Expanded Project Notification Form

BELVIDERE/ DALTON PROJECT

Submitted to:

Boston Redevelopment Authority
One City Hall Square
Boston, Massachusetts 02201

Submitted by:

CL BD LLC
c/o Carpenter and Company, Inc.
Charles Square, 20 University Road
Cambridge, Massachusetts 02138

And
PRG BD Investors LLC
c/o Pritzker Realty Group
300 North LaSalle, Suite 1500
Chicago, IL 60654

Prepared by:

Epsilon Associates, Inc.
3 Clock Tower Place, Suite 250
Maynard, Massachusetts 01754

In Association with:

Pei Cobb Freed & Partners
Cambridge Seven Associates, Inc.
WilmerHale
Vanasse Hangen Brustlin, Inc.
Haley & Aldrich, Inc.
WSP
Nitsch Engineering

July 12, 2013

Epsilon
ASSOCIATES INC.

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Section 1.0

Project Summary

1.0 PROJECT SUMMARY

1.1 Project Overview

CL BD LLC and PRG BD Investors LLC (the Proponent) propose to construct two new buildings at the intersection of Belvidere and Dalton Streets in the Back Bay. The proposed mixed-use project will include residential units, a hotel, open space, as well as restaurant and retail space.

The Proposed Project was envisioned in The First Church of Christ, Scientist's Plaza Revitalization Plan for the Christian Science Plaza and is included in the Master Plan Planned Development Area No. 80 for the Plaza, which was approved by the Boston Redevelopment Authority (BRA) and the Boston Zoning Commission in 2011 after a lengthy public process. The prior review process included study of potential impacts from the project in a document entitled "Plaza Revitalization Project" dated November, 2010. The public review process also included numerous community meetings and more than 20 Citizens Advisory Committee (CAC) meetings. The Proponent will acquire the project site from the Church and construct the Proposed Project independently.

The Proposed Project includes two buildings: a High-rise of approximately 58 stories and a Mid-rise of approximately 25 stories. Together, the proposed buildings will comprise approximately 950,000 square feet of gross floor area. The High-rise building will be developed by CL BD LLC, and the Mid-rise will be developed by PRG BD Investors LLC. The two buildings are analyzed together in this PNF. Separate Development Plans will be submitted to the BRA and the Zoning Commission for the two buildings.

The High-rise will be constructed on the triangular parcel surrounded by Belvidere Street to the north, 101 Belvidere Street (the former Church Colonnade Building) to the east, and Dalton Street to the west. It is expected to include approximately 290,000 square feet of hotel uses and approximately 422,500 square feet of residential space. Together with the existing tower at 111 Huntington Avenue, located a short distance the east, the new High-rise will provide a step-down transition from the Prudential Building to lower buildings on the Plaza and adjacent neighborhoods.

The Mid-rise building will be constructed opposite the High-rise on the west side of Dalton Street on what is now a surface parking lot adjacent to Belvidere Street. It will include approximately 237,500 square feet of residential space, including approximately 1,800 square feet of retail space. This building will continue the step-down in building height toward the surrounding neighborhoods.

Parking for both buildings will be provided in underground garages primarily via valet service.

The area surrounding the two buildings will be integrated together into an overall coherent site plan that will include the creation of a new approximately 4,400 square foot green open space located on the west side of Dalton Street at the east end of Saint Germain Street. The open space will serve as a buffer to the residences on Saint Germain Street and provide a public amenity for the neighborhood.

The Proponent will work with the BRA and the Boston Transportation Department (BTD) to implement several changes to the streets around the project site in order provide for smooth traffic flow. These changes include making Dalton Street between Belvidere and Saint Germain Street one-way southbound, extending Clearway Street from its current terminus at Dalton Street to connect with Belvidere Street, and making geometric improvements to the Dalton Street/Belvidere Street intersection. Extensive pedestrian improvements around the buildings will also be made.

The Project is described in more detail in Chapter 2. Transportation improvements specifically are presented and analyzed in Chapter 3.

1.2 Development Team

Address/Location:	Belvidere/ Dalton Streets
Developer:	CL BD LLC c/o Carpenter and Company, Inc. Charles Square, 20 University Road Cambridge, MA 02138 (617) 864-2800 Peter Diana
	PRG BD Investors LLC c/o Pritzker Realty Group 300 North LaSalle, Suite 1500 Chicago, IL 60654 (312) 873-4800 Seth Martin

Architect:	Pei Cobb Freed & Partners 88 Pine Street New York, NY 10005 (212) 872-4020 Henry N. Cobb
	Cambridge Seven Associates, Inc. 1050 Massachusetts Avenue Cambridge, MA 02138 617-492-7000 Gary Johnson
Landscape Architect	Michael Van Valkenburgh Associates Inc. 231 Concord Ave Cambridge, MA 02138 (617) 864-2076 Laura Solano
Legal Counsel:	WilmerHale 60 State Street Boston, MA 02109 William R. O'Reilly, Jr.
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 David Hewett
Transportation and Parking Consultant	Vanasse Hangen Brustlin, Inc. 99 High Street, 10th floor Boston, MA 02110 (617) 728-7777 Susan Sloane-Rossiter
Civil Engineer	Nitsch Engineering, Inc. 2 Center Plaza, Suite 430 Boston, MA 02108-1928 (617) 338-0063 Gary Pease, P.E.

MEP Engineer	WSP 88 Black Falcon Avenue, Suite 210 Boston, MA 02210 (978) 210-1600 Michael Brown Gary Pomerantz
Geotechnical Consultant:	Haley & Aldrich 465 Medford Street Boston, MA 02129 (617) 886-7400 Mark Haley

1.3 Public Benefits

The Proposed Project will provide many benefits to the Christian Science Plaza, the surrounding neighborhood, and the City of Boston in terms of new jobs, tax revenue, infrastructure and public realm improvements, and the addition of beautiful and sustainably designed new buildings to Boston's skyline.

The Project includes new public open space of approximately 4,400 square feet on Saint Germain Street. This space will provide separation between the new buildings and the existing residential buildings on Saint Germain Street and be an attractive amenity for the neighbors and abutters. The design for the open space includes a lawn area, trees, and seating.

The portion of Dalton Street adjacent to the project will be reconstructed as a pedestrian-friendly public way. The new streetwall and retail spaces created by the Project will improve the pedestrian experience in the area. Clearway Street will also be extended to Belvidere Street as part of the project, including new sidewalks.

The Proposed redesign of the Belvidere Street/Dalton Street intersection will improve site access and neighborhood circulation while also improving the overall safety and functioning of the intersection.

In addition to the open space and infrastructure improvements described above, the project will have the following benefits:

- Creation of an estimated 250-300 permanent jobs;
- Creation of an estimated 1,000-1,200 construction jobs;
- Generation of housing and jobs linkage payments of approximately $1,800,000;

- Generation of an estimated $10,000,000 of annual new real estate taxes;
- Generation of approximately $6,000,000 in annual hotel occupancy and meals tax revenues to the City and to the Commonwealth;
- Addition of distinctive and sustainably designed new architecture;
- Affordable housing commitment pursuant to the Mayor's Executive Order; and
- Creation of additional market-rate housing.

1.4 Preliminary Project Schedule

The Proponent expects to begin construction in early 2014. Construction is expected to take approximately 36 months to complete.

The City of Boston allows construction work from 7:00 a.m. to 6:00 p.m. Monday through Friday. Construction outside of those hours requires a permit. Construction hours will comply with the City's regulations, with no work anticipated on the weekends. In the event that weekend work is necessary, the Proponent will obtain required City approvals.

1.5 Consistency with Zoning

The Belvidere/Dalton Site (the "Site") is included in the Master Plan for Planned Development Area No. 80, Christian Science Plaza, Huntington Avenue/Prudential Center, Boston, dated August 16, 2011 (the "PDA Master Plan"). The Site is located within the Huntington Avenue/Prudential Center District under Article 41 of the Boston Zoning Code (the "Code"), the Restricted Parking District under Article 3-1A.a. of the Code and the Groundwater Protection Overlay District under Article 32 of the Code.

The PDA Master Plan authorizes three new buildings in the PDA containing up to 950,000 square feet of Gross Floor Area between the Huntington Avenue Site and the Belvidere/Dalton Site. The Proponent has submitted a proposed First Amendment to Master Plan, which would increase the permitted Zoning Height of the High-rise Building from 512 feet to 691 feet, and would increase the permitted Zoning Height of the Mid-rise Building from 251 feet to 285 feet. If the First Amendment to Master Plan is adopted, the resulting increase in the permitted height of the High-rise Building and Mid-rise Building could accommodate the allocation of all or substantially all of the 950,000 square feet of Gross Floor Area authorized by the PDA Master Plan. The Proponent also has submitted a Development Plan for the High-rise Building and a Development Plan for the Mid-rise Building for review by the BRA and approval by the Boston Zoning Commission, which would authorize the Project as described herein.

In accordance with Section 41-19 of the Code, off-street parking for the Site will be provided as required in the applicable Development Plan. Parking for new buildings on the Site will be provided primarily by parking spaces in the existing underground Christian Science Center garage and underground parking to be created in the existing Colonnade Building at 101 Belvidere Street, and approximately 21 parking spaces to be constructed under the Mid-rise Building.

The Master Plan requires that the new buildings on the Site will be designed to meet the groundwater standards in Article 32 of the Code for the Groundwater Protection Overlay District, and that upon written determination by the Boston Water and Sewer Commission that such standards are met and such determination is provided to the BRA and the Boston Groundwater Trust, a conditional use permit from the Board of Appeal shall not be required. The PDA Master Plan acknowledges that all buildings subject to Article 80 of the Code, Large Project Review, are subject to Article 37 of the Code, Green Buildings.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

The Proponent is not aware of any legal judgments in effect or legal actions pending with respect to the Project.

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

The Proponent does not have a history of tax arrears on property that it owns in the City of Boston.

1.6.3 Site Control

The Proponent has entered into a Purchase and Sale Agreement with the Trustees of Church Realty Trust to acquire the Property.

1.6.4 Legal Description – Site Limits

The site is shown as Lots 1A, 1B and 2 on the Subdivision Plan prepared by Hancock Associates dated August 15, 2012 was recorded at the Suffolk County Registry of Deeds in Plan Book 2013, Page 311 on August 30, 2012. The southeast lot line of the High-rise Site is subject to minor modification. The Subdivision Plan is included in Appendix A.

1.7 Regulatory Controls and Permits

Table 1-1 presents a preliminary list of local, state, and federal permits and approvals that may be required for the Proposed Project. The list is based on current information about the Proposed Project and is subject to change as the design of the Project advances. Some of the permits listed may not be required, while there may be others not listed that will be needed.

Table 1-1 Preliminary List of Permits and Approvals

Agency	Approval
Boston	
Boston Redevelopment Authority	Article 80B Large Project Review Article 80C Planned Development Area Review
Boston Zoning Commission	Article 80C Planned Development Area Review
Boston Civic Design Commission	Design Review
Boston Landmarks Commission	Comment During Article 80B Process
Boston Water and Sewer Commission	Site Plan Review/General Service Application/Water and Sewer Connection Permits
Public Improvement Commission	Specific Repairs/Discontinuance (if required)
Boston Transportation Department	Construction Management Plan/Transportation Access Plan Agreement
Boston Public Works Department	Curb Cut Permit(s)
Boston Air Pollution Control Commission	Parking Freeze Permit/Exemption
Boston Public Safety Commission	Permit to Erect and Maintain a Parking Structure
Joint Committee on Licenses	Flammable Storage License
Boston Inspectional Services Department	Demolition/Building Permits
Licensing Board for the City of Boston	Hotel/ Restaurant Operating Permits
State	
Executive Office of Environmental Affairs	Massachusetts Environmental Policy Act Review (Previously obtained, EEA #14828)
Massachusetts Historical Commission	Determination of No Adverse Effect
Department of Environmental Protection	Notice of Demolition/Construction/Fossil Fuel and Sewer Connection Permit*
Massachusetts Water Resources Authority	Construction Site Dewatering Discharge Permit (if necessary)
Massachusetts Department of Transportation	MGL, C. 40 Sec. 54A, Consent to construction on former railroad right-of-way.
Federal	
Federal Aviation Administration	Determination of No Hazard to Air Navigation
Environmental Protection Agency	NPDES Notice of Intent for Construction – Stormwater

*Sewer connection permit(s) to be issued by MassDEP and/or BWSC, depending on the outcome of pending regulatory changes.

The Proposed Project has already undergone review pursuant to the Massachusetts Environmental Policy Act (MEPA) as part of the Christian Science Plaza Revitalization Project (EEA Number 14828). The Secretary of Energy and Environmental Affairs issued a Certificate on the Environmental Notification Form for the Plaza Revitalization Project on January 20, 2012 determining that the Project did not require the preparation of an Environmental Impact Report.

Section 2.0

Project Description

2.0 PROJECT DESCRIPTION

This Chapter describes the Proposed Project in detail, including its location, Project site plan, and proposed building program. It also discusses how the Project has evolved from the original proposal included in the PDA Master Plan for the Christian Science Plaza.

2.1 Surrounding Neighborhood

The Proposed Project is located along Boston's so-called "High Spine" that generally runs between Boylston Street and Huntington Avenue in the Back Bay. The Project site also sits on the northern edge of the roughly triangular shaped Christian Science Plaza. The Plaza itself is located at the nexus of several neighborhoods, including the Fenway, Back Bay, the South End/St. Botolph, and the Prudential. These neighborhoods include a mix of residential, retail, office, institutional, nonprofit and cultural uses that combine to create a vibrant city fabric. Immediately adjacent to the Plaza are the St. Botolph and Saint Germain residential areas, and Symphony Hall. The proposed new development on this site is designed to blend well with the existing ensemble of buildings and uses and to harmonize with the surrounding area. Figures 2-1 and 2-2 present photos of the existing conditions in the area in and around the project site

2.2 Project Parcels

The Proposed Project site is located at the intersection of Belvidere and Dalton Streets and comprises three separate parcels that will be developed together.

Lot 1A is a triangular vacant parcel surrounded by Belvidere Street to the north, 101 Belvidere Street (the former Church Colonnade Building) to the east, and Dalton Street to the west. This parcel is approximately 28,544 square feet. The proposed High-rise building will be built on this parcel.

Lot 2 is located west of Dalton Street at its intersection with Belvidere Street. It is currently used as a surface parking lot. It is approximately 12,376 square feet. The proposed Mid-rise building will be built on this parcel.

Lot 1B is located on the west side of Dalton Street at its intersection with Saint Germain Street. It is currently used as a surface parking lot. This parcel is approximately 4,678 square feet. This parcel will be converted to public open space.

The Project site is shown on a USGS Map in Figure 2-3 and on an aerial photograph base in Figure 2-4. A Subdivision Plan prepared by Hancock Associates dated August 15, 2012 which shows the three parcels is included in Appendix A

Belvidere/Dalton Project **Boston, Massachusetts**

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Figure 2-1

View from Dalton and Clearway Streets looking north toward the High-rise site

Belvidere/Dalton Project **Boston, Massachusetts**

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Figure 2-2

View from Dalton and Belvidere Streets facing west toward the Mid-rise site

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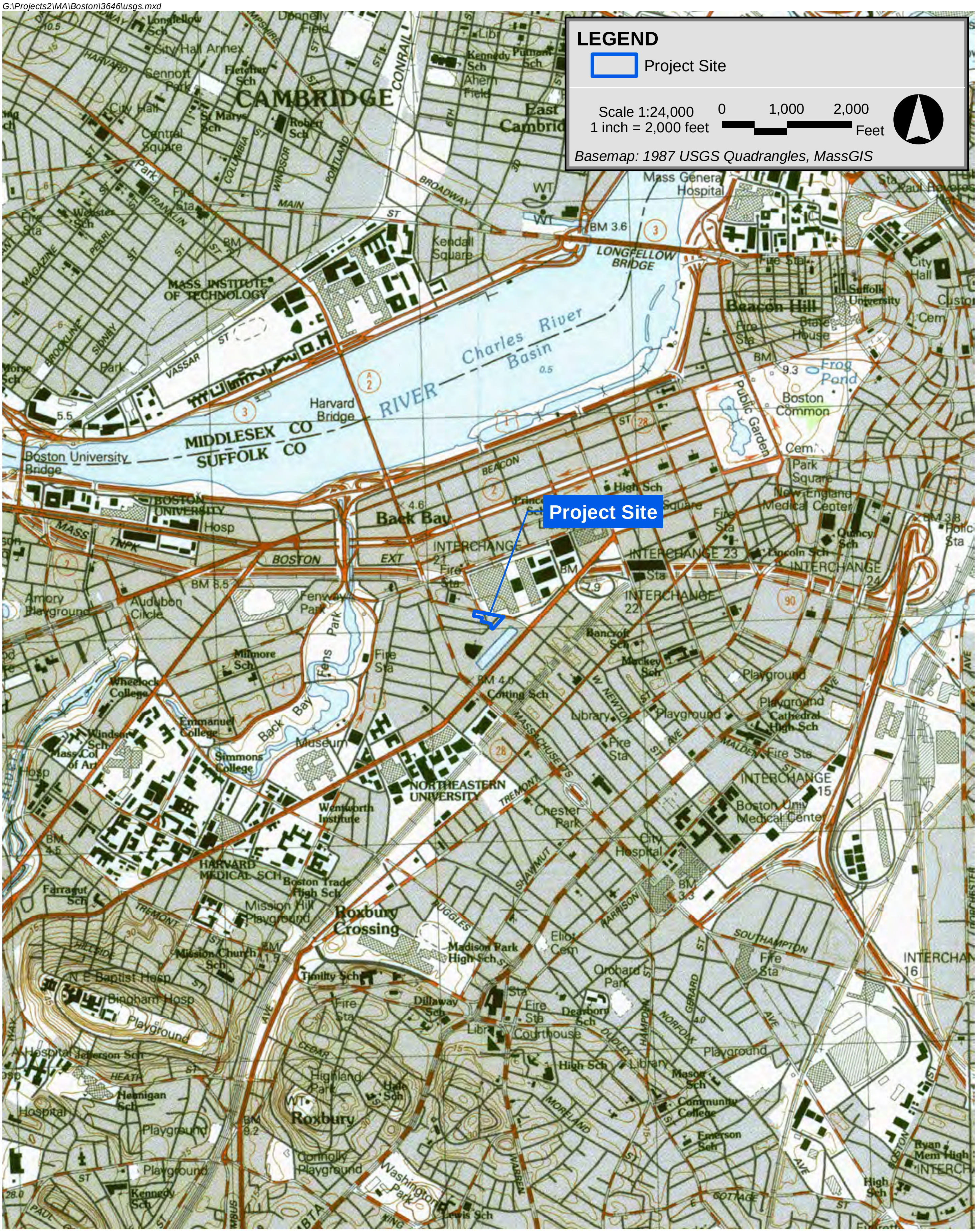

Belvidere/Dalton Project   Boston, Massachusetts

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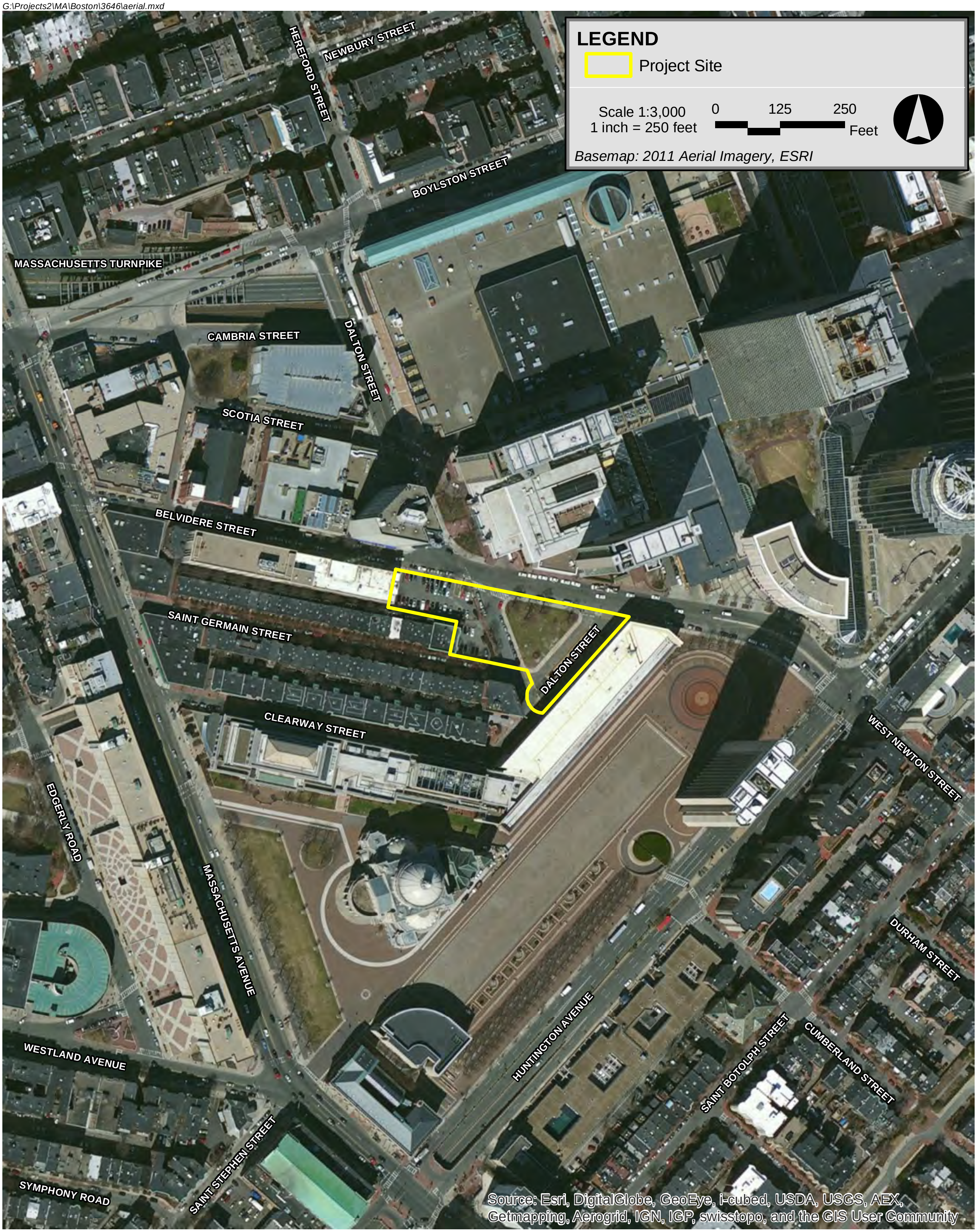
Figure 2-3
USGS Locus

G:\Projects2\MA\Boston\3646\aerial.mxd



Belvidere/Dalton Project **Boston, Massachusetts**

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Figure 2-4
Aerial Locus

2.3 Previous Planning for the Site

As was briefly described in Section 1.1, the Proposed Project was originally conceived in The First Church of Christ Scientist's Plaza Revitalization Project Plan for the Christian Science Plaza ("Revitalization Plan") and was included in the Master Plan Planned Development Area No. 80 for the Plaza, which was approved by the BRA and the Boston Zoning Commission in 2011 after a lengthy public involvement process that included more than 20 Citizens Advisory Committee meetings.

The Revitalization Plan called for a total of 950,000 square feet of new development to be constructed between two locations, together with 2,000 square feet allocated to a pavilion on the Christian Science Plaza, near the intersection of Huntington Avenue and Belvidere Street, which is not included in the Project studied by this PNF. The first location was the current Proposed Project site described in the preceding section. It was referred to in the Revitalization Plan as the Belvidere/Dalton Site. This site was proposed for approximately 800,000 square feet of development to be divided into an approximately 512-foot high-rise building and an approximately 250-foot high mid-rise building

The second location for development envisioned in the Revitalization Plan was along Huntington Avenue adjacent to the Church's Sunday School Building, where an approximately 291-foot high, 150,000 square-foot building was envisioned. Figure 2-5 includes an image of both locations.

Since the completion of the Revitalization Plan, there has been additional consideration given regarding the suitability of the Huntington Avenue Site for development. While there remains a desire to activate the street edge at that location through the introduction of a new use, there is also concern regarding the impacts a development of the size contemplated in the Revitalization Plan would have on the historic/aesthetic aspects of the Plaza, as well as concerns about wind and shadow impacts of a development of that size on the Huntington Avenue site. Therefore, the Proposed Project has been designed to shift development away from the Huntington Avenue Site by moving its proposed square footage to the Belvidere/Dalton site. Thus, the Proposed Project locates on the Belvidere/Dalton Site, which sits within the High Spine, the 950,000 square feet of development which is all of the new development approved in the PDA Master Plan other than the 2,000 square feet allocated to the pavilion. This approach is in lieu of locating some of the approved density in a tall building on Huntington Avenue, which would sit directly on the Christian Science Plaza. While this will result in taller buildings at the Belvidere/Dalton site, the impacts will be minimized due to the site's location adjacent to taller buildings such as the Prudential and 111 Huntington. Expected impacts are analyzed in detail in the following chapters.

Table 2-1 compares the current Proposed Project with the development scenario that was envisioned in the Revitalization Plan and current PDA Master Plan.

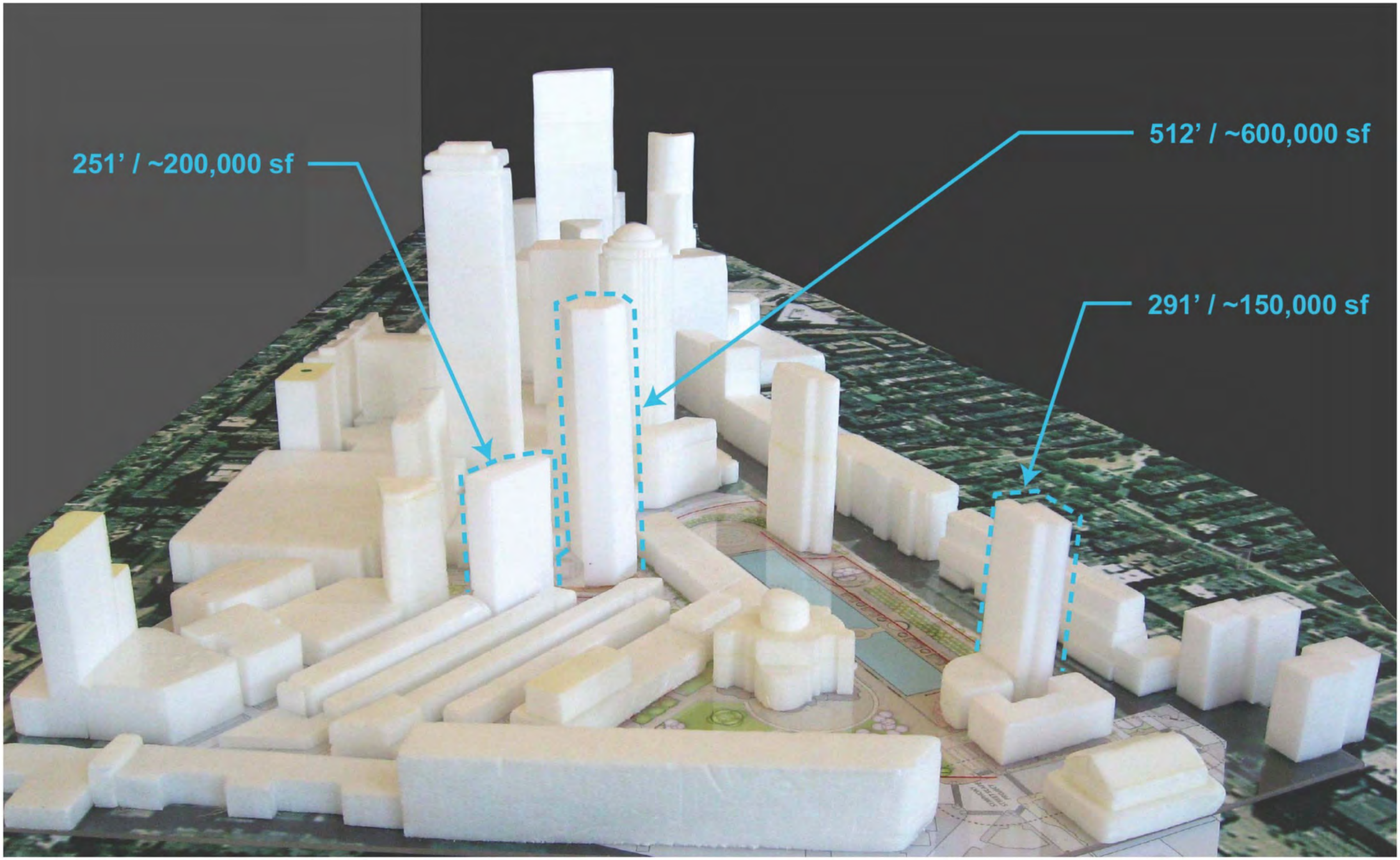


Figure 2-5

Model Showing the Approved Master Plan Development

Table 2-1 Proposed Project Compared with Revitalization Plan Development Scenario

Proposed Project	Revitalization Plan Development Scenario
Belvidere/Dalton Site **High rise Building**	**Belvidere/Dalton Site** **High rise Building**
Zoning Height – 691 feet	Zoning Height – 512 feet
Gross Floor Area – 712,500	Gross Floor Area – 600,000
Belvidere/Dalton Site **Mid Rise Building**	**Belvidere/Dalton Site** **Mid Rise Building**
Zoning Height – 285 feet	Zoning Height – 251 feet
Gross Floor Area – 237,500	Gross Floor Area – 200,000
Huntington Avenue Site	**Huntington Avenue Site**
N/A – No building proposed at this time	Zoning Height – 291 feet
N/A – No building proposed at this time	Gross Square footage – 150,000
Total Gross Floor Area = 950,000	**Total Gross Floor Area = 950,000**

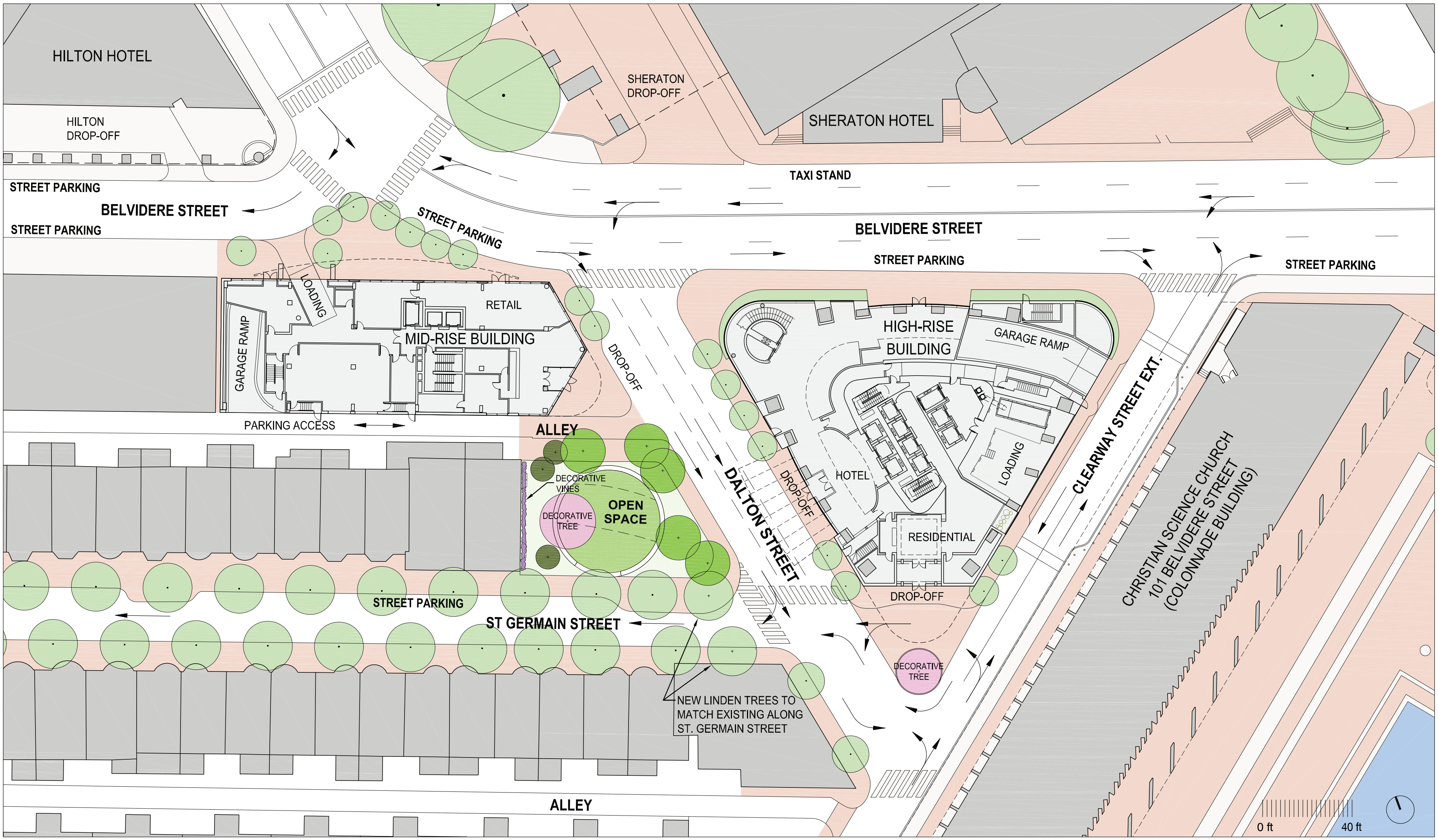
2.4 Project Description

2.4.1 Overall Site Plan

The Proposed Project includes two buildings: a High-rise of approximately 58 stories and a Mid-rise of approximately 25 stories. Together, the proposed buildings will comprise approximately 950,000 square feet of gross floor area. Figure 2-6 presents the overall site plan for the development, depicting the location of the proposed Mid-rise and High rise buildings on opposite sides of Dalton Street, the proposed new open space to be created at the end of Saint Germain Street, and the proposed new traffic improvements which are summarized in Section 2.4.5 and presented in detail in Chapter 3.

2.4.2 High-rise Building

The High-rise will be constructed on the triangular parcel surrounded by Belvidere Street to the north, 101 Belvidere Street (the former Church Colonnade Building) to the east, and Dalton Street to the west. It is expected to include approximately 290,000 square feet of hotel uses and 422,500 square feet of residential units. A number of program elements compose the overall hotel use including guestrooms, meeting rooms, a ballroom, restaurant, café, pool & fitness center. The hotel is expected to have approximately 250 guestrooms, while the residential space is expected to comprise approximately 170 units and up to 425 bedrooms.



Belvidere/Dalton Project **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 2-6
Site Plan

The proposed High-rise shape is derived from the equilateral triangle, softened by gently-curved sides and rounded corners. The resulting form complements without competing with the Mother Church, while its eastern face aligns with the orientation of the Reflecting Pool and the buildings that frame it. Thus the new High-rise, results in a smooth transition from the adjoining Prudential Center to the landmarked Christian Science Plaza.

Floor plans, sections, and elevations of the High-rise are included at the end of this chapter as Figures 2-7 through 2-16.

2.4.3 Mid-rise Building

The proposed Mid-rise building will be constructed opposite the High-rise on the west side of Dalton Street on what is now a surface parking lot adjacent to Belvidere Street. It will include approximately 255 residential units (285 bedrooms) totaling approximately 237,500 square feet including approximately 1,800 square of retail space, such as a coffee shop or café, on the ground floor.

The Mid-rise building's exterior has a curved face that closely resembles the curvature of its neighboring High-rise soft sided triangular form. This building is a pivot point for the project, anchoring the development at the intersection of Belvidere and Dalton Streets, and representing the last and furthest development of the Plaza and Christian Science precinct. The scale of the Mid-rise is much reduced from the High-rise component to match that of its adjacent neighbors, notably the Hilton and Sheraton towers. The scale of this building will also respect the surrounding, lower residential blocks comprised of the handsomely scaled buildings on Saint Germain, Clearway and Belvidere Streets.

Floor plans, sections, and elevations of the Mid-rise are included at the end of this chapter as Figures 2-17 through 2-24.

2.4.4 Program Summary

Table 2-2 summarizes the proposed building program.

Table 2-2 Program Summary

High-rise Building	56 occupiable stories 691 feet tall per Zoning Code
Hotel	290,000 square feet 250 guestroom keys
Residential	422,500 square feet 170 Units 425 Bedrooms
Parking	Up to 400 parking spaces made available in the existing Christian Science Plaza underground garage and in the basement of 101 Belvidere Street.
Mid-rise Building	25 Stories 285 feet tall per Zoning Code
Residential	237,500 square feet 255 Units 285 Bedrooms
Parking	Approximately 21 spaces below grade on site and up to 60 spaces available from the 400 allocated to the High-rise.

2.4.5 Proposed Changes to Surrounding Roadways

2.4.5.1 Proposed Traffic Patterns

The Proposed Project includes a number of changes to the roadway network surrounding the site. Traffic will circulate counter clockwise around the site. Dalton Street will be made one way southbound between Belvidere and Saint Germain Street. Clearway Street will be extended from its current terminus northward to connect with Belvidere Street. The Belvidere Street/Dalton Street intersection will be realigned to improve sight distances, and will contain only two approaches: Belvidere Street westbound and Dalton Street southbound. The Belvidere Street westbound approach will be striped to include a left/through lane and an exclusive right turn lane.

2.4.5.2 Parking and Loading

High-rise Building

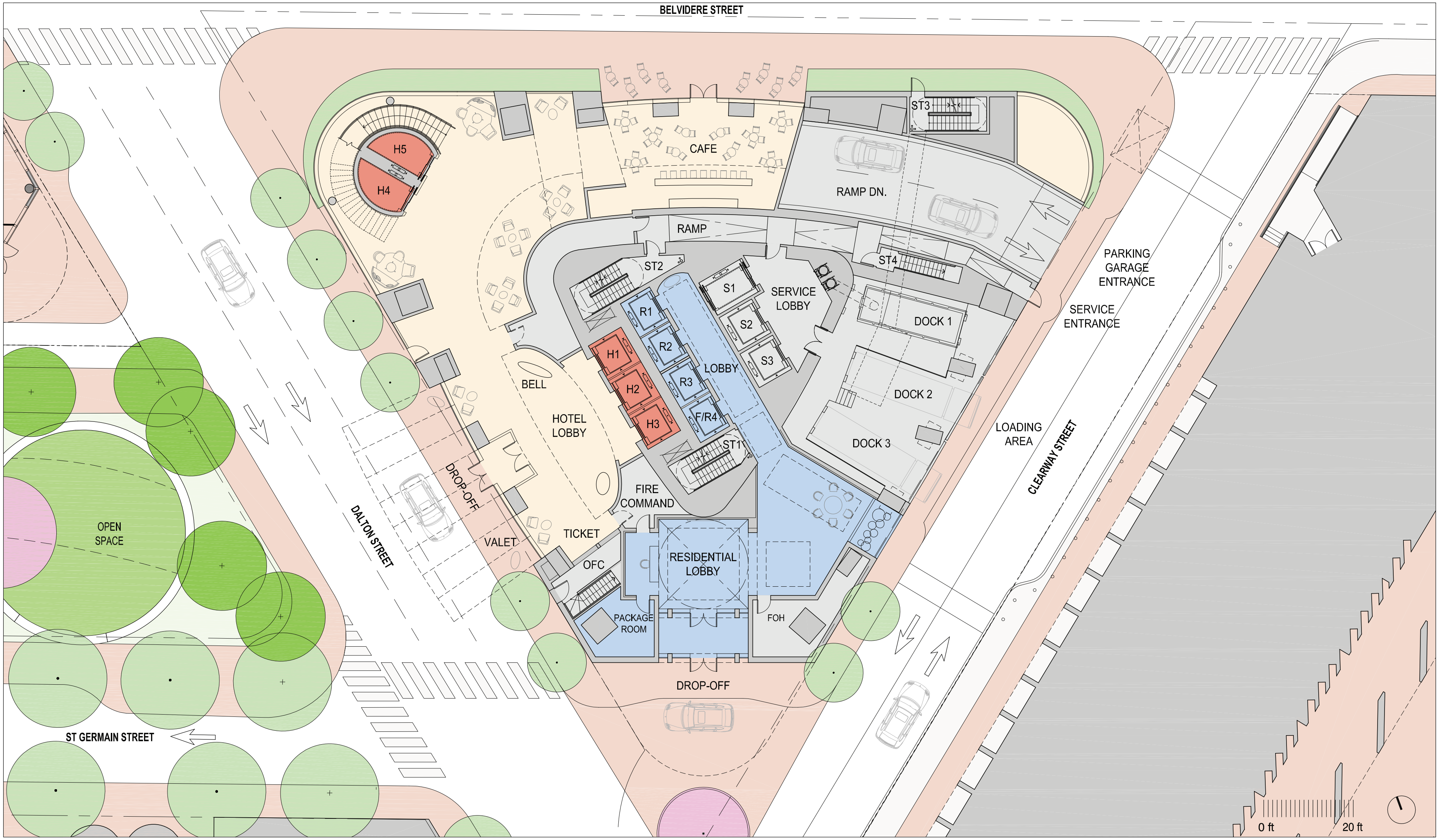
Parking for the High-rise will be handled entirely or almost entirely by valet service at the building's two main entrances on Dalton Street for the hotel, and at the southern apex of the building at the intersection of Dalton and Clearway Streets for the residential units. Parking for the High rise will be provided in the existing First Church of Christ, Scientist's below grade plaza garage and in the basement of the 101 Belvidere Street Building where 60 new spaces will be created. Through the use of valet parking, approximately 113 net new spaces will be added to the garages after taking into account the relocation of 63 surface parking spaces from the Mid-rise site to the garage. Access to the garages will be via a ramp off of the proposed new Clearway Street Extension on the east side of the High-rise.

The Dalton/Belvidere High-rise loading and service area will be located off of the Clearway Street Extension. As currently planned, the building will be served by three loading bays, two for large trucks and a third intended to house a compactor for the building.

Mid-rise Building

Parking for approximately 21 cars will be provided for the Mid-rise building in a new underground garage accessed from the alley on the south side of the building. Additional parking for the Mid-rise will be provided in the existing First Church of Christ, Scientist's below grade garage for up to 60 cars.

The Mid-rise building's loading dock for trash removal and move in/move out operations will be located off of Belvidere Street.



Belvidere/Dalton Project **Boston, Massachusetts**

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Figure 2-7
Level 1 - Lobby

Belvidere/Dalton Project Boston, Massachusetts

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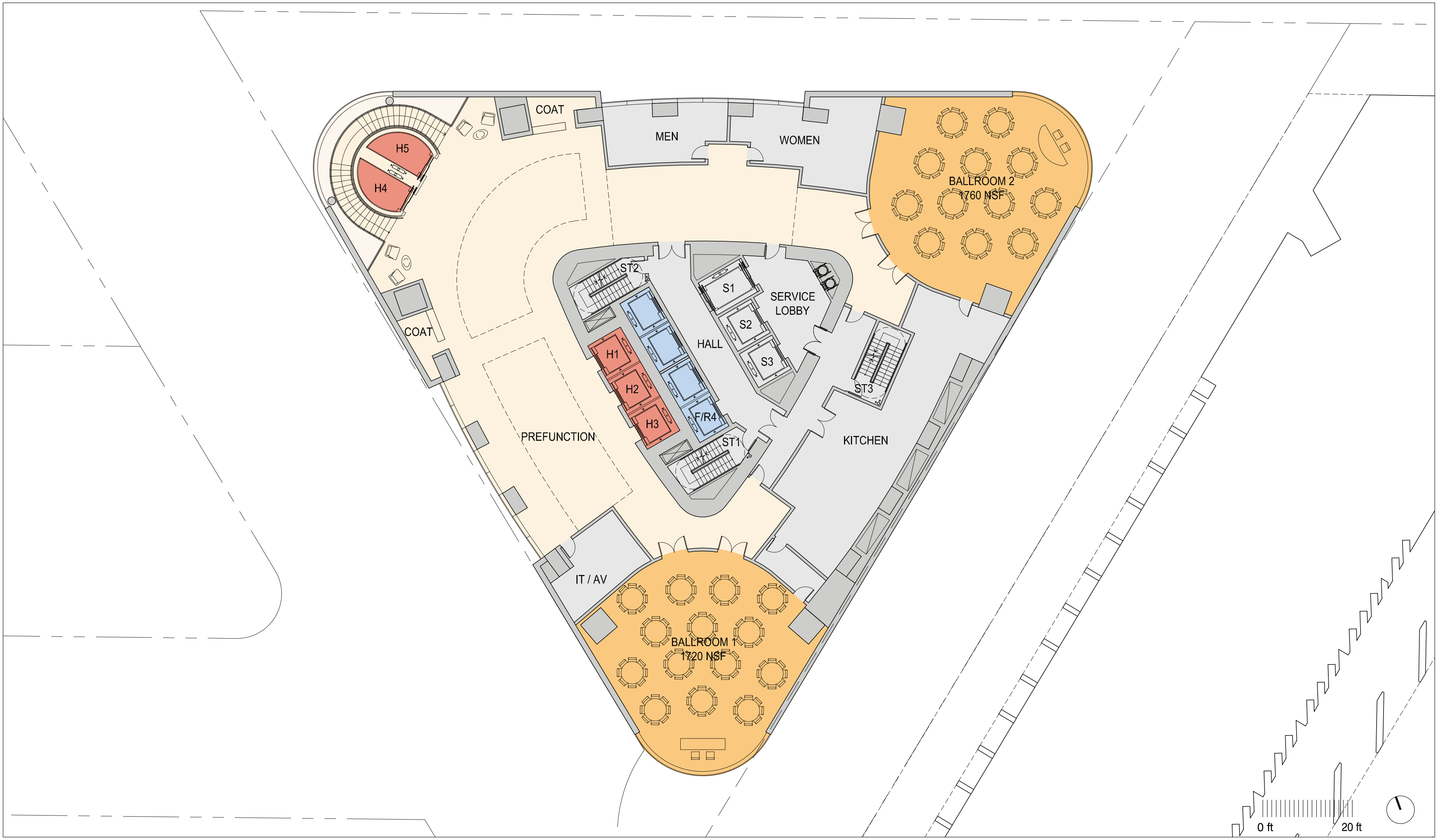
Figure 2-8

Level B1 Basement - Parking Garage Access

Belvidere/Dalton Project **Boston, Massachusetts**

Figure 2-9
Level 2 - Restaurant



Belvidere/Dalton Project **Boston, Massachusetts**

Figure 2-10

Level 3 - Ballroom


H5
H4
BUSINESS CTR.
MEETING RM. 1
CONF. RM. A
TERRACE
MEETING RM. 2
ST2
S1
SERVICE LOBBY
STOR.
S2
S3
COAT
H1
H2
H3
FIRE LOBBY
F/R4
ST1
PANTRY
ST3
MEETING RM. 4
MEN
WOMEN
CONF. RM. C
CONF. RM. B
MEETING RM. 3
TERRACE
0 ft
20 ft

Belvidere/Dalton Project   Boston, Massachusetts

Figure 2-12
Sixth Floor Plan

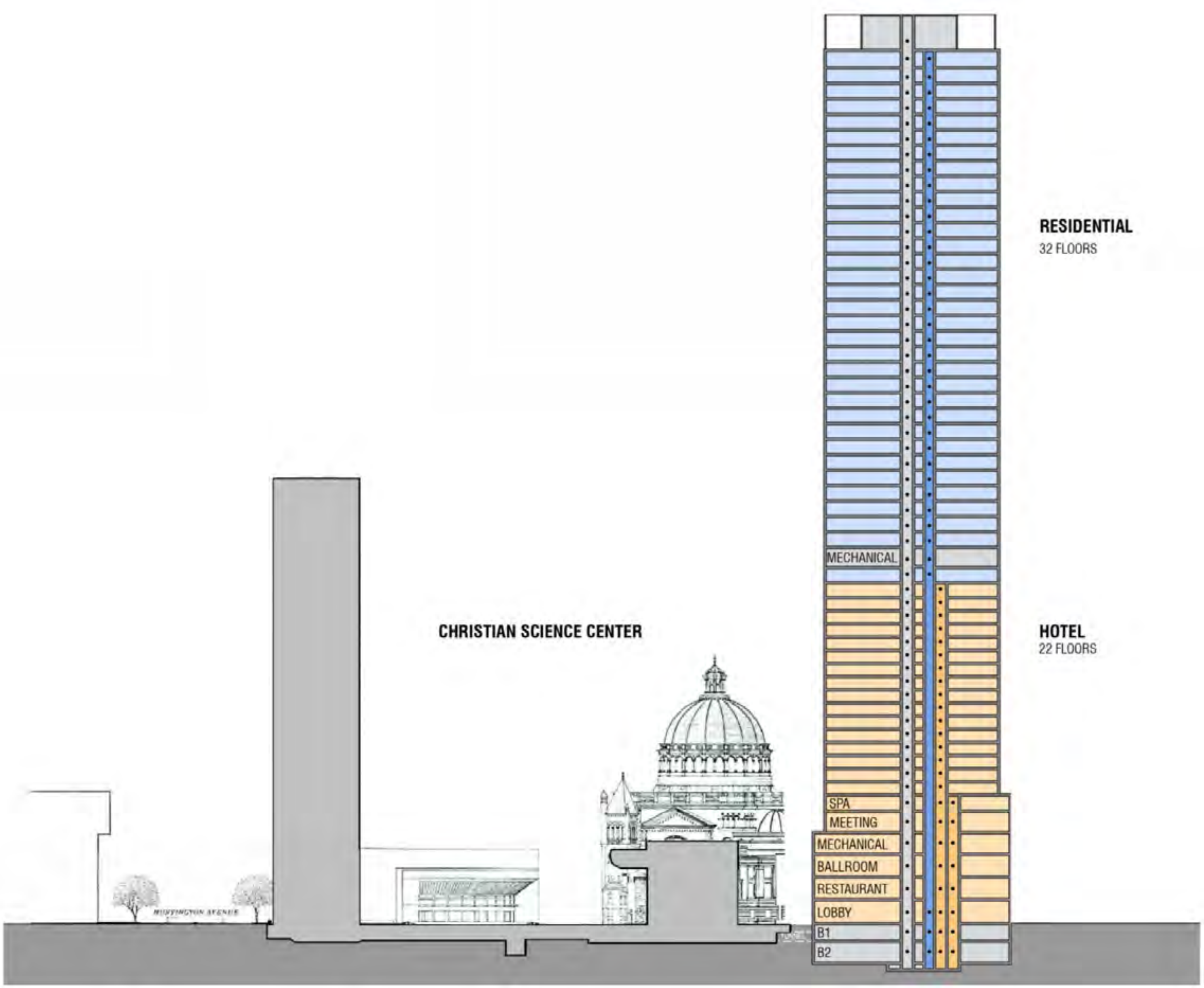


Figure 2-13
Building Section

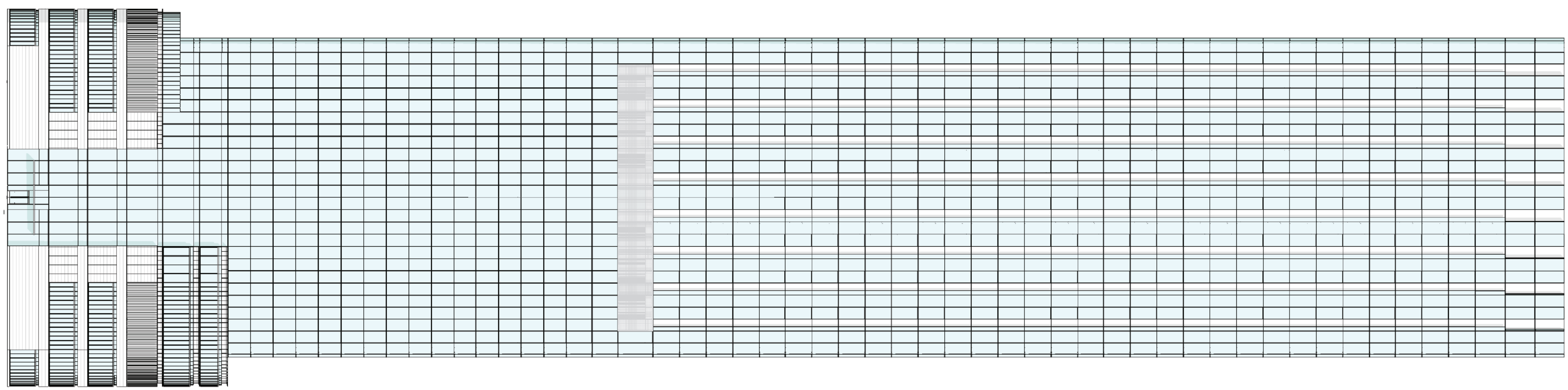


Figure 2-14

Highrise North Elevation

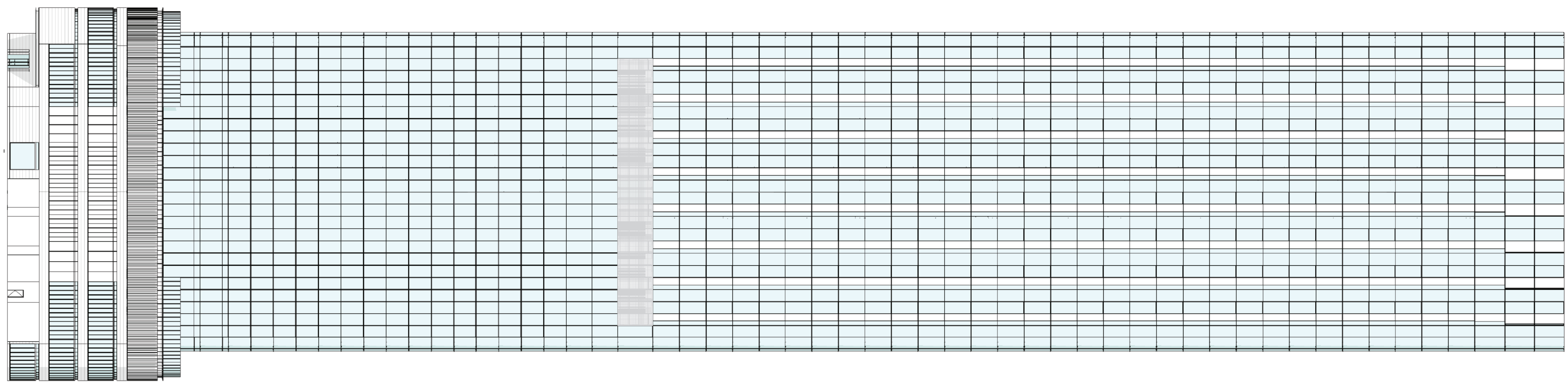


Figure 2-15

Highrise South East Elevation

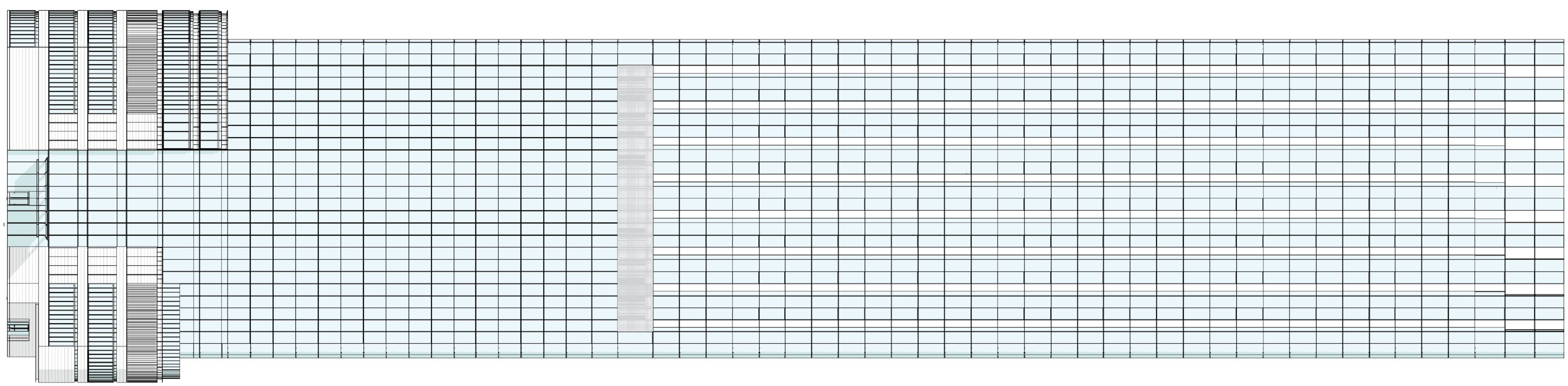


Figure 2-16

Highrise South West Elevation

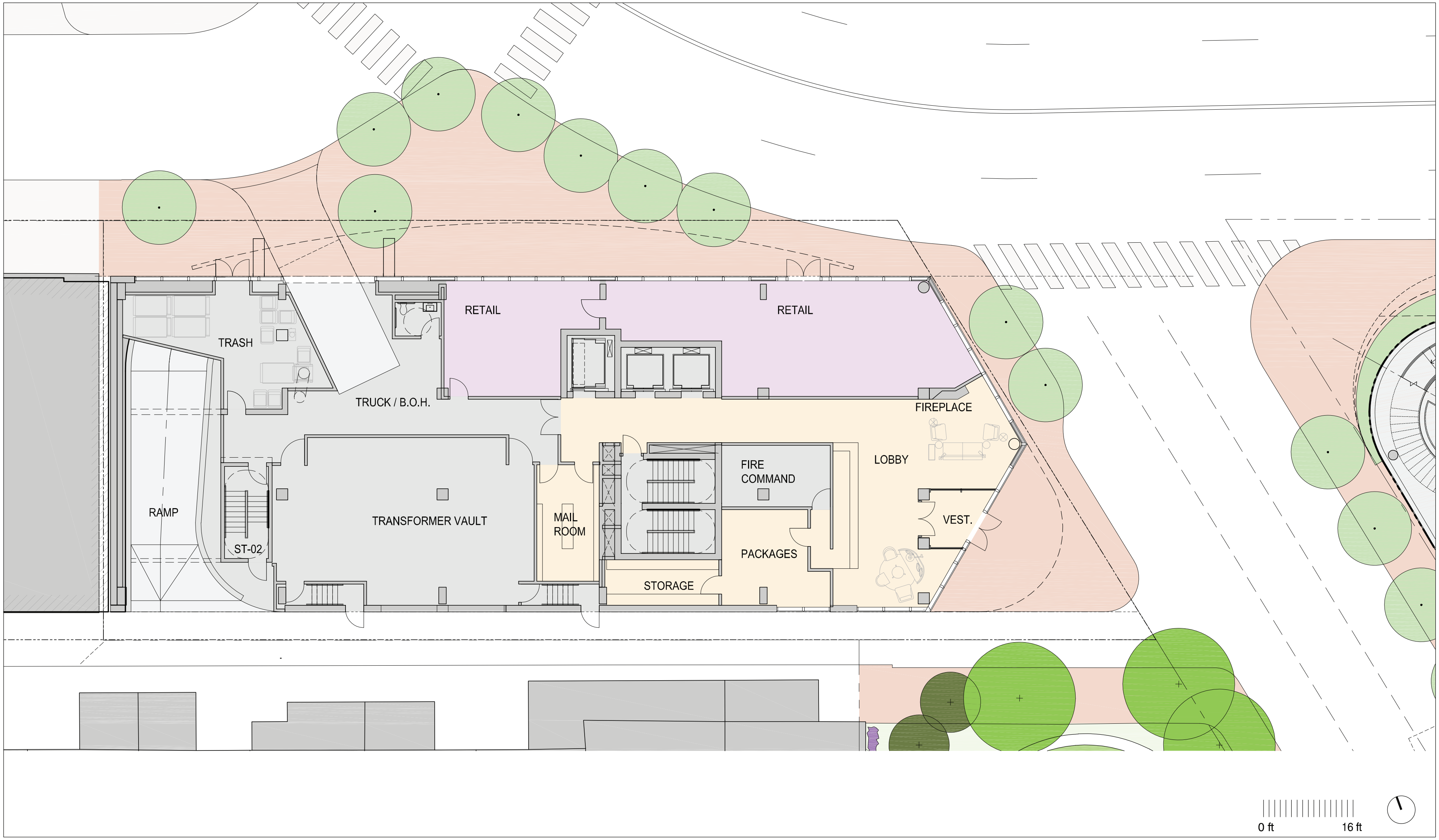


Figure 2-17

Level 1 - Lobby

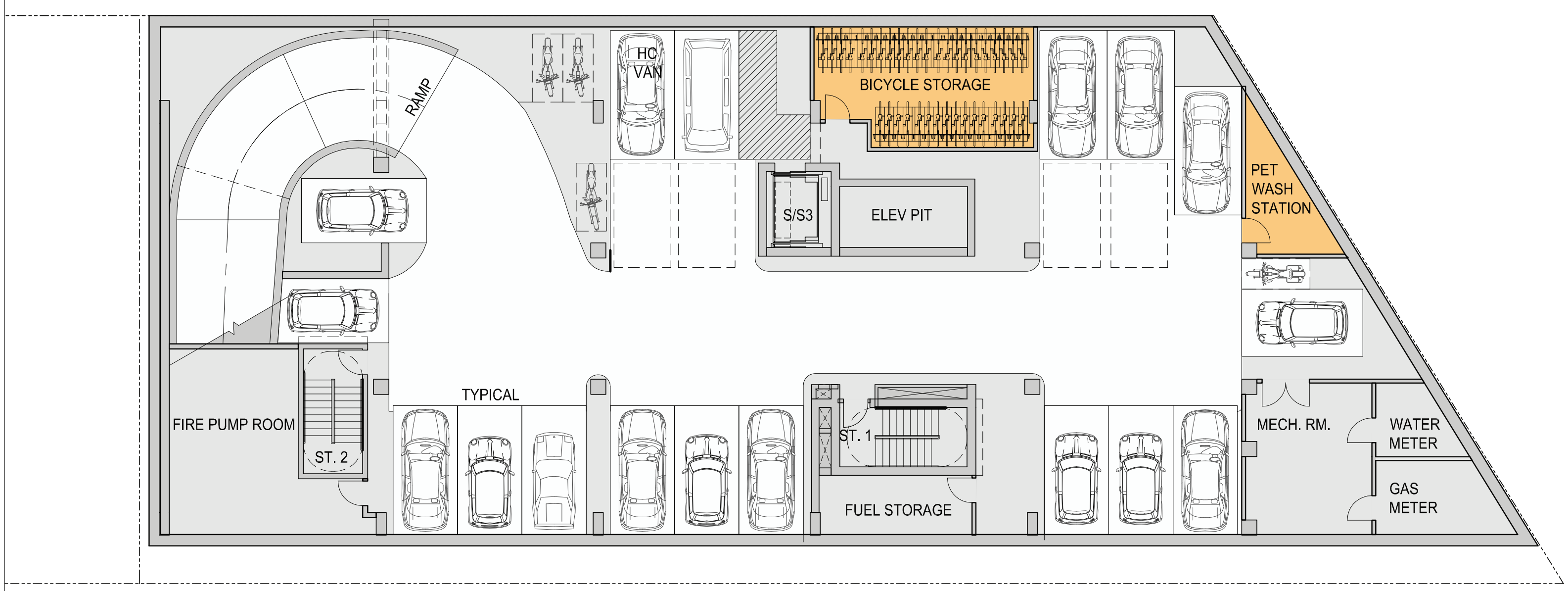


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Figure 2-18

Level B1 Basement - Parking

Figure 2-19

Level 2 - Residential & Amenity

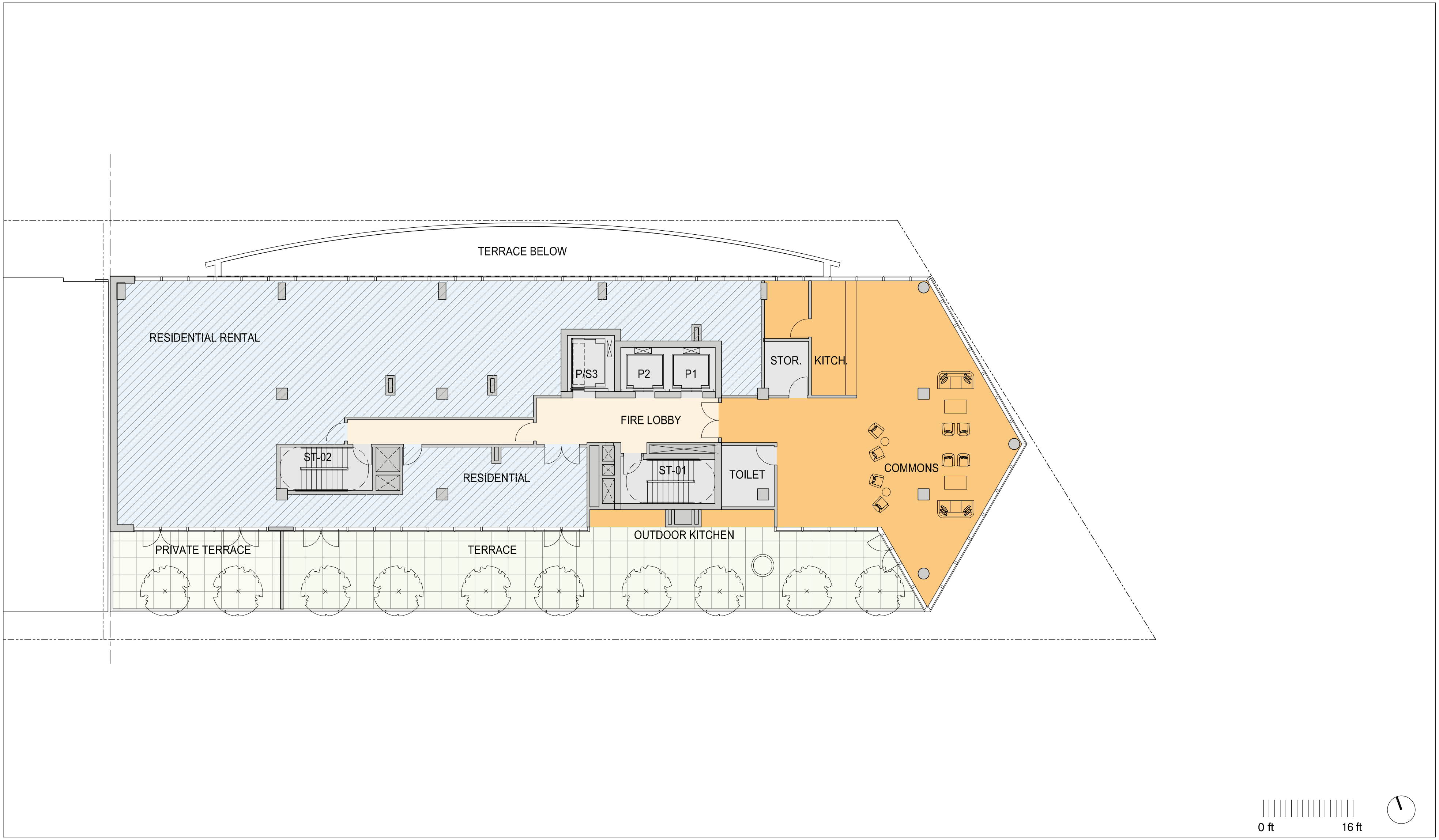
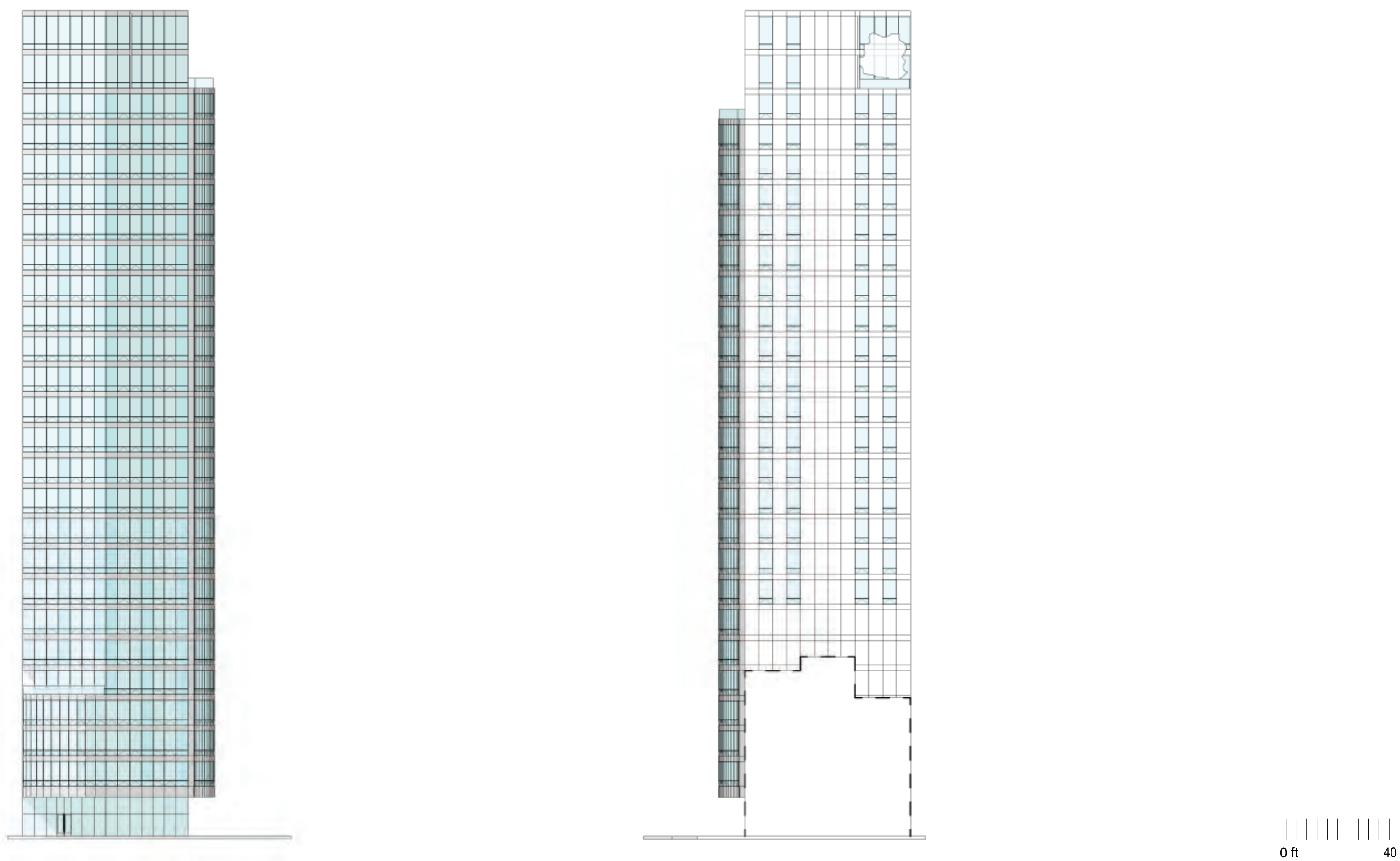


Figure 2-20

Level 25 - Amenity & Rental Space

Figure 2-21

North-South Section



Belvidere/Dalton Project Boston, Massachusetts

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Figure 2-22

East & West Elevations

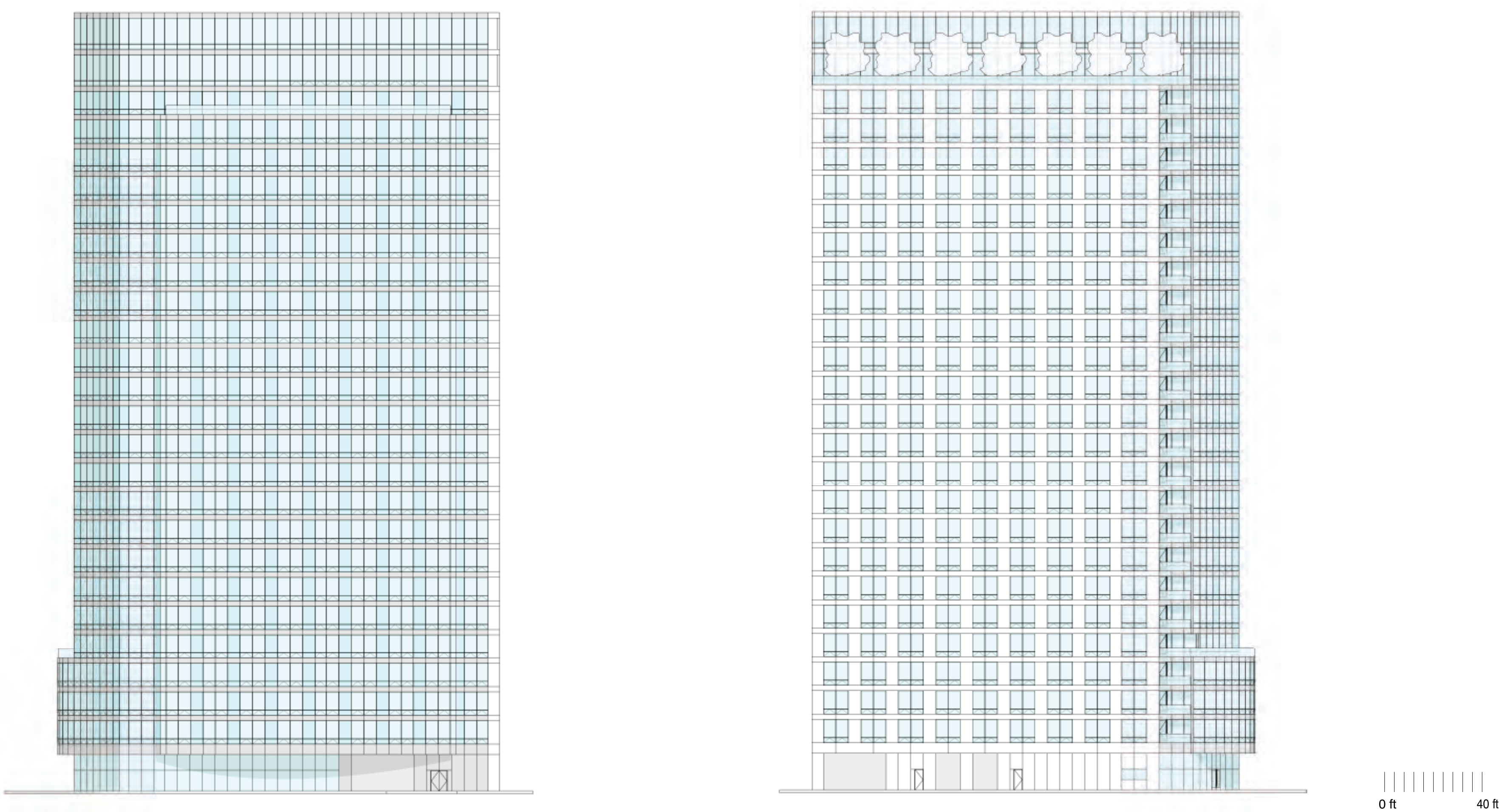

Figure 2-23

North & South Elevations

Belvidere/Dalton Project Boston, Massachusetts

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Figure 2-24
Perspectives

Section 3.0

Transportation Access Plan

3.0 TRANSPORTATION ACCESS PLAN

3.1 Introduction

This chapter presents an evaluation and summary of existing and future transportation infrastructure and operations of the Belvidere/Dalton Project. This transportation study has been developed in order to understand and mitigate the transportation impacts of the Proposed Project.

The Transportation Access Plan includes an analysis of the following:

- Definition and quantification of existing transportation conditions in the Proposed Project Study Area (the "Study Area");
- Projection of future transportation conditions with and without the Proposed Project;
- An assessment of parking conditions in the Study Area;
- A summary of proposed improvements, including travel demand management (TDM) strategies;
- An overview of construction-related activities as they pertain to transportation; and
- Vehicular level of service (LOS) analyses for Study Area intersections.

The transportation analysis considers three specific analysis scenarios as follows:

- 2013 Existing Condition based on traffic volume data collected in May, 2013.
- 2018 No Build Condition including background projects and area growth, and
- 2018 Full Build Condition for a 5-year time horizon assuming completion of the Proposed Project and infrastructure changes to the intersection of Belvidere Street at Dalton Street.

The transportation analysis has been performed in accordance with standard Boston Transportation Department ("BTD") methodologies, including the projection of project trips and the application of local travel characteristics established through the Access Boston 2000-2010 initiative. Synchro 6 software was used to facilitate the evaluation of traffic operations based on Highway Capacity Manual ("HCM") methodologies.

3.1.1 Project Description

The Project is planned to be comprised of approximately 950,000 gross floor area of new development composed of a mix of residential, hotel, and supporting retail uses. The High-rise site is bounded by Dalton Street, Belvidere Street and a private driveway along the First Church of Christ Scientist building and will contain a hotel and residential condominium units. The Mid-rise site is on the corner of Belvidere Street and Dalton Street to the west of Dalton Street and will contain apartment units and some ancillary retail. Parking demand for the High-rise and Mid-rise Buildings will be satisfied as described in Section 3.3.3.7. Figure 3.1-1 depicts the proposed site plan for the Project. The following Table 3-1 summarizes the program by building site.

Table 3-1 Proposed Program

Site:	Hotel	Condominium Units	Net New Parking	Net New Bike Parking
Belvidere/Dalton High-rise	250 units	170 units	113 Spaces	220 spaces
	Retail	Apartment Units	Net New Parking	Net New Bike Parking
Belvidere/Dalton Mid-rise	1,800 SF	255 units	21 spaces	240 spaces

3.1.2 Summary of Findings & Transportation Mitigation

- The Proposed Project has minimal transportation impacts on nearby intersections due to the Project's predominance of residential and hotel land uses.
- The Proposed Project creates a minimal net increase in parking needs due to the existing on-site parking supply and residential and hotel land-use development program.
- The Project area currently has a high use of transit, bicycling and walking versus drive-alone commuting which will be encouraged as part of the Project development program.

3.2 Existing Transportation Conditions

This section provides a summary of existing transportation conditions in the study area. Discussions include the following:

- A description of the existing roadways that provide access to the Project site;
- A description of the existing traffic volumes in the Study Area;
- A discussion of nearby public transportation options;

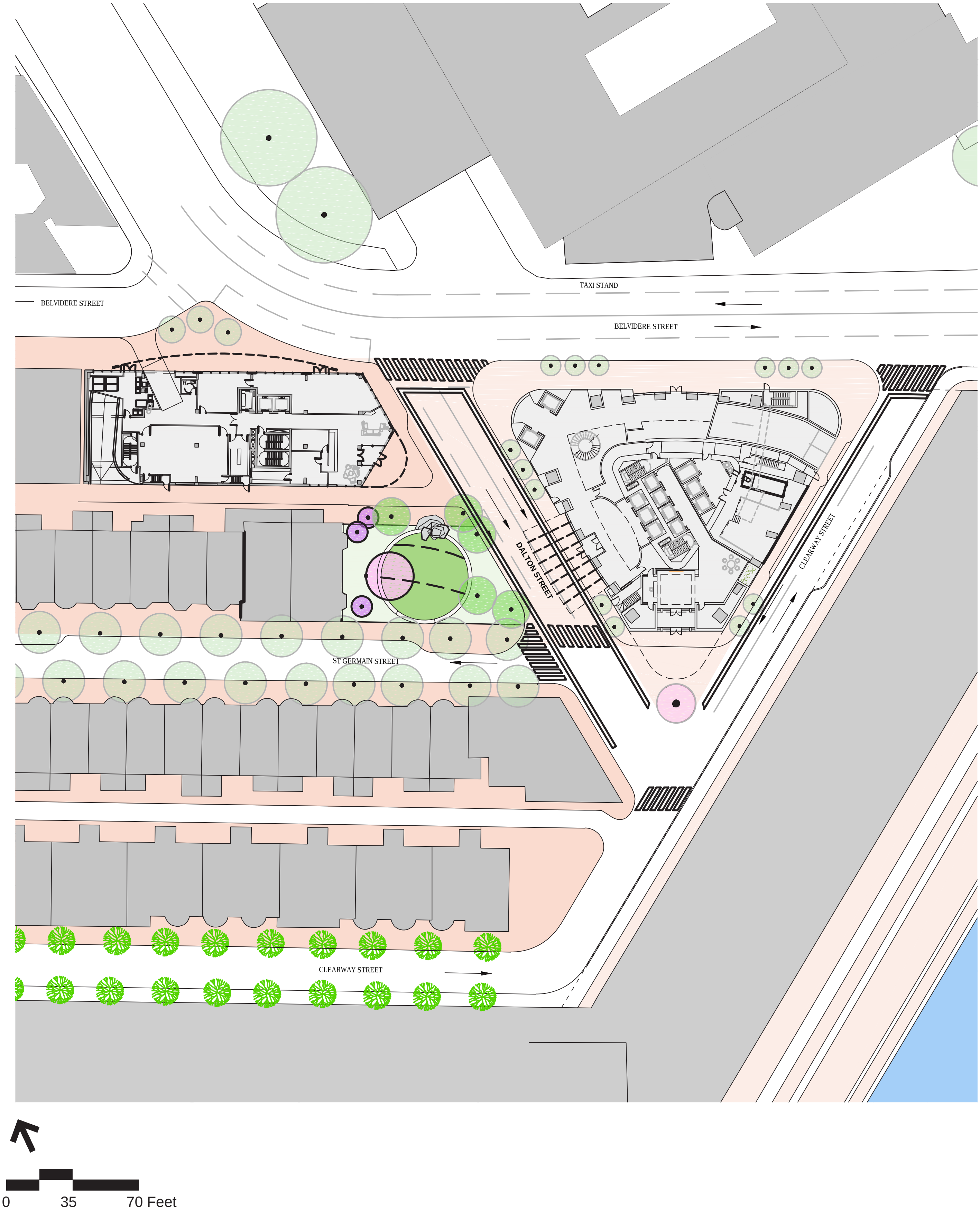

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Figure 3.1-1

Proposed Site Plan

- Summaries of parking in the Study Area; and
- Existing pedestrian and bicycle activity and amenities.

3.2.1 Study Area

The Study Area is located in the Prudential/Back Bay area of downtown Boston, as shown in Figure 3.2-1. The Study Area includes the following ten key intersections:

Signalized Intersections:

- Boylston Street at Massachusetts Avenue
- Belvidere Street at Massachusetts Avenue
- Westland Avenue/Falmouth Avenue at Massachusetts Avenue
- Huntington Avenue at Massachusetts Avenue
- Cumberland Street at Huntington Avenue
- Belvidere Street/W. Newton Street at Huntington Avenue
- Boylston Street at Dalton Street/Hereford Street

Un-signalized Intersections:

- Saint Germain Street at Massachusetts Avenue
- Huntington Avenue at The First Church of Christ Scientist (TFCCS) Driveway West
- Dalton Street at Belvidere Street

3.2.2 Roadway Network

The principal roadways and study intersections in the Study Area are described briefly below. The description of the roadways includes physical characteristics, adjacent land uses, and traffic control devices.

Massachusetts Avenue

Massachusetts Avenue is a two lane roadway in both the north and southbound directions. The roadway, for the most part travels north to south connecting the Boston neighborhood of Dorchester to the City of Cambridge where it becomes Route 2A and travels west through the state of Massachusetts. Parking is located on both sides of the roadway within the study area.

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Figure3.2-1

Study Area Intersections and Count Locations

Huntington Avenue

Huntington Avenue is a minor arterial roadway in the northeast/southwest direction, but extends east to west across the state from Boston to Worcester. Within the study area, the roadway is a three lane roadway with metered parking on the east side and tour bus parking on the side adjacent to The First Church of Christ, Scientist site.

Belvidere Street

Belvidere Street is a local roadway that connects Huntington Avenue to Massachusetts Avenue directly north of the High-rise and Mid-rise buildings. The roadway is two lanes in both the east and westbound directions from Huntington Avenue to the east of Dalton Street. To the west of Dalton Street, Belvidere Street is a single lane, one-way roadway in the westbound direction with parking on both sides.

Clearway Street

Clearway Street contains a single travel lane and connects Massachusetts Avenue to Dalton Street. The roadway is one-way in the eastbound direction with parking and loading on the south side of the street.

Dalton Street

Dalton Street is a two-way roadway that runs in the north-south direction between Boylston Street and Clearway Street. The roadway runs between the High-rise and the Mid-rise buildings. Adjacent to the site, the roadway provides on-street parking on both sides.

3.2.3 Study Area Intersections

The study area includes ten intersections listed in section 3.2.1 which provide a basis for determining to what extent, if any, Project traffic is likely to affect the wider transportation network. These intersections are described below, including general physical characteristics, geometric conditions, pedestrian facilities and traffic control measures.

1) Boylston Street/Massachusetts Avenue

The intersection of Boylston Street at Massachusetts Avenue is a four-legged signalized intersection. The northbound approach has two general purpose travel lanes and a bicycle lane. The southbound approach has an exclusive left-turn lane and two general purpose travel lanes. The eastbound direction has two approach lanes and left-turns are not permitted onto Massachusetts Avenue. The westbound approach has two lanes, one of which is an exclusive right-turn lane. Crosswalks with pedestrian signals are provided across all four legs.

2) Belvidere Street/Massachusetts Avenue

The intersection of Belvidere Street at Massachusetts Avenue is a three legged signalized intersection which includes a fourth leg departing the intersection onto Haviland Street slightly offset to the north of the intersection. Belvidere Street is one-way westbound approaching Massachusetts Avenue with a single general purpose lane. Massachusetts Avenue has two lanes in the north and southbound directions with parking on either side of the roadway. Crosswalks with pedestrian signals are provided across Belvidere Street and across Massachusetts Avenue.

3) Saint Germain Street/Massachusetts Avenue

The unsignalized intersection of Saint Germain Street at Massachusetts Avenue is a minor roadway intersecting a free flowing high volume roadway. Saint Germain Street contains a one-way travel lane with parking on the north side and approaches Massachusetts Avenue with a stop control. Massachusetts Avenue has two lanes in the north and southbound directions with metered parking on each side of the roadway. There is a crosswalk for pedestrians to cross Saint Germain Street, but none across Massachusetts Avenue.

4) Westland Street/Massachusetts Avenue/St. Stephen Street

The five-legged intersection of Westland Street/Massachusetts Avenue/St. Stephen Street and Falmouth Avenue (The First Church of Christ Scientist Driveway) is signalized. St. Stephen Street is a one-way roadway departing the intersection and Falmouth Avenue acts as a driveway to the First Church of Christ, Scientist site and is not part of the signal. Massachusetts Avenue in the northbound direction has an exclusive left-turn lane and a general purpose travel lane. The southbound approach on Massachusetts Avenue has two general purpose lanes. Westland Street approaches the intersection with a single general purpose lane that has a restricted left-turn. There is metered parking located on the Westland Street approach.

5) Huntington Avenue/Massachusetts Avenue

Huntington Avenue at Massachusetts Avenue has two signals that run on a coordinated system. The southern signal allows for access to and from the inbound approach/departure of Huntington Avenue; while the northern signal allows access to and from the outbound approach/departure of Huntington Avenue. The Massachusetts Avenue southbound approach has two through lanes and an exclusive right-turn only lane. The northbound approach on Massachusetts Avenue has two general purpose travel lanes. Both the east and westbound approaches on Huntington Avenue provide for a u-turn movement for vehicles to change directions on Huntington Avenue if necessary and two travel lanes. In addition, an underpass allows vehicles to travel along Huntington Avenue without having to travel through the signalized intersection.

6) Huntington Avenue/TFCCS Driveway

The intersection of Huntington Avenue at the First Church of Christ, Scientist driveway is accessed via Huntington Avenue southwest bound. The Driveway approaches the unsignalized intersection with stop control. Vehicles are only permitted to make a right-turn onto Huntington Avenue. Two lanes are provided in the Huntington Avenue southwest bound-approach.

7) Cumberland Street/ Huntington Avenue

The intersection of Huntington Avenue at Cumberland Street is a right-in/right-out movement for Cumberland Avenue due to the median divided Huntington Avenue. The signal is fully actuated and shows either the pedestrian signal or the minor street movement immediately after being called. There is a crosswalk across Cumberland Street.

8) Belvidere Street/ Huntington Avenue/W. Newton Street

The intersection of Belvidere Street/West Newton Street at Huntington Avenue is a four-legged signalized intersection. The eastbound Huntington Avenue approach contains an exclusive left-turn lane and two general purpose travel lanes with adjacent parking. The westbound approaches the intersection with an exclusive left-turn lane, two through lanes and an exclusive right-turn lane. The northbound West Newton Street approach is a single general purpose lane. The southbound Belvidere Street approach has two general purpose travel lanes and an exclusive left-turn lane. There are crosswalks across all four legs of the intersection.

9) Dalton Street/Belvidere Street

The intersection of Dalton Street at Belvidere Street is a four-legged unsignalized intersection with the Dalton Street south leg being offset to the east. Belvidere Street is one-way westbound departing the intersection to the west of Dalton Street. To the east of Dalton Street, Belvidere Street is a two ways with two travel lanes and parking on either side of the roadway. The northbound and southbound approaches are stop controlled while the westbound approach is free-flowing. The northbound approach from Dalton Street is a single general purpose lane with parking on both sides of the roadway. The southbound approach is two general purpose lanes with tour bus and trolley parking on either side of the roadway.

10) Dalton Street/Boylston Street/Hereford Street

The signalized intersection of Dalton Street/Boylston Street/Hereford Street contains two approaches: Dalton Street northbound and Boylston Street eastbound. Two lanes are provided in the Dalton northbound direction, one is a left-turn lane while the other is a right turn lane. Boylston Street approaches the intersection with two general purpose travel lanes. Crosswalks are provided across each leg of the intersection. Hereford Street departs the intersection to the north with two travel lanes. A fire station is located adjacent to the intersection on Boylston Street.

3.2.4 Traffic Volume Data Collection

To better assess existing conditions in the study area, traffic volumes were collected. Manual turning movement counts (TMCs) were conducted during the morning peak hours, 7:00 AM to 9:00 AM, and during the evening peak hours, 4:00 PM to 6:00 PM, on Tuesday May 14, 2013[1]. Due to the timing of the counts taking place after local colleges and universities were out of session, the existing conditions traffic counts were increased by 5 percent at the Massachusetts Avenue intersections to account for the additional institutional traffic when local colleges and universities are in session.

In addition to the manual turning movement counts, automatic traffic recorder (ATR) counts were conducted over a 24-hour period in May 2013.

TMC and ATR raw data are attached in Appendix B.

Existing Traffic Volumes

TMC and ATR counts were used to develop the daily 24-hour counts and peak hour turning movement traffic volumes for the 2013 Existing Condition.

Table 3-2 presents a summary of the daily traffic volumes calculated from the ATR counts.

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1 *Counts that had been originally scheduled for Tuesday April 30, 2013 when the Berklee School of Music, Northeastern University, New England Conservatory and Wentworth Institute of Technology were in session were delayed due to the April 15, 2013 Boston Bombing event.*

Table 3-2 Existing Traffic Volumes Summary

		Peak Hour					
	Daily	Weekday Morning			Weekday Evening		
Location	Weekday (vpd)*	Volume (vph)**	"K" Factor***	Directional Distribution	Volume (vph)**	"K" Factor***	Directional Distribution
Massachusetts Avenue south of Clearway Street							
Northbound	10,742	745	6.9%	53%	767	7.1%	50%
Southbound	11,861	650	5.5%	47%	756	6.4%	50%
Total	**22,603**	**1,395**	**6.2%**	**-**	**1,523**	**6.7%**	**-**
Belvidere Street north of Huntington Avenue							
Eastbound	2,871	168	5.9%	21%	250	8.7%	29%
Westbound	8,199	649	7.9%	79%	621	7.6%	71%
Total	**11,070**	**817**	**7.4%**	**-**	**871**	**7.9%**	**-**
Huntington Avenue west of Belvidere Street							
Eastbound	8,848	560	6.3%	43%	686	7.8%	50%
Westbound	9,904	728	7.4%	57%	689	7.0%	50%
Total	**18,752**	**1,288**	**6.9%**	**-**	**1,375**	**7.3%**	**–**

Source: Automatic Traffic Recorder (ATR) counts conducted by Precision Data Industries, LLC in May 2013
*Daily traffic expressed in vehicles per day.
**Peak hour volumes expressed in vehicles per hour.
***Percent of daily traffic that occurs during the peak hour.

The intersection turning movement counts were used to establish traffic networks for the 2013 Existing Condition for the Morning and Evening peak hours. The study area's overall morning peak hour was determined to be 7:45 AM to 8:45 AM and the evening peak hour was determined to occur between 5:00 PM and 6:00 PM. Existing Condition (2013) morning and evening peak hour traffic volumes are shown in Figures 3.2-2 and 3.2-3, respectively.

3.2.5 Pedestrian & Bicycle Access

Pedestrian circulation occurs on the sidewalks of streets in and around the site where there is a steady flow of pedestrians throughout the day. Heavily used pedestrian routes are ones that lead to/from train stations and major destinations in the area including the Prudential, Copley, Back Bay and other locations in the area. The area is well served by a sidewalk network that connects it with the rest of the city. Pedestrian facilities in the study area include sidewalks that vary in width, crosswalks at major intersections, and accessible ramps.

The Southwest Corridor Park is a 4.7 mile linear park stretching from the Back Bay to Forest Hills which provides a roadway separated bicycle and walking path for its length. The corridor is approximately 0.25 mile from the Project. In addition, bicycle

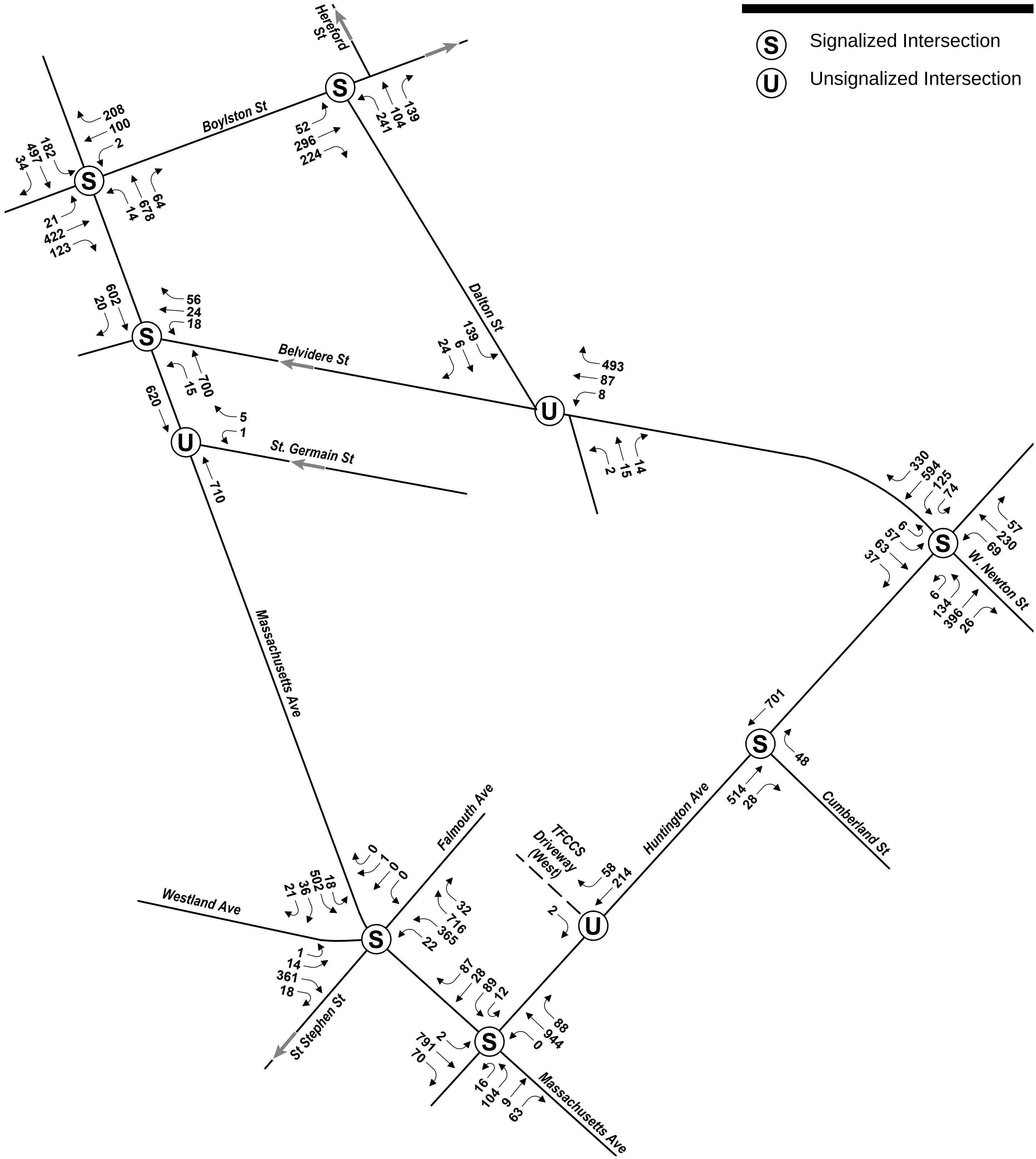

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Figure 3.2-2

Existing Condition (2013) Morning Peak Hour Traffic Volumes (7:45-8:45 AM)

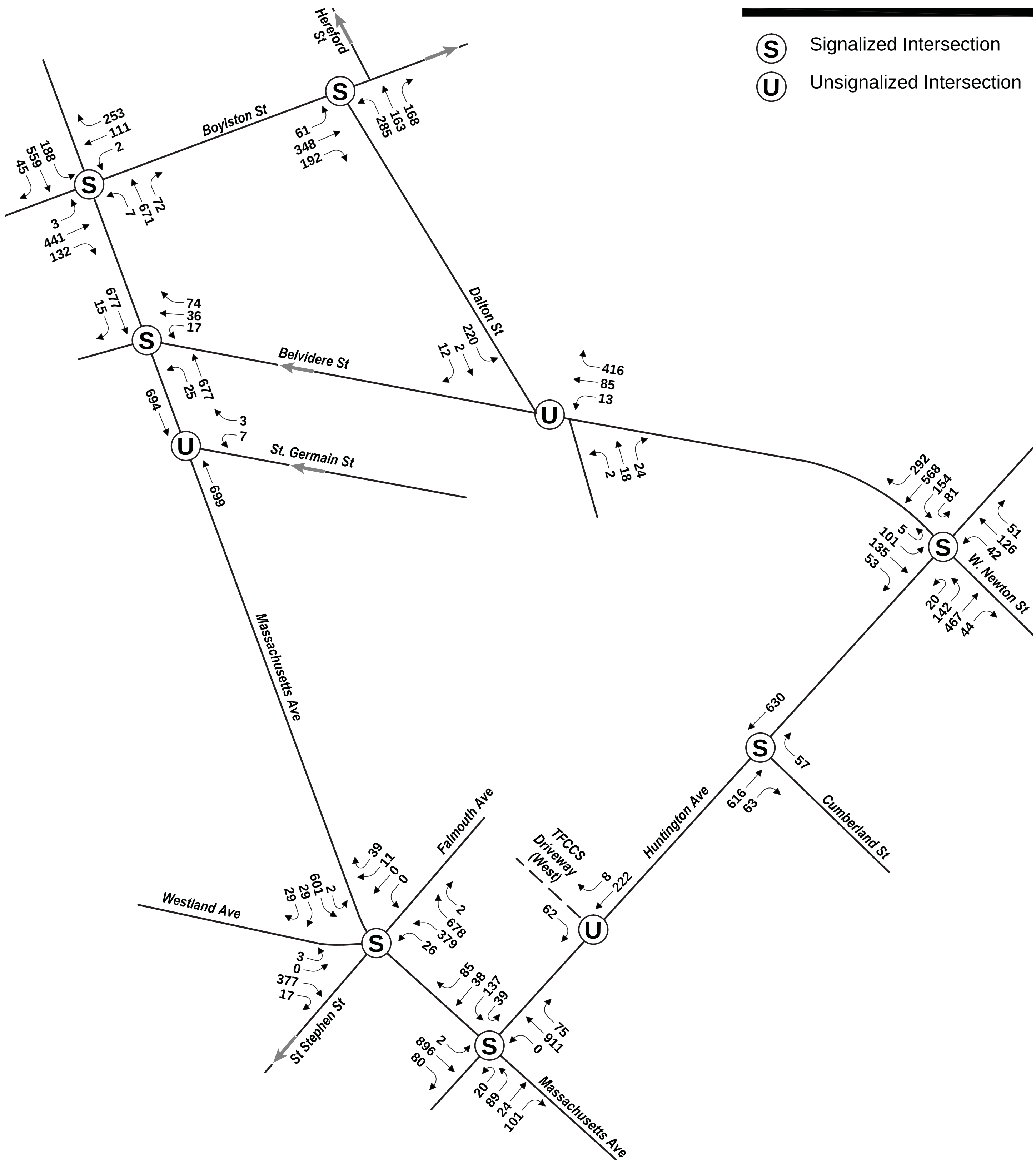

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Figure 3.2-3

Existing Condition (2013) Evening Peak Hour Traffic Volumes (5:00-6:00 PM) lanes are provided on Massachusetts Avenue and St Stephen Street. The Project Study Area has several bicycle rack locations available, specifically on the TFCCS Plaza area. Enhancing bicycle accommodations is an element of the Project, and will also be a consideration in the design of the new buildings.

Starting in April of 2011, the Hubway bike share system was launched to provide the community with over 1,000 bicycles and 100 stations throughout Boston, Brookline, Cambridge and Somerville. Currently, there is a Hubway station, housing 19 bicycles, located on the Christian Science Plaza. The second closest station is located north of the Project at the Prudential Center; this station provides 25 bicycles. The Hubway system allows bicyclists to either obtain a three-season membership or ride casually with short-term pricing.

Morning and evening peak hour pedestrian and bicycle counts conducted at each of the study area intersections are graphically represented in Figures 3.2-4 through 3.2-7 respectively.

3.2.6 Public Transportation

Massachusetts Bay Transportation Authority (MBTA) services in the vicinity of the Project site include multiple bus lines, the Green Line, and four commuter rail lines. These services, illustrated in Figure 3.2-8 are described in further detail below.

3.2.6.1 MBTA Bus Route Service

Five bus routes are available in the vicinity of the Project site providing access to/from Somerville, Cambridge, Waltham, Hyde Park, and Watertown.

- **Route CT1** (Central Square, Cambridge – BU Medical Center/Boston Medical Center via M.I.T.) provides stops along Massachusetts Avenue. The route spans north to south from Central Square in Cambridge to the BU Medical Campus in the South End.
- **Route 1** (Harvard/Holyoke Gate – Dudley Station via Mass Ave) extends from Harvard Station to Roxbury along Massachusetts Avenue with stops to the west of the site.
- **Route 39** (Forest Hills Station – Back Bay Station via Huntington Avenue and Jamaica Plain Center) provides a stop on Huntington Avenue.
- **Route 55** (Jersey and Queensbury – Copley Square or Park and Tremont Stations via Ipswich Street) provides local access between the Boston Common and the Back Bay Fens.

