Draft Project Impact Report

139-149 Washington Street

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

Submitted by:
AvalonBay Communities, Inc.
600 Atlantic Avenue, Floor 20
Boston, MA 02210

Prepared by:
Epsilon Associates, Inc.
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Maynard, MA 01754

In Association with:
CBT Architects
Exclusive Real Estate
Goulston & Storrs
Howard Stein Hudson
Nitsch Engineering
Sanborn Head & Associates
Gregory Lombardi Design

June 5, 2017

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Chapter 1.0

Project Summary

1.0 PROJECT SUMMARY

1.1 Project Overview

AvalonBay Communities Inc. (the Proponent) proposes the redevelopment of 139-149 Washington Street, located between Monastery Road and Fidelis Way in the Brighton neighborhood of Boston. The proposed development includes the demolition of the existing structures and the construction of two new five- to six-story residential buildings, with one building containing approximately 180 rental units and one building containing approximately 30 for-sale units (the Project).

On October 26, 2016, the Proponent submitted a Project Notification Form (PNF) to the Boston Planning and Development Agency (BPDA) outlining a proposal for the site. After submitting the PNF, the Project team met with the Impact Advisory Group (IAG) and community, as well as with the BPDA, City agencies, and elected officials. Following these meetings, the Project team evaluated the various comments and concerns expressed by the community, and in response, has made a number of changes to the Project's site plan, program and design.

The resulting Project continues to include two new residential buildings; however, density has been reduced and the number of units in the rental building has been reduced from 220 units to 180 units. The rental building has been modified to occupy a smaller footprint on the site, which allows for more generous setbacks on all four sides, and now features a U-shaped plan allowing the central courtyard to face the open space across Monastery Driveway and create a visual connection between the two spaces. Parking and access for the Project is now proposed on Fidelis Way, and the Project eliminates the existing curb cut on Washington Street. Pedestrian connections on all sides of the Project will be improved by reconnection Washington Street, Fidelis Way, and Monastery Path with upgraded public improvements. The condominium building contains approximately 30 units, and the parking ratio for the entire Project provides over one space per unit.

Located in a vibrant residential neighborhood, the Project seeks to create a seamless landscape design that will enhance the neighborhood environment. The residential atmosphere on this portion of Washington Street will be reinforced by recreating the streetscape with an increased setback, which serves as a transition from the building at Fidelis Way to the Olmsted Brothers park and the intersection with Monastery Driveway, and by allowing for a traditional sidewalk with trees, as well as a second row of trees and plantings on the property side of the sidewalk. The Project also includes extensive off-site improvements to adjacent roads and properties, including Fidelis Way and the adjacent Commonwealth Development, which is part of the Boston Housing Authority (BHA). In addition to these benefits to the public realm, the Project also provides new housing, including new home-ownership units and new affordable housing, construction and permanent jobs, and improved tax revenues for the City.

This Draft Project Impact Report (DPIR) is being submitted to the BPDA in response to the Scoping Determination issued on May 25, 2017.

1.2 AvalonBay Management

AvalonBay Communities are developed, constructed and managed by AvalonBay associates. The Project will have key management and design advantages that will help to reduce transiency and to promote community involvement with future residents.

AvalonBay Management Advantages:

- Professional on-site management;
- No undergraduates;
- No September 1 turnover;
- Leases are staggered throughout the year;
- Move-ins occur on any day of the month; and
- Loading dock is managed by on-site team.

Design Advantages:

- High percentage of family style apartments (2- and 3-bedroom): approximately 50% of the Project compared to 15-40% at nearby communities;
- Larger units: the average square footage of the apartments will be 900+ sf compared to an average of 750 sf per apartment at nearby communities;
- Management office will be located on-site, in the rental building; and
- There will be an enclosed loading dock.

1.3 Development Team

Name /Location:	139-149 Washington Street	
Proponent:	AvalonBay Communities, Inc. 600 Atlantic Avenue, Floor 20 Boston, MA 02210 (617) 654-9500	
		Michael Roberts David Gillespie Michela DeSantis
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		Alfred Wojciechowski Ken Lewandowski Catriel Tulian Jennifer Robinson
Community Outreach:	Exclusive Real Estate 10 Derne Street Boston, MA 02114 (617) 263-1157	
		Harry Collings Jay Walsh
Landscape Architect:	Gregory Lombardi Design 235 Massachusetts Avenue Cambridge, MA 02140 (617) 492-2808	
		Bill Madden Kurt Massey
Legal Counsel:	Goulston & Storrs 400 Atlantic Avenue Boston, MA 02110 (617) 482-1776	
		Marilyn Sticklor Brian Dugdale

Permitting Consultants:	Epsilon Associates, Inc. 3 Mill & Main Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Peggy Briggs Talya Moked
Transportation and Parking Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Guy Busa Michael Santos
Civil Engineer:	Nitsch Engineering 2 Center Plaza, Suite 430 Boston, MA 02108 (617) 338-0063 John Schmid Jessica Yarmarkovich
Geotechnical Consultant:	Sanborn Head & Associates 1 Technology Park Drive Westford, MA 01886 (978) 392-0900 Kevin Stetson

1.4 Project Changes since Filing the PNF

Since the filing of the PNF, the Project team has made numerous and significant revisions to the Project in response to comments made by the community, IAG, City agencies, and elected officials.

The changes to the Project are described below.

Reduced Density

The number of rental units has been reduced by 40 units in order to reduce the overall density of the Project. The number of home-ownership units is 30, and the Proponent is exploring opportunities to increase the number of home-ownership units.

Increased Setbacks and Open/Green Space

By reducing the building footprints and contributing land from all four sides of the rental building, the revised design includes more publicly accessibly open spaces and two-way streets and sidewalks. Approximately 51% of the site will be open space.

Increased Parking

In addition to the residential parking of one space per unit, the Project now includes approximately ten visitor parking spaces, and eleven new parking spaces for the Commonwealth Development.

Architecture

In addition to increasing setbacks on all four sides of the rental building, the shape of the rental building has been modified to a U-shape, and the massing steps down to five stories as it faces the three-story buildings across Washington Street. The setback along Washington Street increases as it goes from Fidelis Way to the Olmsted Brothers park. The U-shape plan creates an opening so that the residential courtyard faces the open space across Monastery Driveway and gradually steps down to support a visual connection and expansion of the two spaces.

Improved Pedestrian Connections

Adding sidewalks to all sides of the rental building and throughout the site increases connections to neighboring sites, including Monastery Path, and makes the overall Project more approachable and welcoming.

Vehicular Site Access

As described in Section 2.1.3, the PNF filing included several site access options. Since that filing, the Proponent has revised the plan and worked closely with the Boston Housing Authority and the Commonwealth Tenants Association to amend the site plan such that all parking and loading for both rental and home-ownership buildings will be from Fidelis Way.

1.5 Preliminary Project Schedule

It is anticipated that construction will commence in early 2018, and will last approximately 24 months.

1.6 Consistency with Zoning

The Project site is located in the Allston-Brighton Neighborhood District, a neighborhood district that is governed by Article 51 of the Zoning Code (the "Code"). The southern (front) portion of the Project site (fronting along Washington Street) is located in the St. Gabriel's Monastery Conservation Protection Subdistrict (the "CPS Subdistrict") and the northern (rear) portion of the Project site is located within the St. Elizabeth's Hospital Medical Center Institutional Subdistrict (the "IS Subdistrict").

After implementation of the Project, the portion of the Project site in the IS Subdistrict will no longer be operated for institutional use.

The Proponent will seek zoning relief through a number of related actions: 1) a map amendment to remove the rear potion of the Project site from the IS Subdistict and consolidate the entire Project site in the CPS Subdistrict; 2) a text amendment to Article 51 to modify certain provisions pertaining to a PDA in the CPS Subdistrict; and 3) designation of the Project site as a Planned Development Area ("PDA") and adoption of a Development Plan for the Project site.

Uses

The uses of the Project for multi-family residential (except in the basement) and accessory parking are allowed in the CPS Subdistrict, but not in the IS Subdistrict. As noted above, it is proposed to consolidate zoning of the entire Project site in the CPS Subdistrict.

Dimensional Requirements

As noted above, it is proposed to consolidate zoning of the entire Project site in the CPS Subdistrict. The Project will seek zoning relief through modification of certain bulk and dimensional requirements applicable to a PDA in the CPS Subdistrict, followed by designation of the Project Site as a PDA and adoption of a Development Plan for the Project site.

Parking and Loading

Parking and loading requirements are determined through Article 80B Large Project Review. Current plans include an internal loading dock, one parking space per residential unit and visitor parking.

1.7 Legal Information

1.7.1 Legal Judgments Adverse to the Proposed Project

The Proponent is not aware of any legal judgments in effect or other legal actions pending which involve the Project.

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

The Proponent does not own any real estate in Boston on which real estate tax payments are in arrears.

1.7.3 *Site Control/ Public Easements*

The Project site is owned by Roman Catholic Archbishop of Boston. The Proponent and Roman Catholic Archbishop of Boston are parties to a purchase and sale agreement regarding the Project site.

There are no public easements in or through the Project site, except an easement in favor of the Commonwealth of Massachusetts for tunnel for the conveyance of water, which runs in, through and under the Project site. All easements in effect will be accommodated as part of the design of the Project. See Appendix A for a site survey.

1.8 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 Name	Permit/Approval
Local	
Boston Planning and Development Agency	Article 80B Large Project Review and Execution of Related Agreements Recommendation of Text and Map Amendments to rezone portion of Site from IS Subdistrict to CPS Subdistrict and modify provisions applicable to a PDA Development Plan in CPS Subdistrict Approval of Development Plan and Recommendation of Petition for Map Amendment for PDA Designation Design Review
Boston Zoning Commission/Mayor	Approval of Text and Map Amendments to rezone portion of Site from IS Subdistrict to CPS Subdistrict and modify provisions applicable to a PDA Development Plan in CPS Subdistrict Approval of Development Plan and Map Amendment for PDA Designation
Boston Civic Design Commission	Schematic Design Review

Table 1-1 Preliminary List of Permits and Approvals (Continued)

Agency Name	Permit/Approval
Local	
Boston Transportation Department	Transportation Access Plan Agreement Construction Management Plan
Boston Water and Sewer Commission	Site Plan Review Water and Sewer Connection Permits
Public Improvement Commission/Public Works Department	Specific Repair Plan/Curb Cut Permit (as required) Permits/Canopy Licenses (as required) Agreement for Temporary Earth Retention systems, Tie-Back Systems and Temporary Support of Subsurface Construction (as required)
Public Safety Commission/Boston Committee on Licenses	Permit to Erect and Maintain Parking Structure Inflammables License
Boston Fire Department	Plan Review Approval of Fire Safety Equipment
Boston Parks and Recreation Commission	Approval for demolition/construction within 100 feet of Fidelis Way Park
Boston Landmarks Commission	Demolition delay for demolition of building over 50 years of age
Boston Inspectional Services Department	Building Permit Other Construction-Related Permits Certificates of Occupancy
Federal	
EPA	NPDES Permit for Construction Activity on 1 acre or more

Chapter 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.

2.1 Project Description

2.1.1 Project Site

The approximately 3.3-acre Project site is located at 139-149 Washington Street between Monastery Road and Fidelis Way in the Brighton neighborhood of Boston (see Figure 2-1). The site is currently home to the St. John's Seminary Theological Institute and the ABCD Allston-Brighton Head Start, as well as the adjacent parking lot. The northern portion of the site currently contains surface parking. The site includes an 18-20-foot slope from the curb to the northernmost reaches of the property line, its highest point. At this edge, the slope immediately drops off overlooking Fidelis Way Park.

2.1.2 Area Context

The immediate neighborhood surrounding the site contains a mixture of institutional, retail and residential uses. To the northwest of the site is the St. Elizabeth's Medical Center. To the west of the site is the proposed 159-201 Washington Street project, which consists of four new residential buildings ranging from one to six stories, and the rehabilitation of the St. Gabriel's Church and Monastery. To the south and east of the site there is a mixture of single family homes, duplexes, and three to six-story multi-family residential buildings. Approximately one half-mile from the site to the northwest is the Brighton Center neighborhood, which contains a variety of small retail shops and restaurants on the ground floor with offices above.

The site is in close proximity to several MBTA bus routes and subway stations, including the MBTA Green Line Washington Street subway stop, the 65 bus on Washington Street which connects the site to Brighton Center and Kenmore Square, Boston Landing and the 501/504 bus at the corner of Washington Street and Cambridge Street that provides limited stop access to downtown Boston and Back Bay. The Project site is also located along major bike routes, which has become an increasingly popular mode of transportation in recent years.

2.1.3 Project Description

The Project will include the construction of two new residential buildings connected by an access road. The first building, located on the southern portion of the site, will contain approximately 180 rental units with a mix of studio, one-bedroom, two-bedroom and three-bedroom units. The second building will be located on the northern portion of the site, and will contain approximately 30 condominiums with a mix of one-bedroom, two-bedroom

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Figure 2-1
Aerial Locus Map

and three-bedroom units. Approximately 180 parking spaces will be located on the lower floors of the first building, approximately 30 parking spaces will be on the ground level of the second building, and approximately 10 additional spaces will be on the road between the two buildings, which will result in a total parking ratio of approximately 1.05 spaces per unit. The Project will include an approximately 15,000 sf central courtyard as an amenity for the residents, with potential additional amenity space included on the roofs of the buildings (see Figure 2-2 for a site plan). Table 2-1 presents the Project program, and Table 2-2 presents the anticipated unit mix for each building. Floor plans and elevations are presented in Appendix B.

Table 2-1 Project Program

Project Element	Approximate Dimension
Residential	
Rental units	180
Home-ownership units	30
Total Square Footage	**247,000 sf**
Height	Zoning height of 69 feet Height along Washington Street is approximately 62 feet (5 Stories)
Parking	220 spaces
FAR (not including parking)	1.7
Dwelling Units	64 units/acre

Table 2-2 Unit Mix

	Rental		Home Ownership	
Unit Type	Number of Units	Average Size	Number of Units	Average Size
Studio	25	500 sf	-	-
1-Bed	66	750 sf	5	825 sf
2-Bed	75	1,100 sf	15	1,200 sf
3-Bed	14	1,350 sf	10	1,850 sf
TOTAL	**180**	**908 sf**	**30**	**1,354 sf**

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Figure 2-2
Site Plan

The Project will include several massing and architectural elements to effectively integrate into the neighborhood context. The Project will place residential units at street level along Washington Street with direct entry units, emphasizing the residential nature of the neighborhood. The height along Washington Street will be five stories in order to relate to the context between Commonwealth Avenue and Monastery Road along Washington Street, thus re-establishing a contextual residential experience. Loading, trash and move-in operations will be contained within the building.

The Project will enhance the streetscape by increasing the setbacks on all four sides of the rental building, which will provide a unique opportunity to improve connections that benefit the community. Pedestrian connections on all sides of the Project will be improved by reconnecting Washington Street, Fidelis Way and Monastery Path with upgraded public improvements. The setback from the Washington Street curb will be increased from the existing 25 feet to a range of 25 to 45 feet, allowing for a traditional sidewalk with two rows of trees and plantings, creating a front yard experience to match that of the neighborhood context across the street and providing a transition from Fidelis Way (10′ setback at Hamilton Company building) to the Olmsted Brothers park (see Figure 2-3).

Site Access

In the PNF, parking and access were proposed via a relocated curb cut on the portion of the Project site fronting Washington Street, with two alternative access options presented. Since that filing, the Proponent has revised the plan and worked closely with the Boston Housing Authority and the Commonwealth Tenants Association to amend the site plan such that all parking and loading for both the rental and home-ownership buildings will be from Fidelis Way. This allows the Proponent to eliminate an existing curb cut on Washington Street. There will be dedicated garage access to the rental building, allowing all loading, service and delivery activity to occur on site. A second point of access will be provided to allow direct access to the 30-unit home-ownership building in the rear of the site.

The Proponent and the Boston Housing Authority are in the process of signing an agreement which allows the Proponent to access the Project site via Fidelis Way. As part of this agreement, the Project will include significant improvements to Fidelis Way. The Project will add approximately 11 new on-street parking spaces that will be reserved for Commonwealth Development permit parking. The segment of Fidelis Way between the Commonwealth Development community center and Washington Street currently provides 1.5 travel lanes, and a sidewalk and parking lane only on the east side of the street. Fidelis Way will be upgraded and widened to include sidewalks and parking lanes on both sides of the street, as well as two travel lanes. The existing and proposed conditions on Fidelis Way are shown in Figures 2-4 and 2-5, respectively. These improvements will allow for traffic calming and enhanced safety for all members of the community. A comprehensive signage

Figure 2-3
Setbacks from Curb

139-149 Washington Street   Boston, Massachusetts

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Figure 2-4

Fidelis Way – Existing Conditions

Figure 2-5
Fidelis Way – Proposed Conditions

and resident education program will be developed, which will force all traffic from the Project site toward Washington Street, discouraging access through the remainder of Fidelis Way and Jette Court. The widening of Fidelis Way will be accomplished by using land from the Project site.

The reconstruction and reconfiguration of an existing 27-space parking area that currently serves the community center will be required in order to create a through connection to a new roadway on the site that will provide access to the home-ownership building. The reconstruction of the parking area will be accomplished by using land on the north side of the Project site. A new connection will be provided along the north side of the building, and the parking area that serves the community center will be reconfigured to better delineate the parking and travel lanes. The reconfiguration will retain and enhance all 27 parking spaces for this area. The existing and proposed conditions are presented in Figures 2-6 and 2-7, respectively.

As part of the agreement with the Boston Housing Authority, the Proponent will also expand the play area for the After-School Program located at the Commonwealth Development by using land from the Project site and provide funds to upgrade Commonwealth Development facilities (e.g., kitchen) used by both the After-School and Job Training programs.

2.2 Public Benefits

The Project will generate many public benefits for the surrounding neighborhood and the City of Boston as a whole, both during construction and on an ongoing basis upon its completion.

Improved Street and Pedestrian Environment

The Project will enhance the streetscape by increasing the setbacks on all four sides of the rental building, which will provide a unique opportunity to improve connections that benefit the community. Pedestrian connections on all sides of the Project will be improved by reconnecting Washington Street, Fidelis Way and Monastery Path with upgraded public improvements. Specifically, increasing and staggering the setback on Washington Street will allow the Project to soften the building edge and better meet the existing context at Fidelis Way, while opening up the view corridor to the Olmstead Brothers Park. On Fidelis Way, widening will allow for tree plantings and a true two-way street versus its current non-traditional width of 1.5 travel lanes. On the rear side of the rental building, the driveway between the rental building and Commonwealth Development Community Building will be widened to allow for proper two-way traffic and parallel and head-in parking, as well as new sidewalks and street trees. On Monastery Path, widening will allow for a landscape buffer that better aligns with the proposed 159-201 Washington Street project and Olmsted Brothers park.

Figure 2-6

Community Center Drive – Existing Conditions

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Figure 2-7

Community Center Drive – Proposed Conditions

Fidelis Way Improvements

The Proponent will improve Fidelis Way by increasing the usable width using property on the Project site. This widening will allow Fidelis Way to function as a true two-way street with a greatly enhanced functionality for pedestrian use, traffic flows and parking. Specifically, the community will benefit from a safer and more open Fidelis Way that has two properly sized traffic lanes, ADA compliant sidewalks on both sides of the street, traffic calming measures, a bus shelter, and increased and improved landscaping.

Open Space

By increasing setbacks and reducing building density, meaningful open space will be created (over 50% of the site) that will contribute to the Olmsted Brothers park and the connection between Fidelis Way Park, 159-201 Washington and the Commonwealth Development. By blending landscape buffers in cooperation with the adjacent 159-201 Washington Street project, the Boston Housing Authority and Commonwealth Tenants Association, the surrounding area will be reconnected, which will increase pedestrian access and public use of the existing and enhanced open spaces, including Fidelis Way Park.

Neighborhood Connection

The Project will serve as a conduit to reconnect parts of the neighborhood currently separated by the site's former institutional use. With improved pedestrian, bike and vehicular access and connections, the Project will provide a more welcoming point of entry which will enhance the existing connection to Warren Street, the Commonwealth Development, the proposed 159-201 Washington Street project and its restored historic uses, and the under-utilized Fidelis Way Park. By creating a welcoming, approachable and public-friendly environment, the Project has the opportunity to serve as an entry point and connector of currently separate areas of the neighborhood.

Improvements to the Commonwealth Development

The Project will provide benefits to the Commonwealth Development, a large and long-standing part of the Brighton community, by expanding the play area for the After-School Program using land from the Project site, and by providing funds to upgrade on-site facilities (e.g., kitchen) used by both the After-School and Job Training programs. The Proponent will also create an improved parking layout exclusively for the Commonwealth Development, which includes 27 enhanced and properly sized existing spaces and approximately 11 additional parking spaces.

Smart Growth/Transit-Oriented Development

The Project is consistent with smart-growth and transit-oriented development principles. The Project site is well served by existing public transportation, including major regional rapid transit, and bus lines that provide easy access to the Project site from the Greater Boston region. In addition, bike parking will be provided on-site, and the Proponent will investigate the feasibility of alternate forms of transportation including Zipcar and various ride-sharing options available at the time of occupancy.

Additional Home-ownership Opportunities

The Project currently includes approximately 30 home-ownership units. The reduction in density since filing the PNF has been taken exclusively from the rental portion of the Project. The Proponent is exploring the opportunity to add additional condominium units to the site while maintaining a parking ratio of one space/unit for residents.

To continue to reduce transiency and promote community involvement, the Proponent will commit to restricting at least 50% of the home-ownership units to owner-occupied units. The Proponent will continue to study what the appropriate mechanism is to enforce owner occupancy.

Affordable Housing

The Project will comply with the applicable Inclusionary Development Policy (IDP) by providing on-site affordable units in both the rental and home-ownership buildings. 13% of the Project's total units will be affordable. Affordable units will be distributed across all levels of the building. The affordable unit mix will be the same as the anticipated market-rate unit mix. Sizes will be determined as the Project proceeds through design review. In accordance with the IDP, rental units will be designated as affordable to households earning less than or equal to 70% of the area median income (AMI). No less than 50% of the home-ownership units will be designated as affordable to households earning less than or equal to 80% of the AMI. No more than 50% of the home-ownership units will be designated as affordable to households earning 80%-100% of the AMI.

Sustainable Design/Green Building

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

Increased Employment

The Project will create approximately 250 construction jobs and approximately 15 permanent jobs upon stabilization.

New Property Tax

The Project will result in significantly increased tax revenues compared to the existing use. Tax revenue generated by the Project is anticipated to be over $700,000 per year, which is 20 times greater than the existing tax revenue generated by the Project site.

2.3 Public Participation

The Proponent and its Project team have continued to meet with elected officials, the City of Boston, the IAG for the Project, neighborhood groups, abutters, and other interested parties to discuss the Project.

The Proponent has met with elected officials and City agencies, including: City Councilor Ciommo, Representative Honan, the Mayor's Office of Neighborhood Services, the Boston Transportation Department (BTD), the Boston Housing Authority, Boston Parks Department and the BPDA.

Neighborhood groups include the Allston Brighton Community Development Corporation (AB CDC), the Brighton Allston Improvement Association (BAIA), and the Archdiocese of Boston.

Direct abutters include Cabot, Cabot & Forbes, the Commonweath Tenants and its After-School Program, the Hamilton Company, Corcoran Management Company, the Archdioceses of Boston and St. Elizabeth's Hospital.

During the dozens of formal and informal meetings over the past year, the Proponent received constructive feedback from the community and City agencies. In response to this community feedback, several Project components were modified from the PNF filing. Major themes include:

- Density: reduced density by over 20%;
- Open/green space: increased open space to 51% of site and added publicly accessible open spaces;
- Transiency of residents: eliminated 40 rental units and made management commitments;
- Traffic and congestion: eliminated existing curb cut on Washington Street and moved access point to Fidelis Way;
- Parking: added visitor parking and increased parking ratio;

- Architecture: increased setbacks on all four sides of rental building, redesigned the building shape (stepping the massing, revising four facades of rental building, opening up courtyard to Monastery Driveway); and

- Pedestrian connections: added sidewalks to all sides of the rental building, and throughout the site, increased connections to neighbors.

The Project team will continue to meet with the community as the Project moves forward. The Proponent continues to be committed to comprehensive and effective community outreach, and will continue to engage the community to ensure public input on the Project. The Proponent looks forward to working with the BPDA and city agencies, local officials, neighbors, and others as the design and review processes move forward.

Chapter 3.0

Transportation Component

3.0 TRANSPORTATION

3.1 Introduction

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the Project. The transportation study contained in the PNF adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and BPDA Article 80 Large Project Review process. The study included an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity. The PNF also evaluated three different site access alternatives.

The analysis provided in the PNF was based on a slightly larger development program than what is proposed in this DPIR. Based on the analysis in the PNF, the Project is expected to have minimal impact to Washington Street and the surrounding roadway network. The Project was shown to result in a net decrease of traffic volumes during the weekday a.m. peak hour due to the removal of the existing day care uses on the site, and will result in a slight increase in traffic volumes during the weekday p.m. peak hour. These conclusions remain valid under the reduced development program presented in this DPIR.

Since the submission of the PNF, changes to the proposed Project have been minimal in relation to the overall transportation impacts. As shown in Table 3-1, the development program has been reduced by 40 rental units and 30 parking spaces. However, the overall parking ratio has increased from 1.0 spaces per residential unit to 1.05 spaces per unit. These changes are relatively minor and will not result in significant changes to the conclusions of the transportation study, and no additional operations analysis is necessary. Based on the analysis presented in the PNF, the Project will have minimal impact on the study area intersections and the pedestrian and public transportation facilities in the area. During the weekday a.m. peak hour, when compared to the existing uses on the site, the Project is expected to result in an overall reduction in vehicles on the roadway network due to the removal of the existing uses.

The following sections outline the changes to the Project since the filing of the PNF and the proposed transportation demand management measures to be implemented by the Proponent. A supplemental analysis of potential traffic operation improvement strategies for the Washington Street corridor between Cambridge Street and Commonwealth Avenue is also provided in this chapter at the request of BTD. The supplemental analysis incorporates the cumulative projected traffic impacts from all proposed development projects along this segment of Washington Street including 159-201 Washington Street (immediately adjacent to the west side of the Project site) and 101-105 Washington Street (located east of the Project site).

Table 3-1 Building Program Comparison

	PNF Project[1]	DPIR Project	Change
Rental Units	220	180	-40
Home-ownership Units	30	30	0
Parking Spaces	250	220	-30

1. As presented in the October 26, 2016 Project Notification Form.

The PNF also presented an analysis of three site access alternatives: Washington Street access, Fidelis Way access, and Monastery Road access. Each alternative included direct access to the Project's parking supply. Based on the Project team's review of the three options and discussions with the Commonwealth Tenants Association and BHA, it was determined that Fidelis Way was the best option. Fidelis Way is now the proposed access roadway for both buildings, as is presented in this DPIR.

3.2 Transportation Impact Assessment

This section assesses the transportation-related impacts associated with the Project and its comparison with the program as presented in the PNF. This assessment provides a detailed analysis of the transportation characteristics related to the proposed site access (Fidelis Way) and addresses trip generation for the Project.

3.2.1 Existing Conditions

A detailed assessment of existing conditions is provided in the PNF. This section pertains to the existing conditions along Fidelis Way and the existing site uses.

Fidelis Way

Fidelis Way is currently owned by the Boston Housing Authority and provides access to the Commonwealth Development residential units. Fidelis Way is a two-way roadway and runs in a circuitous route between the Commonwealth Avenue Westbound Carriage Road and Washington Street. The segment of Fidelis Way located adjacent to the Project site currently has no sidewalk on the west side (adjacent to the site) and contains overgrown brush that extends to the curb line, preventing any pedestrian activity from occurring. A picture of Fidelis Way, as seen from Washington Street is shown in Figure 3-1.

On-street parking is provided on one side of the street – in the vicinity of the Project, it is provided along the east side of Fidelis Way. On-street parking is restricted to permits issued to the tenants of the Commonwealth Development. A total of 41 parking spaces are located within the Project's area of impact. There are a total of 14 on-street spaces along the east

139-149 Washington Street   Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 3-1
Fidelis Way – Existing Condition

side of Fidelis Way, adjacent to the Project, and a total of 27 parking spaces that serve the community center via a driveway along the west side of Fidelis Way. The existing parking supply in the vicinity of the site is shown in Figure 3-2. The parking area that serves the community center is shown in Figure 3-3.

Existing Site Uses

Existing access to the site is provided by a curb cut along Washington Street at the signalized intersection of Washington Street/Monastery Road. The existing site currently contains the ABCD Allston-Brighton Head Start program and the St. John's Seminary Theological Institute in the lower part of the site closer to Washington Street. The rear of the site currently contains parking spaces that are being used by St. Elizabeth's Medical Center for employee parking. As part of the Project, the existing uses in the lower portion of the site will be eliminated and the St. Elizabeth's parking will be relocated.

3.2.2 Existing Traffic Counts

As part of the PNF, traffic volumes were collected at seven intersections along Washington Street, Commonwealth Avenue, Cambridge Street, and Warren Street, including the unsignalized intersection of Washington Street/Fidelis Way. The detailed traffic counts at each intersection are provided in the PNF. The traffic counts indicate that there are approximately 32 vehicles during the a.m. peak hour and 23 vehicles during the p.m. peak hour that exit Fidelis Way to Washington Street. A total of 50 vehicles during the a.m. peak hour and 50 vehicles during the p.m. peak hour enter Fidelis Way from Washington Street. Based on the traffic counts and observations, vehicular traffic along Fidelis Way is relatively light during the peak hours when compared with the surrounding roadway network.

3.2.3 Build Conditions

The specific Project-related vehicular impacts are detailed in the traffic study provided in the PNF. The Project-related impacts were determined using a multi-step process including developing trip generation estimates from data provided by the Institute of Transportation Engineers (ITE), adjusting the estimates based on expected travel mode splits (walk/transit/drive) provided by the BTD, and assigning the vehicular trips to the roadway network based on prevailing trip distribution patterns throughout the area. The trip generation estimates were updated based on a reduced program that includes 180 apartment units and 30 home-ownership units. The original estimates provided in the PNF were based on 220 apartment units and 30 home-ownership units. Tables 3-2 through Table 3-4 provide a comparison of the trip generation presented in the PNF to the new development program.

Figure 3-2

Existing On Street parking Supply

139-149 Washington Street   Boston, Massachusetts

Figure 3-3

Existing Community Center Parking

Table 3-2 Vehicle Trip Generation Comparison

Land Use		PNF Project	DPIR Project	Change
Daily				
Apartment[1]	In	432	353	-79
	Out	432	353	-79
Condominium[2]	In	51	51	0
	Out	51	51	0
Total	In	483	404	-79
	Out	483	404	-79
	Total	**966**	**808**	**-158**
Weekday a.m. Peak Hour				
Apartment[1]	In	12	9	-3
	Out	46	36	-10
Condominium[2]	In	1	1	0
	Out	5	5	0
Total	In	13	10	-3
	Out	51	41	-10
	Total	**64**	**51**	**-13**
Weekday p.m. Peak Hour				
Apartment[1]	In	46	36	-10
	Out	25	20	-5
Condominium[2]	In	5	5	0
	Out	3	3	0
Total	In	51	41	-10
	Out	28	23	-5
	Total	**79**	**64**	**-15**

1. ITE Trip Generation Rate, 9th Edition, LUC 220 (Apartment), based on 180 units.
2. ITE Trip Generation Rate, 9th Edition, LUC 230 (Residential Condominium/Townhouse), based on 30 units.

Table 3-3 Transit Trip Generation Comparison

Land Use		PNF Project	DPIR Project	Change
Daily				
Apartment[1]	In	157	129	-28
	Out	157	129	-28
Condominium[2]	In	19	19	0
	Out	19	19	0
Total	In	176	148	-28
	Out	176	148	-28
	Total	**352**	**296**	**-56**
Weekday a.m. Peak Hour				
Apartment[1]	In	5	4	-1
	Out	31	25	-6
Condominium[2]	In	0	0	0
	Out	4	4	0
Total	In	5	4	-1
	Out	35	29	-6
	Total	**40**	**33**	**-7**
Weekday p.m. Peak Hour				
Apartment[1]	In	30	25	-5
	Out	10	8	-2
Condominium[2]	In	3	3	0
	Out	1	1	0
Total	In	33	28	-5
	Out	11	9	-2
	Total	**44**	**37**	**-7**

1. ITE Trip Generation Rate, 9th Edition, LUC 220 (Apartment), based on 180 units.
2. ITE Trip Generation Rate, 9th Edition, LUC 230 (Residential Condominium/Townhouse), based on 30 units.

Table 3-4 Walk/Bicycle Trip Generation Comparison

Land Use		PNF Project	DPIR Project	Change
Daily				
Apartment[1]	In	182	149	-33
	Out	182	149	-33
Condominium[2]	In	21	21	0
	Out	21	21	0
Total	In	203	170	-33
	Out	203	170	-33
	Total	**406**	**340**	**-66**
Weekday a.m. Peak Hour				
Apartment[1]	In	7	6	-1
	Out	19	16	-3
Condominium[2]	In	1	1	0
	Out	2	2	0
Total	In	8	7	-1
	Out	21	18	-3
	Total	**29**	**25**	**-4**
Weekday p.m. Peak Hour				
Apartment[1]	In	19	16	-3
	Out	16	13	-3
Condominium[2]	In	2	2	0
	Out	2	2	0
Total	In	21	18	-3
	Out	18	15	-3
	Total	**39**	**33**	**-6**

1. ITE Trip Generation Rate, 9th Edition, LUC 220 (Apartment), based on 180 units.
2. ITE Trip Generation Rate, 9th Edition, LUC 230 (Residential Condominium/Townhouse), based on 30 units.

As shown in Table 3-2, the Project is expected to generate approximately 51 vehicular trips in the a.m. peak hour (10 enter/41 exit) and 64 vehicular trips in the p.m. peak hour (41 enter/23 exit). Based on the expected trip distribution patterns, the vast majority of the Project-generated trips will access the site from Fidelis Way via Washington Street instead of via Commonwealth Avenue. HSH estimates that approximately 98 percent of the entering trips and almost 100 percent of the exiting trips will use Washington Street instead of Commonwealth Avenue, which will prevent most Project-related trips from traveling through the Commonwealth Development. The Proponent has also agreed to install signage to discourage left-turns from the driveway and to direct Project-related trips to Washington Street. The Project will have minimal impact to Fidelis Way between Commonwealth Avenue and the site. The majority of the impacts of the Project will be limited to the segment of Fidelis Way between Washington Street and the site.

The net peak-hour vehicle trip generation for the Project was determined by adjusting the Project-generated vehicle trips to account for the removal of the existing trips associated with the land uses in the lower portion of the site and the rerouting of the existing St. Elizabeth's parking trips. Table 3-5 presents a trip generation comparison between the existing and proposed uses on the site.

Table 3-5 Net Vehicle Trip Generation

Direction	Project-Generated Trips[1]	Eliminated Existing Trips Lower Lot[2]	New Vehicle Trips[3]	Rerouted Existing Trips Upper Lot[4]
a.m. Peak Hour				
In	10	48	**-38**	45
Out	41	31	**10**	0
Total	51	79	**-28**	45
p.m. Peak Hour				
In	41	16	**25**	0
Out	23	19	**4**	26
Total	64	35	**29**	26

1. Based on ITE Trip Generation.
2. Based on existing counts – these trips were removed from the study area.
3. Net new vehicle trips on study area roadway network.
4. Based on existing counts – these trips were reassigned within the study area.

As shown in Table 3-5, the Project will result in a reduction in overall traffic during the a.m. peak hour by 28 vehicles and an addition of 29 new trips during the p.m. peak hour when accounting for the existing uses on the site. Trips currently accessing the existing St. Elizabeth's parking lot in the upper portion of the site will be re-routed to a future, yet to be determined, location. Approximately 45 trips will be re-routed during the weekday a.m. peak hour and 26 trips will be re-routed during the weekday p.m. peak hour.

3.2.4 Site Access

In the PNF, three site access options were considered. A review of the three options resulted in the determination that the Fidelis Way option presents the most efficient access. The Fidelis Way access option provides dedicated garage access for the rental building portion of the Project allowing for all loading, service, and delivery activity to occur on-site. A second point of access will be provided to allow direct access to the 30-unit home-ownership building in the rear of the site. This is the only site access option that will allow for dedicated and separate access to the home-ownership building. In the other two options, all loading, service, and deliveries would be required to travel through the garage in the apartment building to access the home-ownership building, creating issues for emergency and service/delivery vehicles.

3.2.5 Upgrades to Fidelis Way

The segment of Fidelis Way between the community center and Washington Street will be upgraded to provide a wider cross-section, including a sidewalk and on-street parking spaces along the west side of Fidelis Way. The widening of Fidelis Way will be accomplished by using available land from the Project site. The improvements will provide significant upgrades to the pedestrian environment and will enhance pedestrian safety along Fidelis Way.

The home-ownership access point will require the reconstruction and reconfiguration of the existing 27-space parking area that currently serves the community center for the Commonwealth Development. The reconstruction of this parking area will also include a through connection to a new roadway on the site that will provide access to the 30-unit home-ownership building. The reconstruction of the parking area will be accomplished by using available land on the north side of the Project site. The proposed connections and upgrades are shown on Figure 3-4. As shown in Figure 3-4, the Project is adding 11 new on-street parking spaces that will be reserved for Commonwealth Development permit parking. A new connection will be provided along the north side of the building and the parking area that serves the community center will be reconfigured to better delineate the parking and travel lanes. The reconfiguration will retain all 27 parking spaces for this area.

Figure 3-5 shows the upgraded Fidelis Way cross section, as it will be seen from Washington Street. As shown in Figure 3-5, an additional parking lane will be created and a new sidewalk will be installed along the west side of Fidelis Way, which will improve the pedestrian connections throughout the area. Also shown in Figure 3-5 is the installation of new street trees along Fidelis Way and the addition of a bus stop at the corner of Washington Street/Fidelis Way.

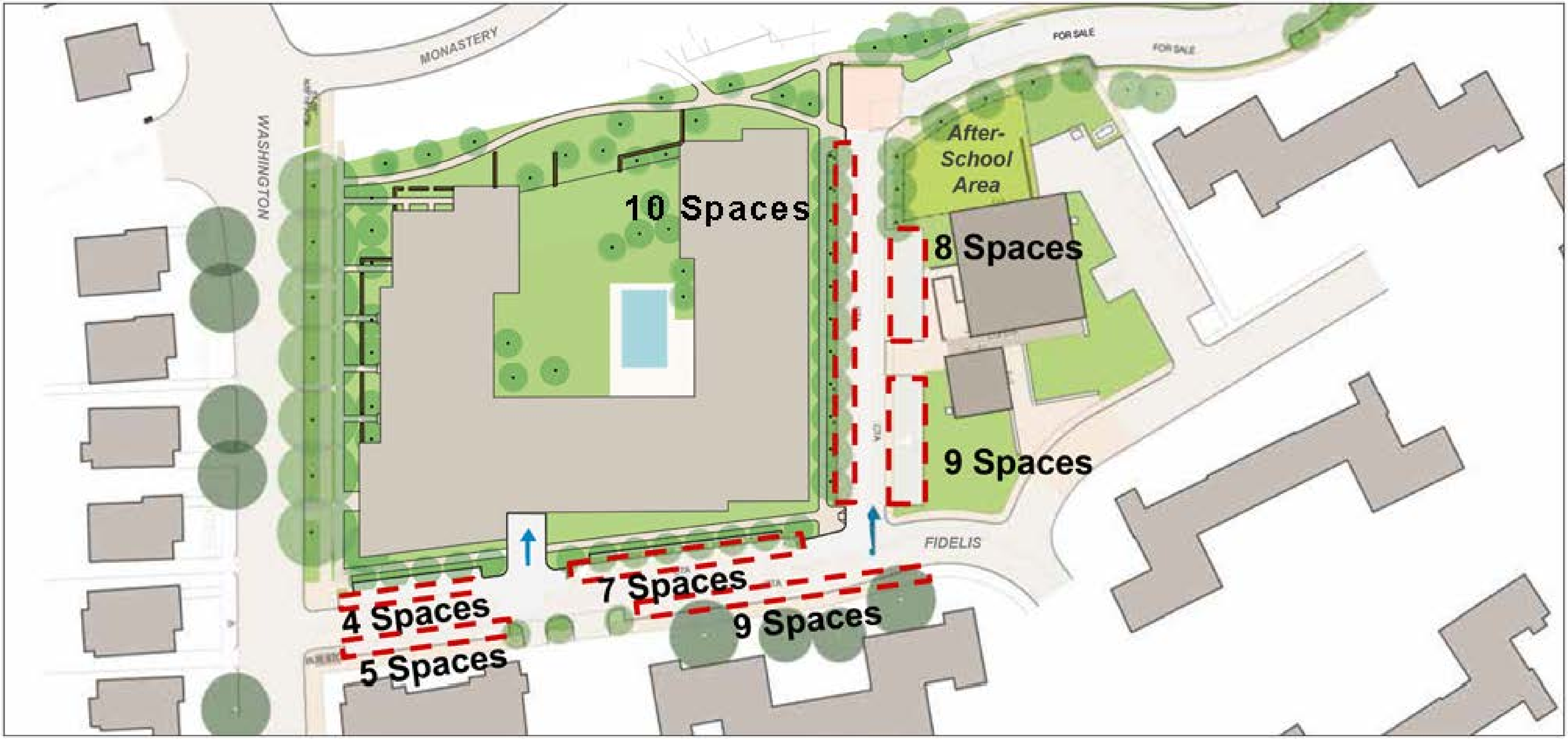

Figure 3-4
Proposed Fidelis Way Connections and Parking

139-149 Washington Street Boston, Massachusetts

Figure 3-5

Proposed Fidelis Way

Figure 3-6 shows the upgraded parking area that will serve the community center. As shown in the figure, the parking spaces will be better defined and two full lanes of travel will be created. The parking layout will be designed to the appropriate standard. The layout will be better delineated and will improve safety conditions in the area. A new crosswalk and new sidewalks will also be installed to create better pedestrian connectivity through the area. This connection will also serve as the primary access route for all vehicular traffic related to the home-ownership building in the rear of the site.

3.2.6 Washington Street Corridor Signal Timing Modifications

At the request of BTD, a supplemental operations analysis was conducted for the signalized intersections along the Washington Street corridor between Cambridge Street to the west and Commonwealth Avenue to the east to evaluate the cumulative effect of three proposed projects along this segment of Washington Street. The two other proposed development projects along this segment of Washington Street that are currently in the BPDA's Article 80 Review process include 159-201 Washington Street, immediately adjacent to the west side of the Project site and 101-105 Washington Street, east of the Project site.

The intent of the supplemental analysis is to determine if there are any traffic signal timing modifications or geometric upgrades at each location that would provide more efficient vehicle travel along Washington Street while providing pedestrian phasing and timing improvements. The analysis includes all new traffic volumes expected to be generated by the three proposed development projects on this segment of Washington Street. As noted in the PNF, the incremental traffic associated with the Project is not a material increase over the existing uses on the site. The Project is expected to generate minimal additional traffic during the peak periods when compared to the existing uses on the Project site.

The three signalized intersections included in this analysis are the following:

- Cambridge Street/Washington Street/Winship Street;
- Washington Street/Monastery Road; and
- Commonwealth Avenue/Washington Street.

Currently, the intersections of Cambridge Street/Washington Street/Winship Street and Commonwealth Avenue/Washington Street use concurrent pedestrian phasing. The intersection of Washington Street/Monastery Road currently uses an exclusive pedestrian phase upon pushbutton activation, which stops all vehicles from entering the intersection to allow pedestrians to cross.

Build Conditions

Table 3-6 presents the a.m. peak hour Build (2023) Conditions operations analysis and Table 3-7 presents the p.m. peak Hour Build (2023) Conditions operations analysis as presented in the PNF.

139-149 Washington Street   Boston, Massachusetts

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Figure 3-6

Proposed Community Center Parking

Table 3-6 Build (2023) Condition, Operations Analysis Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Cambridge St/Washington St/Winship St	**D**	**51.6**	**>1.00**	**-**	**-**
Washington Street EB thru	D	35.9	0.57	140	214
Washington Street EB right/hard right	B	12.3	0.49	76	139
Cambridge Street WB left	E	62.5	0.83	102	#188
Cambridge Street WB bear left	F	90.4	0.97	119	#226
Cambridge Street WB thru	B	10.5	0.39	48	69
Washington Street NB hard left/left	F	104.9	>1.00	~238	#396
Washington Street NB right	C	28.6	0.76	65	#185
Winship Street NEB hard left	D	40.6	0.38	37	79
Winship Street NEB bear right/hard right	E	79.5	0.93	152	#298
Washington St/Monastery Rd	**C**	**20.7**	**0.76**	**-**	**-**
Monastery Road EB left/thru/right	C	23.1	0.49	54	123
Monastery Driveway WB left/thru/right	C	20.8	0.38	40	70
Washington Street NB left/thru/right	C	23.0	0.76	140	#418
Washington Street SB left/ thru/right	B	16.6	0.59	100	274
Commonwealth Avenue/Washington Street	**F**	**120.4**	**>1.00**	**-**	**-**
Commonwealth Ave EB left/thru | thru/right	E	58.2	0.95	373	#508
South Carriage Road EB left/thru	C	29.9	0.07	20	45
South Carriage Road EB right	A	8.1	0.31	0	39
Commonwealth Avenue WB U-turn/left	E	68.7	0.70	102	#192
Commonwealth Avenue WB thru | thru/right	C	33.6	0.48	154	205
North Carriage Road WB left/thru/right	C	34.6	0.32	60	76
Washington Street NB thru/right	F	97.1	>1.00	~532	#706
Washington Street SB left/thru/right	F	252.4	>1.00	~590	#749

~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

Table 3-7 Build (2023) Condition, Operations Analysis Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Cambridge St/Washington St/Winship St	**E**	**64.7**	**>1.00**	**-**	**-**
Washington Street EB thru	C	34.3	0.44	102	172
Washington Street EB right/hard right	B	16.9	0.61	107	215
Cambridge Street WB left	F	182.8	>1.00	~244	m#323
Cambridge Street WB bear left	E	78.6	0.96	161	m#225
Cambridge Street WB thru	B	12.6	0.39	60	m92
Washington Street NB hard left/left	F	101.4	1.07	~249	#374
Washington Street NB right	B	15.6	0.58	27	83
Winship Street NEB hard left	D	35.4	0.21	20	49
Winship Street NEB bear right/hard right	D	52.4	0.70	101	173
Washington St/Monastery Rd	**C**	**30.0**	**0.94**	**-**	**-**
Monastery Road EB left/thru/right	B	19.8	0.34	39	62
Monastery Driveway WB left/thru/right	B	17.4	0.14	15	47
Washington Street NB left/thru/right	C	22.7	0.75	136	#443
Washington Street SB left/ thru/right	D	39.5	0.94	197	#594
Commonwealth Avenue/Washington Street	**F**	**171.8**	**>1.00**	**-**	**-**
Commonwealth Ave EB left/thru | thru/right	D	35.4	0.59	204	266
South Carriage Road EB left/thru	C	28.6	0.07	17	25
South Carriage Road EB right	A	8.8	0.36	0	2
Commonwealth Avenue WB U-turn/left	F	96.7	0.93	159	#308
Commonwealth Avenue WB thru | thru/right	D	36.5	0.66	243	312
North Carriage Road WB left/thru/right	D	37.7	0.45	75	101
Washington Street NB thru/right	F	104.5	>1.00	~542	#741
Washington Street SB left/thru/right	F	356.6	>1.00	~654	#878

~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.

The intersection of **Cambridge Street/Washington Street/Winship Street** is expected to operate at an overall LOS D during the a.m. peak hour and LOS E during the p.m. peak hour under the Build (2023) Conditions. During the a.m. peak hour, the Washington Street northbound left-turn movements operates over capacity, resulting in lengthy queues and delays for those movements. During the p.m. peak hour, the Cambridge Street westbound left-turn and the Washington Street northbound left-turn movements operate over capacity with lengthy queues and delays.

The intersection of **Washington Street/Monastery Road** is expected to operate at an overall LOS C during both the a.m. and p.m. peak hours. The 95th percentile queues along Washington Street are shown to exceed 400 feet (approximately 16 to 20 vehicles) in the northbound direction during the a.m. peak hour and in both directions during the p.m. peak hour. The 95th percentile queues represent the longest queues experienced at the intersection and occur during five percent of the traffic signal cycles (or approximately once per hour, maximum).

The intersection of **Commonwealth Avenue/Washington Street** is expected to operate at an overall LOS F during both the a.m. and p.m. peak hours. The lengthy delays at the intersection are caused by excessive delays and queuing along the Washington Street approaches during both peak hours.

Based on the Build Conditions operations analysis, the Washington Street corridor is at or over capacity during certain times of the day. Traffic signal modifications that provide Washington Street with additional green time, reduced cycle lengths, and modifications to lane geometry may provide some benefit to allow for more efficient flow throughout the corridor.

Build with Modifications Conditions

In order to study the feasibility of improving traffic operations at the signalized intersections, this analysis considers the following measures, where appropriate and possible:

- Installation of concurrent pedestrian phasing;
- Geometric changes to provide more efficient operations; and
- Traffic signal timing and phasing optimization.

Due to the limitations of the capabilities of the analysis software, the installation of adaptive signal control was not included. However, the installation of modern traffic controllers with adaptive signal control capabilities would allow for better queue management and traffic signal optimization.

As part of system-wide planning for the Washington Street corridor modifications are recommended to improve operations efficiency at each location, independent of the proposed Project. The specific recommendations provide varying levels of benefit. The following summarizes the recommendations and is organized from most beneficial to least beneficial.

Commonwealth Avenue/Washington Street – The Washington Street southbound approach consists of a single lane and is currently operating near or at capacity. There is an existing MBTA bus stop at the intersection along the Washington Street southbound approach that could be relocated to the east. Relocating this bus stop would allow the Washington Street southbound approach to operate as two lanes, providing needed capacity. This recommendation would provide the most benefit to the corridor. The additional vehicular capacity gained by providing two lanes along the approach would significantly reduce delays and queues for the Washington Street northbound movements, which currently operate at LOS F with extensive queues. Currently, the movement operates at or over capacity and the queues do not clear within one cycle, resulting in significant delays. The additional lane would provide the capacity necessary to process the queues in a single cycle. The movement would improve to LOS C during the weekday a.m. peak hour and LOS D during the weekday p.m. peak hour with the recommended modifications. The queues along this approach would also be significantly reduced, allowing for better progression along Washington Street.

Washington Street/Monastery Road – This intersection currently has an exclusive pedestrian phase, which stops all traffic at the intersection. It is recommended that concurrent pedestrian phasing be implemented, along with an optimal traffic signal timing plan. These improvements will allow for more green time to be allocated to Washington Street and Monastery Road, as demand requires. By implementing these modifications, both queues and delay along Washington Street will be reduced, allowing for more efficient flow throughout the corridor.

Cambridge Street/Washington Street/Winship Street – This intersection currently operates on a 100 second cycle length during the peak hours and allows for concurrent pedestrian phasing. The intersection is currently operating near or at capacity during the peak hours and without additional geometric capacity, it will continue to operate near capacity. It is recommended that the cycle lengths be reduced to reduce the queuing at the intersection. The cycle length reduction would result in slightly lower queues, but would not provide the level of benefit that would be achieved by the other recommendations.

Table 3-8 and **Table 3-9** present the Build (2023) with Modifications Conditions operations analysis specifically prepared for BTD.

Table 3-8 Build (2023) with Modifications Condition, Operations Analysis Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Cambridge St/Washington St/Winship St	**D**	**49.8**	**>1.00**	**-**	**-**
Washington Street EB thru	D	39.4	0.67	127	#209
Washington Street EB right/hard right	B	11.9	0.51	61	126
Cambridge Street WB left	E	71.4	0.83	83	#168
Cambridge Street WB bear left	F	99.9	0.97	97	#200
Cambridge Street WB thru	C	20.6	0.42	86	136
Washington Street NB hard left/left	F	100.4	>1.00	~200	#350
Washington Street NB right	C	20.0	0.71	35	#126
Winship Street NEB hard left	C	32.4	0.35	29	68
Winship Street NEB bear right/hard right	E	57.9	0.85	121	#244
Washington St/Monastery Rd	**B**	**15.4**	**0.74**	**-**	**-**
Monastery Road EB left/thru/right	C	22.1	0.56	37	107
Monastery Driveway WB left/thru/right	B	19.3	0.44	27	61
Washington Street NB left/thru/right	B	15.5	0.74	85	236
Washington Street SB left/ thru/right	B	10.9	0.58	60	172
Commonwealth Avenue/Washington Street	**E**	**57.4**	**>1.00**	**-**	**-**
Commonwealth Ave EB left/thru | thru/right	D	50.3	0.90	363	#486
South Carriage Road EB left/thru	C	28.5	0.06	19	44
South Carriage Road EB right	A	7.7	0.30	0	38
Commonwealth Avenue WB U-turn/left	E	68.7	0.70	102	#192
Commonwealth Avenue WB thru | thru/right	C	31.8	0.45	150	200
North Carriage Road WB left/thru/right	C	32.7	0.30	59	74
Washington Street NB thru/right	F	114.7	>1.00	~552	#726
Washington Street SB left/thru/right	C	34.7	0.63	182	226

~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

Table 3-9 Build (2023) with Modifications Condition, Operations Analysis Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Cambridge St/Washington St/Winship St	**D**	**51.3**	**>1.00**	**-**	**-**
Washington Street EB thru	D	39.9	0.54	105	177
Washington Street EB right/hard right	B	19.8	0.66	111	225
Cambridge Street WB left	F	98.1	>1.00	~180	#345
Cambridge Street WB bear left	D	54.1	0.76	135	#248
Cambridge Street WB thru	C	20.2	0.40	98	163
Washington Street NB hard left/left	F	98.9	>1.00	~235	#359
Washington Street NB right	B	13.8	0.57	20	73
Winship Street NEB hard left	C	33.4	0.20	19	47
Winship Street NEB bear right/hard right	D	48.5	0.67	94	166
Washington St/Monastery Rd	**B**	**11.2**	**0.67**	**-**	**-**
Monastery Road EB left/thru/right	C	24.8	0.48	33	64
Monastery Driveway WB left/thru/right	B	19.9	0.18	13	47
Washington Street NB left/thru/right	A	7.6	0.54	68	177
Washington Street SB left/ thru/right	B	10.2	0.67	99	264
Commonwealth Avenue/Washington Street	**D**	**44.9**	**>1.00**	**-**	**-**
Commonwealth Ave EB left/thru | thru/right	D	35.4	0.59	204	266
South Carriage Road EB left/thru	C	28.6	0.07	17	25
South Carriage Road EB right	A	8.8	0.36	0	2
Commonwealth Avenue WB U-turn/left	F	96.7	0.93	159	#308
Commonwealth Avenue WB thru | thru/right	D	36.5	0.66	243	312
North Carriage Road WB left/thru/right	D	37.7	0.45	75	101
Washington Street NB thru/right	F	104.5	>1.00	~542	#741
Washington Street SB left/thru/right	D	35.5	0.65	190	255

~ 50th percentile volume exceeds capacity. Queue shown is maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is maximum after two cycles.

3.3 Transportation Demand Management

The Proponent is committed to implementing Transportation Demand Management (TDM) measures to minimize automobile usage and Project-traffic impacts. The TDM program may include an on-site transportation coordinator, secure bicycle parking areas, and distributions of transit maps and schedules to residents, guests, and employees.

On-site management will keep a supply of transit information (schedules, maps, and fare information) to be made available to the residents and visitors of the site. The Proponent will work with the City to develop a TDM program appropriate to the Project and consistent with its level of impact. The TDM measures for the Project may include but are not limited to the following:

- The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries;
- On-site management will work with residents as they move in to help facilitate transportation for new arrivals;
- The Proponent will provide orientation packets to new residents containing information on available transportation choices, including public transportation routes/schedules, nearby vehicle sharing and bicycle sharing locations, and walking opportunities;
- Provide an annual (or more frequent) newsletter or bulletin summarizing transit, ride-sharing, bicycling, alternative work schedules, and other travel options;
- Provide information on travel alternatives for employees, residents, and visitors via the Internet and in the building lobby;
- Join and participate in a local Transportation Management Association on behalf of residents and work with future abutters on the implementation of a shuttle service to provide additional connections to transit lines.
- Provide bike and pedestrian access information on the Project website;
- Proponent will explore the possibility of expanding Hubway in the vicinity of the Project site to meet the demands of the Project and the surrounding community;
- Provide covered, secure bicycle storage for residents;
- Post information in the lobby about public transportation;
- Provide transit access information on the Project website including information on bus and subway routes and schedules;
- Provide electric vehicle charging stations to accommodate 5 percent of the total parking and sufficient infrastructure capacity for future accommodation of at least 15 percent of the total parking spaces;

- Designate up to 5 percent of the parking spaces as preferred parking for low emission vehicles; and
- Explore the feasibility of providing spaces in the garage for a car sharing service.

3.4 Transportation Mitigation Measures

Although the traffic impacts associated with the new trips are minimal (a net negative number of trips in the weekday a.m. peak hour and less than one vehicle trip per minute generated during the weekday p.m. peak hour in the study area's network) the Proponent will continue to work with the City of Boston to ensure that the Project efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use. The Proponent will continue to work with the City of Boston and other area developers to implement the needed improvements throughout the Washington Street corridor.

The Proponent is responsible for preparation of the Transportation Access Plan Agreement (TAPA), a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, travel demand management measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed. The proposed measures listed above and any additional transportation improvements to be undertaken as part of this Project will be agreed to during the Article 80 process and defined and documented in the TAPA. The Proponent is committed to reconstructing and upgrading Fidelis Way between Washington Street and the CTA community center driveway, improving the CTA community center parking layout, and providing additional and improving existing pedestrian connections along Fidelis Way as described in Section 3.2.5.

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

3.5 Evaluation of Short-term Construction Impacts

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

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

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

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

Chapter 4.0

Environmental Review Component

4.0 ENVIRONMENTAL PROTECTION COMPONENT

4.1 Pedestrian Level Winds

4.1.1 Introduction

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by CBT Architects to assess the pedestrian wind conditions for the proposed Project at 139-149 Washington Street in Brighton. This assessment is based on the following:

- a review of regional long-term meteorological data from Boston Logan International Airport;
- design drawings received from CBT Architects;
- wind-tunnel studies undertaken by RWDI for similar projects in the Boston Area;
- RWDI's engineering judgment, experience and expert knowledge of wind flows around buildings[1 2 3]; and,
- use of software developed by RWDI (Windestimator2) for estimating the potential wind conditions around generalized building forms.

This qualitative approach provides a screening-level estimation of potential wind conditions. Conceptual wind control measures to improve wind comfort are recommended, where necessary.

4.1.2 Building and Site Information

The Project site is located on the north side of Washington Street in Brighton. The site is immediately surrounded by mid and low-rise buildings to the east and west, low-rise buildings to the south and Fidelis Way Park and a parking lot to the north (see Figure 4.1-1). Dense trees are located to the west of the southern portion of the site. Further surroundings consist of dense low-rise buildings in all directions.

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1 C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999), "Experience with Remedial Solutions to Control Pedestrian Wind Problems", *10th International Conference on Wind Engineering*, Copenhagen, Denmark.

2 H. Wu, C.J. Williams, H.A. Baker and W.F. Waechter (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", *ASCE Structure Congress 2004*, Nashville, Tennessee.

3 H. Wu and F. Kriksic (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, vol.104-106, pp.397-407.

G:\Projects2\MA\Boston\4621\aerial.mxd

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

139-149 Washington Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 4.1-1

Existing Conditions Map

The site is currently occupied by St. John's Seminary Theological Institute and the ABCD Allston-Brighton Head Start, which consists of two 2-story buildings, a playground and parking lots.

The Project consists of two five- to six-story buildings (see Figure 4.1-2), with a driveway and parking spaces between them. New buildings of similar height are proposed to the west of the Project.

The pedestrian areas of interest include building entrances, walkways and parking lots on site, public sidewalks along Washington Street and Fidelis Way, Fidelis Way Park, the open space to the west of the rental building and outdoor amenity areas on both buildings.

4.1.3 Meteorological Data

Wind statistics at Boston Logan International Airport between 1990 and 2015, inclusive, were analyzed for the spring (March to May), summer (June to August), fall (September to November) and winter (December to February) seasons. Figures 4.1-3 to 4.1-5 graphically depict the distributions of wind frequency and directionality for the four seasons and for the annual period. When all winds are considered (regardless of speed), winds from the northwest and southwest quadrants are predominant. Northeasterly winds are also frequent, especially in the spring.

Strong winds with mean speeds greater than 20 mph (red bands in the images) are prevalently from the northwesterly directions throughout the year, while the southwesterly and northeasterly winds are also frequent.

Winds from the northwest, west, southwest and northeast directions are considered most relevant to the current study, although winds from other directions were also considered in this assessment.

4.1.4 BPDA Wind Criteria

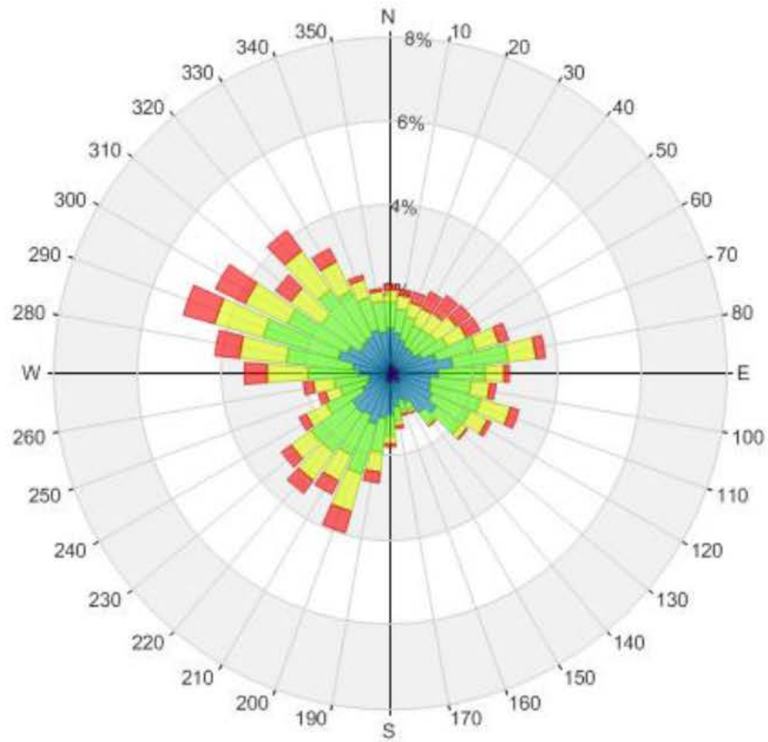
The BPDA has adopted two standards for assessing the relative wind comfort of pedestrians.

First, the BPDA wind design guidance criterion states that an effective gust velocity (hourly-mean wind speed + 1.5 times the root mean square wind speed) of 31 mph should not be exceeded more than one percent (1%) of the time. This criterion is hereby referred to as the gust criterion.

