		1.00			0.99			1.00				
Frt		0.974			0.963			0.998				0.850
Flt Protected	0.950			0.950				0.975			0.972	
Satd. Flow (prot)	1438	2716	0	1354	2754	0	0	1624	0	0	1549	1069
Flt Permitted	0.139			0.088				0.250			0.644	
Satd. Flow (perm)	210	2716	0	125	2754	0	0	416	0	0	1026	1069
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			46			1				163
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			502			340			534	
Travel Time (s)		11.5			11.4			7.7			12.1	
Confl. Bikes (#/hr)			10			28			5			
Peak Hour Factor	0.94	0.94	0.94	0.88	0.88	0.88	0.93	0.93	0.93	0.78	0.78	0.78
Heavy Vehicles (%)	13%	17%	11%	20%	16%	3%	2%	3%	0%	4%	12%	36%
Adj. Flow (vph)	297	636	134	6	777	253	138	128	5	154	110	163
Shared Lane Traffic (%)												
Lane Group Flow (vph)	297	770	0	6	1030	0	0	271	0	0	264	163
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Detector Phase	4	1 4		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	
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	15.0			46.0	46.0		22.0	22.0		22.0	22.0	
Total Split (%)	13.6%			41.8%	41.8%		20.0%	20.0%		20.0%	20.0%	
Maximum Green (s)	10.0			41.0	41.0		17.0	17.0		17.0	17.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	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	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	56.4	61.4		46.4	46.4			17.0			17.0	32.0
Actuated g/C Ratio	0.51	0.56		0.42	0.42			0.15			0.15	0.29
v/c Ratio	1.36	0.50		0.12	0.87			4.17			1.67	0.38
Control Delay	205.9	14.6		29.8	39.1			1475.3			359.1	7.5
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	205.9	14.6		29.8	39.1			1475.3			359.1	7.5
LOS	F	B		C	D			F			F	A
Approach Delay		67.9			39.0			1475.3			224.9	
Approach LOS		E			D			F			F	

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 13 (12%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 4.17	
Intersection Signal Delay: 217.3	Intersection LOS: F
Intersection Capacity Utilization 86.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 10: Pappas Way/Drydock Ave & Summer St



Lane Group	Ø2
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	25%
Maximum Green (s)	23.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	60
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NET	SWT	SWR
Lane Group Flow (vph)	297	770	6	1030	271	264	163
v/c Ratio	1.36	0.50	0.12	0.87	4.17	1.67	0.38
Control Delay	205.9	14.6	29.8	39.1	1475.3	359.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	205.9	14.6	29.8	39.1	1475.3	359.1	7.5
Queue Length 50th (ft)	~222	83	3	360	~356	~272	0
Queue Length 95th (ft)	m#375	m173	14	#489	#524	#362	31
Internal Link Dist (ft)		425		422	260	454	
Turn Bay Length (ft)	365		65				
Base Capacity (vph)	219	1530	52	1188	65	158	426
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	1.36	0.50	0.12	0.87	4.17	1.67	0.38

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	279	598	126	5	684	223	128	119	5	120	86	127
Future Volume (vph)	279	598	126	5	684	223	128	119	5	120	86	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.96			1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	1.00
Satd. Flow (prot)	1438	2716		1354	2756			1623			1548	1069
Flt Permitted	0.14	1.00		0.09	1.00			0.25			0.64	1.00
Satd. Flow (perm)	211	2716		125	2756			416			1027	1069
Peak-hour factor, PHF	0.94	0.94	0.94	0.88	0.88	0.88	0.93	0.93	0.93	0.78	0.78	0.78
Adj. Flow (vph)	297	636	134	6	777	253	138	128	5	154	110	163
RTOR Reduction (vph)	0	15	0	0	27	0	0	1	0	0	0	116
Lane Group Flow (vph)	297	755	0	6	1003	0	0	270	0	0	264	47
Confl. Bikes (#/hr)			10			28			5			
Heavy Vehicles (%)	13%	17%	11%	20%	16%	3%	2%	3%	0%	4%	12%	36%
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	55.6	60.6		45.6	45.6			17.0			17.0	32.0
Effective Green, g (s)	55.6	60.6		45.6	45.6			17.0			17.0	32.0
Actuated g/C Ratio	0.51	0.55		0.41	0.41			0.15			0.15	0.29
Clearance Time (s)	5.0			5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.0			2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	218	1496		51	1142			64			158	310
v/s Ratio Prot	c0.12	0.28			0.36							0.04
v/s Ratio Perm	c0.56			0.05				c0.65			0.26	
v/c Ratio	1.36	0.50		0.12	0.88			4.22			1.67	0.15
Uniform Delay, d1	21.6	15.4		19.8	29.6			46.5			46.5	28.9
Progression Factor	1.56	0.86		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	181.2	0.1		4.7	9.7			1485.5			328.0	0.1
Delay (s)	214.8	13.3		24.5	39.3			1532.0			374.5	29.0
Level of Service	F	B		C	D			F			F	C
Approach Delay (s)		69.4			39.2			1532.0			242.6	
Approach LOS		E			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	226.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	158	404	59	5	208	21	57	11	11	32	16	68
Future Volume (vph)	158	404	59	5	208	21	57	11	11	32	16	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.988		0.973		0.850		0.921	
Flt Protected		0.986			0.999		0.961				0.980	
Satd. Flow (prot)	0	1574	1321	0	1476	0	1345	0	1038	0	1278	0
Flt Permitted		0.986			0.999		0.961				0.980	
Satd. Flow (perm)	0	1574	1321	0	1476	0	1345	0	1038	0	1278	0
Link Speed (mph)		30			30		30				30	
Link Distance (ft)		534			438		201				121	
Travel Time (s)		12.1			10.0		4.6				2.8	
Confl. Peds. (#/hr)	10		7	7		15	1		65	65	7	1
Confl. Bikes (#/hr)			40			1			2			
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.73	0.73	0.73	0.89	0.89	0.89
Heavy Vehicles (%)	10%	6%	10%	0%	14%	21%	20%	11%	33%	6%	20%	28%
Adj. Flow (vph)	200	511	75	7	274	28	78	15	15	36	18	76
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	0	711	75	0	309	0	95	0	13	0	130	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)		0			0		12				12	
Link Offset(ft)		0			0		0				0	
Crosswalk Width(ft)		16			16		16				16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15	9	9	15	15	9
Sign Control		Free			Free		Stop				Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 81.0% ICU Level of Service D

Analysis Period (min) 15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (veh/h)	158	404	59	5	208	21	57	11	11	32	16	68
Future Volume (Veh/h)	158	404	59	5	208	21	57	11	11	32	16	68
Sign Control		Free			Free		Stop				Stop	
Grade		0%			0%		0%				0%	
Peak Hour Factor	0.79	0.79	0.79	0.76	0.76	0.76	0.73	0.73	0.73	0.89	0.89	0.89
Hourly flow rate (vph)	200	511	75	7	274	28	78	15	15	36	18	76
Pedestrians		1			65		7				15	
Lane Width (ft)		12.0			12.0		12.0				12.0	
Walking Speed (ft/s)		3.5			3.5		3.5				3.5	
Percent Blockage		0			6		1				1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		534										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	317			518			1306	1249	583	1316	1235	304
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			395			1282	1217	468	1292	1202	304
tC, single (s)	4.2			4.1			7.3	6.6	6.5	7.2	6.7	6.5
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.7	4.1	3.6	3.6	4.2	3.6
p0 queue free %	83			99			0	88	97	57	85	89
cM capacity (veh/h)	1182			1037			77	125	444	85	122	668

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SW 1
Volume Total	711	75	309	98	10	130
Volume Left	200	0	7	78	0	36
Volume Right	0	75	28	5	10	76
cSH	1182	1700	1037	86	444	189
Volume to Capacity	0.17	0.04	0.01	1.14	0.02	0.69
Queue Length 95th (ft)	15	0	1	171	2	105
Control Delay (s)	3.9	0.0	0.3	227.9	13.3	57.6
Lane LOS	A		A	F	B	F
Approach Delay (s)	3.6		0.3	208.0		57.6
Approach LOS				F		F

Intersection Summary			
Average Delay	24.6		
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	9	17	57	133	99	62
Future Volume (vph)	9	17	57	133	99	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.911				0.948	
Flt Protected	0.983			0.985		
Satd. Flow (prot)	1446	0	0	1554	1428	0
Flt Permitted	0.983			0.985		
Satd. Flow (perm)	1446	0	0	1554	1428	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			121	337	
Travel Time (s)	5.2			2.8	7.7	
Confl. Peds. (#/hr)	28	10	2			28
Confl. Bikes (#/hr)						3
Peak Hour Factor	0.43	0.43	0.87	0.87	0.86	0.86
Heavy Vehicles (%)	0%	9%	0%	12%	22%	0%
Adj. Flow (vph)	21	40	66	153	115	72
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	0	219	187	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 39.9%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	9	17	57	133	99	62
Future Volume (Veh/h)	9	17	57	133	99	62
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.43	0.43	0.87	0.87	0.86	0.86
Hourly flow rate (vph)	21	40	66	153	115	72
Pedestrians	28			10	28	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	3			1	3	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	492	189	215			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	492	189	215			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	96	95	95			
cM capacity (veh/h)	486	805	1331			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	61	219	187
Volume Left	21	66	0
Volume Right	40	0	72
cSH	657	1331	1700
Volume to Capacity	0.09	0.05	0.11
Queue Length 95th (ft)	8	4	0
Control Delay (s)	11.0	2.7	0.0
Lane LOS	B	A	
Approach Delay (s)	11.0	2.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	7	9	17	125	152	84
Future Volume (vph)	7	9	17	125	152	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.925				0.952	
Flt Protected	0.978			0.994		
Satd. Flow (prot)	1517	0	0	1666	1596	0
Flt Permitted	0.978			0.994		
Satd. Flow (perm)	1517	0	0	1666	1596	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	257			337	450	
Travel Time (s)	5.8			7.7	10.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	10	18	136	165	91
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	154	256	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 33.2%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	7	9	17	125	152	84
Future Volume (Veh/h)	7	9	17	125	152	84
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	10	18	136	165	91
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	382	210	256			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382	210	256			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	99			
cM capacity (veh/h)	611	830	1309			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	18	154	256
Volume Left	8	18	0
Volume Right	10	0	91
cSH	716	1309	1700
Volume to Capacity	0.03	0.01	0.15
Queue Length 95th (ft)	2	1	0
Control Delay (s)	10.2	1.0	0.0
Lane LOS	B	A	
Approach Delay (s)	10.2	1.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	5	6	528	69	0	138
Future Volume (vph)	5	6	528	69	0	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.921		0.984			
Flt Protected	0.980					
Satd. Flow (prot)	1513	0	1650	0	0	1676
Flt Permitted	0.980					
Satd. Flow (perm)	1513	0	1650	0	0	1676
Link Speed (mph)	30		30			30
Link Distance (ft)	174		283			485
Travel Time (s)	4.0		6.4			11.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	7	574	75	0	150
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	649	0	0	150
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 45.5%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	5	6	528	69	0	138
Future Volume (Veh/h)	5	6	528	69	0	138
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	7	574	75	0	150
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	762	612			649	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	762	612			649	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	99			100	
cM capacity (veh/h)	373	493			937	

Direction, Lane #	WB 1	NE 1	SW 1
Volume Total	12	649	150
Volume Left	5	0	0
Volume Right	7	75	0
cSH	435	1700	937
Volume to Capacity	0.03	0.38	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	13.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.5	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	16	58	97	429	37	174	16	5	253	87	21	0
Future Volume (vph)	16	58	97	429	37	174	16	5	253	87	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	13	12	13	12	12	11	12	12	12
Lane Util. Factor	0.95	0.91	0.86	0.91	0.95	0.95	0.95	1.00	0.97	1.00	1.00	0.95
Ped Bike Factor			0.99			1.00				0.99		
Frt			0.898	0.850		0.989				0.970		
Flt Protected		0.950	0.999			0.992			0.950			
Satd. Flow (prot)	0	1478	2434	1340	0	3163	0	0	2988	1586	0	0
Flt Permitted		0.950	0.999			0.992			0.222			
Satd. Flow (perm)	0	1478	2434	1340	0	3163	0	0	698	1586	0	0
Right Turn on Red				Yes			Yes				Yes	
Satd. Flow (RTOR)			233	233		6				10		
Link Speed (mph)			30			30				30		
Link Distance (ft)			258			501				127		
Travel Time (s)			5.9			11.4				2.9		
Confl. Bikes (#/hr)				1			2				4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.78	0.78	0.78	0.92	0.85	0.85	0.85	0.89
Heavy Vehicles (%)	0%	0%	20%	2%	6%	4%	0%	0%	2%	5%	0%	50%
Adj. Flow (vph)	17	63	105	466	47	223	21	5	298	102	25	0
Shared Lane Traffic (%)		10%		50%								
Lane Group Flow (vph)	0	74	344	233	0	291	0	0	303	127	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left
Median Width(ft)			14			12				50		
Link Offset(ft)			0			0				0		
Crosswalk Width(ft)			16			16				16		
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.10	1.14	1.10	1.14	1.14	1.19	1.14	1.14	1.14
Turning Speed (mph)	9	15		9	15		9	9	15		9	15
Number of Detectors	1	1	2	1	1	2		1	1	2		1
Detector Template	Left	Left	Thru	Right	Left	Thru		Left	Left	Thru		Left
Leading Detector (ft)	20	20	100	20	20	100		20	20	100		20
Trailing Detector (ft)	0	0	0	0	0	0		0	0	0		0
Detector 1 Position(ft)	0	0	0	0	0	0		0	0	0		0
Detector 1 Size(ft)	20	20	6	20	20	6		20	20	6		20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0
Detector 2 Position(ft)			94			94				94		
Detector 2 Size(ft)			6			6				6		
Detector 2 Type			Cl+Ex			Cl+Ex				Cl+Ex		
Detector 2 Channel												
Detector 2 Extend (s)			0.0			0.0				0.0		
Turn Type	Split	Split	NA	Prot	Split	NA		Perm	Split	NA		
Protected Phases	1	1	1	1	4	4			2	2		3

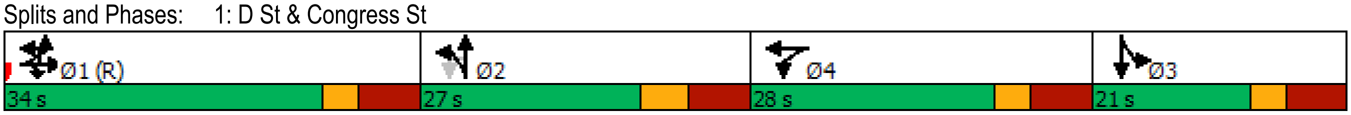
Lane Group	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	494	46
Future Volume (vph)	494	46
Ideal Flow (vphpl)	1900	1900
Lane Width (ft)	14	12
Lane Util. Factor	0.95	0.95
Ped Bike Factor	1.00	
Frt	0.987	
Flt Protected		
Satd. Flow (prot)	3344	0
Flt Permitted		
Satd. Flow (perm)	3344	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	7	
Link Speed (mph)	30	
Link Distance (ft)	194	
Travel Time (s)	4.4	
Confl. Bikes (#/hr)		15
Peak Hour Factor	0.89	0.89
Heavy Vehicles (%)	1%	12%
Adj. Flow (vph)	555	52
Shared Lane Traffic (%)		
Lane Group Flow (vph)	607	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	22	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.05	1.14
Turning Speed (mph)		9
Number of Detectors	2	
Detector Template	Thru	
Leading Detector (ft)	100	
Trailing Detector (ft)	0	
Detector 1 Position(ft)	0	
Detector 1 Size(ft)	6	
Detector 1 Type	Cl+Ex	
Detector 1 Channel		
Detector 1 Extend (s)	0.0	
Detector 1 Queue (s)	0.0	
Detector 1 Delay (s)	0.0	
Detector 2 Position(ft)	94	
Detector 2 Size(ft)	6	
Detector 2 Type	Cl+Ex	
Detector 2 Channel		
Detector 2 Extend (s)	0.0	
Turn Type	NA	
Protected Phases	3	

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Permitted Phases								2				
Detector Phase	1	1	1	1	4	4		2	2	2		3
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	20.0	20.0	20.0	20.0	16.0	16.0		26.0	26.0	26.0		17.0
Total Split (s)	34.0	34.0	34.0	34.0	28.0	28.0		27.0	27.0	27.0		21.0
Total Split (%)	30.9%	30.9%	30.9%	30.9%	25.5%	25.5%		24.5%	24.5%	24.5%		19.1%
Maximum Green (s)	26.0	26.0	26.0	26.0	20.0	20.0		18.0	18.0	18.0		13.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0		3.0
All-Red Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0			0.0	0.0		
Total Lost Time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Lead/Lag	Lead	Lead	Lead	Lead	Lead	Lead		Lag	Lag	Lag		Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None		Max	Max	Max		Max
Walk Time (s)	7.0	7.0	7.0	7.0				7.0	7.0	7.0		7.0
Flash Dont Walk (s)	4.0	4.0	4.0	4.0				10.0	10.0	10.0		2.0
Pedestrian Calls (#/hr)	75	75	75	75				75	75	75		75
Act Effct Green (s)		31.7	31.7	31.7		14.3			18.0	18.0		
Actuated g/C Ratio		0.29	0.29	0.29		0.13			0.16	0.16		
v/c Ratio		0.17	0.40	0.42		0.70			2.66	0.48		
Control Delay		32.1	12.2	6.9		53.9			791.1	45.0		
Queue Delay		0.0	0.0	0.0		0.0			0.0	0.0		
Total Delay		32.1	12.2	6.9		53.9			791.1	45.0		
LOS		C	B	A		D			F	D		
Approach Delay			12.5			53.9				570.8		
Approach LOS			B			D				F		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 39 (35%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 2.66
Intersection Signal Delay: 221.3 Intersection LOS: F
Intersection Capacity Utilization 79.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: D St & Congress St



Lane Group	SBT	SBR
Permitted Phases		
Detector Phase	3	
Switch Phase		
Minimum Initial (s)	8.0	
Minimum Split (s)	17.0	
Total Split (s)	21.0	
Total Split (%)	19.1%	
Maximum Green (s)	13.0	
Yellow Time (s)	3.0	
All-Red Time (s)	5.0	
Lost Time Adjust (s)	0.0	
Total Lost Time (s)	8.0	
Lead/Lag	Lag	
Lead-Lag Optimize?		
Vehicle Extension (s)	2.0	
Recall Mode	Max	
Walk Time (s)	7.0	
Flash Dont Walk (s)	2.0	
Pedestrian Calls (#/hr)	75	
Act Effct Green (s)	13.0	
Actuated g/C Ratio	0.12	
v/c Ratio	1.51	
Control Delay	277.9	
Queue Delay	0.0	
Total Delay	277.9	
LOS	F	
Approach Delay	277.9	
Approach LOS	F	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	74	344	233	291	303	127	607
v/c Ratio	0.17	0.40	0.42	0.70	2.66	0.48	1.51
Control Delay	32.1	12.2	6.9	53.9	791.1	45.0	277.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	12.2	6.9	53.9	791.1	45.0	277.9
Queue Length 50th (ft)	42	33	0	102	~186	76	~315
Queue Length 95th (ft)	90	82	69	122	#258	128	#425
Internal Link Dist (ft)		178		421		47	114
Turn Bay Length (ft)							
Base Capacity (vph)	426	868	552	580	114	267	401
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	0.17	0.40	0.42	0.50	2.66	0.48	1.51

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	16	58	97	429	37	174	16	5	253	87	21	0
Future Volume (vph)	16	58	97	429	37	174	16	5	253	87	21	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	13	12	13	12	12	11	12	12	12
Total Lost time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Lane Util. Factor		0.91	0.86	0.91		0.95			0.97	1.00		
Frpb, ped/bikes		1.00	0.99	1.00		1.00			1.00	0.99		
Flpb, ped/bikes		1.00	1.00	1.00		1.00			1.00	1.00		
Frt		1.00	0.90	0.85		0.99			1.00	0.97		
Flt Protected		0.95	1.00	1.00		0.99			0.95	1.00		
Satd. Flow (prot)		1478	2436	1340		3163			2988	1586		
Flt Permitted		0.95	1.00	1.00		0.99			0.22	1.00		
Satd. Flow (perm)		1478	2436	1340		3163			699	1586		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.78	0.78	0.78	0.92	0.85	0.85	0.85	0.89
Adj. Flow (vph)	17	63	105	466	47	223	21	5	298	102	25	0
RTOR Reduction (vph)	0	0	166	166	0	5	0	0	0	8	0	0
Lane Group Flow (vph)	0	74	178	67	0	286	0	0	303	119	0	0
Confl. Bikes (#/hr)				1			2				4	
Heavy Vehicles (%)	0%	0%	20%	2%	6%	4%	0%	0%	2%	5%	0%	50%
Turn Type	Split	Split	NA	Prot	Split	NA		Perm	Split	NA		
Protected Phases	1	1	1	1	4	4			2	2		3
Permitted Phases								2				
Actuated Green, G (s)		31.7	31.7	31.7		14.3			18.0	18.0		
Effective Green, g (s)		31.7	31.7	31.7		14.3			18.0	18.0		
Actuated g/C Ratio		0.29	0.29	0.29		0.13			0.16	0.16		
Clearance Time (s)		8.0	8.0	8.0		8.0			9.0	9.0		
Vehicle Extension (s)		2.0	2.0	2.0		2.0			2.0	2.0		
Lane Grp Cap (vph)		425	702	386		411			114	259		
v/s Ratio Prot		0.05	c0.07	0.05		c0.09				0.07		
v/s Ratio Perm									c0.43			
v/c Ratio		0.17	0.25	0.17		0.70			2.66	0.46		
Uniform Delay, d1		29.3	30.1	29.3		45.8			46.0	41.6		
Progression Factor		1.00	1.00	1.00		1.00			1.00	1.00		
Incremental Delay, d2		0.9	0.9	1.0		4.1			770.6	5.7		
Delay (s)		30.2	30.9	30.3		49.9			816.6	47.3		
Level of Service		C	C	C		D			F	D		
Approach Delay (s)			30.6			49.9				589.4		
Approach LOS			C			D				F		

Intersection Summary			
HCM 2000 Control Delay	236.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	33.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	494	46
Future Volume (vph)	494	46
Ideal Flow (vphpl)	1900	1900
Lane Width	14	12
Total Lost time (s)	8.0	
Lane Util. Factor	0.95	
Frpb, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3344	
Flt Permitted	1.00	
Satd. Flow (perm)	3344	
Peak-hour factor, PHF	0.89	0.89
Adj. Flow (vph)	555	52
RTOR Reduction (vph)	6	0
Lane Group Flow (vph)	601	0
Confl. Bikes (#/hr)		15
Heavy Vehicles (%)	1%	12%
Turn Type	NA	
Protected Phases	3	
Permitted Phases		
Actuated Green, G (s)	13.0	
Effective Green, g (s)	13.0	
Actuated g/C Ratio	0.12	
Clearance Time (s)	8.0	
Vehicle Extension (s)	2.0	
Lane Grp Cap (vph)	395	
v/s Ratio Prot	c0.18	
v/s Ratio Perm		
v/c Ratio	1.52	
Uniform Delay, d1	48.5	
Progression Factor	1.00	
Incremental Delay, d2	247.1	
Delay (s)	295.6	
Level of Service	F	
Approach Delay (s)	295.6	
Approach LOS	F	