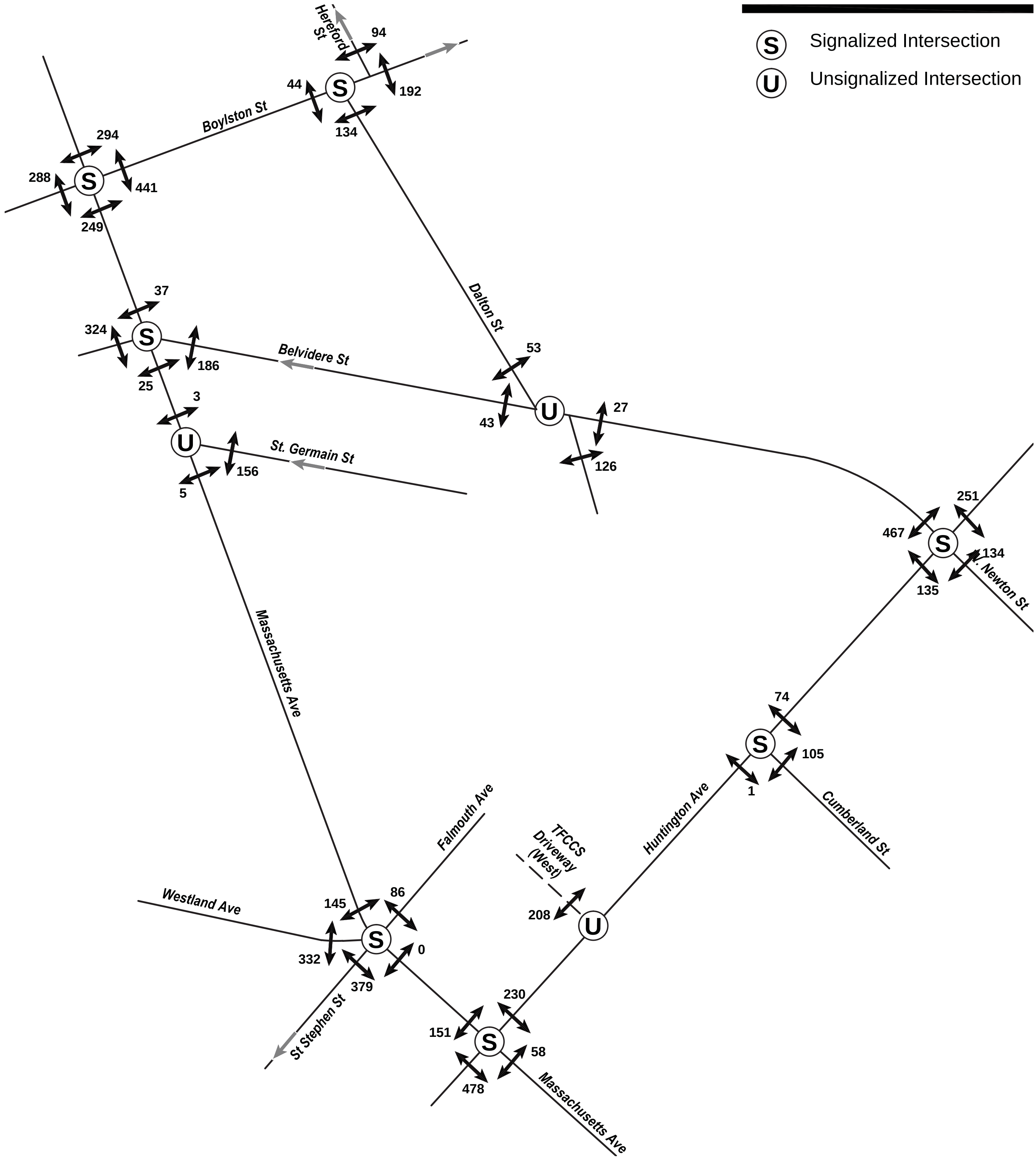

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Figure 3.2-4

Existing Condition (2013) Morning Peak Hour Pedestrian Volumes (7:45-8:45 AM)

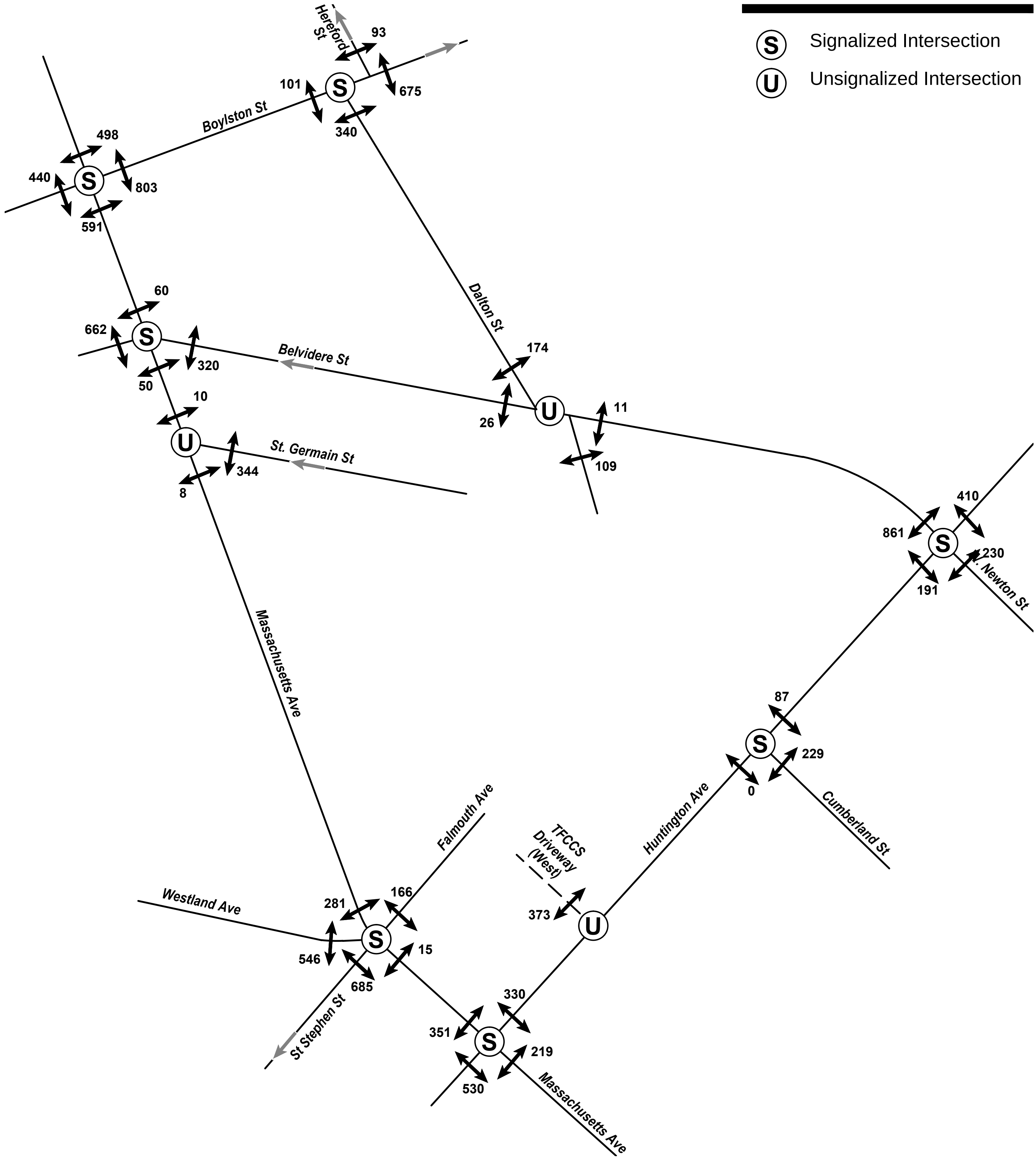

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Figure 3.2-5

Existing Condition (2013) Evening Peak Hour Pedestrian Volumes (5:00-6:00 PM)

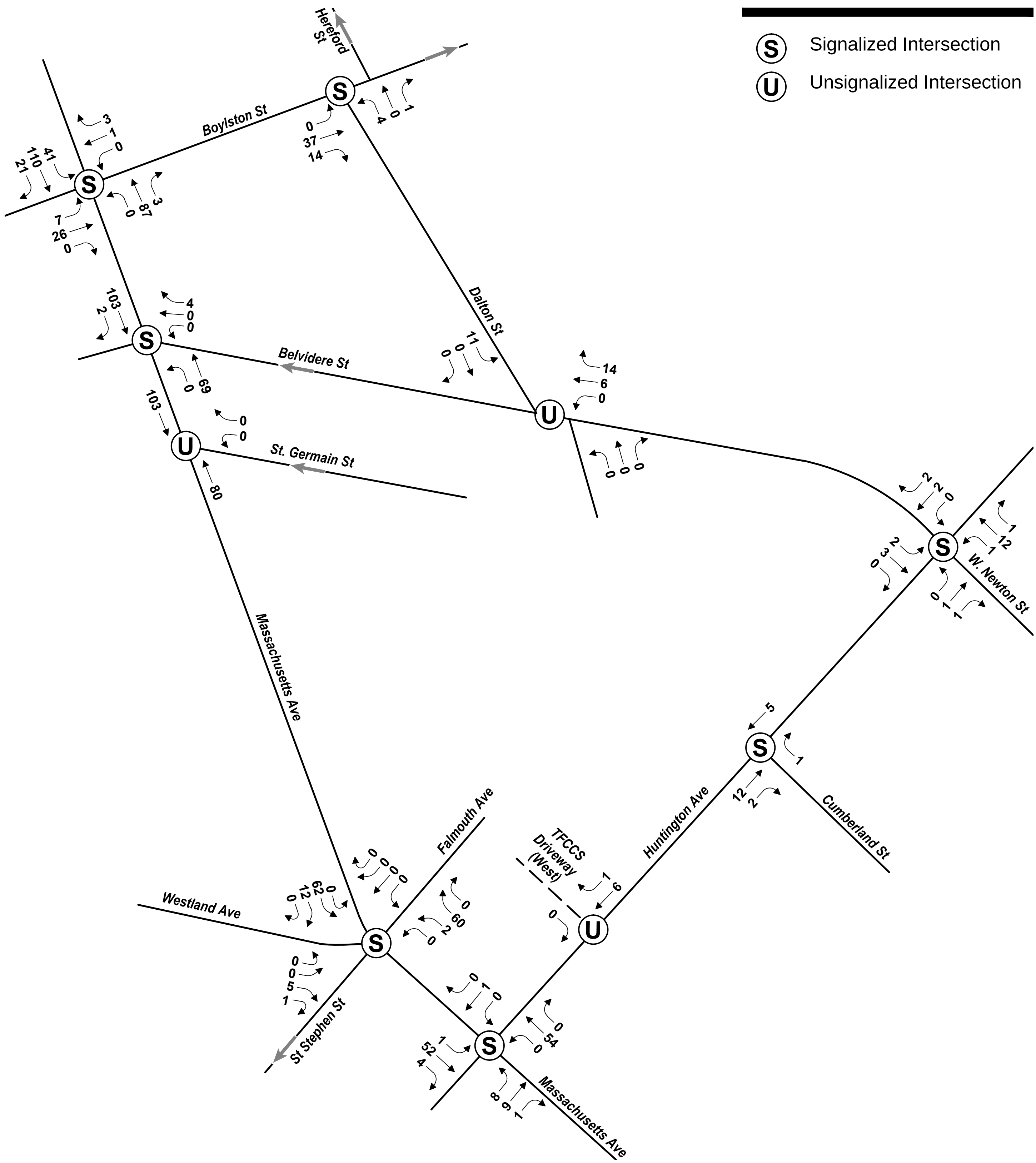

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Figure 3.2-6

Existing Condition (2013) Morning Peak Hour Bicycle Volumes (7:45-8:45 AM)

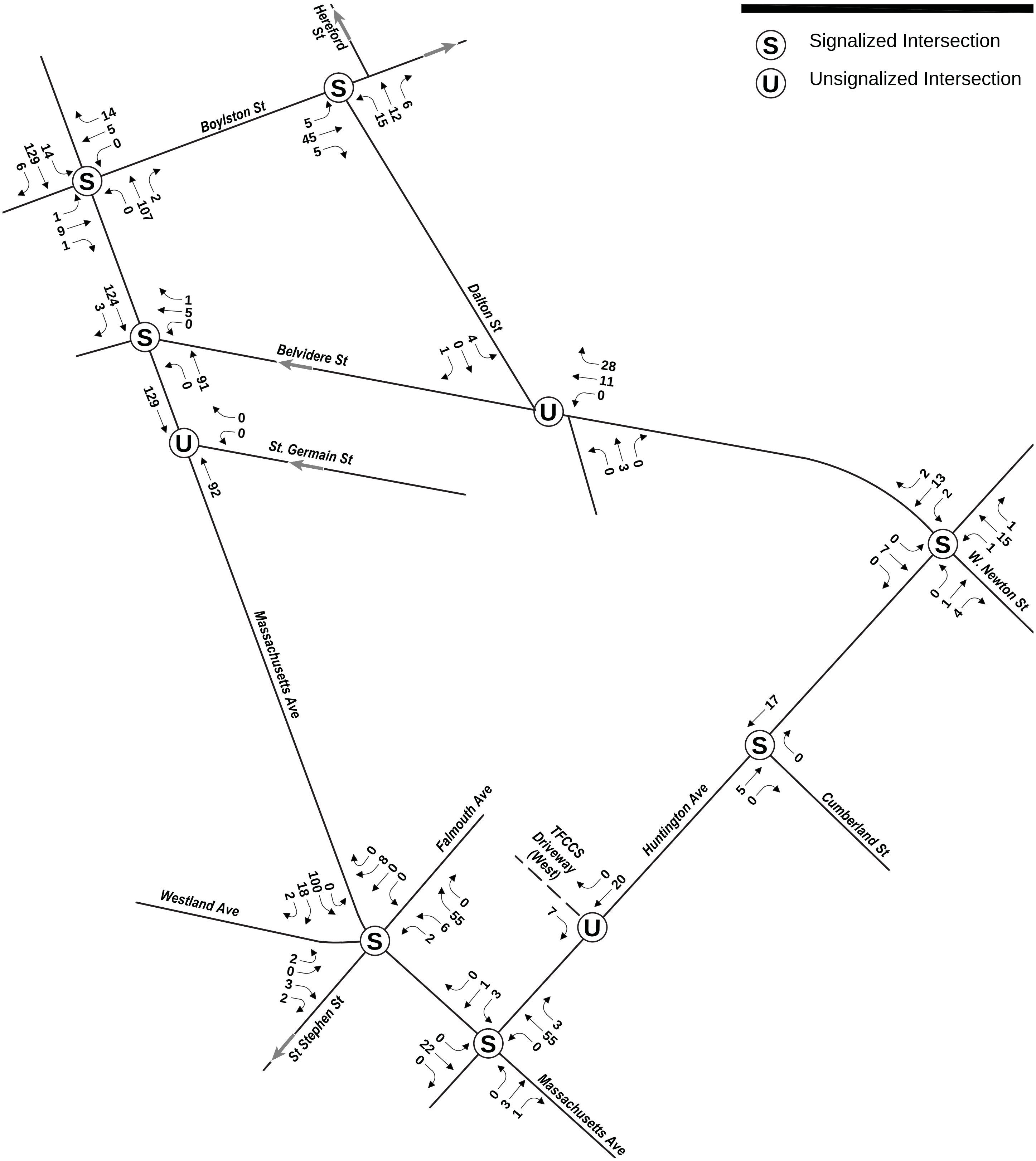

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Figure 3.2-7

Existing Condition (2013) Evening Peak Hour Bicycle Volumes (5:00-6:00 PM)

Source: MBTA

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Figure 3.2-8

Public Transportation

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♦ **Route 170** (Central Square, Waltham – Dudley Square) is a limited service bus route only providing two trips in the morning peak in the outbound direction and two trips in the evening peak in the inbound direction. During the morning peak, there are stops along Massachusetts Avenue and one stop on Boylston Street. During the evening peak, the bus route travels directly to Back Bay Station without stopping in the Study Area.

3.2.6.2 MBTA Subway Services

The Project site is centrally located between the Green Line-E Branch and Orange Line to the south and southeast, and the Green Line-B, C, and D branches to the north. The Massachusetts Avenue Orange Line station located to the south of the site provides access from the most southern station of Forest Hills, Hyde Park through Downtown Crossing to Oak Grove, Malden in the north. The Green Line branches provide access from the Cambridge Lechmere Station and Government Center Station to Newton, Brookline and Brighton to the west.

3.2.6.3 MBTA Commuter Rail Services

Four commuter rail lines are accessible in the vicinity of the Project site. The Providence/Stoughton line, the Franklin/Forge Park line, and the Needham Heights line are accessible from Ruggles Station, just over one-half mile away from the site. In addition, Back Bay Station is located less than a mile away from the Project site and provides access to the previously listed lines in addition to the Worcester/Framingham line. All four of these commuter rail lines terminate at South Station in Boston.

Table 3-3 provides a summary of the rush-hour frequencies for MBTA service in the area.

Table 3-3 Available Public Transportation Service

Route	Origin/Destination	Peak Hour Headway (Outbound)[1]
Framingham/Worcester Commuter Rail Line	South Station to Worcester/Union Station	varies
Providence/Stoughton Commuter Rail Line	South Station to North Kingston, RI	varies
Franklin/Forge Park Commuter Rail Line	South Station to Forge Park	varies
Needham Heights Commuter Rail Line	South Station to Needham Heights	varies
Green Line – B Branch	Government Center Station to Boston College Station	6 Minutes
Green Line – C Branch	North Station to Cleveland Circle Station	7 Minutes
Green Line – D Branch	Government Center Station to Riverside Station	6 Minutes
Green Line – E Branch	Lechmere Station to Heath Street Station	6 Minutes

Table 3-3 Available Public Transportation Service (Continued)

Route	Origin/Destination	Peak Hour Headway (Outbound)[1]
Route CT1	Central Square to BU Medical Center	20 Minutes
Route 1	Harvard Gate to Dudley Station	10 Minutes or Less
Route 39	Forest Hills Station to Back Bay Station	10 Minutes or Less
Route 55	Jersey and Queensbury to Copley Square	17-30 Min
Route 170	Central Square, Waltham to Dudley Square	2 Trips Each Peak

1 Source: Massachusetts Bay Transportation Authority website at www.mbta.com

3.2.7 On-Street Parking

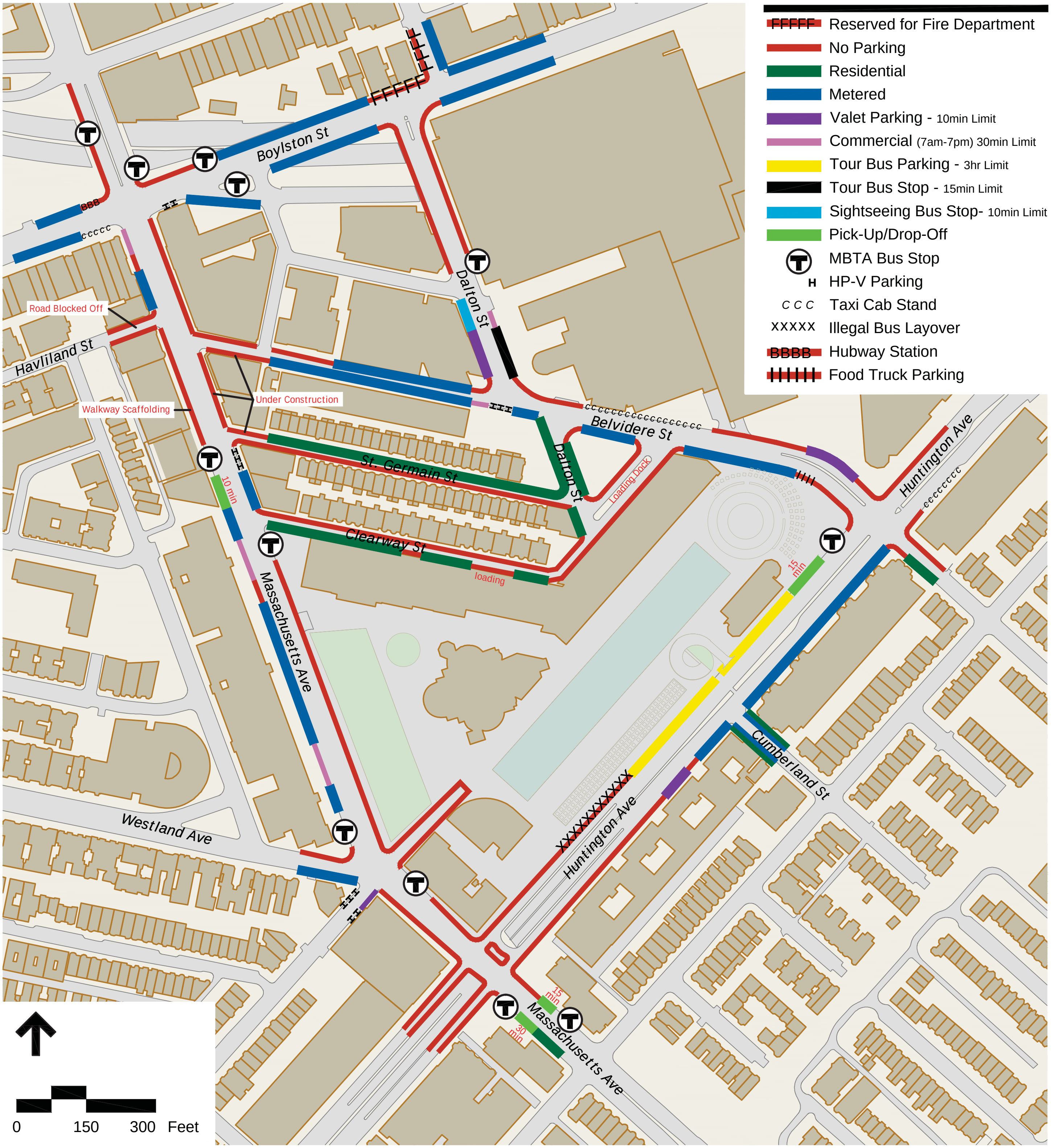
Information regarding curb use within a one-quarter mile walk of the Project site was collected and is graphically shown in Figure 3.2-9. Residential permit parking is permitted along both sides of Dalton Street adjacent to the site and metered parking is provided along Belvidere Street north of the High-rise site.

3.2.8 Public Off-Street Parking

Public Parking is provided at the First Church of Christ, Scientist's Plaza Garage which currently contains approximately 550 parking spaces, 100 of which are available for Commercial use. Access to this garage is provided on Huntington Avenue and Massachusetts Avenue near the southwest corner of the campus. Additional parking is provided on the Mid-rise site which contains approximately 63 public parking spaces that will be transferred to the First Church of Christ, Scientist's Garage.

3.3 Evaluation of Long-Term Transportation Impacts

This section describes the future transportation infrastructure in the study area and the impacts of the Proposed Project. Included is a summary of area transportation infrastructure improvements that are currently planned, are under design, or are under construction by area institutions/developers, the City of Boston, Commonwealth of Massachusetts, and MBTA. Also in this section is a detailed summary of the development of both the future 2018 No-Build and 2018 Build Conditions, including a detailed analysis of morning and evening peak hour traffic activity and operations, parking supply and demands, loading and service accommodations, future pedestrian and bicycle demands, and future transit demands. The development and evaluation of the 2018 No-Build and Build Conditions has been conducted to help identify additional roadway and pedestrian improvements that may be needed to mitigate identified transportation impacts generated by future proposed projects.



Belvidere/Dalton Project **Boston, Massachusetts**

Figure 3.2-9

Curb Use

3.3.1 No-Build Condition

The 2018 No-Build Condition was developed and analyzed to evaluate future transportation conditions in the Study Area without consideration of the Proposed Project.

This future analysis year represents a 5-year horizon from the 2013 Existing Condition. Under the No-Build Condition, anticipated increases in traffic activity on Study Area roadways due to continued general area-wide traffic growth and approved developments in the area are added to the defined morning and evening peak hour traffic networks.

3.3.1.1 Step 1 – Account for Background Traffic Growth

The first step in projecting No-Build traffic volumes was to estimate general area-wide traffic growth and determine an annualized growth rate that could be applied to existing condition peak hour traffic volumes to reasonably account for future traffic growth in the project Study Area. No-Build Conditions utilize an annual growth rate of 0.5 percent per year from 2013 to 2018. This background growth rate is consistent with rates used to estimate future traffic conditions for other developments planned in the area.

3.3.1.2 Step 2 – Development Projects

There are currently eight approved or planned development projects that are expected to have an influence on future year peak hour traffic volumes on Study Area roadways and intersections. A description of each applicable project and/or master plan is provided below.

- 350 Boylston Street: This approved 9-story office building will include 221,230 square feet of office space, with ground level retail, a health club and 150 underground parking spaces. The project status with the BRA is listed as "Board Approved" and last updated June 2013.

- 212-222 Stuart Street Development: This project includes the construction of a 10-story building containing 65,700 square feet of retail and office space. The project status with the BRA is listed as "Board Approved" and last updated March 2013.

- Liberty Mutual at 157 Berkeley Street: The project includes the construction of a 590,000 square feet (22-story) office building and renovation to the existing Liberty Mutual sites on Stuart Street, Berkley Street, St. James Avenue and Columbus Avenue. Parking for up to 205 vehicles will be provided in a below grade parking structure (87 net new spaces). The Project is set to open in the coming weeks.

- Columbus Center: This approved project program includes approximately 1.1 million square feet of development and over 900 parking spaces. The program is comprised of a 199-room hotel, 493 residential units and ground floor retail. The project status with the BRA is listed as "Board Approved" and last updated November 2009.

- Prudential Center Redevelopment: This project includes the construction of a 188-unit residential building (Exeter Residences) as well as development of a 19-story (362,000 square feet) office building, known as 888 Boylston Street. The project status with the BRA is listed as "Board Approved" and last updated June 2013. The Exeter Residences portion of the project is under construction.

- Mass College of Pharmacy- Huntington Avenue Academic Building: The project includes the construction of a 6-story building (49,700 square feet). The proposed structure will provide classroom and auditorium space for approximately 250 students and office space to accommodate approximately 50 employees. Additionally, a 250-seat auditorium will accommodate lectures and guest speakers. No new parking will be provided. The project status with the BRA is listed as "Board Approved" and last updated February 2009.

- 41 Westland Avenue: The project includes the redevelopment of the site into a 7-story (67,000 square feet) building with up to 48 residential condominiums and up to 31 parking spaces within a street level garage. The project status with the BRA is listed as "Under Construction" and last updated January 2013.

- Copley Place Residential and Retail Expansion: This project includes approximately 114,000 square feet of new retail (54,000 of Neiman Marcus and 60,000 square feet of restaurant, shops and a garden) as well as a 660,000 square feet residential tower. The project status with the BRA is listed as "Board Approved" and last updated March 2012.

Additional planned or approved projects in the area were not included in this list due to the fact that they are not expected to influence future year peak hour traffic on study area roadways.

3.3.1.3 Infrastructure Changes

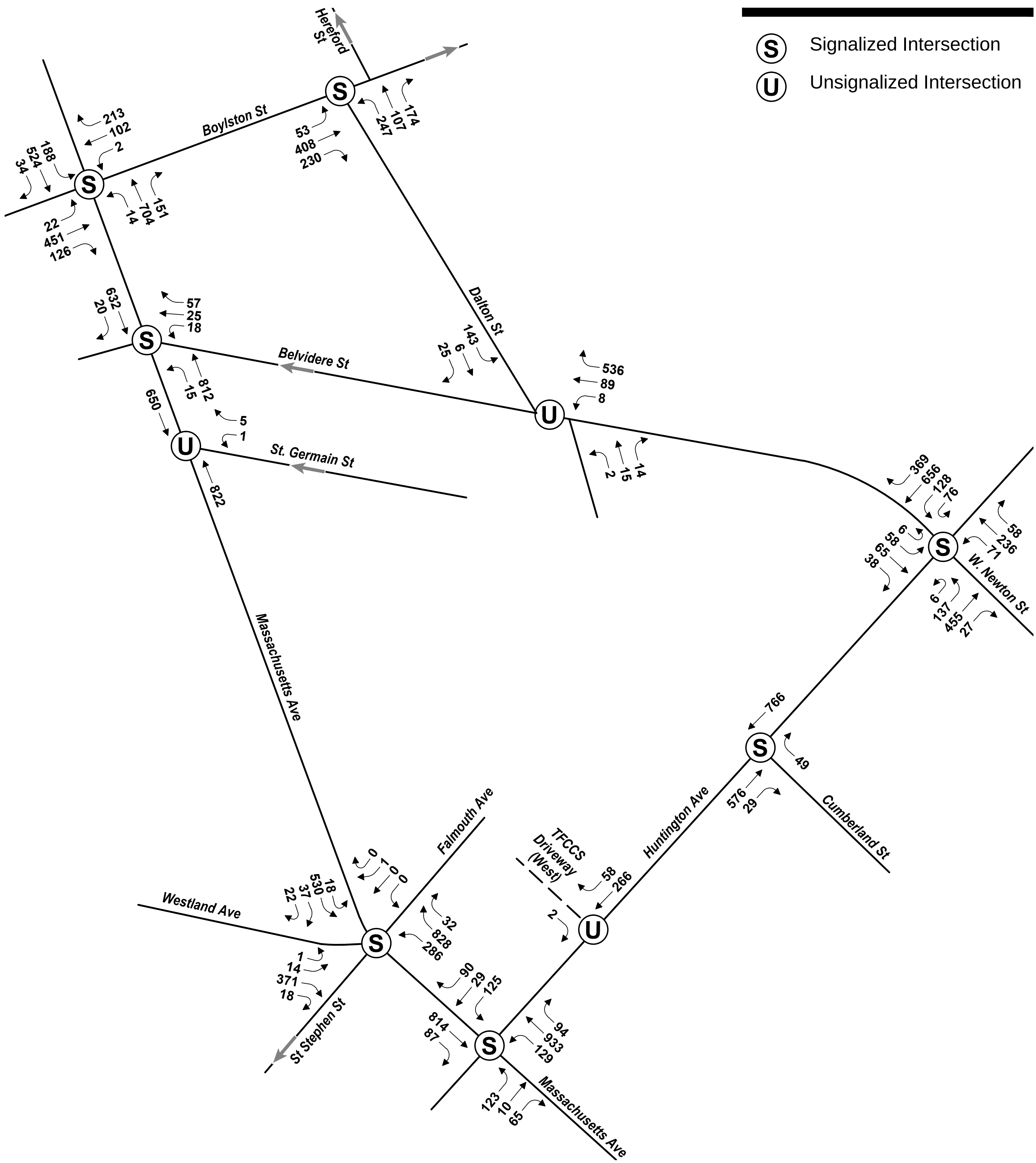
The Boston Transportation Department and Department of Public Works is planning and designing streetscape and transportation improvements in the Project Study Area known as the Symphony Streetscape Project. The construction of the streetscape and transportation improvements will commence in the summer of 2013. The final design includes proposed improvements along a portion of Massachusetts Avenue, from St. Botolph Street to Westland Avenue. Primary transportation improvements include the incorporation of the Christian Science Plaza driveway on Massachusetts Avenue into the signal control at the intersection of Massachusetts Ave/Westland Street/ St. Stephen Street with new signal equipment. Signal phasing and timing upgrades as well as a new pedestrian crosswalk, enhancement of handicap accessibility features and the relocation of bus stops greatly improve the pedestrian and vehicular conditions at this key location. The City is also planning bicycle accommodations as part of the overall roadway improvement to this section of Massachusetts Avenue. Signal improvements and streetscape enhancements are also planned for Huntington Avenue at Massachusetts Avenue. All of these changes to the existing roadway and intersection infrastructure have been accounted for and assumed in this future analysis.

3.3.1.4 2018 No-Build Traffic Volumes

The 2013 Existing Condition volumes were adjusted to 2018 with a growth rate of 0.5 percent per year. The eight area projects that are either planned, approved and/or under construction were added to these adjusted volumes to create the 2018 No-Build Condition weekday morning and evening peak hour traffic volumes. Figures 3.3-1 and 3.3-2 present the 2018 No-Build Condition traffic volume networks for the weekday morning and evening peak hours, respectively.

3.3.2 Build Condition

The 2018 Build Condition was developed in order to evaluate future transportation conditions in the study area with the Belvidere/Dalton Project in place. The 2018 study year represents a five year planning horizon. The Build Condition takes into account the changes and growth established as part of the 2018 No-Build Condition presented previously, and also accounts for the changes that will occur with the Proposed Project. 2018 Build Condition traffic volumes for study area roadways were developed by estimating Project-generated traffic volumes, distributing these volumes, and assigning them to the study area roadways. The traffic volumes expected to be generated by the Proposed Project were added to the 2018 No-Build Condition traffic volumes to create the year 2018 Build Condition traffic volume networks. The following sections describe the procedures used to develop the Build Condition traffic volume networks.

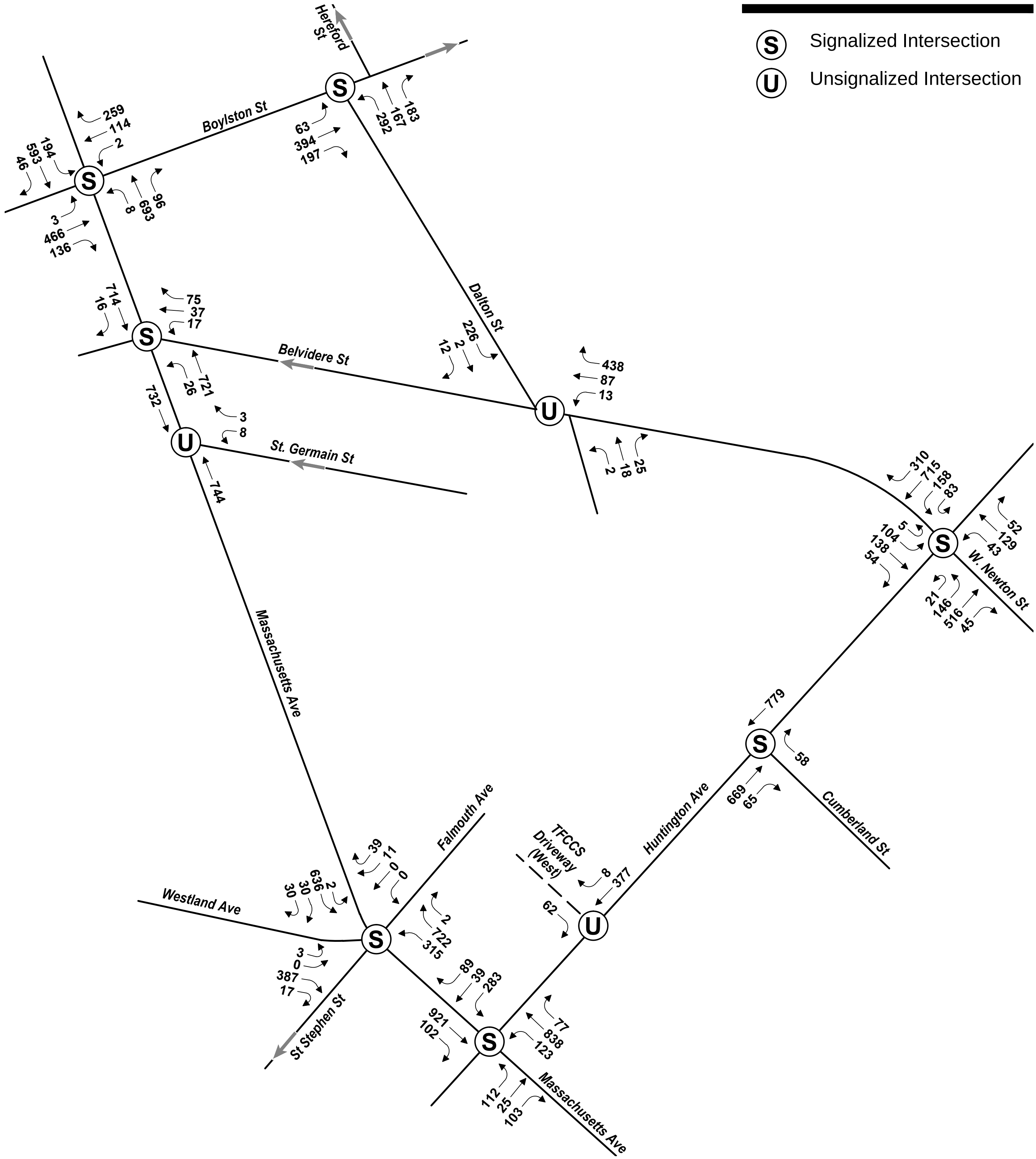


Belvidere/Dalton Project **Boston, Massachusetts**

VHB Vanasse Hangen Brustlin, Inc.

Figure 3.3-1

No-Build Condition (2018) Morning Peak Hour Traffic Volumes (7:45-8:45 AM)



Belvidere/Dalton Project **Boston, Massachusetts**

Vanasse Hangen Brustlin, Inc.

Figure 3.3-2

No-Build Condition (2018) Evening Peak Hour Traffic Volumes (5:00-6:00 PM)

3.3.2.1 Site-Generated Traffic Volumes

Unadjusted Trip Generation

To estimate traffic impacts of the Proposed Project, it is necessary to determine the traffic volumes expected to be generated by the new Belvidere/Dalton Project.

The trip generation for the Residential and Hotel land uses was based on standard Institute of Transportation Engineers (ITE) trip rates published in ITE's Trip Generation manual (8th Edition). ITE's Land Use Codes Condominiums (230), Hotel (310), and Apartments (220) were used to estimate the new trips generated by the Project. Since Hotel (310) is defined as containing retail such as restaurant space within the use in the ITE Trip Generation manual, the restaurant space was not analyzed separately but assumed to be included in the Hotel generated trips. A standard vehicle occupancy rate (VOR) of 1.2 persons per vehicle was applied to determine person-trips rates. These trips are presented in Table 3-4.

Table 3-4 Trip Generation Estimates

		ITE Trip Generation	VOR	Person Trips
Weekday Daily	In	2,402	1.2	2,882
	Out	2,402	1.2	2,882
	Total	**4,804**	**1.2**	**5,764**
Weekday Morning Peak Hour	In	125	1.2	150
	Out	221	1.2	266
	Total	**346**	**1.2**	**416**
Weekday Evening Peak Hour	In	243	1.2	292
	Out	157	1.2	189
	Total	**400**	**1.2**	**481**

Source: Institute of Transportation Engineers, Trip Generation 8h Edition

Adjustments to Trip Generation

Trip generation estimates presented in Table 3-4 do not include any adjustments to reflect public transit, walking trips, or bicycling trips that are characteristic of an urban downtown location.

As previously discussed, the Belvidere/Dalton Project will benefit from MBTA bus and transit services. There will also be a measurable component of walking and bicycling trips to and from the surrounding downtown.

The BTD reference documents published under the Access Boston 2000-2010 (May 2002) initiative were assumed for the mode share splits for the Trip Generation Estimate and are provided in Table 3-5.

Table 3-5 Mode Shares

	Auto	Transit	Walk/Other
Residential			
Daily	24%	19%	57%
AM/PM Peak	21%	15%	64%
Other – Hotel			
Daily	29%	16%	55%
AM/PM Peak	26%	13%	61%

Source: BTD - Access Boston 2000-2010 (May 2002) initiative

The adjusted trip generation estimates are presented in Table 3-6. As shown, the Proposed Project is expected to generate a total of 80 new vehicle trips (31 entering, and 49 exiting) during the weekday morning peak hour, and a total of 92 new vehicle trips (55 entering, and 37 exiting) during the weekday evening peak hour. On a daily basis, the Proposed Project is expected to generate 1,258 new vehicle-trips (629 entering, and 629 exiting) on a weekday.

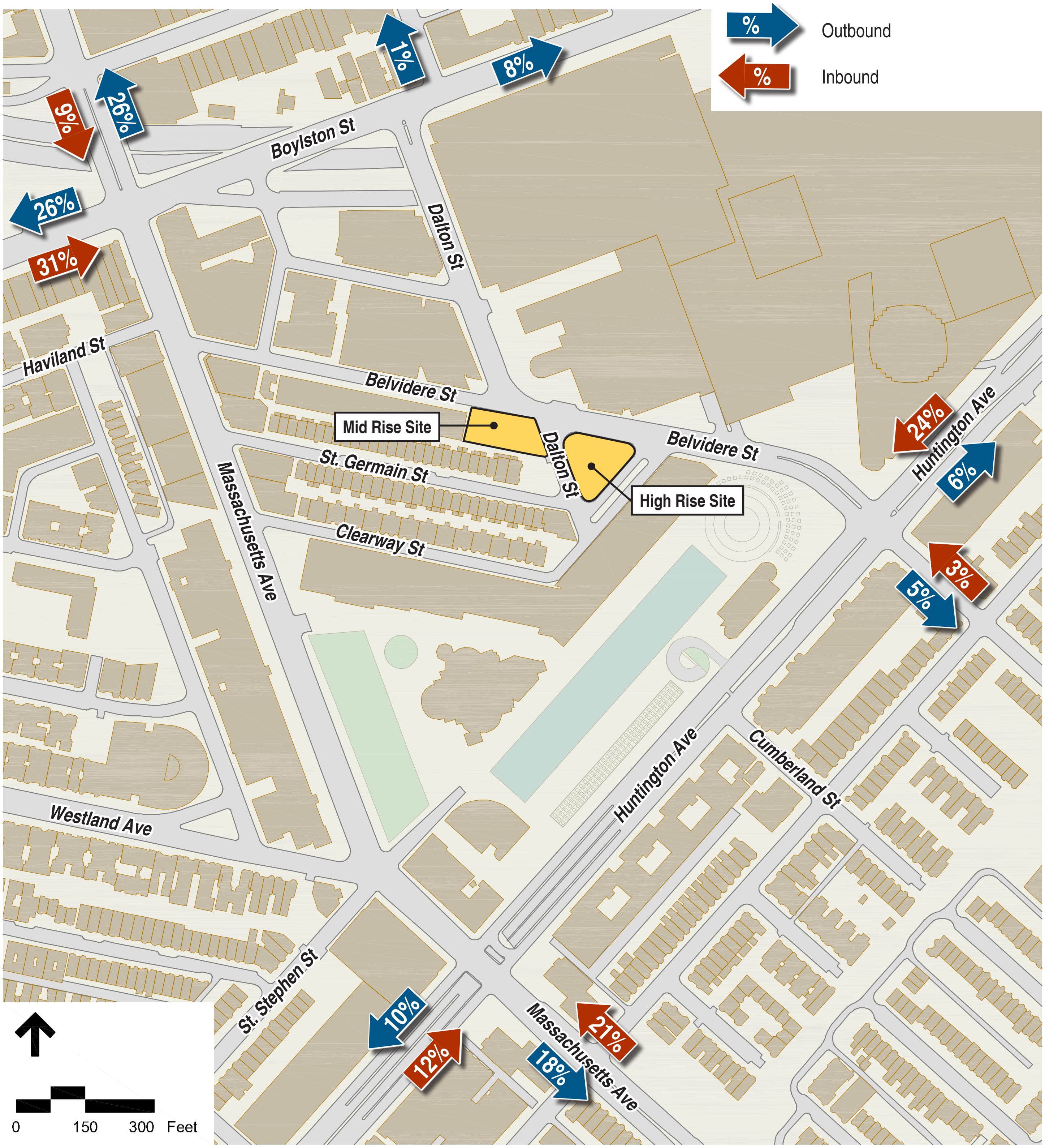
Table 3-6 Trip Generation by Mode

		Person Trips	VOR	Auto Trips	Transit Trips	Walk Trips
Weekday Daily	Enter	2,882	1.2	629	509	1,617
	Exit	2,882	1.2	629	509	1,617
	Total	**5,764**	**1.2**	**1,258**	**1,018**	**3,234**
Weekday Morning Peak Hour	Enter	150	1.2	31	20	93
	Exit	266	1.2	49	39	168
	Total	**416**	**1.2**	**80**	**59**	**261**
Weekday Evening Peak Hour	Enter	292	1.2	55	42	184
	Exit	189	1.2	37	27	118
	Total	**481**	**1.2**	**92**	**69**	**302**

Trip Distribution and Assignment

Having estimated increases in auto trips associated with the Proposed Project, the next step in the analysis involves the assignment of these trips to the local roadway network based on geographic distribution of Project traffic. The directional distribution of Project traffic is a function of several variables. These include the relative locations and densities of population, competing uses, existing travel patterns, and the efficiency of the roadways leading to the site.

Trip distribution patterns were developed based on Access Boston 2000-2010 (May 2002) trip distribution data. They are summarized in the attached Figures 3.3-3 and 3.3-4.

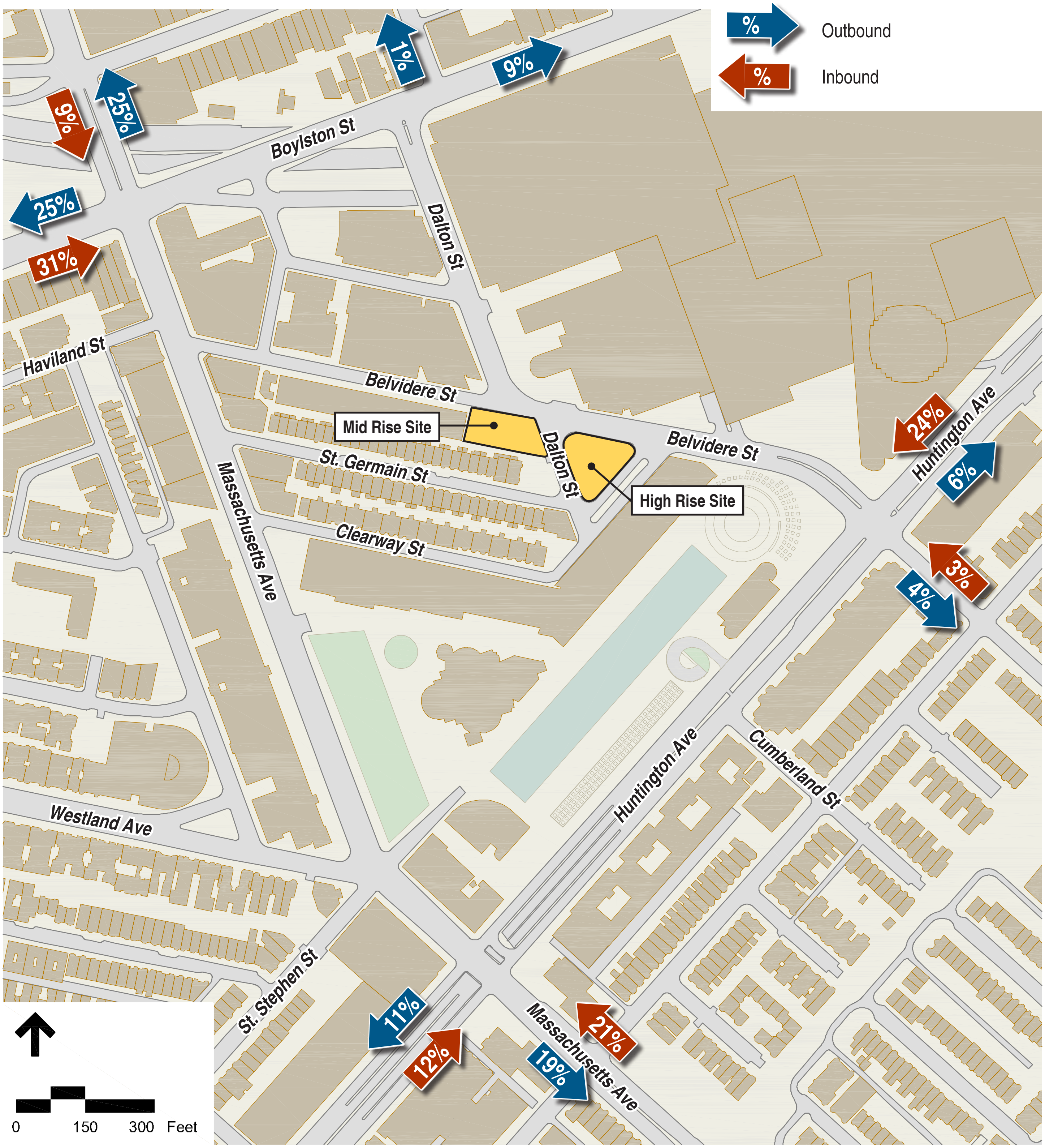


Belvidere/Dalton Project Boston, Massachusetts

Vanasse Hangen Brustlin, Inc.

Figure 3.3-3

Trip Distribution for High Rise Site



Belvidere/Dalton Project **Boston, Massachusetts**

Figure 3.3-4

Trip Distribution for Mid Rise Site

3.3.2.2 2018 Build Condition Improvements

The 2018 Build Condition includes the following improvements to the existing transportation infrastructure in the study area. The improvements associated with the Project are described in the following bullets:

- ♦ Modification of Dalton Street between Saint Germain Street and Belvidere Street to provide one-way travel in the south bound direction.

- ♦ Creation of a Valet/drop-off/pick-up curb area along the east side of Dalton Street for hotel valet operations.

- ♦ Creation of a Valet/drop-off/pick-up curb area along the east side of the Mid-rise site on Dalton Street

- ♦ Modification of Clearway Street so it extends from Dalton Street to Belvidere Street to create the Clearway Street Extension. This will provide two-way access to the proposed parking ramp below the High-rise Building and residential drop-off/pick-up. Clearway Street Extension will approach Belvidere Street with stop control.

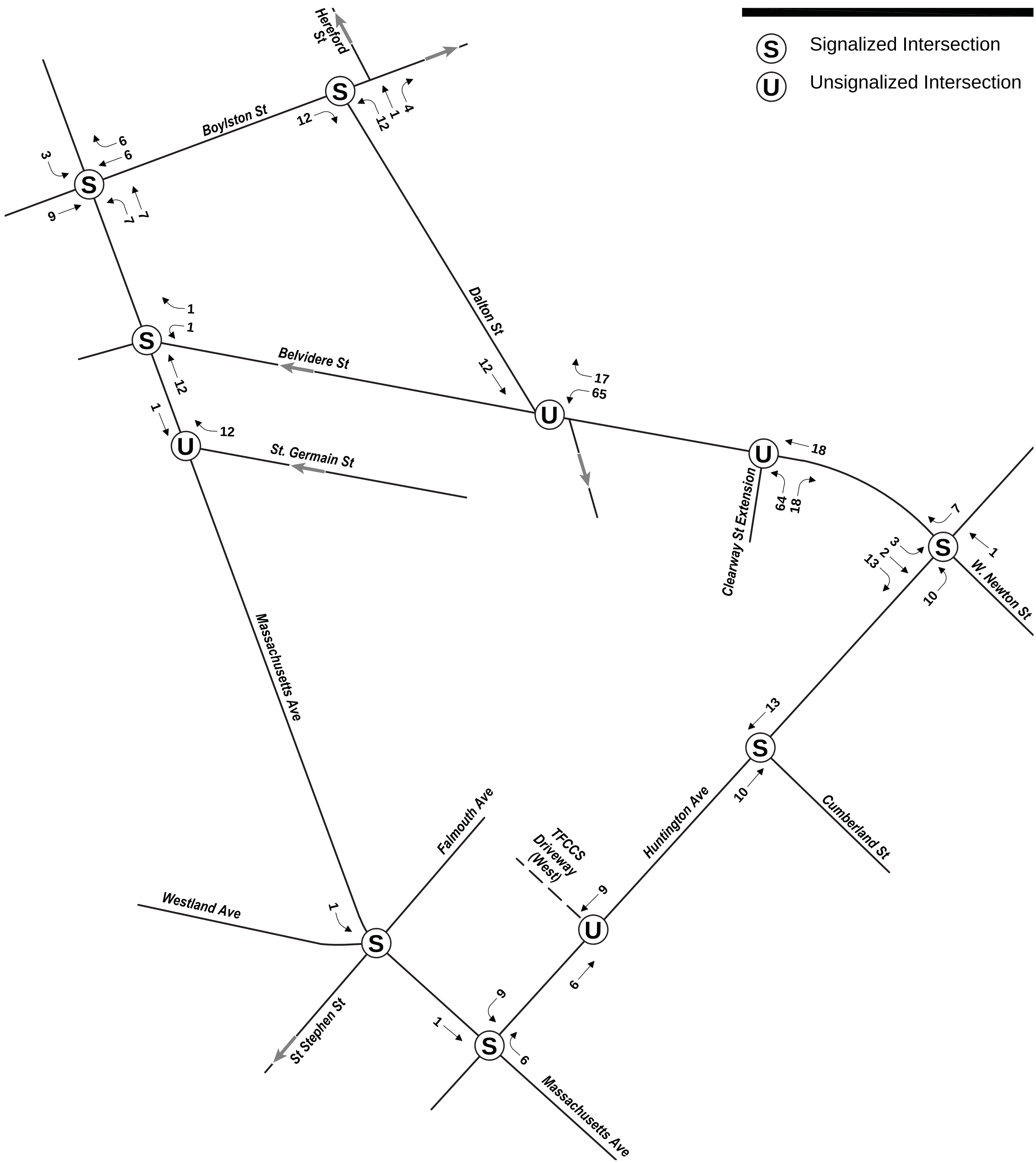
- ♦ Redesign of the Belvidere Street/Dalton Street intersection to include a realigned intersection with improved sight distance while maintaining the stop control in the Dalton Street southbound direction. This intersection will contain only two approaches: Belvidere Street westbound and Dalton Street southbound. The Belvidere Street westbound approach will be striped to include a left/through lane and an exclusive right turn lane at the intersection. Crosswalks will be provided at the newly formed intersection to improve pedestrian circulation.

All of these improvements will be designed in consultation with the Boston Transportation Department and Public Improvements Commission. These modifications have been included in the 2018 Build Condition capacity analysis scenarios.

3.3.2.3 2018 Build Condition Traffic Networks

Based upon the trip distribution patterns described above, the new Project-generated traffic volumes were assigned to the roadway network. The Project generated trips are shown graphically in Figures 3.3-5 and 3.3-6. The new trips were combined with the 2018 No-Build Condition traffic volumes to provide the 2018 Build Condition peak hour traffic networks.

The 2018 Build Condition traffic volume networks are presented in Figures 3.3-7 and 3.3-8 for the weekday morning and evening peak hours, respectively.

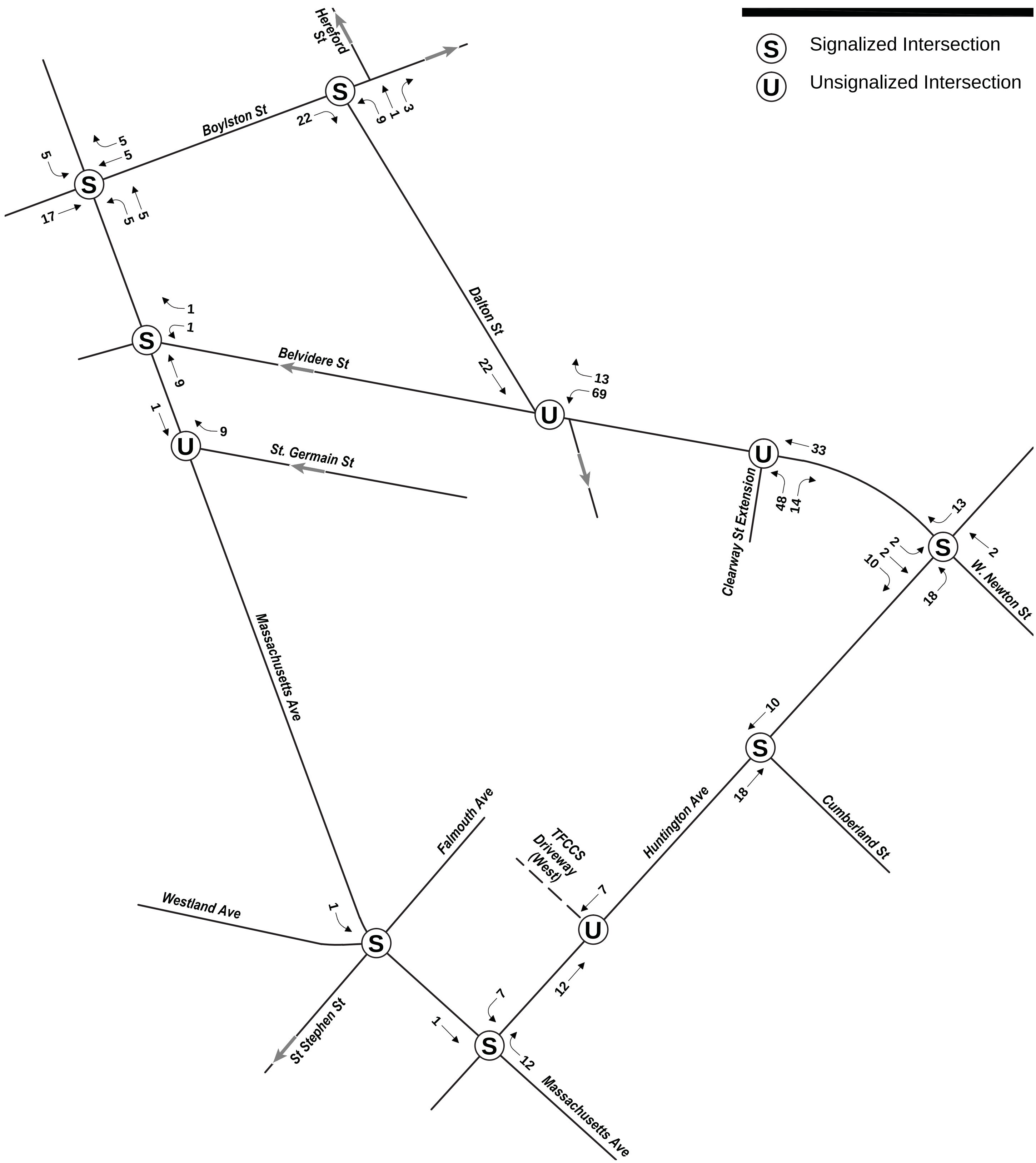


Belvidere/Dalton Project **Boston, Massachusetts**

Vanasse Hangen Brustlin, Inc.

Figure 3.3-5

Project Generated Trips Morning Peak Hour Traffic Volumes (7:45-8:45 AM)



Belvidere/Dalton Project   Boston, Massachusetts

Figure 3.3-6

Project Generated Trips Evening Peak Hour Traffic Volumes (5:00-6:00 PM)

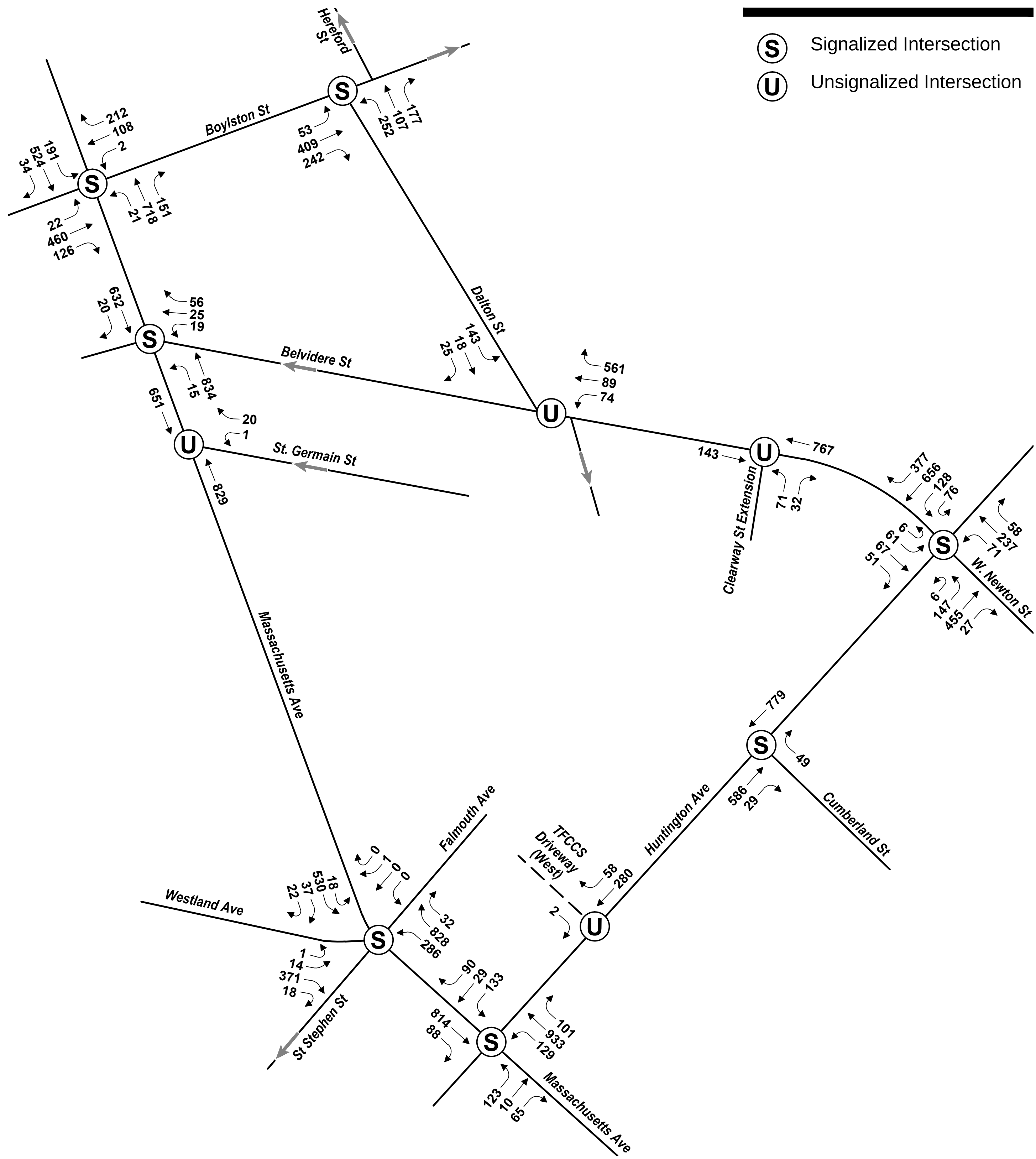
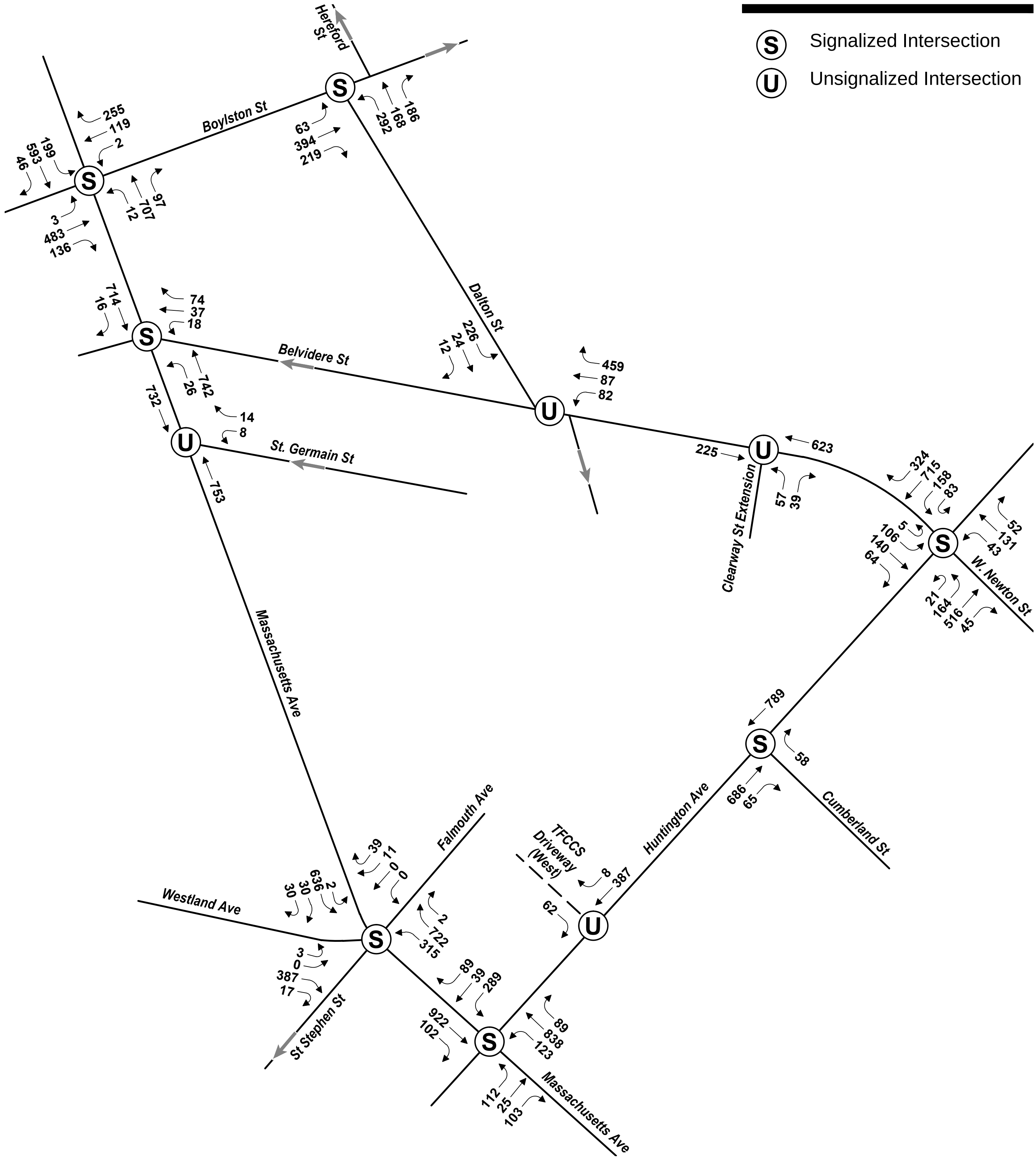


Figure 3.3-7

Build Condition (2018) Morning Peak Hour Traffic Volumes (7:45-8:45 AM)



Belvidere/Dalton Project Boston, Massachusetts

Vanasse Hangen Brustlin, Inc.

Figure 3.3-8

Build Condition (2018) Evening Peak Hour Traffic Volumes (5:00-6:00 PM)

3.3.2.4 Pedestrians

As shown previously in Table 3-6, the Proposed Project is expected to generate 261 morning peak hour pedestrian trips and 302 evening peak hour pedestrian trips. It is expected that hotel patrons will walk to nearby amenities and destinations within the Back Bay neighborhood.

3.3.2.5 Transit

As shown previously in Table 3-6, the Project is expected to generate a total of 59 transit trips during the morning peak hour and 69 transit trips during the evening peak hour. As discussed in the transit section 5.2.5, this Project site is well served by existing transit infrastructure. The transit trips generated by the Project will be able to easily access the Green Line, Bus Lines and the Commuter Rail.

3.3.2.6 Bicycle Parking

Bicycle parking will be provided for employees of the retail and hotel uses as well as residents of the buildings. In the High-rise Building, 220 bicycle parking spaces will be provided below grade. In the Mid-rise Building, approximately 240 bicycle parking/ storage spaces will be primarily provided below grade in the parking garage.

3.3.2.7 Parking and Valet Operations

High-rise Site

The parking needs of the proposed Belvidere/Dalton High-rise site will be met in The First Church of Christ, Scientist's existing below grade plaza garage that currently contains approximately 550 parking spaces as well as additional parking to be provided in the basement of the 101 Belvidere Street Building containing approximately 50 new spaces. Since valet parking will be provided, this will effectively increase the number of vehicles which can be parked in the garage to a total of approximately 726. This results in a net increase in parking capacity of the Garage of 113 vehicles, after taking into account the elimination of 63 commercial parking spaces from the Mid-rise site and the transfer of those spaces to the garage. The First Church has granted to the High-rise Developer the right to park 400 vehicles in the garage and the High-rise Developer will make available to the Mid-rise Developer the right to park 60 vehicles (from the 400). The new spaces below the 101 Belvidere Building will connect to the ramp below the High-rise Building (off of the Clearway Street Extension) as well as the existing Plaza garage.

Mid-rise Site

The proposed Belvidere/Dalton Mid-rise site will contain approximately 21 parking spaces, including some tandem spaces, below grade for a portion of the residents to park. The access ramp to this parking will be provided behind the building along the alley accessed off of Dalton Street. Additional parking for up to 60 vehicles will be provided for residents of the Mid-rise Building from the 400 spaces available to the High-rise building under the 101 Belvidere Street Building and in the existing Plaza Garage.

Valet operations for the hotel and the residential uses will be provided along Dalton Street near the south edge of the Belvidere/Dalton High-rise building. Valet operators will meet drivers on the curb and then park their vehicles in the 101 Belvidere Street Building basement or the Plaza Garage. It is expected that all of the hotel patrons and the majority of the residents will utilize the valet parking service.

3.3.2.8 Loading & Service Activity

The First Church of Christ, Scientist Loading and Service

The First Church of Christ, Scientist's existing site currently utilizes the loading and service ramp to an underground service area accessed off of Belvidere Street. This ramp is located along the 101 Belvidere Street building and due to the constrained space, uses a turn table below grade to re-direct the entering and exiting trucks on the ramp. Due to the modification of this driveway and ramp structure in association with the proposed High-rise building, the existing loading and service activity at this location will be relocated to the existing loading docks on Clearway Street. Clearway Street currently contains a curb cut of 36 feet 9 inches and another curb cut of 94 feet 3 inches for loading and service activity with two existing docking areas, which were historically used for both the Christian Science Monitor as well as servicing church administrative offices within the Publishing House Building. As The Christian Science Monitor is no longer printed on site, these docks have the continued capacity to service the Publishing House Building as well as the capacity to service any heavy delivery needs for the 101 Belvidere building.

Clearway Street currently has approximately three trucks per day that utilize the designated loading and service curb. Currently, the below-grade ramp on the private driveway has approximately seven trucks per day. All of these seven trucks will be relocated to Clearway Street for a total of approximately ten trucks per day at the Clearway Street loading area. Trucks make deliveries between 7:30 a.m. and 11:30 a.m., and again between 2:45 p.m. – 3:45 p.m. but predominately between 8:00 a.m. – 10:00 a.m. Trucks will depart the Clearway Street loading area and continue on through to Belvidere Street via the Clearway Street Extension. Saint Germain Street will not be utilized as a truck route for departing loading and service vehicles. The following table summarizes the existing and proposed loading and service activity for The First Church of Christ, Scientist.

Table 3-7 TFCCS Loading and Service Activity During Typical Levels*

	Existing Loading (# of Trucks Per Day)	Future Loading (# of Trucks Per Day)
Below-grade Ramp Loading	7	0
Clearway Street Loading	3	10
Belvidere Street Loading	3	3

*Activity will increase during either Church or Tenant renovation projects.

High-rise Loading and Service

The Dalton/Belvidere High-rise loading and service area will be located off of the Clearway Street Extension. As currently planned, the building will be served by three loading bays, two for large trucks and a third intended to house a compactor for the building.

Mid-rise Loading and Service

The Dalton/Belvidere Mid-rise building will contain a loading dock off of Belvidere Street on the north side of the building. This will provide trash removal and move in/move out operations.

3.4 Level of Service Operations

This section presents the transportation operations analyses for vehicular operations at study area intersections. These operations analyses provide a summary of transportation capacities and overall operations as they relate to delay and congestion.

3.4.1 Intersection Level of Service (LOS) Operations

Vehicle Level of Service (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 A through D are considered acceptable, while LOS E indicates vehicles endure significant delay and LOS F suggests unacceptable delay for the average vehicle. LOS thresholds differ for signalized and un-signalized intersections with longer delays at signalized intersections perceived as acceptable.

Table 3-8 below presents the LOS delay threshold criteria as defined in the 2000 Highway Capacity Manual (HCM). A LOS D is typically considered acceptable in an urban environment.

Table 3-8 Level of Service Criteria

Level of Service (LOS)	Unsignalized Intersection Control Delay (sec/veh)	Signalized Intersection Control Delay (sec/veh)
A	≤ 10	≤10
B	> 10 - ≤ 15	> 10 - ≤20
C	> 15 - ≤25	> 20 - ≤35
D	> 25 - ≤35	> 35 - ≤55
E	> 35 - ≤50	> 55- ≤ 80
F	> 50	> 80

Source: 2000 HCM

Consistent with BTD's guidelines, Synchro 6 software was used to model LOS operations at the study area intersections. Adjustments were made to the Synchro model to include characteristics of the study area such as heavy vehicles, bus operations, parking activity, and pedestrian crossings.

Signalized Intersection Capacity Analysis

Capacity analyses were conducted for the seven existing signalized intersections identified in the Study Area. A capacity analysis was conducted for 2013 Existing conditions and the 2018 No-Build and Build Conditions. A summary of the signalized capacity analysis is presented in Table 3-9 and Table 3-10.

Table 3-9 Morning Peak Hour Signalized Intersection Capacity Analysis Results

	2013 Existing Condition			2018 No Build Condition			2018 Build Condition		
Approach	v/c[1]	Delay[2]	LOS[3]	v/c[1]	Delay[2]	LOS[3]	v/c[1]	Delay[2]	LOS[3]
Boylston Street at Massachusetts Avenue									
Eastbound – Thru/Right	0.98	70.5	E	>1.0	>80	F	>1.0	>80	F
Westbound – Left/Thru	0.45	33.4	C	0.46	33.5	C	0.49	33.8	C
Westbound – Right	0.37	32.8	C	0.38	32.9	C	0.37	32.9	C
Northbound – Thru/Right	0.92	27.8	C	>1.0	>80	F	>1.0	>80	F
Southbound – Left	0.59	39.6	D	0.61	40.4	D	0.62	40.8	D
Southbound – Thru/Right	0.33	8.3	A	0.35	8.5	A	0.35	8.5	A
Overall	0.83	35.1	D	0.94	55.5	E	0.96	61.8	E
Belvidere Street at Massachusetts Avenue									
Westbound – Left/Thru/Right	0.58	42.3	D	0.59	42.4	D	0.59	42.7	D
Northbound – Left/Thru	0.51	3.9	A	0.59	6.7	A	0.61	7.1	A
Southbound – Thru/Right	0.43	8.0	A	0.45	8.2	A	0.45	8.2	A
Overall	0.53	8.7	A	0.59	9.9	A	0.61	10.1	B
St. Stephen at Massachusetts Avenue									
Westbound – Left/Thru/Right	-	-	-	0.02	40.9	D	0.02	40.9	D
Northbound – Left	0.90	37.0	D	0.75	45.1	D	0.75	44.6	D
Northbound – Thru/Right	0.41	1.7	A	0.43	1.4	A	0.43	1.4	A
Southbound – Left/Thru/Right	0.98	61.5	E	0.73	26.2	C	0.73	26.3	C
Southeastbound – Thru/Right	0.89	49.7	D	0.67	33.9	C	0.67	33.9	C
Overall	0.93	33.1	C	0.66	20.1	C	0.66	20.1	C
Huntington Avenue at Massachusetts Avenue									
Eastbound – Left/Thru/Right	0.38	37.4	D	0.76	50.9	D	0.76	50.9	D
Westbound – Left/Thru/Right	0.42	37.7	D	-	-	-	-	-	-
Westbound – Left/Thru	-	-	-	0.85	67.2	E	0.88	70.5	E
Westbound – Right	-	-	-	0.47	37.8	D	0.46	37.4	D
Northbound – Left	-	-	-	0.68	47.3	D	0.70	48.5	D
Northbound – Thru/Right	>1.0	56.0	E	0.92	34.9	C	0.94	37.4	D
Southbound – Thru/Right	-	-	-	>1.0	>80	F	>1.0	>80	F
Southbound – Thru	0.78	12.7	B	-	-	-	-	-	-
Southbound – Right	0.15	7.1	A	-	-	-	-	-	-
Overall	0.75	36.8	D	>1.0	>80	F	>1.0	>80	F
Huntington Avenue at Cumberland Street									
Eastbound – Thru/Right	0.19	3.2	A	0.22	3.3	A	0.22	3.3	A
Westbound – Thru	0.16	0.8	A	0.18	0.8	A	0.18	0.8	A
Northbound – Right	0.05	39.0	D	0.05	39.0	D	0.05	39.0	D
Overall	0.20	3.8	A	0.21	3.7	A	0.21	3.7	A
Huntington Avenue at Belvidere Street									
Eastbound – Left	0.83	65.6	E	0.84	66.2	E	0.86	69.9	E
Eastbound – Thru/Right	0.53	29.0	C	0.62	31.3	C	0.62	31.5	C
Westbound – Left	0.93	71.9	E	0.94	77.1	E	0.94	77.1	E
Westbound – Thru	0.61	30.6	C	0.69	32.8	C	0.70	33.9	C
Westbound – Right	0.49	74.7	E	0.56	79.7	E	0.58	>80	F
Northbound – Left/Thru/Right	0.90	55.4	E	0.91	57.5	E	0.91	57.8	E
Southbound – Left	0.26	24.3	C	0.26	24.1	C	0.27	24.1	C
Southbound – Thru/Right	0.08	19.4	B	0.08	19.2	B	0.08	19.2	B
Overall	0.70	46.1	D	0.74	48.3	D	0.74	49.5	D
Boylston Street at Dalton Street									
Eastbound – Thru/Right	0.47	18.0	B	0.65	22.7	C	0.66	23.2	C
Northbound – Left	0.77	39.7	D	0.72	34.7	C	0.72	35.0	C
Northbound – Thru/Right	0.85	49.1	D	0.91	56.5	E	0.91	56.4	E
Overall	0.60	30.2	C	0.75	33.0	C	0.75	33.2	C

1 V/C = volume to capacity ratio 2 Delay = Average delay in seconds per vehicle
3 LOS = Level of Service Delay cannot be accurately estimated for v/c ratio greater than 1.0

Table 3-10 Evening Peak Hour Signalized Intersection Capacity Analysis Results

	2013 Existing Condition			2018 No Build Condition			2018 Build Condition		
Approach	v/c[1]	Delay[2]	LOS[3]	v/c[1]	Delay[2]	LOS[3]	v/c[1]	Delay[2]	LOS[3]
Boylston Street at Massachusetts Avenue									
Eastbound – Thru/Right	0.83	41.7	D	0.85	43.4	D	0.87	45.2	D
Westbound – Left/Thru	0.29	29.2	C	0.29	28.8	C	0.30	28.8	C
Westbound – Right	0.33	29.8	C	0.34	29.5	C	0.34	29.5	C
Northbound – Thru/Right	0.83	20.2	C	0.91	32.5	C	0.94	32.7	C
Southbound – Left	0.62	44.9	D	0.64	45.8	D	0.66	46.6	D
Southbound – Thru/Right	0.37	10.4	B	0.40	10.9	B	0.40	11.0	B
Overall	0.78	26.3	C	0.82	30.5	C	0.85	31.1	C
Belvidere Street at Massachusetts Avenue									
Westbound – Left/Thru/Right	0.66	44.4	D	0.67	44.4	D	0.67	44.5	D
Northbound – Left/Thru	0.55	19.6	B	0.59	25.5	C	0.60	21.8	C
Southbound – Thru/Right	0.48	9.8	A	0.51	10.0	A	0.51	9.9	A
Overall	0.58	17.6	B	0.61	20.3	C	0.62	18.6	B
St. Stephen at Massachusetts Avenue									
Westbound – Left/Thru/Right	-	-	-	0.49	46.7	D	0.49	38.8	D
Northbound – Left	0.77	26.2	C	0.82	34.8	C	0.82	55.5	E
Northbound – Thru/Right	0.33	1.4	A	0.34	0.8	A	0.34	1.0	A
Southbound – Left/Thru/Right	>1.0	53.4	D	0.71	16.0	B	0.71	11.9	B
Southeastbound – Thru/Right	0.91	50.9	D	0.70	34.0	C	0.70	36.3	D
Overall	0.91	31.5	C	0.70	18.9	B	0.70	20.5	C
Huntington Avenue at Massachusetts Avenue									
Eastbound – Left/Thru/Right	0.44	37.9	D	0.95	62.1	E	0.96	63.2	E
Westbound – Left/Thru/Right	0.58	39.8	D	-	-	-	-	-	-
Westbound – Left/Thru	-	-	-	>1.0	>80	F	>1.0	>80	F
Westbound– Right	-	-	-	0.38	34.6	C	0.38	34.6	C
Northbound – Left	-	-	-	0.83	70.9	E	0.83	70.9	E
Northbound – Thru/Right	0.87	34.2	C	0.82	28.9	C	0.83	29.7	C
Southbound – Thru/Right	-	-	-	>1.0	>80	F	>1.0	>80	F
Southbound – Thru	0.87	13.7	B	-	-	-	-	-	-
Southbound – Right	0.17	6.2	A						
Overall	0.72	26.7	C	>1.0	>80	F	>1.0	>80	F
Huntington Avenue at Cumberland Street									
Eastbound – Thru/Right	0.23	3.8	A	0.25	3.9	A	0.25	3.9	A
Westbound – Thru	0.15	1.1	A	0.19	1.1	A	0.19	1.1	A
Northbound – Right	0.06	39.1	D	0.06	39.1	D	0.06	39.1	D
Overall	0.22	4.5	A	0.23	4.2	A	0.24	4.2	A
Huntington Avenue at Belvidere Street									
Eastbound – Left	0.80	62.6	E	0.81	63.3	E	0.84	66.9	E
Eastbound – Thru/Right	0.51	27.5	C	0.57	29.1	C	0.57	29.3	C
Westbound – Left	0.92	78.5	E	0.93	>80	F	0.93	>80	F
Westbound – Thru	0.48	24.4	C	0.62	27.7	C	0.63	28.9	C
Westbound – Right	0.51	30.4	C	0.68	39.9	D	0.72	44.0	D
Northbound – Left/Thru/Right	0.73	48.4	D	0.74	48.8	D	0.74	48.8	D
Southbound – Left	0.45	31.8	C	0.46	31.7	C	0.47	31.7	C
Southbound – Thru/Right	0.18	26.9	C	0.18	26.7	C	0.18	26.7	C
Overall	0.64	37.0	D	0.73	38.9	D	0.72	40.1	D
Boylston Street at Dalton Street									
Eastbound – Thru/Right	0.49	20.4	C	0.56	22.2	C	0.58	22.8	C
Northbound – Left	0.68	32.0	C	0.67	30.8	C	0.66	30.3	C
Northbound – Thru/Right	0.85	44.6	D	0.87	45.9	D	0.86	45.5	D
Overall	0.63	29.7	C	0.69	30.6	C	0.70	30.6	C

1 V/C = volume to capacity ratio
2 Delay = Average delay in seconds per vehicle
3 LOS = Level of Service
Delay cannot be accurately estimated for v/c ratio greater than 1.0

Under existing conditions, all signalized intersections operate at a LOS D or better during both the morning and evening peak hours.

Under 2018 No-Build condition, during the morning peak hour, the intersection of Massachusetts Avenue at Boylston Street will decline from a LOS D to a LOS E and the intersection of Huntington Avenue at Massachusetts Avenue will decline from LOS D to a LOS F.

During the weekday evening peak hour, the intersection of Massachusetts Avenue at Belvidere Street will decline from a LOS B to an acceptable LOS C, the intersection of Massachusetts Avenue at St. Stephen Street is expected to improve in LOS from C to a B due to improvements as part of the Symphony Streetscape project. Huntington Avenue at Massachusetts Avenue will decline from LOS C to a LOS F. These changes to LOS operations are due to background growth as well as changes made to the geometry and signal timing/phasing as part of the Symphony Streetscape Project. All other signalized intersections are expected to operate at a LOS D or better as they do during Existing Conditions.

It is important to note that the timings for the Symphony Street Scape improvements could be adjusted in the field to obtain the most efficient splits once the improvements are implemented. The analysis for the intersection of Huntington Avenue/Massachusetts Avenue in the No-Build scenario is conservative since it assumes the timing plans. This intersection could potentially operate at a better LOS once the timings are implemented. The Synchro analysis also assumes the Central Business District (CBD) which provides a conservative analysis and results.

Under 2018 Build conditions (i.e., with the Proposed Project in place), the intersections will continue to operate at same levels of service grades as under 2018 No-Build conditions, except the intersection of Massachusetts Avenue at Belvidere Street which will decline slightly in level of service during the morning peak hour from LOS A to LOS B and improve in LOS during the evening peak hour from C to B. In addition, the intersection of Massachusetts Avenue at St. Stephen Street will decline from LOS B to LOS C during the 2018 Build condition.

Unsignalized Intersection Capacity Analysis

Capacity analyses were also conducted for the three unsignalized intersections identified in the Study Area including one existing driveway. Capacity analyses were conducted for 2013 Existing, 2018 No-Build and Build Conditions. A summary of the unsignalized capacity analysis is presented in Table 3-11 and Table 3-12.

Table 3-11 Morning Peak Hour Unsignalized Intersection Capacity Analysis Results

	2013 Existing Condition			2018 No Build Condition			2018 Build Condition		
Approach	Demand[1]	Delay[2]	LOS[3]	Demand[1]	Delay[2]	LOS[3]	Demand[1]	Delay[2]	LOS[3]
Saint Germain at Massachusetts Avenue									
Westbound – Left/Right	6	17.1	C	6	19.0	C	21	17.7	C
Northbound – Thru	710	0.0	A	822	0.0	A	829	0.0	A
Southbound – Thru	620	0.0	A	650	0.0	A	651	0.0	A
Huntington Avenue at Driveway West									
Westbound – Thru/Right	262	0.0	A	324	0.0	A	338	0.0	A
Southbound – Right	2	18.1	C	2	18.9	C	2	19.0	C
Belvidere at Clearway Street Extension									
Eastbound – Thru/Right	-	-	-	-	-	-	143	0.0	A
Westbound – Left/Thru	-	-	-	-	-	-	767	0.0	A
Northbound – Left/Right	-	-	-	-	-	-	103	13.3	B
Belvidere at Dalton Street									
Westbound – Left/Thru/Right	588	28.9	D	633	39.9	E	724	29.4	D
Northbound – Left/Thru/Right	31	9.4	A	31	9.6	A	-	-	-
Southbound – Left/Thru/Right	169	11.0	B	174	11.3	B	186	11.6	B

1 Demand in vehicles per hour for unsignalized Intersections. 2 Delay 3 LOS = Level of Service

Table 3-12 Evening Peak Hour Unsignalized Intersection Capacity Analysis Results

	2013 Existing Condition			2018 No Build Condition			2018 Build Condition		
Approach	Demand[1]	Delay[2]	LOS[3]	Demand[1]	Delay[2]	LOS[3]	Demand[1]	Delay[2]	LOS[3]
St. Germain at Massachusetts Avenue									
Westbound – Left/Right	10	>50	F	11	>50	F	22	45.6	E
Northbound – Thru	699	0.0	A	744	0.0	A	753	0.0	A
Southbound – Thru	694	0.0	A	732	0.0	A	732	0.0	A
Huntington Avenue at Driveway West									
Westbound – Thru/Right	230	0.0	A	383	0.0	A	393	0.0	A
Southbound – Right	62	>50	F	62	>50	F	62	>50	F
Belvidere at Clearway Street Extension									
Eastbound – Thru/Right	-	-	-	-	-	-	225	0.0	A
Westbound – Left/Thru	-	-	-	-	-	-	623	0.0	A
Northbound – Left/Right	-	-	-	-	-	-	96	12.8	B
Belvidere at Dalton Street									
Westbound – Left/Thru/Right	514	17.1	C	538	19.0	C	628	14.3	B
Northbound – Left/Thru/Right	44	9.2	A	45	9.4	A	-	-	-
Southbound – Left/Thru/Right	234	13.6	B	240	14.1	B	262	14.5	B

1 Demand in vehicles per hour for unsignalized Intersections. The demand applies to only the most critical street approach or lane group.
2 Delay 3 LOS = Level of Service

Under existing conditions, all unsignalized intersections operate at LOS D or better during the morning peak hour. During the evening peak hour, the intersection of St Germain Street at Massachusetts Avenue operates at LOS F in the westbound left/right movements and the intersection of Huntington Street at Driveway West operates at LOS F in the southbound-right movement. Both of these LOS F movements are due to heavy traffic along the main roadway and therefore lack of acceptable gaps in traffic. The traffic movements at the intersection of Belvidere Street at Dalton Street operate at LOS C or better.

Under 2018 No-Build Conditions, traffic operation level of service grades will remain the same as under Existing Conditions, with the exception of the intersection of Belvidere Street at Dalton Street which will decline from LOS D to LOS E in the westbound movement during the morning peak hour only.

Under 2018 Build Conditions (i.e., with the Proposed Project in place) traffic operation level of service grades will remain the same as under No-Build Conditions, with the exception of the intersection of Belvidere Street at Dalton Street which will improve from LOS E to LOS D in the westbound movement during the morning peak hour. During the evening peak hour this approach will improve from a LOS C to a LOS B. It is assumed that the Belvidere Street approach will contain a left/through lane and an exclusive right turn lane at the intersection in order to increase capacity at this approach. The newly formed intersection of Clearway Street Extension at Belvidere Street will operate at LOS A and B during both the morning and evening peak hours. During the evening peak hour, the intersection of Massachusetts Avenue at Saint Germain Street will improve from LOS F to LOS E in the westbound movement due a higher demand in the westbound direction.

3.5 Transportation Demand Management

In addition to physical improvements, the Proponent proposes to minimize reliance by hotel and retail employees, patrons and residents on travel by automobile through implementation of on-site Traffic Demand Management (TDM). Generally, TDM strategies are most effective with commuter travel where most trips are made by employees, e.g. in an office development. However, there are a number of measures that will be implemented in an effort to reduce resident and hotel auto trips to the Project as well as retail and hotel employee trips.

The goal of the Transportation Demand Management (TDM) plan is to reduce the project's overall traffic impact through the implementation of TDM measures that are geared toward affecting the demand side of the transportation equation, rather than the supply side. By their very nature, TDM programs attempt to change people's behavior, and, to be successful, they must rely on incentives or disincentives to make these shifts in behavior attractive to the commuter or resident.

TDM programs are designed to maximize the people-moving capability of the existing transportation infrastructure by increasing the number of persons in a vehicle, providing alternate modes of travel, or influencing the time of, or need to, travel.

TDM measures are most often directed at commuter travel, characterized by the day-to-day regularity of this type of trip. Conditions at the workplace, in terms of employer practices such as on-site services, bicycle storage, and shower facilities impact employee commuter choices, and makes this market the most suitable for identifying alternatives.

The term TDM encompasses both alternatives to driving alone and the techniques or supporting strategies that encourage the use of these alternatives. TDM alternatives to driving alone include: carpools and vanpools, public and private transit, and non-motorized travel including bicycling and walking. TDM alternatives can also influence when trips are made. For example, alternative work hours (compressed work weeks, and flex-time) can affect what time of day trips are made, or if trips occur at all on certain days.

TDM strategies are the supporting measures that encourage the use of alternatives to driving alone. TDM strategies include financial incentives, time incentives, provision of new or enhanced commuter services, dissemination of information, and marketing alternative services. TDM strategies include all the incentives and disincentives that increase the likelihood for people to change their existing travel behavior.

A distinction can be drawn between area-wide TDM programs and employer-based TDM programs. Employer-based TDM programs are those run by individual employers or groups of employers, generally located near one another. "Area-wide" usually refers to a region, municipality or corridor. Area-wide programs address a more diverse group of travelers traveling to a wide variety of locations at many different times.

Transportation Demand Management Plan

To implement a TDM program for the proposed site, the Proponent will consider a number of measures that will contribute toward the reduction of vehicular traffic to and from the site.

The following measures could comprise the proposed TDM package.

Ridesharing

The Proponent will promote ridesharing for its retail and hotel employees by carpooling. The Proponent will provide information regarding carpooling and its benefits to new employees. Interested car-pooler names will be posted in the employee area, and a notice of interested car-poolers will be listed in the facility newsletter.

An incentive program will be established to encourage employees to rideshare by providing a financial incentive.

Guaranteed Ride Home

A guaranteed ride home program, in the case of an emergency for registered rideshare participants, will be provided via a local taxi service. Such programs are very effective in eliminating the concern of an employee that they might not be able to respond effectively, for example to an emergency at home, if they have not used their own car to commute to work. The program can also be applied for unexpected overtime or late working.

Transportation Coordinator

An on-site Transportation Coordinator will be identified to ensure that the complete rideshare program, including ride matching, accommodating work shifts, promotion, incentives, and a guaranteed ride home, is consistently promoted and provided.

Transit Incentives

To encourage the use of transit by employees and residents to commute to work, the proposed buildings will provide local bus schedule and route information in the employee and resident areas.

Bicycle and Pedestrian Measures

Bicycling to the site will likely be attractive to some employees and residents due to the proximity of many residential communities and the urban downtown location. To encourage and facilitate use of bicycles by both employees and residents, secure bicycle storage racks will be provided near the front doors to the new buildings and below grade in the parking garage.

Again due to the close proximity of residential areas to the site, walking is, and will continue to be, attractive to many employees and residents. For this reason, the Project site layout has been designed to encourage pedestrian activity to and from the site by making appropriate connections to the existing pedestrian network in the area.

3.6 Construction Management

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 will be developed and submitted to the BTD for their approval. These plans will detail construction vehicle routing and staging.

Construction Vehicle Traffic

Construction vehicles will be necessary to move construction materials to and from the project sites. Every effort will be made to reduce the noise, control fugitive dust, and minimize other disturbances associated with construction traffic. Truck staging and lay-down areas for the project will be carefully planned. The need for street occupancy (lane closures) along roadways adjacent to the project site is not known at this time.

Construction Parking Issues

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, etc.) Construction workers will also be encouraged to use public transportation to access the Project site because no new parking will be provided for them. Because of the construction workers early arrival/departure (typically 7:00AM-3:00PM) schedule, a conflict for on-street parking is not anticipated.

Pedestrian Access During Construction

During the construction period, pedestrian activity adjacent to the sites may be impacted 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 around the new facilities. Any damage as a result of construction vehicles or otherwise will be repaired per City standards.

Section 4.0

Environmental Protection Component

4.0 ENVIRONMENTAL PROTECTION COMPONENT

4.1 Pedestrian Level Winds

A pedestrian level wind (PLW) study has been performed by RWDI of Guelph, Ontario to assess the effect of the Proposed Project on wind conditions in the pedestrian realm of the Project site and surrounding areas and to provide recommendations for minimizing any potential adverse effects. The results of the wind study are summarized in this section, and the wind study results tables are included in Appendix C.

The wind study involved wind simulations of the Proposed Project on a scale model of the proposed buildings and surroundings in a boundary-layer wind tunnel. A total of 115 wind measurement locations were examined in the wind tunnel under the existing No-Build, the approved Master Plan Build, and the Proposed Project Build Condition for both mean wind speed and effective gust wind speed.

The analysis found that the Proposed Project will not have significant adverse wind impacts. The majority of the locations studied (69 percent) are expected to experience either no change or improved wind conditions under the Proposed Build Condition compared to the No Build Condition. By not constructing at the Huntington Avenue location as was proposed under the approved Master Plan scenario, the Proposed Project avoids creating adverse wind impacts in the vicinity of the Sunday School Building on the Christian Science Plaza.

As design of the Project moves forward, the Proponent will continue to assess the potential for adverse wind impacts and will implement practicable mitigation measures capable of reducing wind impacts adjacent to the Project.

4.1.1 Background

Tall buildings, especially those that protrude above their surroundings, can cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings can intercept these faster winds and deflect them down to the pedestrian level. The funneling of wind through gaps between buildings and the acceleration of wind around corners of buildings may also cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from the prevailing upper-level winds, resulting in no significant changes to the local pedestrian-level wind environment. The most effective way to assess potential pedestrian-level wind impacts around a proposed new building is to conduct scale model tests in a wind tunnel. The 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 and public sidewalks, entrance locations, and gathering spaces 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 are typically standing, somewhat higher winds can be tolerated. For frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. Similarly, 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

For its analysis, RWDI gathered information concerning the site and surrounding buildings and topography within an approximately 1,600-foot radius of the Project site from topographic maps, BRA mapping, and site plans and elevations of the proposed development Project provided by the Project design team. The wind tunnel study looked at a No-Build Condition consisting of the current existing site condition without the Proposed Project, the approved Master Plan Build Condition consisting of the Huntington Building, the High-rise and the Mid-rise at the heights approved in the PDA Master Plan, and the Build Condition; specifically, the Proposed Project as it is described in this Expanded PNF. Photographs of the No Build Condition, Approved Master Plan and Proposed Project models tested are included as Figures 4.1-1 through 4.1-3, respectively. All of the figures related to the wind analyses (Figures 4.1-1 through 4.1-14) described herein are included at the end of this section.

The scale model of the Project site and area was equipped with 115 specially designed wind speed sensors which were, in turn, connected to the wind tunnel's data acquisition system.[1] This system is designed to record the mean and fluctuating components of wind speed at a full-scale height of five feet above grade in pedestrian areas throughout the study area. Wind speeds were measured for 36 wind directions, in 10-degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model. The results were then combined with long-term meteorological data, recorded during the years 1981 to 2011 at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

[1] Note that only 113 sensors obtained full data during testing.

Figures 4.1-4 through 4.1-6 present "wind roses" that summarize the annual 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 southwest and northwest. These are also the dominant direction for strong winds. Winds from the east and east-southeast are also relatively common.

4.1.3 Pedestrian Wind Comfort Criteria

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second standard used by the BRA is based on the work of Melbourne and is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking, as shown in Table 4.2-1.[2] The criteria are shown in terms of benchmarks for the one-hour mean speed exceeded one percent of the time (i.e., the 99-percentile mean wind speed).

Table 4.1-1 Boston Redevelopment Authority Mean Wind Criteria*

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

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

4.1.4 Pedestrian Level Wind Test Results

The following sections review the results of the pedestrian level wind tests for the No-Build, the approved Master Plan Build and the Proposed Project Build Conditions. The results for the annualized mean wind speed analyses for the No-Build, the approved Master Plan Build and the Proposed Project Build Conditions are presented in Figures 4.1-7 through 4.1-9. Figure 4.1-10 presents the net change in BRA comfort ratings between the No-Build and the approved Master Plan Condition, and Figure 4.1-11 presents the net change in BRA comfort ratings between the No-Build and the Proposed Project. The results for the annualized

2 Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions," Journal of Industrial Aerodynamics, 3 (1978) 241 – 249.

effective gust wind speed analyses for the No-Build, the approved Master Plan Build and the Proposed Project Build Conditions are presented in Figures 4.1-12, 4.1-13, and 4.1-14, respectively.

4.1.4.1 No-Build

Under the No-Build Condition, the study finds generally good wind conditions using the BRA's annual mean wind criteria. Most sites are suitable sitting (39 percent) or standing (28 percent). There are no locations categorized as Dangerous; however, there are 13 locations (12 percent) considered to be Uncomfortable. A cluster of these uncomfortable locations (Numbers 17, 18 22, 27, are 28) are near the intersection of Dalton and Belvidere Streets. Other uncomfortable areas are at the north end of the Christian Science Plaza (Numbers 75, 79, 80, 85, and 87). Two are at or near 111 Huntington (Numbers 36 and 115).

Under the No-Build Condition, there are six locations that experience unacceptable gusts. Three are near the Dalton/Belvidere Street intersection (Locations 17, 22, and 27). and three are in the north end of the Christian Science Plaza (Locations 79, 80, and 87).

4.1.4.2 Approved Master Plan Build Condition

Under the approved Master Plan Condition, wind conditions would be made somewhat less calm compared to the No-Build Condition, particularly in the vicinity of the proposed Huntington Avenue site, where under the approved Master Plan Condition, a 291-foot tall building was proposed. This building would have created one Dangerous wind location (Number107) just north of the building and two Uncomfortable locations (Numbers 104 and 106) at its northwest and southeast corners (Numbers 108 and 104). These conditions are not found under the Proposed Project. Another Dangerous location (Number 87) is created under the approved Master Plan Condition near the southeast corner of the building at 177 Huntington Avenue. As noted above, this location is also windy under the No-Build Condition (experiencing Uncomfortable mean annual winds and Unacceptable gusts). Although there would be a net increase in the number of Uncomfortable locations near the Belvidere/ Dalton Street intersection, most locations studied would remain suitable for sitting (27 percent), standing (29 percent), or walking (23 percent).

Unacceptable gusts are predicted at ten locations under the approved Master Plan Condition. Four of the locations (Numbers 27, 79, 80, and 87) also occur under the No-Build Condition. Three are associated with the proposed Huntington Avenue building (Numbers 104, 107, and 108), which would not be constructed under the Proposed Project Condition. One location Number 8) is located at the southern apex of the High-rise building. The remaining two are in the vicinity of the north end of the Christian Science Plaza (Locations 36 and 85).

4.1.4.3 Proposed Project Build Condition

Wind impacts under the Proposed Project Condition are very similar to those of the approved Master Plan Condition, with the exception that the Proposed Project does not have any of the impacts associated with the Huntington Avenue Building that was proposed under the Master Plan Condition.

Under the Proposed Project, most locations will be suitable for sitting (27 percent), standing (29 percent), or walking (23 percent). Compared to the No-Build Condition, the Proposed Project results in either no change or improvement to 69 percent of the locations studied. Of those locations expected to experience a downward shift in wind category, 80 percent will shift by only one category, e.g., from comfortable for sitting to comfortable for standing. Four locations, all near the proposed High-rise, are expected to decline by two categories (e.g, comfortable for sitting to comfortable for walking) and two locations, Numbers 7 and 44 near the southern end of the High-rise, will shift from comfortable for sitting to uncomfortable. One dangerous location (Number 85) is expected on the west side of 177 Huntington Avenue. This is a known windy location that is rated Uncomfortable under existing No-Build conditions, and annual mean wind speed at this location is expected to exceed the existing Uncomfortable category by only one mile per hour.

Comparing the Proposed Project to the approved Master Plan shows that 82 locations (73 percent) would be the same. Fifteen locations (13 percent) will be improved (e.g., shifting from comfortable for walking to comfortable for sitting), and 16 locations (14 percent) are expected to experience a decrease.

Unacceptable gusts are predicted at only six locations under the Proposed Project Condition, which is the same number as under the No Build Condition, and four fewer than the Approved Master Plan Condition.

4.1.5 Conclusions

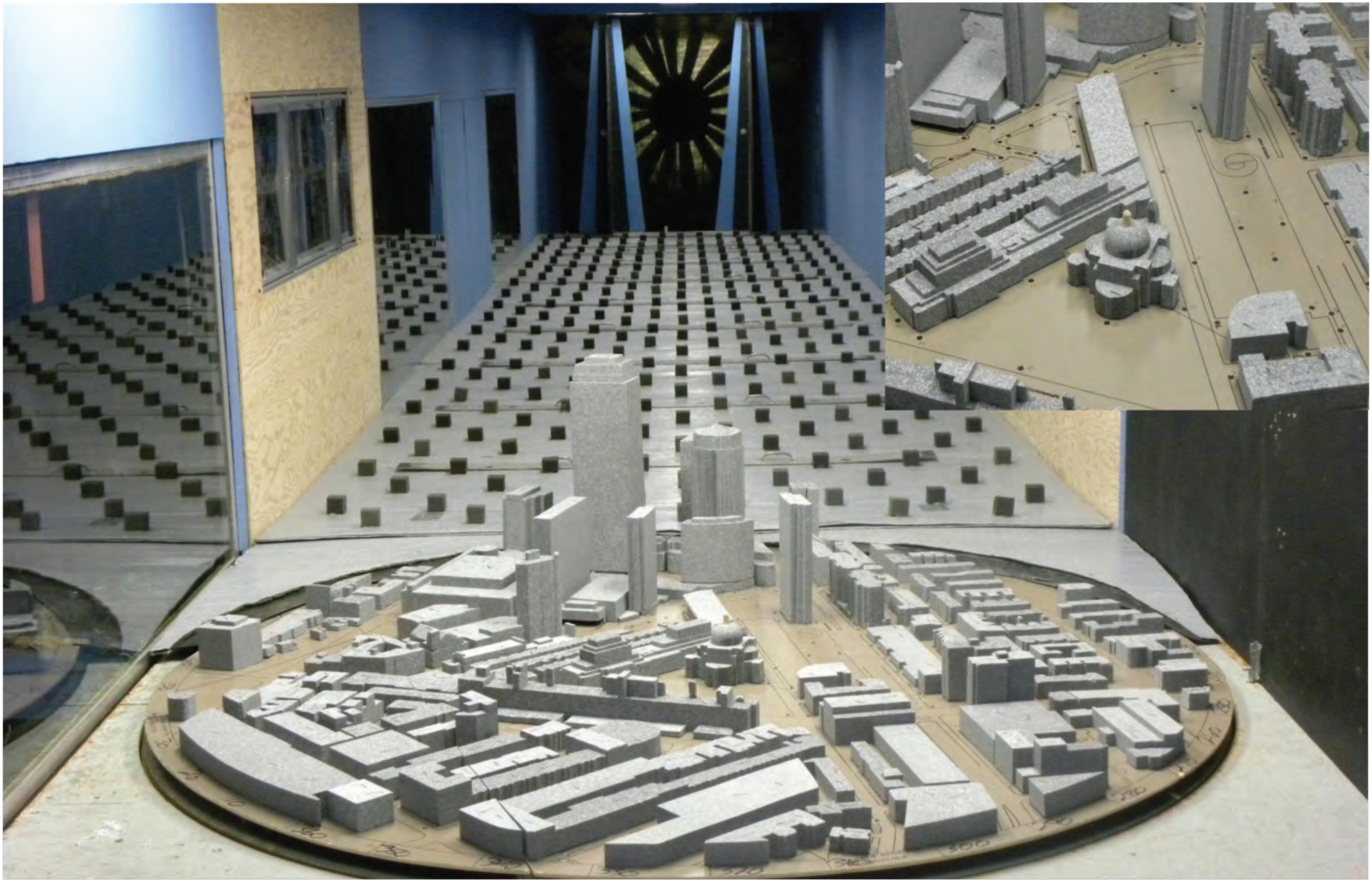
The Proposed Project, as would be expected with any building of substantial size, will result in some increased pedestrian level winds. These increases are not expected to be severe, however, and generally conditions will be similar to the No-Build Condition. At 69 percent of the locations studied, wind conditions under the Proposed Build Condition are expected to be unchanged or improved when compared to the No Build Condition. Compared to the approved Master Plan condition, the Proposed Project will not have any of the adverse wind impacts associated with the Huntington Avenue site that would occur under the approved Master Plan.

Table 4.1-2 summarizes the wind results.

Table 4.1-2 Wind Impacts Summary

BRA Mean Annual Wind Criteria	No-Build		Approved Master Plan		Proposed Project	
Number of Locations Comfortable for Sitting	44	39%	30	27%	31	27%
Number of Locations Comfortable for Standing	32	28%	30	27%	33	29%
Number of Locations Comfortable for Walking	24	21%	31	27%	26	23%
Number of Uncomfortable Locations	13	12%	20	18%	22	19%
Number of Dangerous Locations	0	0%	2	2%	1	1%
Number of Unacceptable Gust Locations	6	5%	10	9%	6	5%

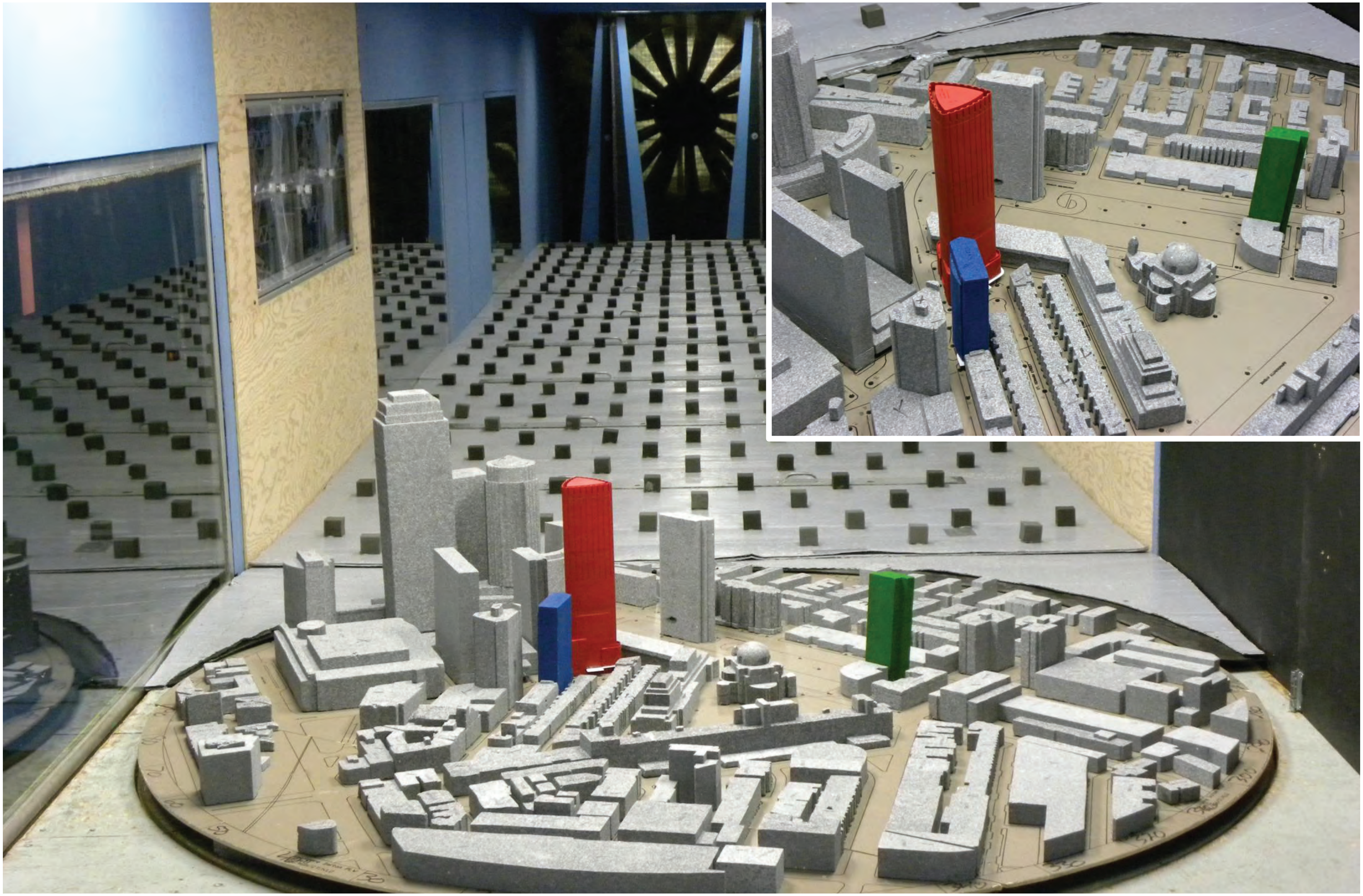
The Proponent will continue to evaluate the need for potential mitigation to minimize the potential for adverse pedestrian level winds. For example, the use of wind screens and a canopy will be employed to protect the south entrance of the High-rise (Location 8) to diffuse westerly winds and a canopy may be used at the entrance to the Mid-rise (Location 16) to protect from wind downwash on the building's façade.