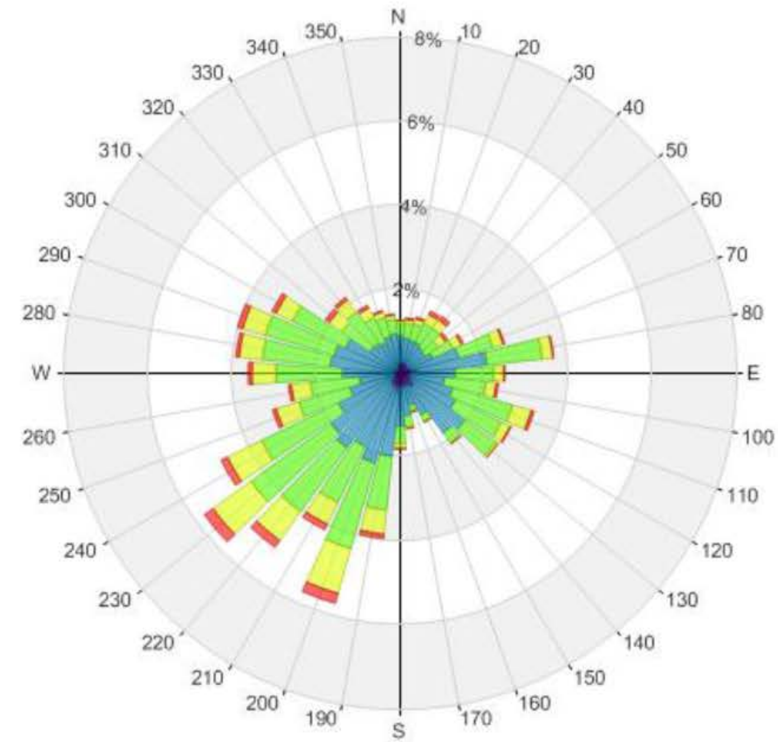
139-149 Washington Street   Boston, Massachusetts

Figure 4.1-2

Proposed Project with Existing and Future Surroundings



Spring
(March - May)

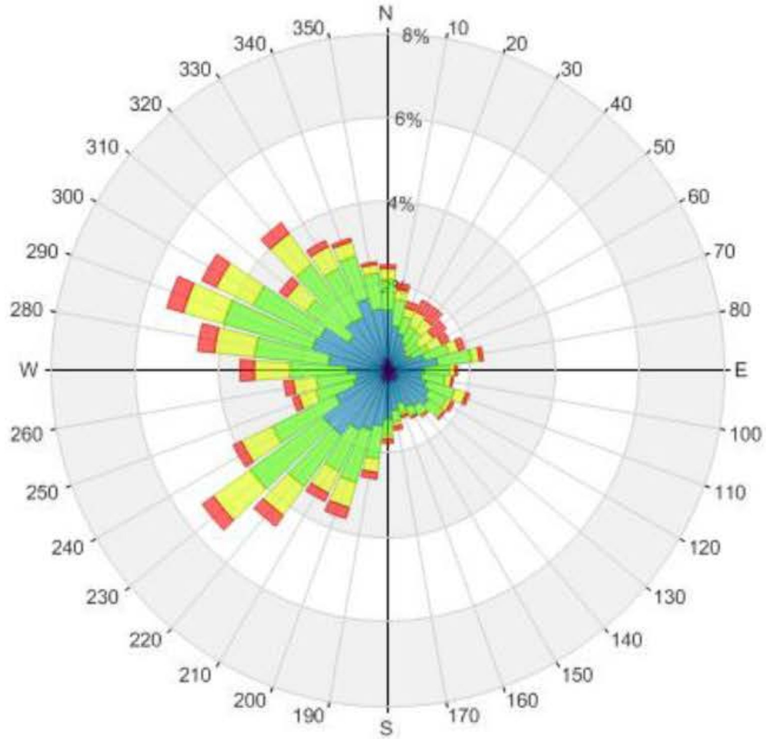


Summer
(June - August)

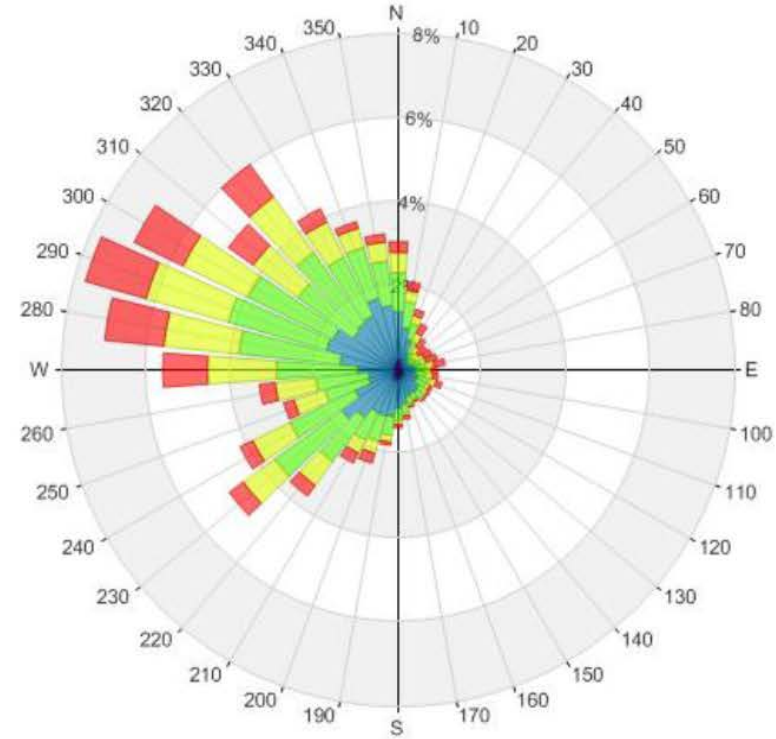
Wind Speed (mph)	Probability (%) Spring	Summer
Calm	2.4	2.7
1-5	6.4	8.9
6-10	28.5	38.1
11-15	32.9	35.1
16-20	19.7	12.6
>20	10.2	2.7

Figure 4.1-3

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1990-2015)



Fall
(September - November)

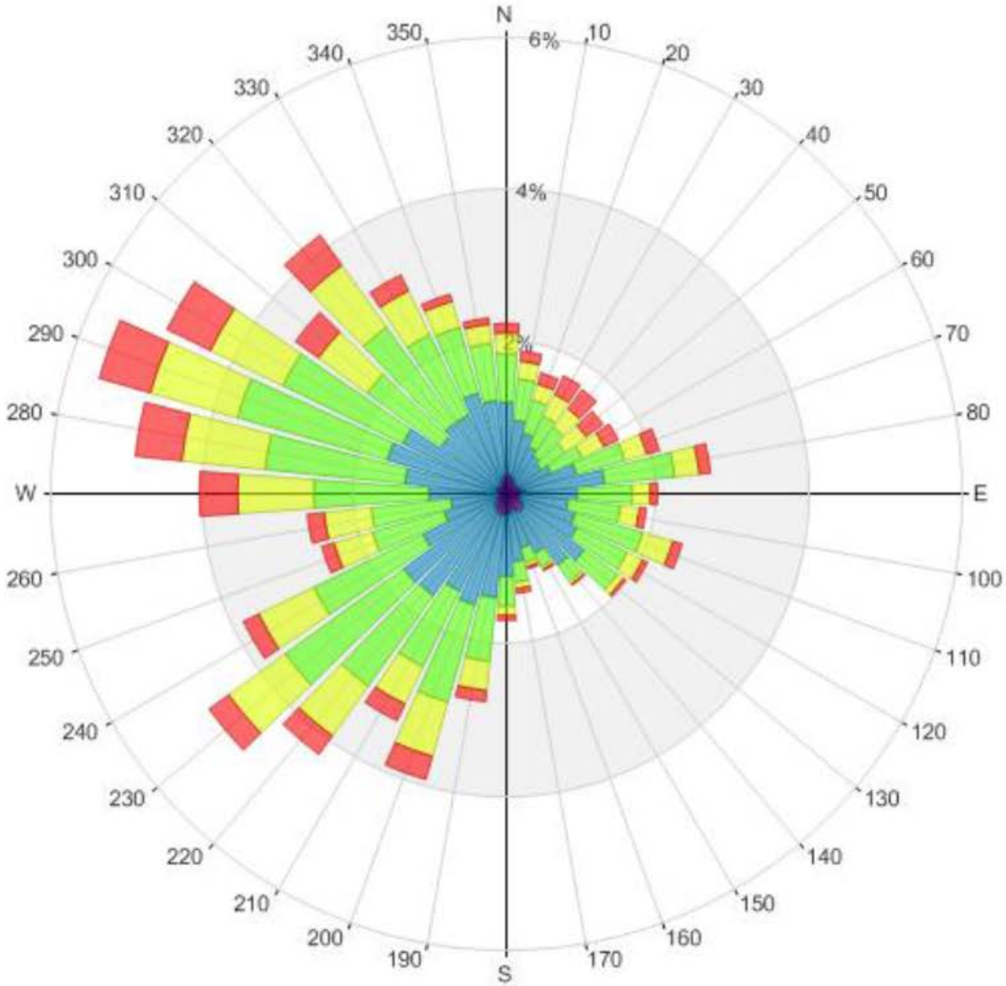


Winter
(December - February)

Wind Speed (mph)	Probability (%) Fall	Winter
Calm	2.9	2.3
1-5	8.0	6.2
6-10	34.3	27.5
11-15	32.8	31.1
16-20	15.3	20.1
>20	6.7	12.8

Figure 4.1-4

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1990-2015)



Annual Winds

	Wind Speed (mph)	Probability (%)
	Calm	2.5
	1-5	7.4
	6-10	32.1
	11-15	33.0
	16-20	16.9
	>20	8.1

Figure 4.1-5

Directional Distribution (%) of Winds (Blowing From) Boston Logan International Airport (1990-2015)

The second set of criteria used by the BPDA to determine the acceptability of specific locations is based on the work of Melbourne[4]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed). They are as follows:

Table 4.1-1 Boston Planning and Development Agency 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.

Pedestrians on sidewalks and parking lots will be active and wind speeds comfortable for walking are appropriate. Lower wind speeds comfortable for standing are desired for building entrances where people are apt to linger. For any outdoor amenity at and above grade, low wind speeds comfortable for sitting are desired in the summer, when it is typically in use.

The wind climate found in a typical location in Brighton is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BPDA effective gust velocity criterion of 31 mph at most areas, while windier conditions may be expected near the corners of tall buildings exposed to the prevailing winds. However, without any mitigation measures, this wind climate is likely to be frequently unsuitable for more passive activities such as sitting.

Discussions related to pedestrian wind comfort and safety will be based on the annual wind climate. Typically the summer and fall winds tend to be more comfortable than the annual winds while the winter and spring winds are less comfortable than the annual winds.

4.1.5 Pedestrian Wind Conditions

Predicting wind speeds and occurrence frequencies is complicated. It involves building geometry, orientation, position and height of surrounding buildings, upstream terrain and the local wind climate. Over the years, RWDI has conducted thousands of wind-tunnel

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

model studies regarding pedestrian wind conditions around buildings, yielding a broad knowledge base. This knowledge has been incorporated into RWDI's proprietary software that allows, in many situations, for a qualitative, screening-level numerical estimation of pedestrian wind conditions without wind tunnel testing.

Given the limited height of the proposed buildings, winds at all pedestrian areas on and around the development are expected to meet the effective gust criterion both with or without the Project. Detailed discussions on the potential wind comfort conditions at key pedestrian areas are provided in the next sections.

4.1.5.1 Sidewalks and Existing Buildings

As shown in Figures 4.1-1 and 4.1-2, the Project site is surrounded by buildings that are similar in height, and tall trees to the northwest and northeast directions, where the prevailing winds are originating from. The proposed buildings, in particular the one located on southern portion of the site, are expected to provide additional shelter from northwesterly and northeasterly winds and are not expected to have a negative effect on the current wind conditions on the site.

As a result, existing wind conditions around the buildings and sidewalks around Washington Street and Fidelis Way are expected to be comfortable for walking or better.

4.1.5.2 Entrances

Entrances to the home-ownership building are located at its southeast corner, along the south and east façade (shown by red triangles in Figure 4.1-6). Northeasterly winds are expected to accelerate between the proposed building and the existing building to its east. As a result of wind acceleration around the southeast corner of the proposed building, wind conditions at the entrances might be higher than desired at times, in particular during spring when the northeasterly winds are strong, but will generally be comfortable for walking or better.

The entrances to the rental building are located along the south and west facades (shown by red triangles in Figure 4.1-6). These entrances are exposed to the northwesterly and southwesterly winds. The proposed trees along the west and south building perimeter as well as the dense landscaped area to the west of the site are expected to reduce the wind speeds as they approach the building. However, wind speeds at these entrances might be slightly higher than desired during the winter and spring seasons when the winds are stronger and the trees do not have full foliage. The higher wind speeds during spring and winter are typical for this area and is similar to what is currently experienced on site around similar building massing.

Figure 4.1-6
Project Entrances

The Proponent acknowledges potential wind conditions at the entrances, which may warrant mitigation measures. The Proponent and design team will evaluate the conditions as the design advances and will include mitigation measures as appropriate. Potential mitigation measures may include canopies, windscreens, landscaping or recessed entrances.

4.1.5.3 Level 2 Amenity Areas

The outdoor amenity area on the west side of the rental building at Level 2 (Location A in Figure 4.1-6) is partially enclosed by the proposed building, but may be affected by the prevailing winds from the northwest and southwest directions. Dense landscaped area to the west of this building is expected to provide protection from the prevailing winds. As a result, the wind conditions in this area are expected to be comfortable for the intended use during the summer. However, wind speeds might be slightly higher than desired during the shoulder seasons when the space is not in use. The outdoor amenity area on the south and west sides of the home-ownership building at Level 2 (Location B in Figure 4.1-6) is generally protected by the proposed surrounding buildings from the northwesterly and southwesterly winds and by the building itself from the northeasterly winds. Although higher wind speeds may be experienced around the southwest corner of the building and along the east edge of the terrace, appropriate wind conditions are expected at this area during the summer. Wind speeds may be slightly higher than desired during the shoulder season when winds are stronger.

4.1.5.4 Walkways, Parking Lot and Park

Pedestrians on walkways and parking lots are typically active and can tolerate relatively high wind speeds. This criterion is predicted to be satisfied throughout the site for all seasons, considering the proposed buildings are only five stories in height and surrounded by dense buildings in all directions.

Wind conditions at Fidelis Way Park and at the open space to the west of the rental building are not expected to be affected by the presence of the proposed development. Presence of the dense landscaping in this area, will result in wind conditions that are comfortable for more passive activities during the summer. Slightly windier conditions are expected during the winter and shoulder seasons, which are typical conditions for this region.

4.1.6 Conclusions

Based on the local wind data, limited building height, information on surroundings and RWDI's experience with similar projects, the proposed project is not expected to have a negative impact on the wind conditions on the surrounding sidewalks and buildings. Wind speeds on and around the Project are predicted to meet the effective gust criterion. Appropriate wind conditions are also expected at the outdoor amenity areas of both buildings during the summer while windier conditions are expected during the shoulder seasons when the spaces are not in use. Wind speeds at some building entrances are expected to be higher than desired during the spring and winter months; however, these conditions are typical for this area.

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.

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. New shadow from the rental building will be cast onto Washington Street's northern sidewalk, onto Monastery Driveway and its sidewalks, and onto a small portion of the landscaped space on the 159-201 Washington Street site. New shadow from the home-ownership building will be cast onto Monastery Driveway and its sidewalks. New shadow will be cast onto the Washington Street at Monastery Road bus stop at the southwestern corner of the site.

At 12:00 p.m., new shadow from the Project will be cast to the north. New shadow from the rental building will not be cast onto nearby streets, sidewalks, or public open spaces. New shadow from the home-ownership building will be cast onto a small portion of Fidelis Way Park. However, the shadow study does not include landscaping, and this portion of the Park comprises of numerous large trees. No new shadow will be cast onto nearby bus stops.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow from the rental building will not be cast onto nearby streets, bus stops, or public open spaces. New shadow from the home-ownership building will be cast onto a portion of Fidelis Way Park. However, the shadow study does not include landscaping, and it is likely that much of this area is already under shadow due to the numerous large trees surrounding the Park. No new shadow will be cast onto nearby bus stops.

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. New shadow from the rental building will be cast onto Washington Street and its northern sidewalk. New shadow from the home-ownership building will be cast onto Monastery Driveway and its sidewalks. New shadow will be cast onto the Washington Street at Monastery Road bus stop at the southwestern corner of the site.

At 12:00 p.m., new shadow from the Project will be cast to the northwest. New shadow from both buildings will not extend beyond the boundaries of the Project site, and no new shadow will be cast onto nearby streets, sidewalks, public open spaces, or bus stops.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow from the rental building will not extend beyond the boundaries of the Project site. New shadow from the home-ownership building will be cast onto a small sliver of Fidelis Way Park that contains numerous large trees. No new shadow will be cast onto nearby bus stops.

At 6:00 p.m., new shadow from the Project will be cast to the east. New shadow from the rental building will be cast onto Fidelis Way and its sidewalks. New shadow from the home-ownership building will be cast onto a small portion of Fidelis Way Park that contains numerous large trees. No new shadow will be cast onto nearby bus stops.

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 west. New shadow from the rental building will be cast onto Washington Street and its northern sidewalk, onto Monastery Driveway and its sidewalks, and onto a small portion of the landscaped space on the 159-201 Washington Street site. New shadow from the home-ownership building will be cast onto Monastery Driveway and its sidewalks. New shadow will be cast onto the Washington Street at Monastery Road bus stop at the southwestern corner of the site.

At 12:00 p.m., new shadow from the Project will be cast to the north. New shadow from the rental building will not be cast onto nearby streets, sidewalks, or public open spaces. New shadow from the home-ownership building will be cast onto a small portion of Fidelis Way Park. However, the shadow study does not include landscaping, and this portion of the Park comprises of numerous large trees. No new shadow will be cast onto nearby bus stops.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow from the rental building will not be cast onto nearby streets, bus stops, or public open spaces. New shadow from the home-ownership building will be cast onto a portion of Fidelis Way Park. However, the shadow study does not include landscaping, and it is likely that much of this area is already under shadow due to the numerous large trees surrounding the Park. No new shadow will be cast onto nearby bus stops.

At 6:00 p.m., much of the area is under existing shadow, and new shadow from the Project will be cast to the east. New shadow from the rental building will be cast onto Fidelis Way and its sidewalks. The home-ownership building will not cast new shadow. No new shadow will be cast onto nearby bus stops or public 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 from the Project will be cast to the northwest. New shadow from the rental building will be cast onto Monastery Driveway and its sidewalks, onto the Washington Street at Monastery Road bus stop, and onto a portion of the landscaped space on the 159-201 Washington Street site. New shadow from the home-ownership building will not be cast onto nearby streets, sidewalks, or public open spaces.

At 12:00 p.m., new shadow from the Project will be cast to the north. New shadow from the rental building will not be cast onto nearby streets, sidewalks, bus stops, or public open spaces. New shadow from the home-ownership building will be cast onto the southwestern corner of Fidelis Way Park. No new shadow will be cast onto nearby bus stops.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow from the rental building will be cast onto Fidelis Way and its sidewalks. New shadow from the home-ownership building will be cast onto a portion of Fidelis Way Park, and onto a portion of the landscaped space at the rear of the Brighton Marine Hospital complex. However, the shadow study does not include landscaping, and it is likely that much of this area is already under shadow due to the numerous large trees surrounding the Park. No new shadow will be cast onto nearby bus stops.

139-129 Washington Street Boston, Massachusetts

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Figure 4.2-1

Shadow Study: March 21, 9:00 a.m.

Figure 4.2-2

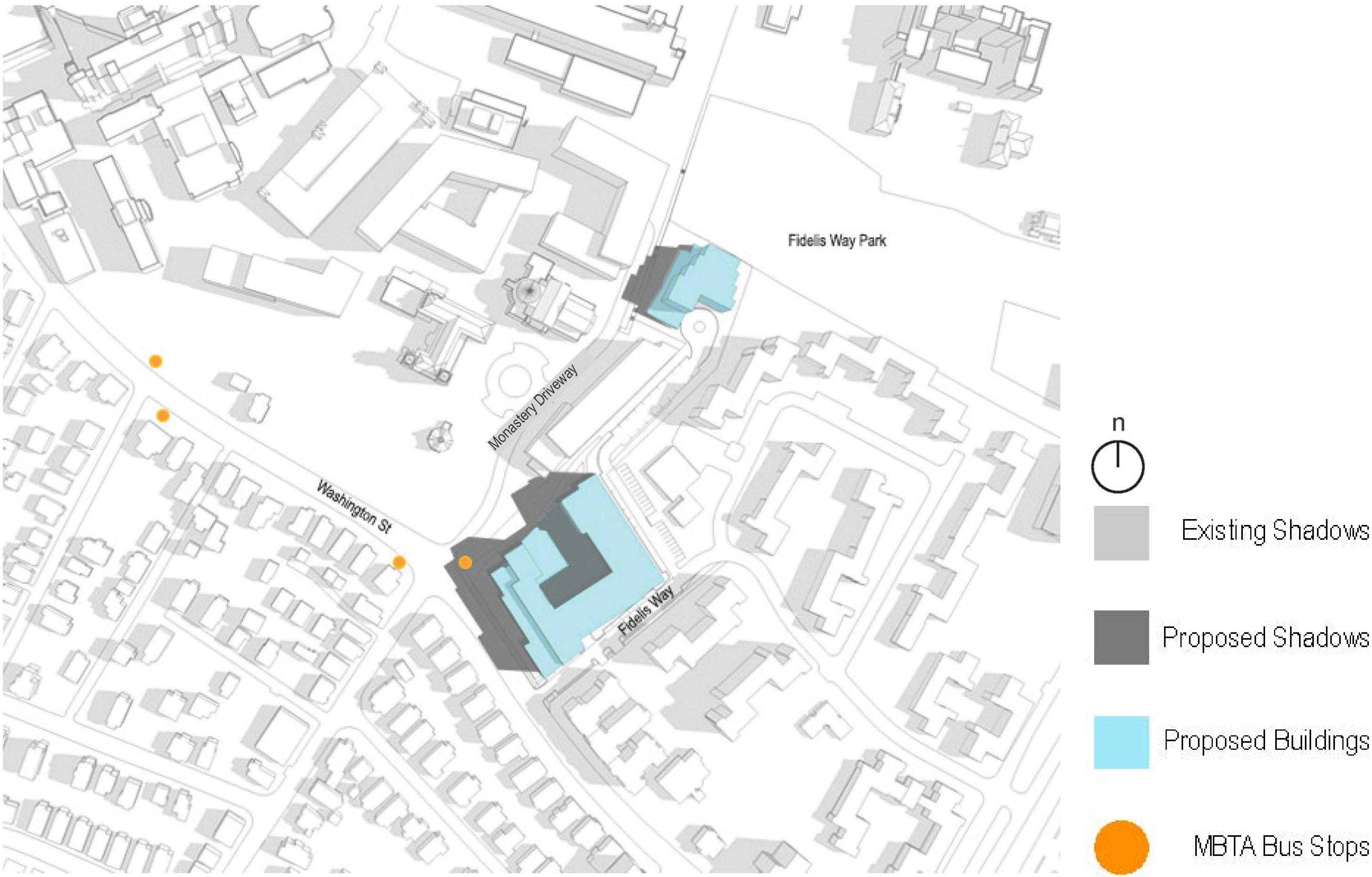
Shadow Study: March 21, 12:00 p.m.

139-129 Washington Street Boston, Massachusetts

cbt

Figure 4.2-3

Shadow Study: March 21, 3:00 p.m.

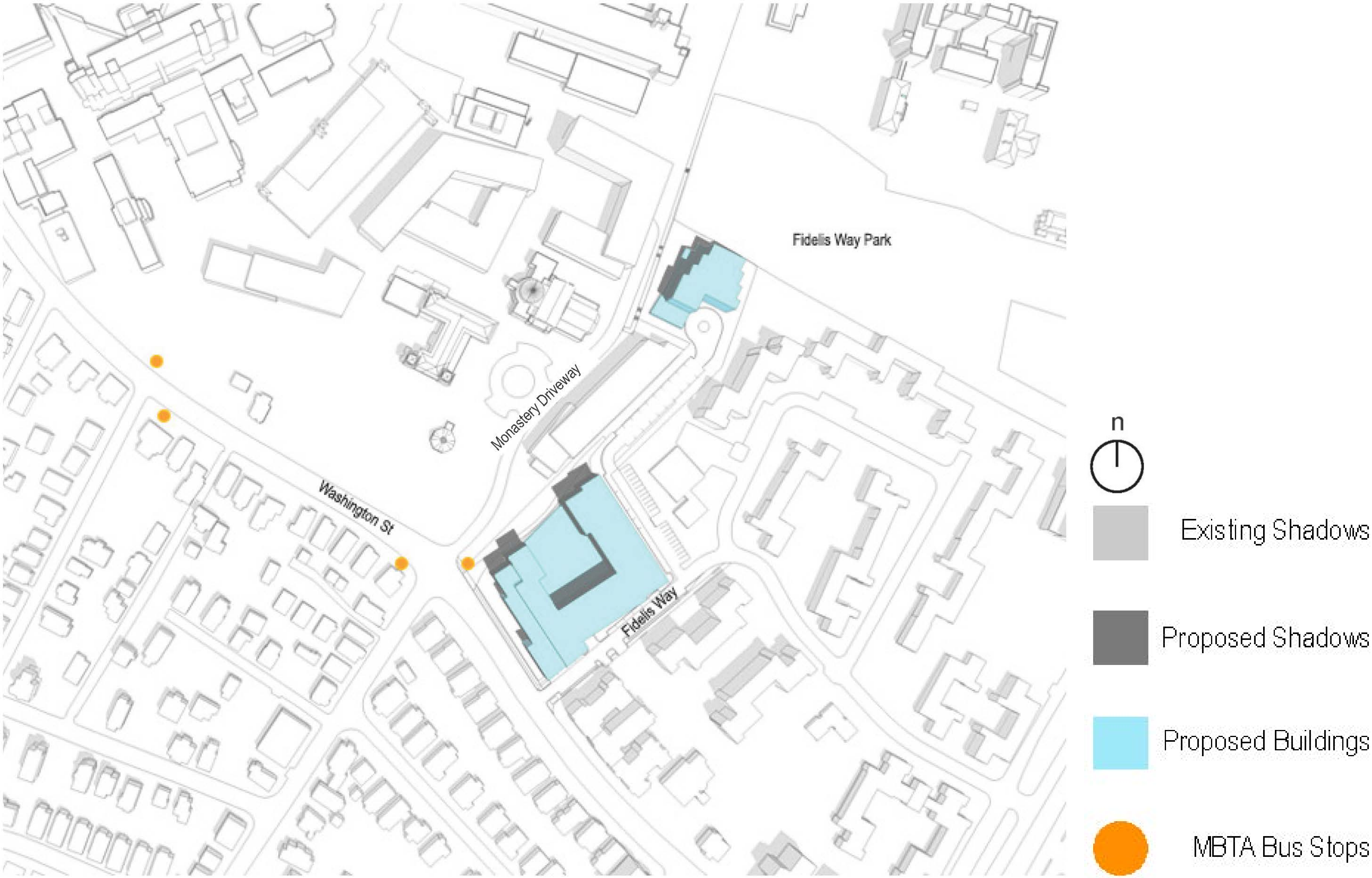


139-129 Washington Street   Boston, Massachusetts

cbt

Figure 4.2-4

Shadow Study: June 21, 9:00 a.m.



139-129 Washington Street   Boston, Massachusetts

cbt

Figure 4.2-5

Shadow Study: June 21, 12:00 p.m.

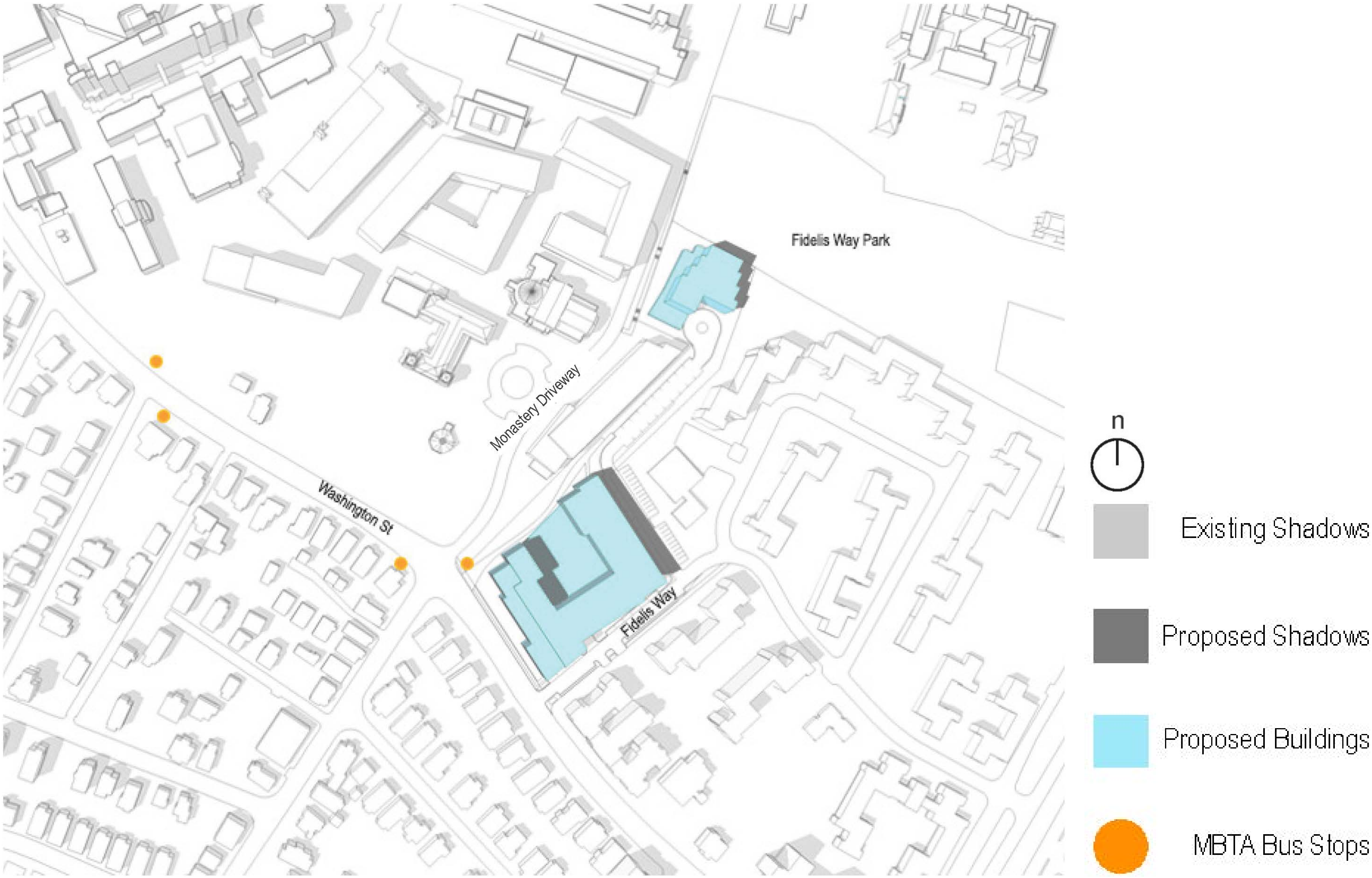


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Figure 4.2-6

Shadow Study: June 21, 3:00 p.m.

139-129 Washington Street   Boston, Massachusetts

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Figure 4.2-7

Shadow Study: June 21, 6:00 p.m.

139-129 Washington Street Boston, Massachusetts

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Figure 4.2-8

Shadow Study: September 21, 9:00 a.m.

cbt

Figure 4.2-9

Shadow Study: September 21, 12:00 p.m.

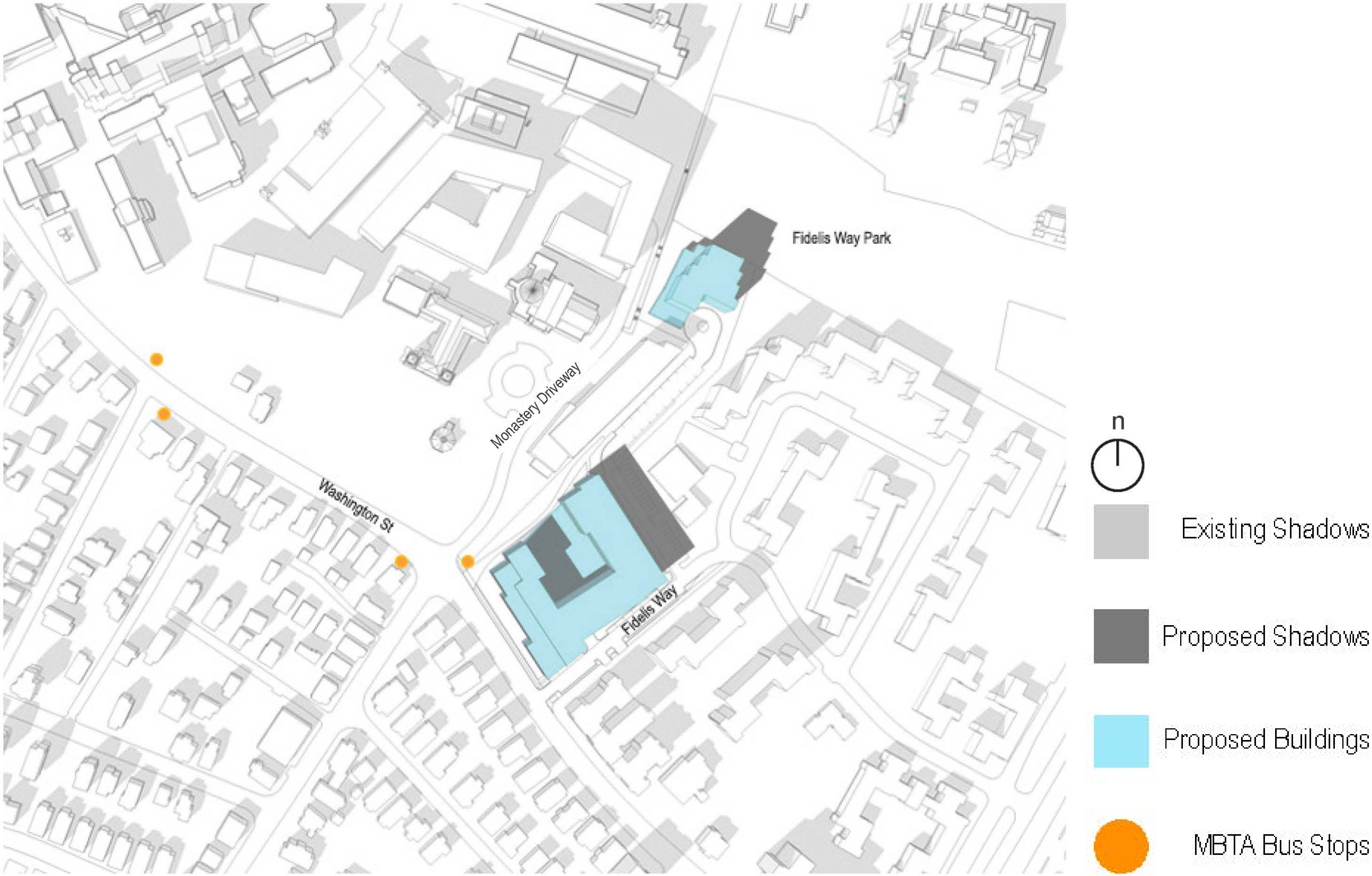

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Figure 4.2-10

Shadow Study: September 21, 3:00 p.m.

139-129 Washington Street   Boston, Massachusetts

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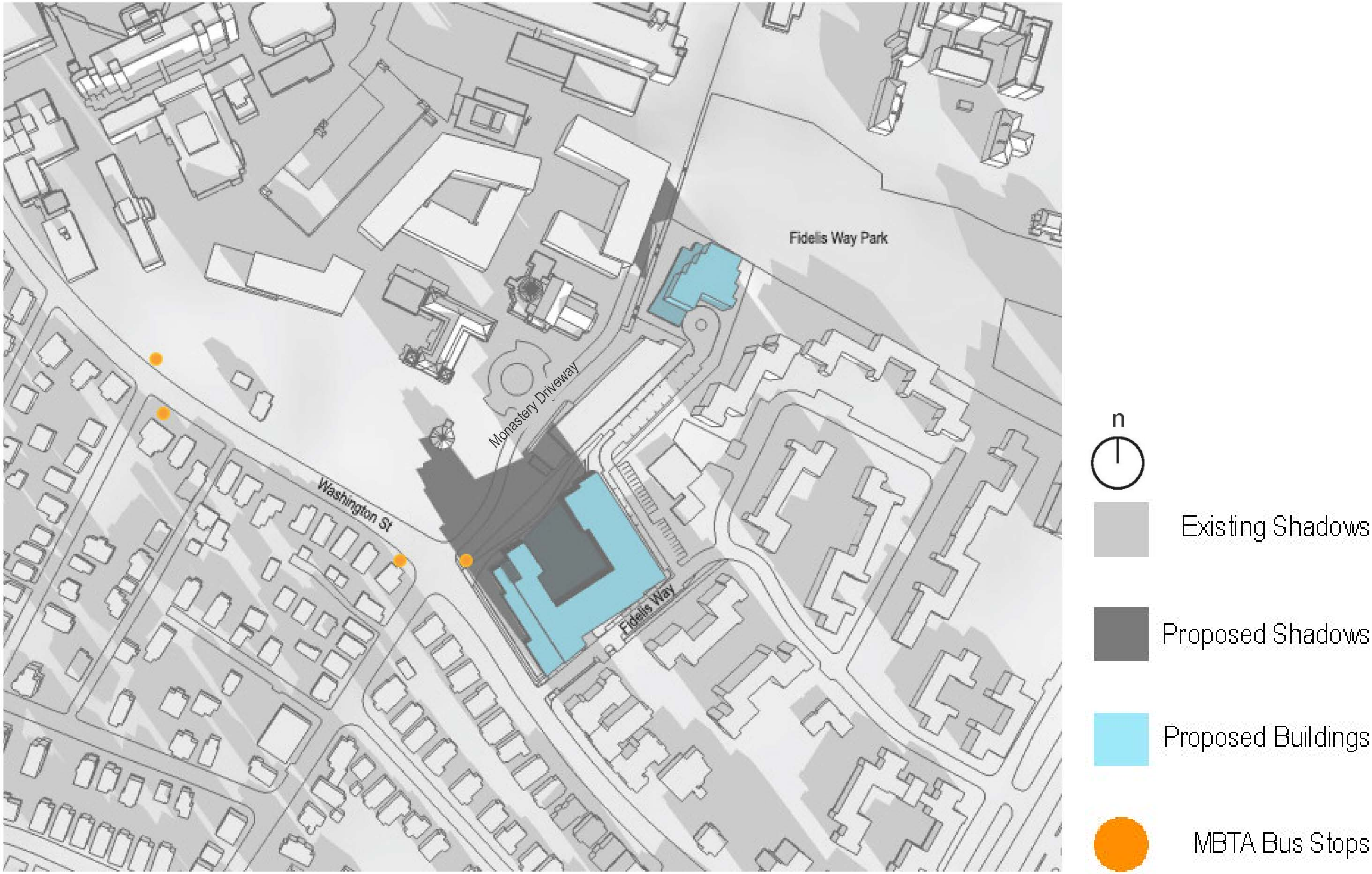
Figure 4.2-11

Shadow Study: September 21, 6:00 p.m.



139-129 Washington Street Boston, Massachusetts

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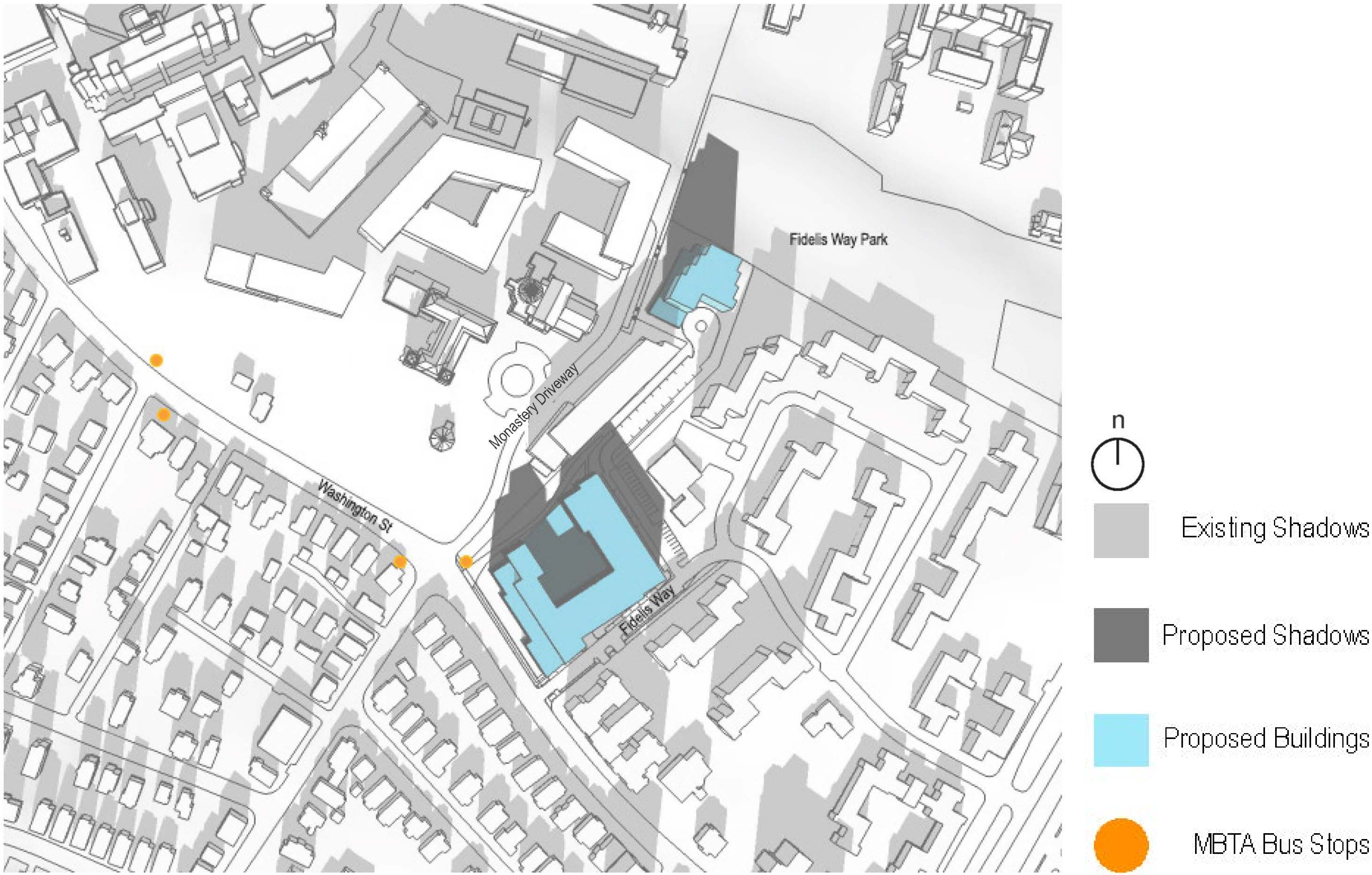
Figure 4.2-12

Shadow Study: December 21, 9:00 a.m.



139-129 Washington Street Boston, Massachusetts

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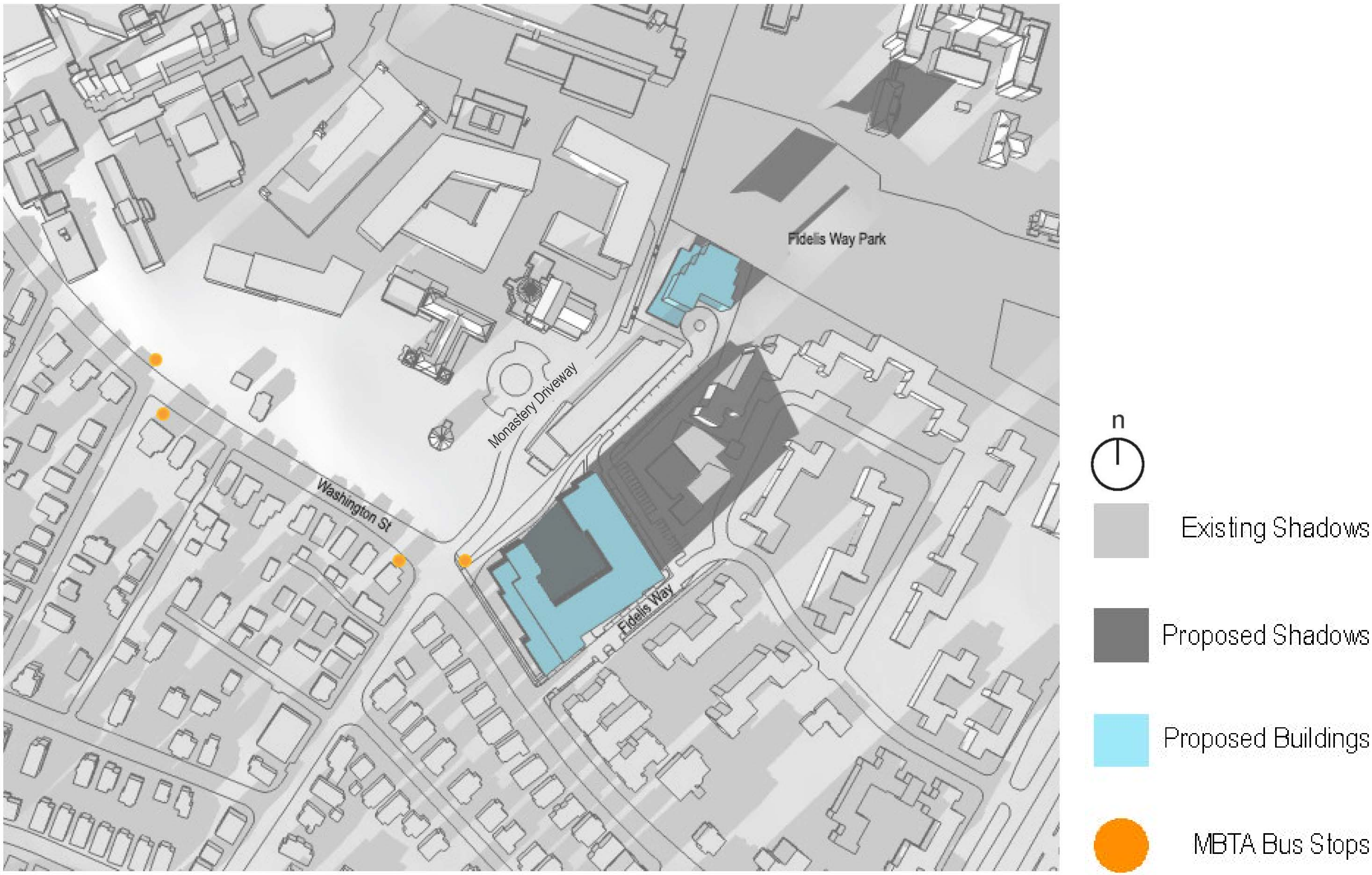
Figure 4.2-13

Shadow Study: December 21, 12:00 p.m.



139-129 Washington Street   Boston, Massachusetts

cbt

Figure 4.2-14

Shadow Study: December 21, 3:00 p.m.

4.2.6 Conclusions

The shadow impact analysis looked at net new shadow created by the Project during fourteen time periods. The Project will cast new shadow on the Washington Street at Monastery Road bus stop during the 9:00 a.m. time periods. New shadow will be cast onto Fidelis Way Park during eight of the fourteen time periods studied. However, the shadow study does not include landscaping, and it is anticipated that much of the areas on which the Project will cast shadow are already under shadow due to the numerous large trees that surround the park.

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.

Since the Project site currently consists of a surface parking lot and two-story buildings, the proposed Project will increase daylight obstruction from the existing condition, however, the resulting conditions will be within the range of the daylight obstruction values of the context points in the area and lower than in other urban areas.

4.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[5]. 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.

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

The analysis compares four conditions: Existing Conditions, Proposed Conditions, As-of-right Alternative Condition, and the context of the area,

One viewpoint was chosen to evaluate daylight obstruction for the Existing, Proposed and As-of-right Alternative conditions. Four area context points were considered in order to provide a basis of comparison to existing conditions in the surrounding area. The viewpoints were taken in the following locations and are shown on Figure 4.3-1.

- **Viewpoint 1:** View from Washington Street facing northeast toward the Project site
- **Area Context Viewpoint (AC1):** View from Washington Street facing northeast toward 127-135 Washington Street
- **Area Context Viewpoint (AC2):** View from Washington Street facing southwest toward a residence on Washington Street
- **Area Context Viewpoint (AC3):** View from Monastery Road facing northwest toward a residence on Monastery Road
- **Area Context Viewpoint (AC4):** View from Washington Street facing southwest toward 116 Washington Street

4.3.3 Results

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

Table 4.3-1 Daylight Analysis Results

Viewpoint Locations		Existing Conditions	Proposed Conditions	As-of-right Alternative
Viewpoint 1	View from Washington Street facing northeast toward the Project site	2.5%	27.5%	15.4%
Area Context Points				
AC1	View from Washington Street facing northeast toward 127-135 Washington Street	54.1%	N/A	N/A
AC2	View from Washington Street facing southwest toward a residence on Washington Street	19.8%	N/A	N/A
AC3	View from Monastery Road facing northwest toward a residence on Monastery Road	33.6%	N/A	N/A
AC4	View from Washington Street facing southwest toward 116 Washington Street	38.5%	N/A	N/A

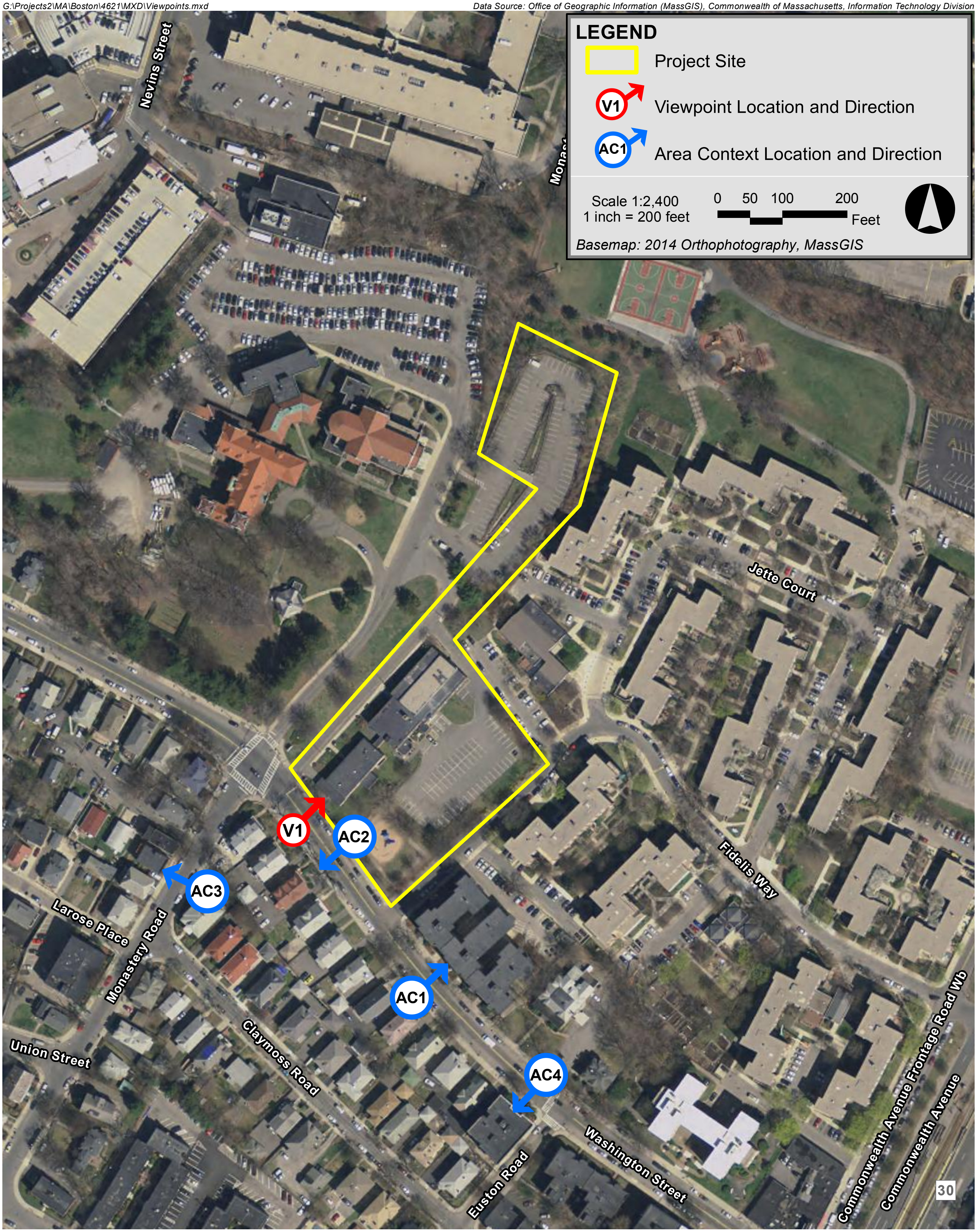


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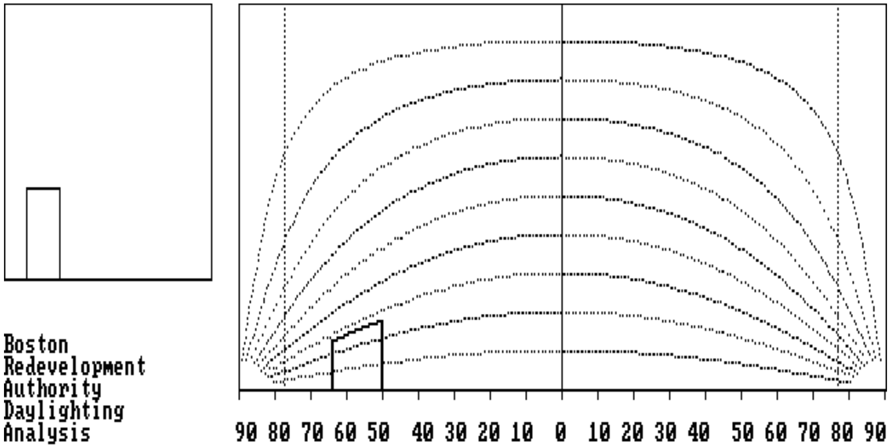
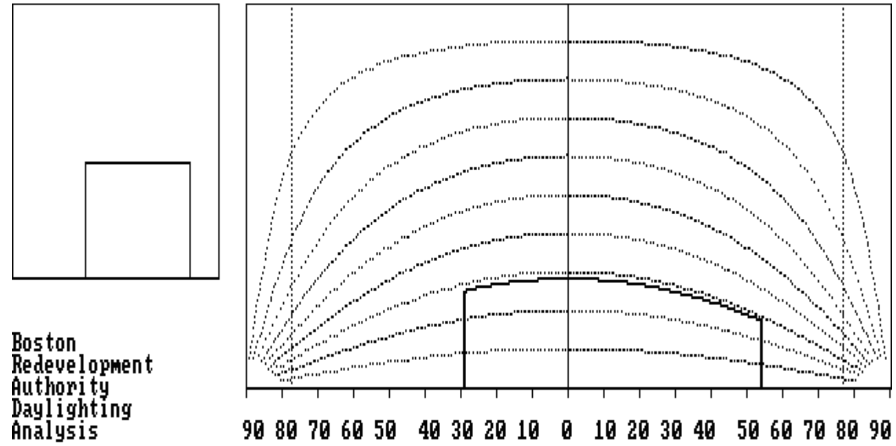
Figure 4.3-1
Viewpoint Map



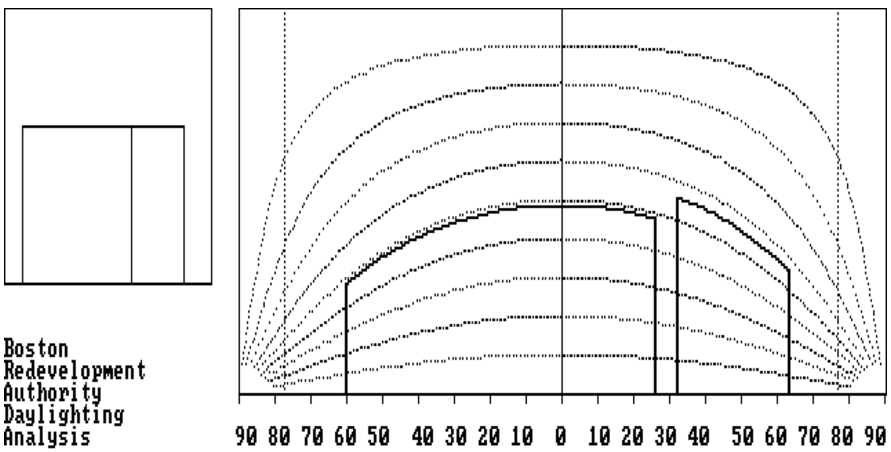
Obstruction of daylight by the building is 2.5 %

Existing Conditions: View from Washington Street facing northeast toward the Project site



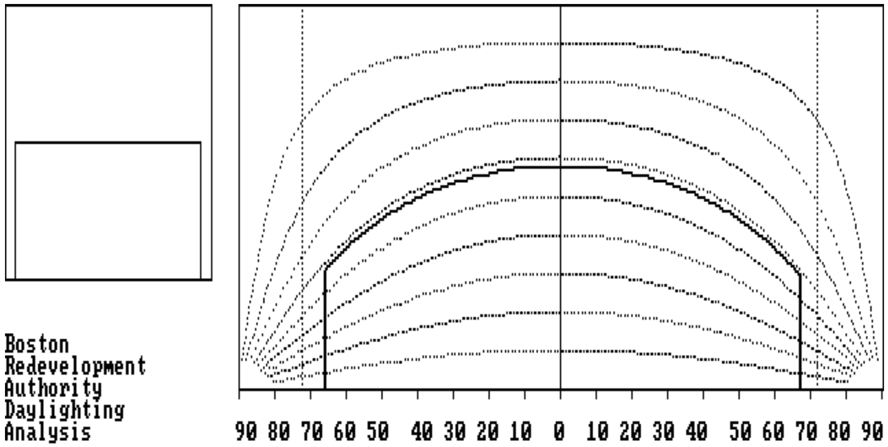
Obstruction of daylight by the building is 15.4 %

As-of-right Alternative Conditions: View from Washington Street facing northeast toward the Project site



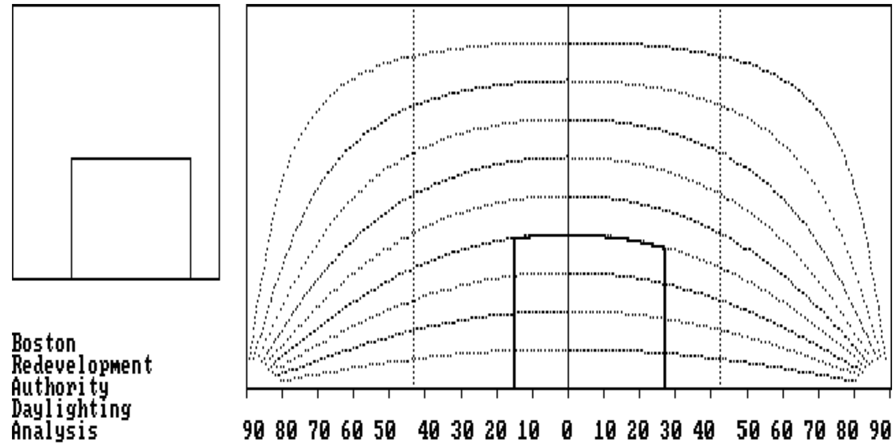
Obstruction of daylight by the building is 27.5 %

Proposed Conditions: View from Washington Street facing northeast toward the Project site



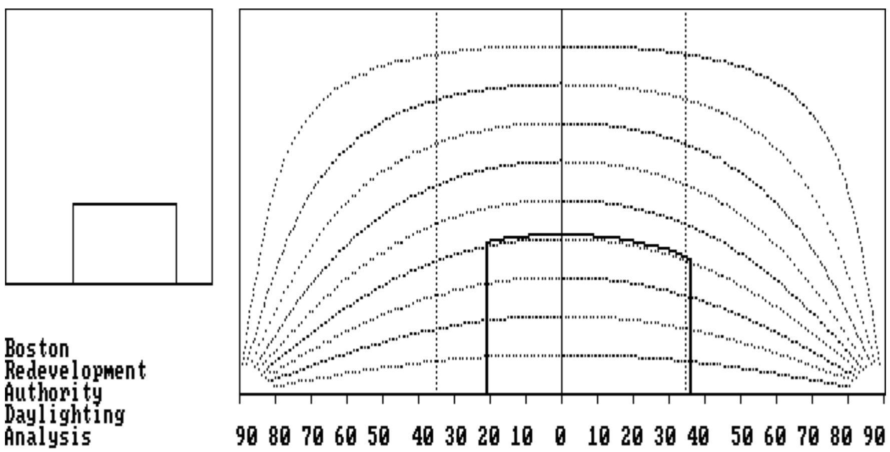
Obstruction of daylight by the building is 54.1 %

Area Context Viewpoint AC1: View from Washington Street facing northeast toward 127-135 Washington Street



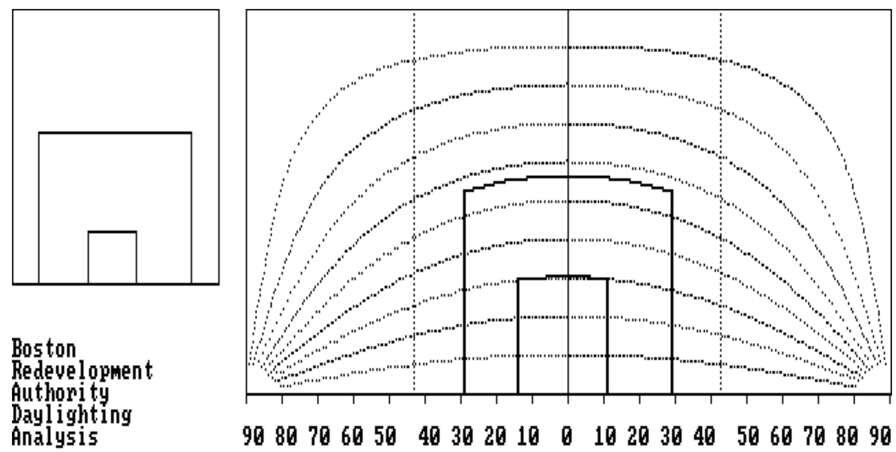
Obstruction of daylight by the building is 19.8 %

Area Context Viewpoint AC2: View from Washington Street facing southwest toward a residence on Washington Street



Obstruction of daylight by the building is 33.6 %

Area Context Viewpoint AC3: View from Monastery Road facing northwest toward a residence on Monastery Road



Obstruction of daylight by the building is 38.5 %

Area Context Viewpoint AC4: View from Washington Street facing southwest toward 116 Washington Street

Washington Street – Viewpoint 1

Washington Street runs along the southwestern edge of the Project. Viewpoint 1 was taken from the center of Washington Street looking northeast at the Project site. Since the existing building has minimal frontage along Washington Street and only occupies a portion of the site, the existing daylight obstruction value is 2.5%. The development of the Project will increase the daylight obstruction value to 27.5%. While this is an increase over Existing Conditions and higher than the As-of-right Alternative, which would have a daylight obstruction value of 15.4%, this daylight obstruction value is consistent with the daylight obstruction value of other buildings in the area, including the Area Context buildings.

Area Context Viewpoints

The Project site is located in an area with a mixture of single family homes, duplexes, and three to six-story multi-family residential buildings. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the four Area Context Viewpoints described above and shown on Figure 4.3-1. The daylight obstruction values range widely, from 19.8% for AC2 to 54.1% for AC1. The daylight obstruction value for the Project is consistent with the Area Context values, and will be less than many of the buildings in the area.

4.3.4 Conclusions

The daylight analysis conducted for the Project describes Existing, Proposed and As-of-right Alternative daylight obstruction conditions at the Project site and in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions will be similar to or less than the daylight obstruction values within the surrounding area.

4.4 Solar Glare

It is not anticipated that the Project will include the use of reflective glass or other reflective materials on the building facades that would result in adverse impacts from reflected solar glare from the Project.

4.5 Air Quality Analysis

4.5.1 Introduction

The BPDA requires that proposed projects evaluate the air quality in the local area, and assess any adverse air quality impacts attributable to a project.

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

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

4.5.2 National Ambient Air Quality Standards and Background Concentrations

Background air quality concentrations and federal air quality standards were utilized to conduct the above air quality impact analyses. Federal National Ambient Air Quality Standards (NAAQS) were developed by the U.S. Environmental Protection Agency (EPA) to protect the human health against adverse health effects with a margin of safety. The modeling methodologies were developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[6] The following sections outline the NAAQS standards and detail the sources of background air quality data.