Intersection Summary

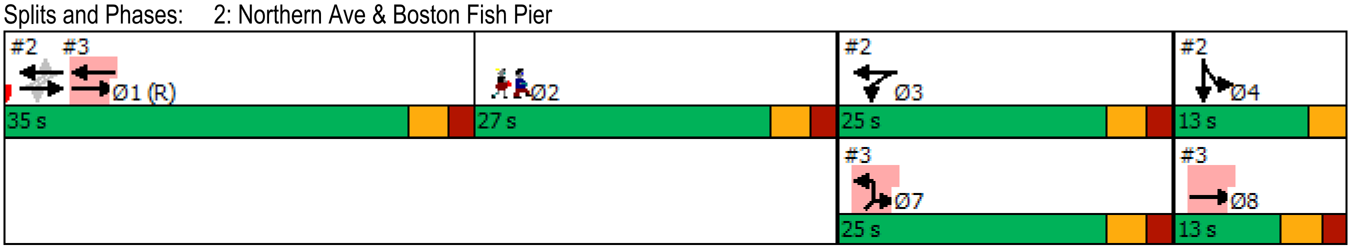
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	420	307	98	501	37	0	0	0	26	41	52
Future Volume (vph)	26	420	307	98	501	37	0	0	0	26	41	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	14	12	12	12	12	12	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00							
Frt		0.939			0.991						0.941	
Flt Protected		0.998			0.992						0.989	
Satd. Flow (prot)	0	3091	0	0	2913	0	0	0	0	0	1513	0
Flt Permitted		0.911			0.648						0.989	
Satd. Flow (perm)	0	2822	0	0	1903	0	0	0	0	0	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		177			9						31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		158			154			160			130	
Travel Time (s)		3.6			3.5			3.6			3.0	
Confl. Bikes (#/hr)			8			44						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.78	0.78	0.78
Heavy Vehicles (%)	4%	6%	2%	8%	9%	17%	2%	2%	2%	7%	3%	6%
Adj. Flow (vph)	28	447	327	104	533	39	0	0	0	33	53	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	802	0	0	676	0	0	0	0	0	153	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.05	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2					1	2	
Detector Template	Left	Thru		Left	Thru					Left	Thru	
Leading Detector (ft)	20	100		20	100					20	100	
Trailing Detector (ft)	0	0		0	0					0	0	
Detector 1 Position(ft)	0	0		0	0					0	0	
Detector 1 Size(ft)	20	6		20	6					20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex					Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0					0.0	0.0	
Detector 2 Position(ft)		94			94						94	
Detector 2 Size(ft)		6			6						6	
Detector 2 Type		Cl+Ex			Cl+Ex						Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0						0.0	
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	

Lane Group	Ø2	Ø7	Ø8
Lane Configurations			
Traffic Volume (vph)			
Future Volume (vph)			
Ideal Flow (vphpl)			
Lane Width (ft)			
Lane Util. Factor			
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)			
Flt Permitted			
Satd. Flow (perm)			
Right Turn on Red			
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Bikes (#/hr)			
Peak Hour Factor			
Heavy Vehicles (%)			
Adj. Flow (vph)			
Shared Lane Traffic (%)			
Lane Group Flow (vph)			
Enter Blocked Intersection			
Lane Alignment			
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor			
Turning Speed (mph)			
Number of Detectors			
Detector Template			
Leading Detector (ft)			
Trailing Detector (ft)			
Detector 1 Position(ft)			
Detector 1 Size(ft)			
Detector 1 Type			
Detector 1 Channel			
Detector 1 Extend (s)			
Detector 1 Queue (s)			
Detector 1 Delay (s)			
Detector 2 Position(ft)			
Detector 2 Size(ft)			
Detector 2 Type			
Detector 2 Channel			
Detector 2 Extend (s)			
Turn Type			
Protected Phases	2	7	8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	1			1								
Detector Phase	1	1		1	1 3					4	4	
Switch Phase												
Minimum Initial (s)	16.0	16.0		5.0						3.5	3.5	
Minimum Split (s)	21.0	21.0		10.0						6.5	6.5	
Total Split (s)	35.0	35.0		25.0						13.0	13.0	
Total Split (%)	35.0%	35.0%		25.0%						13.0%	13.0%	
Maximum Green (s)	30.0	30.0		20.0						10.0	10.0	
Yellow Time (s)	3.0	3.0		3.0						3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0						0.0	0.0	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.0									3.0	
Lead/Lag	Lead	Lead										
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0						2.0	2.0	
Recall Mode	C-Max	C-Max		None						None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		40.0			55.0						10.0	
Actuated g/C Ratio		0.40			0.55						0.10	
v/c Ratio		0.65			0.56						0.85	
Control Delay		22.2			5.3						74.5	
Queue Delay		0.0			0.2						0.0	
Total Delay		22.2			5.6						74.5	
LOS		C			A						E	
Approach Delay		22.2			5.6						74.5	
Approach LOS		C			A						E	

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 47 (47%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 20.2	Intersection LOS: C
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Northern Ave & Boston Fish Pier



Lane Group	Ø2	Ø7	Ø8
Permitted Phases			
Detector Phase			
Switch Phase			
Minimum Initial (s)	5.0	3.0	1.0
Minimum Split (s)	22.0	8.0	6.0
Total Split (s)	27.0	25.0	13.0
Total Split (%)	27%	25%	13%
Maximum Green (s)	22.0	20.0	8.0
Yellow Time (s)	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lag		
Lead-Lag Optimize?			
Vehicle Extension (s)	2.0	2.0	2.0
Recall Mode	None	None	None
Walk Time (s)	7.0		
Flash Dont Walk (s)	10.0		
Pedestrian Calls (#/hr)	212		
Act Effct Green (s)			
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			

Intersection Summary

Lane Group	EBT	WBT	SBT
Lane Group Flow (vph)	802	676	153
v/c Ratio	0.65	0.56	0.85
Control Delay	22.2	5.3	74.5
Queue Delay	0.0	0.2	0.0
Total Delay	22.2	5.6	74.5
Queue Length 50th (ft)	167	39	78
Queue Length 95th (ft)	256	57	#149
Internal Link Dist (ft)	78	74	50
Turn Bay Length (ft)			
Base Capacity (vph)	1235	1347	179
Starvation Cap Reductn	0	187	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.65	0.58	0.85

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	420	307	98	501	37	0	0	0	26	41	52
Future Volume (vph)	26	420	307	98	501	37	0	0	0	26	41	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		5.0			5.0						3.0	
Lane Util. Factor		0.95			0.95						1.00	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.94			0.99						0.94	
Flt Protected		1.00			0.99						0.99	
Satd. Flow (prot)		3093			2916						1513	
Flt Permitted		0.91			0.65						0.99	
Satd. Flow (perm)		2824			1904						1513	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.92	0.92	0.78	0.78	0.78
Adj. Flow (vph)	28	447	327	104	533	39	0	0	0	33	53	67
RTOR Reduction (vph)	0	106	0	0	4	0	0	0	0	0	28	0
Lane Group Flow (vph)	0	696	0	0	672	0	0	0	0	0	125	0
Confl. Bikes (#/hr)			8			44						
Heavy Vehicles (%)	4%	6%	2%	8%	9%	17%	2%	2%	2%	7%	3%	6%
Turn Type	Perm	NA		D.P+P	NA					Split	NA	
Protected Phases		1		3	1 3					4	4	
Permitted Phases	1			1								
Actuated Green, G (s)		40.0			55.0						10.0	
Effective Green, g (s)		40.0			55.0						10.0	
Actuated g/C Ratio		0.40			0.55						0.10	
Clearance Time (s)		5.0									3.0	
Vehicle Extension (s)		2.0									2.0	
Lane Grp Cap (vph)		1129			1199						151	
v/s Ratio Prot					c0.08						c0.08	
v/s Ratio Perm		c0.25			0.22							
v/c Ratio		0.62			0.56						0.83	
Uniform Delay, d1		23.9			14.6						44.2	
Progression Factor		1.00			0.50						1.00	
Incremental Delay, d2		2.5			0.3						28.4	
Delay (s)		26.4			7.6						72.6	
Level of Service		C			A						E	
Approach Delay (s)		26.4			7.6			0.0			72.6	
Approach LOS		C			A			A			E	

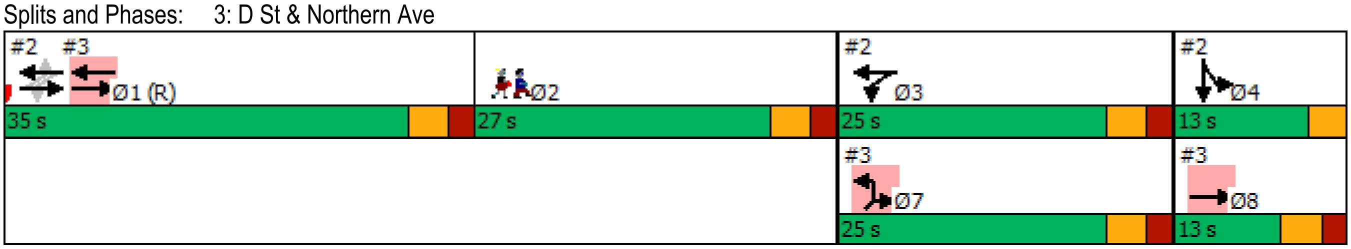
Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Lane Configurations										
Traffic Volume (vph)	446	0	0	488	148	70				
Future Volume (vph)	446	0	0	488	148	70				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	14	12	12	12	12	11				
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00				
Ped Bike Factor										
Frt						0.850				
Flt Protected					0.950					
Satd. Flow (prot)	3269	0	0	2981	1518	1405				
Flt Permitted					0.950					
Satd. Flow (perm)	3269	0	0	2981	1518	1405				
Right Turn on Red		Yes				Yes				
Satd. Flow (RTOR)						78				
Link Speed (mph)	30			30	30					
Link Distance (ft)	154			475	227					
Travel Time (s)	3.5			10.8	5.2					
Confl. Bikes (#/hr)		11								
Peak Hour Factor	0.91	0.91	0.92	0.92	0.90	0.90				
Heavy Vehicles (%)	6%	0%	0%	9%	7%	0%				
Adj. Flow (vph)	490	0	0	530	164	78				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	490	0	0	530	164	78				
Enter Blocked Intersection	No	No	No	No	No	No				
Lane Alignment	Left	Right	Left	Left	Left	Right				
Median Width(ft)	0			0	12					
Link Offset(ft)	0			0	0					
Crosswalk Width(ft)	16			16	16					
Two way Left Turn Lane										
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.19				
Turning Speed (mph)		9	15		15	9				
Number of Detectors	2			2	1	1				
Detector Template	Thru			Thru	Left	Right				
Leading Detector (ft)	100			100	20	20				
Trailing Detector (ft)	0			0	0	0				
Detector 1 Position(ft)	0			0	0	0				
Detector 1 Size(ft)	6			6	20	20				
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex				
Detector 1 Channel										
Detector 1 Extend (s)	0.0			0.0	0.0	0.0				
Detector 1 Queue (s)	0.0			0.0	0.0	0.0				
Detector 1 Delay (s)	0.0			0.0	0.0	0.0				
Detector 2 Position(ft)	94			94						
Detector 2 Size(ft)	6			6						
Detector 2 Type	Cl+Ex			Cl+Ex						
Detector 2 Channel										
Detector 2 Extend (s)	0.0			0.0						
Turn Type	NA			NA	Prot	Prot				
Protected Phases	1 8			1	7	7	2	3	4	8

Lane Group	EBT	EBR	WBL	WBT	NEL	NER	Ø2	Ø3	Ø4	Ø8
Permitted Phases										
Detector Phase	1 8			1	7	7				
Switch Phase										
Minimum Initial (s)				16.0	3.0	3.0	5.0	5.0	3.5	1.0
Minimum Split (s)				21.0	8.0	8.0	22.0	10.0	6.5	6.0
Total Split (s)				35.0	25.0	25.0	27.0	25.0	13.0	13.0
Total Split (%)				35.0%	25.0%	25.0%	27%	25%	13%	13%
Maximum Green (s)				30.0	20.0	20.0	22.0	20.0	10.0	8.0
Yellow Time (s)				3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)				2.0	2.0	2.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)				0.0	0.0	0.0				
Total Lost Time (s)				5.0	5.0	5.0				
Lead/Lag				Lead			Lag			
Lead-Lag Optimize?										
Vehicle Extension (s)				2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode				C-Max	None	None	None	None	None	None
Walk Time (s)							7.0			
Flash Dont Walk (s)							10.0			
Pedestrian Calls (#/hr)							212			
Act Effct Green (s)	53.0			40.0	15.0	15.0				
Actuated g/C Ratio	0.53			0.40	0.15	0.15				
v/c Ratio	0.28			0.44	0.72	0.28				
Control Delay	4.3			24.2	58.0	10.9				
Queue Delay	0.9			0.1	0.0	0.0				
Total Delay	5.2			24.3	58.0	10.9				
LOS	A			C	E	B				
Approach Delay	5.2			24.3	42.8					
Approach LOS	A			C	D					

Intersection Summary	
Area Type: CBD	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 47 (47%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 20.4	Intersection LOS: C
Intersection Capacity Utilization 32.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: D St & Northern Ave



Lane Group	EBT	WBT	NEL	NER
Lane Group Flow (vph)	490	530	164	78
v/c Ratio	0.28	0.44	0.72	0.28
Control Delay	4.3	24.2	58.0	10.9
Queue Delay	0.9	0.1	0.0	0.0
Total Delay	5.2	24.3	58.0	10.9
Queue Length 50th (ft)	22	127	101	0
Queue Length 95th (ft)	m27	190	162	38
Internal Link Dist (ft)	74	395	147	
Turn Bay Length (ft)				
Base Capacity (vph)	1733	1192	303	343
Starvation Cap Reductn	928	0	0	0
Spillback Cap Reductn	0	110	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.49	0.54	0.23

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations	↑↑			↑↑	↰	↱
Traffic Volume (vph)	446	0	0	488	148	70
Future Volume (vph)	446	0	0	488	148	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	14	12	12	12	12	11
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3269			2981	1518	1405
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3269			2981	1518	1405
Peak-hour factor, PHF	0.91	0.91	0.92	0.92	0.90	0.90
Adj. Flow (vph)	490	0	0	530	164	78
RTOR Reduction (vph)	0	0	0	0	0	66
Lane Group Flow (vph)	490	0	0	530	164	12
Confl. Bikes (#/hr)		11				
Heavy Vehicles (%)	6%	0%	0%	9%	7%	0%
Turn Type	NA			NA	Prot	Prot
Protected Phases	1 8			1	7	7
Permitted Phases						
Actuated Green, G (s)	53.0			40.0	15.0	15.0
Effective Green, g (s)	53.0			40.0	15.0	15.0
Actuated g/C Ratio	0.53			0.40	0.15	0.15
Clearance Time (s)				5.0	5.0	5.0
Vehicle Extension (s)				2.0	2.0	2.0
Lane Grp Cap (vph)	1732			1192	227	210
v/s Ratio Prot	c0.15			c0.18	c0.11	0.01
v/s Ratio Perm						
v/c Ratio	0.28			0.44	0.72	0.06
Uniform Delay, d1	13.0			21.9	40.5	36.4
Progression Factor	0.29			1.00	1.00	1.00
Incremental Delay, d2	0.0			1.2	9.2	0.0
Delay (s)	3.8			23.1	49.7	36.5
Level of Service	A			C	D	D
Approach Delay (s)	3.8			23.1	45.5	
Approach LOS	A			C	D	

Intersection Summary			
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	32.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	511	16	129	436	47	163
Future Volume (vph)	511	16	129	436	47	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	12	12	12	12	12
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor						
Frt	0.995				0.895	
Flt Protected				0.989	0.989	
Satd. Flow (prot)	3289	0	0	2964	1399	0
Flt Permitted				0.989	0.989	
Satd. Flow (perm)	3289	0	0	2964	1399	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	475			419	295	
Travel Time (s)	10.8			9.5	6.7	
Confl. Peds. (#/hr)		25	25		110	4
Confl. Bikes (#/hr)		5				
Peak Hour Factor	0.95	0.95	0.92	0.92	0.88	0.88
Heavy Vehicles (%)	5%	0%	3%	10%	9%	8%
Adj. Flow (vph)	538	17	140	474	53	185
Shared Lane Traffic (%)						
Lane Group Flow (vph)	555	0	0	614	238	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.05	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 58.3% ICU Level of Service B

Analysis Period (min) 15

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	511	16	129	436	47	163
Future Volume (Veh/h)	511	16	129	436	47	163
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.92	0.92	0.88	0.88
Hourly flow rate (vph)	538	17	140	474	53	185
Pedestrians	110			4	25	
Lane Width (ft)	14.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	12			0	2	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	475					
pX, platoon unblocked			0.93		0.93	0.93
vC, conflicting volume			580		1198	306
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			408		1070	115
tC, single (s)			4.2		7.0	7.1
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.4
p0 queue free %			87		63	77
cM capacity (veh/h)			1039		142	814

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	359	196	298	316	238
Volume Left	0	0	140	0	53
Volume Right	0	17	0	0	185
cSH	1700	1700	1039	1700	396
Volume to Capacity	0.21	0.12	0.13	0.19	0.60
Queue Length 95th (ft)	0	0	12	0	95
Control Delay (s)	0.0	0.0	4.9	0.0	26.9
Lane LOS			A		D
Approach Delay (s)	0.0		2.4		26.9
Approach LOS					D

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

LANE SUMMARY

Site: 1 [B-PM]

Northern Avenue at Haul Road/Marine Industrial Park
2024 Build Conditions
Weekday Evening Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Haul Road													
Lane 1[d]	303	6.1	625	0.484	100	13.4	LOS B	2.7	71.3	Full	1600	0.0	0.0
Approach	303	6.1		0.484		13.4	LOS B	2.7	71.3				
East: Northern Avenue													
Lane 1[d]	605	13.0	753	0.803	100	25.3	LOS D	14.7	405.1	Full	1600	0.0	0.0
Approach	605	13.0		0.803		25.3	LOS D	14.7	405.1				
NorthEast: Marine Industrial Park													
Lane 1[d]	59	4.2	426	0.138	100	10.5	LOS B	0.4	11.2	Full	1600	0.0	0.0
Approach	59	4.2		0.138		10.5	LOS B	0.4	11.2				
West: Northern Avenue													
Lane 1[d]	676	5.9	831	0.814	100	24.3	LOS C	17.7	464.4	Full	1600	0.0	0.0
Approach	676	5.9		0.814		24.3	LOS C	17.7	464.4				
Intersection	1642	8.5		0.814		22.2	LOS C	17.7	464.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Siegloch M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Movement	EBL	EBR	NBL	SER	SER2
Lane Configurations					
Traffic Volume (veh/h)	19	0	494	495	3
Future Volume (Veh/h)	19	0	494	495	3
Sign Control	Stop		Free	Free	
Grade	0%		0%	0%	
Peak Hour Factor	0.50	0.50	0.84	0.91	0.91
Hourly flow rate (vph)	38	0	588	544	3
Pedestrians	38				
Lane Width (ft)	12.0				
Walking Speed (ft/s)	3.5				
Percent Blockage	4				
Right turn flare (veh)					
Median type			None	None	
Median storage veh)					
Upstream signal (ft)					
pX, platoon unblocked					
vC, conflicting volume	1172	584			
vC1, stage 1 conf vol					
vC2, stage 2 conf vol					
vCu, unblocked vol	1172	584			
tC, single (s)	6.4	6.2			
tC, 2 stage (s)					
tF (s)	3.5	3.3			
p0 queue free %	82	100			
cM capacity (veh/h)	207	497			

Direction, Lane #	EB 1	NB 1	SE 1
Volume Total	38	588	547
Volume Left	38	0	0
Volume Right	0	0	3
cSH	207	963	1700
Volume to Capacity	0.18	0.00	0.32
Queue Length 95th (ft)	16	0	0
Control Delay (s)	26.3	0.0	0.0
Lane LOS	D		
Approach Delay (s)	26.3	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Traffic Volume (vph)	41	323	262	233	171	5
Future Volume (vph)	41	323	262	233	171	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	12	16	16	14	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.880		0.936		0.996	
Flt Protected	0.994		0.974		0.954	
Satd. Flow (prot)	1477	0	1602	0	1645	0
Flt Permitted	0.994		0.974		0.954	
Satd. Flow (perm)	1477	0	1602	0	1645	0
Link Speed (mph)	30		30		30	
Link Distance (ft)	311		289		458	
Travel Time (s)	7.1		6.6		10.4	
Confl. Peds. (#/hr)	54			54		94
Confl. Bikes (#/hr)				3		
Peak Hour Factor	0.87	0.87	0.91	0.91	0.88	0.88
Heavy Vehicles (%)	5%	16%	15%	5%	4%	50%
Adj. Flow (vph)	47	371	288	256	194	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	418	0	544	0	200	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	16		16		14	
Link Offset(ft)	0		0		0	
Crosswalk Width(ft)	16		16		16	
Two way Left Turn Lane						
Headway Factor	0.97	1.14	0.97	0.97	1.05	1.14
Turning Speed (mph)	15	9	15	9	15	9
Sign Control	Stop		Stop		Stop	

Intersection Summary

Area Type: CBD
Control Type: Unsignalized
Intersection Capacity Utilization 81.9% ICU Level of Service D
Analysis Period (min) 15

Movement	WBL	WBR	SBL	SBR	NEL	NER
Lane Configurations						
Sign Control	Stop		Stop		Stop	
Traffic Volume (vph)	41	323	262	233	171	5
Future Volume (vph)	41	323	262	233	171	5
Peak Hour Factor	0.87	0.87	0.91	0.91	0.88	0.88
Hourly flow rate (vph)	47	371	288	256	194	6

Direction, Lane #	WB 1	SB 1	NE 1
Volume Total (vph)	418	544	200
Volume Left (vph)	47	288	0
Volume Right (vph)	371	0	6
Hadj (s)	-0.26	0.28	0.07
Departure Headway (s)	5.8	5.9	6.3
Degree Utilization, x	0.67	0.89	0.35
Capacity (veh/h)	588	592	544
Control Delay (s)	19.9	38.3	12.6
Approach Delay (s)	19.9	38.3	12.6
Approach LOS	C	E	B

Intersection Summary			
Delay	27.3		
Level of Service	D		
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

Lane Group	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (vph)	156	212	142	268	194	70
Future Volume (vph)	156	212	142	268	194	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	13	12
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	0.95
Ped Bike Factor						
Frt		0.850			0.960	
Flt Protected			0.950		0.965	
Satd. Flow (prot)	1474	1127	1593	1449	2668	0
Flt Permitted			0.950		0.965	
Satd. Flow (perm)	1474	1127	1593	1449	2668	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	301			349	314	
Travel Time (s)	6.8			7.9	7.1	
Confl. Bikes (#/hr)		1				
Peak Hour Factor	0.90	0.90	0.83	0.83	0.97	0.97
Heavy Vehicles (%)	16%	29%	2%	18%	23%	8%
Adj. Flow (vph)	173	236	171	323	200	72
Shared Lane Traffic (%)						
Lane Group Flow (vph)	173	236	171	323	272	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	26	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.10	1.14
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 36.5% ICU Level of Service A

Analysis Period (min) 15

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Volume (veh/h)	156	212	142	268	194	70
Future Volume (Veh/h)	156	212	142	268	194	70
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.83	0.83	0.97	0.97
Hourly flow rate (vph)	173	236	171	323	200	72
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			409		838	173
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			409		838	173
tC, single (s)			4.1		6.6	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			85		24	92
cM capacity (veh/h)			1150		264	855

Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	NE 2
Volume Total	173	236	171	323	133	139
Volume Left	0	0	171	0	133	67
Volume Right	0	236	0	0	0	72
cSH	1700	1700	1150	1700	264	411
Volume to Capacity	0.10	0.14	0.15	0.19	0.51	0.34
Queue Length 95th (ft)	0	0	13	0	66	37
Control Delay (s)	0.0	0.0	8.7	0.0	31.8	18.1
Lane LOS			A		D	C
Approach Delay (s)	0.0		3.0		24.9	
Approach LOS					C	