Belvidere/Dalton Project **Boston, Massachusetts**

Figure 4.1-1

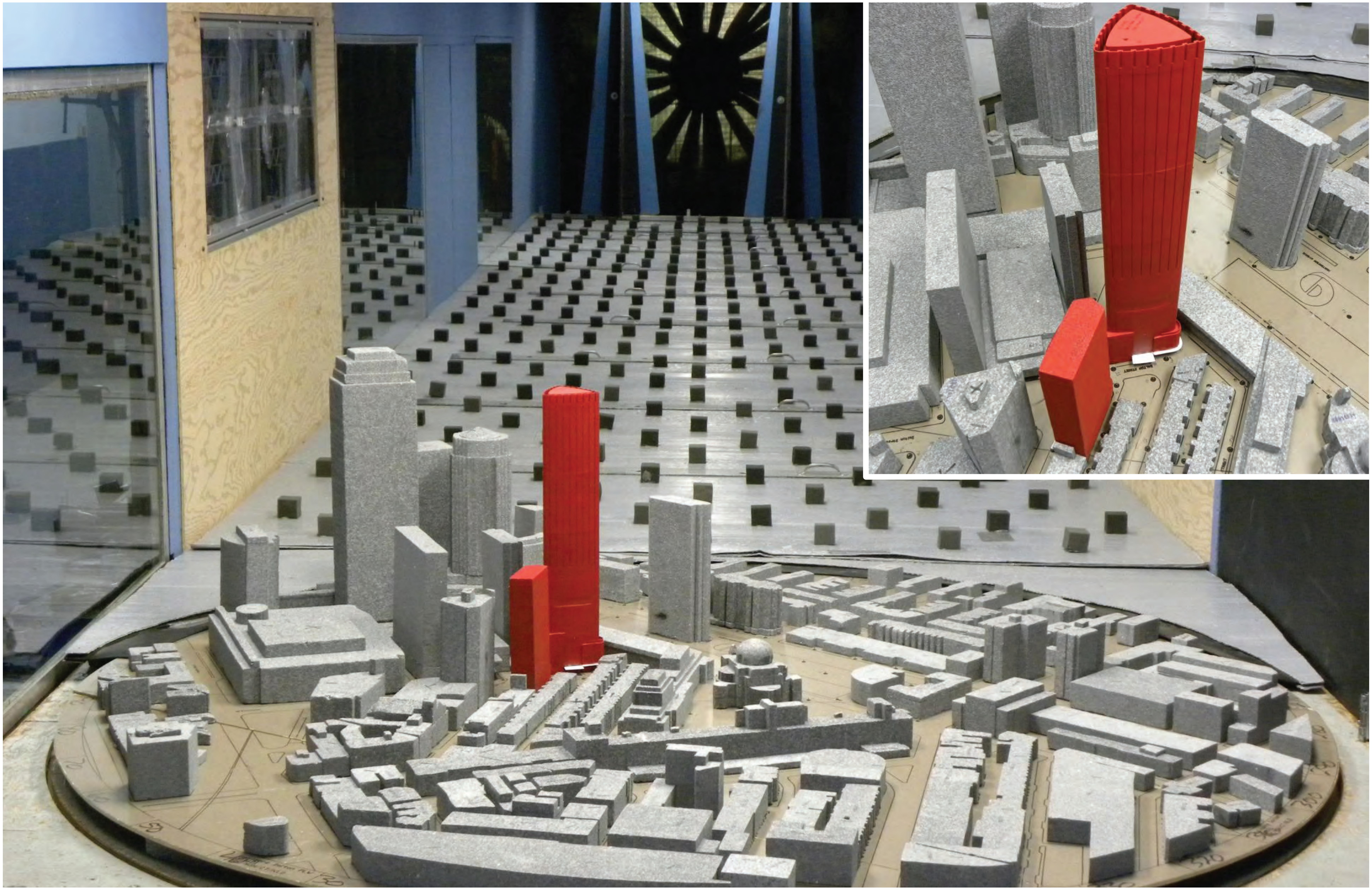
Wind Tunnel Study Model: No Build Configuration



Belvidere/Dalton Project **Boston, Massachusetts**

Figure 4.1-2

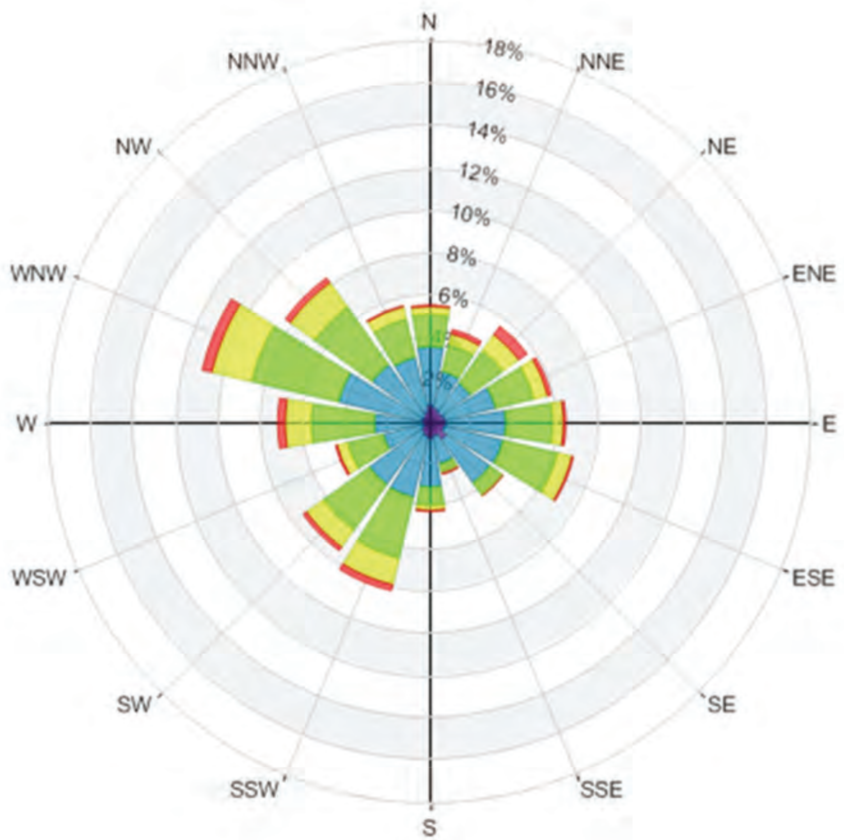
Wind Tunnel Study Model: Approved Master Plan



RWDI

Figure 4.1-3

Wind Tunnel Study Model: Proposed Project



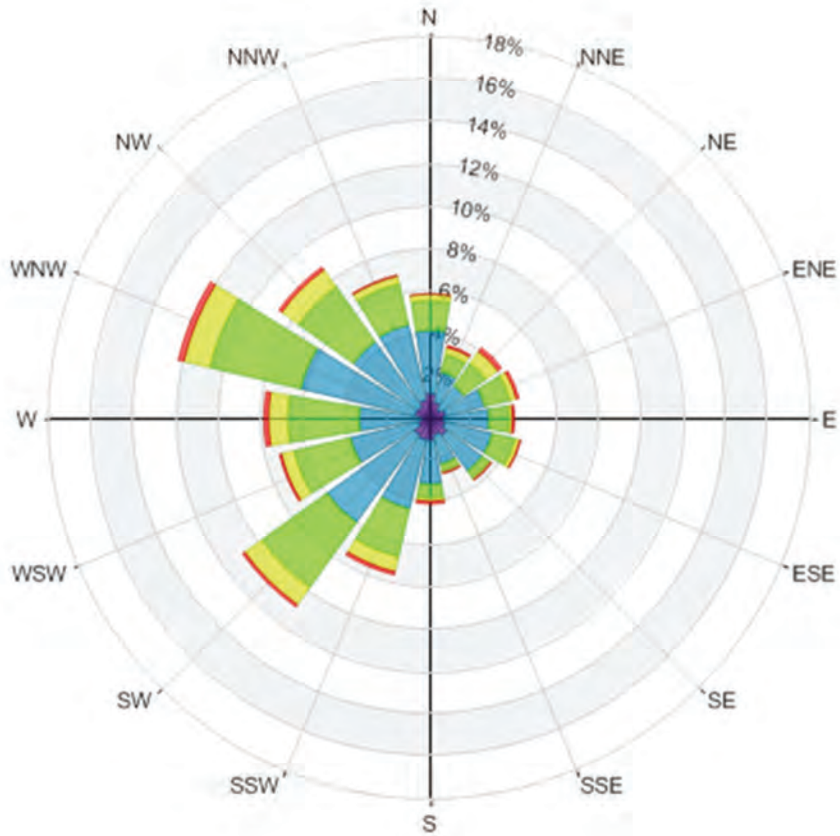
Spring
(March - May)

Summer
(June - August)

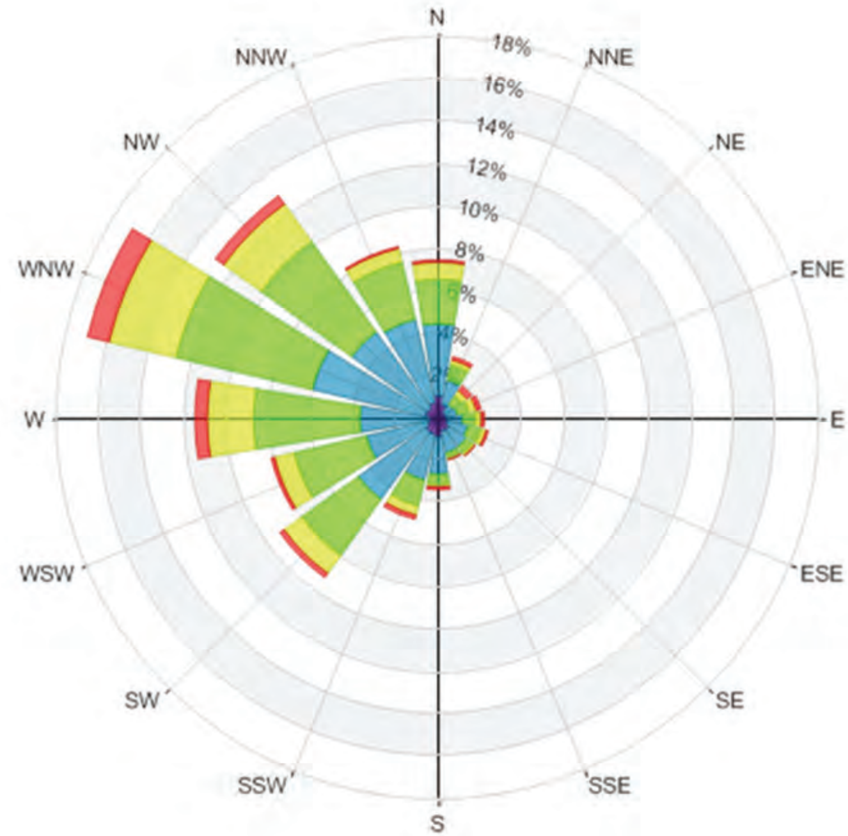
Wind Speed (km/h)	Probability (%) Spring	Summer
Calm	1.7	1.8
1-10	9.8	13.7
11-20	40.4	50.8
21-30	33.0	28.6
31-40	12.1	4.6
>40	3.0	0.4

Figure 4.1-4

Directional Distribution (%) of Winds (Blowing from) Boston Logan International Airport (1981-2011)



Fall
(September - November)

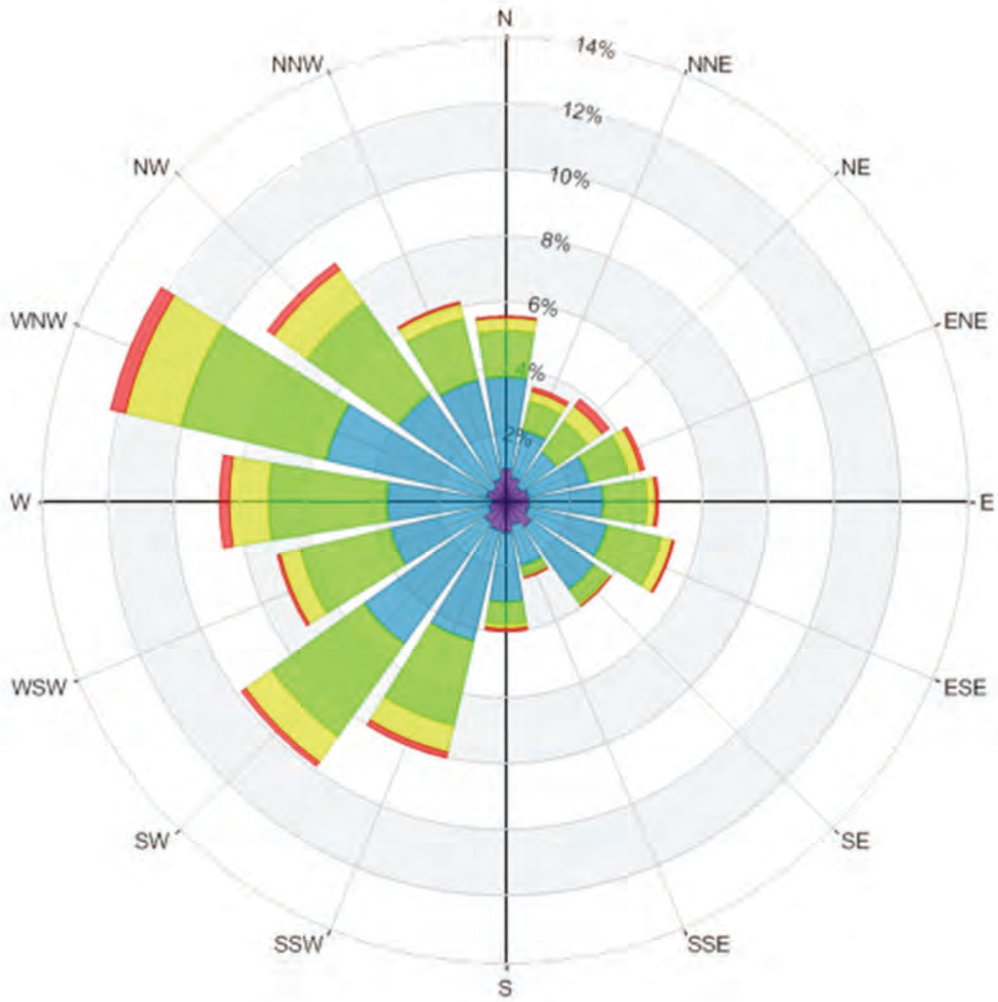


Winter
(December - February)

Wind Speed (km/h)	Probability (%) Fall	Winter
Calm	1.9	1.5
1-10	12.6	9.8
11-20	45.3	37.6
21-30	30.0	33.7
31-40	8.2	13.3
>40	1.9	4.1

Figure 4.1-5

Directional Distribution (%) of Winds (Blowing from) Boston Logan International Airport (1981-2011)



Annual Winds

Wind Speed (km/h)	Probability (%)
Calm	1.7
1-10	11.5
11-20	43.5
21-30	31.3
31-40	9.5
>40	2.3

Figure 4.1-6

Directional Distribution (%) of Winds (Blowing from) Boston Logan International Airport (1981-2011)

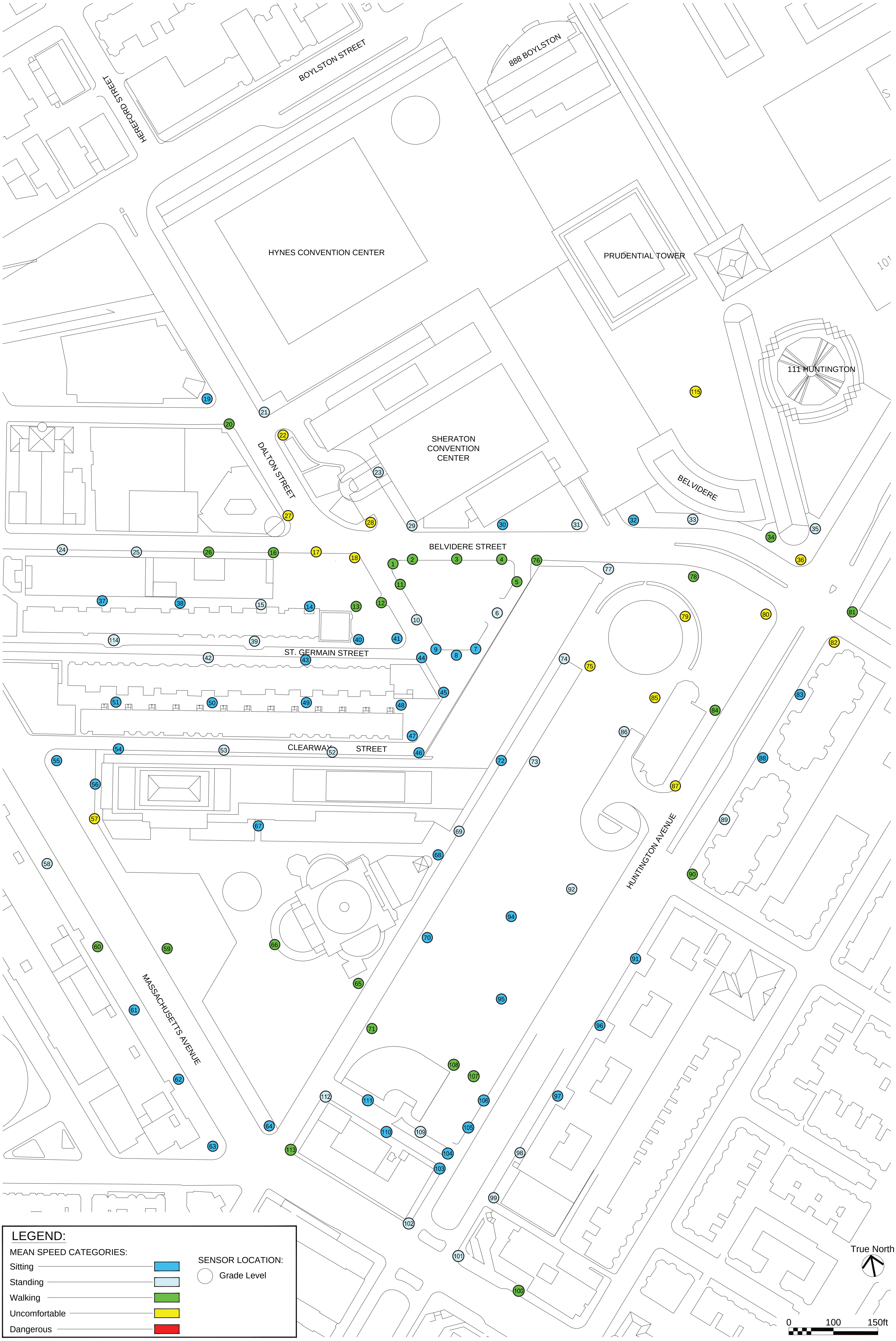


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Figure 4.1-7

Pedestrian Wind Conditions - Mean Speed - No Build, Annual (January to December, 1:00 to 24:00)

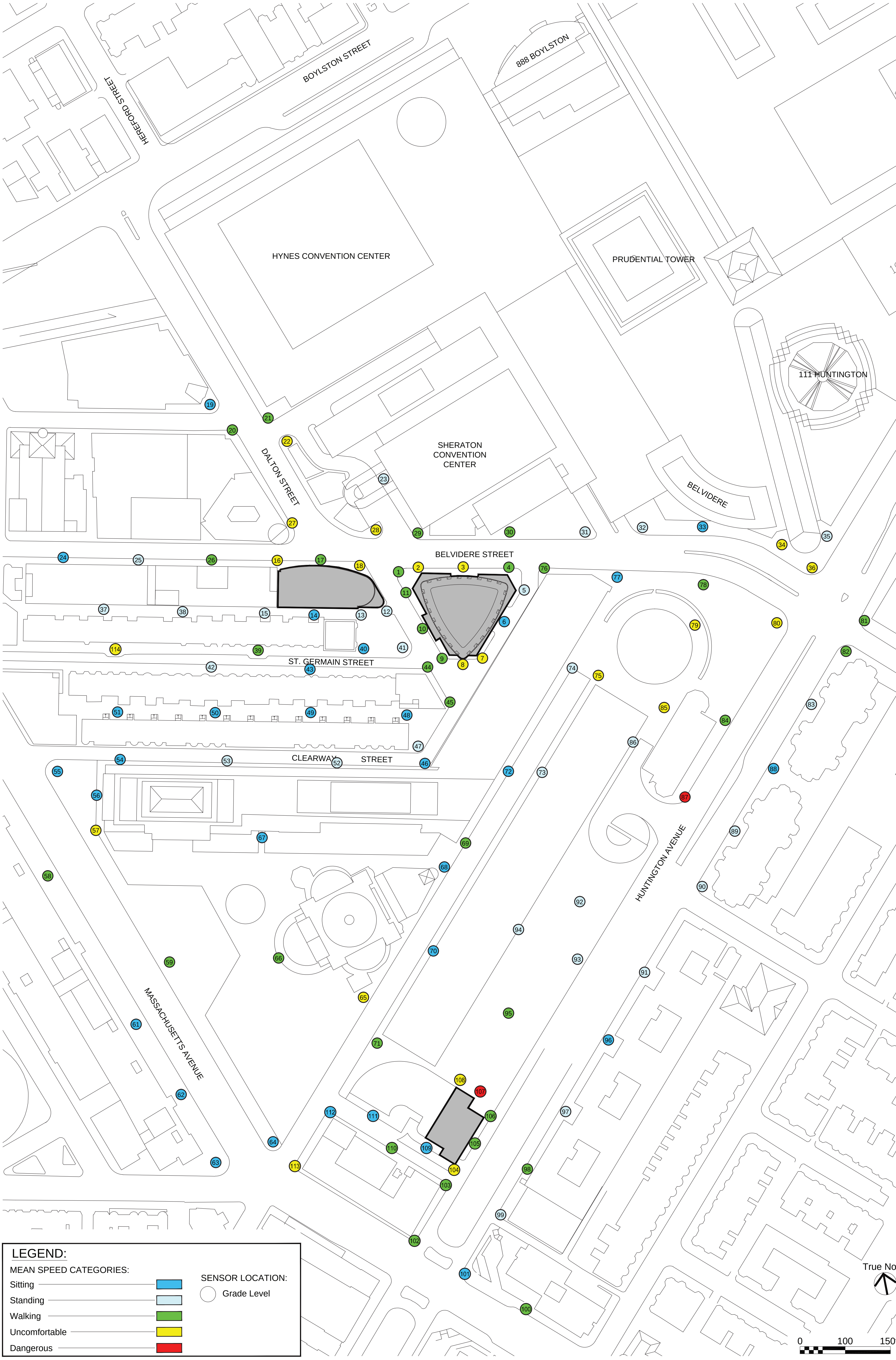

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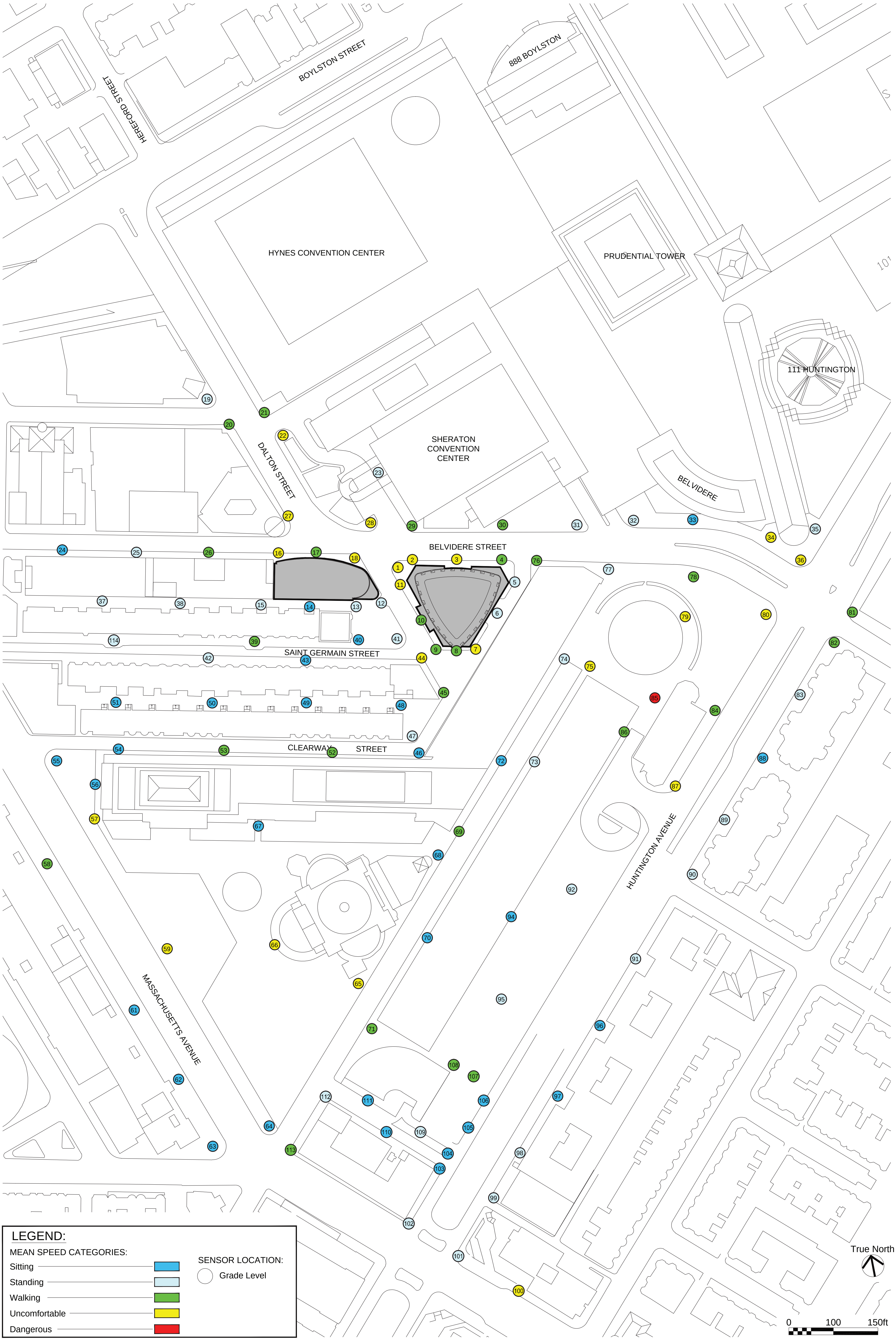
Figure 4.1-8

Pedestrian Wind Conditions- Mean Speed- Master Plan Condition, Annual (January to December, 1:00 to 24:00)



Belvidere/Dalton Project Boston, Massachusetts

RWDI

Figure 4.1-9

Pedestrian Wind Conditions - Mean Speed - Proposed Project Condition, Annual (January to December, 1:00 to 24:00)

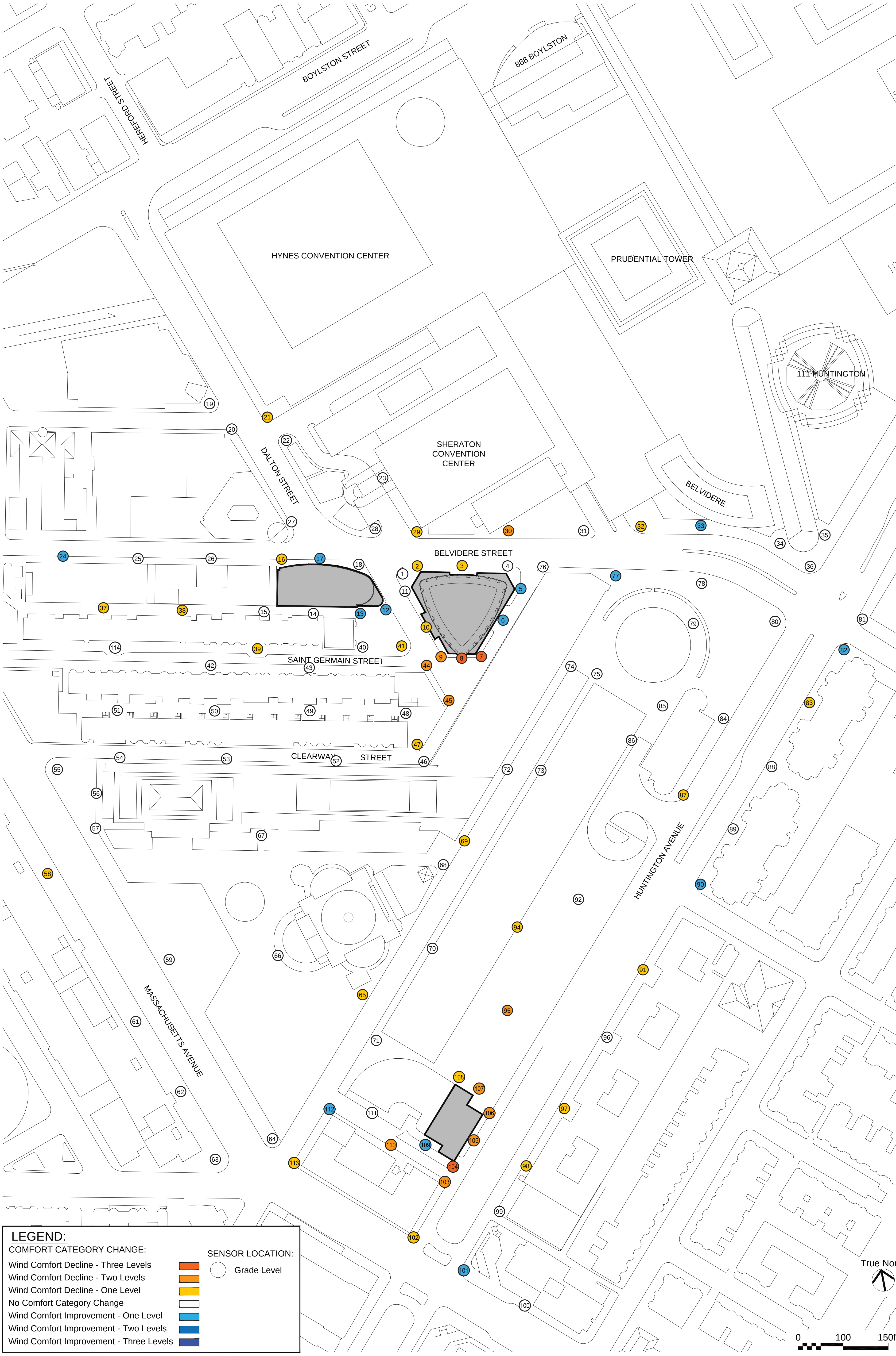


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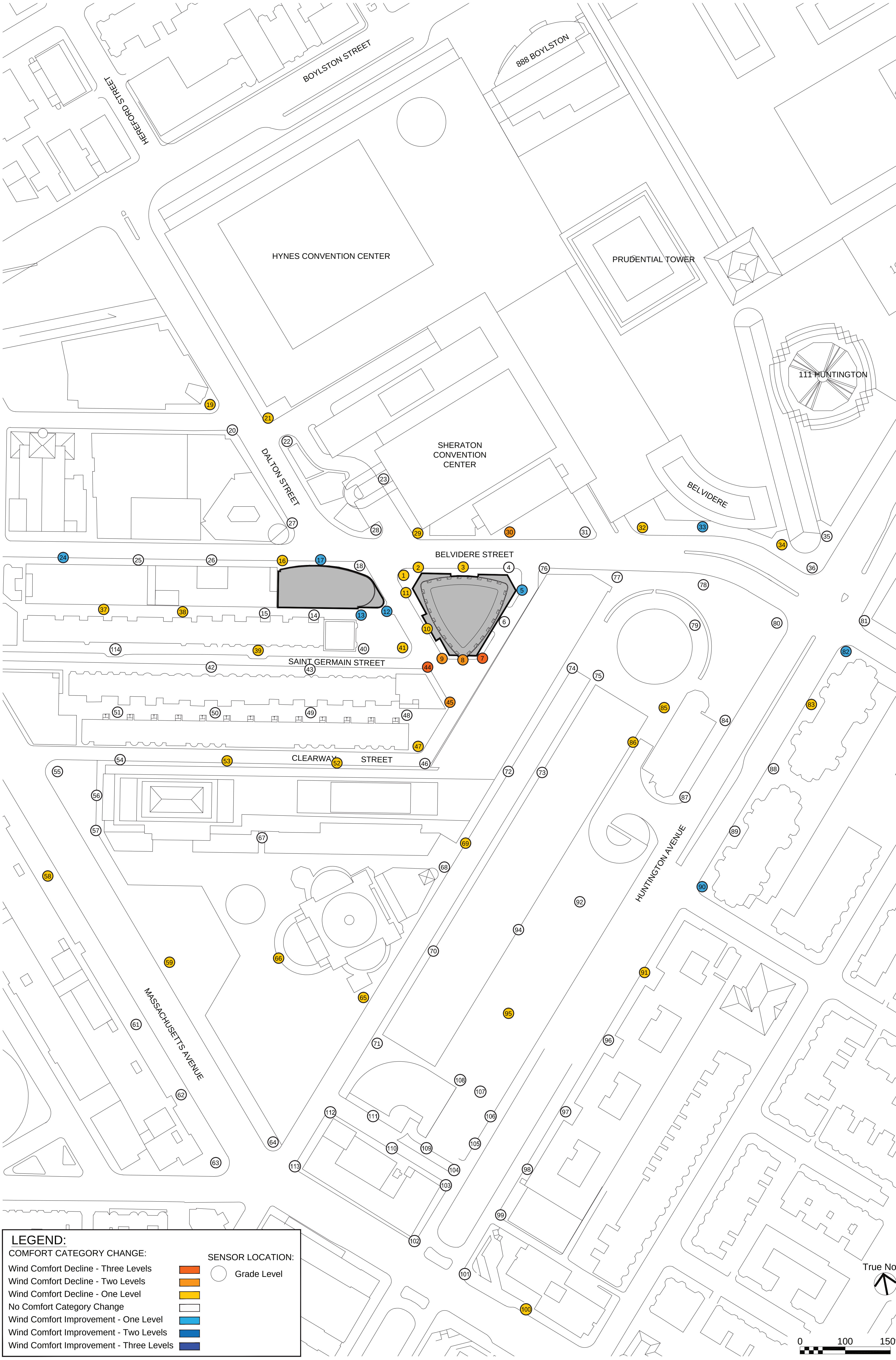
Figure 4.1-10

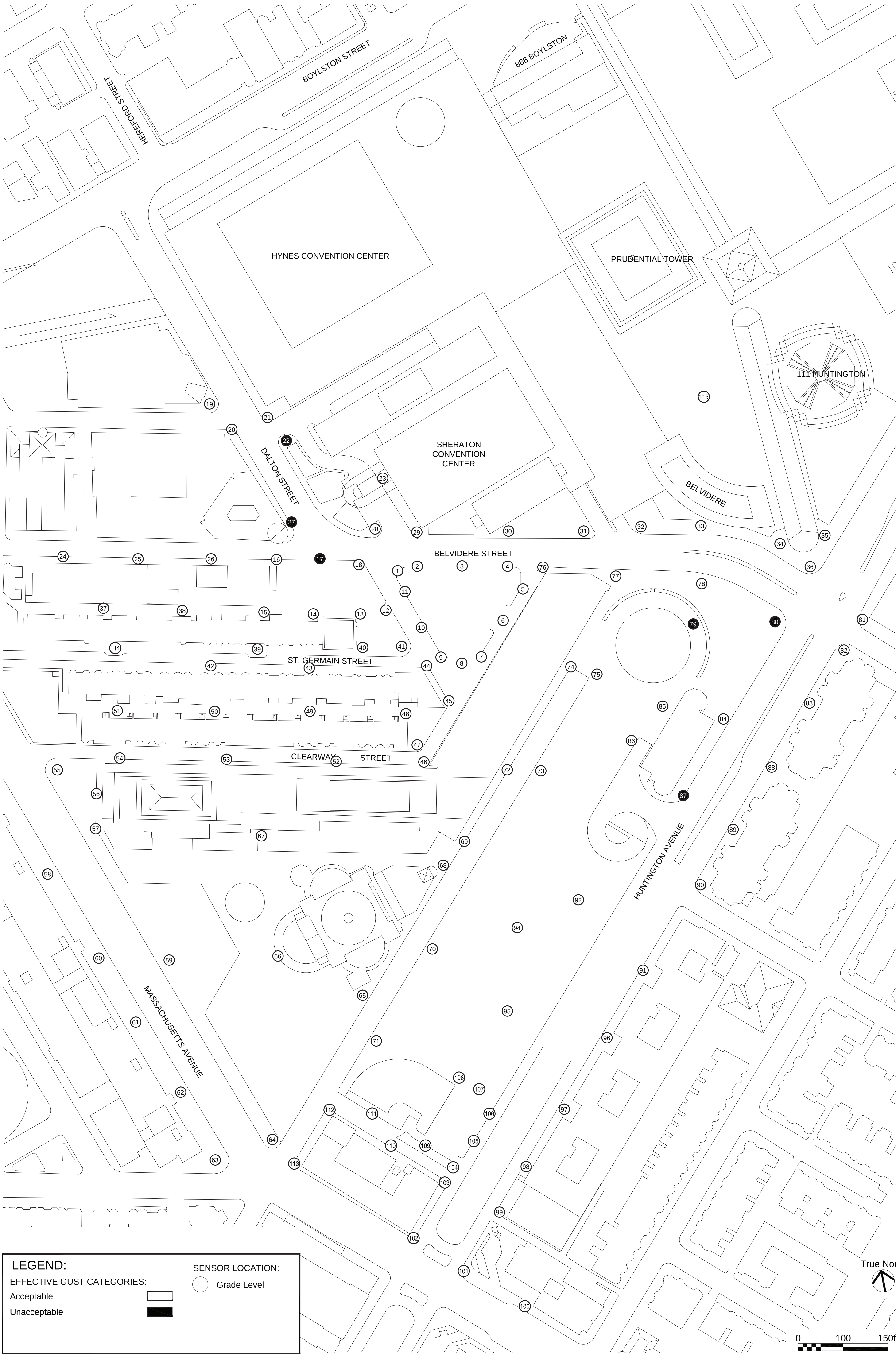
Pedestrian Wind Conditions- Category Change- Master Plan Condition, Annual (January to December, 1:00 to 24:00)



Belvidere/Dalton Project **Boston, Massachusetts**

Figure 4.1-11

Pedestrian Wind Conditions - Category Change - Proposed Project Condition, Annual (January to December, 1:00 to 24:00)



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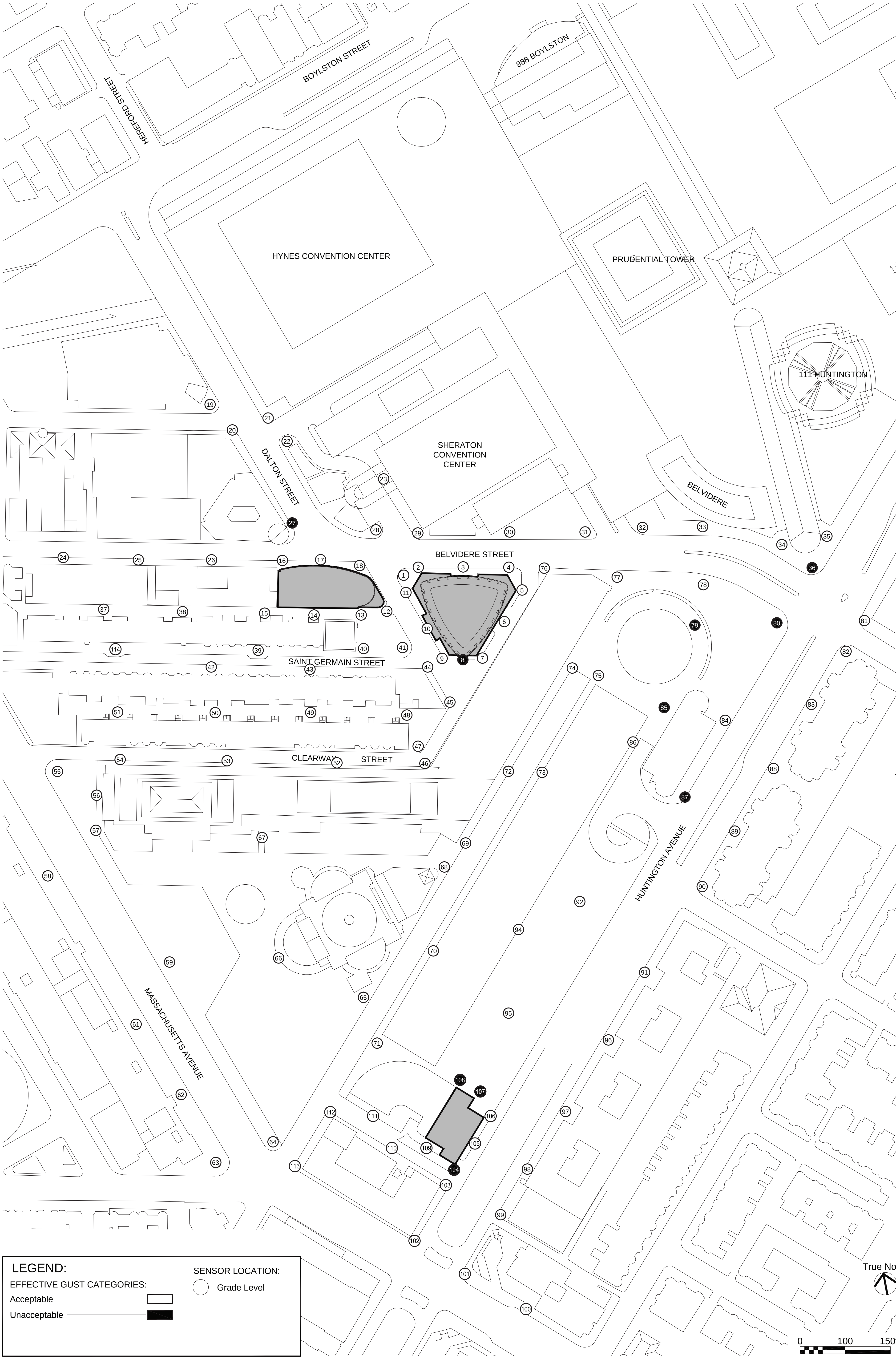
RWDI

Figure 4.1-12

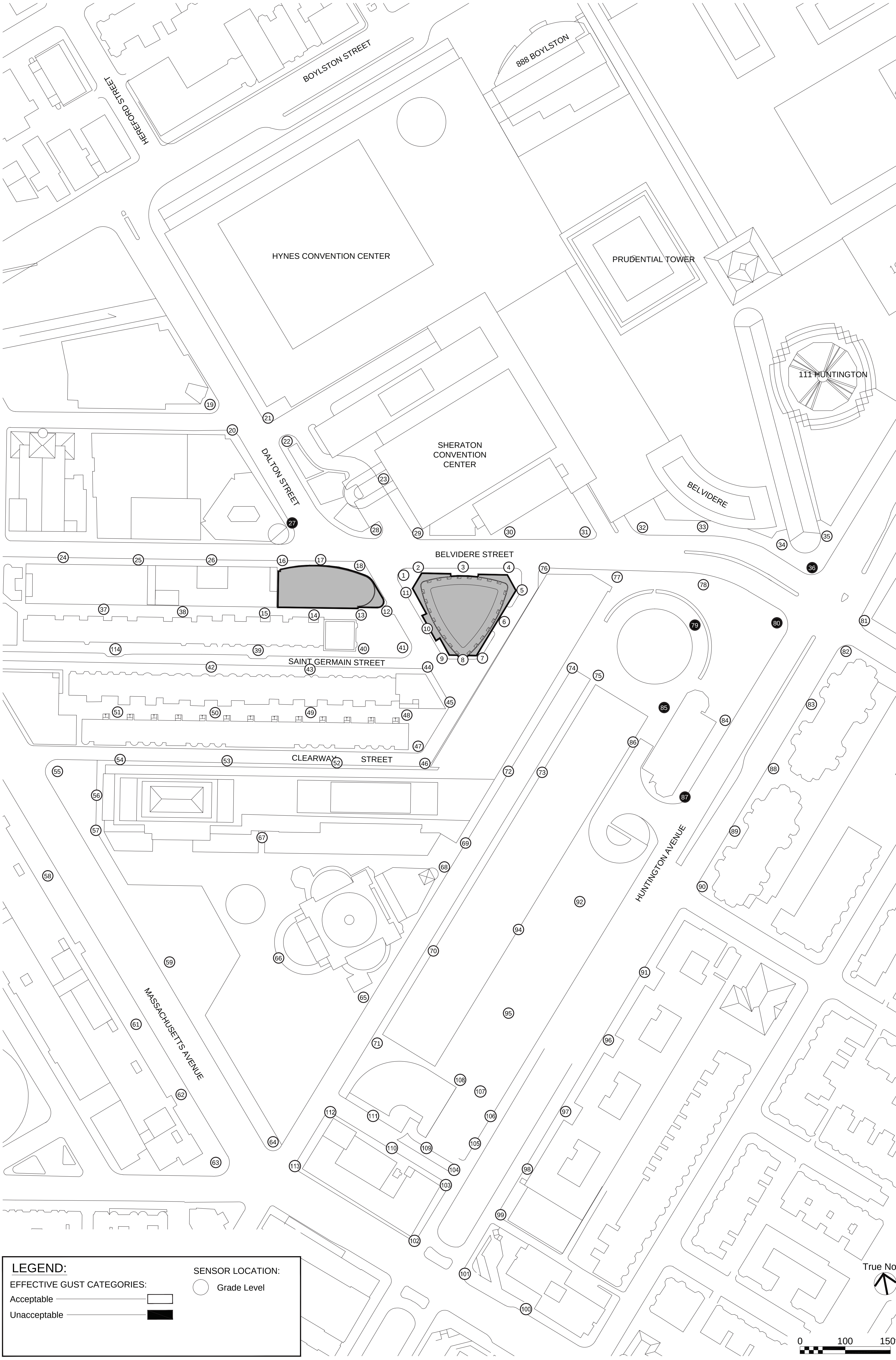
Pedestrian Wind Conditions - Effective Gust - No Build, Annual (January to December, 1:00 to 24:00)



Belvidere/Dalton Project Boston, Massachusetts

Figure 4.1-13

Pedestrian Wind Conditions- Effective Gust- Master Plan Condition, Annual (January to December, 1:00 to 24:00)



Belvidere/Dalton Project **Boston, Massachusetts**

Figure 4.1-14

Pedestrian Wind Conditions - Effective Gust - Proposed Project Condition, Annual (January to December, 1:00 to 24:00)

4.2 Shadow Impacts

4.2.1 Introduction and Methodology

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

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

The shadow analysis presents the existing shadow and new shadow that would be created by the Proposed Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, sidewalks and bus stops adjacent to and in the vicinity of the Project site. It should be noted that the model used for the analysis does not include trees, which can block new shadow from the proposed buildings during much of the year during certain time periods. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 4.2-1 to 4.2-14 at the end of this section. Each Figure distinguishes between the approved Master Plan Build condition with shadow shown in green; the Proposed Project Build condition with new shadow shown in blue, and the approved Master Plan Huntington Avenue building shadow with shadow shown in orange.

4.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, new shadow from the Project will be cast to the northwest. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza, as well as a portion of Massachusetts Avenue and its eastern sidewalk. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Belvidere Street and its northern and southern sidewalks, and a portion of Dalton Street and its eastern and western sidewalks. Additional shadow from the Proposed Project beyond that approved in the Master Plan will be limited to a portion of Boylston Street and the Massachusetts Turnpike, including two bus stops on Boylston Street. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 12:00 p.m., new shadow from the Project will be cast to the north. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Dalton Street and its eastern sidewalk, as well as a portion of Belvidere Street and its northern and southern sidewalks. Additional shadow from the

Proposed Project beyond that approved in the Master Plan will be limited to a small portion of the Sheraton Hotel sidewalk and parking garage entrance. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto a portion of Huntington Avenue and its eastern and western sidewalks. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Belvidere Street and its northern and southern sidewalks, and a small portion of Dalton Street and its eastern and western sidewalks. There will be no additional shadow beyond that approved in the Master Plan as a result of the Proposed Project. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

4.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, new shadow from the Project will be cast to the west. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Dalton Street and its eastern and western sidewalks, a small portion of Belvidere Street and its southern sidewalk, and a portion of the alley between the Project and the Saint Germain Street residences. Additional shadow from the Proposed Project beyond that approved in the Master Plan will be cast onto an additional portion of Belvidere Street and its southern sidewalk, as well as an additional portion of the alley between the Project and the Saint Germain Street residences. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 12:00 p.m., new shadow from the Project will be cast to the north. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto portions of Belvidere Street and its northern and southern sidewalks, as well as a small portion of Dalton Street and its eastern and western sidewalks. Additional shadow from the Proposed Project beyond that approved in the Master Plan will be minimal, with only a sliver of new shadow on Dalton and Belvidere Streets. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 3:00 p.m., new shadow will be cast to the east. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto a portion of Huntington Avenue and its eastern and western sidewalks. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Dalton Street between the two buildings, and a portion of Belvidere Street and its northern and southern sidewalks, including the bus stop on Belvidere Street. Additional shadow from the Proposed Project beyond that approved in the Master Plan will be limited to a sliver of shadow on the landmarked Christian Science Plaza, as well as onto Belvidere Street. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 6:00 p.m., most of the area is under existing shadow. The shadow from the approved Master Plan Huntington Avenue Building would be cast mostly onto rooftops. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto small portion of Dalton Street, a portion of Huntington Avenue and its eastern and western sidewalks, and slivers of shadow onto nearby residential streets to the east. Additional shadow from the Proposed Project beyond that approved in the Master Plan will mostly be cast onto nearby rooftops. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

4.2.4 Autumnal Equinox (September 21)

At 9:00 a.m. during the autumnal equinox, new shadow from the Project will be cast to the northwest. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza, as well as a portion of Massachusetts Avenue and its eastern sidewalk. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Belvidere Street and its northern and southern sidewalks, and a portion of Dalton Street and its eastern and western sidewalks. Additional shadow from the Proposed Project beyond that approved in the Master Plan will be limited to a portion of Boylston Street and the Massachusetts Turnpike, including two bus stations on Boylston Street. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 12:00 p.m., new shadow from the Project will be cast to the north. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Dalton Street and its eastern sidewalk, as well as a portion of Belvidere Street and its northern and southern sidewalks. Additional shadow from the Proposed Project beyond that approved in the Master Plan will be limited to a small portion of the Sheraton Hotel sidewalk and parking garage entrance. By moving to the Belvidere/

Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto a portion of Huntington Avenue and its eastern and western sidewalks. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Belvidere Street and its northern and southern sidewalks, and a small portion of Dalton Street and its eastern and western sidewalks. There will be no additional shadow as a result of the Proposed Project. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 6:00 p.m. (Autumnal Equinox only), most of the area will be under existing shadow. Neither the approved Master Plan Project nor the Proposed Project will cast any new shadow on nearby streets, bus stops, or open space.

4.2.5 Winter Solstice (December 21)

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

At 9:00 a.m., new shadow will be cast to the northwest. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza, as well as a portion of Massachusetts Avenue and its eastern and western sidewalks, including the bus stop at Massachusetts Avenue and Clearway Street. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Belvidere Street and its northern and southern sidewalks, a portion of Dalton Street and its eastern and western sidewalks, and a small portion of the Massachusetts Turnpike. Additional shadow from the Proposed Project beyond that approved in the Master Plan will limited to a small portion of Beacon Street and a small portion of Storrow Drive. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 12:00 p.m., new shadow will be cast to the north. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza. The shadow from the approved Master Plan High-rise and Mid-rise would be cast onto a portion of Belvidere Street and its northern and southern sidewalks, as well as a portion of Dalton Street and its eastern sidewalks. There will be no additional shadow impact from the Proposed Project. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

At 3:00 p.m., most of the area is under existing shadow. The shadow from the approved Master Plan Huntington Avenue Building would be cast onto the landmarked Christian Science Plaza, as well as a portion of Huntington Avenue. The shadow from the approved Master Plan High-rise and Mid-rise would be limited to a portion of Belvidere Street and its northern and southern sidewalks. There will be no additional shadow impact from the Proposed Project. By moving to the Belvidere/ Dalton sites the square footage previously allocated to the Huntington Avenue Building, the Proposed Project eliminates the shadow impact from the approved Master Plan Huntington Avenue Building.

4.2.6 Conclusions

The shadow impact analysis looked at net new shadow created by the Project during fourteen time periods. In some cases, new shadow from the Proposed Project will extend further than the approved Master Plan High-rise and Mid-rise buildings. However, all shadow from the Master Plan Huntington Avenue Building will be eliminated, as this building is not being constructed a part of the Project, therefor the net effect is a lessened shadow impact from the Proposed Project as compared to the approved Master Plan Project.

Shadow impacts from the Project will be quite minor. During two of the fourteen periods studied, new shadow from the Proposed Project will be cast onto nearby bus stops. Otherwise, shadow impacts are generally limited to small areas of streets and sidewalks, but no other public open spaces.

The Project is also in compliance with the shadow criteria of Section 41-16.1 of the Boston Zoning Code, which limits net new shadows on dedicated public parkland.

4.3 Daylight Analysis

4.3.1 Introduction

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. The daylight analysis for the Project considers three conditions: the approved Master Plan conditions, proposed conditions, and typical daylight obstruction values of the surrounding area.

Because the Project site currently consists of a parking lot and undeveloped land, the Proposed Project will inherently result in an increase in daylight obstruction compared to existing conditions. However, the resulting conditions will be a minimal increase compared to the Master Plan Project, and are typical of the area and other urban areas.

Approved Master Plan Building Outline
Approved Master Plan Project Shadows onto Existing Rooftops
Approved Master Plan Project Shadows onto Ground
Bus/Subway Stop
Approved Master Plan Huntington Building Shadows onto Existing Rooftops
Approved Master Plan Huntington Building Shadows onto Ground
Additional Shadows Resulting from Proposed Project onto Existing Rooftops
Additional Shadows Resulting from Proposed Project onto Ground

0 ft 400 ft
N

Figure 4.2-1
Shadow Study - March 21, September 21, 9 AM

Figure 4.2-2

Shadow Study - March 21, September 21, 12 PM

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Figure 4.2-3
Shadow Study - March 21, September 21, 3 PM

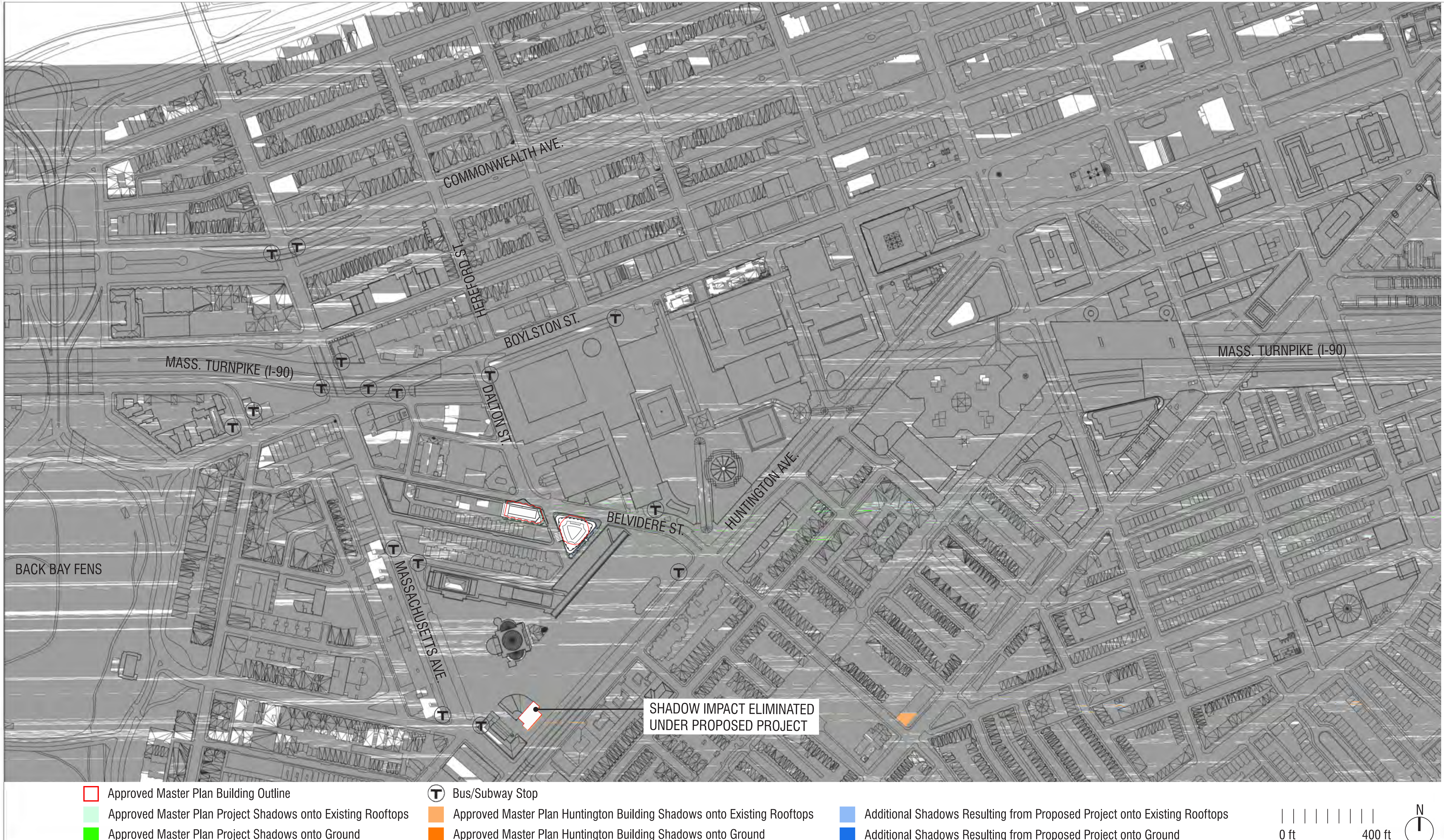

Figure 4.2-4

Shadow Study - March 21, September 21, 6 PM

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Figure 4.2-5

Shadow Study - March 21, September 21, 6 PM

Belvidere/Dalton Project **Boston, Massachusetts**

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Figure 4.2-6

Shadow Study - June 21, 9 AM

Figure 4.2-7

Shadow Study - June 21, 12 PM

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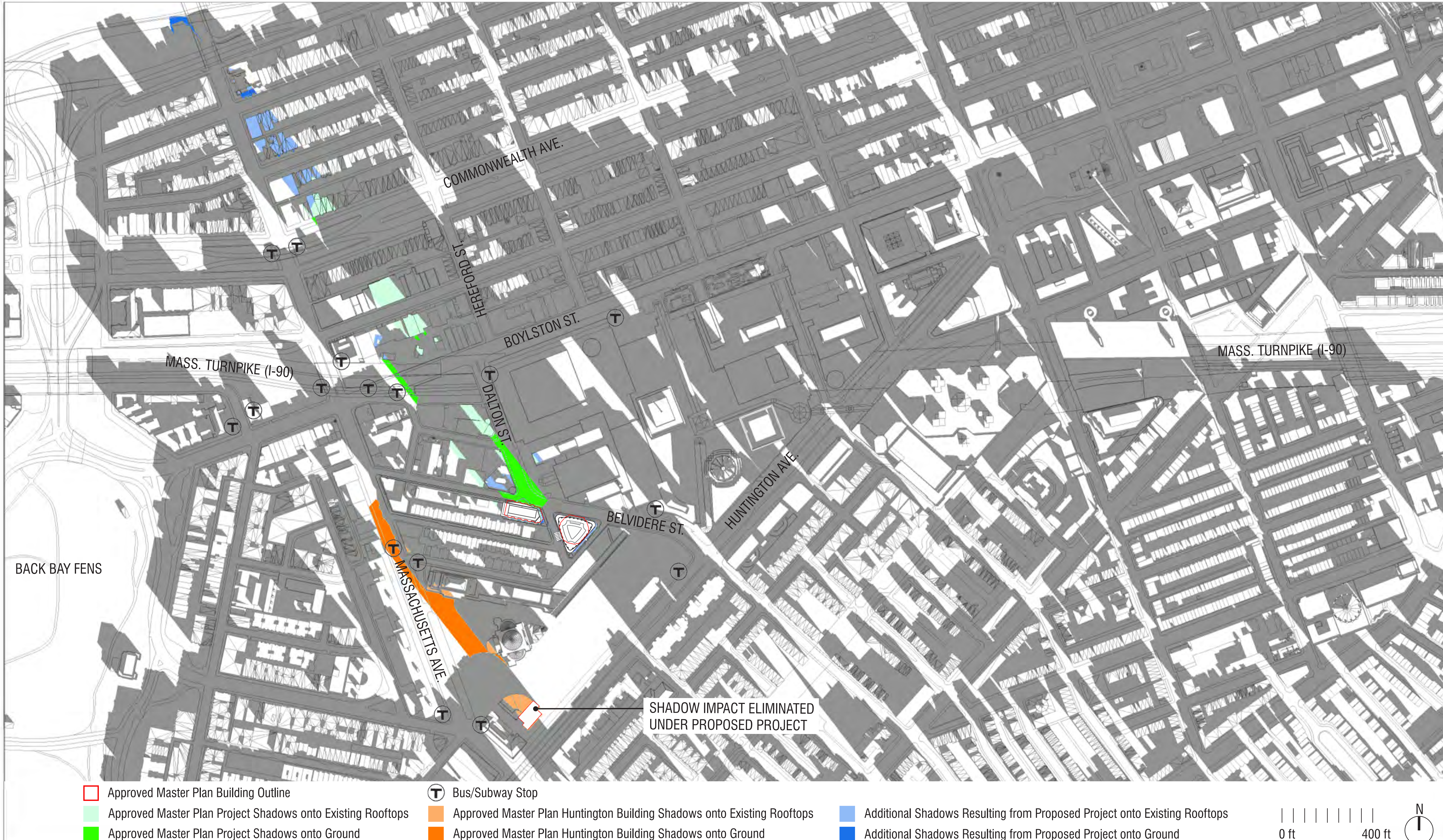
Figure 4.2-8

Shadow Study - June 21, 3 PM

Figure 4.2-9
Shadow Study - June 21, 6 PM


CHARLES RIVER ESPLANADE
BOSTON COMMON
COMMONWEALTH AVE.
HUNTINGTON AVE.
COLUMBUS AVE.
MASSACHUSETTS TURNPIKE.
MASSACHUSETTS TURNPIKE.
SHADOW IMPACT ELIMINATED
UNDER PROPOSED PROJECT
BACK BAY FENS
TREMONT ST.
MASSACHUSETTS AVE.
Approved Master Plan Building Outline
Bus/Subway Stop
Approved Master Plan Project Shadows onto Existing Rooftops
Approved Master Plan Project Shadows onto Ground
Approved Master Plan Huntington Building Shadows onto Existing Rooftops
Approved Master Plan Huntington Building Shadows onto Ground
Additional Shadows Resulting from Proposed Project onto Existing Rooftops
Additional Shadows Resulting from Proposed Project onto Ground
0 ft
800 ft
N



Epsilon

Figure 4.2-11
Shadow Study - December 21, 9 AM

Epsilon

Figure 4.2-12
Shadow Study - December 21, 9AM

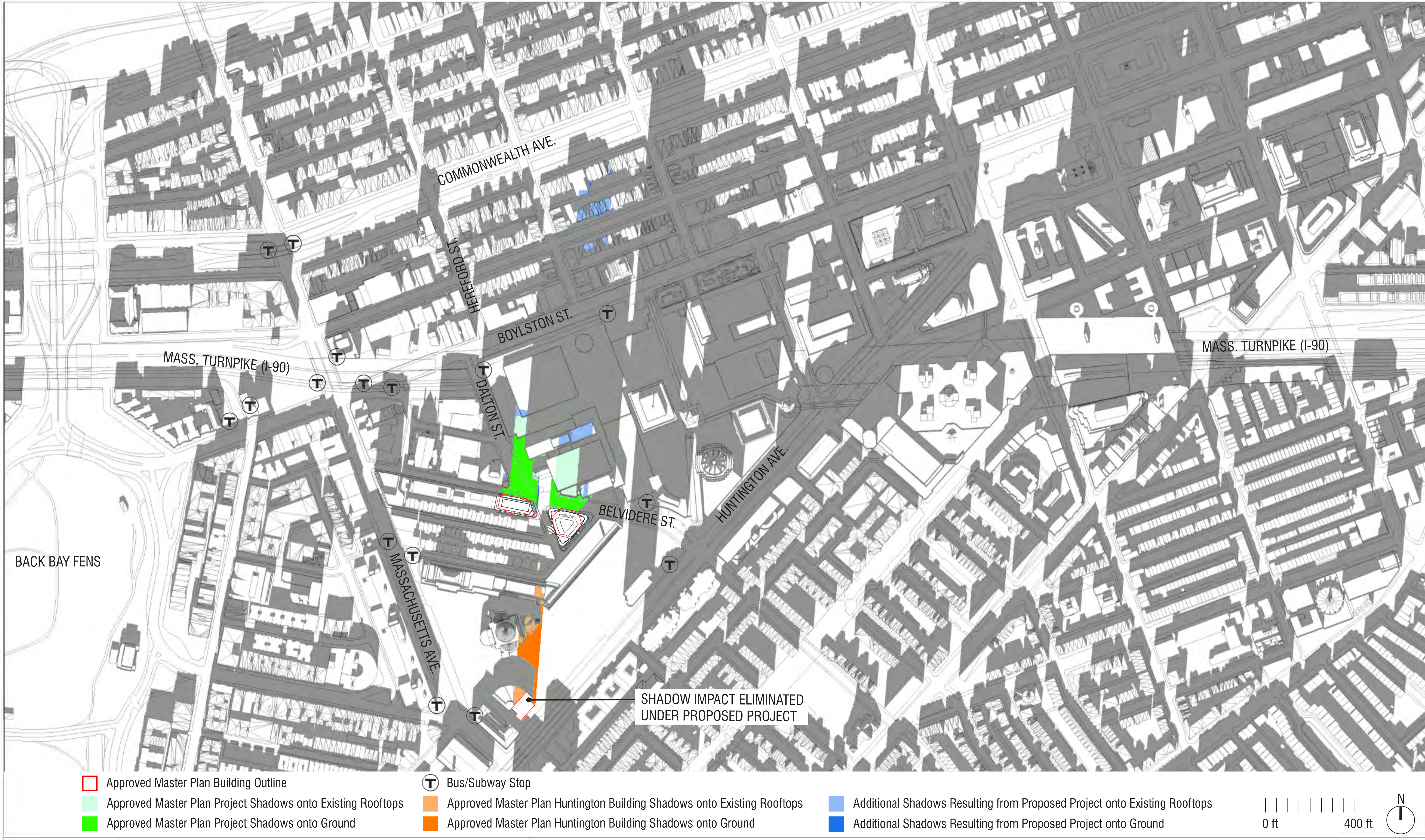


Figure 4.2-13
Shadow Study - December 21, 12 PM

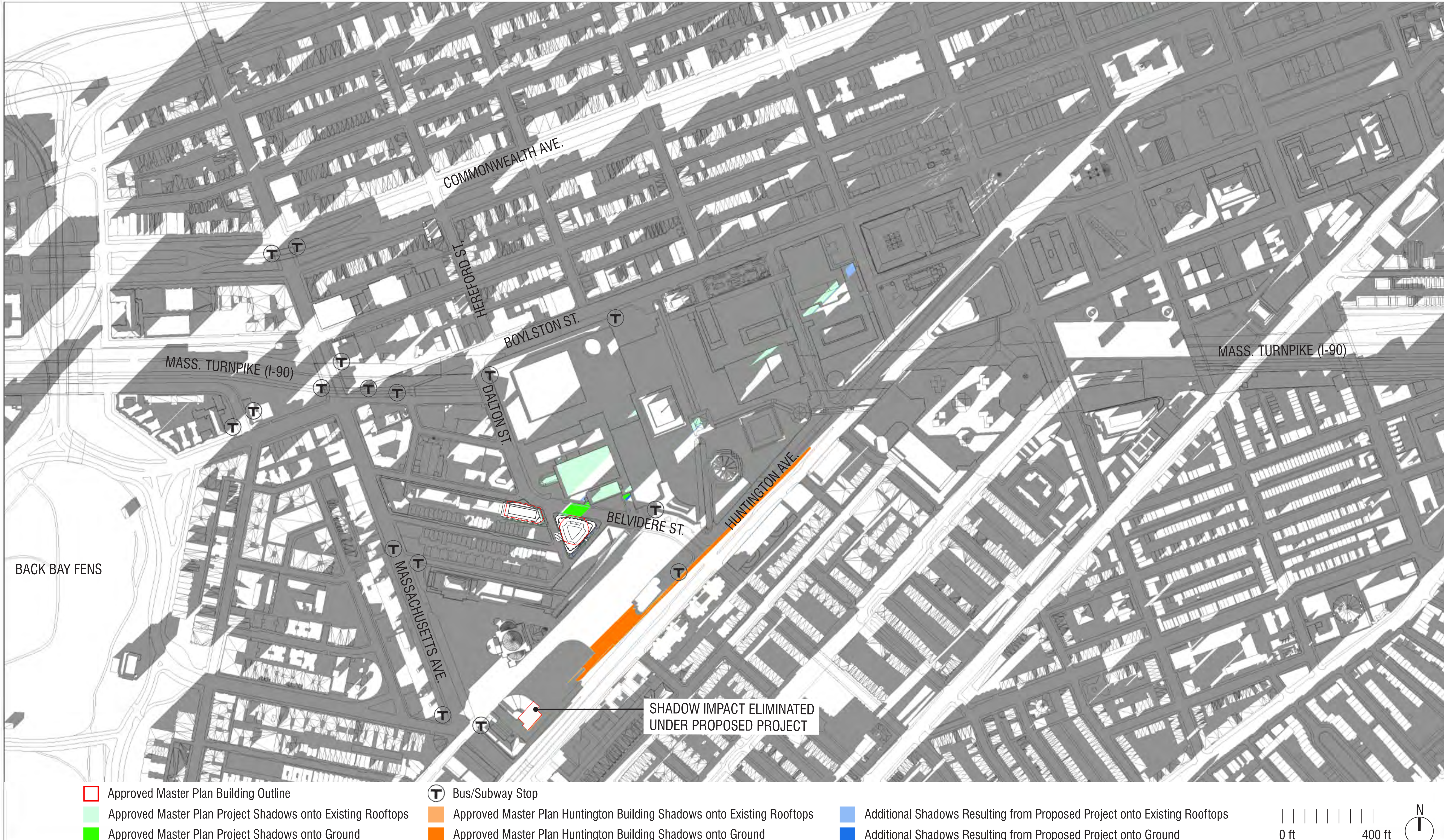


Figure 4.2-14

Shadow Study - December 21, 3 PM

4.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[3]. 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.

Since the Project site is currently undeveloped, the analysis compares the proposed conditions to the approved Master Plan conditions, as well as the context of the area.

Three viewpoints were chosen to evaluate the daylight obstruction for the Master Plan and proposed conditions; one from Belvidere Street facing both the Mid-rise and the High-rise, one from Dalton Street facing the High-rise, and one from Dalton Street facing the Mid-rise. Three area context points were considered in order to provide a basis of comparison to existing conditions in the surrounding area. The viewpoint and area context viewpoints were taken in the following locations and are shown on Figure 4.3-1.

- **Viewpoint 1**: View from Belvidere Street facing south toward the Project site
- **Viewpoint 2**: View from Dalton Street facing northeast toward the Project site
- **Viewpoint 3**: View from Dalton Street facing southwest toward the Project site
- **Area Context Viewpoint AC1**: View from Dalton Street facing southwest toward the building at 40 Dalton Street
- **Area Context Viewpoint AC2**: View from Belvidere Street facing northwest toward the building at 39 Dalton Street

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

G:\Projects2\MA\Boston\3646\viewpoints.mxd

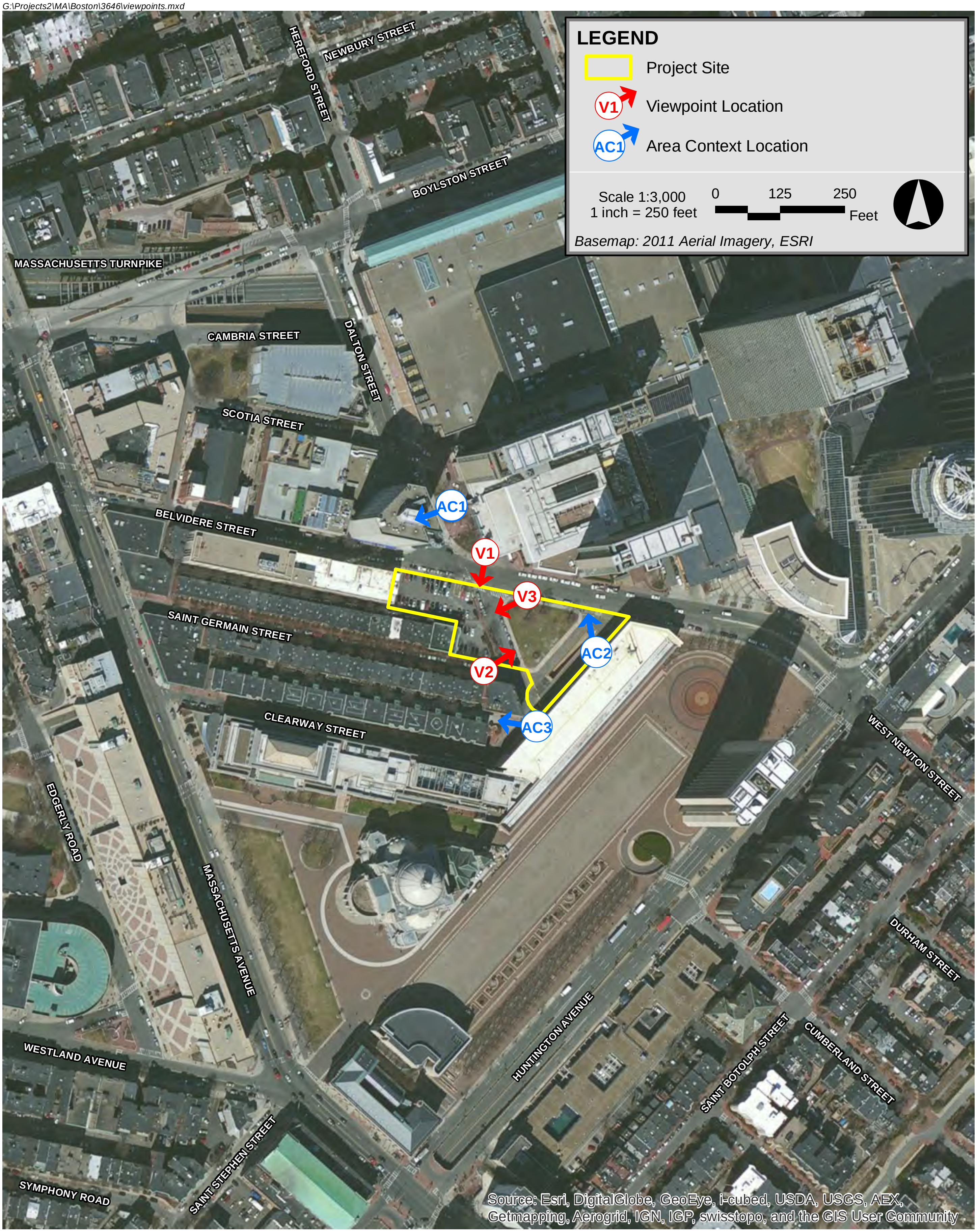


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Figure 4.3-1
Viewpoint and Area Context Locations

- **Area Context Viewpoint AC3**: View from Dalton Street facing southwest toward the building at 67 Saint Germain Street

4.3.3 Results

The results for each viewpoint are described in Table 4.3-1. Figures 4.3-2 to 4.3-4 illustrates the BRADA results for each analysis.

Table 4.3-1 Daylight Analysis Results

Viewpoint Locations		Existing Conditions	Approved Master Plan Conditions	Proposed Conditions
Viewpoint 1	View from Belvidere Street facing south toward the Project site	0%	83.9%	84.6%
Viewpoint 2	View from Dalton Street facing northeast toward the Project site	0%	96.5%	97.7%
Viewpoint 3	View from Dalton Street facing southwest toward the Project site	0%	91.7	92.5%
Area Context Points				
AC1	View from Dalton Street facing southwest toward the building at 40 Dalton Street	94.8%		N/A
AC2	View from Belvidere Street facing northwest toward the building at 39 Dalton Street	93.3%		N/A
AC3	View from Dalton Street facing southwest toward the building at 67 Saint Germain Street	72.5%		N/A

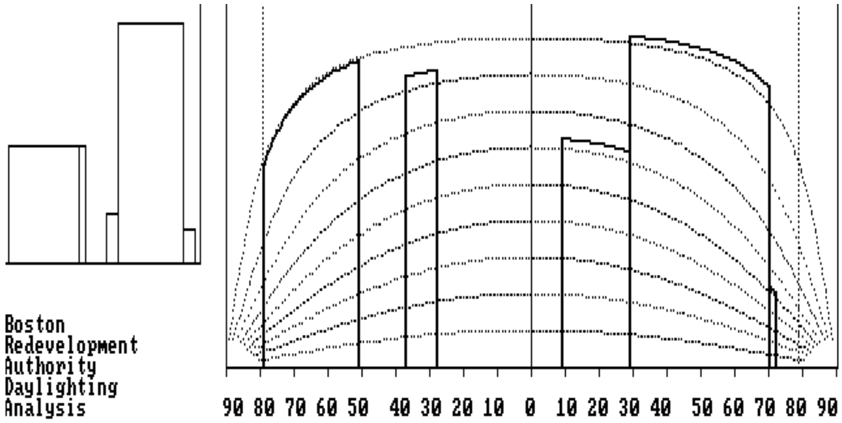
Belvidere Street- Viewpoint 1

Belvidere Street runs along the northern edge of the Project site. Viewpoint 1 was taken from the center of Belvidere Street near the intersection of Dalton Street on the northern side of the site, looking directly south toward the Project site. From this viewpoint, you can see both the High-rise and the Mid-rise buildings. The approved Master Plan would result in a daylight obstruction value of 83.9%. The development of the Proposed Project will result in a minimal increase in the daylight obstruction value over the approved Master Plan to 84.6%.

Dalton Street- Viewpoint 2

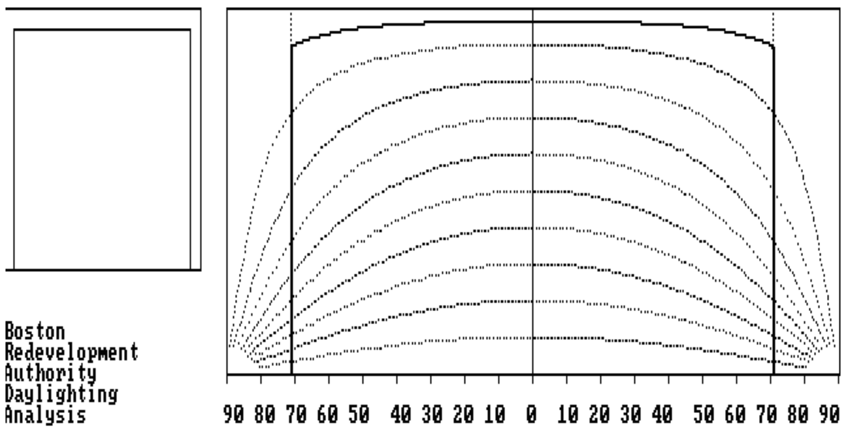
Dalton Street runs through the Project site, between the proposed High-rise and the Mid-rise buildings. Viewpoint 2 was taken from the center of Dalton Street facing northeast toward the High-rise portion of the Project. The approved Master Plan would result in a

Viewpoint 1: View from Belvidere Street facing south toward the Project Site



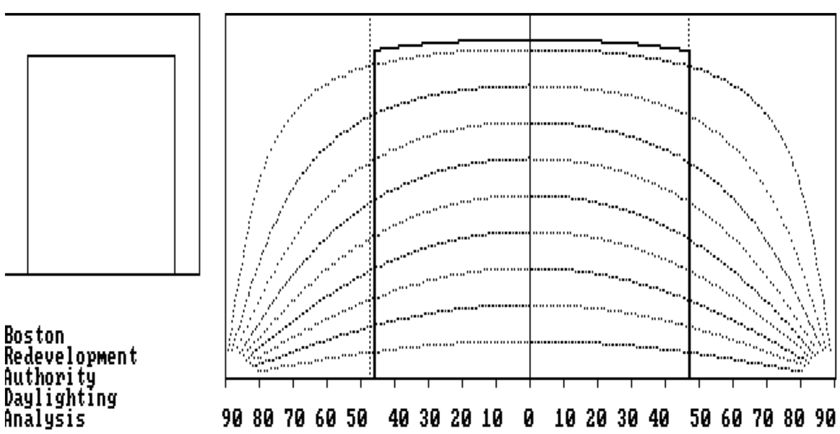
Obstruction of daylight by the building is 83.9 %

Viewpoint 2: View from Dalton Street facing northeast toward the Project Site



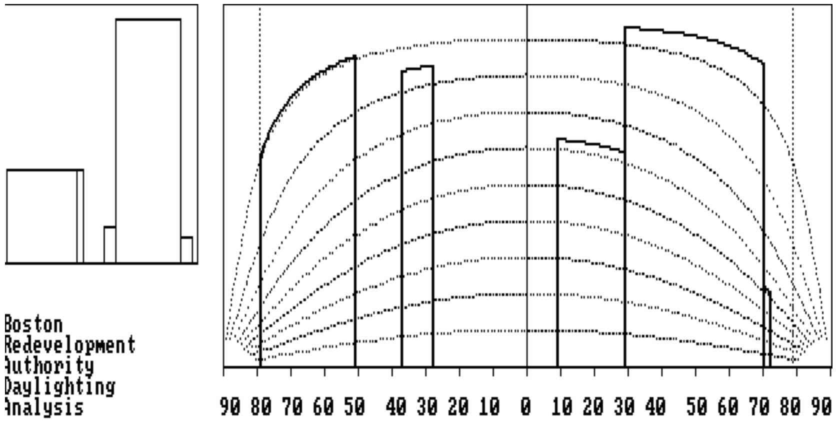
Obstruction of daylight by the building is 96.5 %

Viewpoint 3: View from Dalton Street facing southwest toward the Project Site



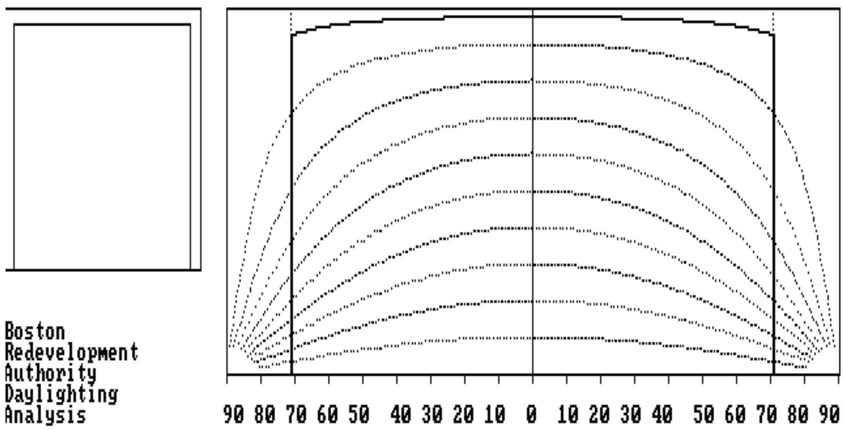
Obstruction of daylight by the building is 91.7 %

Viewpoint 1: View from Belvidere Street facing south toward the Project Site



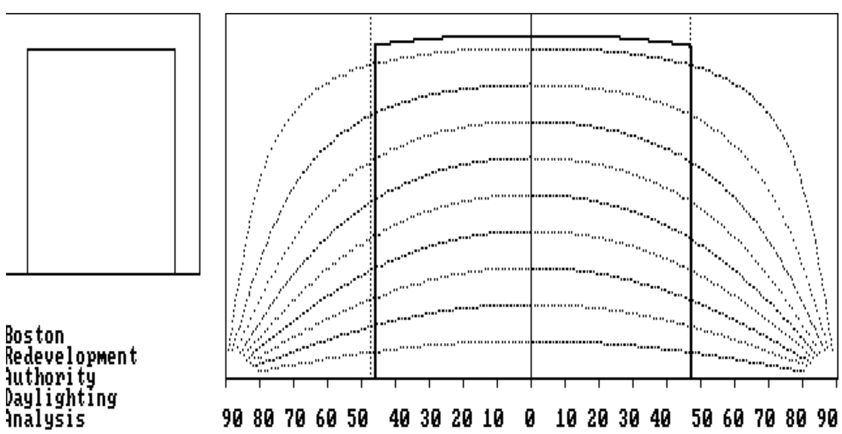
Obstruction of daylight by the building is 84.6 %

Viewpoint 2: View from Dalton Street facing northeast toward the Project Site



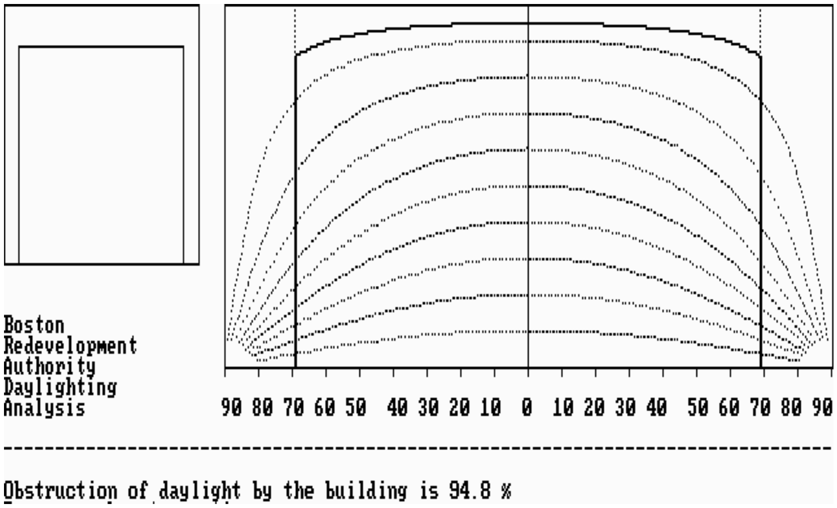
Obstruction of daylight by the building is 97.7 %

Viewpoint 3: View from Dalton Street facing southwest toward the Project Site

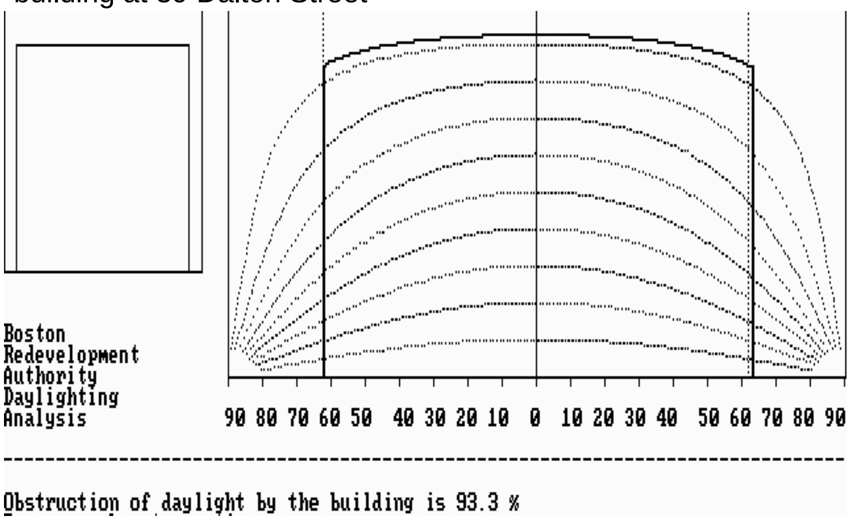


Obstruction of daylight by the building is 92.5 %

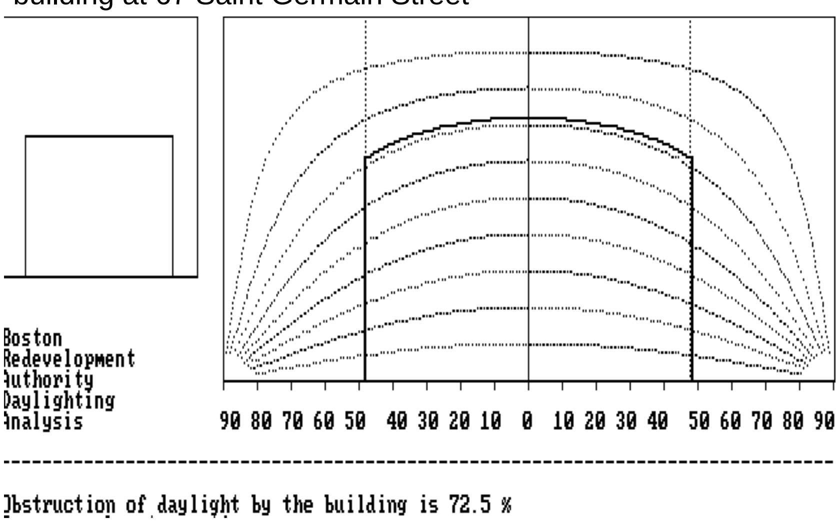
Area Context Viewpoint (AC1): View from Dalton Street facing southwest toward the building at 40 Dalton Street



Area Context Viewpoint (AC2): View from Belvidere Street facing northwest toward the building at 39 Dalton Street



Area Context Viewpoint (AC3): View from Dalton Street facing southwest toward the building at 67 Saint Germain Street



daylight obstruction value of 96.5%. The development of the Proposed Project will result in a slight increase in the daylight obstruction value over the approved Master Plan to 97.7%.

Dalton Street- Viewpoint 3

Viewpoint 3 was taken from the center of Dalton Street facing southwest toward the Mid-rise portion of the Project. The approved Master Plan would result in a daylight obstruction value of 91.7%. The development of the Proposed Project will result in a minimal increase in the daylight obstruction value over the approved Master Plan to 92.5%.

Area Context Views

The Project area is primarily characterized by mixed-use buildings with commercial, hotel and residential uses, with some retail and restaurant uses on the ground floor. The Project is located in a dense urban area with a number of high-rises in the vicinity. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the three area context viewpoints described above and shown on Figure 4.3-1. The daylight obstruction values range from 72.5% for AC3 to 94.8% for AC1. Daylight obstruction values for the Project are similar to the Area Context values.

The Approved Master Plan Huntington Building

As discussed in section 1.3.2, the approved Master Plan included a 291-foot tall building along Huntington Avenue that is not being built under the Proposed Project. Therefore, any daylight obstruction impacts that would have resulted from this building will not occur with this Project.

4.3.4 Conclusions

The daylight analysis conducted for the Project describes approved Master Plan and proposed daylight obstruction conditions at the Project site, as well as existing conditions in the surrounding area. The results of the BRADA analysis indicate that the Project will result in minor increases in daylight obstruction values as compared to the approved Master Plan.

4.4 Solar Glare

As currently designed, the majority of the Proposed Project's exterior elevations will be glazed. No reflective glass (such as that used in the new John Hancock Tower, for example) will be used however, and the Proposed Project is not expected to cause any significant solar glare impacts on the surrounding buildings, pedestrian areas, or roadways. Building details and design elements will be presented to the BRA and the Boston Civic Design Commission as the design progresses. Should there be a design change toward using more reflective glass, then a solar glare analysis will be undertaken to evaluate whether the glazing will have any negative impacts on surrounding areas.

4.5 Air Quality Analysis

4.5.1 Introduction

An air quality analysis was conducted to determine the impact of pollutant emissions from mobile sources generated by the Belvidere-Dalton Project. A microscale analysis was performed to evaluate the potential air quality impacts of carbon monoxide (CO) due to traffic flow around the Project area.

4.5.1.1 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, the Environmental Protection Agency (EPA) promulgated National Ambient Air Quality Standards (NAAQS) for these criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM10 and PM2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS.

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

A one-hour NO_2 standard was promulgated on January 22, 2010 to protect public health, including the health of sensitive populations (e.g., people with asthma, children, and the elderly). The final rule for the new hourly NO_2 NAAQS was published in the Federal Register on February 9, 2010 and became effective on April 12, 2010. The form of this standard is the three-year average of the 98th percentile of the daily maximum one-hour concentrations.

Similarly, a one-hour SO_2 standard was promulgated on June 2, 2010 to protect public health, including the health of sensitive populations (e.g., people with asthma, children, and the elderly). The final rule for the new hourly SO_2 NAAQS was published in the Federal Register on June 22, 2010 and became effective on August 23, 2010. The form of this standard is the three-year average of the 99th percentile of the daily maximum one-hour concentrations.

Table 4.5-1 National Ambient Air Quality Standards

Pollutant	Averaging Period	National Ambient Air Quality Standards and Massachusetts Ambient Air Quality Standards (micrograms per cubic meter)	
		Primary	Secondary
NO_2	Annual [1]	100	Same
	1-hour [7]	188	None
SO_2	Annual [1,8]	80	None
	24-hour [2,8]	365	None
	3-hour [2]	None	1,300
	1-hour [7]	195	None
PM10 [6]	Annual	50	Same
	24-hour [3]	150	Same
PM2.5	Annual [4]	12	15
	24-hour [5]	35	Same
CO	8-hour [2]	10,000	Same
	1-hour [2]	40,000	Same
Ozone	8-hour [3]	235	Same
Pb	3-month [1]	1.5	Same
Notes:			

[1] Not to be exceeded
[2] Not to be exceeded more than once per year.
[3] Not to be exceeded more than an average of one day per year over three years.
[4] Not to be exceeded by the arithmetic average of the annual arithmetic averages from 3 successive years.
[5] Not to be exceeded based on the 98th percentile of data collection.
[6] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM10 standard in 2006 (effective December 17, 2006). However, the annual standard remains codified in 310 CMR 6.00
[7] Not to be exceeded. Based on the 3-yr average of the 98th (NO2) or 99th (SO2) percentile of the daily maximum 1-hour concentrations.
[8]The Annual and 24-hour SO2 standards were revoked on June 2, 2010. However, these standards remain in effect until one year after an area is designated for the 1-hour standard, unless currently in nonattainment.

Source: 40 CFR 50 and 310 CMR 6.00

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

The inhalable particulate (PM10) NAAQS were promulgated on July 1, 1987 at the federal level with the intent of replacing the existing standards limiting ambient levels of Total Suspended Particulate (TSP). EPA also promulgated a Fine Particulate (PM2.5) NAAQS, effective July 18, 1997. The PM2.5 standards have since been strengthened to an annual standard of 12 $\mu g/m^3$ and a 24-hour standard of 35 $\mu g/m^3$.

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

4.5.1.2 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 2007 to 2011. MassDEP guidance specifies the use of the latest three years of available monitoring data from within 10 km of the project site.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM-10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM-2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM-2.5 averages, the average of the highest yearly observations was used as the background concentration. A new 1-hr NO_2 standard was recently promulgated. To attain this standard, the 3-year average of the 98^{th} percentile of the maximum daily 1-hour concentrations must not exceed 188 $\mu g/m^3$.

Background concentrations were determined from the closest available monitoring stations to the Project site. The closest monitor is located at Kenmore Square, in Boston. A summary of the background air quality concentrations are presented in Table 4.5-2.

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

Pollutant	Averaging Time	2009	2010	2011	Background Concentration ($\mu g/m^3$)	Location
SO_2 (1)(7)(8)	1-Hour	65.0	69.9	127.4	127.4	Kenmore Sq., Boston
	3-Hour	88.4	62.4	49.4	88.4	Kenmore Sq., Boston
	24-Hour	23.4	21.8	31.5	31.5	Kenmore Sq., Boston
	Annual	6.5	5.8	6.1	6.5	Kenmore Sq., Boston
PM-10	24-Hour	69.0	40.0	38.0	69.0	Kenmore Sq., Boston
	Annual	20.6	15.5	16.8	20.6	Kenmore Sq., Boston
PM-2.5	24-Hour (4)	19.1	21.9	21.2	20.7	Kenmore Sq., Boston
	Annual (5)	9.0	9.3	9.4	9.2	Kenmore Sq., Boston
NO_2 (3)	1-Hour (6)	112.8	119.4	140.8	140.8	Kenmore Sq., Boston
	Annual	37.8	35.9	38.3	38.3	Kenmore Sq., Boston
CO (2)	1-Hour	1596	2166	1710	2166	Kenmore Sq., Boston
	8-Hour	1254	1710	1482	1710	Kenmore Sq., Boston

Notes: From 2007-2011 MA DEP Annual Data Summaries

1 SO_2 reported in ppm or ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2600 $\mu g/m^3$.

2 CO reported in ppm or ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1140 $\mu g/m^3$.

3 NO_2 reported in ppm or ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1880 $\mu g/m^3$.

4 Background level for 24-hour PM-2.5 is the average concentration of the 98^{th} percentile for three years.

5 Background level for annual PM-2.5 is the average for three years.

6 Maximum annual 1-hr concentrations.

7 The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

8 The 2010 & 2011 SO_2 3-hr value is not reported. Years 2007-2009 used instead.

Air quality is generally good in the area, with all of the ambient concentrations well below their respective NAAQS. For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 1.9 ppm (2166 $\mu g/m^3$) for 1-hour and 1.5 ppm (1710 $\mu g/m^3$) for 8-hour CO.

4.5.2 Methodology

4.5.2.1 Microscale Analysis

The BRA requires an analysis of the effects on air quality as a result of any increase in traffic generated by the Project. This "microscale" analysis is required for any intersection (including garage entrances/exits) where the Level of Service (LOS) is expected to deteriorate to D and the proposed Project causes a 10 percent increase in traffic, or where the LOS is E or F and the proposed project contributes to a reduction in LOS. The microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through both signaled and unsignalized intersections. Predicted ambient concentrations of CO for the Build and No-Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels, since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analyses for the Project followed the procedure outlined in U.S. EPA's intersection modeling guidance.[4]

The microscale analysis has been conducted using the latest versions of EPA's MOBILE6.2 and CAL3QHC programs to estimate CO concentrations at sidewalk receptor locations.

Baseline (2013) and future year (2018) emission factor data calculated from the MOBILE6.2 model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersections.

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

Existing background values of CO at the nearest monitor location at Kenmore Square were obtained from the MassDEP. CAL3QHC results were then added to background CO values of 1.9 ppm (one-hour) and 1.5 ppm (eight-hour), as provided by the MassDEP, to determine total air quality impacts due to the Projects. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and 9 ppm (eight-hour).

The modeling methodology was developed in accordance with the latest Massachusetts Department of Environmental Protection (MassDEP) modeling policies and Federal modeling guidelines.[5]

Modeling assumptions and backup data for results presented in this section are provided in the Air Quality Appendix X.

Intersection Selection

A "microscale" analysis is required for the Project at intersections where 1) project traffic would impact intersections or roadway links currently operating at Level of Service ("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 10% 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 modeling guidance identifies the following steps to determine the intersections to be modeled.

- Rank the top 20 intersections by traffic volumes
- Calculate the Level of Service (LOS) for each intersection
- Rank the intersections by volume
- Rank the intersections by LOS
- Model the top three intersections based on worst LOS and the top three intersections based on the highest traffic volumes

Only three signalized intersections included in the traffic study meet the above conditions (See Section 3, Transportation). The traffic volumes and LOS calculations provided in Section 3 form the basis of evaluating the traffic data versus the microscale thresholds. All three intersections were found to meet the criteria for inclusion in the microscale analysis:

- The intersection of Boylston Street and Massachusetts Avenue;

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5 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

- The intersection of Huntington Avenue and Belvidere Street; and,
- The intersection of Huntington and Massachusetts Avenue.

Microscale modeling was performed for the intersections based on the aforementioned methodology. The 2013 existing conditions, and the 2018 No-Build and Build conditions were each evaluated for both morning (AM) and afternoon (PM) peak.

Emissions Calculations (MOBILE6.2)

The EPA MOBILE6.2 computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOBILE6.2 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 state specific vehicle age registration distribution. The input files for MOBILE6.2 for the existing (2013) and build year (2018) are provided by MassDEP. As is typical, minor edits to the files were necessary to allow the program to output emission factors for the various speeds used in the analyses.

Idle emission factors are obtained from factors for a vehicle speed of 2.5 mph. The resulting emission rate given in (grams/mile) is then multiplied by 2.5 mph to estimate idle emissions (in grams/hour). Moving emissions are calculated based on actual speeds at which free-flowing vehicles travel through the intersections. A speed of 30 mph is used for all free-flow traffic. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary) and left turns, respectively.

Winter CO emission factors are typically higher than summer for CO. Therefore winter vehicular emission factors were conservatively used in the microscale analyses.

Receptors & Meteorology Inputs

Sets of up to 340 receptors were placed in the vicinity of each of the modeled intersections. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersection. The roadway links and receptor locations of the modeled intersections are presented in Figures 4.5-1 through, 4.5-3.

Belvidere/Dalton Project **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 4.5-1

Link and Receptor Locations for CAL3QHC modeling of Intersection of Boylston St. & Mass Ave.

Belvidere/Dalton Project **Boston, Massachusetts**

Figure 4.5-2

Link and Receptor Locations for CAL3QHC modeling of Intersection of Huntington Ave. & Belvidere St.

Belvidere/Dalton Project **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 4.5-3

Link and Receptor Locations for CAL3QHC modeling of Intersection of Huntington Ave .& Mass Ave.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[6], a wind speed of 1 m/s, stability class D (4), and a mixing height of 1000 meters was used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 175 cm was selected for all three intersections.[7]

Impact Calculations (CAL3QHC)

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

4.5.3 Air Quality Results

4.5.3.1 Microscale Analysis

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 4.5-3 through 4.5-5 for the 2013 and 2018 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.7.[9]

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the Project, for the modeled conditions (2.3 ppm) plus background (1.9 ppm) is 4.2 ppm for the 2018 afternoon peak hour case at the intersection of Huntington Avenue and Massachusetts Avenue for both the No-Build and Build conditions. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (1.6 ppm) plus background (1.5 ppm) is 3.1 ppm for the same locations and scenarios. All

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

7 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

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

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

concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm. The increase in concentrations from 2013 to 2018 is due to the geometry and signal timing changes attributed to the Symphony Streetscape Project that is starting construction in the summer of 2013.

It would be expected that any future mitigation measures implemented to improve traffic flow at any of the modeled intersections would result in further improved air quality impacts.

4.5.4 Conclusion

4.5.4.1 Microscale Analysis

Results of the microscale analysis show that all predicted CO concentrations are well below 1-hour and 8-hour NAAQS. Therefore, it can be concluded that there are no adverse air quality impacts resulting from increased traffic in the area.

Table 4.5-3 Summary of Microscale Modeling Analysis (Existing 2013)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Boylston Street and Massachusetts Avenue	AM	1.3	1.9	3.2	35
	PM	1.3	1.9	3.2	35
Huntington Avenue and Belvidere Street	AM	1.5	1.9	3.4	35
	PM	1.5	1.9	3.4	35
Huntington Avenue and Massachusetts Avenue	AM	1.0	1.9	2.9	35
	PM	1.0	1.9	2.9	35
8-Hour					
Boylston Street and Massachusetts Avenue	AM	0.9	1.5	2.4	9
	PM	0.9	1.5	2.4	9
Huntington Avenue and Belvidere Street	AM	1.1	1.5	2.6	9
	PM	1.1	1.5	2.6	9
Huntington Avenue and Massachusetts Avenue	AM	0.7	1.5	2.2	9
	PM	0.7	1.5	2.2	9

Notes:
CAL3QHC 8-hour impacts were conservatively obtained by multiplying 1-hour impacts by a screening factor of 0.7.

Table 4.5-4 Summary of Microscale Modeling Analysis (No-Build 2018)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Boylston Street and Massachusetts Avenue	AM	1.2	1.9	3.1	35
	PM	1.1	1.9	3.0	35
Huntington Avenue and Belvidere Street	AM	1.5	1.9	3.4	35
	PM	1.4	1.9	3.3	35
Huntington Avenue and Massachusetts Avenue	AM	2.2	1.9	4.1	35
	PM	2.3	1.9	4.2	35
8-Hour					
Boylston Street and Massachusetts Avenue	AM	0.8	1.5	2.3	9
	PM	0.8	1.5	2.3	9
Huntington Avenue and Belvidere Street	AM	1.1	1.5	2.6	9
	PM	1.0	1.5	2.5	9
Huntington Avenue and Massachusetts Avenue	AM	1.5	1.5	3.0	9
	PM	1.6	1.5	3.1	9

Notes:

CAL3QHC 8-hour impacts were conservatively obtained by multiplying 1-hour impacts by a screening factor of 0.7.

Table 4.5-5 Summary of Microscale Modeling Analysis (Build 2018)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Boylston Street and Massachusetts Avenue	AM	1.2	1.9	3.1	35
	PM	1.2	1.9	3.1	35
Huntington Avenue and Belvidere Street	AM	1.5	1.9	3.4	35
	PM	1.4	1.9	3.3	35
Huntington Avenue and Massachusetts Avenue	AM	2.2	1.9	4.1	35
	PM	2.3	1.9	4.2	35

Table 4.5-5 Summary of Microscale Modeling Analysis (Build 2018) (Continued)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
8-Hour					
Boylston Street and Massachusetts Avenue	AM	0.8	1.5	2.3	9
	PM	0.8	1.5	2.3	9
Huntington Avenue and Belvidere Street	AM	1.1	1.5	2.6	9
	PM	1.0	1.5	2.5	9
Huntington Avenue and Massachusetts Avenue	AM	1.5	1.5	3.0	9
	PM	1.6	1.5	3.1	9

Notes:

CAL3QHC 8-hour impacts were conservatively obtained by multiplying 1-hour impacts by a screening factor of 0.7.

4.6 Solid and Hazardous Waste

4.6.1 Hazardous Waste

A Phase I Environmental Site Assessment (Phase I ESA) dated 12 July 2012 was prepared using methods consistent with ASTM E1527-05. The Site Assessment identified two historical releases, of #2 fuel oil that occurred on the property in the 1990s. These releases (101 Belvidere Street (RTN 3-17859) and 103 Belvidere Street (RTN 3-13688)) have achieved regulatory closure.

Additionally, there have been offsite releases of dry cleaning solvents (volatile organic compounds (VOCs)) to the northwest of the property; these offsite releases are subject to the Massachusetts Contingency plan (MCP), Chapter 21E and have not achieved regulatory closure. Finally, an offsite utility release abatement measure (URAM, RTN 3-19708) was issued for work conducted in 2000 in Dalton Street, adjacent to the property. The URAM addressed polycyclic aromatic hydrocarbons (PAHs) and total petroleum hydrocarbon (TPH) concentrations in soil. The URAM achieved regulatory closure.

Recent characterization of the soil and groundwater at the site has not been conducted. If required, management of soil and groundwater will be in accordance with applicable local, state, and federal laws and regulations. Characterization of excess material to be excavated and generated for offsite transport will be undertaken prior to removing any material from the property.

An Asbestos and Hazardous Material Evaluation has not been conducted because there are no existing buildings on the parcels. Should any hazardous materials be encountered during construction, they will handled and disposed of in accordance with all applicable federal, state, and city regulations to protect worker safety and public health.

4.6.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of hotel, residential, restaurant and retail uses. Solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by building management. The Project will generate approximately 2,500 tons of solid waste per year.

With the exception of household hazardous wastes typical of hotel and residential developments (e.g., cleaning fluids and paint), the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials.

4.6.3 Recycling

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

4.7 Noise Impacts

4.7.1 Introduction

A noise analysis was conducted for the Project, including an estimate of future sound levels once the Project is in operation. The analysis was conducted in accordance with the BRA Article 80 requirements to address potential impacts solely from the Project.

Baseline noise levels were measured in the vicinity of the Project and were compared to predicted noise levels based on reference sound data for likely mechanical equipment identified by the Proponent for the Project. These predicted noise levels were compared to the City of Boston Zoning District Noise Standards (City Noise Standards) and the Massachusetts Department of Environmental Protection (MassDEP) Noise Policy. The analysis indicates that predicted noise levels from Project-related mechanical equipment with appropriate noise mitigation will comply with the City Noise Standards, and will result in sound level increases that are below the limit established by the MassDEP Noise Policy.

4.7.2 Noise Terminology

There are several ways in which sound (noise) levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. The following information defines the noise measurement terminology used in this analysis.

The decibel scale is logarithmic to accommodate the wide range of sound intensities found in the environment. One property of the decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a three-decibel increase (to 53 dB), not a doubling to 100 dB. Thus, every three dB change in sound levels represents a doubling or halving of sound energy. Related to this is that a change in sound levels of fewer than three dB is imperceptible to the human ear.

Another property of decibels is that if one source of noise is 10 dB (or more) louder than another source, then the total sound level is simply the sound level of the higher source. For example, a source of sound at 60 dB plus another source of sound at 47 dB is 60 dB.

The sound-level meter used to measure noise is a standardized instrument.[10] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various circumstances. One network is the A-weighting network (there are also B- and C-weighting networks). The A-weighted scale (dBA) most closely approximates how the human ear responds to sound at various frequencies. Sounds are frequently reported as detected with the A-weighting network of the sound-level meter. A-weighted sound levels emphasize the middle frequency (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower and higher frequency sounds.

Because the sounds in our environment vary with time, they cannot simply be described with a single number. Two methods are used for describing variable sounds. These are exceedance levels and the equivalent level, both of which are derived from a large number of moment-to-moment, A-weighted sound-level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where n can have a value of 0 to 100 percent. Several sound-level metrics that are commonly reported in community noise studies are described below.

- L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period. The L_{90} is close to the lowest sound level observed. It is essentially the same as the residual sound level, which is the sound level observed when there are no obvious nearby intermittent noise sources.

- L_{50} is the median sound level, the sound level in dBA exceeded 50 percent of the time during the measurement period.

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[10] *American National Standard Specification for Sound Level Meters*, ANSI S1.4-1983, published by the Standards Secretariat of the Acoustical Society of America, Melville, NY.

- L_{10} is the sound level in dBA exceeded only 10 percent of the time. It is close to the maximum level observed during the measurement period. The L_{10} is sometimes called the intrusive sound level because it is caused by occasional louder noises like those from passing motor vehicles.

- L_{max} is the maximum instantaneous sound level observed over a given period.

L_{eq}, the equivalent level, is the level of a hypothetical steady sound that would have the same energy (i.e., the same time-averaged mean square sound pressure) as the actual fluctuating sound observed. The equivalent level is designated L_{eq} and is also A-weighted. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with linear mean square sound pressure values, the L_{eq} is mostly determined by occasional loud, intrusive noises.

By using various noise metrics, it is possible to separate prevailing, steady sounds (the L_{90}) from occasional, louder sounds (L_{10}) in the noise environment or combined average levels (L_{eq}). This analysis of sounds expected from the Project treats all noises as though they will be steady and continuous, and hence the L_{90} exceedance level was used. In the design of noise control treatments, it is essential to know something about the frequency spectrum of the noise of interest. Noise control treatments do not function like the human ear, so simple A-weighted levels are not useful for noise-control design. The spectra of noises are usually stated in terms of octave-band sound pressure levels, in dB, with the octave frequency bands being those established by a generally-accepted standard. To facilitate the noise-control design process, the estimates of noise levels in this analysis are also presented in terms of octave-band sound pressure levels.

4.7.3 Noise Regulations and Criteria

The primary set of regulations relating to the potential increase in noise levels is the City Noise Standards (City of Boston Code – Ordinances: Section 16–26 Unreasonable Noise; and City of Boston Air Pollution Control Commission Regulations for the Control of Noise in the City of Boston). Separate regulations within the City Noise Standards provide criteria to control different types of noise. Regulation 2 is applicable to the effects of the proposed building, as completed, and was considered in the noise study for the Project. Table 3.7-1 includes the City Noise Standards.

Additionally, MassDEP regulates community noise by its Noise Policy (DAQC policy 90-001). The MassDEP Noise Policy limits source sound levels to a 10-dBA increase in the ambient measured noise level (L_{90}) at the Project property line and at the nearest residences. The property line evaluation is typically conducted at the property line of existing residences and/or at the property line of potential future sensitive receptors.[11] The policy further prohibits "pure tone" conditions—when any octave-band, center-frequency sound pressure level exceeds that of the two adjacent center-frequency sound pressure levels by three decibels or more.

Table 4.7-1 City Noise Standards, Maximum Allowable Sound Pressure Levels

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

4.7.4 Existing Conditions

4.7.4.1 Baseline Noise Environment

An ambient noise-level survey was conducted to characterize the "baseline" acoustical environment in the vicinity of the Project site. Existing noise sources consisted of: vehicular traffic (including trucks) on the local roadways, MBTA bus traffic, pedestrian traffic, nearby mechanical equipment located in and on surrounding buildings, sidewalk cleaning, and the general din of the city.

[11] *"Noise levels that exceed the criteria at the source's property line by themselves do not necessarily result in a violation or a condition of air pollution under MassDEP regulations (see 310 CMR 7.10 U)."* MassDEP website (http://www.mass.gov/dep/air/laws/noisepol.htm), accessed April 2013.

4.7.4.2 Noise Measurement Locations

The selection of the sound-monitoring locations was based upon a review of the current land uses in the Project area. Four noise-monitoring locations were selected as representative in obtaining a sampling of the ambient baseline noise environment. The measurement locations are depicted in Figure 4.7-1 and are described below.

- Location 1 is located north of the Project site, outside of the Sheraton Hotel building. Noise sources at this location include vehicular, truck, and pedestrian traffic, birds chirping (daytime only), a generator from a nearby food truck (daytime only), a street sweeper (nighttime only), a power-washing operation (nighttime only) and emergency vehicle sirens.

- Location 2 is located in front of the Hilton Hotel building main entrance north of the Project. Noise sources at this location include vehicular, truck, and pedestrian traffic, birds chirping (daytime only), whistle from nearby hotel cab stand (daytime only), a power-washing operation (nighttime only), leaf rustle (daytime only) and emergency vehicle sirens.

- Location 3 is across from 65/63 Saint Germain Street, southeast of the Project site outside of the Saint Germain Street apartment complex which is representative of residences located near the Project. Noise sources at this location include vehicular, truck, and pedestrian traffic, birds chirping (daytime only), whistle from nearby hotel cab stand (daytime only), a power-washing operation (nighttime only), a street-sweeping operation (nighttime only), construction activity (nighttime only), and emergency vehicle sirens.

- Location 4 is outside from 46 Saint Germain Street, southwest of the Project site outside of an apartment complex which is representative of residences located near the Project. Noise sources at this location include vehicular, truck, and pedestrian traffic, birds chirping (daytime only), whistle from nearby hotel cab stand (daytime only), mechanical ventilation from nearby building, dogs barking, construction activity (daytime only), and emergency vehicle sirens.

4.7.4.3 Noise Measurement Methodology

Sound-level measurements were taken for approximately 20 minutes per location during the daytime (11:15 a.m. to 1:00 p.m.) on May 6, 2013, and during nighttime hours (12:00 a.m. to 1:45 a.m.) on May 7, 2013. Since noise impacts are greatest at night when existing noise levels are lowest, the study was designed to measure community noise levels under conditions typical of a “quiet period” for the area. Daytime measurements were scheduled to exclude peak traffic conditions.