4.5.2.1 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, EPA promulgated NAAQS for the following criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM-10 and PM-2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 4.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS (differences are highlighted in **bold** in Table 4.5-1).

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.

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

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

Table 4.5-1 National (NAAQS) and Massachusetts (MAAQS) Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$) Primary	NAAQS ($\mu g/m^3$) Secondary	MAAQS ($\mu g/m^3$) Primary	MAAQS ($\mu g/m^3$) Secondary
NO_2	Annual (1)	100	Same	100	Same
	1-hour (2)	**188**	None	**None**	None
SO_2	Annual (1)(9)	80	None	80	None
	24-hour (3)(9)	365	None	365	None
	3-hour (3)	None	1300	None	1300
	1-hour (4)	**196**	None	**None**	None
PM-2.5	Annual (1)	**12**	**15**	**None**	**None**
	24-hour (5)	**35**	**Same**	**None**	**None**
PM-10	Annual (1)(6)	**None**	None	**50**	Same
	24-hour (3)(7)	150	Same	150	Same
CO	8-hour (3)	10,000	Same	10,000	Same
	1-hour (3)	40,000	Same	40,000	Same
Ozone	8-hour (8)	**147**	Same	**235**	Same
Pb	3-month (1)	1.5	Same	1.5	Same

(1) Not to be exceeded.
(2) 98th percentile of one-hour daily maximum concentrations, averaged over three years.
(3) Not to be exceeded more than once per year.
(4) 99th percentile of one-hour daily maximum concentrations, averaged over three years.
(5) 98th percentile, averaged over three years.
(6) EPA revoked the annual PM-10 NAAQS in 2006.
(7) Not to be exceeded more than once per year on average over three years.
(8) Annual fourth-highest daily maximum eight-hour concentration, averaged over three years.
(9) EPA revoked the annual and 24-hour SO_2 NAAQS in 2010. However, they remain in effect until one year after the area's initial attainment designation, unless designated as "nonattainment".

Source: http://www.epa.gov/ttn/naaqs/criteria.html and 310 CMR 6.04

4.5.2.2 Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP to EPA was obtained for 2013 to 2015. Data for the pollutant and averaging time combinations were obtained from the EPA's AirData website.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour 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. To attain the one-hour NO_2 standard, the three-year average of the 98th percentile of the maximum daily one-hour concentrations must not exceed 188 $\mu g/m^3$.

Background concentrations were determined from the closest available monitoring stations to the Project site. All pollutants are not monitored at every station, so data from multiple locations are necessary. The closest monitor is at Kenmore Square in Boston, roughly 2.5 miles east of the Project site. The Kenmore Square monitoring site samples all pollutants except Lead and Ozone. These values were obtained from the next closest monitor at Harrison Avenue in Boston, roughly 3.5 miles east-southeast of the Project site. 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	2013	2014	2015	Background Concentration ($\mu g/m^3$)	NAAQS	Percent of NAAQS
SO_2 (1)(6)(7)	1-Hour (5)	32.0	25.4	14.4	23.9	196.0	12%
	3-Hour	36.4	24.6	11.5	36.4	1300.0	3%
	24-Hour	15.7	13.1	7.6	15.7	365.0	4%
	Annual	2.69	2.47	1.39	2.69	80.0	3%
PM-10	24-Hour	50.0	53.0	30.0	53.0	150.0	35%
	Annual	19.31	15.03	14.88	19.31	50.0	39%
PM-2.5	24-Hour (5)	17.5	14.6	14.5	15.5	35.0	44%
	Annual (5)	7.96	6.05	6.50	6.84	12.0	57%
NO_2 (3)	1-Hour (5)	92.1	92.1	105.3	96.5	188.0	51%
	Annual	33.42	32.28	32.52	33.42	100.0	33%
CO (2)	1-Hour	1489.8	1489.8	458.4	1489.8	40000.0	4%
	8-Hour	1146.0	1260.6	343.8	1260.6	10000.0	13%
Ozone (4)	8-Hour	115.8	106.0	109.9	115.8	147.0	79%
Lead	Rolling 3-Month	0.007	0.014	0.016	0.016	0.15	10%

Notes:
From 2013-2015 EPA's AirData Website
(1) SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.
(2) CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.
(3) NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.
(4) O_3 reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1963 $\mu g/m^3$.
(5) Background level is the average concentration of the three years.
(6) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.
(7) The E. 1st St. monitor was closed in 2014. Harrison Avenue data used for 2015 SO_2 and NO_2.

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

4.5.3 *Mobile Sources*

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

4.5.3.1 Methodology

The BPDA typically requests an analysis of the effect on air quality of the increase in traffic generated by projects subject to Large Project Review. This "microscale" analysis is typically required for any intersection where 1) Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; 2) Project traffic would increase traffic volumes on nearby roadways by 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 microscale analysis involves modeling of CO emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No-Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a 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 microscale analysis has been conducted using the latest versions of EPA's MOVES and CAL3QHC programs to estimate CO concentrations at sidewalk receptor locations. Baseline (2016) and future year (2023) emission factor data calculated from the MOVES model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersections. The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[7]

[7] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

Existing background values of CO at the nearest monitor location were obtained from MassDEP. CAL3QHC results were then added to background CO values of 1.3 ppm (one-hour) and 1.1 ppm (eight-hour), as provided by MassDEP, to determine total air quality impacts due to the Project. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and 9 ppm (eight-hour).

Modeling assumptions and backup data for results presented in this section are provided in Appendix D.

Intersection Selection

Four signalized intersections included in the traffic study meet the above conditions described at the beginning of this section (see Chapter 3). The traffic volumes and LOS calculations provided in Chapter 3 form the basis of evaluating the traffic data versus the microscale thresholds. The intersections found to meet the criteria are:

- Washington Street and Commonwealth Avenue,
- Kelton Street, Warren Street, and Commonwealth Avenue,
- Warren Street, Sparhawk Street, and Cambridge Street, and
- Winship Street, Washington Street, and Cambridge Street.

Microscale modeling was performed for the intersections based on the aforementioned methodology. The 2016 Existing Condition and the 2023 No-Build and Build conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak.

Emissions Calculations (MOVES)

The EPA MOVES computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOVES model are based on motor vehicle operations typical of daily periods. The Commonwealth's statewide annual Inspection and Maintenance (I&M) program was included, as well as the county specific vehicle age registration distribution, fleet mix, meteorology, and other inputs. The inputs for MOVES for the existing (2016) and future year (2023) are provided by MassDEP.

All link types for the modeled intersections were input into MOVES. Idle emission factors are obtained from factors for a link average speed of 0 miles per hour (mph). Moving emissions are calculated based on speeds at which free-flowing vehicles travel through the intersection as stated in traffic modeling (Synchro) reports. A speed of 25 mph is used for all free-flow traffic, consistent with the City of Boston speed limit. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary) and left turns, respectively. Roadway emissions factors were obtained from MOVES using EPA guidance.[8]

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

Receptors & Meteorology Inputs

Sets of up to 200 receptors were placed in the vicinity of the modeled intersections. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersections. The roadway links and receptor locations of the modeled intersections are presented in Figures 4.5-1 through 4.5-4.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[9], a wind speed of one meter per second, stability class D (4), and a mixing height of 1,000 meters were used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 321 centimeters was selected.[10]

Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at signalized intersections, worst-case meteorological conditions, and traffic input data. The one-hour concentrations were scaled by a factor of 0.9 to estimate eight-hour concentrations.[11] The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs.

For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 1.3 ppm (1,490 $\mu g/m^3$) for one-hour and 1.1 ppm (1,261 $\mu g/m^3$) for eight-hour CO.

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

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

10 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.

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

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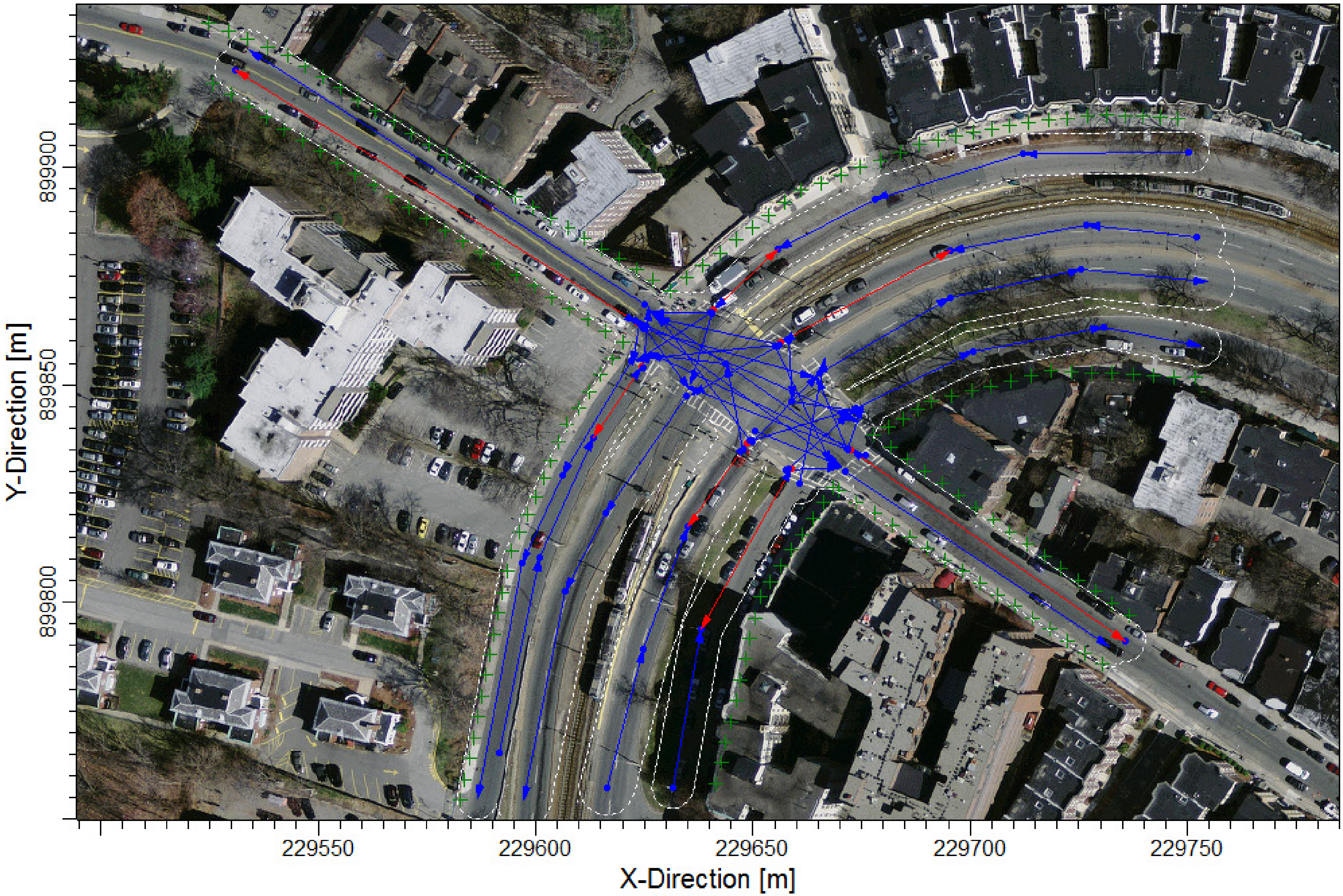
Figure 4.5-1

Link and Receptor Locations for CAL3QHC modeling of Intersection of Washington St. and Commonwealth Ave.



139-149 Washington Street Boston, Massachusetts

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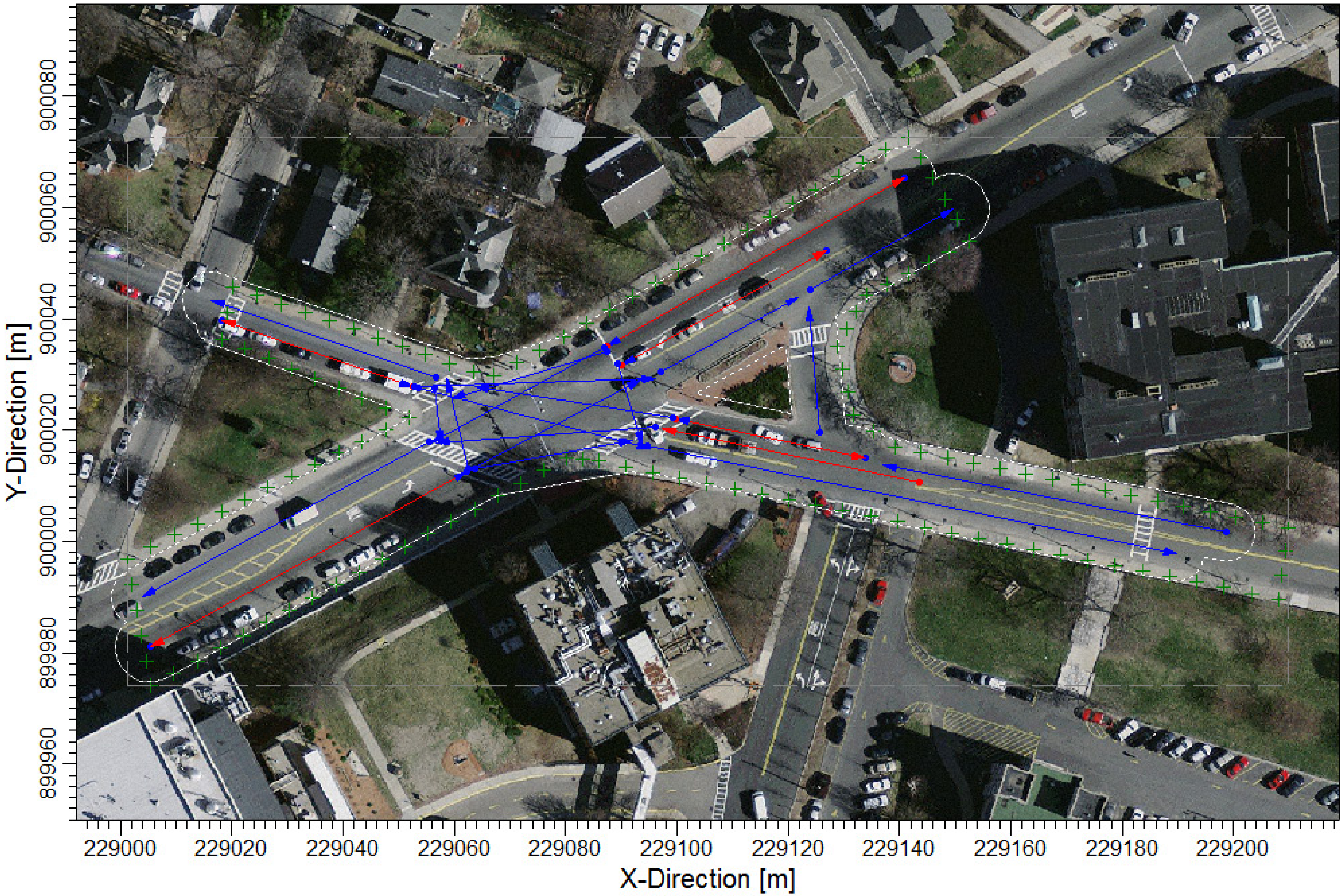
Figure 4.5-2

Link and Receptor Locations for CAL3QHC modeling of Intersection of Kelton St., Warren St., and Commonwealth Ave.



139-149 Washington Street Boston, Massachusetts

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Figure 4.5-3

Link and Receptor Locations for CAL3QHC modeling of Intersection of Warren St., Sparhawk St. and Cambridge St.

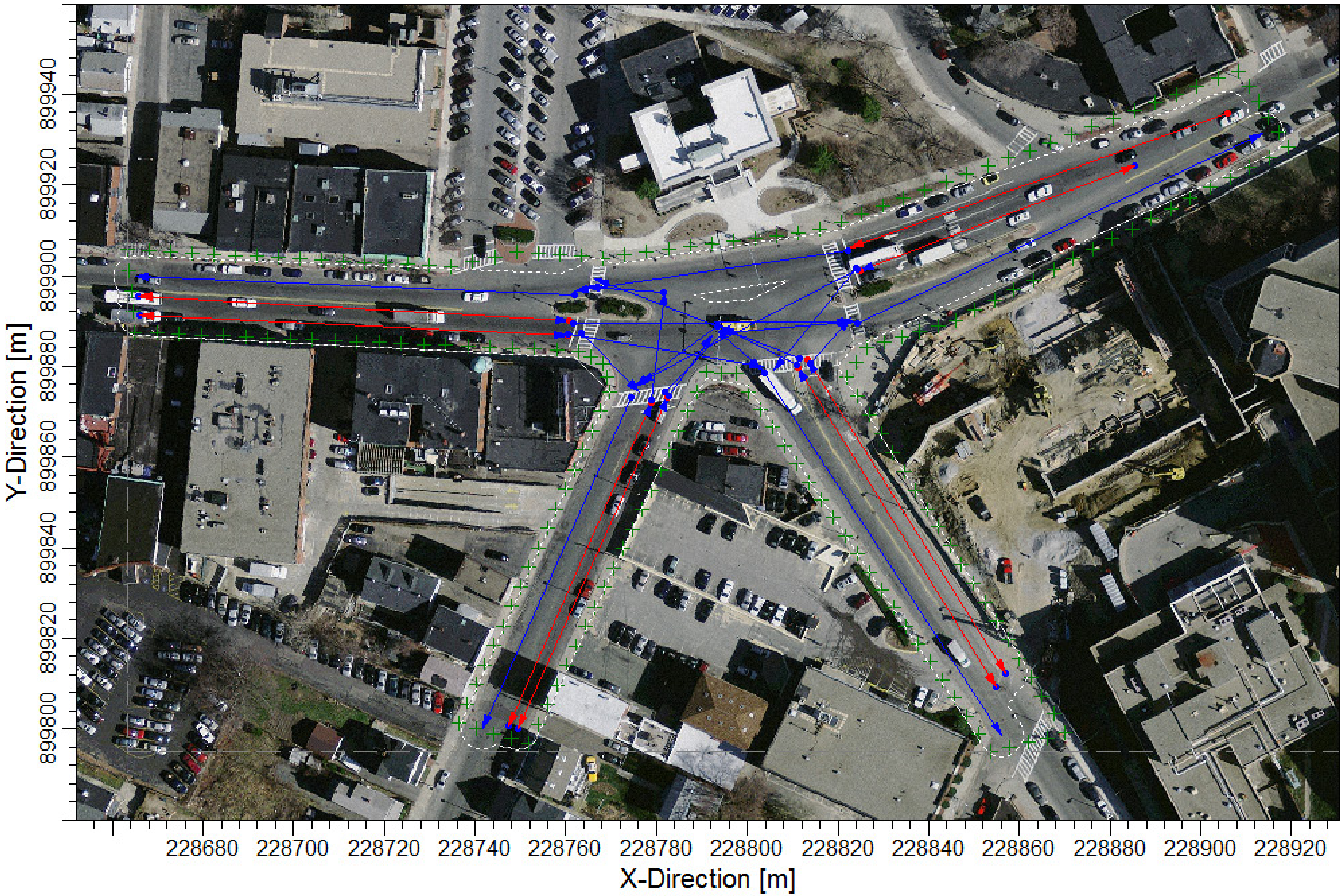

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Figure 4.5-4

Link and Receptor Locations for CAL3QHC modeling of Intersection of Winship St., Washington St. and Cambridge St..

4.5.3.2 Air Quality Results

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 2016 and 2023 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.9.[12]

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 (0.3 ppm) plus background (1.3 ppm) is 2.2 ppm. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.3 ppm) plus background (1.1 ppm) is 1.6 ppm. Both maximum concentrations occur under Existing Conditions.

Under future No-Build and Build cases, the highest one-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.2 ppm) plus background (1.3 ppm) is 2.1 ppm. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.2 ppm) plus background (1.1 ppm) is 1.5 ppm.

All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

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

Table 4.5-3 Summary of Microscale Modeling Analysis (Existing 2016)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Washington Street and Commonwealth Avenue	AM	0.3	1.3	1.6	35
	PM	0.2	1.3	1.5	35
Kelton Street, Warren Street and Commonwealth Avenue	AM	0.2	1.3	1.5	35
	PM	0.2	1.3	1.5	35
Warren Street, Sparhawk Street and Cambridge Street	AM	0.3	1.3	1.6	35
	PM	0.4	1.3	1.7	35
Winship Street, Washington Street and Cambridge Street	AM	0.2	1.3	1.5	35
	PM	0.5	1.3	1.8	35
8-Hour					
Washington Street and Commonwealth Avenue	AM	0.3	1.1	1.4	9
	PM	0.2	1.1	1.3	9
Kelton Street, Warren Street and Commonwealth Avenue	AM	0.2	1.1	1.3	9
	PM	0.2	1.1	1.3	9
Warren Street, Sparhawk Street and Cambridge Street	AM	0.3	1.1	1.4	9
	PM	0.4	1.1	1.5	9
Winship Street, Washington Street and Cambridge Street	AM	0.2	1.1	1.3	9
	PM	0.5	1.1	1.6	9

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

Table 4.5-4 Summary of Microscale Modeling Analysis (No-Build 2023)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Washington Street and Commonwealth Avenue	AM	0.2	1.3	1.5	35
	PM	0.2	1.3	1.5	35
Kelton Street, Warren Street and Commonwealth Avenue	AM	0.1	1.3	1.4	35
	PM	0.1	1.3	1.4	35
Warren Street, Sparhawk Street and Cambridge Street	AM	0.2	1.3	1.5	35
	PM	0.2	1.3	1.5	35
Winship Street, Washington Street and Cambridge Street	AM	0.1	1.3	1.4	35
	PM	0.3	1.3	1.6	35
8-Hour					
Washington Street and Commonwealth Avenue	AM	0.2	1.1	1.3	9
	PM	0.2	1.1	1.3	9
Kelton Street, Warren Street and Commonwealth Avenue	AM	0.1	1.1	1.2	9
	PM	0.1	1.1	1.2	9
Warren Street, Sparhawk Street and Cambridge Street	AM	0.2	1.1	1.3	9
	PM	0.2	1.1	1.3	9
Winship Street, Washington Street and Cambridge Street	AM	0.1	1.1	1.2	9
	PM	0.3	1.1	1.4	9

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

Table 4.5-5 Summary of Microscale Modeling Analysis (Build 2023)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Washington Street and Commonwealth Avenue	AM	0.2	1.3	1.5	35
	PM	0.2	1.3	1.5	35
Kelton Street, Warren Street and Commonwealth Avenue	AM	0.1	1.3	1.4	35
	PM	0.1	1.3	1.4	35
Warren Street, Sparhawk Street and Cambridge Street	AM	0.2	1.3	1.5	35
	PM	0.2	1.3	1.5	35
Winship Street, Washington Street and Cambridge Street	AM	0.1	1.3	1.4	35
	PM	0.3	1.3	1.6	35
8-Hour					
Washington Street and Commonwealth Avenue	AM	0.2	1.1	1.3	9
	PM	0.2	1.1	1.3	9
Kelton Street, Warren Street and Commonwealth Avenue	AM	0.1	1.1	1.2	9
	PM	0.1	1.1	1.2	9
Warren Street, Sparhawk Street and Cambridge Street	AM	0.2	1.1	1.3	9
	PM	0.2	1.1	1.3	9
Winship Street, Washington Street and Cambridge Street	AM	0.1	1.1	1.2	9
	PM	0.3	1.1	1.4	9

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

4.5.4 Conclusions

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

4.6 Solid and Hazardous Waste

4.6.1 Hazardous Waste

Based on a Phase I Environmental Site Assessment (ESA), there was no evidence of Recognized Environmental Conditions (RECs) in connection with the Site. As defined by ASTM E1527-13 a REC is the presence or likely presence of hazardous substances or petroleum products in, on, or at a Site: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. The Site is not listed as a 21E disposal site based on a review of the online database. Based on a Hazardous Building

Materials (HBM) survey, asbestos-containing materials (ACM) were identified within the existing buildings. Abatement will be completed prior to demolition in accordance with local, state and federal regulations.

4.6.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of residential 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 254 tons of solid waste per year.

With the exception of household hazardous wastes typical of 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 sound level assessment was conducted which included a baseline sound monitoring program to measure existing sound levels in the vicinity of the Project, computer modeling to predict operational sound levels from proposed mechanical equipment, and a comparison of future Project sound levels to applicable City of Boston Zoning District Noise Standards and the U.S. Department of Housing and Urban Development Criteria.

This analysis, which is consistent with BPDA requirements for noise studies, indicates that with appropriate noise controls, predicted sound levels from the Project will be below the requirements of the City's Noise Standards.

4.7.2 Noise Terminology

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

The decibel scale is logarithmic to accommodate the wide range of sound intensities observed in the environment. A property of the decibel scale is that the sound pressure levels of two distinct sounds are not purely 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 (53 dB), not a doubling (100 dB). Thus, every three-decibel change in sound level represents a doubling or halving of sound energy. A change in sound level of less than three dB is generally imperceptible to the human ear.

Another property of the decibel scale is that if one source of noise is 10 dB (or more) louder than another source, then the total combined sound level is simply that of the louder source (i.e., the quieter source contributes negligibly to the overall sound level). For example, a source of sound at 60 dB plus another source at 47 dB is 60 dB.

The sound level meter used to measure noise is a standardized instrument.[13] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various conditions. One network is the A-weighting network (there are also Z- and C-weighting networks), which most closely approximates how the human ear responds to sound as a function of frequency, and is the accepted scale used for community sound level measurements. Sounds are frequently reported as detected with the A-weighting network of the sound level meter in dBA. A-weighted sound levels emphasize middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower and higher frequencies.

Because sounds in the environment vary with time, they are usually described with more than simply a single number. Two methods are used for describing variable sounds, 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 in terms of percentage. 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.

- 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.

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13 *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_{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 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.

- L_{dn}, the day-night noise level, is the A-weighted L_{eq} sound level over a 24-hour period with an additional 10 dB penalty imposed on sounds that occur between 10 p.m. and 7 a.m. to account for the increased sensitivity to noise during these periods. The L_{dn} is utilized by the U.S. Department of Housing and Urban Development to evaluate the acceptability of an environment for development of federally assisted residential developments.

In the design of noise controls, which do not function quite like the human ear, it is important to understand the frequency spectrum of the noise source of interest. The spectra of noises are usually stated in terms of octave-band sound pressure levels, in dB, with the frequency bands being those established by standard (American National Standards Institute [ANSI] S1.11, 1986). 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. Octave-band measurements and modeling are used in assessing compliance with the City of Boston noise regulations.

4.7.3 Noise Regulations and Criteria

City of Boston

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

Table 4.7-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the BAPCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. These maximum allowable sound pressure levels apply at the property line of the receiving property. The "Residential Zoning District" limits apply to any lot located within a residential zoning district or to any residential use located in another zone except an Industrial Zoning District, according to Regulation 2.2. Similarly, per Regulation 2.3, business limits apply to any lot located within a business zoning district not in residential or institutional use.

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

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

Notes:

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

United States Department of Housing and Urban Development

The HUD Environmental Criteria and Standards (24 CFR Part 51), Subpart B – Noise Abatement and Control specifies noise criteria for HUD-funded housing developments. The HUD exterior noise goal for residential construction is a day-night average sound level (L_{dn}) of 65 dBA or less. This is considered "Acceptable". L_{dn} sound levels above 65 dBA but not exceeding 75 dBA are considered "Normally Unacceptable," and L_{dn} levels above 75 dBA are considered "Unacceptable". Funding for HUD approvals in "Normally Unacceptable" areas require a minimum of 10 dB of additional sound attenuation for buildings having noise-sensitive uses. The HUD interior noise goal is an L_{dn} of 45 dBA The HUD acceptability criteria are provided in Table 4.7-2.

Table 4.7-2 U.S. Department of Housing and Urban Development Acceptability Criteria

Acceptability	Outdoor L_{dn} (dBA)
Acceptable	Less than 65
Normally Unacceptable	65 to 75
Unacceptable	Above 75 dBA

4.7.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project. Existing noise sources in the vicinity of the Project site include: vehicle and truck traffic along local streets, traffic and construction along I-90, rooftop and residential mechanical equipment, pedestrian foot traffic, overhead aircraft, train whistles, birds, trees, wind, insects, and the general city soundscape.

4.7.4.1 Noise Monitoring Methodology

Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to avoid peak traffic conditions. Sound level measurements were made on Wednesday, October 19, 2016 during the daytime (1:30 p.m. to 3:00 p.m.) and on Thursday, October 20, 2016 during nighttime hours (12:00 a.m. to 2:30 a.m.). All measurements were 20 minutes in duration.

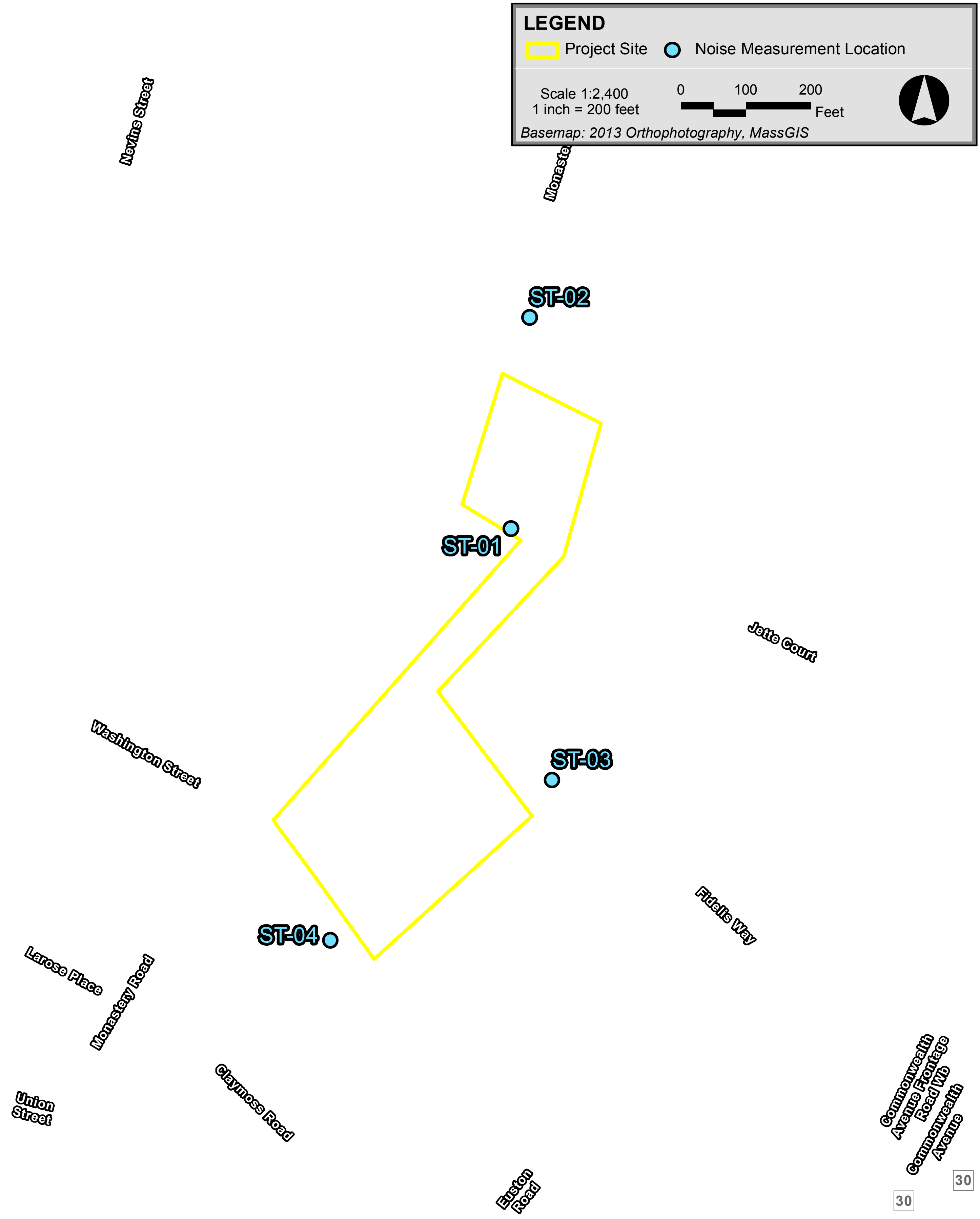
Sound levels were measured on the Project site or at publicly accessible locations at a height of five feet (1.5 meters) above ground level, under low wind conditions, and with dry roadway surfaces. Wind speed measurements were made with a Davis Instruments TurboMeter electronic wind speed indicator, and temperature and humidity measurements were made using a General Tools digital psychrometer. Unofficial observations about meteorology or land use in the community were made solely to characterize the existing sound levels in the area and to estimate the noise sensitivity at properties near the Project site.

4.7.4.2 Noise Monitoring Locations

The selection of the noise monitoring locations was based upon a review of zoning in the Project area. Four noise monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. These measurement locations are depicted on Figure 4.7-1 and described below.

G:\Projects2\MA\Boston\4621\Noise\MXD\Noise_measurement_locations.mxd

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



139-149 Washington Street Boston, Massachusetts

[redacted]

Figure 4.7-1

Noise Measurement Locations

- **Location ST-01** is located within the Project boundary, on a traffic island in the northern St. Elizabeth's Medical Center auxiliary parking lot. This location is east of the St. Gabriel's Monastery and is representative of the Commonwealth Development residences to the east.

- **Location ST-02** is located within Fidelis Way Park, to the north of the Project site. This location is representative of sensitive receptors to the north of the Project site, including Brighton High School and St. Elizabeth's Medical Center.

- **Location ST-03** is located on the western sidewalk outside of 35 Fidelis Way and 512 Jette Court, outside of the Commonwealth Development. This location is representative of the residential receptors to the east of the Project.

- **Location ST-04** is located at 148 Washington Street, along the southern sidewalk, south of the Project. This location is representative of residential receptors to the south of the Project.

4.7.4.3 Noise Monitoring Equipment

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

4.7.4.4 Measured Background Noise Levels

Baseline noise monitoring results are presented in Table 4.7-3 and summarized below:

- The daytime residual background (L_{90}) measurements ranged from 47 to 49 dBA;

- The nighttime residual background (L_{90}) measurements ranged from 43 to 50 dBA;

- The daytime equivalent level (L_{eq}) measurements ranged from 50 to 65 dBA;

- The nighttime equivalent level (L_{eq}) measurements ranged from 48 to 52 dBA.

Table 4.7-3 Summary of Measured Background Noise Levels – October 19, 2016 (Daytime) & October 20, 2016 (Nighttime)

Location	Period	Start Time	L_{dn}	LA_{eq}	LA_{max}	LA_{10}	LA_{50}	LA_{90}	L_{90} Sound Pressure Level by Octave-Band Center Frequency (Hz)									
									31.5	63	125	250	500	1000	2000	4000	8000	16000
			dBA	dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB	dB
ST-01	Day	12:59 PM	58	50	62	53	48	47	58	55	49	46	44	43	35	31	27	28
ST-02	Day	1:26 PM	57	55	71	54	50	48	58	56	51	45	44	44	38	33	29	26
ST-03	Day	2:02 PM	58	58	75	59	51	48	56	55	51	46	43	43	38	36	31	27
ST-04	Day	2:34 PM	64	65	81	69	59	49	57	55	53	47	45	44	41	37	32	27
ST-01	Night	12:23 AM	---	52	59	53	52	50	56	56	54	50	47	46	37	35	24	25
ST-02	Night	12:50 AM	---	49	57	51	49	48	54	56	53	45	44	44	35	38	22	25
ST-03	Night	1:23 AM	---	48	60	49	47	46	52	51	48	43	43	41	36	31	27	25
ST-04	Night	1:54 AM	---	51	67	53	44	43	52	51	48	43	40	38	30	25	23	25

Notes: Sound pressure levels are rounded to the nearest whole decibel. L_{dn} level was calculated by using the measured daytime level to represent all daytime hours (7 am to 10 pm) and the measured nighttime level to represent all nighttime hours (10 pm through 7 am).

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Wednesday, October 19, 2016	84 °F	27%	Mostly Sunny	SE @ 0-2 mph
Nighttime	Thursday, October 20, 2016	58 °F	64%	Clear	Calm

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	3752
Microphone	Larson Davis	377B20	142894
Preamp	Larson Davis	PRM831	029563
Calibrator	Larson Davis	Cal200	7147

4.7.5 Future Conditions

4.7.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project are anticipated to consist of rooftop air conditioning units and garage ventilation fans. A total of 183 air conditioning units are anticipated to be included with the project (156 on the south building and 27 on the north building). Garage ventilation fans are anticipated be located on the western walls of the Level 1 and Level 2 garages.

Table 4.7-4 provides an anticipated list of the major sources of sound. Sound power levels used in the acoustical modeling of each piece of equipment are presented in Table 4.7-5. Sound power level data were provided by the respective manufacturer of each piece of equipment.

The Project includes noise control measures that are necessary to achieve compliance with the applicable noise regulations. Specifically, garage ventilation fan noise will be mitigated through the use of acoustically treated louvers. As the design progresses, specifications for mechanical equipment may change; however, appropriate measures will be taken to ensure compliance with the City Noise Standards. A summary of the noise mitigation proposed for the Project is presented in Table 4.7-6.

Table 4.7-4 Modeled Noise Sources

Noise Source	Quantity	Approximate Location	Size/Capacity
Rooftop Air Conditioners	183	Roof (65′ tier)	1.5 to 5 Tons
Garage Ventilation Fans (Large)	2	Level 1 and 2 Garage West Wall	11,500 CFM
Garage Ventilation Fans (Small)	2	Level 1 and 2 Garage West Wall	2,000 CFM

Table 4.7-5 Modeled Sound Power Levels per Noise Source

Noise Source	Sound Power Level (dB) per Octave-Band Center Frequency (Hz)								
	31.5	63	125	250	500	1k	2k	4k	8k
Rooftop Air Conditioners (1)	67	70	73	72	69	69	66	61	57
Garage Ventilation Fans (Large)	90	92	94	97	97	92	87	82	79
Garage Ventilation Fans (Small)	84	86	81	82	84	81	77	73	69

1. Carrier 24ABC6 Comfort 16 Air Conditioner. Nominal 1.5 to 5 Tons. Data are without Sound Shield.
2. Greenheck SBE-3H36-50, 11,500 CFM fan.
3. Greenheck SBE-3H24-7, 2,000 CFM fan.

Table 4.7-6 Attenuation Values Applied to Mitigate Each Noise Source

Noise Source	Form of Mitigation	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Large Garage Ventilation Fans	Louver (1)	4	6	12	15	21	24	27	25	20
Small Garage Ventilation Fans	Louver (2)	4	6	9	11	16	21	25	22	20

Notes:

1. Assumed IAC Model 2R Acoustical Louver
2. Assumed Dynasonics Model SAJ-1235 Acoustical Louver

4.7.5.2 Noise Modeling Methodology

The noise impacts associated with the Project were predicted at the nearest and most representative 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.

4.7.5.3 Future Sound Levels

The analysis of sound levels assumed that all of the mechanical equipment were operating simultaneously day or night. Ten modeling locations were included in the analysis. Locations A through D are identical to measurement Locations ST-01 through ST-04, respectively. Six additional modeling locations, E through J, were added to represent additional residential and institutional uses in the vicinity of the Project. The modeling receptors are depicted in Figure 4.7-2. The predicted exterior Project-only sound levels range from 23 to 46 dBA at nearby receptors. The City of Boston Residential limits have been conservatively applied to all of the modeling receptor locations (the hospital, high school, park, and church were all considered under the residential standard). Predicted sound levels from Project-related equipment are within the broadband and octave-band daytime and nighttime limits under the City Noise Standards at the modeling locations. The evaluation is presented in Table 4.7-7.

Table 4.7-7 Comparison of Future Predicted Project-Only 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 (ST-01)	Residential	39	41	42	42	39	35	35	32	24	11
B (ST-02)	Residential (Park)	31	36	37	36	32	28	27	22	13	-2
C (ST-03)	Residential	36	40	40	40	37	32	32	27	20	7
D (ST-04)	Residential	36	40	41	40	37	34	32	26	19	8
E	Institutional (Hospital)	23	29	29	29	25	20	18	12	-1	-29
F	Institutional (High School)	28	32	33	34	30	25	24	17	7	-9
G	Institutional (Church)	38	41	42	41	38	35	34	29	21	8
H	Residential	36	39	39	38	35	31	31	28	21	8
I	Residential	34	40	40	40	36	30	29	25	18	10
J	Institutional (Monastery)	46	55	55	51	49	44	38	32	26	23
City of Boston Limits	**Residential Nighttime**	**50**	**68**	**67**	**61**	**52**	**46**	**40**	**33**	**28**	**26**
	Residential Daytime	**60**	**76**	**75**	**69**	**62**	**56**	**50**	**45**	**40**	**38**

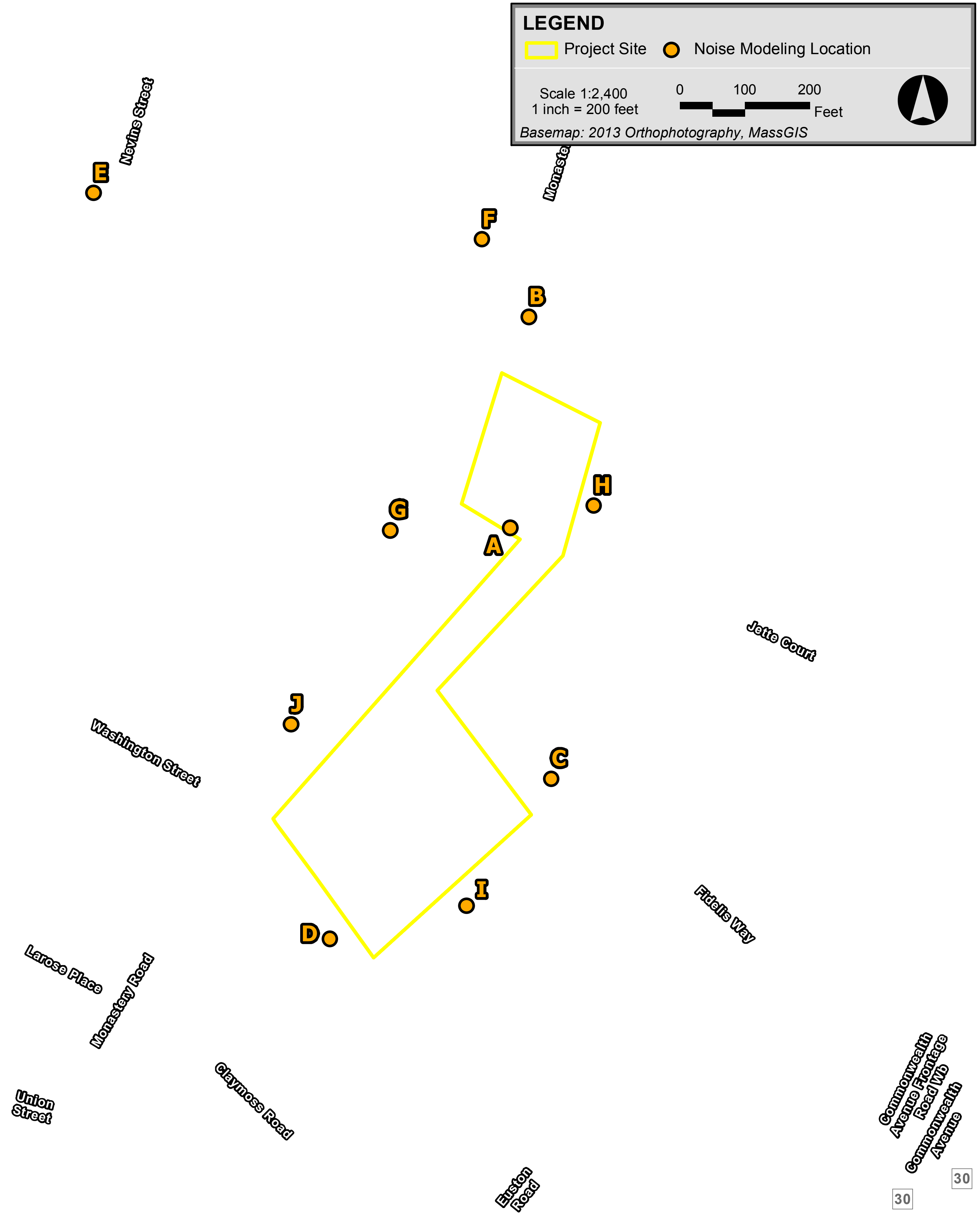
4.7.6 U.S. Department of Housing and Urban Development Acceptability Criteria

The U.S. Department of Housing and Urban Development recommends goals for residential structures are based on an L_{dn} (dBA) sound level. HUD finds an L_{dn} sound level of 65 dBA acceptable at the exterior of a residential structure and an L_{dn} sound level of 45 dBA acceptable at the interior. The criteria, therefore, assume that neighboring residential building construction is sufficient in reducing the exterior levels by 20 dBA to achieve 45 dBA inside. Provided in Table 4.7-8 are the calculated existing L_{dn} levels for the locations where ambient noise monitoring was conducted, Project only L_{dn} levels, and the combined ambient plus Project L_{dn} levels.

Table 4.7-8 HUD Environmental Criteria and Standards Evaluation

Location	L_{dn} Sound Pressure Level (dBA)[1]			
	Background-Only[1]	Project-Only	Combined	HUD Exterior Goal
A	58	45	58	**65**
B	57	37	57	**65**
C	58	42	58	**65**
D	64	42	64	**65**

Notes:
1. Only whole numbers are shown; calculations performed using values with additional precision.



139-149 Washington St. **Brighton/Boston, Massachusetts**

[redacted]

Figure 4.7-2

Noise Modeling Locations

Existing ambient L_{dn} levels are shown to be below 65 dBA at all locations. An accumulation of the Project and existing L_{dn} levels will not affect the areas compliance with the HUD Environmental Criteria and Standards after the Project is complete.

In all cases, the background level of noise governs the overall combined level of noise. The Project does not have a measureable impact under this standard.

4.7.7 Conclusions

Baseline noise levels were measured in the vicinity of the Project during the day and at night. At these and additional locations, future Project-only sound levels were calculated based on information provided by the manufacturer of the expected mechanical equipment. Project-only sound levels were compared to applicable limits.

Predicted mechanical equipment noise levels from the proposed Project at each receptor location, taking into account attenuation due to distance, structures, and noise control measures, will be below the octave-band requirements of the City Noise Standards. The predicted sound levels from Project-related equipment, as modeled, are expected to remain below 50 dBA at residences; therefore, the Project sound levels are 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. Operation of the Project is also expected not to impact the HUD standards at applicable receptors.

At this time, the mechanical equipment and noise controls are being refined, and they are still 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.

4.8 Stormwater/Water Quality

Please refer to Section 8.3.

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 25025C0057G 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 Existing Conditions

The approximately 3.3-acre site is currently occupied by two interconnected, two-story buildings and paved parking lots. The buildings, which were constructed in the 1950s, have partial basements and appear to be supported by spread footings. The site is adjacent to residential buildings to the east and south; the basketball courts and a playground to the north; and St. Gabriel's Monastery to the west. The site is located near a topographical high point in Brighton, Massachusetts with surface elevations ranging from approximately elevation 169 feet along Washington Street to elevation 187 feet in the northern parking lot. From the northern parking lot, which is relatively flat, the site slopes steeply downward approximately 30 feet toward the adjacent properties to the north, east and west.

4.10.2 Subsurface Condition

Based on available data, the subsurface conditions at the site generally consist of asphalt pavement or landscaping at the surface overlying variable-density granular fill underlain by natural glacial till or sand and gravel. The existing fill was encountered below the surface treatment and ranges in thickness from approximately 10 feet in the southern portion of the site to 30 feet in the northern parking lot. The fill typically varies from loose to very dense and generally consists of a fine to coarse sand with varying amounts of gravel and clayey silt. Dense glacial till or sand and gravel were encountered below the fill. Perched groundwater was encountered during drilling in March 2016 at approximately 10 feet below the northern parking lot within the fill layer. Groundwater was not encountered during drilling in the southern portion of the site.

4.10.3 Foundation Considerations

The proposed buildings are anticipated to be supported on shallow spread footings with a slab-on-grade floor system. The footings for the southern building are anticipated to bear on natural soils or compacted structural fill over the natural soils. For the northern building, the existing fill in its current condition is unsuitable to support the proposed building. As such, it is anticipated that the spread footings and slab will be supported on ground improvement elements that extend through the fill down to the underlying glacial till.

4.10.4 Monitoring

Subject to property owner approvals, elevation reference points will be established on adjacent site buildings and other selected nearby facilities prior to construction and monitored during the work to confirm no impact from the construction activities. Vibration and noise monitoring stations will be established to monitor vibration and noise levels pre-construction and during construction.

A qualified representative (geotechnical engineer or technician) will be on site during the foundation and subsurface construction to confirm compliance of the work with the project plans and specifications, as well as monitor geotechnical instrumentation.

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 residents 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*

It is anticipated that construction will commence in early 2018, and will last approximately 24 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 250 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 51% of the total employee work hours be for Boston residents, at least 40% of total employee work hours be for minorities and at least 12% 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. In addition, the Proponent has agreed to provide a notification system through which neighbors can contact the Proponent if they witness rodents on the Project site.

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.

Chapter 5.0

Sustainable Design and Climate Change Preparedness

5.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

5.1 Sustainable Design

To measure the results of their sustainability initiatives and to comply with Article 37, the Proponent intends to use the framework of the Leadership in Energy and Environmental Design (LEED) rating system. The Project will use LEED for New Construction (LEED v4 for BD+C) as the rating system to demonstrate compliance with Article 37. The LEED rating system tracks the sustainable features of a project by achieving points in the following categories: Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation and Design Process and Regional Priority Credits.

A LEED checklist is included at the end of this section, and details the credits the Project anticipates achieving. The checklist will be updated regularly as the design develops and engineering assumptions are substantiated. Presently, 50 points have been targeted. Additional credits, identified as "Maybe" on the checklist, will be evaluated as the design progresses.

The Proponent's approach to each of the credit categories is described below.

Integrative Process

Beginning in pre-design and continuing throughout the design phases, the Project team will identify and use opportunities to achieve synergies across disciplines and building systems. The analyses will inform the Proponent's Project requirements, basis of design, design documents, and construction documents.

Location and Transportation

The Project site is located in a developed area with existing infrastructure and nearby basic services. The site is in close proximity to several MBTA bus routes and subway stations, including the MBTA Green line Washington Street subway stop. Secure bicycle storage for residents will be included in the building. At least 5% of parking spaces will be designated as preferred parking for green vehicles.

Sustainable Sites

To reduce pollution from construction activities, the construction manager will implement a project-specific, EPA-compliant Erosion and Sedimentation Control (ESC) plan. Soil erosion, waterway and stormwater system sedimentation, and airborne dust will be controlled during site preparation, demolition of existing conditions, and the construction of the new development.

A site survey will be completed to evaluate sustainable options and inform site design decisions. At least 30% of the Project site will be usable outdoor space, and at least 25% of this outdoor space will be vegetated using native or adapted species.

The Project will capture and treat runoff from 95% of the average annual rainfall. High reflective roof materials will be used in order to reduce the heat island effect.

Water Efficiency

The Project anticipates minimizing the need for potable water to be used for irrigation through the careful selection of vegetation and mechanical methods to reduce water use. To maximize water efficiency, the Project will include low-flow bathroom fixtures and faucets. Permanent water meters will be installed that measure the total potable water use for the building and associated grounds.

Energy and Atmosphere

A Commissioning Agent, (CxA) will be engaged by the owner for purposes of providing basic commissioning services for the building energy related systems including HVAC & R, lighting, and domestic hot water systems. The CxA will verify the building systems are installed and calibrated and perform to the building owner's Project requirements and the Project team's basis of design.

The Project will install new or use existing building-level energy meters, or submeters that can be aggregated to provide building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, biomass, etc). The Project will not use chlorofluorocarbon (CFC)-based refrigerants in new heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems.

The Project will be constructed based on the building and energy codes in effect at the time of the building permit application. Energy reduction measures are expected to result in energy cost reductions of approximately 20% when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHREA/IESNA Standard 90.1-2007.

Materials and Resources

It is anticipated that a construction and demolition waste management plan will be developed to reduce construction and demolition waste disposed of in landfills and incineration facilities. The waste management plan will describe materials separation strategies and whether the materials will be sorted on-site. The waste management plan is anticipated to direct 75% of all waste and debris to be recycled.

Careful material selection will be performed for the Project. Where possible the Project hopes to integrate products that have Environmental Product Declarations (EPD), Sourcing of raw materials and corporate sustainability reporting, and Material Ingredients disclosures.

The completed Project will provide dedicated areas for the collection and storage of recyclable materials for all building occupants. Collection and storage areas will be readily accessible and adequately sized based on the building square footage and usage. Materials collected for recycling will include: mixed paper, corrugated cardboard, glass, plastics, and metals.

Indoor Environmental Quality

The building mechanical systems will be designed to meet or exceed the requirements of ASHRAE Standard 62.1-2010 and/or applicable building codes. Any naturally ventilated spaces will comply with or exceed the applicable portions of ASHRAE 62.1. No smoking will be allowed within the common areas of the building nor within the apartments. Designated smoking areas outside of the building will be located at least 25 feet from doorways, operable windows and outdoor air intakes.

The Project will target low emit-ting materials for all materials within the building interior, defined as everything within the water-proofing membrane. This includes requirements for product manufacturing volatile organic compound (VOC) emissions in the indoor air and the VOC content of materials.

The Project will develop and implement an indoor air quality (IAQ) management plan for the construction and preoccupancy phases of the building, meeting or exceeding all applicable recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA).

HVAC systems and the building envelope will be designed to meet the requirements of ASHRAE Standard 55-2010 for thermal comfort. The Project has also been designed to maximize daylighting into the building and to provide quality views.

Innovation in Design

In addition to the measures described above, the Project anticipates an additional three LEED points as a result of Innovation and exemplary performance, and one point for having at least one LEED accredited professional on the Project team.

Regional Priority Credits

Regional Priority Credits (RPC) are established LEED credits designated by the USGBC to have priority for a particular area of the country. When a Project team achieves one of the designated RPCs, an additional credit is awarded to the Project. It is anticipated that the Project will achieve two regional priority credits.

5.2 Climate Change Preparedness

Climate change conditions considered by the Project team include higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe freezing rain and heavy rainfall events, and increased wind gusts.

The expected life of the Project is anticipated to be approximately 50 years. Therefore, the Proponent planned for climate-related conditions projected 50 years into the future. A copy of the completed Checklist is 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 Extreme Heat Events

The *Climate Ready Boston* report predicts that in Boston, there may be between 25 to 90 days over 90 degrees by 2070, compared to an average of 11 days per year over 90 degrees between 1971 to 2000. The Project design will include measures to adapt to these conditions, including planting street trees, constructing a high-performance building envelope, and including operable windows where possible.

5.2.2 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponent will take measures to minimize stormwater runoff and protect the Project's mechanical equipment, as necessary. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site, and promote runoff recharge to the greatest extent practicable.

5.2.3 Drought Conditions

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

LEED v4 for BD+C: New Construction and Major Renovation
Project Checklist

Project Name:
Date:

Y	?	N			
1			Credit	Integrative Process	1

7	9	16	**Location and Transportation**		16
		16	Credit	LEED for Neighborhood Development Location	16
	1		Credit	Sensitive Land Protection	1
	2		Credit	High Priority Site	2
	5		Credit	Surrounding Density and Diverse Uses	5
5			Credit	Access to Quality Transit	5
1			Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1

8	2	0	**Sustainable Sites**		10
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
2			Credit	Site Development - Protect or Restore Habitat	2
1			Credit	Open Space	1
3			Credit	Rainwater Management	3
1	1		Credit	Heat Island Reduction	2
	1		Credit	Light Pollution Reduction	1

6	3	2	**Water Efficiency**		11
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
	2		Credit	Outdoor Water Use Reduction	2

6	7	0	**Materials and Resources**		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
	5		Credit	Building Life-Cycle Impact Reduction	5
1	1		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
1	1		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
2			Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

8	7	1	**Indoor Environmental Quality**		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
	2		Credit	Enhanced Indoor Air Quality Strategies	2
3	0		Credit	Low-Emitting Materials	3
1	0		Credit	Construction Indoor Air Quality Management Plan	1
	2		Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
	2		Credit	Interior Lighting	2
2		1	Credit	Daylight	3
1			Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

4	0	2	**Innovation**		6
3		2	Credit	Innovation	5

Y	?	N			
6			Credit	Indoor Water Use Reduction	6
		2	Credit	Cooling Tower Water Use	2
	1		Credit	Water Metering	1

8	**15**	**13**	**Energy and Atmosphere**		**33**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
	6		Credit	Enhanced Commissioning	6
8		13	Credit	Optimize Energy Performance	18
	1		Credit	Advanced Energy Metering	1
	2		Credit	Demand Response	2
	3		Credit	Renewable Energy Production	3
	1		Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2

1			Credit	LEED Accredited Professional	1

2	**0**	**0**	**Regional Priority**		**4**
			Credit	Regional Priority: Specific Credit	1
			Credit	Regional Priority: Specific Credit	1
1			Credit	Regional Priority: Specific Credit	1
1			Credit	Regional Priority: Specific Credit	1

50	**43**	**34**	**TOTALS**	Possible Points:	**110**

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

Chapter 6.0

Urban Design

6.0 URBAN DESIGN

6.1 Urban Design Concept

The Project includes the construction of two new residential buildings connected by an access road; a five- to six-story rental building on the southern portion of the site, and a home-ownership building on the northern portion of the site. Both the rental and home-ownership buildings are designed to minimize their scale by utilizing a series of steps and setbacks. The rental building will feature a U-shape plan with a residential courtyard that faces the open space across Monastery Driveway and gradually steps down to support a visual connection and expansion of the two spaces. The building's height is lowest as it faces Washington Street, and rises with the existing slope. The home-ownership building will be at the top of the hill within a compact plan featuring a landscaped motor court to facilitate drop-offs and access to the enclosed resident parking. The exterior material selection for both buildings will be of a scale to mimic and harmonize with the neighborhood pallet.

A new public pathway will provide access from the corner of Washington Street and Monastery Driveway to a public plaza and to Fidelis Way Park (see Figure 6-1). To the east of the pathway, the building courtyard will terrace down to meet the existing landscape, providing a series of planting opportunities to enhance the adjacent open space. Figure 6-2 presents the Project's pedestrian and vehicular circulation plan.

All vehicular entry to the upper and lower buildings will be from Fidelis Way, and the existing curb cut on Washington Street will be eliminated. Resident parking will be confined to the interior of each building. Loading and unloading for the rental building will take place within the building footprint. The newly created road to the home-ownership building will also include visitor parking to be managed by the Project.

The Project's design strives to achieve several key design concepts:

- Create a residential community that attracts a wide range of residents including families, seniors, and professionals, and incorporates both rental and home ownership options;

- Provide buildings that fit into the neighborhood through the design of articulated facades with balconies and complimentary material selections;

- Reinforce the activation of Washington Street by incorporating direct entries to individual loft rental units. This aspect directly relates to the neighborhood character of housing across the street;

- Create a streetscape environment that reflects the best aspects of the neighborhood through an emphasis on tree planting, decorative seasonal planting, use of quality materials and safe and secure pedestrian access, parking and service entries;

- Provide off-site improvements including new sidewalks, street trees and lighting to enhance the overall neighborhood;

- Position the two buildings for easy pedestrian access to public transportation, nearby retail and the Fidelis Way Park; and

- Respect and embrace the design principles of the adjacent 159-201 Washington Street project in order to provide a cohesive addition to the neighborhood.

6.2 Urban Design Details

6.2.1 Rental Building

The rental building will be configured in a U shape in order to provide a smaller scale façade facing the open space across Monastery Driveway, as well as to provide a visual connection between the two spaces. Along Washington Street, a series of setbacks allows for the Project to relate to the adjacent open space with a 45′ setback staggering to a 25′ setback at Fidelis Way, where it directly relates to the adjacent building (see Figure 6-3). Direct entry apartments will enhance the residential character of Washington Street while steps in the massing, balconies, and a sophisticated composition of materials will provide a distinct residential character. Window patterning also marks the building as individual residences and contributes to its unique identity within the neighborhood.

6.2.2 Home-ownership Building

The home-ownership building is configured to be as compact as possible with steps in the façade that orientate views and balconies towards downtown Boston. A motor court will provide a welcoming entry drop off as well as access to the garage parking (see Figure 6-4). The selection of building materials and window patterning will convey a distinct residential character while blending with the existing neighborhood and the new 159-201 Washington Street project to the west.

6.2.3 Site Design

One of the design priorities is to develop a seamless landscape design that will enhance the neighborhood environment. Not only will there be on site improvements, but there will also be extensive off-site improvements to adjacent roads and properties. Fidelis Way will be repaved with new sidewalks, street trees, and lighting using Boston Complete Streets as a guideline (see Figure 6-5). Additional street parking will be created by using land on the

Project site and widening Fidelis Way for neighborhood access. Washington Street will be developed to meet Boston's Complete Street Guideline for "Neighborhood Connectors" with an 8'-0" wide sidewalk and 10'-6" wide frontage zone at the building lobby. All proposed pedestrian circulation will be designed to be fully accessible.

139-149 Washington Street   Boston, Massachusetts

cbt

Figure 6-1

View from the Corner of Washington Street and Monastery Driveway

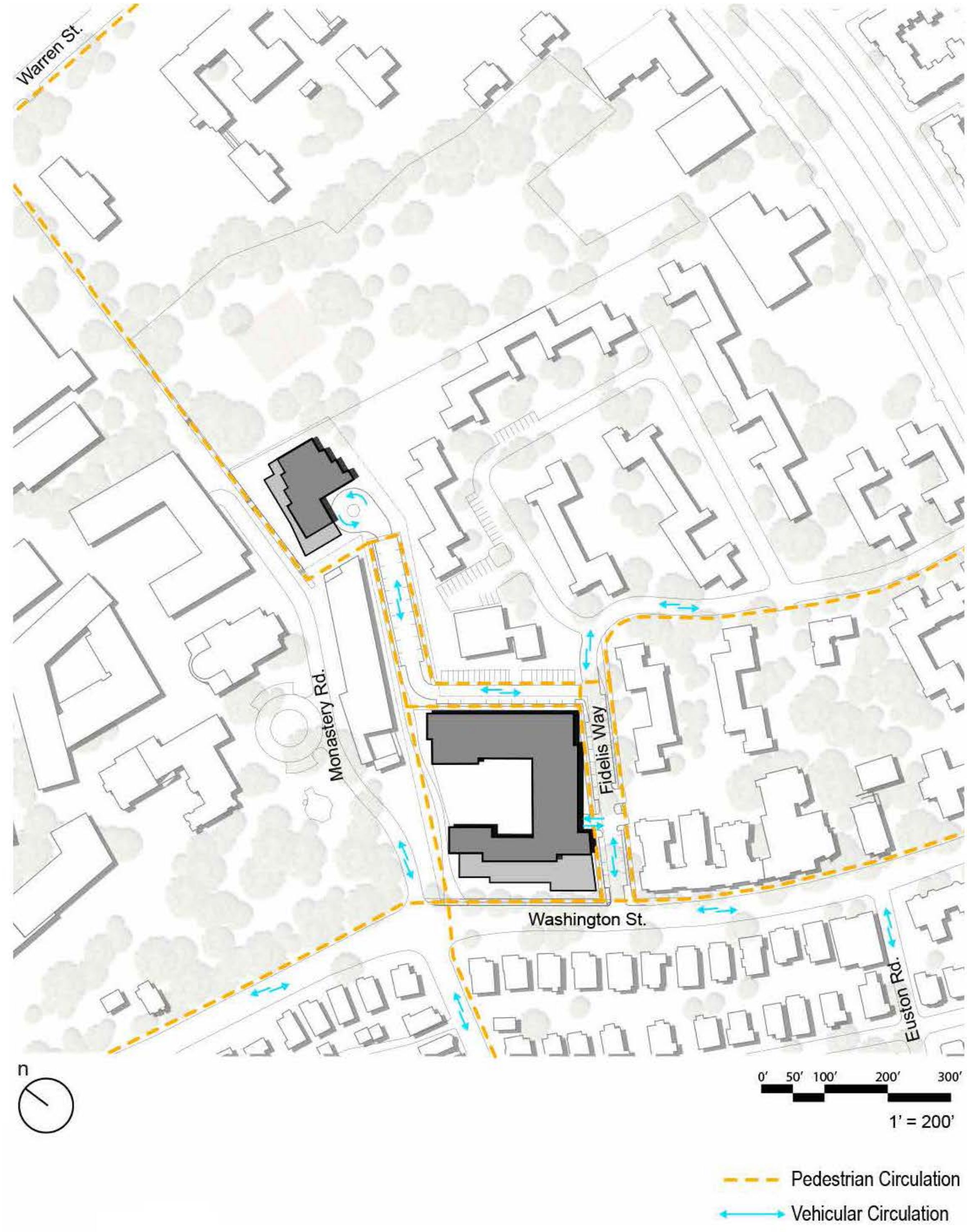


Figure 6-2

Pedestrian and Vehicular Circulation Plan

139-149 Washington Street   Boston, Massachusetts

cbt

Figure 6-3

View from Washington Street and Fidelis Way

139-149 Washington Street   Boston, Massachusetts

cbt

Figure 6-4

Home-ownership Building

cbt

Figure 6-5

Fidelis Way Proposed Conditions

Chapter 7.0

Historic and Archaeological Resources

7.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

The following section summarizes the historic and archaeological resources identified in the PNF and assesses potential Project-related impacts to the resources.