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Lane Configurations							
Traffic Volume (vph)	52	900	714	217	270	84	
Future Volume (vph)	52	900	714	217	270	84	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	11	12	12	12	
Lane Util. Factor	0.95	0.95	0.91	0.91	0.97	0.95	
Ped Bike Factor			0.99				
Frt			0.965		0.964		
Flt Protected		0.997			0.963		
Satd. Flow (prot)	0	2982	4123	0	2817	0	
Flt Permitted		0.784			0.963		
Satd. Flow (perm)	0	2345	4123	0	2817	0	
Right Turn on Red				Yes		Yes	
Satd. Flow (RTOR)			69		35		
Link Speed (mph)		30	30		30		
Link Distance (ft)		543	505		314		
Travel Time (s)		12.3	11.5		7.1		
Confl. Bikes (#/hr)				13			
Peak Hour Factor	0.96	0.96	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	5%	5%	6%	2%	11%	4%	
Adj. Flow (vph)	54	938	776	236	293	91	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	992	1012	0	384	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Left	Left	Right	Left	Right	
Median Width(ft)		12	12		24		
Link Offset(ft)		0	0		0		
Crosswalk Width(ft)		16	16		16		
Two way Left Turn Lane							
Headway Factor	1.14	1.19	1.19	1.14	1.14	1.14	
Turning Speed (mph)	15			9	15	9	
Number of Detectors	1	2	2		1		
Detector Template	Left	Thru	Thru		Left		
Leading Detector (ft)	20	100	100		20		
Trailing Detector (ft)	0	0	0		0		
Detector 1 Position(ft)	0	0	0		0		
Detector 1 Size(ft)	20	6	6		20		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0	0.0	0.0		0.0		
Detector 1 Queue (s)	0.0	0.0	0.0		0.0		
Detector 1 Delay (s)	0.0	0.0	0.0		0.0		
Detector 2 Position(ft)		94	94				
Detector 2 Size(ft)		6	6				
Detector 2 Type		Cl+Ex	Cl+Ex				
Detector 2 Channel							
Detector 2 Extend (s)		0.0	0.0				
Turn Type	D.P+P	NA	NA		Prot		
Protected Phases	5	1 5	1		3		2

Lane Group	SEL	SET	NWT	NWR	SWL	SWR	Ø2
Permitted Phases	1						
Detector Phase	5	1 5	1		3		
Switch Phase							
Minimum Initial (s)	5.0		10.0		8.0		3.0
Minimum Split (s)	12.0		17.0		15.5		30.0
Total Split (s)	13.0		38.0		29.0		30.0
Total Split (%)	11.8%		34.5%		26.4%		27%
Maximum Green (s)	6.0		31.0		21.5		23.0
Yellow Time (s)	4.0		4.0		3.5		3.0
All-Red Time (s)	3.0		3.0		4.0		4.0
Lost Time Adjust (s)			0.0		0.0		
Total Lost Time (s)			7.0		7.5		
Lead/Lag			Lead				Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		2.0		2.0		2.0
Recall Mode	None		C-Max		None		None
Walk Time (s)							7.0
Flash Dont Walk (s)							16.0
Pedestrian Calls (#/hr)							28
Act Effct Green (s)		52.9	46.9		17.6		
Actuated g/C Ratio		0.48	0.43		0.16		
v/c Ratio		0.85	0.56		0.80		
Control Delay		36.8	42.8		53.0		
Queue Delay		0.0	0.0		0.0		
Total Delay		36.8	42.8		53.0		
LOS		D	D		D		
Approach Delay		36.8	42.8		53.0		
Approach LOS		D	D		D		

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 3 (3%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 42.0	Intersection LOS: D
Intersection Capacity Utilization 79.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Summer St & Pumphouse Rd

Lane Group	SET	NWT	SWL
Lane Group Flow (vph)	992	1012	384
v/c Ratio	0.85	0.56	0.80
Control Delay	36.8	42.8	53.0
Queue Delay	0.0	0.0	0.0
Total Delay	36.8	42.8	53.0
Queue Length 50th (ft)	~360	252	123
Queue Length 95th (ft)	#579	m303	170
Internal Link Dist (ft)	463	425	234
Turn Bay Length (ft)			
Base Capacity (vph)	1161	1795	578
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.85	0.56	0.66

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	52	900	714	217	270	84
Future Volume (vph)	52	900	714	217	270	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	11	11	12	12	12
Total Lost time (s)		7.0	7.0		7.5	
Lane Util. Factor		0.95	0.91		0.97	
Frpb, ped/bikes		1.00	1.00		1.00	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.97		0.96	
Flt Protected		1.00	1.00		0.96	
Satd. Flow (prot)		2983	4126		2819	
Flt Permitted		0.78	1.00		0.96	
Satd. Flow (perm)		2345	4126		2819	
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	938	776	236	293	91
RTOR Reduction (vph)	0	0	41	0	29	0
Lane Group Flow (vph)	0	992	971	0	355	0
Confl. Bikes (#/hr)				13		
Heavy Vehicles (%)	5%	5%	6%	2%	11%	4%
Turn Type	D.P+P	NA	NA		Prot	
Protected Phases	5	1 5	1		3	
Permitted Phases	1					
Actuated Green, G (s)		50.1	44.1		17.6	
Effective Green, g (s)		50.1	44.1		17.6	
Actuated g/C Ratio		0.46	0.40		0.16	
Clearance Time (s)			7.0		7.5	
Vehicle Extension (s)			2.0		2.0	
Lane Grp Cap (vph)		1102	1654		451	
v/s Ratio Prot		c0.05	0.24		c0.13	
v/s Ratio Perm		c0.36				
v/c Ratio		0.90	0.59		0.79	
Uniform Delay, d1		27.6	25.8		44.4	
Progression Factor		1.00	1.61		1.00	
Incremental Delay, d2		10.1	1.1		8.1	
Delay (s)		37.7	42.5		52.5	
Level of Service		D	D		D	
Approach Delay (s)		37.7	42.5		52.5	
Approach LOS		D	D		D	

Intersection Summary			
HCM 2000 Control Delay	42.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	28.5
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

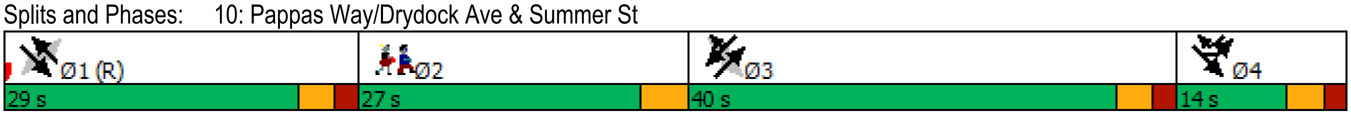
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	92	856	222	11	498	112	56	48	11	283	228	377
Future Volume (vph)	92	856	222	11	498	112	56	48	11	283	228	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	365		0	65		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							
Frt		0.969			0.972			0.987				0.850
Flt Protected	0.950			0.950				0.976			0.973	
Satd. Flow (prot)	1279	2971	0	1624	2993	0	0	1598	0	0	1640	1358
Flt Permitted	0.196			0.140				0.236			0.752	
Satd. Flow (perm)	264	2971	0	239	2993	0	0	386	0	0	1268	1358
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			22			5				405
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		505			502			340			534	
Travel Time (s)		11.5			11.4			7.7			12.1	
Confl. Bikes (#/hr)			12			11						4
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93
Heavy Vehicles (%)	27%	4%	10%	0%	6%	1%	2%	5%	0%	1%	2%	7%
Adj. Flow (vph)	96	892	231	12	541	122	67	57	13	304	245	405
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1123	0	12	663	0	0	137	0	0	549	405
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	Ø2
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Bikes (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Detector Phase	4	1 4		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	
Minimum Split (s)	13.0			13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	14.0			29.0	29.0		40.0	40.0		40.0	40.0	
Total Split (%)	12.7%			26.4%	26.4%		36.4%	36.4%		36.4%	36.4%	
Maximum Green (s)	9.0			24.0	24.0		35.0	35.0		35.0	35.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0			2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0			0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0			5.0	5.0			5.0			5.0	
Lead/Lag	Lag			Lead	Lead		Lead	Lead		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	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	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	38.4	43.4		29.4	29.4			35.0			35.0	49.0
Actuated g/C Ratio	0.35	0.39		0.27	0.27			0.32			0.32	0.45
v/c Ratio	0.55	0.94		0.19	0.81			1.09			1.36	0.49
Control Delay	27.4	33.1		44.5	47.9			142.5			210.3	4.1
Queue Delay	0.0	0.3		0.0	0.0			0.0			0.0	0.0
Total Delay	27.4	33.4		44.5	47.9			142.5			210.3	4.1
LOS	C	C		D	D			F			F	A
Approach Delay		32.9			47.9			142.5			122.8	
Approach LOS		C			D			F			F	

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 23 (21%), Referenced to phase 1:NWSE, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.36	
Intersection Signal Delay: 70.0	Intersection LOS: E
Intersection Capacity Utilization 95.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 10: Pappas Way/Drydock Ave & Summer St



Lane Group	Ø2
Turn Type	
Protected Phases	2
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	25%
Maximum Green (s)	23.0
Yellow Time (s)	4.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Vehicle Extension (s)	2.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	16.0
Pedestrian Calls (#/hr)	75
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Intersection Summary

Lane Group	SEL	SET	NWL	NWT	NET	SWT	SWR
Lane Group Flow (vph)	96	1123	12	663	137	549	405
v/c Ratio	0.55	0.94	0.19	0.81	1.09	1.36	0.49
Control Delay	27.4	33.1	44.5	47.9	142.5	210.3	4.1
Queue Delay	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	33.4	44.5	47.9	142.5	210.3	4.1
Queue Length 50th (ft)	27	~126	7	240	~107	~512	0
Queue Length 95th (ft)	m41	#587	28	#367	#212	#722	55
Internal Link Dist (ft)		425		422	260	454	
Turn Bay Length (ft)	365		65				
Base Capacity (vph)	175	1191	64	816	126	403	829
Starvation Cap Reductn	0	4	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	0.55	0.95	0.19	0.81	1.09	1.36	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	92	856	222	11	498	112	56	48	11	283	228	377
Future Volume (vph)	92	856	222	11	498	112	56	48	11	283	228	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.97		1.00	0.97			0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	1.00
Satd. Flow (prot)	1279	2973		1624	2995			1599			1640	1358
Flt Permitted	0.20	1.00		0.14	1.00			0.24			0.75	1.00
Satd. Flow (perm)	264	2973		239	2995			387			1267	1358
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93
Adj. Flow (vph)	96	892	231	12	541	122	67	57	13	304	245	405
RTOR Reduction (vph)	0	20	0	0	16	0	0	3	0	0	0	225
Lane Group Flow (vph)	96	1103	0	12	647	0	0	134	0	0	549	180
Confl. Bikes (#/hr)			12			11						4
Heavy Vehicles (%)	27%	4%	10%	0%	6%	1%	2%	5%	0%	1%	2%	7%
Turn Type	D.P+P	NA		Perm	NA		Perm	NA		Perm	NA	pt+ov
Protected Phases	4	1 4			1			3			3	3 4
Permitted Phases	1			1			3			3		
Actuated Green, G (s)	37.6	42.6		28.6	28.6			35.0			35.0	49.0
Effective Green, g (s)	37.6	42.6		28.6	28.6			35.0			35.0	49.0
Actuated g/C Ratio	0.34	0.39		0.26	0.26			0.32			0.32	0.45
Clearance Time (s)	5.0			5.0	5.0			5.0			5.0	
Vehicle Extension (s)	2.0			2.0	2.0			2.0			2.0	
Lane Grp Cap (vph)	173	1151		62	778			123			403	604
v/s Ratio Prot	0.05	c0.37			0.22							0.13
v/s Ratio Perm	0.14			0.05				0.35			c0.43	
v/c Ratio	0.55	0.96		0.19	0.83			1.09			1.36	0.30
Uniform Delay, d1	26.9	32.8		31.7	38.4			37.5			37.5	19.5
Progression Factor	0.77	0.61		1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	1.2	11.5		6.8	10.1			106.1			178.4	0.1
Delay (s)	22.0	31.5		38.6	48.5			143.6			215.9	19.6
Level of Service	C	C		D	D			F			F	B
Approach Delay (s)		30.8			48.3			143.6			132.6	
Approach LOS		C			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	72.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (vph)	58	152	42	5	479	21	105	12	5	16	16	304
Future Volume (vph)	58	152	42	5	479	21	105	12	5	16	16	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor												
Frt			0.850		0.994		0.984		0.850		0.878	
Flt Protected		0.986			0.999		0.957				0.995	
Satd. Flow (prot)	0	1510	1454	0	1603	0	1579	0	1038	0	1452	0
Flt Permitted		0.986			0.999		0.957				0.995	
Satd. Flow (perm)	0	1510	1454	0	1603	0	1579	0	1038	0	1452	0
Link Speed (mph)		30			30		30				30	
Link Distance (ft)		534			438		201				121	
Travel Time (s)		12.1			10.0		4.6				2.8	
Confl. Peds. (#/hr)	15		7	7		15		15	121	121	7	2
Confl. Bikes (#/hr)						16			1			
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.79	0.79	0.79	0.81	0.81	0.81
Heavy Vehicles (%)	8%	13%	0%	0%	6%	6%	2%	0%	33%	13%	10%	2%
Adj. Flow (vph)	76	200	55	7	630	28	133	15	6	20	20	375
Shared Lane Traffic (%)									10%			
Lane Group Flow (vph)	0	276	55	0	665	0	149	0	5	0	415	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)		0			0		12				12	
Link Offset(ft)		0			0		0				0	
Crosswalk Width(ft)		16			16		16				16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15	9	9	15	15	9
Sign Control		Free			Free		Stop				Stop	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 92.0% ICU Level of Service F

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
11: Terminal St & Drydock Ave & Harbor St

11/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBR	NBR2	SWL2	SWL	SWR
Lane Configurations												
Traffic Volume (veh/h)	58	152	42	5	479	21	105	12	5	16	16	304
Future Volume (Veh/h)	58	152	42	5	479	21	105	12	5	16	16	304
Sign Control		Free			Free		Stop				Stop	
Grade		0%			0%		0%				0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.79	0.79	0.79	0.81	0.81	0.81
Hourly flow rate (vph)	76	200	55	7	630	28	133	15	6	20	20	375
Pedestrians		2			121		7				15	
Lane Width (ft)		12.0			12.0		12.0				12.0	
Walking Speed (ft/s)		3.5			3.5		3.5				3.5	
Percent Blockage		0			12		1				1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)		534										
pX, platoon unblocked												
vC, conflicting volume	673			207			1404	1046	328	1160	1032	661
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	673			207			1404	1046	328	1160	1032	661
tC, single (s)	4.2			4.1			*4.0	*5.0	*5.0	7.2	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.6	3.6	4.1	3.3
p0 queue free %	91			99			0	95	99	84	90	18
cM capacity (veh/h)	877			1367			58	317	654	125	201	455

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SW 1
Volume Total	276	55	665	150	4	415
Volume Left	76	0	7	133	0	20
Volume Right	0	55	28	2	4	375
cSH	877	1700	1367	64	654	383
Volume to Capacity	0.09	0.03	0.01	2.33	0.01	1.08
Queue Length 95th (ft)	7	0	0	364	0	366
Control Delay (s)	3.3	0.0	0.1	745.6	10.5	103.5
Lane LOS	A		A	F	B	F
Approach Delay (s)	2.7		0.1	726.5		103.5
Approach LOS				F		F

Intersection Summary			
Average Delay	99.6		
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		

* User Entered Value

Lane Group	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	46	46	11	80	290	10
Future Volume (vph)	46	46	11	80	290	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.932				0.995	
Flt Protected	0.976			0.994		
Satd. Flow (prot)	1555	0	0	1543	1654	0
Flt Permitted	0.976			0.994		
Satd. Flow (perm)	1555	0	0	1543	1654	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	230			121	329	
Travel Time (s)	5.2			2.8	7.5	
Confl. Peds. (#/hr)	33	15	8			8
Confl. Bikes (#/hr)						2
Peak Hour Factor	0.50	0.50	0.86	0.86	0.79	0.79
Heavy Vehicles (%)	0%	0%	33%	7%	3%	0%
Adj. Flow (vph)	92	92	13	93	367	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	184	0	0	106	380	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 33.6%	ICU Level of Service A
Analysis Period (min) 15	

Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	46	46	11	80	290	10
Future Volume (Veh/h)	46	46	11	80	290	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.50	0.50	0.86	0.86	0.79	0.79
Hourly flow rate (vph)	92	92	13	93	367	13
Pedestrians	8			15	33	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	1			1	3	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	534	396	388			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	534	396	388			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.5			
p0 queue free %	81	86	99			
cM capacity (veh/h)	485	643	1012			

Direction, Lane #	EB 1	NE 1	SW 1
Volume Total	184	106	380
Volume Left	92	13	0
Volume Right	92	0	13
cSH	553	1012	1700
Volume to Capacity	0.33	0.01	0.22
Queue Length 95th (ft)	36	1	0
Control Delay (s)	14.7	1.2	0.0
Lane LOS	B	A	
Approach Delay (s)	14.7	1.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	54	43	4	122	257	17
Future Volume (vph)	54	43	4	122	257	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.940				0.992	
Flt Protected	0.973			0.999		
Satd. Flow (prot)	1533	0	0	1675	1663	0
Flt Permitted	0.973			0.999		
Satd. Flow (perm)	1533	0	0	1675	1663	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	231			329	458	
Travel Time (s)	5.3			7.5	10.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	47	4	133	279	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	106	0	0	137	297	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: CBD

Control Type: Unsignalized

Intersection Capacity Utilization 29.1% ICU Level of Service A

Analysis Period (min) 15

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (veh/h)	54	43	4	122	257	17
Future Volume (Veh/h)	54	43	4	122	257	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	47	4	133	279	18
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	429	288	297			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	429	288	297			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	94	100			
cM capacity (veh/h)	581	751	1264			

Direction, Lane #	SE 1	NE 1	SW 1
Volume Total	106	137	297
Volume Left	59	4	0
Volume Right	47	0	18
cSH	646	1264	1700
Volume to Capacity	0.16	0.00	0.17
Queue Length 95th (ft)	15	0	0
Control Delay (s)	11.7	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	29.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	33	45	213	13	0	377
Future Volume (vph)	33	45	213	13	0	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922		0.992			
Flt Protected	0.979					
Satd. Flow (prot)	1513	0	1663	0	0	1676
Flt Permitted	0.979					
Satd. Flow (perm)	1513	0	1663	0	0	1676
Link Speed (mph)	30		30			30
Link Distance (ft)	178		196			486
Travel Time (s)	4.0		4.5			11.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	49	232	14	0	410
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	0	246	0	0	410
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type: CBD	
Control Type: Unsignalized	
Intersection Capacity Utilization 33.8%	ICU Level of Service A
Analysis Period (min) 15	

Movement	WBL	WBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	33	45	213	13	0	377
Future Volume (Veh/h)	33	45	213	13	0	377
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	49	232	14	0	410
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	649	239			246	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	649	239			246	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	94			100	
cM capacity (veh/h)	434	800			1320	

Direction, Lane #	WB 1	NE 1	SW 1
Volume Total	85	246	410
Volume Left	36	0	0
Volume Right	49	14	0
cSH	590	1700	1320
Volume to Capacity	0.14	0.14	0.00
Queue Length 95th (ft)	13	0	0
Control Delay (s)	12.1	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.1	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

CRASH RATE WORKSHEET

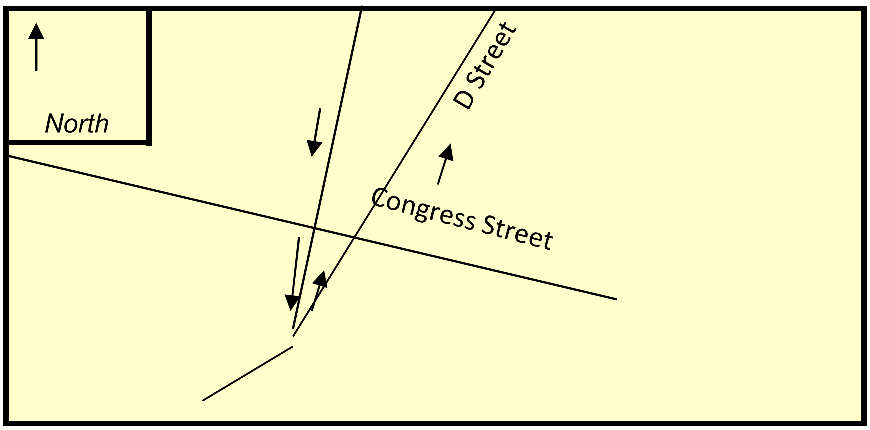
CITY/TOWN :	Boston			COUNT DATE :	Oct 2019
DISTRICT :	6	UNSIGNALIZED :		SIGNALIZED :	X

~ INTERSECTION DATA ~

MAJOR STREET : Congress Street

MINOR STREET(S) : D Street

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	345	475	545	140		

" K " FACTOR : 0.09 APPROACH ADT : 16722.222 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 20 # OF YEARS : 5 AVERAGE # OF CRASHES (**C**) : 4.00

CRASH RATE CALCULATION : 0.66 RATE = $\frac{(C * 1,000,000)}{(ADT * 365)}$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

CRASH RATE WORKSHEET

CITY/TOWN :	Boston			COUNT DATE :	June 2019
DISTRICT :	6	UNSIGNALIZED :		SIGNALIZED :	X

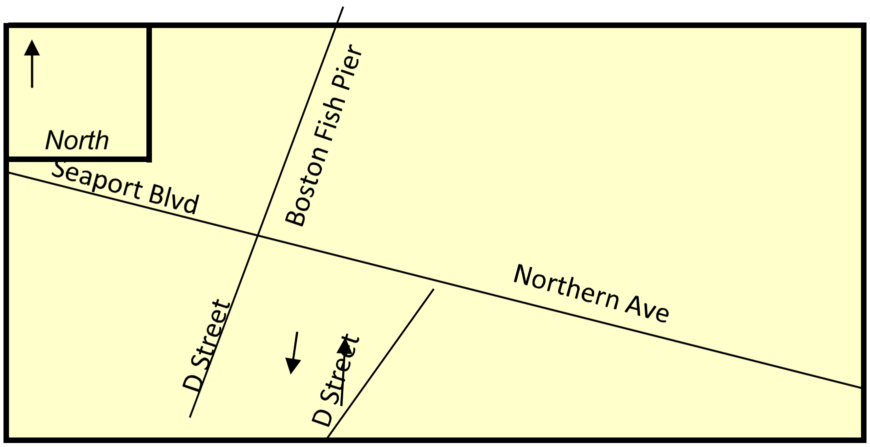
~ INTERSECTION DATA ~

MAJOR STREET : Northern Avenue

MINOR STREET(S) : D Street

Boston Fish Pier

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	200	80	690	450		

" K " FACTOR : 0.09 | APPROACH ADT : 15777.778 | **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 12 | # OF YEARS : 5 | AVERAGE # OF CRASHES (**C**) : 2.40

CRASH RATE CALCULATION : 0.42

$$\text{RATE} = \frac{(C * 1{,}000{,}000)}{(ADT * 365)}$$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

Moving Massachusetts Forward. massDOT Highway

CRASH RATE WORKSHEET

CITY/TOWN : Boston

COUNT DATE : June 2019

DISTRICT : 6

UNSIGNALIZED : X

SIGNALIZED :

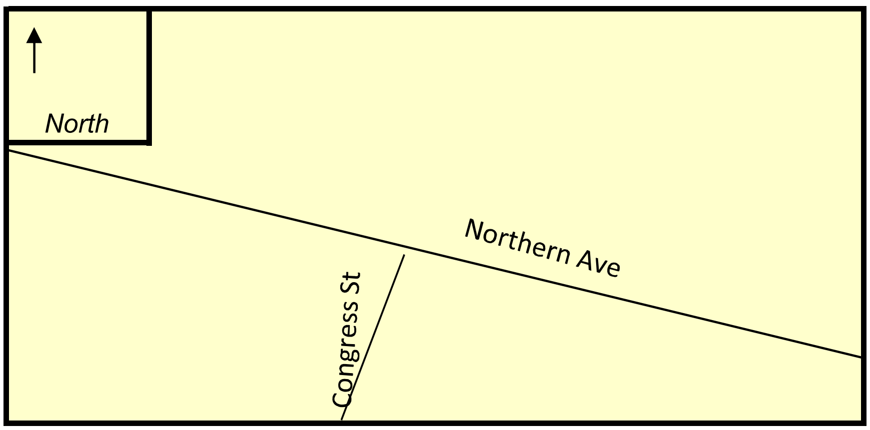
~ INTERSECTION DATA ~

MAJOR STREET : Northern Ave

MINOR STREET(S) : Congress Street

INTERSECTION DIAGRAM

(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	185	0	465	325		

" K " FACTOR : 0.09

APPROACH ADT : 10833.333

ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 0

OF YEARS : 5

AVERAGE # OF CRASHES (**C**) : 0.00

CRASH RATE CALCULATION : 0.00

$$\text{RATE} = \frac{(C * 1{,}000{,}000)}{(ADT * 365)}$$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