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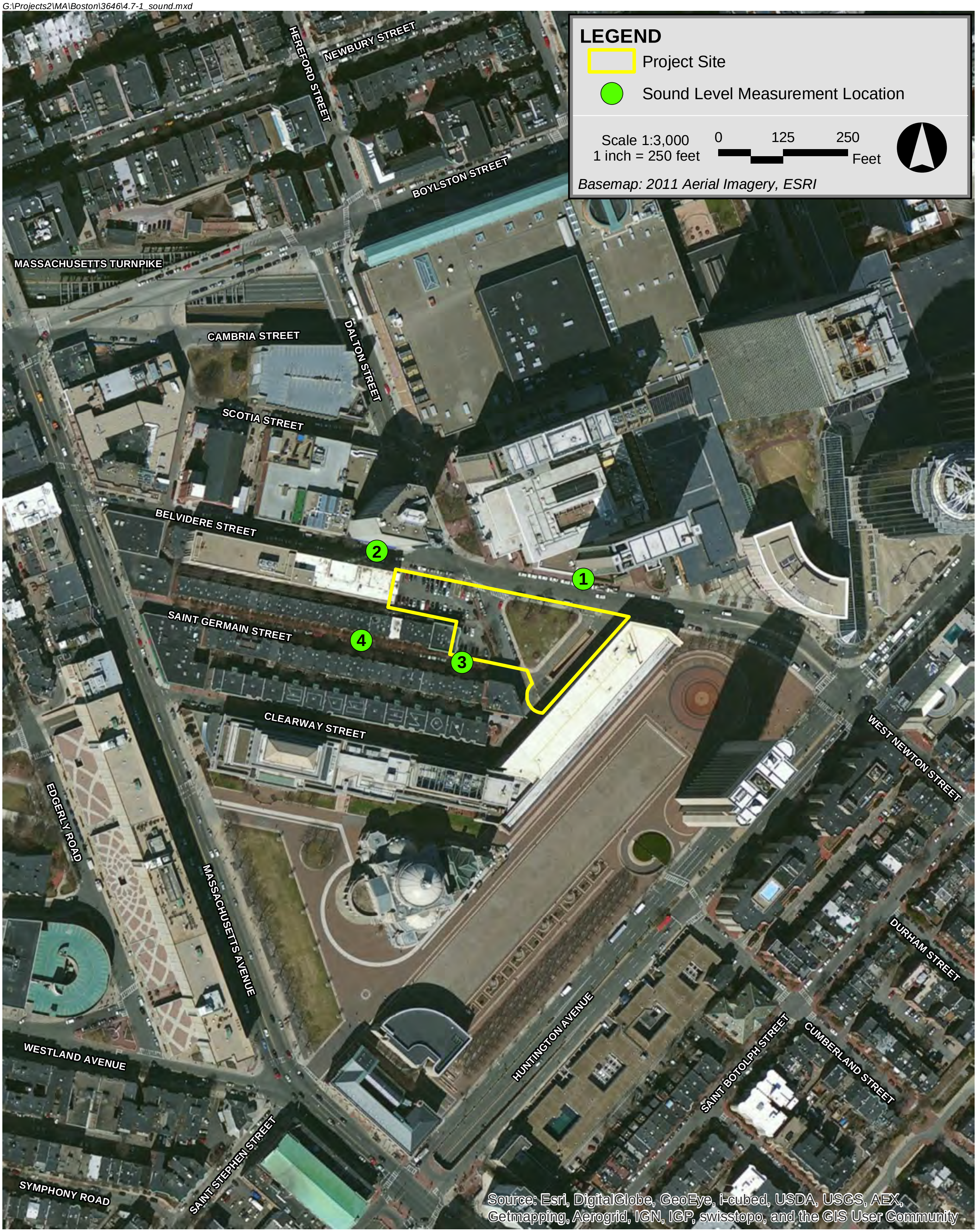

Belvidere/Dalton Project **Boston, Massachusetts**

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Figure 4.7-1

Sound Level Measurement Locations

The sound levels were measured at publicly-accessible locations at a height of approximately 1.5 meters above the ground. The measurements were made under low wind conditions, and roadway surfaces were dry. Wind speed measurements were made with a Davis Instruments TurboMeter electronic wind speed indicator, and temperature and humidity measurements were made using a General Tools digital psychrometer. Unofficial observations about meteorology, including wind speed, temperature, and humidity, as well as 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 Proposed Project.

4.7.4.4 Measurement Equipment

A Larson Davis model 831 Sound Level Analyzer, equipped with a Larson Davis model PRM831 Preamplifier, a PCB Piezotronics half-inch microphone, and a four-inch windscreen were used to collect broadband and octave band ambient sound pressure level data. The instrumentation meets the "Type 1 – Precision" requirements set forth in American National Standards Institute (ANSI) S1.4 for acoustical measuring devices. The meter was tripod-mounted at a height of five feet above ground level (AGL). The meter has data logging capability and was programmed to log statistical data for each 20-minute sampling period for the following parameters: L_{10}, L_{50}, L_{90}, L_{max}, L_{min}, and L_{eq}.

All measurement equipment was calibrated in the field before and after the surveys with a LD CAL200 acoustical calibrator, which meets the standards of IEC 942 Class 1L and ANSI S1.40-1984. The meters were calibrated and certified as accurate to standards set by the National Institute of Standards and Technology. These calibrations were conducted by an independent laboratory within the past 12 months.

4.7.4.5 Baseline Ambient Noise Levels

The existing ambient noise environment consists primarily of vehicular traffic on nearby roadways, building mechanical systems, pedestrian activity, and sidewalk cleaning. Baseline noise monitoring results are presented in Table 4.7-2, and summarized below.

- The daytime residual background (L_{90}) measurements ranged from 52 to 59 dBA;
- The nighttime residual background (L_{90}) measurements ranged from 49 to 59 dBA;
- The daytime equivalent level (L_{eq}) measurements ranged from 54 to 72 dBA; and
- The nighttime equivalent level (L_{eq}) measurements ranged from 52 to 63 dBA.

Table 4.7-2 Baseline Ambient Sound Level Measurements

Receptor I.D	Start Time	L_{10}	L_{50}	L_{eq}	L_{90}	L_{max}	L_{90} Sound Level (dB) per Octave Band Center Frequency (Hz)								
		(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	31.5	63	125	250	500	1000	2000	4000	8000
1-Day	11:16 a.m.	69	62	72	59	97	69	65	62	57	54	55	49	43	32
2-Day	11:44 a.m.	59	59	59	59	59	65	67	61	58	56	54	51	47	33
3-Day	12:12 p.m.	61	59	59	57	70	66	64	58	55	53	53	48	41	26
4-Day	12:36 p.m.	55	54	54	52	69	57	57	54	50	49	47	42	38	26
1-Night	12:59 a.m.	67	57	63	56	78	60	59	59	55	51	51	48	41	29
2-Night	1:25 a.m.	61	60	61	59	70	60	64	61	56	54	54	52	47	36
3-Night	12:30 a.m.	59	58	58	53	64	59	59	54	52	50	49	45	35	25
4-Night	12:05 a.m.	51	50	52	49	70	54	54	52	49	47	44	39	31	21

Notes:

1. Daytime weather: Temperature = 67.1˚ F, Relative Humidity = 35%, clear skies, east winds 0-4 miles per hour.
   Nighttime weather: Temperature = 56.2˚ F, Relative Humidity = 66%, clear skies, southwest winds 0-1mile per hour.
2. All road surfaces were dry during measurements.
3. Sampling periods were at least 20 minutes in duration.
4. Daytime measurements were collected on May 6, 2013.
   Nighttime measurements were collected on May 7, 2013.

4.7.5 Overview of Potential Project Noise Sources

The Project will consist of a two buildings, the High-rise and the Mid-rise. The primary sources of continuous sound exterior to the Project will consist of ventilation, cooling, and emergency power noise sources. Multiple noise sources will be located on the roof and there will be various exhaust/intakes along the façades of the buildings on several floors.

4.7.5.1 High-rise

The major sources of sound exterior to the proposed High-rise will be three 500-ton chillers, two 1,000-ton cooling towers, two 38,000 CFM parking corridor exhaust fans, two 38,000 CFM parking corridor intake fans, six 8,500 CFM toilet exhaust fans, two 11,000 CFM kitchen exhaust fans, two 3,500 CFM laundry exhaust fans, two 3,500 CFM trash exhaust fans, 11 15,000 CFM make-up air handling units, two 11,000 CFM make-up air handling units, three 5,000 CFM air handling units, one 3,000 CFM air handling unit, 15 pumps, and one 2,000 kW standby generator. Wall construction and louver selection is assumed to result in insignificant sound pressure level contributions from interior sound levels in the fourth floor mechanical room as compared to sound pressure levels from intakes and exhausts on this level.

The proposed 500-ton chillers are Trane Model CVHF units. These will be located in the fourth floor mechanical room. The proposed rooftop cooling towers for the building are Baltimore Aircoil Company, Inc. Model 31056C 1,000-ton units. They will be located on the roof at a height of approximately 692 feet AGL. The parking corridor intake and exhaust fans are proposed to be Greenheck Model 73-BISW-41-10-I-400 fans. The two exhaust fans will discharge on the western façade of the fourth floor while the two intake fans will draw in air from the northern façade of the fourth floor. The toilet exhaust fans will be Greenheck Model SWB-333-50 fans. The toilet exhaust fans are proposed to exhaust on the northern façade of the 24th floor (2), the southwestern façade of the 24th floor (2) and on the roof (2) at a height of approximately 692 feet AGL. The kitchen exhaust fans will be Greenheck Model SWB-333-75 fans. The kitchen exhaust fans are proposed to exhaust on the southwestern façade of the 24th floor (1) and on the roof (1) at a height of approximately 692 feet AGL. The laundry exhaust fans are proposed to be Greenheck Model SWB-216-30 fans. The laundry exhaust fans are proposed to exhaust on the northern façade of the 24th floor (1) and on the roof (1) at a height of approximately 692 feet AGL. The trash exhaust fans are proposed to be Greenheck Model SWB-216-30 fans. The trash exhaust fans are proposed to exhaust on the southwestern façade of the 24th floor (1) and on the roof (1) at a height of approximately 692 feet AGL. Each 15,000 CFM make-up air handling unit is proposed to be a Johnson Controls Solution Indoor Air Handler 60x96. Six units will be located on the fourth floor with intakes along the eastern façade. An additional four units will be located on the fourth floor with intakes on the northern façade. One 15,000 CFM unit will be located on the 24th floor with the intake along the eastern façade. Each 5,000 CFM air handling unit is proposed to be a Johnson Controls Solution Indoor Air Handler 33x66. Two units will be located on the 24th floor with the intakes and exhausts along the eastern façade. A third unit will be located on the roof at a height of approximately 692 feet AGL. Each 11,000 CFM make-up air handling unit is proposed to be a Johnson Controls Solution Indoor Air Handler 48x84. One unit will be located on the 24th floor and the second on the roof with the intakes along the eastern façade. A 3,000 CFM York Solution Indoor Air Handler 39x42 is proposed to be located on the 24th floor with its intake on the western façade. 15 Bell and Gossett pumps each with a rating of 1800 RPM and 75 HP are proposed to be located in the 24th floor mechanical room. The 2,000 kW Caterpillar standby generator is proposed to be located on the roof at a height of approximately 692 feet AGL.

A tabular summary of the modeled mechanical equipment proposed for the High-rise building is presented below in Table 4.7-3a. Manufacturer specifications indicating the sound power for each piece of equipment, except where noted, are presented in Table 4.7-3b. The Project includes various noise-control measures that are necessary to achieve compliance with the applicable noise regulations. Mitigation will be installed to reduce the sound levels associated with several façade exhausts and intakes. The emergency generator will be controlled using an exhaust silencer and an acoustical enclosure. To further limit impacts from the standby generator, its required periodic, routine testing will be conducted during daytime hours, when background sound levels are highest. A summary of the noise mitigation proposed for the High-rise building is presented below in Table 4.7-3c. Transmission loss assumptions for the 24th floor of the High-rise mitigation are presented below in Table 4.7-3d.

Table 4.7-3a Modeled Noise Sources – High-rise

Noise Source	Quantity	Approximate Location	Size/Capacity
Chiller	3	4th Floor Mechanical Room	500 Ton
Cooling Tower	2	Roof at 692’ AGL	1,000 Ton
Parking Corridor Exhaust Fan	2	4th Floor Facade	38,000 CFM
Parking Corridor Intake Fan	2	4th Floor Facade	38,000 CFM
Toilet Exhaust Fan	6	24th Floor Façade, Roof at 692’ AGL	8,500 CFM
Kitchen Exhaust Fan	2	24th Floor Façade, Roof at 692’ AGL	11,000 CFM
Laundry Exhaust Fan	2	24th Floor Façade, Roof at 692’ AGL	3,500 CFM
Trash Exhaust Fan	2	24th Floor Façade, Roof at 692’ AGL	3,500 CFM
Air Handling Make-up Air Unit	11	4th & 24th Floor Façade	15,000 CFM
Air Handling Make-up Air Unit	2	24th Floor Façade, Roof at 692’ AGL	11,000 CFM
Air Handling Unit	3	24th Floor Façade, Roof at 692’ AGL	5,000 CFM
Air Handling Unit	1	24th Floor Façade	3,000 CFM
Pumps	15	4th Floor Mechanical Room	1800 RPM / 75 HP
Generator	1	Roof at 692’ AGL	2,000 kW

Table 4.7-3b Modeled Sound Power Levels per Noise Source – High-rise

Noise Source	Broadband (dBA)	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Chiller	80	76[1]	76	77	74	73	73	75	74	63
Cooling Tower	100	104[1]	104	102	103	98	93	86	81	77
Parking Corridor Exhaust Fan – Greenheck – 38,000 CFM	78	92[1]	92	83	79	77	70	64	61	57
Parking Corridor Intake Fan – Greenheck – 38,000 CFM	74	87[1]	87	79	74	74	67	63	58	54
Toilet Exhaust Fan – Greenheck – 8,500 CFM	77	82[1]	82	82	78	73	73	68	61	55
Kitchen Exhaust Fan – Greenheck – 11,000 CFM	82	84[1]	84	87	82	77	77	73	67	61
Laundry Exhaust Fan – Greenheck – 3,500 CFM	81	86[1]	86	78	79	79	75	73	68	62
Trash Exhaust Fan – Greenheck – 3,500 CFM	81	86[1]	86	78	79	79	75	73	68	62
Air Handling Unit – 5,000 CFM - Exhaust	95	90[1]	90	90	89	92	90	88	82	75
Air Handling Unit – 5,000 CFM - Intake	93	89[1]	89	89	88	90	88	87	81	74
Air Handling Make-up Air Unit – 11,000 CFM - Intake	94	92[1]	92	88	99	88	87	84	77	69
Air Handling Make-up Air Unit – 15,000 CFM - Intake	95	93[1]	93	93	99	91	89	84	77	69
Air Handling Unit – 3,000 CFM - Intake	86	87[1]	87	78	80	78	81	80	79	74
Pumps – Bell and Gossett[2]	84	73	74	75	77	77	80	77	73	67
2,000 kW Generator – Mechanical – Caterpillar[3]	127	130[1]	130	139	130	121	117	116	114	118
2,000 kW Generator – Exhaust – Caterpillar[3]	134	124[1]	124	139	135	127	125	126	126	124

Notes:

Sound power levels do not include mitigation.

1. Sound level assumed to be equal to dB level in 63 Hz band.
2. Broadband sound power provided by the client; octave band sound power levels estimated based on procedure in Noise Control for Buildings and Manufacturing Plants, Hoover & Keith Inc.
3. The sound power was calculated using sound pressure levels provided at a reference distance.

Table 4.7-3c Attenuation Values Applied to Mitigate Each Noise Source – High-rise

Noise Source	Form of Mitigation	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
All Air Handling Unit Intakes except Rooftop	Silencer	5	10	21	37	55	53	55	36	25
Parking Corridor Intake Fans	Silencer	5	10	21	37	55	53	55	36	25
Parking Corridor Exhaust Fans	Silencer	4	7	17	32	53	54	55	38	27
5,000 CFM Air Handling Unit Exhaust – 24th Floor	Silencer	4	7	17	32	53	54	55	38	27
Fourth Floor Kitchen Exhaust (western façade), Trash Exhaust (western façade), & Laundry Exhaust (northern façade)	Silencer	2	5	5	19	15	12	11	9	8
8000 kW Generator – Mechanical	Enclosure	4	7	13	25	25	25	25	25	25
800 kW Generator – Exhaust	Silencer	0	17	34	32	30	20	20	20	20

Table 4.7-3d Transmission Loss Values Applied to 24th Floor Mechanical Room – High-rise

Location	Material	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Exterior Facade	Glass	2	8	13	19	23	27	27	27	31

4.7.5.2 Mid-rise

The major sources of sound exterior to the proposed Mid-rise will be two 250-ton open cell cooling towers, two 7,000 cubic-feet-per-minute (CFM) energy-recovery units, one 3,000 CFM exhaust fan for the life safety room, one 3,000 CFM exhaust fan for the mechanical penthouse, two 5,000 CFM garage exhaust fans, one 15,000 CFM garage exhaust fan for the NSTAR vault, and one 800 kW standby generator. Pumps and additional equipment will be located inside the mechanical penthouse. It is anticipated that the mechanical penthouse will be constructed in such a manner that this equipment will result in insignificant sound pressure levels as compared to the previously identified equipment. Therefore, these minor sources in the mechanical penthouse have not been included in the sound level impact assessment.

The proposed rooftop cooling towers for the building are Baltimore Aircoil Company, Inc. Model 15250 250-ton units. They will be located on the roof at a height of approximately 285 feet above ground level (AGL). Each of the two Valent VPRE Series energy-recovery units are proposed to be on the roof as well. One of the two Cook 165QMX exhaust fans is proposed to be located at the mechanical penthouse on Level 25 with the exhaust located on the northern façade of the building. The second fan is proposed to be located in the Life and Safety Room above the mechanical penthouse with the exhaust also located on the northern façade. Each of the garage exhaust fans is proposed to be a Cook 202QMX exhaust fan. Both will exhaust approximate 10 feet above grade on the southern façade of the building. The vault exhaust fan is proposed to be a Cook 270QMX fan. It will also exhaust approximately 10 feet above grade along the southern façade. The 1,000 kW Caterpillar standby generator is proposed to be located on the roof at a height of approximately 285 feet AGL.

A tabular summary of the modeled mechanical equipment proposed for the Mid-rise building is presented below in Table 4.7-4a. Manufacturer specifications indicating the sound power for each piece of equipment, except where noted, are presented in Table 4.7-4b. The Project includes various noise-control measures that are necessary to achieve compliance with the applicable noise regulations. Mitigation will be installed to reduce the sound levels associated with several façade exhausts, the cooling towers, and the emergency generator. The emergency generator will be controlled using an exhaust silencer and an acoustical enclosure. To further limit impacts from the standby generator, its required periodic, routine testing will be conducted during daytime hours, when background sound levels are highest. A summary of the noise mitigation proposed for the Mid-rise building is presented below in Table 4.7-4c.

Table 4.7-4a Modeled Noise Sources – Mid-rise

Noise Source	Quantity	Approximate Location	Size/Capacity
Cooling Tower	2	Roof at 285’ AGL	250 Ton
Energy Recovery Unit	2	Roof at 285’ AGL	7,000 CFM
Exhaust Fan – Life and Safety Room	1	Above the Mechanical Penthouse	3,000 CFM
Exhaust Fan – Mechanical Penthouse	1	Level 25	3,000 CFM
Garage Exhaust Fan	2	10’ AGL, Facade	5,000 CFM
Vault Exhaust Fan	1	10’ AGL, Facade	15,000 CFM
Generator	1	Roof at 285’ AGL	800 kW

Table 4.7-4b Modeled Sound Power Levels per Noise Source – Mid-rise

Noise Source	Broadband (dBA)	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Cooling Tower	102	102[1]	102	105	102	101	98	91	85	80
Energy Recovery Unit – Valent VPRE Series – Exhaust[2]	83	87[1]	87	80	87	79	74	74	66	64
Energy Recovery Unit – Valent VPRE Series – Supply[2]	98	102[1]	102	95	102	94	89	89	81	79
Exhaust Fan – Cook – 3,000 CFM	73	71[1]	71	70	73	73	65	61	56	47
Garage Exhaust Fan – Cook – 5,000 CFM	78	79[1]	79	77	78	78	71	66	61	54
Vault Exhaust Fan – Cook – 15,000 CFM	88	83[1]	83	86	89	87	83	79	73	66
800 kW Generator – Mechanical – Caterpillar[3]	124	114[1]	114	123	118	118	120	116	112	113
800 kW Generator – Exhaust – Caterpillar[3]	121	85[1]	85	111	121	117	116	115	106	87

Notes:
Sound power levels do not include mitigation.
1. Sound level assumed to be equal to dB level in 63 Hz band.
2. Each energy recovery unit contains two exhaust and two supply fans, each at 3,500 CFM. Sound power presented for 1 fan.
3. The sound power was calculated using sound pressure levels provided at a reference distance.

Table 4.7-4c Attenuation Values Applied to Mitigate Each Noise Source – Mid-rise

Noise Source	Form of Mitigation	Sound Level (dB) per Octave Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Cooling Towers	Mitigation	0	0	2	4	5	5	5	5	4
Garage and Vault Exhaust	Silencer	4	7	17	32	53	54	55	38	27
8000 kW Generator – Mechanical	Enclosure	4	7	13	25	25	25	25	25	25
800 kW Generator – Exhaust	Silencer	0	17	34	32	30	20	20	20	20

4.7.6 Modeling Methodology

The noise impacts associated with the Project were predicted at the nearest receptors using the Cadna/A noise calculation software developed by DataKustik GmbH. This software uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation). The benefits of this software are a more refined set of computations due to the inclusion of topography, ground attenuation, multiple building reflections, drop-off with distance, and atmospheric absorption. The Cadna/A software allows for octave band calculation of noise from multiple noise sources, as well as computation of diffraction around building edges.

4.7.6.1 Future Sound Levels- Nighttime

The analysis of sound levels at night considered all of the mechanical equipment without the emergency generators running, to simulate typical nighttime operating conditions at nearby receptors. Nine modeling locations were included in the analysis. These modeling receptors, which correspond to the closest residential locations, are depicted in Figure 4.7-2. The predicted exterior Project-Only sound levels range from 38 to 45 dBA at nearby receptors. The range at residential modeling locations is 38 to 45 dBA. This analysis conservatively evaluates hotels as residential uses.

Predicted sound levels from Project-related equipment are within the broadband and octave-band nighttime limits under the City Noise Standards at the modeling locations. This evaluation is presented in Table 4.7-5a. In addition, the predicted future total sound levels (Project + Background) are below the MassDEP criteria of 10 dBA over the quietest nighttime sound levels (the L90 level) at sensitive receptors with nighttime use. This evaluation is presented in Table 4.7-5b. Since nighttime sound levels at Locations 1, 2, and 3 were influenced by cleaning activities at the Sheraton Hotel, the ambient nighttime sound levels at Location 4 were conservatively used in this evaluation for all modeling locations. The Project's mechanical equipment is not expected to create any additional "pure-tone" conditions per the MassDEP Noise Policy when combined with existing middle of the night background sound levels at these locations as shown in Table 4.7-5c.

Table 4.7-5a Comparison of Future Predicted Project-Only Nighttime Sound Levels to the City of Boston Limits

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	42	61	57	50	45	38	36	30	22	15
B	Residential	38	54	50	44	42	34	31	27	17	4
C	Residential	42	58	55	50	46	39	35	29	20	7
D	Residential	44	57	55	50	49	41	35	29	19	6
E	Residential	44	62	58	51	47	41	37	31	22	11
F	Residential	43	58	55	49	48	39	35	30	21	10
G	Residential	45	64	61	53	49	40	35	30	21	20
H	Residential	42	58	54	49	44	40	36	29	20	5
I	Residential	42	58	54	48	44	38	36	31	22	10
City of Boston Limits	Residential	50	68	67	61	52	46	40	33	28	26

Table 4.7-5b Comparison of Future Predicted Nighttime Sound Levels with Existing Background – MassDEP Noise Policy

Modeling Location ID	Zoning / Land Use	Project-Generated Sound Levels (dBA)	Existing L_{90} – Nighttime (dBA)[2]	Future L_{90} – Nighttime Total (dBA)[1]	Increase (dBA)[1]
A	Residential	42	49	50	1
B	Residential	38	49	49	0
C	Residential	42	49	50	1
D	Residential	44	49	50	1
E	Residential	44	49	50	1
F	Residential	43	49	50	1
G	Residential	45	49	50	1
H	Residential	42	49	50	1
I	Residential	42	49	50	1

Notes:
1. Calculation performed using existing and Project sound levels rounded to one decimal place.
2. Existing sound levels at Modeling ID's A through I correspond to measured sound levels at monitoring Location 4.

Table 4.7-5c MassDEP Noise Policy "Pure-Tone" Evaluation of Future Predicted Nighttime Sound Levels

Modeling Location ID	Zoning / Land Use	Sound Level (dB) per Octave Band Center Frequency (Hz)[1]								
		31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	62	59	54	50	47	45	39	31	22
B	Residential	57	56	53	50	47	44	39	31	21
C	Residential	59	57	54	51	47	45	39	31	21
D	Residential	58	57	54	52	48	45	39	31	21
E	Residential	62	60	55	51	48	45	40	31	22
F	Residential	59	58	54	51	48	44	39	31	22
G	Residential	64	62	56	52	48	44	39	31	24
H	Residential	59	57	54	50	48	45	39	31	21
I	Residential	59	57	53	50	47	45	40	31	22

Notes:
1. Calculation performed using existing and Project sound levels rounded to one decimal place.

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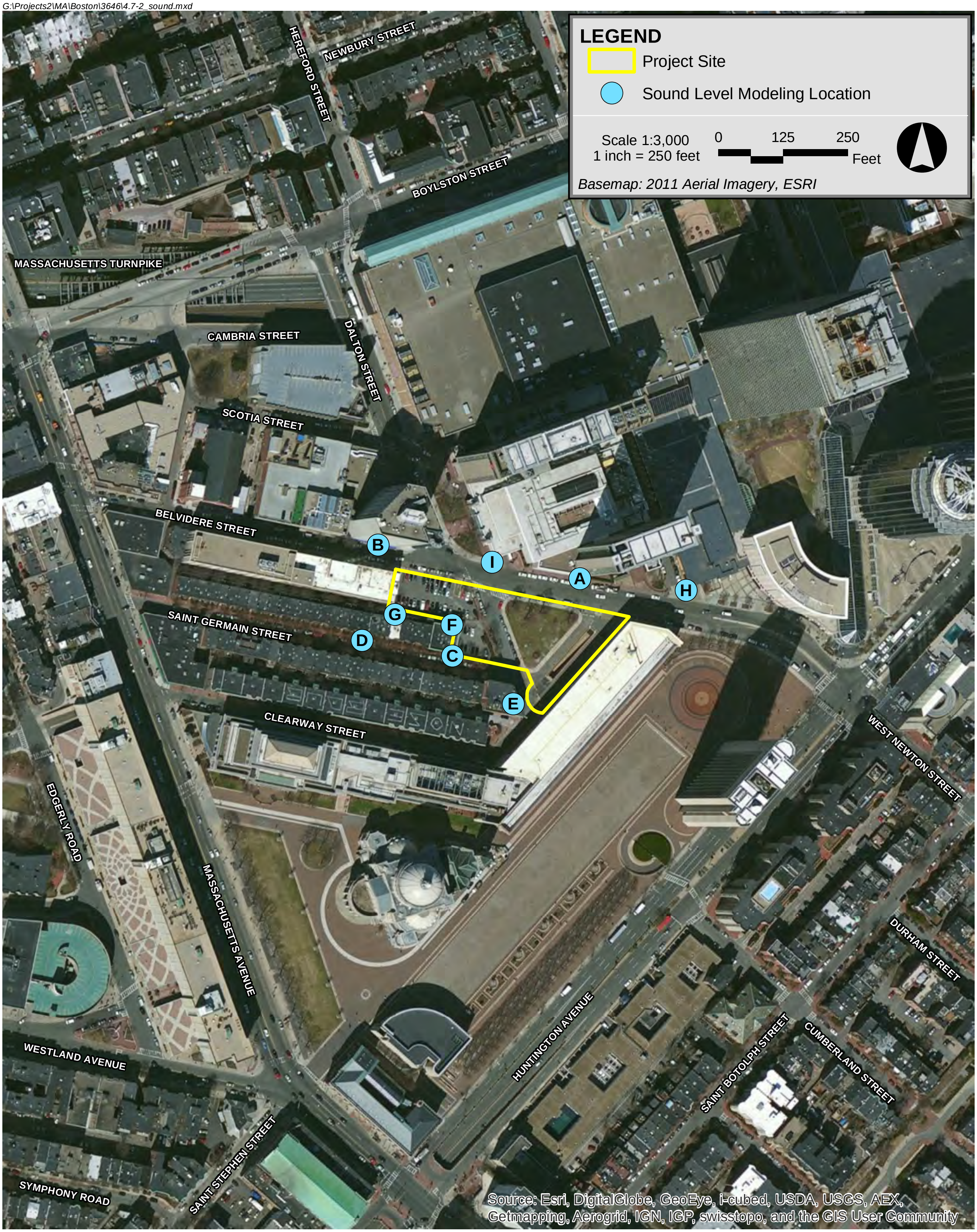


Belvidere/Dalton Project **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 4.7-2

Sound Level Modeling Locations

4.7.6.2 Future Sound Levels –Daytime

As noted above, the emergency generator will only operate during the day for brief, routine testing when the background sound levels are high, or during an interruption of power from the electrical grid. A second analysis combined noise from the Project's mechanical equipment and its emergency generator to reflect worst-case daytime conditions. The sound levels were calculated at the same receptors as in the nighttime analysis, and then were evaluated against daytime limits. Daytime ambient sound levels were incorporated where applicable.

The predicted exterior Project-Only daytime sound levels range from 44 to 47 dBA at nearby receptors. The range at residential modeling locations is 44 to 47 dBA. Predicted sound levels from Project-related equipment are within the daytime broadband and octave-band limits under the City Noise Standards at each of the modeling locations. This evaluation is presented in Table 4.7-6a. In addition, the predicted future total sound levels (Project + Background) are below the MassDEP criteria of 10 dBA over the daytime ambient sound levels (the L_{90} level) at each of the residential locations. That evaluation is presented in Table 4.7-6b. The Project's mechanical equipment is not expected to create any additional "pure-tone" conditions as defined under the MassDEP Noise Policy when combined with existing midday background sound levels. The predicted total sound levels per octave band are shown in Table 3.7-6c.

Table 4.7-6a Comparison of Future Predicted Project-Only Daytime Sound Levels to City Noise Standards

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	47	68	61	60	46	39	38	33	25	15
B	Residential	46	67	59	60	44	37	36	32	24	9
C	Residential	44	65	58	55	46	39	36	32	24	9
D	Residential	46	65	58	56	49	41	36	32	23	9
E	Residential	45	64	59	55	48	41	38	33	25	12
F	Residential	44	62	57	53	48	40	36	33	24	12
G	Residential	45	65	61	55	49	40	36	32	24	21
H	Residential	47	68	61	60	46	41	39	34	25	7
I	Residential	47	68	61	61	45	39	38	34	26	11
City of Boston Limits	Residential	60	76	75	69	62	56	50	45	40	38

Table 4.7-6b Comparison of Future Predicted Daytime Sound Levels with Existing Background – MassDEP Noise Policy

Modeling Location ID	Zoning / Land Use	Project-Generated Sound Levels (dBA)	Existing L_{90} – Daytime (dBA)	Future L_{90} – Daytime Total (dBA)[1]	Increase (dBA)[1]
A	Residential	47	59[2]	59	0
B	Residential	46	59[2]	59	0
C	Residential	44	57[2]	57	0
D	Residential	46	52[2]	53	1
E	Residential	45	57[3]	57	0
F	Residential	44	57[3]	57	0
G	Residential	45	52[4]	53	1
H	Residential	47	59[5]	59	0
I	Residential	47	59[5]	59	0

Notes:
1. Calculation performed using existing and Project sound levels rounded to one decimal place.
2. Sound levels at Modeling ID's A through D correspond to measured sound levels at monitoring locations 1 through 4.
3. Ambient sound level assumed to be comparable to Location 3.
4. Ambient sound level assumed to be comparable to Location 4.
5. Ambient sound level assumed to be comparable to Location 1

Table 4.7-6c MassDEP Noise Policy "Pure-Tone" Evaluation of Future Predicted Daytime Sound Levels

Modeling Location ID	Zoning / Land Use	Sound Level (dB) per Octave Band Center Frequency (Hz)[1]								
		31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	71	66	64	58	54	55	50	43	32
B	Residential	69	67	63	58	56	54	52	48	33
C	Residential	68	64	60	56	53	53	48	41	26
D	Residential	66	61	58	53	50	48	43	39	26
E	Residential	68	65	60	56	53	53	48	41	27
F	Residential	67	64	59	56	53	53	48	41	27
G	Residential	66	63	57	53	50	48	43	39	27
H	Residential	71	66	64	58	54	55	50	43	32
I	Residential	71	66	64	58	54	55	50	43	32

Notes:
1. Calculation performed using existing and Project sound levels rounded to one decimal place.

4.7.7 Conclusions

Baseline noise levels were measured in the vicinity of the Project during the day and at night. These levels were compared to modeled sound levels that were calculated based on information provided by the manufacturers of the expected mechanical equipment. Project-Only and future sound levels (Project + Background) were compared to applicable limits.

Predicted mechanical equipment noise levels from the Project at each receptor location, taking into account attenuation due to distance, structures, and noise-control measures, will be equal to or below the broadband requirements of City Noise Standards. When the aforementioned mitigation efforts are included, the predicted sound levels from Project-related equipment are expected to remain below 50 dBA, within the nighttime residential zoning limits for the City of Boston at the nearest residential receptors. The results indicate that the Project can operate without significant impact on the existing acoustical environment, and will result in a noise experience similar to that of a typical urban setting. In addition, the Project will comply with the MassDEP Noise Policy.

At this time, the mechanical equipment and noise controls are conceptual in nature. During the final design phase of the Project, mechanical equipment and noise controls will be specified and designed to meet the applicable broadband limit and the corresponding octave-band limits of the City Noise Standards, as well as the MassDEP Noise Policy. Additional mitigation may include the selection of quieter mechanical units, and/or the addition of acoustical louvers, screening walls, mufflers, or equipment enclosures, as needed.

4.8 Storm Drainage System

4.8.1 Existing Storm Drainage System

There are BWSC storm drains in Belvidere Street and Saint Germain Street. There are also two combined sewers beneath Dalton Street as described in the Sewer Infrastructure section above. East of Dalton Street, there is a 42-inch BWSC storm drain beneath the north side of Belvidere Street and a 54-inch BWSC storm drain main beneath the south side of Belvidere Street. The 54-inch storm drain is located in an easement which runs through the Project site. West of Dalton Street, there is an 18-inch storm drain on the north side of Belvidere Street. There is a 12-inch BWSC storm drain beneath Saint Germain Street. All of the storm drains described flow into the combined sewer in Dalton Street which flows in the northerly direction.

Stormwater from the existing parking lot is collected in a closed drainage system and directed to the 18-inch BWSC storm drain in Belvidere Street. There is no existing closed drainage system on the High-rise site, stormwater runoff from the site flows to the adjacent properties and the closed drainage system in Belvidere Street and Dalton Street.

4.8.2 Proposed Storm Drainage System

The Project will increase the amount of impervious area at the site compared to the existing condition, but will maintain the existing peak rates and volumes of runoff. No significant stormwater rate or volume mitigation is anticipated.

Stormwater runoff collected from the roof of the Mid-rise will be directed to a subsurface recharge system beneath the new open space which will overflow to the 48-inch x 50-inch combined sewer in Dalton Street. Stormwater runoff collected from the High-rise will be directed across Dalton Street to the recharge system beneath the new open space. The existing BWSC storm drain system is illustrated in Figure 4.8-1

All improvements and connections to BWSC infrastructure will be reviewed as part of the Commission's 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.

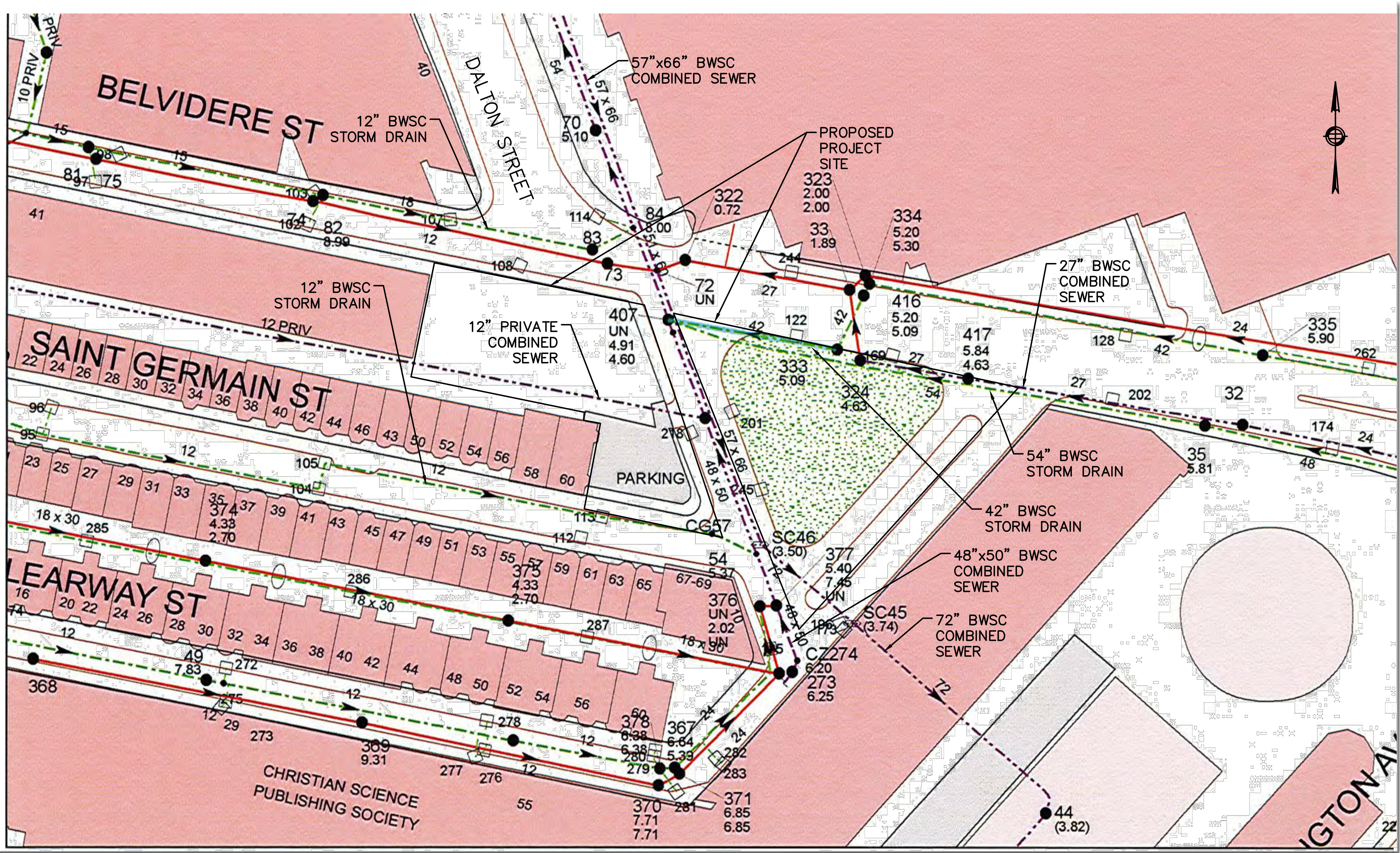
4.8.3 Water Quality Impacts

The Project will not affect the water quality of nearby water bodies. Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and BWSC storm drain systems. During construction, existing catch basins will be protected with filter fabric, hay bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until all areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

All necessary dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Proposed Project will be in compliance with all local and state stormwater management policies. See below for additional information.

4.8.4 DEP Stormwater Management Policy Standards

In March 1997, the Department of Environmental Protection DEP adopted a new Stormwater Management Policy to address non-point source pollution. In 1997, the Massachusetts DEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy, which was revised in February 2008. The Policy prescribes specific stormwater management standards for development projects, including urban pollutant removal criteria for projects that may impact environmental resource areas. Compliance is achieved through the implementation of Best Management Practices (BMPs) in the stormwater management design. The Policy is administered locally pursuant to MGL Ch. 131, s. 40.


BELVIDERE ST
DALTON STREET
SAINT GERMAIN ST
CLEARWAY ST
57"x66" BWSC COMBINED SEWER
12" BWSC STORM DRAIN
PROPOSED PROJECT SITE
12" BWSC STORM DRAIN
12" PRIVATE COMBINED SEWER
27" BWSC COMBINED SEWER
54" BWSC STORM DRAIN
42" BWSC STORM DRAIN
48"x50" BWSC COMBINED SEWER
72" BWSC COMBINED SEWER
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A brief explanation of each Policy Standard and the system compliance is provided 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 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 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 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, landscaping, parking and pedestrian areas. Any paved areas that would contribute unwanted sediments or pollutants to the existing storm drain system will be collected by deep sump, hooded catch basins and conveyed through water quality units before discharging into the BWSC 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 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 untreated stormwater to a sensitive area or any other 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 design will comply with this Standard. The Project complies with the Stormwater Management Standards as applicable to the development.

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 these projects 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 associated with the Project.

4.9 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 25025C0077G.D indicates the FEMA Flood Zone Designations for the site area. The map shows that the Project is located in a Zone X, "Areas determined to be outside the 0.2% annual chance floodplain.".

The site does not contain wetlands.

4.10 Geotechnical Impacts

4.10.1 Subsurface Soil and Bedrock Conditions

Available subsurface data and geologic information was collected for the site to define existing subsurface soil and groundwater conditions. In general, subsurface conditions anticipated in order of increasing depth below ground surface are comprised of approximately 10 ft of miscellaneous fill, over 7 ft of relatively soft organic silt and peat. Naturally deposited sand is present approximately 17 ft below grade and is 18 ft thick. The clay unit is comparatively thick (up to 130 ft) and is underlain by relatively thin (up to 2 ft thick) glacial till deposits. Bedrock is anticipated to be encountered at approximately 155 to 165 ft below the ground surface

4.10.2 Groundwater

Groundwater levels in the project area measured during the past approximately six years from observation wells monitored and published by the Boston Groundwater Trust (BGwT) range from about El. 2.2 to El. 8.2 Boston City Base (BCB) datum.

4.10.3 Project Impacts and Foundation Considerations

Proposed Foundation Construction Methodology

The proposed site development includes construction of a High-rise building on Lot #1A, which will include three levels of below grade space. Lot # 2 will be developed as a Mid-rise building with two levels of below grade space. Lot #1B will be developed as open space.

Column loads for the High-rise structure are expected to require deep foundations that extend into bedrock. The types of foundations being considered at this time are concrete drill shafts supported in the bedrock. The new foundations would be installed from the ground surface. The proposed Mid-rise building will likely be supported by a reinforced mat foundation bearing in the marine clay stratum or by deep foundations extending to the underlying glacial till or bedrock.

Construction of both buildings will require an excavation extending to the depth required for below grade construction. For the High-rise building depth of excavation will be 45 ft below ground surface (approximately El. -31 BCB). For the Mid-rise building depth of excavation will be in the range of 25 to 30 feet. For both buildings, it is anticipated that the excavation will terminate within the marine clay deposit. A lateral earth support system will be installed prior to excavation to provide excavation support during construction, to limit impacts to adjacent properties, control groundwater seepage, and maintain groundwater levels outside the excavation. Although the wall system has not been selected, it will likely consist of a reinforced concrete diaphragm wall ("slurry wall") installed into the clay stratum. This relatively impervious wall system is commonly used on projects of similar magnitude in the Boston area.

Due to the depth of excavation, temporary lateral bracing of the walls will be required and will probably consist of an internal cross- lot bracing system. Pre-excavation will be required along the building perimeter to remove obstructions prior to installing the excavation support system and foundations. Any penetrations through the temporary support walls and permanent basement walls will be sealed.

Potential Impacts during Excavation and Foundation Construction

Potential impacts during excavation and foundation construction include various impacts to area. The foundation design and construction will be specified and conducted to limit potential adverse impacts, especially to adjacent structures and to groundwater levels.

The Project is located in the Groundwater Conservation Overlay District (GCOD) and will be designed and constructed to comply with the groundwater conservation standards set forth in Article 32 of the City of Boston Zoning Code. In accordance with the approved Master Plan, a written determination from the Boston Water and Sewer Commission will be obtained to evidence compliance with water standards. As described above, the Proponent expects to slurry wall installed into clay to seal the excavation and protect groundwater levels. The lowest floor level for the Proposed Project is planned to be at El. -31 which is about 37 feet below the average measured groundwater level for the area.

4.11 Construction Impacts

4.11.1 Introduction

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

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

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

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

4.11.2 Construction Methodology/Public Safety

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

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

4.11.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in early 2014 and last for approximately 36 months.

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

4.11.4 Construction Staging/Access

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

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

4.11.5 Construction Mitigation

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

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

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

4.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 1,000- 1,200 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 50% of the total employee work hours be for Boston residents, at least 25% of total employee work hours be for minorities and at least 10% of the total employee work hours be for women. The Proponent will enter into jobs agreements with the City of Boston.

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

4.11.7 Construction Truck Routes and Deliveries

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

"No Idling" signs will be included at the loading, delivery, pick-up and drop-off areas.

4.11.8 Construction Air Quality

Short-term air quality impacts from fugitive dust may be expected during demolition, excavation and the early phases of construction. Plans for controlling fugitive dust during demolition, excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks. The construction contract will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts, pursuant to this Article 80 approval. 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.

4.11.9 Construction Noise

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

Mitigation measures are expected to include:

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

4.11.10 Construction Vibration

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

4.11.11 Construction Waste

The Proponent will take an active role with regard to the reprocessing and recycling of construction waste. The disposal contract will include specific requirements that will ensure that construction procedures allow for the necessary segregation, reprocessing, reuse and recycling of materials when possible. 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. Construction will be conducted so that materials that may be recycled are segregated from those materials not recyclable to enable disposal at an approved solid waste facility.

4.11.12 Protection of Utilities

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

4.11.13 Rodent Control

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

4.11.14 Wildlife Habitat

The Project Site is in an established urban neighborhood. There are no wildlife habitats in or adjacent to the Project Site.

Section 5.0

Sustainable Design and Climate Change Preparedness

5.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

5.1 Sustainable Design

To comply with Article 37 of the Code, the Proponent intends to measure the results of their sustainability initiatives using the framework of the Leadership in Energy and Environmental Design (LEED) rating system. As new construction for hotel, residential, retail and restaurant uses, the Project will use the LEED V3 NC 2009 (New Construction) for both the High-rise and the Mid-rise to show compliance with Article 37. The LEED rating system tracks the sustainable features of a project by achieving points in the following categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Innovation in Design.

LEED checklists for the High-rise and the Mid-rise are included in Appendix D, and show the credits each building anticipates achieving. The checklists will be updated regularly as the design develops and engineering assumptions are substantiated. Presently, the High-rise is targeted as being of LEED Gold Certified design standards at 64 points, and the Mid-rise is targeted as being of LEED Silver Certified design standards at 58 points.

Sustainable Sites

SS Prerequisite 1, Construction Activity Pollution Prevention: An erosion and sedimentation control plan will be created and implemented to reduce pollution from construction activity.

SS Credit 1, Site Selection: The Project site was chosen strategically due to its urban placement. The site is not prime farmland, is not habitat for species on federal or state threatened or endangered lists, not located within 100 feet of wetlands, or public parkland.

SS Credit 2, Development Density and Community Connectivity: The Project site is in a densely urban area, located within walking distance to cultural, institutional and shopping centers.

SS Credit 4.1, Alternative Transportation- Public Transportation Access: The Project site is located near several heavily served mass transit stops, including the Prudential Station on the MBTA Green Line, and the Back Bay Commuter Rail Station.

SS Credit 4.2, Alternative Transportation- Bicycle Storage and Changing Rooms: To encourage bicycle commuting, secure bike racks accommodating a minimum of 5% of occupants are located within 200 feet of the building. In the High-rise building, a shower and changing facility will be available. In the Mid-rise building, there will be staff showers.

SS Credit 4.4, Alternative Transportation- Parking Capacity: Parking capacity will meet but not exceed minimum local zoning requirements to help in reducing private automobile use.

SS Credits 6.1 and 6.2, Stormwater Design- Quantity Control and Quantity Control: A stormwater management plan will be developed that ensures that the post-development stormwater discharge does not exceed the existing rates and incorporates best management practices for water treatment. The stormwater management plans also addresses the removal of at least 80% of suspended solids in the runoff from the site.

SS Credits 7.1 and 7.2, Heat Island Effect- Non-roof and Roof: The Project will use several strategies for at least 50% of the hardscape and 75% of the roof, including: providing shade from trees, providing shade from architecture features that maximize solar reflectance, using hardscape and roofing materials that maximize solar reflectance, and using pervious pavement systems when appropriate.

SS Credit 8, Light Pollution Reduction: The Project's non-emergency interior lighting visible from the exterior will either be shielded or powered off for the hours of 11:00 p.m. to 5:00 a.m., and exterior lighting will include lighting areas only for safety and comfort. Lighting power densities will not exceed ANSI/ASHRAE/IESNA Standard 90.1-2007.

Water Efficiency

WE Prerequisite 1 and Credit 3, Water Use Reduction: The Project will have a rigorous goal of 30% water use reduction from the LEED calculated baseline through proper fixture selection and procurement, going beyond the industry best practice of 20% below the baseline.

WE Credit 1, Water Efficient Landscaping: Potable water reductions will be achieved through the plant species, density and microclimate factor, and irrigation efficiency opportunities will be explored.

Energy and Atmosphere

EA Prerequisite 1 and Credit 3, Commissioning of Building Energy Systems: In compliance with industry best practices, both prerequisite and enhanced commissioning process will occur with these buildings. An independent commissioning agent with documented commissioning authority experience will conduct a design review of the building energy systems before, during and after the construction process, including the review of contractor submittals in parallel with the design architect and engineer. A commissioning agent will later develop a systems manual that provides future operating staff the information needed to understand and optimally operate the building energy system and will review with staff and occupants within 10 months after the building's substantial completion.

EA Prerequisite 2 and Credit 1, Energy Performance: Through whole building energy model simulation, the Project will demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating.

EA Prerequisite 3 and Credit 4, Refrigerant Management: Refrigerant management to minimize the negative impacts on ozone depletion and climate change will use all of the following strategies to reduce dangerous refrigerant leakage to the environment:

- Designing buildings that do not rely on chemical refrigerants.
- Designing HVAC&R equipment that uses energy efficiently.
- Selecting refrigerants with zero or low ozone depleting potential (ODP) and minimal direct global warming potential (GWP).
- Maintaining HVAC&R equipment to reduce refrigerant leakage to the environment.

EA Credit 5, Measurement and Verification: An M&V plan will be developed and implemented consistent with Option D: Calibrated Simulation (Savings Estimation Method 2) as specified by the International Performance Measurement & Verification Protocol (IPMVP).

Materials and Resources

MR Prerequisite 1, Storage and Collection of Recyclables: A dedicated recyclables storage and collection program will facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

MR Credit 2, Construction Waste Management: The project will implement a construction waste management plan with a goal to divert at least 75% of construction-related debris by volume from landfills. This plan includes redirecting recyclable recovered resources back to the manufacturing process and reusable materials to appropriate sites.

MR Credit 4, Recycled Content: The Project will aim to use recycled materials for at least 10% of the construction materials by cost.

MR Credit 5, Regional Materials: The Project will aim to include regional materials for at least 40% of the construction materials by cost.

MR Credit 7, Certified Wood: At least 50% of the wood-based materials used for the Project will be wood that is certified in accordance with the Forest Stewardship Council's principles and criteria for wood building components.

Indoor Environmental Quality

IEQ Prerequisite 1 and Credit 2, Indoor Air Quality Performance and Increased Ventilation: All occupied spaces will have increased breathing zone outdoor air ventilation rates by at least 30% above the minimum rates required by ASHRAE Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality. Mechanical ventilation systems will be designed using the ventilation rate procedure or the applicable local code, whichever is more stringent.

IEQ Prerequisite 2, Environmental Tobacco Smoke (ETS) Control: The Project will comply with this prerequisite, either by prohibiting smoking or, for the residential units, via the measures laid out in Case 2, which include prohibiting smoking in common areas, the installation of weather-stripping on exterior and windows, and other measures to minimize uncontrolled pathways for ETS.

IEQ Credit 1, Outdoor Air Delivery Monitoring: CO2 concentrations will be monitored within all densely occupied spaces (those with a design occupant density of 25 people or more per 1,000 square feet). CO2 monitors must be between 3 and 6 feet above the floor.

IEQ Credits 3.1 and 3.2, Construction IAQ Management Plan- During Construction and Before Occupancy: To reduce the introduction of potentially negative effects of the construction process on indoor air quality, the construction team will meet or exceed the recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association IAQ Guidelines for Occupied Buildings Under Construction. In addition, absorptive materials stored on-site and installed will be protected from moisture damage.

IEQ Credits 4.1-4.4, Low-Emitting Materials: By using low-emitting materials the Project will significantly reduce odorous, irritating and/or harmful indoor air contaminants.

IEQ Credit 5, Indoor Chemical and Pollutant Source Control: To reduce or mitigate human contact with airborne chemicals and particles, permanent entryway systems such as walk-off mats will be installed to capture dirt and particulates entering the building. In addition, spaces where hazardous gases or chemicals may be present such as a copying or printing room will be properly exhausted.

IEQ Credit 6.1, Controllability of Systems-lighting: Providing individual controls for lighting increases occupants' comfort by enabling them to adjust the workspace to their individual needs. Individual controls will allow for multiple lighting possibilities in meeting spaces– lighting for specific tasks, general overhead lighting, and lighting with consideration for A/V needs, and lecture style lighting with emphasis on the learning walls or presentation screens, for example.

IEQ Credit 6.2, Controllability of Systems- Thermal Comfort: The Project will provide individual comfort controls for at least 50% of the building occupants in workspace locations (e.g. private offices, open plan workstations, reception stations, ticket booths, etc.) to enable adjustments. In multi-occupant spaces where groups congregate, there will be at least one accessible means of control over thermal comfort in the space.

IEQ Credit 7.1, Thermal Comfort- Design: As a result, the design HVAC systems and the building envelope will meet the requirements of ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy, Section 6.1.1.

IEQ Credit 7.2, Thermal Comfort- Verification: To satisfy the LEED requirements, the operating staff will participate in a thermal comfort survey of building occupants within 6 to 18 months after occupancy.

IEQ Credits 8.1 and 8.2, Daylight and Views: To achieve the first credit, the Project may potentially provide building occupants with a connection between indoor spaces and the outdoors through the introduction of daylit views into at least 75% of regularly occupied areas. To achieve the second credit, the Project will provide a direct line of sight to the outdoor environment via vision glazing between 30 inches and 90 inches above the finish floor for building occupants in 90% of all regularly occupied areas.

Innovation in Design

ID Credit 2, LEED Accredited Professional: The Project team includes at least one LEED Accredited Professional.

Regional Priority

The Project anticipates that several points will be achieved in the Regional Priority category.

1. Regional Priority – SS Credit 6.1, Stormwater Design- Quantity Control and Quality Control
2. Regional Priority – SS Credit 7.1, Heat Island Effect- Non-roof
3. Regional Priority – SS Credit 7.2, Heat Island Effect- Roof

5.2 Climate Change Preparedness

The Proponent understands that the City of Boston is especially interested in the adaptability of the city to long-term climate change. This interest has been manifested already by the Mayor's Executive Order Relative to Climate Change in Boston and the recent convening of the Mayor's Climate Action Leadership Committee.

In general, the Proposed Project team examined three areas of concern related to climate change: sea level rise, drought conditions, and increased number of high-heat days and higher cost of energy.

The BRA recently began asking project proponents to complete an on-line questionnaire regarding their project's climate change preparedness. Copies of the completed questionnaire for both the High-rise and the Mid-rise are included in Appendix E. Given the preliminary level of design, the responses are also preliminary and may be updated as the Project design progresses.

5.2.1 Sea Level Rise

According to the Intergovernmental Panel on Climate Change (IPCC), if sea level continues to rise at the current rate, the sea level in Massachusetts as a whole will rise by one foot by the year 2100. However, using a high emissions scenario, sea level rise could reach six feet[1]. According to The Boston Harbor Association's Seal-level Rise Maps, the Project site would not be impacted by a rise in sea level of up to five feet. The Proponent has not taken any special precautions to protect against sea level rise.

5.2.2 Drought Conditions

As described in Section 5.1 Water Efficiency, the Proposed Project will employ steps to greatly reduce water consumption and is targeting a 30 percent reduction compared to the baseline case. Further, Project landscaping will be designed to require as little water as practicable. While these measures will not protect against a regional drought, they will incrementally lessen demand on the MWRA system. If similar water conservation measures were to be widely adopted throughout the MWRA's service area, it could potentially make drought conditions more tolerable by making water supplies able to last longer.

5.2.3 High Heat Days and Cost of Energy

The IPCC has predicted that in Massachusetts, the number of days with temperatures greater than 90°F will increase from five to twenty. To prepare for this, when possible the Project will provide shade from trees; provide shade from architecture features that maximize solar reflectance, use hardscape and roofing materials that maximize solar reflectance, and use pervious pavement systems in order to reduce the heat island effect of urban development. In addition all residential units will have operable windows to allow for natural cooling.

Energy modeling for the Project's two buildings has not yet been completed; however, as indicated on the LEED Checklist, the Proponent will strive to reduce the Project's overall energy demand and GHG emissions that contribute to global warming. The Project's proposed TDM program described in Section 3.5 will also help to lessen fossil fuel consumption.

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[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.

Section 6.0

Urban Design

6.0 URBAN DESIGN

The Project site is located along the "High Spine" that includes both the Hancock Building and the Prudential Center. The Project site also sits on the far northern edge of the Christian Science Plaza, one of Boston's most cherished and venerable landmarks. The Plaza's skillfully-scaled building and plaza elements form a singular composition that is grand in its vision and impressive in its execution, providing the City with a majestic urban experience. Each building within the complex is exquisite in its individual architectural approach, proportions and detailing, resulting in a classically modernist expression of the late twenty century. Pei, Cobb, Freed & Partners, the architects of the Plaza, created for the Church an architectural masterpiece in Boston.

In order to produce a design that compliments the existing Christian Science Plaza, the Proponent has engaged as one of its collaborating architects Henry Cobb of Pei, Cobb, Freed & Partners. Mr. Cobb is a contemporary of, and partners with, Araldo Cosutta, who designed the Plaza. Mr. Cobb is also notable for his past work in Boston, which includes the Hancock Building in the Back Bay and the Moakley Courthouse in the Seaport.

The Proposed Project, which consists of a High-rise and Mid-rise building, has been designed so that these new components will enhance and elevate the Belvidere and Dalton streetscape to a design stature equaling the Christian Science Center itself. The new structures will bring forth architecture that is of "this time", with continued emphasis on architectural proportion and elegance of detail, while combining sustainable design practices and an overall commitment to enhancing the pedestrian experience in this important area of Boston.

The buildings are designed to blend well with the existing ensemble of buildings and open space, and work harmoniously with the surrounding areas. The proposal adds height to the High-rise building (as compared to the Plaza Revitalization Plan), bringing it more into proportion with its high rise environment, addressing not just the Prudential Tower, but even the Hancock Tower, expanding the grouping of tall buildings on the city skyline. See Figure 6-1 for an aerial perspective of the Proposed Project.

At the larger urban scale, the Project represents the harmonization of the Christian Science Center precinct and the Boston high spine. The Christian Science Center precinct is an equilateral triangle formed by Huntington Avenue to the southeast, Massachusetts Avenue to the southwest, and Belvedere Street to the north. The High-rise parcel is also triangular in shape, and thus consistent with the overall geometries of the Christian Science Center precinct. To maintain this geometry, the High-rise has evolved as a "soft" triangular shape that extends up 56 stories. The Mid-rise follows a more rectilinear form for its 25 stories. The Boston high spine includes all of the buildings within the Prudential Center area, which is adjacent to the site, and extends further east to the Hancock Tower and beyond.

Belvidere/Dalton Project   Boston, Massachusetts

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Figure 6-1
Site Aerial View

The lower register of each building is designed to form a pedestrian-scaled experience that deliberately transforms the scale, materiality and expression of the buildings. Each of the buildings' entries face a new public open space, thus creating a new street experience within the context of the larger urban experience.

The High-rise Building

The proposed High-rise shape is derived from the equilateral triangle, softened by gently-curved sides and rounded corners. The resulting High-rise form complements without competing with the Mother Church, while its eastern face appropriately aligns with the orientation of the Reflecting Pool and the buildings that frame it. Thus the new High-rise, results in a smooth transition from the adjoining Prudential Center to the landmarked Christian Science Plaza.

The High-rise is based in a podium approximating the 67-foot height of the Plaza's Colonnade Building where it faces that building. The podium's volume will be articulated in such a way as to interact vigorously with the High-rise, so that the latter is seen to rise gracefully from the ground rather than awkwardly from the podium roof. The podium's masonry and glass exterior is enlivened by generous street-level entries and upper-level openings that celebrate the quasi-public spaces within, while relating harmoniously to the adjoining residential neighborhood. The new High-rise will be a welcome enrichment of the urban scene. See Figures 6-2 through 6-4 for ground level perspectives of the High-rise.

The Mid-rise Building

The Mid-rise building presents itself within the City as an integral part of the urban fabric on Dalton Street and Belvidere Street. This building is a pivot point for the project, anchoring the development at the intersection of Belvidere and Dalton Streets, and representing the last and furthest development of the Plaza and Christian Science precinct. The scale of the Mid-rise is much reduced from the High-rise component to match that of its adjacent neighbors, notably the Hilton and Sheraton towers. The scale of this building will also respect the surrounding, lower residential blocks comprised of the handsomely scaled buildings on Saint Germain, Clearway and Belvidere Streets.

The ground floor along Belvidere Street nominally aligns with the existing street wall to the west and emphasizes the continuation of the street pedestrian circulation and view corridor. The facades of this building are varied, with the north façade above this level shaped to follow the motion of the curved intersection at Belvidere and Dalton Streets. The curve also resembles, and retains a balance with its neighboring High-rise. The south and west faces of the building are derivative of the rectilinear geometries of the surrounding city blocks, and thus they present themselves as coplanar. This opens the possibility for a change in materials, color and texture of the building facades, which in turn creates interest as the building is viewed from differing points. See Figures 6-5 and 6-6 for ground level perspectives of the Mid-rise.

Belvidere/Dalton Project   Boston, Massachusetts

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Figure 6-2
High-Rise Podium Looking From The East

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Figure 6-3

High-Rise Residential Drop-off and Entrance

Belvidere/Dalton Project Boston, Massachusetts

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Figure 6-4

High-Rise Hotel Drop-off and Entrance on Dalton Street

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Figure 6-5

Mid-Rise Looking West Down Belvidere Street

Figure 6-6
View Looking South On Dalton Street

Like the High-rise, the Mid-rise residential building is prominently positioned to interact with the new public open space at the intersection of Saint Germain and Dalton Streets. The lobby of the Mid-rise will open directly onto the new open space.

As with all civic minded developments, the Mid-rise and the High-rise buildings both seek to create a harmonious urban environment, one that creates exquisite architecture that engages with pedestrians and invites them to participate, and that establishes a new defined "place" for hospitality, living, and entertaining within the City of Boston.

Development Plan

The proposed Belvidere and Dalton Street buildings will contain new uses combining a hotel, residences and restaurants that will enhance the surrounding streets with increased pedestrian activity and life. A full-service luxury hotel will occupy the High-rise on Belvidere Street, with residential condominium units in the upper floors. The Mid-rise building will contain luxury rental housing.

The High-rise, with its gently curved triangular form includes the Project's hotel component in the lower register of the building and condominium residences above. Restaurants, lobbies and service access are strategically arranged at the base of the building to optimize pedestrian and vehicular access in an effortless and graceful manner. A café along Belvidere Street is designed to spill out onto the sidewalk to enliven the street edge, while the two lobbies, one for the hotel and one for the residences, have their primary entry facing onto Dalton Street, away from the traffic of Belvidere. The ground floor of the building is porous to the extent that it is mostly public, with access to the hotel lobby and the café and restaurant amenities.

The Mid-rise building has also been shaped with a gentle curving façade facing Belvidere Street, in the same spirit as the High-rise geometries. Retail space will be located along Belvidere Street to help in enlivening that streetscape.

The arrival experience to the development will be effortless, with pedestrians, motorists and taxis accommodated in a graceful manner that does not mar the streetscape or become an impediment to pedestrians. Service and parking entries will be discreet.

At the lobby level, the two new buildings present themselves and their front doors graciously to the residential neighborhoods of Saint Germain and Clearwater Streets. The new open space becomes the important centerpiece and focal point for the pedestrian environment created by the surrounding High rise and the Mid-rise buildings and the existing neighborhood, all of which comprise this new development.

The new buildings will not diminish or overwhelm the beautiful residential neighborhoods near the site. The proposed open space is an important element in this transition between old and new. Its design will define the urban character of the development at the ground plane, while respecting the surrounding neighborhoods.

This site is in a pivotal and important location. It calls for an iconic architectural solution that embraces the architecture of the Christian Science Center, while also establishing an architectural character that is forward looking for this century.

Section 7.0

Historic and Archaeological Resources

7.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This section describes the historic and archaeological resources within and in the vicinity of the Project site.

7.1 Historic Resources

No historic resources are located within the Project site. The Project site is located adjacent to the Christian Science Center Complex, a Boston Landmark that is listed in the State Register of Historic Places. The Project site is also located in the vicinity of several historic resources listed in the State and National Registers of Historic Places and included in the Inventory of Historic and Archaeological Assets of the Commonwealth. Figure 7-1 and Table 7-1 identify historic resources within ¼ mile of the Project site.

Table 7-1 Historic Resources in Vicinity of Project Site

Listed in the National Register of Historic Places		
Map No	Name	Address
A	Horticultural Hall	300 Massachusetts Avenue
B	Symphony Hall (also a NHL)	301 Massachusetts Avenue
C	The New Riding Club	52 Hemenway Street
D	Fenway-Boylston Historic District	Boylston, Westland and Hemenway Streets
E	Back Bay Historic District	Arlington, Providence, St. James, Exeter and Boylston Streets, Charlesgate East and the Charles River
F	Saint Botolph Street Area (NRDOE)	Blackwood, Cumberland, Durham, Follen, Saint Botolph and West Newton Streets
G	South End District	Penn Central Railroad, Massachusetts and Harrison Avenues and East Berkeley and Tremont Streets
Listed in the State Register of Historic Places as Local Landmarks		
E	Back Bay Architectural District	Back Street, Embankment Road and Arlington, Boylston and Charlesgate East
G	South End Landmark District	Penn Central Railroad, Camden Street, Harrison Avenue and East Berkeley and Tremont Streets
H	Christian Science Center Complex	Huntington Avenue, Horticultural Hall, Massachusetts Avenue, Clearway, Dalton and Belvidere Streets
F	Saint Botolph Street Area Architectural Conservation District (LL, NRDOE)	Harcourt Street, Penn Central Railroad. Alley north of Massachusetts Avenue and alley east of Huntington Avenue

Table 7-1 Historic Resources in Vicinity of Project Site (Continued)

Included in the Inventory of Historic and Archaeological Assets of the Commonwealth		
1	Saint Germain Street	8, 10, 12, 14-59, 61, 63, 65 St. Germain Street
2	Henry M Whitney Row House	28-56 St. Stephen Street
3	Jesse Tirrell Row House	3-22 Symphony Road
4	David Thomas Apartment Building	25 St. Stephen Street
5	Hemenway Chambers – Hotel Hemenway	91 Westland Avenue
6	A.J. Bawford Store	58 Burbank Street
7	John P. Webber Row Houses	12-30 Edgerly Road
8	Saint Cecilia Roman Catholic Church	14-18 Belvidere Street
9	State Street Trust Company Building	130-132 Massachusetts Avenue
10	Fenway Theater	136 Massachusetts Avenue
11	William Smith Row House	179-181 Massachusetts Avenue

A portion of the Project site is identified in the Christian Science Complex Study Report prepared by the Boston Landmarks Commission as "Triangle Park." The site was once a larger triangle of land lined with rowhouses. The site is currently an open turf area with some deciduous trees. Although identified in the Study Report, "Triangle Park" is not part of the Christian Science Center Complex Landmark District. The Study Report also envisioned construction of a new tower on the "Triangle Park" and nearby Belvidere Street parcel.

7.2 Archaeological Resources

The Proposed Project is located on filled land which has been previously disturbed by prior construction. No previously identified archaeological resources are located within the Project site. No impacts to archaeological resources are anticipated.

7.3 Visual Impacts to Historic Resources

The Proposed Project is situated adjacent to the Christian Science Center Complex. Due to their height, the proposed new buildings will be visible from nearby historic resources. The new construction will serve as an intermediately-scaled structure in the context of the taller Prudential and Hancock towers. The base of the buildings both feature strong bases of varied materials. By creating a heavier base, the lower portions of the buildings will relate to the nearby lower-scale masonry structures within the Christian Science Center Complex and the rowhouses on Saint Germain Street. The ground level will also be activated by pedestrian scale entrances and storefronts and sidewalks to connect directly to the pedestrian scale of Belvidere and Saint Germain Streets. It is expected that the taller portions of the High-Rise Building will be largely constructed of glass, giving it a lighter feeling, and will relate directly with the Prudential Building and Hancock towers in the Boston skyline.

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Belvidere/Dalton Project **Boston, Massachusetts**

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Figure 7-1
Historic Resources

7.4 Shadow Impacts to Historic Resources

Limited new shadow from the Project will fall on historic resources in the vicinity of the Project site. Although new shadow will be created by the Project, most impacts are during periods where surrounding properties and districts are already in shadow. As a result, shadow impacts on historic resources are anticipated to be minimal.

New shadow cast by the Project at the Spring and Autumnal Equinox is limited to rooftop shadow on Saint Cecilia's Church and the Fenway Theater at 9:00AM. Minor new shadow will occur on the rooftops in the Saint Botolph Street Area at 6:00PM, however, the area is already largely in shadow. At 9:00AM on the Summer Solstice, new shadow is limited to shadow on the rooftops of buildings on the north side of Saint Germain Street, however, these shadows are fleeting and are gone by 12:00PM. New shadow is also cast on the ground and rooftops of buildings in the Saint Botolph Street Area and in the South End District at 6:00PM, however, most of these areas are already in shadow. During the Winter Solstice, new shadow is cast on the ground and rooftops of buildings in the Back Bay Historic District at 9:00AM when much of the District is already in shadow. By 12:00PM, the shadow is reduced to the rooftops of few buildings on Newbury Street between Fairfield and Gloucester Streets.

7.5 Consistency with State and Federal Regulatory Requirements

The Proposed Project is subject to State Register Review by the Massachusetts Historical Commission (MHC). A MHC Project Notification Form will be submitted to initiate the review. The proponent will coordinate review of the Project with the Boston Landmarks Commission.

Section 8.0

Infrastructure

8.0 INFRASTRUCTURE

This chapter outlines the existing utilities surrounding the Project site, the proposed connections required to provide service to the Proposed Project, and any impacts on the existing utility systems that may result from the construction of the Project. Impacts to sewer, water supply, fire protection, electricity, natural gas, and telecommunications are also discussed.

8.1 Wastewater

8.1.1 Existing Sewer System

There are existing Boston Water and Sewer Commission (BWSC) sanitary sewer mains located in Belvidere Street, Dalton Street and Saint Germain Street adjacent to the Project site. There are two BWSC combined sewers beneath Dalton Street. There is a 57-inch x 66-inch combined sewer that transitions into a 72-inch combined sewer and flows in a southerly direction, and a 48-inch x 50-inch which increases to a 51 inch x 60 inch and to a 54 inch diameter round line which flows in a northerly direction. There is a 12-inch BWSC sanitary sewer main beneath Belvidere Street west of Dalton Street. This sanitary sewer main flows into the 51-inch x 60-inch combined sewer beneath Dalton Street. In Belvidere Street east of Dalton Street, there is a 24-inch sanitary sewer beneath the northerly side of the street and a 27-inch combined sewer beneath the southerly side of the Street. Both of these sewers flow into a 27-inch sanitary sewer which flows into the 51-inch x 60-inch combined sewer beneath Dalton Street. There is a 12-inch private combined sewer which runs beneath the alley between Belvidere Street and Saint Germain Street, passing through the Project site and connecting to the 48-inch x 50-inch combined sewer beneath Dalton Street.

The BWSC combined sewer flowing in a southerly direction flows through private property, down Saint Stephen's Street and to the Boston Main Interceptor beneath Gainsborough Street. The Boston Main Interceptor ultimately flows to the MWRA Deer Island Waste Water Treatment Plan for treatment and disposal. The BWSC combined sewer which flows in the northerly direction flows up Dalton Street and Hereford Street. At the intersection of Hereford Street and Beacon Street, the main is directed either into the combined sewer which flows in a southerly direction described above, or, during times of high flow, to a Combined Sewer Overflow that directs flow into the Charles River.

There are currently no sewer services at the Project site. The existing sewer system is illustrated in Figure 8-1.

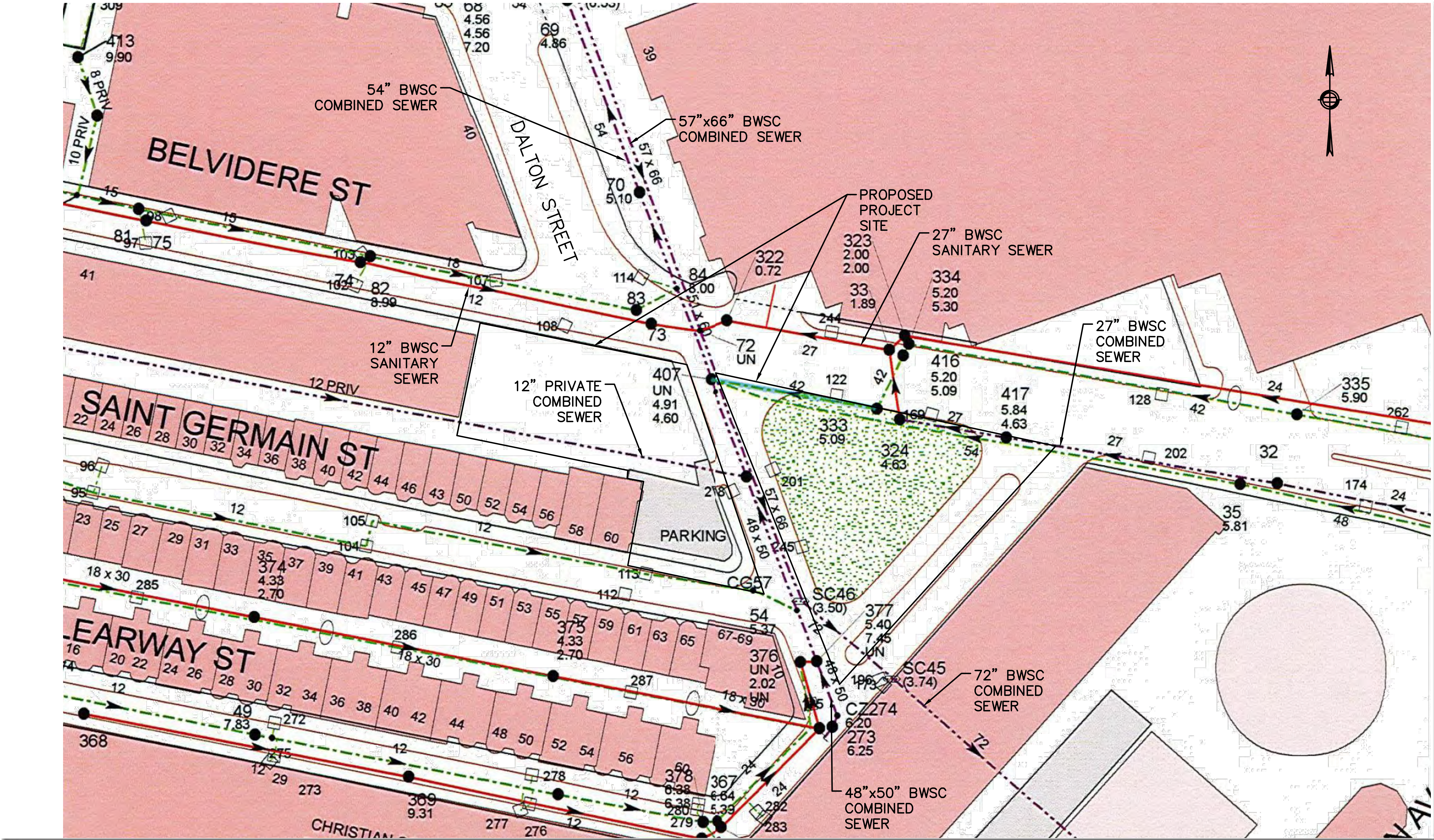

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Figure 8-1

Existing Sewer System

8.1.2 *Project-Generated Sanitary Sewer Flow*

The Project's sewage generation rates were estimated using the Massachusetts Division of Water Pollution Control Sewer System Extension and Connection Permit Program at 314 CMR 07.00. 314 CMR 07.00 lists typical generation values for the sources listed in Table 8-1 for the High-rise building, and Table 8-2 for the Mid-rise building. Typical generation values are generally conservative values for estimating the sewage flows from new construction. 314 CMR 07.00 sewage generation values are used to evaluate new sewage flows or the increase in flows to existing connections. Tables 8-1 and 8-2 describe the increased sewage generation due to the Proposed Project.

Table 8-1 Projected Sanitary Sewer Flows: High-rise

Use	Program	Generation Rate	Total Flow (GPD)
Residential	425 bedrooms	110 gpd/ bedroom	46,750
Hotel	250 rooms	110 gpd/ room	27,500
Food Service	320 seats	35 gpd/ room	11,200
o Restaurant	140 seats		
o Cafe	85 seats		
o Breakfast Room	95 seats		
Meeting Rooms	310 seats	3 gpd/ seat	930
Function Areas	225 seats	15 gpd/ seat	3,375
Ballroom	140 seats		
Junior Ballroom	85 seats		
Building Amenities			
o Pool	30 people	10 gpd/ person	300
o Spa	3,021 sf	100 gpd/ 1,000 sf	302
o Fitness Center	2,452 sf	100 gpd/ 1,000 sf	245
Proposed Sewer Flows			**90,602**

Table 8-2 Projected Sanitary Sewer Flow: Mid-rise

Use	Program	Generation Rate	Total Flow (GPD)
Residential	285 bedrooms	110 gpd/ bedroom	31,350
Retail Space	1,800 sf	50 gpd/ 100 sf	90
Proposed Sewer Flows			**31,440**

The Project's impact to the existing BWSC systems in Belvidere Street and Dalton Street was analyzed. The existing sewer system capacity calculations are presented in Table 8-3.

Table 8-3 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)
417 to 324	72	4.73	4.63	0.1%	27	0.013	11.54	7.46
325 to 33	47	4.63	1.89	5.8%	27	0.013	74.78	48.33
323 to 33	15	5.20	2.00	21.3%	24	0.013	104.49	67.53
33 to 322	113	1.89	0.72	1.0%	27	0.013	31.51	20.37
64 to SC46	464	6.53	3.50	0.7%	57x66	0.013	183.56	118.64

Note: 1. Manhole numbers taken from BWSC Sewer System Map no. 22I
2. Flow Calculations based on Manning Equation
3. All pipes assumed to be vitrified clay, to be conservative
4. A conservative slope of 0.1% was assumed for Manhole 471 to 325.

8.1.3 Sanitary Sewer Connection

The sewer services for the mid-rise building are proposed to tie into the 12-inch sewer main located in Belvidere Street. The sewer services for the high-rise building are expected to tie into either the 27-inch sanitary sewer in Belvidere Street or the 57-inch x 66-inch combined sewer in Dalton Street.

The adjacent roadway sewer system in Belvidere Street and Dalton Street and potential building service connection to the sewer system was analyzed.

Results shown in Table 8-3 indicate the hydraulic capacity of the 27-inch sanitary sewer system within Belvidere Street and the 57-inch x 66-inch combined sewer system within Dalton Street near the Proposed Project. The minimum hydraulic capacity is 7.46 million gallons per day (MGD) or 11.54 cfs for the 27-inch system in Belvidere Street, and 118.64 MGD or 183.56 cfs for the 57-inch x 66-inch system in Dalton Street. Based on an average daily flow estimate for the Proposed Project of 117,264 GPD or 0.12 MGD; and with a factor of safety of 10 (total estimate = 0.12 MGD x 10 = 1.2 MGD), no capacity problems are expected within either the Belvidere Street or Dalton Street systems.

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the sewer system. The High-rise is expected to generate approximately 90,000 gallons per day, and the Mid-rise is expected to generate approximately 31,000 gallons per day. Because the net sanitary flow for the High-rise is greater than 50,000 gpd, a MassDEP Sewer Connection Permit will be required. MassDEP is currently in the process of eliminating their sewer connection permit program, and depending on the timing, the Project may not be required to submit to MassDEP, in which case approval for the net sanitary flow will come from BWSC.

All improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's site plan review process for the Project. 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.

The Proponent will also coordinate with the BWSC and the MWRA regarding the need to potentially offset the Project's increased wastewater flows via inflow/infiltration (I/I) removal. If required, any net increase in flows will be mitigated in compliance with applicable policies and regulations.

8.2 Water System

8.2.1 Existing Water Service

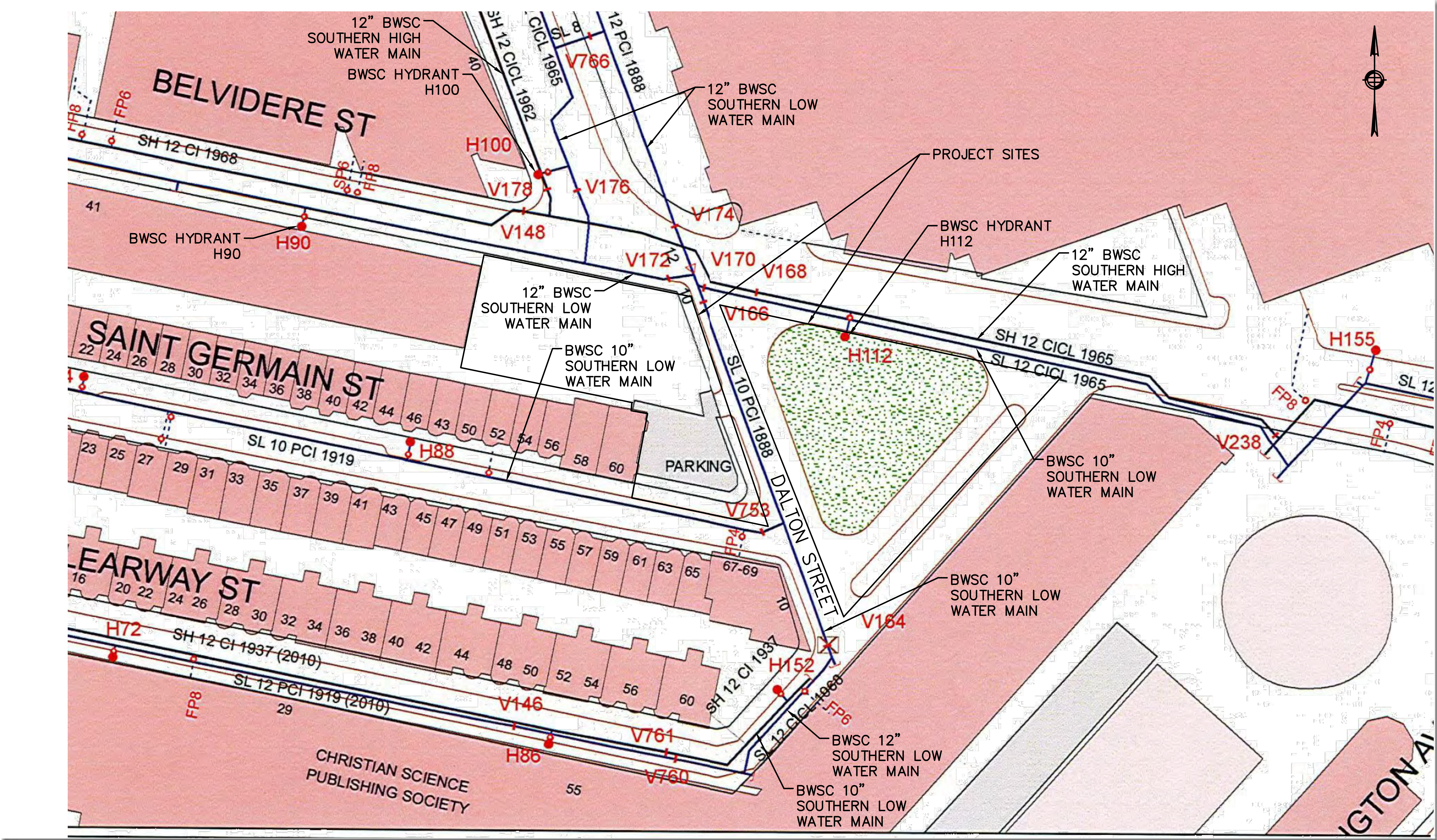
The water mains in the vicinity of the Project site are predominantly owned and maintained by the BWSC. There are five different water systems within the city, and these provide service to portions of the city based on ground surface elevation. The five systems are southern low (commonly known as low service), southern high (commonly known as high service), southern extra high, northern low, and northern high. There is a 12-inch BWSC Southern High main and a 12-inch Southern Low main beneath Belvidere Street, a 10-inch Southern Low main beneath Dalton Street, and a 10-inch Southern Low main beneath Saint Germain Street. The existing water system is illustrated in Figure 8-2.

There are currently no domestic or fire services to the Project site.

8.2.2 Anticipated Water Consumption

The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 314 CMR 07.00 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project, which is being built on an existing parking lot and an undeveloped parcel, will require approximately 122,042 gpd of domestic water. The water for the Project will be supplied by the BWSC system.

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.



Epsilon

Figure 8-2

Existing Water System

8.2.3 Proposed Water Service

BWSC record flow test data containing actual flow and pressure for a hydrant within the vicinity of the Project site was available. Additional testing has been requested, as hydrant flow data should be less than a year old to be used as a design tool. The results of the BWSC testing near the Proposed Project site are indicated in Table 8-4.

Table 8-4 Existing Hydrant Flow Data

Flow Hydrant Number	Date of Test	Static Pressure (psi)	Residual Pressure (psi)	Total Flow (gpm)	Flow (gpm) at 20 psi	Flow (gpm) at 10 psi
H152 12-inch Southern High	10/29/2008	108	80	2,456	4,558	4,831

The domestic and fire services for the Mid-rise building are proposed to connect to the 12-inch Southern High service in Belvidere Street west of Dalton Street. The domestic and fire services for the High-rise building will connect to the 12-inch Southern High in Belvidere Street east of Dalton Street.

The domestic and fire protection water service connections required by the 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.

8.2.4 Water Supply Conservation and Mitigation Measures

All efforts to reduce water consumption will be made. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed.

The State Building Code requires the use of water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand on the existing distribution system. The installation of sensor-operated sinks with water conserving aerators and sensor-operated toilets in all restrooms will be incorporated into the design plans for the Proposed Project.

8.3 Electrical Service

Electrical service for the Project will be provided by NStar. Utility owned switchgear and substation transformers will be installed for each building with underground primary and secondary cables feeding the proposed buildings. Switchgear and substation transformers will be located in electrical rooms within each building. Capacity issues are not anticipated for this project.

8.4 Natural Gas

The Project site is served by low pressure natural gas mains owned by National Grid. Both proposed buildings will have individual services that will provide energy to the building heating, cooling and water heating units. These units will be high efficiency Energy Star compliant units and will be designed to function in accordance with the LEED design criteria.

8.5 Telecommunications Systems

During the final design of the Project, the applicant will work with Verizon to determine the proper sizing and number of pairs for the conduit and cables for each building. As with other utilities, capacity is not anticipated to be an issue.

Cable television and internet services are provided by Comcast in the Project area. Each building will have service connections to these lines that will be designed by the applicant in consultation with Comcast.

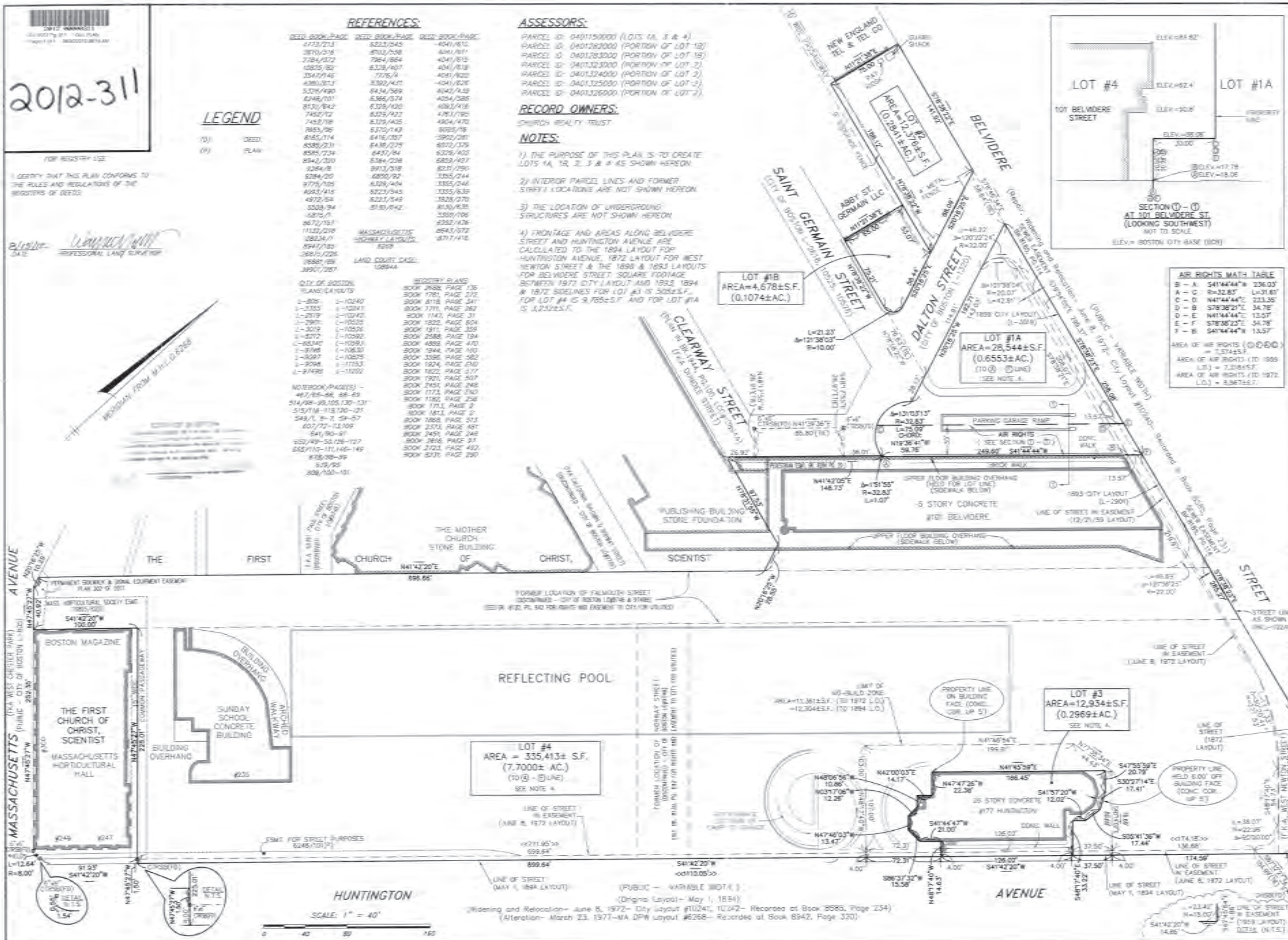
8.6 Utility Protection During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during construction. The installation of proposed utility connections within public ways will be undertaken in accordance with BWSC, the Boston Public Works Department, the Dig-Safe Program, and applicable utility company requirements. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer, and drain facilities will be reviewed by the BWSC as part of its Site Plan Review process. All necessary permits will be obtained before the commencement of work.

The Proponent will continue to work and coordinate with the BWSC and the utility companies to ensure safe and coordinated utility operations in connection with the Proposed Project.

Appendix A

Subdivision Plan



REFERENCES:

DEED BOOK/PAGE	DEED BOOK/PAGE	DEED BOOK/PAGE
4773/213	5223/545	4041/610
3810/316	8702/558	4041/611
2784/372	7964/864	4041/615
10825/82	6329/407	4041/618
3547/146	7776/4	4041/620
4380/313	5392/431	4041/626
5326/490	6434/569	4042/439
8246/101	6366/574	4054/585
8130/842	6329/420	4093/416
7452/72	6329/422	4763/795
7452/78	6329/405	4904/470
7883/96	5370/143	5095/78
8165/114	6416/357	5902/281
8585/231	6436/275	6072/379
8585/234	6437/84	6329/402
8942/320	6364/228	6859/407
9264/8	8913/518	8231/290
9284/20	6850/92	3355/244
9775/105	6329/404	3355/246
4093/416	5223/545	3355/639
4972/54	5223/549	3826/270
5508/94	8130/842	8130/835
6875/1		3556/106
8672/157		6252/426
11132/218		8643/372
10823/1		8717/416
8947/185		
26875/226		
26887/89		
38901/287		

MASSACHUSETTS HIGHWAY LAYOUTS:
6268

LAND COURT CASE:
108944

CITY OF BOSTON PLANS/LAYOUTS

L-806	L-10240
L-3355	L-10241
L-2519	L-10242
L-2901	L-10525
L-3019	L-10526
L-5212	L-10592
L-8834D	L-10593
L-9746	L-10630
L-9097	L-10675
L-9098	L-11153
L-9749B	L-11202

NOTEBOOK/PAGE(S) –
467/65–66, 68–69
514/98–99,105,130–131
515/116–118,120–121
549/1, 5–7, 54–57
607/72–73,109
641/90–91
652/49–50,126–127
665/110–111,145–149
678/38–39
515/95
809/100–101

REGISTRY PLANS
BOOK 2688, PAGE 136
BOOK 1761, PAGE 272
BOOK 8118, PAGE 341
BOOK 7711, PAGE 262
BOOK 1147, PAGE 31
BOOK 1822, PAGE 604
BOOK 1911, PAGE 359
BOOK 2588, PAGE 194
BOOK 4889, PAGE 470
BOOK 1944, PAGE 100
BOOK 3596, PAGE 582
BOOK 1924, PAGE END
BOOK 1822, PAGE 577
BOOK 1921, PAGE 507
BOOK 2451, PAGE 248
BOOK 1173, PAGE END
BOOK 1182, PAGE 256
BOOK 1713, PAGE 2
BOOK 1813, PAGE 2
BOOK 1868, PAGE 513
BOOK 2373, PAGE 481
BOOK 2451, PAGE 248
BOOK 2616, PAGE 37
BOOK 2723, PAGE 482
BOOK 8231, PAGE 290

ASSESSORS:

PARCEL ID: 0401150000 (LOTS 1A, 3 & 4)
PARCEL ID: 0401282000 (PORTION OF LOT 1B)
PARCEL ID: 0401283000 (PORTION OF LOT 1B)
PARCEL ID: 0401323000 (PORTION OF LOT 2)
PARCEL ID: 0401324000 (PORTION OF LOT 2)
PARCEL ID: 0401325000 (PORTION OF LOT 2)
PARCEL ID: 0401326000 (PORTION OF LOT 2)

RECORD OWNERS:

CHURCH REALTY TRUST

NOTES:

1) THE PURPOSE OF THIS PLAN IS TO CREATE LOTS 1A, 1B, 2, 3 & 4 AS SHOWN HEREON.

2) INTERIOR PARCEL LINES AND FORMER STREET LOCATIONS ARE NOT SHOWN HEREON.

3) THE LOCATION OF UNDERGROUND STRUCTURES ARE NOT SHOWN HEREON.

4) FRONTAGE AND AREAS ALONG BELVIDERE STREET AND HUNTINGTON AVENUE ARE CALCULATED TO THE 1894 LAYOUT FOR HUNTINGTON AVENUE, 1872 LAYOUT FOR WEST NEWTON STREET & THE 1898 & 1893 LAYOUTS FOR BELVIDERE STREET. SQUARE FOOTAGE BETWEEN 1972 CITY LAYOUT AND 1893, 1894 & 1872 SIDELINES FOR LOT #3 IS 505±S.F., FOR LOT #4 IS 9,785±S.F. AND FOR LOT #1A IS 3,232±S.F.