7.1 Historic Resources within the Project Site

As noted in the PNF, the Project site contains two existing mid-20th century, institutional, brick masonry buildings formerly associated with the St. Gabriel's Church and Monastery property located on the opposite side of Monastery Driveway. These include a former parish school and a former convent, which would later serve as a rectory.

7.1.1 St. Gabriel's Parish School, 149 Washington Street

The former St. Gabriel Parish School, built in 1949, was designed by architect John Edmund Kelley. The two-story building features a buff brick exterior with a concrete foundation, concrete coping at the roofline, and a flat roof. Bands of six windows define the bays on the facade and rear elevations. The facade is composed of an entry block with two entries framing a band of six windows which steps out to a projecting block to the northeast consisting of three bands of six windows. The original windows and doors have been replaced with late 20th century metal and glass systems. A narrow single-story connector links the former school with the adjacent convent/rectory.

7.1.2 St. Gabriel's Convent / Rectory, 139-149 Washington Street

Constructed in 1967 as the convent for the parish school, the two story structure at 149 Washington Street housed the St. Gabriel's Rectory as early as 1970. The building features a variegated buff brick exterior with a concrete foundation and a flat roof with metal flashing. The entry is recessed at the center of the symmetrical, five-bay facade. Groups of two and three windows frame brick panels used for decorative effect in cast stone surrounds. An attached one-bay, flat-roofed garage with similar variegated buff brick is located on the southwest corner and projects beyond the front façade.

In 2004, the parish school and convent / rectory were surveyed by the Boston Preservation Alliance as part of an effort to document the real estate holdings of the Roman Catholic Archdiocese of Boston (RCAB). As part of the RCAB property survey, the St. Gabriel's School and Convent / Rectory were added to the Massachusetts Historical Commission's (MHC) *Inventory of Historic and Archaeological Assets of the Commonwealth* ("the Inventory"). Neither of the buildings is currently listed in the State or National Registers of Historic Places.

7.1.3 Washington - Warren Institutions Area

A portion of the Project site is located within the Washington - Warren Institutions Area, an area included in the MHC Inventory. Specifically, portions of the access driveways and parking areas are included in the historic area; the existing two buildings on the Project site are not included (see Figure 7-1).

The Washington - Warren Institutions Area is believed to be among the largest, most densely developed collections of late 19th and early 20th century institutional buildings in the city. The area includes the 1890s William Howard Taft School, the St. Gabriel's Monastery and Church complex, the 1930s Brighton High School complex, the former 1940s Kennedy Memorial Hospital and the 1940s Brighton Marine Hospital complex; but not the buildings on the Project site. While the Washington - Warren Institutions Area is included the Inventory, the area is not listed in the State or National Registers of Historic Places.

7.2 Historic Resources in the Vicinity of the Project Site

7.2.1 St. Gabriel's Monastery and Church complex

Built in 1909 and based on the designs of Boston architect T. Edward Sheehan, St. Gabriel's Monastery is located on the opposite side of Washington Street from the Project site. The Monastery features characteristics of the Mission style, including its red clay tile roof, arcaded entry porch, overhanging eaves, curvilinear gable parapets, corner towers and flush stucco wall surfaces.

The Monastery building was designated an individual City of Boston landmark in 1988. In addition, the roof of the Monastery is the subject of a preservation restriction held by the MHC. As a result of the landmark designation and preservation restriction, the Monastery building is individually listed in the State Register of Historic Places.

Completed in 1929, the Church of St. Gabriel was designed in a Neo-Renaissance style by the Boston architecture firm of Maginnis and Walsh, which specialized in the design of Roman Catholic churches, convents and schools. The two-story church, Basilican in plan, features exterior elevations of buff- colored brick and limestone below a red clay tile roof.

In addition to the Monastery and Church, the St. Gabriel's complex includes the 1927 / 1950s Retreat House which features a buff brick exterior and red tile roof similar to those of the Monastery and Church; the 1966 Our Lady of Fatima Shrine, a small, one-story, hexagonal building that commemorates the apparition of the Virgin Mary to a group of Portuguese peasant children in the early 20th century; and a ca. 1960 stucco covered garage with a tile shed roof. Also located on the St. Gabriel's property is the Passionist Cemetery. Rectangular in plan, the Cemetery features symmetrical rows of identical granite gravestones, each incised with the name of a Passionist Brother who died while in residence at St. Gabriel's.

139-149 Washington Street **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 7-1
Historic Resources Map

7.3 Archaeological Resources on the Project Site

There are no known recorded archaeological sites located on the Project site or within the immediate vicinity. Previous ground disturbance activities associated with the construction of the existing buildings, driveways, walkways, parking areas and other site improvements have likely impacted the potential for the site to yield significant archaeological resources.

7.4 Impacts to Historic Resources

7.4.1 Urban Design

As discussed in further detail in Chapter 6: Urban Design, the two new buildings were designed to minimize their scale by utilizing a series of steps and setbacks. The rental building will feature a U-shape plan with a residential courtyard that faces the open space across Monastery Driveway and gradually steps down to support a visual connection and expansion of the two spaces. The building's height is lowest as it faces Washington Street, and rises with the existing slope. Direct entry apartments will enhance the residential character of the Washington Street elevation while steps in the massing, balconies, and a sophisticated composition of materials will provide a distinct residential character. Window patterning will also mark the building as individual residences and contribute to its unique identity within the neighborhood.

The home-ownership building will be at the top of the hill within a compact plan featuring a landscaped motor court to facilitate drop-offs and access to the enclosed resident parking. The exterior material selection for both buildings will be of a scale to mimic and harmonize with the neighborhood pallet.

The existing underutilized school and convent/rectory buildings will be demolished to accommodate the new construction, open space, and site access. Retaining the existing structures and incorporating them into the Project is infeasible due their locations on the Project site and their physical constraints. In addition, their limited architectural significance makes them poor candidates for retention and reuse.

7.4.2 Shadow Impacts

As discussed in further detail in Section 4.2, the shadow impact analysis looked at net new shadow created by the Project during fourteen time periods. During the periods studied there were no shadow impacts to any of the historic buildings on the St. Gabriel's Monastery and Church complex.

The only buildings within the Washington - Warren Institutions Area to be impacted by new shadow during the periods studied were the buildings at the rear of the 1940s Brighton Marine Hospital complex. These impacts were limited to December 21st at 3:00 p.m. when shadows reach their greatest distance. It is also important to note that the model used for the shadow analysis does not take into account existing trees, which can block new shadow from the proposed buildings. Because the Project site and Brighton Marine Hospital complex are separated by Fidelis Way Park, the impacted area at the Brighton Marine Hospital site likely already experiences shadow from the many large trees within the park.

7.5 Status of Project Review with Historical Agencies

7.5.1 Massachusetts Historical Commission

The PNF stated that the Proponent did not anticipate that the Project would require any state or federal licenses, permits or approvals, and did not anticipate utilizing any state or federal funds. Therefore, review by MHC was not anticipated; this remains the case at this this time. In the event that state or federal licenses, permits or approvals are required, or if funding is involved, the Proponent will file an MHC Project Notification Form to initiate review of the Project.

7.5.2 Boston Landmarks Commission

Based on their 1949 and 1967 construction dates, the proposed demolition of the St. Gabriel's Parish School and St. Gabriel's Convent/Rectory are subject to the Boston Landmarks Commission's (BLC) review in accordance with Article 85 (Demolition Delay) of the Boston Zoning Code. The Proponent will consult with BLC staff and will file an Article 85 application for the proposed demolition activities at the appropriate time. The Proponent will work closely with the BLC staff to fulfill the Article 85 review requirements.

Chapter 8.0

Infrastructure

8.0 INFRASTRUCTURE

This Chapter outlines the existing utilities surrounding the Project site, the connections required to provide service to the Project, and any impacts on the existing utility systems that may result from the construction of the Project. The following utility systems are discussed herein:

- Sewer
- Domestic water
- Fire protection
- Drainage
- Natural gas
- Electricity
- Telecommunications

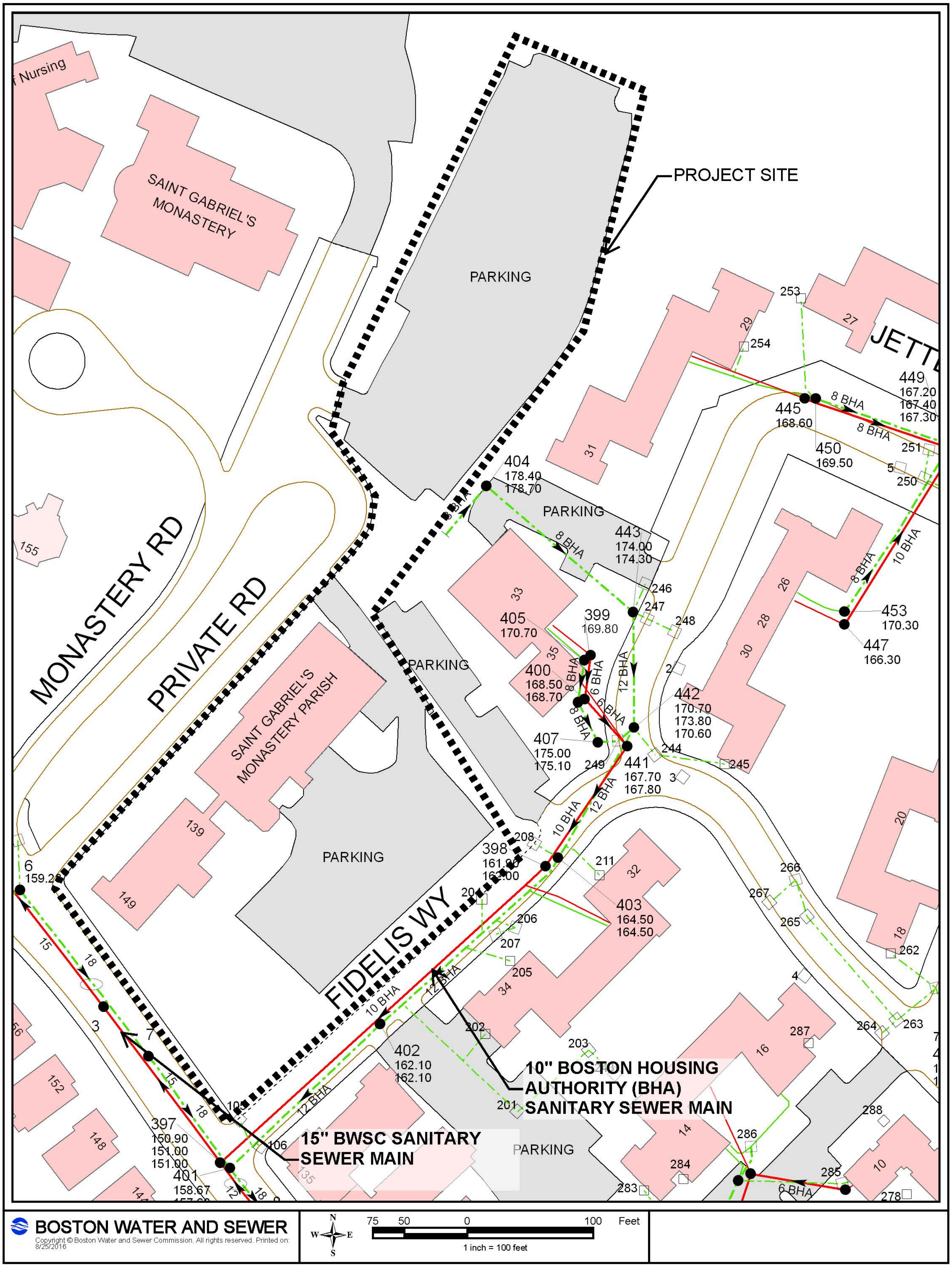
8.1 Wastewater

8.1.1 Existing Sewer System

An existing Boston Water and Sewer Commission (BWSC) sanitary sewer main is located in Washington Street and an existing Boston Housing Authority sewer main is located in Fidelis Way. The existing 10-inch sanitary sewer main in Fidelis Way flows southwest in Fidelis Way and discharges to the sewer main in Washington Street. The existing BWSC sewer main flows northwest in Washington Street; the sewer main increases from a 12-inch sewer main to a 15-inch sewer main where the Fidelis Way sewer main connects into the Washington Street sewer main. The 15-inch sewer main ultimately flows to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal. See Figure 8-1 for the Existing BWSC Sanitary Sewer System Map.

8.1.2 Project-Generated Sanitary Sewer Flow

The Project's sewage generation rates were estimated using the Department of Environmental Protection State Environmental Code (Title V) Section 310 CMR 15.00 and the proposed building program. 310 CMR 15.00 lists typical sewage generation values for the building use, as shown in Table 8-1. Typical generation values are conservative values for estimating the sewage flows from new construction and are used to evaluate new sewage flows or an increase in flows to existing connections. The existing site consists of an abandoned rectory at 139 Washington Street and an active theological institute with a



139-149 Washington Street Boston, Massachusetts

Nitsch Engineering

Figure 8-1

Existing Sewer System

preschool located at 149 Washington Street. The Project includes the demolition of the existing buildings and the construction of two new buildings. Table 8-1 describes the increased sewage generation in gallons per day (gpd) due to the Project.

The total sanitary sewage flow as a result of the Project is estimated to be 38,280 gpd, a total increase of an estimated 37,300 gpd.

Table 8-1 Proposed Wastewater Generation

	Room Use	Size	310 CMR Value (gpd/unit)	Total Flow (gpd)
Existing	Pre-School	90 People	10/Person	900
	Theological Institute	8 Staff	10/Person	80
			Total	980
Proposed	Rental Building	283 Bedrooms	110/Bedroom	31,130
	Home-ownership Building	65 Bedrooms	110/Bedroom	7,150
			Total	38,280
			Total Increase	37,300

8.1.3 Sanitary Sewer Connection

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the existing BWSC sewer system. The Project is expected to generate an increase in wastewater flows of approximately 37,300 gallons per day. Approval for the increase in sanitary flow will come from BWSC.

The sewer services for the Project is expected to connect to the existing sanitary sewer main located in Washington Street. Proposed improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's Site Plan Review process for the Project. This process will include a comprehensive design review of the proposed service connections, an assessment of Project demands and system capacity, and the establishment of service accounts.

As the design progresses, the Project will look at alternative sewer service connection approaches, including Fidelis Way and/or a potential utility extension in the private road shared with the adjacent property.

8.1.4 Sewage Capacity

The Project's impact on the existing sanitary sewer mains in Fidelis Way and Washington Street were analyzed. The existing sewer system capacity calculations are presented in Table 8-2.

Table 8-2 Sewer Hydraulic Capacity Analysis

Manhole (BWSC Number)	Length (ft)	Inv. (up)	Inv. (down)	Slope (%)	Dia. (inches)	Manning's Number	Flow Capacity (cfs)	Flow Capacity (MGD)
Fidelis Way								
MH 441 to MH 398	116	167.70	162	4.9%	10	0.012	5.26	3.40
MH 398 to MH 397	161.9	151.00	57.56	57.7%	10	0.012	18.03	11.65
						Minimum Flow Analyzed:	5.26	3.40
Washington Street								
MH 397 to MH 3	151	150.90	149.90	0.7%	15	0.012	2.87	1.85
MH 3 to MH @ Monastery RD	201.5	149.90	148.70	0.6%	15	0.012	2.72	1.76
						Minimum Flow Analyzed:	2.72	1.76

Notes: 1. Flow Calculations based on Manning Equation
2. Manhole numbers were taken from BWSC Sewer System Map.
3. Elevations refer to Boston City Base (BCB)
4. Invert information was taken from BWSC Sewer System Map and the Existing Conditions Plan prepared by Feldman Land Surveyors.

Table 8-2 indicates the hydraulic capacity of the 10-inch sanitary sewer in Fidelis Way and the 15-inch sanitary sewer in Washington Street. The sanitary sewer in Fidelis Way discharges to the sanitary sewer in Washington Street; Washington Street has the limiting hydraulic capacity of the two street systems. The minimum hydraulic capacity is 1.76 million gallons per day (MGD) or 2.72 cubic feet per second (CFS) for the 15-inch main in Washington Street.

Based on an average daily flow estimate for the Project of 38,280 GPD or .038 MGD, an increase of 37,300 GPD or 0.037 MGD from the existing buildings; and with a factor of safety of 10 (total estimate = 0.038 MGD x 10 = 0.38 MGD), no capacity problems are expected within the BWSC sewer systems in Fidelis Way or Washington Street.

8.2 Water System

8.2.1 Existing Water Service

Water for the Project site will be provided by the BWSC. There are five water systems within the City which 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. Existing BWSC water mains are located in Fidelis Way and Washington Street. See Figure 8-2 and Figure 8-3 for the BWSC Water System Map.

BWSC owns and operates a 12-inch southern high water main in Washington Street. There is a private 8-inch southern high water main in Fidelis Way which connects to the 12-inch water main in Washington Street. The existing buildings are serviced by the water main in Washington Street. The existing water system information was obtained from the BWSC System Map (See Figure 8-2).

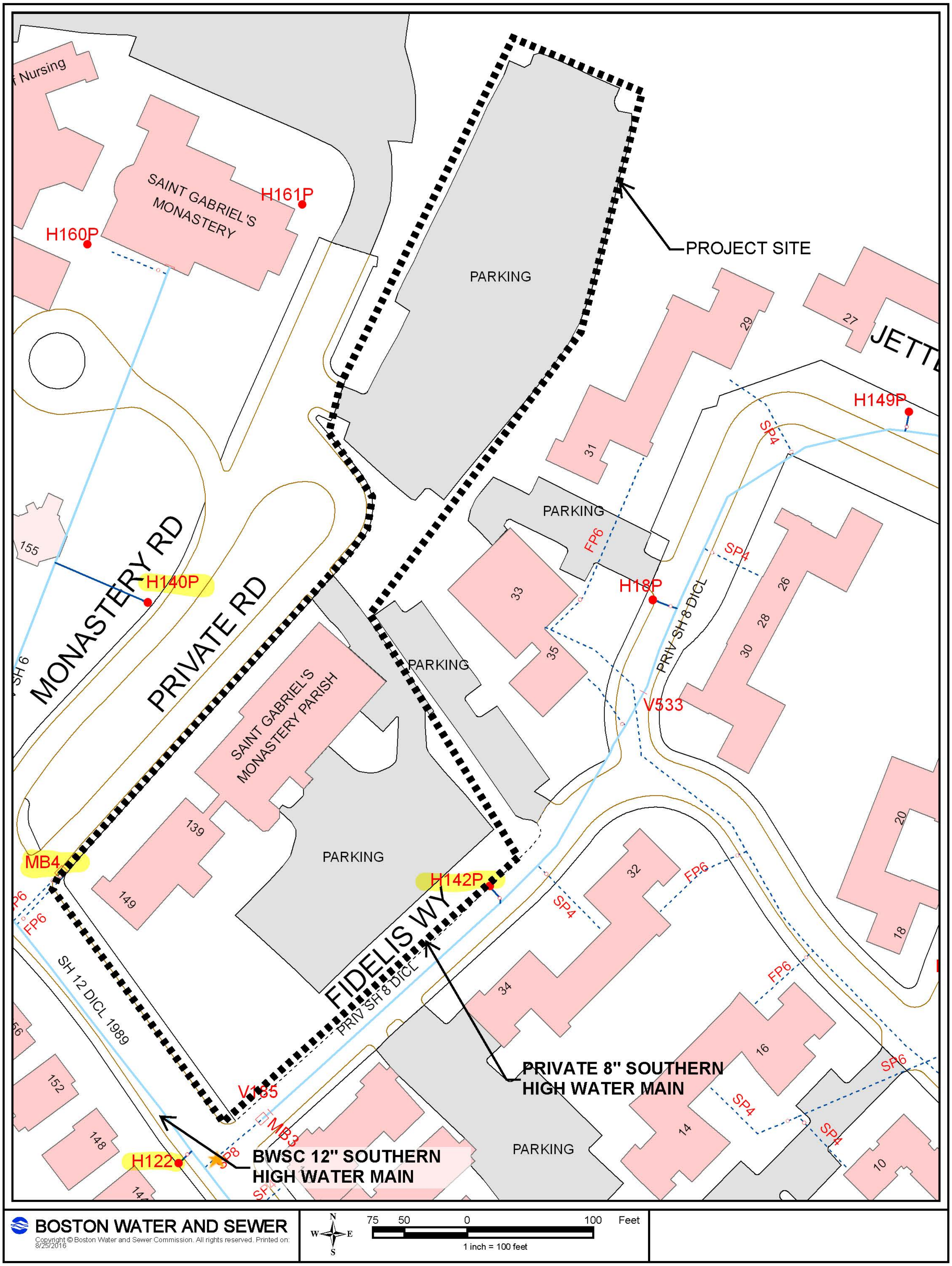
BWSC record flow test data containing actual flow and pressure for hydrants within the vicinity of the Project site was requested from BWSC by the Proponent. Hydrant flow data was available for only one hydrant within the vicinity of the site. The existing hydrant flow data is available in Table 8-3. As the Project design progresses, the Proponent will request hydrant flow tests be conducted.

Table 8-3 Existing Hydrant Flow Data

Date of Test	Flow Hydrant Number	Static Hydrant	Pressure Zone	Ele. (ft.)	Static (psi)	Residual (psi)	Flow (gpm)
11/17/11	H124	---	SH	167	44	42	1486

8.2.2 Anticipated Water Consumption

The Project's water demand estimate for domestic service is based on the Project's estimated sewage generation, described in the previous section. A conservative factor of 1.1 (110%) is applied to the estimated average daily wastewater flows to account for consumption, system losses, and other usages to estimate an average daily water demand for the Project. The water demand for the Project is estimated to be 42,108 gpd, an increase of approximately 41,030 gpd. The water for the Project is expected to be supplied by the BWSC system in Washington Street. As the design progresses, the Project will explore alternative water service connection approaches, including Fidelis Way and/or a potential utility extension in the private road shared with the adjacent property.



139-149 Washington Street Boston, Massachusetts

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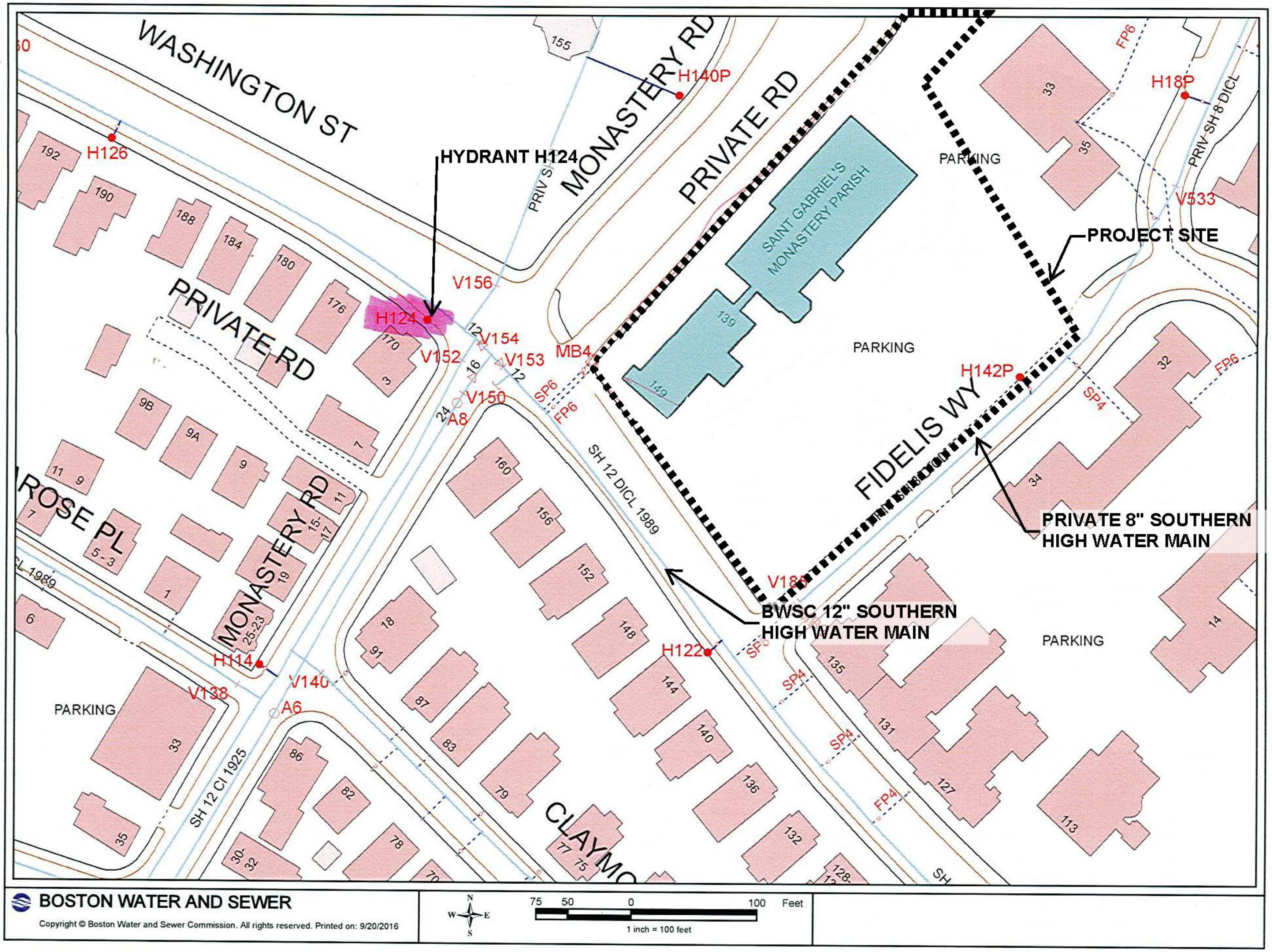
Figure 8-2

Existing Water System



139-149 Washington Street Boston, Massachusetts

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Figure 8-3

Existing Water Hydrants

8.2.3 Proposed Water Service

Domestic water and fire protection service connections will be required for the Project. New services will connect to the existing BWSC water mains in Washington Street and/or the private water main in Fidelis Way or the shared road. The existing water mains surrounding the Project site will be protected and maintained during construction.

The domestic and fire protection water service connections required for the Project will meet the applicable BWSC, City, State, and Federal codes and standards, including cross-connection backflow prevention. Compliance with the standards for the water system service connection will be reviewed as part of BWSC's Site Plan Review process. This review will include 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

Measures to reduce water consumption will be incorporated into the Project's design. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed where possible.

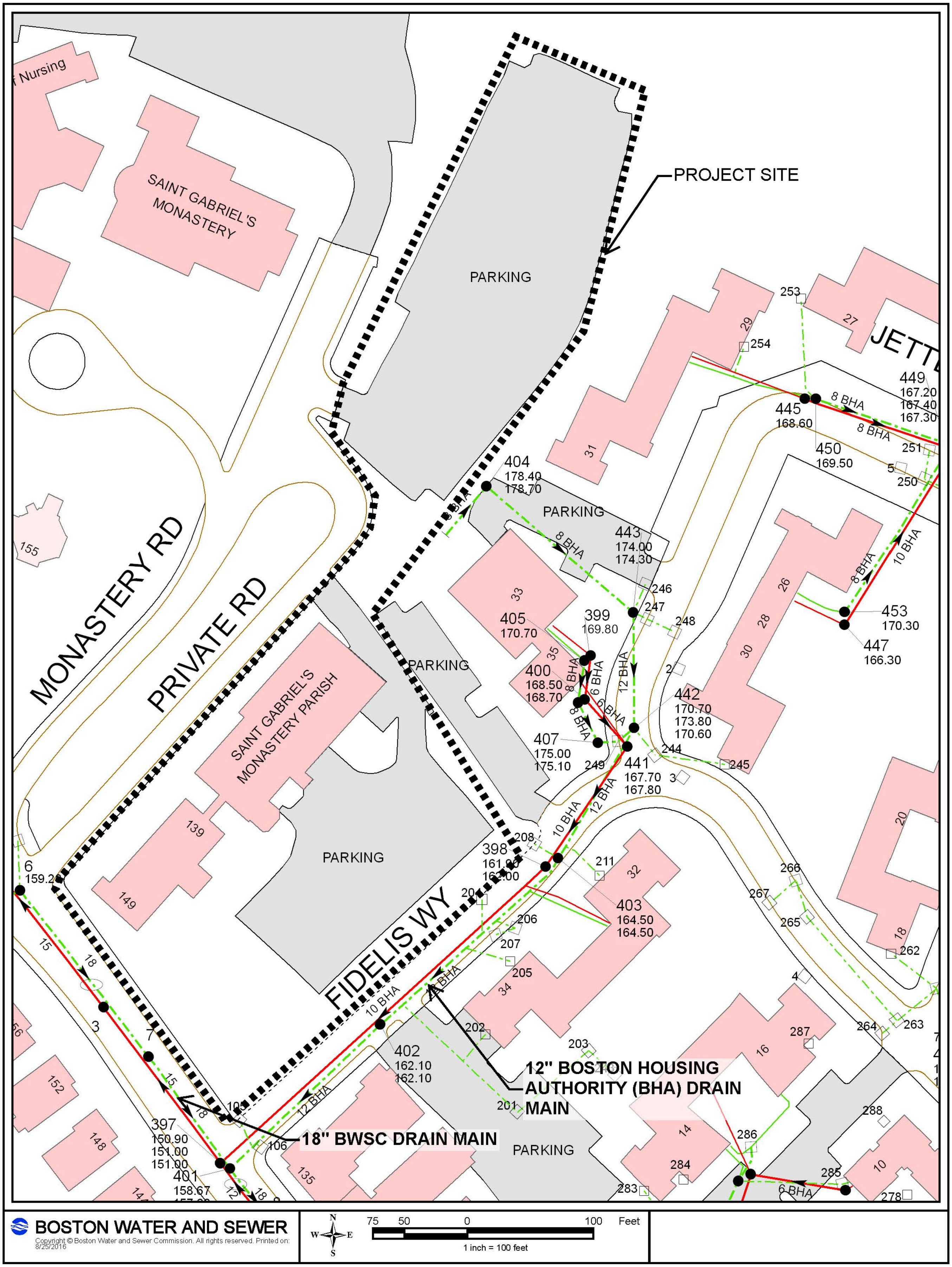
The Project will comply with the Commonwealth's Stretch Energy Code and as such, will reduce energy use from the base energy code. The State Building Code requires the use of water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand on the existing distribution system. The installation of sensor-operated sinks with water conserving aerators and sensor-operated toilets in all non-residential restrooms will be incorporated into the design plans for the Project.

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 BWSC's Automatic Meter Reading ("AMR") system.

8.3 Storm Drainage System

8.3.1 Existing Storm Drainage System

An existing BWSC storm drain main is located in Washington Street and an existing BHA storm drain main is located in Fidelis Way. The existing 18-inch BWSC storm drain in Washington Street flows southeast. The existing 12-inch drain main in Fidelis Way flows southwest in Fidelis Way and discharges to the 18-inch water main in Washington Street. The Project is located within the Charles River Watershed. See Figure 8-4 for the Existing BWSC Storm Drain System Map.



139-149 Washington Street Boston, Massachusetts

Figure 8-4

Existing Drainage System

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The Project's impact on the existing storm drain mains in Fidelis Way and Washington Street were analyzed. The existing storm drain system capacity calculations are presented in Table 8-4.

Table 8-4 Storm Drain Hydraulic Capacity Analysis

Manhole (BWSC Number)	Length (ft)	Inv. (up)	Inv. (down)	Slope (%)	Dia. (inches)	Manning's Number	Flow Capacity (cfs)	Flow Capacity (MGD)
Fidelis Way								
MH 404 to MH 443	153	178.4	174.3	2.7%	12	0.013	5.83	3.77
MH 443 to MH 442	90	174	170.7	3.7%	12	0.013	6.82	4.41
MH 442 to MH 403	122.5	170.6	164.5	5.0%	12	0.013	7.95	5.14
MH 403 to MH 402	191	164.5	162.1	1.3%	12	0.013	3.99	2.58
MH402 to MH401	168	162.1	158.67	2.0%	12	0.013	5.09	2.58
						Minimum Flow Analyzed:	3.99	2.58
Washington Street								
MH6 to MH7	161	159.28	158.90	0.2%	18	0.013	2.90	1.87
MH7 to MH401	100	158.90	158.67	0.2%	18	0.013	2.86	1.85
						Minimum Flow Analyzed:	2.86	1.85

Notes
1. Flow Calculations based on Manning Equation
2. Manhole numbers were taken from BWSC Sewer System Map.
3. Elevations refer to Boston City Base (BCB)
4. Invert information was taken from BWSC Sewer System Map and the Existing Conditions Plan prepared by Feldman Land Surveyors.

Table 8-3 indicates the hydraulic capacity of the 12-inch storm drain in Fidelis Way and the 18-inch storm drain Washington Street; Washington Street has the limiting hydraulic capacity of the two storm drain systems. The minimum hydraulic capacity is 1.85 MGD or 2.86 CFS for the 18-inch system in Washington Street.

The proposed Project is expected to increase impervious cover on the site while incorporating an upgraded stormwater management system. The upgraded stormwater closed drainage collection and treatment system will recharge stormwater to the maximum extent practicable prior to overflowing to the BWSC system.

8.3.2 *Proposed Storm Drainage System*

Stormwater improvements will be reviewed as part of the BWSC Site Plan Review process. This process includes a comprehensive design review of the proposed service connections, assessment of Project demands and system capacity, and establishment of service accounts. The proposed stormwater management system will collect site runoff and recharge 1-inch over the Project's impervious area to the maximum extent practicable, per the BWSC stormwater management standards.

Site runoff will be collected by a closed drainage system and treated before overflowing to the BWSC storm drainage system. Stormwater runoff will be collected by a series of catch basins in the proposed parking lots which will then flow to a proposed treatment and/or recharge system. Roof runoff will flow to a proposed recharge system. See Figure 8-5 for a Proposed Stormwater Management System Plan.

New stormwater runoff will not be directed towards abutters. The Project will result in an overall increase in impervious area within the Project limits. The existing site is approximately 57% impervious cover. The Project will increase impervious cover to approximately 66% of the site. The Project is expected to include approximately 2.4 acres of total impervious area in the proposed condition, and will provide a minimum recharge volume of 0.2 acre-feet, one-inch over the site impervious area, via the proposed stormwater recharge systems.

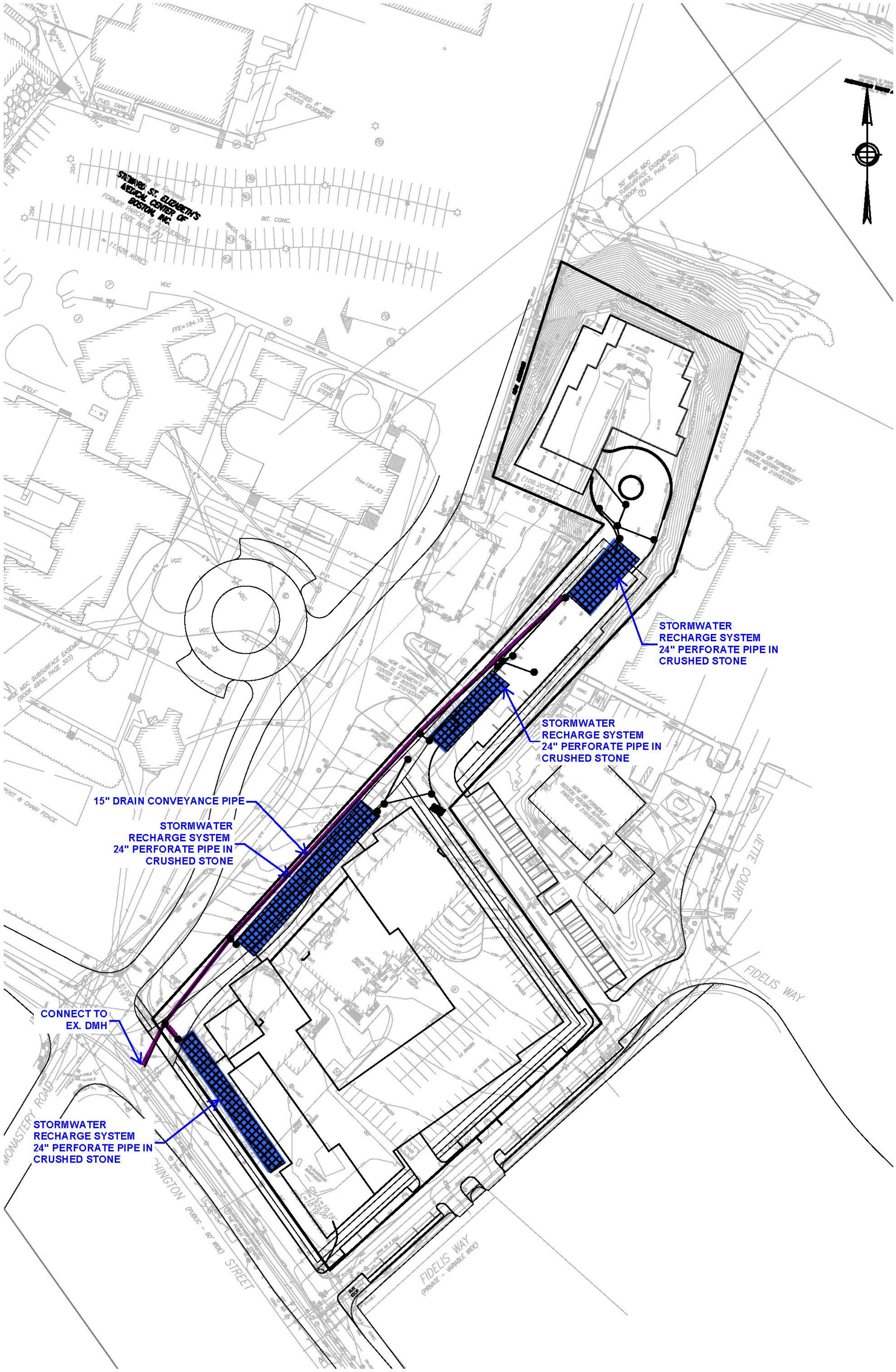
The stormwater management system will decrease or maintain the peak flow rates of stormwater runoff from the site. Below is a summary of the approximate existing and proposed peak runoff rates for the 2-year and the 10-year 24-hour storm events. Table 8-5 indicates a reduction in peak runoff rates from the site as a result of the proposed stormwater management system.

Table 8-5 Stormwater Peak Runoff Rates

	Peak Runoff Rate (2-year Storm)	Peak Runoff Rate (10-year Storm)
Existing	6.0 cfs	10.6 cfs
Proposed	6.0 cfs, or less	10.6 cfs, of less

8.3.3 *Groundwater Conservation Overlay District*

The Project is not located within the City of Boston Groundwater Conservation Overland District (GCOD) so the design is not required to comply with Article 32 of the Boston Zoning Code.



139-149 Washington Street   Boston, Massachusetts

Nitsch Engineering

Figure 8-5

Proposed Stormwater Management System

8.3.4 Water Quality Impact

The Project will not adversely 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, straw bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until the areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

If required, site dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Project will be in compliance with local and state stormwater management policies, as described below.

8.3.5 State Stormwater Standards

In March 1997, MassDEP adopted a new Stormwater Management Policy to address non-point source pollution. In 1997, MassDEP 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.

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 shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR.

Compliance: The proposed design will comply with this Standard to the maximum extent practicable. The post-development peak discharge rates will not exceed the pre-development peak discharge rates through methods involving infiltration and stormwater recharge on site.

Standard #3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmental sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Compliance: The Project is a re-development project; the Project will comply with this standard to the maximum extent practicable.

Standard #4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;
b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and
c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Compliance: The proposed design will comply with this standard to the maximum extent practicable. The Project will not have an impact on stormwater runoff quality. The Project storm drain service will not discharge to a combined sewer.

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 thereunder 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).

Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

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 is a redevelopment; the Project will comply with the standards to the maximum extent practicable.

Standard #8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

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

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

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

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

Compliance: The Project will comply with this standard. There will be no illicit connections associated with the Project.

8.4 Electrical Service

Eversource Energy owns the electrical system in the vicinity of the Project site. It is expected that adequate service is available in the existing electrical systems in the surrounding streets to serve the Project. The Proponent will work with Eversource to confirm adequate system capacity as the design is finalized.

8.5 Natural Gas

National Grid owns and maintains the gas distribution system in the vicinity of the Project site. The Proponent will work with National Grid to confirm the system has adequate capacity as the design advances.

8.6 Telecommunications Systems

Telecommunication systems are located in the vicinity of the Project site. The Proponent will work with each provider to determine the appropriate services and connection locations to support the proposed development.

8.7 Utility Protection During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during Project construction. The installation of proposed utility connections within public ways will be undertaken in accordance with the BWSC, 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 Project.

Chapter 9.0

Response to Comments

9.0 RESPONSE TO COMMENTS

This Chapter provides responses to the BPDA Scoping Determination and the associated comment letters that were received on the Expanded PNF filed with the BPDA on October 26, 2016. The letters have been reproduced and individual comments coded in the margins. Responses to the comments follow each individual letter and can be matched using the comment code numbers. Table 9-1 provides a list of letters received from City of Boston Departments, organizations, and individuals:

Table 9-1 BPDA Scoping Determination and Comment Letters Received

Boston Planning and Development Agency Scoping Determination	BPDA
Katie Pedersen – Boston Planning and Development Agency	KP
Boston Planning and Development Agency Urban Design	UD
Mayor's Commission for Persons with Disabilities	CPD
Boston Parks and Recreation Department	BPRD
Boston Transportation Department	BTD
Boston Water and Sewer Commission	
Liz Breadon	LB
Leslie Bordonaro	LBO
Rosa Tempesta	RT
Annette Pechenick	AP
Jim Magarian	JM
Bob Pessek	BP
Diane Kline	DK

boston planning &
development agency

May 25, 2017

David O. Gillespie
Vice President- Development
AvalonBay Communities, Inc.
600 Atlantic Ave., 20th Floor
Boston, MA 02210

Re: **Scoping Determination for proposed 139-149 Washington St. (St. Gabriel's) Project**

Dear Mr. Gillespie:

Please find enclosed the Scoping Determination for the proposed St. Gabriel's site project located at 139-149 Washington Street, in the Brighton neighborhood of Boston. The Scoping Determination describes information required by the Boston Redevelopment Authority d/b/a the Boston Planning & Development Agency in response to the Project Notification Form, which was submitted under Article 80B of the Boston Zoning Code on October 27, 2016. Additional information may be required during the course of the review of the proposals.

If you have any questions regarding the Scoping Determination or the review process, please contact me at (617) 918-4311.

Sincerely,

Lance Campbell

Lance Campbell
Senior Project Manager

CC: Brian Golden, BPDA
Sara Myerson, BPDA
Jonathan Greeley, BPDA
Michael Christopher, BPDA
Lara Merida, BPDA
Viktorija Abolina, BPDA
Lauren Shurtleff, BPDA
Warren O'Reilly, Mayor's Office of Neighborhood Services

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

SCOPING DETERMINATION
139-149 WASHINGTON STREET (ST. GABRIEL'S)

SUBMISSION REQUIREMENTS
FOR DRAFT PROJECT IMPACT REPORT (DPIR)

PROPOSED PROJECT:	139-149 WASHINGTON STREET (ST. GABRIEL'S)
PROJECT SITE:	139-149 WASHINGTON STREET, BRIGHTON, DIRECTLY ADJACENT TO THE COMMOMWEALTH HOUSING DEVELOPMENT TO THE EAST, AND FEDELIS WAY PARK TO THE NORTH.
PROPONENT:	AVALONBAY COMMUNITIES, INC.
DATE:	MAY 25, 2017

The Boston Redevelopment Authority ("BRA"), d/b/a The Boston Planning & Development Agency ("BPDA") is issuing this Scoping Determination pursuant to Section 80B-5 of the Boston Zoning Code ("Code") in response to a Project Notification Form ("PNF"), which AvalonBay Communities Inc., (the "Proponent") filed on October 27, 2016 for the proposed 139-149 Washington Street project (the "Proposed Project"). Notice of the receipt by the BPDA of the PNF was published in the Boston Herald on October 27, 2016, which initiated a public comment period with a closing date of November 28, 2016. Pursuant to Section 80A-2 of the Code, the PNF was sent to the City's public agencies/departments and elected officials on October 28, 2016.

On July 11, 2016, the Proponent filed a Letter of Intent ("LOI") in accordance with the Executive Order Regarding Provision of Mitigation by Development Projects in Boston for the redevelopment of the St. John's Seminary Theological Institute and the ABCD Allston-Brighton Head Start on the former St. Gabriel's Site located at 139-149 Washington Street in the Brighton neighborhood of Boston.

On May 19, 2016, letters soliciting Impact Advisory Group ("IAG") nominations for the Proposed Project were delivered to City Councilor Mark Ciommo, State Representative Kevin Honan, State Representative Michael Moran, and Senator William Brownsberger. Additional letters seeking recommendations were delivered to the office of Neighborhood Services and the City Councilors At-Large. Nominations were also sought from the BPDA. Twelve (12) individuals were appointed to the IAG and have been invited to participate in advising BPDA staff on the determination and consideration of impacts and appropriate mitigation regarding the Proposed Project.

It was determined that the same IAG selected to review the 159-201 Washington Street (St. Gabriel's) proposed project submitted by Cabot, Cabot & Forbes would serve as the IAG for the proposed project located at 139-149 Washington Street (St. Gabriel's) submitted by AvalonBay.

The following is a list of the IAG members:

1. Richard Holahan
2. Carol Ridge Martinez
3. Dan Daly
4. Anabella Gomes
5. Athena Laines
6. Patrick Murphy
7. Michael Lombardi
8. Diane Kline
9. Abigail Furey
10. John Bligh
11. James Long
12. Joanne La Plant

The BPDA appreciates the efforts of the IAG and its members should be applauded for their commitment to the review of the Proposed Project located at 139-149 Washington Street and the proposed project located at 159-201 Washington Street Brighton.

The notice of the receipt by the BPDA of the PNF along with the PNF were sent to the City's public agencies pursuant to Section 80A-2 of the Code, as well as to the IAG members. Pursuant to Section 80B-5.3 of the Code, a scoping session was held on November 10, 2016 with the City of Boston's public agencies/departments at which time the Proposed Project was reviewed and discussed. Members of the IAG were also invited to attend the scoping session.

An advertised public meeting was conducted on November 10, 2016 at St. Elizabeth's Health Center. An IAG working session meeting was also held on April 3, 2017 at the Boston Housing Authority Commonwealth Housing Development, Commonwealth Tenants Association ("CTA") building. The IAG and the community will continue to have an opportunity to give input regarding the Proposed Project during the Article 80 review process.

Comments received by the BPDA during the comment period are included in **Appendices A, B and C**. The Draft Project Impact Report (the "DPIR") should include complete responses to all comments included in **Appendices A, B and C** within the framework of the criteria outlined in the Scoping Determination.

Written Comments received from BPDA staff, public agencies/departments, and elected officials are included in **Appendix A** and must be answered in their entirety.

Specifically, they are:

- Michael Cannizzo, Senior Architect/Urban Designer, Jill Zick, Landscape Architect, BPDA Urban Design Staff
- Katie Pederson, Senior Land Use Planner, Sustainability & Environmental Review Boston Planning & Development Agency
- Kristen McCosh, Commissioner, Mayor's Commission for Persons with Disabilities
- William Conroy, Transportation Planner, Boston Transportation Department
- Liz Meyer, Chief Landscape Architect, Boston Parks & Recreation Department
- John P. Sullivan, P.E., Chief Engineer and Operations Boston Water and Sewer Commission

Written comments in response to the PNF received by the BPDA from the public are included in **Appendix B** and must be answered in their entirety. Written comments in response to the PNF received by the BPDA from the IAG are included in **Appendix C** and must be answered in their entirety.

The Scoping Determination requests information that the BPDA requires for its review of the Proposed Project in connection with Article 80 of the Code, Development Review and Approval, and other applicable sections of the Code.

In addition to the specific submission requirements outlined in the sections below, the following points are highlighted for additional emphasis and consideration:

- Throughout this initial phase of review, the Proponent has taken steps to meet with local residents, elected officials, abutters, and City and State agencies. These conversations must continue, ensuring that what is presented in the DPIR is beneficial to the adjacent neighborhoods and the City of Boston as a whole. **BPDA 01**

- It is clear in reading through the comment letters that the Proposed Project has simultaneously generated excitement and concern. While many of the letters show desire to see the redevelopment of the St. Gabriel's Monastery Site, the St. John's Seminary Theological Institute and the ABCD Allston-Brighton Head Start on the former St. Gabriel's Site located at 139-149 Washington Street, the letters strongly urge that there be more homeownership opportunities, more parking and transportation opportunities, that there be more focus on open space and connections to open space, as well as the potential benefits to the community. The BPDA encourages the Proponent to continue to work with all interested parties, including the IAG and community, who have expressed concern in order to minimize and mitigate the Proposed Project's impacts. **BPDA 02**

- The public, along with the IAG, have expressed concern about the number of proposed condominium units compared to the number of apartment units as well as the height and density of building one, which would be located along Washington Street. The BPDA encourages the Proponent to continue to work with the community to address the concerns about adding more homeownership opportunities while taking into account the density of the overall project. **BPDA 03** **BPDA 04**

- The BPDA encourages the Proponent to continue to work with both the St. Elizabeth's Medical Center as the hospital looks to move the parking spaces currently on the St. Gabriel's site and with the property owners (Cabot, Cabot & Forbes) of the adjacent St. Gabriel's Rectory site to work on issues in regards to site access points, enhanced pedestrian connections, building footprints, and other impacts that may arise from both projects. **BPDA 05**

- The PNF proposes that the setback from the Washington Street curb will be increased from the existing condition of 25 feet to 45 feet, allowing for a traditional sidewalk with two rows of trees and plantings, creating a front yard experience to match that of the neighborhood context across Washington Street. By doing, this the Proponent suggests acknowledging the existing Olmsted Brothers landscaped buffer along the north side of Washington Street adjacent to the proposed project located at 159-201 Washington Street and the said project located at 139-159 Washington Street. The BPDA encourages the Proponent to continue to work with the IAG, community and City agencies on ways to improve the public open spaces along Washington Street and how the community at large can easily access these spaces. **BPDA 06**

- The Proposed Project features a mix of unit types in the first building, which is a rental building totaling approximately 250 rental units, that range from studios, one-bedrooms, two-bedrooms to 3-bedroom units. The Proponent intends to include all of the required affordable units on site. The second building, a condominium building totaling approximately 30 condominium units, includes one-bedroom, two-bedroom and three-bedroom units. The BPDA encourages the Proponent to continue to work with the IAG and community on the unit mix to help meet the demands of the neighborhood. The Proponent should look at the scenario of combining the rental units and the condominium units into one building. **BPDA 07**

- The BPDA encourages the Proponent work closely with the Boston Transportation Department ("BTD") to address concerns regarding site access and egress, internal circulation from the Washington Street/Fidelis Way access point. The BPDA encourages the Proponent to continue to work with BTD on these issues. **BPDA 08**

- The Proponent has been working with the City of Boston's Parks and Recreation Department to address site access through Monastery Path and pedestrian access to Fidelis Way Park, which is adjacent to the site. The BPDA encourages the Proponent to continue to work with the Parks and Recreation Department, along with the IAG and community, to address access points from both Washington Street, Warren Street and Fidelis Way. **BPDA 09**

- As stated in the PNF, the Proponent intends to provide approximately 250 parking spaces. A better understanding of how these spaces will be allocated must be provided in the DPIR. The Proponent should promote alternative modes of transit to new occupants and visitors to the site. **BPDA 10** **BPDA 11**

- All development projects have construction impacts. As with any urban development there needs to be a balance of constructions related inconveniences with the daily activities that will continue to occur adjacent to the project site. A detailed approach to the construction management must be included in the DPIR. **BPDA 12**

I. PROJECT SITE

The site of the Proposed Project is an approximately 3.3-acre lot located at 139-149 Washington Street between Monastery Road and Fidelis Way in the Brighton neighborhood of Boston (the "Project Site"). The Project Site is currently home to the St. John's Seminary Theological Institute and the ABCD Allston- Brighton Head Start, as well as the adjacent parking lot. The northern portion of the site currently contains surface parking. The site includes a 15-foot slope from the curb to the northernmost reaches of the property line, which is its highest point. At this edge, the slope immediately drops off overlooking Fidelis Way Park.

II. PROJECT DESCRIPTION

According to the PNF, the Proposed Project includes several massing and architectural elements to effectively integrate into the neighborhood context. The Proposed Project places residential units at street level along Washington Street with direct access stoop entrances, emphasizing the residential nature of the neighborhood. The height along Washington Street will be five (5) stories in order to relate to both the multifamily homes across the street and the taller buildings towards Commonwealth Avenue, thus re-establishing a contextual residential experience. Parking and loading will be de-emphasized by bringing these functions inside the building and creating a porte-cochere front door drop off feel. Loading, trash and move-in operations will be contained within the building.

The Proposed Project includes the construction of two (2) new residential buildings with a total of 360,000 gross square feet. The first building, located on the southern portion of the site, will contain approximately 250 apartments with a mix of studio, one-bedroom, two-bedroom and three-bedroom units. Studio and one-bedroom units will comprise approximately 53 percent of the building, while two- and three-bedroom units will comprise approximately 47 percent. The second building will be located on the northern portion of the site and will contain approximately 30 condominiums with a mix of one-bedroom, two-bedroom and three-bedroom units. Approximately 27 percent of the units will be one-bedroom, approximately 53 percent of the units will be two-bedroom, and approximately 20 percent will be three-bedroom. Approximately 220 parking spaces will be located on the lower floors of the first building, and 30 parking spaces will be on the ground level of the second building, which results in a total parking ratio of one (1) space per unit. The Project will include an approximately 18,000 square-foot central courtyard as an amenity for the residents, with additional amenity space included on the roofs of the buildings.

III. PREAMBLE

The Proposed Project is being reviewed pursuant to Article 80, Development Review and Approval, which sets forth a comprehensive procedure for project review of the following components: transportation, environmental protection, urban design, historic resources, infrastructure systems, site plan, tidelands, and Development Impact Project, if any. The Proponent is required to prepare and submit to the BPDA, a DPIR that meets the requirements of the Scoping Determination by detailing the Proposed Project's impacts and proposed measures to mitigate, limit or minimize such impacts. The DPIR shall contain the information necessary to meet the specifications of Section 80B-3 (Scope of Large Project Review; Content of Reports) and Section 80B-4 (Standards for Large Project Review Approval), as required by the Scoping Determination. After submitting the DPIR, the Proponent shall publish notice of such submittal as required by Section 80A-2. Pursuant to Section 80B-5.4(c) (i) (3), the BPDA shall issue a written Preliminary Adequacy Determination ("PAD") within ninety (90) days. Public comments, including the comments of public agencies, shall be transmitted in writing to the BPDA no later than fifteen (15) days prior to the date by which the BPDA must issue its PAD. The PAD shall indicate the additional steps, if any, necessary for the Proponent to satisfy the requirements of the Scoping Determination. If the BPDA determines that the DPIR adequately describes the Proposed Project's impacts and, if appropriate, proposed measures to mitigate, limit or minimize such impacts, the PAD will announce such a determination and that the requirements of further review are waived pursuant to Section 80B-5.4(c) (iv). Section 80B-6 requires the Director of the BPDA to issue a Certification of Compliance indicating the successful completion of the Article 80 development review requirements before the Commissioner of Inspectional Services can issue any building permit for the Proposed Project.

IV. REVIEW/SUBMISSION REQUIREMENTS

In addition to full-size scale drawings, 15 copies of a bound booklet and an electronic copy (PDF format) containing all submission materials reduced to size 8-1/2" x 11", except where otherwise specified are required. The electronic copy should be submitted to the BPDA via the following website: https://attachments.bostonredevelopmentauthority.org/.

The booklet should be printed on both sides of the page. In addition, an adequate number of copies must be available for community review. A copy of this Scoping Determination should be included in the booklet for reference.

A. General Information

1. Applicant/Proponent Information
   a. Development Team

      (1) Names **BPDA 13**

         (a) Proponent (including description of development entity and type of corporation, and the principals thereof)
         (b) Attorney
         (c) Project consultants and architect(s)

      (2) Business address, telephone number, FAX number and e-mail, where available for each

      (3) Designated contact person for each

   b. Legal Information **BPDA 14**

      (1) Legal judgements or actions pending concerning the Proposed Project

      (2) History of tax arrears on property owned in Boston by Applicant

(3) Evidence of site control over project area, including current ownership and purchase options, if any, for all parcels in the Proposed Project, all restrictive covenants and contractual restrictions affecting the Proponent's right or ability to accomplish the Proposed Project, and the nature of the agreements for securing parcels not owned by the Applicant.

(4) Nature and extent of any and all public easements into, through, or surrounding the site.

2. Project Area

a. An area map identifying the location of the Proposed Project **BPDA 15**
b. Description of metes and bounds of project area or certified survey of the project area. **BPDA 16**
c. Current zoning **BPDA 17**

3. Project Description and Alternatives

a. The DPIR shall contain a full description of the Proposed Project and its components, including its size, physical characteristics, development schedule, costs, and proposed uses. This section of the DPIR shall also present analysis of the development context of the Proposed Project. Appropriate site and building plans to clearly illustrate the Proposed Project shall be required. **BPDA 18**

b. A description of alternatives to the Proposed Project that were considered shall be presented and primary differences among the alternatives, particularly as they may affect environmental and traffic/transportation conditions, shall be discussed. **BPDA 19**

4. Public Benefits **BPDA 20**

a. Anticipated employment levels including the following:
(1) Estimated number of construction jobs

(2) Estimated number of permanent jobs

b. Current and/or future activities and programs which benefit the host neighborhood, adjacent neighborhoods of Boston and the city at large, such as, child care programs, scholarships, internships, elderly services, education and job training programs, public realm/infrastructure improvements, grant programs, etc.

c. Other public benefits, if any, to be provided.

5. Community Process **BPDA 21**

a. A list of meetings held and proposed with interested parties, including public agencies, abutters, elected officials, businesses and community groups.

b. Names and addresses of project area owners, abutters, and any community or business groups which, in the opinion of the applicant, may be substantially interested in or affected by the Proposed Project.

B. REGULATORY CONTROLS AND PERMITS

An updated listing of all anticipated permits or approvals required from other municipal, state or federal agencies, including a proposed application schedule shall be included in the DPIR. **BPDA 22**

A statement on the applicability of the Massachusetts Environmental Policy Act ("MEPA") should be provided. If the Proposed Project is subject to MEPA, all required documentation should be provided to the BPDA, including, but not limited to, a copy of the Environmental Notification Form, decisions of the secretary of Environmental Affairs, and the proposed schedule for coordination with BPDA procedure. **BPDA 23**

C. TRANSPORTATION COMPONENT **BPDA 24**

In addition to the information required to meet the specifications of Section 80B-3 and Section 80B-4 of the Code the analysis included in the DPIR must utilize as its framework *the scope as outlined in the comments of the Boston Transportation Department ("BTD"), dated March 6, 2017 and included in* ***Appendix A.*** *These comments are attached herein by reference and must be addressed in their entirety in the DPIR.*

Site Plan

The proponent needs to submit an engineered site plan within the context of the surrounding roadways at 1:20 scale depicting:

- Vehicular access and circulation
- Parking layout and circulation
- Pedestrian access and circulation
- Bicycle access and circulation
- Area shuttle/van pool pickup and drop-off
- Parking spaces for car sharing services
- Service and loading*
- Roadways and sidewalks
- Building layout
- Bicycle parking locations and types (covered, indoor, bike share, etc.)
- Transit stops and connections
- Electric vehicle charging stations and ev-ready spaces
- *Trash compactors/dumpsters need to be depicted as well.

Construction Management Plan

As the project in the DPIR advances, the proponents will be required to develop and submit a detailed Construction Management Plan (CMP) to BTD for review and approval. The CMP will address TDM measures for construction workers, proposed street occupancies, equipment staging, sidewalk and bike-lane relocations and hours of construction work. BTD will work with the proponents to execute the CMP.

The issues raised above should be addressed in the DPIR. BTD looks forward to working collaboratively with the proponents and the community in the review of these projects and to address any outstanding concerns in the permitting process.

D. ENVIRONMENTAL PROTECTION COMPONENT

The DPIR must address the comments of Katie Pedersen, Senior Land Use Planner/Sustainability Specialist, BPDA, dated March 28, 2017, included in **Appendix A**. These comments are incorporated herein by reference and made a part hereof and must be addressed in their entirety in the DPIR. The DPIR should also include the most up to date Article 37/Interagency Green Building Committee ("IGBC") documentation.

Wind BPDA 25

The Proponent has stated that none of the Proposed Project buildings will be greater than 69 feet in height and thus a quantitative wind analysis of the pedestrian-level wind impacts from both existing (no-build) and build conditions shall not be required. However, the Proponent shall be required to perform a qualitative analysis of the pedestrian level winds (PLW) conditions. The analysis shall include public and other areas of pedestrian use, including entrances to adjacent buildings, sidewalks, and pedestrian walkways adjacent to and in the vicinity of the Proposed Project, and existing and proposed open spaces in the vicinity of the Proposed Project.

For areas where wind speeds are projected to exceed acceptable levels, measures to reduce wind speeds and to mitigate potential adverse impacts shall be identified.

Shadow BPDA 26

The Proponent shall be required to conduct a shadow analysis for both existing and build conditions for the hours of 9:00 a.m., 12:00 noon, 3:00 p.m. for the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21) and 6:00 p.m. in the summer and the fall.

The shadow impact analysis must include net new shadows as well as existing shadows; net new shadows shall have a clear graphic distinction.

The shadow impact analysis must show the incremental effects of the Proposed Project on the existing and proposed public open spaces and pedestrian areas including, but not limited to, sidewalks and pedestrian walkways adjacent to and in the vicinity of the Proposed Project and parks, including but not limited to the Fidelis Way Park, plazas and other open space areas.

Daylight BPDA 27

(Please refer to Urban Design's comments)

Solar Glare BPDA 28

The Proponent has stated that the Proposed Project design does not include the use of reflective glass or other reflective materials and thus a solar glare analysis shall not be required. However, if it is determined that a significant amount of glass will be included in the Proposed Project design, the Proponent shall be required to conduct a solar glare analysis. The analysis shall measure potential reflective glare from the buildings onto potentially affected streets and public open spaces and sidewalk areas in order to determine the likelihood of visual impairment or discomfort due to reflective spot glare. Mitigation measures to eliminate any adverse reflective glare shall be identified.

Air Quality BPDA 29

The Proponent shall be required to conduct a future analysis of the carbon monoxide levels if any of the intersections studied is anticipated to have a level of service (LOS) that is projected to deteriorate to D and cause a 10 percent increase in traffic or where the level of service is E or F and the Proposed Project contributes to a reduction in LOS. The Proponent shall be required to demonstrate that Proposed Project does not create an adverse impact on air quality and demonstrate conformance with the National Ambient Air Quality Standards (NAAQS).