CRASH RATE WORKSHEET

CITY/TOWN : Boston COUNT DATE : June 2019

DISTRICT : 6 UNSIGNALIZED : X SIGNALIZED :

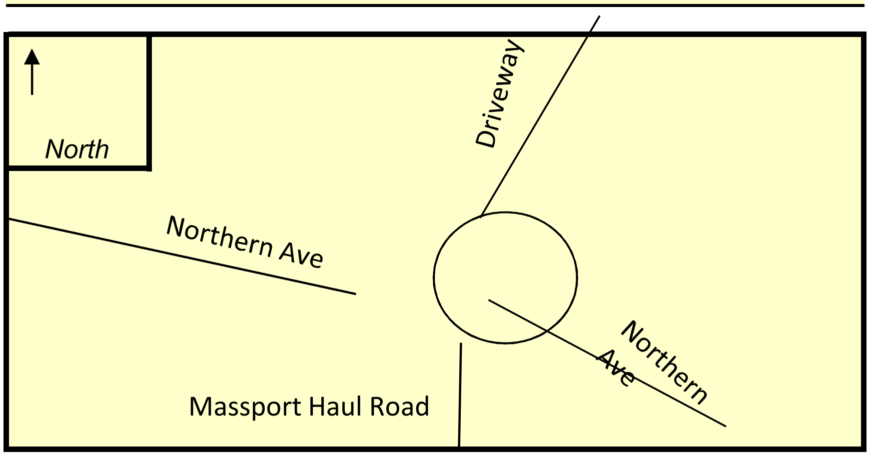
~ INTERSECTION DATA ~

MAJOR STREET : Northern Ave (roundabout)

MINOR STREET(S) : Massport Haul Road

Marine Industrial Park Driveway

INTERSECTION DIAGRAM (Label Approaches)



Peak Hour Volumes

APPROACH :	**1**	**2**	**3**	**4**	**5**	**6**
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	150	40	565	310		

" K " FACTOR : 0.09 APPROACH ADT : 11833.333 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 4 # OF YEARS : 5 AVERAGE # OF CRASHES (**C**) : 0.80

CRASH RATE CALCULATION : 0.19 RATE = $\frac{(C * 1{,}000{,}000)}{(ADT * 365)}$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

CRASH RATE WORKSHEET

CITY/TOWN : Boston

COUNT DATE : June 2019

DISTRICT : 6

UNSIGNALIZED : X

SIGNALIZED :

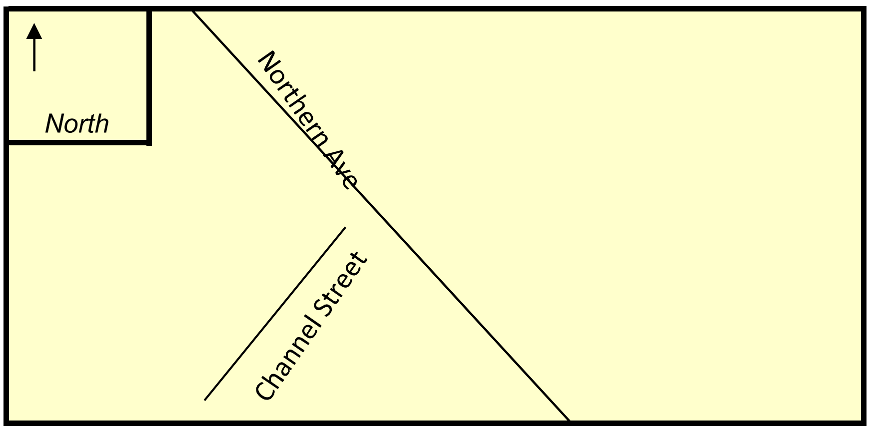
~ INTERSECTION DATA ~

MAJOR STREET : Northern Ave

MINOR STREET(S) : Channel St

INTERSECTION DIAGRAM

(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	0	0	420	315		

" K " FACTOR : 0.09

APPROACH ADT : 8166.6667

ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 0

OF YEARS : 5

AVERAGE # OF CRASHES (**C**) : 0.00

CRASH RATE CALCULATION : 0.00

$$\text{RATE} = \frac{(C * 1{,}000{,}000)}{(ADT * 365)}$$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

CRASH RATE WORKSHEET

CITY/TOWN : Boston

COUNT DATE : June 2019

DISTRICT : 6

UNSIGNALIZED : X

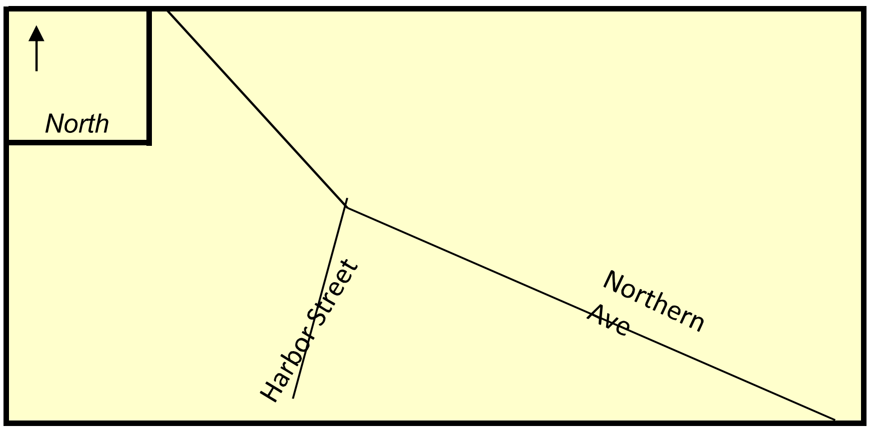
SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Northern Avenue

MINOR STREET(S) : Harbor Street

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	75	0	420	285		

" K " FACTOR : 0.09

APPROACH ADT : 8666.6667

ADT = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 3

OF YEARS : 5

AVERAGE # OF CRASHES (**C**) : 0.60

CRASH RATE CALCULATION : 0.19

$$\text{RATE} = \frac{(\,C * 1{,}000{,}000\,)}{(\,ADT * 365\,)}$$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

CRASH RATE WORKSHEET

CITY/TOWN : Boston   COUNT DATE : June 2019

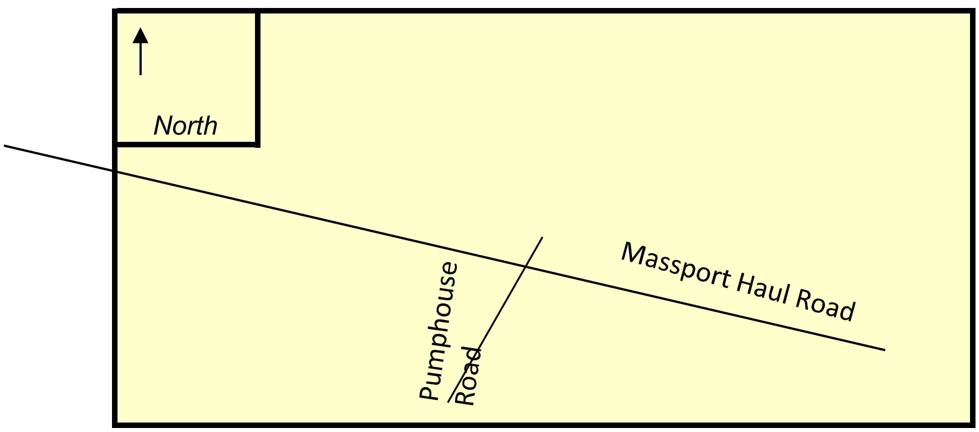
DISTRICT : 6   UNSIGNALIZED : X   SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Massport Haul Road

MINOR STREET(S) : Pumphouse Road

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	220	0	270	290		

" K " FACTOR : 0.09   APPROACH ADT : 8666.6667   **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 2   # OF YEARS : 5   AVERAGE # OF CRASHES (**C**) : 0.40

CRASH RATE CALCULATION : 0.13   RATE = $\frac{(C * 1,000,000)}{(ADT * 365)}$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

massDOT Highway

CRASH RATE WORKSHEET

CITY/TOWN : Boston   COUNT DATE : June 2019

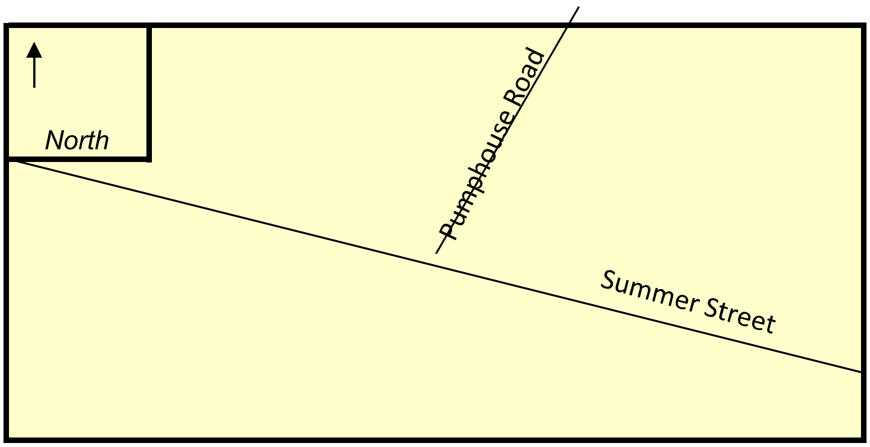
DISTRICT : 6   UNSIGNALIZED :   SIGNALIZED : X

~ INTERSECTION DATA ~

MAJOR STREET : Summer Street

MINOR STREET(S) : Pumphouse Road

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	0	305	770	635		

" K " FACTOR : 0.09   APPROACH ADT : 19000   **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 0   # OF YEARS : 5   AVERAGE # OF CRASHES (**C**) : 0.00

CRASH RATE CALCULATION : 0.00   RATE = $\frac{(C * 1{,}000{,}000)}{(ADT * 365)}$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

CRASH RATE WORKSHEET

CITY/TOWN :	Boston	COUNT DATE :	June 2019
DISTRICT :	6	UNSIGNALIZED :	
SIGNALIZED :	X		

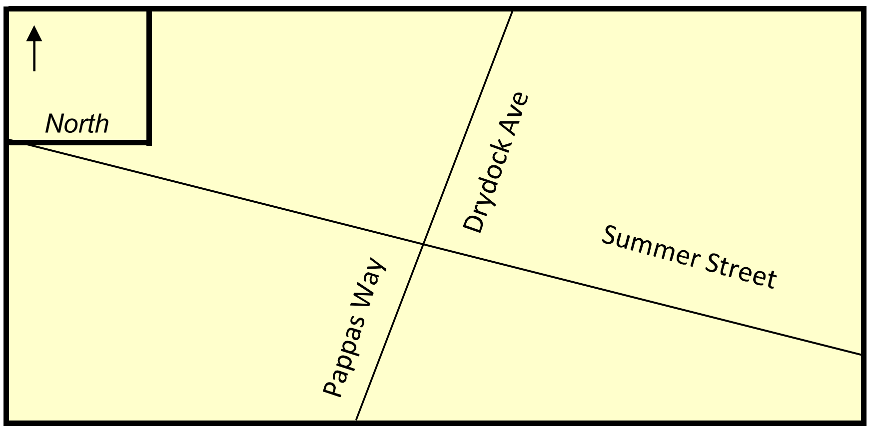
~ INTERSECTION DATA ~

MAJOR STREET : Summer Street

MINOR STREET(S) : Pappas Way

Drydock Avenue

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	100	675	970	400		

" K " FACTOR : 0.09   APPROACH ADT : 23833.333   **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 3   # OF YEARS : 5   AVERAGE # OF CRASHES (**C**) : 0.60

CRASH RATE CALCULATION : 0.07   RATE = $\frac{(C * 1,000,000)}{(ADT * 365)}$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

Moving Massachusetts Forward. massDOT Highway

CRASH RATE WORKSHEET

CITY/TOWN : Boston

COUNT DATE : June 2019

DISTRICT : 6

UNSIGNALIZED : X

SIGNALIZED :

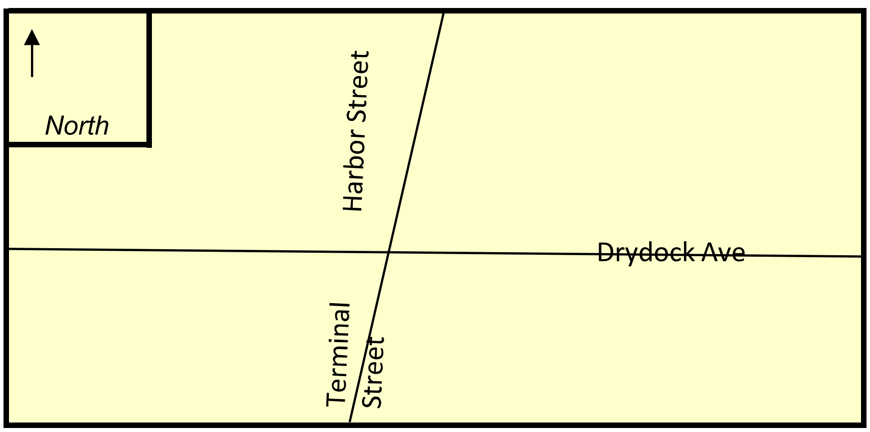
~ INTERSECTION DATA ~

MAJOR STREET : Drydock Avenue

MINOR STREET(S) : Terminal Street

Harbor Street

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	75	240	185	425		

" K " FACTOR : 0.09

APPROACH ADT : 10277.778 **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 1

OF YEARS : 5

AVERAGE # OF CRASHES (**C**) : 0.20

CRASH RATE CALCULATION : 0.05

$$\text{RATE} = \frac{(C * 1{,}000{,}000)}{(ADT * 365)}$$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

CRASH RATE WORKSHEET

CITY/TOWN : Boston　　COUNT DATE : June 2019

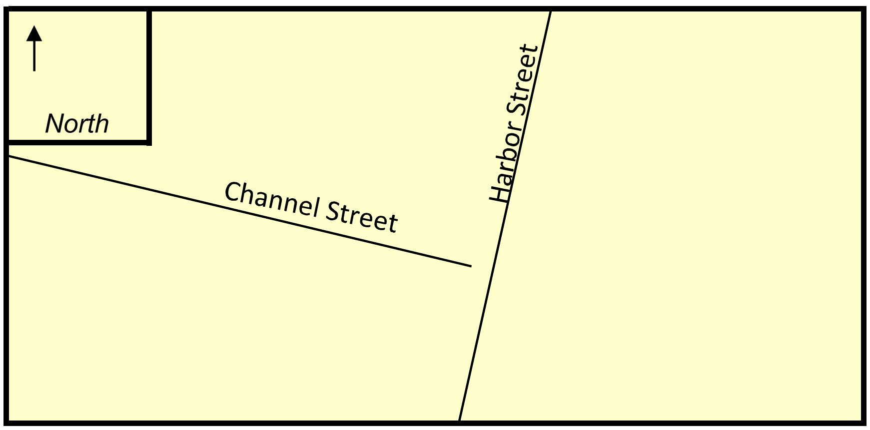
DISTRICT : 6　　UNSIGNALIZED : X　　SIGNALIZED :

~ INTERSECTION DATA ~

MAJOR STREET : Harbor Street

MINOR STREET(S) : Channel Street

INTERSECTION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	6
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	80	230	10	0		

" K " FACTOR : 0.09　　APPROACH ADT : 3555.5556　　**ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 0　　# OF YEARS : 5　　AVERAGE # OF CRASHES (**C**) : 0.00

CRASH RATE CALCULATION : 0.00　　RATE = $\frac{(C * 1,000,000)}{(ADT * 365)}$

Source (optional): Volumes from Existing Condition PM Peak

Comments:

last updated: 11/06/01

Appendix C

Boston Landmarks Commission Letter

JAN 18 2008

Boston Landmarks Commission

City of Boston
The Environment Department

Boston City Hall/Room 805
Boston, Massachusetts 02201
617/635-3850

January 11, 2008
Jim Fagan
ICCNE,LLC
c/o Cargo Ventures
One Harbor Street, Suite 101
Boston, MA 02210

NOTICE OF DETERMINATION

Application #08.598D1293
Demolition of a warehouse building at 329 Northern Avenue, South Boston

Dear Mr. Fagan:

The Boston Landmarks Commission staff have determined that the above-mentioned building is not a significant building under the Criteria for determining significance in Section 85-5.3 (a-e) of the Demolition Delay Ordinance (Article 85, Chapter 665 of the Acts of 1956 as amended). No further review by the Boston Landmarks Commission under Article 85 is required. If you have any questions regarding this decision, please contact me at 617-635-3850.

Please bring this determination with you to Inspectional Services Department when applying for a demolition permit. Thank you for your cooperation in this matter.

Sincerely,

Gary L Russell
Staff Architect

cc: Paul Osborn, BRA
Larry Mammoli, BRA

Appendix D

Tabulated Pedestrian Wind Study Results

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
1	No Build	Annual	15		Standing	21		Acceptable
	Build	Annual	13	-13%	Standing	19		Acceptable
2	No Build	Annual	17		Walking	23		Acceptable
	Build	Annual	14	-18%	Standing	22		Acceptable
3	No Build	Annual	16		Walking	21		Acceptable
	Build	Annual	18	12%	Walking	24	14%	Acceptable
4	No Build	Annual	14		Standing	20		Acceptable
	Build	Annual	10	-29%	Sitting	16	-20%	Acceptable
5	No Build	Annual	12		Sitting	18		Acceptable
	Build	Annual	13		Standing	21	17%	Acceptable
6	No Build	-	-	-	-	-	-	-
	Build	Annual	14	-	Standing	20	-	Acceptable
7	No Build	-	-	-	-	-	-	-
	Build	Annual	16	-	Walking	24	-	Acceptable
8	No Build	Annual	11		Sitting	16		Acceptable
	Build	Annual	18	64%	Walking	25	56%	Acceptable
9	No Build	Annual	12		Sitting	17		Acceptable
	Build	Annual	16	33%	Walking	23	35%	Acceptable
10	No Build	Annual	11		Sitting	16		Acceptable
	Build	Annual	14	27%	Standing	21	31%	Acceptable
11	No Build	Annual	13		Standing	18		Acceptable
	Build	Annual	14		Standing	22	22%	Acceptable
12	No Build	Annual	12		Sitting	18		Acceptable
	Build	Annual	10	-17%	Sitting	16	-11%	Acceptable
13	No Build	Annual	17		Walking	22		Acceptable
	Build	Annual	24	41%	Uncomfortable	31	41%	Acceptable
14	No Build	Annual	12		Sitting	18		Acceptable
	Build	Annual	13		Standing	19		Acceptable
15	No Build	Annual	9		Sitting	14		Acceptable
	Build	Annual	10	11%	Sitting	16	14%	Acceptable
16	No Build	Annual	11		Sitting	16		Acceptable
	Build	Annual	10		Sitting	17		Acceptable
17	No Build	Annual	10		Sitting	16		Acceptable
	Build	Annual	10		Sitting	16		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed: Speed (mph)	Mean Wind Speed: % Change	Mean Wind Speed: Rating	Effective Gust Wind Speed: Speed (mph)	Effective Gust Wind Speed: % Change	Effective Gust Wind Speed: Rating
18	No Build	Annual	13		Standing	19		Acceptable
	Build	Annual	16	23%	Walking	24	26%	Acceptable
19	No Build	Annual	13		Standing	19		Acceptable
	Build	Annual	12		Sitting	20		Acceptable
20	No Build	Annual	14		Standing	20		Acceptable
	Build	Annual	19	36%	Walking	26	30%	Acceptable
21	No Build	Annual	15		Standing	20		Acceptable
	Build	Annual	16		Walking	22		Acceptable
22	No Build	Annual	14		Standing	20		Acceptable
	Build	Annual	14		Standing	20		Acceptable
23	No Build	Annual	17		Walking	23		Acceptable
	Build	Annual	14	-18%	Standing	21		Acceptable
24	No Build	Annual	17		Walking	24		Acceptable
	Build	Annual	15	-12%	Standing	22		Acceptable
25	No Build	Annual	16		Walking	24		Acceptable
	Build	Annual	15		Standing	23		Acceptable
26	No Build	Annual	17		Walking	23		Acceptable
	Build	Annual	14	-18%	Standing	21		Acceptable
27	No Build	Annual	15		Standing	22		Acceptable
	Build	Annual	14		Standing	21		Acceptable
28	No Build	Annual	16		Walking	23		Acceptable
	Build	Annual	16		Walking	23		Acceptable
29	No Build	Annual	17		Walking	22		Acceptable
	Build	Annual	16		Walking	23		Acceptable
30	No Build	Annual	15		Standing	21		Acceptable
	Build	Annual	17	13%	Walking	24	14%	Acceptable
31	No Build	Annual	14		Standing	22		Acceptable
	Build	Annual	15		Standing	23		Acceptable
32	No Build	Annual	16		Walking	24		Acceptable
	Build	Annual	18	12%	Walking	25		Acceptable
33	No Build	Annual	19		Walking	25		Acceptable
	Build	Annual	19		Walking	26		Acceptable
34	No Build	Annual	16		Walking	25		Acceptable
	Build	Annual	18	12%	Walking	26		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
35	No Build	Annual	18		Walking	25		Acceptable
	Build	Annual	20	11%	Uncomfortable	26		Acceptable
36	No Build	Annual	18		Walking	24		Acceptable
	Build	Annual	18		Walking	25		Acceptable
37	No Build	Annual	16		Walking	22		Acceptable
	Build	Annual	19	19%	Walking	26	18%	Acceptable
38	No Build	Annual	17		Walking	23		Acceptable
	Build	Annual	18		Walking	25		Acceptable
39	No Build	Annual	14		Standing	20		Acceptable
	Build	Annual	19	36%	Walking	27	35%	Acceptable
40	No Build	Annual	12		Sitting	19		Acceptable
	Build	Annual	19	54%	Walking	27	42%	Acceptable
41	No Build	-	-	-	-	-	-	-
	Build	Annual	16	23%	Walking	23	28%	Acceptable
42	No Build	-	-	-	-	-	-	-
	Build	Annual	17	-	Walking	24	-	Acceptable
43	No Build	Annual	12		Sitting	16		Acceptable
	Build	Annual	15	25%	Standing	23	44%	Acceptable
44	No Build	Annual	15		Standing	24		Acceptable
	Build	Annual	18	20%	Walking	26		Acceptable
45	No Build	Annual	10		Sitting	16		Acceptable
	Build	Annual	14	40%	Standing	21	31%	Acceptable
46	No Build	Annual	20		Uncomfortable	27		Acceptable
	Build	Annual	23	15%	Uncomfortable	31	15%	Acceptable
47	No Build	-	-	-	-	-	-	-
	Build	Annual	16	-	Walking	24	-	Acceptable
48	No Build	Annual	11		Sitting	18		Acceptable
	Build	Annual	13	18%	Standing	21	17%	Acceptable
49	No Build	Annual	22		Uncomfortable	28		Acceptable
	Build	Annual	22		Uncomfortable	29		Acceptable
50	No Build	Annual	15		Standing	22		Acceptable
	Build	Annual	16		Walking	23		Acceptable
51	No Build	Annual	16		Walking	24		Acceptable
	Build	Annual	15		Standing	23		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
52	No Build Build	Annual Annual	14 13		Standing Standing	20 21		Acceptable Acceptable
53	No Build Build	Annual Annual	12 13		Sitting Standing	18 20	 11%	Acceptable Acceptable
54	No Build Build	Annual Annual	12 14	 17%	Sitting Standing	18 21	 17%	Acceptable Acceptable
55	No Build Build	Annual Annual	11 18	 64%	Sitting Walking	17 25	 47%	Acceptable Acceptable
56	No Build Build	Annual Annual	14 22	 57%	Standing Uncomfortable	20 30	 50%	Acceptable Acceptable
57	No Build Build	Annual Annual	14 23	 64%	Standing Uncomfortable	20 29	 45%	Acceptable Acceptable
58	No Build Build	Annual Annual	17 15	 -12%	Walking Standing	24 22		Acceptable Acceptable
59	No Build Build	Annual Annual	13 14		Standing Standing	20 21		Acceptable Acceptable
60	No Build Build	Annual Annual	12 13		Sitting Standing	17 18		Acceptable Acceptable
61	No Build Build	Annual Annual	16 16		Walking Walking	21 21		Acceptable Acceptable
62	No Build Build	Annual Annual	15 15		Standing Standing	21 20		Acceptable Acceptable
63	No Build Build	Annual Annual	16 15		Walking Standing	22 21		Acceptable Acceptable
64	No Build Build	Annual Annual	14 13		Standing Standing	20 19		Acceptable Acceptable
65	No Build Build	Annual Annual	15 13	 -13%	Standing Standing	20 19		Acceptable Acceptable
66	No Build Build	Annual Annual	15 9	 -40%	Standing Sitting	21 15	 -29%	Acceptable Acceptable
67	No Build Build	Annual Annual	15 18	 20%	Standing Walking	20 24	 20%	Acceptable Acceptable
68	No Build Build	Annual Annual	15 14		Standing Standing	21 19		Acceptable Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
69	No Build	Annual	12		Sitting	17		Acceptable
	Build	Annual	10	-17%	Sitting	15	-12%	Acceptable
70	No Build	Annual	11		Sitting	17		Acceptable
	Build	Annual	10		Sitting	15	-12%	Acceptable
71	No Build	Annual	17		Walking	23		Acceptable
	Build	Annual	15	-12%	Standing	21		Acceptable
72	No Build	Annual	17		Walking	25		Acceptable
	Build	Annual	16		Walking	24		Acceptable
73	No Build	Annual	14		Standing	19		Acceptable
	Build	Annual	13		Standing	18		Acceptable
74	No Build	Annual	15		Standing	20		Acceptable
	Build	Annual	13	-13%	Standing	19		Acceptable
75	No Build	Annual	14		Standing	19		Acceptable
	Build	Annual	15		Standing	22	16%	Acceptable
76	No Build	Annual	14		Standing	19		Acceptable
	Build	Annual	14		Standing	20		Acceptable
77	No Build	Annual	17		Walking	22		Acceptable
	Build	Annual	14	-18%	Standing	20		Acceptable
78	No Build	Annual	15		Standing	21		Acceptable
	Build	Annual	14		Standing	20		Acceptable
79	No Build	Annual	13		Standing	19		Acceptable
	Build	Annual	13		Standing	18		Acceptable
80	No Build	Annual	14		Standing	19		Acceptable
	Build	Annual	13		Standing	19		Acceptable
81	No Build	Annual	13		Standing	19		Acceptable
	Build	Annual	12		Sitting	18		Acceptable
82	No Build	Annual	12		Sitting	19		Acceptable
	Build	Annual	12		Sitting	18		Acceptable
83	No Build	Annual	13		Standing	20		Acceptable
	Build	Annual	13		Standing	19		Acceptable
84	No Build	Annual	19		Walking	27		Acceptable
	Build	Annual	20		Uncomfortable	28		Acceptable
85	No Build	Annual	14		Standing	23		Acceptable
	Build	Annual	13		Standing	21		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Annual

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
86	No Build	Annual	12		Sitting	20		Acceptable
	Build	Annual	14	17%	Standing	21		Acceptable
87	No Build	Annual	12		Sitting	18		Acceptable
	Build	Annual	12		Sitting	18		Acceptable
88	No Build	Annual	14		Standing	22		Acceptable
	Build	Annual	14		Standing	21		Acceptable
89	No Build	Annual	19		Walking	26		Acceptable
	Build	Annual	19		Walking	25		Acceptable
90	No Build	Annual	18		Walking	24		Acceptable
	Build	Annual	18		Walking	24		Acceptable
91	No Build	Annual	16		Walking	22		Acceptable
	Build	Annual	18	12%	Walking	24		Acceptable
92	No Build	Annual	14		Standing	19		Acceptable
	Build	Annual	16	14%	Walking	23	21%	Acceptable
93	No Build	Annual	15		Standing	21		Acceptable
	Build	Annual	17	13%	Walking	24	14%	Acceptable
94	No Build	Annual	11		Sitting	17		Acceptable
	Build	Annual	20	82%	Uncomfortable	27	59%	Acceptable
95	No Build	Annual	12		Sitting	19		Acceptable
	Build	Annual	12		Sitting	19		Acceptable

Configurations	Mean Wind Criteria Speed (mph)		Effective Gust Criteria (mph)	
No Build	≤ 12	Comfortable for Sitting	≤ 31	Acceptable
Existing building with existing surroundings	13 - 15	Comfortable for Standing	> 31	Unacceptable
Build	16 - 19	Comfortable for Walking		
Proposed building with existing surroundings	20 - 27	Uncomfortable for Walking		
	> 27	Dangerous Conditions		

Notes

1) Wind Speeds are for a 1% probability of exceedance

2) % Change is based on comparison with Configuration A

3) % changes less than 10% are excluded

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
1	No Build	16	13	15	17	22	18	21	23
	Build	14	10	13	13	21	16	19	20
2	No Build	19	14	17	18	25	19	23	25
	Build	16	12	14	14	24	17	22	23
3	No Build	17	13	15	16	23	17	21	23
	Build	19	14	17	19	25	19	23	25
4	No Build	15	11	14	15	21	16	20	21
	Build	11	10	10	10	17	15	16	17
5	No Build	13	10	12	13	19	15	18	20
	Build	13	10	13	14	21	17	20	23
6	No Build	-	-	-	-	-	-	-	-
	Build	14	11	13	15	21	17	20	22
7	No Build	-	-	-	-	-	-	-	-
	Build	16	13	15	17	24	19	23	26
8	No Build	12	10	12	12	18	14	17	17
	Build	19	15	18	19	27	21	25	27
9	No Build	13	10	12	12	18	14	17	18
	Build	17	13	15	16	25	19	23	24
10	No Build	12	9	11	11	18	13	17	17
	Build	15	12	14	15	23	18	21	23
11	No Build	14	10	13	13	20	15	19	19
	Build	15	12	14	15	24	18	22	22
12	No Build	13	10	12	12	19	14	18	18
	Build	11	8	10	10	17	13	16	16
13	No Build	19	13	17	19	24	17	22	24
	Build	27	18	24	23	35	24	32	31
14	No Build	13	10	12	13	20	14	18	19
	Build	15	10	13	13	22	16	20	20
15	No Build	9	8	9	10	14	11	13	15
	Build	11	8	10	11	17	13	16	18
16	No Build	11	8	11	12	17	13	16	18
	Build	11	9	10	11	17	13	16	18
17	No Build	10	8	9	10	16	13	15	17
	Build	11	9	10	11	17	13	15	18

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
18	No Build	14	10	13	14	20	15	18	20
	Build	17	13	15	18	25	19	23	26
19	No Build	14	10	13	14	20	15	18	20
	Build	13	9	12	13	21	15	19	21
20	No Build	15	12	14	15	21	17	20	21
	Build	20	15	18	20	28	21	25	27
21	No Build	16	12	15	16	22	16	20	22
	Build	17	13	15	17	24	19	22	24
22	No Build	15	11	14	15	21	17	20	22
	Build	15	11	13	14	21	16	20	21
23	No Build	18	13	16	18	25	18	23	25
	Build	15	11	14	15	22	17	21	22
24	No Build	19	13	17	19	26	19	24	26
	Build	16	12	15	17	24	17	22	24
25	No Build	18	12	16	16	27	19	25	25
	Build	17	12	16	17	25	18	23	25
26	No Build	18	13	17	18	25	18	23	25
	Build	15	11	14	15	22	17	21	22
27	No Build	16	12	15	15	24	18	23	23
	Build	15	11	14	15	23	17	22	23
28	No Build	17	13	16	16	26	19	24	24
	Build	17	13	16	17	25	19	23	25
29	No Build	18	13	17	18	24	19	22	24
	Build	17	13	16	17	24	19	23	25
30	No Build	16	13	15	16	22	18	21	23
	Build	18	13	17	17	26	19	24	25
31	No Build	15	11	14	15	23	18	22	23
	Build	16	12	15	16	24	19	23	24
32	No Build	17	14	16	17	25	21	24	25
	Build	19	16	18	19	26	22	25	27
33	No Build	19	16	18	20	26	22	25	26
	Build	20	16	18	20	28	22	26	28
34	No Build	17	14	16	17	26	21	24	26
	Build	19	16	18	19	27	23	26	27

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
35	No Build	19	16	18	19	26	22	25	27
	Build	21	17	19	21	28	22	26	28
36	No Build	18	15	17	19	25	21	24	26
	Build	18	15	18	20	25	20	24	26
37	No Build	16	13	16	17	23	18	22	23
	Build	21	15	19	21	28	20	26	28
38	No Build	18	13	16	18	24	18	23	25
	Build	19	14	18	19	26	19	24	27
39	No Build	15	11	14	15	22	16	20	22
	Build	21	15	19	21	29	20	26	29
40	No Build	13	10	12	13	20	15	18	20
	Build	21	15	19	20	27	20	25	30
41	No Build	-	-	-	-	-	-	-	-
	Build	18	13	17	17	24	18	23	24
42	No Build	-	-	-	-	-	-	-	-
	Build	17	13	16	18	24	19	23	26
43	No Build	12	10	12	12	17	14	16	17
	Build	16	12	15	17	23	18	22	24
44	No Build	16	12	15	17	24	18	22	26
	Build	20	14	19	18	28	20	26	27
45	No Build	11	9	10	10	17	14	16	16
	Build	14	10	13	15	22	17	21	23
46	No Build	20	15	18	22	27	21	26	30
	Build	24	17	22	24	32	23	30	33
47	No Build	-	-	-	-	-	-	-	-
	Build	18	13	16	16	27	19	24	25
48	No Build	12	9	11	12	19	15	18	19
	Build	14	10	13	14	22	16	21	22
49	No Build	23	17	21	23	30	22	28	30
	Build	23	17	22	23	31	22	29	30
50	No Build	16	12	15	16	23	17	22	23
	Build	17	12	16	16	24	18	23	24
51	No Build	17	12	16	17	25	18	23	25
	Build	16	11	15	16	24	17	22	25

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
52	No Build	15	10	14	15	21	15	20	22
	Build	14	10	13	14	22	16	21	22
53	No Build	13	9	12	12	19	14	18	19
	Build	13	9	12	14	21	15	20	22
54	No Build	13	9	12	12	19	14	18	18
	Build	15	11	14	15	23	17	21	23
55	No Build	13	9	11	11	19	14	17	17
	Build	20	14	18	18	28	20	25	26
56	No Build	16	11	14	14	22	16	20	20
	Build	25	17	23	22	34	23	30	30
57	No Build	15	11	14	15	21	16	19	21
	Build	26	18	23	23	33	23	30	30
58	No Build	19	14	17	18	26	19	24	25
	Build	16	12	14	16	24	18	22	24
59	No Build	15	11	13	14	22	16	20	22
	Build	16	11	14	14	23	17	21	22
60	No Build	13	9	12	13	18	14	17	19
	Build	13	10	12	14	19	14	17	19
61	No Build	17	12	16	16	23	17	21	22
	Build	17	12	16	16	22	16	21	22
62	No Build	16	12	15	16	22	16	20	22
	Build	16	11	14	16	21	16	20	22
63	No Build	17	13	16	17	23	18	21	23
	Build	16	12	15	16	22	17	20	22
64	No Build	14	11	13	15	21	16	19	21
	Build	15	10	13	15	20	15	19	20
65	No Build	16	12	15	16	22	17	20	22
	Build	14	11	12	14	20	15	18	20
66	No Build	17	12	15	13	24	16	21	19
	Build	10	8	9	10	16	12	15	16
67	No Build	16	12	15	15	21	16	20	21
	Build	19	14	18	19	26	19	24	26
68	No Build	16	13	15	16	22	17	20	22
	Build	14	11	14	14	20	16	19	20

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
69	No Build	13	10	12	13	18	14	17	18
	Build	11	8	10	11	16	12	15	16
70	No Build	12	9	11	12	18	14	17	18
	Build	11	8	10	11	16	12	15	17
71	No Build	18	13	17	18	25	18	23	24
	Build	17	12	15	16	23	16	21	22
72	No Build	17	13	16	18	25	19	24	28
	Build	17	12	15	18	25	18	23	27
73	No Build	15	11	14	15	21	16	19	21
	Build	13	10	13	13	19	14	18	19
74	No Build	16	12	15	16	22	16	20	22
	Build	14	10	13	14	20	15	19	21
75	No Build	15	11	14	15	20	15	19	21
	Build	15	12	15	16	23	17	22	24
76	No Build	15	11	14	14	20	15	18	20
	Build	14	11	13	15	21	16	19	22
77	No Build	18	13	16	18	24	17	22	24
	Build	14	11	13	14	21	16	19	21
78	No Build	16	12	15	15	23	17	21	22
	Build	15	11	14	15	22	16	20	22
79	No Build	15	11	13	14	21	16	19	20
	Build	14	10	13	13	20	15	19	19
80	No Build	15	12	14	14	21	16	19	20
	Build	15	11	13	14	20	15	19	20
81	No Build	15	11	13	14	20	16	19	20
	Build	14	10	13	13	19	14	18	19
82	No Build	13	10	12	13	20	14	18	20
	Build	13	10	12	13	20	14	18	20
83	No Build	14	11	13	15	20	16	20	22
	Build	14	10	13	15	20	15	19	21
84	No Build	22	16	20	20	30	22	28	29
	Build	21	16	20	20	30	22	28	29
85	No Build	15	11	15	15	25	18	24	23
	Build	14	10	13	14	23	17	22	22

Table 2: Mean Speed and Effective Gust Categories - Seasonal

Location	Configuration	Mean Wind Speed (mph)				Effective Gust Wind Speed (mph)			
		Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
86	No Build	13	10	13	13	21	16	21	21
	Build	14	10	13	15	22	16	21	23
87	No Build	13	10	12	13	19	15	17	19
	Build	14	10	12	13	19	15	18	19
88	No Build	15	13	14	15	23	20	22	23
	Build	14	12	13	14	22	19	21	22
89	No Build	21	16	19	20	28	21	25	27
	Build	20	15	19	20	27	21	25	27
90	No Build	19	14	18	19	26	19	24	26
	Build	19	14	18	19	26	19	24	26
91	No Build	17	13	16	17	23	17	22	23
	Build	20	14	18	20	26	19	24	26
92	No Build	14	11	14	15	20	15	19	20
	Build	17	12	16	18	24	17	23	25
93	No Build	15	12	14	16	21	17	20	22
	Build	19	13	17	17	26	19	25	25
94	No Build	12	9	11	12	18	13	17	18
	Build	23	16	21	19	31	21	28	26
95	No Build	13	10	12	13	20	16	18	20
	Build	13	10	12	13	20	16	18	20

Seasons	Months	Mean Wind Criteria Speed (mph)		Effective Gust Criteria (mph)	
Spring	March - May	≤ 12	Comfortable for Sitting	≤ 31	Acceptable
Summer	June - August	13 - 15	Comfortable for Standing	> 31	Unacceptable
Fall	September - November	16 - 19	Comfortable for Walking		
Winter	December - February	20 - 27	Uncomfortable for Walking		
Annual	January - December	> 27	Dangerous Conditions		

Configurations	
No Build	Existing building with existing surroundings
Build	Proposed building with existing surroundings

Appendix E

BPDA Accessibility Checklist

ARTICLE 80 – ACCESSIBILITY CHECKLIST

A Requirement of the Boston Planning & Development Agency (BPDA)
Article 80 Development Review Process

The Mayor's Commission for Persons with Disabilities works to reduce architectural barriers that impact accessibility in Boston's built environment. This Checklist is intended to ensure that accessibility is planned at the beginning of projects, rather than after a design is completed. It aims to ensure that projects not only meet minimum MAAB/ADA requirements, but that they create a built environment which provides equitable experiences for all people, regardless of age or ability.

All BPDA Small or Large Project Review, including Institutional Master Plan modifications, must complete this Checklist to provide specific detail and data on accessibility. An updated Checklist is required if any project plans change significantly.

For more information on compliance requirements, best practices, and creating ideal designs for accessibility throughout Boston's built environment, proponents are strongly encouraged to meet with Disability Commission staff prior to filing.

Accessibility Analysis Information Sources:

1. Age-Friendly Design Guidelines - Design features that allow residents to Age in Place https://www.enterprisecommunity.org/download?fid=6623&nid=3496
2. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design http://www.ada.gov/2010ADAstandards_index.htm
3. Massachusetts Architectural Access Board 521 CMR http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
4. Massachusetts State Building Code 780 CMR http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html
5. Massachusetts Office of Disability – Disabled Parking Regulations http://www.mass.gov/anf/docs/mod/hp-parking-regulations-summary-mod.pdf
6. MBTA Fixed Route Accessible Transit Stations http://www.mbta.com/riding_the_t/accessible_services/
7. City of Boston – Complete Street Guidelines http://bostoncompletestreets.org/
8. City of Boston – Mayor's Commission for Persons with Disabilities http://www.boston.gov/disability
9. City of Boston – Public Works Sidewalk Reconstruction Policy http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
10. City of Boston – Public Improvement Commission Sidewalk Café Policy http://www.cityofboston.gov/images_documents/Sidewalk_cafes_tcm3-1845.pdf
11. International Symbol of Accessibility (ISA) https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/guide-to-the-adastandards/guidance-on-the-isa
12. LEED – Pilot Credits for Social Equity and Inclusion https://www.usgbc.org/articles/social-equity-pilot-credits-added-leed-nd-and-leed-om

Glossary of Terms:

1. ***Accessible Route*** – A continuous and unobstructed path of travel that meets or exceeds the dimensional requirements set forth by MAAB 521 CMR: Section 20
2. ***Accessible Guestrooms*** – Guestrooms with additional floor space, that meet or exceed the dimensional requirements set forth by MAAB 521 CMR: Section 8.4
3. ***Age-Friendly*** – Implementing structures, settings and polices that allow people to age with dignity and respect in their homes and communities
4. ***Housing – Group 1 Units*** – Residential Units that contain features which can be modified without structural change to meet the specific functional needs of an occupant with a disability, per MAAB 521 CMR: Section 9.3
5. ***Housing – Group 2 Units*** – Residential units with additional floor space that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 9.4
6. ***Ideal Design for Accessibility*** – Design which meets, as well as exceeds, compliance with AAB/ADA building code requirements
7. ***Inclusionary Development Policy (IDP)*** – Program run by the BPDA that preserves access to affordable housing opportunities in the City. For more information visit: http://www.bostonplans.org/housing/overview
8. ***Public Improvement Commission (PIC)*** – The regulatory body in charge of managing the public right of way in Boston. For more information visit: https://www.boston.gov/pic
9. ***Social Equity LEED Credit*** – Pilot LEED credit for projects that engage neighborhood residents and provide community benefits, particularly for persons with disabilities
10. ***Visitability*** – A structure that is designed intentionally with no architectural barriers in its common spaces (entrances, doors openings, hallways, bathrooms), thereby allowing persons with disabilities who have functional limitations to visit

Today's Date:	**Your Name and Title:**		
1. Project Information: *If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.*			
Project Name:	2 Harbor Street		
Project Address(es):	2 Harbor Street / 329 Northern Ave. Boston, MA		
Total Number of Phases/Buildings:	1 phase / 1 building		
Primary Contact: (Name / Title / Company / Email / Phone):	Kevin Donahoe/ ICCNE LLC/ kdonahoe@cargoventures.com /617-451-0300		
Owner / Developer:	ICCNE LLC		
Architect:	Handel Architects LLP and Studio ENÉE Inc		
Civil Engineer:	Nitsch Engineering, Inc.		
Landscape Architect:	Klopfer Martin Design Group		
Code Consultant:	Cosentini Associates		
Accessibility Consultant (*If you have one*):	N/A		
What stage is the project on the date this checklist is being filled out?	SPRA / PNF / **Expanded PNF** Submitted	Draft / Final Project Impact Report Submitted	BPDA Board Approved or other: ___________

2. Building Classification and Description: *This section identifies preliminary construction information about the project including size and uses.*				
What are the dimensions of the project? See below:				
Site Area:	*189,987 SF*	Building Area:	*380,800 GSF*	
First Floor Elevation:	*20.5 FT BCB*	Any below-grade space	***Yes*** */ No*	
What is the construction classification?	**New Construction**	Renovation	Addition	Change of Use

Do you anticipate filing any variances with the MAAB (Massachusetts Architectural Access Board) due to noncompliance with 521 CMR?	YES **NO**
If yes, is the reason for your MAAB variance: (1) technical infeasibility, **OR** (2) excessive and unreasonable cost without substantial benefit for persons with disabilities? Have you met with an accessibility consultant or Disability Commission to try to achieve compliance rather than applying for a variance? Explain:	(1) OR (2)

<table>
<tr><td colspan="2"></td><td colspan="3"></td></tr>
<tr><td rowspan="3">What are principal building uses? (using IBC definitions, select all appropriate that apply):</td><td>Residential – One - Three Unit</td><td>Residential - Multi-unit, Four+</td><td>Institutional</td><td>Educational</td></tr>
<tr><td>Business</td><td>Mercantile</td><td>Factory</td><td>Hospitality</td></tr>
<tr><td>Laboratory / Medical</td><td>Storage, Utility and Other</td><td colspan="2">Other:</td></tr>
<tr><td>List street-level uses of the building:</td><td colspan="4">Lobby, laboratory/business, mechanical, loading, back-of-house and parking.</td></tr>
</table>

3. Accessibility of Existing Infrastructure:

This section explores the proximity to accessible transit lines and institutions. Identify how the area surrounding the development is accessible for people with mobility impairments, and analyze the existing condition of the accessible routes to these sites through sidewalk and pedestrian ramp reports.

Provide a description of the neighborhood where this development is located and its identifying topographical characteristics:	The project is located within the Raymond L. Flynn Marine Park. The Park, built on reclaimed land, is predominantly level.
List the surrounding accessible MBTA transit lines and their proximity to development site, including commuter rail, subway stations, and bus stops:	The Silver Line Silver Line Way station (SL 1, 2, and 3) is approximately 400 feet from the site. An additional bus stop for SL 2 and Route 4 abuts the site on Northern Avenue.

List surrounding institutions and their proximity: hospitals, public housing, elderly and disabled housing, educational facilities, others:	The RLFMP consists mostly of industrial & commercial facilities.
List surrounding government buildings and their proximity: libraries, community centers, recreational facilities, and related facilities:	Except for the offices of the EDIC, none of the listed building types exist in the RLFMP.
4. Surrounding Site Conditions – Existing: *This section identifies current condition of the sidewalks and pedestrian ramps at the development site.*	
Is the development site within a formally recognized historic district? ***If yes,*** which one?	YES **NO**
Are there existing sidewalks and pedestrian ramps at the development site? ***If yes***, list the existing sidewalk and pedestrian ramp slopes, dimensions, materials, and physical condition:	**YES** NO An existing concrete sidewalk is in place along the Northern Avenue edge of the site, with flush curbs at crosswalks at the intersections with Haul Road, Harbor Street, and the former Channel Street passing through the site. The Harbor Street ramps have detectable warning strips. The sidewalk is approximately 4-½ feet wide, though it narrows to 2-½ feet wide where street trees are planted. The concrete is in good condition with few cracks.

Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA/MAAB compliant (with yellow composite detectable warnings, cast in concrete)? ***If yes,*** provide description and photos. If ***no,*** explain plans for compliance:	YES **NO**
5. Surrounding Site Conditions – Proposed *This section identifies the proposed condition of the sidewalks and pedestrian ramps around the development site. Ideal sidewalk width contributes to lively pedestrian activity, allowing people to walk side by side and pass each other comfortably walking alone, in pairs, or using a wheelchair or walker.*	

Are the proposed sidewalks consistent with Boston Complete Streets? ***If yes***, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard. Explain:	**YES** NO Specific street type to be determined.
What are the total dimensions and slopes of the proposed sidewalks? List the widths of each proposed zone: Frontage, Pedestrian and Furnishing Zone:	To be determined within compliance of all applicable regulations. **Frontage:** **Pedestrian:** **Furnishing:**
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-ofway?	To be determined within compliance of all applicable regulations. **Frontage:** **Pedestrian:** **Furnishing:**
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-ofway? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	**YES** NO No sidewalk cafe Furnishings to be provided in pedestrian plaza. To be determined within compliance of all applicable regulations
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	YES **NO** No easement with the PIC will be sought for pedestrian ways on private property.

Will any portion of this project be going through the Public Improvement Commission (PIC)? ***If yes,*** identify PIC actions and provide details:	YES **NO** Our understanding is that PIC is not applicable in the RLFMP.

6. **Building Entrances, Vertical Connections, Accessible Routes, and Common Areas:** *The primary objective in ideal accessible design is to build smooth, level, continuous routes and vertical connections that are integrated with standard routes, not relocated to alternate areas. This creates universal access to all entrances and spaces, and creates equity for persons of all ages and abilities by allowing for "aging in place" and "visitability" (visiting neighbors).*	
Are all of the building entrances accessible? Describe the accessibility of each building entrance: flush condition, stairs, ramp, lift, elevator, or other. If all of the building entrances are ***not accessible,*** explain:	**YES** NO Most of the ground floor will be raised approximately 4' from current grade for resiliency reasons. The primary entries to the main lobby will be from Northern Avenue at existing sidewalk level (+0) and from the pedestrian plaza & pick-up/drop-off area (+4'). For the entry from Northern Avenue, there will be an interior ramp/sloped walkway to bring building users to the +4' Level. There is also an accessible exterior sloped walkway that is parallel to the interior ramp/walkway and connects the sidewalk with the drop off. There is also an accessible public pedestrian plaza in front of the building on Northern Ave. There is an additional entrance to the building for the South parking lot, which will have an accessible ramp or sloped walkway to the +4' elevation
Are all building entrances well-marked with signage, lighting, and protection from weather?	**YES** NO
Are all vertical connections located within the site (interior and exterior) integrated and accessible? Describe each vertical connection (interior and exterior): stairs, ramp, lift, elevator, or other. If all the vertical connections are ***not integrated and accessible,*** explain:	**YES** NO All vertical connections located within the site (interior and exterior) are integrated and accessible. Where any interior or exterior stairs exist, there are adjacent/nearby sloped walkways or ramps.
Are all common spaces in the development located on an accessible route? Describe:	**YES** NO See illustrations
Are all of the common spaces accessible for persons with mobility impairments? (Examples: community rooms, laundry areas, outdoor spaces, garages, decks/roof decks):	**YES** NO

What built-in features are provided in common public spaces? (Examples: built-in furnishings such as tables, seating; countertop heights, outdoor grills and benches). Are these accessible? Do benches and seats have armrests? Describe:	Built -in furnishings in common floor spaces to be determined at a later date within compliance of all applicable regulations

If this project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package:	Project is subject to Large Project Review. Accessible routes wayfinding to be developed at a later date.
7. Accessible Housing Units (If applicable) – Residential Group 1, Group 2, and Hospitality Guestrooms *In order to create accessible housing and hospitality rooms, this section addresses the number of accessible units that are proposed for barrier-free housing and hotel rooms in this development.*	
What is the total number of proposed housing units or hotel rooms for this development?	N/A
If a residential development, how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP (Inclusionary Development Policy) units?	N/A
If a residential development, will all units be constructed as MAAB Group 1* units, which have blocking and other built-in infrastructure that makes them adaptable for access modifications in the future? *(*this is required in all new construction)*:	YES NO N/A
If a residential development, how many fully built-out ADA (MAAB Group 2) units will there be? (*requirement is 5%*):	N/A
If a residential development, how many units will be built-out as ADA/MAAB sensory units? (*requirement is 2%):*	N/A

If a residential development, how many of the fully built-out ADA (MAAB Group 2) units will also be IDP units? ***If none***, explain:	N/A
If a hospitality development, how many of the accessible units will feature a wheel-in shower? Will accessibility features and equipment be built in or provided (built-in bench, tub seat, etc.)? ***If yes,*** provide details and location of equipment:	N/A
Do the proposed housing and hotel units that are standard, non-ADA units (MAAB Group 1) have any architectural barriers that	YES NO N/A

would prevent entry or use of the space by persons with mobility impairments? (Example: stairs or thresholds within units, step up to balcony, etc.). ***If yes,*** explain:	N/A
8. Accessible Parking: *See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirements and the Massachusetts Office of Disability Disabled Parking Regulations*.	
What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage? Will they be mechanically stacked? Explain:	Total Spaces: 325. Approximately 220 Spaces in one-level below grade, valet-served stackers. Approximately 70 Spaces on surface lot South of the building. Approximately 35 spaces on surface lot West of the building.
How many of these parking spaces will be designated as Accessible Parking Spaces? How many will be "Van Accessible" spaces with an 8 foot access aisle? Describe:	(8) Eight total accessible spaces will be provided. (1) of these is a van space. (4) Four accessible spaces in west surface lot. (1) of these is a van space (4) Four accessible spaces in south surface lot.
Will visitor parking be provided? If ***yes,*** where will the accessible visitor parking be located?	**YES** NO Visitor spaces to be provided both on the surface and below grade. Specific amount to be determined.
Has a drop-off area been identified? ***If yes,*** where is it located, and is it wheelchair accessible?	**YES** NO Yes, it is a wheelchair accessible. See illustrations for location

9. Community Impact:

Accessibility and inclusion extend past required compliance with building codes to providing an overall development that allows full and equal participation of persons with disabilities and older adults.

Has the proponent looked into either of the two new LEED Credit Pilots for (1) Inclusion, or (2) Social Equity – with a proposal that could increase inclusion of persons with disabilities? ***If yes,*** describe:	**YES** NO The project is familiar with the Inclusive Design pilot credit and the 3 Social Equity pilot credits. Once the project advances to the next design stage, the project will consider LEED registration, which will allow registration for these pilot credits and their further exploration for applicability to the LEED_BD+Cv4 and availability for registration. LEED Pilot credits are being changed and the registration for projects is available only while the pilot credit is open. <u>INpc125 Inclusive Design</u> As part of Inclusive Design, the design team can analyze the 5 key components of the pilot credit including the physical access, wayfinding, assistive technology, emotional health and inclusive spaces. LEED defines these components as follows: "1. Physical Access: Demonstrate increased access beyond federal, state or local regulatory requirements, whichever is more stringent. 2.Wayfinding: Implement strategies to help individuals navigate spaces with ease. 3.Assistive Technology: Provide at least one technology to enhance functionality for all building occupants. 4.Emotional Health: Include strategies to support mental and emotional health, such as the incorporation of nature, art, daylight, biophilic elements and strategies, and connectivity to outdoor space. 5.Inclusive Spaces: Include specific spaces—including, but not limited to, lactation rooms, all-gender or family restrooms, fitness spaces and so on." The team also is in the process of analyzing and assessing the feasibility of targeting one of the three (IPpc 89, 90, 91) Social equity pilot credits: IPpc89 - Social equity within the community. Two other Social Equity pilot credits include:IPpc90 - Social equity within the project team and IPpc91 - Social equity within the supply chain <u>IPpc89 - Social equity within the community</u>. As defined by SEED, "The SEED Network provides a path toward accomplishing the <u>USGBC LEED Social Equity</u> within the Community credit. The intent of this credit is to "Encourage any and all members of the project team to promote and further social equity by integrating strategies that address identified social and community needs and disparities among

	those affected by the project by: Creating fairer, healthier, and more supportive environments for those who work/live in the project; Responding to the needs of the surrounding community to promote a fair distribution of benefits and burdens; Promoting fair trade, respect for human rights, and other equity practices among disadvantaged communities."
These new LEED Pilot Credits may be awarded for filling out this checklist and evaluating ways to add features to your design that will increase equity for persons with disabilities. Have you looked at this list to assess the feasibility of adding any of these features?	YES NO LEED Pilot credits are available to LEED registered projects, while the pilot credits are open for registration. Once the design progresses, the project will consider registering for LEED and the select pilot credits which may be feasible for the project to target.
Is this project providing funding or improvements to the surrounding neighborhood or to adjacent MBTA Station infrastructure? (Examples: adding street trees, building or refurbishing parks, adding an additional MBTA elevator or funding other accessibility improvements or other community initiatives)? ***If yes,*** describe:	YES NO TBD. Specific Project-Sponsored mitigation to be determined.
Will any public transportation infrastructure be affected by this development, during and/or post-construction (Examples: are any bus stops being removed or relocated)? ***If yes***, has the proponent coordinated with the MBTA for mitigation? Explain:	YES NO TBD. Specific Project-Sponsored mitigation to be determined.
During construction, will any on-street accessible parking spaces be impacted (during and/or post-construction)? **If yes,** what is the plan for relocating the spaces?	YES NO Construction management plan yet to be determined, but it is not anticipated that any on-street accessible parking spaces will be impacted.
Has the proponent reviewed these plans with the City of Boston Disability Commission Architectural Access staff? ***If no,*** will you be setting up a meeting before filing?	YES **NO** Not yet, but will set up a meeting after the filing of the PNF.

10. Attachments *Include a list of all documents you are submitting with this Checklist – drawings, diagrams, photos, or any other materials that describe the accessible and inclusive elements of this project.*
Provide a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations, including route distances. Provided
Provide a diagram of the accessible route connections through the site, including distances. Provided
Provide a diagram the accessible route to any roof decks or outdoor space (if applicable). Provided
Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry. N/A
Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project. ☐ Toilets and showers diagrams explained in the attached figures. ☐ ☐ ☐

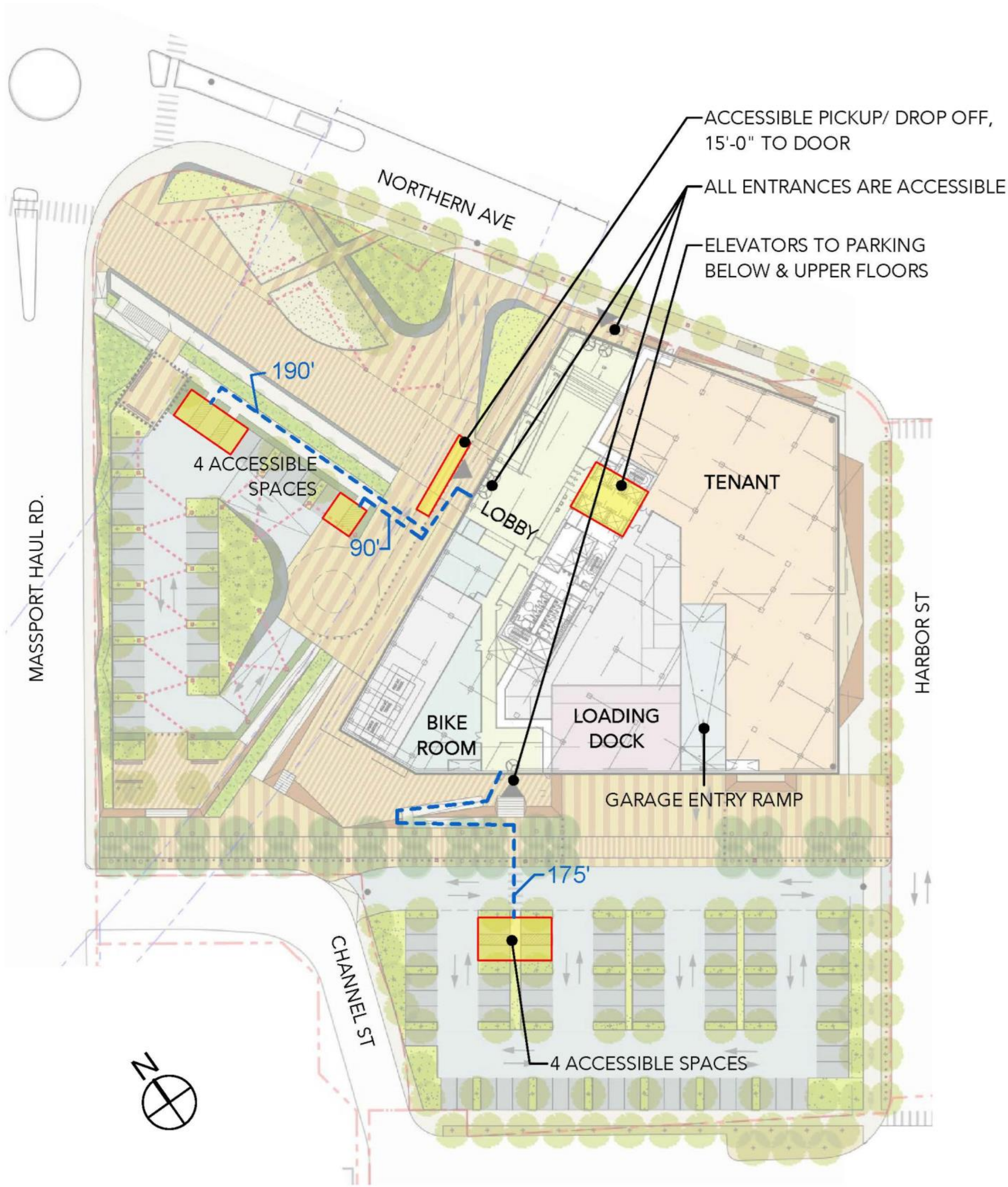
This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to ensure that all buildings, sidewalks, parks, and open spaces are welcoming and usable to Boston's diverse residents and visitors, including those with physical, sensory, and other disabilities.

For questions about this checklist, or for more information on best practices for improving accessibility and inclusion, visit www.boston.gov/disability, or contact our Architectural Access staff at:

ADA@boston.gov | patricia.mendez@boston.gov | sarah.leung@boston.gov |
617-635-3682 (phone) | 617-635-2726 (fax) | 617-635-2541 (tty)

The Mayor's Commission for Persons with Disabilities
Boston City Hall, One City Hall Square, Room 967, Boston MA 02201

Updated: October, 2019



SITE PLAN

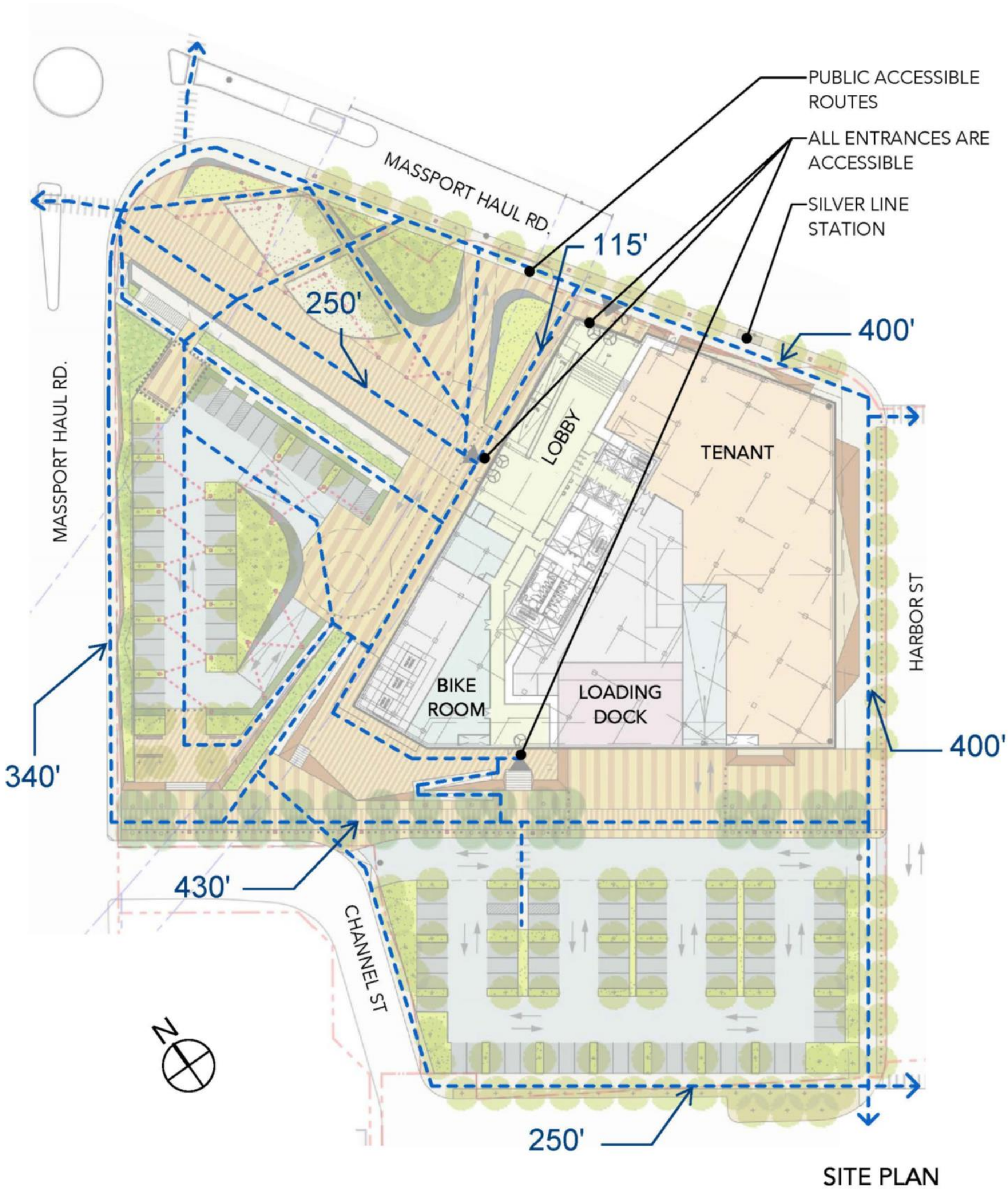
1" = 80'-0"

2 Harbor Street Boston, MA

Epsilon ASSOCIATES INC.

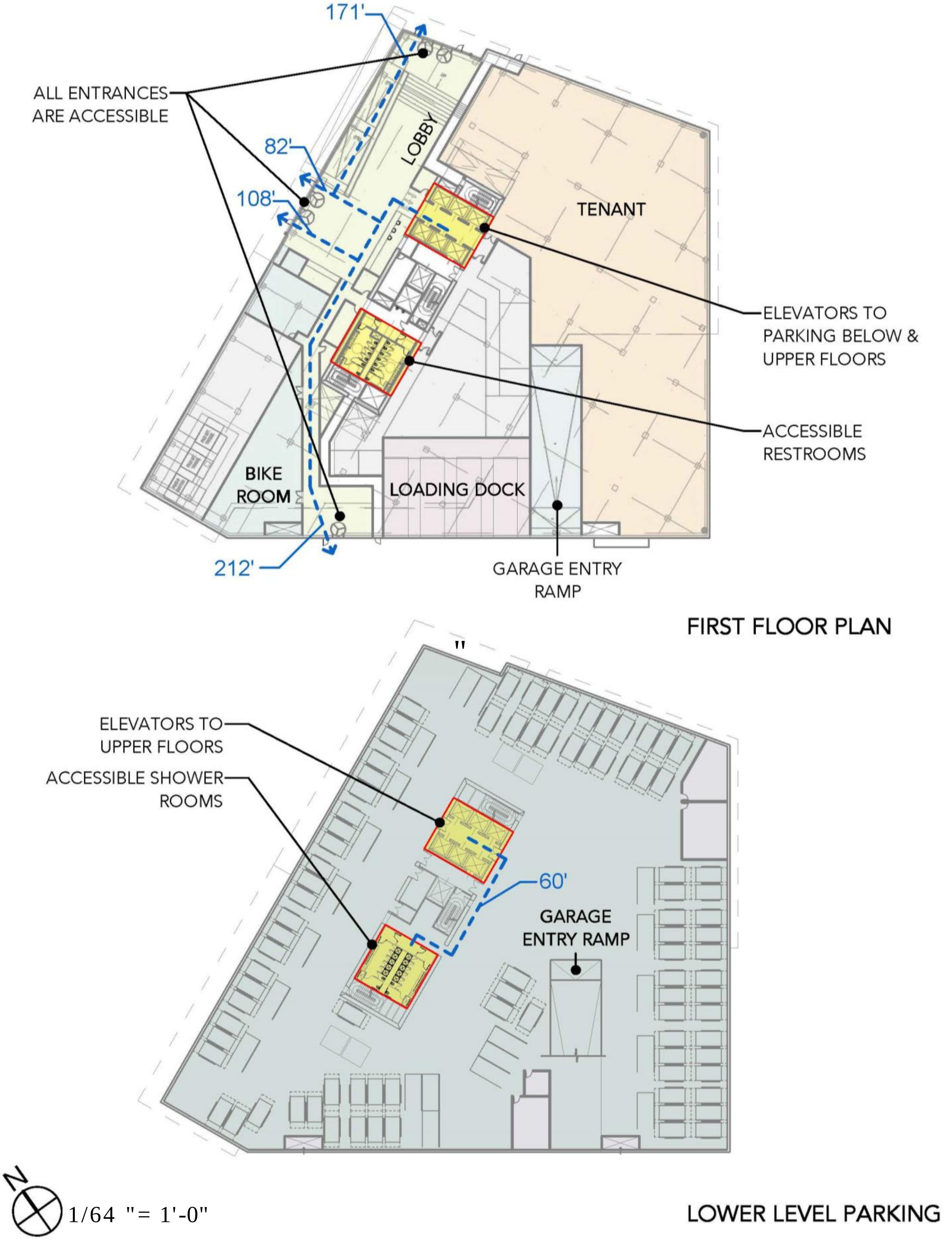
Appendix E

Figure E-1 Accessible Routes and Drop-Off Areas



1" = 80'-0"

Figure E-2 Accessible Routes through the Site

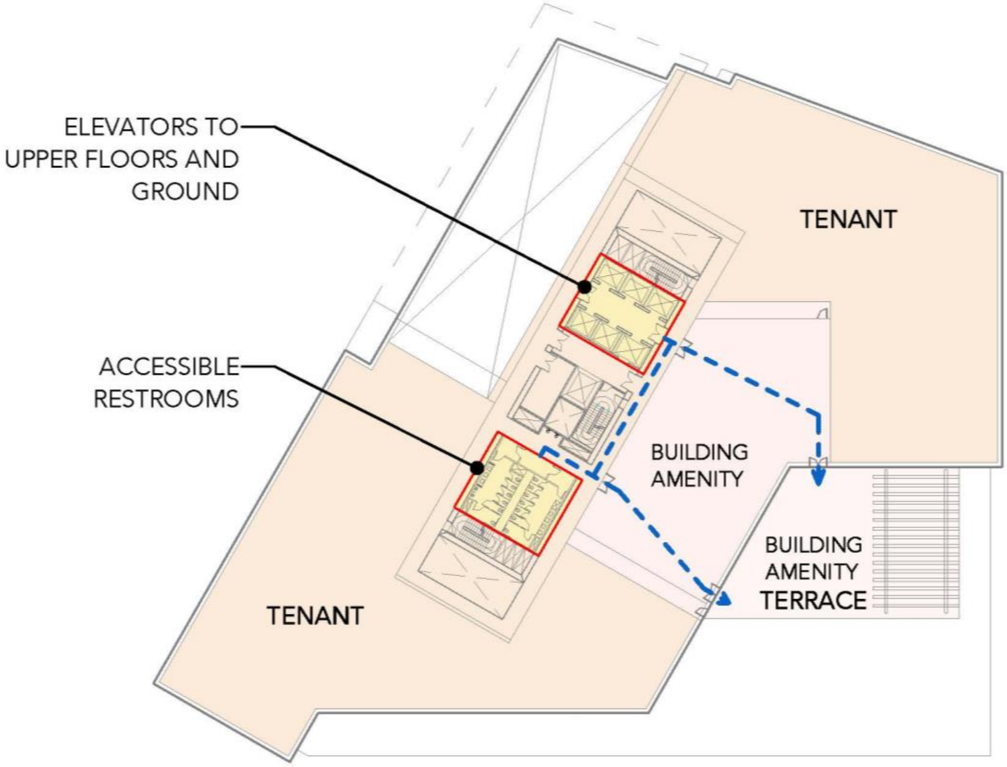


2 Harbor Street Boston, MA

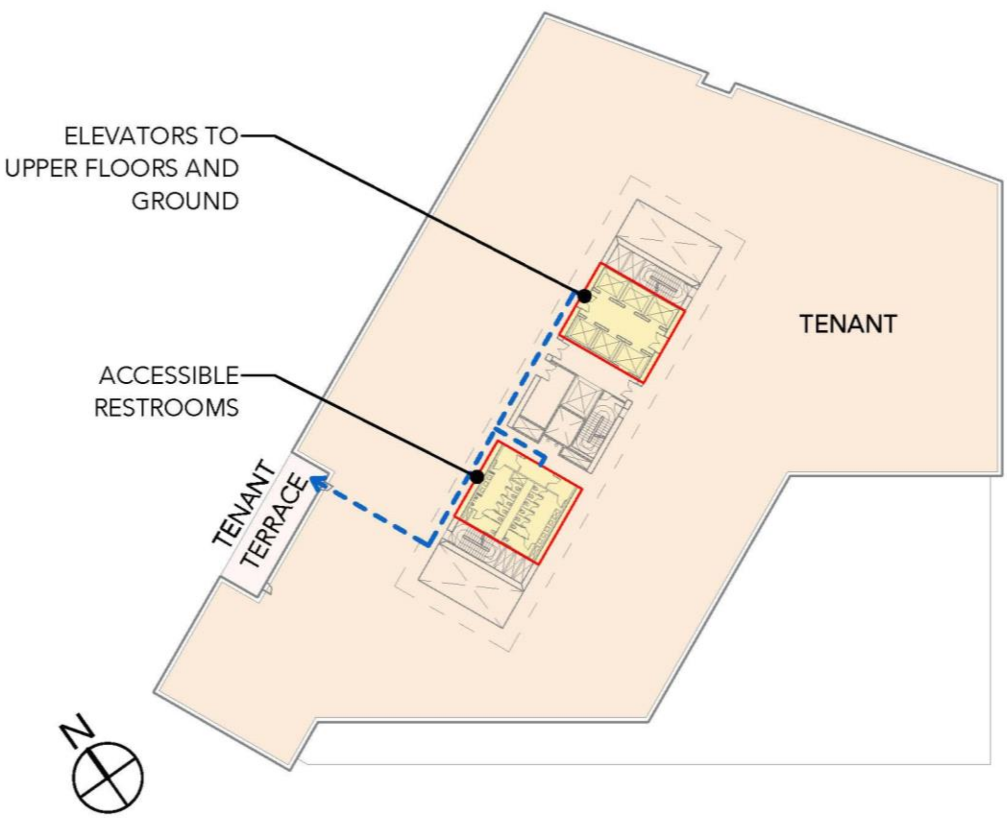
Epsilon Associates Inc.

Appendix E

Figure E-3 Accessible Routes including Distances



SECOND FLOOR PLAN



EIGHTH FLOOR PLAN

1/64 "= 1'-0"

2 Harbor Street Boston, MA

Epsilon
ASSOCIATES INC.

Appendix E

Figure E-4 Accessible Routes – Rooftop and Outdoor Areas

Appendix F

Climate Change Preparedness Checklist

Boston Planning & Development Agency

Climate Resiliency Report Summary

Submitted: 11/22/2019 10:58:04

A.1 - Project Information

Project Name:	2 Harbor			
Project Address:	2 Harbor Street, Boston, MA			
Filing Type:	Initial (PNF, EPNF, NPC or other substantial filing)			
Filing Contact:	Kevin Donahoe	ICCNE LLC	hhashimoto@epsilonassociates.com	617-451-0300
Is MEPA approval required?	Yes	MEPA date:		

A.2 - Project Team

Owner / Developer:	ICCNE LLC
Architect:	Handel Architects LLP and Studio ENEÉ
Engineer:	Cosentini Associates
Sustainability / LEED:	VvS Architects & Consultants
Permitting:	Epsilon Associates
Construction Management:	TBD

A.3 - Project Description and Design Conditions

List the principal Building Uses:	Lab / Office / R&D
List the First Floor Uses:	Lab / Office / R&D / Supporting Uses
List any Critical Site Infrastructure and or Building Uses:	TBD

Site and Building:

Site Area (SF):	189987	Building Area (SF):	380800
Building Height (Ft):	150	Building Height (Stories):	10
Existing Site Elevation – Low (Ft BCB):	15.6	Existing Site Elevation – High (Ft BCB):	17.6
Proposed Site Elevation – Low (Ft BCB):	15.6	Proposed Site Elevation – High (Ft BCB):	20.5
Proposed First Floor Elevation (Ft BCB):	20.5	Below grade spaces/levels (#):	1

Article 37 Green Building:

LEED Version - Rating System:	4	LEED Certification:	Yes
Proposed LEED rating:	Gold	Proposed LEED point score (Pts.):	60

Boston Planning & Development Agency
Climate Resiliency Report Summary

Building Envelope:

When reporting R values, differentiate between R discontinuous and R continuous. For example, use “R13” to show R13 discontinuous and use R10c.i. to show R10 continuous. When reporting U value, report total assembly U value including supports and structural elements.

Roof:	R-35.7c.i.	Exposed Floor :	R-18
Foundation Wall:	R-7.5c.i.	Slab Edge (at or below grade):	15

Vertical Above-grade Assemblies (%’s are of total vertical area and together should total 100%):

Area of Opaque Curtain Wall & Spandrel Assembly:	22	Wall & Spandrel Assembly Value:	U-0.056 / U-0.2
Area of Framed & Insulated / Standard Wall:	32	Wall Value:	R-15 c.i./ U-0.058
Area of Vision Window:	46	Window Glazing Assembly Value:	U-0.34
		Window Glazing SHGC:	0.37
Area of Doors:	TBD	Door Assembly Value :	U-0.65

Energy Loads and Performance

For this filing – describe how energy loads & performance were determined	Historic data from recent projects of similar size and program. A more thorough analysis will be conducted as Project Design is developed for all sections including the building envelope.		
Annual Electric (kWh):	8800000	Peak Electric (kW):	5000
Annual Heating (MMbtu/hr):	5100	Peak Heating (MMbtu):	39
Annual Cooling (Tons/hr):	4500000	Peak Cooling (Tons):	3400
Energy Use - Below ASHRAE 90.1 - 2013 (%):	10.5	Have the local utilities reviewed the building energy performance?:	No
Energy Use - Below Mass. Code (%):	12	Energy Use Intensity (kBtu/SF):	

Back-up / Emergency Power System

Electrical Generation Output (kW):	2000	Number of Power Units:	2
System Type (kW):	Combustion engine	Fuel Source:	Fuel oil

Emergency and Critical System Loads (in the event of a service interruption)

Electric (kW):	2000	Heating (MMbtu/hr):	5
		Cooling (Tons/hr):	500

B – Greenhouse Gas Reduction and Net Zero / Net Positive Carbon Building Performance

Boston Planning & Development Agency

Climate Resiliency Report Summary

Reducing greenhouse gas emissions is critical to avoiding more extreme climate change conditions. To achieve the City's goal of carbon-neutrality by 2050 the performance of new buildings will need to progressively improve to carbon net zero and net positive.

B.1 – GHG Emissions - Design Conditions

For this filing - Annual Building GHG Emissions (Tons): 3491

For this filing - describe how building energy performance has been integrated into project planning, design, and engineering and any supporting analysis or modeling:

Sustainability has been a part of the project since early phases. The sustainability consultant was engaged early in the project planning / concept phase. The client, design team participated in a sustainability kick off charrette during which various sustainability strategies, goals and certification options were discussed. The project prepared an early energy model during schematic design phase to analyze various design options which could impact the project performance.

Describe building specific passive energy efficiency measures including orientation, massing, building envelop, and systems:

The building's compact massing and high-performance envelope will help with energy efficiency while strategic placement of windows and interior design will allow for maximizing daylighting. Exterior light shelves, interior blinds and operable windows will increase occupant comfort while helping with energy conservation.

Describe building specific active energy efficiency measures including high performance equipment, controls, fixtures, and systems:

The building will feature advanced lighting and automated lighting controls will further aid in energy conservation. HVAC systems will be designed to ensure occupant comfort and wellbeing while also reducing the use of fossil fuels on site.

Describe building specific load reduction strategies including on-site renewable energy, clean energy, and storage systems:

TBD

Describe any area or district scale emission reduction strategies including renewable energy, central energy plants, distributed energy systems, and smart grid infrastructure:

None

Describe any energy efficiency assistance or support provided or to be provided to the project:

TBD

B.2 - GHG Reduction - Adaptation Strategies

Describe how the building and its systems will evolve to further reduce GHG emissions and achieve annual carbon net zero and net positive performance (e.g. added efficiency measures, renewable energy, energy storage, etc.) and the timeline for meeting that goal (by 2050):

TBD

C - Extreme Heat Events

Annual average temperature in Boston increased by about 2˚F in the past hundred years and will continue to rise due to climate change. By the end of the century, the average annual temperature could be 56° (compared to 46° now) and the number of days above 90° (currently about 10 a year) could rise to 90.

C.1 – Extreme Heat - Design Conditions

Temperature Range - Low (Deg.):	7	Temperature Range - High (Deg.):	91
Annual Heating Degree Days:	5621	Annual Cooling Degree Days	2938

What Extreme Heat Event characteristics will be / have been used for project planning

Days - Above 90° (#):	60	Days - Above 100° (#):	30
Number of Heatwaves / Year (#):	6	Average Duration of Heatwave (Days):	5

Describe all building and site measures to reduce heat-island effect at the site and in the surrounding area:

The project will feature underground parking. The roof will meet characteristics of a cool roof, amenity decks will be light colored. The pavement around the project will be light-colored with SRI>33. Wherever possible on the site, the project will plant native landscaping.

C.2 - Extreme Heat – Adaptation Strategies

Describe how the building and its systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heatwaves, and longer heatwaves:

The project will feature underground parking. The roof will meet characteristics of a cool roof. The pavement around the project will be light-colored with SRI>33. Wherever possible on the site, the project will plant native landscaping. Improved envelope will reduce cooling loads during heatwaves.

Describe all mechanical and non-mechanical strategies that will support building functionality and use during extended interruptions of utility services and infrastructure including proposed and future adaptations:

The project will be energy efficient, will feature advanced envelope, and reduced LPD which also aids reduction in cooling loads in the summer.

D - Extreme Precipitation Events

From 1958 to 2010, there was a 70 percent increase in the amount of precipitation that fell on the days with the heaviest precipitation. Currently, the 10-Year, 24-Hour Design Storm precipitation level is 5.25”. There is a significant probability that this will increase to at least 6” by the end of the century. Additionally, fewer, larger storms are likely to be accompanied by more frequent droughts.

D.1 – Extreme Precipitation - Design Conditions

What is the project design precipitation level? (In. / 24 Hours)	6In.

Describe all building and site measures for reducing storm water run-off:

Stormwater infrastructure will meet the Boston Water and Sewer and BPDA requirements to retain the first 1.25 inch of stormwater onsite. An underground infiltration system, or equivalent structure will be installed to infiltrate this volume into the ground. Permeable/porous pavement will be used in some site areas to further increase the site pervious area. The site is being greened, and will reduce the amount of impervious surfaces onsite, which will reduce the rate and volume of stormwater runoff.

D.2 - Extreme Precipitation - Adaptation Strategies

Describe how site and building systems will be adapted to efficiently accommodate future more significant rain events (e.g. rainwater harvesting, on-site storm water retention, bio swales, green roofs):

Storm water recharge (per above) and greening of the site through new landscaping and vegetation.

E – Sea Level Rise and Storms

Under any plausible greenhouse gas emissions scenario, the sea level in Boston will continue to rise throughout the century. This will increase the number of buildings in Boston susceptible to coastal flooding and the likely frequency of flooding for those already in the floodplain.

Is any portion of the site in a FEMA Special Flood Hazard Area?	Yes	What Zone:	AE
What is the current FEMA SFHA Zone Base Flood Elevation for the site (Ft BCB)?			16.5

Is any portion of the site in the BPDA Sea Level Rise Flood Hazard Area (see SLR-FHA online map)?	Yes

If you answered YES to either of the above questions, please complete the following questions.
Otherwise you have completed the questionnaire; thank you!

E.1 – Sea Level Rise and Storms – Design Conditions

Proposed projects should identify immediate and future adaptation strategies for managing the flooding scenario represented by the Sea Level Rise Flood Hazard Area (SLR-FHA), which includes 3.2' of sea level rise above 2013 tide levels, an additional 2.5" to account for subsidence, and the 1% Annual Chance Flood. After using the SLR-FHA to identify a project's Sea Level Rise Base Flood Elevation, proponents should calculate the Sea Level Rise Design Flood Elevation by adding 12" of freeboard for buildings, and 24" of freeboard for critical facilities and infrastructure and any ground floor residential units.

What is the Sea Level Rise - Base Flood Elevation for the site (Ft BCB)?	19.5		
What is the Sea Level Rise - Design Flood Elevation for the site (Ft BCB)?	20.5	First Floor Elevation (Ft BCB):	20.5
What are the Site Elevations at Building (Ft BCB)?	16.5-20.5	What is the Accessible Route Elevation (Ft BCB)?	16.5-20.5

Describe site design strategies for adapting to sea level rise including building access during flood events, elevated site areas, hard and soft barriers, wave / velocity breaks, storm water systems, utility services, etc.:

Elevated plaza and building entry at SLR DFE of approximately 20.5' BCB, placing mechanical equipment above the flood elevation at approximately 21.5' BCB.

Describe how the proposed Building Design Flood Elevation will be achieved including dry / wet flood proofing, critical systems protection, utility service protection, temporary flood barriers, waste and drain water back flow prevention, etc.:

Ground floor elevation will be placed at SLR DFE of approximately 20.5' BCB, with critical equipment placed 1' higher at approximately 21.5' BCB. Entrances to below-grade garage, loading areas, lobby access from Northern Avenue are below SLR DFE and will therefore require additional protection such as temporary flood barriers with wet and dry flood proofing

Describe how occupants might shelter in place during a flooding event including any emergency power, water, and waste water provisions and the expected availability of any such measures:

TBD

Describe any strategies that would support rapid recovery after a weather event:

TBD

E.2 – Sea Level Rise and Storms – Adaptation Strategies

Describe future site design and or infrastructure adaptation strategies for responding to sea level rise including future elevating of site areas and access routes, barriers, wave / velocity breaks, storm water systems, utility services, etc.:

	TBD

Describe future building adaptation strategies for raising the Sea Level Rise Design Flood Elevation and further protecting critical systems, including permanent and temporary measures:

	TBD

Thank you for completing the Boston Climate Change Checklist!

For questions or comments about this checklist or Climate Change best practices, please contact:
John.Dalzell@boston.gov

Appendix G

BPDA Smart Utilities Checklist

Boston Smart Utilities Checklist

Date Submitted:	11/22/2019 14:49:05
Submitted by:	fvardy@epsilonassociates.com

Background

The Smart Utilities Checklist will facilitate the Boston Smart Utilities Steering Committee's review of:

a) compliance with the Smart Utilities Policy for Article 80 Development Review, which calls for the integration of five (5) Smart Utility Technologies (SUTs) into Article 80 developments

b) integration of the Smart Utility Standards

More information about the Boston Smart Utilities Vision project, including the Smart Utilities Policy and Smart Utility Standards, is available at: www.http://bostonplans.org/smart-utilities

Note: Any documents submitted via email to manuel.esquivel@boston.gov will not be attached to the pdf form generated after submission, but are available upon request.

Part 1 - General Project Information

1.1 Project Name	2 Harbor Street
1.2 Project Address	2 Harbor Street / 329 Northern Avenue
1.3 Building Size (square feet) **For a multi-building development, enter total development size (square feet)*	380800
1.4 Filing Stage	Initial Filing (i.e., PNF)

1.5 Filing Contact Information

1.5a Name	Kevin Donahoe

Boston Smart Utilities Checklist

1.5b Company	ICCNE LLC
1.5c E-mail	fvardy@epsilonassociates.com
1.5d Phone Number	6174510300

1.6 Project Team

1.6a Project Owner/Developer	ICCNE LLC
1.6b Architect	Handel Architects LLP and Studio ENEE Inc
1.6c Permitting	Epsilon Associates, Inc.
1.6d Construction Management	TBD

Part 2 - District Energy Microgrids

Fill out this section if the proposed project's total development size is equal to or greater than 1.5 million square feet.

Note on submission requirements timeline:

Feasibility Assessment Part A should be submitted with PNF or any other initial filing.

Feasibility Assessment Part B should be submitted with any major filing during the Development Review stage (i.e., DPIR)

District Energy Microgrid Master Plan Part A should be submitted before submission of the Draft Board Memorandum by the BPDA Project Manager (Note: Draft Board Memorandums are due one month ahead of the BPDA Board meetings)

District Energy Microgrid Master Plan Part B should be submitted before applying for a Building Permit

Please email submission to manuel.esquivel@boston.gov

2.1 Consultant Assessing/Designing District Energy Microgrid (if applicable)	
2.2 Latest document submitted	

Boston Smart Utilities Checklist

2.3 Date of latest submission	
2.4 Which of the following have you had engagement/review meetings with regarding District Energy Microgrids? (select all that apply)	
2.5 What engagement meetings have you had with utilities and/or other agencies (i.e., MA DOER, MassCEC) regarding District Energy Microgrids? (Optional: include dates)	
2.6 Additional Information	

Part 3 - Telecommunications Utilidor

Fill out this section if the proposed project's total development size is equal to or greater than 1.5 million square feet OR if the project will include the construction of roadways equal to or greater than 0.5 miles in length.

Please submit a map/diagram highlighting the sections of the roads on the development area where a Telecom Utilidor will be installed, including access points to the Telcom Utilidor (i.e., manholes)

Please email submission to manuel.esquivel@boston.gov

3.1 Consultant Assessing/Designing Telecom Utilidor (if applicable)	
3.2 Date Telecom Utilidor Map/Diagram was submitted	
3.3 Dimensions of Telecom Utilidor (include units)	

Boston Smart Utilities Checklist

3.3a Cross-section (i.e., diameter, width X height)	
3.3b Length	
3.4 Capacity of Telecom Utilidor (i.e., number of interducts, 2 inch (ID) pipes, etc.)	
3.5 Which of the following have you had engagement/review meetings with regarding the Telecom Utilidor? (select all that apply)	
3.6 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding the Telecom Utilidor? (Optional: include dates)	
3.7 Additional Information	

Part 4 - Green Infrastructure

Fill out this section if the proposed project's total development size is equal to or greater than 100,000 square feet.

Please submit a map/diagram highlighting where on the development Green Infrastructure will be installed.

Please email submission to manuel.esquivel@boston.gov

4.1 Consultant Assessing/Designing Green Infrastructure (if applicable)	Nitsch Engineering
4.2 Date Green Infrastructure Map/Diagram was submitted	11/22/2019

Boston Smart Utilities Checklist

4.3 Types of Green Infrastructure included in the project (select all that apply)	Infiltration Chambers
4.4 Total impervious area of the development (in square inches)	17353872
4.5 Volume of stormwater that will be retained (in cubic inches)* **Note: Should equal to at least "Total impervious area (entered in section 4.4)" times "1.25 inches"*	1807695
4.6 Which of the following have you had engagement/review meetings with regarding Green Infrastructure? (select all that apply)	
4.7 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding Green Infrastructure? (Optional: include dates)	Cosentini met with Eversource on 11/19/2019
4.8 Additional Information	

Part 5 - Adaptive Signal Technology (AST)

Fill out this section if as part of your project BTD will require you to install new traffic signals or make significant improvements to the existing signal system.

Please submit a map/diagram highlighting the context of AST around the proposed development area, as well as any areas within the development where new traffic signals will be installed or where significant improvements to traffic signals will be made.

Please email submission to manuel.esquivel@boston.gov

5.1 Consultant Assessing/Designing Adaptive Signal Technology (if applicable)	

Boston Smart Utilities Checklist

5.2 Date AST Map/Diagram was submitted	
5.3 Describe how the AST system will benefit/impact the following transportation modes	
5.3a Pedestrians	
5.3b Bicycles	
5.3c Buses and other Public Transportation	
5.3d Other Motorized Vehicles	
5.4 Describe the components of the AST system (including system design and components)	
5.5 Which of the following have you had engagement/review meetings with regarding AST? (select all that apply)	
5.6 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding AST? (Optional: include dates)	
5.7 Additional Information	

Part 6 - Smart Street Lights

Fill out this section if as part of your project PWD and PIC will require you to install new street lights or make significant improvements to the existing street light system.

Please submit a map/diagram highlighting where new street lights will be installed or where improvements to street lights will be made.

Please email submission to manuel.esquivel@boston.gov

Boston Smart Utilities Checklist

6.1 Consultant Assessing/Designing Smart Street Lights (if applicable)	Nitsch Engineering, if required
6.2 Date Smart Street Lights Map/Diagram was submitted	
6.3 Which of the following have you had engagement/review meetings with regarding Smart Street Lights? (select all that apply)	
6.4 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding Smart Street Lights? (Optional: include dates)	
6.5 Additional Information	Applicability TBD based on ownership of street lights.

Part 7 - Smart Utility Standards

The Smart Utility Standards set forth guidelines for planning and integration of SUTs with existing utility infrastructure in existing or new streets, including cross-section, lateral, and intersection diagrams. The Smart Utility Standards are intended to serve as guidelines for developers, architects, engineers, and utility providers for planning, designing, and locating utilities. The Smart Utility Standards will serve as the baseline for discussions on any deviations from the standards needed/proposed for any given utility infrastructure.

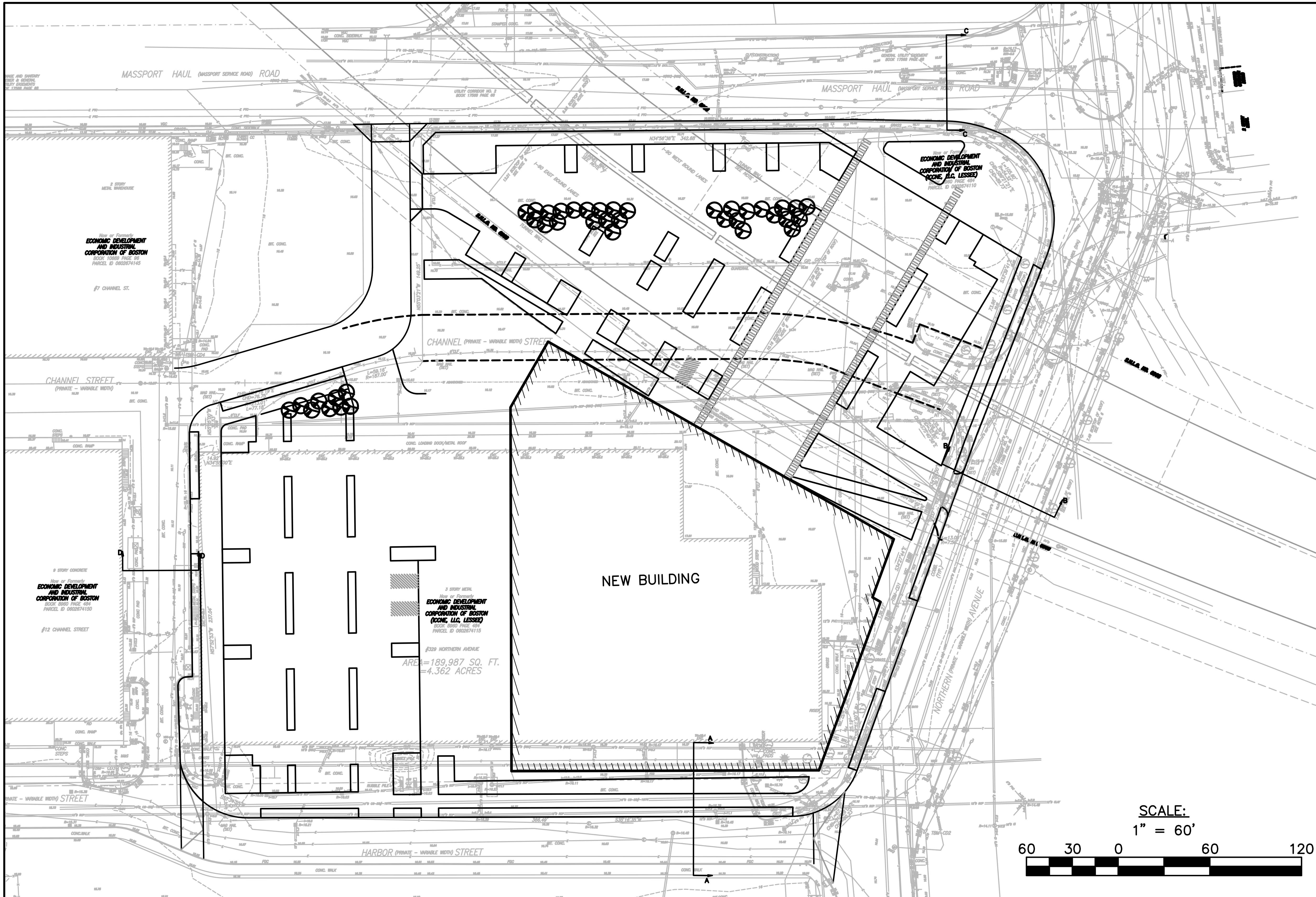
Please submit typical below and above grade cross section diagrams of all utility infrastructure in the proposed development area (including infrastructure related to the applicable SUTs).

Please submit typical below and above grade lateral diagrams of all utility infrastructure in the proposed development area (including infrastructure related to the applicable SUTs).

Please email submission to manuel.esquivel@boston.gov

Boston Smart Utilities Checklist

7.1 Date Cross Section Diagram(s) was submitted	11/22/2019
7.2 Date Lateral Diagram(s) was submitted	11/22/2019
7.3 Additional Information	



Nitsch Engineering

www.nitscheng.com

2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472

- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

BPDA SMART UTILITIES SECTIONS

INNOVATION CAMPUS
SOUTH BOSTON, MA

PREPARED FOR:

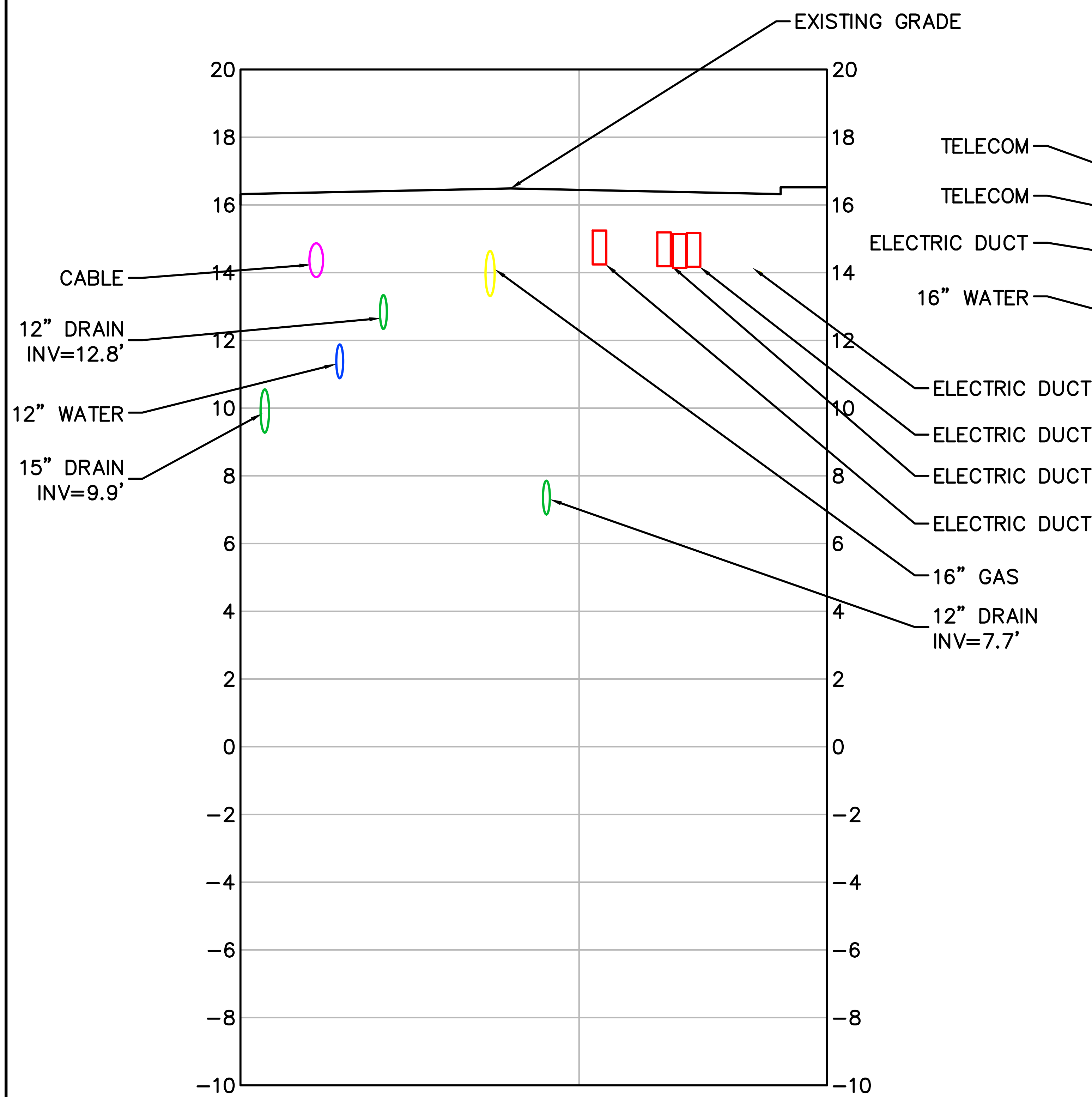
CARGO VENTURES
33 ARCH STREET, SUITE 2520, BOSTON, MA 02110

PROJECT #	13569
FILE:	13569BPDA.DWG
SCALE:	AS NOTED
DATE:	11/21/2019
PROJECT MGR:	JEG
SURVEYOR:	FELDMAN
DRAFTED BY:	GG
CHECKED BY:	CDH

SHEET: 1

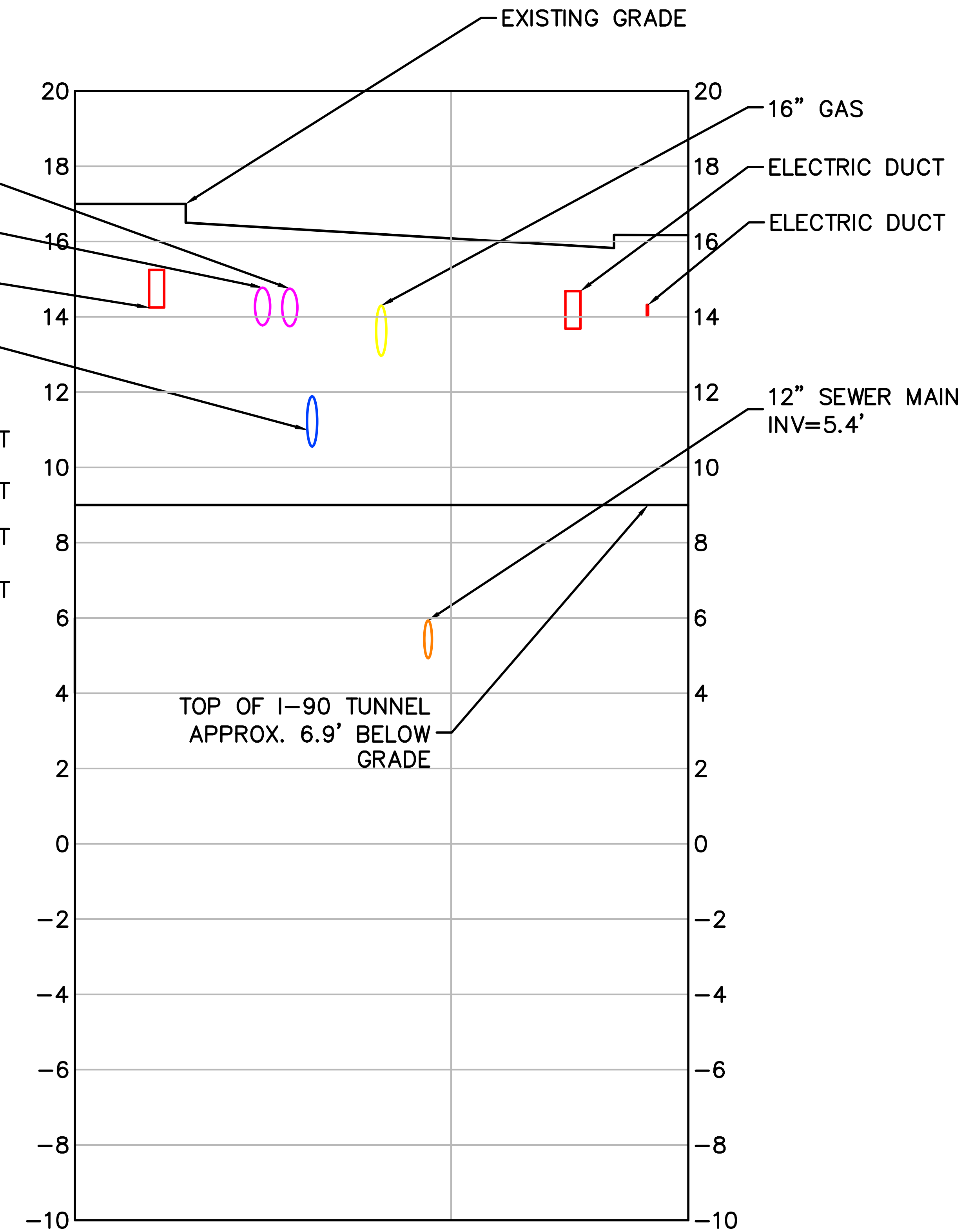
UT-1

OF 4 REV.



HARBOR STREET

SECTION A–A
VERTICAL SCALE 1"=4'
HORIZONTAL SCALE 1"=20'



NORTHERN AVENUE

SECTION B–B
VERTICAL SCALE 1"=4'
HORIZONTAL SCALE 1"=20'

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Boston, MA 02108
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F: (617) 338-6472

- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

BPDA SMART UTILITIES SECTIONS

INNOVATION CAMPUS
SOUTH BOSTON, MA

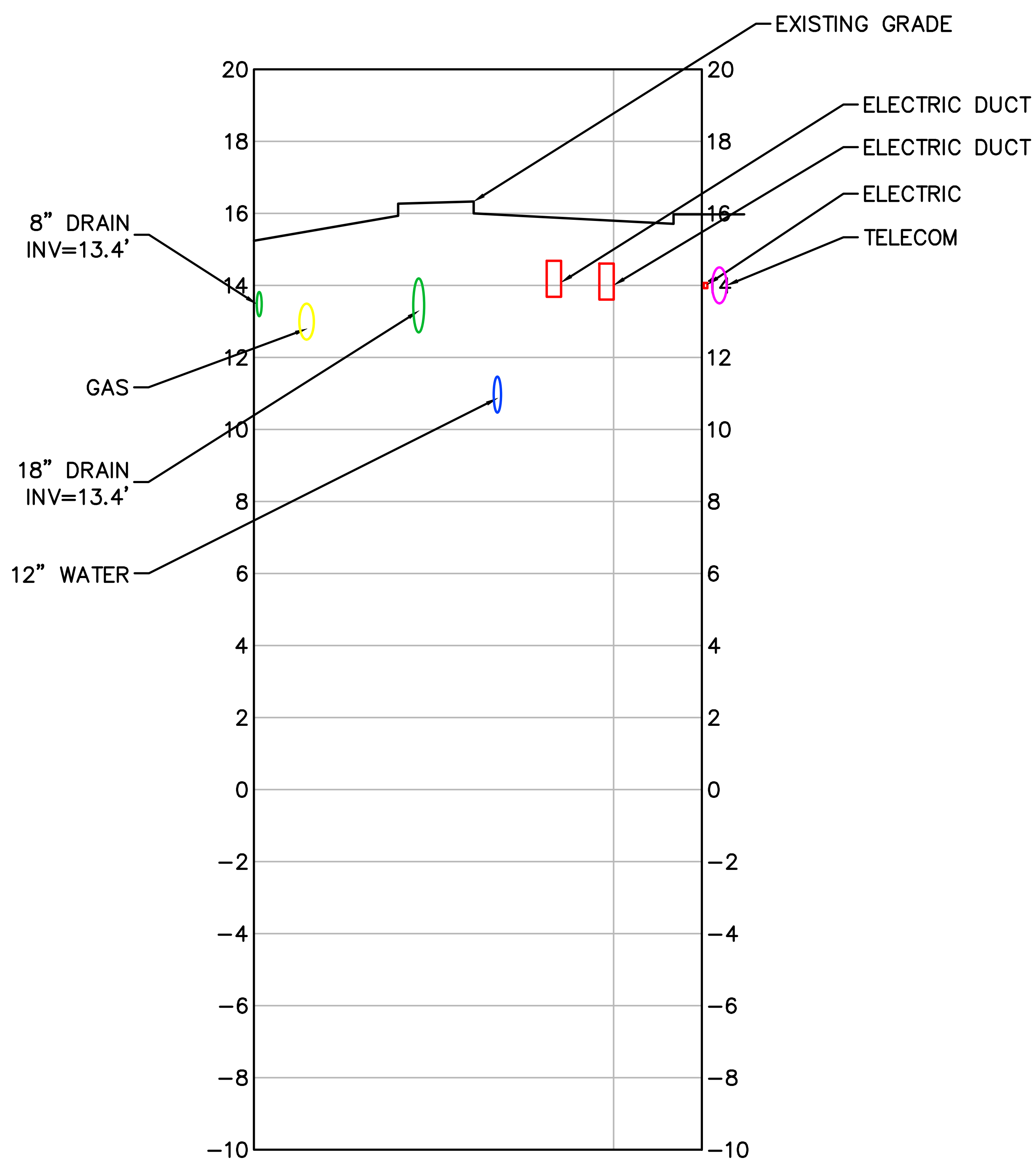
PREPARED FOR:
CARGO VENTURES
33 ARCH STREET, SUITE 2520, BOSTON, MA 02110

PROJECT #: 13569
FILE: 13569BPDA.DWG
SCALE: AS NOTED
DATE: 11/21/2019
PROJECT MGR: JEG
SURVEYOR: FELDMAN
DRAFTED BY: GG
CHECKED BY: CDH

SHEET: 1

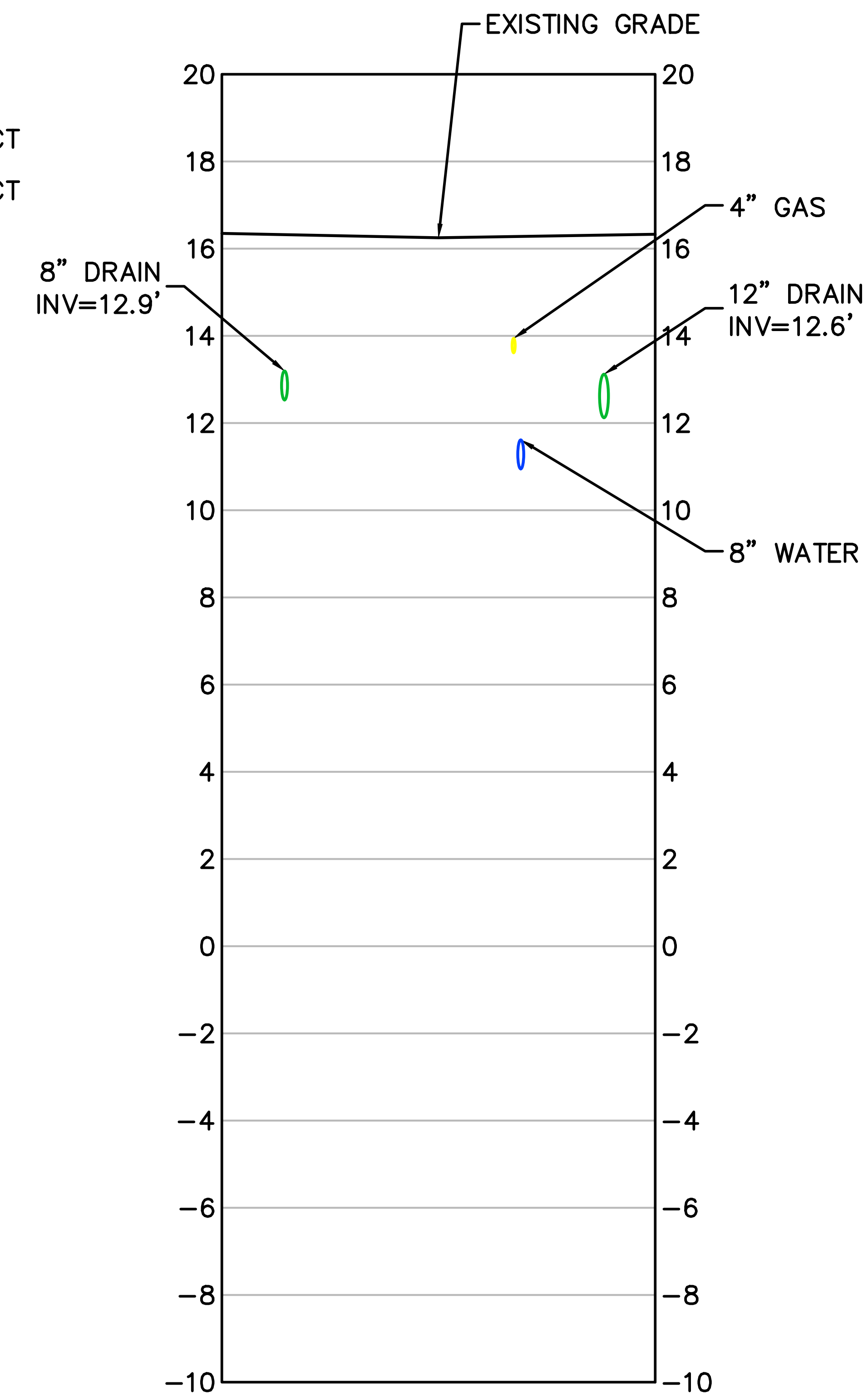
UT-2

OF 2 REV.



MASSPORT HAUL ROAD

SECTION C–C
VERTICAL SCALE 1"=4'
HORIZONTAL SCALE 1"=20'



HARBOR ST ALLEY

SECTION D–D
VERTICAL SCALE 1"=4'
HORIZONTAL SCALE 1"=20'

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- Civil Engineering
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- Transportation Engineering
- Structural Engineering
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- Planning
- GIS

BPDA SMART UTILITIES SECTIONS
INNOVATION CAMPUS
SOUTH BOSTON, MA

PREPARED FOR:
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33 ARCH STREET, SUITE 2520, BOSTON, MA 02110

PROJECT #	13569
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SURVEYOR:	FELDMAN
DRAFTED BY:	GG
CHECKED BY:	CDH

SHEET: 1

UT-3

OF 2 REV.

Appendix H

BPDA Broadband Ready Buildings Questionnaire

29				11/22/2019 9:57:26
		Form Publisher Template		
11/22/2019				

This is a simple template document automatically generated by Form Publisher.
Feel free to personalize it like any other Google Spreadsheet.

FormPublisher

Questions list:				
Project Name::				
Project Address Primary: :				
Project Address Additional: :				
Project Contact (name / Title / Company / email / phone): :				
Expected completion date:				
Owner / Developer:	ICCNE LLC			
Architect:	Handel Architects LLP and Studio ENÉE Inc			
Engineer (building systems)::	Cosentini Associates			
Permitting::	Epsilon Associates			
Construction Management:	TBD			
Number of Points of Entry:	Two Entry Locations			
Locations of Points of Entry:	Harbor Street and Northern Avenue			
Quantity and size of conduits:	4 at 4" each			
Location where conduits connect (e.g. building-owned manhole, carrier-specific manhole or stubbed at property line) :	TBD			
Other information/comments:	^Telecom only			
Do you plan to conduct a utility site assessment to identify where cabling is located within the street? This information can be helpful in determining the locations of POEs and telco rooms. Please enter ‘unknown’ if these decisions have not yet been made or you are presently unsure.:	Yes			
Number of risers:	One riser location adjacent to each elevator core			
Distance between risers (if more than one):	250'			
Dimensions of riser closets:	TBD			
Riser or conduit will reach to top floor :	Yes			
Number and size of conduits or sleeves within each riser:	TBD			
Proximity to other utilities (e.g. electrical, heating):	Located in dedicated closet adjacent to other vertical utilities			
Other information/comments:	^Telecom only			
What is the size of the telecom room?:	8'X10' at each entrance location			
Describe the electrical capacity of the telecom room (i.e. # and size of electrical circuits):	TBD			

Will the telecom room be located in an area of the building containing one or more load bearing walls?:	No			
Will the telecom room be climate controlled? :	Yes			
If the building is within a flood-prone geographic area, will the telecom equipment will be located above the floodplain?:	Yes			
Will the telecom room be located on a floor where water or other liquid storage is present?:	Yes			
Will the telecom room contain a flood drain?:	No			
Will the telecom room be single use (telecom only) or shared with other utilities?:	Yes			
Other information/comments:	^Telecom only			
Will building/developer supply common inside wiring to all floors of the building? :	Unknown			
If yes, what transmission medium (e.g. coax, fiber)? Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.:				
Is the building/developer providing wiring within each unit? :	Unknown			
If yes, what transmission medium (e.g. coax, fiber)? Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.:				
Will the building conduct any RF benchmark testing to assess cellular coverage?:	Yes			
Will the building allocate any floor space for future in-building wireless solutions (DAS/small cell/booster equipment)?:	Unknown			
Will the building be providing an in-building solution (DAS/ Small cell/ booster)? :	Unknown			
If so, are you partnering with a carrier, neutral host provider, or self-installing?:				
Will you allow cellular providers to place equipment on the roof?:	No			
Will you allow broadband providers (fixed wireless) to install equipment on the roof? :	No			
Will you allow broadband providers (fixed wireless) to install equipment on the roof? :	No			
Date contacted:				
Does Comcast intend to serve the building?:				
Transmission Medium:				
If no or unknown, why?:				
Date contacted:				
Does RCN intend to serve the building?:				
Transmission Medium:				

If no or unknown, why?:				
Date contacted:				
Does Verizon intend to serve the building?:				
Transmission Medium:				
If no or unknown, why?:				
Date contacted:				
Does netBlazr intend to serve the building?:				
Transmission Medium:				
If no or unknown, why?:				
Date contacted:				
Does WebPass intend to serve the building?:				
Transmission Medium:				
If no or unknown, why?:				
Date contacted:				
Does Starry intend to serve the building?:				
Transmission Medium:				
If no or unknown, why?:				
Do you plan to abstain from exclusivity agreements with broadband and cable providers? :	Unknown			
Do you plan to make public to tenants and prospective tenants the list of broadband/cable providers who serve the building?:	Yes			