CHRISTIAN SCIENCE PLAZA

Boston, Massachusetts

PREPARED FOR

THE FIRST CHURCH OF CHRIST SCIENTIST

Huntington Avenue
Boston, Massachusetts

HANCOCK ASSOCIATES

Civil Engineers

Land Surveyors

Wetland Scientists

NO.	BY	APP.	DATE	ISSUE/REVISION DESCRIPTION
3	MWM	MCJ	8/15/12	FALMOUTH, NORWAY
2	MWM	MCJ	8/14/12	STREET LAYOUTS
1	MCJ	MCJ	7/23/12	ADD STREET REFS

DATE: 6/5/12 DRAWN BY: MWM
SCALE: 1"=40' CHECK BY: JMS

PLAN OF LAND IN BOSTON, MA

SHEET 1 OF 1

1

PROJECT NO.: 13254

Appendix B

Transportation Appendix

APPENDIX
Transportation

Automatic Traffic Recorder Counts
Turning Movement Counts

2013 Existing Condition Synchro Reports
2018 No-Build Condition Synchro Reports
2018 Build Condition Synchro Reports

Automatic Traffic Recorder Counts

Massachusetts Avenue
south of Clearway Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

133307 A Class
Site Code: TBA

NB

Start Time	Bicylce	Cars	Buses	Heavy Vehicle	Total									
05/14/13	5	129	7	6	0	0	0	0	0	0	0	0	0	147
01:00	0	91	3	1	0	0	0	0	0	0	0	0	0	95
02:00	2	51	4	0	0	0	0	0	0	0	0	0	0	57
03:00	0	33	10	0	0	0	0	0	0	0	0	0	0	43
04:00	1	58	9	0	0	0	0	0	0	0	0	0	0	68
05:00	8	208	29	9	0	0	0	0	0	0	0	0	0	254
06:00	20	412	62	23	0	0	0	0	0	0	0	0	0	517
07:00	23	554	83	20	0	0	0	0	0	0	0	0	0	680
08:00	91	594	49	19	0	0	0	0	0	0	0	0	0	753
09:00	53	482	49	17	0	0	0	0	0	0	0	0	0	601
10:00	35	430	56	13	0	0	0	0	0	0	0	0	0	534
11:00	23	497	53	9	0	0	0	0	0	0	0	0	0	582
12 PM	23	465	47	9	0	0	0	0	0	0	0	0	0	544
13:00	28	475	39	22	0	0	0	0	0	0	0	0	0	564
14:00	38	487	33	17	0	0	0	0	0	0	0	0	0	575
15:00	46	570	14	16	0	0	0	0	0	0	0	0	0	646
16:00	52	537	29	16	0	0	0	0	0	0	0	0	0	634
17:00	83	648	12	24	0	0	0	0	0	0	0	0	0	767
18:00	77	529	5	15	0	0	0	0	0	0	0	0	0	626
19:00	48	428	8	14	0	0	0	0	0	0	0	0	0	498
20:00	42	396	9	13	0	0	0	0	0	0	0	0	0	460
21:00	20	356	9	7	0	0	0	0	0	0	0	0	0	392
22:00	16	404	12	8	0	0	0	0	0	0	0	0	0	440
23:00	12	240	8	5	0	0	0	0	0	0	0	0	0	265
Total	746	9074	639	283	0	0	0	0	0	0	0	0	0	10742
Percent	6.9%	84.5%	5.9%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	07:00	06:00										08:00
Vol.	91	594	83	23										753
Midday Peak	14:00	11:00	11:00	13:00										11:00
Vol.	38	497	53	22										582
PM Peak	17:00	17:00	16:00	17:00										17:00
Vol.	83	648	29	24										767

Massachusetts Avenue
south of Clearway Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

133307 A Class
Site Code: TBA

SB

Start Time	Bicylce	Cars	Buses	Heavy Vehicle	Total									
05/14/13	10	211	5	6	0	0	0	0	0	0	0	0	0	232
01:00	4	174	4	2	0	0	0	0	0	0	0	0	0	184
02:00	4	79	2	3	0	0	0	0	0	0	0	0	0	88
03:00	0	46	4	0	0	0	0	0	0	0	0	0	0	50
04:00	1	45	8	0	0	0	0	0	0	0	0	0	0	54
05:00	1	105	14	7	0	0	0	0	0	0	0	0	0	127
06:00	16	309	24	8	0	0	0	0	0	0	0	0	0	357
07:00	46	476	41	13	0	0	0	0	0	0	0	0	0	576
08:00	93	530	52	16	0	0	0	0	0	0	0	0	0	691
09:00	87	518	59	23	0	0	0	0	0	0	0	0	0	687
10:00	35	469	59	15	0	0	0	0	0	0	0	0	0	578
11:00	40	483	60	10	0	0	0	0	0	0	0	0	0	593
12 PM	22	520	55	6	0	0	0	0	0	0	0	0	0	603
13:00	23	580	56	7	0	0	0	0	0	0	0	0	0	666
14:00	21	647	45	11	0	0	0	0	0	0	0	0	0	724
15:00	43	619	35	10	0	0	0	0	0	0	0	0	0	707
16:00	58	653	17	10	0	0	0	0	0	0	0	0	0	738
17:00	114	612	16	14	0	0	0	0	0	0	0	0	0	756
18:00	79	564	10	16	0	0	0	0	0	0	0	0	0	669
19:00	62	562	14	25	0	0	0	0	0	0	0	0	0	663
20:00	35	510	6	10	0	0	0	0	0	0	0	0	0	561
21:00	39	598	9	8	0	0	0	0	0	0	0	0	0	654
22:00	21	469	8	5	0	0	0	0	0	0	0	0	0	503
23:00	11	375	8	6	0	0	0	0	0	0	0	0	0	400
Total	865	10154	611	231	0	0	0	0	0	0	0	0	0	11861
Percent	7.3%	85.6%	5.2%	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	09:00	09:00										08:00
Vol.	93	530	59	23										691
Midday Peak	11:00	14:00	11:00	14:00										14:00
Vol.	40	647	60	11										724
PM Peak	17:00	16:00	15:00	19:00										17:00
Vol.	114	653	35	25										756

PRECISION
D A T A
INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

Massachusetts Avenue
south of Clearway Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

133307 A Volume
Site Code: TBA

Start	NB				SB				Combined				14-May-13	
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue	
12:00	40		143		77		158		117		301			
12:15	41		129		58		160		99		289			
12:30	38		131		59		142		97		273			
12:45	28	147	141	544	38	232	143	603	66	379	284	1147		
01:00	39		128		63		166		102		294			
01:15	20		152		50		170		70		322			
01:30	18		146		43		168		61		314			
01:45	18	95	138	564	28	184	162	666	46	279	300	1230		
02:00	15		123		27		154		42		277			
02:15	19		150		24		172		43		322			
02:30	14		168		17		205		31		373			
02:45	9	57	134	575	20	88	193	724	29	145	327	1299		
03:00	9		166		19		171		28		337			
03:15	9		164		11		171		20		335			
03:30	10		167		13		174		23		341			
03:45	15	43	149	646	7	50	191	707	22	93	340	1353		
04:00	13		142		14		176		27		318			
04:15	10		161		13		171		23		332			
04:30	23		172		12		193		35		365			
04:45	22	68	159	634	15	54	198	738	37	122	357	1372		
05:00	29		196		14		190		43		386			
05:15	57		183		37		199		94		382			
05:30	78		196		41		192		119		388			
05:45	90	254	192	767	35	127	175	756	125	381	367	1523		
06:00	108		161		63		181		171		342			
06:15	111		152		93		150		204		302			
06:30	147		160		99		166		246		326			
06:45	151	517	153	626	102	357	172	669	253	874	325	1295		
07:00	161		134		129		167		290		301			
07:15	165		122		127		189		292		311			
07:30	173		125		165		172		338		297			
07:45	181	680	117	498	155	576	135	663	336	1256	252	1161		
08:00	183		111		158		149		341		260			
08:15	174		119		155		141		329		260			
08:30	207		108		182		150		389		258			
08:45	189	753	122	460	196	691	121	561	385	1444	243	1021		
09:00	136		102		179		155		315		257			
09:15	151		95		168		158		319		253			
09:30	174		108		164		194		338		302			
09:45	140	601	87	392	176	687	147	654	316	1288	234	1046		
10:00	134		116		157		137		291		253			
10:15	120		121		142		130		262		251			
10:30	151		105		138		129		289		234			
10:45	129	534	98	440	141	578	107	503	270	1112	205	943		
11:00	149		64		157		113		306		177			
11:15	132		64		145		105		277		169			
11:30	158		81		139		100		297		181			
11:45	143	582	56	265	152	593	82	400	295	1175	138	665		
Total	4331		6411		4217		7644		8548		14055			
Percent	50.7%		45.6%		49.3%		54.4%							
Day Total		10742				11861				22603				
Peak	08:00	-	05:00	-	08:30	-	04:30	-	08:00	-	05:00	-	-	-
Vol.	753	-	767	-	725	-	780	-	1444	-	1523	-	-	-
P.H.F.	0.909		0.978		0.925		0.980		0.928		0.981			

Huntington Avenue (Route 9)
west of Belvidere Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

133307 B Class
Site Code: TBA

WB

Start Time	Bicylce	Cars	Buses	Heavy Vehicle	Total									
05/14/13	2	96	6	3	0	0	0	0	0	0	0	0	0	107
01:00	1	84	2	2	0	0	0	0	0	0	0	0	0	89
02:00	1	55	0	7	0	0	0	0	0	0	0	0	0	63
03:00	0	23	0	0	0	0	0	0	0	0	0	0	0	23
04:00	1	21	0	11	0	0	0	0	0	0	0	0	0	33
05:00	2	100	10	20	0	0	0	0	0	0	0	0	0	132
06:00	3	363	19	38	0	0	0	0	0	0	0	0	0	423
07:00	4	575	15	27	0	0	0	0	0	0	0	0	0	621
08:00	9	667	23	26	0	0	0	0	0	0	0	0	0	725
09:00	7	659	24	30	0	0	0	0	0	0	0	0	0	720
10:00	5	523	23	25	0	0	0	0	0	0	0	0	0	576
11:00	3	495	18	23	0	0	0	0	0	0	0	0	0	539
12 PM	11	484	19	30	0	0	0	0	0	0	0	0	0	544
13:00	4	498	21	17	0	0	0	0	0	0	0	0	0	540
14:00	9	501	34	12	0	0	0	0	0	0	0	0	0	556
15:00	5	498	26	8	0	0	0	0	0	0	0	0	0	537
16:00	15	569	25	8	0	0	0	0	0	0	0	0	0	617
17:00	22	635	23	9	0	0	0	0	0	0	0	0	0	689
18:00	18	607	18	4	0	0	0	0	0	0	0	0	0	647
19:00	11	474	19	3	0	0	0	0	0	0	0	0	0	507
20:00	3	365	10	0	0	0	0	0	0	0	0	0	0	378
21:00	3	347	12	4	0	0	0	0	0	0	0	0	0	366
22:00	8	291	5	2	0	0	0	0	0	0	0	0	0	306
23:00	0	158	6	2	0	0	0	0	0	0	0	0	0	166
Total	147	9088	358	311	0	0	0	0	0	0	0	0	0	9904
Percent	1.5%	91.8%	3.6%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	09:00	06:00										08:00
Vol.	9	667	24	38										725
Midday Peak	12:00	14:00	14:00	12:00										14:00
Vol.	11	501	34	30										556
PM Peak	17:00	17:00	15:00	17:00										17:00
Vol.	22	635	26	9										689

Huntington Avenue (Route 9)
west of Belvidere Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

133307 B Class
Site Code: TBA

EB

Start Time	Bicylce	Cars	Buses	Heavy Vehicle	Total									
05/14/1 3	0	105	7	1	0	0	0	0	0	0	0	0	0	113
01:00	0	66	0	1	0	0	0	0	0	0	0	0	0	67
02:00	0	49	0	7	0	0	0	0	0	0	0	0	0	56
03:00	0	31	0	4	0	0	0	0	0	0	0	0	0	35
04:00	0	55	1	10	0	0	0	0	0	0	0	0	0	66
05:00	3	115	8	8	0	0	0	0	0	0	0	0	0	134
06:00	1	253	13	17	0	0	0	0	0	0	0	0	0	284
07:00	4	469	19	14	0	0	0	0	0	0	0	0	0	506
08:00	14	534	17	26	0	0	0	0	0	0	0	0	0	591
09:00	14	497	26	22	0	0	0	0	0	0	0	0	0	559
10:00	6	423	23	27	0	0	0	0	0	0	0	0	0	479
11:00	14	437	23	22	0	0	0	0	0	0	0	0	0	496
12 PM	0	436	24	24	0	0	0	0	0	0	0	0	0	484
13:00	7	469	25	16	0	0	0	0	0	0	0	0	0	517
14:00	9	460	18	14	0	0	0	0	0	0	0	0	0	501
15:00	12	541	19	9	0	0	0	0	0	0	0	0	0	581
16:00	15	558	18	16	0	0	0	0	0	0	0	0	0	607
17:00	9	646	25	6	0	0	0	0	0	0	0	0	0	686
18:00	15	490	15	6	0	0	0	0	0	0	0	0	0	526
19:00	9	394	13	0	0	0	0	0	0	0	0	0	0	416
20:00	3	350	12	6	0	0	0	0	0	0	0	0	0	371
21:00	6	298	9	1	0	0	0	0	0	0	0	0	0	314
22:00	0	285	9	4	0	0	0	0	0	0	0	0	0	298
23:00	0	156	5	0	0	0	0	0	0	0	0	0	0	161
Total	141	8117	329	261	0	0	0	0	0	0	0	0	0	8848
Percent	1.6%	91.7%	3.7%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	09:00	08:00										08:00
Vol.	14	534	26	26										591
Midday Peak	11:00	13:00	13:00	12:00										13:00
Vol.	14	469	25	24										517
PM Peak	16:00	17:00	17:00	16:00										17:00
Vol.	15	646	25	16										686

Huntington Avenue (Route 9)
west of Belvidere Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
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INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
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133307 B Volume
Site Code: TBA

Start Time	WB A.M.		WB P.M.		EB A.M.		EB P.M.		Combined A.M.		Combined P.M.		14-May-13 Tue	
12:00	28		134		37		136		65		270			
12:15	28		134		30		99		58		233			
12:30	24		142		27		126		51		268			
12:45	27	107	134	544	19	113	123	484	46	220	257	1028		
01:00	24		128		16		142		40		270			
01:15	17		141		20		135		37		276			
01:30	26		130		19		124		45		254			
01:45	22	89	141	540	12	67	116	517	34	156	257	1057		
02:00	14		126		15		122		29		248			
02:15	15		140		15		114		30		254			
02:30	20		144		15		128		35		272			
02:45	14	63	146	556	11	56	137	501	25	119	283	1057		
03:00	5		141		8		133		13		274			
03:15	8		137		9		144		17		281			
03:30	6		134		10		164		16		298			
03:45	4	23	125	537	8	35	140	581	12	58	265	1118		
04:00	7		136		15		145		22		281			
04:15	10		159		11		193		21		352			
04:30	8		157		20		117		28		274			
04:45	8	33	165	617	20	66	152	607	28	99	317	1224		
05:00	14		156		12		172		26		328			
05:15	30		182		38		176		68		358			
05:30	33		179		45		158		78		337			
05:45	55	132	172	689	39	134	180	686	94	266	352	1375		
06:00	62		163		49		153		111		316			
06:15	98		149		53		126		151		275			
06:30	138		179		90		131		228		310			
06:45	125	423	156	647	92	284	116	526	217	707	272	1173		
07:00	117		140		112		119		229		259			
07:15	164		133		105		115		269		248			
07:30	151		113		141		99		292		212			
07:45	189	621	121	507	148	506	83	416	337	1127	204	923		
08:00	177		105		152		117		329		222			
08:15	183		99		125		88		308		187			
08:30	179		89		135		87		314		176			
08:45	186	725	85	378	179	591	79	371	365	1316	164	749		
09:00	167		99		147		82		314		181			
09:15	193		89		144		80		337		169			
09:30	177		93		141		68		318		161			
09:45	183	720	85	366	127	559	84	314	310	1279	169	680		
10:00	160		108		118		68		278		176			
10:15	140		90		112		98		252		188			
10:30	144		53		122		66		266		119			
10:45	132	576	55	306	127	479	66	298	259	1055	121	604		
11:00	136		51		114		41		250		92			
11:15	113		41		130		46		243		87			
11:30	155		45		113		40		268		85			
11:45	135	539	29	166	139	496	34	161	274	1035	63	327		
Total	4051		5853		3386		5462		7437		11315			
Percent	54.5%		51.7%		45.5%		48.3%							
Day Total		9904				8848				18752				
Peak	07:45	-	05:15	-	08:45	-	05:00	-	08:45	-	05:00	-	-	-
Vol.	728	-	696	-	611	-	686	-	1334	-	1375	-	-	-
P.H.F.	0.963		0.956		0.853		0.953		0.914		0.960			

Belvidere Street north of
Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
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133307 C Class
Site Code: TBA

NB

Start Time	Bicylce	Cars	Buses	Heavy Vehicle	Total									
05/14/13	0	114	8	1	0	0	0	0	0	0	0	0	0	123
01:00	1	64	0	1	0	0	0	0	0	0	0	0	0	66
02:00	2	56	0	4	0	0	0	0	0	0	0	0	0	62
03:00	0	42	0	11	0	0	0	0	0	0	0	0	0	53
04:00	0	49	0	7	0	0	0	0	0	0	0	0	0	56
05:00	0	114	10	17	0	0	0	0	0	0	0	0	0	141
06:00	4	240	16	26	0	0	0	0	0	0	0	0	0	286
07:00	12	435	20	36	0	0	0	0	0	0	0	0	0	503
08:00	22	535	24	43	0	0	0	0	0	0	0	0	0	624
09:00	8	414	38	36	0	0	0	0	0	0	0	0	0	496
10:00	6	365	29	31	0	0	0	0	0	0	0	0	0	431
11:00	14	354	28	22	0	0	0	0	0	0	0	0	0	418
12 PM	15	340	28	27	0	0	0	0	0	0	0	0	0	410
13:00	8	365	27	29	0	0	0	0	0	0	0	0	0	429
14:00	9	346	29	14	0	0	0	0	0	0	0	0	0	398
15:00	13	365	31	11	0	0	0	0	0	0	0	0	0	420
16:00	12	435	28	11	0	0	0	0	0	0	0	0	0	486
17:00	46	544	26	5	0	0	0	0	0	0	0	0	0	621
18:00	31	545	26	6	0	0	0	0	0	0	0	0	0	608
19:00	19	401	18	1	0	0	0	0	0	0	0	0	0	439
20:00	7	357	14	2	0	0	0	0	0	0	0	0	0	380
21:00	5	291	10	1	0	0	0	0	0	0	0	0	0	307
22:00	8	238	7	3	0	0	0	0	0	0	0	0	0	256
23:00	3	177	5	1	0	0	0	0	0	0	0	0	0	186
Total	245	7186	422	346	0	0	0	0	0	0	0	0	0	8199
Percent	3.0%	87.6%	5.1%	4.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	09:00	08:00										08:00
Vol.	22	535	38	43										624
Midday Peak	12:00	13:00	14:00	13:00										13:00
Vol.	15	365	29	29										429
PM Peak	17:00	18:00	15:00	15:00										17:00
Vol.	46	545	31	11										621

Belvidere Street north of
Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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133307 C Class
Site Code: TBA

SB

Start Time	Bicylce	Cars	Buses	Heavy Vehicle	Total									
05/14/13	0	46	0	1	0	0	0	0	0	0	0	0	0	47
01:00	0	25	0	0	0	0	0	0	0	0	0	0	0	25
02:00	0	13	0	2	0	0	0	0	0	0	0	0	0	15
03:00	0	12	0	0	0	0	0	0	0	0	0	0	0	12
04:00	0	24	0	0	0	0	0	0	0	0	0	0	0	24
05:00	2	41	1	2	0	0	0	0	0	0	0	0	0	46
06:00	5	73	1	5	0	0	0	0	0	0	0	0	0	84
07:00	8	114	1	7	0	0	0	0	0	0	0	0	0	130
08:00	22	136	3	6	0	0	0	0	0	0	0	0	0	167
09:00	22	124	1	8	0	0	0	0	0	0	0	0	0	155
10:00	9	112	2	6	0	0	0	0	0	0	0	0	0	129
11:00	7	106	1	5	0	0	0	0	0	0	0	0	0	119
12 PM	5	136	1	2	0	0	0	0	0	0	0	0	0	144
13:00	9	145	0	1	0	0	0	0	0	0	0	0	0	155
14:00	1	137	2	5	0	0	0	0	0	0	0	0	0	145
15:00	4	154	2	5	0	0	0	0	0	0	0	0	0	165
16:00	11	179	1	4	0	0	0	0	0	0	0	0	0	195
17:00	10	237	1	2	0	0	0	0	0	0	0	0	0	250
18:00	7	204	1	0	0	0	0	0	0	0	0	0	0	212
19:00	7	164	0	1	0	0	0	0	0	0	0	0	0	172
20:00	5	113	2	0	0	0	0	0	0	0	0	0	0	120
21:00	3	129	1	0	0	0	0	0	0	0	0	0	0	133
22:00	4	139	2	1	0	0	0	0	0	0	0	0	0	146
23:00	1	80	0	0	0	0	0	0	0	0	0	0	0	81
Total	142	2643	23	63	0	0	0	0	0	0	0	0	0	2871
Percent	4.9%	92.1%	0.8%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
AM Peak	08:00	08:00	08:00	09:00										08:00
Vol.	22	136	3	8										167
Midday Peak	13:00	13:00	14:00	11:00										13:00
Vol.	9	145	2	5										155
PM Peak	16:00	17:00	15:00	15:00										17:00
Vol.	11	237	2	5										250

Belvidere Street north of
Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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133307 C Volume
Site Code: TBA

Start	NB				SB				Combined				14-May-13	
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		Tue	
12:00	39		102		9		34		48		136			
12:15	34		109		17		33		51		142			
12:30	27		104		8		37		35		141			
12:45	23	123	95	410	13	47	40	144	36	170	135	554		
01:00	16		100		5		24		21		124			
01:15	16		125		6		42		22		167			
01:30	16		100		7		39		23		139			
01:45	18	66	104	429	7	25	50	155	25	91	154	584		
02:00	23		94		3		28		26		122			
02:15	19		104		4		34		23		138			
02:30	12		94		2		49		14		143			
02:45	8	62	106	398	6	15	34	145	14	77	140	543		
03:00	12		119		3		48		15		167			
03:15	12		91		4		45		16		136			
03:30	16		98		4		34		20		132			
03:45	13	53	112	420	1	12	38	165	14	65	150	585		
04:00	10		106		3		49		13		155			
04:15	14		125		10		44		24		169			
04:30	16		135		4		55		20		190			
04:45	16	56	120	486	7	24	47	195	23	80	167	681		
05:00	26		155		8		53		34		208			
05:15	31		144		7		69		38		213			
05:30	44		148		11		60		55		208			
05:45	40	141	174	621	20	46	68	250	60	187	242	871		
06:00	56		166		19		70		75		236			
06:15	57		152		18		49		75		201			
06:30	79		153		20		45		99		198			
06:45	94	286	137	608	27	84	48	212	121	370	185	820		
07:00	91		124		23		50		114		174			
07:15	108		110		30		42		138		152			
07:30	127		122		42		47		169		169			
07:45	177	503	83	439	35	130	33	172	212	633	116	611		
08:00	198		117		38		33		236		150			
08:15	148		87		50		28		198		115			
08:30	126		88		45		34		171		122			
08:45	152	624	88	380	34	167	25	120	186	791	113	500		
09:00	140		99		42		27		182		126			
09:15	118		63		42		32		160		95			
09:30	107		64		40		35		147		99			
09:45	131	496	81	307	31	155	39	133	162	651	120	440		
10:00	109		73		41		49		150		122			
10:15	110		60		28		38		138		98			
10:30	103		59		35		32		138		91			
10:45	109	431	64	256	25	129	27	146	134	560	91	402		
11:00	121		40		31		17		152		57			
11:15	98		66		37		26		135		92			
11:30	98		46		21		21		119		67			
11:45	101	418	34	186	30	119	17	81	131	537	51	267		
Total	3259		4940		953		1918		4212		6858			
Percent	77.4%		72.0%		22.6%		28.0%							
Day Total		8199				2871				11070				
Peak	07:30	-	05:45	-	08:15	-	05:15	-	07:45	-	05:15	-	-	-
Vol.	650	-	645	-	171	-	267	-	817	-	899	-	-	-
P.H.F.	0.821		0.927		0.855		0.954		0.865		0.929			

Turning Movement Counts

N/S: Massachusetts Avenue
E/W: Boylston Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
D A T A
INDUSTRIES, LLC

P.O.Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
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File Name : 133307 A
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	4	105	38	0	20	20	4	0	23	140	1	0	27	75	4	1	462
07:15 AM	5	105	31	0	37	22	0	0	21	149	1	0	28	65	2	0	466
07:30 AM	9	110	37	0	41	18	2	0	13	148	2	0	31	99	2	0	512
07:45 AM	10	109	49	0	41	24	0	0	13	171	5	0	28	95	5	0	550
Total	28	429	155	0	139	84	6	0	70	608	9	0	114	334	13	1	1990
08:00 AM	2	101	35	0	84	26	1	0	16	152	2	0	34	107	4	0	564
08:15 AM	11	128	47	0	47	22	1	0	24	142	5	0	25	107	7	0	566
08:30 AM	9	134	42	0	26	23	0	0	8	181	1	0	30	93	4	0	551
08:45 AM	5	127	40	0	41	16	0	0	16	126	3	0	40	115	2	0	531
Total	27	490	164	0	198	87	2	0	64	601	11	0	129	422	17	0	2212
Grand Total	55	919	319	0	337	171	8	0	134	1209	20	0	243	756	30	1	4202
Apprch %	4.3	71.1	24.7	0	65.3	33.1	1.6	0	9.8	88.7	1.5	0	23.6	73.4	2.9	0.1	
Total %	1.3	21.9	7.6	0	8	4.1	0.2	0	3.2	28.8	0.5	0	5.8	18	0.7	0	
Cars	48	828	271	0	315	151	4	0	115	1070	18	0	213	705	27	1	3766
% Cars	87.3	90.1	85	0	93.5	88.3	50	0	85.8	88.5	90	0	87.7	93.3	90	100	89.6
Heavy Vehicles	7	68	45	0	18	7	3	0	16	105	1	0	25	37	3	0	335
% Heavy Vehicles	12.7	7.4	14.1	0	5.3	4.1	37.5	0	11.9	8.7	5	0	10.3	4.9	10	0	8
Buses	0	23	3	0	4	13	1	0	3	34	1	0	5	14	0	0	101
% Buses	0	2.5	0.9	0	1.2	7.6	12.5	0	2.2	2.8	5	0	2.1	1.9	0	0	2.4

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	10	109	**49**	0	168	41	24	0	0	65	13	171	**5**	0	189	28	95	5	0	128	550
08:00 AM	2	101	35	0	138	**84**	**26**	**1**	0	**111**	16	152	2	0	170	**34**	**107**	4	0	**145**	564
08:15 AM	**11**	128	47	0	**186**	47	22	1	0	70	**24**	142	5	0	171	25	107	**7**	0	139	**566**
08:30 AM	9	**134**	42	0	185	26	23	0	0	49	8	**181**	1	0	**190**	30	93	4	0	127	551
Total Volume	32	472	173	0	677	198	95	2	0	295	61	646	13	0	720	117	402	20	0	539	2231
% App. Total	4.7	69.7	25.6	0		67.1	32.2	0.7	0		8.5	89.7	1.8	0		21.7	74.6	3.7	0		
PHF	.727	.881	.883	.000	.910	.589	.913	.500	.000	.664	.635	.892	.650	.000	.947	.860	.939	.714	.000	.929	.985
Cars	30	434	146	0	610	188	82	2	0	272	54	584	13	0	651	99	370	18	0	487	2020
% Cars	93.8	91.9	84.4	0	90.1	94.9	86.3	100	0	92.2	88.5	90.4	100	0	90.4	84.6	92.0	90.0	0	90.4	90.5
Heavy Vehicles	2	29	25	0	56	8	6	0	0	14	5	48	0	0	53	16	25	2	0	43	166
% Heavy Vehicles	6.3	6.1	14.5	0	8.3	4.0	6.3	0	0	4.7	8.2	7.4	0	0	7.4	13.7	6.2	10.0	0	8.0	7.4
Buses	0	9	2	0	11	2	7	0	0	9	2	14	0	0	16	2	7	0	0	9	45
% Buses	0	1.9	1.2	0	1.6	1.0	7.4	0	0	3.1	3.3	2.2	0	0	2.2	1.7	1.7	0	0	1.7	2.0

N/S: Massachusetts Avenue
E/W: Boylston Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 A
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	3	99	34	0	19	18	2	0	19	118	1	0	26	72	3	1	415
07:15 AM	5	91	23	0	29	21	0	0	18	127	0	0	25	59	2	0	400
07:30 AM	6	93	34	0	40	17	0	0	11	131	2	0	28	94	2	0	458
07:45 AM	10	101	41	0	39	19	0	0	10	146	5	0	23	88	3	0	485
Total	24	384	132	0	127	75	2	0	58	522	8	0	102	313	10	1	1758
08:00 AM	2	92	32	0	81	23	1	0	15	142	2	0	28	100	4	0	522
08:15 AM	10	117	38	0	42	20	1	0	22	130	5	0	20	93	7	0	505
08:30 AM	8	124	35	0	26	20	0	0	7	166	1	0	28	89	4	0	508
08:45 AM	4	111	34	0	39	13	0	0	13	110	2	0	35	110	2	0	473
Total	24	444	139	0	188	76	2	0	57	548	10	0	111	392	17	0	2008
Grand Total	48	828	271	0	315	151	4	0	115	1070	18	0	213	705	27	1	3766
Apprch %	4.2	72.2	23.6	0	67	32.1	0.9	0	9.6	88.9	1.5	0	22.5	74.5	2.9	0.1	
Total %	1.3	22	7.2	0	8.4	4	0.1	0	3.1	28.4	0.5	0	5.7	18.7	0.7	0	

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	**10**	101	**41**	0	152	39	19	0	0	58	10	146	**5**	0	161	23	88	3	0	114	485
08:00 AM	2	92	32	0	126	**81**	**23**	**1**	0	**105**	15	142	2	0	159	**28**	**100**	4	0	**132**	**522**
08:15 AM	10	117	38	0	165	42	20	1	0	63	**22**	130	5	0	157	20	93	**7**	0	120	505
08:30 AM	8	**124**	35	0	**167**	26	20	0	0	46	7	**166**	1	0	**174**	28	89	4	0	121	508
Total Volume	30	434	146	0	610	188	82	2	0	272	54	584	13	0	651	99	370	18	0	487	2020
% App. Total	4.9	71.1	23.9	0		69.1	30.1	0.7	0		8.3	89.7	2	0		20.3	76	3.7	0		
PHF	.750	.875	.890	.000	.913	.580	.891	.500	.000	.648	.614	.880	.650	.000	.935	.884	.925	.643	.000	.922	.967

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File Name : 133307 A
Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	1	4	4	0	1	0	2	0	4	15	0	0	1	2	1	0	35
07:15 AM	0	11	8	0	7	0	0	0	3	18	1	0	3	4	0	0	55
07:30 AM	3	11	3	0	0	1	1	0	2	11	0	0	2	3	0	0	37
07:45 AM	0	7	7	0	2	3	0	0	2	22	0	0	4	5	2	0	54
Total	4	33	22	0	10	4	3	0	11	66	1	0	10	14	3	0	181
08:00 AM	0	6	3	0	3	1	0	0	1	6	0	0	5	6	0	0	31
08:15 AM	1	8	9	0	3	0	0	0	1	9	0	0	5	10	0	0	46
08:30 AM	1	8	6	0	0	2	0	0	1	11	0	0	2	4	0	0	35
08:45 AM	1	13	5	0	2	0	0	0	2	13	0	0	3	3	0	0	42
Total	3	35	23	0	8	3	0	0	5	39	0	0	15	23	0	0	154
Grand Total	7	68	45	0	18	7	3	0	16	105	1	0	25	37	3	0	335
Apprch %	5.8	56.7	37.5	0	64.3	25	10.7	0	13.1	86.1	0.8	0	38.5	56.9	4.6	0	
Total %	2.1	20.3	13.4	0	5.4	2.1	0.9	0	4.8	31.3	0.3	0	7.5	11	0.9	0	

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	1	4	4	0	9	1	0	2	0	3	4	15	0	0	19	1	2	1	0	4	35
07:15 AM	0	11	8	0	19	7	0	0	0	7	3	18	1	0	22	3	4	0	0	7	55
07:30 AM	3	11	3	0	17	0	1	1	0	2	2	11	0	0	13	2	3	0	0	5	37
07:45 AM	0	7	7	0	14	2	3	0	0	5	2	22	0	0	24	4	5	2	0	11	54
Total Volume	4	33	22	0	59	10	4	3	0	17	11	66	1	0	78	10	14	3	0	27	181
% App. Total	6.8	55.9	37.3	0		58.8	23.5	17.6	0		14.1	84.6	1.3	0		37	51.9	11.1	0		
PHF	.333	.750	.688	.000	.776	.357	.333	.375	.000	.607	.688	.750	.250	.000	.813	.625	.700	.375	.000	.614	.823

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Groups Printed- Buses

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	2	0	0	0	2	0	0	0	7	0	0	0	1	0	0	12
07:15 AM	0	3	0	0	1	1	0	0	0	4	0	0	0	2	0	0	11
07:30 AM	0	6	0	0	1	0	1	0	0	6	0	0	1	2	0	0	17
07:45 AM	0	1	1	0	0	2	0	0	1	3	0	0	1	2	0	0	11
Total	0	12	1	0	2	5	1	0	1	20	0	0	2	7	0	0	51
08:00 AM	0	3	0	0	0	2	0	0	0	4	0	0	1	1	0	0	11
08:15 AM	0	3	0	0	2	2	0	0	1	3	0	0	0	4	0	0	15
08:30 AM	0	2	1	0	0	1	0	0	0	4	0	0	0	0	0	0	8
08:45 AM	0	3	1	0	0	3	0	0	1	3	1	0	2	2	0	0	16
Total	0	11	2	0	2	8	0	0	2	14	1	0	3	7	0	0	50
Grand Total	0	23	3	0	4	13	1	0	3	34	1	0	5	14	0	0	101
Apprch %	0	88.5	11.5	0	22.2	72.2	5.6	0	7.9	89.5	2.6	0	26.3	73.7	0	0	
Total %	0	22.8	3	0	4	12.9	1	0	3	33.7	1	0	5	13.9	0	0	

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	0	6	0	0	6	1	0	1	0	2	0	6	0	0	6	1	2	0	0	3	17
07:45 AM	0	1	1	0	2	0	2	0	0	2	1	3	0	0	4	1	2	0	0	3	11
08:00 AM	0	3	0	0	3	0	2	0	0	2	0	4	0	0	4	1	1	0	0	2	11
08:15 AM	0	3	0	0	3	2	2	0	0	4	1	3	0	0	4	0	4	0	0	4	15
Total Volume	0	13	1	0	14	3	6	1	0	10	2	16	0	0	18	3	9	0	0	12	54
% App. Total	0	92.9	7.1	0		30	60	10	0		11.1	88.9	0	0		25	75	0	0		
PHF	.000	.542	.250	.000	.583	.375	.750	.250	.000	.625	.500	.667	.000	.000	.750	.750	.563	.000	.000	.750	.794

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Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	1	5	2	33	0	0	0	40	0	10	0	26	0	2	0	27	146
07:15 AM	3	9	2	28	1	0	0	56	0	7	0	18	0	0	3	42	169
07:30 AM	1	15	3	39	0	1	0	71	0	11	0	44	0	1	4	51	241
07:45 AM	6	30	7	53	0	0	0	92	1	10	0	53	0	0	0	58	310
Total	11	59	14	153	1	1	0	259	1	38	0	141	0	3	7	178	866
08:00 AM	5	22	7	75	2	0	0	98	0	15	0	51	0	5	1	78	359
08:15 AM	5	28	14	89	1	0	0	126	0	30	0	71	0	8	2	68	442
08:30 AM	5	30	13	77	0	1	0	125	2	32	0	74	0	13	4	84	460
08:45 AM	2	41	6	116	0	0	0	135	0	18	0	90	4	12	2	102	528
Total	17	121	40	357	3	1	0	484	2	95	0	286	4	38	9	332	1789
Grand Total	28	180	54	510	4	2	0	743	3	133	0	427	4	41	16	510	2655
Apprch %	3.6	23.3	7	66.1	0.5	0.3	0	99.2	0.5	23.6	0	75.8	0.7	7.2	2.8	89.3	
Total %	1.1	6.8	2	19.2	0.2	0.1	0	28	0.1	5	0	16.1	0.2	1.5	0.6	19.2	

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	**5**	22	7	75	109	**2**	0	0	98	100	0	15	0	51	66	0	5	1	78	84	359
08:15 AM	5	28	**14**	89	136	1	0	0	126	127	0	30	0	71	101	0	8	2	68	78	442
08:30 AM	5	30	13	77	125	0	**1**	0	125	126	**2**	**32**	0	74	**108**	0	**13**	**4**	84	101	460
08:45 AM	2	**41**	6	**116**	**165**	0	0	0	**135**	**135**	0	18	0	**90**	108	**4**	12	2	**102**	**120**	**528**
Total Volume	17	121	40	357	535	3	1	0	484	488	2	95	0	286	383	4	38	9	332	383	1789
% App. Total	3.2	22.6	7.5	66.7		0.6	0.2	0	99.2		0.5	24.8	0	74.7		1	9.9	2.3	86.7		
PHF	.850	.738	.714	.769	.811	.375	.250	.000	.896	.904	.250	.742	.000	.794	.887	.250	.731	.563	.814	.798	.847

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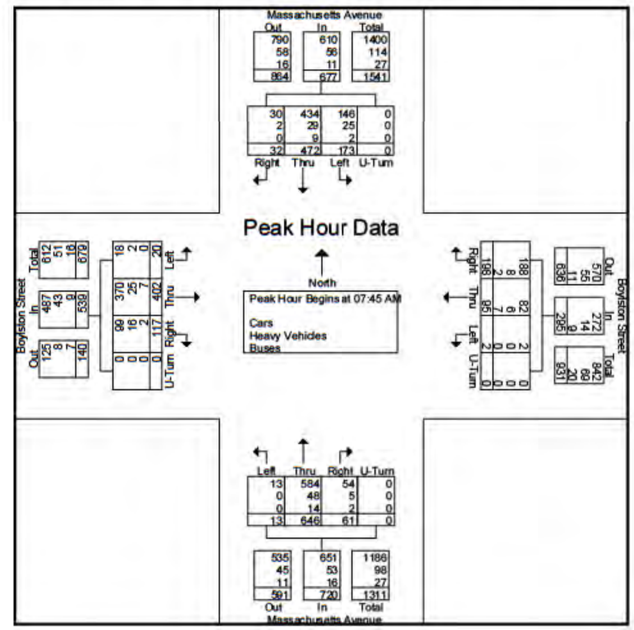
	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	10	109	**49**	0	168	41	24	0	0	65	13	171	**5**	0	189	28	95	5	0	128	550
08:00 AM	2	101	35	0	138	**84**	**26**	**1**	0	**111**	16	152	2	0	170	**34**	**107**	4	0	**145**	564
08:15 AM	**11**	128	47	0	**186**	47	22	1	0	70	**24**	142	5	0	171	25	107	**7**	0	139	**566**
08:30 AM	9	**134**	42	0	185	26	23	0	0	49	8	**181**	1	0	**190**	30	93	4	0	127	551
Total Volume	32	472	173	0	677	198	95	2	0	295	61	646	13	0	720	117	402	20	0	539	2231
% App. Total	4.7	69.7	25.6	0		67.1	32.2	0.7	0		8.5	89.7	1.8	0		21.7	74.6	3.7	0		
PHF	.727	.881	.883	.000	.910	.589	.913	.500	.000	.664	.635	.892	.650	.000	.947	.860	.939	.714	.000	.929	.985
Cars	30	434	146	0	610	188	82	2	0	272	54	584	13	0	651	99	370	18	0	487	2020
% Cars	93.8	91.9	84.4	0	90.1	94.9	86.3	100	0	92.2	88.5	90.4	100	0	90.4	84.6	92.0	90.0	0	90.4	90.5
Heavy Vehicles	2	29	25	0	56	8	6	0	0	14	5	48	0	0	53	16	25	2	0	43	166
% Heavy Vehicles	6.3	6.1	14.5	0	8.3	4.0	6.3	0	0	4.7	8.2	7.4	0	0	7.4	13.7	6.2	10.0	0	8.0	7.4
Buses	0	9	2	0	11	2	7	0	0	9	2	14	0	0	16	2	7	0	0	9	45
% Buses	0	1.9	1.2	0	1.6	1.0	7.4	0	0	3.1	3.3	2.2	0	0	2.2	1.7	1.7	0	0	1.7	2.0



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Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	16	129	43	2	39	19	3	0	16	131	2	0	35	114	0	0	549
04:15 PM	7	123	39	0	46	26	0	0	15	126	1	0	31	103	2	0	519
04:30 PM	7	140	38	0	42	23	3	0	20	156	0	0	38	112	0	0	579
04:45 PM	9	144	44	0	63	27	0	0	14	132	3	0	30	106	1	0	573
Total	39	536	164	2	190	95	6	0	65	545	6	0	134	435	3	0	2220
05:00 PM	13	131	40	0	63	22	0	0	17	156	0	0	38	110	1	0	591
05:15 PM	8	134	46	1	62	32	0	0	14	156	0	0	34	101	1	0	589
05:30 PM	9	132	43	0	55	27	1	0	18	156	2	0	27	102	1	0	573
05:45 PM	13	129	50	0	61	25	1	0	20	156	5	0	27	107	0	0	594
Total	43	526	179	1	241	106	2	0	69	624	7	0	126	420	3	0	2347
Grand Total	82	1062	343	3	431	201	8	0	134	1169	13	0	260	855	6	0	4567
Apprch %	5.5	71.3	23	0.2	67.3	31.4	1.2	0	10.2	88.8	1	0	23.2	76.3	0.5	0	
Total %	1.8	23.3	7.5	0.1	9.4	4.4	0.2	0	2.9	25.6	0.3	0	5.7	18.7	0.1	0	
Cars	77	1015	334	3	424	180	7	0	126	1099	10	0	248	823	4	0	4350
% Cars	93.9	95.6	97.4	100	98.4	89.6	87.5	0	94	94	76.9	0	95.4	96.3	66.7	0	95.2
Heavy Vehicles	2	24	6	0	5	3	1	0	8	30	3	0	10	12	1	0	105
% Heavy Vehicles	2.4	2.3	1.7	0	1.2	1.5	12.5	0	6	2.6	23.1	0	3.8	1.4	16.7	0	2.3
Buses	3	23	3	0	2	18	0	0	0	40	0	0	2	20	1	0	112
% Buses	3.7	2.2	0.9	0	0.5	9	0	0	0	3.4	0	0	0.8	2.3	16.7	0	2.5

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	13	131	40	0	184	63	22	0	0	85	17	156	0	0	173	38	110	1	0	149	591
05:15 PM	8	134	46	1	189	62	32	0	0	94	14	156	0	0	170	34	101	1	0	136	589
05:30 PM	9	132	43	0	184	55	27	1	0	83	18	156	2	0	176	27	102	1	0	130	573
05:45 PM	13	129	50	0	192	61	25	1	0	87	20	156	5	0	181	27	107	0	0	134	594
Total Volume	43	526	179	1	749	241	106	2	0	349	69	624	7	0	700	126	420	3	0	549	2347
% App. Total	5.7	70.2	23.9	0.1		69.1	30.4	0.6	0		9.9	89.1	1	0		23	76.5	0.5	0		
PHF	.827	.981	.895	.250	.975	.956	.828	.500	.000	.928	.863	1.00	.350	.000	.967	.829	.955	.750	.000	.921	.988
Cars	40	498	176	1	715	239	100	1	0	340	67	592	6	0	665	121	408	2	0	531	2251
% Cars	93.0	94.7	98.3	100	95.5	99.2	94.3	50.0	0	97.4	97.1	94.9	85.7	0	95.0	96.0	97.1	66.7	0	96.7	95.9
Heavy Vehicles	0	15	0	0	15	1	0	1	0	2	2	9	1	0	12	3	4	0	0	7	36
% Heavy Vehicles	0	2.9	0	0	2.0	0.4	0	50.0	0	0.6	2.9	1.4	14.3	0	1.7	2.4	1.0	0	0	1.3	1.5
Buses	3	13	3	0	19	1	6	0	0	7	0	23	0	0	23	2	8	1	0	11	60
% Buses	7.0	2.5	1.7	0	2.5	0.4	5.7	0	0	2.0	0	3.7	0	0	3.3	1.6	1.9	33.3	0	2.0	2.6

N/S: Massachusetts Avenue
E/W: Boylston Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	15	122	43	2	39	16	3	0	16	119	0	0	32	108	0	0	515
04:15 PM	7	118	38	0	44	23	0	0	13	118	1	0	28	100	2	0	492
04:30 PM	7	135	35	0	41	18	3	0	17	144	0	0	38	107	0	0	545
04:45 PM	8	142	42	0	61	23	0	0	13	126	3	0	29	100	0	0	547
Total	37	517	158	2	185	80	6	0	59	507	4	0	127	415	2	0	2099
05:00 PM	13	125	39	0	62	20	0	0	16	145	0	0	35	103	0	0	558
05:15 PM	8	126	46	1	62	30	0	0	13	149	0	0	33	100	1	0	569
05:30 PM	8	124	43	0	55	26	1	0	18	151	2	0	27	99	1	0	555
05:45 PM	11	123	48	0	60	24	0	0	20	147	4	0	26	106	0	0	569
Total	40	498	176	1	239	100	1	0	67	592	6	0	121	408	2	0	2251
Grand Total	77	1015	334	3	424	180	7	0	126	1099	10	0	248	823	4	0	4350
Apprch %	5.4	71	23.4	0.2	69.4	29.5	1.1	0	10.2	89	0.8	0	23.1	76.6	0.4	0	
Total %	1.8	23.3	7.7	0.1	9.7	4.1	0.2	0	2.9	25.3	0.2	0	5.7	18.9	0.1	0	

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	13	125	39	0	177	62	20	0	0	82	16	145	0	0	161	35	103	0	0	138	558
05:15 PM	8	126	46	1	181	62	30	0	0	92	13	149	0	0	162	33	100	1	0	134	569
05:30 PM	8	124	43	0	175	55	26	1	0	82	18	151	2	0	171	27	99	1	0	127	555
05:45 PM	11	123	48	0	182	60	24	0	0	84	20	147	4	0	171	26	106	0	0	132	569
Total Volume	40	498	176	1	715	239	100	1	0	340	67	592	6	0	665	121	408	2	0	531	2251
% App. Total	5.6	69.7	24.6	0.1		70.3	29.4	0.3	0		10.1	89	0.9	0		22.8	76.8	0.4	0		
PHF	.769	.988	.917	.250	.982	.964	.833	.250	.000	.924	.838	.980	.375	.000	.972	.864	.962	.500	.000	.962	.989

N/S: Massachusetts Avenue
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City, State: Boston, MA
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File Name : 133307 AA
Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	1	5	0	0	0	1	0	0	0	7	2	0	3	2	0	0	21
04:15 PM	0	2	1	0	2	0	0	0	2	3	0	0	3	1	0	0	14
04:30 PM	0	0	3	0	0	2	0	0	3	7	0	0	0	1	0	0	16
04:45 PM	1	2	2	0	2	0	0	0	1	4	0	0	1	4	1	0	18
Total	2	9	6	0	4	3	0	0	6	21	2	0	7	8	1	0	69
05:00 PM	0	2	0	0	1	0	0	0	1	2	0	0	2	2	0	0	10
05:15 PM	0	5	0	0	0	0	0	0	1	3	0	0	0	1	0	0	10
05:30 PM	0	4	0	0	0	0	0	0	0	1	0	0	0	1	0	0	6
05:45 PM	0	4	0	0	0	0	1	0	0	3	1	0	1	0	0	0	10
Total	0	15	0	0	1	0	1	0	2	9	1	0	3	4	0	0	36
Grand Total	2	24	6	0	5	3	1	0	8	30	3	0	10	12	1	0	105
Apprch %	6.2	75	18.8	0	55.6	33.3	11.1	0	19.5	73.2	7.3	0	43.5	52.2	4.3	0	
Total %	1.9	22.9	5.7	0	4.8	2.9	1	0	7.6	28.6	2.9	0	9.5	11.4	1	0	

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**1**	**5**	0	0	**6**	0	1	0	0	1	0	**7**	**2**	0	9	**3**	2	0	0	5	**21**
04:15 PM	0	2	1	0	3	**2**	0	0	0	**2**	2	3	0	0	5	3	1	0	0	4	14
04:30 PM	0	0	**3**	0	3	0	**2**	0	0	2	**3**	7	0	0	**10**	0	1	0	0	1	16
04:45 PM	1	2	2	0	5	2	0	0	0	2	1	4	0	0	5	1	**4**	**1**	0	**6**	18
Total Volume	2	9	6	0	17	4	3	0	0	7	6	21	2	0	29	7	8	1	0	16	69
% App. Total	11.8	52.9	35.3	0		57.1	42.9	0	0		20.7	72.4	6.9	0		43.8	50	6.2	0		
PHF	.500	.450	.500	.000	.708	.500	.375	.000	.000	.875	.500	.750	.250	.000	.725	.583	.500	.250	.000	.667	.821

N/S: Massachusetts Avenue
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Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Buses

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	2	0	0	0	2	0	0	0	5	0	0	0	4	0	0	13
04:15 PM	0	3	0	0	0	3	0	0	0	5	0	0	0	2	0	0	13
04:30 PM	0	5	0	0	1	3	0	0	0	5	0	0	0	4	0	0	18
04:45 PM	0	0	0	0	0	4	0	0	0	2	0	0	0	2	0	0	8
Total	0	10	0	0	1	12	0	0	0	17	0	0	0	12	0	0	52
05:00 PM	0	4	1	0	0	2	0	0	0	9	0	0	1	5	1	0	23
05:15 PM	0	3	0	0	0	2	0	0	0	4	0	0	1	0	0	0	10
05:30 PM	1	4	0	0	0	1	0	0	0	4	0	0	0	2	0	0	12
05:45 PM	2	2	2	0	1	1	0	0	0	6	0	0	0	1	0	0	15
Total	3	13	3	0	1	6	0	0	0	23	0	0	2	8	1	0	60
Grand Total	3	23	3	0	2	18	0	0	0	40	0	0	2	20	1	0	112
Apprch %	10.3	79.3	10.3	0	10	90	0	0	0	100	0	0	8.7	87	4.3	0	
Total %	2.7	20.5	2.7	0	1.8	16.1	0	0	0	35.7	0	0	1.8	17.9	0.9	0	

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	3	0	0	3	0	3	0	0	3	0	5	0	0	5	0	2	0	0	2	13
04:30 PM	0	**5**	0	0	**5**	**1**	3	0	0	**4**	0	5	0	0	5	0	4	0	0	4	18
04:45 PM	0	0	0	0	0	0	**4**	0	0	4	0	2	0	0	2	0	2	0	0	2	8
05:00 PM	0	4	**1**	0	5	0	2	0	0	2	0	**9**	0	0	**9**	**1**	**5**	**1**	0	**7**	**23**
Total Volume	0	12	1	0	13	1	12	0	0	13	0	21	0	0	21	1	13	1	0	15	62
% App. Total	0	92.3	7.7	0		7.7	92.3	0	0		0	100	0	0		6.7	86.7	6.7	0		
PHF	.000	.600	.250	.000	.650	.250	.750	.000	.000	.813	.000	.583	.000	.000	.583	.250	.650	.250	.000	.536	.674

N/S: Massachusetts Avenue
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City, State: Boston, MA
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Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North				Boylston Street From East				Massachusetts Avenue From South				Boylston Street From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	3	9	0	120	0	3	0	116	0	10	0	100	0	2	0	123	486
04:15 PM	6	18	0	102	0	0	0	119	0	14	0	81	0	0	1	136	477
04:30 PM	6	21	2	78	0	0	0	91	0	5	0	188	0	3	1	120	515
04:45 PM	6	26	1	83	0	0	0	116	0	10	0	116	0	3	0	67	428
Total	21	74	3	383	0	3	0	442	0	39	0	485	0	8	2	446	1906
05:00 PM	0	30	0	114	3	2	0	187	0	17	0	119	0	1	1	136	610
05:15 PM	1	38	3	124	1	0	0	208	0	32	0	134	0	5	0	160	706
05:30 PM	3	39	6	138	5	1	0	209	2	30	0	170	0	2	0	73	678
05:45 PM	2	22	5	122	5	2	0	199	0	28	0	168	1	1	0	71	626
Total	6	129	14	498	14	5	0	803	2	107	0	591	1	9	1	440	2620
Grand Total	27	203	17	881	14	8	0	1245	2	146	0	1076	1	17	3	886	4526
Apprch %	2.4	18	1.5	78.1	1.1	0.6	0	98.3	0.2	11.9	0	87.9	0.1	1.9	0.3	97.7	
Total %	0.6	4.5	0.4	19.5	0.3	0.2	0	27.5	0	3.2	0	23.8	0	0.4	0.1	19.6	

	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	30	0	114	144	3	**2**	0	187	192	0	17	0	119	136	0	1	**1**	136	138	610
05:15 PM	1	38	3	124	166	1	0	0	208	209	0	**32**	0	134	166	0	**5**	0	**160**	**165**	**706**
05:30 PM	**3**	**39**	**6**	**138**	**186**	**5**	1	0	**209**	**215**	**2**	30	0	**170**	**202**	0	2	0	73	75	678
05:45 PM	2	22	5	122	151	5	2	0	199	206	0	28	0	168	196	**1**	1	0	71	73	626
Total Volume	6	129	14	498	647	14	5	0	803	822	2	107	0	591	700	1	9	1	440	451	2620
% App. Total	0.9	19.9	2.2	77		1.7	0.6	0	97.7		0.3	15.3	0	84.4		0.2	2	0.2	97.6		
PHF	.500	.827	.583	.902	.870	.700	.625	.000	.961	.956	.250	.836	.000	.869	.866	.250	.450	.250	.688	.683	.928

N/S: Massachusetts Avenue
E/W: Boylston Street
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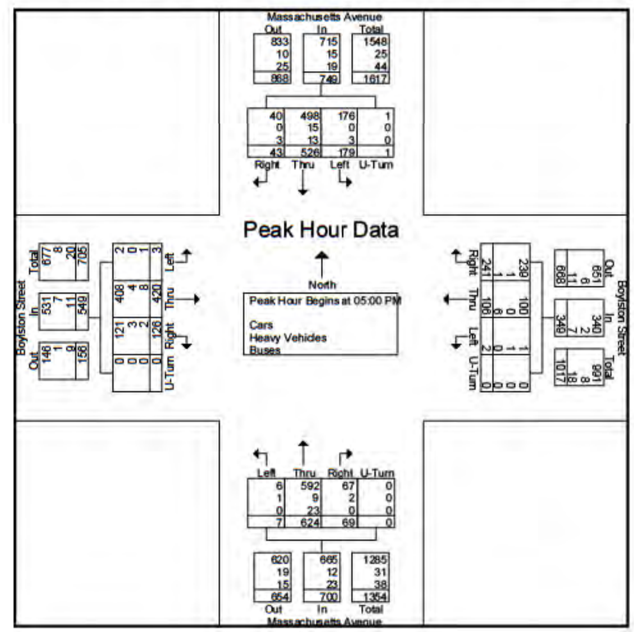
	Massachusetts Avenue From North					Boylston Street From East					Massachusetts Avenue From South					Boylston Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**13**	131	40	0	184	**63**	22	0	0	85	17	**156**	0	0	173	**38**	**110**	**1**	0	**149**	591
05:15 PM	8	**134**	46	**1**	189	62	**32**	0	0	**94**	14	156	0	0	170	34	101	1	0	136	589
05:30 PM	9	132	43	0	184	55	27	**1**	0	83	18	156	2	0	176	27	102	1	0	130	573
05:45 PM	13	129	**50**	0	**192**	61	25	1	0	87	**20**	156	**5**	0	**181**	27	107	0	0	134	**594**
Total Volume	43	526	179	1	749	241	106	2	0	349	69	624	7	0	700	126	420	3	0	549	2347
% App. Total	5.7	70.2	23.9	0.1		69.1	30.4	0.6	0		9.9	89.1	1	0		23	76.5	0.5	0		
PHF	.827	.981	.895	.250	.975	.956	.828	.500	.000	.928	.863	1.00	.350	.000	.967	.829	.955	.750	.000	.921	.988
Cars	40	498	176	1	715	239	100	1	0	340	67	592	6	0	665	121	408	2	0	531	2251
% Cars	93.0	94.7	98.3	100	95.5	99.2	94.3	50.0	0	97.4	97.1	94.9	85.7	0	95.0	96.0	97.1	66.7	0	96.7	95.9
Heavy Vehicles	0	15	0	0	15	1	0	1	0	2	2	9	1	0	12	3	4	0	0	7	36
% Heavy Vehicles	0	2.9	0	0	2.0	0.4	0	50.0	0	0.6	2.9	1.4	14.3	0	1.7	2.4	1.0	0	0	1.3	1.5
Buses	3	13	3	0	19	1	6	0	0	7	0	23	0	0	23	2	8	1	0	11	60
% Buses	7.0	2.5	1.7	0	2.5	0.4	5.7	0	0	2.0	0	3.7	0	0	3.3	1.6	1.9	33.3	0	2.0	2.6



N/S: Massachusetts Avenue
E/W: Belvidere Street/ Haviland Street
City, State: Boston, MA
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File Name : 133307 B
Site Code : 10135.00
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Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	3	131	0	0	16	4	4	0	0	151	6	0	0	0	0	0	315
07:15 AM	4	125	0	0	12	8	7	0	0	151	5	0	0	0	0	0	312
07:30 AM	7	140	0	0	7	5	6	0	0	151	5	0	0	0	0	0	321
07:45 AM	5	138	0	0	19	5	5	0	0	170	2	0	0	0	0	0	344
Total	19	534	0	0	54	22	22	0	0	623	18	0	0	0	0	0	1292
08:00 AM	4	134	0	0	14	3	4	0	0	157	4	0	0	0	0	0	320
08:15 AM	6	139	0	0	13	9	3	0	0	165	4	0	0	0	0	0	339
08:30 AM	4	154	0	0	7	6	5	0	0	175	4	0	0	0	0	0	355
08:45 AM	8	159	0	0	11	4	5	0	0	126	5	0	0	0	0	0	318
Total	22	586	0	0	45	22	17	0	0	623	17	0	0	0	0	0	1332
Grand Total	41	1120	0	0	99	44	39	0	0	1246	35	0	0	0	0	0	2624
Apprch %	3.5	96.5	0	0	54.4	24.2	21.4	0	0	97.3	2.7	0	0	0	0	0	
Total %	1.6	42.7	0	0	3.8	1.7	1.5	0	0	47.5	1.3	0	0	0	0	0	
Cars	39	994	0	0	92	43	35	0	0	1088	35	0	0	0	0	0	2326
% Cars	95.1	88.8	0	0	92.9	97.7	89.7	0	0	87.3	100	0	0	0	0	0	88.6
Heavy Vehicles	1	96	0	0	7	1	4	0	0	123	0	0	0	0	0	0	232
% Heavy Vehicles	2.4	8.6	0	0	7.1	2.3	10.3	0	0	9.9	0	0	0	0	0	0	8.8
Buses	1	30	0	0	0	0	0	0	0	35	0	0	0	0	0	0	66
% Buses	2.4	2.7	0	0	0	0	0	0	0	2.8	0	0	0	0	0	0	2.5

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	5	138	0	0	143	**19**	5	**5**	0	**29**	0	170	2	0	172	0	0	0	0	0	344
08:00 AM	4	134	0	0	138	14	3	4	0	21	0	157	**4**	0	161	0	0	0	0	0	320
08:15 AM	**6**	139	0	0	145	13	**9**	3	0	25	0	165	4	0	169	0	0	0	0	0	339
08:30 AM	4	**154**	0	0	**158**	7	6	5	0	18	0	**175**	4	0	**179**	0	0	0	0	0	**355**
Total Volume	19	565	0	0	584	53	23	17	0	93	0	667	14	0	681	0	0	0	0	0	1358
% App. Total	3.3	96.7	0	0		57	24.7	18.3	0		0	97.9	2.1	0		0	0	0	0		
PHF	.792	.917	.000	.000	.924	.697	.639	.850	.000	.802	.000	.953	.875	.000	.951	.000	.000	.000	.000	.000	.956
Cars	18	507	0	0	525	51	22	15	0	88	0	599	14	0	613	0	0	0	0	0	1226
% Cars	94.7	89.7	0	0	89.9	96.2	95.7	88.2	0	94.6	0	89.8	100	0	90.0	0	0	0	0	0	90.3
Heavy Vehicles	1	43	0	0	44	2	1	2	0	5	0	54	0	0	54	0	0	0	0	0	103
% Heavy Vehicles	5.3	7.6	0	0	7.5	3.8	4.3	11.8	0	5.4	0	8.1	0	0	7.9	0	0	0	0	0	7.6
Buses	0	15	0	0	15	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	29
% Buses	0	2.7	0	0	2.6	0	0	0	0	0	0	2.1	0	0	2.1	0	0	0	0	0	2.1

N/S: Massachusetts Avenue
E/W: Belvidere Street/ Haviland Street
City, State: Boston, MA
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Groups Printed- Cars

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	3	122	0	0	15	4	4	0	0	124	6	0	0	0	0	0	278
07:15 AM	4	107	0	0	9	8	7	0	0	130	5	0	0	0	0	0	270
07:30 AM	6	122	0	0	7	5	5	0	0	129	5	0	0	0	0	0	279
07:45 AM	4	125	0	0	19	5	5	0	0	145	2	0	0	0	0	0	305
Total	17	476	0	0	50	22	21	0	0	528	18	0	0	0	0	0	1132
08:00 AM	4	118	0	0	13	2	4	0	0	142	4	0	0	0	0	0	287
08:15 AM	6	123	0	0	13	9	2	0	0	149	4	0	0	0	0	0	306
08:30 AM	4	141	0	0	6	6	4	0	0	163	4	0	0	0	0	0	328
08:45 AM	8	136	0	0	10	4	4	0	0	106	5	0	0	0	0	0	273
Total	22	518	0	0	42	21	14	0	0	560	17	0	0	0	0	0	1194
Grand Total	39	994	0	0	92	43	35	0	0	1088	35	0	0	0	0	0	2326
Apprch %	3.8	96.2	0	0	54.1	25.3	20.6	0	0	96.9	3.1	0	0	0	0	0	
Total %	1.7	42.7	0	0	4	1.8	1.5	0	0	46.8	1.5	0	0	0	0	0	

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	4	125	0	0	129	**19**	5	**5**	0	**29**	0	145	2	0	147	0	0	0	0	0	305
08:00 AM	4	118	0	0	122	13	2	4	0	19	0	142	**4**	0	146	0	0	0	0	0	287
08:15 AM	**6**	123	0	0	129	13	**9**	2	0	24	0	149	4	0	153	0	0	0	0	0	306
08:30 AM	4	**141**	0	0	**145**	6	6	4	0	16	0	**163**	4	0	**167**	0	0	0	0	0	**328**
Total Volume	18	507	0	0	525	51	22	15	0	88	0	599	14	0	613	0	0	0	0	0	1226
% App. Total	3.4	96.6	0	0		58	25	17	0		0	97.7	2.3	0		0	0	0	0		
PHF	.750	.899	.000	.000	.905	.671	.611	.750	.000	.759	.000	.919	.875	.000	.918	.000	.000	.000	.000	.000	.934

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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	7	0	0	1	0	0	0	0	20	0	0	0	0	0	0	28
07:15 AM	0	14	0	0	3	0	0	0	0	18	0	0	0	0	0	0	35
07:30 AM	0	13	0	0	0	0	1	0	0	16	0	0	0	0	0	0	30
07:45 AM	1	9	0	0	0	0	0	0	0	21	0	0	0	0	0	0	31
Total	1	43	0	0	4	0	1	0	0	75	0	0	0	0	0	0	124
08:00 AM	0	12	0	0	1	1	0	0	0	10	0	0	0	0	0	0	24
08:15 AM	0	13	0	0	0	0	1	0	0	13	0	0	0	0	0	0	27
08:30 AM	0	9	0	0	1	0	1	0	0	10	0	0	0	0	0	0	21
08:45 AM	0	19	0	0	1	0	1	0	0	15	0	0	0	0	0	0	36
Total	0	53	0	0	3	1	3	0	0	48	0	0	0	0	0	0	108
Grand Total	1	96	0	0	7	1	4	0	0	123	0	0	0	0	0	0	232
Apprch %	1	99	0	0	58.3	8.3	33.3	0	0	100	0	0	0	0	0	0	
Total %	0.4	41.4	0	0	3	0.4	1.7	0	0	53	0	0	0	0	0	0	

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	7	0	0	7	1	0	0	0	1	0	20	0	0	20	0	0	0	0	0	28
07:15 AM	0	**14**	0	0	**14**	**3**	0	0	0	**3**	0	18	0	0	18	0	0	0	0	0	**35**
07:30 AM	0	13	0	0	13	0	0	**1**	0	1	0	16	0	0	16	0	0	0	0	0	30
07:45 AM	**1**	9	0	0	10	0	0	0	0	0	0	**21**	0	0	**21**	0	0	0	0	0	31
Total Volume	1	43	0	0	44	4	0	1	0	5	0	75	0	0	75	0	0	0	0	0	124
% App. Total	2.3	97.7	0	0		80	0	20	0		0	100	0	0		0	0	0	0		
PHF	.250	.768	.000	.000	.786	.333	.000	.250	.000	.417	.000	.893	.000	.000	.893	.000	.000	.000	.000	.000	.886

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Groups Printed- Buses

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	2	0	0	0	0	0	0	0	7	0	0	0	0	0	0	9
07:15 AM	0	4	0	0	0	0	0	0	0	3	0	0	0	0	0	0	7
07:30 AM	1	5	0	0	0	0	0	0	0	6	0	0	0	0	0	0	12
07:45 AM	0	4	0	0	0	0	0	0	0	4	0	0	0	0	0	0	8
Total	1	15	0	0	0	0	0	0	0	20	0	0	0	0	0	0	36
08:00 AM	0	4	0	0	0	0	0	0	0	5	0	0	0	0	0	0	9
08:15 AM	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	6
08:30 AM	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	6
08:45 AM	0	4	0	0	0	0	0	0	0	5	0	0	0	0	0	0	9
Total	0	15	0	0	0	0	0	0	0	15	0	0	0	0	0	0	30
Grand Total	1	30	0	0	0	0	0	0	0	35	0	0	0	0	0	0	66
Apprch %	3.2	96.8	0	0	0	0	0	0	0	100	0	0	0	0	0	0	
Total %	1.5	45.5	0	0	0	0	0	0	0	53	0	0	0	0	0	0	

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	2	0	0	2	0	0	0	0	0	0	**7**	0	0	**7**	0	0	0	0	0	9
07:15 AM	0	4	0	0	4	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	7
07:30 AM	**1**	**5**	0	0	**6**	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	**12**
07:45 AM	0	4	0	0	4	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	8
Total Volume	1	15	0	0	16	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	36
% App. Total	6.2	93.8	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.250	.750	.000	.000	.667	.000	.000	.000	.000	.000	.000	.714	.000	.000	.714	.000	.000	.000	.000	.000	.750

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Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	4	0	2	2	0	0	23	0	8	0	3	0	0	0	35	77
07:15 AM	0	6	0	7	0	0	0	29	0	10	0	2	0	0	0	61	115
07:30 AM	0	16	0	9	0	1	0	34	0	8	0	1	0	0	0	64	133
07:45 AM	1	26	0	5	0	0	0	34	0	8	0	1	0	0	0	63	138
Total	1	52	0	23	2	1	0	120	0	34	0	7	0	0	0	223	463
08:00 AM	0	22	0	9	0	0	0	52	0	13	0	7	0	0	0	75	178
08:15 AM	0	27	0	12	1	0	0	45	0	20	0	7	0	0	0	77	189
08:30 AM	1	28	0	11	3	0	0	55	0	28	0	10	0	0	1	109	246
08:45 AM	0	36	0	7	0	0	0	52	0	14	0	19	0	0	0	101	229
Total	1	113	0	39	4	0	0	204	0	75	0	43	0	0	1	362	842
Grand Total	2	165	0	62	6	1	0	324	0	109	0	50	0	0	1	585	1305
Apprch %	0.9	72.1	0	27.1	1.8	0.3	0	97.9	0	68.6	0	31.4	0	0	0.2	99.8	
Total %	0.2	12.6	0	4.8	0.5	0.1	0	24.8	0	8.4	0	3.8	0	0	0.1	44.8	

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	22	0	9	31	0	0	0	52	52	0	13	0	7	20	0	0	0	75	75	178
08:15 AM	0	27	0	12	39	1	0	0	45	46	0	20	0	7	27	0	0	0	77	77	189
08:30 AM	1	28	0	11	40	3	0	0	55	58	0	28	0	10	38	0	0	1	109	110	246
08:45 AM	0	36	0	7	43	0	0	0	52	52	0	14	0	19	33	0	0	0	101	101	229
Total Volume	1	113	0	39	153	4	0	0	204	208	0	75	0	43	118	0	0	1	362	363	842
% App. Total	0.7	73.9	0	25.5		1.9	0	0	98.1		0	63.6	0	36.4		0	0	0.3	99.7		
PHF	.250	.785	.000	.813	.890	.333	.000	.000	.927	.897	.000	.670	.000	.566	.776	.000	.000	.250	.830	.825	.856

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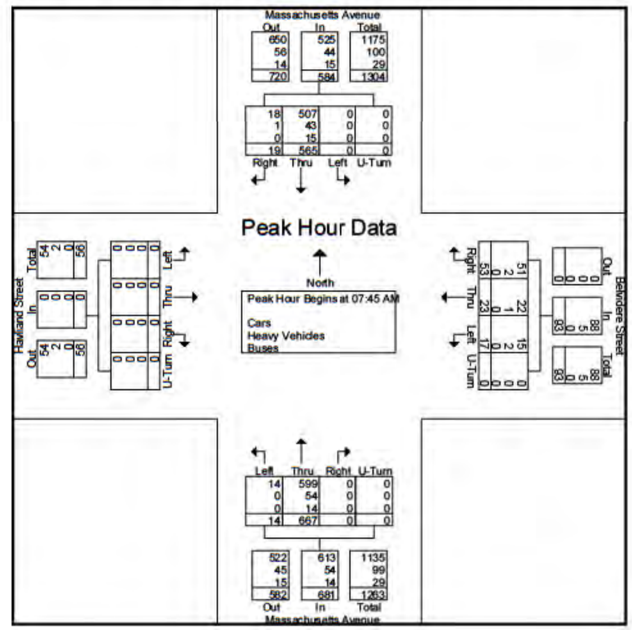
	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	5	138	0	0	143	19	5	5	0	29	0	170	2	0	172	0	0	0	0	0	344
08:00 AM	4	134	0	0	138	14	3	4	0	21	0	157	4	0	161	0	0	0	0	0	320
08:15 AM	6	139	0	0	145	13	9	3	0	25	0	165	4	0	169	0	0	0	0	0	339
08:30 AM	4	154	0	0	158	7	6	5	0	18	0	175	4	0	179	0	0	0	0	0	355
Total Volume	19	565	0	0	584	53	23	17	0	93	0	667	14	0	681	0	0	0	0	0	1358
% App. Total	3.3	96.7	0	0		57	24.7	18.3	0		0	97.9	2.1	0		0	0	0	0		
PHF	.792	.917	.000	.000	.924	.697	.639	.850	.000	.802	.000	.953	.875	.000	.951	.000	.000	.000	.000	.000	.956
Cars	18	507	0	0	525	51	22	15	0	88	0	599	14	0	613	0	0	0	0	0	1226
% Cars	94.7	89.7	0	0	89.9	96.2	95.7	88.2	0	94.6	0	89.8	100	0	90.0	0	0	0	0	0	90.3
Heavy Vehicles	1	43	0	0	44	2	1	2	0	5	0	54	0	0	54	0	0	0	0	0	103
% Heavy Vehicles	5.3	7.6	0	0	7.5	3.8	4.3	11.8	0	5.4	0	8.1	0	0	7.9	0	0	0	0	0	7.6
Buses	0	15	0	0	15	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	29
% Buses	0	2.7	0	0	2.6	0	0	0	0	0	0	2.1	0	0	2.1	0	0	0	0	0	2.1



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Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	7	166	0	0	14	7	2	0	0	130	7	0	0	0	0	0	333
04:15 PM	3	152	0	0	14	8	8	0	0	128	4	1	0	0	0	0	318
04:30 PM	1	176	0	0	16	10	4	0	0	159	2	1	0	0	0	0	369
04:45 PM	4	178	0	0	16	3	1	0	0	149	2	0	0	0	0	0	353
Total	15	672	0	0	60	28	15	0	0	566	15	2	0	0	0	0	1373
05:00 PM	4	165	0	0	18	7	4	0	0	164	6	0	0	0	0	0	368
05:15 PM	2	163	0	0	10	12	4	0	0	158	4	0	0	0	0	0	353
05:30 PM	4	158	0	0	16	6	6	0	0	151	9	2	0	0	0	0	352
05:45 PM	5	150	0	0	26	9	2	0	0	169	3	0	0	0	0	0	364
Total	15	636	0	0	70	34	16	0	0	642	22	2	0	0	0	0	1437
Grand Total	30	1308	0	0	130	62	31	0	0	1208	37	4	0	0	0	0	2810
Apprch %	2.2	97.8	0	0	58.3	27.8	13.9	0	0	96.7	3	0.3	0	0	0	0	
Total %	1.1	46.5	0	0	4.6	2.2	1.1	0	0	43	1.3	0.1	0	0	0	0	
Cars	30	1250	0	0	127	61	30	0	0	1130	36	4	0	0	0	0	2668
% Cars	100	95.6	0	0	97.7	98.4	96.8	0	0	93.5	97.3	100	0	0	0	0	94.9
Heavy Vehicles	0	34	0	0	3	1	1	0	0	39	1	0	0	0	0	0	79
% Heavy Vehicles	0	2.6	0	0	2.3	1.6	3.2	0	0	3.2	2.7	0	0	0	0	0	2.8
Buses	0	24	0	0	0	0	0	0	0	39	0	0	0	0	0	0	63
% Buses	0	1.8	0	0	0	0	0	0	0	3.2	0	0	0	0	0	0	2.2

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	1	176	0	0	177	16	10	**4**	0	**30**	0	159	2	**1**	162	0	0	0	0	0	**369**
04:45 PM	**4**	**178**	0	0	**182**	16	3	1	0	20	0	149	2	0	151	0	0	0	0	0	353
05:00 PM	4	165	0	0	169	**18**	7	4	0	29	0	**164**	**6**	0	**170**	0	0	0	0	0	368
05:15 PM	2	163	0	0	165	10	**12**	4	0	26	0	158	4	0	162	0	0	0	0	0	353
Total Volume	11	682	0	0	693	60	32	13	0	105	0	630	14	1	645	0	0	0	0	0	1443
% App. Total	1.6	98.4	0	0		57.1	30.5	12.4	0		0	97.7	2.2	0.2		0	0	0	0		
PHF	.688	.958	.000	.000	.952	.833	.667	.813	.000	.875	.000	.960	.583	.250	.949	.000	.000	.000	.000	.000	.978
Cars	11	654	0	0	665	57	32	12	0	101	0	591	13	1	605	0	0	0	0	0	1371
% Cars	100	95.9	0	0	96.0	95.0	100	92.3	0	96.2	0	93.8	92.9	100	93.8	0	0	0	0	0	95.0
Heavy Vehicles	0	15	0	0	15	3	0	1	0	4	0	18	1	0	19	0	0	0	0	0	38
% Heavy Vehicles	0	2.2	0	0	2.2	5.0	0	7.7	0	3.8	0	2.9	7.1	0	2.9	0	0	0	0	0	2.6
Buses	0	13	0	0	13	0	0	0	0	0	0	21	0	0	21	0	0	0	0	0	34
% Buses	0	1.9	0	0	1.9	0	0	0	0	0	0	3.3	0	0	3.3	0	0	0	0	0	2.4

N/S: Massachusetts Avenue
E/W: Belvidere Street/ Haviland Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
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Groups Printed- Cars

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	7	157	0	0	14	6	2	0	0	117	7	0	0	0	0	0	310
04:15 PM	3	146	0	0	14	8	8	0	0	119	4	1	0	0	0	0	303
04:30 PM	1	171	0	0	15	10	4	0	0	146	2	1	0	0	0	0	350
04:45 PM	4	173	0	0	16	3	0	0	0	142	1	0	0	0	0	0	339
Total	15	647	0	0	59	27	14	0	0	524	14	2	0	0	0	0	1302
05:00 PM	4	155	0	0	17	7	4	0	0	153	6	0	0	0	0	0	346
05:15 PM	2	155	0	0	9	12	4	0	0	150	4	0	0	0	0	0	336
05:30 PM	4	150	0	0	16	6	6	0	0	147	9	2	0	0	0	0	340
05:45 PM	5	143	0	0	26	9	2	0	0	156	3	0	0	0	0	0	344
Total	15	603	0	0	68	34	16	0	0	606	22	2	0	0	0	0	1366
Grand Total	30	1250	0	0	127	61	30	0	0	1130	36	4	0	0	0	0	2668
Apprch %	2.3	97.7	0	0	58.3	28	13.8	0	0	96.6	3.1	0.3	0	0	0	0	
Total %	1.1	46.9	0	0	4.8	2.3	1.1	0	0	42.4	1.3	0.1	0	0	0	0	

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	1	171	0	0	172	15	10	**4**	0	**29**	0	146	2	**1**	149	0	0	0	0	0	**350**
04:45 PM	**4**	**173**	0	0	**177**	16	3	0	0	19	0	142	1	0	143	0	0	0	0	0	339
05:00 PM	4	155	0	0	159	**17**	7	4	0	28	0	**153**	**6**	0	**159**	0	0	0	0	0	346
05:15 PM	2	155	0	0	157	9	**12**	4	0	25	0	150	4	0	154	0	0	0	0	0	336
Total Volume	11	654	0	0	665	57	32	12	0	101	0	591	13	1	605	0	0	0	0	0	1371
% App. Total	1.7	98.3	0	0		56.4	31.7	11.9	0		0	97.7	2.1	0.2		0	0	0	0		
PHF	.688	.945	.000	.000	.939	.838	.667	.750	.000	.871	.000	.966	.542	.250	.951	.000	.000	.000	.000	.000	.979

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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	8	0	0	0	1	0	0	0	8	0	0	0	0	0	0	17
04:15 PM	0	2	0	0	0	0	0	0	0	6	0	0	0	0	0	0	8
04:30 PM	0	2	0	0	1	0	0	0	0	8	0	0	0	0	0	0	11
04:45 PM	0	3	0	0	0	0	1	0	0	5	1	0	0	0	0	0	10
Total	0	15	0	0	1	1	1	0	0	27	1	0	0	0	0	0	46
05:00 PM	0	5	0	0	1	0	0	0	0	2	0	0	0	0	0	0	8
05:15 PM	0	5	0	0	1	0	0	0	0	3	0	0	0	0	0	0	9
05:30 PM	0	4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5
05:45 PM	0	5	0	0	0	0	0	0	0	6	0	0	0	0	0	0	11
Total	0	19	0	0	2	0	0	0	0	12	0	0	0	0	0	0	33
Grand Total	0	34	0	0	3	1	1	0	0	39	1	0	0	0	0	0	79
Apprch %	0	100	0	0	60	20	20	0	0	97.5	2.5	0	0	0	0	0	
Total %	0	43	0	0	3.8	1.3	1.3	0	0	49.4	1.3	0	0	0	0	0	

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	8	0	0	8	0	1	0	0	1	0	8	0	0	8	0	0	0	0	0	17
04:15 PM	0	2	0	0	2	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	8
04:30 PM	0	2	0	0	2	1	0	0	0	1	0	8	0	0	8	0	0	0	0	0	11
04:45 PM	0	3	0	0	3	0	0	1	0	1	0	5	1	0	6	0	0	0	0	0	10
Total Volume	0	15	0	0	15	1	1	1	0	3	0	27	1	0	28	0	0	0	0	0	46
% App. Total	0	100	0	0		33.3	33.3	33.3	0		0	96.4	3.6	0		0	0	0	0		
PHF	.000	.469	.000	.000	.469	.250	.250	.250	.000	.750	.000	.844	.250	.000	.875	.000	.000	.000	.000	.000	.676

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Groups Printed- Buses

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	1	0	0	0	0	0	0	0	5	0	0	0	0	0	0	6
04:15 PM	0	4	0	0	0	0	0	0	0	3	0	0	0	0	0	0	7
04:30 PM	0	3	0	0	0	0	0	0	0	5	0	0	0	0	0	0	8
04:45 PM	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4
Total	0	10	0	0	0	0	0	0	0	15	0	0	0	0	0	0	25
05:00 PM	0	5	0	0	0	0	0	0	0	9	0	0	0	0	0	0	14
05:15 PM	0	3	0	0	0	0	0	0	0	5	0	0	0	0	0	0	8
05:30 PM	0	4	0	0	0	0	0	0	0	3	0	0	0	0	0	0	7
05:45 PM	0	2	0	0	0	0	0	0	0	7	0	0	0	0	0	0	9
Total	0	14	0	0	0	0	0	0	0	24	0	0	0	0	0	0	38
Grand Total	0	24	0	0	0	0	0	0	0	39	0	0	0	0	0	0	63
Apprch %	0	100	0	0	0	0	0	0	0	100	0	0	0	0	0	0	
Total %	0	38.1	0	0	0	0	0	0	0	61.9	0	0	0	0	0	0	

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	5	0	0	5	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	14
05:15 PM	0	3	0	0	3	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	8
05:30 PM	0	4	0	0	4	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	7
05:45 PM	0	2	0	0	2	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	9
Total Volume	0	14	0	0	14	0	0	0	0	0	0	24	0	0	24	0	0	0	0	0	38
% App. Total	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.700	.000	.000	.700	.000	.000	.000	.000	.000	.000	.667	.000	.000	.667	.000	.000	.000	.000	.000	.679

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Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North				Belvidere Street From East				Massachusetts Avenue From South				Havliand Street From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	8	0	14	1	0	2	75	0	14	0	12	0	0	0	135	261
04:15 PM	1	19	0	15	1	0	1	39	0	19	1	22	0	0	0	160	278
04:30 PM	0	18	0	11	0	0	0	55	0	8	0	7	2	0	0	136	237
04:45 PM	1	25	1	8	0	0	0	72	0	13	0	6	0	0	0	134	260
Total	2	70	1	48	2	0	3	241	0	54	1	47	2	0	0	565	1036
05:00 PM	1	28	0	20	0	0	0	77	0	19	0	13	0	0	0	161	319
05:15 PM	0	38	0	14	0	4	0	86	0	29	0	11	0	0	0	149	331
05:30 PM	0	38	0	7	0	0	0	78	0	23	0	12	0	0	0	182	340
05:45 PM	2	20	0	19	1	1	0	79	0	20	0	14	0	0	0	170	326
Total	3	124	0	60	1	5	0	320	0	91	0	50	0	0	0	662	1316
Grand Total	5	194	1	108	3	5	3	561	0	145	1	97	2	0	0	1227	2352
Apprch %	1.6	63	0.3	35.1	0.5	0.9	0.5	98.1	0	59.7	0.4	39.9	0.2	0	0	99.8	
Total %	0.2	8.2	0	4.6	0.1	0.2	0.1	23.9	0	6.2	0	4.1	0.1	0	0	52.2	

	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	1	28	0	**20**	49	0	0	0	77	77	0	19	0	13	32	0	0	0	161	161	319
05:15 PM	0	**38**	0	14	**52**	0	**4**	0	**86**	**90**	0	**29**	0	11	**40**	0	0	0	149	149	331
05:30 PM	0	38	0	7	45	0	0	0	78	78	0	23	0	12	35	0	0	0	**182**	**182**	**340**
05:45 PM	**2**	20	0	19	41	**1**	1	0	79	81	0	20	0	**14**	34	0	0	0	170	170	326
Total Volume	3	124	0	60	187	1	5	0	320	326	0	91	0	50	141	0	0	0	662	662	1316
% App. Total	1.6	66.3	0	32.1		0.3	1.5	0	98.2		0	64.5	0	35.5		0	0	0	100		
PHF	.375	.816	.000	.750	.899	.250	.313	.000	.930	.906	.000	.784	.000	.893	.881	.000	.000	.000	.909	.909	.968

N/S: Massachusetts Avenue
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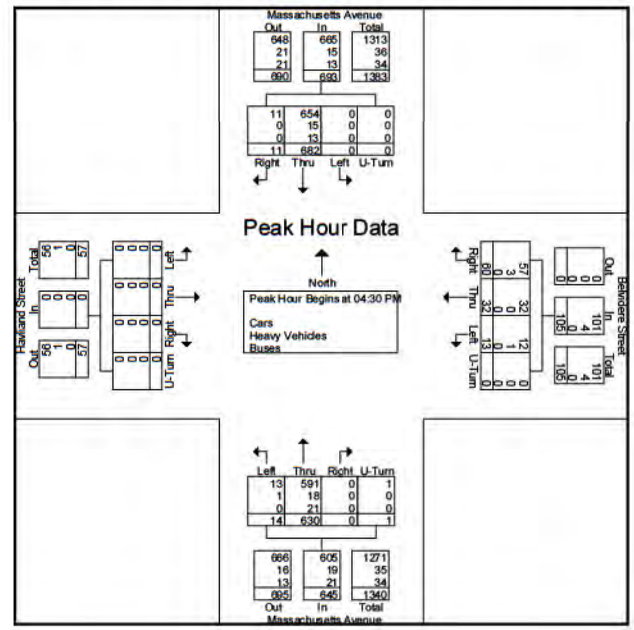
	Massachusetts Avenue From North					Belvidere Street From East					Massachusetts Avenue From South					Havliand Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	1	176	0	0	177	16	10	**4**	0	**30**	0	159	2	**1**	162	0	0	0	0	0	**369**
04:45 PM	**4**	**178**	0	0	**182**	16	3	1	0	20	0	149	2	0	151	0	0	0	0	0	353
05:00 PM	4	165	0	0	169	**18**	7	4	0	29	0	**164**	**6**	0	**170**	0	0	0	0	0	368
05:15 PM	2	163	0	0	165	10	**12**	4	0	26	0	158	4	0	162	0	0	0	0	0	353
Total Volume	11	682	0	0	693	60	32	13	0	105	0	630	14	1	645	0	0	0	0	0	1443
% App. Total	1.6	98.4	0	0		57.1	30.5	12.4	0		0	97.7	2.2	0.2		0	0	0	0		
PHF	.688	.958	.000	.000	.952	.833	.667	.813	.000	.875	.000	.960	.583	.250	.949	.000	.000	.000	.000	.000	.978
Cars	11	654	0	0	665	57	32	12	0	101	0	591	13	1	605	0	0	0	0	0	1371
% Cars	100	95.9	0	0	96.0	95.0	100	92.3	0	96.2	0	93.8	92.9	100	93.8	0	0	0	0	0	95.0
Heavy Vehicles	0	15	0	0	15	3	0	1	0	4	0	18	1	0	19	0	0	0	0	0	38
% Heavy Vehicles	0	2.2	0	0	2.2	5.0	0	7.7	0	3.8	0	2.9	7.1	0	2.9	0	0	0	0	0	2.6
Buses	0	13	0	0	13	0	0	0	0	0	0	21	0	0	21	0	0	0	0	0	34
% Buses	0	1.9	0	0	1.9	0	0	0	0	0	0	3.3	0	0	3.3	0	0	0	0	0	2.4



N/S: Massachusetts Avenue
E: St. Germain Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	135	0	0	0	2	0	0	157	0	294
07:15 AM	134	0	0	0	1	0	0	158	0	293
07:30 AM	148	0	0	1	2	0	0	163	0	314
07:45 AM	145	0	0	2	1	0	0	167	1	316
Total	562	0	0	3	6	0	0	645	1	1217
08:00 AM	142	0	0	0	0	0	0	163	0	305
08:15 AM	139	0	0	2	0	0	0	162	1	304
08:30 AM	164	0	0	1	0	0	0	179	0	344
08:45 AM	165	0	0	1	0	0	0	150	0	316
Total	610	0	0	4	0	0	0	654	1	1269
Grand Total	1172	0	0	7	6	0	0	1299	2	2486
Apprch %	100	0	0	53.8	46.2	0	0	99.8	0.2	
Total %	47.1	0	0	0.3	0.2	0	0	52.3	0.1	
Cars	1044	0	0	6	6	0	0	1139	1	2196
% Cars	89.1	0	0	85.7	100	0	0	87.7	50	88.3
Heavy Vehicles	97	0	0	1	0	0	0	127	1	226
% Heavy Vehicles	8.3	0	0	14.3	0	0	0	9.8	50	9.1
Buses	31	0	0	0	0	0	0	33	0	64
% Buses	2.6	0	0	0	0	0	0	2.5	0	2.6

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	145	0	0	145	**2**	**1**	0	**3**	0	167	**1**	168	316
08:00 AM	142	0	0	142	0	0	0	0	0	163	0	163	305
08:15 AM	139	0	0	139	2	0	0	2	0	162	1	163	304
08:30 AM	**164**	0	0	**164**	1	0	0	1	0	**179**	0	**179**	**344**
Total Volume	590	0	0	590	5	1	0	6	0	671	2	673	1269
% App. Total	100	0	0		83.3	16.7	0		0	99.7	0.3		
PHF	.899	.000	.000	.899	.625	.250	.000	.500	.000	.937	.500	.940	.922
Cars	531	0	0	531	4	1	0	5	0	600	1	601	1137
% Cars	90.0	0	0	90.0	80.0	100	0	83.3	0	89.4	50.0	89.3	89.6
Heavy Vehicles	44	0	0	44	1	0	0	1	0	55	1	56	101
% Heavy Vehicles	7.5	0	0	7.5	20.0	0	0	16.7	0	8.2	50.0	8.3	8.0
Buses	15	0	0	15	0	0	0	0	0	16	0	16	31
% Buses	2.5	0	0	2.5	0	0	0	0	0	2.4	0	2.4	2.4

N/S: Massachusetts Avenue
E: St. Germain Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Cars

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	126	0	0	0	2	0	0	131	0	259
07:15 AM	117	0	0	0	1	0	0	138	0	256
07:30 AM	129	0	0	1	2	0	0	141	0	273
07:45 AM	133	0	0	2	1	0	0	143	1	280
Total	505	0	0	3	6	0	0	553	1	1068
08:00 AM	125	0	0	0	0	0	0	145	0	270
08:15 AM	124	0	0	1	0	0	0	149	0	274
08:30 AM	149	0	0	1	0	0	0	163	0	313
08:45 AM	141	0	0	1	0	0	0	129	0	271
Total	539	0	0	3	0	0	0	586	0	1128
Grand Total	1044	0	0	6	6	0	0	1139	1	2196
Apprch %	100	0	0	50	50	0	0	99.9	0.1	
Total %	47.5	0	0	0.3	0.3	0	0	51.9	0	

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	133	0	0	133	**2**	**1**	0	**3**	0	143	**1**	144	280
08:00 AM	125	0	0	125	0	0	0	0	0	145	0	145	270
08:15 AM	124	0	0	124	1	0	0	1	0	149	0	149	274
08:30 AM	**149**	0	0	**149**	1	0	0	1	0	**163**	0	**163**	**313**
Total Volume	531	0	0	531	4	1	0	5	0	600	1	601	1137
% App. Total	100	0	0		80	20	0		0	99.8	0.2		
PHF	.891	.000	.000	.891	.500	.250	.000	.417	.000	.920	.250	.922	.908

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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	7	0	0	0	0	0	0	21	0	28
07:15 AM	14	0	0	0	0	0	0	18	0	32
07:30 AM	14	0	0	0	0	0	0	18	0	32
07:45 AM	8	0	0	0	0	0	0	21	0	29
Total	43	0	0	0	0	0	0	78	0	121
08:00 AM	13	0	0	0	0	0	0	13	0	26
08:15 AM	12	0	0	1	0	0	0	10	1	24
08:30 AM	11	0	0	0	0	0	0	11	0	22
08:45 AM	18	0	0	0	0	0	0	15	0	33
Total	54	0	0	1	0	0	0	49	1	105
Grand Total	97	0	0	1	0	0	0	127	1	226
Apprch %	100	0	0	100	0	0	0	99.2	0.8	
Total %	42.9	0	0	0.4	0	0	0	56.2	0.4	

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:00 AM													
07:00 AM	7	0	0	7	0	0	0	0	0	**21**	0	**21**	28
07:15 AM	**14**	0	0	**14**	0	0	0	0	0	18	0	18	**32**
07:30 AM	14	0	0	14	0	0	0	0	0	18	0	18	32
07:45 AM	8	0	0	8	0	0	0	0	0	21	0	21	29
Total Volume	43	0	0	43	0	0	0	0	0	78	0	78	121
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.768	.000	.000	.768	.000	.000	.000	.000	.000	.929	.000	.929	.945

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Groups Printed- Buses

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
07:00 AM	2	0	0	0	0	0	0	5	0	7
07:15 AM	3	0	0	0	0	0	0	2	0	5
07:30 AM	5	0	0	0	0	0	0	4	0	9
07:45 AM	4	0	0	0	0	0	0	3	0	7
Total	14	0	0	0	0	0	0	14	0	28
08:00 AM	4	0	0	0	0	0	0	5	0	9
08:15 AM	3	0	0	0	0	0	0	3	0	6
08:30 AM	4	0	0	0	0	0	0	5	0	9
08:45 AM	6	0	0	0	0	0	0	6	0	12
Total	17	0	0	0	0	0	0	19	0	36
Grand Total	31	0	0	0	0	0	0	33	0	64
Apprch %	100	0	0	0	0	0	0	100	0	
Total %	48.4	0	0	0	0	0	0	51.6	0	

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	4	0	0	4	0	0	0	0	0	5	0	5	9
08:15 AM	3	0	0	3	0	0	0	0	0	3	0	3	6
08:30 AM	4	0	0	4	0	0	0	0	0	5	0	5	9
08:45 AM	**6**	0	0	**6**	0	0	0	0	0	**6**	0	**6**	**12**
Total Volume	17	0	0	17	0	0	0	0	0	19	0	19	36
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.708	.000	.000	.708	.000	.000	.000	.000	.000	.792	.000	.792	.750

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Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
07:00 AM	4	0	0	0	0	22	0	8	2	36
07:15 AM	9	0	0	0	0	32	0	11	0	52
07:30 AM	16	0	0	0	0	26	0	10	2	54
07:45 AM	26	0	0	0	0	36	0	11	3	76
Total	55	0	0	0	0	116	0	40	7	218
08:00 AM	20	0	0	0	0	40	0	19	0	79
08:15 AM	26	0	3	0	0	35	0	23	0	87
08:30 AM	31	0	0	0	0	45	0	27	2	105
08:45 AM	35	0	1	0	0	46	0	19	1	102
Total	112	0	4	0	0	166	0	88	3	373
Grand Total	167	0	4	0	0	282	0	128	10	591
Apprch %	97.7	0	2.3	0	0	100	0	92.8	7.2	
Total %	28.3	0	0.7	0	0	47.7	0	21.7	1.7	

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 08:00 AM													
08:00 AM	20	0	0	20	0	0	40	40	0	19	0	19	79
08:15 AM	26	0	3	29	0	0	35	35	0	23	0	23	87
08:30 AM	31	0	0	31	0	0	45	45	0	27	2	29	105
08:45 AM	35	0	1	36	0	0	46	46	0	19	1	20	102
Total Volume	112	0	4	116	0	0	166	166	0	88	3	91	373
% App. Total	96.6	0	3.4		0	0	100		0	96.7	3.3		
PHF	.800	.000	.333	.806	.000	.000	.902	.902	.000	.815	.375	.784	.888

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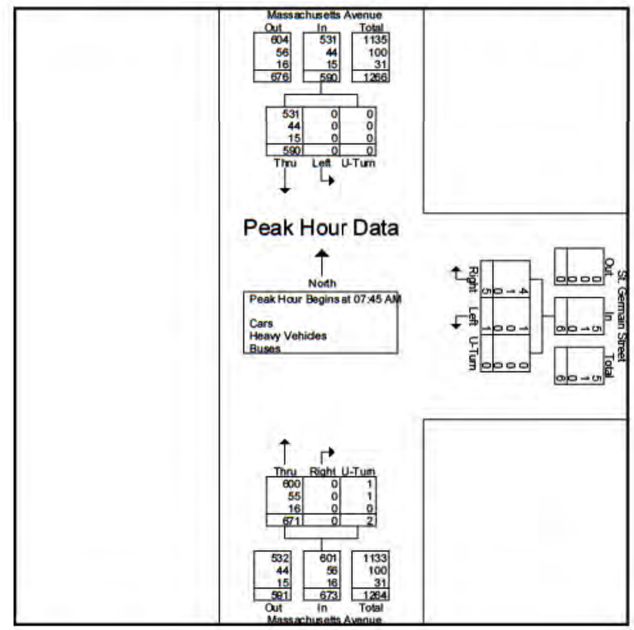
	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 07:45 AM													
07:45 AM	145	0	0	145	2	1	0	3	0	167	1	168	316
08:00 AM	142	0	0	142	0	0	0	0	0	163	0	163	305
08:15 AM	139	0	0	139	2	0	0	2	0	162	1	163	304
08:30 AM	164	0	0	164	1	0	0	1	0	179	0	179	344
Total Volume	590	0	0	590	5	1	0	6	0	671	2	673	1269
% App. Total	100	0	0		83.3	16.7	0		0	99.7	0.3		
PHF	.899	.000	.000	.899	.625	.250	.000	.500	.000	.937	.500	.940	.922
Cars	531	0	0	531	4	1	0	5	0	600	1	601	1137
% Cars	90.0	0	0	90.0	80.0	100	0	83.3	0	89.4	50.0	89.3	89.6
Heavy Vehicles	44	0	0	44	1	0	0	1	0	55	1	56	101
% Heavy Vehicles	7.5	0	0	7.5	20.0	0	0	16.7	0	8.2	50.0	8.3	8.0
Buses	15	0	0	15	0	0	0	0	0	16	0	16	31
% Buses	2.5	0	0	2.5	0	0	0	0	0	2.4	0	2.4	2.4



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Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	169	0	1	2	1	0	0	134	1	308
04:15 PM	152	0	0	1	2	0	0	134	0	289
04:30 PM	178	0	1	0	2	0	0	162	0	343
04:45 PM	182	0	0	2	3	0	0	149	1	337
Total	681	0	2	5	8	0	0	579	2	1277
05:00 PM	173	0	0	1	1	0	0	174	0	349
05:15 PM	165	0	0	0	1	0	0	157	0	323
05:30 PM	167	0	0	2	1	0	0	163	0	333
05:45 PM	156	0	0	0	4	0	0	172	0	332
Total	661	0	0	3	7	0	0	666	0	1337
Grand Total	1342	0	2	8	15	0	0	1245	2	2614
Apprch %	99.9	0	0.1	34.8	65.2	0	0	99.8	0.2	
Total %	51.3	0	0.1	0.3	0.6	0	0	47.6	0.1	
Cars	1282	0	2	8	13	0	0	1166	2	2473
% Cars	95.5	0	100	100	86.7	0	0	93.7	100	94.6
Heavy Vehicles	35	0	0	0	2	0	0	39	0	76
% Heavy Vehicles	2.6	0	0	0	13.3	0	0	3.1	0	2.9
Buses	25	0	0	0	0	0	0	40	0	65
% Buses	1.9	0	0	0	0	0	0	3.2	0	2.5

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	178	0	**1**	179	0	2	0	2	0	162	0	162	343
04:45 PM	**182**	0	0	**182**	**2**	**3**	0	**5**	0	149	**1**	150	337
05:00 PM	173	0	0	173	1	1	0	2	0	**174**	0	**174**	**349**
05:15 PM	165	0	0	165	0	1	0	1	0	157	0	157	323
Total Volume	698	0	1	699	3	7	0	10	0	642	1	643	1352
% App. Total	99.9	0	0.1		30	70	0		0	99.8	0.2		
PHF	.959	.000	.250	.960	.375	.583	.000	.500	.000	.922	.250	.924	.968
Cars	668	0	1	669	3	5	0	8	0	605	1	606	1283
% Cars	95.7	0	100	95.7	100	71.4	0	80.0	0	94.2	100	94.2	94.9
Heavy Vehicles	16	0	0	16	0	2	0	2	0	18	0	18	36
% Heavy Vehicles	2.3	0	0	2.3	0	28.6	0	20.0	0	2.8	0	2.8	2.7
Buses	14	0	0	14	0	0	0	0	0	19	0	19	33
% Buses	2.0	0	0	2.0	0	0	0	0	0	3.0	0	3.0	2.4

N/S: Massachusetts Avenue
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Groups Printed- Cars

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	159	0	1	2	1	0	0	119	1	283
04:15 PM	147	0	0	1	2	0	0	124	0	274
04:30 PM	172	0	1	0	1	0	0	150	0	324
04:45 PM	176	0	0	2	2	0	0	142	1	323
Total	654	0	2	5	6	0	0	535	2	1204
05:00 PM	163	0	0	1	1	0	0	164	0	329
05:15 PM	157	0	0	0	1	0	0	149	0	307
05:30 PM	159	0	0	2	1	0	0	157	0	319
05:45 PM	149	0	0	0	4	0	0	161	0	314
Total	628	0	0	3	7	0	0	631	0	1269
Grand Total	1282	0	2	8	13	0	0	1166	2	2473
Apprch %	99.8	0	0.2	38.1	61.9	0	0	99.8	0.2	
Total %	51.8	0	0.1	0.3	0.5	0	0	47.1	0.1	

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	172	0	**1**	173	0	1	0	1	0	150	0	150	324
04:45 PM	**176**	0	0	**176**	**2**	**2**	0	**4**	0	142	**1**	143	323
05:00 PM	163	0	0	163	1	1	0	2	0	**164**	0	**164**	**329**
05:15 PM	157	0	0	157	0	1	0	1	0	149	0	149	307
Total Volume	668	0	1	669	3	5	0	8	0	605	1	606	1283
% App. Total	99.9	0	0.1		37.5	62.5	0		0	99.8	0.2		
PHF	.949	.000	.250	.950	.375	.625	.000	.500	.000	.922	.250	.924	.975

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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	9	0	0	0	0	0	0	10	0	19
04:15 PM	1	0	0	0	0	0	0	4	0	5
04:30 PM	3	0	0	0	1	0	0	9	0	13
04:45 PM	4	0	0	0	1	0	0	4	0	9
Total	17	0	0	0	2	0	0	27	0	46
05:00 PM	5	0	0	0	0	0	0	2	0	7
05:15 PM	4	0	0	0	0	0	0	3	0	7
05:30 PM	4	0	0	0	0	0	0	2	0	6
05:45 PM	5	0	0	0	0	0	0	5	0	10
Total	18	0	0	0	0	0	0	12	0	30
Grand Total	35	0	0	0	2	0	0	39	0	76
Apprch %	100	0	0	0	100	0	0	100	0	
Total %	46.1	0	0	0	2.6	0	0	51.3	0	

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	9	0	0	9	0	0	0	0	0	10	0	10	19
04:15 PM	1	0	0	1	0	0	0	0	0	4	0	4	5
04:30 PM	3	0	0	3	0	1	0	1	0	9	0	9	13
04:45 PM	4	0	0	4	0	1	0	1	0	4	0	4	9
Total Volume	17	0	0	17	0	2	0	2	0	27	0	27	46
% App. Total	100	0	0		0	100	0		0	100	0		
PHF	.472	.000	.000	.472	.000	.500	.000	.500	.000	.675	.000	.675	.605

N/S: Massachusetts Avenue
E: St. Germain Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Buses

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	1	0	0	0	0	0	0	5	0	6
04:15 PM	4	0	0	0	0	0	0	6	0	10
04:30 PM	3	0	0	0	0	0	0	3	0	6
04:45 PM	2	0	0	0	0	0	0	3	0	5
Total	10	0	0	0	0	0	0	17	0	27
05:00 PM	5	0	0	0	0	0	0	8	0	13
05:15 PM	4	0	0	0	0	0	0	5	0	9
05:30 PM	4	0	0	0	0	0	0	4	0	8
05:45 PM	2	0	0	0	0	0	0	6	0	8
Total	15	0	0	0	0	0	0	23	0	38
Grand Total	25	0	0	0	0	0	0	40	0	65
Apprch %	100	0	0	0	0	0	0	100	0	
Total %	38.5	0	0	0	0	0	0	61.5	0	

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	5	0	0	5	0	0	0	0	0	8	0	8	13
05:15 PM	4	0	0	4	0	0	0	0	0	5	0	5	9
05:30 PM	4	0	0	4	0	0	0	0	0	4	0	4	8
05:45 PM	2	0	0	2	0	0	0	0	0	6	0	6	8
Total Volume	15	0	0	15	0	0	0	0	0	23	0	23	38
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.750	.000	.000	.750	.000	.000	.000	.000	.000	.719	.000	.719	.731

N/S: Massachusetts Avenue
E: St. Germain Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North			St. Germain Street From East			Massachusetts Avenue From South			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	12	0	2	0	0	73	0	19	4	110
04:15 PM	21	0	4	0	0	50	0	18	2	95
04:30 PM	19	0	0	0	0	47	0	11	2	79
04:45 PM	22	0	0	0	0	65	0	10	9	106
Total	74	0	6	0	0	235	0	58	17	390
05:00 PM	30	0	2	0	0	77	0	19	2	130
05:15 PM	39	0	1	0	0	87	0	25	1	153
05:30 PM	38	0	5	0	0	92	0	24	2	161
05:45 PM	22	0	2	0	0	88	0	24	3	139
Total	129	0	10	0	0	344	0	92	8	583
Grand Total	203	0	16	0	0	579	0	150	25	973
Apprch %	92.7	0	7.3	0	0	100	0	85.7	14.3	
Total %	20.9	0	1.6	0	0	59.5	0	15.4	2.6	

	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	30	0	2	32	0	0	77	77	0	19	2	21	130
05:15 PM	**39**	0	1	40	0	0	87	87	0	**25**	1	26	153
05:30 PM	38	0	**5**	**43**	0	0	**92**	**92**	0	24	2	26	**161**
05:45 PM	22	0	2	24	0	0	88	88	0	24	**3**	**27**	139
Total Volume	129	0	10	139	0	0	344	344	0	92	8	100	583
% App. Total	92.8	0	7.2		0	0	100		0	92	8		
PHF	.827	.000	.500	.808	.000	.000	.935	.935	.000	.920	.667	.926	.905

N/S: Massachusetts Avenue
E: St. Germain Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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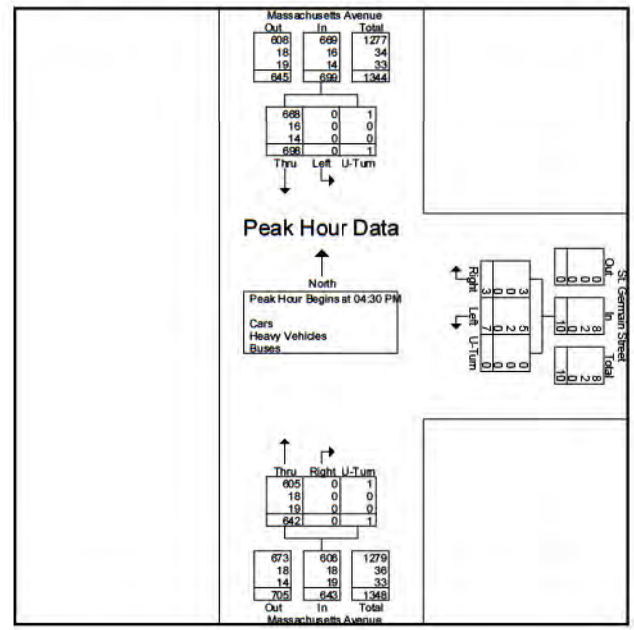
	Massachusetts Avenue From North				St. Germain Street From East				Massachusetts Avenue From South				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:30 PM													
04:30 PM	178	0	**1**	179	0	2	0	2	0	162	0	162	343
04:45 PM	**182**	0	0	**182**	**2**	**3**	0	**5**	0	149	**1**	150	337
05:00 PM	173	0	0	173	1	1	0	2	0	**174**	0	**174**	**349**
05:15 PM	165	0	0	165	0	1	0	1	0	157	0	157	323
Total Volume	698	0	1	699	3	7	0	10	0	642	1	643	1352
% App. Total	99.9	0	0.1		30	70	0		0	99.8	0.2		
PHF	.959	.000	.250	.960	.375	.583	.000	.500	.000	.922	.250	.924	.968
Cars	668	0	1	669	3	5	0	8	0	605	1	606	1283
% Cars	95.7	0	100	95.7	100	71.4	0	80.0	0	94.2	100	94.2	94.9
Heavy Vehicles	16	0	0	16	0	2	0	2	0	18	0	18	36
% Heavy Vehicles	2.3	0	0	2.3	0	28.6	0	20.0	0	2.8	0	2.8	2.7
Buses	14	0	0	14	0	0	0	0	0	19	0	19	33
% Buses	2.0	0	0	2.0	0	0	0	0	0	3.0	0	3.0	2.4



N/S/NW: Massachusetts Ave/ Westland Ave
E/W: Christian Science Dr/St. Stephen St
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	9	6	98	6	0	0	0	0	0	0	5	154	83	7	0	0	0	0	0	0	2	77	1	0	0	448
07:15 AM	10	3	115	4	0	1	1	0	0	0	7	157	69	2	0	0	0	0	0	0	3	92	2	0	0	466
07:30 AM	9	4	132	6	0	0	0	0	0	0	1	166	84	4	0	0	0	0	0	0	1	96	1	0	0	504
07:45 AM	4	13	111	5	0	0	0	0	0	0	9	184	97	4	0	0	0	0	0	0	5	81	1	0	0	514
Total	32	26	456	21	0	1	1	0	0	0	22	661	333	17	0	0	0	0	0	0	11	346	5	0	0	1932
08:00 AM	7	6	109	6	0	0	1	0	0	0	5	169	101	9	0	0	0	0	0	0	4	86	2	0	0	505
08:15 AM	3	9	127	4	0	0	0	0	0	0	6	148	76	6	0	0	0	0	0	0	4	87	5	1	0	476
08:30 AM	6	6	131	2	0	0	0	0	0	0	10	181	74	2	0	0	0	0	0	0	4	90	5	0	0	511
08:45 AM	8	11	137	6	0	0	0	0	0	0	11	160	64	8	0	0	0	0	0	0	5	98	4	0	0	512
Total	24	32	504	18	0	0	1	0	0	0	32	658	315	25	0	0	0	0	0	0	17	361	16	1	0	2004
Grand Total	56	58	960	39	0	1	2	0	0	0	54	1319	648	42	0	0	0	0	0	0	28	707	21	1	0	3936
Apprch %	5	5.2	86.3	3.5	0	33.3	66.7	0	0	0	2.6	63.9	31.4	2	0	0	0	0	0	0	3.7	93.4	2.8	0.1	0	
Total %	1.4	1.5	24.4	1	0	0	0.1	0	0	0	1.4	33.5	16.5	1.1	0	0	0	0	0	0	0.7	18	0.5	0	0	
Cars	43	55	855	39	0	1	2	0	0	0	53	1158	616	36	0	0	0	0	0	0	27	677	21	0	0	3583
% Cars	76.8	94.8	89.1	100	0	100	100	0	0	0	98.1	87.8	95.1	85.7	0	0	0	0	0	0	96.4	95.8	100	0	0	91
Heavy Vehicles	12	2	78	0	0	0	0	0	0	0	1	117	16	6	0	0	0	0	0	0	1	13	0	1	0	247
% Heavy Vehicles	21.4	3.4	8.1	0	0	0	0	0	0	0	1.9	8.9	2.5	14.3	0	0	0	0	0	0	3.6	1.8	0	100	0	6.3
Buses	1	1	27	0	0	0	0	0	0	0	0	44	16	0	0	0	0	0	0	0	0	17	0	0	0	106
% Buses	1.8	1.7	2.8	0	0	0	0	0	0	0	0	3.3	2.5	0	0	0	0	0	0	0	0	2.4	0	0	0	2.7

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:45 AM																															
07:45 AM	4	13	111	5	0	133	0	0	0	0	0	0	9	184	97	4	0	294	0	0	0	0	0	0	5	81	1	0	0	87	514
08:00 AM	7	6	109	6	0	128	0	1	0	0	0	1	5	169	101	9	0	284	0	0	0	0	0	0	4	86	2	0	0	92	505
08:15 AM	3	9	127	4	0	143	0	0	0	0	0	0	6	148	76	6	0	236	0	0	0	0	0	0	4	87	5	1	0	97	476
08:30 AM	6	6	131	2	0	145	0	0	0	0	0	0	10	181	74	2	0	267	0	0	0	0	0	0	4	90	5	0	0	99	511
Total Volume	20	34	478	17	0	549	0	1	0	0	0	1	30	682	348	21	0	1081	0	0	0	0	0	0	17	344	13	1	0	375	2006
% App. Total	3.6	6.2	87.1	3.1	0		0	100	0	0	0		2.8	63.1	32.2	1.9	0		0	0	0	0	0		4.5	91.7	3.5	0.3	0		
PHF	.714	.654	.912	.708	.000	.947	.000	.250	.000	.000	.000	.250	.750	.927	.861	.583	.000	.919	.000	.000	.000	.000	.000	.000	.850	.956	.650	.250	.000	.947	.976
Cars	14	31	434	17	0	496	0	1	0	0	0	1	29	615	337	19	0	1000	0	0	0	0	0	0	16	322	13	0	0	351	1848
% Cars	70.0	91.2	90.8	100	0	90.3	0	100	0	0	0	100	96.7	90.2	96.8	90.5	0	92.5	0	0	0	0	0	0	94.1	93.6	100	0	0	93.6	92.1
Heavy Vehicles	5	2	32	0	0	39	0	0	0	0	0	0	1	49	3	2	0	55	0	0	0	0	0	0	1	10	0	1	0	12	106
% Heavy Vehicles	25.0	5.9	6.7	0	0	7.1	0	0	0	0	0	0	3.3	7.2	0.9	9.5	0	5.1	0	0	0	0	0	0	5.9	2.9	0	100	0	3.2	5.3
Buses	1	1	12	0	0	14	0	0	0	0	0	0	0	18	8	0	0	26	0	0	0	0	0	0	0	12	0	0	0	12	52
% Buses	5.0	2.9	2.5	0	0	2.6	0	0	0	0	0	0	0	2.6	2.3	0	0	2.4	0	0	0	0	0	0	0	3.5	0	0	0	3.2	2.6

N/S/NW: Massachusetts Ave/ Westland Ave
E/W: Christian Science Dr/St. Stephen St
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Cars

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	8	6	90	6	0	0	0	0	0	0	5	129	74	7	0	0	0	0	0	0	2	75	1	0	0	403
07:15 AM	7	3	103	4	0	1	1	0	0	0	7	136	65	2	0	0	0	0	0	0	3	91	2	0	0	425
07:30 AM	7	4	113	6	0	0	0	0	0	0	1	141	79	1	0	0	0	0	0	0	1	92	1	0	0	446
07:45 AM	3	12	104	5	0	0	0	0	0	0	8	155	92	4	0	0	0	0	0	0	4	75	1	0	0	463
Total	25	25	410	21	0	1	1	0	0	0	21	561	310	14	0	0	0	0	0	0	10	333	5	0	0	1737
08:00 AM	5	6	97	6	0	0	1	0	0	0	5	157	97	7	0	0	0	0	0	0	4	80	2	0	0	467
08:15 AM	2	7	116	4	0	0	0	0	0	0	6	136	75	6	0	0	0	0	0	0	4	80	5	0	0	441
08:30 AM	4	6	117	2	0	0	0	0	0	0	10	167	73	2	0	0	0	0	0	0	4	87	5	0	0	477
08:45 AM	7	11	115	6	0	0	0	0	0	0	11	137	61	7	0	0	0	0	0	0	5	97	4	0	0	461
Total	18	30	445	18	0	0	1	0	0	0	32	597	306	22	0	0	0	0	0	0	17	344	16	0	0	1846
Grand Total	43	55	855	39	0	1	2	0	0	0	53	1158	616	36	0	0	0	0	0	0	27	677	21	0	0	3583
Apprch %	4.3	5.5	86.2	3.9	0	33.3	66.7	0	0	0	2.8	62.2	33.1	1.9	0	0	0	0	0	0	3.7	93.4	2.9	0	0	
Total %	1.2	1.5	23.9	1.1	0	0	0.1	0	0	0	1.5	32.3	17.2	1	0	0	0	0	0	0	0.8	18.9	0.6	0	0	

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:45 AM																															
07:45 AM	3	12	104	5	0	124	0	0	0	0	0	0	8	155	92	4	0	259	0	0	0	0	0	0	4	75	1	0	0	80	463
08:00 AM	5	6	97	6	0	114	0	1	0	0	0	1	5	157	97	7	0	266	0	0	0	0	0	0	4	80	2	0	0	86	467
08:15 AM	2	7	116	4	0	129	0	0	0	0	0	0	6	136	75	6	0	223	0	0	0	0	0	0	4	80	5	0	0	89	441
08:30 AM	4	6	117	2	0	129	0	0	0	0	0	0	10	167	73	2	0	252	0	0	0	0	0	0	4	87	5	0	0	96	477
Total Volume	14	31	434	17	0	496	0	1	0	0	0	1	29	615	337	19	0	1000	0	0	0	0	0	0	16	322	13	0	0	351	1848
% App. Total	2.8	6.2	87.5	3.4	0		0	100	0	0	0		2.9	61.5	33.7	1.9	0		0	0	0	0	0		4.6	91.7	3.7	0	0		
PHF	.700	.646	.927	.708	.000	.961	.000	.250	.000	.000	.000	.250	.725	.921	.869	.679	.000	.940	.000	.000	.000	.000	.000	.000	1.00	.925	.650	.000	.000	.914	.969

N/S/NW: Massachusetts Ave/ Westland Ave
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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	1	0	5	0	0	0	0	0	0	0	0	18	4	0	0	0	0	0	0	0	0	0	0	0	0	28
07:15 AM	3	0	9	0	0	0	0	0	0	0	0	18	3	0	0	0	0	0	0	0	0	0	0	0	0	33
07:30 AM	2	0	14	0	0	0	0	0	0	0	0	17	4	3	0	0	0	0	0	0	0	3	0	0	0	43
07:45 AM	0	0	6	0	0	0	0	0	0	0	1	23	1	0	0	0	0	0	0	0	1	3	0	0	0	35
Total	6	0	34	0	0	0	0	0	0	0	1	76	12	3	0	0	0	0	0	0	1	6	0	0	0	139
08:00 AM	2	0	8	0	0	0	0	0	0	0	0	7	1	2	0	0	0	0	0	0	0	2	0	0	0	22
08:15 AM	1	2	8	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0	0	3	0	1	0	25
08:30 AM	2	0	10	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	2	0	0	0	24
08:45 AM	1	0	18	0	0	0	0	0	0	0	0	15	2	1	0	0	0	0	0	0	0	0	0	0	0	37
Total	6	2	44	0	0	0	0	0	0	0	0	41	4	3	0	0	0	0	0	0	0	7	0	1	0	108
Grand Total	12	2	78	0	0	0	0	0	0	0	1	117	16	6	0	0	0	0	0	0	1	13	0	1	0	247
Apprch %	13	2.2	84.8	0	0	0	0	0	0	0	0.7	83.6	11.4	4.3	0	0	0	0	0	0	6.7	86.7	0	6.7	0	
Total %	4.9	0.8	31.6	0	0	0	0	0	0	0	0.4	47.4	6.5	2.4	0	0	0	0	0	0	0.4	5.3	0	0.4	0	

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:00 AM																															
07:00 AM	1	0	5	0	0	6	0	0	0	0	0	0	0	18	4	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	28
07:15 AM	3	0	9	0	0	12	0	0	0	0	0	0	0	18	3	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	33
07:30 AM	2	0	14	0	0	16	0	0	0	0	0	0	0	17	4	3	0	24	0	0	0	0	0	0	0	3	0	0	0	3	43
07:45 AM	0	0	6	0	0	6	0	0	0	0	0	0	1	23	1	0	0	25	0	0	0	0	0	0	1	3	0	0	0	4	35
Total Volume	6	0	34	0	0	40	0	0	0	0	0	0	1	76	12	3	0	92	0	0	0	0	0	0	1	6	0	0	0	7	139
% App. Total	15	0	85	0	0		0	0	0	0	0		1.1	82.6	13	3.3	0		0	0	0	0	0		14.3	85.7	0	0	0		
PHF	.500	.000	.607	.000	.000	.625	.000	.000	.000	.000	.000	.000	.250	.826	.750	.250	.000	.920	.000	.000	.000	.000	.000	.000	.250	.500	.000	.000	.000	.438	.808

N/S/NW: Massachusetts Ave/ Westland Ave
E/W: Christian Science Dr/St. Stephen St
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 D
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Buses

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	0	0	3	0	0	0	0	0	0	0	0	7	5	0	0	0	0	0	0	0	0	2	0	0	0	17
07:15 AM	0	0	3	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	1	0	0	0	8
07:30 AM	0	0	5	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	0	1	0	0	0	15
07:45 AM	1	1	1	0	0	0	0	0	0	0	0	6	4	0	0	0	0	0	0	0	0	3	0	0	0	16
Total	1	1	12	0	0	0	0	0	0	0	0	24	11	0	0	0	0	0	0	0	0	7	0	0	0	56
08:00 AM	0	0	4	0	0	0	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	4	0	0	0	16
08:15 AM	0	0	3	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	4	0	0	0	10
08:30 AM	0	0	4	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	1	0	0	0	10
08:45 AM	0	0	4	0	0	0	0	0	0	0	0	8	1	0	0	0	0	0	0	0	0	1	0	0	0	14
Total	0	0	15	0	0	0	0	0	0	0	0	20	5	0	0	0	0	0	0	0	0	10	0	0	0	50
Grand Total	1	1	27	0	0	0	0	0	0	0	0	44	16	0	0	0	0	0	0	0	0	17	0	0	0	106
Apprch %	3.4	3.4	93.1	0	0	0	0	0	0	0	0	73.3	26.7	0	0	0	0	0	0	0	0	100	0	0	0	
Total %	0.9	0.9	25.5	0	0	0	0	0	0	0	0	41.5	15.1	0	0	0	0	0	0	0	0	16	0	0	0	

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:30 AM																															
07:30 AM	0	0	5	0	0	5	0	0	0	0	0	0	0	8	1	0	0	9	0	0	0	0	0	0	0	1	0	0	0	1	15
07:45 AM	1	1	1	0	0	3	0	0	0	0	0	0	0	6	4	0	0	10	0	0	0	0	0	0	0	3	0	0	0	3	16
08:00 AM	0	0	4	0	0	4	0	0	0	0	0	0	0	5	3	0	0	8	0	0	0	0	0	0	0	4	0	0	0	4	16
08:15 AM	0	0	3	0	0	3	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	0	0	0	0	4	0	0	0	4	10
Total Volume	1	1	13	0	0	15	0	0	0	0	0	0	0	22	8	0	0	30	0	0	0	0	0	0	0	12	0	0	0	12	57
% App. Total	6.7	6.7	86.7	0	0		0	0	0	0	0		0	73.3	26.7	0	0		0	0	0	0	0		0	100	0	0	0		
PHF	.250	.250	.650	.000	.000	.750	.000	.000	.000	.000	.000	.000	.000	.688	.500	.000	.000	.750	.000	.000	.000	.000	.000	.000	.000	.750	.000	.000	.000	.750	.891