Noise BPDA 30

The Proponent shall be required to provide a description of the Proposed Project's mechanical systems and the location of the mechanical systems.

The Proponent shall be required to demonstrate that the Proposed Project will be in compliance with the sound level limits set by the Massachusetts DEP Noise Policy, City of Boston Noise Regulations, and HUD's Residential Site Acceptability Standards and but, if anything should change, the Proponent shall be required to include measures designed to minimize and eliminate adverse noise impacts on nearby sensitive receptors.

Construction Impacts BPDA 31

As applicable, construction impact analysis shall include a description and evaluation of the following:

(a) Potential dust and pollutant emissions and mitigation measures to control these emissions, including participation in the Commonwealth's Clean Construction Initiative.

(b) Potential noise generation and mitigation measures to minimize increase in noise levels.

(c) Location of construction staging areas and construction worker parking; measures to encourage carpooling and/or public transportation use by construction workers.

(d) Construction schedule, including hours of construction activity.

(e) Access routes for construction trucks and anticipated volume of construction truck traffic.

(f) Construction methodology (including foundation and piling construction), amount and method of excavation required, disposal of the excavated material, description of foundation support, maintenance of groundwater levels, and measures to prevent any adverse effects or damage to adjacent structures and infrastructure.

(g) Method of demolition of existing buildings on the site and disposal of the demolition waste, as applicable.

(h) Potential for the recycling of construction and demolition debris, including asphalt from existing parking lots.

(I) Identification of best management practices to control erosion and to prevent the discharge of sediments and contaminated groundwater or storm water runoff into the City's drainage system during the construction period.

(j) Coordination of project construction activities with other major construction projects being undertaken in the project vicinity at the same time, including scheduling and phasing of individual construction activities.

(k) Impact of project construction on rodent populations and description of the proposed rodent control program, including frequency of application and compliance with applicable City and State regulatory requirements.

(l) Measures to protect the public safety.

Rodent Control

BPDA 32

Compliance with city and state rodent control program requirements must be ensured. Rodent inspection monitoring and treatment, if necessary, should be carried out before, during and at the completion of the construction period. Extermination for rodents shall be required for issuance of permits for demolition, excavation, foundations and basement rehabilitation. Licensed exterminators shall indicate before and during construction activity whether or not rodent activity is identified. Compliance with this policy will be monitored by the Rodent Control Unit of the Inspectional Services Department.

Sustainable Design/Green Buildings

BPDA 33

Article 37 to the Boston Zoning Code requires any proposed project which is subject to or shall elect to comply with Section 80B of Zoning Code of the City of Boston, Large Project Review, shall be subject to the requirements of Article 37. Proposed Projects shall be "certifiable" under the most appropriate United States Green Building Counsel (USGBC) Leadership in Energy and Environmental Design (LEED) Rating System. The purpose of Article 37 is to ensure that major building projects are planned, designed, constructed, and managed to minimize adverse environmental impacts; to conserve natural resources; to promote sustainable development; and to enhance the quality of life in the City of Boston.

The PNF indicates that the Proposed Project will use the LEED for New Construction v4 for BD+C as the rating system and shows the intent to achieve LEED Silver with 50 points.

Please see the **Boston Zoning Code Article 37, Green Buildings, and Climate Change Preparedness and Resiliency Review Procedures and Submittal Requirements,** found on the Boston Planning and Development Agency Article 37 Planning Initiatives webpage (http://www.bostonplans.org/planning/planning-initiatives/article-37-green-building-guidelines).

E. URBAN DESIGN COMPONENT

The DPIR must address the comments from Michael Cannizzo and Jill Zick, of the, BPDA, Design Department dated March 28, 2017 included in **Appendix A**. These comments are incorporated herein by reference and made a part hereof and must be addressed in their entirety in the DPIR.

- Explore providing **the parking and service** entry to the site off of either Monastery Road or Fidelis Way.
- Show the relationship of both buildings to Building #1 of the neighboring development (CCF)
- Work closely with the abutting development (CCF) on pedestrian access along their common edges
- Set-up meeting between Avalon Bay and CCF landscape architects to jointly resolve the preservation of the community connection to the Fidelis Way Park entry stair from both developments. In particular, they need to work together to study the area around the top of the existing stair that provides entry to the park. The focus should be on improving the quality of the connection from both sites, and improving the park entry sequence and experience to the top of the stair and along the stair and path to the park that is sited on the seam of the two developments.

Front Building

- **Vehicle** Access to the building should not be off of Washington Street
- Reduce the density of the front building - **footprint of the building is much larger than building found in the surrounding neighborhood**
- Show how residents of the front building can access Fidelis Way Park and the quality of that experience.

Rear Building

- All parking for the rear (upper) building site should be enclosed
- We need to better understand how pedestrians access the rear building
- We need to better understand how cars access the rear building for both parking and drop-off
- Vehicular access to the rear building should not be routed through the front (lower) building

F. INFRASTRUCTURE SYSTEMS COMPONENT

BPDA 35

An infrastructure impact analysis must be performed. Please continue to work with the Boston Water and Sewer Commission ("BWSC") and the Boston Groundwater Trust on Infrastructure impacts. The DPIR must address the comments of the Boston Water and Sewer Commission, dated November 18, 2016 and included in **Appendix A**.

G. PUBLIC NOTICE

BPDA 36

The Proponent will be responsible for preparing and publishing in one newspaper of general circulation in the City of Boston a public notice of the submission of the DPIR to the BRA as required by Section 80A-2. This notice shall be published within five (5) days after the receipt of the DPIR by the BPDA. Therefore, public comments shall be transmitted to the BPDA within forty-five (45) days of the publication of the notice. A draft of the public notice must be submitted to the BPDA for review prior to publication. A sample of the public notice is attached as **Appendix D**.

Following publication of the public notice, the Proponent shall submit to the BPDA a copy of the published notice together with the date of publication.

H. INCLUSIONARY DEVELOPMENT POLICY/ AFFORDABLE HOUSING COMPONENT

BPDA 37

As indicated in the PNF, the Proposed Project will comply with the Executive Order regarding the Inclusionary Development Policy executed on December 10, 2015 ("IDP") and the affordable housing requirements that will be required for a Planned Development Areas that governs this development site. The Proponent intends to meet its affordable housing obligation on-site. The DPIR should include the number of units to be created, the incomes of the households, the sizes and locations of the units, and the anticipated unit mix.

I. ACCESSIBILITY CHECKLIST

BPDA 38

As part of the DPIR, the Proponent must include an up to date and completed Article 80 Accessibility Checklist for the Proposed Project. An Accessibility Checklist is attached as **Appendix E**.

BOSTON PLANNING AND DEVELOPMENT AGENCY SCOPING DETERMINATION

BPDA 01 Public Process

The Proponent will continue to meet with local residents, elected officials, abutters and City and State agencies. The Proponent continues to be committed to a comprehensive and effective community outreach and will continue to engage the community to ensure public input on the Project.

BPDA 02 Project Impacts

The Proponent has modified the Project based on constructive feedback from the community. Modifications include improved open space connections on all four sides of the rental building and along the property line with the adjacent 159-201 Washington Street project; increased parking; reduction in the number of rental units; and multi-modal transportation options within and to/from the site (pedestrian, bicycle, bus, car, MBTA Green Line and Boston Landing station).

BPDA 03 Unit Types

The Proponent has reduced the overall density of the Project from 250 units to 210 units. This reduction of 40 units is fully attributable to a reduction in the number of rental units. The prior unit composition was 220 rental units and 30 home-ownership units. The revised unit mix proposed in this DPIR is 180 rental units and 30 home-ownership units. Home-ownership units represent over 14.3% of the total units in the Project, up from 12.0% in the PNF filed in October 2016. The Proponent will continue to explore ways to incorporate additional home-ownership units, but it should be noted that the amount of home-ownership units is driven by the amount of parking available to the building, and the ability to maintain at least one parking space per unit.

BPDA 04 Height and Density

The overall density of the Project has been reduced (see response to comment BPDA 03 above) by 20%. The height on Washington Street is currently five stories, which is similar to other buildings on the north side of Washington Street.

BPDA 05 St. Elizabeth's Medical Center Parking

St. Elizabeth's is currently in the process of filing a renewal of its Institutional Master Plan, which will include a plan to relocate its parking spaces.

BPDA 06 Public Open Spaces

Through continuing work with the community, BPDA, and BCDC, the Project has been refined to include a series of setbacks ranging from 25′ off Washington Street at the Fidelis Way street corner, to 45′ at the Monastery Driveway intersection (see Figure 2-3). A new pathway will provide public access to Monastery Path from the corner of Washington Street and Monastery Driveway. In addition, the U-shape design of the rental building creates an opening from the courtyard to the existing landscape to create an extended green space. A sidewalk will connect Fidelis Way with the extended Monastery Path through the existing Community Center parking lot.

BPDA 07 Unit Mix

The unit mix was modified to enhance the number of family style unit types, to reduce transiency, and to promote community involvement with future residents. The current plan retains a two-building layout, which benefits both the density on Washington Street and the marketability of the home-ownership building.

BPDA 08 BTD

After discussions and feedback with the BTD, the current plan includes the elimination of the existing curb cut on Washington Street. Suboptimal access options were removed from the plan. Both buildings are served by access points off of Fidelis Way. The home-ownership building does not require passing through the footprint of the rental building. The Proponent will continue to work with the BTD, and will be required to develop a Transportation Access Plan Agreement (TAPA) that will address BTD's requirements and concerns.

BPDA 09 Access to Fidelis Way Park

Enhancing the landscape buffer surrounding the Project contributes to and extends the visual connection to the Olmsted Brothers Park. This landscape buffer also features a welcoming pedestrian path that connects to Monastery Path and respects the historic resources on the adjacent site. A pedestrian circulation plan is provided in Figure 6-2, and shows how pedestrians can access the Park through the site.

BPDA 10 Parking Allocation

Approximately 180 parking spaces will be located on the lower floors of the rental building, 30 parking spaces will be on the ground level of the condominium building, and 10 additional spaces will be on the road between the two buildings for use by visitors to the site.

BPDA 11 **Alternative Modes of Transit**

The Proponent will promote alternative modes of transit via on-site staff and with a resident welcome package that describes transportation opportunities in the area, including pedestrian, bicycle, bus, car, MBTA Green Line and Boston Landing (commuter rail and bus). TDM measures are discussed in Section 3.3.

BPDA 12 **Construction Management**

Construction impacts are addressed in Section 4.11.

BPDA 13 **Development Team**

The development team is identified in Section 1.3.

BPDA 14 **Legal Information**

The legal information is provided in Section 1.7.

BPDA 15 **Area Map**

An area map is provided as Figure 2-1.

BPDA 16 **Survey**

A site survey is included as Appendix A.

BPDA 17 **Zoning**

The current zoning is described in Section 1.6.

BPDA 18 **Project Description**

Please see Section 2.1.3 for an updated Project Description.

BPDA 19 **Alternatives**

As discussed in Section 1.4, the Proponent has made numerous changes to the Project since the filing of the PNF in order to address comments from the IAG, community, City agencies and elected officials.

BPDA 20 **Public Benefits**

The public benefits are described in Section 2.2.

BPDA 21 **Community Process**

The community process to date is described in Section 2.3.

BPDA 22 **Anticipated Permits**

A list of anticipated permits and approvals is provided in Section 1.8.

BPDA 23 **Applicability of MEPA**

The Proponent does not expect that the Project will require review by the Massachusetts Environmental Policy Act (MEPA) Office of the Massachusetts Executive Office of Energy and Environmental Affairs. Current plans do not call for the Project to receive any state permits, state funding or involve any state land transfers.

BPDA 24 **Transportation Component**

The transportation component is provided as Chapter 3.

BPDA 25 **Wind**

A qualitative wind study is provided in Section 4.1.

BPDA 26 **Shadow**

Shadow impacts are discussed in Section 4.2.

BPDA 27 **Daylight**

A daylight analysis is provided in Section 4.3.

BPDA 28 **Solar Glare**

The Project is not anticipated to use highly reflective glass that would create solar glare impacts.

BPDA 29 **Air Quality Microscale**

A microscale air quality analysis is included in Section 4.5.

BPDA 30 **Noise**

A noise analysis is provided in Section 4.7.

BPDA 31 **Construction Impacts**

Construction impacts are discussed in Section 4.11.

BPDA 32 **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. Additionally, the Proponent has agreed to provide a notification system through which neighbors can contact the Proponent if they witness rodents on the Project site.

BPDA 33 **Sustainable Design**

A discussion of climate change resilience is included in Chapter 5. The Climate Change Preparedness and Resiliency Checklist is included in Appendix E.

BPDA 34 **Urban Design**

Urban design is discussed in Chapter 6. Comments from the BPDA Design Department are addressed in this Chapter.

BPDA 35 **Infrastructure Systems Component**

Infrastructure systems are discussed in Chapter 8.

BPDA 36 **Public Notice**

A public notice will be published in the Boston Herald notifying the public of the submittal of the DPIR to the BPDA.

BPDA 37 **Inclusionary Development**

The Proponent plans to meet the affordable housing obligation, per the Inclusionary Development Policy (IDP), on-site. 13% of the Project's total units will be affordable. Affordable units will be distributed across all levels of the building. The affordable unit mix is the same as the anticipated market-rate unit mix. Sizes will be determined as we proceed through design review. In accordance with the IDP, rental units shall be designated as affordable to households earning less than or equal to 70% of the AMI. No less than 50% of the home-ownership units shall be designated as affordable to households earning less than or equal to 80% of the AMI. No more than 50% of the home-ownership units shall be designated as affordable to households earning 80%-100% of the AMI.

BPDA 38 Accessibility Checklist

The Accessibility Checklist is included as Appendix F.

Boston Planning and Development Agency

TO: Lance Campbell

FROM: Katie Pedersen

DATE: March 28, 2017

RE: 139-149 Washington Street
Boston, Massachusetts
Project Notification Form

I have reviewed the Project Notification Form (the "PNF") dated October 26, 2016 and submit the following comments for the Environmental Protection component. AvalonBay Communities, Inc. (the "Proponent") proposes to the construction of two new residential buildings. The first building will contain approximately 220 apartments with a mix of studio, one-bedroom, two-bedroom and three-bedroom units. The second building will contain approximately 30 condominiums with a mix of one-bedroom, two-bedroom and three-bedroom units. Approximately 220 parking spaces will be located on the lower floors of the first building and 30 parking spaces will be provided for the condominium building (the "Proposed Project").

Wind **KP 01**

The Proponent has stated that none of the Proposed Project buildings will be greater than 69 feet in height and thus a quantitative wind analysis of the pedestrian-level wind impacts from both existing (no-build) and build conditions shall not be required. However, the Proponent shall be required to perform a qualitative analysis of the pedestrian level winds (PLW) conditions. The analysis shall include public and other areas of pedestrian use, including entrances to adjacent buildings, sidewalks, and pedestrian walkways adjacent to and in the vicinity of the Proposed Project, and existing and proposed open spaces in the vicinity of the Proposed Project.

For areas where wind speeds are projected to exceed acceptable levels, measures to reduce wind speeds and to mitigate potential adverse impacts shall be identified.

Shadow **KP 02**

The Proponent shall be required to conduct a shadow analysis for both existing and build conditions for the hours of 9:00 a.m., 12:00 noon, 3:00 p.m. for the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21) and 6:00 p.m. in the summer and the fall.

The shadow impact analysis must include net new shadows as well as existing shadows; net new shadows shall have a clear graphic distinction.

The shadow impact analysis must show the incremental effects of the Proposed Project on the existing and proposed public open spaces and pedestrian areas including, but not limited to, sidewalks and pedestrian walkways adjacent to and in the vicinity of the Proposed Project and parks, including but not limited to the Fidelis Way Park, plazas and other open space areas.

Daylight

(Please refer to Urban Design's comments)

Solar Glare

KP 03

The Proponent has stated that the Proposed Project design does not include the use of reflective glass or other reflective materials and thus a solar glare analysis shall not be required. However, if it is determined that a significant amount of glass will be included in the Proposed Project design, the Proponent shall be required to conduct a solar glare analysis. The analysis shall measure potential reflective glare from the buildings onto potentially affected streets and public open spaces and sidewalk areas in order to determine the likelihood of visual impairment or discomfort due to reflective spot glare. Mitigation measures to eliminate any adverse reflective glare shall be identified.

Air Quality

KP 04

The Proponent shall be required to conduct a future analysis of the carbon monoxide levels if any of the intersections studied is anticipated to have a level of service (LOS) that is projected to deteriorate to D and cause a 10 percent increase in traffic or where the level of service is E or F and the Proposed Project contributes to a reduction in LOS. The Proponent shall be required to demonstrate that Proposed Project does not create an adverse impact on air quality and demonstrate conformance with the National Ambient Air Quality Standards (NAAQS).

Noise

KP 05

The Proponent shall be required to provide a description of the Proposed Project's mechanical systems and the location of the mechanical systems.

The Proponent shall be required to demonstrate that the Proposed Project will be in compliance with the sound level limits set by the Massachusetts DEP Noise Policy, City of Boston Noise Regulations, and HUD's Residential Site Acceptability Standards and but, if anything should change, the Proponent shall be required to include measures designed to minimize and eliminate adverse noise impacts on nearby sensitive receptors.

Sustainable Design/Green Buildings

Article 37 to the Boston Zoning Code requires any proposed project which is subject to or shall elect to comply with Section 80B of Zoning Code of the City of Boston, Large Project Review, shall be subject to the requirements of Article 37. Proposed Projects shall be "certifiable" under the most appropriate United States Green Building Counsel (USGBC) Leadership in Energy and Environmental Design (LEED) Rating System. The purpose of Article 37 is to ensure that major building projects are planned, designed, constructed, and managed to minimize adverse environmental impacts; to conserve natural resources; to promote sustainable development; and to enhance the quality of life in the City of Boston.

The PNF indicates that the Proposed Project will use the LEED for New Construction v4 for BD+C as the rating system and shows the intent to achieve LEED Silver with 50 points.

Please see the **Boston Zoning Code Article 37, Green Buildings, and Climate Change Preparedness and Resiliency Review Procedures and Submittal Requirements,** found on the
Boston Planning and Development Agency Article 37 Planning Initiatives webpage (http://www.bostonplans.org/planning/planning-initiatives/article-37-green-building-guidelines).

KATIE PEDERSEN, BOSTON PLANNING AND DEVELOPMENT AGENCY

KP 01 Wind

A qualitative wind study is provided in Section 4.1.

KP 02 Shadow

Shadow impacts are discussed in Section 4.2.

KP 03 Solar Glare

The Project is not anticipated to use highly reflective glass that would create solar glare impacts.

KP 04 Air Quality

A microscale air quality analysis is included in Section 4.5.

KP 05 Noise

A noise analysis is provided in Section 4.7.

Boston Planning and Development Agency

TO: Lance Campbell

FROM: Jill Zick & Michael Cannizzo

DATE: March 28, 2017

RE: 139-149 Washington Street (St. Gabriel's) Brighton, Massachusetts

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BPDA Design Department Comments are as follows:

General

- Explore providing **the parking and service** entry to the site off of either Monastery Road or Fidelis Way. **UD 01**
- Show the relationship of both buildings to Building #1 of the neighboring development (CCF) **UD 02**
- Work closely with the abutting development (CCF) on pedestrian access along their common edges **UD 03**
- Set-up meeting between Avalon Bay and CCF landscape architects to jointly resolve the preservation of the community connection to the Fidelis Way Park entry stair from both developments. In particular, they need to work together to study the area around the top of the existing stair that provides entry to the park. The focus should be on improving the quality of the connection from both sites, and improving the park entry sequence and experience to the top of the stair and along the stair and path to the park that is sited on the seam of the two developments. **UD 04**

Front Building

- **Vehicle** Access to the building should not be off of Washington Street **UD 05**
- Reduce the density of the front building - **footprint of the building is much larger than building found in the surrounding neighborhood** **UD 06**
- Show how residents of the front building can access Fidelis Way Park and the quality of that experience. **UD 07**

Rear Building

- All parking for the rear (upper) building site should be enclosed **UD 08**
- We need to better understand how pedestrians access the rear building **UD 09**
- We need to better understand how cars access the rear building for both parking and drop-off **UD 10**
- Vehicular access to the rear building should not be routed through the front (lower) building **UD 11**

BOSTON PLANNING AND DEVELOPMENT AGENCY URBAN DESIGN

UD 01 Parking and Service Entry

Fidelis Way will act as the point of entry for all proposed buildings. The garage entry will be located directly off of Fidelis Way. Access to the upper portion of the site will be through an extension and widening of the area of between the Commonwealth Development Community Center and the proposed building.

UD 02 Relationship to Building 1

The current relationship to Building 1 of the neighboring property provides ample opportunity for landscaping, including a sidewalk connection along Building 1 to connect to the existing Monastery Path. There will be 50′ between the lower building and Building 1 and approximately 40′ between the upper building and Building 1 (see Figure 2-3). This 40′ will include a landscaped plaza and enhanced connection to the existing Monastery Path stairway.

UD 03 Pedestrian Access

There is a proposed sidewalk from the intersection of Monastery Driveway and Washington Street that will continue along the proposed building, through the length of the site and connecting to the existing portion of Monastery Path. This allows for one shared sidewalk between both properties.

UD 04 Fidelis Way Park Entry

The Proponent is working directly with Cabot, Cabot & Forbes and their landscape architect on the community connection to Fidelis Way Park. Currently a plaza is proposed for the immediate connection to the stairs. This coordination is still ongoing.

UD 05 Vehicle Access

There will be no access off of Washington Street. All vehicular access to the site will be from Fidelis Way. Vehicular access to the home-ownership building at the upper portion of the site is also off Fidelis Way. Signage will prevent residents from turning left onto Fidelis Way and will direct vehicles to Washington Street.

UD 06 Density of Front Building

The proposed building has a series of incremental setbacks that relate directly to its neighbors. This setback is ~5' further back than the adjacent building along Fidelis Way. This setback increases from 25' at Fidelis Way to 45' at Monastery Driveway. The building has been opened visually and physically to the neighboring open space to create a continuous, accessible, and public landscape.

UD 07 Fidelis Way Park Access

There will be a landscaped sidewalk with trees on both sides that will connect from Washington Street to the existing Monastery Path along Monastery Driveway. There will be a landscaped area between the private courtyard and the public terrace with trees, seating, and flowers.

UD 08 Upper Building Parking

All parking for the home-ownership building is enclosed within the building, providing a 1:1 parking ratio. Additional visitor parking for both buildings is provided along the roadway to the home-ownership building.

UD 09 Rear Building Pedestrian Access

There will be sidewalks that surround the building providing access along Washington Street, Monastery Driveway, Fidelis Way and the Fidelis Way extension. All sidewalks will have street trees and landscaping.

UD 10 Rear Building Parking and Drop-off

There will be a new road that will connect Fidelis Way for vehicular access to the home-ownership building. This road will have a turnaround for ease of use in drop-off situations, and will provide access to the resident garage. This road will be created through the widening of the existing parking lot to create a sidewalk, head-in parking, two lanes of traffic, parallel parking, a landscape buffer, a sidewalk, and more landscape / trees.

UD 11 Vehicular Access to Rear Building

There will be no vehicular access through the building.

Mayor's Commission for Persons with Disabilities

Martin J. Walsh, Mayor

November 28th, 2016

RE: **139-149 Washington Street, Brighton, MA 02135**
Project Notification Form
Boston Planning and Development Agency

The Disability Commission has reviewed the Project Notification Form that was submitted for 139-149 Washington Street in Brighton. Since the proposed project is planned to be a vibrant destination area for housing, I would like to encourage a scheme that allows full and equal participation of persons with disabilities through *ideal design which meets as well as exceeds compliance* with accessibility building code requirements. It is crucial that the site layout, buildings, open spaces, parking, and circulation routes be developed with access in mind.

Therefore, in order for my Commission to give its full support to this project, I would like to ask that the following accessibility issues be considered and/or explained:

- **Accessible Group 2 Units:**
  - We would like to request more details on the accessible Group 2 units within the Project, including locations, types and floor plans. **CPD 01**
  - Will any accessible Group 2 units will be included in the Inclusionary Development Policy? If so, how many? **CPD 02**
  - Select ground-level units are shown to have stoops. We do not support this as this limits persons with disabilities and those who would like to age-in-place, as well as the visitability to these particular units, even if an accessible entry is given through the interior of the building. We would recommend that exterior stoops incorporate an accessible means of circulation in order to allow for full and equal participation for persons with disabilities. **CPD 03**

- **Accessible Route and Entry:**
  - Please elaborate on the circulation strategies being employed to help mitigate the challenging slopes of the site, as it relates to pedestrian circulation. **CPD 04**
  - We encourage the Proponent to work with their abutters to find an accessible solution to the slope challenges of the site regarding pedestrian circulation (especially to the condominium portion of the site). **CPD 05**
  - Please provide detail on all walkways and plazas within the Site, including unit paving and decking materials, dimensions and slopes. We support the use of cast-in-place concrete to ensure that the surface texture is smooth and continuous, as well as for the ease of maintenance. **CPD 06**

- **Construction:**
  - Do you anticipate any portion of the Project going through the Public Improvement Commission? If so, please identify and provide details. **CPD 07**

- **Community Benefits:**
  - Accessibility extends past compliance through building code requirements. For example, by providing employment and other opportunities for persons with disabilities, the development becomes an asset to the surrounding community. What opportunities (ex. employment, community support, social) will the development provide for persons with disabilities? **CPD 08**

- **Wayfinding:**
  - Do you have a Wayfinding Package to better understand wayfinding strategies within the scope of the proposed project? **CPD 09**

- **Variances:**
  - Do you anticipate filing for any variances with the Massachusetts Architectural Access Board? If so, please identify and explain. **CPD 10**

Commission's General Statement on Access:

The Mayor's Commission for Persons with Disabilities supports barrier-free design and construction in all buildings throughout Boston, including renovation projects as well as new structures. We work with City departments and developers to ensure compliance with local, state, and federal building codes including Boston Complete Streets, Massachusetts Architectural Access Board (MGL, 521 CMR) and the Americans with Disabilities Act (ADAAG, 28 CFR). Designing or constructing structures that are non-compliant with these requirements is a violation of the law unless it can be demonstrated that it would be structurally infeasible to do so.

Priorities for accessibility other than building design and construction include: ensuring maintenance and upkeep of accessibility features; posting signage for way-finding; utilizing compliant barricades throughout construction; designating appropriate location and amount of accessible parking spaces; and removing barriers in existing buildings wherever "readily achievable" (*"easily accomplishable and able to be carried out without much difficulty or expense"*).

The Commission is available for technical assistance and design review to help achieve accessibility compliance and to ensure that all buildings, sidewalks, parks, and open spaces are usable and welcoming to all of Boston's diverse residents, including those with physical, sensory, intellectual, and communication disabilities.

Thank You.

Kristen McCosh, Commissioner
Mayor's Commission for Persons with Disabilities
kristen.mccosh@boston.gov
617-635-3682

Reviewed by:

Patricia Mendez AIA, Architectural Access Specialist
Mayor's Commission for Persons with Disabilities
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617-635-2529

Sarah Leung, Architectural Access Project Coordinator
Mayor's Commission for Persons with Disabilities
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617-635-3746

MAYOR'S COMMISSION FOR PERSONS WITH DISABILITIES

CPD 01 Group 2 Units

Five percent of the total Project units will be accessible Group 2 units. The exact location of these units will be determined as design review continues. Additionally, all units in the building will be adaptable.

CPD 02 Group 2/IDP Units

Yes, some of the accessible Group 2 units will be included in the IDP. The final number will be determined with BPDA in affordable housing review.

CPD 03 Exterior Stoops

Ground level units will be accessible direct-entry units. They will not have stoops or steps, which restrict access.

CPD 04 Circulation Strategies

The site clearly rises from Washington Street to the highest point by approximately 20′ over a distance of 550′. The average slope over this distance is less than 4%. Given that the roads and sidewalks within the development limit line will be completely reconstructed, all pedestrian sidewalk grades will be designed to be less than 5% in the direction of travel.

CPD 05 Slope Challenges

The Proponent will continue to work with abutters to find an accessible solution to the slope challenges of the site regarding pedestrian circulation. An initial review of the site design concludes that an accessible route is achievable from Washington Street to the home-ownership building.

CPD 06 Walkways and Plazas

All public sidewalks are cast-in-place concrete. Other detail on walkways and plazas in the Project site will be determined as design progresses.

CPD 07 Public Improvement Commission

This will be determined as the Project continues to develop the scope of work in the public way.

CPD 08 Opportunities for Persons with Disabilities

AvalonBay is committed to being an inclusive company for employees and residents. Toward this goal, they make reasonable accommodations to ensure that their communities are accessible to those with disabilities, including temporary disabilities.

CPD 09 Wayfinding

A wayfinding package has not yet been developed at this early stage in the design and permitting process. However, as the design advances into the design development phase, a complete sign package, including wayfinding signs, will be developed. The wayfinding package will include clear directions to both rental and home-ownership buildings, as well as Fidelis Way, Monastery Path, the Commonwealth Development Community Center, and other community amenities as applicable.

CPD 10 MAAB Variances

The Proponent does not anticipate filing for any variances with the Massachusetts Architectural Access Board at this time.

Liza Meyer Boston Parks & Recreation Department

I met with the developer for St. Gabriel's at the site today to look at the connection to Overlook Park. As you know, there is a continuous stairway from their site, along the edge of the park, past Brighton High School and down to Warren Street. We discussed how to make this stairway safer, more accessible, and better connected to their site (and ultimately to Washington St - though that wasn't the focus of our attention today).

They are going to look at what it might take to replace the stairs with an ADA accessible ramp between their site and the park proper (the stairs are on BPRD property). This would need to be coupled with grading improvements, planting strategies and thoughtful building siting and access to make it a successful improvement. Ultimately, improving this connection is a benefit to their project because future residents at St. Gabriel's (and the adjacent Avalon Bay site) stand to gain the most from better park access.

As they continue to work with the BRA, can this improvement be part of the ongoing design discussions? We first have to see what's feasible in terms of grading. If we can connect all the way out to Washington - instead of just to the entry plaza at their proposed Building 1 - all the better. I know that consideration is tied into how these two development parcels relate to each other so that's another piece of the puzzle. **BPRD 01**

Thanks

BOSTON PARKS AND RECREATION DEPARTMENT

BPRD 01 Overlook Park Access

Monastery Path is not accessible from the Project site due to steep grading from the existing parking lot down to Fidelis Way Park. The Proponent intends to strengthen the connection from Washington Street and Fidelis Way, including the Commonwealth Development Community Center, to the top of Monastery Path by reconstructing pedestrian connections from adjacent properties and public rights of way.

BOSTON
TRANSPORTATION
DEPARTMENT

ONE CITY HALL SQUARE • ROOM 721
BOSTON, MASSACHUSETTS 02201
617-635-4680 • FAX 617-635-4295

April 14, 2017

Lance Campbell, Project Assistant
Boston Planning and Development Agency
Boston City Hall, 9th Floor
Boston, MA 02201

RE: 139-149 Washington Street ("PNF")

Dear Lance:

Thank you for the opportunity to comment on the 139-149 Washington Street Project Notification Form dated October 26, 2016. The Project Notification Form is initiating a review of the following proposed Project:

The Avalon Project is located at 139-149 Washington Street in Brighton MA. The Project site is located between Monastery Road and Fidelis Way. The Project will include the construction of two new residential buildings. The first building will contain approximately 220 apartments with a mix of studio, one-bedroom, two-bedroom and three-bedroom units. The second building will contain approximately 30 condominiums with a mix of one-bedroom, two-bedroom and three-bedroom units. Approximately 220 parking spaces will be located on the lower floors of the first building and 30 parking spaces will be provided for the condominium building.

The Boston Transportation Department (BTD) has reviewed the PNF and BTD has identified some concerns in the PNF below which BTD looks forward in resolving with the proponent.

1. The proposed egresses of the Project **BTD 01**

2. How one proposed egress works with another adjacent Project (St. Gabriel's Site) **BTD 02**

3. Traffic Impacts to Washington Street **BTD 03**

4. Traffic Impacts to Fidelis Way **BTD 04**

5. Signal Timing Improvements using the signal equipment that currently exists at each intersection between Cambridge Street and Commonwealth Avenue. The intent of the **BTD 05**

signal timing modifications to each corridor is to provide more efficient vehicle travel west-east through the corridors, while also providing pedestrian improvements via concurrent pedestrian phasing that will allow for longer walk times. Progressive signals should be considered for this corridor as well.

6. The implementation of Transportation Demand Management Plan needs to be determined and these items should include but not limited to: **BTD 06**

    1) The installation of Hubway Stations
    2) The proponent will work with a car sharing service to determine whether it is possible to provide car sharing vehicles within the garage.
    3) 5% of the garage spaces will be equipped with electric vehicle charging stations. The garage will also include the infrastructure in place to increase this percentage to 15% should the demand arise.
    4) The proponent should consider working with existing and future abutters on the implementation of shuttle service to be implemented in the area with connections to MBTA transit lines.
    5) Bike parking should be installed in accordance with BTD's Policy Parking Guidelines.

7. A detailed comprehensive curbside regulation plan **BTD 07**

8. Internal traffic circulation within the site **BTD 08**

9. Loading and unloading within the site **BTD 09**

The Proponent will also be responsible in the preparation of a Transportation Access Plan Agreement (TAPA). The TAPA is a formal legal agreement between the project proponent and the BTD. The TAPA formalizes the findings of the Transportation Access Plan, mitigation commitments, elements of access and physical design, and any other responsibilities that agreed to by both the proponent and the BTD. Since the TAPA must incorporate the results of the technical analysis, physical design, and assessment of mitigation requirements, it must be executed after these processes have been completed. However, the TAPA must be executed prior to approval of the project's design through the City of Boston's Public Improvements Commission (PIC). An electronic copy of the basic TAPA form is available from BTD. It is the proponent's responsibility to complete the TAPA so that it reflects the specific findings and commitments for the project, and to get BTD review and approval of the document.

BTD looks forward in working with the proponent's from the Avalon Project and the BPDA in developing a Draft Impact Report (DIR) that will help minimize traffic impacts and improve transportation conditions in the area.

Sincerely,

William H. Conroy IV,
Senior Transportation Planner

- Cc: Vineet Gupta, Director of Policy and Planning
- John DeBenedictis, Director of Engineering

BOSTON TRANSPORTATION DEPARTMENT

BTD 01 Project Egress

The current proposal provides access/egress along Fidelis Way in two locations. A driveway is provided along Fidelis Way to access the garage for the rental building and a new roadway connection will be constructed to provide access to the home-ownership units.

BTD 02 Coordination with Adjacent Site

The Proponent has coordinated with the adjacent property owners and developers. As currently proposed, the Project will not share an access/egress point with the adjacent 159-201 Washington Street project.

BTD 03 Washington Street Traffic

The Project's impacts to Washington Street are documented in the PNF and are minimal in nature. The existing curb cut will be eliminated as part of the proposed Project. The Project will result in a net decrease of traffic volumes during the weekday a.m. peak hour due to the removal of the existing day care uses on the site. The Project will result in a slight increase of traffic volumes during the weekday p.m. peak hour and will have minimal impact on the surrounding roadway network.

BTD 04 Fidelis Way Traffic

The traffic impacts to Fidelis Way are documented in Section 3.2.

BTD 05 Signal Timing Improvements

Traffic signal timing improvements are presented in Section 3.2.6.

BTD 06 TDM Plan

The Proponent's detailed TDM plan is presented in Section 3.3.

BTD 07 Curbside Regulation Plan

The Proponent is not proposing any changes to curbside regulations along Washington Street. The existing regulations along Washington Street generally consist of two-hour parking and residential permit parking. As part of the Project, Fidelis Way, adjacent to the site, will be upgraded and additional parallel parking will be provided for residents of the Commonwealth Development.

BTD 08 Internal Traffic Circulation

The Project site will be designed to accommodate all required BTD design vehicles, including moving trucks, trash/recycling trucks, and service vehicles. Vehicular movements will be documented in the TAPA.

BTD 09 Loading and Unloading

All loading and unloading will take place within the site and will not have an impact on traffic or pedestrian operations along Washington Street or Fidelis Way.

Boston Water and Sewer Commission

980 Harrison Avenue
Boston, MA 02119-2540
617-989-7000

November 18, 2016

Mr. Lance Campbell
Boston Planning & Development
One City Hall Square
Boston, MA 02201

Re: 139-149 Washington Street

Dear Mr. Campbell:

The Boston Water and Sewer Commission (Commission, BWSC) has reviewed the Project Notification Form (PNF) for the proposed 139-149 Washington Street Project (Project). The Project site is located at 139-149 Washington Street, which is located between Monastery Road and Fidelis Way in the Brighton neighborhood of Boston. The Project consists of the demolition of the existing structures and the construction of two new five- to six-story residential buildings, with one building containing approximately 220 apartments and one building containing approximately 30 condominiums. Approximately 220 parking spaces will be located on the lower floors of the first building and 30 parking spaces will be provided for the condominium building.

For sanitary sewer and storm drainage service the Project site is served by a 15-inch BWSC sanitary sewer and an 18-inch BWSC storm drain on Washington Street. There is also a 10-inch sanitary sewer and a 12-inch storm drain on Fidelis Way which are owned by the Boston Housing Authority (BHA). Total sanitary flow for the Project is estimated at 44,660 gallons per day (gpd).

For water service the Project site is served by a 12-inch BWSC water main on Washington Street. Also, there is a private 18-inch water main located on Fidelis Way. Water demand for the Project is estimated at 49,126 gpd.

The Commission has the following comments regarding the proposed Project:

General

1. The Proponent must submit a site plan and General Service Application to the Commission for the proposed Project. The site plan must show the location of the water mains, sewers and drains serving the Project site, as well as the locations of existing and proposed service connections. To assure compliance with the Commission's requirements, the Proponent should submit the site plan and General Service Application to the Commission's Engineering Customer Service Department for review when the design for the Project is at 50 percent complete. **BWSC 01**

2. Any new or relocated water mains, sewers and storm drains must be designed and constructed at the Proponent's expense. They must be designed and constructed in conformance with the Commission's design standards, Water Distribution System and Sewer Use Regulations, and Requirements for Site Plans. **BWSC 02**

3. With the site plan the Proponent must provide detailed estimates for water demand (including water required for landscaping), wastewater generation, and stormwater runoff for the Project. **BWSC 03**

4. It is the Proponent's responsibility to evaluate the capacity of the water and sewer system serving the Project site to determine if the systems are adequate to meet future Project demands. With the site plan, the Proponent must include a detailed capacity analysis for the water and sewer systems serving the Project site, as well as an analysis of the impact the Project will have on the Commission's systems and the MWRA's systems overall. The analysis should identify specific measures that will be implemented to offset the impacts of the anticipated flows on the Commission and MWRA sewer systems. **BWSC 04**

5. Developers of projects involving disturbances of land of one acre or more are required to obtain an NPDES General Permit for Construction from the Environmental Protection Agency. The Proponent is responsible for determining if such a permit is required and for obtaining the permit. If such a permit is required for the proposed Project, a copy of the Notice of Intent and any pollution prevention plan submitted to EPA pursuant to the permit must be provided to the Commission's Engineering Services Department prior to the commencement of construction. **BWSC 05**

6. Before the Proponent demolishes the existing structures the existing water and sewer connections to the structures must be cut and capped in accordance with Commission standards. The Proponent must complete a Termination Verification Approval Form for a Demolition Permit, available from the Commission. The completed form must be submitted to the City of Boston's Inspectional Services Department before a Demolition Permit will be issued. **BWSC 06**

<u>**Sewage/Drainage**</u>

7. The discharge of dewatering drainage to a sanitary sewer is prohibited by the Commission and the MWRA. The discharge of any dewatering drainage to the storm drainage system requires a Drainage Discharge Permit from the Commission. If the dewatering drainage is contaminated with petroleum products for example, the Proponent will be required to obtain a Remediation General Permit from the EPA for the discharge. **BWSC 07**

8. The Department of Environmental Protection (DEP), in cooperation with the Massachusetts Water Resources Authority (MWRA) and its member communities are implementing a coordinated approach to flow control in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g., infiltration/ inflow ("I/I")) in the system. Pursuant to the policy new developments with design flow exceeding 15,000 gpd of wastewater are subject to the Department of Environmental Protection's regulation 314 CMR 12.00, section 12.04(2)(d). This regulation requires all new sewer connections with design flows exceeding 15,000 gpd to mitigate the impacts of the development by removing four **BWSC 08**

gallons of infiltration and inflow (I/I) for each new gallon of wastewater flow added. The Commission will require the Proponent to develop an inflow reduction plan consistent with the regulation. The 4:1 reduction should be addressed at least 90 days prior to activation of water service, and will be based on the estimated sewage generation provided with the Project site plan.

9. The site plan must show in detail how drainage from the building's roof top and from other impervious areas will be managed. Roof runoff and other stormwater runoff must be conveyed separately from sanitary waste at all times. **BWSC 09**

10. A Total Maximum Daily Load (TMDL) for Nutrients has been established for the Lower Charles River Watershed by the DEP. In order to achieve the reductions in phosphorus loadings required by the TMDL phosphorus concentrations in stormwater discharges to the lower Charles River from Boston must be reduced by 64%. To accomplish the necessary reductions in phosphorus the Commission requires developers of projects in the lower Charles River watershed to infiltrate all stormwater discharging from impervious areas. The Proponent must submit with the site plan a phosphorus reduction plan for the Project. **BWSC 10**

11. The Proponent must fully investigate methods for infiltrating all stormwater on-site before the Commission will consider a request to discharge stormwater to the Commission's system. A feasibility assessment for infiltrating stormwater on-site must be submitted with the site plan for the Project. **BWSC 11**

12. The Massachusetts Department of Environmental Protection (MassDEP) has established Performance Standards for Stormwater Management. The Standards address stormwater quality, quantity and recharge. In addition to Commission standards, the proposed Project will be required to meet MassDEP's Stormwater Management Standards. **BWSC 12**

13. In conjunction with the site plan and General Service Application the Proponent will be required to submit a Stormwater Pollution Prevention Plan. The plan must: **BWSC 13**

    - Specifically identify how the Project will comply with the Department of Environmental Protection's Performance Standards for Stormwater Management both during construction and after construction is complete.

    - Identify specific best management measures for controlling erosion and preventing the discharge of sediment, contaminated stormwater or construction debris to the Commission's drainage system when construction is underway.

    - Include a site map which shows, at a minimum, existing drainage patterns and areas used for storage or treatment of contaminated soils, groundwater or stormwater, and the location of major control or treatment structures to be utilized during construction.

14. The Commission requests that the Proponent install a permanent casting stating: "Don't Dump: Drains to Charles River next to any new catch basin installed as part of the Project. The Proponent may contact the Commission's Operations Division for information regarding the purchase of the castings. **BWSC 14**

15. The Commission encourages the Proponent to explore additional opportunities for protecting stormwater quality by minimizing sanding and the use of deicing chemicals, pesticides and fertilizers. **BWSC 15**

Water

16. The Proponent is required to obtain a Hydrant Permit for use of any hydrant during construction of the Project. The water used from the hydrant must be metered. The Proponent should contact the Commission's Operations Department for information on obtaining a Hydrant Permit. **BWSC 16**

17. The Commission utilizes a Fixed Radio Meter Reading System to obtain water meter readings. Where a new water meter is needed, the Commission will provide a Meter Transmitter Unit (MTU) and connect the device to the meter. For information regarding the installation of MTUs, the Proponent should contact the Commission's Meter Installation Department. **BWSC 17**

18. The Proponent should explore opportunities for implementing water conservation measures in addition to those required by the State Plumbing Code. In particular the Proponent should consider indoor and outdoor landscaping which requires minimal use of water to maintain. If the Proponent plans to install in-ground sprinkler systems, the Commission recommends that timers, soil moisture indicators and rainfall sensors be installed. The use of sensor-operated faucets and toilets in common areas of buildings should also be considered. **BWSC 18**

Thank you for the opportunity to comment on this Project.

Yours truly,

John P. Sullivan, P.E.
Chief Engineer and Operations Officer

JPS/as

cc: Michael Roberts, AvalonBay Communities, Inc.
Marianne Connolly, Mass. Water Resources Authority
Maura Zlody, Boston Environment Department
Phil Larocque, Boston Water and Sewer Commission

BOSTON WATER AND SEWER COMMISSION

BWSC 01 Site Plan and General Service Application

The Project will submit the site plan and General Service Application to the Commission's Engineering Customer Service Department for review and approval (Site Plan Review) once the Project's design is further developed.

BWSC 02 New or Relocated Utilities

If the Project is to construct any new or relocated water, sewer and/or storm drains, the Project will comply with the Commission's requirements.

BWSC 03 Detailed Estimates

Detailed estimates for water demand and wastewater generation are provided in Chapter 8. A rough estimate of existing and proposed stormwater runoff rates for the site are provided in Chapter 8. A more detailed stormwater analysis of the site will be provided as part of the Site Plan Review.

BWSC 04 Capacity and Impact

Detailed estimates of the existing sanitary sewer and storm drain mains are provided in Chapter 8. A more current fire flow test will be provided to provide up-to-date water pressure information for the Project. I/I will be provided as necessary, and will be coordinated with the Commission during the Site Plan Review (See Response to BWSC 08).

BWSC 05 NPDES

A copy of the NPDES Notice of Intent will be provided to the Commission prior to the commencement of construction.

BWSC 06 Existing Water and Sewer Connections

All existing water and/or sewer utility cut and caps will be performed in accordance with the Commission, and the Proponent will complete a Termination Verification Approval Form as necessary. The form will be submitted to the Inspectional Services Department (ISD) prior to obtaining the Demolition Permit.

BWSC 07 Dewatering Drainage

The discharge of any dewatering to the storm drainage system will be permitted with the Commission and EPA as necessary.

BWSC 08 Infiltration/Inflow

The Project will provide an inflow reduction plan consistent 314 CMR 12.00 Section 12.04(2)(d). This will be coordinated between the Proponent and the Commission as part of the Site Plan Review.

BWSC 09 Stormwater Runoff

The Project will comply with stormwater regulations set forth by the Commission and the Massachusetts Department of Environmental Protection as necessary. Storm drain and sanitary sewer connections will be conveyed separately.

BWSC 10 Phosphorous Reduction Plan

The Project will meet the phosphorous reduction requirement, to be reviewed as part of the Site Plan Review.

BWSC 11 Stormwater Infiltration

The Project will meet the stormwater infiltration requirements as practicable on the Site. Site assessments will be submitted to the Commission as part of the Site Plan Review.

BWSC 12 MassDEP Stormwater Management Standards

An explanation of how the Project will comply with the State Stormwater Standards is provided in Section 8.3.5.

BWSC 13 Stormwater Pollution Prevention Plan

The Project will prepare a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the NPDES Permit. The SWPPP will be submitted as part of the Site Plan Review.

BWSC 14 Don't Dump Castings

"Don't Dump: Drains to the Charles River" castings will be installed at any new catch basins and drain inlets as part of the Project.

BWSC 15 Stormwater Quality Protection

The Proponent will explore opportunities of reduced sanding, use of deicing chemicals, pesticides and fertilizers.

BWSC 16 Hydrant Permit

The Proponent will obtain and comply with the Hydrant Permit as necessary during Project construction.

BWSC 17 Water Meters

The Proponent will contact the Commission's Meter Installation Department when a new water meter is needed.

BWSC 18 Water Conservation Measures

Measures to reduce water consumption will be incorporated into the Project's design. Aeration fixtures and appliances will be chosen for water conservation qualities. In public areas, sensor operated faucets and toilets will be installed where possible. The Project anticipates minimizing the need for potable water to be used for irrigation through the careful selection of vegetation and mechanical methods to reduce water use.

LIZ BREADON

LB 01 St. Elizabeth's Parking

St. Elizabeth's is currently in the process of filing a renewal of its Institutional Master Plan, which will include a plan to relocate its parking spaces.

LB 02 Project Parking Supply

The Project parking supply was developed based on BTD guidelines for maximum parking ratios, a detailed study of parking and vehicle ownership data from the latest U.S. Census, and on a market analysis conducted by the developer. Based on these detailed studies, the proposed parking supply of 1.05 spaces per unit will be more than sufficient to meet the Project's parking demand.

LB 03 Visitor Parking

The Project's parking supply will provide sufficient spaces for both residents and visitors. The Proponent will designate a total of 10 spaces for visitors and will adjust as necessary to meet Project demands.

LB 04 Car Sharing

The Proponent will explore the feasibility of providing on-site car sharing services.

LB 05 Density

The Proponent has reduced the overall density of the Project from 250 units to 210 units. This reduction of 40 units is fully attributable to a reduction in the number of rental units. The prior unit composition was 220 rental units and 30 home-ownership units. The revised unit mix proposed in this DPIR is 180 rental units and 30 home-ownership units. Home-ownership units represent over 14.3% of the total units in the Project, up from 12.0% in the PNF filed in October 2016. The Proponent will continue to explore ways to incorporate additional home-ownership units, but it should be noted that the amount of home-ownership units is driven by the amount of parking available to the building, and the ability to maintain at least one parking space per unit.

LB 06 Community Connection

The modified Project design is more connected to the neighboring community. The U-shaped building opens up to Monastery Driveway and the adjacent landscaped space. The Project will serve as a conduit to reconnect parts of the neighborhood separated by the site's former institutional use. An enhanced pedestrian network will provide a more welcoming point of entry, which enhances the existing connection to

Warren Street, the Commonwealth Development, the proposed CC&F Project and its restored historic uses and the under-utilized Fidelis Way/Overlook Park. By creating a welcoming, approachable and public-friendly environment, the Project has the opportunity to serve as an entry point and connector of currently separate areas of the neighborhood.

LB 07 Vehicular Access

The Project will no longer have access off Washington Street. Access to both buildings will be from Fidelis Way.

LB 08 Condominiums

The overall density of the project was reduced 20% and home-ownership units as a percent of total units increased. The Proponent will explore opportunities to include additional home-ownership units.

To : Lance.Campbell@Boston.gov

Dear Mr. Campbell,

I write to express my concerns regarding the 139-149 Washington Street Development being proposed by Avalon Bay Communities Inc.

We need a planning process for Allston Brighton

This piecemeal approach to development is doing our community a huge disservice. Development projects along the Washington Street corridor in Brighton need to be undertaken in the context of an inclusive neighborhood wide planning process. This is a community concern that comes up at every meeting to discuss proposed developments in Allston Brighton. It is not good enough to say there is no money for planning, why is the agency called the Boston Planning and Development Agency when they are not doing any planning? Building all these new developments without looking at the big picture and considering public safety, transportation, greenspace, schools, emergency planning etc is not good policy.

Parking and Traffic

The unresolved issues with the Saint Elizabeth's IMP with regard to parking are a great concern in this already congested area. Saint Elizabeth's currently uses 400 parking spaces on the 159-201 Washington Street and 139-149 Washington Street locations. In addition, this development is proposing 250 units of housing with only 250 parking spaces. This is unrealistic as it assumes that only one person in a unit will have a car given that our public transit system is already over capacity. Even if residents use public transit to commute to work many will still have cars for taking kids to school, recreational activities, shopping etc. **LB 01** **LB 02**

Visitor parking and car sharing

The plan does not make any allowance for visitor parking. Is there a proposal to have car sharing on site? **LB 03** **LB 04**

Density

This development of 250 units with 250 parking spaces is proposed for 3.3 acres. This development is too dense especially when taken in the context of all the other development that is in the pipeline for the immediate neighborhood. **LB 05**

In the Washington Street Corridor in Brighton between 5 Washington Street and 460 Washington Street, (**a distance of 1.1 miles**) there are proposals for 1376 units of new housing with only 1027 parking spaces.

• 5 Washington Street	118 units
• 101-105 Washington Street	73 units
• 139-149 Washington Street	250 units
• 159- 201 Washington Street	679 units
• 425 Washington Street	54 units
• 458-460 Washington Street	28 units
• 386-388 Market Street	17 units
• 375 Market Street	39 units

Lacks connection to the neighboring community.

The design concept presents almost as a "gated community" that does not have connection to the neighborhood. The modification of the plan to include a 45 feet setback on Washington Street helps somewhat. But the building itself is out of scale and lacks any meaningful connection to the surrounding community. **LB 06**

Vehicular access on Washington Street

The proposal to have a curb cut with access directly onto Washington Street seems impractical especially at traffic time. **LB 07**

More condominiums for owner occupancy needed.

Allston Brighton is a neighborhood that is out of balance in terms of income inequality and demographics. We have a very low owner occupancy rate, which has a destabilizing impact on the community. We need more opportunities for owner occupancy for those young people and retirees who want to make Brighton their home. Of the 2,095 units in the pipeline in Brighton there are only 125 condos. Condominiums that come to market in Brighton sell very quickly so there is a large unmet demand. Large projects like this present an opportunity to increase owner occupancy if at lease 20% of the units were condos. **LB 08**

Thank you for the opportunity to comment on this project.

Sincerely,

Liz Breadon

33 Champney Street

Brighton

Lance Campbell <lance.campbell@boston.gov>

comments on project 139-149 Washington St (Avalon Bay)

1 message

Leslie Bordonaro <bordonaro_lz@hotmail.com> Fri, Dec 9, 2016 at 2:54 PM
To: "Viktoria.Abolina@Boston.gov" <Viktoria.Abolina@boston.gov>, "Lance.Campbell@Boston.gov" <Lance.Campbell@boston.gov>, "michael.rooney@boston.gov" <michael.rooney@boston.gov>

I have not been able to attend the meetings on 139-149 Washington/Avalon Bay project but I am incuding below some of my concerns about the 159-201 Washington street project slightly adjusted that are just as relevant to Avalon Bay:

I have some major concerns with this housing project.

1. TRAFFIC: The traffic along Washington St. is already pretty horrendous. I'm afraid that I won't **LBO 01** be able to get anywhere when I leave my home after this project is built. We already have to allow for 5-10 minutes just to cross Comm Ave, or get past St. Elizabeth in the other direction. The cars are often backed up all the way to Monastery from Comm. Ave, and going the other way, the light at Washington/Cambridge street is always backed up past St Elizabeth's and further.

The LAST thing we need on this stretch or Washington St. is ANOTHER traffic light but we already have to take special care every time we come out of Shannon on to Washington, so any additional traffic will only increase the danger. Two HUGE developments in that location will make it unbearable. Somebody will be killed I've no doubt.

2. PUBLIC TRANSPORTATION: If 100s of new people from these developments are taking the B **LBO 02** line at Washington street during rush hour there won't be space to breath on the train. Quite often the train is literally packed, standing room only at Washington St. (This was not always the case. I used to pretty much feel guaranteed a seat inbound from there.)

What's going to happen to us commuters when this development (and the others) all funnel more people into the B train? It's already the worst line in the city. Less service, crowded trains, SLOW trips.

3. OPEN SPACE: I know the 159-201 developers say they want to leave the landscape along **LBO 03** Washington street alone, and have no idea about this development. But **whatever** they do they will be taking some open space away. The fact is that Brighton is woefully short of open space and trees. There is NOT ONE street tree along the street I live on, Union. Even the one little playground along Union has recently been renovated - which is nice, but we currently only have small trees, and no shade, along the street because the mature pines were cut down. It was the ONLY patch of shade along the street.

I would MUCH PREFER this whole St. Gabriel's area be designated a permanent OPEN SPACE for quality of life issues for the whole neighborhood - for Brighton Ctr even. We have almost NO PARKS of any size in this part of town. We desperately NEED our tree lungs to keep this town liveable!

Leslie Bordonaro

61R Union St.

LESLIE BORDONARO

LBO 01 Washington Street Traffic

The Proponent acknowledges the current traffic conditions along Washington Street, specifically at the intersections with Cambridge Street to the west and with Commonwealth Avenue to the east. As part of a study requested by BTD, the Proponent has identified some potential signal timing and geometric improvements, which could help mitigate this existing problem.

LBO 02 Transit Capacity

The Proponent acknowledges the high level of ridership along the MBTA Green Line. The Proponent expects residents will use an array of transportation options, including the Green line, bus, walking, bicycling, etc. The inclusion of 210 new housing units will not have a measurable change on the Green Line usage.

LBO 03 Open Space

Open space as a percent of the total site has increased to 51%, and publicly accessible spaces were added to the site. Open space at the corner of the Project site near Washington Street and Monastery Driveway serves as a gateway to the adjacent landscaped space and also to Fidelis Way Park located at the rear of the site.

Lance Campbell <lance.campbell@boston.gov>

Project Comment Submission: 139-149 Washington Street

4 messages

no-reply@boston.gov <no-reply@boston.gov> Fri, Dec 9, 2016 at 12:19 PM
To: BRAWebContent@cityofboston.gov, lance.campbell@boston.gov

CommentsSubmissionFormID: 1402

Form inserted: 12/9/2016 12:18:41 PM

Form updated: 12/9/2016 12:18:41 PM

Document Name: 139-149 Washington Street

Document Name Path: /Development/Development Projects/139-149 Washington Street

Origin Page Url: /projects/development-projects/139-149-washington-street

First Name: Rosa

Last Name: Tempesta

Organization:

Email: rmtempesta@msn.com

Street Address: Washington St

Address Line 2:

City: Brighton

State: MA

Phone: (470) 588-5378

Zip: 02135

Comments: This project will bring in anywhere from 250-1,000 cars, below symbolizes 250-1,000 cars:
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constant traffic jams on Washington St. now, especially in this part of Washington St because everyone is trying to get to Commonwealth Avenue. This project should be stopped or at best, their goal should be car-free transporation... foot, bike, or transit only. This project needs to be car free. **RT 01**

PMContact: lance.campbell@boston.gov

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no-reply@boston.gov <no-reply@boston.gov> Fri, Dec 9, 2016 at 12:42 PM
To: BRAWebContent@cityofboston.gov, lance.campbell@boston.gov

CommentsSubmissionFormID: 1403

Form inserted: 12/9/2016 12:42:11 PM

Form updated: 12/9/2016 12:42:11 PM

Document Name: 139-149 Washington Street

Document Name Path: /Development/Development Projects/139-149 Washington Street

Origin Page Url: /projects/development-projects/139-149-washington-street

First Name: Rosa

Last Name: Tempesta

Organization:

Email: rmtempesta@msn.com

Street Address: Washington St

Address Line 2:

City: Brighton

State: MA

Phone: (470) 588-5378

Zip: 02135

Comments: This project will bring in anywhere from 250-1,000 people, below symbolizes 250-1,000 people:
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%%% This project is too dense and brings in too many people in that space, especially in combination with the project being considered on **RT 02**

the opposite corner. Zoning regulations should not be changed,not this much anyway. Developers should be required only 2 or 3 family units, at best condo home ownership. We cannot continue to fill our city with studio and one bedroom apartments with small rooms for single people. Such trends push parents and children out of the neighborhood. Also, this creates a transient population that is not good for the family-oriented neighborhood that we seek. THIS PROJECT SHOULD BE STOPPED...at best severely limited to only one building, in the back enabling the frontage to be green space. Also, this project should only be approved only after the developers and any/all officials that want this project build this exact project across the street from their own private homes. Changing our neighborhood for the worse is permanent, unlike the transient population that will be allowed here. **RT 03**

PMContact: lance.campbell@boston.gov

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no-reply@boston.gov <no-reply@boston.gov> Fri, Dec 9, 2016 at 12:50 PM
To: BRAWebContent@cityofboston.gov, lance.campbell@boston.gov

CommentsSubmissionFormID: 1404

Form inserted: 12/9/2016 12:50:20 PM

Form updated: 12/9/2016 12:50:20 PM

Document Name: 139-149 Washington Street

Document Name Path: /Development/Development Projects/139-149 Washington Street

Origin Page Url: /projects/development-projects/139-149-washington-street

First Name: Rosa

Last Name: Tempesta

Organization:

Email: rmtempesta@msn.com

Street Address: Washington St

Address Line 2:

City: Brighton

State: MA

Phone: (470) 588-5378

Zip: 02135

Comments: 1) This project must be stopped, or at best, cut back to only one building in the back, for home ownership only. This would allow for more permanent residents and allow the front for green space. As it is, there are not enough playgrounds/open space for the children in the area. Studies show that children must have playgrounds within walking distance in order to develop important cognitive and social skills. This project removes the only playground in that area. 2) Major improvements to public transportation system is needed. 3) Their goal should be car-free transportation... foot, **RT 04**
bike, or transit only. 4) Brighton/Allston is the student capital of Boston. This project needs to be car free/truck free, **RT 05**
especially with the annual move-in/move -out dates of August 31-September. 5) Crime and pollution will increase. 6) I **RT 06**
would like the developers and any/all officials that want this project to build this exact project across the street from their homes as well.

PMContact: lance.campbell@boston.gov

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no-reply@boston.gov <no-reply@boston.gov> Fri, Dec 9, 2016 at 5:35 PM
To: BRAWebContent@cityofboston.gov, lance.campbell@boston.gov

ROSA TEMPESTA

RT 01 Washington Street Traffic

The Proponent acknowledges the current traffic conditions along Washington Street, specifically at the intersections with Cambridge Street to the west and with Commonwealth Avenue to the east. As part of a study requested by BTD, the Proponent has identified some potential signal timing and geometric improvements, which could help mitigate this existing problem.

RT 02 Density

The Proponent has reduced the overall density of the Project from 250 units to 210 units. This reduction of 40 units is fully attributable to a reduction in the number of rental units. The prior unit composition was 220 rental units and 30 home-ownership units. The revised unit mix proposed in this DPIR is 180 rental units and 30 home-ownership units. Home-ownership units represent over 14.3% of the total units in the Project, up from 12.0% in the PNF filed in October 2016. The Proponent will continue to explore ways to incorporate additional home-ownership units, but it should be noted that the amount of home-ownership units is driven by the amount of parking available to the building, and the ability to maintain at least one parking space per unit.

RT 03 Unit Types

The overall density of the project was reduced 20% and home-ownership units as a percent of total units increased. Additionally, the unit mix was modified to enhance the number of family style unit types to reduce transiency and to promote community involvement with future residents.

RT 04 Public Transportation

The Proponent acknowledges the high level of ridership along the MBTA Green Line. The Proponent expects residents will use an array of transportation options, including the Green line, bus, walking, bicycling, etc. The inclusion of 210 new housing units will not have a measureable change on the Green Line usage.

RT 05 Annual Move-in Dates

The Proponent will stagger leases throughout the year, avoiding the annual September 1 move-in date.

RT 06 Crime and Pollution

AvalonBay Communities are developed, constructed and managed by AvalonBay associates. As described in Section 1.2, the Project has key management and design advantages that will help to reduce transiency and to promote community involvement with future residents.

Section 4.5 contains an air quality analysis, and concludes that there are no anticipated adverse air quality impacts resulting from increased traffic in the area.

Lance Campbell <lance.campbell@boston.gov>

Project Comment Submission: 139-149 Washington Street

1 message

no-reply@boston.gov <no-reply@boston.gov> Tue, Dec 6, 2016 at 9:02 PM
To: BRAWebContent@cityofboston.gov, lance.campbell@boston.gov

CommentsSubmissionFormID: 1401

Form inserted: 12/6/2016 9:02:32 PM

Form updated: 12/6/2016 9:02:32 PM

Document Name: 139-149 Washington Street

Document Name Path: /Development/Development Projects/139-149 Washington Street

Origin Page Url: /projects/development-projects/139-149-washington-street

First Name: Annette

Last Name: Pechenick

Organization:

Email: arph@rcn.com

Street Address: 97 Colborne Road

Address Line 2:

City: Brighton

State: MA

Phone: (617) 987-2134

Zip: 02135

Comments: I am very frustrated at the lack of planning on behalf of this project. It is utter ludicrousness to want dwellers
to pay for parking. Our neighborhood is already taxed with its lack of parking. Not only should parking be provided at no **AP 01**
cost but that for every one bedroom to have two parking spaces, a three bedroom six parking spaces, a four bedroom to
have four parking spaces. The community/neighborhood feels completely ignored by the "elephant in the room". There
has not been enough opportunity to fix the congestion on Washington Street. There should be a better study to represent **AP 02**
the massive congestion Washington Street will have if this project is given a go ahead. There should not be access to
Washington Street for egresses, but, instead perhaps Warren Street. These developments would have in excess of
1,000 cars and the neighborhood just could not work. What is Avalon doing for the neighborhood? As far as I can tell, not **AP 03**
much. We need to be represented to make the Board of Appeals understand our situation and not give the go ahead on
such a massive redevelopment. The Mayor and City Councilmen should attend the next meeting so that we can actually
be heard and that it should be recorded so there are notes for everyone concerned to look at. Zoning should not even be
discussed until our needs are addressed. The development should give shuttle bus services to the Longwood Medical **AP 04**
Area, the C line, and the B line so that there would be a decrease need for cars.

PMContact: lance.campbell@boston.gov

Lance Campbell <lance.campbell@boston.gov>

Project Comment Submission: 139-149 Washington Street

1 message

no-reply@boston.gov <no-reply@boston.gov> Mon, Nov 14, 2016 at 6:41 PM
To: BRAWebContent@cityofboston.gov, lance.campbell@boston.gov

CommentsSubmissionFormID: 1319

Form inserted: 11/14/2016 6:41:10 PM

Form updated: 11/14/2016 6:41:10 PM

Document Name: 139-149 Washington Street

Document Name Path: /Development/Development Projects/139-149 Washington Street

Origin Page Url: /projects/development-projects/139-149-washington-street?utm_source=
Neighborhoods&utm_campaign=5e73eb0538-139-149_Washington_Public_Meeting11_14_2016&utm_
medium=email&utm_term=0_bccda74844-5e73eb0538-198158669

First Name: Annette

Last Name: Pechenick

Organization:

Email: arph@rcn.com

Street Address: 97 Colborne Road

Address Line 2:

City: Brighton

State: MA

Phone: (617) 987-2134

Zip: 02135

Comments: There needs to be more parking available and the project should not have access on Washington Street but open on Warren Street. The development should also use shuttle buses to Kenmore and Riverside so there would be less cars causing less traffic congestion.

PMContact: lance.campbell@boston.gov

ANNETTE PECHENICK

AP 01 Parking Supply and Cost

The parking ratio has been increased from 1.0 spaces per unit to 1.05 spaces per unit.

AP 02 Washington Street Traffic

The Proponent acknowledges the current traffic conditions along Washington Street, specifically at the intersections with Cambridge Street to the west and with Commonwealth Avenue to the east. As part of a study requested by BTD, the Proponent has identified some potential signal timing and geometric improvements, which could help mitigate this existing problem. Further, access and egress between the Project site and Warren Street is not possible due to grading challenges and no availability of public right-of-way.

AP 03 Community Benefits

See Section 2.2 for a discussion of community benefits.

AP 04 Shuttle Bus Service

The Proponent has explored the possibility of shuttle bus service at the Project. With a project of this size, there is not enough density to warrant shuttle bus services. The Proponent is open to exploring a neighborhood-wide shuttle option if feasible and supported by others.

Lance Campbell <lance.campbell@boston.gov>

Fwd: Contact Us Submission: # 2379 // Development

1 message

Michael Christopher <michael.christopher@boston.gov> Wed, Jul 13, 2016 at 7:45 AM
To: lance.campbell@boston.gov, katelyn.sullivan@boston.gov, michael.rooney@boston.gov

FYI

Sent from my iPhone

Begin forwarded message:

> **From:** kentico@boston.gov
> **Date:** July 13, 2016 at 7:42:53 AM EDT
> **To:** BRAWebContent@boston.gov, michael.christopher@boston.gov
> **Subject: Contact Us Submission: # 2379 // Development**
>
> CommentsSubmissionFormID: 2379
>
> Form inserted: 7/13/2016 7:42:11 AM
>
> Form updated: 7/13/2016 7:42:11 AM
>
> Document Name: Contact Us
>
> Document Name Path: /About Us/Contact Us
>
> Origin Page Url: /about-us/contact-us
>
> First Name: Jim
>
> Last Name: Magarian
>
> Organization: Resident/Homeowner
>
> Email: james.magarian@gmail.com
>
> Street Address: 108 Washington St.
>
> Address Line 2: Unit 22
>
> City: Brighton
>
> Subject: michael.christopher@boston.gov:Development
>
> State: MA
>
> Phone: (978) 987-7955
>
> Zip: 02135
>
> Comments: Dear BRA, I'm writing to provide neighbor input on the proposed apartment development projects on Washington St. in Brighton (e.g., 101-105 Washington, 159 Washington, 139-149 Washington). I am a resident and condo-owner at 108 Washington st. First, our household welcomes development on Washington St. We've always thought that Brighton had a lot of potential to be part of the solution for Boston's housing shortage. Also, we've thought that new development could help the area in a number of ways by bringing a new infusion of community investment, focusing renewed attention on transit, and

bringing some new retail nearby, etc. There's really only one key point we want to raise to the BRA's attention: These new proposals are heavily rental-oriented (if not all rental). As neighbors, we'd just really like to advocate strongly for a mix of rental + condos. As you know, Brighton is an accommodating home to thousands of transient renters (largely college students). We feel that community-building, community investment and community involvement would all benefit if the neighborhood had a combination of ownership/rental (across all income levels). Owners are more likely to invest in the community in a variety of ways that are less likely among renters. We think Brighton would really benefit from this. We hope the BRA will consider advocating for a mix of rentals + condos at the Washington St. developments. While we don't have access to the statistics, our intuition is that Brighton is proportionally rental-heavy. Let's invest in Brighton by providing opportunities for people to put down ownership roots here. Sincerely, Jim **JM 01**

JIM MAGARIAN

JM 01 Unit Type

As described in Section 1.2, the Project will have key management and design advantages that will help to reduce transiency and to promote community involvement with future residents.

CommentsSubmissionFormID: 1405

Form inserted: 12/9/2016 5:34:51 PM

Form updated: 12/9/2016 5:34:51 PM

Document Name: 139-149 Washington Street

Document Name Path: /Development/Development Projects/139-149 Washington Street

Origin Page Url: /projects/development-projects/139-149-washington-street

First Name: Bob

Last Name: Pessek

Organization: Allston Civic Association

Email: grilkpessek@verizon.net

Street Address: 9 High Rock Way #1

Address Line 2:

City: Allston

State: MA

Phone: (617) 562-0390

Zip: 02134

Comments: This will b brief, because of the uncertainty of the zoning issues involved in this project and the adjacent St. **BP 01**
Gabriel's development. In short, 139-149 Washington St., as presented, has too many units, and not enough required **BP 02**
home ownership or open space. A poorly planned use of urban space that seems to strengthen the stereo type of developers who don't care about the community in which the project is located, but are most interested in maximizing profit. As to the architecture, the "look" of the building, there is not enough information available to make comment. But the most frustrating aspect of the combined St. Gab's and this project is the zoning. Will there be a PDA? What will be the yardstick by which anyone can judge or comment on the projects? And this is as both of them move forward. Not a shining moment for the shiny, new BPDA.

PMContact: lance.campbell@boston.gov

BOB PESSEK

BP 01 Density

The Proponent has reduced the overall density of the Project from 250 units to 210 units. This reduction of 40 units is fully attributable to a reduction in the number of rental units. The prior unit composition was 220 rental units and 30 home-ownership units. The revised unit mix proposed in this DPIR is 180 rental units and 30 home-ownership units. Home-ownership units represent over 14.3% of the total units in the Project, up from 12.0% in the PNF filed in October 2016. The Proponent will continue to explore ways to incorporate additional home-ownership units, but it should be noted that the amount of home-ownership units is driven by the amount of parking available to the building, and the ability to maintain at least one parking space per unit.

BP 02 Home-ownership and Open Space

Changes to the Project since filing the PNF, as described in Section 1.4, include a reduction in the number of rental units and an increase in open space on the site.

Lance Campbell <lance.campbell@boston.gov>

139-149 WASHINGTON STREET

1 message

Diane Kline <klinelopa@msn.com> Sat, Dec 10, 2016 at 4:23 PM
To: "lance.campbell@boston.gov" <lance.campbell@boston.gov>

Lance Campbell, Senior Project Manager
Boston Planning & Development Agency

Dear Lance:

I would like to submit the following comments with regard to the proposed development at 139-149 Washington Street in Brighton:

The developer, Avalon Bay, has proposed 220 rental units and 30 condominiums. Even with the adjusted FAR of 2.1, this project is still far too dense. With 250 proposed parking spaces, parking for residents of this **DK 01** development is inadequate and neighbors are rightly concerned that many more cars will be competing for the few street spaces that exist in the neighborhood. There is no visitor parking provided and traffic continues to **DK 02** be a major concern.

The developer has increased the front setback from 25 to 45 feet but side setbacks are still inadequate. The **DK 03** existing green space is an internal courtyard and is for the benefit of the residents only. If the courtyard were decreased, increased side setbacks could be accommodated and the resulting green space enjoyed by both residents and neighbors.

Access to the property is problematic and has yet to be resolved. The developer is investigating a direct **DK 04** entrance from Washington Street and having conversations about the use of Fidelis Way. Access needs to be decided before further consideration of this proposal can be made.

There are too few opportunities for people to own their own homes in Brighton, and the creation of home **DK 05** ownership opportunities is paramount. With just 30 of the 250 proposed units designed as condos, this development does not address this problem in a satisfactory way. The community is consistent in its insistence that developers provide greater opportunity for home ownership. Deed restrictions requiring buyers **DK 06** live in their units and not rent them have been discussed and should be fully investigated by the developer.

The developer is complying with the Inclusionary Development Policy by providing 13% on-site affordable **DK 07** units. In today's market with sky high prices on property, the number of affordable units should be increased to allow for greater diversity of both tenants and home owners.

Before this project or the abutting St. Gabriel's project proceed, the zoning for both these sites needs to be resolved. After one very contentious public meeting, it is the opinion of the vast majority of neighbors that this issue needs to be resolved before this project can go forward.

Thanks,
Diane Kline
Radnor Road, Brighton

DIANE KLINE

DK 01 Density

The FAR for the Project has been further reduced to 1.7.

DK 02 Parking and Traffic

The Project has added approximately ten visitor parking spaces, and increased the parking ratio from 1.0 spaces per unit to 1.05 spaces per unit.

DK 03 Green Space

The side setbacks are currently at 35′ from the property line along Monastery Driveway, 50′ from the adjacent building and approximately 25′ along Fidelis Way. The 25′ setback on Fidelis Way allows for the widening of Fidelis Way to include a widened sidewalk, street trees, two-way traffic and proper parallel parking on both sides of the street. The courtyard has been opened to face the adjacent landscaped space and allows for an increase in open space available to the public.

DK 04 Site Access

As described in Section 2.1, all access for the Project will now be from Fidelis Way, and the existing curb cut on Washington Street will be eliminated.

DK 05 Home-ownership

Home-ownership units as a percent of total units has increased. The Proponent is exploring opportunities for additional home-ownership units.

DK 06 Owner-occupied Condos

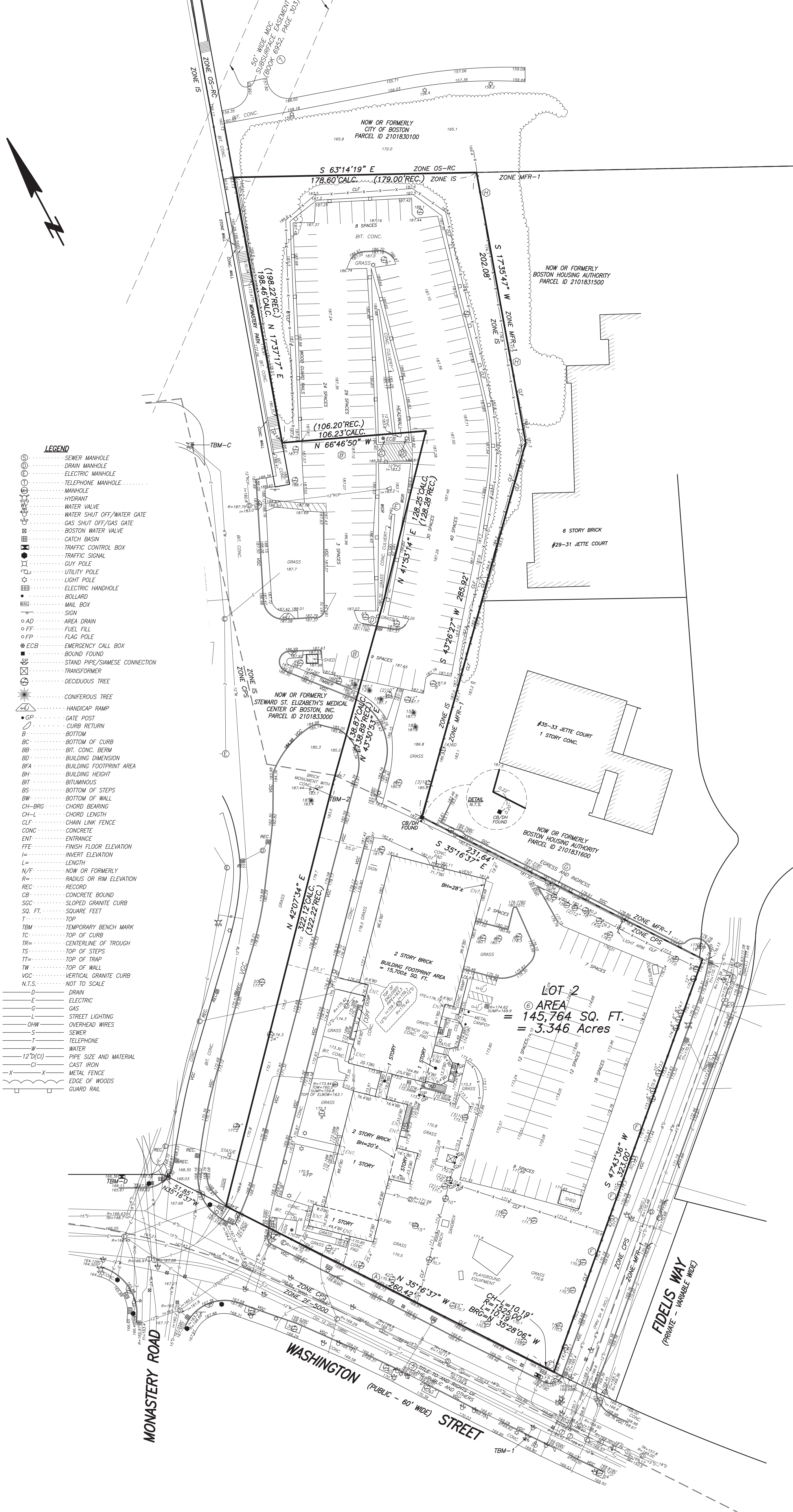
The Proponent will commit to at least 50% of the condominiums being restricted to owner-occupied units. The Proponent will continue to study what the appropriate mechanism is to enforce owner occupancy.

DK 07 Affordable Housing

The Proponent is open to discussing additional community benefits as related to affordability with the IAG.

Appendix A

Site Survey



NOTES:

1) BENCH MARK INFORMATION:

BENCH MARK USED:
RIGHT OUTER CORNER LOWER STONE STEP (R.O.C.L.S.S.) AT #1408 COMMONWEALTH AVENUE. ELEVATION=74.61

TEMPORARY BENCH MARKS SET:

TBM-C: X-CUT ON RIGHT FRONT CAP BOLT OF HYDRANT LOCATED AT WEST SIDE OF LOCUS, AS SHOWN HEREON. ELEVATION = 189.34

TBM-D: NORTHERLY CORNER OF CONCRETE PAD FOR TRAFFIC CONTROL BOX LOCATED AT NORTHERLY CORNER OF INTERSECTION OF WASHINGTON STREET AND MONASTERY ROAD, AS SHOWN HEREON. ELEVATION = 167.02

TBM-1: LEFT BOLT OVER MAIN OUTLET OF HYDRANT LOCATED ON SOUTHWESTERLY SIDE OF WASHINGTON STREET AT INTERSECTION OF FIDELIS WAY, AS SHOWN HEREON. ELEVATION = 171.86

TBM-2: SCRIBE SET ON EASTERLY CORNER OF BRICK MONUMENT WITH CONCRETE CAP LOCATED AT MEDIAN AT WEST SIDE OF LOCUS, AS SHOWN HEREON. ELEVATION = 187.48

2) ELEVATIONS REFER TO BOSTON CITY BASE.

3) CONTOUR INTERVAL EQUALS ONE (1) FOOT.

4) UTILITY INFORMATION SHOWN IS BASED ON BOTH A FIELD SURVEY AND PLANS OF RECORD. THE LOCATIONS OF UNDERGROUND PIPES AND CONDUITS HAVE BEEN DETERMINED FROM THE AFOREMENTIONED RECORD PLANS AND ARE APPROXIMATE ONLY. WE CANNOT ASSUME RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES THAT ARE OMITTED OR INACCURATELY SHOWN ON SAID RECORD PLANS, SINCE SUB-SURFACE UTILITIES CANNOT BE VISIBLY VERIFIED. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED AND THE ACTUAL LOCATION OF SUB-SURFACE STRUCTURES SHOULD BE DETERMINED IN THE FIELD. CALL, TOLL FREE, THE DIG SAFE CALL CENTER AT 1-888-344-7233 SEVENTY-TWO HOURS PRIOR TO EXCAVATION.

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

6) UNDERGROUND ELECTRIC LINES SHOWN HEREON COMPILED FROM BOSTON WATER AND SEWER COMMISSION RECORD PLANS. ELECTRIC COMPANY FOUND NO RECORD ELECTRIC INFORMATION IN THIS AREA.

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

ROBERT G. APPLEGATE, PLS (MA# 28514) DATE

EXISTING CONDITIONS PLAN OF LAND
139-149 WASHINGTON STREET
BOSTON, MASS.

FELDMAN LAND SURVEYORS
112 SHAWMUT AVENUE
BOSTON, MASS. 02118

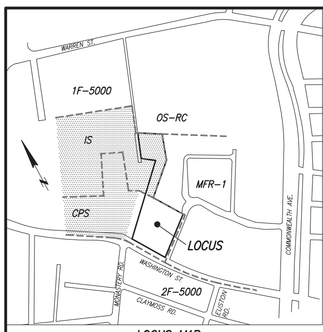
APRIL 1, 2016
PHONE: (617)357-9740
www.feldmansurveyors.com

FELDMAN
LAND SURVEYORS

30 0 15 30 60 120
SCALE: 1"=30'

RESEARCH	FIELD CHIEF	PROJ MGR	APPROVED	SHEET NO. 1 OF 1
CALC	CADD	FIELD CHECKED	CRD FILE	JOB NO. 15040

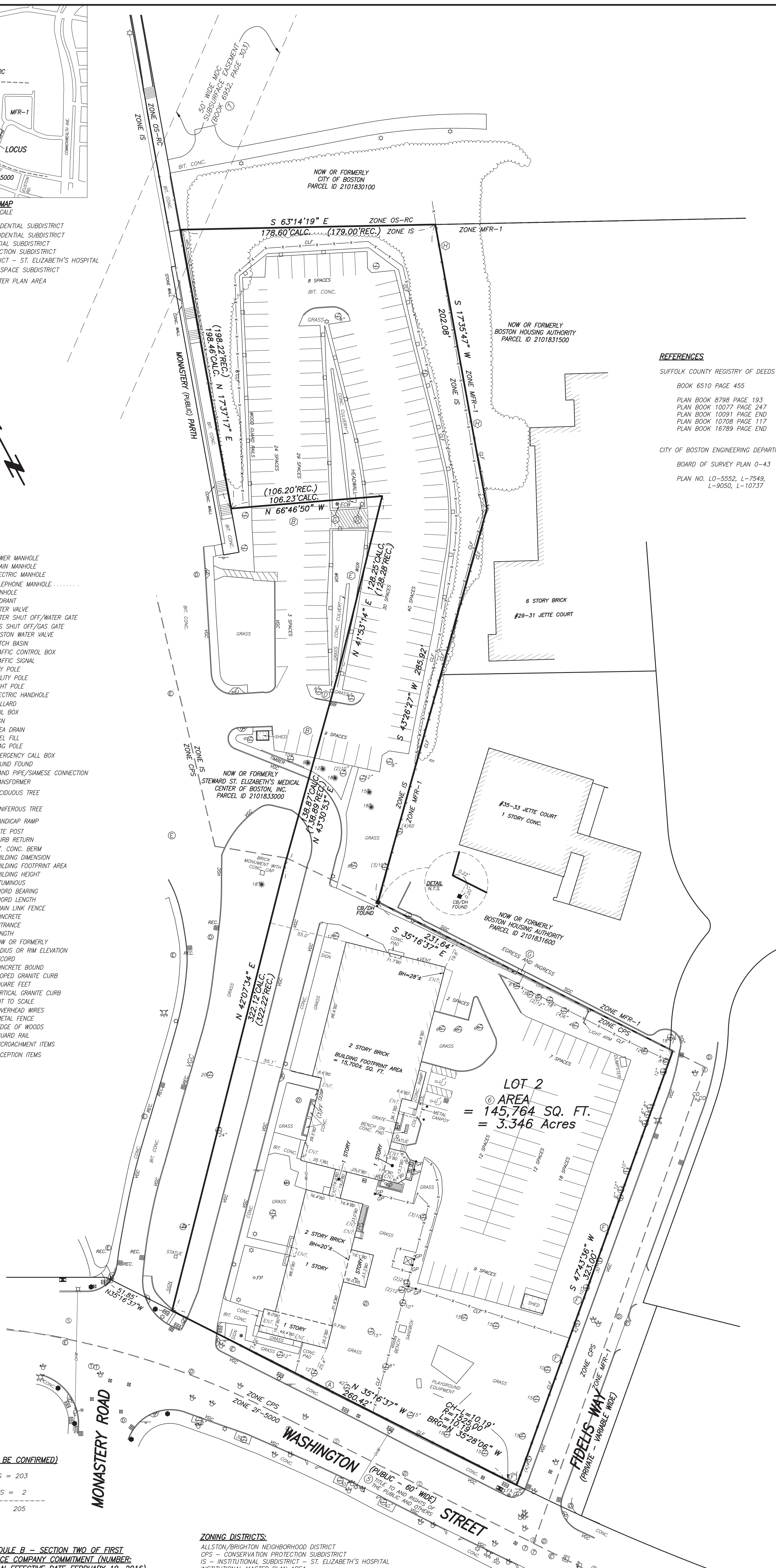
FILENAME: S:\PROJECTS\15000s\15040\DWG\15040.dwg



LOCUS MAP

NOT TO SCALE

(1F-5000) – ONE-FAMILY RESIDENTIAL SUBDISTRICT
(2F-5000) – TWO-FAMILY RESIDENTIAL SUBDISTRICT
(MFR) – MULTIFAMILY RESIDENTIAL SUBDISTRICT
(CPS) – CONSERVATION PROTECTION SUBDISTRICT
(IS) – INSTITUTIONAL SUBDISTRICT – ST. ELIZABETH'S HOSPITAL
(OS-RC) – RECREATION OPEN SPACE SUBDISTRICT
– INSTITUTIONAL MASTER PLAN AREA



LEGEND

- SEWER MANHOLE
- DRAIN MANHOLE
- ELECTRIC MANHOLE
- TELEPHONE MANHOLE
- MANHOLE
- HYDRANT
- WATER VALVE
- WATER SHUT OFF/WATER GATE
- GAS SHUT OFF/GAS GATE
- BOSTON WATER VALVE
- CATCH BASIN
- TRAFFIC CONTROL BOX
- TRAFFIC SIGNAL
- GUY POLE
- UTILITY POLE
- LIGHT POLE
- ELECTRIC HANDHOLE
- BOLLARD
- MAIL BOX
- SIGN
- AD ········· AREA DRAIN
- FF ········· FUEL FILL
- FP ········· FLAG POLE
- ECB ········· EMERGENCY CALL BOX
- BOUND FOUND
- SP ········· STAND PIPE/SIAMESE CONNECTION
- TRANSFORMER
- DECIDUOUS TREE
- CONIFEROUS TREE
- HANDICAP RAMP
- GP ········· GATE POST
- CURB RETURN
- BB ········· BIT. CONC. BERM
- BD ········· BUILDING DIMENSION
- BFA ········· BUILDING FOOTPRINT AREA
- BH ········· BUILDING HEIGHT
- BIT ········· BITUMINOUS
- CH-BRG ········· CHORD BEARING
- CH-L ········· CHORD LENGTH
- CLF ········· CHAIN LINK FENCE
- CONC ········· CONCRETE
- ENT ········· ENTRANCE
- L= ········· LENGTH
- N/F ········· NOW OR FORMERLY
- R= ········· RADIUS OR RIM ELEVATION
- REC ········· RECORD
- CB ········· CONCRETE BOUND
- SGC ········· SLOPED GRANITE CURB
- SQ. FT. ········· SQUARE FEET
- VGC ········· VERTICAL GRANITE CURB
- N.T.S. ········· NOT TO SCALE
- OHW ········· OVERHEAD WIRES
- X ········· METAL FENCE
- EDGE OF WOODS
- GUARD RAIL
- A ········· ENCROACHMENT ITEMS
- # ········· EXCEPTION ITEMS

REFERENCES

SUFFOLK COUNTY REGISTRY OF DEEDS

BOOK 6510 PAGE 455

PLAN BOOK 8798 PAGE 193
PLAN BOOK 10077 PAGE 247
PLAN BOOK 10091 PAGE END
PLAN BOOK 10708 PAGE 117
PLAN BOOK 16789 PAGE END

CITY OF BOSTON ENGINEERING DEPARTMENT

BOARD OF SURVEY PLAN 0-43

PLAN NO. LO-5552, L-7549,
L-9050, L-10737

BOUNDARY DESCRIPTIONS: (PER SCHEDULE A OF FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT (NUMBER: 3020-775270) HAVING AN EFFECTIVE DATE FEBRUARY 19, 2016)

REAL PROPERTY IN THE CITY OF BOSTON, COUNTY OF SUFFOLK, COMMONWEALTH OF MASSACHUSETTS, DESCRIBED AS FOLLOWS:

THE LAND REFERRED TO AS LOT #2 AS SHOW ON A PLAN OF LAND IN BOSTON MASS (BRIGHTON DISTRICT) DATED DEC 21, 1948 BY WILLIAM S. CROCKER AND RECORDED AT BOOK # 6510, PAGE # 454.

BOUNDARY DESCRIPTIONS: (PER SURVEY)

A CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF BOSTON, BRIGHTON DISTRICT, SUFFOLK COUNTY, COMMONWEALTH OF MASSACHUSETTS, BEING BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE NORTHEASTERLY SIDELINE OF WASHINGTON STREET 51.85 FEET SOUTHEASTERLY FROM AN ANGLE POINT; THENCE RUNNING BY LAND NOW OR FORMERLY OF STEWARD ST. ELIZABETH'S MEDICAL CENTER OF BOSTON, INC. N 42°07'34" E, A DISTANCE OF 322.12 FEET TO A POINT;

THENCE TURNING AND RUNNING BY SAID LAND N 43°30'53" E, A DISTANCE OF 138.87 FEET TO A POINT;

THENCE TURNING AND RUNNING BY SAID LAND N 41°53'14" E, A DISTANCE OF 128.25 FEET TO A POINT;

THENCE TURNING AND RUNNING BY SAID LAND N 66°46'50" W, A DISTANCE OF 106.23 FEET TO THE EASTERLY SIDELINE OF MONASTERY PATH;

THENCE TURNING AND RUNNING ALONG SAID EASTERLY SIDELINE OF MONASTERY PATH N 17°37'17" E, A DISTANCE OF 198.46 FEET TO A POINT;

THENCE TURNING AND RUNNING BY LAND NOW OR FORMERLY OF CITY OF BOSTON S 63°14'19" E, A DISTANCE OF 178.60 FEET TO A POINT;

THENCE TURNING AND RUNNING BY LAND NOW OR FORMERLY OF BOSTON HOUSING AUTHORITY S 17°35'47" W, A DISTANCE OF 202.08 FEET TO A POINT;

THENCE TURNING AND RUNNING BY SAID LAND OF BOSTON HOUSING AUTHORITY S 43°26'27" W, A DISTANCE OF 285.92 FEET TO A POINT;

THENCE TURNING AND RUNNING BY THE SAID LAND OF BOSTON HOUSING AUTHORITY AND BY FIDELIS WAY S 35°16'37" E, A DISTANCE OF 231.64;

THENCE TURNING AND RUNNING BY THE WESTERLY SIDELINE OF SAID FIDELIS WAY S 47°43'36" W, A DISTANCE OF 323.00 FEET TO THE NORTHEASTERLY SIDELINE OF WASHINGTON;

THENCE TURNING AND RUNNING ALONG SAID NORTHEASTERLY SIDELINE OF WASHINGTON STREET ON A CURVE TO THE RIGHT, HAVING A RADIUS OF 1525.00 FEET, AN ARC LENGTH OF 10.19 FEET, A CHORD LENGTH OF 10.19 FEET, AND A CHORD BEARING OF N 35°28'06" W TO A POINT OF TANGENCY;

THENCE RUNNING ALONG SAID NORTHEASTERLY SIDELINE OF WASHINGTON STREET N 35°16'37" W, A DISTANCE OF 260.42 FEET TO THE POINT OF BEGINNING.

CONTAINS AND AREA OF 145,764 SQUARE FEET, OR 3.346 ACRES.

LIST OF VISIBLE ENCROACHMENTS:

- (A) – CHAIN LINE FENCE ENCROACHES 0.2' INTO WASHINGTON STREET.
- (B) – PARKING SPACES ENCROACH INTO ABUTTING LOT AT WESTERLY BOUNDARY.
- (C) – EMERGENCY CALL BOX AT ABUTTING LOT AT WESTERLY BOUNDARY
- (D) – TWO LIGHT POLES AT ABUTTING LOT AT WESTERLY BOUNDARY.
- (E) – GUARDRAIL ENCROACH INTO ABUTTING LOT AT WESTERLY BOUNDARY.
- (F) – CHAIN LINK FENCE ENCROACHES 0.1'–0.4' INTO FIDELIS WAY AT VARIOUS LOCATIONS.
- (G) – EGRESS AND INGRESS BETWEEN ABUTTING LOT
- (H) – CHAIN LINK FENCES CROSS THE EASTERLY BOUNDARY LINE AT VARIOUS LOCATIONS.

NOTES:

1) BY GRAPHIC PLOTTING ONLY, THE PARCEL SHOWN HEREON LIES WITHIN A ZONE "X" (UNSHADED), AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (F.E.M.A) FLOOD INSURANCE RATE MAP (F.I.R.M.) FOR SUFFOLK COUNTY, MASSACHUSETTS, MAP NUMBER 25025C0057G, CITY OF BOSTON COMMUNITY NUMBER 250286, PANEL NUMBER 0057G, HAVING AN EFFECTIVE DATE OF SEPTEMBER 25, 2009.

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

3) THE PROPERTY DESCRIBED AND SHOWN ON THE SURVEY IS THE SAME PROPERTY SHOWN ON FIRST AMERICAN TITLE INSURANCE COMPANY'S COMMITMENT No. 3020-775270.

4) NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS WAS OBSERVED.

5) NO EVIDENCE OF STREET OR SIDEWALK CONSTRUCTION OR REPAIRS WAS OBSERVED.

TO: FIRST AMERICAN TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 7(A), 7(B)(1), 7(C), 8, 9, 10(A), 13, 14, 16, 17, 19 AND 20 OF TABLE A THEREOF. THE FIELDWORK WAS COMPLETED ON APRIL 1, 2016.

FELDMAN LAND SURVEYORS

KARL S McCARTHY, PLS (MA# 38714) DATE

PARKING SUMMARY: (TO BE CONFIRMED)

REGULAR PARKING SPACES = 203

HANDICAP PARKING SPACES = 2

TOTAL PARKING SPACES = 205

EXCEPTIONS: (PER SCHEDULE B – SECTION TWO OF FIRST AMERICAN TITLE INSURANCE COMPANY COMMITMENT (NUMBER: 3020-775270) HAVING AN EFFECTIVE DATE FEBRUARY 19, 2016)

5. TITLE TO AND RIGHTS OF THE PUBLIC AND OTHERS ENTITLED THERETO IN AND TO THOSE PORTIONS OF THE INSURED PREMISES LYING WITHIN THE BOUNDS OF ADJACENT STREETS, ROADS, AND WAYS. (AS SHOWN HEREON)

6. THE EXACT ACREAGE OR SQUARE FOOTAGE BEING OTHER THAN AS STATED SCHEDULE A OR THE PLAN(S) THEREIN REFERRED TO. (AS SHOWN HEREON)

7. TAKING OF PERMANENT EASEMENT (CONSTRUCT, REPAIR, REPLACE AND FOREVER MAINTAIN TUNNEL FOR CONVEYANCE OF WATER, IN, THROUGH AND UNDER LOCUS AND OTHERS) BY THE METROPOLITAN DISTRICT COMMISSION IN THE NAME AND BEHALF OF THE COMMONWEALTH OF MASSACHUSETTS, DATED APRIL 15, 1954 AND RECORDED ON APRIL 23, 1954 AT BOOK # 6952, PAGE # 303. [PLAN # CT-55] (AS SHOWN HEREON)

ZONING DISTRICTS:

ALLSTON/BRIGHTON NEIGHBORHOOD DISTRICT
CPS – CONSERVATION PROTECTION SUBDISTRICT
IS – INSTITUTIONAL SUBDISTRICT – ST. ELIZABETH'S HOSPITAL
INSTITUTIONAL MASTER PLAN AREA

DIMENSIONAL REQUIREMENTS:

	CPS	IS
MAXIMUM FLOOR AREA RATIO	*0.3	2.0
MAXIMUM BUILDING HEIGHT	35 FEET	*55 FEET
MAXIMUM NUMBER OF DWELLING UNITS/ACRE	*3	--
MINIMUM LOT SIZE	*1 ACRE(RESIDENTIAL USE) NONE(OTHER USE)	NONE
MINIMUM LOT WIDTH	NONE	NONE
MINIMUM LOT FRONTAGE	NONE	NONE
MINIMUM FRONT YARD	*50 FEET	20 FEET
MINIMUM SIDE YARD	*50 FEET	NONE
MINIMUM REAR YARD	*50 FEET	NONE

* SEE ARTICLE 51 OF CITY OF BOSTON ZONING BY-LAWS

ALTA/NSPS LAND TITLE SURVEY
139-149 WASHINGTON STREET
BOSTON, MASS.

FELDMAN LAND SURVEYORS
112 SHAWMUT AVENUE
BOSTON, MASS. 02118

APRIL 1, 2016
PHONE: (617)357-9740
www.feldmansurveyors.com

FELDMAN
LAND SURVEYORS

30 0 15 30 60 120

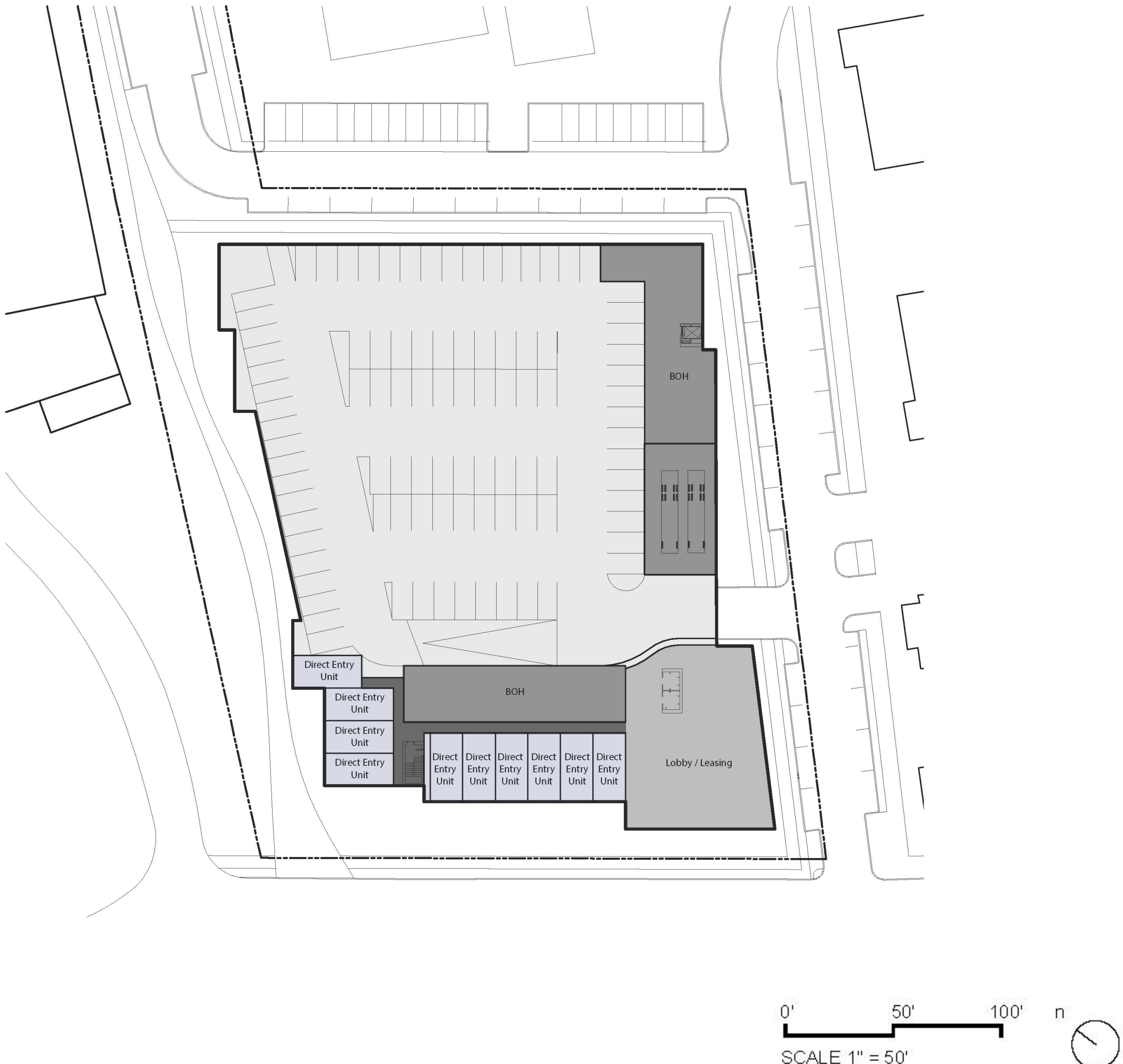
SCALE: 1"=30'

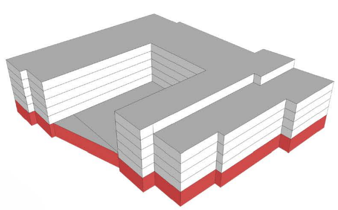
RESEARCH SMD	FIELD CHIEF FS	PROJ MGR SMD	APPROVED	SHEET NO. 1 OF 1
CALC GL	CADD GL	FIELD CHECKED	CRD FILE 15040	JOB NO. 15040

FILENAME: S:\PROJECTS\15000s\15040\DWG\15040.dwg

Appendix B

Floor Plans and Elevations

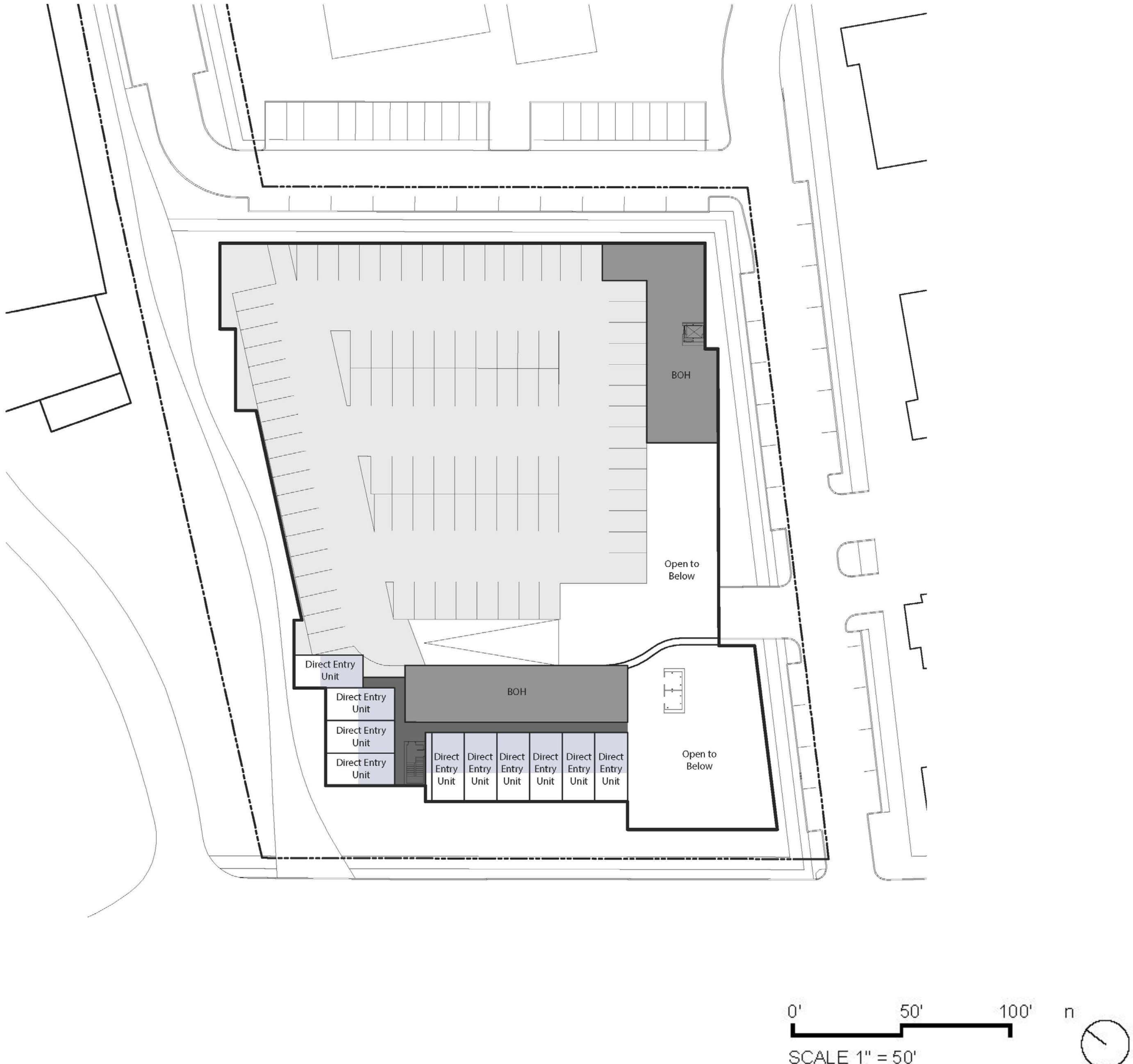


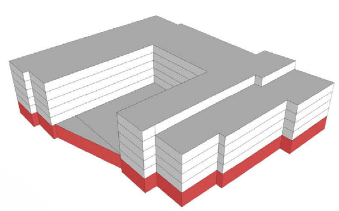


139-149 Washington Street   Boston, Massachusetts

cbt

Rental Building – Ground Level

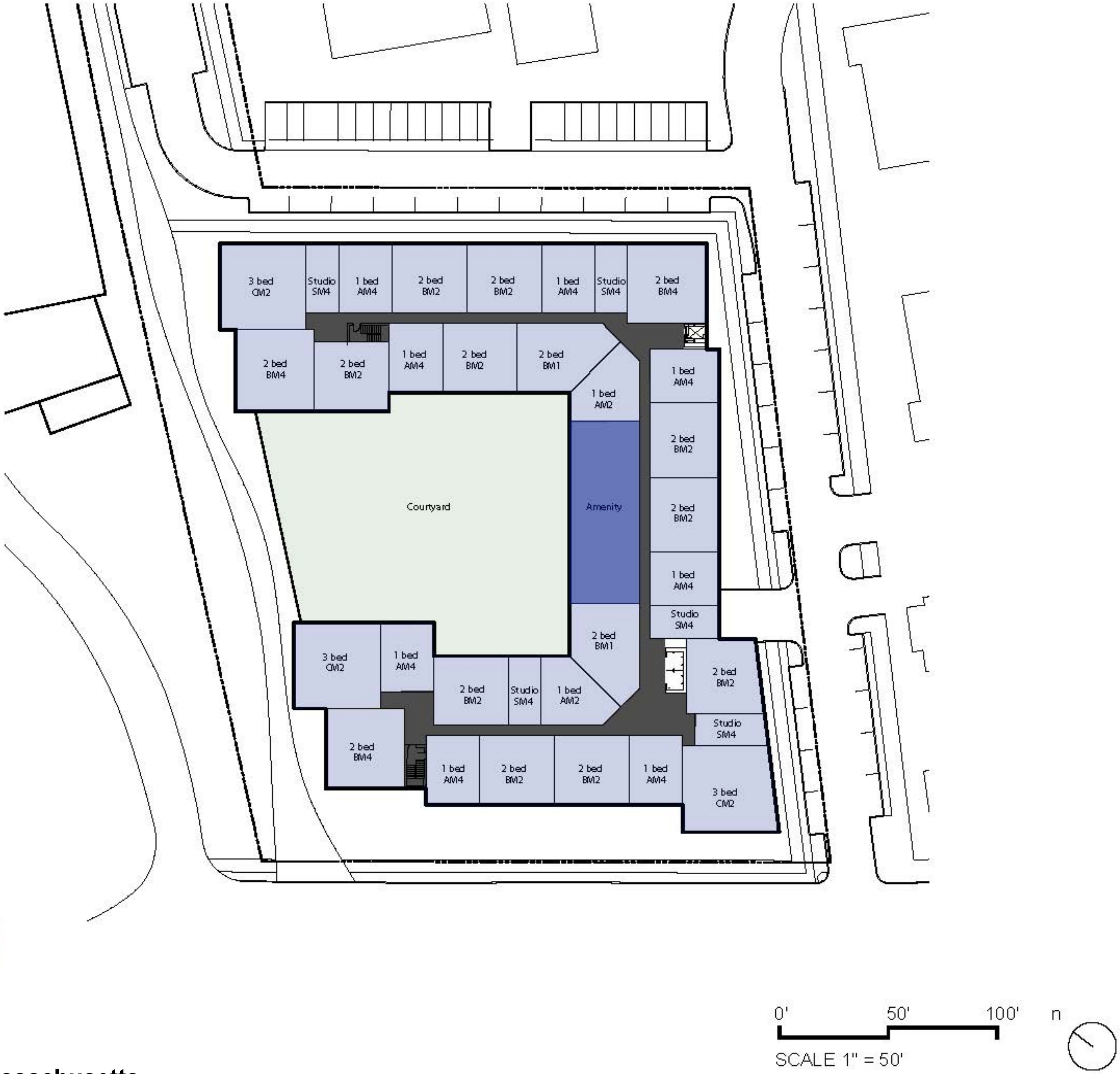


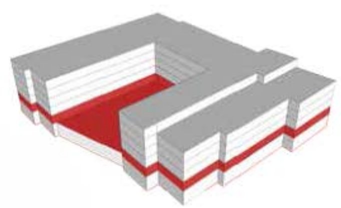


139-149 Washington Street Boston, Massachusetts

cbt

Rental Building – Mezzanine Level

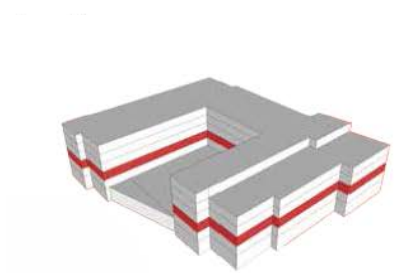




139-149 Washington Street   Boston, Massachusetts

cbt

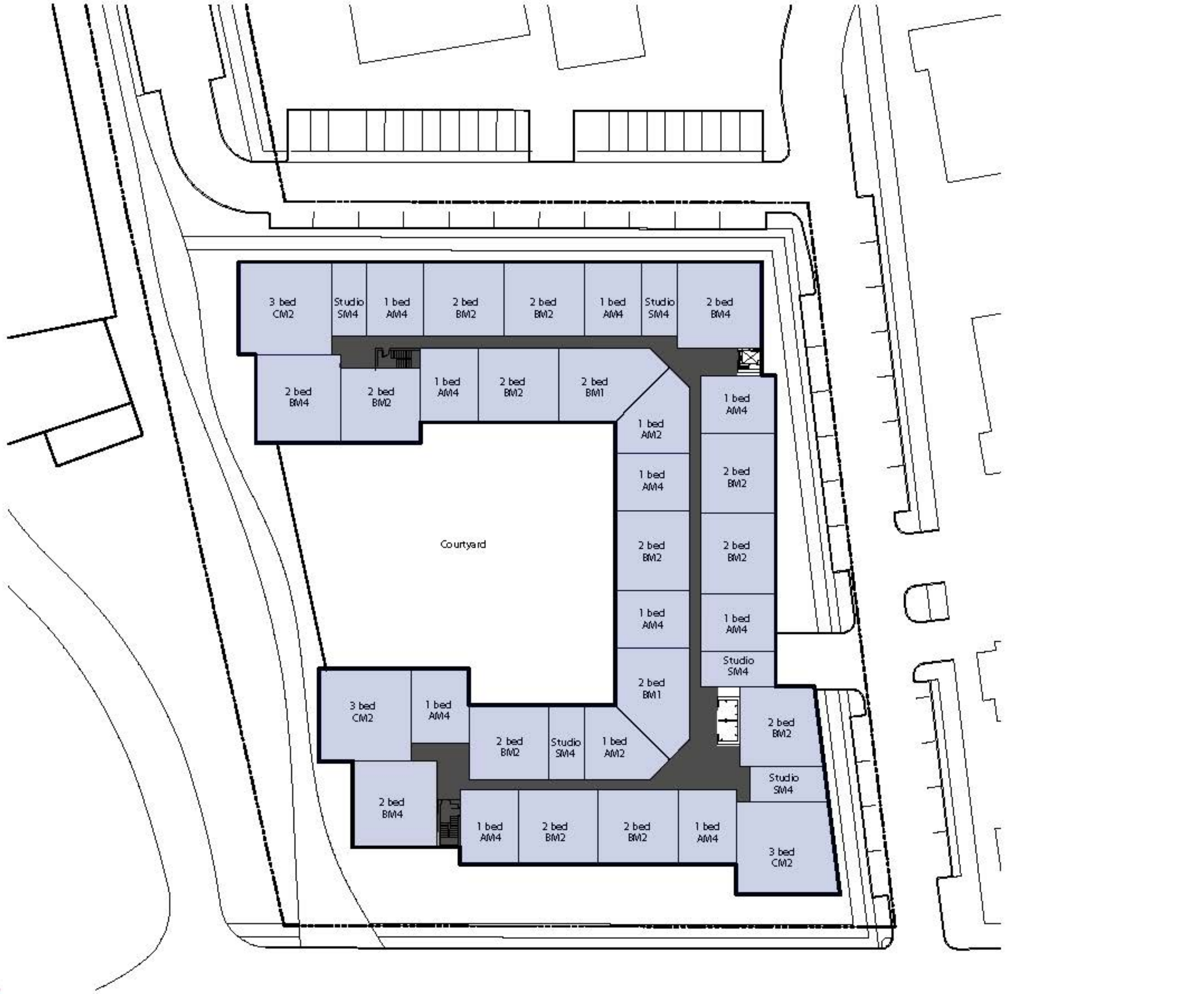
Rental Building – Level 1

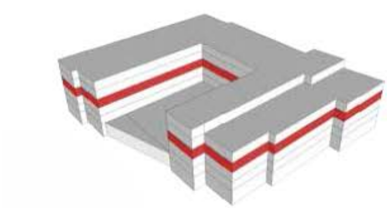


0' 50' 100' n

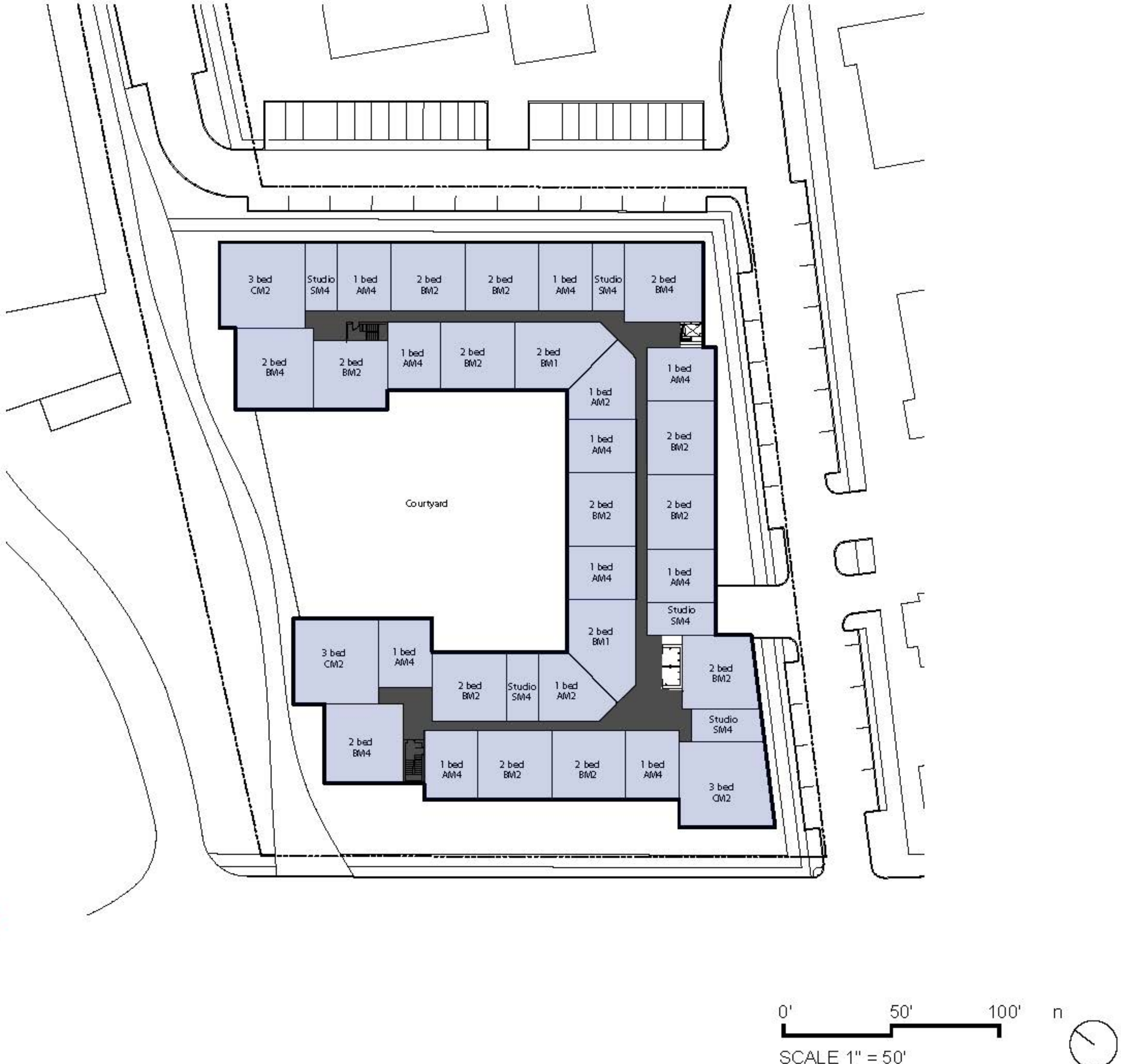
SCALE 1" = 50'

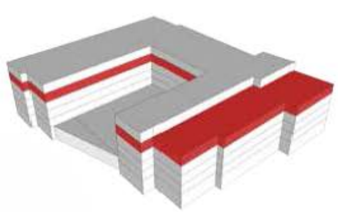
139-149 Washington Street Boston, Massachusetts





139-149 Washington Street Boston, Massachusetts

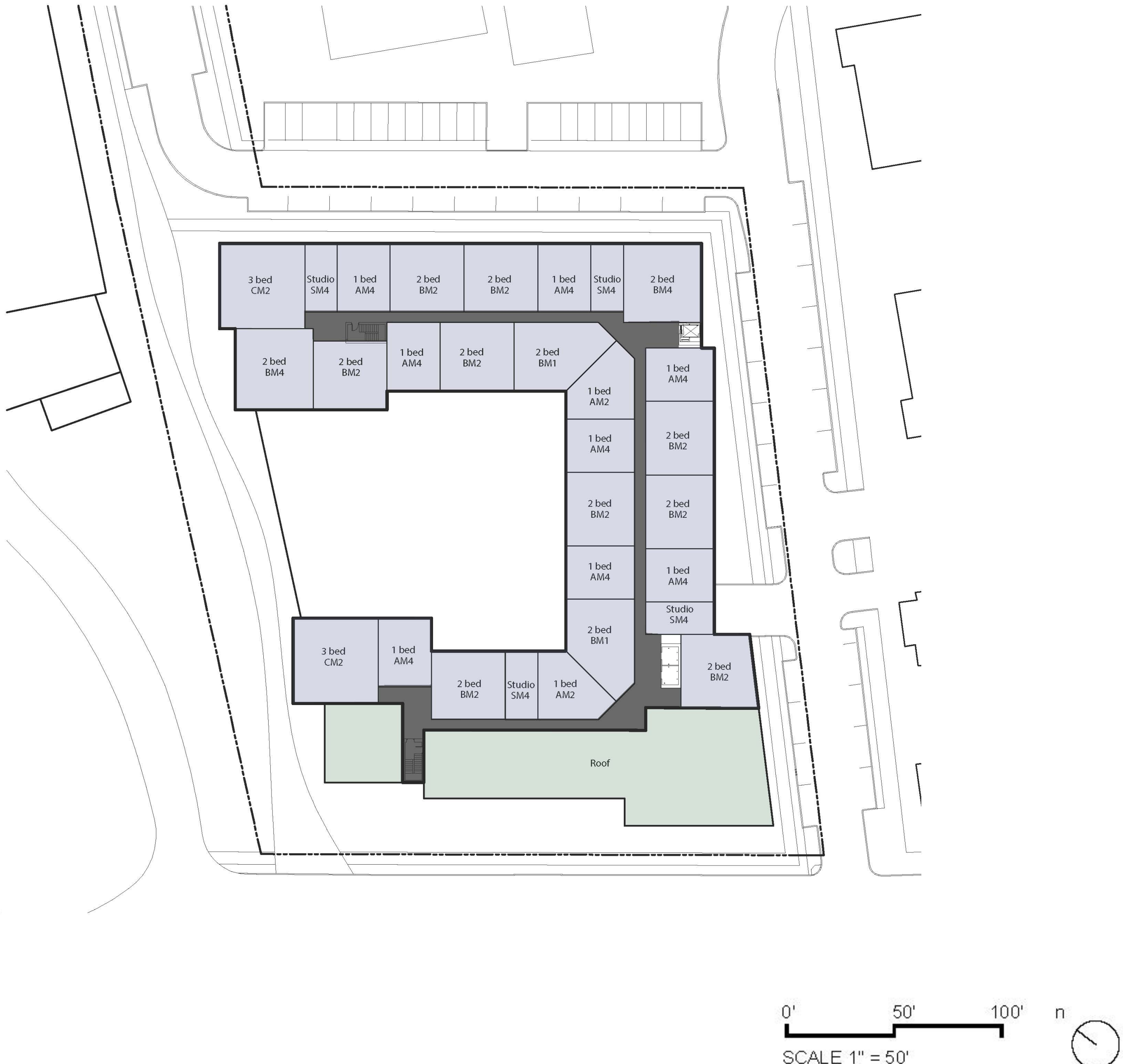


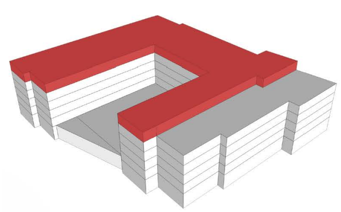


139-149 Washington Street   Boston, Massachusetts

cbt

Rental Building – Level 4

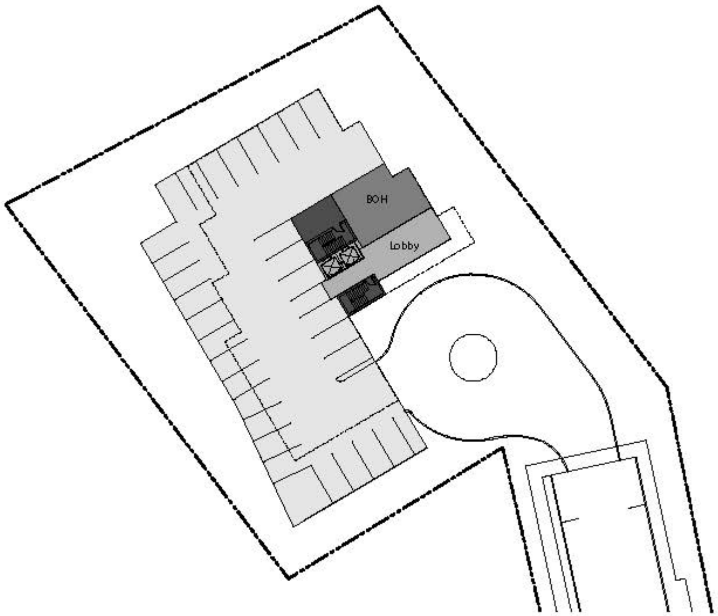


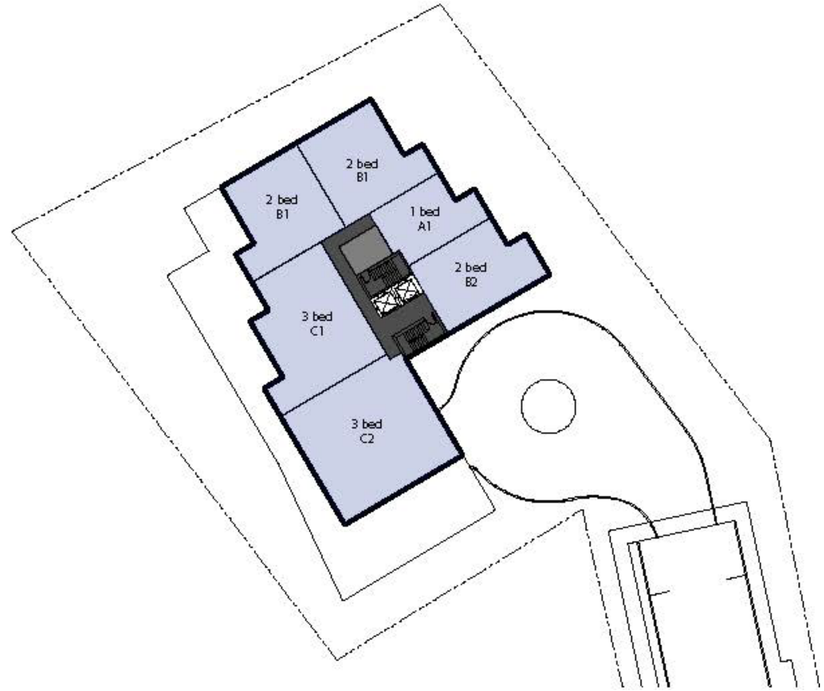


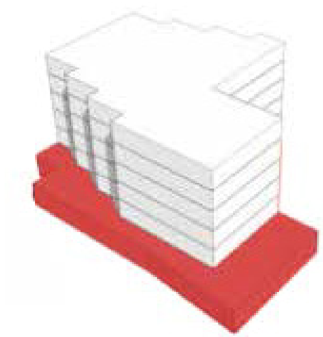
139-149 Washington Street **Boston, Massachusetts**

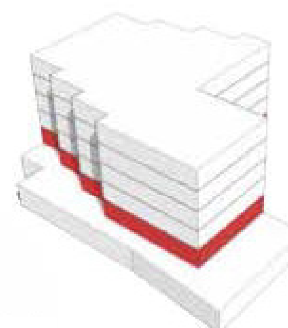
cbt

Rental Building – Level 5



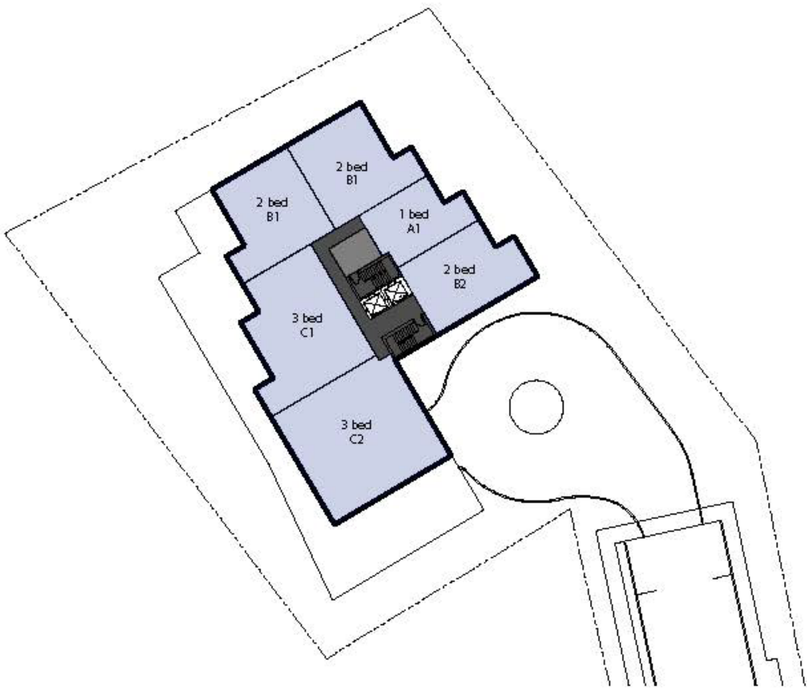


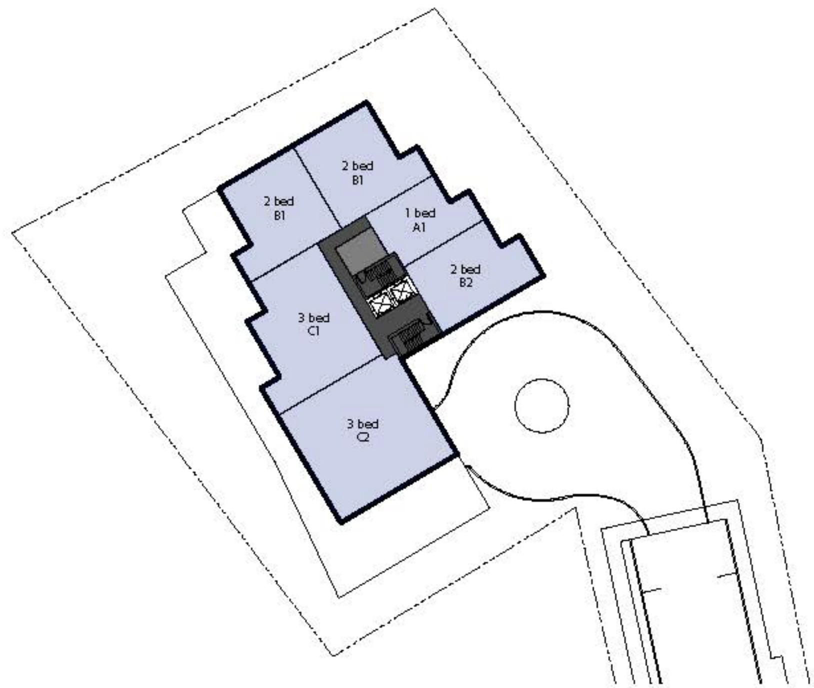


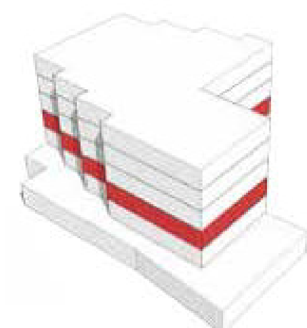


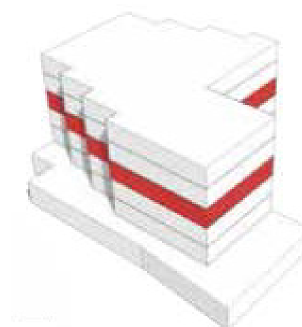
0' 50' 100'
SCALE 1" = 50'
n

139-149 Washington Street   Boston, Massachusetts









0' 50' 100'

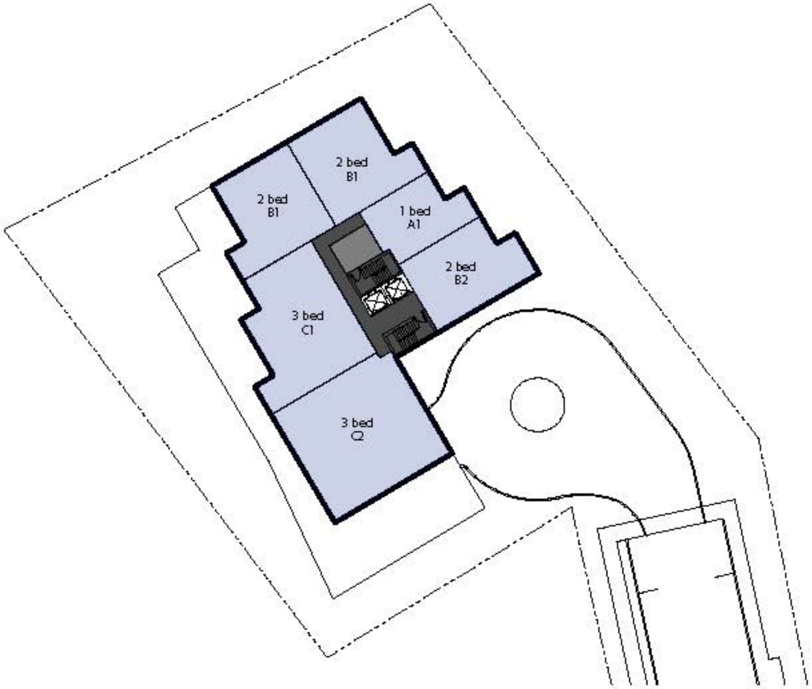
SCALE 1" = 50'

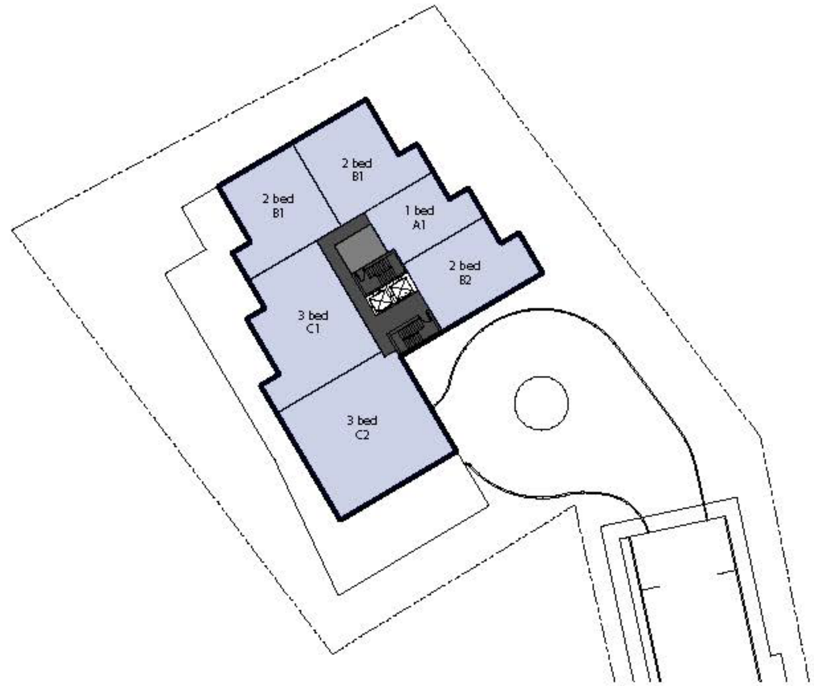
n

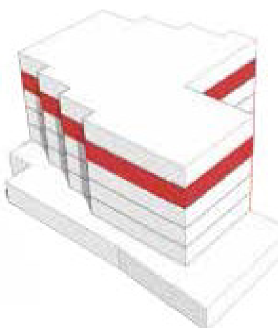
139-149 Washington Street Boston, Massachusetts

cbt

Home-ownership Building – Second and Third Floor Plans







0' 50' 100'
SCALE 1" = 50'
n

139-149 Washington Street Boston, Massachusetts

cbt

Home-ownership Building – Fourth and Fifth Floor Plans

139-149 Washington Street Boston, Massachusetts

cbt

Rental Building - East and West Elevations

139-149 Washington Street   Boston, Massachusetts

Rental Building - North and South Elevations

Appendix C

Transportation

TRANSPORTATION TECHNICAL APPENDIX

- TRIP GENERATION CALCULATIONS
- INTERSECTION CAPACITY ANALYSIS WORKSHEETS

TRIP GENERATION CALCULATIONS

Avalon - Brighton, MA
Trip Generation Assessment

HOWARD STEIN HUDSON
June 2017

xx HARD CODED TO BALANCE (Manually change formatting)

Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Assumed National Vehicle Occupancy Rate[1]	Unadjusted Person-Trips	Internal Capture Person-Trips[2]	Pass-By Person-Trips Share	Pass-By Person-Trips	Non-Primary Person-Trips	Primary Person Trips	Transit Share[3]	Transit Person-Trips	Walk/Bike/ Other Share[3]	Walk/ Bike/ Other Trips	Auto Share[3]	Auto Person-Trips	Assumed Local Auto Occupancy Rate[4]	Total Adjusted Auto Trips
Daily Peak Hour																				
Apartment[5]	180	Total		6.650	1,198	1.13	**1,354**	0	0%	0	0	**1,354**	19%	**258**	22%	**298**	59%	**798**	1.13	**706**
	units	In	50%	3.325	599	1.13	**677**	0	0%	0	0	**677**	19%	**129**	22%	**149**	59%	**399**	1.13	**353**
		Out	50%	3.325	599	1.13	**677**	0	0%	0	0	**677**	19%	**129**	22%	**149**	59%	**399**	1.13	**353**
Condominium[6]	30	Total		5.810	174	1.13	**196**	0	0%	0	0	**196**	19%	**38**	22%	**44**	59%	**114**	1.13	**100**
	units	In	50%	2.905	87	1.13	**98**	0	0%	0	0	**98**	19%	**19**	22%	**22**	59%	**57**	1.13	**50**
		Out	50%	2.905	87	1.13	**98**	0	0%	0	0	**98**	19%	**19**	22%	**22**	59%	**57**	1.13	**50**
Total		Total			**1,372**		**1,550**	**0**		**0**	0	**1,550**		**296**		**342**		**912**		**806**
		In			**686**		**775**	**0**		**0**	0	**775**		**148**		**171**		**456**		**403**
		Out			**686**		**775**	**0**		**0**	0	**775**		**148**		**171**		**456**		**403**
AM Peak Hour																				
Apartment[5]	180	Total		0.51	91	1.13	**102**	0	0%	0	0	**102**		**29**		**22**		**51**	1.13	**45**
	units	In	20%	0.102	18	1.13	**20**	0	0%	0	0	**20**	18%	**4**	30%	**6**	52%	**10**	1.13	**9**
		Out	80%	0.408	73	1.13	**82**	0	0%	0	0	**82**	30%	**25**	19%	**16**	51%	**41**	1.13	**36**
Condominium[6]	30	Total		0.44	13	1.13	**14**	0	0%	0	0	**14**		**4**		**3**		**7**	1.13	**6**
	units	In	17%	0.075	2	1.13	**2**	0	0%	0	0	**2**	18%	**0**	30%	**1**	52%	**1**	1.13	**1**
		Out	83%	0.365	11	1.13	**12**	0	0%	0	0	**12**	30%	**4**	19%	**2**	51%	**6**	1.13	**5**
Total		Total			**104**		**116**	**0**		**0**	0	**116**		**33**		**25**		**58**		**51**
		In			**20**		**22**	**0**		**0**	0	**22**		**4**		**7**		**11**		**10**
		Out			**84**		**94**	**0**		**0**	0	**94**		**29**		**18**		**47**		**41**
PM Peak Hour																				
Apartment[5]	180	Total		0.62	112	1.13	**126**	0	0%	0	0	**126**		**33**		**29**		**64**	1.13	**56**
	units	In	65%	0.403	73	1.13	**82**	0	0%	0	0	**82**	30%	**25**	19%	**16**	51%	**41**	1.13	**36**
		Out	35%	0.217	39	1.13	**44**	0	0%	0	0	**44**	18%	**8**	30%	**13**	52%	**23**	1.13	**20**
Condominium[6]	30	Total		0.52	15	1.13	**17**	0	0%	0	0	**17**		**4**		**4**		**9**	1.13	**8**
	units	In	67%	0.348	10	1.13	**11**	0	0%	0	0	**11**	30%	**3**	19%	**2**	51%	**6**	1.13	**5**
		Out	33%	0.172	5	1.13	**6**	0	0%	0	0	**6**	18%	**1**	30%	**2**	52%	**3**	1.13	**3**
Total		Total			**127**		**143**	**0**		**0**	0	**143**		**37**		**33**		**73**		**64**
		In			**83**		**93**	**0**		**0**	0	**93**		**28**		**18**		**47**		**41**
		Out			**44**		**50**	**0**		**0**	0	**50**		**9**		**15**		**26**		**23**

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Based on ITE Trip Generation Handbook, 3rd Edition method
3. Mode shares based on peak-hour BTD Data for Area 10
4. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates
5. ITE Trip Generation Manual, 9th Edition, LUC 220 (Apartment), average rate
6. ITE Trip Generation Manual, 9th Edition, LUC 230 (Residential Condominium/Townhouse), average rate

INTERSECTION CAPACITY ANALYSIS WORKSHEETS

Lane Group	EBT	EBR	EBR2	WBL2	WBL	WBT	NBL2	NBL	NBR	NEL	NER	NER2
Lane Configurations												
Traffic Volume (vph)	225	261	13	131	150	194	12	286	260	63	218	9
Future Volume (vph)	225	261	13	131	150	194	12	286	260	63	218	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	10	12	10	12	13	10	12	12	12
Grade (%)	0%					0%		0%		0%		
Storage Length (ft)		35			133			0	65	0	75	
Storage Lanes		1			2			1	1	1	1	
Taper Length (ft)					120			25		25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92							0.91	0.97	0.87	
Frt		0.850							0.850		0.850	
Flt Protected				0.950	0.950			0.950		0.950		
Satd. Flow (prot)	1559	1214	0	1458	1425	1294	0	1610	1317	1240	1381	0
Flt Permitted				0.950	0.950			0.950		0.644		
Satd. Flow (perm)	1559	1116	0	1458	1425	1294	0	1610	1199	818	1205	0
Right Turn on Red			Yes						Yes			No
Satd. Flow (RTOR)		109							185			
Link Speed (mph)	30					30		30		30		
Link Distance (ft)	401					588		1122		798		
Travel Time (s)	9.1					13.4		25.5		18.1		
Confl. Peds. (#/hr)			21						20	13		40
Confl. Bikes (#/hr)												3
Peak Hour Factor	0.87	0.87	0.87	0.84	0.84	0.84	0.88	0.88	0.88	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	4%	8%	4%	14%	11%	33%	3%	3%	31%	5%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)		0	0			0						
Mid-Block Traffic (%)	0%					0%		0%		0%		
Adj. Flow (vph)	259	300	15	156	179	231	14	325	295	67	232	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	315	0	156	179	231	0	339	295	67	242	0
Turn Type	NA	custom		Prot	Prot	NA	Perm	Prot	Perm	Perm	Perm	
Protected Phases	1			5	5	1 5		7				
Permitted Phases		1 7!					7!		7	6	6	
Detector Phase	1	1 7		5	5	1 5	7	7	7	6	6	
Switch Phase												
Minimum Initial (s)	10.0			8.0	8.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	24.0			15.0	15.0		20.0	20.0	20.0	25.0	25.0	
Total Split (s)	33.0			17.0	17.0		24.0	24.0	24.0	26.0	26.0	
Total Split (%)	33.0%			17.0%	17.0%		24.0%	24.0%	24.0%	26.0%	26.0%	
Maximum Green (s)	26.0			10.0	10.0		18.0	18.0	18.0	20.0	20.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0		3.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-3.0			-3.0	-3.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0			4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag				Lead	Lead					Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Minimum Gap (s)	2.0			2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Time Before Reduce (s)	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	C-Max			Max	Max		None	None	None	None	None	
Walk Time (s)	7.0						7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	10.0						7.0	7.0	7.0	12.0	12.0	
Pedestrian Calls (#/hr)	0						20	20	20	53	53	
Act Effct Green (s)	29.3	53.3		13.0	13.0	46.3		20.0	20.0	21.7	21.7	
Actuated g/C Ratio	0.29	0.53		0.13	0.13	0.46		0.20	0.20	0.22	0.22	
v/c Ratio	0.57	0.49		0.83	0.97	0.39		1.05	0.76	0.38	0.93	
Control Delay	35.9	12.3		62.5	90.4	10.5		104.9	28.6	40.6	79.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	35.9	12.3		62.5	90.4	10.5		104.9	28.6	40.6	79.5	
LOS	D	B		E	F	B		F	C	D	E	
Approach Delay	23.0					50.1		69.4		71.1		
Approach LOS	C					D		E		E		
Queue Length 50th (ft)	140	76		102	119	48		~238	65	37	152	
Queue Length 95th (ft)	214	139		#188	#226	69		#396	#185	79	#298	
Internal Link Dist (ft)	321					508		1042		718		
Turn Bay Length (ft)		35		133	133				65		75	
Base Capacity (vph)	457	645		189	185	599		322	387	179	265	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.57	0.49		0.83	0.97	0.39		1.05	0.76	0.37	0.91	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 45 (45%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 51.6 Intersection LOS: D
Intersection Capacity Utilization 68.5% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 633: Winship Street & Washington Street & Cambridge Street

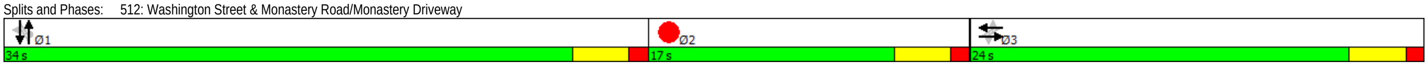
Ø1 (R)	Ø5	Ø6	Ø7
33 s	17 s	26 s	24 s

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations		✣			✣			✣			✣		
Traffic Volume (vph)	83	4	69	37	2	53	54	434	6	16	374	17	
Future Volume (vph)	83	4	69	37	2	53	54	434	6	16	374	17	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Grade (%)		0%			0%			0%			0%		
Storage Length (ft)	0		0	0		0	0		0	0		0	
Storage Lanes	0		0	0		0	0		0	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.98			0.98						1.00		
Frt		0.940			0.922			0.998			0.994		
Flt Protected		0.974			0.980			0.995			0.998		
Satd. Flow (prot)	0	1547	0	0	1464	0	0	1669	0	0	1635	0	
Flt Permitted		0.796			0.842			0.918			0.974		
Satd. Flow (perm)	0	1255	0	0	1255	0	0	1540	0	0	1595	0	
Right Turn on Red			No			No			Yes			Yes	
Satd. Flow (RTOR)								1			4		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		523			238			57			449		
Travel Time (s)		11.9			5.4			1.3			10.2		
Confl. Peds. (#/hr)	10		4	4		10							
Confl. Bikes (#/hr)												2	
Peak Hour Factor	0.77	0.77	0.77	0.59	0.59	0.59	0.86	0.86	0.86	0.87	0.87	0.87	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	2%	0%	0%	4%	0%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	
Parking (#/hr)													
Mid-Block Traffic (%)		0%			0%			0%			0%		
Adj. Flow (vph)	108	5	90	63	3	90	63	505	7	18	430	20	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	203	0	0	156	0	0	575	0	0	468	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0		8.0
Minimum Split (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0		17.0
Total Split (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0		17.0
Total Split (%)	32.0%	32.0%		32.0%	32.0%		45.3%	45.3%		45.3%	45.3%		23%
Maximum Green (s)	20.0	20.0		20.0	20.0		30.0	30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		4.0			4.0			4.0			4.0		
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max		None
Walk Time (s)													8.0
Flash Dont Walk (s)													5.0
Pedestrian Calls (#/hr)													5
Act Effct Green (s)		20.2			20.2			30.3			30.3		
Actuated g/C Ratio		0.33			0.33			0.49			0.49		
v/c Ratio		0.49			0.38			0.76			0.59		
Control Delay		23.1			20.8			23.0			16.6		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		23.1			20.8			23.0			16.6		
LOS		C			C			C			B		
Approach Delay		23.1			20.8			23.0			16.6		
Approach LOS		C			C			C			B		
Queue Length 50th (ft)		54			40			140			100		
Queue Length 95th (ft)		123			70			#418			274		
Internal Link Dist (ft)		443			158			1			369		
Turn Bay Length (ft)													
Base Capacity (vph)		412			412			761			789		
Starvation Cap Reductn		0			0			0			0		
Spillback Cap Reductn		0			0			0			0		
Storage Cap Reductn		0			0			0			0		
Reduced v/c Ratio		0.49			0.38			0.76			0.59		

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 61.4
Natural Cycle: 70
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 20.7 Intersection LOS: C
Intersection Capacity Utilization 71.7% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 512: Washington Street & Monastery Road/Monastery Driveway



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2	Ø6
Lane Configurations															
Traffic Volume (vph)	0	0	0	0	17	50	0	421	13	2	459	9			
Future Volume (vph)	0	0	0	0	17	50	0	421	13	2	459	9			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12			
Grade (%)		0%			0%			0%			0%				
Storage Length (ft)	0		0	0		0	0		0	0		0			
Storage Lanes	0		0	0		0	1		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped Bike Factor					0.78										
Frt					0.899			0.996			0.997				
Flt Protected															
Satd. Flow (prot)	0	0	0	0	1022	0	1710	1609	0	0	1455	0			
Flt Permitted											0.664				
Satd. Flow (perm)	0	0	0	0	1022	0	1710	1609	0	0	966	0			
Right Turn on Red			Yes			No			Yes			Yes			
Satd. Flow (RTOR)											1				
Link Speed (mph)		30			30			30			30				
Link Distance (ft)		486			472			87			526				
Travel Time (s)		11.0			10.7			2.0			12.0				
Confl. Peds. (#/hr)						66				142					
Confl. Bikes (#/hr)															
Peak Hour Factor	0.92	0.92	0.92	0.65	0.65	0.65	0.81	0.81	0.81	0.85	0.85	0.85			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	2%	2%	2%	0%	6%	5%	0%	6%	0%	100%	5%	11%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0			
Parking (#/hr)				0	0	0				0	0	0			
Mid-Block Traffic (%)		0%			0%			0%			0%				
Adj. Flow (vph)	0	0	0	0	26	77	0	520	16	2	540	11			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	0	0	0	103	0	0	536	0	0	553	0			
Turn Type					NA		Perm	NA		Perm	NA				
Protected Phases					1 6!			1 2 5 6!			5		1	2	6
Permitted Phases				1 6!			1 2 5 6!			5					
Detector Phase				1 6	1 6		1 2 5 6	1 2 5 6		5	5				
Switch Phase															
Minimum Initial (s)										10.0	10.0		8.0	5.0	6.0
Minimum Split (s)										25.0	25.0		21.0	20.0	21.0
Total Split (s)										56.0	56.0		23.0	20.0	21.0
Total Split (%)										46.7%	46.7%		19%	17%	18%
Maximum Green (s)										47.0	47.0		17.0	14.0	15.0
Yellow Time (s)										3.0	3.0		3.0	3.0	3.0
All-Red Time (s)										6.0	6.0		3.0	3.0	3.0
Lost Time Adjust (s)											0.0				
Total Lost Time (s)											9.0				
Lead/Lag										Lead	Lead		Lead	Lag	Lag
Lead-Lag Optimize?															Yes
Vehicle Extension (s)										2.0	2.0		2.0	4.0	2.0
Minimum Gap (s)										2.0	2.0		2.0	4.0	2.0
Time Before Reduce (s)										0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)										0.0	0.0		0.0	0.0	0.0
Recall Mode										Ped	Ped		C-Max	Ped	Ped
Walk Time (s)										7.0	7.0		8.0	7.0	7.0
Flash Dont Walk (s)										7.0	7.0		6.0	7.0	8.0
Pedestrian Calls (#/hr)										0	0		0	0	0
Act Effct Green (s)					38.0			120.0			47.0				
Actuated g/C Ratio					0.32			1.00			0.39				
v/c Ratio					0.32			0.33			1.46				
Control Delay					34.6			0.8			252.4				
Queue Delay					0.0			0.0			0.0				
Total Delay					34.6			0.8			252.4				
LOS					C			A			F				
Approach Delay					34.6			0.8			252.4				
Approach LOS					C			A			F				
Queue Length 50th (ft)					60			0			~590				
Queue Length 95th (ft)					76			0			#749				
Internal Link Dist (ft)		406			392			7			446				
Turn Bay Length (ft)															
Base Capacity (vph)					323			1609			378				
Starvation Cap Reductn					0			0			0				
Spillback Cap Reductn					0			0			0				
Storage Cap Reductn					0			0			0				
Reduced v/c Ratio					0.32			0.33			1.46				

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.46
Intersection Signal Delay: 120.4 — Intersection LOS: F
Intersection Capacity Utilization 53.4% — ICU Level of Service A
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 179: Washington Street & North Carriage Road

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø5
Lane Configurations															
Traffic Volume (vph)	0	843	24	29	99	450	0	51	433	45	90	328	44		
Future Volume (vph)	0	843	24	29	99	450	0	51	433	45	90	328	44		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	11	12	12	11	11	12	12	16	12	12	16	12		
Grade (%)		0%				0%			0%			0%			
Storage Length (ft)	0		0		102		0	0		0	0		0		
Storage Lanes	0		0		1		0	1		0	1		0		
Taper Length (ft)	25				50			25			25				
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor		1.00			0.94										
Frt		0.996							0.986			0.982			
Flt Protected					0.950			0.950			0.950				
Satd. Flow (prot)	0	3063	0	0	1382	3020	0	1547	1798	0	1608	1793	0		
Flt Permitted					0.950			0.507			0.435				
Satd. Flow (perm)	0	3063	0	0	1305	3020	0	826	1798	0	736	1793	0		
Right Turn on Red			No				Yes			Yes			Yes		
Satd. Flow (RTOR)															
Link Speed (mph)		30				30			30			30			
Link Distance (ft)		540				483			50			87			
Travel Time (s)		12.3				11.0			1.1			2.0			
Confl. Peds. (#/hr)				81											
Confl. Bikes (#/hr)			1												
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.80	0.80	0.80	0.85	0.85	0.85		
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Heavy Vehicles (%)	0%	2%	5%	19%	12%	4%	0%	5%	6%	9%	1%	6%	7%		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0		
Parking (#/hr)															
Mid-Block Traffic (%)		0%				0%			0%			0%			
Adj. Flow (vph)	0	916	26	31	105	479	0	64	541	56	106	386	52		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	942	0	0	136	479	0	64	597	0	106	438	0		
Turn Type		NA		Prot	Prot	NA		Perm	NA		Perm	NA			
Protected Phases	2!	1 2!		6	6!	1 6!			1 2 5 6!			1 2 5 6!		1	5
Permitted Phases	1!							1 2 5 6!			1 2 5 6!				
Detector Phase	2	1 2		6	6	1 6		1 2 5 6	1 2 5 6		1 2 5 6	1 2 5 6			
Switch Phase															
Minimum Initial (s)	5.0			6.0	6.0									8.0	10.0
Minimum Split (s)	20.0			21.0	21.0									21.0	25.0
Total Split (s)	20.0			21.0	21.0									23.0	56.0
Total Split (%)	16.7%			17.5%	17.5%									19%	47%
Maximum Green (s)	14.0			15.0	15.0									17.0	47.0
Yellow Time (s)	3.0			3.0	3.0									3.0	3.0
All-Red Time (s)	3.0			3.0	3.0									3.0	6.0
Lost Time Adjust (s)					-2.0										
Total Lost Time (s)					4.0										
Lead/Lag	Lag			Lag	Lag									Lead	Lead
Lead-Lag Optimize?				Yes	Yes										
Vehicle Extension (s)	4.0			2.0	2.0									2.0	2.0
Minimum Gap (s)	4.0			2.0	2.0									2.0	2.0
Time Before Reduce (s)	0.0			0.0	0.0									0.0	0.0
Time To Reduce (s)	0.0			0.0	0.0									0.0	0.0
Recall Mode	Ped			Ped	Ped									C-Max	Ped
Walk Time (s)	7.0			7.0	7.0									8.0	7.0
Flash Dont Walk (s)	7.0			8.0	8.0									6.0	7.0
Pedestrian Calls (#/hr)	0			0	0									0	0
Act Effct Green (s)		39.0			17.0	40.0		120.0	120.0		120.0	120.0			
Actuated g/C Ratio		0.32			0.14	0.33		1.00	1.00		1.00	1.00			
v/c Ratio		0.95			0.70	0.48		0.08	0.33		0.14	0.24			
Control Delay		58.2			68.7	33.6		0.1	0.2		0.0	0.0			
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		58.2			68.7	33.6		0.1	0.2		0.0	0.0			
LOS		E			E	C		A	A		A	A			
Approach Delay		58.2				41.4			0.2						
Approach LOS		E				D			A						
Queue Length 50th (ft)		373			102	154		0	0		0	0			
Queue Length 95th (ft)		#508			#192	205		m0	m0		m0	m0			
Internal Link Dist (ft)		460				403			1			7			
Turn Bay Length (ft)					102										
Base Capacity (vph)		995			195	1006		826	1798		736	1793			
Starvation Cap Reductn		0			0	0		0	0		0	0			
Spillback Cap Reductn		0			0	0		0	4		0	0			
Storage Cap Reductn		0			0	0		0	0		0	0			
Reduced v/c Ratio		0.95			0.70	0.48		0.08	0.33		0.14	0.24			

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.46
Intersection Signal Delay: 29.1 Intersection LOS: C
Intersection Capacity Utilization 88.9% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 180: Washington Street & Commonwealth Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø6
Lane Configurations														
Traffic Volume (vph)	0	32	95	0	0	0	0	520	8	17	434	0		
Future Volume (vph)	0	32	95	0	0	0	0	520	8	17	434	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12		
Grade (%)		0%			0%			0%			0%			
Storage Length (ft)	0		80	0		0	0		0	0		0		
Storage Lanes	0		1	0		0	0		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor			0.62											
Frt			0.850					0.998						
Flt Protected										0.950				
Satd. Flow (prot)	0	1710	1295	0	0	0	0	1450	0	1533	1598	0		
Flt Permitted										0.432				
Satd. Flow (perm)	0	1710	807	0	0	0	0	1450	0	697	1598	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)			109					1						
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		684			880			483			50			
Travel Time (s)		15.5			20.0			11.0			1.1			
Confl. Peds. (#/hr)			85											
Confl. Bikes (#/hr)														
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.86	0.86	0.86	0.89	0.89	0.89		
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Heavy Vehicles (%)	0%	0%	1%	2%	2%	2%	0%	6%	0%	6%	7%	0%		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0		
Parking (#/hr)			0					0	0					
Mid-Block Traffic (%)		0%			0%			0%			0%			
Adj. Flow (vph)	0	36	107	0	0	0	0	605	9	19	488	0		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	36	107	0	0	0	0	614	0	19	488	0		
Turn Type		NA	custom					NA		Perm	NA			
Protected Phases		1 2!	2!					5			1 2 5 6!		1	6
Permitted Phases	1 2!		1							1 2 5 6!				
Detector Phase	1 2	1 2	2					5		1 2 5 6	1 2 5 6			
Switch Phase														
Minimum Initial (s)			5.0					10.0					8.0	6.0
Minimum Split (s)			20.0					25.0					21.0	21.0
Total Split (s)			20.0					56.0					23.0	21.0
Total Split (%)			16.7%					46.7%					19%	18%
Maximum Green (s)			14.0					47.0					17.0	15.0
Yellow Time (s)			3.0					3.0					3.0	3.0
All-Red Time (s)			3.0					6.0					3.0	3.0
Lost Time Adjust (s)			0.0					0.0						
Total Lost Time (s)			6.0					9.0						
Lead/Lag			Lag					Lead					Lead	Lag
Lead-Lag Optimize?														Yes
Vehicle Extension (s)			4.0					2.0					2.0	2.0
Minimum Gap (s)			4.0					2.0					2.0	2.0
Time Before Reduce (s)			0.0					0.0					0.0	0.0
Time To Reduce (s)			0.0					0.0					0.0	0.0
Recall Mode			Ped					Ped					C-Max	Ped
Walk Time (s)			7.0					7.0					8.0	7.0
Flash Dont Walk (s)			7.0					7.0					6.0	8.0
Pedestrian Calls (#/hr)			0					0					0	0
Act Effct Green (s)		37.0	31.0					47.0		120.0	120.0			
Actuated g/C Ratio		0.31	0.26					0.39		1.00	1.00			
v/c Ratio		0.07	0.31					1.08		0.03	0.31			
Control Delay		29.9	8.1					97.1		0.1	0.5			
Queue Delay		0.0	0.0					0.0		0.0	0.0			
Total Delay		29.9	8.1					97.1		0.1	0.5			
LOS		C	A					F		A	A			
Approach Delay		13.6						97.1			0.5			
Approach LOS		B						F			A			
Queue Length 50th (ft)		20	0					~532		0	0			
Queue Length 95th (ft)		45	39					#706		m0	m0			
Internal Link Dist (ft)		604			800			403			1			
Turn Bay Length (ft)			80											
Base Capacity (vph)		527	346					568		697	1598			
Starvation Cap Reductn		0	0					0		0	0			
Spillback Cap Reductn		0	0					0		0	0			
Storage Cap Reductn		0	0					0		0	0			
Reduced v/c Ratio		0.07	0.31					1.08		0.03	0.31			

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.46
Intersection Signal Delay: 48.9 — Intersection LOS: D
Intersection Capacity Utilization 55.1% — ICU Level of Service B
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

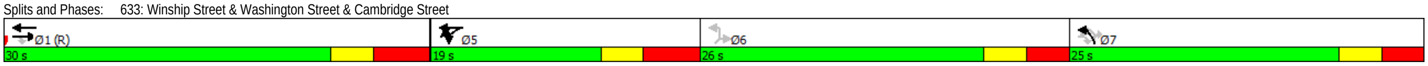
Splits and Phases: 181: Washington Street & South Carriage Road

Lane Group	EBT	EBR	EBR2	WBL2	WBL	WBT	NBL2	NBL	NBR	NEL	NER	NER2
Lane Configurations												
Traffic Volume (vph)	181	322	19	277	225	234	9	287	196	35	145	13
Future Volume (vph)	181	322	19	277	225	234	9	287	196	35	145	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	10	12	10	12	13	10	12	12	12
Grade (%)	0%					0%		0%		0%		
Storage Length (ft)		35			133			0	65	0	75	
Storage Lanes		1			2			1	1	1	1	
Taper Length (ft)					120			25		25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.82							0.94	0.97	0.88	
Frt		0.850							0.850		0.850	
Flt Protected				0.950	0.950			0.950		0.950		
Satd. Flow (prot)	1531	1219	0	1501	1624	1318	0	1625	1330	1490	1440	0
Flt Permitted				0.950	0.950			0.950		0.613		
Satd. Flow (perm)	1531	1003	0	1501	1624	1318	0	1625	1248	931	1261	0
Right Turn on Red			Yes						Yes			No
Satd. Flow (RTOR)		109							185			
Link Speed (mph)	30					30		30		30		
Link Distance (ft)	401					588		1122		798		
Travel Time (s)	9.1					13.4		25.5		18.1		
Confl. Peds. (#/hr)			51						12	17		40
Confl. Bikes (#/hr)		7	9									1
Peak Hour Factor	0.95	0.95	0.95	0.96	0.96	0.96	0.83	0.83	0.83	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	8%	2%	33%	1%	0%	9%	44%	2%	2%	9%	1%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)		0	0			0						
Mid-Block Traffic (%)	0%					0%		0%		0%		
Adj. Flow (vph)	191	339	20	289	234	244	11	346	236	38	158	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	191	359	0	289	234	244	0	357	236	38	172	0
Turn Type	NA	custom		Prot	Prot	NA	Perm	Prot	Perm	Perm	Perm	
Protected Phases	1			5	5	1 5		7				
Permitted Phases		1 7!					7!		7	6	6	
Detector Phase	1	1 7		5	5	1 5	7	7	7	6	6	
Switch Phase												
Minimum Initial (s)	10.0			8.0	8.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	24.0			15.0	15.0		20.0	20.0	20.0	25.0	25.0	
Total Split (s)	30.0			19.0	19.0		25.0	25.0	25.0	26.0	26.0	
Total Split (%)	30.0%			19.0%	19.0%		25.0%	25.0%	25.0%	26.0%	26.0%	
Maximum Green (s)	23.0			12.0	12.0		19.0	19.0	19.0	20.0	20.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0		3.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-3.0			-3.0	-3.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0			4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag				Lead	Lead					Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Minimum Gap (s)	2.0			2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Time Before Reduce (s)	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	C-Max			Max	Max		None	None	None	None	None	
Walk Time (s)	7.0						7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	10.0						7.0	7.0	7.0	12.0	12.0	
Pedestrian Calls (#/hr)	0						5	5	5	57	57	
Act Effct Green (s)	28.4	53.4		15.0	15.0	47.4		21.0	21.0	19.6	19.6	
Actuated g/C Ratio	0.28	0.53		0.15	0.15	0.47		0.21	0.21	0.20	0.20	
v/c Ratio	0.44	0.61		1.28	0.96	0.39		1.05	0.58	0.21	0.70	
Control Delay	34.3	16.9		182.8	78.6	12.6		101.4	15.6	35.4	52.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	34.3	16.9		182.8	78.6	12.6		101.4	15.6	35.4	52.4	
LOS	C	B		F	E	B		F	B	D	D	
Approach Delay	23.0					96.9		67.2		49.3		
Approach LOS	C					F		E		D		
Queue Length 50th (ft)	102	107		~244	161	60		~249	27	20	101	
Queue Length 95th (ft)	172	215		m#323	m#225	m92		#374	83	49	173	
Internal Link Dist (ft)	321					508		1042		718		
Turn Bay Length (ft)		35		133	133				65		75	
Base Capacity (vph)	435	586		225	243	624		341	408	204	277	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.44	0.61		1.28	0.96	0.39		1.05	0.58	0.19	0.62	

Intersection Summary

Area Type: CBD
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 15 (15%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.28
Intersection Signal Delay: 64.7 Intersection LOS: E
Intersection Capacity Utilization 76.2% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 633: Winship Street & Washington Street & Cambridge Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	32	15	38	14	19	19	48	442	24	72	518	45	
Future Volume (vph)	32	15	38	14	19	19	48	442	24	72	518	45	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Grade (%)		0%			0%			0%			0%		
Storage Length (ft)	0		0	0		0	0		0	0		0	
Storage Lanes	0		0	0		0	0		0	0		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.99			0.99								
Frt		0.940			0.951			0.994			0.991		
Flt Protected		0.982			0.987			0.995			0.994		
Satd. Flow (prot)	0	1559	0	0	1590	0	0	1671	0	0	1671	0	
Flt Permitted		0.881			0.922			0.908			0.893		
Satd. Flow (perm)	0	1396	0	0	1483	0	0	1525	0	0	1501	0	
Right Turn on Red			No			No			Yes			Yes	
Satd. Flow (RTOR)								4			6		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		523			238			57			449		
Travel Time (s)		11.9			5.4			1.3			10.2		
Confl. Peds. (#/hr)	3		4	4		3							
Confl. Bikes (#/hr)													
Peak Hour Factor	0.55	0.55	0.55	0.79	0.79	0.79	0.91	0.91	0.91	0.91	0.91	0.91	
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	4%	1%	0%	0%	1%	0%	
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	
Parking (#/hr)													
Mid-Block Traffic (%)		0%			0%			0%			0%		
Adj. Flow (vph)	58	27	69	18	24	24	53	486	26	79	569	49	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	154	0	0	66	0	0	565	0	0	697	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA		
Protected Phases		3			3			1			1		2
Permitted Phases	3			3			1			1			
Detector Phase	3	3		3	3		1	1		1	1		
Switch Phase													
Minimum Initial (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0		8.0
Minimum Split (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0		17.0
Total Split (s)	24.0	24.0		24.0	24.0		34.0	34.0		34.0	34.0		17.0
Total Split (%)	32.0%	32.0%		32.0%	32.0%		45.3%	45.3%		45.3%	45.3%		23%
Maximum Green (s)	20.0	20.0		20.0	20.0		30.0	30.0		30.0	30.0		13.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		1.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0		
Total Lost Time (s)		4.0			4.0			4.0			4.0		
Lead/Lag							Lead	Lead		Lead	Lead		Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Recall Mode	Max	Max		Max	Max		Max	Max		Max	Max		None
Walk Time (s)													8.0
Flash Dont Walk (s)													5.0
Pedestrian Calls (#/hr)													5
Act Effct Green (s)		20.2			20.2			30.3			30.3		
Actuated g/C Ratio		0.33			0.33			0.49			0.49		
v/c Ratio		0.34			0.14			0.75			0.94		
Control Delay		19.8			17.4			22.7			39.5		
Queue Delay		0.0			0.0			0.0			0.0		
Total Delay		19.8			17.4			22.7			39.5		
LOS		B			B			C			D		
Approach Delay		19.8			17.4			22.7			39.5		
Approach LOS		B			B			C			D		
Queue Length 50th (ft)		39			15			136			197		
Queue Length 95th (ft)		62			47			#443			#594		
Internal Link Dist (ft)		443			158			1			369		
Turn Bay Length (ft)													
Base Capacity (vph)		459			488			754			744		
Starvation Cap Reductn		0			0			0			0		
Spillback Cap Reductn		0			0			0			0		
Storage Cap Reductn		0			0			0			0		
Reduced v/c Ratio		0.34			0.14			0.75			0.94		

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 61.4
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 30.0 Intersection LOS: C
Intersection Capacity Utilization 67.9% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 512: Washington Street & Monastery Road/Monastery Driveway

Ø1 34 s | Ø2 17 s | Ø3 24 s

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2	Ø6
Lane Configurations															
Traffic Volume (vph)	0	0	0	0	21	67	2	435	13	4	518	7			
Future Volume (vph)	0	0	0	0	21	67	2	435	13	4	518	7			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12			
Grade (%)		0%			0%			0%			0%				
Storage Length (ft)	0		0	0		0	0		0	0		0			
Storage Lanes	0		0	0		0	1		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Ped Bike Factor					0.60						1.00				
Frt					0.898			0.996			0.998				
Flt Protected							0.950								
Satd. Flow (prot)	0	0	0	0	833	0	1624	1655	0	0	1521	0			
Flt Permitted							0.451				0.585				
Satd. Flow (perm)	0	0	0	0	833	0	771	1655	0	0	890	0			
Right Turn on Red			Yes			No			Yes			Yes			
Satd. Flow (RTOR)											1				
Link Speed (mph)		30			30			30			30				
Link Distance (ft)		476			472			87			1136				
Travel Time (s)		10.8			10.7			2.0			25.8				
Confl. Peds. (#/hr)						127				183					
Confl. Bikes (#/hr)						10						4			
Peak Hour Factor	0.92	0.92	0.92	0.71	0.71	0.71	0.87	0.87	0.87	0.93	0.93	0.93			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	3%	0%	0%	1%	0%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0			
Parking (#/hr)				0	0	0				0	0	0			
Mid-Block Traffic (%)		0%			0%			0%			0%				
Adj. Flow (vph)	0	0	0	0	30	94	2	500	15	4	557	8			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	0	0	0	124	0	2	515	0	0	569	0			
Turn Type					NA		Perm	NA		Perm	NA				
Protected Phases					1 6!			1 2 5 6!			5		1	2	6
Permitted Phases				1 6!			1 2 5 6!			5					
Detector Phase				1 6	1 6		1 2 5 6	1 2 5 6		5	5				
Switch Phase															
Minimum Initial (s)										10.0	10.0		8.0	5.0	6.0
Minimum Split (s)										25.0	25.0		21.0	20.0	21.0
Total Split (s)										54.0	54.0		25.0	20.0	21.0
Total Split (%)										45.0%	45.0%		21%	17%	18%
Maximum Green (s)										45.0	45.0		19.0	14.0	15.0
Yellow Time (s)										3.0	3.0		3.0	3.0	3.0
All-Red Time (s)										6.0	6.0		3.0	3.0	3.0
Lost Time Adjust (s)											0.0				
Total Lost Time (s)											9.0				
Lead/Lag										Lead	Lead		Lead	Lag	Lag
Lead-Lag Optimize?															Yes
Vehicle Extension (s)										2.0	2.0		2.0	4.0	2.0
Minimum Gap (s)										2.0	2.0		2.0	4.0	2.0
Time Before Reduce (s)										0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)										0.0	0.0		0.0	0.0	0.0
Recall Mode										Ped	Ped		C-Max	Ped	Ped
Walk Time (s)										7.0	7.0		8.0	7.0	7.0
Flash Dont Walk (s)										7.0	7.0		6.0	7.0	8.0
Pedestrian Calls (#/hr)										0	0		0	0	0
Act Effct Green (s)					40.0		120.0	120.0			45.0				
Actuated g/C Ratio					0.33		1.00	1.00			0.38				
v/c Ratio					0.45		0.00	0.31			1.70				
Control Delay					37.7		0.0	0.5			356.6				
Queue Delay					0.0		0.0	0.0			0.0				
Total Delay					37.7		0.0	0.5			356.6				
LOS					D		A	A			F				
Approach Delay					37.7			0.5			356.6				
Approach LOS					D			A			F				
Queue Length 50th (ft)					75		0	0			~654				
Queue Length 95th (ft)					101		m0	0			#878				
Internal Link Dist (ft)		396			392			7			1056				
Turn Bay Length (ft)															
Base Capacity (vph)					277		771	1655			334				
Starvation Cap Reductn					0		0	0			0				
Spillback Cap Reductn					0		0	0			0				
Storage Cap Reductn					0		0	0			0				
Reduced v/c Ratio					0.45		0.00	0.31			1.70				

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 23 (19%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.70
Intersection Signal Delay: 171.8 — Intersection LOS: F
Intersection Capacity Utilization 58.5% — ICU Level of Service B
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 179: Washington Street & North Carriage Road

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø5
Lane Configurations															
Traffic Volume (vph)	0	522	59	14	179	668	0	50	446	44	40	440	40		
Future Volume (vph)	0	522	59	14	179	668	0	50	446	44	40	440	40		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	11	12	12	11	11	12	12	16	12	12	16	12		
Grade (%)		0%				0%			0%			0%			
Storage Length (ft)	0		0		102		0	0		0	0		0		
Storage Lanes	0		0		1		0	1		0	1		0		
Taper Length (ft)	25				50			25			25				
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor					0.86				1.00						
Frt		0.985							0.986			0.987			
Flt Protected					0.950			0.950			0.950				
Satd. Flow (prot)	0	3027	0	0	1556	3079	0	1593	1855	0	1624	1895	0		
Flt Permitted					0.950			0.473			0.468				
Satd. Flow (perm)	0	3027	0	0	1342	3079	0	793	1855	0	800	1895	0		
Right Turn on Red			No				Yes			Yes			Yes		
Satd. Flow (RTOR)															
Link Speed (mph)		30				30			30			30			
Link Distance (ft)		516				478			50			87			
Travel Time (s)		11.7				10.9			1.1			2.0			
Confl. Peds. (#/hr)				159											
Confl. Bikes (#/hr)							1			5					
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94		
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Heavy Vehicles (%)	0%	2%	4%	0%	1%	2%	0%	2%	3%	2%	0%	1%	0%		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0		
Parking (#/hr)															
Mid-Block Traffic (%)		0%				0%			0%			0%			
Adj. Flow (vph)	0	549	62	15	190	711	0	53	474	47	43	468	43		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	611	0	0	205	711	0	53	521	0	43	511	0		
Turn Type		NA		Prot	Prot	NA		Perm	NA		Perm	NA			
Protected Phases	2!	1 2!		6	6!	1 6!			1 2 5 6!			1 2 5 6!		1	5
Permitted Phases	1!							1 2 5 6!			1 2 5 6!				
Detector Phase	2	1 2		6	6	1 6		1 2 5 6	1 2 5 6		1 2 5 6	1 2 5 6			
Switch Phase															
Minimum Initial (s)	5.0			6.0	6.0									8.0	10.0
Minimum Split (s)	20.0			21.0	21.0									21.0	25.0
Total Split (s)	20.0			21.0	21.0									25.0	54.0
Total Split (%)	16.7%			17.5%	17.5%									21%	45%
Maximum Green (s)	14.0			15.0	15.0									19.0	45.0
Yellow Time (s)	3.0			3.0	3.0									3.0	3.0
All-Red Time (s)	3.0			3.0	3.0									3.0	6.0
Lost Time Adjust (s)					-2.0										
Total Lost Time (s)					4.0										
Lead/Lag	Lag			Lag	Lag									Lead	Lead
Lead-Lag Optimize?				Yes	Yes										
Vehicle Extension (s)	4.0			2.0	2.0									2.0	2.0
Minimum Gap (s)	4.0			2.0	2.0									2.0	2.0
Time Before Reduce (s)	0.0			0.0	0.0									0.0	0.0
Time To Reduce (s)	0.0			0.0	0.0									0.0	0.0
Recall Mode	Ped			Ped	Ped									C-Max	Ped
Walk Time (s)	7.0			7.0	7.0									8.0	7.0
Flash Dont Walk (s)	7.0			8.0	8.0									6.0	7.0
Pedestrian Calls (#/hr)	0			0	0									0	0
Act Effct Green (s)		41.0			17.0	42.0		120.0	120.0		120.0	120.0			
Actuated g/C Ratio		0.34			0.14	0.35		1.00	1.00		1.00	1.00			
v/c Ratio		0.59			0.93	0.66		0.07	0.28		0.05	0.27			
Control Delay		35.4			96.7	36.5		0.0	0.0		0.0	0.0			
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		35.4			96.7	36.5		0.0	0.0		0.0	0.0			
LOS		D			F	D		A	A		A	A			
Approach Delay		35.4				50.0									
Approach LOS		D				D									
Queue Length 50th (ft)		204			159	243		0	0		0	0			
Queue Length 95th (ft)		266			#308	312		m0	m0		m0	m0			
Internal Link Dist (ft)		436				398			1			7			
Turn Bay Length (ft)					102										
Base Capacity (vph)		1034			220	1077		793	1855		800	1895			
Starvation Cap Reductn		0			0	0		0	0		0	0			
Spillback Cap Reductn		0			0	0		0	0		0	0			
Storage Cap Reductn		0			0	0		0	0		0	0			
Reduced v/c Ratio		0.59			0.93	0.66		0.07	0.28		0.05	0.27			

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 23 (19%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.70
Intersection Signal Delay: 25.4 Intersection LOS: C
Intersection Capacity Utilization 87.7% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 180: Washington Street & Commonwealth Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø6
Lane Configurations														
Traffic Volume (vph)	0	18	69	0	0	0	0	529	12	30	648	0		
Future Volume (vph)	0	18	69	0	0	0	0	529	12	30	648	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12		
Grade (%)		0%			0%			0%			0%			
Storage Length (ft)	0		80	0		0	0		0	0		0		
Storage Lanes	0		1	0		0	0		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor			0.45					1.00						
Frt			0.850					0.997						
Flt Protected										0.950				
Satd. Flow (prot)	0	1449	1308	0	0	0	0	1490	0	1518	1693	0		
Flt Permitted										0.432				
Satd. Flow (perm)	0	1449	591	0	0	0	0	1490	0	690	1693	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)			121					1						
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		669			880			483			50			
Travel Time (s)		15.2			20.0			11.0			1.1			
Confl. Peds. (#/hr)			162											
Confl. Bikes (#/hr)									1					
Peak Hour Factor	0.57	0.57	0.57	0.92	0.92	0.92	0.88	0.88	0.88	0.94	0.94	0.94		
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Heavy Vehicles (%)	25%	18%	0%	2%	2%	2%	0%	3%	0%	7%	1%	0%		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0		
Parking (#/hr)			0					0	0					
Mid-Block Traffic (%)		0%			0%			0%			0%			
Adj. Flow (vph)	0	32	121	0	0	0	0	601	14	32	689	0		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	32	121	0	0	0	0	615	0	32	689	0		
Turn Type		NA	custom					NA		Perm	NA			
Protected Phases		1 2!	2!					5			1 2 5 6!		1	6
Permitted Phases	1 2!		1							1 2 5 6!				
Detector Phase	1 2	1 2	2					5		1 2 5 6	1 2 5 6			
Switch Phase														
Minimum Initial (s)			5.0					10.0					8.0	6.0
Minimum Split (s)			20.0					25.0					21.0	21.0
Total Split (s)			20.0					54.0					25.0	21.0
Total Split (%)			16.7%					45.0%					21%	18%
Maximum Green (s)			14.0					45.0					19.0	15.0
Yellow Time (s)			3.0					3.0					3.0	3.0
All-Red Time (s)			3.0					6.0					3.0	3.0
Lost Time Adjust (s)			0.0					0.0						
Total Lost Time (s)			6.0					9.0						
Lead/Lag			Lag					Lead					Lead	Lag
Lead-Lag Optimize?														Yes
Vehicle Extension (s)			4.0					2.0					2.0	2.0
Minimum Gap (s)			4.0					2.0					2.0	2.0
Time Before Reduce (s)			0.0					0.0					0.0	0.0
Time To Reduce (s)			0.0					0.0					0.0	0.0
Recall Mode			Ped					Ped					C-Max	Ped
Walk Time (s)			7.0					7.0					8.0	7.0
Flash Dont Walk (s)			7.0					7.0					6.0	8.0
Pedestrian Calls (#/hr)			0					0					0	0
Act Effct Green (s)		39.0	33.0					45.0		120.0	120.0			
Actuated g/C Ratio		0.32	0.28					0.38		1.00	1.00			
v/c Ratio		0.07	0.36					1.10		0.05	0.41			
Control Delay		28.6	8.8					104.5		0.1	0.7			
Queue Delay		0.0	0.0					0.0		0.0	0.0			
Total Delay		28.6	8.8					104.5		0.1	0.7			
LOS		C	A					F		A	A			
Approach Delay		12.9						104.5			0.7			
Approach LOS		B						F			A			
Queue Length 50th (ft)		17	0					~542		0	0			
Queue Length 95th (ft)		25	2					#741		m0	m0			
Internal Link Dist (ft)		589			800			403			1			
Turn Bay Length (ft)			80											
Base Capacity (vph)		470	333					559		690	1693			
Starvation Cap Reductn		0	0					0		0	0			
Spillback Cap Reductn		0	0					0		0	0			
Storage Cap Reductn		0	0					0		0	0			
Reduced v/c Ratio		0.07	0.36					1.10		0.05	0.41			

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 23 (19%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.70
Intersection Signal Delay: 44.8 Intersection LOS: D
Intersection Capacity Utilization 59.9% ICU Level of Service B
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 181: Washington Street & South Carriage Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2	Ø6
Lane Configurations															
Traffic Volume (vph)	0	0	0	0	17	50	0	421	13	2	459	9			
Future Volume (vph)	0	0	0	0	17	50	0	421	13	2	459	9			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12			
Grade (%)		0%			0%			0%			0%				
Storage Length (ft)	0		0	0		0	0		0	0		0			
Storage Lanes	0		0	0		0	1		0	0		0			
Taper Length (ft)	25			25			25			25					
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95			
Ped Bike Factor					0.78										
Frt					0.899			0.996			0.997				
Flt Protected															
Satd. Flow (prot)	0	0	0	0	1022	0	1710	1609	0	0	2918	0			
Flt Permitted											0.796				
Satd. Flow (perm)	0	0	0	0	1022	0	1710	1609	0	0	2323	0			
Right Turn on Red			Yes			No			Yes			Yes			
Satd. Flow (RTOR)											2				
Link Speed (mph)		30			30			30			30				
Link Distance (ft)		320			472			87			526				
Travel Time (s)		7.3			10.7			2.0			12.0				
Confl. Peds. (#/hr)						66				142					
Confl. Bikes (#/hr)															
Peak Hour Factor	0.92	0.92	0.92	0.65	0.65	0.65	0.81	0.81	0.81	0.85	0.85	0.85			
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%			
Heavy Vehicles (%)	2%	2%	2%	0%	6%	5%	0%	6%	0%	100%	5%	11%			
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0			
Parking (#/hr)				0	0	0				0	0	0			
Mid-Block Traffic (%)		0%			0%			0%			0%				
Adj. Flow (vph)	0	0	0	0	26	77	0	520	16	2	540	11			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	0	0	0	103	0	0	536	0	0	553	0			
Turn Type					NA		Perm	NA		Perm	NA				
Protected Phases					1 6!			1 2 5 6!			5		1	2	6
Permitted Phases				1 6!			1 2 5 6!			5					
Detector Phase				1 6	1 6		1 2 5 6	1 2 5 6		5	5				
Switch Phase															
Minimum Initial (s)										10.0	10.0		8.0	5.0	6.0
Minimum Split (s)										25.0	25.0		21.0	20.0	21.0
Total Split (s)										54.0	54.0		25.0	20.0	21.0
Total Split (%)										45.0%	45.0%		21%	17%	18%
Maximum Green (s)										45.0	45.0		19.0	14.0	15.0
Yellow Time (s)										3.0	3.0		3.0	3.0	3.0
All-Red Time (s)										6.0	6.0		3.0	3.0	3.0
Lost Time Adjust (s)											0.0				
Total Lost Time (s)											9.0				
Lead/Lag										Lead	Lead		Lead	Lag	Lag
Lead-Lag Optimize?															Yes
Vehicle Extension (s)										2.0	2.0		2.0	4.0	2.0
Minimum Gap (s)										2.0	2.0		2.0	4.0	2.0
Time Before Reduce (s)										0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)										0.0	0.0		0.0	0.0	0.0
Recall Mode										Ped	Ped		C-Max	Ped	Ped
Walk Time (s)										7.0	7.0		8.0	7.0	7.0
Flash Dont Walk (s)										7.0	7.0		6.0	7.0	8.0
Pedestrian Calls (#/hr)										0	0		0	0	0
Act Effct Green (s)					40.0			120.0			45.0				
Actuated g/C Ratio					0.33			1.00			0.38				
v/c Ratio					0.30			0.33			0.63				
Control Delay					32.7			1.1			34.6				
Queue Delay					0.0			0.0			0.0				
Total Delay					32.7			1.1			34.7				
LOS					C			A			C				
Approach Delay					32.7			1.1			34.7				
Approach LOS					C			A			C				
Queue Length 50th (ft)					59			0			182				
Queue Length 95th (ft)					74			0			226				
Internal Link Dist (ft)		240			392			7			446				
Turn Bay Length (ft)															
Base Capacity (vph)					340			1609			872				
Starvation Cap Reductn					0			0			0				
Spillback Cap Reductn					0			0			3				
Storage Cap Reductn					0			0			0				
Reduced v/c Ratio					0.30			0.33			0.64				

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 19.4 — Intersection LOS: B
Intersection Capacity Utilization 47.2% — ICU Level of Service A
Analysis Period (min) 15
! Phase conflict between lane groups.

Splits and Phases: 179: Washington Street & North Carriage Road

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø5
Lane Configurations															
Traffic Volume (vph)	0	843	24	29	99	450	0	51	433	45	90	328	44		
Future Volume (vph)	0	843	24	29	99	450	0	51	433	45	90	328	44		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	11	12	12	11	11	12	12	16	12	12	16	12		
Grade (%)		0%				0%			0%			0%			
Storage Length (ft)	0		0		102		0	0		0	0		0		
Storage Lanes	0		0		1		0	1		0	1		0		
Taper Length (ft)	25				50			25			25				
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor		1.00			0.94										
Frt		0.996							0.986			0.982			
Flt Protected					0.950			0.950			0.950				
Satd. Flow (prot)	0	3063	0	0	1382	3020	0	1547	1798	0	1608	1793	0		
Flt Permitted					0.950			0.507			0.435				
Satd. Flow (perm)	0	3063	0	0	1305	3020	0	826	1798	0	736	1793	0		
Right Turn on Red			No				Yes			Yes			Yes		
Satd. Flow (RTOR)															
Link Speed (mph)		30				30			30			30			
Link Distance (ft)		716				483			50			87			
Travel Time (s)		16.3				11.0			1.1			2.0			
Confl. Peds. (#/hr)				81											
Confl. Bikes (#/hr)			1												
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.80	0.80	0.80	0.85	0.85	0.85		
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Heavy Vehicles (%)	0%	2%	5%	19%	12%	4%	0%	5%	6%	9%	1%	6%	7%		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0		
Parking (#/hr)															
Mid-Block Traffic (%)		0%				0%			0%			0%			
Adj. Flow (vph)	0	916	26	31	105	479	0	64	541	56	106	386	52		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	942	0	0	136	479	0	64	597	0	106	438	0		
Turn Type		NA		Prot	Prot	NA		Perm	NA		Perm	NA			
Protected Phases	2!	1 2!		6	6!	1 6!			1 2 5 6!			1 2 5 6!		1	5
Permitted Phases	1!							1 2 5 6!			1 2 5 6!				
Detector Phase	2	1 2		6	6	1 6		1 2 5 6	1 2 5 6		1 2 5 6	1 2 5 6			
Switch Phase															
Minimum Initial (s)	5.0			6.0	6.0									8.0	10.0
Minimum Split (s)	20.0			21.0	21.0									21.0	25.0
Total Split (s)	20.0			21.0	21.0									25.0	54.0
Total Split (%)	16.7%			17.5%	17.5%									21%	45%
Maximum Green (s)	14.0			15.0	15.0									19.0	45.0
Yellow Time (s)	3.0			3.0	3.0									3.0	3.0
All-Red Time (s)	3.0			3.0	3.0									3.0	6.0
Lost Time Adjust (s)					-2.0										
Total Lost Time (s)					4.0										
Lead/Lag	Lag			Lag	Lag									Lead	Lead
Lead-Lag Optimize?				Yes	Yes										
Vehicle Extension (s)	4.0			2.0	2.0									2.0	2.0
Minimum Gap (s)	4.0			2.0	2.0									2.0	2.0
Time Before Reduce (s)	0.0			0.0	0.0									0.0	0.0
Time To Reduce (s)	0.0			0.0	0.0									0.0	0.0
Recall Mode	Ped			Ped	Ped									C-Max	Ped
Walk Time (s)	7.0			7.0	7.0									8.0	7.0
Flash Dont Walk (s)	7.0			8.0	8.0									6.0	7.0
Pedestrian Calls (#/hr)	0			0	0									0	0
Act Effct Green (s)		41.0			17.0	42.0		120.0	120.0		120.0	120.0			
Actuated g/C Ratio		0.34			0.14	0.35		1.00	1.00		1.00	1.00			
v/c Ratio		0.90			0.70	0.45		0.08	0.33		0.14	0.24			
Control Delay		50.3			68.7	31.8		0.1	0.2		0.3	0.6			
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		50.3			68.7	31.8		0.1	0.2		0.3	0.6			
LOS		D			E	C		A	A		A	A			
Approach Delay		50.3				40.0			0.2			0.6			
Approach LOS		D				D			A			A			
Queue Length 50th (ft)		363			102	150		0	0		0	5			
Queue Length 95th (ft)		#486			#192	200		m0	m0		m0	0			
Internal Link Dist (ft)		636				403			1			7			
Turn Bay Length (ft)					102										
Base Capacity (vph)		1046			195	1057		826	1798		736	1793			
Starvation Cap Reductn		0			0	0		0	0		0	0			
Spillback Cap Reductn		0			0	0		0	9		0	0			
Storage Cap Reductn		0			0	0		0	0		0	0			
Reduced v/c Ratio		0.90			0.70	0.45		0.08	0.33		0.14	0.24			

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 37 (31%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 26.2 Intersection LOS: C
Intersection Capacity Utilization 88.9% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 180: Washington Street & Commonwealth Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø6
Lane Configurations														
Traffic Volume (vph)	0	32	95	0	0	0	0	520	8	17	434	0		
Future Volume (vph)	0	32	95	0	0	0	0	520	8	17	434	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12		
Grade (%)		0%			0%			0%			0%			
Storage Length (ft)	0		80	0		0	0		0	0		0		
Storage Lanes	0		1	0		0	0		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor			0.62											
Frt			0.850					0.998						
Flt Protected										0.950				
Satd. Flow (prot)	0	1710	1295	0	0	0	0	1450	0	1533	1598	0		
Flt Permitted										0.432				
Satd. Flow (perm)	0	1710	807	0	0	0	0	1450	0	697	1598	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)			109					1						
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		601			880			483			50			
Travel Time (s)		13.7			20.0			11.0			1.1			
Confl. Peds. (#/hr)			85											
Confl. Bikes (#/hr)														
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.86	0.86	0.86	0.89	0.89	0.89		
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Heavy Vehicles (%)	0%	0%	1%	2%	2%	2%	0%	6%	0%	6%	7%	0%		
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0		
Parking (#/hr)			0					0	0					
Mid-Block Traffic (%)		0%			0%			0%			0%			
Adj. Flow (vph)	0	36	107	0	0	0	0	605	9	19	488	0		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	36	107	0	0	0	0	614	0	19	488	0		
Turn Type		NA	custom					NA		Perm	NA			
Protected Phases		1 2!	2!					5			1 2 5 6!		1	6
Permitted Phases	1 2!		1							1 2 5 6!				
Detector Phase	1 2	1 2	2					5		1 2 5 6	1 2 5 6			
Switch Phase														
Minimum Initial (s)			5.0					10.0					8.0	6.0
Minimum Split (s)			20.0					25.0					21.0	21.0
Total Split (s)			20.0					54.0					25.0	21.0
Total Split (%)			16.7%					45.0%					21%	18%
Maximum Green (s)			14.0					45.0					19.0	15.0
Yellow Time (s)			3.0					3.0					3.0	3.0
All-Red Time (s)			3.0					6.0					3.0	3.0
Lost Time Adjust (s)			0.0					0.0						
Total Lost Time (s)			6.0					9.0						
Lead/Lag			Lag					Lead					Lead	Lag
Lead-Lag Optimize?														Yes
Vehicle Extension (s)			4.0					2.0					2.0	2.0
Minimum Gap (s)			4.0					2.0					2.0	2.0
Time Before Reduce (s)			0.0					0.0					0.0	0.0
Time To Reduce (s)			0.0					0.0					0.0	0.0
Recall Mode			Ped					Ped					C-Max	Ped
Walk Time (s)			7.0					7.0					8.0	7.0
Flash Dont Walk (s)			7.0					7.0					6.0	8.0
Pedestrian Calls (#/hr)			0					0					0	0
Act Effct Green (s)		39.0	33.0					45.0		120.0	120.0			
Actuated g/C Ratio		0.32	0.28					0.38		1.00	1.00			
v/c Ratio		0.06	0.30					1.13		0.03	0.31			
Control Delay		28.5	7.7					114.7		0.1	0.5			
Queue Delay		0.0	0.0					0.0		0.0	0.0			
Total Delay		28.5	7.7					114.7		0.1	0.5			
LOS		C	A					F		A	A			
Approach Delay		12.9						114.7			0.5			
Approach LOS		B						F			A			
Queue Length 50th (ft)		19	0					~552		0	0			
Queue Length 95th (ft)		44	38					#726		m0	m0			
Internal Link Dist (ft)		521			800			403			1			
Turn Bay Length (ft)			80											
Base Capacity (vph)		555	357					544		697	1598			
Starvation Cap Reductn		0	0					0		0	0			
Spillback Cap Reductn		0	0					0		0	0			
Storage Cap Reductn		0	0					0		0	0			
Reduced v/c Ratio		0.06	0.30					1.13		0.03	0.31			

Intersection Summary

Area Type: CBD

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 37 (31%), Referenced to phase 1:NBWB, Start of Green

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 57.4 Intersection LOS: E

Intersection Capacity Utilization 55.1% ICU Level of Service B

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 181: Washington Street & South Carriage Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	4	69	37	2	53	54	434	6	16	374	17
Future Volume (vph)	83	4	69	37	2	53	54	434	6	16	374	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.98						1.00	
Frt		0.940			0.922			0.998			0.994	
Flt Protected		0.974			0.980			0.995			0.998	
Satd. Flow (prot)	0	1547	0	0	1465	0	0	1669	0	0	1635	0
Flt Permitted		0.805			0.841			0.918			0.975	
Satd. Flow (perm)	0	1270	0	0	1255	0	0	1540	0	0	1597	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								1			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			238			57			449	
Travel Time (s)		11.9			5.4			1.3			10.2	
Confl. Peds. (#/hr)	10		4	4		10						
Confl. Bikes (#/hr)												2
Peak Hour Factor	0.77	0.77	0.77	0.59	0.59	0.59	0.86	0.86	0.86	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	0%	8%	0%	0%	0%	2%	0%	0%	4%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	108	5	90	63	3	90	63	505	7	18	430	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	203	0	0	156	0	0	575	0	0	468	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Total Split (s)	26.0	26.0		26.0	26.0		49.0	49.0		49.0	49.0	
Total Split (%)	34.7%	34.7%		34.7%	34.7%		65.3%	65.3%		65.3%	65.3%	
Maximum Green (s)	22.0	22.0		22.0	22.0		45.0	45.0		45.0	45.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Minimum Gap (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Time Before Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		12.2			12.2			21.6			21.6	
Actuated g/C Ratio		0.28			0.28			0.50			0.50	
v/c Ratio		0.56			0.44			0.74			0.58	
Control Delay		22.1			19.3			15.5			10.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		22.1			19.3			15.5			10.9	
LOS		C			B			B			B	
Approach Delay		22.1			19.3			15.5			10.9	
Approach LOS		C			B			B			B	
Queue Length 50th (ft)		37			27			85			60	
Queue Length 95th (ft)		107			61			236			172	
Internal Link Dist (ft)		443			158			1			369	
Turn Bay Length (ft)												
Base Capacity (vph)		741			732			1402			1454	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.27			0.21			0.41			0.32	

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 42.9
Natural Cycle: 40
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 15.4 Intersection LOS: B
Intersection Capacity Utilization 71.7% ICU Level of Service C
Analysis Period (min) 15

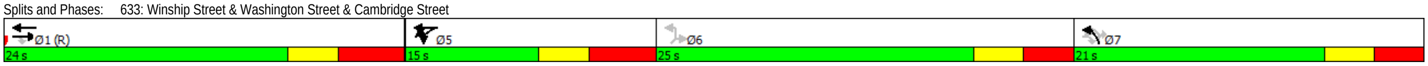
Splits and Phases: 512: Washington Street & Monastery Road/Monastery Driveway

Lane Group	EBT	EBR	EBR2	WBL2	WBL	WBT	NBL2	NBL	NBR	NEL	NER	NER2
Lane Configurations												
Traffic Volume (vph)	225	261	13	131	150	194	12	286	260	63	218	9
Future Volume (vph)	225	261	13	131	150	194	12	286	260	63	218	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	10	12	10	12	13	10	12	12	12
Grade (%)	0%					0%		0%		0%		
Storage Length (ft)		35			133			0	65	0	75	
Storage Lanes		1			2			1	1	1	1	
Taper Length (ft)					120			25		25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93							0.92	0.98	0.89	
Frt		0.850							0.850		0.850	
Flt Protected				0.950	0.950			0.950		0.950		
Satd. Flow (prot)	1559	1214	0	1458	1425	1294	0	1610	1317	1240	1381	0
Flt Permitted				0.950	0.950			0.950		0.644		
Satd. Flow (perm)	1559	1127	0	1458	1425	1294	0	1610	1212	822	1227	0
Right Turn on Red			Yes						Yes			No
Satd. Flow (RTOR)		128							218			
Link Speed (mph)	30					30		30		30		
Link Distance (ft)	401					588		1122		798		
Travel Time (s)	9.1					13.4		25.5		18.1		
Confl. Peds. (#/hr)			21						20	13		40
Confl. Bikes (#/hr)												3
Peak Hour Factor	0.87	0.87	0.87	0.84	0.84	0.84	0.88	0.88	0.88	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	6%	4%	8%	4%	14%	11%	33%	3%	3%	31%	5%	11%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)		0	0			0						
Mid-Block Traffic (%)	0%					0%		0%		0%		
Adj. Flow (vph)	259	300	15	156	179	231	14	325	295	67	232	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	315	0	156	179	231	0	339	295	67	242	0
Turn Type	NA	custom		Prot	Prot	NA	Perm	Prot	Perm	Perm	Perm	
Protected Phases	1			5	5	1 5		7				
Permitted Phases		1 7!					7!		7	6	6	
Detector Phase	1	1 7		5	5	1 5	7	7	7	6	6	
Switch Phase												
Minimum Initial (s)	10.0			8.0	8.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	24.0			15.0	15.0		20.0	20.0	20.0	25.0	25.0	
Total Split (s)	24.0			15.0	15.0		21.0	21.0	21.0	25.0	25.0	
Total Split (%)	28.2%			17.6%	17.6%		24.7%	24.7%	24.7%	29.4%	29.4%	
Maximum Green (s)	17.0			8.0	8.0		15.0	15.0	15.0	19.0	19.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0		3.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-3.0			-3.0	-3.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0			4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag				Lead	Lead					Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Minimum Gap (s)	2.0			2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Time Before Reduce (s)	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	C-Max			None	None		None	None	None	None	None	
Walk Time (s)	7.0						7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	10.0						7.0	7.0	7.0	12.0	12.0	
Pedestrian Calls (#/hr)	0						20	20	20	53	53	
Act Effct Green (s)	21.2	42.2		11.0	11.0	36.2		17.0	17.0	19.8	19.8	
Actuated g/C Ratio	0.25	0.50		0.13	0.13	0.43		0.20	0.20	0.23	0.23	
v/c Ratio	0.67	0.51		0.83	0.97	0.42		1.05	0.71	0.35	0.85	
Control Delay	39.4	11.9		71.4	99.9	20.6		100.4	20.0	32.4	57.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	39.4	11.9		71.4	99.9	20.6		100.4	20.0	32.4	57.9	
LOS	D	B		E	F	C		F	C	C	E	
Approach Delay	24.3					59.7		63.0		52.4		
Approach LOS	C					E		E		D		
Queue Length 50th (ft)	127	61		83	97	86		~200	35	29	121	
Queue Length 95th (ft)	#209	126		#168	#200	136		#350	#126	68	#244	
Internal Link Dist (ft)	321					508		1042		718		
Turn Bay Length (ft)		35		133	133				65		75	
Base Capacity (vph)	387	623		188	184	550		322	416	203	303	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.67	0.51		0.83	0.97	0.42		1.05	0.71	0.33	0.80	

Intersection Summary

Area Type: CBD
Cycle Length: 85
Actuated Cycle Length: 85
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 49.8 Intersection LOS: D
Intersection Capacity Utilization 68.5% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 633: Winship Street & Washington Street & Cambridge Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2	Ø6
Lane Configurations															
Traffic Volume (vph)	0	0	0	0	21	67	2	435	13	4	518	7			
Future Volume (vph)	0	0	0	0	21	67	2	435	13	4	518	7			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95			
Ped Bike Factor					0.60						1.00				
Frt					0.898			0.996			0.998				
Flt Protected							0.950								
Satd. Flow (prot)	0	0	0	0	833	0	1624	1655	0	0	3049	0			
Flt Permitted							0.438				0.761				
Satd. Flow (perm)	0	0	0	0	833	0	749	1655	0	0	2321	0			
Right Turn on Red			Yes			No			Yes			Yes			
Satd. Flow (RTOR)											1				
Link Speed (mph)		30			30			30			30				
Link Distance (ft)		292			472			87			1136				
Travel Time (s)		6.6			10.7			2.0			25.8				
Confl. Peds. (#/hr)						127				183					
Confl. Bikes (#/hr)						10						4			
Peak Hour Factor	0.92	0.92	0.92	0.71	0.71	0.71	0.87	0.87	0.87	0.93	0.93	0.93			
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	0%	3%	0%	0%	1%	0%			
Parking (#/hr)				0	0	0				0	0	0			
Adj. Flow (vph)	0	0	0	0	30	94	2	500	15	4	557	8			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	0	0	0	124	0	2	515	0	0	569	0			
Turn Type					NA		Perm	NA		Perm	NA				
Protected Phases					1 6!			1 2 5 6!			5		1	2	6
Permitted Phases				1 6!			1 2 5 6!			5					
Detector Phase				1 6	1 6		1 2 5 6	1 2 5 6		5	5				
Switch Phase															
Minimum Initial (s)										10.0	10.0		8.0	5.0	6.0
Minimum Split (s)										25.0	25.0		21.0	20.0	21.0
Total Split (s)										54.0	54.0		25.0	20.0	21.0
Total Split (%)										45.0%	45.0%		21%	17%	18%
Maximum Green (s)										45.0	45.0		19.0	14.0	15.0
Yellow Time (s)										3.0	3.0		3.0	3.0	3.0
All-Red Time (s)										6.0	6.0		3.0	3.0	3.0
Lost Time Adjust (s)											0.0				
Total Lost Time (s)											9.0				
Lead/Lag										Lead	Lead		Lead	Lag	Lag
Lead-Lag Optimize?															Yes
Vehicle Extension (s)										2.0	2.0		2.0	4.0	2.0
Recall Mode										Ped	Ped		C-Max	Ped	Ped
Walk Time (s)										7.0	7.0		8.0	7.0	7.0
Flash Dont Walk (s)										7.0	7.0		6.0	7.0	8.0
Pedestrian Calls (#/hr)										0	0		0	0	0
Act Effct Green (s)					40.0		120.0	120.0			45.0				
Actuated g/C Ratio					0.33		1.00	1.00			0.38				
v/c Ratio					0.45		0.00	0.31			0.65				
Control Delay					37.7		0.0	0.5			35.3				
Queue Delay					0.0		0.0	0.0			0.2				
Total Delay					37.7		0.0	0.5			35.5				
LOS					D		A	A			D				
Approach Delay					37.7			0.5			35.5				
Approach LOS					D			A			D				
Queue Length 50th (ft)					75		0	0			190				
Queue Length 95th (ft)					101		m0	0			255				
Internal Link Dist (ft)		212			392			7			1056				
Turn Bay Length (ft)															
Base Capacity (vph)					277		749	1655			871				
Starvation Cap Reductn					0		0	0			0				
Spillback Cap Reductn					0		0	0			27				
Storage Cap Reductn					0		0	0			0				
Reduced v/c Ratio					0.45		0.00	0.31			0.67				

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 23 (19%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 20.7 Intersection LOS: C
Intersection Capacity Utilization 48.0% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 179: Washington Street & North Carriage Road

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø5
Lane Configurations															
Traffic Volume (vph)	0	522	59	14	179	668	0	50	446	44	40	440	40		
Future Volume (vph)	0	522	59	14	179	668	0	50	446	44	40	440	40		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	11	12	12	11	11	12	12	16	12	12	16	12		
Storage Length (ft)	0		0		102		0	0		0	0		0		
Storage Lanes	0		0		1		0	1		0	1		0		
Taper Length (ft)	25				50			25			25				
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor					0.86				1.00						
Frt		0.985							0.986			0.987			
Flt Protected					0.950			0.950			0.950				
Satd. Flow (prot)	0	3027	0	0	1556	3079	0	1593	1855	0	1624	1895	0		
Flt Permitted					0.950			0.473			0.468				
Satd. Flow (perm)	0	3027	0	0	1342	3079	0	793	1855	0	800	1895	0		
Right Turn on Red			No				Yes			Yes			Yes		
Satd. Flow (RTOR)															
Link Speed (mph)		30				30			30			30			
Link Distance (ft)		651				478			50			87			
Travel Time (s)		14.8				10.9			1.1			2.0			
Confl. Peds. (#/hr)				159											
Confl. Bikes (#/hr)							1			5					
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94		
Heavy Vehicles (%)	0%	2%	4%	0%	1%	2%	0%	2%	3%	2%	0%	1%	0%		
Adj. Flow (vph)	0	549	62	15	190	711	0	53	474	47	43	468	43		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	611	0	0	205	711	0	53	521	0	43	511	0		
Turn Type		NA		Prot	Prot	NA		Perm	NA		Perm	NA			
Protected Phases	2!	1 2!		6	6!	1 6!			1 2 5 6!			1 2 5 6!		1	5
Permitted Phases	1!							1 2 5 6!			1 2 5 6!				
Detector Phase	2	1 2		6	6	1 6		1 2 5 6	1 2 5 6		1 2 5 6	1 2 5 6			
Switch Phase															
Minimum Initial (s)	5.0			6.0	6.0									8.0	10.0
Minimum Split (s)	20.0			21.0	21.0									21.0	25.0
Total Split (s)	20.0			21.0	21.0									25.0	54.0
Total Split (%)	16.7%			17.5%	17.5%									21%	45%
Maximum Green (s)	14.0			15.0	15.0									19.0	45.0
Yellow Time (s)	3.0			3.0	3.0									3.0	3.0
All-Red Time (s)	3.0			3.0	3.0									3.0	6.0
Lost Time Adjust (s)					-2.0										
Total Lost Time (s)					4.0										
Lead/Lag	Lag			Lag	Lag									Lead	Lead
Lead-Lag Optimize?				Yes	Yes										
Vehicle Extension (s)	4.0			2.0	2.0									2.0	2.0
Recall Mode	Ped			Ped	Ped									C-Max	Ped
Walk Time (s)	7.0			7.0	7.0									8.0	7.0
Flash Dont Walk (s)	7.0			8.0	8.0									6.0	7.0
Pedestrian Calls (#/hr)	0			0	0									0	0
Act Effct Green (s)		41.0			17.0	42.0		120.0	120.0		120.0	120.0			
Actuated g/C Ratio		0.34			0.14	0.35		1.00	1.00		1.00	1.00			
v/c Ratio		0.59			0.93	0.66		0.07	0.28		0.05	0.27			
Control Delay		35.4			96.7	36.5		0.0	0.0		0.1	1.5			
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay		35.4			96.7	36.5		0.0	0.0		0.1	1.5			
LOS		D			F	D		A	A		A	A			
Approach Delay		35.4				50.0						1.4			
Approach LOS		D				D						A			
Queue Length 50th (ft)		204			159	243		0	0		0	27			
Queue Length 95th (ft)		266			#308	312		m0	m0		m0	30			
Internal Link Dist (ft)		571				398			1			7			
Turn Bay Length (ft)					102										
Base Capacity (vph)		1034			220	1077		793	1855		800	1895			
Starvation Cap Reductn		0			0	0		0	0		0	0			
Spillback Cap Reductn		0			0	0		0	0		0	0			
Storage Cap Reductn		0			0	0		0	0		0	0			
Reduced v/c Ratio		0.59			0.93	0.66		0.07	0.28		0.05	0.27			

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 23 (19%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 25.7 Intersection LOS: C
Intersection Capacity Utilization 87.7% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 180: Washington Street & Commonwealth Avenue

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø6
Lane Configurations														
Traffic Volume (vph)	0	18	69	0	0	0	0	529	12	30	648	0		
Future Volume (vph)	0	18	69	0	0	0	0	529	12	30	648	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		80	0		0	0		0	0		0		
Storage Lanes	0		1	0		0	0		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor			0.45					1.00						
Frt			0.850					0.997						
Flt Protected										0.950				
Satd. Flow (prot)	0	1449	1308	0	0	0	0	1490	0	1518	1693	0		
Flt Permitted										0.432				
Satd. Flow (perm)	0	1449	591	0	0	0	0	1490	0	690	1693	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)			121					1						
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		634			880			483			50			
Travel Time (s)		14.4			20.0			11.0			1.1			
Confl. Peds. (#/hr)			162											
Confl. Bikes (#/hr)									1					
Peak Hour Factor	0.57	0.57	0.57	0.92	0.92	0.92	0.88	0.88	0.88	0.94	0.94	0.94		
Heavy Vehicles (%)	25%	18%	0%	2%	2%	2%	0%	3%	0%	7%	1%	0%		
Parking (#/hr)			0					0	0					
Adj. Flow (vph)	0	32	121	0	0	0	0	601	14	32	689	0		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	32	121	0	0	0	0	615	0	32	689	0		
Turn Type		NA	custom					NA		Perm	NA			
Protected Phases		1 2!	2!					5			1 2 5 6!		1	6
Permitted Phases	1 2!		1							1 2 5 6!				
Detector Phase	1 2	1 2	2					5		1 2 5 6	1 2 5 6			
Switch Phase														
Minimum Initial (s)			5.0					10.0					8.0	6.0
Minimum Split (s)			20.0					25.0					21.0	21.0
Total Split (s)			20.0					54.0					25.0	21.0
Total Split (%)			16.7%					45.0%					21%	18%
Maximum Green (s)			14.0					45.0					19.0	15.0
Yellow Time (s)			3.0					3.0					3.0	3.0
All-Red Time (s)			3.0					6.0					3.0	3.0
Lost Time Adjust (s)			0.0					0.0						
Total Lost Time (s)			6.0					9.0						
Lead/Lag			Lag					Lead					Lead	Lag
Lead-Lag Optimize?														Yes
Vehicle Extension (s)			4.0					2.0					2.0	2.0
Recall Mode			Ped					Ped					C-Max	Ped
Walk Time (s)			7.0					7.0					8.0	7.0
Flash Dont Walk (s)			7.0					7.0					6.0	8.0
Pedestrian Calls (#/hr)			0					0					0	0
Act Effct Green (s)		39.0	33.0					45.0		120.0	120.0			
Actuated g/C Ratio		0.32	0.28					0.38		1.00	1.00			
v/c Ratio		0.07	0.36					1.10		0.05	0.41			
Control Delay		28.6	8.8					104.5		0.1	0.8			
Queue Delay		0.0	0.0					0.0		0.0	0.0			
Total Delay		28.6	8.8					104.5		0.1	0.8			
LOS		C	A					F		A	A			
Approach Delay		12.9						104.5			0.8			
Approach LOS		B						F			A			
Queue Length 50th (ft)		17	0					~542		0	3			
Queue Length 95th (ft)		25	2					#741		m0	m0			
Internal Link Dist (ft)		554			800			403			1			
Turn Bay Length (ft)			80											
Base Capacity (vph)		470	333					559		690	1693			
Starvation Cap Reductn		0	0					0		0	0			
Spillback Cap Reductn		0	0					0		0	0			
Storage Cap Reductn		0	0					0		0	0			
Reduced v/c Ratio		0.07	0.36					1.10		0.05	0.41			

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 23 (19%), Referenced to phase 1:NBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 44.9 Intersection LOS: D
Intersection Capacity Utilization 59.9% ICU Level of Service B
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 181: Washington Street & South Carriage Road

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	15	38	14	19	19	48	442	24	72	518	45
Future Volume (vph)	32	15	38	14	19	19	48	442	24	72	518	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.99							
Frt		0.940			0.951			0.994			0.991	
Flt Protected		0.982			0.987			0.995			0.994	
Satd. Flow (prot)	0	1557	0	0	1589	0	0	1671	0	0	1671	0
Flt Permitted		0.848			0.920			0.911			0.900	
Satd. Flow (perm)	0	1342	0	0	1479	0	0	1530	0	0	1513	0
Right Turn on Red			No			No			Yes			Yes
Satd. Flow (RTOR)								8			12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			238			57			449	
Travel Time (s)		11.9			5.4			1.3			10.2	
Confl. Peds. (#/hr)	3		4	4		3						
Peak Hour Factor	0.55	0.55	0.55	0.79	0.79	0.79	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	4%	1%	0%	0%	1%	0%
Adj. Flow (vph)	58	27	69	18	24	24	53	486	26	79	569	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	154	0	0	66	0	0	565	0	0	697	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Detector Phase	3	3		3	3		1	1		1	1	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Total Split (s)	19.0	19.0		19.0	19.0		56.0	56.0		56.0	56.0	
Total Split (%)	25.3%	25.3%		25.3%	25.3%		74.7%	74.7%		74.7%	74.7%	
Maximum Green (s)	15.0	15.0		15.0	15.0		52.0	52.0		52.0	52.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effct Green (s)		10.4			10.4			29.4			29.4	
Actuated g/C Ratio		0.24			0.24			0.69			0.69	
v/c Ratio		0.48			0.18			0.54			0.67	
Control Delay		24.8			19.9			7.6			10.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		24.8			19.9			7.6			10.2	
LOS		C			B			A			B	
Approach Delay		24.8			19.9			7.6			10.2	
Approach LOS		C			B			A			B	
Queue Length 50th (ft)		33			13			68			99	
Queue Length 95th (ft)		64			47			177			264	
Internal Link Dist (ft)		443			158			1			369	
Turn Bay Length (ft)												
Base Capacity (vph)		603			664			1442			1427	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.26			0.10			0.39			0.49	

Intersection Summary

Area Type: CBD
Cycle Length: 75
Actuated Cycle Length: 42.9
Natural Cycle: 45
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.67
Intersection Signal Delay: 11.2 — Intersection LOS: B
Intersection Capacity Utilization 67.9% — ICU Level of Service C
Analysis Period (min) 15

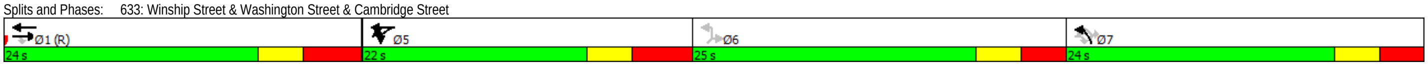
Splits and Phases: 512: Washington Street & Monastery Road/Monastery Driveway

Lane Group	EBT	EBR	EBR2	WBL2	WBL	WBT	NBL2	NBL	NBR	NEL	NER	NER2
Lane Configurations												
Traffic Volume (vph)	181	322	19	277	225	234	9	287	196	35	145	13
Future Volume (vph)	181	322	19	277	225	234	9	287	196	35	145	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	10	12	10	12	13	10	12	12	12
Storage Length (ft)		35			133			0	65	0	75	
Storage Lanes		1			2			1	1	1	1	
Taper Length (ft)					120			25		25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.83							0.94	0.97	0.88	
Frt		0.850							0.850		0.850	
Flt Protected				0.950	0.950			0.950		0.950		
Satd. Flow (prot)	1531	1219	0	1501	1624	1318	0	1625	1330	1490	1440	0
Flt Permitted				0.950	0.950			0.950		0.613		
Satd. Flow (perm)	1531	1010	0	1501	1624	1318	0	1625	1250	932	1268	0
Right Turn on Red			Yes						Yes			No
Satd. Flow (RTOR)		115							195			
Link Speed (mph)	30					30		30		30		
Link Distance (ft)	401					588		1122		798		
Travel Time (s)	9.1					13.4		25.5		18.1		
Confl. Peds. (#/hr)			51						12	17		40
Confl. Bikes (#/hr)		7	9									1
Peak Hour Factor	0.95	0.95	0.95	0.96	0.96	0.96	0.83	0.83	0.83	0.92	0.92	0.92
Heavy Vehicles (%)	8%	2%	33%	1%	0%	9%	44%	2%	2%	9%	1%	0%
Parking (#/hr)		0	0			0						
Adj. Flow (vph)	191	339	20	289	234	244	11	346	236	38	158	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	191	359	0	289	234	244	0	357	236	38	172	0
Turn Type	NA	custom		Prot	Prot	NA	Perm	Prot	Perm	Perm	Perm	
Protected Phases	1			5	5	1 5		7				
Permitted Phases		1 7!					7!		7	6	6	
Detector Phase	1	1 7		5	5	1 5	7	7	7	6	6	
Switch Phase												
Minimum Initial (s)	10.0			8.0	8.0		8.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	24.0			15.0	15.0		20.0	20.0	20.0	25.0	25.0	
Total Split (s)	24.0			22.0	22.0		24.0	24.0	24.0	25.0	25.0	
Total Split (%)	25.3%			23.2%	23.2%		25.3%	25.3%	25.3%	26.3%	26.3%	
Maximum Green (s)	17.0			15.0	15.0		18.0	18.0	18.0	19.0	19.0	
Yellow Time (s)	3.0			3.0	3.0		3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0		3.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-3.0			-3.0	-3.0			-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0			4.0	4.0			4.0	4.0	4.0	4.0	
Lead/Lag				Lead	Lead					Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Recall Mode	C-Max			None	None		None	None	None	None	None	
Walk Time (s)	7.0						7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	10.0						7.0	7.0	7.0	12.0	12.0	
Pedestrian Calls (#/hr)	0						5	5	5	57	57	
Act Effct Green (s)	21.9	45.9		18.0	18.0	43.9		20.0	20.0	19.1	19.1	
Actuated g/C Ratio	0.23	0.48		0.19	0.19	0.46		0.21	0.21	0.20	0.20	
v/c Ratio	0.54	0.66		1.02	0.76	0.40		1.04	0.57	0.20	0.67	
Control Delay	39.9	19.8		98.1	54.1	20.2		98.9	13.8	33.4	48.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	39.9	19.8		98.1	54.1	20.2		98.9	13.8	33.4	48.5	
LOS	D	B		F	D	C		F	B	C	D	
Approach Delay	26.8					59.9		65.1		45.8		
Approach LOS	C					E		E		D		
Queue Length 50th (ft)	105	111		~180	135	98		~235	20	19	94	
Queue Length 95th (ft)	177	225		#345	#248	163		#359	73	47	166	
Internal Link Dist (ft)	321					508		1042		718		
Turn Bay Length (ft)		35		133	133				65		75	
Base Capacity (vph)	353	547		284	307	608		342	417	206	280	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.54	0.66		1.02	0.76	0.40		1.04	0.57	0.18	0.61	

Intersection Summary

Area Type: CBD
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 51.3 Intersection LOS: D
Intersection Capacity Utilization 76.2% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 633: Winship Street & Washington Street & Cambridge Street



Appendix D

Air Quality

APPENDIX D - AIR QUALITY

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 MOVES computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2017 and 2024 for speed limits of idle, 10, 15, and 25 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

Carbon Monoxide Only

		2016	2023
Free Flow	25 mph	2.849	1.921
Right Turns	10 mph	4.447	2.956
Left Turns	15 mph	3.823	2.586
Queues	Idle	9.997	4.102

Notes: Winter CO emission factors are higher than Summer and are conservatively used
Urban Unrestricted Roadway type used

CAL3QHC

For the intersection studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOVES. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness (z_0) of 321 cm was used for the intersection. Idle emission rates for queue links were based on 0 mph emission rates derived in MOVES. Emission rates for speeds of 10, 15, and 25 mph were used for right turn, left turn, and free flow links, respectively.

139-149 Washington Street Background Concentrations

POLLUTANT	AVERAGING TIME	Form	2013	2014	2015	Units	ppm/ppb to $\mu g/m^3$ Conversion Factor	2013-2015 Background Concentration ($\mu g/m^3$)	Location
SO_2 (1)(5)	1-Hour (4)	99th %	12.2	9.7	5.5	ppb	2.62	23.9	Kenmore Sq., Boston
	3-Hour (6)	H2H	13.9	9.4	4.4	ppb	2.62	36.4	Kenmore Sq., Boston
	24-Hour	H2H	6	5	2.9	ppb	2.62	15.7	Kenmore Sq., Boston
	Annual	H	1.0	0.9	0.5	ppb	2.62	2.7	Kenmore Sq., Boston
PM-10	24-Hour	H2H	50	53	30	$\mu g/m^3$	1	53	Kenmore Sq., Boston
	Annual	H	19.3	15.0	14.9	$\mu g/m^3$	1	19.3	Kenmore Sq., Boston
PM-2.5	24-Hour (4)	98th %	17.5	14.6	14.5	$\mu g/m^3$	1	15.5	Kenmore Sq., Boston
	Annual (4)	H	8.0	6.1	6.5	$\mu g/m^3$	1	6.8	Kenmore Sq., Boston
NO_2 (3)	1-Hour (4)	98th %	49	49	56	ppb	1.88	96.5	Kenmore Sq., Boston
	Annual	H	17.8	17.2	17.3	ppb	1.88	33.4	Kenmore Sq., Boston
CO (2)	1-Hour	H2H	1.3	1.3	0.4	ppm	1146	1489.8	Kenmore Sq., Boston
	8-Hour	H2H	1.0	1.1	0.3	ppm	1146	1260.6	Kenmore Sq., Boston
Ozone	8-Hour	H4H	0.059	0.054	0.056	ppm	1963	115.8	Harrison Ave., Boston
Lead	Rolling 3-Month	H	0.007	0.014	0.016	$\mu g/m^3$	1	0.016	Harrison Ave., Boston

Notes:
From 2013-2015 EPA's AirData Website
1 SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.
2 CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.
3 NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.
4 Background level is the average concentration of the three years.
5 The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

Due to excessive size CAL3QHC, and MOVES input and output files are available on digital media upon request.

Appendix E

Climate Change Preparedness Checklist

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at http://www.cityofboston.gov/climate

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/)
3. Army Corps of Engineers guidance on sea level rise (http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf)
4. Proceeding of the National Academy of Science, "Global sea level rise linked to global temperature", Vermeer and Rahmstorf, 2009 (http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf)
5. "Hotspot of accelerated sea-level rise on the Atlantic coast of North America", Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 (http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf)
6. "Building Resilience in Boston": Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 (http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf)

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond "Yes" to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current Climate Change Preparedness & Resiliency Checklist.

A.1 - Project Information

Project Name:	139-149 Washington Street
Project Address Primary:	139-149 Washington Street
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	David O. Gillespie Vice President- Development AvalonBay Communities, Inc. Phone: 617-654-9507 david_gillespie@avalonbay.com

A.2 - Team Description

Owner / Developer:	AvalonBay Communities, Inc.
Architect:	CBT Architects
Engineer (building systems):	Nitsch Engineering
Sustainability / LEED:	CBT Architects
Permitting:	Epsilon Associates
Construction Management:	AvalonBay Communities, Inc.
Climate Change Expert:	

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

☐ PNF / Expanded PNF Submission	☑ Draft / Final Project Impact Report Submission	☐ BRA Board Approved	☐ Notice of Project Change
☐ Planned Development Area	☐ BRA Final Design Approved	☐ Under Construction	☐ Construction just completed:

A.4 - Building Classification and Description

List the principal Building Uses:	Residential
List the First Floor Uses:	*Residential, loading and parking, lobby*

What is the principal Construction Type – select most appropriate type?

☑ Wood Frame	☐ Masonry	☐ Steel Frame	☑ Concrete

Describe the building?

Site Area:	*3.3 acres*	Building Area:	*247,000 SF*
Building Height:	*69 Ft.*	Number of Stories:	*5-6 Flrs.*

First Floor Elevation (reference Boston City Base):	*168-188 Elev.*	Are there below grade spaces/levels, if yes how many:	*Yes, one level*

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:	☑ New Construction	☐ Core & Shell	☐ Healthcare	☐ Schools
	☐ Retail	☐ Homes Midrise	☐ Homes	☐ Other
Select LEED Outcome:	☐ Certified	☑ Silver	☐ Gold	☐ Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	*Yes / No*	Certified:	*Yes / No*
	TBD		*TBD*

A.6 - Building Energy-

What are the base and peak operating energy loads for the building?

Electric:	*TBD (kW)*	Heating:	*TBD (MMBtu/hr)*
What is the planned building Energy Use Intensity:	*TBD (kWh/SF)*	Cooling:	*TBD (Tons/hr)*

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	*TBD (kW)*	Heating:	*TBD (MMBtu/hr)*
		Cooling:	*TBD (Tons/hr)*

What is nature and source of your back-up / emergency generators?

Electrical Generation:	*TBD (kW)*		Fuel Source:	
System Type and Number of Units:	☐ Combustion Engine	☐ Gas Turbine	☐ Combine Heat and Power	*(Units)*

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 - Analysis

What is the full expected life of the project?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:	☐ 10 Years	☑ 25 Years	☐ 50 Years	☐ 75 Years

What time span of future Climate Conditions was considered?

Select most appropriate:	☐ 10 Years	☐ 25 Years	☑ 50 Years	☐ 75 Years

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

8/91 Deg.	Based on ASHRAE Fundamentals 2013 99.6% heating; 0.4% cooling

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

95 Deg.	*5 Days*	*6 Events / yr.*

What Drought characteristics will be used for project planning – Duration and Frequency?

30-90 Days	*0.2 Events / yr.*

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

45 Inches / yr.	*4 Inches*	*0.5 Events / yr.*

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

130 Peak Wind	*10 Hours*	*0.25 Events / yr.*

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:	***TBD***
How is performance determined:	Energy Model

What specific measures will the project employ to reduce building energy consumption?

Select all appropriate:				
	☑ High performance building envelop	☑ High performance lighting & controls	☐ Building day lighting	☑ EnergyStar equip. / appliances
	☑ High performance HVAC equipment	☐ Energy recovery ventilation	☐ No active cooling	☐ No active heating
Describe any added measures:				

What are the insulation (R) values for building envelop elements?

Roof:	*R = 25*	Walls / Curtain Wall Assembly:	*R = 13/17*
Foundation:	*R = 15*	Basement / Slab:	*R =10*
Windows:	*R = / U =0.4*	Doors:	*R = / U =0.7*

What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure?

☐ On-site clean energy / CHP system(s)	☐ Building-wide power dimming	☐ Thermal energy storage systems	☐ Ground source heat pump
☐ On-site Solar PV	☐ On-site Solar Thermal	☐ Wind power	☑ None

Describe any added measures:	

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems?

Select all appropriate:				
	☐ Connected to local distributed electrical	☐ Building will be Smart Grid ready	☐ Connected to distributed steam, hot, chilled water	☐ Distributed thermal energy ready

Will the building remain operable without utility power for an extended period?

		If yes, for how long:	*Days*
If Yes, is building "Islandable?			
If Yes, describe strategies:			

Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure:

Select all appropriate:				
	☐ Solar oriented – longer south walls	☐ Prevailing winds oriented	☑ External shading devices	☐ Tuned glazing,
	☐ Building cool zones	☑ Operable windows	☑ Natural ventilation	☐ Building shading
	☐ Potable water for drinking / food preparation	☐ Potable water for sinks / sanitary systems	☐ Waste water storage capacity	☑ High Performance Building Envelop
Describe any added measures:				

What measures will the project employ to reduce urban heat-island effect?

Select all appropriate:				
	☐ High reflective paving materials	☑ Shade trees & shrubs	☐ High reflective roof materials	☐ Vegetated roofs
Describe other strategies:				

What measures will the project employ to accommodate rain events and more rain fall?

Select all appropriate:				
	☐ On-site retention systems & ponds	☑ Infiltration galleries & areas	☐ Vegetated water capture systems	☐ Vegetated roofs
Describe other strategies:				

What measures will the project employ to accommodate extreme storm events and high winds?

Select all appropriate:				
	☐ Hardened building structure & elements	☑ Buried utilities & hardened infrastructure	☐ Hazard removal & protective landscapes	☐ Soft & permeable surfaces (water infiltration)
Describe other strategies:				

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

No

Describe site conditions?

Site Elevation – Low/High Points:	*168-188 Boston City Base Elev.(Ft.)*
Building Proximity to Water:	*4,400 Ft.*

Is the site or building located in any of the following?

Coastal Zone:	*No*	Velocity Zone:	*No*
Flood Zone:	*No*	Area Prone to Flooding:	*No*

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs:	*No*	Future floodplain delineation updates:	*No*

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

4,350 Ft.

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. ***Otherwise you have completed the questionnaire; thank you!***

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise:	*3 Ft.*	Frequency of storms:	*0.25 per year*

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:	*Boston City Base Elev.(Ft.)*	First Floor Elevation:	*Boston City Base Elev. (Ft.)*

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

	Yes / No	If Yes, to what elevation	*Boston City Base Elev. (Ft.)*
If Yes, describe:			

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

☐ Systems located above 1st Floor.	☐ Water tight utility conduits	☐ Waste water back flow prevention	☐ Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Yes / No

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

Yes / No	If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

	Yes / No
If Yes, describe:	

Will the building remain occupiable without utility power during an extended period of inundation:

Yes / No	If Yes, for how long:	*days*

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:	*Yes / No*	☐ Hardened / Resilient Ground Floor Construction	☐ Temporary shutters and or barricades	☐ Resilient site design, materials and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:	*Yes / No*	☐ Surrounding site elevation can be raised	☐ Building ground floor can be raised	☐ Construction been engineered
Describe additional strategies:				

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:	*Yes / No*	☐ Solar PV	☐ Solar Thermal	☐ Clean Energy / CHP System(s)
		☐ Potable water storage	☐ Wastewater storage	☐ Back up energy systems & fuel
Describe any specific or additional strategies:				

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

Appendix F

Accessibility Checklist

Article 80 – Accessibility Checklist

A requirement of the Boston Planning & Development Agency (BPDA)
Article 80 Development Review Process

The Mayor's Commission for Persons with Disabilities strives to reduce architectural, procedural, attitudinal, and communication barriers that affect persons with disabilities in the City of Boston. In 2009, a Disability Advisory Board was appointed by the Mayor to work alongside the Commission in creating universal access throughout the city's built environment. The Disability Advisory Board is made up of 13 volunteer Boston residents with disabilities who have been tasked with representing the accessibility needs of their neighborhoods and increasing inclusion of people with disabilities.

In conformance with this directive, the BDPA has instituted this Accessibility Checklist as a tool to encourage developers to begin thinking about access and inclusion at the beginning of development projects, and strive to go beyond meeting only minimum MAAB / ADAAG compliance requirements. Instead, our goal is for developers to create ideal design for accessibility which will ensure that the built environment provides equitable experiences for all people, regardless of their abilities. As such, any project subject to Boston Zoning Article 80 Small or Large Project Review, including Institutional Master Plan modifications and updates, must complete this Accessibility Checklist thoroughly to provide specific detail about accessibility and inclusion, including descriptions, diagrams, and data.

For more information on compliance requirements, advancing best practices, and learning about progressive approaches to expand accessibility throughout Boston's built environment. Proponents are highly encouraged to meet with Commission staff, prior to filing.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
   http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Massachusetts State Building Code 780 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html
4. Massachusetts Office of Disability – Disabled Parking Regulations
   http://www.mass.gov/anf/docs/mod/hp-parking-regulations-summary-mod.pdf
5. MBTA Fixed Route Accessible Transit Stations
   http://www.mbta.com/riding_the_t/accessible_services/
6. City of Boston – Complete Street Guidelines
   http://bostoncompletestreets.org/
7. City of Boston – Mayor's Commission for Persons with Disabilities Advisory Board
   www.boston.gov/disability
8. City of Boston – Public Works Sidewalk Reconstruction Policy
   http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
9. City of Boston – Public Improvement Commission Sidewalk Café Policy
   http://www.cityofboston.gov/images_documents/Sidewalk_cafes_tcm3-1845.pdf

Glossary of Terms:

1. ***Accessible Route*** – A continuous and unobstructed path of travel that meets or exceeds the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 20
2. ***Accessible Group 2 Units*** – Residential units with additional floor space that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 9.4
3. ***Accessible Guestrooms*** – Guestrooms with additional floor space, that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 8.4
4. ***Inclusionary Development Policy (IDP)*** – Program run by the BPDA that preserves access to affordable housing opportunities, in the City. For more information visit: http://www.bostonplans.org/housing/overview
5. ***Public Improvement Commission (PIC)*** – The regulatory body in charge of managing the public right of way. For more information visit: https://www.boston.gov/pic
6. ***Visitability*** – A place's ability to be accessed and visited by persons with disabilities that cause functional limitations; where architectural barriers do not inhibit access to entrances/doors and bathrooms.

1. Project Information: *If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.*			
Project Name:	**Avalon Brighton**		
Primary Project Address:	**139 Washington Street**		
Total Number of Phases/Buildings:	2		
Primary Contact (Name / Title / Company / Email / Phone):	**David O. Gillespie** Vice President-Development **Avalon Bay Communities, Inc** Phone:617 -654-9507 David Gillespie@avalonbay.com		
Owner / Developer:	**Avalon Bay Communities**		
Architect:	**CBT Architects**		
Civil Engineer:	**Nitsch Engineering**		
Landscape Architect:	**Gregory Lombardi Design**		
Permitting:	**Epsilon Associates**		
Construction Management:	**Avalon Bay Communities**		
At what stage is the project at time of this questionnaire? Select below:			
	PNF / Expanded PNF Submitted	**Draft / Final Project Impact Report Submitted**	BPDA Board Approved
	BPDA Design Approved	Under Construction	Construction Completed:
Do you anticipate filing for any variances with the Massachusetts Architectural Access Board (MAAB)? ***If yes,*** identify and explain.	The Proponent does not anticipate filing for any variances with the Massachusetts Architectural Access Board at this time.		

2. Building Classification and Description: *This section identifies preliminary construction information about the project including size and uses.*				
What are the dimensions of the project?				
Site Area:	*3.3 acres*	Building Area:		*247,000 GSF*
Building Height:	*69 FT.*	Number of Stories:		*5-6 Flrs.*
First Floor Elevation:	168-188 Elev.	Is there below grade space:		*Yes*
What is the Construction Type? (Select most appropriate type)				
	Wood Frame	Masonry	Steel Frame	Concrete
What are the principal building uses? (IBC definitions are below – select all appropriate that apply)				

	Residential – One - Three Unit	**Residential - Multi-unit, Four +**	Institutional	Educational
	Business	Mercantile	Factory	Hospitality
	Laboratory / Medical	Storage, Utility and Other		
List street-level uses of the building:	*Residential units, lobby*			

3. Assessment of Existing Infrastructure for Accessibility: *This section explores the proximity to accessible transit lines and institutions, such as (but not limited to) hospitals, elderly & disabled housing, and general neighborhood resources. Identify how the area surrounding the development is accessible for people with mobility impairments and analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports*.	
Provide a description of the neighborhood where this development is located and its identifying topographical characteristics:	The proposed project site is located in Brighton. The site is located in the north side of Washington Street and flanked by Monastery Road on the west and Fidelis Way on the east.
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	The #65-Brighton Center-Kenmore Sta. via Washington St. accessible bus stop has a stop at the proposed site on Washington Street and Monastery Road.
List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others:	St. Elizabeth's Medical Center Brighton High School Fidelis Way Day Care Center US Family Health Plan @ Brighton Marine Our Lady of Fatima Shrine Old St Gabriel Monastary
List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	Boston Public Library – Brighton Branch Boston Police District D-14 Brighton/Allston Commonwealth Tenants Association Fidelis Way Park
4. Surrounding Site Conditions – Existing: *This section identifies current condition of the sidewalks and pedestrian ramps at the development site.*	
Is the development site within a historic district? ***If yes,*** identify which district:	A portion of the Project site is located within the Washington-Warren Institutions Area, an area included in the Inventory. Specifically, portions of the access driveways and parking areas are included in the historic area; neither of the two existing buildings on the Project site was recommended for individual listing or is currently in the State or National Registers of Historic Places.

Are there sidewalks and pedestrian ramps existing at the development site? *If yes*, list the existing sidewalk and pedestrian ramp dimensions, slopes, materials, and physical condition at the development site:	Currently the site has concrete sidewalks along both sides of Washington Street and along one side of Fidelis Way for access to existing buildings. Over the years, ramps have been installed at cross walks on Washington Street and a few other significant crossing points. As part of the redevelopment, all existing buildings and sidewalks within the property line and extending to the curbs will be demolished and rebuilt to current accessibility standards. New sidewalks will also be provided on the northwest side of Fidelis Way, the southwest side of the rebuilt road in front of the Commonwealth Development Center and on both sides of the newly built road to access the condominiums, with all built to current accessibility standards. Once the Project is completed, all sidewalks and access points to the buildings within the development limit line will be barrier free to all pedestrians.
Are the sidewalks and pedestrian ramps existing-to-remain? *If yes,* have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? *If yes,* provide description and photos:	No, to be replaced.
5. Surrounding Site Conditions – Proposed *This section identifies the proposed condition of the walkways and pedestrian ramps around the development site. Sidewalk width contributes to the degree of comfort walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Wider sidewalks allow people to walk side by side and pass each other comfortably walking alone, walking in pairs, or using a wheelchair.*	
Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? *If yes*, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard.	Yes, the “Neighborhood Connector” street type has been applied along Washington Street. Although, other sidewalks within the Project are adjacent to private roads, the “Neighborhood Residential” street type has been applied.
What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:	Along Washington Street, the sidewalk is 8 feet wide with a slope less than 5 percent. The Frontage zone is 10’-6” wide at the building lobby and increases to 30’-10” as the building façade steps away from the street. The Pedestrian zone is 8’ wide and the Furnishing zone is 5’ wide. All other sidewalks in the Project are 5 feet wide or greater with a slope of less than 5 percent.
List the proposed materials for each Zone. Will the proposed materials be on private property or will the	The sidewalks throughout the Project will be concrete. The frontage zones will be planted, except for in front of the lobby entrance facing Washington Street, which will be stone pavers. The Furnishing zone will be planted with

proposed materials be on the City of Boston pedestrian right-of-way?	street trees, except for in front of the lobby entrance on Washington Street, which will be permeable paver.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	No
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	
Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details.	This will be determined as the Project continues to develop the scope of work in the public way.
6. Accessible Parking: *See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability – Disabled Parking Regulations*.	
What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage?	There will be 180 garage parking spaces in the apartment building of which 6 will be accessible. There will be 30 garage parking spaces in the condominium building of which 2 will be accessible.
What is the total number of accessible spaces provided at the development site? How many of these are “Van Accessible” spaces with an 8 foot access aisle?	A total of 12 accessible spaces will be provided on the development site. Each building will have 1 “Van Accessible” space within the building.
Will any on-street accessible parking spaces be required? ***If yes,*** has the proponent contacted the Commission for Persons with Disabilities regarding this need?	No
Where is the accessible visitor parking located?	Within the buildings.
Has a drop-off area been identified? ***If yes,*** will it be accessible?	Both buildings will have an accessible drop off area.
7. Circulation and Accessible Routes:	

The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability-with neighbors.	
Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	Flush conditions.
Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe.* ***If no***, what is the reason?	Yes
If project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package.	All proposed pedestrian circulation on the site will be designed to be accessible.
8. Accessible Units (Group 2) and Guestrooms: (If applicable) *In order to facilitate access to housing and hospitality, this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing and hotel rooms.*	
What is the total number of proposed housing units or hotel rooms for the development?	220 Units
If a residential development, how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP (Inclusionary Development Policy) units?	30 for sale condominiums units 180 rental units 13% of the units will be IDP units.
If a residential development, how many accessible Group 2 units are being proposed?	5% of the units will be Group 2 units.
If a residential development, how many accessible Group 2 units will also be IDP units? ***If none***, describe reason.	Some of the accessible Group 2 units will be included in the IDP. The final number will be determined with BPDA in affordable housing review.
If a hospitality development, how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? ***If yes,*** provide amount and location of equipment.	N/A

Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. ***If yes***, provide reason.	No
Are there interior elevators, ramps or lifts located in the development for access around architectural barriers and/or to separate floors? ***If yes***, describe:	Yes. The buildings will be fully accessible.
9. Community Impact: *Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community.*	
Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives?	Yes, the Project will include new landscaping surrounding the site, and significant improvements to Fidelis Way and to the Commonwealth Development community center. These improvements and other public benefits are described in detail in Section 2.2.
What inclusion elements does this development provide for persons with disabilities in common social and open spaces? Example: Indoor seating and TVs in common rooms; outdoor seating and barbeque grills in yard. Will all of these spaces and features provide accessibility?	All common areas of the Project will be accessible.
Are any restrooms planned in common public spaces? ***If yes,*** will any be single-stall, ADA compliant and designated as "Family"/ "Companion" restrooms? ***If no***, explain why not.	Yes Yes
Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? ***If yes,*** did they approve? ***If no,*** what were their comments?	This meeting is pending further development of the plans.

Has the proponent presented the proposed plan to the Disability Advisory Board at one of their monthly meetings? Did the Advisory Board vote to support this project? *If no,* what recommendations did the Advisory Board give to make this project more accessible?	This meeting is pending further development of the plans.

10. Attachments *Include a list of all documents you are submitting with this Checklist. This may include drawings, diagrams, photos, or any other material that describes the accessible and inclusive elements of this project.*
Provide a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations, including route distances. See attached diagrams
Provide a diagram of the accessible route connections through the site, including distances. See attached diagrams.
Provide a diagram the accessible route to any roof decks or outdoor courtyard space? (if applicable)
Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry. This will be determined as design progresses.
Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project. • • •

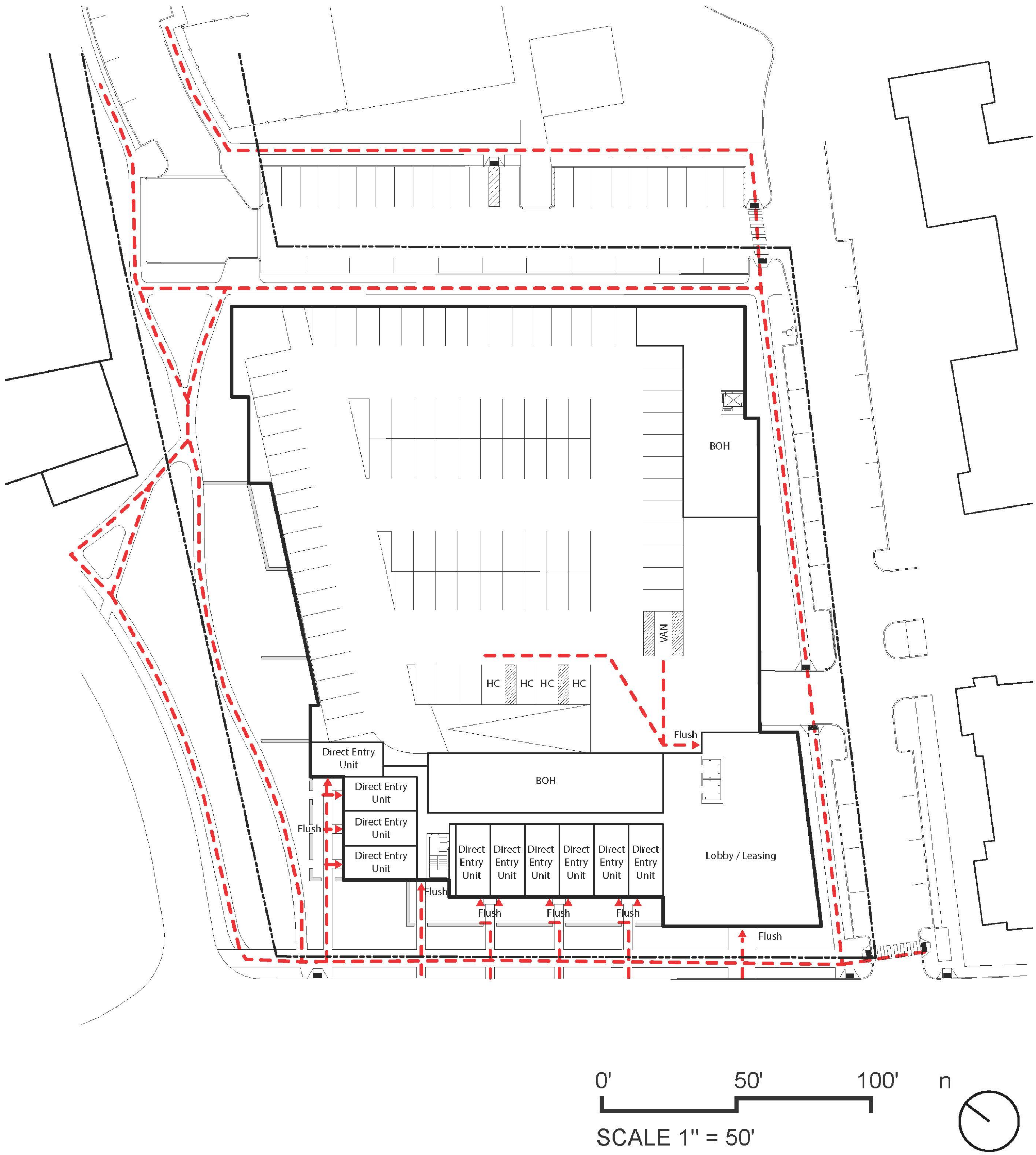
This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to help achieve ideal accessibility and to ensure that all buildings, sidewalks, parks, and open spaces are usable and welcoming to Boston's diverse residents and visitors, including those with physical, sensory, and other disabilities.

For questions or comments about this checklist, or for more information on best practices for improving accessibility and inclusion, visit www.boston.gov/disability, or our office:

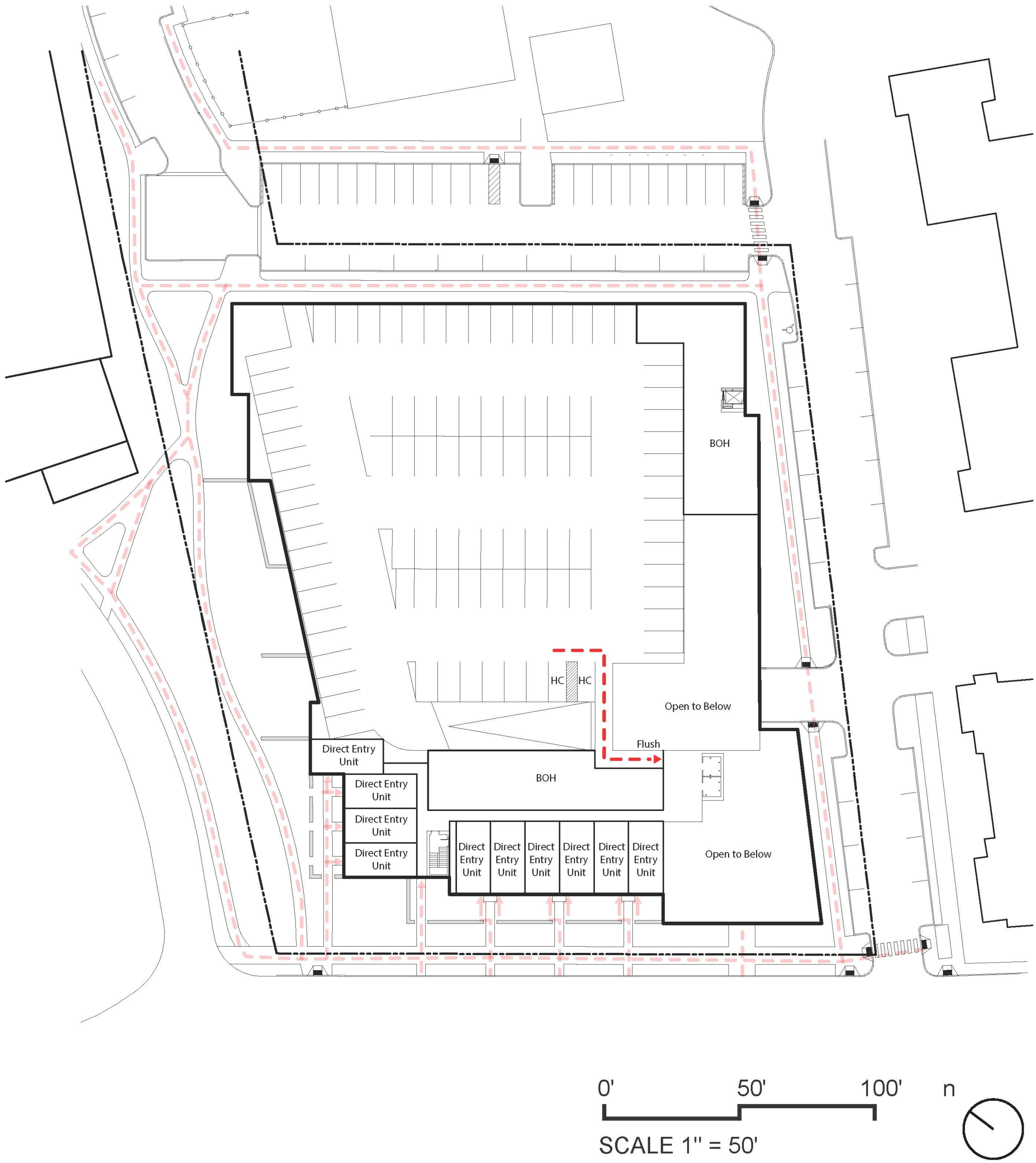
The Mayor's Commission for Persons with Disabilities
1 City Hall Square, Room 967,
Boston MA 02201.

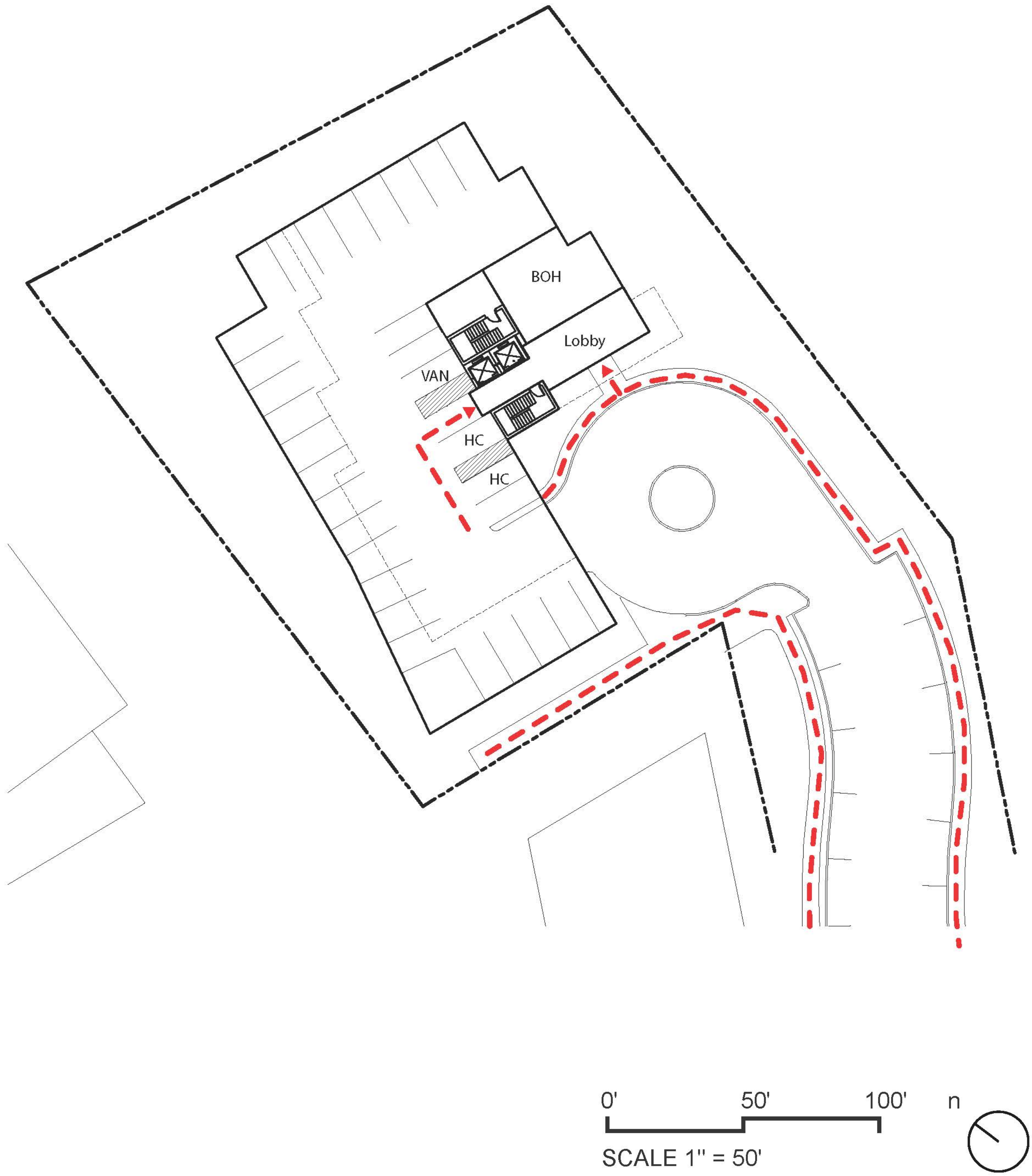
Architectural Access staff can be reached at:

accessibility@boston.gov | patricia.mendez@boston.gov | sarah.leung@boston.gov | 617-635-3682



139-149 Washington Street Boston, Massachusetts


BOH
HC
HC
Open to Below
Flush
Direct Entry Unit
BOH
Direct Entry Unit
Direct Entry Unit
Direct Entry Unit
Direct Entry Unit
Direct Entry Unit
Direct Entry Unit
Direct Entry Unit
Direct Entry Unit
Direct Entry Unit
Open to Below
0'
50'
100'
n
SCALE 1" = 50'



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cbt

Home-ownership Building – Ground Floor Accessibility