N/S/NW: Massachusetts Ave/ Westland Ave
E/W: Christian Science Dr/St. Stephen St
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 D
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Int. Total
07:00 AM	0	1	2	0	17	0	0	0	0	15	0	6	0	0	0	0	0	0	0	44	0	1	0	0	38	124
07:15 AM	0	1	6	0	19	0	0	0	0	22	0	13	2	0	0	0	0	0	0	69	0	0	0	0	66	198
07:30 AM	0	1	12	0	17	0	0	0	0	16	0	7	1	0	0	0	0	0	0	67	0	0	0	0	71	192
07:45 AM	0	2	18	0	27	0	0	0	0	30	0	4	1	0	0	0	0	0	0	67	1	2	0	0	63	215
Total	0	5	38	0	80	0	0	0	0	83	0	30	4	0	0	0	0	0	0	247	1	3	0	0	238	729
08:00 AM	0	0	12	0	31	0	0	0	0	20	0	18	0	0	0	0	0	0	0	95	0	0	0	0	79	255
08:15 AM	0	5	13	0	45	0	0	0	0	24	0	16	0	0	0	0	0	0	0	104	0	3	0	0	89	299
08:30 AM	0	5	19	0	42	0	0	0	0	12	0	22	1	0	0	0	0	0	0	113	0	0	0	0	101	315
08:45 AM	0	3	23	0	50	0	0	0	0	8	1	21	3	0	0	0	0	0	0	110	0	3	1	0	101	324
Total	0	13	67	0	168	0	0	0	0	64	1	77	4	0	0	0	0	0	0	422	0	6	1	0	370	1193
Grand Total	0	18	105	0	248	0	0	0	0	147	1	107	8	0	0	0	0	0	0	669	1	9	1	0	608	1922
Apprch %	0	4.9	28.3	0	66.8	0	0	0	0	100	0.9	92.2	6.9	0	0	0	0	0	0	100	0.2	1.5	0.2	0	98.2	
Total %	0	0.9	5.5	0	12.9	0	0	0	0	7.6	0.1	5.6	0.4	0	0	0	0	0	0	34.8	0.1	0.5	0.1	0	31.6	

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 08:00 AM																															
08:00 AM	0	0	12	0	31	43	0	0	0	0	20	20	0	18	0	0	0	18	0	0	0	0	95	95	0	0	0	0	79	79	255
08:15 AM	0	5	13	0	45	63	0	0	0	0	24	24	0	16	0	0	0	16	0	0	0	0	104	104	0	3	0	0	89	92	299
08:30 AM	0	5	19	0	42	66	0	0	0	0	12	12	0	22	1	0	0	23	0	0	0	0	113	113	0	0	0	0	101	101	315
08:45 AM	0	3	23	0	50	76	0	0	0	0	8	8	1	21	3	0	0	25	0	0	0	0	110	110	0	3	1	0	101	105	324
Total Volume	0	13	67	0	168	248	0	0	0	0	64	64	1	77	4	0	0	82	0	0	0	0	422	422	0	6	1	0	370	377	1193
% App. Total	0	5.2	27	0	67.7		0	0	0	0	100		1.2	93.9	4.9	0	0		0	0	0	0	100		0	1.6	0.3	0	98.1		
PHF	.000	.650	.728	.000	.840	.816	.000	.000	.000	.000	.667	.667	.250	.875	.333	.000	.000	.820	.000	.000	.000	.000	.934	.934	.000	.500	.250	.000	.916	.898	.921

N/S/NW: Massachusetts Ave/ Westland Ave
E/W: Christian Science Dr/St. Stephen St
City, State: Boston, MA
Client: VHB/ M. Houdlette

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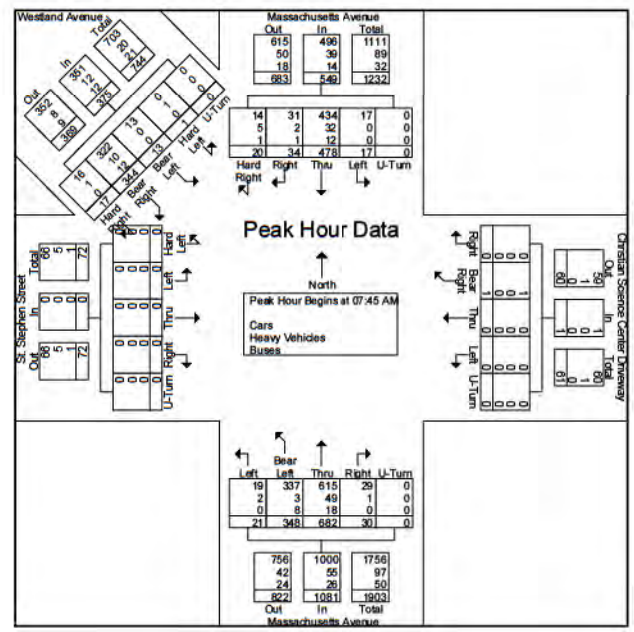
	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:45 AM																															
07:45 AM	4	13	111	5	0	133	0	0	0	0	0	0	9	184	97	4	0	294	0	0	0	0	0	0	5	81	1	0	0	87	514
08:00 AM	7	6	109	6	0	128	0	1	0	0	0	1	5	169	101	9	0	284	0	0	0	0	0	0	4	86	2	0	0	92	505
08:15 AM	3	9	127	4	0	143	0	0	0	0	0	0	6	148	76	6	0	236	0	0	0	0	0	0	4	87	5	1	0	97	476
08:30 AM	6	6	131	2	0	145	0	0	0	0	0	0	10	181	74	2	0	267	0	0	0	0	0	0	4	90	5	0	0	99	511
Total Volume	20	34	478	17	0	549	0	1	0	0	0	1	30	682	348	21	0	1081	0	0	0	0	0	0	17	344	13	1	0	375	2006
% App. Total	3.6	6.2	87.1	3.1	0		0	100	0	0	0		2.8	63.1	32.2	1.9	0		0	0	0	0	0		4.5	91.7	3.5	0.3	0		
PHF	.714	.654	.912	.708	.000	.947	.000	.250	.000	.000	.000	.250	.750	.927	.861	.583	.000	.919	.000	.000	.000	.000	.000	.000	.850	.956	.650	.250	.000	.947	.976
Cars	14	31	434	17	0	496	0	1	0	0	0	1	29	615	337	19	0	1000	0	0	0	0	0	0	16	322	13	0	0	351	1848
% Cars	70.0	91.2	90.8	100	0	90.3	0	100	0	0	0	100	96.7	90.2	96.8	90.5	0	92.5	0	0	0	0	0	0	94.1	93.6	100	0	0	93.6	92.1
Heavy Vehicles	5	2	32	0	0	39	0	0	0	0	0	0	1	49	3	2	0	55	0	0	0	0	0	0	1	10	0	1	0	12	106
% Heavy Vehicles	25.0	5.9	6.7	0	0	7.1	0	0	0	0	0	0	3.3	7.2	0.9	9.5	0	5.1	0	0	0	0	0	0	5.9	2.9	0	100	0	3.2	5.3
Buses	1	1	12	0	0	14	0	0	0	0	0	0	0	18	8	0	0	26	0	0	0	0	0	0	0	12	0	0	0	12	52
% Buses	5.0	2.9	2.5	0	0	2.6	0	0	0	0	0	0	0	2.6	2.3	0	0	2.4	0	0	0	0	0	0	0	3.5	0	0	0	3.2	2.6



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Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	6	10	145	1	0	6	6	0	0	0	1	120	80	11	0	0	0	0	0	0	6	77	0	1	0	470
04:15 PM	6	5	129	3	0	5	3	0	0	0	1	136	83	9	0	0	0	0	0	0	2	92	0	0	0	474
04:30 PM	6	10	147	0	0	6	4	0	0	0	1	154	72	1	0	0	0	0	0	0	0	59	0	2	0	462
04:45 PM	13	4	163	0	0	9	4	0	0	0	3	141	92	16	0	0	0	0	0	0	1	92	0	0	0	538
Total	31	29	584	4	0	26	17	0	0	0	6	551	327	37	0	0	0	0	0	0	9	320	0	3	0	1944
05:00 PM	8	9	137	1	0	17	2	0	0	0	0	158	95	4	0	0	0	0	0	0	3	99	0	1	0	534
05:15 PM	8	7	148	0	0	6	1	0	0	0	1	156	92	6	0	0	0	0	0	0	4	96	0	1	0	526
05:30 PM	11	8	144	0	0	7	3	0	0	0	1	165	89	8	0	0	0	0	0	0	5	83	0	1	0	525
05:45 PM	1	4	143	1	0	7	4	0	0	0	0	167	85	7	0	0	0	0	0	0	4	81	0	0	0	504
Total	28	28	572	2	0	37	10	0	0	0	2	646	361	25	0	0	0	0	0	0	16	359	0	3	0	2089
Grand Total	59	57	1156	6	0	63	27	0	0	0	8	1197	688	62	0	0	0	0	0	0	25	679	0	6	0	4033
Apprch %	4.6	4.5	90.5	0.5	0	70	30	0	0	0	0.4	61.2	35.2	3.2	0	0	0	0	0	0	3.5	95.6	0	0.8	0	
Total %	1.5	1.4	28.7	0.1	0	1.6	0.7	0	0	0	0.2	29.7	17.1	1.5	0	0	0	0	0	0	0.6	16.8	0	0.1	0	
Cars	58	56	1101	6	0	63	27	0	0	0	8	1124	680	62	0	0	0	0	0	0	25	661	0	6	0	3877
% Cars	98.3	98.2	95.2	100	0	100	100	0	0	0	100	93.9	98.8	100	0	0	0	0	0	0	100	97.3	0	100	0	96.1
Heavy Vehicles	1	1	31	0	0	0	0	0	0	0	0	35	2	0	0	0	0	0	0	0	0	5	0	0	0	75
% Heavy Vehicles	1.7	1.8	2.7	0	0	0	0	0	0	0	0	2.9	0.3	0	0	0	0	0	0	0	0	0.7	0	0	0	1.9
Buses	0	0	24	0	0	0	0	0	0	0	0	38	6	0	0	0	0	0	0	0	0	13	0	0	0	81
% Buses	0	0	2.1	0	0	0	0	0	0	0	0	3.2	0.9	0	0	0	0	0	0	0	0	1.9	0	0	0	2

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 04:45 PM																															
04:45 PM	13	4	163	0	0	180	9	4	0	0	0	13	3	141	92	16	0	252	0	0	0	0	0	0	1	92	0	0	0	93	538
05:00 PM	8	9	137	1	0	155	17	2	0	0	0	19	0	158	95	4	0	257	0	0	0	0	0	0	3	99	0	1	0	103	534
05:15 PM	8	7	148	0	0	163	6	1	0	0	0	7	1	156	92	6	0	255	0	0	0	0	0	0	4	96	0	1	0	101	526
05:30 PM	11	8	144	0	0	163	7	3	0	0	0	10	1	165	89	8	0	263	0	0	0	0	0	0	5	83	0	1	0	89	525
Total Volume	40	28	592	1	0	661	39	10	0	0	0	49	5	620	368	34	0	1027	0	0	0	0	0	0	13	370	0	3	0	386	2123
% App. Total	6.1	4.2	89.6	0.2	0		79.6	20.4	0	0	0		0.5	60.4	35.8	3.3	0		0	0	0	0	0		3.4	95.9	0	0.8	0		
PHF	.769	.778	.908	.250	.000	.918	.574	.625	.000	.000	.000	.645	.417	.939	.968	.531	.000	.976	.000	.000	.000	.000	.000	.000	.650	.934	.000	.750	.000	.937	.987
Cars	40	28	562	1	0	631	39	10	0	0	0	49	5	590	363	34	0	992	0	0	0	0	0	0	13	361	0	3	0	377	2049
% Cars	100	100	94.9	100	0	95.5	100	100	0	0	0	100	100	95.2	98.6	100	0	96.6	0	0	0	0	0	0	100	97.6	0	100	0	97.7	96.5
Heavy Vehicles	0	0	15	0	0	15	0	0	0	0	0	0	0	11	1	0	0	12	0	0	0	0	0	0	0	2	0	0	0	2	29
% Heavy Vehicles	0	0	2.5	0	0	2.3	0	0	0	0	0	0	0	1.8	0.3	0	0	1.2	0	0	0	0	0	0	0	0.5	0	0	0	0.5	1.4
Buses	0	0	15	0	0	15	0	0	0	0	0	0	0	19	4	0	0	23	0	0	0	0	0	0	0	7	0	0	0	7	45
% Buses	0	0	2.5	0	0	2.3	0	0	0	0	0	0	0	3.1	1.1	0	0	2.2	0	0	0	0	0	0	0	1.9	0	0	0	1.8	2.1

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Groups Printed- Cars

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	6	9	139	1	0	6	6	0	0	0	1	107	79	11	0	0	0	0	0	0	6	72	0	1	0	444
04:15 PM	6	5	122	3	0	5	3	0	0	0	1	127	82	9	0	0	0	0	0	0	2	90	0	0	0	455
04:30 PM	5	10	142	0	0	6	4	0	0	0	1	143	72	1	0	0	0	0	0	0	0	57	0	2	0	443
04:45 PM	13	4	157	0	0	9	4	0	0	0	3	133	90	16	0	0	0	0	0	0	1	90	0	0	0	520
Total	30	28	560	4	0	26	17	0	0	0	6	510	323	37	0	0	0	0	0	0	9	309	0	3	0	1862
05:00 PM	8	9	128	1	0	17	2	0	0	0	0	149	93	4	0	0	0	0	0	0	3	98	0	1	0	513
05:15 PM	8	7	141	0	0	6	1	0	0	0	1	148	92	6	0	0	0	0	0	0	4	93	0	1	0	508
05:30 PM	11	8	136	0	0	7	3	0	0	0	1	160	88	8	0	0	0	0	0	0	5	80	0	1	0	508
05:45 PM	1	4	136	1	0	7	4	0	0	0	0	157	84	7	0	0	0	0	0	0	4	81	0	0	0	486
Total	28	28	541	2	0	37	10	0	0	0	2	614	357	25	0	0	0	0	0	0	16	352	0	3	0	2015
Grand Total	58	56	1101	6	0	63	27	0	0	0	8	1124	680	62	0	0	0	0	0	0	25	661	0	6	0	3877
Apprch %	4.8	4.6	90.2	0.5	0	70	30	0	0	0	0.4	60	36.3	3.3	0	0	0	0	0	0	3.6	95.5	0	0.9	0	
Total %	1.5	1.4	28.4	0.2	0	1.6	0.7	0	0	0	0.2	29	17.5	1.6	0	0	0	0	0	0	0.6	17	0	0.2	0	

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 04:45 PM																															
04:45 PM	13	4	157	0	0	174	9	4	0	0	0	13	3	133	90	16	0	242	0	0	0	0	0	0	1	90	0	0	0	91	520
05:00 PM	8	9	128	1	0	146	17	2	0	0	0	19	0	149	93	4	0	246	0	0	0	0	0	0	3	98	0	1	0	102	513
05:15 PM	8	7	141	0	0	156	6	1	0	0	0	7	1	148	92	6	0	247	0	0	0	0	0	0	4	93	0	1	0	98	508
05:30 PM	11	8	136	0	0	155	7	3	0	0	0	10	1	160	88	8	0	257	0	0	0	0	0	0	5	80	0	1	0	86	508
Total Volume	40	28	562	1	0	631	39	10	0	0	0	49	5	590	363	34	0	992	0	0	0	0	0	0	13	361	0	3	0	377	2049
% App. Total	6.3	4.4	89.1	0.2	0		79.6	20.4	0	0	0		0.5	59.5	36.6	3.4	0		0	0	0	0	0		3.4	95.8	0	0.8	0		
PHF	.769	.778	.895	.250	.000	.907	.574	.625	.000	.000	.000	.645	.417	.922	.976	.531	.000	.965	.000	.000	.000	.000	.000	.000	.650	.921	.000	.750	.000	.924	.985

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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	0	1	6	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	2	0	0	0	17
04:15 PM	0	0	2	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	6
04:30 PM	1	0	3	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	1	0	0	0	13
04:45 PM	0	0	4	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Total	1	1	15	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	3	0	0	0	45
05:00 PM	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	6
05:15 PM	0	0	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5
05:30 PM	0	0	4	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	1	0	0	0	9
05:45 PM	0	0	5	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	10
Total	0	0	16	0	0	0	0	0	0	0	0	10	2	0	0	0	0	0	0	0	0	2	0	0	0	30
Grand Total	1	1	31	0	0	0	0	0	0	0	0	35	2	0	0	0	0	0	0	0	0	5	0	0	0	75
Apprch %	3	3	93.9	0	0	0	0	0	0	0	0	94.6	5.4	0	0	0	0	0	0	0	0	100	0	0	0	
Total %	1.3	1.3	41.3	0	0	0	0	0	0	0	0	46.7	2.7	0	0	0	0	0	0	0	0	6.7	0	0	0	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
04:00 PM	0	1	6	0	0	7	0	0	0	0	0	0	0	8	0	0	0	8	0	0	0	0	0	0	0	2	0	0	0	2	17
04:15 PM	0	0	2	0	0	2	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	6
04:30 PM	1	0	3	0	0	4	0	0	0	0	0	0	0	8	0	0	0	8	0	0	0	0	0	0	0	1	0	0	0	1	13
04:45 PM	0	0	4	0	0	4	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	9
Total Volume	1	1	15	0	0	17	0	0	0	0	0	0	0	25	0	0	0	25	0	0	0	0	0	0	0	3	0	0	0	3	45
% App. Total	5.9	5.9	88.2	0	0		0	0	0	0	0		0	100	0	0	0		0	0	0	0	0		0	100	0	0	0		
PHF	.250	.250	.625	.000	.000	.607	.000	.000	.000	.000	.000	.000	.000	.781	.000	.000	.000	.781	.000	.000	.000	.000	.000	.000	.000	.375	.000	.000	.000	.375	.662

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Groups Printed- Buses

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	3	0	0	0	9
04:15 PM	0	0	5	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	2	0	0	0	13
04:30 PM	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	6
04:45 PM	0	0	2	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	2	0	0	0	9
Total	0	0	9	0	0	0	0	0	0	0	0	16	4	0	0	0	0	0	0	0	0	8	0	0	0	37
05:00 PM	0	0	5	0	0	0	0	0	0	0	0	8	2	0	0	0	0	0	0	0	0	0	0	0	0	15
05:15 PM	0	0	4	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	3	0	0	0	13
05:30 PM	0	0	4	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	8
05:45 PM	0	0	2	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Total	0	0	15	0	0	0	0	0	0	0	0	22	2	0	0	0	0	0	0	0	0	5	0	0	0	44
Grand Total	0	0	24	0	0	0	0	0	0	0	0	38	6	0	0	0	0	0	0	0	0	13	0	0	0	81
Apprch %	0	0	100	0	0	0	0	0	0	0	0	86.4	13.6	0	0	0	0	0	0	0	0	100	0	0	0	
Total %	0	0	29.6	0	0	0	0	0	0	0	0	46.9	7.4	0	0	0	0	0	0	0	0	16	0	0	0	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:45 PM

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
04:45 PM	0	0	2	0	0	2	0	0	0	0	0	0	0	3	2	0	0	5	0	0	0	0	0	0	0	2	0	0	0	2	9
05:00 PM	0	0	5	0	0	5	0	0	0	0	0	0	0	8	2	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	15
05:15 PM	0	0	4	0	0	4	0	0	0	0	0	0	0	6	0	0	0	6	0	0	0	0	0	0	0	3	0	0	0	3	13
05:30 PM	0	0	4	0	0	4	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	8
Total Volume	0	0	15	0	0	15	0	0	0	0	0	0	0	19	4	0	0	23	0	0	0	0	0	0	0	7	0	0	0	7	45
% App. Total	0	0	100	0	0		0	0	0	0	0		0	82.6	17.4	0	0		0	0	0	0	0		0	100	0	0	0		
PHF	.000	.000	.750	.000	.000	.750	.000	.000	.000	.000	.000	.000	.000	.594	.500	.000	.000	.575	.000	.000	.000	.000	.000	.000	.000	.583	.000	.000	.000	.583	.750

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Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North					Christian Science Center Driveway From East					Massachusetts Avenue From South					St. Stephen Street From West					Westland Avenue From Northwest					
Start Time	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Int. Total
04:00 PM	0	1	4	0	67	0	0	0	0	57	0	2	0	0	2	0	0	0	0	156	0	0	0	0	176	465
04:15 PM	0	4	8	0	54	0	0	0	0	42	0	4	0	0	2	0	0	0	0	135	0	1	0	0	163	413
04:30 PM	0	3	12	0	57	0	0	0	0	43	0	2	2	0	3	0	0	0	0	152	0	5	0	0	180	459
04:45 PM	0	8	9	0	71	0	0	0	0	45	0	6	0	0	0	0	0	0	0	157	0	1	0	0	179	476
Total	0	16	33	0	249	0	0	0	0	187	0	14	2	0	7	0	0	0	0	600	0	7	0	0	698	1813
05:00 PM	2	6	23	0	49	0	0	0	0	46	0	9	2	0	9	0	0	0	0	135	0	1	0	1	129	412
05:15 PM	0	3	28	0	86	0	4	0	0	35	0	14	2	2	4	0	0	0	0	166	0	1	0	0	136	481
05:30 PM	0	4	30	0	74	0	4	0	0	42	0	15	1	0	2	0	0	0	0	188	1	1	0	1	121	484
05:45 PM	0	5	19	0	72	0	0	0	0	43	0	17	1	0	0	0	0	0	0	196	1	0	0	0	160	514
Total	2	18	100	0	281	0	8	0	0	166	0	55	6	2	15	0	0	0	0	685	2	3	0	2	546	1891
Grand Total	2	34	133	0	530	0	8	0	0	353	0	69	8	2	22	0	0	0	0	1285	2	10	0	2	1244	3704
Apprch %	0.3	4.9	19	0	75.8	0	2.2	0	0	97.8	0	68.3	7.9	2	21.8	0	0	0	0	100	0.2	0.8	0	0.2	98.9	
Total %	0.1	0.9	3.6	0	14.3	0	0.2	0	0	9.5	0	1.9	0.2	0.1	0.6	0	0	0	0	34.7	0.1	0.3	0	0.1	33.6	

	Massachusetts Avenue From North						Christian Science Center Driveway From East						Massachusetts Avenue From South						St. Stephen Street From West						Westland Avenue From Northwest						
Start Time	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	2	6	23	0	49	80	0	0	0	0	46	46	0	9	2	0	9	20	0	0	0	0	135	135	0	1	0	1	129	131	412
05:15 PM	0	3	28	0	86	117	0	4	0	0	35	39	0	14	2	2	4	22	0	0	0	0	166	166	0	1	0	0	136	137	481
05:30 PM	0	4	30	0	74	108	0	4	0	0	42	46	0	15	1	0	2	18	0	0	0	0	188	188	1	1	0	1	121	124	484
05:45 PM	0	5	19	0	72	96	0	0	0	0	43	43	0	17	1	0	0	18	0	0	0	0	196	196	1	0	0	0	160	161	514
Total Volume	2	18	100	0	281	401	0	8	0	0	166	174	0	55	6	2	15	78	0	0	0	0	685	685	2	3	0	2	546	553	1891
% App. Total	0.5	4.5	24.9	0	70.1		0	4.6	0	0	95.4		0	70.5	7.7	2.6	19.2		0	0	0	0	100		0.4	0.5	0	0.4	98.7		
PHF	.250	.750	.833	.000	.817	.857	.000	.500	.000	.000	.902	.946	.000	.809	.750	.250	.417	.886	.000	.000	.000	.000	.874	.874	.500	.750	.000	.500	.853	.859	.920

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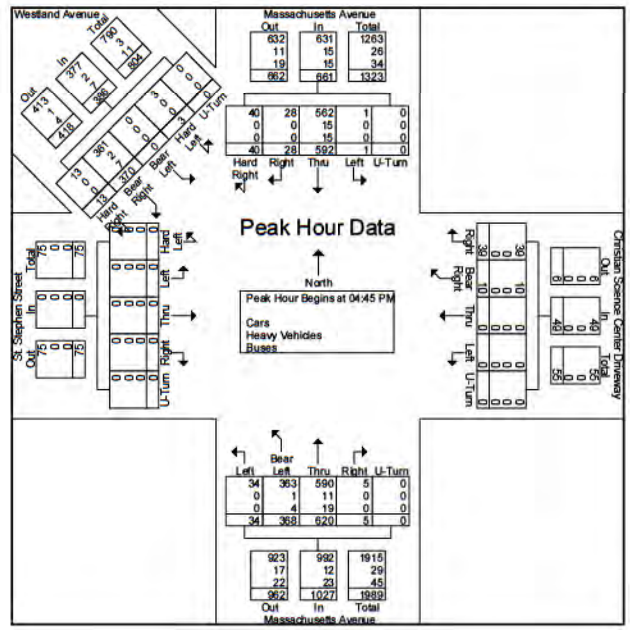
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour for Entire Intersection Begins at 04:45 PM																															
04:45 PM	13	4	163	0	0	180	9	4	0	0	0	13	3	141	92	16	0	252	0	0	0	0	0	0	1	92	0	0	0	93	538
05:00 PM	8	9	137	1	0	155	17	2	0	0	0	19	0	158	95	4	0	257	0	0	0	0	0	0	3	99	0	1	0	103	534
05:15 PM	8	7	148	0	0	163	6	1	0	0	0	7	1	156	92	6	0	255	0	0	0	0	0	0	4	96	0	1	0	101	526
05:30 PM	11	8	144	0	0	163	7	3	0	0	0	10	1	165	89	8	0	263	0	0	0	0	0	0	5	83	0	1	0	89	525
Total Volume	40	28	592	1	0	661	39	10	0	0	0	49	5	620	368	34	0	1027	0	0	0	0	0	0	13	370	0	3	0	386	2123
% App. Total	6.1	4.2	89.6	0.2	0		79.6	20.4	0	0	0		0.5	60.4	35.8	3.3	0		0	0	0	0	0		3.4	95.9	0	0.8	0		
PHF	.769	.778	.908	.250	.000	.918	.574	.625	.000	.000	.000	.645	.417	.939	.968	.531	.000	.976	.000	.000	.000	.000	.000	.000	.650	.934	.000	.750	.000	.937	.987
Cars	40	28	562	1	0	631	39	10	0	0	0	49	5	590	363	34	0	992	0	0	0	0	0	0	13	361	0	3	0	377	2049
% Cars	100	100	94.9	100	0	95.5	100	100	0	0	0	100	100	95.2	98.6	100	0	96.6	0	0	0	0	0	0	100	97.6	0	100	0	97.7	96.5
Heavy Vehicles	0	0	15	0	0	15	0	0	0	0	0	0	0	11	1	0	0	12	0	0	0	0	0	0	0	2	0	0	0	2	29
% Heavy Vehicles	0	0	2.5	0	0	2.3	0	0	0	0	0	0	0	1.8	0.3	0	0	1.2	0	0	0	0	0	0	0	0.5	0	0	0	0.5	1.4
Buses	0	0	15	0	0	15	0	0	0	0	0	0	0	19	4	0	0	23	0	0	0	0	0	0	0	7	0	0	0	7	45
% Buses	0	0	2.5	0	0	2.3	0	0	0	0	0	0	0	3.1	1.1	0	0	2.2	0	0	0	0	0	0	0	1.9	0	0	0	1.8	2.1



N/S: Massachusetts Avenue
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
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File Name : 133307 E
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	25	144	0	0	9	8	12	2	22	220	1	0	22	4	21	0	490
07:15 AM	23	166	1	0	8	5	15	2	13	195	1	0	21	5	23	8	486
07:30 AM	25	194	0	0	10	10	21	3	18	220	0	0	15	0	18	4	538
07:45 AM	13	171	0	0	17	2	14	3	20	248	0	0	11	4	26	5	534
Total	86	675	1	0	44	25	62	10	73	883	2	0	69	13	88	17	2048
08:00 AM	16	193	0	0	20	11	22	3	18	250	0	0	16	2	16	2	569
08:15 AM	19	193	1	0	22	10	24	2	18	184	0	0	20	2	25	6	526
08:30 AM	19	195	1	0	19	4	20	3	28	213	0	0	13	1	32	2	550
08:45 AM	29	199	0	0	14	6	17	7	24	195	0	0	9	6	30	8	544
Total	83	780	2	0	75	31	83	15	88	842	0	0	58	11	103	18	2189
Grand Total	169	1455	3	0	119	56	145	25	161	1725	2	0	127	24	191	35	4237
Apprch %	10.4	89.4	0.2	0	34.5	16.2	42	7.2	8.5	91.4	0.1	0	33.7	6.4	50.7	9.3	
Total %	4	34.3	0.1	0	2.8	1.3	3.4	0.6	3.8	40.7	0	0	3	0.6	4.5	0.8	
Cars	154	1331	2	0	108	50	138	21	147	1547	2	0	116	20	172	31	3839
% Cars	91.1	91.5	66.7	0	90.8	89.3	95.2	84	91.3	89.7	100	0	91.3	83.3	90.1	88.6	90.6
Heavy Vehicles	13	82	1	0	9	5	7	2	11	128	0	0	9	4	15	4	290
% Heavy Vehicles	7.7	5.6	33.3	0	7.6	8.9	4.8	8	6.8	7.4	0	0	7.1	16.7	7.9	11.4	6.8
Buses	2	42	0	0	2	1	0	2	3	50	0	0	2	0	4	0	108
% Buses	1.2	2.9	0	0	1.7	1.8	0	8	1.9	2.9	0	0	1.6	0	2.1	0	2.5

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 08:00 AM

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
08:00 AM	16	193	0	0	209	20	**11**	22	3	56	18	**250**	0	0	**268**	16	2	16	2	36	**569**
08:15 AM	19	193	**1**	0	213	**22**	10	**24**	2	**58**	18	184	0	0	202	**20**	2	25	6	**53**	526
08:30 AM	19	195	1	0	215	19	4	20	3	46	**28**	213	0	0	241	13	1	**32**	2	48	550
08:45 AM	**29**	**199**	0	0	**228**	14	6	17	**7**	44	24	195	0	0	219	9	**6**	30	**8**	53	544
Total Volume	83	780	2	0	865	75	31	83	15	204	88	842	0	0	930	58	11	103	18	190	2189
% App. Total	9.6	90.2	0.2	0		36.8	15.2	40.7	7.4		9.5	90.5	0	0		30.5	5.8	54.2	9.5		
PHF	.716	.980	.500	.000	.948	.852	.705	.865	.536	.879	.786	.842	.000	.000	.868	.725	.458	.805	.563	.896	.962
Cars	76	707	2	0	785	69	27	81	13	190	79	775	0	0	854	52	8	96	16	172	2001
% Cars	91.6	90.6	100	0	90.8	92.0	87.1	97.6	86.7	93.1	89.8	92.0	0	0	91.8	89.7	72.7	93.2	88.9	90.5	91.4
Heavy Vehicles	5	52	0	0	57	5	4	2	1	12	6	46	0	0	52	6	3	5	2	16	137
% Heavy Vehicles	6.0	6.7	0	0	6.6	6.7	12.9	2.4	6.7	5.9	6.8	5.5	0	0	5.6	10.3	27.3	4.9	11.1	8.4	6.3
Buses	2	21	0	0	23	1	0	0	1	2	3	21	0	0	24	0	0	2	0	2	51
% Buses	2.4	2.7	0	0	2.7	1.3	0	0	6.7	1.0	3.4	2.5	0	0	2.6	0	0	1.9	0	1.1	2.3

N/S: Massachusetts Avenue
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
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File Name : 133307 E
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	22	135	0	0	7	8	11	2	19	187	1	0	19	4	19	0	434
07:15 AM	20	158	0	0	8	5	12	2	13	172	1	0	21	5	18	7	442
07:30 AM	24	173	0	0	8	8	20	2	18	195	0	0	15	0	15	4	482
07:45 AM	12	158	0	0	16	2	14	2	18	218	0	0	9	3	24	4	480
Total	78	624	0	0	39	23	57	8	68	772	2	0	64	12	76	15	1838
08:00 AM	15	177	0	0	18	10	20	3	16	230	0	0	13	1	16	1	520
08:15 AM	17	174	1	0	21	8	24	2	16	169	0	0	18	2	25	5	482
08:30 AM	18	180	1	0	18	4	20	3	26	200	0	0	12	0	30	2	514
08:45 AM	26	176	0	0	12	5	17	5	21	176	0	0	9	5	25	8	485
Total	76	707	2	0	69	27	81	13	79	775	0	0	52	8	96	16	2001
Grand Total	154	1331	2	0	108	50	138	21	147	1547	2	0	116	20	172	31	3839
Apprch %	10.4	89.5	0.1	0	34.1	15.8	43.5	6.6	8.7	91.2	0.1	0	34.2	5.9	50.7	9.1	
Total %	4	34.7	0.1	0	2.8	1.3	3.6	0.5	3.8	40.3	0.1	0	3	0.5	4.5	0.8	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 08:00 AM

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
08:00 AM	15	177	0	0	192	18	**10**	20	3	51	16	**230**	0	0	**246**	13	1	16	1	31	**520**
08:15 AM	17	174	**1**	0	192	**21**	8	**24**	2	**55**	16	169	0	0	185	**18**	2	25	5	**50**	482
08:30 AM	18	**180**	1	0	199	18	4	20	3	45	**26**	200	0	0	226	12	0	**30**	2	44	514
08:45 AM	**26**	176	0	0	**202**	12	5	17	**5**	39	21	176	0	0	197	9	**5**	25	**8**	47	485
Total Volume	76	707	2	0	785	69	27	81	13	190	79	775	0	0	854	52	8	96	16	172	2001
% App. Total	9.7	90.1	0.3	0		36.3	14.2	42.6	6.8		9.3	90.7	0	0		30.2	4.7	55.8	9.3		
PHF	.731	.982	.500	.000	.972	.821	.675	.844	.650	.864	.760	.842	.000	.000	.868	.722	.400	.800	.500	.860	.962

N/S: Massachusetts Avenue
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
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Site Code : 10135.00
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Page No : 1

Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	3	3	0	0	1	0	1	0	3	22	0	0	2	0	2	0	37
07:15 AM	3	4	1	0	0	0	3	0	0	19	0	0	0	0	4	1	35
07:30 AM	1	14	0	0	2	1	1	0	0	19	0	0	0	0	2	0	40
07:45 AM	1	9	0	0	1	0	0	1	2	22	0	0	1	1	2	1	41
Total	8	30	1	0	4	1	5	1	5	82	0	0	3	1	10	2	153
08:00 AM	0	9	0	0	2	1	2	0	1	12	0	0	3	1	0	1	32
08:15 AM	2	13	0	0	1	2	0	0	2	11	0	0	2	0	0	1	34
08:30 AM	0	12	0	0	1	0	0	0	2	9	0	0	1	1	2	0	28
08:45 AM	3	18	0	0	1	1	0	1	1	14	0	0	0	1	3	0	43
Total	5	52	0	0	5	4	2	1	6	46	0	0	6	3	5	2	137
Grand Total	13	82	1	0	9	5	7	2	11	128	0	0	9	4	15	4	290
Apprch %	13.5	85.4	1	0	39.1	21.7	30.4	8.7	7.9	92.1	0	0	28.1	12.5	46.9	12.5	
Total %	4.5	28.3	0.3	0	3.1	1.7	2.4	0.7	3.8	44.1	0	0	3.1	1.4	5.2	1.4	

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	3	3	0	0	6	1	0	1	0	2	3	22	0	0	25	2	0	2	0	4	37
07:15 AM	3	4	1	0	8	0	0	3	0	3	0	19	0	0	19	0	0	4	1	5	35
07:30 AM	1	14	0	0	15	2	1	1	0	4	0	19	0	0	19	0	0	2	0	2	40
07:45 AM	1	9	0	0	10	1	0	0	1	2	2	22	0	0	24	1	1	2	1	5	41
Total Volume	8	30	1	0	39	4	1	5	1	11	5	82	0	0	87	3	1	10	2	16	153
% App. Total	20.5	76.9	2.6	0		36.4	9.1	45.5	9.1		5.7	94.3	0	0		18.8	6.2	62.5	12.5		
PHF	.667	.536	.250	.000	.650	.500	.250	.417	.250	.688	.417	.932	.000	.000	.870	.375	.250	.625	.500	.800	.933

N/S: Massachusetts Avenue
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Page No : 1

Groups Printed- Buses

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	6	0	0	1	0	0	0	0	11	0	0	1	0	0	0	19
07:15 AM	0	4	0	0	0	0	0	0	0	4	0	0	0	0	1	0	9
07:30 AM	0	7	0	0	0	1	0	1	0	6	0	0	0	0	1	0	16
07:45 AM	0	4	0	0	0	0	0	0	0	8	0	0	1	0	0	0	13
Total	0	21	0	0	1	1	0	1	0	29	0	0	2	0	2	0	57
08:00 AM	1	7	0	0	0	0	0	0	1	8	0	0	0	0	0	0	17
08:15 AM	0	6	0	0	0	0	0	0	0	4	0	0	0	0	0	0	10
08:30 AM	1	3	0	0	0	0	0	0	0	4	0	0	0	0	0	0	8
08:45 AM	0	5	0	0	1	0	0	1	2	5	0	0	0	0	2	0	16
Total	2	21	0	0	1	0	0	1	3	21	0	0	0	0	2	0	51
Grand Total	2	42	0	0	2	1	0	2	3	50	0	0	2	0	4	0	108
Apprch %	4.5	95.5	0	0	40	20	0	40	5.7	94.3	0	0	33.3	0	66.7	0	
Total %	1.9	38.9	0	0	1.9	0.9	0	1.9	2.8	46.3	0	0	1.9	0	3.7	0	

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	6	0	0	6	1	0	0	0	1	0	11	0	0	11	1	0	0	0	1	19
07:15 AM	0	4	0	0	4	0	0	0	0	0	0	4	0	0	4	0	0	1	0	1	9
07:30 AM	0	7	0	0	7	0	1	0	1	2	0	6	0	0	6	0	0	1	0	1	16
07:45 AM	0	4	0	0	4	0	0	0	0	0	0	8	0	0	8	1	0	0	0	1	13
Total Volume	0	21	0	0	21	1	1	0	1	3	0	29	0	0	29	2	0	2	0	4	57
% App. Total	0	100	0	0		33.3	33.3	0	33.3		0	100	0	0		50	0	50	0		
PHF	.000	.750	.000	.000	.750	.250	.250	.000	.250	.375	.000	.659	.000	.000	.659	.500	.000	.500	.000	1.00	.750

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Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	2	0	21	0	0	0	24	0	3	0	10	0	2	1	46	109
07:15 AM	1	4	0	10	0	0	0	28	0	9	0	11	0	0	1	75	139
07:30 AM	2	8	1	23	0	0	0	26	2	7	0	15	0	0	0	79	163
07:45 AM	2	13	1	38	0	0	0	43	0	10	0	24	0	2	0	52	185
Total	5	27	2	92	0	0	0	121	2	29	0	60	0	4	2	252	596
08:00 AM	0	9	0	33	0	0	0	60	0	12	0	11	0	2	2	118	247
08:15 AM	1	14	0	41	0	0	0	72	0	19	0	13	0	2	1	119	282
08:30 AM	1	16	0	39	0	1	0	55	0	13	0	10	1	3	5	189	333
08:45 AM	0	20	0	59	0	1	0	63	0	23	1	14	0	3	0	142	326
Total	2	59	0	172	0	2	0	250	0	67	1	48	1	10	8	568	1188
Grand Total	7	86	2	264	0	2	0	371	2	96	1	108	1	14	10	820	1784
Apprch %	1.9	24	0.6	73.5	0	0.5	0	99.5	1	46.4	0.5	52.2	0.1	1.7	1.2	97	
Total %	0.4	4.8	0.1	14.8	0	0.1	0	20.8	0.1	5.4	0.1	6.1	0.1	0.8	0.6	46	

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	9	0	33	42	0	0	0	60	60	0	12	0	11	23	0	2	2	118	122	247
08:15 AM	1	14	0	41	56	0	0	0	72	72	0	19	0	13	32	0	2	1	119	122	282
08:30 AM	1	16	0	39	56	0	1	0	55	56	0	13	0	10	23	1	3	5	189	198	333
08:45 AM	0	20	0	59	79	0	1	0	63	64	0	23	1	14	38	0	3	0	142	145	326
Total Volume	2	59	0	172	233	0	2	0	250	252	0	67	1	48	116	1	10	8	568	587	1188
% App. Total	0.9	25.3	0	73.8		0	0.8	0	99.2		0	57.8	0.9	41.4		0.2	1.7	1.4	96.8		
PHF	.500	.738	.000	.729	.737	.000	.500	.000	.868	.875	.000	.728	.250	.857	.763	.250	.833	.400	.751	.741	.892

N/S: Massachusetts Avenue
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
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Site Code : 10135.00
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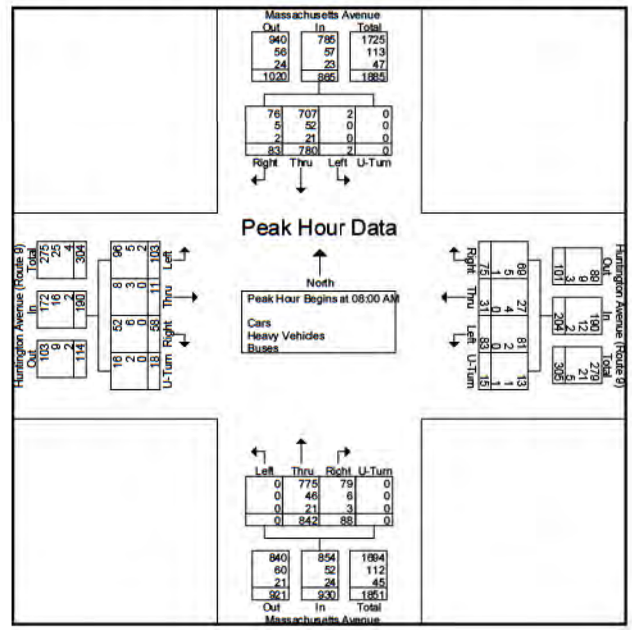
	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	16	193	0	0	209	20	11	22	3	56	18	250	0	0	268	16	2	16	2	36	569
08:15 AM	19	193	1	0	213	22	10	24	2	58	18	184	0	0	202	20	2	25	6	53	526
08:30 AM	19	195	1	0	215	19	4	20	3	46	28	213	0	0	241	13	1	32	2	48	550
08:45 AM	29	199	0	0	228	14	6	17	7	44	24	195	0	0	219	9	6	30	8	53	544
Total Volume	83	780	2	0	865	75	31	83	15	204	88	842	0	0	930	58	11	103	18	190	2189
% App. Total	9.6	90.2	0.2	0		36.8	15.2	40.7	7.4		9.5	90.5	0	0		30.5	5.8	54.2	9.5		
PHF	.716	.980	.500	.000	.948	.852	.705	.865	.536	.879	.786	.842	.000	.000	.868	.725	.458	.805	.563	.896	.962
Cars	76	707	2	0	785	69	27	81	13	190	79	775	0	0	854	52	8	96	16	172	2001
% Cars	91.6	90.6	100	0	90.8	92.0	87.1	97.6	86.7	93.1	89.8	92.0	0	0	91.8	89.7	72.7	93.2	88.9	90.5	91.4
Heavy Vehicles	5	52	0	0	57	5	4	2	1	12	6	46	0	0	52	6	3	5	2	16	137
% Heavy Vehicles	6.0	6.7	0	0	6.6	6.7	12.9	2.4	6.7	5.9	6.8	5.5	0	0	5.6	10.3	27.3	4.9	11.1	8.4	6.3
Buses	2	21	0	0	23	1	0	0	1	2	3	21	0	0	24	0	0	2	0	2	51
% Buses	2.4	2.7	0	0	2.7	1.3	0	0	6.7	1.0	3.4	2.5	0	0	2.6	0	0	1.9	0	1.1	2.3



N/S: Massachusetts Avenue
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 EE
Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Cars - Heavy Vehicles - Buses

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	27	197	1	0	17	5	17	6	10	183	0	0	22	2	16	2	505
04:15 PM	25	203	1	0	16	9	21	12	19	188	0	0	21	9	21	3	548
04:30 PM	11	200	0	0	16	14	38	7	13	177	0	0	24	9	25	4	538
04:45 PM	31	212	1	0	25	10	20	11	4	182	1	0	31	10	21	5	564
Total	94	812	3	0	74	38	96	36	46	730	1	0	98	30	83	14	2155
05:00 PM	16	214	0	0	19	5	27	12	19	209	0	0	28	6	25	6	586
05:15 PM	19	222	0	0	17	5	34	11	19	211	0	0	27	5	21	5	596
05:30 PM	21	197	1	0	21	18	27	7	17	223	0	0	18	4	16	4	574
05:45 PM	20	191	1	0	20	8	38	7	16	212	0	0	23	8	23	4	571
Total	76	824	2	0	77	36	126	37	71	855	0	0	96	23	85	19	2327
Grand Total	170	1636	5	0	151	74	222	73	117	1585	1	0	194	53	168	33	4482
Apprch %	9.4	90.3	0.3	0	29	14.2	42.7	14	6.9	93.1	0.1	0	43.3	11.8	37.5	7.4	
Total %	3.8	36.5	0.1	0	3.4	1.7	5	1.6	2.6	35.4	0	0	4.3	1.2	3.7	0.7	
Cars	165	1570	4	0	144	72	208	59	115	1516	1	0	189	50	159	32	4284
% Cars	97.1	96	80	0	95.4	97.3	93.7	80.8	98.3	95.6	100	0	97.4	94.3	94.6	97	95.6
Heavy Vehicles	3	33	1	0	5	1	5	2	1	30	0	0	3	3	5	1	93
% Heavy Vehicles	1.8	2	20	0	3.3	1.4	2.3	2.7	0.9	1.9	0	0	1.5	5.7	3	3	2.1
Buses	2	33	0	0	2	1	9	12	1	39	0	0	2	0	4	0	105
% Buses	1.2	2	0	0	1.3	1.4	4.1	16.4	0.9	2.5	0	0	1	0	2.4	0	2.3

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	16	214	0	0	230	19	5	27	12	63	19	209	0	0	228	28	6	25	6	65	586
05:15 PM	19	222	0	0	241	17	5	34	11	67	19	211	0	0	230	27	5	21	5	58	596
05:30 PM	21	197	1	0	219	21	18	27	7	73	17	223	0	0	240	18	4	16	4	42	574
05:45 PM	20	191	1	0	212	20	8	38	7	73	16	212	0	0	228	23	8	23	4	58	571
Total Volume	76	824	2	0	902	77	36	126	37	276	71	855	0	0	926	96	23	85	19	223	2327
% App. Total	8.4	91.4	0.2	0		27.9	13	45.7	13.4		7.7	92.3	0	0		43	10.3	38.1	8.5		
PHF	.905	.928	.500	.000	.936	.917	.500	.829	.771	.945	.934	.959	.000	.000	.965	.857	.719	.850	.792	.858	.976
Cars	75	789	1	0	865	75	35	118	31	259	71	826	0	0	897	93	23	78	18	212	2233
% Cars	98.7	95.8	50.0	0	95.9	97.4	97.2	93.7	83.8	93.8	100	96.6	0	0	96.9	96.9	100	91.8	94.7	95.1	96.0
Heavy Vehicles	0	19	1	0	20	2	1	3	0	6	0	8	0	0	8	2	0	4	1	7	41
% Heavy Vehicles	0	2.3	50.0	0	2.2	2.6	2.8	2.4	0	2.2	0	0.9	0	0	0.9	2.1	0	4.7	5.3	3.1	1.8
Buses	1	16	0	0	17	0	0	5	6	11	0	21	0	0	21	1	0	3	0	4	53
% Buses	1.3	1.9	0	0	1.9	0	0	4.0	16.2	4.0	0	2.5	0	0	2.3	1.0	0	3.5	0	1.8	2.3

N/S: Massachusetts Avenue
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 EE
Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Cars

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	26	186	1	0	15	5	16	6	9	171	0	0	22	1	16	2	476
04:15 PM	25	196	1	0	16	8	19	9	18	178	0	0	21	7	20	3	521
04:30 PM	11	194	0	0	16	14	36	7	13	167	0	0	24	9	24	4	519
04:45 PM	28	205	1	0	22	10	19	6	4	174	1	0	29	10	21	5	535
Total	90	781	3	0	69	37	90	28	44	690	1	0	96	27	81	14	2051
05:00 PM	15	206	0	0	18	5	24	11	19	201	0	0	28	6	23	6	562
05:15 PM	19	213	0	0	17	5	32	7	19	204	0	0	26	5	19	4	570
05:30 PM	21	186	1	0	21	18	26	6	17	218	0	0	17	4	15	4	554
05:45 PM	20	184	0	0	19	7	36	7	16	203	0	0	22	8	21	4	547
Total	75	789	1	0	75	35	118	31	71	826	0	0	93	23	78	18	2233
Grand Total	165	1570	4	0	144	72	208	59	115	1516	1	0	189	50	159	32	4284
Apprch %	9.5	90.3	0.2	0	29.8	14.9	43.1	12.2	7	92.9	0.1	0	44	11.6	37	7.4	
Total %	3.9	36.6	0.1	0	3.4	1.7	4.9	1.4	2.7	35.4	0	0	4.4	1.2	3.7	0.7	

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	15	206	0	0	221	18	5	24	11	58	19	201	0	0	220	28	6	23	6	63	562
05:15 PM	19	213	0	0	232	17	5	32	7	61	19	204	0	0	223	26	5	19	4	54	570
05:30 PM	21	186	1	0	208	21	18	26	6	71	17	218	0	0	235	17	4	15	4	40	554
05:45 PM	20	184	0	0	204	19	7	36	7	69	16	203	0	0	219	22	8	21	4	55	547
Total Volume	75	789	1	0	865	75	35	118	31	259	71	826	0	0	897	93	23	78	18	212	2233
% App. Total	8.7	91.2	0.1	0		29	13.5	45.6	12		7.9	92.1	0	0		43.9	10.8	36.8	8.5		
PHF	.893	.926	.250	.000	.932	.893	.486	.819	.705	.912	.934	.947	.000	.000	.954	.830	.719	.848	.750	.841	.979

N/S: Massachusetts Avenue
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Heavy Vehicles

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	1	8	0	0	1	0	1	0	1	7	0	0	0	1	0	0	20
04:15 PM	0	1	0	0	0	0	0	0	0	4	0	0	0	2	0	0	7
04:30 PM	0	1	0	0	0	0	1	0	0	7	0	0	0	0	1	0	10
04:45 PM	2	4	0	0	2	0	0	2	0	4	0	0	1	0	0	0	15
Total	3	14	0	0	3	0	2	2	1	22	0	0	1	3	1	0	52
05:00 PM	0	4	0	0	1	0	1	0	0	1	0	0	0	0	0	0	7
05:15 PM	0	5	0	0	0	0	1	0	0	1	0	0	1	0	2	1	11
05:30 PM	0	5	0	0	0	0	0	0	0	2	0	0	1	0	1	0	9
05:45 PM	0	5	1	0	1	1	1	0	0	4	0	0	0	0	1	0	14
Total	0	19	1	0	2	1	3	0	0	8	0	0	2	0	4	1	41
Grand Total	3	33	1	0	5	1	5	2	1	30	0	0	3	3	5	1	93
Apprch %	8.1	89.2	2.7	0	38.5	7.7	38.5	15.4	3.2	96.8	0	0	25	25	41.7	8.3	
Total %	3.2	35.5	1.1	0	5.4	1.1	5.4	2.2	1.1	32.3	0	0	3.2	3.2	5.4	1.1	

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	**8**	0	0	**9**	1	0	**1**	0	2	**1**	**7**	0	0	**8**	0	1	0	0	1	**20**
04:15 PM	0	1	0	0	1	0	0	0	0	0	0	4	0	0	4	0	**2**	0	0	**2**	7
04:30 PM	0	1	0	0	1	0	0	1	0	1	0	7	0	0	7	0	0	**1**	0	1	10
04:45 PM	**2**	4	0	0	6	**2**	0	0	**2**	**4**	0	4	0	0	4	**1**	0	0	0	1	15
Total Volume	3	14	0	0	17	3	0	2	2	7	1	22	0	0	23	1	3	1	0	5	52
% App. Total	17.6	82.4	0	0		42.9	0	28.6	28.6		4.3	95.7	0	0		20	60	20	0		
PHF	.375	.438	.000	.000	.472	.375	.000	.500	.250	.438	.250	.786	.000	.000	.719	.250	.375	.250	.000	.625	.650

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Groups Printed- Buses

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	3	0	0	1	0	0	0	0	5	0	0	0	0	0	0	9
04:15 PM	0	6	0	0	0	1	2	3	1	6	0	0	0	0	1	0	20
04:30 PM	0	5	0	0	0	0	1	0	0	3	0	0	0	0	0	0	9
04:45 PM	1	3	0	0	1	0	1	3	0	4	0	0	1	0	0	0	14
Total	1	17	0	0	2	1	4	6	1	18	0	0	1	0	1	0	52
05:00 PM	1	4	0	0	0	0	2	1	0	7	0	0	0	0	2	0	17
05:15 PM	0	4	0	0	0	0	1	4	0	6	0	0	0	0	0	0	15
05:30 PM	0	6	0	0	0	0	1	1	0	3	0	0	0	0	0	0	11
05:45 PM	0	2	0	0	0	0	1	0	0	5	0	0	1	0	1	0	10
Total	1	16	0	0	0	0	5	6	0	21	0	0	1	0	3	0	53
Grand Total	2	33	0	0	2	1	9	12	1	39	0	0	2	0	4	0	105
Apprch %	5.7	94.3	0	0	8.3	4.2	37.5	50	2.5	97.5	0	0	33.3	0	66.7	0	
Total %	1.9	31.4	0	0	1.9	1	8.6	11.4	1	37.1	0	0	1.9	0	3.8	0	

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	**6**	0	0	**6**	0	**1**	**2**	**3**	**6**	**1**	6	0	0	**7**	0	0	1	0	1	**20**
04:30 PM	0	5	0	0	5	0	0	1	0	1	0	3	0	0	3	0	0	0	0	0	9
04:45 PM	**1**	3	0	0	4	**1**	0	1	3	5	0	4	0	0	4	**1**	0	0	0	1	14
05:00 PM	1	4	0	0	5	0	0	2	1	3	0	**7**	0	0	7	0	0	**2**	0	**2**	17
Total Volume	2	18	0	0	20	1	1	6	7	15	1	20	0	0	21	1	0	3	0	4	60
% App. Total	10	90	0	0		6.7	6.7	40	46.7		4.8	95.2	0	0		25	0	75	0		
PHF	.500	.750	.000	.000	.833	.250	.250	.750	.583	.625	.250	.714	.000	.000	.750	.250	.000	.375	.000	.500	.750

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Page No : 1

Groups Printed- Peds and Bicycles

	Massachusetts Avenue From North				Huntington Avenue (Route 9) From East				Massachusetts Avenue From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	4	0	49	0	2	0	70	0	10	0	42	0	2	1	115	295
04:15 PM	0	4	0	40	0	0	1	55	0	15	0	38	0	3	0	101	257
04:30 PM	0	7	0	42	0	0	0	56	0	9	1	61	0	3	0	118	297
04:45 PM	0	3	0	64	0	0	0	53	0	7	2	55	0	3	0	122	309
Total	0	18	0	195	0	2	1	234	0	41	3	196	0	11	1	456	1158
05:00 PM	0	5	0	79	0	1	2	70	2	13	0	58	0	1	0	149	380
05:15 PM	0	6	0	81	0	0	1	80	0	11	0	56	0	1	0	131	367
05:30 PM	0	4	0	90	0	0	0	97	0	14	0	53	0	0	0	132	390
05:45 PM	0	7	0	101	0	0	0	83	1	17	0	52	1	1	0	118	381
Total	0	22	0	351	0	1	3	330	3	55	0	219	1	3	0	530	1518
Grand Total	0	40	0	546	0	3	4	564	3	96	3	415	1	14	1	986	2676
Apprch %	0	6.8	0	93.2	0	0.5	0.7	98.8	0.6	18.6	0.6	80.3	0.1	1.4	0.1	98.4	
Total %	0	1.5	0	20.4	0	0.1	0.1	21.1	0.1	3.6	0.1	15.5	0	0.5	0	36.8	

	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	5	0	79	84	0	**1**	**2**	70	73	**2**	13	0	**58**	**73**	0	**1**	0	**149**	**150**	380
05:15 PM	0	6	0	81	87	0	0	1	80	81	0	11	0	56	67	0	1	0	131	132	367
05:30 PM	0	4	0	90	94	0	0	0	**97**	**97**	0	14	0	53	67	0	0	0	132	132	**390**
05:45 PM	0	**7**	0	**101**	**108**	0	0	0	83	83	1	**17**	0	52	70	**1**	1	0	118	120	381
Total Volume	0	22	0	351	373	0	1	3	330	334	3	55	0	219	277	1	3	0	530	534	1518
% App. Total	0	5.9	0	94.1		0	0.3	0.9	98.8		1.1	19.9	0	79.1		0.2	0.6	0	99.3		
PHF	.000	.786	.000	.869	.863	.000	.250	.375	.851	.861	.375	.809	.000	.944	.949	.250	.750	.000	.889	.890	.973

N/S: Massachusetts Avenue
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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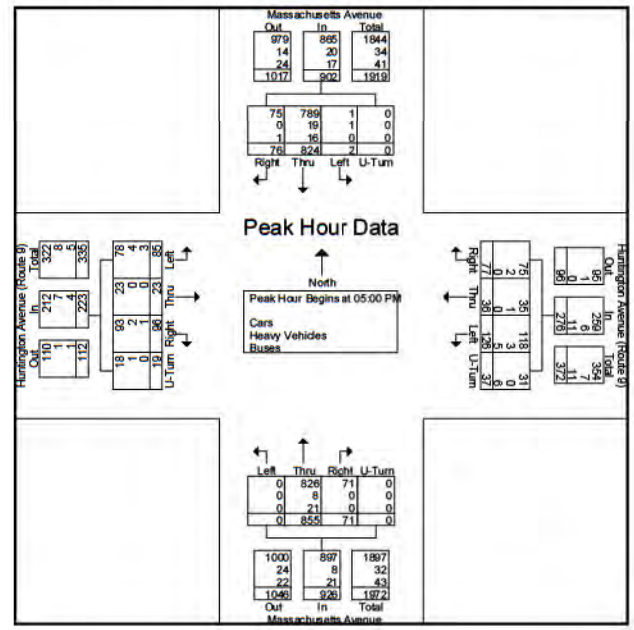
	Massachusetts Avenue From North					Huntington Avenue (Route 9) From East					Massachusetts Avenue From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	16	214	0	0	230	19	5	27	**12**	63	**19**	209	0	0	228	**28**	6	**25**	**6**	**65**	586
05:15 PM	19	**222**	0	0	**241**	17	5	34	11	67	19	211	0	0	230	27	5	21	5	58	**596**
05:30 PM	**21**	197	**1**	0	219	**21**	**18**	27	7	**73**	17	**223**	0	0	**240**	18	4	16	4	42	574
05:45 PM	20	191	1	0	212	20	8	**38**	7	73	16	212	0	0	228	23	**8**	23	4	58	571
Total Volume	76	824	2	0	902	77	36	126	37	276	71	855	0	0	926	96	23	85	19	223	2327
% App. Total	8.4	91.4	0.2	0		27.9	13	45.7	13.4		7.7	92.3	0	0		43	10.3	38.1	8.5		
PHF	.905	.928	.500	.000	.936	.917	.500	.829	.771	.945	.934	.959	.000	.000	.965	.857	.719	.850	.792	.858	.976
Cars	75	789	1	0	865	75	35	118	31	259	71	826	0	0	897	93	23	78	18	212	2233
% Cars	98.7	95.8	50.0	0	95.9	97.4	97.2	93.7	83.8	93.8	100	96.6	0	0	96.9	96.9	100	91.8	94.7	95.1	96.0
Heavy Vehicles	0	19	1	0	20	2	1	3	0	6	0	8	0	0	8	2	0	4	1	7	41
% Heavy Vehicles	0	2.3	50.0	0	2.2	2.6	2.8	2.4	0	2.2	0	0.9	0	0	0.9	2.1	0	4.7	5.3	3.1	1.8
Buses	1	16	0	0	17	0	0	5	6	11	0	21	0	0	21	1	0	3	0	4	53
% Buses	1.3	1.9	0	0	1.9	0	0	4.0	16.2	4.0	0	2.5	0	0	2.3	1.0	0	3.5	0	1.8	2.3



N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Cars - Heavy Vehicles - Buses

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	2	0	0	0	9	29	0	0	0	0	0	0	0	70	0	0	110
07:15 AM	0	0	0	0	8	32	0	0	0	0	0	0	0	79	0	0	119
07:30 AM	0	0	0	0	9	46	0	0	0	0	0	0	0	116	0	0	171
07:45 AM	0	0	0	0	16	41	0	0	0	0	0	0	0	105	0	0	162
Total	2	0	0	0	42	148	0	0	0	0	0	0	0	370	0	0	562
08:00 AM	2	0	0	0	19	56	0	0	0	0	0	0	0	116	0	0	193
08:15 AM	0	0	0	0	11	58	0	0	0	0	0	0	0	110	0	0	179
08:30 AM	0	0	0	0	12	49	0	0	0	0	0	0	0	100	0	0	161
08:45 AM	1	0	0	0	13	44	0	0	0	0	0	0	0	125	0	0	183
Total	3	0	0	0	55	207	0	0	0	0	0	0	0	451	0	0	716
Grand Total	5	0	0	0	97	355	0	0	0	0	0	0	0	821	0	0	1278
Apprch %	100	0	0	0	21.5	78.5	0	0	0	0	0	0	0	100	0	0	
Total %	0.4	0	0	0	7.6	27.8	0	0	0	0	0	0	0	64.2	0	0	
Cars	4	0	0	0	97	332	0	0	0	0	0	0	0	775	0	0	1208
% Cars	80	0	0	0	100	93.5	0	0	0	0	0	0	0	94.4	0	0	94.5
Heavy Vehicles	1	0	0	0	0	18	0	0	0	0	0	0	0	20	0	0	39
% Heavy Vehicles	20	0	0	0	0	5.1	0	0	0	0	0	0	0	2.4	0	0	3.1
Buses	0	0	0	0	0	5	0	0	0	0	0	0	0	26	0	0	31
% Buses	0	0	0	0	0	1.4	0	0	0	0	0	0	0	3.2	0	0	2.4

	Christian Science Center Driveway From North					Huntington Avenue (Route 9) From East					From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	**2**	0	0	0	2	**19**	56	0	0	75	0	0	0	0	0	0	116	0	0	116	**193**
08:15 AM	0	0	0	0	0	11	**58**	0	0	69	0	0	0	0	0	0	110	0	0	110	179
08:30 AM	0	0	0	0	0	12	49	0	0	61	0	0	0	0	0	0	100	0	0	100	161
08:45 AM	1	0	0	0	1	13	44	0	0	57	0	0	0	0	0	0	**125**	0	0	**125**	183
Total Volume	3	0	0	0	3	55	207	0	0	262	0	0	0	0	0	0	451	0	0	451	716
% App. Total	100	0	0	0		21	79	0	0		0	0	0	0		0	100	0	0		
PHF	.375	.000	.000	.000	.375	.724	.892	.000	.000	.873	.000	.000	.000	.000	.000	.000	.902	.000	.000	.902	.927
Cars	2	0	0	0	2	55	197	0	0	252	0	0	0	0	0	0	429	0	0	429	683
% Cars	66.7	0	0	0	66.7	100	95.2	0	0	96.2	0	0	0	0	0	0	95.1	0	0	95.1	95.4
Heavy Vehicles	1	0	0	0	1	0	7	0	0	7	0	0	0	0	0	0	10	0	0	10	18
% Heavy Vehicles	33.3	0	0	0	33.3	0	3.4	0	0	2.7	0	0	0	0	0	0	2.2	0	0	2.2	2.5
Buses	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	12	0	0	12	15
% Buses	0	0	0	0	0	0	1.4	0	0	1.1	0	0	0	0	0	0	2.7	0	0	2.7	2.1

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 F
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	2	0	0	0	9	26	0	0	0	0	0	0	0	62	0	0	99
07:15 AM	0	0	0	0	8	30	0	0	0	0	0	0	0	72	0	0	110
07:30 AM	0	0	0	0	9	40	0	0	0	0	0	0	0	110	0	0	159
07:45 AM	0	0	0	0	16	39	0	0	0	0	0	0	0	102	0	0	157
Total	2	0	0	0	42	135	0	0	0	0	0	0	0	346	0	0	525
08:00 AM	1	0	0	0	19	55	0	0	0	0	0	0	0	111	0	0	186
08:15 AM	0	0	0	0	11	55	0	0	0	0	0	0	0	104	0	0	170
08:30 AM	0	0	0	0	12	48	0	0	0	0	0	0	0	92	0	0	152
08:45 AM	1	0	0	0	13	39	0	0	0	0	0	0	0	122	0	0	175
Total	2	0	0	0	55	197	0	0	0	0	0	0	0	429	0	0	683
Grand Total	4	0	0	0	97	332	0	0	0	0	0	0	0	775	0	0	1208
Apprch %	100	0	0	0	22.6	77.4	0	0	0	0	0	0	0	100	0	0	
Total %	0.3	0	0	0	8	27.5	0	0	0	0	0	0	0	64.2	0	0	

	Christian Science Center Driveway From North					Huntington Avenue (Route 9) From East					From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	**1**	0	0	0	1	**19**	**55**	0	0	74	0	0	0	0	0	0	111	0	0	111	**186**
08:15 AM	0	0	0	0	0	11	55	0	0	66	0	0	0	0	0	0	104	0	0	104	170
08:30 AM	0	0	0	0	0	12	48	0	0	60	0	0	0	0	0	0	92	0	0	92	152
08:45 AM	1	0	0	0	1	13	39	0	0	52	0	0	0	0	0	0	**122**	0	0	**122**	175
Total Volume	2	0	0	0	2	55	197	0	0	252	0	0	0	0	0	0	429	0	0	429	683
% App. Total	100	0	0	0		21.8	78.2	0	0		0	0	0	0		0	100	0	0		
PHF	.500	.000	.000	.000	.500	.724	.895	.000	.000	.851	.000	.000	.000	.000	.000	.000	.879	.000	.000	.879	.918

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 F
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	4
07:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	6
07:30 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	4	0	0	9
07:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	0	11	0	0	0	0	0	0	0	10	0	0	21
08:00 AM	1	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	4
08:15 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	6
08:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	4	0	0	5
08:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	0	3
Total	1	0	0	0	0	7	0	0	0	0	0	0	0	10	0	0	18
Grand Total	1	0	0	0	0	18	0	0	0	0	0	0	0	20	0	0	39
Apprch %	100	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	
Total %	2.6	0	0	0	0	46.2	0	0	0	0	0	0	0	51.3	0	0	

	Christian Science Center Driveway From North					Huntington Avenue (Route 9) From East					From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	4
07:15 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4	0	0	4	6
07:30 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	9
07:45 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Total Volume	0	0	0	0	0	0	11	0	0	11	0	0	0	0	0	0	10	0	0	10	21
% App. Total	0	0	0	0		0	100	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.550	.000	.000	.550	.000	.000	.000	.000	.000	.000	.625	.000	.000	.625	.583

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Buses

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	6	0	0	7
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
07:30 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
Total	0	0	0	0	0	2	0	0	0	0	0	0	0	14	0	0	16
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
08:45 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	5
Total	0	0	0	0	0	3	0	0	0	0	0	0	0	12	0	0	15
Grand Total	0	0	0	0	0	5	0	0	0	0	0	0	0	26	0	0	31
Apprch %	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	16.1	0	0	0	0	0	0	0	83.9	0	0	

	Christian Science Center Driveway From North					Huntington Avenue (Route 9) From East					From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6	7
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	3
07:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	3
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	3
Total Volume	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	14	0	0	14	16
% App. Total	0	0	0	0		0	100	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.500	.000	.000	.500	.000	.000	.000	.000	.000	.000	.583	.000	.000	.583	.571

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
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Groups Printed- Peds and Bicycles

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	19	0	0	0	0	0	0	0	0	0	1	0	0	20
07:15 AM	0	0	0	11	0	1	0	0	0	0	0	0	0	1	0	0	13
07:30 AM	0	0	0	27	1	0	0	0	0	0	0	0	0	0	0	0	28
07:45 AM	0	0	0	52	0	1	0	0	0	0	0	0	0	0	0	0	53
Total	0	0	0	109	1	2	0	0	0	0	0	0	0	2	0	0	114
08:00 AM	0	0	0	51	0	3	0	0	0	0	0	0	0	0	0	0	54
08:15 AM	0	0	0	48	1	1	0	0	0	0	0	0	0	0	0	0	50
08:30 AM	0	0	0	57	0	1	0	0	0	0	0	0	0	0	0	0	58
08:45 AM	0	0	0	72	0	3	0	0	0	0	0	0	0	0	0	0	75
Total	0	0	0	228	1	8	0	0	0	0	0	0	0	0	0	0	237
Grand Total	0	0	0	337	2	10	0	0	0	0	0	0	0	2	0	0	351
Apprch %	0	0	0	100	16.7	83.3	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	96	0.6	2.8	0	0	0	0	0	0	0	0.6	0	0	

	Christian Science Center Driveway From North					Huntington Avenue (Route 9) From East					From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	51	51	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	54
08:15 AM	0	0	0	48	48	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	50
08:30 AM	0	0	0	57	57	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	58
08:45 AM	0	0	0	72	72	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	75
Total Volume	0	0	0	228	228	1	8	0	0	9	0	0	0	0	0	0	0	0	0	0	237
% App. Total	0	0	0	100		11.1	88.9	0	0		0	0	0	0		0	0	0	0		
PHF	.000	.000	.000	.792	.792	.250	.667	.000	.000	.750	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.790

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
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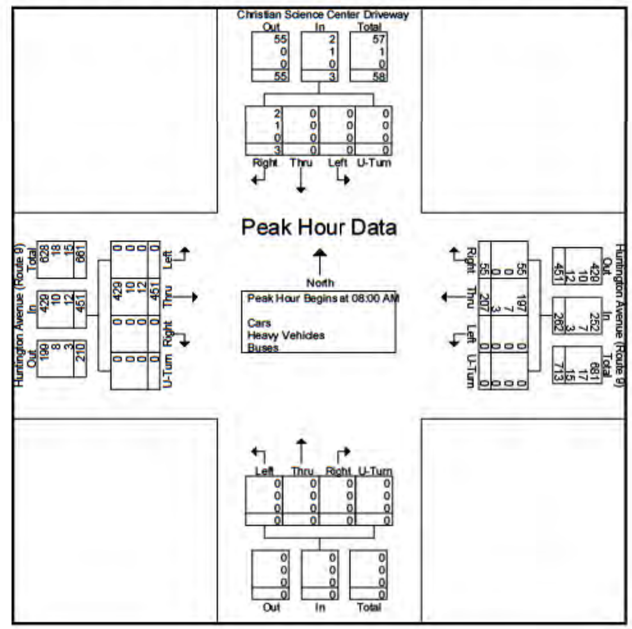
	Christian Science Center Driveway From North					Huntington Avenue (Route 9) From East					From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	2	0	0	0	2	19	56	0	0	75	0	0	0	0	0	0	116	0	0	116	193
08:15 AM	0	0	0	0	0	11	58	0	0	69	0	0	0	0	0	0	110	0	0	110	179
08:30 AM	0	0	0	0	0	12	49	0	0	61	0	0	0	0	0	0	100	0	0	100	161
08:45 AM	1	0	0	0	1	13	44	0	0	57	0	0	0	0	0	0	125	0	0	125	183
Total Volume	3	0	0	0	3	55	207	0	0	262	0	0	0	0	0	0	451	0	0	451	716
% App. Total	100	0	0	0		21	79	0	0		0	0	0	0		0	100	0	0		
PHF	.375	.000	.000	.000	.375	.724	.892	.000	.000	.873	.000	.000	.000	.000	.000	.000	.902	.000	.000	.902	.927
Cars	2	0	0	0	2	55	197	0	0	252	0	0	0	0	0	0	429	0	0	429	683
% Cars	66.7	0	0	0	66.7	100	95.2	0	0	96.2	0	0	0	0	0	0	95.1	0	0	95.1	95.4
Heavy Vehicles	1	0	0	0	1	0	7	0	0	7	0	0	0	0	0	0	10	0	0	10	18
% Heavy Vehicles	33.3	0	0	0	33.3	0	3.4	0	0	2.7	0	0	0	0	0	0	2.2	0	0	2.2	2.5
Buses	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	12	0	0	12	15
% Buses	0	0	0	0	0	0	1.4	0	0	1.1	0	0	0	0	0	0	2.7	0	0	2.7	2.1



N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Cars - Heavy Vehicles - Buses

	Christian Science Center Driveway From North			Huntington Avenue (Route 9) From East			Huntington Avenue (Route 9) From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
04:00 PM	10	0	0	1	37	0	0	0	0	48
04:15 PM	11	0	0	1	55	0	0	0	0	67
04:30 PM	22	0	0	0	57	0	0	0	0	79
04:45 PM	11	0	0	0	59	0	0	0	0	70
Total	54	0	0	2	208	0	0	0	0	264
05:00 PM	17	0	0	0	48	0	0	0	0	65
05:15 PM	13	0	0	4	57	0	0	0	0	74
05:30 PM	22	0	0	3	55	0	0	0	0	80
05:45 PM	10	0	0	1	62	0	0	0	0	73
Total	62	0	0	8	222	0	0	0	0	292
Grand Total	116	0	0	10	430	0	0	0	0	556
Apprch %	100	0	0	2.3	97.7	0	0	0	0	
Total %	20.9	0	0	1.8	77.3	0	0	0	0	
Cars	116	0	0	10	392	0	0	0	0	518
% Cars	100	0	0	100	91.2	0	0	0	0	93.2
Heavy Vehicles	0	0	0	0	12	0	0	0	0	12
% Heavy Vehicles	0	0	0	0	2.8	0	0	0	0	2.2
Buses	0	0	0	0	26	0	0	0	0	26
% Buses	0	0	0	0	6	0	0	0	0	4.7

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				Huntington Avenue (Route 9) From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	17	0	0	17	0	48	0	48	0	0	0	0	65
05:15 PM	13	0	0	13	4	57	0	61	0	0	0	0	74
05:30 PM	22	0	0	22	3	55	0	58	0	0	0	0	80
05:45 PM	10	0	0	10	1	62	0	63	0	0	0	0	73
Total Volume	62	0	0	62	8	222	0	230	0	0	0	0	292
% App. Total	100	0	0		3.5	96.5	0		0	0	0		
PHF	.705	.000	.000	.705	.500	.895	.000	.913	.000	.000	.000	.000	.913
Cars	62	0	0	62	8	205	0	213	0	0	0	0	275
% Cars	100	0	0	100	100	92.3	0	92.6	0	0	0	0	94.2
Heavy Vehicles	0	0	0	0	0	4	0	4	0	0	0	0	4
% Heavy Vehicles	0	0	0	0	0	1.8	0	1.7	0	0	0	0	1.4
Buses	0	0	0	0	0	13	0	13	0	0	0	0	13
% Buses	0	0	0	0	0	5.9	0	5.7	0	0	0	0	4.5

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Cars

	Christian Science Center Driveway From North			Huntington Avenue (Route 9) From East			Huntington Avenue (Route 9) From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
04:00 PM	10	0	0	1	34	0	0	0	0	45
04:15 PM	11	0	0	1	48	0	0	0	0	60
04:30 PM	22	0	0	0	55	0	0	0	0	77
04:45 PM	11	0	0	0	50	0	0	0	0	61
Total	54	0	0	2	187	0	0	0	0	243
05:00 PM	17	0	0	0	43	0	0	0	0	60
05:15 PM	13	0	0	4	51	0	0	0	0	68
05:30 PM	22	0	0	3	52	0	0	0	0	77
05:45 PM	10	0	0	1	59	0	0	0	0	70
Total	62	0	0	8	205	0	0	0	0	275
Grand Total	116	0	0	10	392	0	0	0	0	518
Apprch %	100	0	0	2.5	97.5	0	0	0	0	
Total %	22.4	0	0	1.9	75.7	0	0	0	0	

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				Huntington Avenue (Route 9) From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	17	0	0	17	0	43	0	43	0	0	0	0	60
05:15 PM	13	0	0	13	4	51	0	55	0	0	0	0	68
05:30 PM	22	0	0	22	3	52	0	55	0	0	0	0	77
05:45 PM	10	0	0	10	1	59	0	60	0	0	0	0	70
Total Volume	62	0	0	62	8	205	0	213	0	0	0	0	275
% App. Total	100	0	0		3.8	96.2	0		0	0	0		
PHF	.705	.000	.000	.705	.500	.869	.000	.888	.000	.000	.000	.000	.893

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 FF
Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Heavy Vehicles

	Christian Science Center Driveway From North			Huntington Avenue (Route 9) From East			Huntington Avenue (Route 9) From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	2	0	0	0	0	2
04:15 PM	0	0	0	0	1	0	0	0	0	1
04:30 PM	0	0	0	0	1	0	0	0	0	1
04:45 PM	0	0	0	0	4	0	0	0	0	4
Total	0	0	0	0	8	0	0	0	0	8
05:00 PM	0	0	0	0	1	0	0	0	0	1
05:15 PM	0	0	0	0	1	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	2	0	0	0	0	2
Total	0	0	0	0	4	0	0	0	0	4
Grand Total	0	0	0	0	12	0	0	0	0	12
Apprch %	0	0	0	0	100	0	0	0	0	
Total %	0	0	0	0	100	0	0	0	0	

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

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				Huntington Avenue (Route 9) From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
04:00 PM	0	0	0	0	0	2	0	2	0	0	0	0	2
04:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	1
04:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	1
04:45 PM	0	0	0	0	0	4	0	4	0	0	0	0	4
Total Volume	0	0	0	0	0	8	0	8	0	0	0	0	8
% App. Total	0	0	0		0	100	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.500

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
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Groups Printed- Buses

	Christian Science Center Driveway From North			Huntington Avenue (Route 9) From East			Huntington Avenue (Route 9) From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	1	0	0	0	0	1
04:15 PM	0	0	0	0	6	0	0	0	0	6
04:30 PM	0	0	0	0	1	0	0	0	0	1
04:45 PM	0	0	0	0	5	0	0	0	0	5
Total	0	0	0	0	13	0	0	0	0	13
05:00 PM	0	0	0	0	4	0	0	0	0	4
05:15 PM	0	0	0	0	5	0	0	0	0	5
05:30 PM	0	0	0	0	3	0	0	0	0	3
05:45 PM	0	0	0	0	1	0	0	0	0	1
Total	0	0	0	0	13	0	0	0	0	13
Grand Total	0	0	0	0	26	0	0	0	0	26
Apprch %	0	0	0	0	100	0	0	0	0	
Total %	0	0	0	0	100	0	0	0	0	

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

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				Huntington Avenue (Route 9) From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
04:45 PM	0	0	0	0	0	5	0	5	0	0	0	0	5
05:00 PM	0	0	0	0	0	4	0	4	0	0	0	0	4
05:15 PM	0	0	0	0	0	5	0	5	0	0	0	0	5
05:30 PM	0	0	0	0	0	3	0	3	0	0	0	0	3
Total Volume	0	0	0	0	0	17	0	17	0	0	0	0	17
% App. Total	0	0	0		0	100	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.850	.000	.850	.000	.000	.000	.000	.850

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
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Groups Printed- Peds and Bicycles

	Christian Science Center Driveway From North			Huntington Avenue (Route 9) From East			Huntington Avenue (Route 9) From West			
Start Time	Right	Left	Peds	Right	Thru	Peds	Thru	Left	Peds	Int. Total
04:00 PM	0	0	52	0	6	1	0	0	1	60
04:15 PM	1	0	78	0	2	0	0	0	0	81
04:30 PM	0	0	72	0	5	0	0	0	0	77
04:45 PM	1	0	67	0	2	0	0	0	1	71
Total	2	0	269	0	15	1	0	0	2	289
05:00 PM	0	0	89	0	8	0	0	0	0	97
05:15 PM	4	0	103	0	4	0	0	0	0	111
05:30 PM	0	0	107	0	4	0	0	0	0	111
05:45 PM	3	0	74	0	4	0	0	0	0	81
Total	7	0	373	0	20	0	0	0	0	400
Grand Total	9	0	642	0	35	1	0	0	2	689
Apprch %	1.4	0	98.6	0	97.2	2.8	0	0	100	
Total %	1.3	0	93.2	0	5.1	0.1	0	0	0.3	

	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				Huntington Avenue (Route 9) From West				
Start Time	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	0	0	89	89	0	**8**	0	**8**	0	0	0	0	97
05:15 PM	**4**	0	103	**107**	0	4	0	4	0	0	0	0	**111**
05:30 PM	0	0	**107**	107	0	4	0	4	0	0	0	0	111
05:45 PM	3	0	74	77	0	4	0	4	0	0	0	0	81
Total Volume	7	0	373	380	0	20	0	20	0	0	0	0	400
% App. Total	1.8	0	98.2		0	100	0		0	0	0		
PHF	.438	.000	.871	.888	.000	.625	.000	.625	.000	.000	.000	.000	.901

N: Christian Science Center Driveway
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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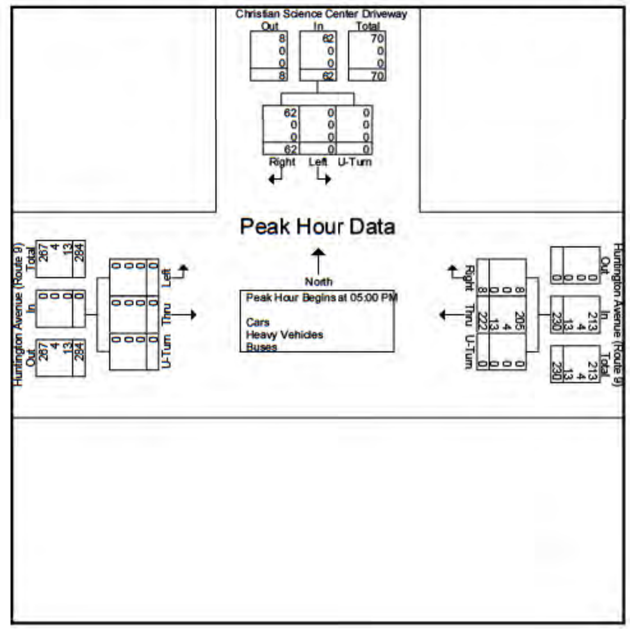
	Christian Science Center Driveway From North				Huntington Avenue (Route 9) From East				Huntington Avenue (Route 9) From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	17	0	0	17	0	48	0	48	0	0	0	0	65
05:15 PM	13	0	0	13	**4**	57	0	61	0	0	0	0	74
05:30 PM	**22**	0	0	**22**	3	55	0	58	0	0	0	0	**80**
05:45 PM	10	0	0	10	1	**62**	0	**63**	0	0	0	0	73
Total Volume	62	0	0	62	8	222	0	230	0	0	0	0	292
% App. Total	100	0	0		3.5	96.5	0		0	0	0		
PHF	.705	.000	.000	.705	.500	.895	.000	.913	.000	.000	.000	.000	.913
Cars	62	0	0	62	8	205	0	213	0	0	0	0	275
% Cars	100	0	0	100	100	92.3	0	92.6	0	0	0	0	94.2
Heavy Vehicles	0	0	0	0	0	4	0	4	0	0	0	0	4
% Heavy Vehicles	0	0	0	0	0	1.8	0	1.7	0	0	0	0	1.4
Buses	0	0	0	0	0	13	0	13	0	0	0	0	13
% Buses	0	0	0	0	0	5.9	0	5.7	0	0	0	0	4.5



S: Cumberland Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
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Groups Printed- Cars - Heavy Vehicles - Buses

	From North				Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	114	0	0	6	0	0	0	3	107	0	0	230
07:15 AM	0	0	0	0	0	151	0	0	13	0	0	0	7	87	0	0	258
07:30 AM	0	0	0	0	0	143	0	0	9	0	0	0	8	120	0	0	280
07:45 AM	0	0	0	0	0	185	0	0	10	0	0	0	8	155	0	0	358
Total	0	0	0	0	0	593	0	0	38	0	0	0	26	469	0	0	1126
08:00 AM	0	0	0	0	0	166	0	0	18	0	0	0	8	118	0	0	310
08:15 AM	0	0	0	0	0	176	0	0	9	0	0	0	9	124	0	0	318
08:30 AM	0	0	0	0	0	174	0	0	11	0	0	0	3	117	0	0	305
08:45 AM	0	0	0	0	0	173	0	0	11	0	0	0	12	159	0	0	355
Total	0	0	0	0	0	689	0	0	49	0	0	0	32	518	0	0	1288
Grand Total	0	0	0	0	0	1282	0	0	87	0	0	0	58	987	0	0	2414
Apprch %	0	0	0	0	0	100	0	0	100	0	0	0	5.6	94.4	0	0	
Total %	0	0	0	0	0	53.1	0	0	3.6	0	0	0	2.4	40.9	0	0	
Cars	0	0	0	0	0	1194	0	0	83	0	0	0	58	916	0	0	2251
% Cars	0	0	0	0	0	93.1	0	0	95.4	0	0	0	100	92.8	0	0	93.2
Heavy Vehicles	0	0	0	0	0	53	0	0	4	0	0	0	0	35	0	0	92
% Heavy Vehicles	0	0	0	0	0	4.1	0	0	4.6	0	0	0	0	3.5	0	0	3.8
Buses	0	0	0	0	0	35	0	0	0	0	0	0	0	36	0	0	71
% Buses	0	0	0	0	0	2.7	0	0	0	0	0	0	0	3.6	0	0	2.9

	From North					Huntington Avenue (Route 9) From East					Cumberland Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	0	**185**	0	0	**185**	10	0	0	0	10	8	**155**	0	0	**163**	**358**
08:00 AM	0	0	0	0	0	0	166	0	0	166	**18**	0	0	0	**18**	8	118	0	0	126	310
08:15 AM	0	0	0	0	0	0	176	0	0	176	9	0	0	0	9	**9**	124	0	0	133	318
08:30 AM	0	0	0	0	0	0	174	0	0	174	11	0	0	0	11	3	117	0	0	120	305
Total Volume	0	0	0	0	0	0	701	0	0	701	48	0	0	0	48	28	514	0	0	542	1291
% App. Total	0	0	0	0		0	100	0	0		100	0	0	0		5.2	94.8	0	0		
PHF	.000	.000	.000	.000	.000	.000	.947	.000	.000	.947	.667	.000	.000	.000	.667	.778	.829	.000	.000	.831	.902
Cars	0	0	0	0	0	0	653	0	0	653	46	0	0	0	46	28	480	0	0	508	1207
% Cars	0	0	0	0	0	0	93.2	0	0	93.2	95.8	0	0	0	95.8	100	93.4	0	0	93.7	93.5
Heavy Vehicles	0	0	0	0	0	0	29	0	0	29	2	0	0	0	2	0	18	0	0	18	49
% Heavy Vehicles	0	0	0	0	0	0	4.1	0	0	4.1	4.2	0	0	0	4.2	0	3.5	0	0	3.3	3.8
Buses	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	0	16	0	0	16	35
% Buses	0	0	0	0	0	0	2.7	0	0	2.7	0	0	0	0	0	0	3.1	0	0	3.0	2.7

S: Cumberland Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars

	From North				Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	108	0	0	6	0	0	0	3	97	0	0	214
07:15 AM	0	0	0	0	0	145	0	0	13	0	0	0	7	80	0	0	245
07:30 AM	0	0	0	0	0	129	0	0	8	0	0	0	8	113	0	0	258
07:45 AM	0	0	0	0	0	172	0	0	10	0	0	0	8	147	0	0	337
Total	0	0	0	0	0	554	0	0	37	0	0	0	26	437	0	0	1054
08:00 AM	0	0	0	0	0	152	0	0	17	0	0	0	8	110	0	0	287
08:15 AM	0	0	0	0	0	167	0	0	9	0	0	0	9	115	0	0	300
08:30 AM	0	0	0	0	0	162	0	0	10	0	0	0	3	108	0	0	283
08:45 AM	0	0	0	0	0	159	0	0	10	0	0	0	12	146	0	0	327
Total	0	0	0	0	0	640	0	0	46	0	0	0	32	479	0	0	1197
Grand Total	0	0	0	0	0	1194	0	0	83	0	0	0	58	916	0	0	2251
Apprch %	0	0	0	0	0	100	0	0	100	0	0	0	6	94	0	0	
Total %	0	0	0	0	0	53	0	0	3.7	0	0	0	2.6	40.7	0	0	

	From North					Huntington Avenue (Route 9) From East					Cumberland Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	0	**172**	0	0	**172**	10	0	0	0	10	8	**147**	0	0	**155**	**337**
08:00 AM	0	0	0	0	0	0	152	0	0	152	**17**	0	0	0	**17**	8	110	0	0	118	287
08:15 AM	0	0	0	0	0	0	167	0	0	167	9	0	0	0	9	**9**	115	0	0	124	300
08:30 AM	0	0	0	0	0	0	162	0	0	162	10	0	0	0	10	3	108	0	0	111	283
Total Volume	0	0	0	0	0	0	653	0	0	653	46	0	0	0	46	28	480	0	0	508	1207
% App. Total	0	0	0	0		0	100	0	0		100	0	0	0		5.5	94.5	0	0		
PHF	.000	.000	.000	.000	.000	.000	.949	.000	.000	.949	.676	.000	.000	.000	.676	.778	.816	.000	.000	.819	.895

S: Cumberland Street
E/W: Huntington Avenue (Route 9)
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Client: VHB/ M. Houdlette

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Groups Printed- Heavy Vehicles

	From North				Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	4	0	0	9
07:15 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	3	0	0	7
07:30 AM	0	0	0	0	0	7	0	0	1	0	0	0	0	2	0	0	10
07:45 AM	0	0	0	0	0	11	0	0	0	0	0	0	0	4	0	0	15
Total	0	0	0	0	0	27	0	0	1	0	0	0	0	13	0	0	41
08:00 AM	0	0	0	0	0	9	0	0	1	0	0	0	0	5	0	0	15
08:15 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	4	0	0	9
08:30 AM	0	0	0	0	0	4	0	0	1	0	0	0	0	5	0	0	10
08:45 AM	0	0	0	0	0	8	0	0	1	0	0	0	0	8	0	0	17
Total	0	0	0	0	0	26	0	0	3	0	0	0	0	22	0	0	51
Grand Total	0	0	0	0	0	53	0	0	4	0	0	0	0	35	0	0	92
Apprch %	0	0	0	0	0	100	0	0	100	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	57.6	0	0	4.3	0	0	0	0	38	0	0	

	From North					Huntington Avenue (Route 9) From East					Cumberland Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	0	9	0	0	9	1	0	0	0	1	0	5	0	0	5	15
08:15 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	9
08:30 AM	0	0	0	0	0	0	4	0	0	4	1	0	0	0	1	0	5	0	0	5	10
08:45 AM	0	0	0	0	0	0	8	0	0	8	1	0	0	0	1	0	8	0	0	8	17
Total Volume	0	0	0	0	0	0	26	0	0	26	3	0	0	0	3	0	22	0	0	22	51
% App. Total	0	0	0	0		0	100	0	0		100	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.722	.000	.000	.722	.750	.000	.000	.000	.750	.000	.688	.000	.000	.688	.750

S: Cumberland Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Start Date : 5/14/2013
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Groups Printed- Buses

	From North				Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	6	0	0	7
07:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	6
07:30 AM	0	0	0	0	0	7	0	0	0	0	0	0	0	5	0	0	12
07:45 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0	0	6
Total	0	0	0	0	0	12	0	0	0	0	0	0	0	19	0	0	31
08:00 AM	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	0	8
08:15 AM	0	0	0	0	0	4	0	0	0	0	0	0	0	5	0	0	9
08:30 AM	0	0	0	0	0	8	0	0	0	0	0	0	0	4	0	0	12
08:45 AM	0	0	0	0	0	6	0	0	0	0	0	0	0	5	0	0	11
Total	0	0	0	0	0	23	0	0	0	0	0	0	0	17	0	0	40
Grand Total	0	0	0	0	0	35	0	0	0	0	0	0	0	36	0	0	71
Apprch %	0	0	0	0	0	100	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	49.3	0	0	0	0	0	0	0	50.7	0	0	

	From North					Huntington Avenue (Route 9) From East					Cumberland Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	3	0	0	3	8
08:15 AM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	9
08:30 AM	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	4	0	0	4	12
08:45 AM	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	5	0	0	5	11
Total Volume	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	0	17	0	0	17	40
% App. Total	0	0	0	0		0	100	0	0		0	0	0	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.719	.000	.000	.719	.000	.000	.000	.000	.000	.000	.850	.000	.000	.850	.833

S: Cumberland Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
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Groups Printed- Peds and Bicycles

	From North				Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	0	0	4	0	12	0	0	0	14	0	3	0	0	33
07:15 AM	0	0	0	0	0	0	0	10	0	0	0	17	0	1	0	0	28
07:30 AM	0	0	0	0	0	1	0	12	0	0	0	27	0	2	0	0	42
07:45 AM	0	0	0	0	0	1	0	21	0	0	0	30	1	0	0	0	53
Total	0	0	0	0	0	6	0	55	0	0	0	88	1	6	0	0	156
08:00 AM	0	0	0	0	0	2	0	10	0	0	0	21	1	5	0	1	40
08:15 AM	0	0	0	0	0	1	0	19	0	0	0	14	0	2	0	0	36
08:30 AM	0	0	0	0	0	1	0	24	1	0	0	40	0	5	0	0	71
08:45 AM	0	0	0	0	0	4	0	16	0	0	0	34	0	3	0	0	57
Total	0	0	0	0	0	8	0	69	1	0	0	109	1	15	0	1	204
Grand Total	0	0	0	0	0	14	0	124	1	0	0	197	2	21	0	1	360
Apprch %	0	0	0	0	0	10.1	0	89.9	0.5	0	0	99.5	8.3	87.5	0	4.2	
Total %	0	0	0	0	0	3.9	0	34.4	0.3	0	0	54.7	0.6	5.8	0	0.3	

	From North					Huntington Avenue (Route 9) From East					Cumberland Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	0	2	0	10	12	0	0	0	21	21	**1**	**5**	0	**1**	**7**	40
08:15 AM	0	0	0	0	0	0	1	0	19	20	0	0	0	14	14	0	2	0	0	2	36
08:30 AM	0	0	0	0	0	0	1	0	**24**	**25**	**1**	0	0	**40**	**41**	0	5	0	0	5	**71**
08:45 AM	0	0	0	0	0	0	**4**	0	16	20	0	0	0	34	34	0	3	0	0	3	57
Total Volume	0	0	0	0	0	0	8	0	69	77	1	0	0	109	110	1	15	0	1	17	204
% App. Total	0	0	0	0		0	10.4	0	89.6		0.9	0	0	99.1		5.9	88.2	0	5.9		
PHF	.000	.000	.000	.000	.000	.000	.500	.000	.719	.770	.250	.000	.000	.681	.671	.250	.750	.000	.250	.607	.718

S: Cumberland Street
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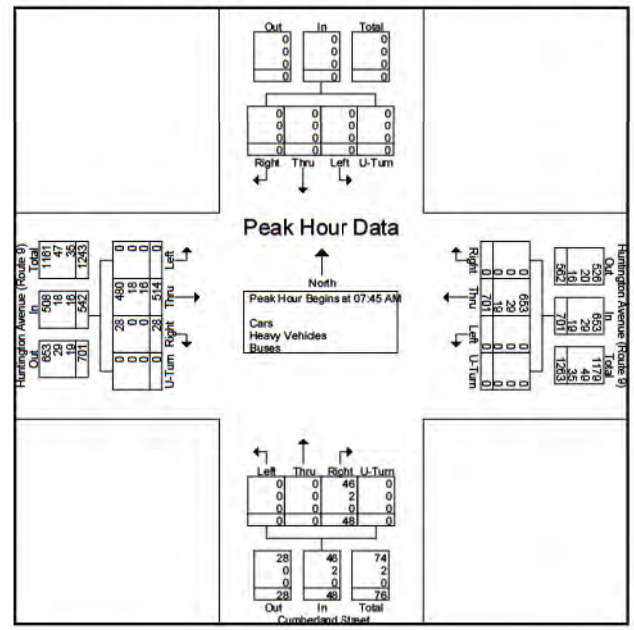
	From North					Huntington Avenue (Route 9) From East					Cumberland Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	0	0	0	0	0	0	**185**	0	0	**185**	10	0	0	0	10	8	**155**	0	0	**163**	**358**
08:00 AM	0	0	0	0	0	0	166	0	0	166	**18**	0	0	0	**18**	8	118	0	0	126	310
08:15 AM	0	0	0	0	0	0	176	0	0	176	9	0	0	0	9	**9**	124	0	0	133	318
08:30 AM	0	0	0	0	0	0	174	0	0	174	11	0	0	0	11	3	117	0	0	120	305
Total Volume	0	0	0	0	0	0	701	0	0	701	48	0	0	0	48	28	514	0	0	542	1291
% App. Total	0	0	0	0		0	100	0	0		100	0	0	0		5.2	94.8	0	0		
PHF	.000	.000	.000	.000	.000	.000	.947	.000	.000	.947	.667	.000	.000	.000	.667	.778	.829	.000	.000	.831	.902
Cars	0	0	0	0	0	0	653	0	0	653	46	0	0	0	46	28	480	0	0	508	1207
% Cars	0	0	0	0	0	0	93.2	0	0	93.2	95.8	0	0	0	95.8	100	93.4	0	0	93.7	93.5
Heavy Vehicles	0	0	0	0	0	0	29	0	0	29	2	0	0	0	2	0	18	0	0	18	49
% Heavy Vehicles	0	0	0	0	0	0	4.1	0	0	4.1	4.2	0	0	0	4.2	0	3.5	0	0	3.3	3.8
Buses	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	0	16	0	0	16	35
% Buses	0	0	0	0	0	0	2.7	0	0	2.7	0	0	0	0	0	0	3.1	0	0	3.0	2.7



S: Cumberland Street
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Groups Printed- Cars - Heavy Vehicles - Buses

	Huntington Avenue (Route 9) From East			Cumberland Street From South			Huntington Avenue (Route 9) From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	125	0	0	19	0	0	11	125	0	280
04:15 PM	152	0	0	19	0	0	11	162	0	344
04:30 PM	165	0	0	8	0	0	6	106	0	285
04:45 PM	159	0	0	7	0	0	5	138	0	309
Total	601	0	0	53	0	0	33	531	0	1218
05:00 PM	136	0	0	9	0	0	9	155	0	309
05:15 PM	166	0	0	21	0	0	20	152	0	359
05:30 PM	157	0	0	11	0	0	17	141	0	326
05:45 PM	171	0	0	16	0	0	17	155	0	359
Total	630	0	0	57	0	0	63	603	0	1353
Grand Total	1231	0	0	110	0	0	96	1134	0	2571
Apprch %	100	0	0	100	0	0	7.8	92.2	0	
Total %	47.9	0	0	4.3	0	0	3.7	44.1	0	
Cars	1168	0	0	109	0	0	95	1071	0	2443
% Cars	94.9	0	0	99.1	0	0	99	94.4	0	95
Heavy Vehicles	19	0	0	1	0	0	1	21	0	42
% Heavy Vehicles	1.5	0	0	0.9	0	0	1	1.9	0	1.6
Buses	44	0	0	0	0	0	0	42	0	86
% Buses	3.6	0	0	0	0	0	0	3.7	0	3.3

	Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	136	0	0	136	9	0	0	9	9	**155**	0	164	309
05:15 PM	166	0	0	166	**21**	0	0	**21**	**20**	152	0	**172**	**359**
05:30 PM	157	0	0	157	11	0	0	11	17	141	0	158	326
05:45 PM	**171**	0	0	**171**	16	0	0	16	17	155	0	172	359
Total Volume	630	0	0	630	57	0	0	57	63	603	0	666	1353
% App. Total	100	0	0		100	0	0		9.5	90.5	0		
PHF	.921	.000	.000	.921	.679	.000	.000	.679	.788	.973	.000	.968	.942
Cars	598	0	0	598	57	0	0	57	62	572	0	634	1289
% Cars	94.9	0	0	94.9	100	0	0	100	98.4	94.9	0	95.2	95.3
Heavy Vehicles	10	0	0	10	0	0	0	0	1	6	0	7	17
% Heavy Vehicles	1.6	0	0	1.6	0	0	0	0	1.6	1.0	0	1.1	1.3
Buses	22	0	0	22	0	0	0	0	0	25	0	25	47
% Buses	3.5	0	0	3.5	0	0	0	0	0	4.1	0	3.8	3.5

S: Cumberland Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 GG
Site Code : 10135.00
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Groups Printed- Cars

	Huntington Avenue (Route 9) From East			Cumberland Street From South			Huntington Avenue (Route 9) From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	120	0	0	19	0	0	11	117	0	267
04:15 PM	144	0	0	19	0	0	11	148	0	322
04:30 PM	159	0	0	8	0	0	6	101	0	274
04:45 PM	147	0	0	6	0	0	5	133	0	291
Total	570	0	0	52	0	0	33	499	0	1154
05:00 PM	129	0	0	9	0	0	9	148	0	295
05:15 PM	154	0	0	21	0	0	19	142	0	336
05:30 PM	151	0	0	11	0	0	17	135	0	314
05:45 PM	164	0	0	16	0	0	17	147	0	344
Total	598	0	0	57	0	0	62	572	0	1289
Grand Total	1168	0	0	109	0	0	95	1071	0	2443
Apprch %	100	0	0	100	0	0	8.1	91.9	0	
Total %	47.8	0	0	4.5	0	0	3.9	43.8	0	

	Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	129	0	0	129	9	0	0	9	9	**148**	0	157	295
05:15 PM	154	0	0	154	**21**	0	0	**21**	**19**	142	0	161	336
05:30 PM	151	0	0	151	11	0	0	11	17	135	0	152	314
05:45 PM	**164**	0	0	**164**	16	0	0	16	17	147	0	**164**	**344**
Total Volume	598	0	0	598	57	0	0	57	62	572	0	634	1289
% App. Total	100	0	0		100	0	0		9.8	90.2	0		
PHF	.912	.000	.000	.912	.679	.000	.000	.679	.816	.966	.000	.966	.937

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Groups Printed- Heavy Vehicles

	Huntington Avenue (Route 9) From East			Cumberland Street From South			Huntington Avenue (Route 9) From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	3	0	0	0	0	0	0	4	0	7
04:15 PM	1	0	0	0	0	0	0	7	0	8
04:30 PM	2	0	0	0	0	0	0	2	0	4
04:45 PM	3	0	0	1	0	0	0	2	0	6
Total	9	0	0	1	0	0	0	15	0	25
05:00 PM	1	0	0	0	0	0	0	0	0	1
05:15 PM	5	0	0	0	0	0	1	2	0	8
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	4	0	0	0	0	0	0	4	0	8
Total	10	0	0	0	0	0	1	6	0	17
Grand Total	19	0	0	1	0	0	1	21	0	42
Apprch %	100	0	0	100	0	0	4.5	95.5	0	
Total %	45.2	0	0	2.4	0	0	2.4	50	0	

	Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	3	0	0	3	0	0	0	0	0	4	0	4	7
04:15 PM	1	0	0	1	0	0	0	0	0	7	0	7	8
04:30 PM	2	0	0	2	0	0	0	0	0	2	0	2	4
04:45 PM	3	0	0	3	1	0	0	1	0	2	0	2	6
Total Volume	9	0	0	9	1	0	0	1	0	15	0	15	25
% App. Total	100	0	0		100	0	0		0	100	0		
PHF	.750	.000	.000	.750	.250	.000	.000	.250	.000	.536	.000	.536	.781

S: Cumberland Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 GG
Site Code : 10135.00
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Groups Printed- Buses

	Huntington Avenue (Route 9) From East			Cumberland Street From South			Huntington Avenue (Route 9) From West			
Start Time	Thru	Left	U-Turn	Right	Left	U-Turn	Right	Thru	U-Turn	Int. Total
04:00 PM	2	0	0	0	0	0	0	4	0	6
04:15 PM	7	0	0	0	0	0	0	7	0	14
04:30 PM	4	0	0	0	0	0	0	3	0	7
04:45 PM	9	0	0	0	0	0	0	3	0	12
Total	22	0	0	0	0	0	0	17	0	39
05:00 PM	6	0	0	0	0	0	0	7	0	13
05:15 PM	7	0	0	0	0	0	0	8	0	15
05:30 PM	6	0	0	0	0	0	0	6	0	12
05:45 PM	3	0	0	0	0	0	0	4	0	7
Total	22	0	0	0	0	0	0	25	0	47
Grand Total	44	0	0	0	0	0	0	42	0	86
Apprch %	100	0	0	0	0	0	0	100	0	
Total %	51.2	0	0	0	0	0	0	48.8	0	

	Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	9	0	0	9	0	0	0	0	0	3	0	3	12
05:00 PM	6	0	0	6	0	0	0	0	0	7	0	7	13
05:15 PM	7	0	0	7	0	0	0	0	0	8	0	8	15
05:30 PM	6	0	0	6	0	0	0	0	0	6	0	6	12
Total Volume	28	0	0	28	0	0	0	0	0	24	0	24	52
% App. Total	100	0	0		0	0	0		0	100	0		
PHF	.778	.000	.000	.778	.000	.000	.000	.000	.000	.750	.000	.750	.867

S: Cumberland Street
E/W: Huntington Avenue (Route 9)
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Groups Printed- Peds and Bicycles

	Huntington Avenue (Route 9) From East			Cumberland Street From South			Huntington Avenue (Route 9) From West			
Start Time	Thru	Left	Peds	Right	Left	Peds	Right	Thru	Peds	Int. Total
04:00 PM	3	0	14	0	0	29	0	2	0	48
04:15 PM	2	0	29	0	0	31	0	3	0	65
04:30 PM	2	0	11	0	0	32	0	5	0	50
04:45 PM	2	0	22	0	0	53	0	6	0	83
Total	9	0	76	0	0	145	0	16	0	246
05:00 PM	5	0	27	0	0	53	0	2	0	87
05:15 PM	5	0	20	0	0	70	0	1	0	96
05:30 PM	3	0	22	0	0	50	0	1	0	76
05:45 PM	4	0	18	0	0	56	0	1	0	79
Total	17	0	87	0	0	229	0	5	0	338
Grand Total	26	0	163	0	0	374	0	21	0	584
Apprch %	13.8	0	86.2	0	0	100	0	100	0	
Total %	4.5	0	27.9	0	0	64	0	3.6	0	

	Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:45 PM													
04:45 PM	2	0	22	24	0	0	53	53	0	**6**	0	**6**	83
05:00 PM	**5**	0	**27**	**32**	0	0	53	53	0	2	0	2	87
05:15 PM	5	0	20	25	0	0	**70**	**70**	0	1	0	1	**96**
05:30 PM	3	0	22	25	0	0	50	50	0	1	0	1	76
Total Volume	15	0	91	106	0	0	226	226	0	10	0	10	342
% App. Total	14.2	0	85.8		0	0	100		0	100	0		
PHF	.750	.000	.843	.828	.000	.000	.807	.807	.000	.417	.000	.417	.891

S: Cumberland Street
E/W: Huntington Avenue (Route 9)
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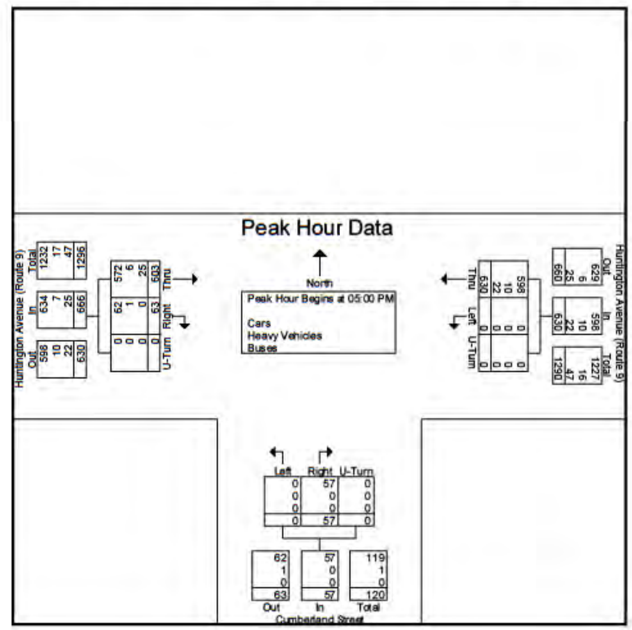
	Huntington Avenue (Route 9) From East				Cumberland Street From South				Huntington Avenue (Route 9) From West				
Start Time	Thru	Left	U-Turn	App. Total	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 05:00 PM													
05:00 PM	136	0	0	136	9	0	0	9	9	**155**	0	164	309
05:15 PM	166	0	0	166	**21**	0	0	**21**	**20**	152	0	**172**	**359**
05:30 PM	157	0	0	157	11	0	0	11	17	141	0	158	326
05:45 PM	**171**	0	0	**171**	16	0	0	16	17	155	0	172	359
Total Volume	630	0	0	630	57	0	0	57	63	603	0	666	1353
% App. Total	100	0	0		100	0	0		9.5	90.5	0		
PHF	.921	.000	.000	.921	.679	.000	.000	.679	.788	.973	.000	.968	.942
Cars	598	0	0	598	57	0	0	57	62	572	0	634	1289
% Cars	94.9	0	0	94.9	100	0	0	100	98.4	94.9	0	95.2	95.3
Heavy Vehicles	10	0	0	10	0	0	0	0	1	6	0	7	17
% Heavy Vehicles	1.6	0	0	1.6	0	0	0	0	1.6	1.0	0	1.1	1.3
Buses	22	0	0	22	0	0	0	0	0	25	0	25	47
% Buses	3.5	0	0	3.5	0	0	0	0	0	4.1	0	3.8	3.5



N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 H
Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Cars - Heavy Vehicles - Buses

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	2	11	14	0	40	98	24	10	15	33	15	0	6	82	22	0	372
07:15 AM	8	12	8	0	74	130	19	19	14	33	27	0	6	85	9	5	449
07:30 AM	5	13	22	0	52	115	15	15	17	43	26	0	14	84	31	1	453
07:45 AM	9	15	15	2	91	152	27	16	15	64	22	0	16	99	38	3	584
Total	24	51	59	2	257	495	85	60	61	173	90	0	42	350	100	9	1858
08:00 AM	10	13	11	1	110	139	36	13	20	56	14	0	2	104	31	1	561
08:15 AM	4	21	17	2	63	160	33	22	12	66	14	0	2	84	29	1	530
08:30 AM	14	14	14	1	66	143	29	23	10	44	19	0	6	82	36	1	502
08:45 AM	9	19	13	0	85	140	34	19	11	41	20	0	12	114	37	3	557
Total	37	67	55	4	324	582	132	77	53	207	67	0	22	384	133	6	2150
Grand Total	61	118	114	6	581	1077	217	137	114	380	157	0	64	734	233	15	4008
Apprch %	20.4	39.5	38.1	2	28.9	53.5	10.8	6.8	17.5	58.4	24.1	0	6.1	70.2	22.3	1.4	
Total %	1.5	2.9	2.8	0.1	14.5	26.9	5.4	3.4	2.8	9.5	3.9	0	1.6	18.3	5.8	0.4	
Cars	57	111	111	6	506	991	206	133	111	370	154	0	59	701	197	15	3728
% Cars	93.4	94.1	97.4	100	87.1	92	94.9	97.1	97.4	97.4	98.1	0	92.2	95.5	84.5	100	93
Heavy Vehicles	2	4	3	0	61	47	6	4	2	8	2	0	5	24	10	0	178
% Heavy Vehicles	3.3	3.4	2.6	0	10.5	4.4	2.8	2.9	1.8	2.1	1.3	0	7.8	3.3	4.3	0	4.4
Buses	2	3	0	0	14	39	5	0	1	2	1	0	0	9	26	0	102
% Buses	3.3	2.5	0	0	2.4	3.6	2.3	0	0.9	0.5	0.6	0	0	1.2	11.2	0	2.5

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	9	15	15	**2**	41	91	152	27	16	286	15	64	**22**	0	**101**	**16**	99	**38**	**3**	**156**	**584**
08:00 AM	10	13	11	1	35	**110**	139	**36**	13	**298**	**20**	56	14	0	90	2	**104**	31	1	138	561
08:15 AM	4	**21**	**17**	2	**44**	63	**160**	33	22	278	12	**66**	14	0	92	2	84	29	1	116	530
08:30 AM	**14**	14	14	1	43	66	143	29	**23**	261	10	44	19	0	73	6	82	36	1	125	502
Total Volume	37	63	57	6	163	330	594	125	74	1123	57	230	69	0	356	26	369	134	6	535	2177
% App. Total	22.7	38.7	35	3.7		29.4	52.9	11.1	6.6		16	64.6	19.4	0		4.9	69	25	1.1		
PHF	.661	.750	.838	.750	.926	.750	.928	.868	.804	.942	.713	.871	.784	.000	.881	.406	.887	.882	.500	.857	.932
Cars	35	58	55	6	154	288	550	118	72	1028	56	223	67	0	346	22	358	114	6	500	2028
% Cars	94.6	92.1	96.5	100	94.5	87.3	92.6	94.4	97.3	91.5	98.2	97.0	97.1	0	97.2	84.6	97.0	85.1	100	93.5	93.2
Heavy Vehicles	1	3	2	0	6	31	25	5	2	63	1	7	2	0	10	4	10	5	0	19	98
% Heavy Vehicles	2.7	4.8	3.5	0	3.7	9.4	4.2	4.0	2.7	5.6	1.8	3.0	2.9	0	2.8	15.4	2.7	3.7	0	3.6	4.5
Buses	1	2	0	0	3	11	19	2	0	32	0	0	0	0	0	0	1	15	0	16	51
% Buses	2.7	3.2	0	0	1.8	3.3	3.2	1.6	0	2.8	0	0	0	0	0	0	0.3	11.2	0	3.0	2.3

N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
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Groups Printed- Cars

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	2	10	14	0	36	91	24	10	14	33	15	0	6	79	17	0	351
07:15 AM	8	12	7	0	62	124	18	19	13	33	27	0	6	77	7	5	418
07:30 AM	5	13	22	0	44	99	14	13	17	41	26	0	14	79	29	1	417
07:45 AM	9	13	15	2	77	140	25	16	15	63	22	0	13	98	34	3	545
Total	24	48	58	2	219	454	81	58	59	170	90	0	39	333	87	9	1731
08:00 AM	10	13	11	1	100	126	35	13	20	53	12	0	2	100	27	1	524
08:15 AM	4	19	16	2	55	153	30	20	12	64	14	0	2	82	23	1	497
08:30 AM	12	13	13	1	56	131	28	23	9	43	19	0	5	78	30	1	462
08:45 AM	7	18	13	0	76	127	32	19	11	40	19	0	11	108	30	3	514
Total	33	63	53	4	287	537	125	75	52	200	64	0	20	368	110	6	1997
Grand Total	57	111	111	6	506	991	206	133	111	370	154	0	59	701	197	15	3728
Apprch %	20	38.9	38.9	2.1	27.6	54	11.2	7.2	17.5	58.3	24.3	0	6.1	72.1	20.3	1.5	
Total %	1.5	3	3	0.2	13.6	26.6	5.5	3.6	3	9.9	4.1	0	1.6	18.8	5.3	0.4	

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	9	13	15	**2**	39	77	140	25	16	258	15	63	**22**	0	**100**	**13**	98	**34**	**3**	**148**	**545**
08:00 AM	10	13	11	1	35	**100**	126	**35**	13	**274**	**20**	53	12	0	85	2	**100**	27	1	130	524
08:15 AM	4	**19**	**16**	2	**41**	55	**153**	30	20	258	12	**64**	14	0	90	2	82	23	1	108	497
08:30 AM	**12**	13	13	1	39	56	131	28	**23**	238	9	43	19	0	71	5	78	30	1	114	462
Total Volume	35	58	55	6	154	288	550	118	72	1028	56	223	67	0	346	22	358	114	6	500	2028
% App. Total	22.7	37.7	35.7	3.9		28	53.5	11.5	7		16.2	64.5	19.4	0		4.4	71.6	22.8	1.2		
PHF	.729	.763	.859	.750	.939	.720	.899	.843	.783	.938	.700	.871	.761	.000	.865	.423	.895	.838	.500	.845	.930

N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
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File Name : 133307 H
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	2	2	0	0	1	0	0	0	0	2	2	0	9
07:15 AM	0	0	1	0	11	4	0	0	0	0	0	0	0	5	0	0	21
07:30 AM	0	0	0	0	8	9	0	2	0	0	0	0	0	2	0	0	21
07:45 AM	0	1	0	0	11	9	1	0	0	1	0	0	3	1	0	0	27
Total	0	1	1	0	32	24	1	2	1	1	0	0	3	10	2	0	78
08:00 AM	0	0	0	0	7	7	0	0	0	3	2	0	0	3	2	0	24
08:15 AM	0	1	1	0	5	5	3	2	0	2	0	0	0	2	1	0	22
08:30 AM	1	1	1	0	8	4	1	0	1	1	0	0	1	4	2	0	25
08:45 AM	1	1	0	0	9	7	1	0	0	1	0	0	1	5	3	0	29
Total	2	3	2	0	29	23	5	2	1	7	2	0	2	14	8	0	100
Grand Total	2	4	3	0	61	47	6	4	2	8	2	0	5	24	10	0	178
Apprch %	22.2	44.4	33.3	0	51.7	39.8	5.1	3.4	16.7	66.7	16.7	0	12.8	61.5	25.6	0	
Total %	1.1	2.2	1.7	0	34.3	26.4	3.4	2.2	1.1	4.5	1.1	0	2.8	13.5	5.6	0	

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	7	7	0	0	14	0	3	2	0	5	0	3	2	0	5	24
08:15 AM	0	1	1	0	2	5	5	3	2	15	0	2	0	0	2	0	2	1	0	3	22
08:30 AM	1	1	1	0	3	8	4	1	0	13	1	1	0	0	2	1	4	2	0	7	25
08:45 AM	1	1	0	0	2	9	7	1	0	17	0	1	0	0	1	1	5	3	0	9	29
Total Volume	2	3	2	0	7	29	23	5	2	59	1	7	2	0	10	2	14	8	0	24	100
% App. Total	28.6	42.9	28.6	0		49.2	39	8.5	3.4		10	70	20	0		8.3	58.3	33.3	0		
PHF	.500	.750	.500	.000	.583	.806	.821	.417	.250	.868	.250	.583	.250	.000	.500	.500	.700	.667	.000	.667	.862

N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
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Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Buses

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	1	0	0	2	5	0	0	0	0	0	0	0	1	3	0	12
07:15 AM	0	0	0	0	1	2	1	0	1	0	0	0	0	3	2	0	10
07:30 AM	0	0	0	0	0	7	1	0	0	2	0	0	0	3	2	0	15
07:45 AM	0	1	0	0	3	3	1	0	0	0	0	0	0	0	4	0	12
Total	0	2	0	0	6	17	3	0	1	2	0	0	0	7	11	0	49
08:00 AM	0	0	0	0	3	6	1	0	0	0	0	0	0	1	2	0	13
08:15 AM	0	1	0	0	3	2	0	0	0	0	0	0	0	0	5	0	11
08:30 AM	1	0	0	0	2	8	0	0	0	0	0	0	0	0	4	0	15
08:45 AM	1	0	0	0	0	6	1	0	0	0	1	0	0	1	4	0	14
Total	2	1	0	0	8	22	2	0	0	0	1	0	0	2	15	0	53
Grand Total	2	3	0	0	14	39	5	0	1	2	1	0	0	9	26	0	102
Apprch %	40	60	0	0	24.1	67.2	8.6	0	25	50	25	0	0	25.7	74.3	0	
Total %	2	2.9	0	0	13.7	38.2	4.9	0	1	2	1	0	0	8.8	25.5	0	

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	3	6	1	0	10	0	0	0	0	0	0	1	2	0	3	13
08:15 AM	0	1	0	0	1	3	2	0	0	5	0	0	0	0	0	0	0	5	0	5	11
08:30 AM	1	0	0	0	1	2	8	0	0	10	0	0	0	0	0	0	0	4	0	4	15
08:45 AM	1	0	0	0	1	0	6	1	0	7	0	0	1	0	1	0	1	4	0	5	14
Total Volume	2	1	0	0	3	8	22	2	0	32	0	0	1	0	1	0	2	15	0	17	53
% App. Total	66.7	33.3	0	0		25	68.8	6.2	0		0	0	100	0		0	11.8	88.2	0		
PHF	.500	.250	.000	.000	.750	.667	.688	.500	.000	.800	.000	.000	.250	.000	.250	.000	.500	.750	.000	.850	.883

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Page No : 1

Groups Printed- Peds and Bicycles

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	34	0	0	0	36	0	1	0	22	0	3	0	16	112
07:15 AM	0	3	0	35	1	0	0	37	1	2	0	26	0	2	0	22	129
07:30 AM	0	3	0	69	0	0	0	47	0	2	0	26	0	0	0	25	172
07:45 AM	0	1	0	101	0	0	0	56	0	2	0	26	0	0	0	40	226
Total	0	7	0	239	1	0	0	176	1	7	0	100	0	5	0	103	639
08:00 AM	0	1	0	117	1	0	0	61	0	4	1	34	0	0	0	20	239
08:15 AM	0	1	2	126	1	1	0	62	0	3	0	37	0	0	0	35	268
08:30 AM	0	0	0	123	0	1	0	72	1	3	0	37	1	1	0	40	279
08:45 AM	0	2	1	134	0	2	0	104	0	1	0	46	0	0	0	37	327
Total	0	4	3	500	2	4	0	299	1	11	1	154	1	1	0	132	1113
Grand Total	0	11	3	739	3	4	0	475	2	18	1	254	1	6	0	235	1752
Apprch %	0	1.5	0.4	98.1	0.6	0.8	0	98.5	0.7	6.5	0.4	92.4	0.4	2.5	0	97.1	
Total %	0	0.6	0.2	42.2	0.2	0.2	0	27.1	0.1	1	0.1	14.5	0.1	0.3	0	13.4	

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	1	0	117	118	**1**	0	0	61	62	0	**4**	**1**	34	39	0	0	0	20	20	239
08:15 AM	0	1	**2**	126	129	1	1	0	62	64	0	3	0	37	40	0	0	0	35	35	268
08:30 AM	0	0	0	123	123	0	1	0	72	73	**1**	3	0	37	41	**1**	**1**	0	**40**	**42**	279
08:45 AM	0	**2**	1	**134**	**137**	0	**2**	0	**104**	**106**	0	1	0	**46**	**47**	0	0	0	37	37	**327**
Total Volume	0	4	3	500	507	2	4	0	299	305	1	11	1	154	167	1	1	0	132	134	1113
% App. Total	0	0.8	0.6	98.6		0.7	1.3	0	98		0.6	6.6	0.6	92.2		0.7	0.7	0	98.5		
PHF	.000	.500	.375	.933	.925	.500	.500	.000	.719	.719	.250	.688	.250	.837	.888	.250	.250	.000	.825	.798	.851

N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
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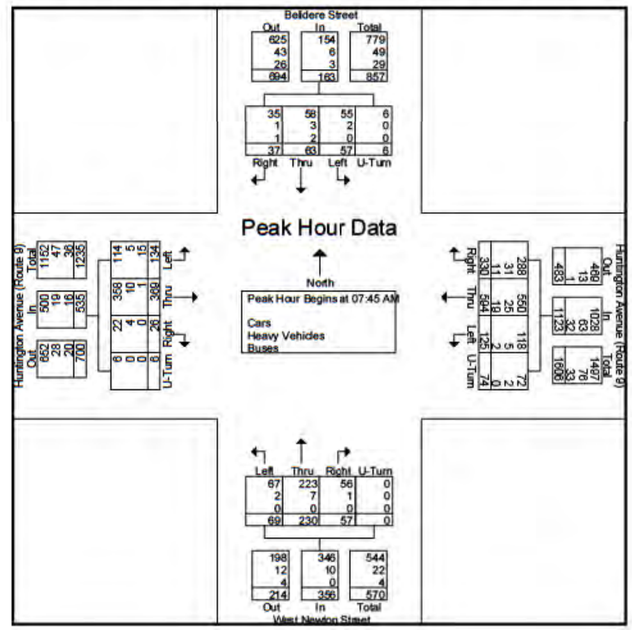
	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	9	15	15	**2**	41	91	152	27	16	286	15	64	**22**	0	**101**	**16**	99	**38**	**3**	**156**	**584**
08:00 AM	10	13	11	1	35	**110**	139	**36**	13	**298**	**20**	56	14	0	90	2	**104**	31	1	138	561
08:15 AM	4	**21**	**17**	2	**44**	63	**160**	33	22	278	12	**66**	14	0	92	2	84	29	1	116	530
08:30 AM	**14**	14	14	1	43	66	143	29	**23**	261	10	44	19	0	73	6	82	36	1	125	502
Total Volume	37	63	57	6	163	330	594	125	74	1123	57	230	69	0	356	26	369	134	6	535	2177
% App. Total	22.7	38.7	35	3.7		29.4	52.9	11.1	6.6		16	64.6	19.4	0		4.9	69	25	1.1		
PHF	.661	.750	.838	.750	.926	.750	.928	.868	.804	.942	.713	.871	.784	.000	.881	.406	.887	.882	.500	.857	.932
Cars	35	58	55	6	154	288	550	118	72	1028	56	223	67	0	346	22	358	114	6	500	2028
% Cars	94.6	92.1	96.5	100	94.5	87.3	92.6	94.4	97.3	91.5	98.2	97.0	97.1	0	97.2	84.6	97.0	85.1	100	93.5	93.2
Heavy Vehicles	1	3	2	0	6	31	25	5	2	63	1	7	2	0	10	4	10	5	0	19	98
% Heavy Vehicles	2.7	4.8	3.5	0	3.7	9.4	4.2	4.0	2.7	5.6	1.8	3.0	2.9	0	2.8	15.4	2.7	3.7	0	3.6	4.5
Buses	1	2	0	0	3	11	19	2	0	32	0	0	0	0	0	0	1	15	0	16	51
% Buses	2.7	3.2	0	0	1.8	3.3	3.2	1.6	0	2.8	0	0	0	0	0	0	0.3	11.2	0	3.0	2.3



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Groups Printed- Cars - Heavy Vehicles - Buses

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	12	23	21	0	64	105	32	15	12	24	10	0	13	106	21	3	461
04:15 PM	13	22	19	2	68	121	29	13	11	34	13	0	12	129	27	8	521
04:30 PM	13	30	21	2	65	124	32	13	14	35	10	0	4	79	36	5	483
04:45 PM	5	22	20	0	68	133	49	17	13	29	17	0	9	107	20	5	514
Total	43	97	81	4	265	483	142	58	50	122	50	0	38	421	104	21	1979
05:00 PM	12	35	17	2	76	141	33	25	8	31	11	0	8	119	43	3	564
05:15 PM	14	40	28	1	66	143	39	16	11	24	16	0	12	122	36	7	575
05:30 PM	16	26	24	0	69	138	35	23	18	35	8	0	10	106	27	6	541
05:45 PM	11	34	32	2	81	146	47	17	14	36	7	0	14	120	36	4	601
Total	53	135	101	5	292	568	154	81	51	126	42	0	44	467	142	20	2281
Grand Total	96	232	182	9	557	1051	296	139	101	248	92	0	82	888	246	41	4260
Apprch %	18.5	44.7	35.1	1.7	27.3	51.4	14.5	6.8	22.9	56.2	20.9	0	6.5	70.6	19.6	3.3	
Total %	2.3	5.4	4.3	0.2	13.1	24.7	6.9	3.3	2.4	5.8	2.2	0	1.9	20.8	5.8	1	
Cars	90	227	178	9	517	991	286	138	101	242	92	0	81	852	218	41	4063
% Cars	93.8	97.8	97.8	100	92.8	94.3	96.6	99.3	100	97.6	100	0	98.8	95.9	88.6	100	95.4
Heavy Vehicles	5	4	3	0	13	13	4	1	0	5	0	0	0	19	2	0	69
% Heavy Vehicles	5.2	1.7	1.6	0	2.3	1.2	1.4	0.7	0	2	0	0	0	2.1	0.8	0	1.6
Buses	1	1	1	0	27	47	6	0	0	1	0	0	1	17	26	0	128
% Buses	1	0.4	0.5	0	4.8	4.5	2	0	0	0.4	0	0	1.2	1.9	10.6	0	3

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	12	35	17	**2**	66	76	141	33	**25**	275	8	31	11	0	50	8	119	**43**	3	173	564
05:15 PM	14	**40**	28	1	**83**	66	143	39	16	264	11	24	**16**	0	51	12	**122**	36	**7**	**177**	575
05:30 PM	**16**	26	24	0	66	69	138	35	23	265	**18**	35	8	0	**61**	10	106	27	6	149	541
05:45 PM	11	34	**32**	2	79	**81**	**146**	**47**	17	**291**	14	**36**	7	0	57	**14**	120	36	4	174	**601**
Total Volume	53	135	101	5	294	292	568	154	81	1095	51	126	42	0	219	44	467	142	20	673	2281
% App. Total	18	45.9	34.4	1.7		26.7	51.9	14.1	7.4		23.3	57.5	19.2	0		6.5	69.4	21.1	3		
PHF	.828	.844	.789	.625	.886	.901	.973	.819	.810	.941	.708	.875	.656	.000	.898	.786	.957	.826	.714	.951	.949
Cars	51	133	99	5	288	277	537	151	81	1046	51	124	42	0	217	44	452	126	20	642	2193
% Cars	96.2	98.5	98.0	100	98.0	94.9	94.5	98.1	100	95.5	100	98.4	100	0	99.1	100	96.8	88.7	100	95.4	96.1
Heavy Vehicles	2	2	1	0	5	4	8	1	0	13	0	2	0	0	2	0	6	0	0	6	26
% Heavy Vehicles	3.8	1.5	1.0	0	1.7	1.4	1.4	0.6	0	1.2	0	1.6	0	0	0.9	0	1.3	0	0	0.9	1.1
Buses	0	0	1	0	1	11	23	2	0	36	0	0	0	0	0	0	9	16	0	25	62
% Buses	0	0	1.0	0	0.3	3.8	4.0	1.3	0	3.3	0	0	0	0	0	0	1.9	11.3	0	3.7	2.7

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Groups Printed- Cars

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	11	23	20	0	59	99	31	15	12	24	10	0	13	100	19	3	439
04:15 PM	12	20	19	2	62	114	27	12	11	34	13	0	12	118	25	8	489
04:30 PM	11	29	21	2	59	117	32	13	14	34	10	0	4	78	31	5	460
04:45 PM	5	22	19	0	60	124	45	17	13	26	17	0	8	104	17	5	482
Total	39	94	79	4	240	454	135	57	50	118	50	0	37	400	92	21	1870
05:00 PM	11	34	17	2	71	134	32	25	8	30	11	0	8	118	37	3	541
05:15 PM	14	39	27	1	63	132	39	16	11	24	16	0	12	116	32	7	549
05:30 PM	16	26	23	0	66	131	33	23	18	34	8	0	10	102	25	6	521
05:45 PM	10	34	32	2	77	140	47	17	14	36	7	0	14	116	32	4	582
Total	51	133	99	5	277	537	151	81	51	124	42	0	44	452	126	20	2193
Grand Total	90	227	178	9	517	991	286	138	101	242	92	0	81	852	218	41	4063
Apprch %	17.9	45	35.3	1.8	26.8	51.3	14.8	7.1	23.2	55.6	21.1	0	6.8	71.5	18.3	3.4	
Total %	2.2	5.6	4.4	0.2	12.7	24.4	7	3.4	2.5	6	2.3	0	2	21	5.4	1	

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	11	34	17	**2**	64	71	134	32	**25**	262	8	30	11	0	49	8	**118**	**37**	3	166	541
05:15 PM	14	**39**	27	1	**81**	63	132	39	16	250	11	24	**16**	0	51	12	116	32	**7**	**167**	549
05:30 PM	**16**	26	23	0	65	66	131	33	23	253	**18**	34	8	0	**60**	10	102	25	6	143	521
05:45 PM	10	34	**32**	2	78	**77**	**140**	**47**	17	**281**	14	**36**	7	0	57	**14**	116	32	4	166	**582**
Total Volume	51	133	99	5	288	277	537	151	81	1046	51	124	42	0	217	44	452	126	20	642	2193
% App. Total	17.7	46.2	34.4	1.7		26.5	51.3	14.4	7.7		23.5	57.1	19.4	0		6.9	70.4	19.6	3.1		
PHF	.797	.853	.773	.625	.889	.899	.959	.803	.810	.931	.708	.861	.656	.000	.904	.786	.958	.851	.714	.961	.942

N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
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File Name : 133307 HH
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	1	0	1	0	1	1	0	0	0	0	0	0	0	4	0	0	8
04:15 PM	0	1	0	0	2	2	0	1	0	0	0	0	0	7	0	0	13
04:30 PM	2	1	0	0	2	1	0	0	0	1	0	0	0	1	1	0	9
04:45 PM	0	0	1	0	4	1	3	0	0	2	0	0	0	1	1	0	13
Total	3	2	2	0	9	5	3	1	0	3	0	0	0	13	2	0	43
05:00 PM	1	1	0	0	3	0	0	0	0	1	0	0	0	0	0	0	6
05:15 PM	0	1	1	0	0	3	0	0	0	0	0	0	0	2	0	0	7
05:30 PM	0	0	0	0	1	2	1	0	0	1	0	0	0	1	0	0	6
05:45 PM	1	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	7
Total	2	2	1	0	4	8	1	0	0	2	0	0	0	6	0	0	26
Grand Total	5	4	3	0	13	13	4	1	0	5	0	0	0	19	2	0	69
Apprch %	41.7	33.3	25	0	41.9	41.9	12.9	3.2	0	100	0	0	0	90.5	9.5	0	
Total %	7.2	5.8	4.3	0	18.8	18.8	5.8	1.4	0	7.2	0	0	0	27.5	2.9	0	

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	1	0	1	0	2	1	1	0	0	2	0	0	0	0	0	0	4	0	0	4	8
04:15 PM	0	1	0	0	1	2	2	0	1	5	0	0	0	0	0	0	7	0	0	7	13
04:30 PM	2	1	0	0	3	2	1	0	0	3	0	1	0	0	1	0	1	1	0	2	9
04:45 PM	0	0	1	0	1	4	1	3	0	8	0	2	0	0	2	0	1	1	0	2	13
Total Volume	3	2	2	0	7	9	5	3	1	18	0	3	0	0	3	0	13	2	0	15	43
% App. Total	42.9	28.6	28.6	0		50	27.8	16.7	5.6		0	100	0	0		0	86.7	13.3	0		
PHF	.375	.500	.500	.000	.583	.563	.625	.250	.250	.563	.000	.375	.000	.000	.375	.000	.464	.500	.000	.536	.827

N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 HH
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Buses

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	4	5	1	0	0	0	0	0	0	2	2	0	14
04:15 PM	1	1	0	0	4	5	2	0	0	0	0	0	0	4	2	0	19
04:30 PM	0	0	0	0	4	6	0	0	0	0	0	0	0	0	4	0	14
04:45 PM	0	0	0	0	4	8	1	0	0	1	0	0	1	2	2	0	19
Total	1	1	0	0	16	24	4	0	0	1	0	0	1	8	10	0	66
05:00 PM	0	0	0	0	2	7	1	0	0	0	0	0	0	1	6	0	17
05:15 PM	0	0	0	0	3	8	0	0	0	0	0	0	0	4	4	0	19
05:30 PM	0	0	1	0	2	5	1	0	0	0	0	0	0	3	2	0	14
05:45 PM	0	0	0	0	4	3	0	0	0	0	0	0	0	1	4	0	12
Total	0	0	1	0	11	23	2	0	0	0	0	0	0	9	16	0	62
Grand Total	1	1	1	0	27	47	6	0	0	1	0	0	1	17	26	0	128
Apprch %	33.3	33.3	33.3	0	33.8	58.8	7.5	0	0	100	0	0	2.3	38.6	59.1	0	
Total %	0.8	0.8	0.8	0	21.1	36.7	4.7	0	0	0.8	0	0	0.8	13.3	20.3	0	

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	1	1	0	0	2	4	5	2	0	11	0	0	0	0	0	0	4	2	0	6	19
04:30 PM	0	0	0	0	0	4	6	0	0	10	0	0	0	0	0	0	0	4	0	4	14
04:45 PM	0	0	0	0	0	4	8	1	0	13	0	1	0	0	1	1	2	2	0	5	19
05:00 PM	0	0	0	0	0	2	7	1	0	10	0	0	0	0	0	0	1	6	0	7	17
Total Volume	1	1	0	0	2	14	26	4	0	44	0	1	0	0	1	1	7	14	0	22	69
% App. Total	50	50	0	0		31.8	59.1	9.1	0		0	100	0	0		4.5	31.8	63.6	0		
PHF	.250	.250	.000	.000	.250	.875	.813	.500	.000	.846	.000	.250	.000	.000	.250	.250	.438	.583	.000	.786	.908

N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 HH
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Peds and Bicycles

	Belidere Street From North				Huntington Avenue (Route 9) From East				West Newton Street From South				Huntington Avenue (Route 9) From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	0	0	149	3	5	0	101	0	1	0	39	0	1	0	28	327
04:15 PM	0	1	0	124	0	1	0	73	0	1	0	31	0	0	0	33	264
04:30 PM	0	4	1	130	1	5	0	93	0	1	0	38	0	0	1	46	320
04:45 PM	0	6	0	168	0	2	0	93	0	2	0	64	0	2	1	30	368
Total	0	11	1	571	4	13	0	360	0	5	0	172	0	3	2	137	1279
05:00 PM	0	0	0	220	0	3	0	104	0	2	0	58	2	1	0	49	439
05:15 PM	0	0	0	212	0	6	1	118	1	1	0	70	1	0	0	32	442
05:30 PM	0	3	0	213	1	1	1	93	0	2	0	55	0	0	0	43	412
05:45 PM	0	4	0	216	1	3	0	95	0	10	1	47	1	0	0	67	445
Total	0	7	0	861	2	13	2	410	1	15	1	230	4	1	0	191	1738
Grand Total	0	18	1	1432	6	26	2	770	1	20	1	402	4	4	2	328	3017
Apprch %	0	1.2	0.1	98.7	0.7	3.2	0.2	95.8	0.2	4.7	0.2	94.8	1.2	1.2	0.6	97	
Total %	0	0.6	0	47.5	0.2	0.9	0.1	25.5	0	0.7	0	13.3	0.1	0.1	0.1	10.9	

	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	0	0	0	**220**	**220**	0	3	0	104	107	0	2	0	58	60	**2**	**1**	0	49	52	439
05:15 PM	0	0	0	212	212	0	**6**	**1**	**118**	**125**	**1**	1	0	**70**	**72**	1	0	0	32	33	442
05:30 PM	0	3	0	213	216	**1**	1	1	93	96	0	2	0	55	57	0	0	0	43	43	412
05:45 PM	0	**4**	0	216	220	1	3	0	95	99	0	**10**	**1**	47	58	1	0	0	**67**	**68**	**445**
Total Volume	0	7	0	861	868	2	13	2	410	427	1	15	1	230	247	4	1	0	191	196	1738
% App. Total	0	0.8	0	99.2		0.5	3	0.5	96		0.4	6.1	0.4	93.1		2	0.5	0	97.4		
PHF	.000	.438	.000	.978	.986	.500	.542	.500	.869	.854	.250	.375	.250	.821	.858	.500	.250	.000	.713	.721	.976

N/S: Belidere Street/ West Newton Street
E/W: Huntington Avenue (Route 9)
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
Start Date : 5/14/2013
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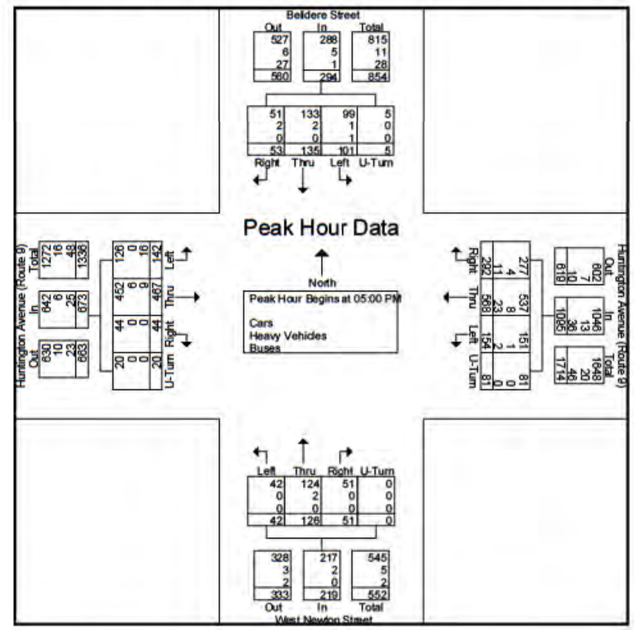
	Belidere Street From North					Huntington Avenue (Route 9) From East					West Newton Street From South					Huntington Avenue (Route 9) From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	12	35	17	**2**	66	76	141	33	**25**	275	8	31	11	0	50	8	119	**43**	3	173	564
05:15 PM	14	**40**	28	1	**83**	66	143	39	16	264	11	24	**16**	0	51	12	**122**	36	**7**	**177**	575
05:30 PM	**16**	26	24	0	66	69	138	35	23	265	**18**	35	8	0	**61**	10	106	27	6	149	541
05:45 PM	11	34	**32**	2	79	**81**	**146**	**47**	17	**291**	14	**36**	7	0	57	**14**	120	36	4	174	**601**
Total Volume	53	135	101	5	294	292	568	154	81	1095	51	126	42	0	219	44	467	142	20	673	2281
% App. Total	18	45.9	34.4	1.7		26.7	51.9	14.1	7.4		23.3	57.5	19.2	0		6.5	69.4	21.1	3		
PHF	.828	.844	.789	.625	.886	.901	.973	.819	.810	.941	.708	.875	.656	.000	.898	.786	.957	.826	.714	.951	.949
Cars	51	133	99	5	288	277	537	151	81	1046	51	124	42	0	217	44	452	126	20	642	2193
% Cars	96.2	98.5	98.0	100	98.0	94.9	94.5	98.1	100	95.5	100	98.4	100	0	99.1	100	96.8	88.7	100	95.4	96.1
Heavy Vehicles	2	2	1	0	5	4	8	1	0	13	0	2	0	0	2	0	6	0	0	6	26
% Heavy Vehicles	3.8	1.5	1.0	0	1.7	1.4	1.4	0.6	0	1.2	0	1.6	0	0	0.9	0	1.3	0	0	0.9	1.1
Buses	0	0	1	0	1	11	23	2	0	36	0	0	0	0	0	0	9	16	0	25	62
% Buses	0	0	1.0	0	0.3	3.8	4.0	1.3	0	3.3	0	0	0	0	0	0	1.9	11.3	0	3.7	2.7



N/S/NW: Hotel Driveway/ Dalton Street
E/W: Belvidere Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Site Code : 10135.00
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Page No : 1

Groups Printed- Cars - Heavy Vehicles - Buses

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	6	71	19	0	0	4	0	1	1	0	0	0	0	0	0	2	0	20	3	0	127
07:15 AM	0	0	0	0	0	3	87	10	0	2	5	0	4	2	0	0	0	0	0	0	4	0	22	6	0	145
07:30 AM	0	0	0	0	0	13	94	16	0	0	1	0	2	0	0	0	0	0	0	0	3	0	43	5	0	177
07:45 AM	0	0	0	0	0	6	122	29	4	0	4	0	3	0	0	0	0	0	0	0	6	2	32	6	0	214
Total	0	0	0	0	0	28	374	74	4	2	14	0	10	3	0	0	0	0	0	0	15	2	117	20	0	663
08:00 AM	0	0	0	0	0	11	160	18	2	0	4	0	3	1	0	0	0	0	0	0	5	3	28	0	0	235
08:15 AM	0	0	0	0	0	12	117	22	1	3	3	0	6	1	0	0	0	0	0	0	7	1	37	2	1	213
08:30 AM	0	0	0	0	0	2	94	18	1	1	3	0	3	0	0	0	0	0	0	0	6	0	30	4	0	162
08:45 AM	0	0	0	0	0	12	105	23	1	0	2	0	3	0	0	0	0	0	0	0	4	1	29	4	0	184
Total	0	0	0	0	0	37	476	81	5	4	12	0	15	2	0	0	0	0	0	0	22	5	124	10	1	794
Grand Total	0	0	0	0	0	65	850	155	9	6	26	0	25	5	0	0	0	0	0	0	37	7	241	30	1	1457
Apprch %	0	0	0	0	0	6	78.3	14.3	0.8	0.6	46.4	0	44.6	8.9	0	0	0	0	0	0	11.7	2.2	76.3	9.5	0.3	
Total %	0	0	0	0	0	4.5	58.3	10.6	0.6	0.4	1.8	0	1.7	0.3	0	0	0	0	0	0	2.5	0.5	16.5	2.1	0.1	
Cars	0	0	0	0	0	65	739	149	9	5	25	0	22	5	0	0	0	0	0	0	35	5	228	30	1	1318
% Cars	0	0	0	0	0	100	86.9	96.1	100	83.3	96.2	0	88	100	0	0	0	0	0	0	94.6	71.4	94.6	100	100	90.5
Heavy Vehicles	0	0	0	0	0	0	68	6	0	1	1	0	3	0	0	0	0	0	0	0	2	2	9	0	0	92
% Heavy Vehicles	0	0	0	0	0	0	8	3.9	0	16.7	3.8	0	12	0	0	0	0	0	0	0	5.4	28.6	3.7	0	0	6.3
Buses	0	0	0	0	0	0	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	47
% Buses	0	0	0	0	0	0	5.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7	0	0	3.2

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
07:30 AM	0	0	0	0	0	0	13	94	16	0	0	123	1	0	2	0	0	3	0	0	0	0	0	0	3	0	43	5	0	51	177
07:45 AM	0	0	0	0	0	0	6	122	29	4	0	161	4	0	3	0	0	7	0	0	0	0	0	0	6	2	32	6	0	46	214
08:00 AM	0	0	0	0	0	0	11	160	18	2	0	191	4	0	3	1	0	8	0	0	0	0	0	0	5	3	28	0	0	36	235
08:15 AM	0	0	0	0	0	0	12	117	22	1	3	155	3	0	6	1	0	10	0	0	0	0	0	0	7	1	37	2	1	48	213
Total Volume	0	0	0	0	0	0	42	493	85	7	3	630	12	0	14	2	0	28	0	0	0	0	0	0	21	6	140	13	1	181	839
% App. Total	0	0	0	0	0		6.7	78.3	13.5	1.1	0.5		42.9	0	50	7.1	0		0	0	0	0	0		11.6	3.3	77.3	7.2	0.6		
PHF	.000	.000	.000	.000	.000	.000	.808	.770	.733	.438	.250	.825	.750	.000	.583	.500	.000	.700	.000	.000	.000	.000	.000	.000	.750	.500	.814	.542	.250	.887	.893
Cars	0	0	0	0	0	0	42	429	82	7	3	563	11	0	13	2	0	26	0	0	0	0	0	0	20	4	136	13	1	174	763
% Cars	0	0	0	0	0	0	100	87.0	96.5	100	100	89.4	91.7	0	92.9	100	0	92.9	0	0	0	0	0	0	95.2	66.7	97.1	100	100	96.1	90.9
Heavy Vehicles	0	0	0	0	0	0	0	39	3	0	0	42	1	0	1	0	0	2	0	0	0	0	0	0	1	2	2	0	0	5	49
% Heavy Vehicles	0	0	0	0	0	0	0	7.9	3.5	0	0	6.7	8.3	0	7.1	0	0	7.1	0	0	0	0	0	0	4.8	33.3	1.4	0	0	2.8	5.8
Buses	0	0	0	0	0	0	0	25	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	27
% Buses	0	0	0	0	0	0	0	5.1	0	0	0	4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	0	0	1.1	3.2

N/S/NW: Hotel Driveway/ Dalton Street
E/W: Belvidere Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
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Groups Printed- Cars

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	6	62	19	0	0	4	0	1	1	0	0	0	0	0	0	2	0	19	3	0	117
07:15 AM	0	0	0	0	0	3	77	9	0	1	5	0	3	2	0	0	0	0	0	0	4	0	20	6	0	130
07:30 AM	0	0	0	0	0	13	81	16	0	0	1	0	2	0	0	0	0	0	0	0	3	0	43	5	0	164
07:45 AM	0	0	0	0	0	6	106	29	4	0	3	0	2	0	0	0	0	0	0	0	6	1	30	6	0	193
Total	0	0	0	0	0	28	326	73	4	1	13	0	8	3	0	0	0	0	0	0	15	1	112	20	0	604
08:00 AM	0	0	0	0	0	11	143	16	2	0	4	0	3	1	0	0	0	0	0	0	5	2	28	0	0	215
08:15 AM	0	0	0	0	0	12	99	21	1	3	3	0	6	1	0	0	0	0	0	0	6	1	35	2	1	191
08:30 AM	0	0	0	0	0	2	81	17	1	1	3	0	2	0	0	0	0	0	0	0	5	0	26	4	0	142
08:45 AM	0	0	0	0	0	12	90	22	1	0	2	0	3	0	0	0	0	0	0	0	4	1	27	4	0	166
Total	0	0	0	0	0	37	413	76	5	4	12	0	14	2	0	0	0	0	0	0	20	4	116	10	1	714
Grand Total	0	0	0	0	0	65	739	149	9	5	25	0	22	5	0	0	0	0	0	0	35	5	228	30	1	1318
Apprch %	0	0	0	0	0	6.7	76.4	15.4	0.9	0.5	48.1	0	42.3	9.6	0	0	0	0	0	0	11.7	1.7	76.3	10	0.3	
Total %	0	0	0	0	0	4.9	56.1	11.3	0.7	0.4	1.9	0	1.7	0.4	0	0	0	0	0	0	2.7	0.4	17.3	2.3	0.1	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
07:30 AM	0	0	0	0	0	0	13	81	16	0	0	110	1	0	2	0	0	3	0	0	0	0	0	0	3	0	43	5	0	51	164
07:45 AM	0	0	0	0	0	0	6	106	29	4	0	145	3	0	2	0	0	5	0	0	0	0	0	0	6	1	30	6	0	43	193
08:00 AM	0	0	0	0	0	0	11	143	16	2	0	172	4	0	3	1	0	8	0	0	0	0	0	0	5	2	28	0	0	35	215
08:15 AM	0	0	0	0	0	0	12	99	21	1	3	136	3	0	6	1	0	10	0	0	0	0	0	0	6	1	35	2	1	45	191
Total Volume	0	0	0	0	0	0	42	429	82	7	3	563	11	0	13	2	0	26	0	0	0	0	0	0	20	4	136	13	1	174	763
% App. Total	0	0	0	0	0		7.5	76.2	14.6	1.2	0.5		42.3	0	50	7.7	0		0	0	0	0	0		11.5	2.3	78.2	7.5	0.6		
PHF	.000	.000	.000	.000	.000	.000	.808	.750	.707	.438	.250	.818	.688	.000	.542	.500	.000	.650	.000	.000	.000	.000	.000	.000	.833	.500	.791	.542	.250	.853	.887

N/S/NW: Hotel Driveway/ Dalton Street
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Groups Printed- Heavy Vehicles

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	5
07:15 AM	0	0	0	0	0	0	8	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	13
07:30 AM	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
07:45 AM	0	0	0	0	0	0	9	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0	13
Total	0	0	0	0	0	0	30	1	0	1	1	0	2	0	0	0	0	0	0	0	0	1	4	0	0	40
08:00 AM	0	0	0	0	0	0	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	14
08:15 AM	0	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	13
08:30 AM	0	0	0	0	0	0	7	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	3	0	0	13
08:45 AM	0	0	0	0	0	0	10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	12
Total	0	0	0	0	0	0	38	5	0	0	0	0	1	0	0	0	0	0	0	0	2	1	5	0	0	52
Grand Total	0	0	0	0	0	0	68	6	0	1	1	0	3	0	0	0	0	0	0	0	2	2	9	0	0	92
Apprch %	0	0	0	0	0	0	90.7	8	0	1.3	25	0	75	0	0	0	0	0	0	0	15.4	15.4	69.2	0	0	
Total %	0	0	0	0	0	0	73.9	6.5	0	1.1	1.1	0	3.3	0	0	0	0	0	0	0	2.2	2.2	9.8	0	0	

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:45 AM																															
07:45 AM	0	0	0	0	0	0	0	9	0	0	0	9	1	0	1	0	0	2	0	0	0	0	0	0	0	1	1	0	0	2	13
08:00 AM	0	0	0	0	0	0	0	11	2	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	14
08:15 AM	0	0	0	0	0	0	0	10	1	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	13
08:30 AM	0	0	0	0	0	0	0	7	1	0	0	8	0	0	1	0	0	1	0	0	0	0	0	0	1	0	3	0	0	4	13
Total Volume	0	0	0	0	0	0	0	37	4	0	0	41	1	0	2	0	0	3	0	0	0	0	0	0	2	2	5	0	0	9	53
% App. Total	0	0	0	0	0		0	90.2	9.8	0	0		33.3	0	66.7	0	0		0	0	0	0	0		22.2	22.2	55.6	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.841	.500	.000	.000	.788	.250	.000	.500	.000	.000	.375	.000	.000	.000	.000	.000	.000	.500	.500	.417	.000	.000	.563	.946

N/S/NW: Hotel Driveway/ Dalton Street
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Groups Printed- Buses

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
07:15 AM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:30 AM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
07:45 AM	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	8
Total	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	19
08:00 AM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
08:15 AM	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	9
08:30 AM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	7
08:45 AM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6
Total	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	28
Grand Total	0	0	0	0	0	0	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	47
Apprch %	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	0	91.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.5	0	0	

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:45 AM																															
07:45 AM	0	0	0	0	0	0	0	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	8
08:00 AM	0	0	0	0	0	0	0	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
08:15 AM	0	0	0	0	0	0	0	8	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	9
08:30 AM	0	0	0	0	0	0	0	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	7
Total Volume	0	0	0	0	0	0	0	27	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	30
% App. Total	0	0	0	0	0		0	100	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.844	.000	.000	.000	.844	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.750	.000	.000	.750	.833

N/S/NW: Hotel Driveway/ Dalton Street
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Groups Printed- Peds and Bicycles

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Int. Total
07:00 AM	0	0	0	0	9	0	0	2	0	1	0	0	0	0	6	0	0	0	0	1	0	0	2	0	14	35
07:15 AM	0	0	0	0	15	1	3	1	0	4	0	0	0	0	12	0	0	0	0	7	0	0	3	0	27	73
07:30 AM	0	0	0	0	16	0	3	3	0	4	0	0	0	0	17	0	0	0	0	3	0	0	4	0	10	60
07:45 AM	0	0	0	0	15	0	2	1	0	4	0	0	0	0	28	0	0	0	0	4	0	0	0	0	17	71
Total	0	0	0	0	55	1	8	7	0	13	0	0	0	0	63	0	0	0	0	15	0	0	9	0	68	239
08:00 AM	0	0	0	0	19	0	6	1	0	8	0	0	0	0	31	0	0	0	0	16	0	0	2	0	13	96
08:15 AM	0	0	0	0	16	0	1	3	0	11	0	0	0	0	30	0	0	0	0	11	0	0	5	0	17	94
08:30 AM	0	0	0	0	28	0	5	1	0	4	0	0	0	0	37	0	0	0	0	12	0	0	4	0	6	97
08:45 AM	0	0	0	0	18	0	3	2	0	9	0	0	0	0	26	0	0	0	0	16	0	0	5	0	13	92
Total	0	0	0	0	81	0	15	7	0	32	0	0	0	0	124	0	0	0	0	55	0	0	16	0	49	379
Grand Total	0	0	0	0	136	1	23	14	0	45	0	0	0	0	187	0	0	0	0	70	0	0	25	0	117	618
Apprch %	0	0	0	0	100	1.2	27.7	16.9	0	54.2	0	0	0	0	100	0	0	0	0	100	0	0	17.6	0	82.4	
Total %	0	0	0	0	22	0.2	3.7	2.3	0	7.3	0	0	0	0	30.3	0	0	0	0	11.3	0	0	4	0	18.9	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 08:00 AM

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
08:00 AM	0	0	0	0	19	19	0	6	1	0	8	15	0	0	0	0	31	31	0	0	0	0	16	16	0	0	2	0	13	15	96
08:15 AM	0	0	0	0	16	16	0	1	3	0	11	15	0	0	0	0	30	30	0	0	0	0	11	11	0	0	5	0	17	22	94
08:30 AM	0	0	0	0	28	28	0	5	1	0	4	10	0	0	0	0	37	37	0	0	0	0	12	12	0	0	4	0	6	10	97
08:45 AM	0	0	0	0	18	18	0	3	2	0	9	14	0	0	0	0	26	26	0	0	0	0	16	16	0	0	5	0	13	18	92
Total Volume	0	0	0	0	81	81	0	15	7	0	32	54	0	0	0	0	124	124	0	0	0	0	55	55	0	0	16	0	49	65	379
% App. Total	0	0	0	0	100		0	27.8	13	0	59.3		0	0	0	0	100		0	0	0	0	100		0	0	24.6	0	75.4		
PHF	.000	.000	.000	.000	.723	.723	.000	.625	.583	.000	.727	.900	.000	.000	.000	.000	.838	.838	.000	.000	.000	.000	.859	.859	.000	.000	.800	.000	.721	.739	.977

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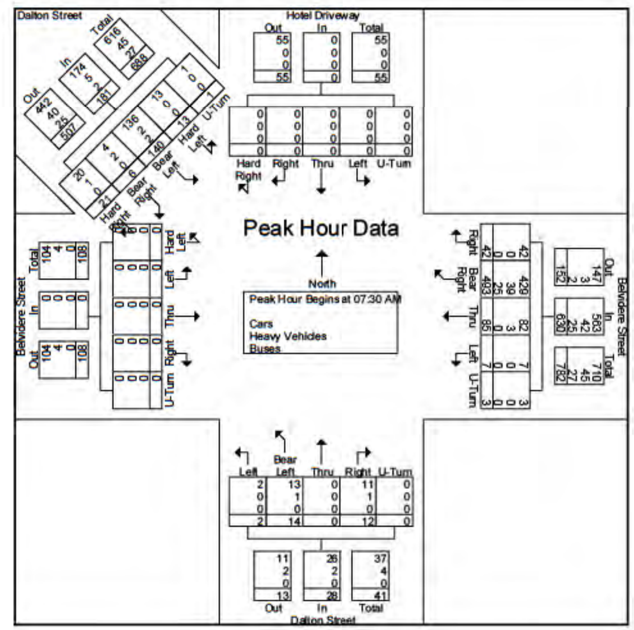
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
07:30 AM	0	0	0	0	0	0	13	94	16	0	0	123	1	0	2	0	0	3	0	0	0	0	0	0	3	0	43	5	0	51	177
07:45 AM	0	0	0	0	0	0	6	122	29	4	0	161	4	0	3	0	0	7	0	0	0	0	0	0	6	2	32	6	0	46	214
08:00 AM	0	0	0	0	0	0	11	160	18	2	0	191	4	0	3	1	0	8	0	0	0	0	0	0	5	3	28	0	0	36	235
08:15 AM	0	0	0	0	0	0	12	117	22	1	3	155	3	0	6	1	0	10	0	0	0	0	0	0	7	1	37	2	1	48	213
Total Volume	0	0	0	0	0	0	42	493	85	7	3	630	12	0	14	2	0	28	0	0	0	0	0	0	21	6	140	13	1	181	839
% App. Total	0	0	0	0	0		6.7	78.3	13.5	1.1	0.5		42.9	0	50	7.1	0		0	0	0	0	0		11.6	3.3	77.3	7.2	0.6		
PHF	.000	.000	.000	.000	.000	.000	.808	.770	.733	.438	.250	.825	.750	.000	.583	.500	.000	.700	.000	.000	.000	.000	.000	.000	.750	.500	.814	.542	.250	.887	.893
Cars	0	0	0	0	0	0	42	429	82	7	3	563	11	0	13	2	0	26	0	0	0	0	0	0	20	4	136	13	1	174	763
% Cars	0	0	0	0	0	0	100	87.0	96.5	100	100	89.4	91.7	0	92.9	100	0	92.9	0	0	0	0	0	0	95.2	66.7	97.1	100	100	96.1	90.9
Heavy Vehicles	0	0	0	0	0	0	0	39	3	0	0	42	1	0	1	0	0	2	0	0	0	0	0	0	1	2	2	0	0	5	49
% Heavy Vehicles	0	0	0	0	0	0	0	7.9	3.5	0	0	6.7	8.3	0	7.1	0	0	7.1	0	0	0	0	0	0	4.8	33.3	1.4	0	0	2.8	5.8
Buses	0	0	0	0	0	0	0	25	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	27
% Buses	0	0	0	0	0	0	0	5.1	0	0	0	4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	0	0	1.1	3.2



N/S/NW: Hotel Driveway/ Dalton Street
E/W: Belvidere Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 II
Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Cars - Heavy Vehicles - Buses

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	6	69	15	1	2	2	0	3	1	0	0	0	0	0	0	5	0	41	5	0	150
04:15 PM	0	0	0	0	0	3	95	16	4	1	2	0	4	1	0	0	0	0	0	0	4	2	40	1	0	173
04:30 PM	0	0	0	0	0	12	94	23	0	3	6	0	2	0	0	0	0	0	0	0	3	2	41	3	0	189
04:45 PM	0	0	0	0	0	3	96	15	2	2	2	0	1	0	0	0	0	0	0	0	1	4	36	5	0	167
Total	0	0	0	0	0	24	354	69	7	8	12	0	10	2	0	0	0	0	0	0	13	8	158	14	0	679
05:00 PM	0	0	0	0	0	12	108	14	0	0	6	0	8	1	0	0	0	0	0	0	4	2	43	3	1	202
05:15 PM	0	0	0	0	0	8	102	18	3	0	3	0	4	1	0	0	0	0	0	0	3	0	60	6	0	208
05:30 PM	0	0	0	0	0	8	100	26	2	1	9	2	2	0	0	0	0	0	0	0	2	0	43	4	1	200
05:45 PM	0	0	0	0	0	9	106	27	5	2	4	0	4	0	0	0	0	0	0	0	3	0	53	6	0	219
Total	0	0	0	0	0	37	416	85	10	3	22	2	18	2	0	0	0	0	0	0	12	2	199	19	2	829
Grand Total	0	0	0	0	0	61	770	154	17	11	34	2	28	4	0	0	0	0	0	0	25	10	357	33	2	1508
Apprch %	0	0	0	0	0	6	76	15.2	1.7	1.1	50	2.9	41.2	5.9	0	0	0	0	0	0	5.9	2.3	83.6	7.7	0.5	
Total %	0	0	0	0	0	4	51.1	10.2	1.1	0.7	2.3	0.1	1.9	0.3	0	0	0	0	0	0	1.7	0.7	23.7	2.2	0.1	
Cars	0	0	0	0	0	61	701	152	16	11	34	2	28	3	0	0	0	0	0	0	25	9	350	33	2	1427
% Cars	0	0	0	0	0	100	91	98.7	94.1	100	100	100	100	75	0	0	0	0	0	0	100	90	98	100	100	94.6
Heavy Vehicles	0	0	0	0	0	0	14	2	1	0	0	0	0	1	0	0	0	0	0	0	0	1	4	0	0	23
% Heavy Vehicles	0	0	0	0	0	0	1.8	1.3	5.9	0	0	0	0	25	0	0	0	0	0	0	0	10	1.1	0	0	1.5
Buses	0	0	0	0	0	0	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	58
% Buses	0	0	0	0	0	0	7.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	0	0	3.8

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 05:00 PM

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
05:00 PM	0	0	0	0	0	0	12	108	14	0	0	134	6	0	8	1	0	15	0	0	0	0	0	0	4	2	43	3	1	53	202
05:15 PM	0	0	0	0	0	0	8	102	18	3	0	131	3	0	4	1	0	8	0	0	0	0	0	0	3	0	60	6	0	69	208
05:30 PM	0	0	0	0	0	0	8	100	26	2	1	137	9	2	2	0	0	13	0	0	0	0	0	0	2	0	43	4	1	50	200
05:45 PM	0	0	0	0	0	0	9	106	27	5	2	149	4	0	4	0	0	8	0	0	0	0	0	0	3	0	53	6	0	62	219
Total Volume	0	0	0	0	0	0	37	416	85	10	3	551	22	2	18	2	0	44	0	0	0	0	0	0	12	2	199	19	2	234	829
% App. Total	0	0	0	0	0		6.7	75.5	15.4	1.8	0.5		50	4.5	40.9	4.5	0		0	0	0	0	0		5.1	0.9	85	8.1	0.9		
PHF	.000	.000	.000	.000	.000	.000	.771	.963	.787	.500	.375	.924	.611	.250	.563	.500	.000	.733	.000	.000	.000	.000	.000	.000	.750	.250	.829	.792	.500	.848	.946
Cars	0	0	0	0	0	0	37	384	85	10	3	519	22	2	18	1	0	43	0	0	0	0	0	0	12	2	196	19	2	231	793
% Cars	0	0	0	0	0	0	100	92.3	100	100	100	94.2	100	100	100	50.0	0	97.7	0	0	0	0	0	0	100	100	98.5	100	100	98.7	95.7
Heavy Vehicles	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2	0	0	2	7
% Heavy Vehicles	0	0	0	0	0	0	0	1.0	0	0	0	0.7	0	0	0	50.0	0	2.3	0	0	0	0	0	0	0	0	1.0	0	0	0.9	0.8
Buses	0	0	0	0	0	0	0	28	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	29
% Buses	0	0	0	0	0	0	0	6.7	0	0	0	5.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0.4	3.5

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Page No : 1

Groups Printed- Cars

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	6	60	15	1	2	2	0	3	1	0	0	0	0	0	0	5	0	40	5	0	140
04:15 PM	0	0	0	0	0	3	89	16	4	1	2	0	4	1	0	0	0	0	0	0	4	2	38	1	0	165
04:30 PM	0	0	0	0	0	12	81	22	0	3	6	0	2	0	0	0	0	0	0	0	3	1	40	3	0	173
04:45 PM	0	0	0	0	0	3	87	14	1	2	2	0	1	0	0	0	0	0	0	0	1	4	36	5	0	156
Total	0	0	0	0	0	24	317	67	6	8	12	0	10	2	0	0	0	0	0	0	13	7	154	14	0	634
05:00 PM	0	0	0	0	0	12	95	14	0	0	6	0	8	0	0	0	0	0	0	0	4	2	42	3	1	187
05:15 PM	0	0	0	0	0	8	98	18	3	0	3	0	4	1	0	0	0	0	0	0	3	0	59	6	0	203
05:30 PM	0	0	0	0	0	8	92	26	2	1	9	2	2	0	0	0	0	0	0	0	2	0	42	4	1	191
05:45 PM	0	0	0	0	0	9	99	27	5	2	4	0	4	0	0	0	0	0	0	0	3	0	53	6	0	212
Total	0	0	0	0	0	37	384	85	10	3	22	2	18	1	0	0	0	0	0	0	12	2	196	19	2	793
Grand Total	0	0	0	0	0	61	701	152	16	11	34	2	28	3	0	0	0	0	0	0	25	9	350	33	2	1427
Apprch %	0	0	0	0	0	6.5	74.5	16.2	1.7	1.2	50.7	3	41.8	4.5	0	0	0	0	0	0	6	2.1	83.5	7.9	0.5	
Total %	0	0	0	0	0	4.3	49.1	10.7	1.1	0.8	2.4	0.1	2	0.2	0	0	0	0	0	0	1.8	0.6	24.5	2.3	0.1	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 05:00 PM

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
05:00 PM	0	0	0	0	0	0	12	95	14	0	0	121	6	0	8	0	0	14	0	0	0	0	0	0	4	2	42	3	1	52	187
05:15 PM	0	0	0	0	0	0	8	98	18	3	0	127	3	0	4	1	0	8	0	0	0	0	0	0	3	0	59	6	0	68	203
05:30 PM	0	0	0	0	0	0	8	92	26	2	1	129	9	2	2	0	0	13	0	0	0	0	0	0	2	0	42	4	1	49	191
05:45 PM	0	0	0	0	0	0	9	99	27	5	2	142	4	0	4	0	0	8	0	0	0	0	0	0	3	0	53	6	0	62	212
Total Volume	0	0	0	0	0	0	37	384	85	10	3	519	22	2	18	1	0	43	0	0	0	0	0	0	12	2	196	19	2	231	793
% App. Total	0	0	0	0	0		7.1	74	16.4	1.9	0.6		51.2	4.7	41.9	2.3	0		0	0	0	0	0		5.2	0.9	84.8	8.2	0.9		
PHF	.000	.000	.000	.000	.000	.000	.771	.970	.787	.500	.375	.914	.611	.250	.563	.250	.000	.768	.000	.000	.000	.000	.000	.000	.750	.250	.831	.792	.500	.849	.935

N/S/NW: Hotel Driveway/ Dalton Street
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Groups Printed- Heavy Vehicles

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3
04:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	6
04:45 PM	0	0	0	0	0	0	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Total	0	0	0	0	0	0	10	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	16
05:00 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	5
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	7
Grand Total	0	0	0	0	0	0	14	2	1	0	0	0	0	1	0	0	0	0	0	0	0	1	4	0	0	23
Apprch %	0	0	0	0	0	0	82.4	11.8	5.9	0	0	0	0	100	0	0	0	0	0	0	0	20	80	0	0	
Total %	0	0	0	0	0	0	60.9	8.7	4.3	0	0	0	0	4.3	0	0	0	0	0	0	0	4.3	17.4	0	0	

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 04:15 PM																															
04:15 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	3	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	6
04:45 PM	0	0	0	0	0	0	0	4	1	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
05:00 PM	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	5
Total Volume	0	0	0	0	0	0	0	11	2	1	0	14	0	0	0	1	0	1	0	0	0	0	0	0	0	1	2	0	0	3	18
% App. Total	0	0	0	0	0		0	78.6	14.3	7.1	0		0	0	0	100	0		0	0	0	0	0		0	33.3	66.7	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.688	.500	.250	.000	.583	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.250	.500	.000	.000	.375	.750

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Groups Printed- Buses

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
04:15 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	7
04:30 PM	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
04:45 PM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Total	0	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	29
05:00 PM	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
05:15 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
05:30 PM	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	9
05:45 PM	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Total	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	29
Grand Total	0	0	0	0	0	0	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	58
Apprch %	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	
Total %	0	0	0	0	0	0	94.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.2	0	0	

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 04:15 PM																															
04:15 PM	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	7
04:30 PM	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
04:45 PM	0	0	0	0	0	0	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
05:00 PM	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Total Volume	0	0	0	0	0	0	0	30	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	32
% App. Total	0	0	0	0	0		0	100	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	100	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.750	.000	.000	.000	.750	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.800

N/S/NW: Hotel Driveway/ Dalton Street
E/W: Belvidere Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
P.O.Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 133307 II
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Peds and Bicycles

	Hotel Driveway From North					Belvidere Street From East					Dalton Street From South					Belvidere Street From West					Dalton Street From Northwest					
Start Time	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Int. Total
04:00 PM	0	0	0	0	31	0	3	2	0	2	0	0	0	0	27	0	0	0	0	16	0	0	2	0	24	107
04:15 PM	0	0	0	0	29	0	2	2	0	0	0	0	0	0	13	0	0	0	0	6	0	0	1	0	19	72
04:30 PM	0	0	0	0	42	0	3	2	0	4	0	0	0	0	21	0	0	0	0	6	0	0	2	0	37	117
04:45 PM	0	0	0	0	32	0	4	0	0	2	0	0	0	0	17	0	0	0	0	3	0	0	3	0	23	84
Total	0	0	0	0	134	0	12	6	0	8	0	0	0	0	78	0	0	0	0	31	0	0	8	0	103	380
05:00 PM	0	0	0	0	43	0	6	1	0	0	0	0	1	0	26	0	0	0	0	8	0	0	1	0	26	112
05:15 PM	0	0	0	0	65	0	7	7	0	6	0	0	1	0	33	0	0	0	0	5	1	0	1	0	50	176
05:30 PM	0	0	0	0	37	0	6	1	0	3	0	0	0	0	24	0	0	0	0	7	0	0	1	0	47	126
05:45 PM	0	0	0	0	55	0	9	2	0	2	0	0	1	0	26	0	0	0	0	6	0	0	1	0	51	153
Total	0	0	0	0	200	0	28	11	0	11	0	0	3	0	109	0	0	0	0	26	1	0	4	0	174	567
Grand Total	0	0	0	0	334	0	40	17	0	19	0	0	3	0	187	0	0	0	0	57	1	0	12	0	277	947
Apprch %	0	0	0	0	100	0	52.6	22.4	0	25	0	0	1.6	0	98.4	0	0	0	0	100	0.3	0	4.1	0	95.5	
Total %	0	0	0	0	35.3	0	4.2	1.8	0	2	0	0	0.3	0	19.7	0	0	0	0	6	0.1	0	1.3	0	29.3	

	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	0	0	0	43	43	0	6	1	0	0	7	0	0	1	0	26	27	0	0	0	0	8	8	0	0	1	0	26	27	112
05:15 PM	0	0	0	0	65	65	0	7	7	0	6	20	0	0	1	0	33	34	0	0	0	0	5	5	1	0	1	0	50	52	176
05:30 PM	0	0	0	0	37	37	0	6	1	0	3	10	0	0	0	0	24	24	0	0	0	0	7	7	0	0	1	0	47	48	126
05:45 PM	0	0	0	0	55	55	0	9	2	0	2	13	0	0	1	0	26	27	0	0	0	0	6	6	0	0	1	0	51	52	153
Total Volume	0	0	0	0	200	200	0	28	11	0	11	50	0	0	3	0	109	112	0	0	0	0	26	26	1	0	4	0	174	179	567
% App. Total	0	0	0	0	100		0	56	22	0	22		0	0	2.7	0	97.3		0	0	0	0	100		0.6	0	2.2	0	97.2		
PHF	.000	.000	.000	.000	.769	.769	.000	.778	.393	.000	.458	.625	.000	.000	.750	.000	.826	.824	.000	.000	.000	.000	.813	.813	.250	.000	1.00	.000	.853	.861	.805

N/S/NW: Hotel Driveway/ Dalton Street
E/W: Belvidere Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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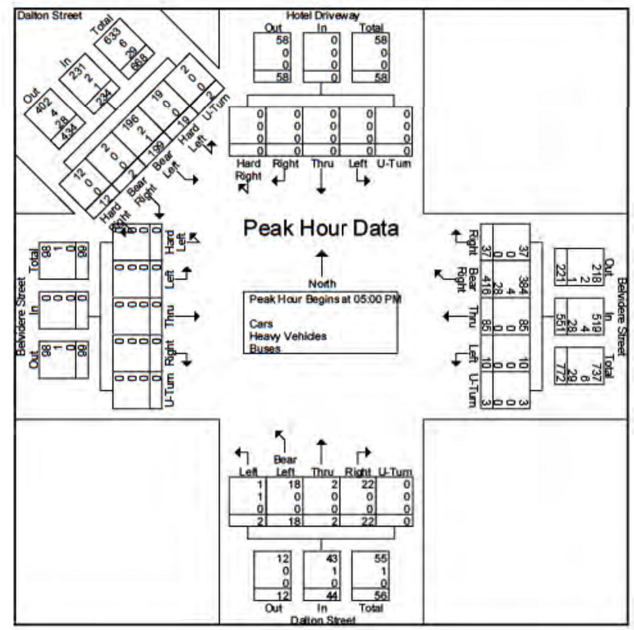
	Hotel Driveway From North						Belvidere Street From East						Dalton Street From South						Belvidere Street From West						Dalton Street From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	0	0	0	0	0	12	108	14	0	0	134	6	0	8	1	0	15	0	0	0	0	0	0	4	2	43	3	1	53	202
05:15 PM	0	0	0	0	0	0	8	102	18	3	0	131	3	0	4	1	0	8	0	0	0	0	0	0	3	0	60	6	0	69	208
05:30 PM	0	0	0	0	0	0	8	100	26	2	1	137	9	2	2	0	0	13	0	0	0	0	0	0	2	0	43	4	1	50	200
05:45 PM	0	0	0	0	0	0	9	106	27	5	2	149	4	0	4	0	0	8	0	0	0	0	0	0	3	0	53	6	0	62	219
Total Volume	0	0	0	0	0	0	37	416	85	10	3	551	22	2	18	2	0	44	0	0	0	0	0	0	12	2	199	19	2	234	829
% App. Total	0	0	0	0	0		6.7	75.5	15.4	1.8	0.5		50	4.5	40.9	4.5	0		0	0	0	0	0		5.1	0.9	85	8.1	0.9		
PHF	.000	.000	.000	.000	.000	.000	.771	.963	.787	.500	.375	.924	.611	.250	.563	.500	.000	.733	.000	.000	.000	.000	.000	.000	.750	.250	.829	.792	.500	.848	.946
Cars	0	0	0	0	0	0	37	384	85	10	3	519	22	2	18	1	0	43	0	0	0	0	0	0	12	2	196	19	2	231	793
% Cars	0	0	0	0	0	0	100	92.3	100	100	100	94.2	100	100	100	50.0	0	97.7	0	0	0	0	0	0	100	100	98.5	100	100	98.7	95.7
Heavy Vehicles	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	1	0	1	0	0	0	0	0	0	0	0	2	0	0	2	7
% Heavy Vehicles	0	0	0	0	0	0	0	1.0	0	0	0	0.7	0	0	0	50.0	0	2.3	0	0	0	0	0	0	0	0	1.0	0	0	0.9	0.8
Buses	0	0	0	0	0	0	0	28	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	29
% Buses	0	0	0	0	0	0	0	6.7	0	0	0	5.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0.4	3.5



N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION
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Email: datarequests@pdillc.com

File Name : 133307 J
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars - Heavy Vehicles - Buses

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	20	0	32	0	42	59	18	0	0	194
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	23	0	54	0	44	56	16	0	0	213
07:30 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	25	0	44	0	57	60	15	0	0	239
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	36	1	55	0	56	68	7	1	0	249
Total	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	104	104	1	185	0	199	243	56	1	0	895
08:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43	15	0	84	0	50	71	14	0	0	278
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	32	0	58	0	63	82	22	0	0	295
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	21	0	44	0	55	75	9	1	0	238
08:45 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35	27	0	42	0	67	71	17	1	0	262
Total	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	149	95	0	228	0	235	299	62	2	0	1073
Grand Total	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	253	199	1	413	0	434	542	118	3	0	1968
Apprch %	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29.2	23	0.1	47.7	0	39.6	49.4	10.8	0.3	0	
Total %	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.9	10.1	0.1	21	0	22.1	27.5	6	0.2	0	
Cars	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	202	185	0	376	0	418	460	104	3	0	1753
% Cars	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	79.8	93	0	91	0	96.3	84.9	88.1	100	0	89.1
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	12	1	21	0	12	68	14	0	0	155
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.7	6	100	5.1	0	2.8	12.5	11.9	0	0	7.9
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	2	0	16	0	4	14	0	0	0	60
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.5	1	0	3.9	0	0.9	2.6	0	0	0	3

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 08:00 AM

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
08:00 AM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	43	15	0	84	0	142	50	71	14	0	0	135	278
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	32	0	58	0	128	63	82	22	0	0	167	295
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	21	0	44	0	98	55	75	9	1	0	140	238
08:45 AM	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	35	27	0	42	0	104	67	71	17	1	0	156	262
Total Volume	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	149	95	0	228	0	472	235	299	62	2	0	598	1073
% App. Total	100	0	0	0	0		0	0	0	0	0		0	0	0	0	0		31.6	20.1	0	48.3	0		39.3	50	10.4	0.3	0		
PHF	.375	.000	.000	.000	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.866	.742	.000	.679	.000	.831	.877	.912	.705	.500	.000	.895	.909
Cars	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	119	89	0	210	0	418	225	253	54	2	0	534	955
% Cars	100	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	79.9	93.7	0	92.1	0	88.6	95.7	84.6	87.1	100	0	89.3	89.0
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	6	0	8	0	30	7	40	8	0	0	55	85
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.7	6.3	0	3.5	0	6.4	3.0	13.4	12.9	0	0	9.2	7.9
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	10	0	24	3	6	0	0	0	9	33
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.4	0	0	4.4	0	5.1	1.3	2.0	0	0	0	1.5	3.1

N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
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File Name : 133307 J
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	19	0	28	0	42	51	18	0	0	176
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	22	0	46	0	42	44	13	0	0	185
07:30 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	21	0	43	0	57	55	12	0	0	219
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	34	0	49	0	52	57	7	1	0	218
Total	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83	96	0	166	0	193	207	50	1	0	798
08:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	13	0	80	0	50	61	12	0	0	251
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30	0	51	0	58	64	19	0	0	252
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	20	0	40	0	52	68	7	1	0	212
08:45 AM	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	26	0	39	0	65	60	16	1	0	240
Total	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119	89	0	210	0	225	253	54	2	0	955
Grand Total	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	202	185	0	376	0	418	460	104	3	0	1753
Apprch %	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26.5	24.2	0	49.3	0	42.4	46.7	10.6	0.3	0	
Total %	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11.5	10.6	0	21.4	0	23.8	26.2	5.9	0.2	0	

Peak Hour Analysis From 08:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 08:00 AM

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
08:00 AM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	34	13	0	80	0	127	50	61	12	0	0	123	251
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30	0	51	0	111	58	64	19	0	0	141	252
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	20	0	40	0	84	52	68	7	1	0	128	212
08:45 AM	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	31	26	0	39	0	96	65	60	16	1	0	142	240
Total Volume	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	119	89	0	210	0	418	225	253	54	2	0	534	955
% App. Total	100	0	0	0	0		0	0	0	0	0		0	0	0	0	0		28.5	21.3	0	50.2	0		42.1	47.4	10.1	0.4	0		
PHF	.375	.000	.000	.000	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.875	.742	.000	.656	.000	.823	.865	.930	.711	.500	.000	.940	.947

N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
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Email: datarequests@pdillc.com

File Name : 133307 J
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	7	0	0	0	11
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	6	0	2	9	3	0	0	21
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	1	0	0	3	3	0	0	15
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	1	4	0	3	9	0	0	0	23
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	6	1	13	0	5	28	6	0	0	70
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	2	0	0	9	2	0	0	19
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	3	0	4	15	3	0	0	33
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	3	0	2	7	2	0	0	18
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	1	9	1	0	0	15
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	6	0	8	0	7	40	8	0	0	85
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	12	1	21	0	12	68	14	0	0	155
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44.3	19.7	1.6	34.4	0	12.8	72.3	14.9	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17.4	7.7	0.6	13.5	0	7.7	43.9	9	0	0	

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:45 AM																															
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	1	4	0	11	3	9	0	0	0	12	23
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	2	0	8	0	9	2	0	0	11	19
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	3	0	11	4	15	3	0	0	22	33
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	3	0	7	2	7	2	0	0	11	18
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	7	1	12	0	37	9	40	7	0	0	56	93
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		45.9	18.9	2.7	32.4	0		16.1	71.4	12.5	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.708	.875	.250	.750	.000	.841	.563	.667	.583	.000	.000	.636	.705

N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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Groups Printed- Buses

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	2	0	0	1	0	0	0	7
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	3	0	0	0	7
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	2	0	0	0	5
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0	1	2	0	0	0	8
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	2	0	6	0	1	8	0	0	0	27
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	2	0	0	1	0	0	0	8
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	0	1	3	0	0	0	10
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	1	0	1	0	0	0	0	8
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	1	2	0	0	0	7
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	10	0	3	6	0	0	0	33
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	2	0	16	0	4	14	0	0	0	60
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57.1	4.8	0	38.1	0	22.2	77.8	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	3.3	0	26.7	0	6.7	23.3	0	0	0	

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 07:45 AM																															
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0	5	1	2	0	0	0	3	8
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	2	0	7	0	1	0	0	0	1	8
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	4	0	6	1	3	0	0	0	4	10
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	1	0	7	1	0	0	0	0	1	8
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	0	9	0	25	3	6	0	0	0	9	34
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		64	0	0	36	0		33.3	66.7	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.667	.000	.000	.563	.000	.893	.750	.500	.000	.000	.000	.563	.850

N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
City, State: Boston, MA
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File Name : 133307 J
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Page No : 1

Groups Printed- Peds and Bicycles

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Int. Total
07:00 AM	0	0	0	0	10	0	0	0	0	1	0	0	0	0	11	0	0	0	0	11	1	2	0	0	8	44
07:15 AM	0	0	0	0	13	0	0	0	0	12	0	0	0	0	23	0	2	0	0	9	1	2	0	0	8	70
07:30 AM	0	0	0	0	18	0	0	0	0	14	0	0	0	0	32	0	1	0	0	18	3	4	0	0	3	93
07:45 AM	0	0	0	0	16	0	0	0	0	21	0	0	0	0	42	0	1	0	0	26	0	7	0	0	10	123
Total	0	0	0	0	57	0	0	0	0	48	0	0	0	0	108	0	4	0	0	64	5	15	0	0	29	330
08:00 AM	0	0	0	0	20	0	0	0	0	23	0	0	0	0	37	0	0	0	3	35	2	8	0	0	7	135
08:15 AM	0	0	0	0	25	0	0	0	0	23	0	0	0	0	48	0	0	0	1	34	7	11	0	0	10	159
08:30 AM	0	0	0	0	21	0	0	0	0	27	0	0	0	0	65	0	0	0	0	39	5	11	0	0	17	185
08:45 AM	0	0	0	0	20	0	0	0	0	41	0	0	0	0	65	0	0	0	0	35	4	10	0	0	13	188
Total	0	0	0	0	86	0	0	0	0	114	0	0	0	0	215	0	0	0	4	143	18	40	0	0	47	667
Grand Total	0	0	0	0	143	0	0	0	0	162	0	0	0	0	323	0	4	0	4	207	23	55	0	0	76	997
Apprch %	0	0	0	0	100	0	0	0	0	100	0	0	0	0	100	0	1.9	0	1.9	96.3	14.9	35.7	0	0	49.4	
Total %	0	0	0	0	14.3	0	0	0	0	16.2	0	0	0	0	32.4	0	0.4	0	0.4	20.8	2.3	5.5	0	0	7.6	

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 08:00 AM																															
08:00 AM	0	0	0	0	20	20	0	0	0	0	23	23	0	0	0	0	37	37	0	0	0	3	35	38	2	8	0	0	7	17	135
08:15 AM	0	0	0	0	25	25	0	0	0	0	23	23	0	0	0	0	48	48	0	0	0	1	34	35	7	11	0	0	10	28	159
08:30 AM	0	0	0	0	21	21	0	0	0	0	27	27	0	0	0	0	65	65	0	0	0	0	39	39	5	11	0	0	17	33	185
08:45 AM	0	0	0	0	20	20	0	0	0	0	41	41	0	0	0	0	65	65	0	0	0	0	35	35	4	10	0	0	13	27	188
Total Volume	0	0	0	0	86	86	0	0	0	0	114	114	0	0	0	0	215	215	0	0	0	4	143	147	18	40	0	0	47	105	667
% App. Total	0	0	0	0	100		0	0	0	0	100		0	0	0	0	100		0	0	0	2.7	97.3		17.1	38.1	0	0	44.8		
PHF	.000	.000	.000	.000	.860	.860	.000	.000	.000	.000	.695	.695	.000	.000	.000	.000	.827	.827	.000	.000	.000	.333	.917	.942	.643	.909	.000	.000	.691	.795	.887

N/S: Fire Station/Dalton Street
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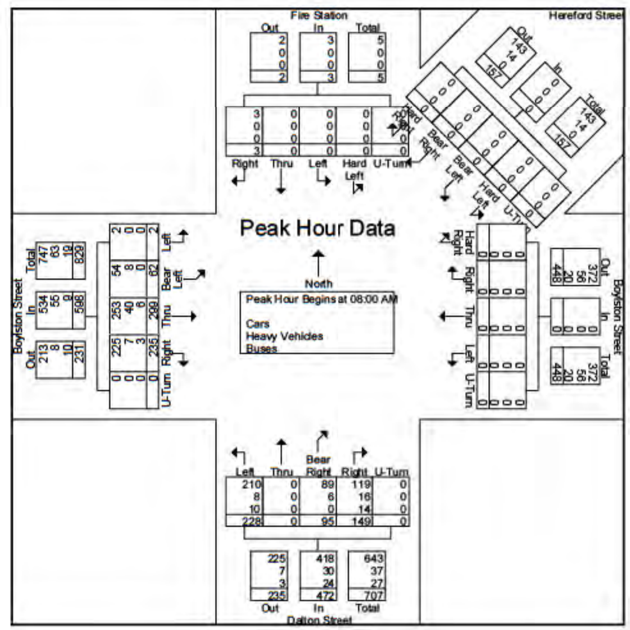
	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 08:00 AM																															
08:00 AM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	43	15	0	84	0	142	50	71	14	0	0	135	278
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	32	0	58	0	128	63	82	22	0	0	167	295
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	21	0	44	0	98	55	75	9	1	0	140	238
08:45 AM	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	35	27	0	42	0	104	67	71	17	1	0	156	262
Total Volume	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	149	95	0	228	0	472	235	299	62	2	0	598	1073
% App. Total	100	0	0	0	0		0	0	0	0	0		0	0	0	0	0		31.6	20.1	0	48.3	0		39.3	50	10.4	0.3	0		
PHF	.375	.000	.000	.000	.000	.375	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.866	.742	.000	.679	.000	.831	.877	.912	.705	.500	.000	.895	.909
Cars	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	119	89	0	210	0	418	225	253	54	2	0	534	955
% Cars	100	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	79.9	93.7	0	92.1	0	88.6	95.7	84.6	87.1	100	0	89.3	89.0
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	6	0	8	0	30	7	40	8	0	0	55	85
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.7	6.3	0	3.5	0	6.4	3.0	13.4	12.9	0	0	9.2	7.9
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	10	0	24	3	6	0	0	0	9	33
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.4	0	0	4.4	0	5.1	1.3	2.0	0	0	0	1.5	3.1



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Groups Printed- Cars - Heavy Vehicles - Buses

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	30	0	41	0	46	108	19	0	0	273
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	28	0	61	0	50	84	15	0	0	275
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	43	0	53	0	36	83	19	0	0	271
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	42	0	66	0	34	84	23	0	0	295
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	149	143	0	221	0	166	359	76	0	0	1114
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	37	0	68	0	43	83	16	0	0	293
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	46	0	76	0	51	86	12	0	0	313
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	28	0	73	0	45	83	22	0	0	295
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	52	0	68	0	53	96	11	0	0	316
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	163	0	285	0	192	348	61	0	0	1217
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	317	306	0	506	0	358	707	137	0	0	2331
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28.1	27.1	0	44.8	0	29.8	58.8	11.4	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13.6	13.1	0	21.7	0	15.4	30.3	5.9	0	0	
Cars	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280	304	0	477	0	352	668	132	0	0	2213
% Cars	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	88.3	99.3	0	94.3	0	98.3	94.5	96.4	0	0	94.9
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	5	0	4	20	2	0	0	38
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.9	0.3	0	1	0	1.1	2.8	1.5	0	0	1.6
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	1	0	24	0	2	19	3	0	0	80
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.8	0.3	0	4.7	0	0.6	2.7	2.2	0	0	3.4

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 05:00 PM

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**46**	37	0	68	0	151	43	83	16	0	0	142	293
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	46	0	**76**	0	**164**	51	86	12	0	0	149	313
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	28	0	73	0	145	45	83	**22**	0	0	150	295
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	**52**	0	68	0	156	**53**	**96**	11	0	0	**160**	**316**
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	163	0	285	0	616	192	348	61	0	0	601	1217
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		27.3	26.5	0	46.3	0		31.9	57.9	10.1	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.915	.784	.000	.988	.000	.939	.906	.906	.693	.000	.000	.939	.963
Cars	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146	162	0	274	0	582	190	333	59	0	0	582	1164
% Cars	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86.9	99.4	0	96.1	0	94.5	99.0	95.7	96.7	0	0	96.8	95.6
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0	5	2	6	0	0	0	8	13
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	0	0	0.7	0	0.8	1.0	1.7	0	0	0	1.3	1.1
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	9	0	29	0	9	2	0	0	11	40
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11.3	0.6	0	3.2	0	4.7	0	2.6	3.3	0	0	1.8	3.3

N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
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File Name : 133307 JJ
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Cars

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	30	0	37	0	45	103	18	0	0	258
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	28	0	57	0	49	79	14	0	0	263
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	42	0	47	0	35	76	19	0	0	250
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	42	0	62	0	33	77	22	0	0	278
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	134	142	0	203	0	162	335	73	0	0	1049
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	37	0	63	0	42	77	15	0	0	272
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	46	0	74	0	50	82	12	0	0	304
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	28	0	72	0	45	81	21	0	0	285
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	51	0	65	0	53	93	11	0	0	303
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146	162	0	274	0	190	333	59	0	0	1164
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280	304	0	477	0	352	668	132	0	0	2213
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26.4	28.7	0	45	0	30.6	58	11.5	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12.7	13.7	0	21.6	0	15.9	30.2	6	0	0	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 05:00 PM

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	37	0	63	0	138	42	77	15	0	0	134	272
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**40**	46	0	**74**	0	**160**	50	82	12	0	0	144	**304**
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38	28	0	72	0	138	45	81	**21**	0	0	147	285
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	**51**	0	65	0	146	**53**	**93**	11	0	0	**157**	303
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146	162	0	274	0	582	190	333	59	0	0	582	1164
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		25.1	27.8	0	47.1	0		32.6	57.2	10.1	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.913	.794	.000	.926	.000	.909	.896	.895	.702	.000	.000	.927	.957

N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

PRECISION DATA INDUSTRIES, LLC
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File Name : 133307 JJ
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Heavy Vehicles

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	1	0	0	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	4	0	0	0	5
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	4	0	0	0	7
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	4	1	0	0	8
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	3	0	2	14	2	0	0	25
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	3	0	0	0	6
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0	2	6	0	0	0	13
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	5	0	4	20	2	0	0	38
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	8.3	0	41.7	0	15.4	76.9	7.7	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15.8	2.6	0	13.2	0	10.5	52.6	5.3	0	0	

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 04:15 PM																															
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	4	0	0	0	4	5
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	1	4	0	0	0	5	7
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	3	0	4	1	0	0	5	8
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	1	3	0	0	0	4	6
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	3	0	8	2	15	1	0	0	18	26
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		50	12.5	0	37.5	0		11.1	83.3	5.6	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.250	.000	.750	.000	.667	.500	.938	.250	.000	.000	.900	.813

N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 JJ
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

Groups Printed- Buses

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	3	0	0	3	0	0	0	10
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	1	1	1	0	0	7
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	6	0	0	3	0	0	0	14
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	0	1	3	0	0	0	9
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	15	0	2	10	1	0	0	40
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	4	0	0	3	1	0	0	15
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	2	0	0	0	6
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	1	0	0	1	1	0	0	8
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	2	0	0	3	0	0	0	11
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	9	0	0	9	2	0	0	40
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	1	0	24	0	2	19	3	0	0	80
Apprch %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55.4	1.8	0	42.9	0	8.3	79.2	12.5	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	38.8	1.2	0	30	0	2.5	23.8	3.8	0	0	

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 04:15 PM																															
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	4	1	1	1	0	0	3	7
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	6	0	11	0	3	0	0	0	3	14
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	0	5	1	3	0	0	0	4	9
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	4	0	11	0	3	1	0	0	4	15
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	16	0	31	2	10	2	0	0	14	45
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		48.4	0	0	51.6	0		14.3	71.4	14.3	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.536	.000	.000	.667	.000	.705	.500	.833	.500	.000	.000	.875	.750

N/S: Fire Station/Dalton Street
E/W/NE: Boylston Street/ Hereford Street
City, State: Boston, MA
Client: VHB/ M. Houdlette

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File Name : 133307 JJ
Site Code : 10135.00
Start Date : 5/14/2013
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Groups Printed- Peds and Bicycles

	Fire Station From North					Hereford Street From Northeast					Boylston Street From East					Dalton Street From South					Boylston Street From West					
Start Time	Right	Thru	Left	Hard Left	Peds	Hard Right	Bear Right	Bear Left	Hard Left	Peds	Hard Right	Right	Thru	Left	Peds	Right	Bear Right	Thru	Left	Peds	Right	Thru	Bear Left	Left	Peds	Int. Total
04:00 PM	0	0	0	0	26	0	0	0	0	43	0	0	0	0	146	0	1	0	1	87	0	5	0	0	16	325
04:15 PM	0	0	0	0	25	0	0	0	0	25	0	0	0	0	141	1	0	0	0	93	0	3	0	0	15	303
04:30 PM	0	0	0	0	21	0	0	0	0	31	0	0	0	0	131	1	3	0	0	92	0	10	1	0	22	312
04:45 PM	0	0	0	0	41	0	0	0	0	24	0	0	0	0	143	0	1	0	0	76	0	7	0	0	19	311
Total	0	0	0	0	113	0	0	0	0	123	0	0	0	0	561	2	5	0	1	348	0	25	1	0	72	1251
05:00 PM	0	0	0	0	31	0	0	0	0	18	0	0	0	0	170	2	2	0	3	62	1	8	1	0	21	319
05:15 PM	0	0	0	0	36	0	0	0	0	16	0	0	0	0	146	1	3	0	4	71	1	9	2	0	30	319
05:30 PM	0	0	0	0	48	0	0	0	0	27	0	0	0	0	188	1	1	0	6	129	2	17	2	0	18	439
05:45 PM	0	0	0	0	51	0	0	0	0	32	0	0	0	0	171	2	6	0	2	78	1	11	0	0	32	386
Total	0	0	0	0	166	0	0	0	0	93	0	0	0	0	675	6	12	0	15	340	5	45	5	0	101	1463
Grand Total	0	0	0	0	279	0	0	0	0	216	0	0	0	0	1236	8	17	0	16	688	5	70	6	0	173	2714
Apprch %	0	0	0	0	100	0	0	0	0	100	0	0	0	0	100	1.1	2.3	0	2.2	94.4	2	27.6	2.4	0	68.1	
Total %	0	0	0	0	10.3	0	0	0	0	8	0	0	0	0	45.5	0.3	0.6	0	0.6	25.4	0.2	2.6	0.2	0	6.4	

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	0	0	0	31	31	0	0	0	0	18	18	0	0	0	0	170	170	2	2	0	3	62	69	1	8	1	0	21	31	319
05:15 PM	0	0	0	0	36	36	0	0	0	0	16	16	0	0	0	0	146	146	1	3	0	4	71	79	1	9	2	0	30	42	319
05:30 PM	0	0	0	0	48	48	0	0	0	0	27	27	0	0	0	0	188	188	1	1	0	6	129	137	2	17	2	0	18	39	439
05:45 PM	0	0	0	0	51	51	0	0	0	0	32	32	0	0	0	0	171	171	2	6	0	2	78	88	1	11	0	0	32	44	386
Total Volume	0	0	0	0	166	166	0	0	0	0	93	93	0	0	0	0	675	675	6	12	0	15	340	373	5	45	5	0	101	156	1463
% App. Total	0	0	0	0	100		0	0	0	0	100		0	0	0	0	100		1.6	3.2	0	4	91.2		3.2	28.8	3.2	0	64.7		
PHF	.000	.000	.000	.000	.814	.814	.000	.000	.000	.000	.727	.727	.000	.000	.000	.000	.898	.898	.750	.500	.000	.625	.659	.681	.625	.662	.625	.000	.789	.886	.833

N/S: Fire Station/Dalton Street
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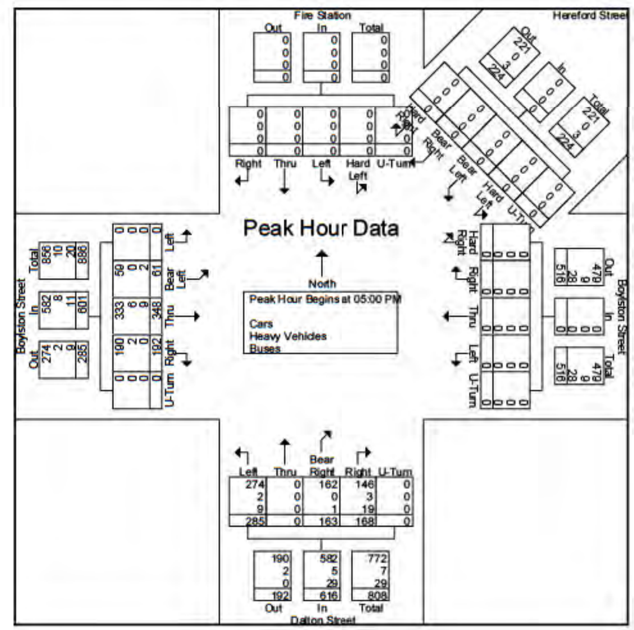
File Name : 133307 JJ
Site Code : 10135.00
Start Date : 5/14/2013
Page No : 1

	Fire Station From North						Hereford Street From Northeast						Boylston Street From East						Dalton Street From South						Boylston Street From West						
Start Time	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																															
Peak Hour for Entire Intersection Begins at 05:00 PM																															
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	37	0	68	0	151	43	83	16	0	0	142	293
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	46	0	76	0	164	51	86	12	0	0	149	313
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	44	28	0	73	0	145	45	83	22	0	0	150	295
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	52	0	68	0	156	53	96	11	0	0	160	316
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	168	163	0	285	0	616	192	348	61	0	0	601	1217
% App. Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		27.3	26.5	0	46.3	0		31.9	57.9	10.1	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.913	.784	.000	.938	.000	.939	.906	.906	.693	.000	.000	.939	.963
Cars	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	146	162	0	274	0	582	190	333	59	0	0	582	1164
% Cars	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86.9	99.4	0	96.1	0	94.5	99.0	95.7	96.7	0	0	96.8	95.6
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0	5	2	6	0	0	0	8	13
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.8	0	0	0.7	0	0.8	1.0	1.7	0	0	0	1.3	1.1
Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	1	0	9	0	29	0	9	2	0	0	11	40
% Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11.3	0.6	0	3.2	0	4.7	0	2.6	3.3	0	0	1.8	3.3



2013 Existing Condition
Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		0.95		1.00	0.95	
Frpb, ped/bikes		0.93			1.00	0.67		0.97		1.00	0.96	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.97			1.00	0.85		0.99		1.00	0.99	
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		2745			1502	860		2626		1307	2679	
Flt Permitted		0.94			0.99	1.00		0.94		0.95	1.00	
Satd. Flow (perm)		2584			1486	860		2469		1307	2679	
Volume (vph)	21	422	123	2	100	208	14	678	64	182	497	34
Peak-hour factor, PHF	0.93	0.93	0.93	0.66	0.66	0.66	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	23	454	132	3	152	315	15	714	67	200	546	37
RTOR Reduction (vph)	0	25	0	0	0	243	0	0	0	0	0	0
Lane Group Flow (vph)	0	584	0	0	155	72	0	796	0	200	583	0
Confl. Peds. (#/hr)			249			294			441			288
Confl. Bikes (#/hr)			26			1			87			110
Heavy Vehicles (%)	10%	8%	15%	0%	14%	5%	0%	10%	12%	16%	8%	6%
Turn Type	Perm			Perm		Perm	Perm			Prot		
Protected Phases		7			7			1		5	1 5	
Permitted Phases	7			7		7	1					
Actuated Green, G (s)		22.0			22.0	22.0		34.0		24.0	63.0	
Effective Green, g (s)		23.0			23.0	23.0		35.0		26.0	65.0	
Actuated g/C Ratio		0.23			0.23	0.23		0.35		0.26	0.65	
Clearance Time (s)		5.0			5.0	5.0		5.0		6.0		
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0		
Lane Grp Cap (vph)		594			342	198		864		340	1741	
v/s Ratio Prot										c0.15	0.22	
v/s Ratio Perm		c0.23			0.10	0.08		c0.32				
v/c Ratio		0.98			0.45	0.37		0.92		0.59	0.33	
Uniform Delay, d1		38.3			33.1	32.4		31.2		32.3	7.8	
Progression Factor		1.00			1.00	1.00		0.41		1.00	1.00	
Incremental Delay, d2		32.2			0.3	0.4		14.9		7.3	0.5	
Delay (s)		70.5			33.4	32.8		27.8		39.6	8.3	
Level of Service		E			C	C		C		D	A	
Approach Delay (s)		70.5			33.0			27.8			16.3	
Approach LOS		E			C			C			B	

Intersection Summary

HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	10	10	10	10	10	10
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			0.95			0.95	
Frpb, ped/bikes					1.00			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.92			1.00			1.00	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1416			2578			2596	
Flt Permitted					0.99			0.94			1.00	
Satd. Flow (perm)					1416			2414			2596	
Volume (vph)	0	0	0	18	24	56	15	700	0	0	602	20
Peak-hour factor, PHF	0.25	0.25	0.25	0.80	0.80	0.80	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	22	30	70	16	737	0	0	654	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	122	0	0	753	0	0	674	0
Confl. Bikes (#/hr)												103
Heavy Vehicles (%)	0%	0%	0%	12%	4%	4%	0%	10%	0%	0%	10%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	7	0	0	0	8
Parking (#/hr)				1	1	1		1			1	1
Turn Type				Split			Perm					
Protected Phases				3	3			1			1	
Permitted Phases							1					
Actuated Green, G (s)					12.8			58.8			58.8	
Effective Green, g (s)					14.8			60.8			60.8	
Actuated g/C Ratio					0.15			0.61			0.61	
Clearance Time (s)					6.0			6.0			6.0	
Vehicle Extension (s)					2.0			2.0			2.0	
Lane Grp Cap (vph)					210			1468			1578	
v/s Ratio Prot					c0.09						0.26	
v/s Ratio Perm								c0.31				
v/c Ratio					0.58			0.51			0.43	
Uniform Delay, d1					39.7			11.2			10.4	
Progression Factor					1.00			0.24			0.70	
Incremental Delay, d2					2.6			1.2			0.8	
Delay (s)					42.3			3.9			8.0	
Level of Service					D			A			A	
Approach Delay (s)		0.0			42.3			3.9			8.0	
Approach LOS		A			D			A			A	

Intersection Summary

HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	24.4
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	5	710	0	0	620
Peak Hour Factor	0.50	0.50	0.94	0.94	0.90	0.90
Hourly flow rate (vph)	2	10	755	0	0	689
Pedestrians			161			159
Lane Width (ft)			10.0			10.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			11			11
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			1002			222
pX, platoon unblocked	0.89					
vC, conflicting volume	1261	537			755	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1173	537			755	
tC, single (s)	6.8	7.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	99	97			100	
cM capacity (veh/h)	149	396			864	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	378	378	344	344
Volume Left	2	0	0	0	0
Volume Right	10	0	0	0	0
cSH	310	1700	1700	1700	1700
Volume to Capacity	0.04	0.22	0.22	0.20	0.20
Queue Length 95th (ft)	3	0	0	0	0
Control Delay (s)	17.1	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	17.1	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER	SER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	12	12
Total Lost time (s)		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00	0.95			0.95			1.00	
Frpb, ped/bikes		1.00	0.99			0.94			1.00	
Flpb, ped/bikes		1.00	1.00			1.00			1.00	
Frt		1.00	0.99			0.99			0.86	
Flt Protected		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1466	2669			2574			1238	
Flt Permitted		0.42	1.00			0.67			1.00	
Satd. Flow (perm)		652	2669			1727			1238	
Volume (vph)	22	365	716	32	18	502	36	21	361	18
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	24	397	778	35	19	528	38	22	380	19
RTOR Reduction (vph)	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	421	810	0	0	607	0	0	399	0
Confl. Peds. (#/hr)				86	86			332		
Confl. Bikes (#/hr)			2	60				62	5	
Heavy Vehicles (%)	10%	3%	10%	3%	0%	9%	9%	30%	7%	6%
Bus Blockages (#/hr)	0	0	10	10	0	0	12	12	0	0
Parking (#/hr)							1	1	1	1
Turn Type	custom	Prot			Perm				custom	
Protected Phases	2	2 3 4	1 2 4			1			3 4	
Permitted Phases	3 4				1					
Actuated Green, G (s)		48.0	72.0			34.0			34.0	
Effective Green, g (s)		52.0	74.0			36.0			36.0	
Actuated g/C Ratio		0.52	0.74			0.36			0.36	
Clearance Time (s)						6.0				
Vehicle Extension (s)						2.0				
Lane Grp Cap (vph)		469	1975			622			446	
v/s Ratio Prot		c0.14	0.30						0.32	
v/s Ratio Perm		c0.32				c0.35				
v/c Ratio		0.90	0.41			0.98			0.89	
Uniform Delay, d1		16.6	4.9			31.6			30.2	
Progression Factor		1.70	0.30			1.02			1.00	
Incremental Delay, d2		8.6	0.2			29.3			19.5	
Delay (s)		37.0	1.7			61.5			49.7	
Level of Service		D	A			E			D	
Approach Delay (s)			13.7			61.5				
Approach LOS			B			E				

Intersection Summary			
HCM Average Control Delay	33.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1600	1600	1600	1600	1600	1600
Lane Width	12	11	12	11	11	11	12	12	16	12	10	10
Total Lost time (s)		7.5			7.5			7.0			7.0	7.0
Lane Util. Factor		0.95			0.95			0.95			0.95	1.00
Frpb, ped/bikes		0.96			0.89			1.00			1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.95			0.94			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		2269			2179			2489			2343	1058
Flt Permitted		0.97			0.98			1.00			1.00	1.00
Satd. Flow (perm)		2269			2179			2489			2343	1058
Volume (vph)	104	9	63	89	28	87	0	944	88	0	791	70
Peak-hour factor, PHF	0.86	0.86	0.86	0.84	0.94	0.94	0.91	0.91	0.91	0.96	0.96	0.96
Adj. Flow (vph)	121	10	73	106	30	93	0	1037	97	0	824	73
RTOR Reduction (vph)	0	61	0	0	78	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	143	0	0	151	0	0	1127	0	0	824	73
Confl. Peds. (#/hr)			58			151						
Confl. Bikes (#/hr)			9			1			54			52
Heavy Vehicles (%)	7%	27%	10%	2%	13%	8%	0%	8%	10%	0%	9%	8%
Turn Type	Split			Split								Prot
Protected Phases	2	2		3	3			1			1	1
Permitted Phases												
Actuated Green, G (s)		18.0			18.0			44.0			44.0	44.0
Effective Green, g (s)		16.5			16.5			45.0			45.0	45.0
Actuated g/C Ratio		0.16			0.16			0.45			0.45	0.45
Clearance Time (s)		6.0			6.0			8.0			8.0	8.0
Vehicle Extension (s)		2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)		374			360			1120			1054	476
v/s Ratio Prot		c0.06			c0.07			c0.45			0.35	0.07
v/s Ratio Perm												
v/c Ratio		0.38			0.42			1.01			0.78	0.15
Uniform Delay, d1		37.2			37.5			27.5			23.3	16.2
Progression Factor		1.00			1.00			1.00			0.46	0.42
Incremental Delay, d2		0.2			0.3			28.5			2.0	0.2
Delay (s)		37.4			37.7			56.0			12.7	7.1
Level of Service		D			D			E			B	A
Approach Delay (s)		37.4			37.7			56.0			12.3	
Approach LOS		D			D			E			B	

Intersection Summary			
HCM Average Control Delay	36.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	0	204	58	0	2
Peak Hour Factor	0.92	0.92	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	0	0	215	61	0	2
Pedestrians		208			208	
Lane Width (ft)		11.0			13.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		16			19	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		260	507			
pX, platoon unblocked						
vC, conflicting volume	484				453	554
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484				453	554
tC, single (s)	4.1				6.8	7.6
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.6
p0 queue free %	100				100	99
cM capacity (veh/h)	885				439	276

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	0	143	133	2
Volume Left	0	0	0	0	0
Volume Right	0	0	0	61	2
cSH	1700	1700	1700	1700	276
Volume to Capacity	0.00	0.00	0.08	0.08	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	18.1
Lane LOS					C
Approach Delay (s)	0.0		0.0		18.1
Approach LOS					C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	16
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.86		1.00
Frpb, ped/bikes	1.00			1.00		1.00
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.99			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4047			5208		1443
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4047			5208		1443
Volume (vph)	514	28	0	701	0	48
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.67	0.67
Adj. Flow (vph)	571	31	0	738	0	72
RTOR Reduction (vph)	3	0	0	0	0	67
Lane Group Flow (vph)	599	0	0	738	0	5
Confl. Bikes (#/hr)		12				
Heavy Vehicles (%)	7%	0%	0%	7%	0%	4%
Bus Blockages (#/hr)	0	0	20	20	0	0
Parking (#/hr)	1	1				1
Turn Type						custom
Protected Phases	6			1 2		5
Permitted Phases						
Actuated Green, G (s)	68.4			78.8		6.4
Effective Green, g (s)	68.4			78.8		6.4
Actuated g/C Ratio	0.76			0.88		0.07
Clearance Time (s)	4.0					4.0
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	3076			4560		103
v/s Ratio Prot	c0.15			c0.14		0.00
v/s Ratio Perm						
v/c Ratio	0.19			0.16		0.05
Uniform Delay, d1	3.0			0.8		39.0
Progression Factor	1.00			1.00		1.00
Incremental Delay, d2	0.1			0.0		0.1
Delay (s)	3.2			0.8		39.0
Level of Service	A			A		D
Approach Delay (s)	3.2			0.8	39.0	
Approach LOS	A			A	D	

Intersection Summary

HCM Average Control Delay	3.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.2
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	10	10	11	11	12	16	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		4.0		
Lane Util. Factor		1.00	0.95			1.00	0.95	1.00		1.00		
Frpb, ped/bikes		1.00	0.98			1.00	1.00	0.58		1.00		
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00		1.00		
Frt		1.00	0.99			1.00	1.00	0.85		0.98		
Flt Protected		0.95	1.00			0.95	1.00	1.00		0.99		
Satd. Flow (prot)		1373	2701			1451	2935	722		1819		
Flt Permitted		0.95	1.00			0.95	1.00	1.00		0.91		
Satd. Flow (perm)		1373	2701			1451	2935	722		1675		
Volume (vph)	6	134	396	26	74	125	594	330	69	230	57	6
Peak-hour factor, PHF	0.92	0.86	0.86	0.86	0.95	0.94	0.94	0.94	0.88	0.88	0.88	0.85
Adj. Flow (vph)	7	156	460	30	78	133	632	351	78	261	65	7
RTOR Reduction (vph)	0	0	5	0	0	0	0	228	0	7	0	0
Lane Group Flow (vph)	0	163	485	0	0	211	632	123	0	397	0	0
Confl. Peds. (#/hr)				134				467				
Confl. Bikes (#/hr)				1				2			12	
Heavy Vehicles (%)	0%	15%	3%	15%	2%	6%	7%	13%	3%	3%	2%	0%
Parking (#/hr)			1	1								
Turn Type	Prot	Prot			Prot	Prot		Perm	Perm			D.P+P
Protected Phases	5	5	2		1	1	6			4		3
Permitted Phases								6	4			4
Actuated Green, G (s)		14.3	32.7			15.7	34.1	34.1		25.4		
Effective Green, g (s)		14.3	33.7			15.7	35.1	35.1		26.4		
Actuated g/C Ratio		0.14	0.34			0.16	0.35	0.35		0.26		
Clearance Time (s)		4.0	5.0			4.0	5.0	5.0		5.0		
Vehicle Extension (s)		2.0	2.0			2.0	2.0	2.0		2.0		
Lane Grp Cap (vph)		196	910			228	1030	253		442		
v/s Ratio Prot		0.12	0.18			c0.15	c0.22					
v/s Ratio Perm								0.17		c0.24		
v/c Ratio		0.83	0.53			0.93	0.61	0.49		0.90		
Uniform Delay, d1		41.7	26.8			41.6	26.8	25.4		35.5		
Progression Factor		1.00	1.00			0.80	1.04	2.68		1.00		
Incremental Delay, d2		23.9	2.2			38.6	2.7	6.5		19.9		
Delay (s)		65.6	29.0			71.9	30.6	74.7		55.4		
Level of Service		E	C			E	C	E		E		
Approach Delay (s)			38.2				50.9			55.4		
Approach LOS			D				D			E		

Intersection Summary

HCM Average Control Delay	46.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	12	12	11
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.94	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1568	2856	
Flt Permitted	0.31	1.00	
Satd. Flow (perm)	517	2856	
Volume (vph)	57	63	37
Peak-hour factor, PHF	0.93	0.93	0.93
Adj. Flow (vph)	61	68	40
RTOR Reduction (vph)	0	25	0
Lane Group Flow (vph)	68	83	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			3
Heavy Vehicles (%)	4%	8%	5%
Parking (#/hr)			
Turn Type	D.P+P		
Protected Phases	3	3 4	
Permitted Phases	4		
Actuated Green, G (s)	33.6	37.6	
Effective Green, g (s)	34.6	38.6	
Actuated g/C Ratio	0.35	0.39	
Clearance Time (s)	4.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	265	1102	
v/s Ratio Prot	c0.02	0.03	
v/s Ratio Perm	0.07		
v/c Ratio	0.26	0.08	
Uniform Delay, d1	24.1	19.4	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.2	0.0	
Delay (s)	24.3	19.4	
Level of Service	C	B	
Approach Delay (s)		21.3	
Approach LOS		C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	8	87	493	2	15	14	139	6	24
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.78	0.78	0.78	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	10	107	609	3	19	18	154	7	27

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	726	40	158	30
Volume Left (vph)	10	3	154	0
Volume Right (vph)	609	18	0	27
Hadj (s)	-0.30	-0.14	0.55	-0.48
Departure Headway (s)	4.3	6.0	6.9	5.8
Degree Utilization, x	0.87	0.07	0.30	0.05
Capacity (veh/h)	820	573	505	593
Control Delay (s)	28.9	9.4	11.6	7.9
Approach Delay (s)	28.9	9.4	11.0	
Approach LOS	D	A	B	

Intersection Summary			
Delay	24.5		
HCM Level of Service	C		
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0					4.0	4.0				
Lane Util. Factor		0.95					1.00	1.00				
Frpb, ped/bikes		0.98					1.00	1.00				
Flpb, ped/bikes		1.00					1.00	1.00				
Frt		0.94					1.00	0.91				
Flt Protected		1.00					0.95	1.00				
Satd. Flow (prot)		2611					1504	1371				
Flt Permitted		1.00					0.95	1.00				
Satd. Flow (perm)		2611					1504	1371				
Volume (vph)	52	296	224	0	0	0	241	104	139	0	0	0
Peak-hour factor, PHF	0.86	0.86	0.86	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	60	344	260	0	0	0	284	122	164	0	0	0
RTOR Reduction (vph)	0	102	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	562	0	0	0	0	284	286	0	0	0	0
Confl. Bikes (#/hr)			37									
Heavy Vehicles (%)	13%	15%	4%	0%	0%	0%	8%	6%	20%	0%	0%	0%
Turn Type	Perm						Split					
Protected Phases		1					3	3				
Permitted Phases	1											
Actuated Green, G (s)		39.4					21.2	21.2				
Effective Green, g (s)		41.4					22.2	22.2				
Actuated g/C Ratio		0.46					0.25	0.25				
Clearance Time (s)		6.0					5.0	5.0				
Vehicle Extension (s)		2.0					2.0	2.0				
Lane Grp Cap (vph)		1201					371	338				
v/s Ratio Prot							0.19	c0.21				
v/s Ratio Perm		0.22										
v/c Ratio		0.47					0.77	0.85				
Uniform Delay, d1		16.7					31.5	32.3				
Progression Factor		1.00					1.00	1.00				
Incremental Delay, d2		1.3					8.2	16.8				
Delay (s)		18.0					39.7	49.1				
Level of Service		B					D	D				
Approach Delay (s)		18.0			0.0			44.4			0.0	
Approach LOS		B			A			D			A	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.4
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

1: Boylston Street & Massachusetts Avenue

Evening Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		0.95		1.00	0.95	
Frpb, ped/bikes		0.90			1.00	0.60		0.95		1.00	0.95	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.97			1.00	0.85		0.99		1.00	0.99	
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		2832			1601	813		2707		1486	2709	
Flt Permitted		0.95			0.99	1.00		0.95		0.95	1.00	
Satd. Flow (perm)		2703			1589	813		2570		1486	2709	
Volume (vph)	3	441	132	2	111	253	7	671	72	188	559	45
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	479	143	2	119	272	7	692	74	194	576	46
RTOR Reduction (vph)	0	29	0	0	0	199	0	0	0	0	0	0
Lane Group Flow (vph)	0	596	0	0	121	73	0	773	0	194	622	0
Confl. Peds. (#/hr)			591			498			803			440
Confl. Bikes (#/hr)			9			5			107			129
Heavy Vehicles (%)	33%	3%	4%	50%	6%	1%	14%	5%	3%	2%	5%	7%
Turn Type	Perm			Perm		Perm	Perm			Prot		
Protected Phases		7			7			1		5	1 5	
Permitted Phases	7			7		7	1					
Actuated Green, G (s)		25.7			25.7	25.7		35.3		19.0	59.3	
Effective Green, g (s)		26.7			26.7	26.7		36.3		21.0	61.3	
Actuated g/C Ratio		0.27			0.27	0.27		0.36		0.21	0.61	
Clearance Time (s)		5.0			5.0	5.0		5.0		6.0		
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0		
Lane Grp Cap (vph)		722			424	217		933		312	1661	
v/s Ratio Prot										c0.13	0.23	
v/s Ratio Perm		c0.22			0.08	0.09		c0.30				
v/c Ratio		0.83			0.29	0.33		0.83		0.62	0.37	
Uniform Delay, d1		34.5			29.1	29.5		29.0		35.9	9.7	
Progression Factor		1.00			1.00	1.00		0.45		1.00	1.00	
Incremental Delay, d2		7.3			0.1	0.3		7.1		9.0	0.6	
Delay (s)		41.7			29.2	29.8		20.2		44.9	10.4	
Level of Service		D			C	C		C		D	B	
Approach Delay (s)		41.7			29.6			20.2			18.6	
Approach LOS		D			C			C			B	

Intersection Summary

HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

2: Belvidere Street & Massachusetts Avenue

Evening Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	10	10	10	10	10	10
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			0.95			0.95	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.92			1.00			1.00	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1421			2667			2749	
Flt Permitted					0.99			0.91			1.00	
Satd. Flow (perm)					1421			2434			2749	
Volume (vph)	0	0	0	17	36	74	25	677	0	0	677	16
Peak-hour factor, PHF	0.25	0.25	0.25	0.81	0.81	0.81	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	21	44	91	26	698	0	0	705	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	156	0	0	724	0	0	721	0
Confl. Bikes (#/hr)						5						124
Heavy Vehicles (%)	0%	0%	0%	8%	0%	5%	7%	6%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	7	0	0	0	8
Parking (#/hr)				1	1	1		1			1	1
Turn Type				Split			Perm					
Protected Phases				3	3			1			1	
Permitted Phases							1					
Actuated Green, G (s)					14.6			52.2			52.2	
Effective Green, g (s)					16.6			54.2			54.2	
Actuated g/C Ratio					0.17			0.54			0.54	
Clearance Time (s)					6.0			6.0			6.0	
Vehicle Extension (s)					2.0			2.0			2.0	
Lane Grp Cap (vph)					236			1319			1490	
v/s Ratio Prot					c0.11						0.26	
v/s Ratio Perm								c0.30				
v/c Ratio					0.66			0.55			0.48	
Uniform Delay, d1					39.1			14.9			14.2	
Progression Factor					1.00			1.21			0.62	
Incremental Delay, d2					5.3			1.6			1.0	
Delay (s)					44.4			19.6			9.8	
Level of Service					D			B			A	
Approach Delay (s)		0.0			44.4			19.6			9.8	
Approach LOS		A			D			B			A	

Intersection Summary

HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	29.2
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	7	3	699	0	0	694
Peak Hour Factor	0.63	0.63	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	11	5	728	0	0	723
Pedestrians			352			354
Lane Width (ft)			10.0			10.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			24			25
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			1002			222
pX, platoon unblocked	0.86					
vC, conflicting volume	1442	718			728	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1351	718			728	
tC, single (s)	7.4	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.3			2.2	
p0 queue free %	85	98			100	
cM capacity (veh/h)	73	284			885	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	16	364	364	361	361
Volume Left	11	0	0	0	0
Volume Right	5	0	0	0	0
cSH	93	1700	1700	1700	1700
Volume to Capacity	0.17	0.21	0.21	0.21	0.21
Queue Length 95th (ft)	14	0	0	0	0
Control Delay (s)	51.3	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	51.3	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	NBL2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER	SER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	12	12
Total Lost time (s)		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00	0.95			0.95			1.00	
Frpb, ped/bikes		1.00	1.00			0.94			1.00	
Flpb, ped/bikes		1.00	1.00			1.00			1.00	
Frt		1.00	1.00			0.99			0.86	
Flt Protected		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1502	2827			2696			1311	
Flt Permitted		0.39	1.00			0.81			1.00	
Satd. Flow (perm)		620	2827			2181			1311	
Volume (vph)	26	379	678	2	2	601	29	29	377	17
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.92	0.92
Adj. Flow (vph)	27	387	692	2	2	620	30	30	410	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	414	694	0	0	682	0	0	428	0
Confl. Peds. (#/hr)				166	166			546		
Confl. Bikes (#/hr)			2	55			100	18	3	
Heavy Vehicles (%)	0%	1%	5%	0%	0%	5%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	10	10	0	0	12	12	0	0
Parking (#/hr)							1	1	1	1
Turn Type	custom	Prot			Perm				custom	
Protected Phases	2	2 3 4	1 2 4			1			3 4	
Permitted Phases	3 4				1					
Actuated Green, G (s)		53.0	72.0			29.0			34.0	
Effective Green, g (s)		57.0	74.0			31.0			36.0	
Actuated g/C Ratio		0.57	0.74			0.31			0.36	
Clearance Time (s)						6.0				
Vehicle Extension (s)						2.0				
Lane Grp Cap (vph)		539	2092			676			472	
v/s Ratio Prot		c0.16	0.25						c0.33	
v/s Ratio Perm		0.28				c0.31				
v/c Ratio		0.77	0.33			1.01			0.91	
Uniform Delay, d1		12.8	4.5			34.5			30.4	
Progression Factor		1.80	0.26			0.54			1.00	
Incremental Delay, d2		3.2	0.2			34.9			20.4	
Delay (s)		26.2	1.4			53.4			50.9	
Level of Service		C	A			D			D	
Approach Delay (s)			10.7			53.4				
Approach LOS			B			D				

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Huntington Avenue & Massachusetts Avenue

2013 Existing Conditions
Evening Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1600	1600	1600	1600	1600	1600
Lane Width	12	11	12	11	11	11	12	12	16	12	10	10
Total Lost time (s)		7.5			7.5			7.0			7.0	7.0
Lane Util. Factor		0.95			0.95			0.95			0.95	1.00
Frpb, ped/bikes		0.85			0.88			1.00			1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.93			0.95			0.99			1.00	0.85
Flt Protected		0.98			0.97			1.00			1.00	1.00
Satd. Flow (prot)		2080			2195			2624			2455	1131
Flt Permitted		0.98			0.97			1.00			1.00	1.00
Satd. Flow (perm)		2080			2195			2624			2455	1131
Volume (vph)	89	24	101	137	38	85	0	911	75	0	896	80
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	103	28	117	146	40	90	0	949	78	0	953	85
RTOR Reduction (vph)	0	98	0	0	59	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	150	0	0	217	0	0	1021	0	0	953	85
Confl. Peds. (#/hr)			219			351						
Confl. Bikes (#/hr)			3			1			55			22
Heavy Vehicles (%)	5%	8%	3%	6%	3%	3%	0%	3%	0%	50%	4%	1%
Turn Type	Split			Split								Prot
Protected Phases	2	2		3	3			1			1	1
Permitted Phases												
Actuated Green, G (s)		18.0			18.4			43.6			43.6	43.6
Effective Green, g (s)		16.5			16.9			44.6			44.6	44.6
Actuated g/C Ratio		0.16			0.17			0.45			0.45	0.45
Clearance Time (s)		6.0			6.0			8.0			8.0	8.0
Vehicle Extension (s)		2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)		343			371			1170			1095	504
v/s Ratio Prot		c0.07			c0.10			c0.39			0.39	0.08
v/s Ratio Perm												
v/c Ratio		0.44			0.58			0.87			0.87	0.17
Uniform Delay, d1		37.6			38.3			25.1			25.1	16.6
Progression Factor		1.00			1.00			1.00			0.42	0.36
Incremental Delay, d2		0.3			1.5			9.1			3.2	0.2
Delay (s)		37.9			39.8			34.2			13.7	6.2
Level of Service		D			D			C			B	A
Approach Delay (s)		37.9			39.8			34.2			13.1	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Huntington Avenue & Driveway West

2013 Existing Conditions
Evening Peak Period

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	0	222	8	0	62
Peak Hour Factor	0.92	0.92	0.91	0.91	0.70	0.70
Hourly flow rate (vph)	0	0	244	9	0	89
Pedestrians		373			373	
Lane Width (ft)		11.0			13.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		28			34	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		260	507			
pX, platoon unblocked						
vC, conflicting volume	626				621	872
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	626				621	872
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	37
cM capacity (veh/h)	640				281	141

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	0	163	90	89
Volume Left	0	0	0	0	0
Volume Right	0	0	0	9	89
cSH	1700	1700	1700	1700	141
Volume to Capacity	0.00	0.00	0.10	0.05	0.63
Queue Length 95th (ft)	0	0	0	0	84
Control Delay (s)	0.0	0.0	0.0	0.0	65.9
Lane LOS					F
Approach Delay (s)	0.0		0.0		65.9
Approach LOS					F

Intersection Summary			
Average Delay	17.1		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	16
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.86		1.00
Frpb, ped/bikes	1.00			1.00		1.00
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.99			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4092			5307		1500
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4092			5307		1500
Volume (vph)	616	63	0	630	0	57
Peak-hour factor, PHF	0.97	0.97	0.92	0.92	0.68	0.68
Adj. Flow (vph)	635	65	0	685	0	84
RTOR Reduction (vph)	6	0	0	0	0	78
Lane Group Flow (vph)	694	0	0	685	0	6
Confl. Bikes (#/hr)		5				
Heavy Vehicles (%)	5%	2%	0%	5%	0%	0%
Bus Blockages (#/hr)	0	0	20	20	0	0
Parking (#/hr)	1	1				1
Turn Type						custom
Protected Phases	6			1 2		5
Permitted Phases						
Actuated Green, G (s)	66.8			77.2		6.4
Effective Green, g (s)	66.8			77.2		6.4
Actuated g/C Ratio	0.74			0.86		0.07
Clearance Time (s)	4.0					4.0
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	3037			4552		107
v/s Ratio Prot	c0.17			c0.13		0.00
v/s Ratio Perm						
v/c Ratio	0.23			0.15		0.06
Uniform Delay, d1	3.6			1.0		39.0
Progression Factor	1.00			1.00		1.00
Incremental Delay, d2	0.2			0.0		0.1
Delay (s)	3.8			1.1		39.1
Level of Service	A			A		D
Approach Delay (s)	3.8			1.1	39.1	
Approach LOS	A			A	D	

Intersection Summary

HCM Average Control Delay	4.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.8
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	10	10	11	11	12	16	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		4.0		
Lane Util. Factor		1.00	0.95			1.00	0.95	1.00		1.00		
Frpb, ped/bikes		1.00	0.97			1.00	1.00	0.46		0.99		
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00		1.00		
Frt		1.00	0.99			1.00	1.00	0.85		0.97		
Flt Protected		0.95	1.00			0.95	1.00	1.00		0.99		
Satd. Flow (prot)		1433	2680			1486	2991	613		1825		
Flt Permitted		0.95	1.00			0.95	1.00	1.00		0.89		
Satd. Flow (perm)		1433	2680			1486	2991	613		1645		
Volume (vph)	20	142	467	44	81	154	568	292	42	126	51	5
Peak-hour factor, PHF	0.92	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.90	0.90	0.90	0.85
Adj. Flow (vph)	22	149	492	46	85	164	604	311	47	140	57	6
RTOR Reduction (vph)	0	0	6	0	0	0	0	180	0	11	0	0
Lane Group Flow (vph)	0	171	532	0	0	249	604	131	0	233	0	0
Confl. Peds. (#/hr)				230				861				
Confl. Bikes (#/hr)				1				13			15	
Heavy Vehicles (%)	0%	11%	3%	0%	2%	2%	5%	5%	0%	2%	0%	0%
Parking (#/hr)			1	1								
Turn Type	Prot	Prot			Prot	Prot		Perm	Perm			D.P+P
Protected Phases	5	5	2		1	1	6			4		3
Permitted Phases								6	4			4
Actuated Green, G (s)		16.4	41.7			20.0	45.3	45.3		20.4		
Effective Green, g (s)		16.4	42.7			20.0	46.3	46.3		21.4		
Actuated g/C Ratio		0.15	0.39			0.18	0.42	0.42		0.19		
Clearance Time (s)		4.0	5.0			4.0	5.0	5.0		5.0		
Vehicle Extension (s)		2.0	2.0			2.0	2.0	2.0		2.0		
Lane Grp Cap (vph)		214	1040			270	1259	258		320		
v/s Ratio Prot		0.12	0.20			c0.17	0.20					
v/s Ratio Perm								c0.21		c0.14		
v/c Ratio		0.80	0.51			0.92	0.48	0.51		0.73		
Uniform Delay, d1		45.2	25.7			44.2	23.1	23.5		41.6		
Progression Factor		1.00	1.00			1.00	1.00	1.00		1.00		
Incremental Delay, d2		17.4	1.8			34.2	1.3	7.0		6.8		
Delay (s)		62.6	27.5			78.5	24.4	30.4		48.4		
Level of Service		E	C			E	C	C		D		
Approach Delay (s)			36.0				37.6			48.4		
Approach LOS			D				D			D		

Intersection Summary

HCM Average Control Delay	37.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	12	12	11
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.96	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1594	3019	
Flt Permitted	0.37	1.00	
Satd. Flow (perm)	619	3019	
Volume (vph)	101	135	53
Peak-hour factor, PHF	0.89	0.89	0.89
Adj. Flow (vph)	113	152	60
RTOR Reduction (vph)	0	41	0
Lane Group Flow (vph)	119	171	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			7
Heavy Vehicles (%)	2%	2%	4%
Parking (#/hr)			
Turn Type	D.P+P		
Protected Phases	3	3 4	
Permitted Phases	4		
Actuated Green, G (s)	30.3	34.3	
Effective Green, g (s)	31.3	35.3	
Actuated g/C Ratio	0.28	0.32	
Clearance Time (s)	4.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	264	969	
v/s Ratio Prot	c0.04	0.06	
v/s Ratio Perm	0.09		
v/c Ratio	0.45	0.18	
Uniform Delay, d1	31.4	26.9	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.4	0.0	
Delay (s)	31.8	26.9	
Level of Service	C	C	
Approach Delay (s)		28.7	
Approach LOS		C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	13	85	416	2	18	24	220	2	12
Peak Hour Factor	0.25	0.25	0.25	0.92	0.92	0.92	0.73	0.73	0.73	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	14	92	452	3	25	33	259	2	14

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	559	60	260	15
Volume Left (vph)	14	3	259	0
Volume Right (vph)	452	33	0	14
Hadj (s)	-0.46	-0.28	0.53	-0.65
Departure Headway (s)	4.5	5.6	6.5	5.3
Degree Utilization, x	0.70	0.09	0.47	0.02
Capacity (veh/h)	779	558	525	633
Control Delay (s)	17.1	9.2	13.9	7.2
Approach Delay (s)	17.1	9.2	13.6	
Approach LOS	C	A	B	

Intersection Summary

Delay	15.5		
HCM Level of Service	C		
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0					4.0	4.0				
Lane Util. Factor		0.95					1.00	1.00				
Frpb, ped/bikes		0.98					1.00	0.99				
Flpb, ped/bikes		1.00					1.00	1.00				
Frt		0.95					1.00	0.92				
Flt Protected		0.99					0.95	1.00				
Satd. Flow (prot)		2835					1562	1459				
Flt Permitted		0.99					0.95	1.00				
Satd. Flow (perm)		2835					1562	1459				
Volume (vph)	61	348	192	0	0	0	285	163	168	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	65	370	204	0	0	0	303	173	179	0	0	0
RTOR Reduction (vph)	0	51	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	588	0	0	0	0	303	352	0	0	0	0
Confl. Bikes (#/hr)			45						12			
Heavy Vehicles (%)	3%	4%	1%	0%	0%	0%	4%	1%	13%	0%	0%	0%
Turn Type	Perm						Split					
Protected Phases		1					3	3				
Permitted Phases	1											
Actuated Green, G (s)		36.0					24.6	24.6				
Effective Green, g (s)		38.0					25.6	25.6				
Actuated g/C Ratio		0.42					0.28	0.28				
Clearance Time (s)		6.0					5.0	5.0				
Vehicle Extension (s)		2.0					2.0	2.0				
Lane Grp Cap (vph)		1197					444	415				
v/s Ratio Prot							0.19	c0.24				
v/s Ratio Perm		0.21										
v/c Ratio		0.49					0.68	0.85				
Uniform Delay, d1		19.0					28.6	30.4				
Progression Factor		1.00					1.00	1.00				
Incremental Delay, d2		1.4					3.4	14.3				
Delay (s)		20.4					32.0	44.6				
Level of Service		C					C	D				
Approach Delay (s)		20.4			0.0			38.8			0.0	
Approach LOS		C			A			D			A	

Intersection Summary			
HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.4
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

2018 No-Build Condition
Synchro Reports

HCM Signalized Intersection Capacity Analysis
1: Boylston Street & Massachusetts Avenue

2018 NoBuild Conditions
Morning Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		0.95		1.00	0.95	
Frpb, ped/bikes		0.93			1.00	0.67		0.93		1.00	0.96	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.97			1.00	0.85		0.97		1.00	0.99	
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		2762			1502	860		2487		1307	2685	
Flt Permitted		0.94			0.99	1.00		0.94		0.95	1.00	
Satd. Flow (perm)		2601			1486	860		2341		1307	2685	
Volume (vph)	21	451	123	2	102	213	14	704	151	188	524	34
Peak-hour factor, PHF	0.93	0.93	0.93	0.66	0.66	0.66	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	23	485	132	3	155	323	15	741	159	207	576	37
RTOR Reduction (vph)	0	23	0	0	0	249	0	0	0	0	0	0
Lane Group Flow (vph)	0	617	0	0	158	74	0	915	0	207	613	0
Confl. Peds. (#/hr)			249			294			441			288
Confl. Bikes (#/hr)			26			1			87			110
Heavy Vehicles (%)	10%	8%	15%	0%	14%	5%	0%	10%	12%	16%	8%	6%
Turn Type	Perm			Perm		Perm	Perm			Prot		
Protected Phases		7			7			1		5	1 5	
Permitted Phases	7			7		7	1					
Actuated Green, G (s)		22.0			22.0	22.0		34.0		24.0	63.0	
Effective Green, g (s)		23.0			23.0	23.0		35.0		26.0	65.0	
Actuated g/C Ratio		0.23			0.23	0.23		0.35		0.26	0.65	
Clearance Time (s)		5.0			5.0	5.0		5.0		6.0		
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0		
Lane Grp Cap (vph)		598			342	198		819		340	1745	
v/s Ratio Prot										c0.16	0.23	
v/s Ratio Perm		c0.24			0.11	0.09		c0.39				
v/c Ratio		1.03			0.46	0.38		1.12		0.61	0.35	
Uniform Delay, d1		38.5			33.2	32.4		32.5		32.5	7.9	
Progression Factor		1.00			1.00	1.00		0.50		1.00	1.00	
Incremental Delay, d2		45.2			0.4	0.4		66.3		7.9	0.6	
Delay (s)		83.7			33.5	32.9		82.5		40.4	8.5	
Level of Service		F			C	C		F		D	A	
Approach Delay (s)		83.7			33.1			82.5			16.6	
Approach LOS		F			C			F			B	

Intersection Summary			
HCM Average Control Delay	55.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
2: Belvidere Street & Massachusetts Avenue

2018 NoBuild Conditions
Morning Peak Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	10	10	10	10	10	10
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			0.95			0.95	
Frpb, ped/bikes					1.00			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.92			1.00			1.00	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1416			2577			2597	
Flt Permitted					0.99			0.94			1.00	
Satd. Flow (perm)					1416			2417			2597	
Volume (vph)	0	0	0	18	25	57	15	812	0	0	632	20
Peak-hour factor, PHF	0.25	0.25	0.25	0.80	0.80	0.80	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	22	31	71	16	855	0	0	687	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	124	0	0	871	0	0	707	0
Confl. Bikes (#/hr)												103
Heavy Vehicles (%)	0%	0%	0%	12%	4%	4%	0%	10%	0%	0%	10%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	7	0	0	0	8
Parking (#/hr)				1	1	1		1			1	1
Turn Type				Split			Perm					
Protected Phases				3	3			1			1	
Permitted Phases							1					
Actuated Green, G (s)					12.9			58.7			58.7	
Effective Green, g (s)					14.9			60.7			60.7	
Actuated g/C Ratio					0.15			0.61			0.61	
Clearance Time (s)					6.0			6.0			6.0	
Vehicle Extension (s)					2.0			2.0			2.0	
Lane Grp Cap (vph)					211			1467			1576	
v/s Ratio Prot					c0.09						0.27	
v/s Ratio Perm								c0.36				
v/c Ratio					0.59			0.59			0.45	
Uniform Delay, d1					39.7			12.1			10.6	
Progression Factor					1.00			0.42			0.70	
Incremental Delay, d2					2.7			1.7			0.8	
Delay (s)					42.4			6.7			8.2	
Level of Service					D			A			A	
Approach Delay (s)		0.0			42.4			6.7			8.2	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	24.4
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	5	822	0	0	650
Peak Hour Factor	0.50	0.50	0.94	0.94	0.90	0.90
Hourly flow rate (vph)	2	10	874	0	0	722
Pedestrians			161			159
Lane Width (ft)			10.0			10.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			11			11
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			1002			222
pX, platoon unblocked	0.88					
vC, conflicting volume	1397	596			874	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1317	596			874	
tC, single (s)	6.8	7.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	98	97			100	
cM capacity (veh/h)	119	360			780	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	437	437	361	361
Volume Left	2	0	0	0	0
Volume Right	10	0	0	0	0
cSH	269	1700	1700	1700	1700
Volume to Capacity	0.04	0.26	0.26	0.21	0.21
Queue Length 95th (ft)	3	0	0	0	0
Control Delay (s)	19.0	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	19.0	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBT	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER	SER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	10	10	10	10	10	10	10	12	12
Total Lost time (s)	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00	0.95			0.95			0.88	
Frpb, ped/bikes	1.00	1.00	0.99			0.93			1.00	
Flpb, ped/bikes	1.00	1.00	1.00			1.00			1.00	
Frt	1.00	1.00	0.99			0.99			0.85	
Flt Protected	1.00	0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1938	1472	2656			2546			2266	
Flt Permitted	1.00	0.95	1.00			0.68			1.00	
Satd. Flow (perm)	1938	1472	2656			1745			2266	
Volume (vph)	1	286	828	32	18	530	37	22	386	18
Peak-hour factor, PHF	0.38	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	3	311	900	35	19	558	39	23	406	19
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	311	935	0	0	639	0	0	425	0
Confl. Peds. (#/hr)				86	86			332		
Confl. Bikes (#/hr)			2	60				62	5	
Heavy Vehicles (%)	0%	3%	10%	3%	0%	9%	9%	30%	7%	6%
Bus Blockages (#/hr)	0	0	10	10	0	0	12	12	0	0
Parking (#/hr)							1	1	1	1
Turn Type		Prot			Perm				Over	
Protected Phases	5	6	1 6			1			6	
Permitted Phases					1					
Actuated Green, G (s)	7.6	25.1	79.4			47.3			25.1	
Effective Green, g (s)	9.6	28.1	82.4			50.3			28.1	
Actuated g/C Ratio	0.10	0.28	0.82			0.50			0.28	
Clearance Time (s)	6.0	7.0				7.0			7.0	
Vehicle Extension (s)	2.0	2.0				0.2			2.0	
Lane Grp Cap (vph)	186	414	2189			878			637	
v/s Ratio Prot	c0.00	c0.21	0.35						0.19	
v/s Ratio Perm						c0.37				
v/c Ratio	0.02	0.75	0.43			0.73			0.67	
Uniform Delay, d1	40.9	32.8	2.4			19.5			31.8	
Progression Factor	1.00	1.30	0.56			1.10			1.00	
Incremental Delay, d2	0.0	2.6	0.0			4.8			2.1	
Delay (s)	40.9	45.1	1.4			26.2			33.9	
Level of Service	D	D	A			C			C	
Approach Delay (s)	40.9		12.3			26.2				
Approach LOS	D		B			C				

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Huntington Avenue & Massachusetts Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1600	1600	1600	1600	1600	1600
Lane Width	12	11	12	11	11	11	12	12	16	12	10	10
Total Lost time (s)		7.5			7.5	5.5	4.0	7.0			7.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.96			1.00	1.00	1.00	1.00			0.99	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00			1.00	
Frt		0.95			1.00	0.85	1.00	0.99			0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		2274			1367	1164	1368	2486			2292	
Flt Permitted		0.97			0.96	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		2274			1367	1164	1368	2486			2292	
Volume (vph)	123	10	65	125	29	90	129	933	94	0	814	87
Peak-hour factor, PHF	0.86	0.86	0.86	0.84	0.94	0.94	0.91	0.91	0.91	0.96	0.96	0.96
Adj. Flow (vph)	143	12	76	149	31	96	142	1025	103	0	848	91
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	231	0	0	180	96	142	1128	0	0	939	0
Confl. Peds. (#/hr)			58			151						
Confl. Bikes (#/hr)			9			1			54			52
Heavy Vehicles (%)	7%	27%	10%	2%	13%	8%	0%	8%	10%	0%	9%	8%
Turn Type	Split			Split		Prot	Prot					
Protected Phases	6	6		5	5	5	7	1 7			1	
Permitted Phases												
Actuated Green, G (s)		13.9			15.9	15.9	12.2	49.2			30.0	
Effective Green, g (s)		13.4			15.4	17.4	15.2	49.2			30.0	
Actuated g/C Ratio		0.13			0.15	0.17	0.15	0.49			0.30	
Clearance Time (s)		7.0			7.0	7.0	7.0				7.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0				0.2	
Lane Grp Cap (vph)		305			211	203	208	1223			688	
v/s Ratio Prot		c0.10			c0.13	0.08	0.10	c0.45			c0.41	
v/s Ratio Perm												
v/c Ratio		0.76			0.85	0.47	0.68	0.92			1.36	
Uniform Delay, d1		41.7			41.2	37.2	40.1	23.6			35.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00			1.05	
Incremental Delay, d2		9.2			26.0	0.6	7.2	11.3			170.8	
Delay (s)		50.9			67.2	37.8	47.3	34.9			207.6	
Level of Service		D			E	D	D	C			F	
Approach Delay (s)		50.9			57.0			36.3			207.6	
Approach LOS		D			E			D			F	

Intersection Summary			
HCM Average Control Delay	98.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Huntington Avenue & Driveway West

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	0	266	58	0	2
Peak Hour Factor	0.92	0.92	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	0	0	280	61	0	2
Pedestrians		208			208	
Lane Width (ft)		11.0			13.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		16			19	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		260	507			
pX, platoon unblocked						
vC, conflicting volume	549				519	587
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	549				519	587
tC, single (s)	4.1				6.8	7.6
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.6
p0 queue free %	100				100	99
cM capacity (veh/h)	837				399	262

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	0	187	154	2
Volume Left	0	0	0	0	0
Volume Right	0	0	0	61	2
cSH	1700	1700	1700	1700	262
Volume to Capacity	0.00	0.00	0.11	0.09	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	18.9
Lane LOS					C
Approach Delay (s)	0.0		0.0		18.9
Approach LOS					C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	16
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.86		1.00
Frpb, ped/bikes	1.00			1.00		1.00
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.99			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4048			5208		1443
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4048			5208		1443
Volume (vph)	576	29	0	766	0	49
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.67	0.67
Adj. Flow (vph)	640	32	0	806	0	73
RTOR Reduction (vph)	2	0	0	0	0	68
Lane Group Flow (vph)	670	0	0	806	0	5
Confl. Bikes (#/hr)		12				
Heavy Vehicles (%)	7%	0%	0%	7%	0%	4%
Bus Blockages (#/hr)	0	0	20	20	0	0
Parking (#/hr)	1	1				1
Turn Type						custom
Protected Phases	6			1 2		5
Permitted Phases						
Actuated Green, G (s)	68.4			78.8		6.4
Effective Green, g (s)	68.4			78.8		6.4
Actuated g/C Ratio	0.76			0.88		0.07
Clearance Time (s)	4.0					4.0
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	3076			4560		103
v/s Ratio Prot	c0.17			c0.15		0.00
v/s Ratio Perm						
v/c Ratio	0.22			0.18		0.05
Uniform Delay, d1	3.1			0.8		39.0
Progression Factor	1.00			1.00		1.00
Incremental Delay, d2	0.2			0.0		0.1
Delay (s)	3.3			0.8		39.0
Level of Service	A			A		D
Approach Delay (s)	3.3			0.8	39.0	
Approach LOS	A			A	D	

Intersection Summary

HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.2
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	10	10	11	11	12	16	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		4.0		
Lane Util. Factor		1.00	0.95			1.00	0.95	1.00		1.00		
Frpb, ped/bikes		1.00	0.99			1.00	1.00	0.58		1.00		
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00		1.00		
Frt		1.00	0.99			1.00	1.00	0.85		0.98		
Flt Protected		0.95	1.00			0.95	1.00	1.00		0.99		
Satd. Flow (prot)		1373	2709			1451	2935	722		1820		
Flt Permitted		0.95	1.00			0.95	1.00	1.00		0.91		
Satd. Flow (perm)		1373	2709			1451	2935	722		1672		
Volume (vph)	6	137	455	27	76	128	656	369	71	236	58	6
Peak-hour factor, PHF	0.92	0.86	0.86	0.86	0.95	0.94	0.94	0.94	0.88	0.88	0.88	0.85
Adj. Flow (vph)	7	159	529	31	80	136	698	393	81	268	66	7
RTOR Reduction (vph)	0	0	4	0	0	0	0	252	0	7	0	0
Lane Group Flow (vph)	0	166	556	0	0	216	698	141	0	408	0	0
Confl. Peds. (#/hr)				134				467				
Confl. Bikes (#/hr)				1				2			12	
Heavy Vehicles (%)	0%	15%	3%	15%	2%	6%	7%	13%	3%	3%	2%	0%
Parking (#/hr)			1	1								
Turn Type	Prot	Prot			Prot	Prot		Perm	Perm			D.P+P
Protected Phases	5	5	2		1	1	6			4		3
Permitted Phases								6	4			4
Actuated Green, G (s)		14.4	32.2			15.8	33.6	33.6		25.8		
Effective Green, g (s)		14.4	33.2			15.8	34.6	34.6		26.8		
Actuated g/C Ratio		0.14	0.33			0.16	0.35	0.35		0.27		
Clearance Time (s)		4.0	5.0			4.0	5.0	5.0		5.0		
Vehicle Extension (s)		2.0	2.0			2.0	2.0	2.0		2.0		
Lane Grp Cap (vph)		198	899			229	1016	250		448		
v/s Ratio Prot		0.12	0.21			c0.15	c0.24					
v/s Ratio Perm								0.19		c0.24		
v/c Ratio		0.84	0.62			0.94	0.69	0.56		0.91		
Uniform Delay, d1		41.7	28.1			41.7	28.1	26.6		35.4		
Progression Factor		1.00	1.00			0.82	1.04	2.67		1.00		
Incremental Delay, d2		24.5	3.2			43.0	3.8	8.8		22.0		
Delay (s)		66.2	31.3			77.1	32.8	79.7		57.5		
Level of Service		E	C			E	C	E		E		
Approach Delay (s)			39.2				54.2			57.5		
Approach LOS			D				D			E		

Intersection Summary

HCM Average Control Delay	48.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	12	12	11
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.94	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1568	2857	
Flt Permitted	0.31	1.00	
Satd. Flow (perm)	514	2857	
Volume (vph)	58	65	38
Peak-hour factor, PHF	0.93	0.93	0.93
Adj. Flow (vph)	62	70	41
RTOR Reduction (vph)	0	25	0
Lane Group Flow (vph)	69	86	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			3
Heavy Vehicles (%)	4%	8%	5%
Parking (#/hr)			
Turn Type	D.P+P		
Protected Phases	3	3 4	
Permitted Phases	4		
Actuated Green, G (s)	34.0	38.0	
Effective Green, g (s)	35.0	39.0	
Actuated g/C Ratio	0.35	0.39	
Clearance Time (s)	4.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	266	1114	
v/s Ratio Prot	c0.02	0.03	
v/s Ratio Perm	0.07		
v/c Ratio	0.26	0.08	
Uniform Delay, d1	24.0	19.2	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.2	0.0	
Delay (s)	24.1	19.2	
Level of Service	C	B	
Approach Delay (s)		21.1	
Approach LOS		C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	8	89	536	2	15	14	143	6	25
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.78	0.78	0.78	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	10	110	662	3	19	18	159	7	28

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	781	40	162	31
Volume Left (vph)	10	3	159	0
Volume Right (vph)	662	18	0	28
Hadj (s)	-0.31	-0.14	0.55	-0.49
Departure Headway (s)	4.4	6.2	7.0	5.9
Degree Utilization, x	0.95	0.07	0.32	0.05
Capacity (veh/h)	818	572	505	594
Control Delay (s)	39.9	9.6	12.0	8.1
Approach Delay (s)	39.9	9.6	11.4	
Approach LOS	E	A	B	

Intersection Summary

Delay	33.3		
HCM Level of Service	D		
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0					4.0	4.0				
Lane Util. Factor		0.95					1.00	1.00				
Frpb, ped/bikes		0.98					1.00	1.00				
Flpb, ped/bikes		1.00					1.00	1.00				
Frt		0.95					1.00	0.91				
Flt Protected		1.00					0.95	1.00				
Satd. Flow (prot)		2628					1504	1353				
Flt Permitted		1.00					0.95	1.00				
Satd. Flow (perm)		2628					1504	1353				
Volume (vph)	53	408	230	0	0	0	247	107	174	0	0	0
Peak-hour factor, PHF	0.86	0.86	0.86	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	62	474	267	0	0	0	291	126	205	0	0	0
RTOR Reduction (vph)	0	62	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	741	0	0	0	0	291	331	0	0	0	0
Confl. Bikes (#/hr)			37									
Heavy Vehicles (%)	13%	15%	4%	0%	0%	0%	8%	6%	20%	0%	0%	0%
Turn Type	Perm						Split					
Protected Phases		1					3	3				
Permitted Phases	1											
Actuated Green, G (s)		37.3					23.3	23.3				
Effective Green, g (s)		39.3					24.3	24.3				
Actuated g/C Ratio		0.44					0.27	0.27				
Clearance Time (s)		6.0					5.0	5.0				
Vehicle Extension (s)		2.0					2.0	2.0				
Lane Grp Cap (vph)		1148					406	365				
v/s Ratio Prot							0.19	c0.24				
v/s Ratio Perm		0.28										
v/c Ratio		0.65					0.72	0.91				
Uniform Delay, d1		19.9					29.7	31.8				
Progression Factor		1.00					1.00	1.00				
Incremental Delay, d2		2.8					5.0	24.8				
Delay (s)		22.7					34.7	56.5				
Level of Service		C					C	E				
Approach Delay (s)		22.7			0.0			46.3			0.0	
Approach LOS		C			A			D			A	

Intersection Summary

HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.4
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		0.95		1.00	0.95	
Frpb, ped/bikes		0.90			1.00	0.60		0.94		1.00	0.95	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.97			1.00	0.85		0.98		1.00	0.99	
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		2839			1601	813		2661		1486	2715	
Flt Permitted		0.95			0.99	1.00		0.95		0.95	1.00	
Satd. Flow (perm)		2710			1589	813		2523		1486	2715	
Volume (vph)	3	466	136	2	114	259	8	693	96	194	593	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	507	148	2	123	278	8	714	99	200	611	47
RTOR Reduction (vph)	0	28	0	0	0	202	0	0	0	0	0	0
Lane Group Flow (vph)	0	630	0	0	125	76	0	821	0	200	658	0
Confl. Peds. (#/hr)			591			498			803			440
Confl. Bikes (#/hr)			9			5			107			129
Heavy Vehicles (%)	33%	3%	4%	50%	6%	1%	14%	5%	3%	2%	5%	7%
Turn Type	Perm			Perm		Perm	Perm			Prot		
Protected Phases		7			7			1		5	1 5	
Permitted Phases	7			7		7	1					
Actuated Green, G (s)		26.3			26.3	26.3		34.7		19.0	58.7	
Effective Green, g (s)		27.3			27.3	27.3		35.7		21.0	60.7	
Actuated g/C Ratio		0.27			0.27	0.27		0.36		0.21	0.61	
Clearance Time (s)		5.0			5.0	5.0		5.0		6.0		
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0		
Lane Grp Cap (vph)		740			434	222		901		312	1648	
v/s Ratio Prot										c0.13	0.24	
v/s Ratio Perm		c0.23			0.08	0.09		c0.33				
v/c Ratio		0.85			0.29	0.34		0.91		0.64	0.40	
Uniform Delay, d1		34.4			28.7	29.1		30.6		36.1	10.2	
Progression Factor		1.00			1.00	1.00		0.52		1.00	1.00	
Incremental Delay, d2		9.0			0.1	0.3		12.6		9.7	0.7	
Delay (s)		43.4			28.8	29.5		28.6		45.8	10.9	
Level of Service		D			C	C		C		D	B	
Approach Delay (s)		43.4			29.3			28.6			19.0	
Approach LOS		D			C			C			B	

Intersection Summary

HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	10	10	10	10	10	10
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			0.95			0.95	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.92			1.00			1.00	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1422			2667			2749	
Flt Permitted					0.99			0.91			1.00	
Satd. Flow (perm)					1422			2427			2749	
Volume (vph)	0	0	0	17	37	75	26	721	0	0	714	16
Peak-hour factor, PHF	0.25	0.25	0.25	0.81	0.81	0.81	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	21	46	93	27	743	0	0	744	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	160	0	0	770	0	0	760	0
Confl. Bikes (#/hr)						5						124
Heavy Vehicles (%)	0%	0%	0%	8%	0%	5%	7%	6%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	7	0	0	0	8
Parking (#/hr)				1	1	1		1			1	1
Turn Type				Split			Perm					
Protected Phases				3	3			1			1	
Permitted Phases							1					
Actuated Green, G (s)					14.8			52.0			52.0	
Effective Green, g (s)					16.8			54.0			54.0	
Actuated g/C Ratio					0.17			0.54			0.54	
Clearance Time (s)					6.0			6.0			6.0	
Vehicle Extension (s)					2.0			2.0			2.0	
Lane Grp Cap (vph)					239			1311			1484	
v/s Ratio Prot					c0.11						0.28	
v/s Ratio Perm								c0.32				
v/c Ratio					0.67			0.59			0.51	
Uniform Delay, d1					39.0			15.5			14.6	
Progression Factor					1.00			1.28			0.60	
Incremental Delay, d2					5.4			1.8			1.1	
Delay (s)					44.4			21.7			10.0	
Level of Service					D			C			A	
Approach Delay (s)		0.0			44.4			21.7			10.0	
Approach LOS		A			D			C			A	

Intersection Summary

HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	29.2
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	8	3	744	0	0	732
Peak Hour Factor	0.63	0.63	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	13	5	775	0	0	762
Pedestrians			352			354
Lane Width (ft)			10.0			10.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			24			25
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			1002			222
pX, platoon unblocked	0.85					
vC, conflicting volume	1508	742			775	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1420	742			775	
tC, single (s)	7.4	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.3			2.2	
p0 queue free %	80	98			100	
cM capacity (veh/h)	64	274			850	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	17	388	388	381	381
Volume Left	13	0	0	0	0
Volume Right	5	0	0	0	0
cSH	81	1700	1700	1700	1700
Volume to Capacity	0.22	0.23	0.23	0.22	0.22
Queue Length 95th (ft)	19	0	0	0	0
Control Delay (s)	61.5	0.0	0.0	0.0	0.0
Lane LOS	F				
Approach Delay (s)	61.5	0.0		0.0	
Approach LOS	F				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBT	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER	SER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	12	10	10	10	10	10	10	10	12	12
Total Lost time (s)	4.0			4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00			1.00	0.95			0.95			0.88	
Frpb, ped/bikes	1.00			1.00	1.00			0.93			1.00	
Flpb, ped/bikes	1.00			1.00	1.00			1.00			1.00	
Frt	0.86			1.00	1.00			0.99			0.85	
Flt Protected	1.00			0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1676			1501	2825			2655			2401	
Flt Permitted	1.00			0.95	1.00			0.83			1.00	
Satd. Flow (perm)	1676			1501	2825			2203			2401	
Volume (vph)	0	11	39	315	722	2	2	636	30	30	390	17
Peak-hour factor, PHF	0.38	0.38	0.38	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.92	0.92
Adj. Flow (vph)	0	29	103	321	737	2	2	656	31	31	424	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	132	0	0	321	739	0	0	720	0	0	442	0
Confl. Peds. (#/hr)						166	166			546		
Confl. Bikes (#/hr)					2	55			100	18	3	
Heavy Vehicles (%)	0%	0%	0%	1%	5%	0%	0%	5%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	10	10	0	0	12	12	0	0
Parking (#/hr)									1	1	1	1
Turn Type				Prot			Perm				Over	
Protected Phases	5			6	1 6			1			6	
Permitted Phases							1					
Actuated Green, G (s)	14.0			23.2	73.0			42.8			23.2	
Effective Green, g (s)	16.0			26.2	76.0			45.8			26.2	
Actuated g/C Ratio	0.16			0.26	0.76			0.46			0.26	
Clearance Time (s)	6.0			7.0				7.0			7.0	
Vehicle Extension (s)	2.0			2.0				0.2			2.0	
Lane Grp Cap (vph)	268			393	2147			1009			629	
v/s Ratio Prot	c0.08			c0.21	0.26						0.18	
v/s Ratio Perm								c0.33				
v/c Ratio	0.49			0.82	0.34			0.71			0.70	
Uniform Delay, d1	38.3			34.6	3.9			21.8			33.4	
Progression Factor	1.00			1.41	0.26			0.37			1.00	
Incremental Delay, d2	0.5			7.0	0.0			3.8			2.9	
Delay (s)	38.8			55.8	1.0			11.9			36.3	
Level of Service	D			E	A			B			D	
Approach Delay (s)	38.8				17.6			11.9				
Approach LOS	D				B			B				

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1600	1600	1600	1600	1600	1600
Lane Width	12	11	12	11	11	11	12	12	16	12	10	10
Total Lost time (s)		7.5			7.5	5.5	4.0	7.0			7.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.86			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	
Frt		0.94			1.00	0.85	1.00	0.99			0.98	
Flt Protected		0.98			0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		2111			1341	1221	1368	2621			2414	
Flt Permitted		0.98			0.96	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		2111			1341	1221	1368	2621			2414	
Volume (vph)	112	25	103	283	39	89	123	838	77	0	921	102
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	130	29	120	301	41	95	128	873	80	0	980	109
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	279	0	0	342	95	128	953	0	0	1089	0
Confl. Peds. (#/hr)			219			351						
Confl. Bikes (#/hr)			3			1			55			22
Heavy Vehicles (%)	5%	8%	3%	6%	3%	3%	0%	3%	0%	50%	4%	1%
Turn Type	Split			Split		Prot	Prot					
Protected Phases	6	6		5	5	5	7	1 7			1	
Permitted Phases												
Actuated Green, G (s)		15.7			19.0	19.0	8.3	44.3			29.0	
Effective Green, g (s)		15.2			18.5	20.5	11.3	44.3			29.0	
Actuated g/C Ratio		0.15			0.18	0.20	0.11	0.44			0.29	
Clearance Time (s)		7.0			7.0	7.0	7.0				7.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0				0.2	
Lane Grp Cap (vph)		321			248	250	155	1161			700	
v/s Ratio Prot		c0.13			c0.26	0.08	0.09	c0.36			c0.45	
v/s Ratio Perm												
v/c Ratio		0.95dr			1.38	0.38	0.83	0.82			1.56	
Uniform Delay, d1		41.4			40.8	34.3	43.4	24.4			35.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00			0.82	
Incremental Delay, d2		20.6			193.8	0.4	27.5	4.5			255.0	
Delay (s)		62.1			234.6	34.6	70.9	28.9			283.9	
Level of Service		E			F	C	E	C			F	
Approach Delay (s)		62.1			191.1			33.9			283.9	
Approach LOS		E			F			C			F	

Intersection Summary			
HCM Average Control Delay	154.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.33		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	103.9%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	0	377	8	0	62
Peak Hour Factor	0.92	0.92	0.91	0.91	0.70	0.70
Hourly flow rate (vph)	0	0	414	9	0	89
Pedestrians		373			373	
Lane Width (ft)		11.0			13.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		28			34	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		260	507			
pX, platoon unblocked						
vC, conflicting volume	796				792	958
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796				792	958
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	29
cM capacity (veh/h)	554				219	124

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	0	276	147	89
Volume Left	0	0	0	0	0
Volume Right	0	0	0	9	89
cSH	1700	1700	1700	1700	124
Volume to Capacity	0.00	0.00	0.16	0.09	0.71
Queue Length 95th (ft)	0	0	0	0	99
Control Delay (s)	0.0	0.0	0.0	0.0	85.7
Lane LOS					F
Approach Delay (s)	0.0		0.0		85.7
Approach LOS					F

Intersection Summary			
Average Delay	14.8		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	16
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.86		1.00
Frpb, ped/bikes	1.00			1.00		1.00
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.99			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4095			5307		1500
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4095			5307		1500
Volume (vph)	669	65	0	779	0	58
Peak-hour factor, PHF	0.97	0.97	0.92	0.92	0.68	0.68
Adj. Flow (vph)	690	67	0	847	0	85
RTOR Reduction (vph)	6	0	0	0	0	79
Lane Group Flow (vph)	751	0	0	847	0	6
Confl. Bikes (#/hr)		5				
Heavy Vehicles (%)	5%	2%	0%	5%	0%	0%
Bus Blockages (#/hr)	0	0	20	20	0	0
Parking (#/hr)	1	1				1
Turn Type						custom
Protected Phases	6			1 2		5
Permitted Phases						
Actuated Green, G (s)	66.8			77.2		6.4
Effective Green, g (s)	66.8			77.2		6.4
Actuated g/C Ratio	0.74			0.86		0.07
Clearance Time (s)	4.0					4.0
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	3039			4552		107
v/s Ratio Prot	c0.18			c0.16		0.00
v/s Ratio Perm						
v/c Ratio	0.25			0.19		0.06
Uniform Delay, d1	3.7			1.1		39.0
Progression Factor	1.00			1.00		1.00
Incremental Delay, d2	0.2			0.0		0.1
Delay (s)	3.9			1.1		39.1
Level of Service	A			A		D
Approach Delay (s)	3.9			1.1	39.1	
Approach LOS	A			A	D	

Intersection Summary

HCM Average Control Delay	4.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	29.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	10	10	11	11	12	16	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		4.0		
Lane Util. Factor		1.00	0.95			1.00	0.95	1.00		1.00		
Frpb, ped/bikes		1.00	0.97			1.00	1.00	0.46		0.99		
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00		1.00		
Frt		1.00	0.99			1.00	1.00	0.85		0.97		
Flt Protected		0.95	1.00			0.95	1.00	1.00		0.99		
Satd. Flow (prot)		1433	2688			1486	2991	613		1826		
Flt Permitted		0.95	1.00			0.95	1.00	1.00		0.89		
Satd. Flow (perm)		1433	2688			1486	2991	613		1643		
Volume (vph)	21	146	516	45	83	158	715	310	43	129	52	5
Peak-hour factor, PHF	0.92	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.90	0.90	0.90	0.85
Adj. Flow (vph)	23	154	543	47	87	168	761	330	48	143	58	6
RTOR Reduction (vph)	0	0	5	0	0	0	0	158	0	10	0	0
Lane Group Flow (vph)	0	177	585	0	0	255	761	172	0	239	0	0
Confl. Peds. (#/hr)				230				861				
Confl. Bikes (#/hr)				1				13			15	
Heavy Vehicles (%)	0%	11%	3%	0%	2%	2%	5%	5%	0%	2%	0%	0%
Parking (#/hr)			1	1								
Turn Type	Prot	Prot			Prot	Prot		Perm	Perm			D.P+P
Protected Phases	5	5	2		1	1	6			4		3
Permitted Phases								6	4			4
Actuated Green, G (s)		16.8	41.1			20.2	44.5	44.5		20.7		
Effective Green, g (s)		16.8	42.1			20.2	45.5	45.5		21.7		
Actuated g/C Ratio		0.15	0.38			0.18	0.41	0.41		0.20		
Clearance Time (s)		4.0	5.0			4.0	5.0	5.0		5.0		
Vehicle Extension (s)		2.0	2.0			2.0	2.0	2.0		2.0		
Lane Grp Cap (vph)		219	1029			273	1237	254		324		
v/s Ratio Prot		0.12	0.22			c0.17	0.25					
v/s Ratio Perm								c0.28		c0.15		
v/c Ratio		0.81	0.57			0.93	0.62	0.68		0.74		
Uniform Delay, d1		45.0	26.8			44.2	25.4	26.3		41.5		
Progression Factor		1.00	1.00			1.00	1.00	1.00		1.00		
Incremental Delay, d2		18.3	2.3			36.6	2.3	13.6		7.3		
Delay (s)		63.3	29.1			80.8	27.7	39.9		48.8		
Level of Service		E	C			F	C	D		D		
Approach Delay (s)			37.0				40.7			48.8		
Approach LOS			D				D			D		

Intersection Summary

HCM Average Control Delay	38.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	12	12	11
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.96	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1594	3019	
Flt Permitted	0.37	1.00	
Satd. Flow (perm)	615	3019	
Volume (vph)	104	138	54
Peak-hour factor, PHF	0.89	0.89	0.89
Adj. Flow (vph)	117	155	61
RTOR Reduction (vph)	0	41	0
Lane Group Flow (vph)	123	175	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			7
Heavy Vehicles (%)	2%	2%	4%
Parking (#/hr)			
Turn Type	D.P+P		
Protected Phases	3	3 4	
Permitted Phases	4		
Actuated Green, G (s)	30.7	34.7	
Effective Green, g (s)	31.7	35.7	
Actuated g/C Ratio	0.29	0.32	
Clearance Time (s)	4.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	266	980	
v/s Ratio Prot	c0.04	0.06	
v/s Ratio Perm	0.09		
v/c Ratio	0.46	0.18	
Uniform Delay, d1	31.2	26.6	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.5	0.0	
Delay (s)	31.7	26.7	
Level of Service	C	C	
Approach Delay (s)		28.5	
Approach LOS		C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	13	87	438	2	18	25	226	2	12
Peak Hour Factor	0.25	0.25	0.25	0.92	0.92	0.92	0.73	0.73	0.73	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	14	95	476	3	25	34	266	2	14

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	585	62	267	15
Volume Left (vph)	14	3	266	0
Volume Right (vph)	476	34	0	14
Hadj (s)	-0.46	-0.29	0.53	-0.65
Departure Headway (s)	4.5	5.7	6.6	5.4
Degree Utilization, x	0.73	0.10	0.49	0.02
Capacity (veh/h)	776	547	518	624
Control Delay (s)	19.0	9.4	14.5	7.3
Approach Delay (s)	19.0	9.4	14.1	
Approach LOS	C	A	B	

Intersection Summary			
Delay	16.9		
HCM Level of Service	C		
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0					4.0	4.0				
Lane Util. Factor		0.95					1.00	1.00				
Frpb, ped/bikes		0.98					1.00	0.99				
Flpb, ped/bikes		1.00					1.00	1.00				
Frt		0.95					1.00	0.92				
Flt Protected		1.00					0.95	1.00				
Satd. Flow (prot)		2844					1562	1453				
Flt Permitted		1.00					0.95	1.00				
Satd. Flow (perm)		2844					1562	1453				
Volume (vph)	63	394	197	0	0	0	292	167	183	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	67	419	210	0	0	0	311	178	195	0	0	0
RTOR Reduction (vph)	0	45	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	651	0	0	0	0	311	373	0	0	0	0
Confl. Bikes (#/hr)			45						12			
Heavy Vehicles (%)	3%	4%	1%	0%	0%	0%	4%	1%	13%	0%	0%	0%
Turn Type	Perm						Split					
Protected Phases		1					3	3				
Permitted Phases	1											
Actuated Green, G (s)		34.9					25.7	25.7				
Effective Green, g (s)		36.9					26.7	26.7				
Actuated g/C Ratio		0.41					0.30	0.30				
Clearance Time (s)		6.0					5.0	5.0				
Vehicle Extension (s)		2.0					2.0	2.0				
Lane Grp Cap (vph)		1166					463	431				
v/s Ratio Prot							0.20	c0.26				
v/s Ratio Perm		0.23										
v/c Ratio		0.56					0.67	0.87				
Uniform Delay, d1		20.3					27.8	29.9				
Progression Factor		1.00					1.00	1.00				
Incremental Delay, d2		1.9					3.0	15.9				
Delay (s)		22.2					30.8	45.9				
Level of Service		C					C	D				
Approach Delay (s)		22.2			0.0			39.0			0.0	
Approach LOS		C			A			D			A	

Intersection Summary

HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.4
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

2018 Build Condition
Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		0.95		1.00	0.95	
Frpb, ped/bikes		0.93			1.00	0.67		0.93		1.00	0.96	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.97			1.00	0.85		0.97		1.00	0.99	
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		2762			1502	860		2494		1307	2685	
Flt Permitted		0.94			0.99	1.00		0.93		0.95	1.00	
Satd. Flow (perm)		2598			1486	860		2323		1307	2685	
Volume (vph)	22	460	126	2	108	212	21	718	151	191	524	34
Peak-hour factor, PHF	0.93	0.93	0.93	0.66	0.66	0.66	0.95	0.95	0.95	0.91	0.91	0.91
Adj. Flow (vph)	24	495	135	3	164	321	22	756	159	210	576	37
RTOR Reduction (vph)	0	23	0	0	0	247	0	0	0	0	0	0
Lane Group Flow (vph)	0	631	0	0	167	74	0	937	0	210	613	0
Confl. Peds. (#/hr)			249			294			441			288
Confl. Bikes (#/hr)			26			1			87			110
Heavy Vehicles (%)	10%	8%	15%	0%	14%	5%	0%	10%	12%	16%	8%	6%
Turn Type	Perm			Perm		Perm	Perm			Prot		
Protected Phases		7			7			1		5	1 5	
Permitted Phases	7			7		7	1					
Actuated Green, G (s)		22.0			22.0	22.0		34.0		24.0	63.0	
Effective Green, g (s)		23.0			23.0	23.0		35.0		26.0	65.0	
Actuated g/C Ratio		0.23			0.23	0.23		0.35		0.26	0.65	
Clearance Time (s)		5.0			5.0	5.0		5.0		6.0		
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0		
Lane Grp Cap (vph)		598			342	198		813		340	1745	
v/s Ratio Prot										c0.16	0.23	
v/s Ratio Perm		c0.24			0.11	0.09		c0.40				
v/c Ratio		1.06			0.49	0.37		1.15		0.62	0.35	
Uniform Delay, d1		38.5			33.4	32.4		32.5		32.6	7.9	
Progression Factor		1.00			1.00	1.00		0.50		1.00	1.00	
Incremental Delay, d2		52.2			0.4	0.4		80.1		8.2	0.6	
Delay (s)		90.7			33.8	32.9		96.3		40.8	8.5	
Level of Service		F			C	C		F		D	A	
Approach Delay (s)		90.7			33.2			96.3			16.7	
Approach LOS		F			C			F			B	

Intersection Summary

HCM Average Control Delay	61.8	HCM Level of Service		E
HCM Volume to Capacity ratio	0.96			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		16.0
Intersection Capacity Utilization	83.9%	ICU Level of Service		E
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	10	10	10	10	10	10
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			0.95			0.95	
Frpb, ped/bikes					1.00			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.92			1.00			1.00	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1416			2577			2597	
Flt Permitted					0.99			0.94			1.00	
Satd. Flow (perm)					1416			2418			2597	
Volume (vph)	0	0	0	19	25	56	15	834	0	0	632	20
Peak-hour factor, PHF	0.25	0.25	0.25	0.80	0.80	0.80	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	24	31	70	16	878	0	0	687	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	125	0	0	894	0	0	707	0
Confl. Bikes (#/hr)												103
Heavy Vehicles (%)	0%	0%	0%	12%	4%	4%	0%	10%	0%	0%	10%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	7	0	0	0	8
Parking (#/hr)				1	1	1		1			1	1
Turn Type				Split			Perm					
Protected Phases				3	3			1			1	
Permitted Phases							1					
Actuated Green, G (s)					12.9			58.7			58.7	
Effective Green, g (s)					14.9			60.7			60.7	
Actuated g/C Ratio					0.15			0.61			0.61	
Clearance Time (s)					6.0			6.0			6.0	
Vehicle Extension (s)					2.0			2.0			2.0	
Lane Grp Cap (vph)					211			1468			1576	
v/s Ratio Prot					c0.09						0.27	
v/s Ratio Perm								c0.37				
v/c Ratio					0.59			0.61			0.45	
Uniform Delay, d1					39.7			12.3			10.6	
Progression Factor					1.00			0.43			0.69	
Incremental Delay, d2					3.0			1.8			0.8	
Delay (s)					42.7			7.1			8.2	
Level of Service					D			A			A	
Approach Delay (s)		0.0			42.7			7.1			8.2	
Approach LOS		A			D			A			A	

Intersection Summary

HCM Average Control Delay	10.1	HCM Level of Service		B
HCM Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		24.4
Intersection Capacity Utilization	50.8%	ICU Level of Service		A
Analysis Period (min)	15			
c Critical Lane Group				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	20	829	0	0	651
Peak Hour Factor	0.50	0.50	0.94	0.94	0.90	0.90
Hourly flow rate (vph)	2	40	882	0	0	723
Pedestrians			161			159
Lane Width (ft)			10.0			10.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			11			11
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			1002			222
pX, platoon unblocked	0.88					
vC, conflicting volume	1405	600			882	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1326	600			882	
tC, single (s)	6.8	7.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.2	
p0 queue free %	98	89			100	
cM capacity (veh/h)	117	358			775	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	42	441	441	362	362
Volume Left	2	0	0	0	0
Volume Right	40	0	0	0	0
cSH	326	1700	1700	1700	1700
Volume to Capacity	0.13	0.26	0.26	0.21	0.21
Queue Length 95th (ft)	11	0	0	0	0
Control Delay (s)	17.7	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	17.7	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBT	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER	SER2
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	10	10	10	10	10	10	10	12	12
Total Lost time (s)	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00	0.95			0.95			0.88	
Frpb, ped/bikes	1.00	1.00	0.98			0.93			1.00	
Flpb, ped/bikes	1.00	1.00	1.00			1.00			1.00	
Frt	1.00	1.00	0.99			0.99			0.85	
Flt Protected	1.00	0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1938	1472	2638			2546			2266	
Flt Permitted	1.00	0.95	1.00			0.68			1.00	
Satd. Flow (perm)	1938	1472	2638			1745			2266	
Volume (vph)	1	286	828	32	18	530	37	22	386	18
Peak-hour factor, PHF	0.38	0.92	0.92	0.92	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	3	311	900	35	19	558	39	23	406	19
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	3	311	935	0	0	639	0	0	425	0
Confl. Peds. (#/hr)				86	86			332		
Confl. Bikes (#/hr)			2	60				62	5	
Heavy Vehicles (%)	0%	3%	10%	3%	0%	9%	9%	30%	7%	6%
Bus Blockages (#/hr)	0	0	10	10	0	0	12	12	0	0
Parking (#/hr)							1	1	1	1
Turn Type		Prot			Perm				Over	
Protected Phases	5	6	6 1			1			6	
Permitted Phases					1					
Actuated Green, G (s)	7.6	25.1	79.4			47.3			25.1	
Effective Green, g (s)	9.6	28.1	82.4			50.3			28.1	
Actuated g/C Ratio	0.10	0.28	0.82			0.50			0.28	
Clearance Time (s)	6.0	7.0				7.0			7.0	
Vehicle Extension (s)	2.0	2.0				0.2			2.0	
Lane Grp Cap (vph)	186	414	2174			878			637	
v/s Ratio Prot	c0.00	c0.21	0.35						0.19	
v/s Ratio Perm						c0.37				
v/c Ratio	0.02	0.75	0.43			0.73			0.67	
Uniform Delay, d1	40.9	32.8	2.4			19.5			31.8	
Progression Factor	1.00	1.29	0.56			1.10			1.00	
Incremental Delay, d2	0.0	2.4	0.0			4.8			2.1	
Delay (s)	40.9	44.6	1.4			26.3			33.9	
Level of Service	D	D	A			C			C	
Approach Delay (s)	40.9		12.1			26.3				
Approach LOS	D		B			C				

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Huntington Avenue & Massachusetts Avenue

6/14/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1600	1600	1600	1600	1600	1600
Lane Width	12	11	12	11	11	11	12	12	16	12	10	10
Total Lost time (s)		7.5			7.5	5.5	4.0	7.0			7.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.96			1.00	1.00	1.00	1.00			0.99	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00			1.00	
Frt		0.95			1.00	0.85	1.00	0.99			0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		2274			1368	1164	1368	2483			2291	
Flt Permitted		0.97			0.96	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		2274			1368	1164	1368	2483			2291	
Volume (vph)	123	10	65	133	29	90	129	933	101	0	814	88
Peak-hour factor, PHF	0.86	0.86	0.86	0.84	0.94	0.94	0.91	0.91	0.91	0.96	0.96	0.96
Adj. Flow (vph)	143	12	76	158	31	96	142	1025	111	0	848	92
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	231	0	0	189	96	142	1136	0	0	940	0
Confl. Peds. (#/hr)			58			151						
Confl. Bikes (#/hr)			9			1			54			52
Heavy Vehicles (%)	7%	27%	10%	2%	13%	8%	0%	8%	10%	0%	9%	8%
Turn Type	Split			Split		Prot	Prot					
Protected Phases	6	6		5	5	5	7	1 7			1	
Permitted Phases												
Actuated Green, G (s)		13.9			16.3	16.3	11.9	48.8			29.9	
Effective Green, g (s)		13.4			15.8	17.8	14.9	48.8			29.9	
Actuated g/C Ratio		0.13			0.16	0.18	0.15	0.49			0.30	
Clearance Time (s)		7.0			7.0	7.0	7.0				7.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0				0.2	
Lane Grp Cap (vph)		305			216	207	204	1212			685	
v/s Ratio Prot		c0.10			c0.14	0.08	0.10	c0.46			c0.41	
v/s Ratio Perm												
v/c Ratio		0.76			0.88	0.46	0.70	0.94			1.37	
Uniform Delay, d1		41.7			41.1	36.8	40.4	24.2			35.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00			1.05	
Incremental Delay, d2		9.2			29.4	0.6	8.1	13.2			174.1	
Delay (s)		50.9			70.5	37.4	48.5	37.4			211.0	
Level of Service		D			E	D	D	D			F	
Approach Delay (s)		50.9			59.4			38.6			211.0	
Approach LOS		D			E			D			F	

Intersection Summary			
HCM Average Control Delay	101.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	82.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
6: Huntington Avenue & Driveway West

2018 Build Conditions
Morning Peak Period

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	0	280	58	0	2
Peak Hour Factor	0.92	0.92	0.95	0.95	0.85	0.85
Hourly flow rate (vph)	0	0	295	61	0	2
Pedestrians		208			208	
Lane Width (ft)		11.0			13.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		16			19	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		260	507			
pX, platoon unblocked						
vC, conflicting volume	564				533	594
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	564				533	594
tC, single (s)	4.1				6.8	7.6
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.6
p0 queue free %	100				100	99
cM capacity (veh/h)	827				391	259

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	0	196	159	2
Volume Left	0	0	0	0	0
Volume Right	0	0	0	61	2
cSH	1700	1700	1700	1700	259
Volume to Capacity	0.00	0.00	0.12	0.09	0.01
Queue Length 95th (ft)	0	0	0	0	1
Control Delay (s)	0.0	0.0	0.0	0.0	19.0
Lane LOS					C
Approach Delay (s)	0.0		0.0		19.0
Approach LOS					C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	16
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.86		1.00
Frpb, ped/bikes	1.00			1.00		1.00
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.99			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4049			5208		1443
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4049			5208		1443
Volume (vph)	586	29	0	779	0	49
Peak-hour factor, PHF	0.90	0.90	0.95	0.95	0.67	0.67
Adj. Flow (vph)	651	32	0	820	0	73
RTOR Reduction (vph)	2	0	0	0	0	68
Lane Group Flow (vph)	681	0	0	820	0	5
Confl. Bikes (#/hr)		12				
Heavy Vehicles (%)	7%	0%	0%	7%	0%	4%
Bus Blockages (#/hr)	0	0	20	20	0	0
Parking (#/hr)	1	1				1
Turn Type						custom
Protected Phases	6			1 2		5
Permitted Phases						
Actuated Green, G (s)	68.4			78.8		6.4
Effective Green, g (s)	68.4			78.8		6.4
Actuated g/C Ratio	0.76			0.88		0.07
Clearance Time (s)	4.0					4.0
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	3077			4560		103
v/s Ratio Prot	c0.17			c0.16		0.00
v/s Ratio Perm						
v/c Ratio	0.22			0.18		0.05
Uniform Delay, d1	3.1			0.8		39.0
Progression Factor	1.00			1.00		1.00
Incremental Delay, d2	0.2			0.0		0.1
Delay (s)	3.3			0.8		39.0
Level of Service	A			A		D
Approach Delay (s)	3.3			0.8	39.0	
Approach LOS	A			A	D	

Intersection Summary

HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	11.2
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	10	10	11	11	12	16	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		4.0		
Lane Util. Factor		1.00	0.95			1.00	0.95	1.00		1.00		
Frpb, ped/bikes		1.00	0.99			1.00	1.00	0.58		1.00		
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00		1.00		
Frt		1.00	0.99			1.00	1.00	0.85		0.98		
Flt Protected		0.95	1.00			0.95	1.00	1.00		0.99		
Satd. Flow (prot)		1373	2709			1451	2935	722		1820		
Flt Permitted		0.95	1.00			0.95	1.00	1.00		0.91		
Satd. Flow (perm)		1373	2709			1451	2935	722		1665		
Volume (vph)	6	147	455	27	76	128	656	377	71	237	58	6
Peak-hour factor, PHF	0.92	0.86	0.86	0.86	0.95	0.94	0.94	0.94	0.88	0.88	0.88	0.85
Adj. Flow (vph)	7	171	529	31	80	136	698	401	81	269	66	7
RTOR Reduction (vph)	0	0	4	0	0	0	0	260	0	7	0	0
Lane Group Flow (vph)	0	178	556	0	0	216	698	141	0	409	0	0
Confl. Peds. (#/hr)				134				467				
Confl. Bikes (#/hr)				1				2			12	
Heavy Vehicles (%)	0%	15%	3%	15%	2%	6%	7%	13%	3%	3%	2%	0%
Parking (#/hr)			1	1								
Turn Type	Prot	Prot			Prot	Prot		Perm	Perm			D.P+P
Protected Phases	5	5	2		1	1	6			4		3
Permitted Phases								6	4			4
Actuated Green, G (s)		15.0	32.0			15.8	32.8	32.8		25.9		
Effective Green, g (s)		15.0	33.0			15.8	33.8	33.8		26.9		
Actuated g/C Ratio		0.15	0.33			0.16	0.34	0.34		0.27		
Clearance Time (s)		4.0	5.0			4.0	5.0	5.0		5.0		
Vehicle Extension (s)		2.0	2.0			2.0	2.0	2.0		2.0		
Lane Grp Cap (vph)		206	894			229	992	244		448		
v/s Ratio Prot		0.13	0.21			c0.15	c0.24					
v/s Ratio Perm								0.20		c0.25		
v/c Ratio		0.86	0.62			0.94	0.70	0.58		0.91		
Uniform Delay, d1		41.5	28.2			41.7	28.7	27.2		35.4		
Progression Factor		1.00	1.00			0.82	1.04	2.72		1.00		
Incremental Delay, d2		28.4	3.2			43.0	4.1	9.5		22.4		
Delay (s)		69.9	31.5			77.1	33.9	83.6		57.8		
Level of Service		E	C			E	C	F		E		
Approach Delay (s)			40.8				56.2			57.8		
Approach LOS			D				E			E		

Intersection Summary

HCM Average Control Delay	49.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	12	12	11
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.94	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1568	2830	
Flt Permitted	0.31	1.00	
Satd. Flow (perm)	514	2830	
Volume (vph)	61	67	51
Peak-hour factor, PHF	0.93	0.93	0.93
Adj. Flow (vph)	66	72	55
RTOR Reduction (vph)	0	33	0
Lane Group Flow (vph)	73	94	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			3
Heavy Vehicles (%)	4%	8%	5%
Parking (#/hr)			
Turn Type	D.P+P		
Protected Phases	3	3 4	
Permitted Phases	4		
Actuated Green, G (s)	34.2	38.2	
Effective Green, g (s)	35.2	39.2	
Actuated g/C Ratio	0.35	0.39	
Clearance Time (s)	4.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	268	1109	
v/s Ratio Prot	c0.02	0.03	
v/s Ratio Perm	0.07		
v/c Ratio	0.27	0.08	
Uniform Delay, d1	23.9	19.1	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.2	0.0	
Delay (s)	24.1	19.1	
Level of Service	C	B	
Approach Delay (s)		20.9	
Approach LOS		C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Stop			Stop	
Volume (vph)	0	0	0	74	89	561	0	0	0	143	18	25
Peak Hour Factor	0.25	0.25	0.25	0.81	0.81	0.81	0.78	0.78	0.78	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	91	110	693	0	0	0	159	20	28

Direction, Lane #	WB 1	WB 2	SB 1	SB 2
Volume Total (vph)	201	693	169	38
Volume Left (vph)	91	0	159	0
Volume Right (vph)	0	693	0	28
Hadj (s)	0.26	-0.48	0.55	-0.30
Departure Headway (s)	5.5	4.7	7.0	6.2
Degree Utilization, x	0.31	0.91	0.33	0.06
Capacity (veh/h)	637	752	497	560
Control Delay (s)	9.7	35.2	12.3	8.4
Approach Delay (s)	29.4		11.6	
Approach LOS	D		B	

Intersection Summary

Delay	26.1		
HCM Level of Service	D		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0					4.0	4.0				
Lane Util. Factor		0.95					1.00	1.00				
Frpb, ped/bikes		0.98					1.00	1.00				
Flpb, ped/bikes		1.00					1.00	1.00				
Frt		0.95					1.00	0.91				
Flt Protected		1.00					0.95	1.00				
Satd. Flow (prot)		2625					1504	1351				
Flt Permitted		1.00					0.95	1.00				
Satd. Flow (perm)		2625					1504	1351				
Volume (vph)	53	409	242	0	0	0	252	107	177	0	0	0
Peak-hour factor, PHF	0.86	0.86	0.86	0.92	0.92	0.92	0.85	0.85	0.85	0.92	0.92	0.92
Adj. Flow (vph)	62	476	281	0	0	0	296	126	208	0	0	0
RTOR Reduction (vph)	0	68	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	751	0	0	0	0	296	334	0	0	0	0
Confl. Bikes (#/hr)			37									
Heavy Vehicles (%)	13%	15%	4%	0%	0%	0%	8%	6%	20%	0%	0%	0%
Turn Type	Perm						Split					
Protected Phases		1					3	3				
Permitted Phases	1											
Actuated Green, G (s)		37.1					23.5	23.5				
Effective Green, g (s)		39.1					24.5	24.5				
Actuated g/C Ratio		0.43					0.27	0.27				
Clearance Time (s)		6.0					5.0	5.0				
Vehicle Extension (s)		2.0					2.0	2.0				
Lane Grp Cap (vph)		1140					409	368				
v/s Ratio Prot							0.20	c0.25				
v/s Ratio Perm		0.29										
v/c Ratio		0.66					0.72	0.91				
Uniform Delay, d1		20.2					29.7	31.7				
Progression Factor		1.00					1.00	1.00				
Incremental Delay, d2		3.0					5.3	24.7				
Delay (s)		23.2					35.0	56.4				
Level of Service		C					C	E				
Approach Delay (s)		23.2			0.0			46.3			0.0	
Approach LOS		C			A			D			A	

Intersection Summary

HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.4
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	143	0	0	767	71	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	155	0	0	834	77	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)				480		
pX, platoon unblocked						
vC, conflicting volume			155		572	78
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			155		572	78
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		83	96
cM capacity (veh/h)			1437		455	974

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	104	52	278	556	112
Volume Left	0	0	0	0	77
Volume Right	0	0	0	0	35
cSH	1700	1700	1437	1700	545
Volume to Capacity	0.06	0.03	0.00	0.33	0.21
Queue Length 95th (ft)	0	0	0	0	19
Control Delay (s)	0.0	0.0	0.0	0.0	13.3
Lane LOS					B
Approach Delay (s)	0.0		0.0		13.3
Approach LOS					B

Intersection Summary

Average Delay	1.4		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↱			↰	↱		↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	13	12	12	10	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor		0.95			1.00	1.00		0.95		1.00	0.95	
Frpb, ped/bikes		0.91			1.00	0.60		0.94		1.00	0.95	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.97			1.00	0.85		0.98		1.00	0.99	
Flt Protected		1.00			1.00	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		2850			1602	813		2662		1486	2715	
Flt Permitted		0.95			0.99	1.00		0.94		0.95	1.00	
Satd. Flow (perm)		2720			1589	813		2511		1486	2715	
Volume (vph)	3	483	136	2	119	255	12	707	97	199	593	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	3	525	148	2	128	274	12	729	100	205	611	47
RTOR Reduction (vph)	0	27	0	0	0	199	0	0	0	0	0	0
Lane Group Flow (vph)	0	649	0	0	130	75	0	841	0	205	658	0
Confl. Peds. (#/hr)			591			498			803			440
Confl. Bikes (#/hr)			9			5			107			129
Heavy Vehicles (%)	33%	3%	4%	50%	6%	1%	14%	5%	3%	2%	5%	7%
Turn Type	Perm			Perm		Perm	Perm			Prot		
Protected Phases		7			7			1		5	1 5	
Permitted Phases	7			7		7	1					
Actuated Green, G (s)		26.4			26.4	26.4		34.6		19.0	58.6	
Effective Green, g (s)		27.4			27.4	27.4		35.6		21.0	60.6	
Actuated g/C Ratio		0.27			0.27	0.27		0.36		0.21	0.61	
Clearance Time (s)		5.0			5.0	5.0		5.0		6.0		
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0		
Lane Grp Cap (vph)		745			435	223		894		312	1645	
v/s Ratio Prot										c0.14	0.24	
v/s Ratio Perm		c0.24			0.08	0.09		c0.33				
v/c Ratio		0.87			0.30	0.34		0.94		0.66	0.40	
Uniform Delay, d1		34.6			28.7	29.0		31.2		36.2	10.2	
Progression Factor		1.00			1.00	1.00		0.54		1.00	1.00	
Incremental Delay, d2		10.6			0.1	0.3		15.9		10.4	0.7	
Delay (s)		45.2			28.8	29.4		32.7		46.6	11.0	
Level of Service		D			C	C		C		D	B	
Approach Delay (s)		45.2			29.2			32.7			19.4	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥			↰↑			↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	14	12	10	10	10	10	10	10
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					1.00			0.95			0.95	
Frpb, ped/bikes					0.99			1.00			1.00	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					0.92			1.00			1.00	
Flt Protected					0.99			1.00			1.00	
Satd. Flow (prot)					1424			2667			2749	
Flt Permitted					0.99			0.91			1.00	
Satd. Flow (perm)					1424			2430			2749	
Volume (vph)	0	0	0	18	37	74	26	742	0	0	714	16
Peak-hour factor, PHF	0.25	0.25	0.25	0.81	0.81	0.81	0.97	0.97	0.97	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	22	46	91	27	765	0	0	744	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	0	159	0	0	792	0	0	760	0
Confl. Bikes (#/hr)						5						124
Heavy Vehicles (%)	0%	0%	0%	8%	0%	5%	7%	6%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	7	0	0	0	8
Parking (#/hr)				1	1	1		1			1	1
Turn Type				Split			Perm					
Protected Phases				3	3			1			1	
Permitted Phases							1					
Actuated Green, G (s)					14.7			52.1			52.1	
Effective Green, g (s)					16.7			54.1			54.1	
Actuated g/C Ratio					0.17			0.54			0.54	
Clearance Time (s)					6.0			6.0			6.0	
Vehicle Extension (s)					2.0			2.0			2.0	
Lane Grp Cap (vph)					238			1315			1487	
v/s Ratio Prot					c0.11						0.28	
v/s Ratio Perm								c0.33				
v/c Ratio					0.67			0.60			0.51	
Uniform Delay, d1					39.1			15.6			14.6	
Progression Factor					1.00			1.27			0.60	
Incremental Delay, d2					5.4			2.0			1.1	
Delay (s)					44.5			21.8			9.9	
Level of Service					D			C			A	
Approach Delay (s)		0.0			44.5			21.8			9.9	
Approach LOS		A			D			C			A	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	29.2
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	8	14	753	0	0	732
Peak Hour Factor	0.63	0.63	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	13	22	784	0	0	762
Pedestrians			352			354
Lane Width (ft)			10.0			10.0
Walking Speed (ft/s)			4.0			4.0
Percent Blockage			24			25
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			1002			222
pX, platoon unblocked	0.85					
vC, conflicting volume	1518	746			784	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1431	746			784	
tC, single (s)	7.4	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.8	3.3			2.2	
p0 queue free %	80	92			100	
cM capacity (veh/h)	63	272			843	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	392	392	381	381
Volume Left	13	0	0	0	0
Volume Right	22	0	0	0	0
cSH	123	1700	1700	1700	1700
Volume to Capacity	0.28	0.23	0.23	0.22	0.22
Queue Length 95th (ft)	27	0	0	0	0
Control Delay (s)	45.6	0.0	0.0	0.0	0.0
Lane LOS	E				
Approach Delay (s)	45.6	0.0		0.0	
Approach LOS	E				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBT	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SBR2	SER	SER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	12	10	10	10	10	10	10	10	12	12
Total Lost time (s)	4.0			4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00			1.00	0.95			0.95			0.88	
Frpb, ped/bikes	1.00			1.00	1.00			0.93			1.00	
Flpb, ped/bikes	1.00			1.00	1.00			1.00			1.00	
Frt	0.86			1.00	1.00			0.99			0.85	
Flt Protected	1.00			0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1676			1501	2825			2655			2401	
Flt Permitted	1.00			0.95	1.00			0.83			1.00	
Satd. Flow (perm)	1676			1501	2825			2203			2401	
Volume (vph)	0	11	39	315	722	2	2	636	30	30	390	17
Peak-hour factor, PHF	0.38	0.38	0.38	0.98	0.98	0.98	0.97	0.97	0.97	0.97	0.92	0.92
Adj. Flow (vph)	0	29	103	321	737	2	2	656	31	31	424	18
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	132	0	0	321	739	0	0	720	0	0	442	0
Confl. Peds. (#/hr)						166	166			546		
Confl. Bikes (#/hr)					2	55			100	18	3	
Heavy Vehicles (%)	0%	0%	0%	1%	5%	0%	0%	5%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	10	10	0	0	12	12	0	0
Parking (#/hr)									1	1	1	1
Turn Type				Prot			Perm				Over	
Protected Phases	5			6	1 6			1			6	
Permitted Phases							1					
Actuated Green, G (s)	14.0			23.2	73.0			42.8			23.2	
Effective Green, g (s)	16.0			26.2	76.0			45.8			26.2	
Actuated g/C Ratio	0.16			0.26	0.76			0.46			0.26	
Clearance Time (s)	6.0			7.0				7.0			7.0	
Vehicle Extension (s)	2.0			2.0				2.0			2.0	
Lane Grp Cap (vph)	268			393	2147			1009			629	
v/s Ratio Prot	c0.08			c0.21	0.26						0.18	
v/s Ratio Perm								c0.33				
v/c Ratio	0.49			0.82	0.34			0.71			0.70	
Uniform Delay, d1	38.3			34.6	3.9			21.8			33.4	
Progression Factor	1.00			1.41	0.26			0.37			1.00	
Incremental Delay, d2	0.5			6.7	0.0			3.8			2.9	
Delay (s)	38.8			55.5	1.0			11.9			36.3	
Level of Service	D			E	A			B			D	
Approach Delay (s)	38.8				17.5			11.9				
Approach LOS	D				B			B				

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
5: Huntington Avenue & Massachusetts Avenue

6/14/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1700	1700	1700	1700	1700	1600	1600	1600	1600	1600	1600
Lane Width	12	11	12	11	11	11	12	12	16	12	10	10
Total Lost time (s)		7.5			7.5	5.5	4.0	7.0			7.0	
Lane Util. Factor		0.95			1.00	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.85			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	
Frt		0.94			1.00	0.85	1.00	0.99			0.98	
Flt Protected		0.98			0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		2099			1341	1221	1368	2615			2414	
Flt Permitted		0.98			0.96	1.00	0.95	1.00			1.00	
Satd. Flow (perm)		2099			1341	1221	1368	2615			2414	
Volume (vph)	112	25	103	289	39	89	123	838	89	0	922	102
Peak-hour factor, PHF	0.86	0.86	0.86	0.94	0.94	0.94	0.96	0.96	0.96	0.94	0.94	0.94
Adj. Flow (vph)	130	29	120	307	41	95	128	873	93	0	981	109
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	279	0	0	348	95	128	966	0	0	1090	0
Confl. Peds. (#/hr)			219			351						
Confl. Bikes (#/hr)			3			1			55			22
Heavy Vehicles (%)	5%	8%	3%	6%	3%	3%	0%	3%	0%	50%	4%	1%
Turn Type	Split			Split		custom	Prot					
Protected Phases	6	6		5	5	5	7	1 7			1	
Permitted Phases						5						
Actuated Green, G (s)		15.7			19.0	19.0	8.3	44.3			29.0	
Effective Green, g (s)		15.2			18.5	20.5	11.3	44.3			29.0	
Actuated g/C Ratio		0.15			0.18	0.20	0.11	0.44			0.29	
Clearance Time (s)		7.0			7.0	7.0	7.0				7.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0				0.2	
Lane Grp Cap (vph)		319			248	250	155	1158			700	
v/s Ratio Prot		c0.13			c0.26	0.08	0.09	c0.37			c0.45	
v/s Ratio Perm												
v/c Ratio		0.96dr			1.40	0.38	0.83	0.83			1.56	
Uniform Delay, d1		41.5			40.8	34.3	43.4	24.6			35.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00			0.81	
Incremental Delay, d2		21.8			203.9	0.4	27.5	5.1			255.6	
Delay (s)		63.2			244.7	34.6	70.9	29.7			284.5	
Level of Service		E			F	C	E	C			F	
Approach Delay (s)		63.2			199.6			34.5			284.5	
Approach LOS		E			F			C			F	

Intersection Summary			
HCM Average Control Delay	156.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	29.0
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: Huntington Avenue & Driveway West

2018 Build Conditions
Evening Peak Period

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	0	385	8	0	62
Peak Hour Factor	0.92	0.92	0.91	0.91	0.70	0.70
Hourly flow rate (vph)	0	0	423	9	0	89
Pedestrians		373			373	
Lane Width (ft)		11.0			13.0	
Walking Speed (ft/s)		4.0			4.0	
Percent Blockage		28			34	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		260	507			
pX, platoon unblocked						
vC, conflicting volume	805				800	962
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	805				800	962
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	28
cM capacity (veh/h)	549				216	123

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	0	282	150	89
Volume Left	0	0	0	0	0
Volume Right	0	0	0	9	89
cSH	1700	1700	1700	1700	123
Volume to Capacity	0.00	0.00	0.17	0.09	0.72
Queue Length 95th (ft)	0	0	0	0	100
Control Delay (s)	0.0	0.0	0.0	0.0	87.0
Lane LOS					F
Approach Delay (s)	0.0		0.0		87.0
Approach LOS					F

Intersection Summary			
Average Delay	14.8		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
7: Huntington Avenue & Cumberland Street

2018 Build Conditions
Evening Peak Period

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	12	16
Total Lost time (s)	4.0			4.0		4.0
Lane Util. Factor	0.91			0.86		1.00
Frpb, ped/bikes	1.00			1.00		1.00
Flpb, ped/bikes	1.00			1.00		1.00
Frt	0.99			1.00		0.86
Flt Protected	1.00			1.00		1.00
Satd. Flow (prot)	4096			5307		1500
Flt Permitted	1.00			1.00		1.00
Satd. Flow (perm)	4096			5307		1500
Volume (vph)	686	65	0	789	0	58
Peak-hour factor, PHF	0.97	0.97	0.92	0.92	0.68	0.68
Adj. Flow (vph)	707	67	0	858	0	85
RTOR Reduction (vph)	5	0	0	0	0	79
Lane Group Flow (vph)	769	0	0	858	0	6
Confl. Bikes (#/hr)		5				
Heavy Vehicles (%)	5%	2%	0%	5%	0%	0%
Bus Blockages (#/hr)	0	0	20	20	0	0
Parking (#/hr)	1	1				1
Turn Type						custom
Protected Phases	6			1 2		5
Permitted Phases						
Actuated Green, G (s)	66.8			77.2		6.4
Effective Green, g (s)	66.8			77.2		6.4
Actuated g/C Ratio	0.74			0.86		0.07
Clearance Time (s)	4.0					4.0
Vehicle Extension (s)	2.0					2.0
Lane Grp Cap (vph)	3040			4552		107
v/s Ratio Prot	c0.19			c0.16		0.00
v/s Ratio Perm						
v/c Ratio	0.25			0.19		0.06
Uniform Delay, d1	3.7			1.1		39.0
Progression Factor	1.00			1.00		1.00
Incremental Delay, d2	0.2			0.0		0.1
Delay (s)	3.9			1.1		39.1
Level of Service	A			A		D
Approach Delay (s)	3.9			1.1	39.1	
Approach LOS	A			A	D	

Intersection Summary

HCM Average Control Delay	4.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: Huntington Avenue & Belvidere Street

2018 Build Conditions
Evening Peak Period

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	10	11	10	10	11	11	12	16	12	12
Total Lost time (s)		4.0	4.0			4.0	4.0	4.0		4.0		
Lane Util. Factor		1.00	0.95			1.00	0.95	1.00		1.00		
Frpb, ped/bikes		1.00	0.97			1.00	1.00	0.46		0.99		
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00		1.00		
Frt		1.00	0.99			1.00	1.00	0.85		0.97		
Flt Protected		0.95	1.00			0.95	1.00	1.00		0.99		
Satd. Flow (prot)		1431	2688			1486	2991	613		1827		
Flt Permitted		0.95	1.00			0.95	1.00	1.00		0.89		
Satd. Flow (perm)		1431	2688			1486	2991	613		1640		
Volume (vph)	21	164	516	45	83	158	715	324	43	131	52	5
Peak-hour factor, PHF	0.92	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.90	0.90	0.90	0.85
Adj. Flow (vph)	23	173	543	47	87	168	761	345	48	146	58	6
RTOR Reduction (vph)	0	0	5	0	0	0	0	169	0	10	0	0
Lane Group Flow (vph)	0	196	585	0	0	255	761	176	0	242	0	0
Confl. Peds. (#/hr)				230				861				
Confl. Bikes (#/hr)				1				13			15	
Heavy Vehicles (%)	0%	11%	3%	0%	2%	2%	5%	5%	0%	2%	0%	0%
Parking (#/hr)			1	1								
Turn Type	Prot	Prot			Prot	Prot		Perm	Perm			D.P+P
Protected Phases	5	5	2		1	1	6			4		3
Permitted Phases								6	4			4
Actuated Green, G (s)		17.9	40.9			20.2	43.2	43.2		20.9		
Effective Green, g (s)		17.9	41.9			20.2	44.2	44.2		21.9		
Actuated g/C Ratio		0.16	0.38			0.18	0.40	0.40		0.20		
Clearance Time (s)		4.0	5.0			4.0	5.0	5.0		5.0		
Vehicle Extension (s)		2.0	2.0			2.0	2.0	2.0		2.0		
Lane Grp Cap (vph)		233	1024			273	1202	246		327		
v/s Ratio Prot		0.14	0.22			c0.17	0.25					
v/s Ratio Perm								c0.29		c0.15		
v/c Ratio		0.84	0.57			0.93	0.63	0.72		0.74		
Uniform Delay, d1		44.7	26.9			44.2	26.4	27.6		41.4		
Progression Factor		1.00	1.00			1.00	1.00	1.00		1.00		
Incremental Delay, d2		22.2	2.3			36.6	2.5	16.4		7.3		
Delay (s)		66.9	29.3			80.8	28.9	44.0		48.7		
Level of Service		E	C			F	C	D		D		
Approach Delay (s)			38.6				42.5			48.7		
Approach LOS			D				D			D		

Intersection Summary

HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL	SBT	SBR
Lane Configurations			
Ideal Flow (vphpl)	1900	1900	1900
Lane Width	12	12	11
Total Lost time (s)	4.0	4.0	
Lane Util. Factor	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.95	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1594	3001	
Flt Permitted	0.36	1.00	
Satd. Flow (perm)	612	3001	
Volume (vph)	106	140	64
Peak-hour factor, PHF	0.89	0.89	0.89
Adj. Flow (vph)	119	157	72
RTOR Reduction (vph)	0	49	0
Lane Group Flow (vph)	125	180	0
Confl. Peds. (#/hr)			
Confl. Bikes (#/hr)			7
Heavy Vehicles (%)	2%	2%	4%
Parking (#/hr)			
Turn Type	D.P+P		
Protected Phases	3	3 4	
Permitted Phases	4		
Actuated Green, G (s)	30.9	34.9	
Effective Green, g (s)	31.9	35.9	
Actuated g/C Ratio	0.29	0.33	
Clearance Time (s)	4.0		
Vehicle Extension (s)	2.0		
Lane Grp Cap (vph)	267	979	
v/s Ratio Prot	c0.04	0.06	
v/s Ratio Perm	0.09		
v/c Ratio	0.47	0.18	
Uniform Delay, d1	31.1	26.6	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.5	0.0	
Delay (s)	31.6	26.6	
Level of Service	C	C	
Approach Delay (s)		28.4	
Approach LOS		C	

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Stop			Stop	
Volume (vph)	0	0	0	82	87	459	0	0	0	226	24	12
Peak Hour Factor	0.25	0.25	0.25	0.92	0.92	0.92	0.73	0.73	0.73	0.85	0.85	0.85
Hourly flow rate (vph)	0	0	0	89	95	499	0	0	0	266	28	14

Direction, Lane #	WB 1	WB 2	SB 1	SB 2
Volume Total (vph)	184	499	280	28
Volume Left (vph)	89	0	266	0
Volume Right (vph)	0	499	0	14
Hadj (s)	0.31	-0.70	0.51	-0.35
Departure Headway (s)	5.8	4.8	6.6	5.8
Degree Utilization, x	0.30	0.67	0.51	0.05
Capacity (veh/h)	594	731	517	586
Control Delay (s)	10.1	15.8	15.2	7.8
Approach Delay (s)	14.3		14.5	
Approach LOS	B		B	

Intersection Summary

Delay	14.4		
HCM Level of Service	B		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)		4.0					4.0	4.0				
Lane Util. Factor		0.95					1.00	1.00				
Frpb, ped/bikes		0.98					1.00	0.99				
Flpb, ped/bikes		1.00					1.00	1.00				
Frt		0.95					1.00	0.92				
Flt Protected		1.00					0.95	1.00				
Satd. Flow (prot)		2832					1562	1452				
Flt Permitted		1.00					0.95	1.00				
Satd. Flow (perm)		2832					1562	1452				
Volume (vph)	63	394	219	0	0	0	292	168	186	0	0	0
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92
Adj. Flow (vph)	67	419	233	0	0	0	311	179	198	0	0	0
RTOR Reduction (vph)	0	55	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	664	0	0	0	0	311	377	0	0	0	0
Confl. Bikes (#/hr)			45						12			
Heavy Vehicles (%)	3%	4%	1%	0%	0%	0%	4%	1%	13%	0%	0%	0%
Turn Type	Perm						Split					
Protected Phases		1					3	3				
Permitted Phases	1											
Actuated Green, G (s)		34.6					26.0	26.0				
Effective Green, g (s)		36.6					27.0	27.0				
Actuated g/C Ratio		0.41					0.30	0.30				
Clearance Time (s)		6.0					5.0	5.0				
Vehicle Extension (s)		2.0					2.0	2.0				
Lane Grp Cap (vph)		1152					469	436				
v/s Ratio Prot							0.20	c0.26				
v/s Ratio Perm		0.23										
v/c Ratio		0.58					0.66	0.86				
Uniform Delay, d1		20.7					27.5	29.8				
Progression Factor		1.00					1.00	1.00				
Incremental Delay, d2		2.1					2.7	15.7				
Delay (s)		22.8					30.3	45.5				
Level of Service		C					C	D				
Approach Delay (s)		22.8			0.0			38.6			0.0	
Approach LOS		C			A			D			A	

Intersection Summary

HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	26.4
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	225	0	0	623	57	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	245	0	0	677	62	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)				480		
pX, platoon unblocked						
vC, conflicting volume			245		583	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			245		583	122
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		86	95
cM capacity (veh/h)			1333		448	912

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	163	82	226	451	104
Volume Left	0	0	0	0	62
Volume Right	0	0	0	0	42
cSH	1700	1700	1333	1700	565
Volume to Capacity	0.10	0.05	0.00	0.27	0.18
Queue Length 95th (ft)	0	0	0	0	17
Control Delay (s)	0.0	0.0	0.0	0.0	12.8
Lane LOS					B
Approach Delay (s)	0.0		0.0		12.8
Approach LOS					B

Intersection Summary

Average Delay	1.3		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix C

Air Quality Appendix

AIR QUALITY APPENDIX

Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 4.5 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale air quality analysis.

Motor Vehicle Emissions

The EPA MOBILE6.2 computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2013 and 2018 for speed limits of 2.5, 10, 15, and 30 mph for use in the microscale analyses. The 10 mph rate was used to estimate parking garage emissions.

CAL3QHC

For the intersections studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOBILE6.2. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness (z_0) of 175 cm was used for all intersections. Idle emission rates for queue links were based on 2.5 mph emission rates derived in MOBILE6.2 and converted from grams per mile to grams per hour. Emission rates for speeds of 10, 15, and 30 mph were used for right turn, left turn, and free flow links, respectively.

Belvedere Dalton - Christian Science Center - Boston, MA
Calculation of Microscale Modeling Emission Factors
Summary of MOBILE6 Output

Carbon Monoxide Only

Queues	Idle
Free Flow	30 mph
Right Turns	10 mph
Left Turns	15 mph

Winter	**2013**	**2018**	**Units**
Idle	46.840	42.335	g/hr
2.5 mph	18.736	16.934	g/mile
10 mph	10.195	9.284	g/mile
15 mph	9.193	8.380	g/mile
30 mph	8.237	7.521	g/mile

Note: Winter CO emission factors are higher than Summer and are conservatively used

Due to excessive size CAL3QHC, and MOBILE6.2 input and output files are available on digital media upon request.

Appendix D

LEED Checklists

Project Name: Belvidere Dalton High Rise | Project Address: Boston, MA 02115 US

LEED 2009 for New Construction and Major Renovations

Project Checklist

Sustainable Sites — Possible Points: 26

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

Water Efficiency — Possible Points: 10

Y	N	?			
6	2	2		**Water Efficiency**	**Possible Points: 10**
Y			Prereq 1	Water Use Reduction—20% Reduction	
4			Credit 1	Water Efficient Landscaping	2 to 4
	2		Credit 2	Innovative Wastewater Technologies	2
2		2	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

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

Materials and Resources — Possible Points: 14

Y	N	?			
5	7	2		**Materials and Resources**	**Possible Points: 14**
Y			Prereq 1	Storage and Collection of Recyclables	
	3		Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
	1		Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
	2		Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

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

Indoor Environmental Quality — Possible Points: 15

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

Innovation and Design Process — Possible Points: 6

Y	N	?			
2		4		**Innovation and Design Process**	**Possible Points: 6**
1			Credit 1.1	Exemplary Performance SSc4.1	1
		1	Credit 1.2	Exemplary Performance MRc5	1
		1	Credit 1.3	Pilot Credit 14: Walkable Streets	1
		1	Credit 1.4	Pilot Credit 48: Discovery—Analysis to Support Integrative Process	1
		1	Credit 1.5	Pilot Credit 49: Implementing Strategies—Analysis to Support Integrat	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

Y	N	?			
3	1			**Regional Priority Credits**	**Possible Points: 4**
	1		Credit 1.1	02115 Regional Priority: SSc3, Brownfield Redevelopment	1
1			Credit 1.2	02115 Regional Priority: SSc7.1, Stormwater Design, Quantity Control	1
1			Credit 1.3	02115 Regional Priority: SSc7.1, Heat Island Effect—Non-Roof	1
1			Credit 1.4	02115 Regional Priority: SSc7.2, Heat Island Effect—Roof	1

Total — Possible Points: 110

Y	N	?		
64	30	16	**Total**	**Possible Points: 110**

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

Project Name: Belvidere Dalton Mid Rise | Project Address: Boston, MA 02115 US

LEED 2009 for New Construction and Major Renovations

Project Checklist

Sustainable Sites — Possible Points: 26

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

Water Efficiency — Possible Points: 10

Y	N	?			
6	2	2		**Water Efficiency**	
Y			Prereq 1	Water Use Reduction—20% Reduction	
4			Credit 1	Water Efficient Landscaping	2 to 4
	2		Credit 2	Innovative Wastewater Technologies	2
2		2	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y	N	?			
10	15	10		**Energy and Atmosphere**	
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
3	6	10	Credit 1	Optimize Energy Performance	1 to 19
	7		Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
3			Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y	N	?			
5	7	2		**Materials and Resources**	
Y			Prereq 1	Storage and Collection of Recyclables	
	3		Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
	1		Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
	2		Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

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

Indoor Environmental Quality — Possible Points: 15

Y	N	?			
12		3		**Indoor Environmental Quality**	
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
		1	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
1			Credit 7.2	Thermal Comfort—Verification	1
		1	Credit 8.1	Daylight and Views—Daylight	1
1			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

Y	N	?			
2		4		**Innovation and Design Process**	
1			Credit 1.1	Exemplary Performance SSc4.1	1
		1	Credit 1.2	Exemplary Performance MRc5	1
		1	Credit 1.3	Pilot Credit 14: Walkable Streets	1
		1	Credit 1.4	Pilot Credit 48: Discovery—Analysis to Support Integrative Process	1
		1	Credit 1.5	Pilot Credit 49: Implementing Strategies—Analysis to Support Integrat	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

Y	N	?			
3	1			**Regional Priority Credits**	
	1		Credit 1.1	02115 Regional Priority: SSc3, Brownfield Redevelopment	1
1			Credit 1.2	02115 Regional Priority: SSc7.1, Stormwater Design, Quantity Control	1
1			Credit 1.3	02115 Regional Priority: SSc7.1, Heat Island Effect—Non-Roof	1
1			Credit 1.4	02115 Regional Priority: SSc7.2, Heat Island Effect—Roof	1

Total — Possible Points: 110

Y	N	?	
58	30	22	**Total**

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

Appendix E

Climate Change Preparedness Questionnaire

APPENDIX E CLIMATE CHANGE PREPAREDNESS QUESTIONNAIRE

In conformance with Mayor Menino's 2011 Climate Action Leadership Committee's recommendations, the Proponent has preliminarily completed a Climate Change Preparedness Questionnaire for both the High-rise and Mid-rise buildings. Given the preliminary level of design, the responses are also preliminary and may be changed as the Project design advances.

Climate Change Preparedness Questionnaire – High-rise Building

Boston Climate Change Preparedness Questionnaire

1. Project Type

1. Is this project a:

Single building

2. At what phase is this project?

PNF Submitted

2. Phased, multi-building project

Project Identification

3. Single building project

3. Project Identification:

Project Name : Belvidere/ Dalton Project High-rise
Primary Project Address : Dalton Street, Boston, MA

4. Master Plan

Project Identification

5. Institutional Master Plan

Project Identification

6. Project Information

4. Project Contact:

Name : David Hewett
Title : Associate
Company : Epsilon Associates, Inc.
Email Address : dhewett@epsilonassociates.com
Phone Number : (978) 461-6215

Email Address to send completed questionnaire:

5. Team Description:

Owner / Developer : CL BD LLC c/o Carpenter and Company Inc
Architect : Cambridge Seven Associates/ Pei Cobb Freed & Partners
Engineer (building systems) : WSP
Sustainability / LEED : Cambridge Seven Associates

Permitting : Epsilon Associates, Inc.
Construction Management : Tishman Construction
Climate Change Expert : Epsilon Associates, Inc.

7. Building Classification and Description

6. Building Uses - check all appropriate uses:

Assembly
Residential - Multi-unit, Four plus

7. Building First Floor Uses - list all:

Restaurant, hotel lobby, residential lobby

8. Construction Type – select most appropriate type:

Concrete Frame

9. Building Size: do not include commas

Site Area (Square Feet) : 28,544
Building Area (Square Feet) : 712,500
Building Height (Feet) : 691
Number of Stories (Floors) : 56
First Floor Elevation (Feet above sea level) : 18 ft
Number of below grade levels : 2

8. Green Building

10. Which LEED Rating System(s) has or will your project use (by area for projects using multiple rating systems):

	Rating System
Primary Use	LEED 2009 for New Construction
Secondary Use	
Additional Uses	

11. What are the projected LEED Rating System Outcome(s):

	Rating System
Primary Use	Gold
Secondary Use	
Additional Uses	

12. Is or will the Project Register with the US Green Building Council

No

13. Is or will the Project Seek US Green Building Council Certification:

No

9. Higher Temperatures and Heat Waves - Analysis and General Strategies

14. Analysis Sources:

List Climate Change information sources : http://www.climatechoices.org/ne/

15. What time span of Climate Change was considered:

None

16. Analysis Conditions:

What Low Temperature will be used for project planning (degrees) : 0
What High Temperature will be used for project planning (degrees) : 100

17. What Extreme Heat Event characteristics will be used for project planning:

Peak High (degrees) : 100
Duration (days) : 4
Number of events per year : 2

18. What measures will the project employ to reduce urban heat-island effect:

Shade trees
High reflective roof materials
Vegetated roof materials
Other: Grass

19. Will the project be able to manage hotter and more humid summers without increasing its electrical load; if so how?

No

20. Will the building remain operable without utility power for an extended period; if so for how long and by what strategies?

If Yes, for how long (days) and describe strategies: 1 day using an emergency power generator

10. High Temperatures and Heat Waves - Active and Passive Strategies

21. What will be the overall energy performance of the project or building (percentage above code)

20%

22. How will project energy performance be determined

Whole Building Energy Model

23. What specific measures will the project employ to reduce building energy consumption

High performance lighting
Automatic lighting controls
EnergyStar equipment / appliances
High performance HVAC equipment
Energy recovery ventilation
Describe any added measures: Variable frequency drives/ High efficiency domestic water heating equipment

24. What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure

None

25. Will the project employ Smart Grid Infrastructure and / or Systems

No

26. Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure

Operable windows (including emergency only)
Natural ventilation
Potable water storage for drinking / food preparation
Potable water for sinks / sanitary systems
High performance building envelop

27. List the R values for building envelope elements:

Roof : 21
Walls : 27
Floors / Slab : 18
Foundation / Basement : 16
Windows : 2.6
Doors : 3.6

11. Sea-Level Rise and Storms – location analysis and description

28. Location Description:

Site Elevation - low point (feet above sea level) : 16
Site Elevation - high point (feet above sea level) : 18

29. Location Classification - is the site or building located in any of the following:

	Yes	No
Coastal Zone		✓
Velocity Zone		✓
Flood Zone		✓
Area Prone to Flooding		✓

30. Are updates in the floodplain delineation due to climate change likely to change the classification of the site or building location:

No

31. What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding (horizontal distance in feet)

1,700 feet

12. Sea-Level Rise and Storms – analysis and general strategies

Analysis Sources:

What time span of Climate Change and Rising Sea-Levels was considered:

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

13. Sea-Level Rise and Storms - Building Flood Proofing

Will the building remain occupiable without utility power during a period of extended inundation:

Will the proposed ground floor be raised in response to Sea Level Rise:

Will the proposed ground floor be raised in response to Sea Level Rise:

Will lower building levels be constructed in a manner to prevent water penetration:

Describe measures and strategies intended to ensure the integrity of critical building systems during a flood or severe storm event:

Were the differing effects of fresh water and salt water flooding considered:

Will the project site and building(s) be accessible during periods of inundation or limited circulation and / or access to transportation:

Describe any additional Building Floor Proofing strategies?

14. Sea-Level Rise and Storms - Building Resiliency and Adaptability

Will the building be able to withstand severe storm impacts and endure temporary inundation

Will the building include additional structural capacity and or building systems to accommodate future on-site renewable and or clean energy sources; if so what:

Can the site and building be reasonably modified to increase Building Flood Proofing; if so how:

Describe any additional Building Resiliency and Adaptability strategies:

Climate Change Preparedness Questionnaire – Mid-rise Building

Boston Climate Change Preparedness Questionnaire

1. Project Type

1. Is this project a:

Single building

2. At what phase is this project?

PNF Submitted

2. Phased, multi-building project

Project Identification

3. Single building project

3. Project Identification:

Project Name : Belvidere/ Dalton Project Mid-rise
Primary Project Address : Belvidere Street, Boston, MA

4. Master Plan

Project Identification

5. Institutional Master Plan

Project Identification

6. Project Information

4. Project Contact:

Name : David Hewett
Title : Associate
Company : Epsilon Associates, Inc.
Email Address : dhewett@epsilonassociates.com
Phone Number : (978) 461-6215

Email Address to send completed questionnaire:

5. Team Description:

Owner / Developer : PRG BD Investors LCC c/o Pritzker Realty Group
Architect : Cambridge Seven Associates/ Pei Cobb Freed & Partners
Engineer (building systems) : WSP
Sustainability / LEED : Cambridge Seven Associates

Permitting : Epsilon Associates, Inc.
Construction Management : TBD
Climate Change Expert : Epsilon Associates, Inc.

7. Building Classification and Description

6. Building Uses - check all appropriate uses:

Retail
Residential - Multi-unit, Four plus

7. Building First Floor Uses - list all:

Retail, Lobby

8. Construction Type – select most appropriate type:

Steel Frame
Concrete Frame

9. Building Size: do not include commas

Site Area (Square Feet) : 12,376
Building Area (Square Feet) : 237,500
Building Height (Feet) : 285
Number of Stories (Floors) : 25
First Floor Elevation (Feet above sea level) : 17
Number of below grade levels : 1

8. Green Building

10. Which LEED Rating System(s) has or will your project use (by area for projects using multiple rating systems):

	Rating System
Primary Use	LEED 2009 for New Construction
Secondary Use	
Additional Uses	

11. What are the projected LEED Rating System Outcome(s):

	Rating System
Primary Use	Silver
Secondary Use	
Additional Uses	

12. Is or will the Project Register with the US Green Building Council

No

13. Is or will the Project Seek US Green Building Council Certification:

No

9. Higher Temperatures and Heat Waves - Analysis and General Strategies

14. Analysis Sources:

List Climate Change information sources : http://www.climatechoices.org/ne/
Was there information you were unable to find : no

15. What time span of Climate Change was considered:

None

16. Analysis Conditions:

What Low Temperature will be used for project planning (degrees) : 0
What High Temperature will be used for project planning (degrees) : 100

17. What Extreme Heat Event characteristics will be used for project planning:

Peak High (degrees) : 100
Duration (days) : 4
Number of events per year : 2

18. What measures will the project employ to reduce urban heat-island effect:

Shade trees
High reflective roof materials
Vegetated roof materials

19. Will the project be able to manage hotter and more humid summers without increasing its electrical load; if so how?

No

20. Will the building remain operable without utility power for an extended period; if so for how long and by what strategies?

If Yes, for how long (days) and describe strategies: 1 day using an emergency power generator

10. High Temperatures and Heat Waves - Active and Passive Strategies

21. What will be the overall energy performance of the project or building (percentage above code)

20%

22. How will project energy performance be determined

Whole Building Energy Model

23. What specific measures will the project employ to reduce building energy consumption

High performance lighting
Automatic lighting controls
EnergyStar equipment / appliances
High performance HVAC equipment
Energy recovery ventilation
Describe any added measures: Variable frequency drives/ High efficiency domestic water heating equipment

24. What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure

None

25. Will the project employ Smart Grid Infrastructure and / or Systems

No

26. Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure

Operable windows (including emergency only)
Natural ventilation
Potable water storage for drinking / food preparation
High performance building envelop

27. List the R values for building envelope elements:

Roof : 21
Walls : 27
Floors / Slab : 16
Foundation / Basement : 18
Windows : 2.6
Doors : 3.6

11. Sea-Level Rise and Storms – location analysis and description

28. Location Description:

Site Elevation - low point (feet above sea level) : 16
Site Elevation - high point (feet above sea level) : 18

29. Location Classification - is the site or building located in any of the following:

	Yes	No
Coastal Zone		✓
Velocity Zone		✓
Flood Zone		✓
Area Prone to Flooding		✓

30. Are updates in the floodplain delineation due to climate change likely to change the classification of the site or building location:

No

31. What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding (horizontal distance in feet)

1,700 feet

12. Sea-Level Rise and Storms – analysis and general strategies

Analysis Sources:

What time span of Climate Change and Rising Sea-Levels was considered:

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

13. Sea-Level Rise and Storms - Building Flood Proofing

Will the building remain occupiable without utility power during a period of extended inundation:

Will the proposed ground floor be raised in response to Sea Level Rise:

Will the proposed ground floor be raised in response to Sea Level Rise:

Will lower building levels be constructed in a manner to prevent water penetration:

Describe measures and strategies intended to ensure the integrity of critical building systems during a flood or severe storm event:

Were the differing effects of fresh water and salt water flooding considered:

Will the project site and building(s) be accessible during periods of inundation or limited circulation and / or access to transportation:

Describe any additional Building Floor Proofing strategies?

14. Sea-Level Rise and Storms - Building Resiliency and Adaptability

Will the building be able to withstand severe storm impacts and endure temporary inundation

Will the building include additional structural capacity and or building systems to accommodate future on-site renewable and or clean energy sources; if so what:

Can the site and building be reasonably modified to increase Building Flood Proofing; if so how:

Describe any additional Building Resiliency and Adaptability strategies: