345 Harrison Avenue

EXPANDED PROJECT NOTIFICATION FORM

SUBMITTED TO:
BOSTON REDEVELOPMENT AUTHORITY

SUBMITTED BY:
F8345 HARRISON OWNER LLC

PREPARED BY:
EPSILON ASSOCIATES, INC.

OCTOBER 31, 2013

Epsilon
ASSOCIATES INC.

EXPANDED PROJECT NOTIFICATION FORM

345 Harrison Avenue

SUBMITTED TO:
Boston Redevelopment Authority
One City Hall Square
Boston, Massachusetts 02201

SUBMITTED BY:
F8345 Harrison Owner LLC

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

IN ASSOCIATION WITH
CBT Architects, Inc.
DLA Piper LLP
Howard/Stein-Hudson Associates
Vanasse Hangen Brustlin, Inc.
Haley & Aldrich, Inc.

OCTOBER 31, 2013

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Chapter 1.0

General Information

1.0 INTRODUCTION / PROJECT DESCRIPTION

1.1 Introduction

F8345 Harrison Owner LLC (the Proponent), proposes to redevelop an approximately two acre site (the Project site) at 345 Harrison Avenue in the South End neighborhood of Boston (the Project). The Project includes the demolition of the existing building on the site and the development of two residential buildings with ground floor retail totaling approximately 569,400 square feet (sf), as well as parking.

The Project includes the redevelopment of an underused parcel in this growing area of the South End bringing new residents to the area as well as additional ground floor retail and restaurant space. The industrial neighborhood in which the Project is situated was the result of the post WWII 'urban renewal' process that saw the wholesale demolition of a neighborhood. Since that time, the subject area has been controlled almost exclusively by corporate users (Boston Herald, Teradyne, Verizon, Graybar, etc.). In many ways, the neighborhood has been 'frozen in time' and has not benefited from the cultural and architectural renaissance enjoyed by the balance of the South End. The site was created through the demolition of the area in the 1950s to accommodate industrial uses and the Boston Herald (see Figure 1-1). The existing site includes surface parking and a warehouse with some retail and office space (see Figure 1-2), which is in contrast to the residential uses to the west and dense mixed-use development in Downtown to the north. Transforming the site through this mixed-use residential development will continue the revitalization of the area and connect the vibrant Downtown and the growing South End urban neighborhood.

The Project will improve pedestrian connectivity and circulation in the neighborhood, introduce a mix of vibrant 18/7 uses by bringing significant residential space along with neighborhood retail, and will serve as a vital physical and economic link between the Downtown, Chinatown, and South End neighborhoods. The site will be broken up with a landscaped pedestrian way connecting the Massachusetts Bay Transportation Authority (MBTA) Silver Line on Washington Street to the Ink Block development on Harrison Avenue, with an additional entrance to the Project on Traveler Street. Improvements to the streetscape will further enhance the site and the surrounding area. The Project will also result in a number of public benefits, including affordable housing, tax revenues, and an improved urban environment.

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

345 Harrison Avenue Boston, Massachusetts

cbt

Figure 1-1

Historic Photo of Site

345 Harrison Avenue Boston, Massachusetts

cbt

Figure 1-2

Existing Site Use

1.2 Project Identification

Address/Location:	345 Harrison Avenue
Proponent/owner entity:	F8345 Harrison Owner LLC
Developer:	Nordblom Company 71 Third Avenue Burlington, MA 01803 (781) 272-4000 Ogden Hunnewell Todd Fremont-Smith
Architect:	CBT Architects, Inc. 110 Canal Street Boston, MA 02114 (617) 262-4354 Henry Weinberg
Legal Counsel:	DLA Piper LLP (US) 33 Arch Street, 26th Floor Boston, MA 02110 (617) 406-6000 John Rattigan Primo Fontana
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Cindy Schlessinger Geoff Starsiak
Transportation and Parking Consultant:	Howard/Stein-Hudson Associates 38 Chauncy Street Boston, MA 02111 (617) 482-7080 Guy Busa Michael Santos

Civil Engineer: Vanasse Hangen Brustlin, Inc.
99 High Street, 10th Floor
Boston, MA 02110
(617) 728-7777
Karen Wynne

Geotechnical Consultant: Haley & Aldrich, Inc.
465 Medford Street, Suite 2200
Boston, MA 02129
(617) 886-7400
Michael Atwood

1.3 Project Description

1.3.1 Project Site

The Project site is an approximately two acre parcel of land located at 345 Harrison Avenue that currently consists of a two-story brick building with a warehouse used by Graybar Electric Company and surface parking. The Project site is directly bound by William E. Mullins Way to the north, Harrison Avenue to the east, Traveler Street to the south and Washington Street to the west (see Figure 1-3 at the end of Section 1.3) and is located at the northeast corner of the South End near the intersections of I-90 (Massachusetts Turnpike) and I-93 (Southeast Expressway). The site is at a transition point between the surrounding neighborhoods, with the Chinatown and Downtown neighborhoods located to the north of the Project site across I-90, the Fort Point Channel and South Boston neighborhoods to the east across I-93, and the South End and Back Bay neighborhoods immediately southwest and west, respectively. The site is conveniently located along major MBTA bus routes and a northbound MBTA Silver Line station is located on the northwest corner of the site.

1.3.2 Area Context

The surrounding buildings are generally industrial in nature and consist of light manufacturing and warehouse uses as shown in Figures 1-4 and 1-5 at the end of Section 1.3. Three major development projects are underway within two blocks of the site:

- To the east is the former Boston Herald Site known as "The Ink Block", which is currently being developed with approximately 475 residential units, retail storefronts, and a flagship Whole Foods Market.

- To the southeast of the site is 275 Albany Street, which is proposed to be developed as a new approximately 400 unit apartment complex with complementary retail uses.

- To the southwest of the site is 80 East Berkeley Street, which is proposed to be developed as an approximately 308,000 sf mixed-use office building.

On the block directly to the north of the site is the 1000 Washington Street office building and its associated two-story parking deck.

There are three public open spaces located within one-quarter-mile of the Project site including Peter's Park, Rotch Playground, and Rolling Bridge Park.

1.3.3 Proposed Development

1.3.3.1 Description and Program

The Project includes one 14-story building and one 13-story building containing approximately 535,900 sf of residential space with approximately 602 rental units and 33,500 sf of ground floor retail and restaurant space. The 14-story building runs along Harrison Avenue (the "Harrison Avenue building") and the 13-story building along Washington Street (the "Washington Street building"). Between and below the two buildings on the north side of the site is an enclosed garage dedicated to residents. On the southern portion of the site is a lower bar of residential and retail space that fronts on Traveler Street. An open pedestrian way will traverse the site in an east-west direction between Washington Street and Harrison Avenue, with a connection south to Traveler Street, and will be accessible to the residents and the general public. Vehicular and loading access to the site is from William E. Mullins Way. No new parking is provided for the retail spaces. Figure 1-6, at the end of this subsection, shows the site plan. Figures 1-7 to 1-15, at the end of this subsection, include floor plans.

The Harrison Avenue building is accessed from a ground floor residential lobby located near the center of the block and directly across the street from the future Ink Block mixed use development (see Figure 1-7). The building contains approximately 369 rental units. Residential amenities are located on the upper floors of the building facing the pedestrian way. Ground floor retail spaces line Washington Street, Traveler Street and Harrison Avenue as well as the east-west pedestrian way. Bicycle storage will be located on the ground floor and in the garage above. Located at the fifth floor on the rooftop of the parking garage, is a large green roof amenity space and private patios for residents of the fifth floor (see Figure 1-11). The fifth floor may also contain indoor amenity space that fronts on the green roof space.

The Washington Street building is accessed from a ground floor residential lobby located near the center of the block adjacent to the pedestrian way (see Figure 1-7). The building contains approximately 233 residential rental units. Residential amenity space will be shared with the Harrison Avenue building, with additional space located on the ground floor facing the pedestrian way (see Figure 1-7).

As mentioned above, access to the loading dock and parking garage is from William E. Mullins Way. The loading dock is intended to serve all residential move-in move-out and service needs. This loading dock is also utilized by the retail tenant at the corner of Harrison Avenue and William E. Mullins Way, which is anticipated to be a large restaurant. Likewise, the retail tenant at the corner of Washington Street and William E. Mullins Way will utilize this main loading dock area. The four-story parking garage, located on the northern portion of the site includes approximately 252 spaces. The parking garage is wrapped on three sides with a corridor and residential units, while one side remains open with decorative screening elements on William E. Mullins Way.

Approximately 20% of the site is designed and built to ensure public access and to enhance the public realm. The building is setback 10 feet from the property line along Traveler Street, which provides a generous streetscape encouraging pedestrian activity. Traffic on the east-west pedestrian way through the site is limited to pedestrians and cyclists. The pedestrian way is open to the sky and lined with trees and landscape elements to provide a continuous through-block connection linking Harrison Avenue, Washington Street and Traveler Street. In addition, there is a north-south landscaped pedestrian way from Traveler Street to the east-west pedestrian way.

Table 1-1 presents the Project program.

Table 1-1 Project Program

Project Element	Harrison Avenue Building	Washington Street Building
Residential	369 units	233 units
Retail/Restaurant*	19,000 sf	14,500 sf
Total Square Footage*	346,400 sf	223,000 sf
Building Height*	150 feet	150 feet
Parking	252 spaces	

*Measured according to the Boston Zoning Code.

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345 Harrison Avenue Boston, Massachusetts

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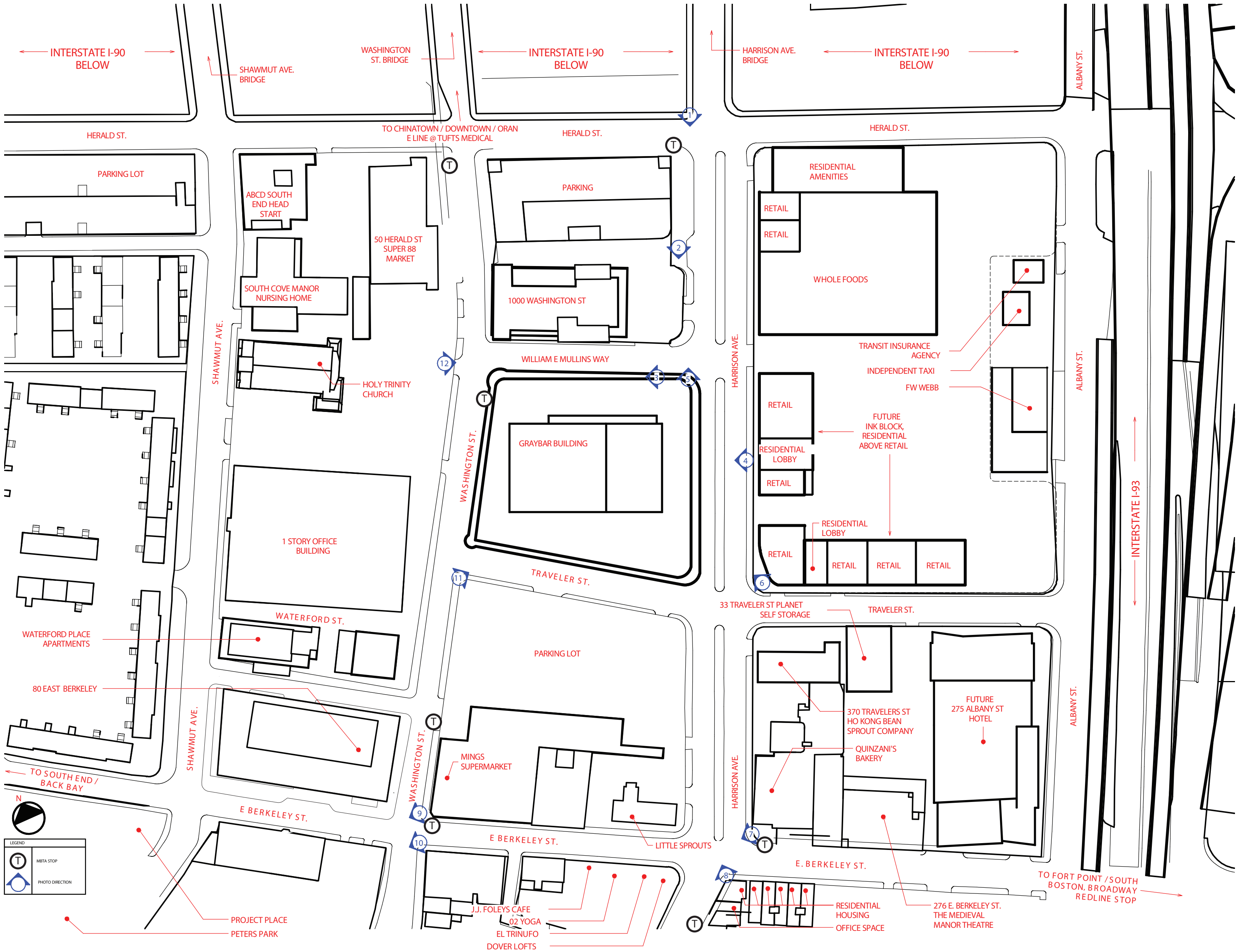
Figure 1-3
Aerial Locus



345 Harrison Avenue Boston, Massachusetts

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Figure 1-4
Area Context

PHOTO 1

PHOTO 2

PHOTO3

PHOTO 4

PHOTO 5

PHOTO 6

PHOTO 7

PHOTO 8

PHOTO 9

PHOTO 10

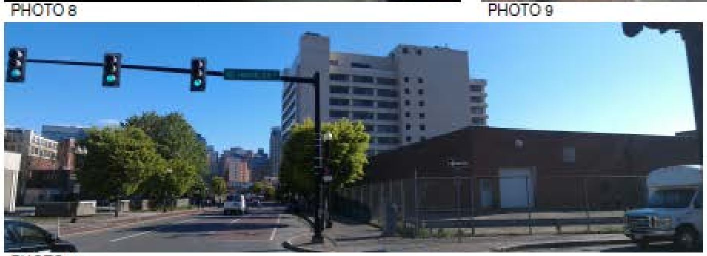

PHOTO 11

PHOTO 12

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Figure 1-5

Area Photographs

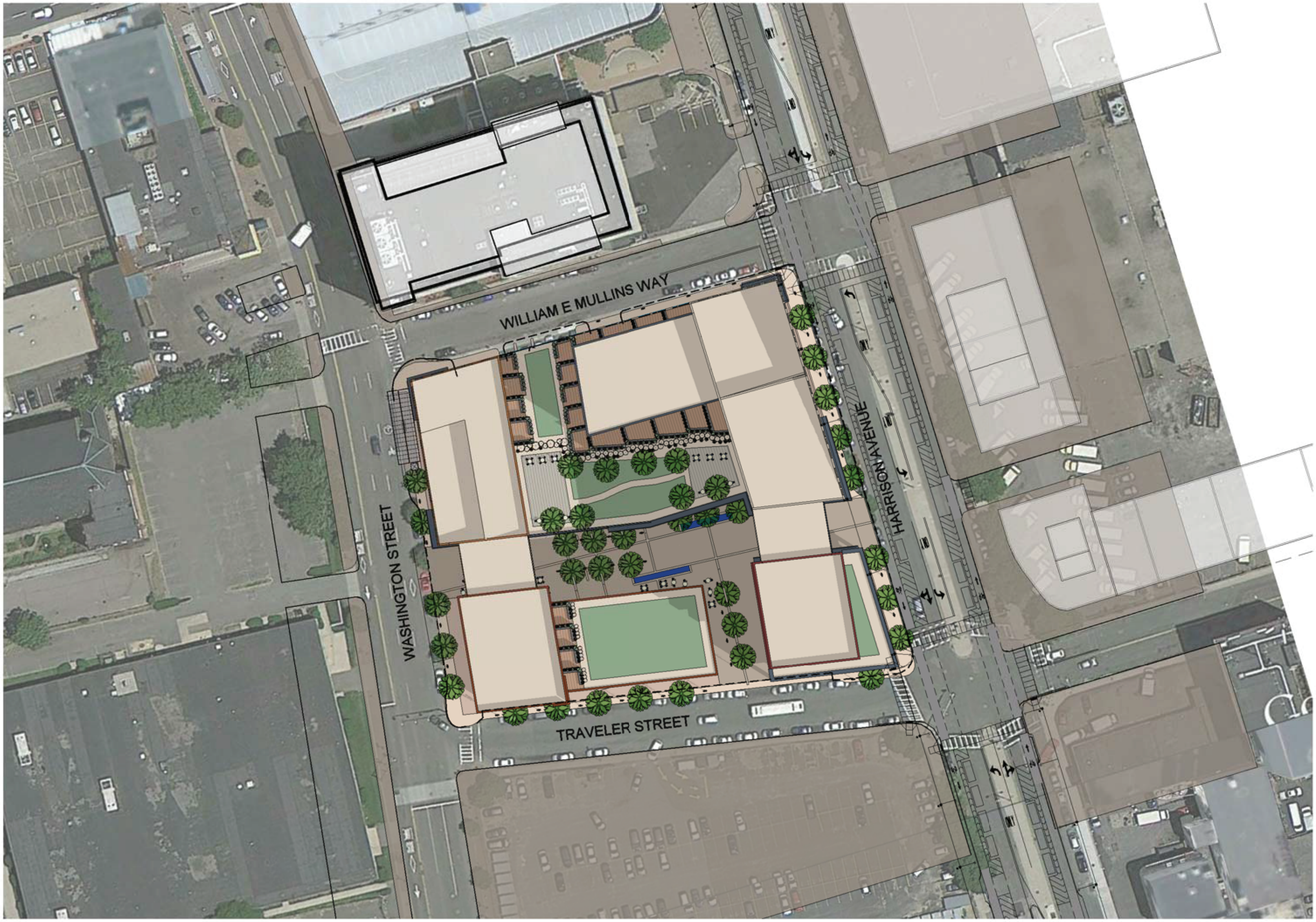

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Figure 1-6

Site Plan

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Figure 1-7

Level 1 Floor Plan

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Figure 1-8
Level 2 Floor Plan

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Figure 1-9

Level 3 Floor Plan

Figure 1-10

Level 4 Floor Plan

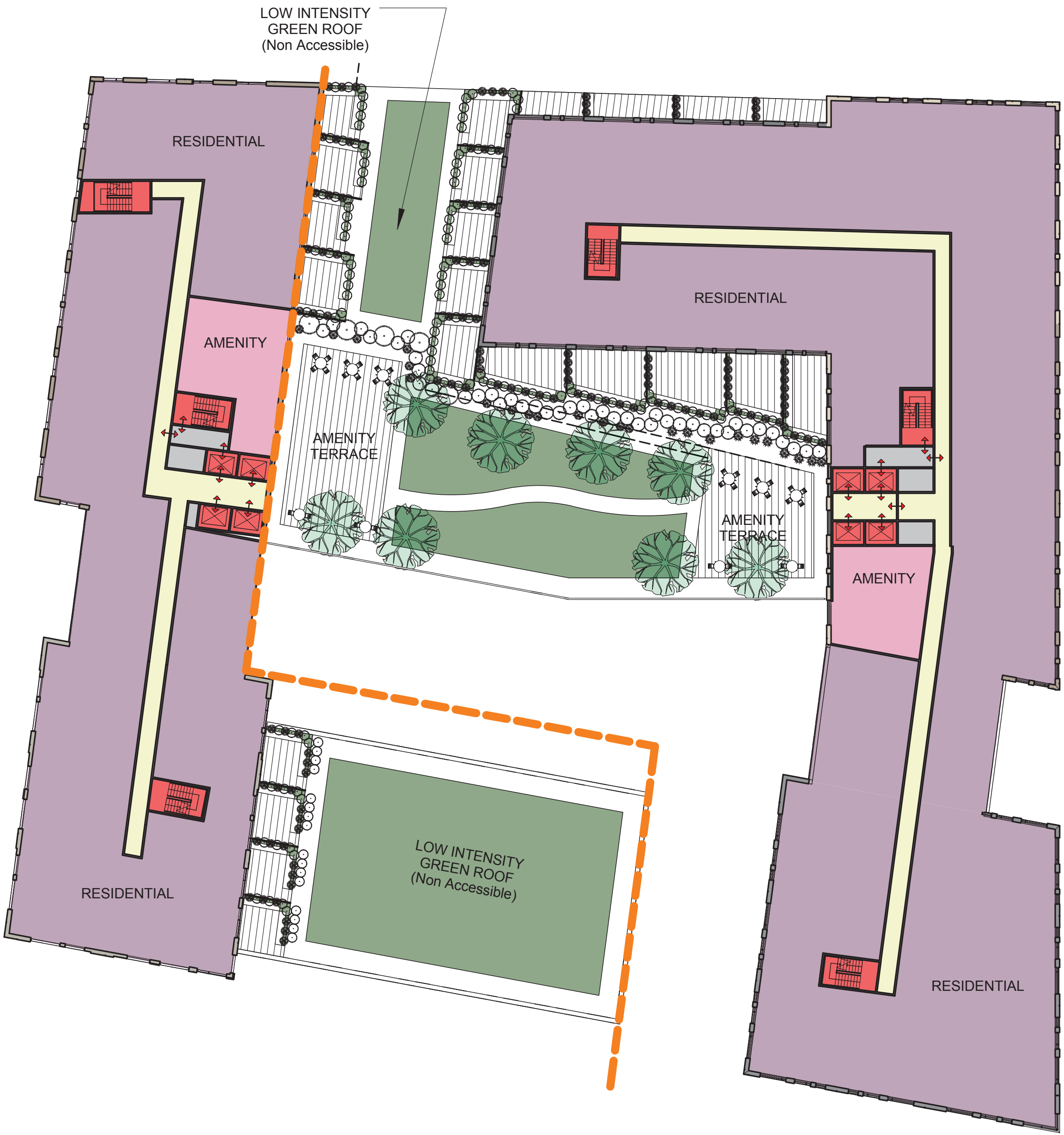

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Figure 1-11

Level 5 Floor Plan

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Figure 1-12
Level 6 Floor Plan

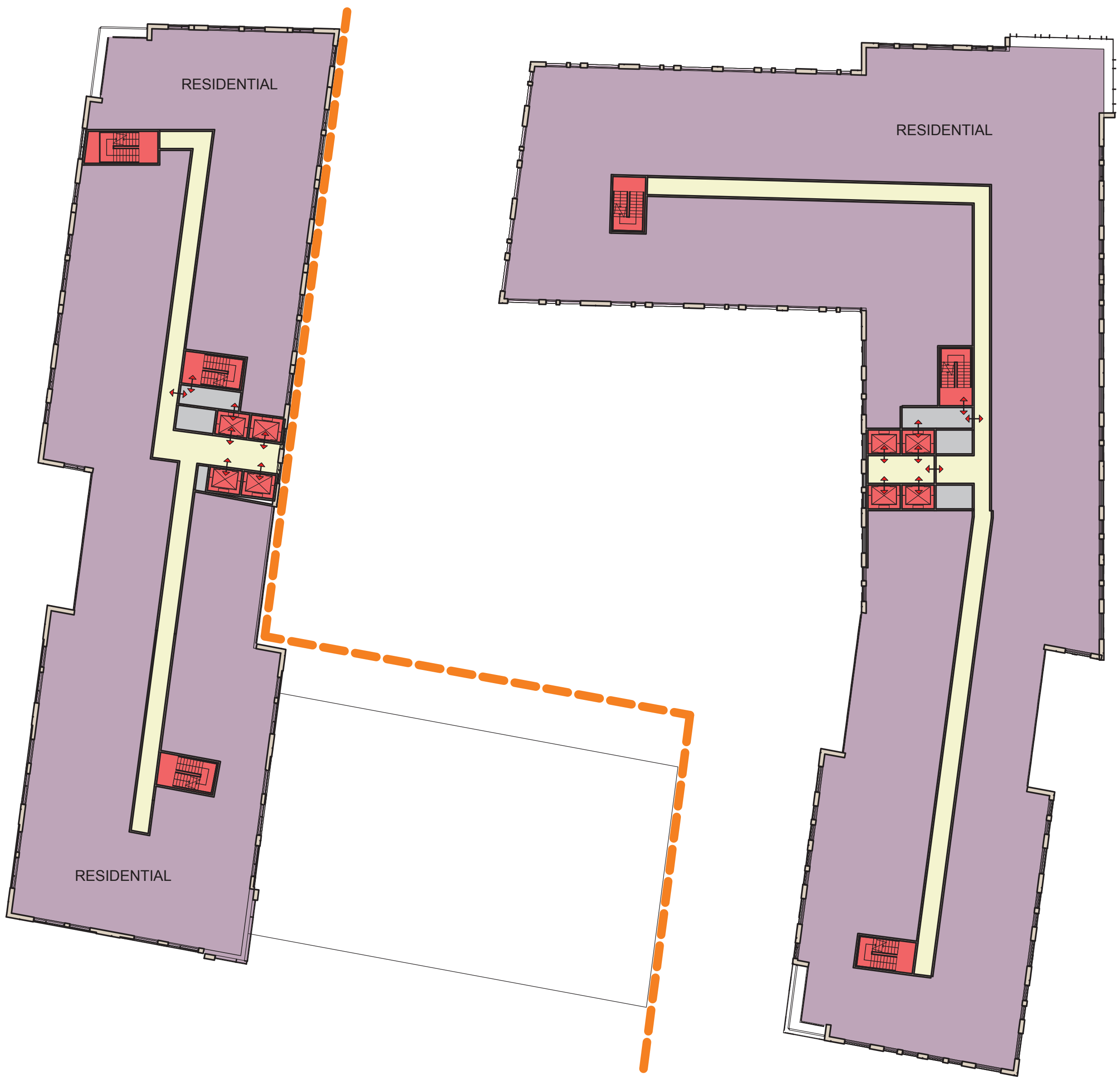

Figure 1-13

Levels 7-12 Floor Plan

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Figure 1-14
Level 13 Floor Plan

Figure 1-15
Level 14 Floor Plan

1.3.3.2 Consistency with the Harrison-Albany Corridor Strategic Plan

The Project site is located within the boundaries of the Harrison-Albany Corridor Strategic Plan, which was adopted by the BRA in November of 2011. The Strategic Plan is made up of four distinct sub-areas, with the Project site located in the New York Streets sub-area. The vision for the area is to:

> *"emphasize its location as the vital physical and economic link between the City's downtown, Chinatown, and South End neighborhoods with convenient access to South Boston and the regional roadway system. Future development should provide exciting new 18-hour uses within a pedestrian-friendly public realm that includes a finer grain of city blocks that allow for enhanced transportation access and circulation. Non-residential uses should provide new jobs for Boston residents."* (p. 20)

The Project is consistent with the goals stated in the Strategic Plan by achieving the following:

- ♦ Introducing a dense urban mix of interactive neighborhood uses, including "18-hour" retail, restaurant and residential uses;
- ♦ Developing a new pedestrian way through the site, breaking up the massing and encouraging pedestrian activity;
- ♦ Creating a pedestrian-friendly environment on the major streets, and locating vehicular and truck access to William E. Mullins Way;
- ♦ Revitalizing an underutilized urban area and removing an unattractive warehouse building, using land efficiently to connect the area to downtown and Chinatown;
- ♦ Introducing high-quality architecture and diverse architecture styles to provide a transformative effect for the neighborhood;
- ♦ Improving the public realm with new benefits, including sidewalks with increased width and streetscape enhancements;
- ♦ Promoting the use of alternative modes of transportation and minimizing parking on-site, while providing bicycle racks and amenities; and
- ♦ Improving water quality by replacing surface parking with new buildings with green roofs, and a central open space through the site that will be landscaped.

1.3.4 *Evolution of Design*

The Project team explored a number of design and use options for the Project site. The various options were explored in regard to program components, urban design, parking requirements, market viability, and overall Project costs.

The site design was influenced by the desire to both maximize activation of the street edge with residential and retail space, and to minimize the impact of the parking garage placement. The design process also focused on how to break apart the massing of the Project and provide a street-level connection though the site. A number of options were studied that included wrapping the parking garage with residential and retail uses, placing residential space above parking across the entire site, and breaking up the Project into two buildings with parking either below grade or above one level of retail. These later options included a north-south street-level connection.

The street-level connection was also the focus of a number of design options. Consistent with the Harrison-Albany Corridor Strategic Plan, the connection was studied as a north-south connection between Traveler Street and William E. Mullins Way. Scenarios for this connection included a pedestrian-only connection, a pedestrian space with a potential vehicular driveway, or a potential limited-access street. Although the orientation of a north-south connection maximizes sunlight to the space, an east-west connection would link the existing residential uses and MBTA Silver Line to the west and the Ink Block project to the east that is currently under construction. Acknowledging the potential of an east-west connection, the design was revised to include an east-west connection, while continuing to provide a link from Traveler Street, breaking up the massing along this portion of the block.

The Project team also studied an as-of-right development that included a concrete parking structure at grade across the entire site that would be wrapped with retail on the three sides facing Harrison Avenue, Traveler Street, and Washington Street. Above the parking would be residential space. This option would not provide for any public amenity space on the site, but rather would provide privatized roof patios between structures built on top of the garage. The design would eliminate connections through the block, and instead encompass the entire site.

The Project team also explored additional program uses, including office space on a portion of the site. Office space would require more parking on the site, increasing the mass of the building and requiring the parking garage to line the sidewalks. It was determined that this type of development would do little to improve the urban design and pedestrian potential of the area.

1.4 Public Benefits

The Project includes the redevelopment of an underused site with a pedestrian-friendly, sustainably designed building that complements the recent and proposed growth in the area. Among its many other improvements, the Project will result in the following benefits:

- Creation of approximately 602 new residential units within approximately one-quarter mile of the MBTA Silver, Orange and Red Lines and bus routes;
- Increase of the City's affordable housing stock. At least 10% of the units will be Affordable Housing as such term is used in the Boston Zoning Code. An amount equivalent to 10% of the units shall also be applied towards affordable housing through some combination of a contribution to the Boston Redevelopment Authority's Inclusionary Housing Fund, creation of off-site Affordable Housing and/or additional Affordable Housing at the Project.
- Creation of approximately 300 to 450 construction jobs and 50 to 80 new permanent jobs.
- Generation of over $20 million in property taxes over the first 10 years upon Project completion, a substantial increase from the tax levied on the underdeveloped Project site.

The Project will provide a variety of urban design benefits to the surrounding neighborhood, including:

- Removing an existing unattractive warehouse building and redeveloping an underutilized parcel in an emerging neighborhood.
- Creating a new through block pedestrian corridor to break up the larger blocks in the area and provide an outdoor space for visitors and residents.
- Introducing high-quality architecture and diverse architecture styles to provide a transformative effect for the neighborhood.
- Providing an improved streetscape with street trees and new lighting that will be activated with new retail and restaurant space.
- Reconnecting South End with Downtown.
- Complying with Article 37 of the Boston Zoning Code by being Leadership in Energy and Environmental Design (LEED) certifiable at the Silver level.

1.5 City of Boston Zoning

The site is located in the South End Neighborhood District. The Proponent intends to establish a Planned Development Area for the site pursuant to Section 64-28 of the Boston Zoning Code, which will permit the proposed uses and dimensions of the Project.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

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

1.6.2 History of Tax Arrears on Property

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

1.6.3 Site Control / Public Easements

The Proponent received a deed for the site which is filed with the Suffolk Registry District of the Land Court as Document No. 804180 and recorded with the Suffolk Registry of Deeds in Book 49597, Page 116. There are currently no public easements affecting the site. The site survey can be found in Appendix A.

1.7 Anticipated Permits

Table 1-2 presents a preliminary list of permits and approvals from governmental agencies that are expected to be required for the Project, based on currently available information. It is possible that only some of these permits or actions will be required, or that additional permits or actions will be required.

Table 1-2 Anticipated Permits and Approvals

Agency Name	Permit / Approval
FEDERAL	
U.S. Environmental Protection Agency	National Pollution Discharge Elimination System Small Construction Discharges Groundwater Treatment Construction Dewatering
Federal Aviation Administration	Determination of No Hazard to Air Navigation
STATE	
Department of Environmental Protection, Division of Water Pollution Control	Sewer Connection and Extension Permit
Department of Environmental Protection, Division of Air Quality Control	Pre-Construction Notice

Table 1-2 Anticipated Permits and Approvals

Agency Name	Permit / Approval
STATE	
Massachusetts Water Resources Authority	Sewer Use Discharge Permit; Construction Dewatering Permit
Massachusetts Historical Commission	Determination of Affect on Historic Resources
LOCAL	
Boston Redevelopment Authority	Article 80B Large Project Review; Article 80C Planned Development Area Review
Boston Civic Design Commission	Schematic Design Review
Boston Zoning Commission	Planned Development Area Approval
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan Street and Sidewalk Occupation Permits; Tieback/Earth Retention Permit
Boston Water and Sewer Commission	Sewer Use Discharge Permit; Site Plan Approval; Construction Dewatering Permit; Sewer Extension/ Connection Permit; Stormwater Connection
Public Works Department/Public Improvement Commission	Streetscape Improvements Curb Cut Permits; Specific Repairs
Boston Air Pollution Control Commission	Exemption from Boston Parking Freeze
City of Boston Committee on Licenses	Parking Garage Permit; Fuel Storage License
City of Boston Inspectional Services Department	Building and Occupancy Permits
South End Landmark District Commission	Design Review

1.8 Public Participation

Members of the development team participated in the Harrison-Albany Corridor Strategic Plan planning process including participation or attendance at numerous community and public meetings. The BRA worked with neighborhood businesses, property owners, institutions and community members to develop a comprehensive Strategic Plan for the Harrison-Albany Corridor. The Mayor appointed a 30-member Advisory Group as part of this Strategic Planning process, which started in April 2009. There were more than 15 Advisory Group meetings (open to the public) and two community-wide meetings. The Harrison-Albany Corridor Strategic Plan was adopted by the BRA Board of Directors in November 2011.

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. The Proponent looks forward to working with the city, neighbors, and others as the design and review processes move forward.

1.9 Schedule

Construction is anticipated by the second quarter of 2014, and will occur over approximately 26 months.

Chapter 2.0

Transportation Component

2.0 TRANSPORTATION

2.1 Introduction

Howard/Stein-Hudson Associates, Inc. (HSH) has conducted an evaluation of the transportation impacts of the mixed-use Project containing residential and retail uses to be located at 345 Harrison Avenue (the Project site) in the South End neighborhood of Boston as shown in Figure 2-1. This transportation study adheres to the Boston Transportation Department (BTD) *Transportation Access Plan Guidelines* and Article 80 development review process and includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity. The study indicates that the existing transportation infrastructure has adequate capacity to accommodate the Project's impacts.

2.1.1 Project Description

The Project site is bounded by William E. Mullins Way to the north, Harrison Avenue to the east, Washington Street to the west, and Traveler Street to the south. The Project site currently contains an electrical supply wholesale and distribution facility and associated parking, which will be demolished as part of the Project. The Project is a proposed mixed-use development consisting of the construction of one 14-story building and one 13-story building containing approximately 602 residential apartment units and approximately 33,500 sf of retail/restaurant space. The Washington Street building will be located on the western portion of the site abutting Washington Street, Traveler Street and William E. Mullins Way and will contain approximately 233 residential units and approximately 14,500 sf of retail/restaurant space. The Harrison Avenue building will be located on the eastern portion of the site abutting William E. Mullins Way, Harrison Avenue and Traveler Street. The Harrison Avenue building will contain approximately 369 residential units and approximately 19,000 sf of retail/restaurant space.

Approximately 252 parking spaces will be provided on-site in a parking garage accessed off of William E. Mullins Way. Loading will occur on-site and will also be accessed off William E. Mullins Way. Storage for approximately 612 bicycles will also be provided on-site (602 for the residential component and 10 additional spaces for the retail/restaurant component). An open pedestrian way will traverse the site in an east-west direction between Washington Street and Harrison Avenue, with a connection south to Traveler Street, and will be accessible to the residents and the general public.

2.1.2 Study Area

The study area is generally bounded by Herald Street to the north, Washington Street to the west, East Berkeley Street to the south, and the Interstate 93 (I-93) Frontage Road to the east. It includes the following 13 intersections, also shown on Figure 2-1:

- Washington Street/East Berkeley Street;
- Washington Street/Traveler Street;
- Washington Street/William E. Mullins Way;
- Washington Street/Herald Street;
- Harrison Avenue/East Berkeley Street;
- Harrison Avenue/Traveler Street;
- Harrison Avenue/William E. Mullins Way;
- Harrison Avenue/Herald Street;
- Albany Street/East Berkeley Street;
- Albany Street/Traveler Street;
- Albany Street/Herald Street;
- Frontage Road/East Berkeley Street/West Fourth Street; and
- Frontage Road/Traveler Street/Broadway Bridge.

2.1.3 Study Methodology

This transportation study and supporting analyses were conducted in accordance with BTD guidelines and is described below.

The existing conditions analysis includes an inventory of the existing (2013) transportation conditions, such as roadway capacities, traffic characteristics, parking and curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Existing counts for vehicles, bicycles, and pedestrians were obtained from traffic studies conducted for nearby projects at the study area intersections. The traffic counts form the basis for the traffic analysis conducted as part of this evaluation.

345 Harrison Avenue   Boston, Massachusetts

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Figure 2-1
Study Area Intersections

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. Long-term impacts are evaluated for the year 2018, based on a five-year horizon from the existing year (2013). Expected roadway, parking, transit, pedestrian, bicycle accommodation, and loading capacities and deficiencies are identified. This section includes the following scenarios:

- The 2018 No Build condition scenario includes both general background traffic growth and traffic growth associated with specific developments in the vicinity of the Project site. The 2018 No Build condition scenario also incorporates any proposed modifications and improvements to the surrounding transportation infrastructure.
- The 2018 Build condition scenario includes Project-generated traffic volume estimates added to the traffic volumes developed as part of the 2018 No Build condition scenario.

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

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

2.2 Existing Conditions

2.2.1 Existing Roadway Conditions

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

Washington Street

- Is adjacent to the west side of the Project site.
- Is classified as an urban principal arterial within the study area.
- Generally runs in a northeast-southwest direction through downtown Boston, the South End, Roxbury, and Jamaica Plain.
- In the vicinity of the site, Washington Street southbound consists of a single lane restricted to buses and bicycles. Washington Street northbound consists of two general travel lanes and a shared bus/bicycle lane.
- Sidewalks are provided along both sides of Washington Street within the study area.

Harrison Avenue

- Is adjacent to the east side of the Project site.
- Is classified as an urban minor arterial within the study area.
- Generally runs in a northeast-southwest direction between downtown Boston and Roxbury.
- In the vicinity of the site, Harrison Avenue consists of two travel lanes separated by a wide median and on-street parking in each direction.
- Sidewalks are provided along both sides of Harrison Avenue within the study area.

Traveler Street

- Is adjacent to the south side of the Project site.
- Is classified as a local roadway between Washington Street and Albany Street, and an urban principal arterial between Albany Street and Dorchester Avenue (as the Broadway Bridge).
- Generally runs in an east-west direction between Washington Street and Frontage Road.
- Between Washington Street and Harrison Avenue, Traveler Street is one-way in the westbound direction and consists of a single lane.
- Between Harrison Avenue and Albany Street, Traveler Street is two-way with a single lane of travel in each direction.
- Between Albany Street and the Frontage Road, Traveler Street is one-way in the eastbound direction and consists of two travel lanes.
- East of the Frontage Road, Traveler Street connects to the Broadway Bridge which is two-way with two lanes of travel in each direction.
- Sidewalks are generally provided along both sides of Traveler Street throughout the study area.

William E. Mullins Way

- Is adjacent to the north side of the Project site.
- Is classified as a local roadway within the study area.

- Runs in an east-west direction and provides primary access to the Project site.
- William E. Mullins Way is two-way with a single lane of travel in each direction.
- Sidewalks are provided along both sides of William E. Mullins Way.

Albany Street

- Is located east of the Project site.
- Is classified as an urban principal arterial within the study area.
- Generally runs in a northeast-southwest direction between Kneeland Street in Chinatown through to Roxbury.
- In the vicinity of the site, Albany Street is one way in the southbound direction and consists of three travel lanes.
- Sidewalks are provided along both sides of Albany Street within the study area.

Frontage Road

- Is located east of the Project site.
- Is classified as an urban principal arterial within the study area.
- Generally runs in a north-south direction along I-93 between downtown Boston and Southampton Street in Dorchester.
- In the vicinity of the site, the Frontage Road is one-way in the northbound direction and consists of three to four travel lanes.
- Sidewalks are generally not provided along the Frontage Road within the study area.

East Berkeley Street

- Is located south of the Project site.
- Is classified as an urban principal arterial within the study area.
- Generally runs in a northwest-southeast direction between Tremont Street and Dorchester Avenue.
- In the vicinity of the site, East Berkeley Street is one-way in the westbound direction and consists of three travel lanes.

- Sidewalks are provided along both sides of East Berkeley Street within the study area.

Herald Street

- Is located north of the Project site.
- Is classified as is an urban principal arterial within the study area.
- Runs in an east-west direction between Tremont Street and Albany Street.
- Herald Street is one-way in the eastbound direction and consists of three travel lanes.
- Sidewalks are provided along both sides of Herald Street.

2.2.2 Existing Intersection Conditions

Existing conditions at each of the study area intersections are described below.

Washington Street/East Berkeley Street

- Is a four-legged, signalized intersection under BTD jurisdiction.
- East Berkeley Street is one-way westbound and consists of a shared left-turn/through lane, an exclusive through lane, and a shared through/right-turn lane.
- Washington Street northbound consists of an exclusive left-turn lane, a through lane, and an exclusive bus lane for the MBTA Silver Line.
- Washington Street southbound consists of an exclusive bus lane for the MBTA Silver Line.
- Far-side MBTA bus stops are provided along both Washington Street northbound and southbound;
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided at all approaches to the intersection.

Washington Street/Traveler Street

- Is a three-legged, signalized intersection under BTD jurisdiction.
- Traveler Street is one-way westbound and consists of a single right-turn lane.
- Washington Street northbound consists of two through lanes and an exclusive bus lane for the MBTA Silver Line.

- Washington Street southbound consists of an exclusive bus lane for the MBTA Silver Line.

- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided for the Washington Street northbound and Traveler Street westbound approaches to the intersection.

Washington Street/William E. Mullins Way

- Is a three-legged, unsignalized intersection under BTD jurisdiction.

- William E. Mullins Way westbound consists of a single right-turn lane under STOP-sign control.

- Washington Street northbound consists of two through lanes and an exclusive bus lane for the MBTA Silver Line that also accommodates right-turning vehicles.

- An MBTA bus stop is provided along the Washington Street northbound approach.

- Washington Street southbound consists of an exclusive bus lane for the MBTA Silver Line.

- A crosswalk with handicap-accessible ramps is provided across the William E. Mullins Way westbound approach.

Washington Street/Herald Street

- Is a four-legged, signalized intersection under BTD jurisdiction.

- Herald Street is one-way eastbound and consists of a shared left-turn/through lane and two through lanes.

- Washington Street northbound consists of two through lanes and an exclusive right-turn lane that also accommodates the MBTA Silver Line buses.

- Washington Street southbound consists of an exclusive bus lane for the MBTA Silver Line.

- An MBTA bus stop is provided along Washington Street southbound departing the intersection.

- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided across both Herald Street approaches and the Washington Street northbound approach to the intersection.

Harrison Avenue/East Berkeley Street

- Is a four-legged, signalized intersection under BTD jurisdiction.
- East Berkeley Street is one-way westbound and consists of a shared left-turn/through lane, a through lane, and a shared through/right-turn lane.
- Harrison Avenue northbound consists of a single travel lane with enough width to allow a short queue for left-turning vehicles to form.
- Harrison Avenue southbound consists of a through lane and a shared through/right-turn lane.
- Directions of travel along Harrison Avenue southbound are separated by a raised median.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided at all approaches to the intersection with the exception of the departing lanes of East Berkeley Street westbound.

Harrison Avenue/Traveler Street

- Is a four-legged, signalized intersection under BTD jurisdiction.
- Traveler Street westbound consists of a shared left-turn/ through/right-turn lane.
- Traveler Street is one-way in the westbound direction departing the intersection.
- Harrison Avenue northbound consists of a left-turn/through lane and a through/ right-turn lane.
- Harrison Avenue southbound consists of a left-turn/through lane and a through/ right-turn lane.
- Directions of travel along Harrison Avenue is separated by a raised median.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided at all approaches to the intersection.

Harrison Avenue/William E. Mullins Way

- Is a three-legged, unsignalized intersection under BTD jurisdiction.
- William E. Mullins Way eastbound consists of a shared left-turn/right-turn lane under STOP control.

- Harrison Avenue northbound consists of a shared left-turn lane and a through lane.
- Harrison Avenue southbound consists of a through lane and a shared through/right-turn lane.
- Directions of travel along Harrison Avenue are separated by a raised median.
- Crosswalks with handicap-accessible ramps are provided at all approaches to the intersection.

Harrison Avenue/Herald Street

- Is a four-legged, signalized intersection under BTD jurisdiction.
- Herald Street is one-way eastbound and consists of two through lanes and a shared through/right-turn lane.
- Harrison Avenue northbound consists of two exclusive right-turn lanes.
- Harrison Avenue is one-way southbound north of the intersection and consists of an exclusive left-turn lane and two through lanes.
- Directions of travel along Harrison Avenue northbound are separated by a raised median.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided across the Harrison Avenue northbound approach and both Herald Street legs of the intersection.

Albany Street/East Berkeley Street

- Is a four-legged, signalized intersection under MassDOT jurisdiction.
- East Berkeley Street is one-way westbound and consists of a shared left-turn/through lane and two through lanes.
- Albany Street is one-way southbound and consists of two through lanes and a shared through/right-turn lane.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided across East Berkeley Street, west of the intersection and Albany Street, south of the intersection.

Albany Street/Traveler Street

- Is a four-legged, signalized intersection under MassDOT jurisdiction.

- Traveler Street is one-way eastbound and consists of a shared through/right-turn lane that is wide enough to accommodate two lanes of travel.
- Albany Street is one-way southbound and consists of an exclusive left-turn lane, a shared left-turn/through lane, and a shared through/right-turn lane.
- Crosswalks with handicap-accessible ramps and pedestrian signals are provided at the Traveler Street approach and for Albany Street, south of the intersection.

Albany Street/Herald Street

- Is a three-legged, signalized intersection under MassDOT jurisdiction.
- Herald Street is one-way eastbound and consists of three right-turn lanes.
- Albany Street is one-way southbound and consists of three through lanes.
- Crosswalks with handicap-accessible ramps and pedestrian signals are provided across the Herald Street eastbound and Albany Street southbound approaches to the intersection.

Frontage Road/East Berkeley Street/West Fourth Street

- Is a four-legged, signalized intersection under MassDOT jurisdiction.
- West Fourth Street westbound and consists of two through lanes and a shared through/right-turn lane.
- East Berkeley Street is one-way in the westbound direction, west of the intersection.
- The Frontage Road is one-way northbound and consists of an exclusive left-turn lane, a shared left-turn/through lane, and a shared through/right-turn lane.
- Crosswalks with handicap-accessible ramps and pedestrian signal equipment are provided along the Frontage Road northbound and West Fourth Street westbound approaches.

Frontage Road/Traveler Street/Broadway Bridge

- Is a four-legged, signalized intersection under MassDOT jurisdiction.
- Traveler Street is one-way eastbound and consists of a channelized, exclusive left-turn lane to I-90, an exclusive left-turn lane to I-93, and two through travel lanes to the Broadway Bridge.
- The Broadway Bridge westbound approach consists of two right-turn lanes.

- Frontage Road is one-way northbound and consists of two through lanes to I-90, two through lanes to I-93, and a shared through/right-turn lane.

- The two through lanes to I-90 on the Frontage Road are separated from the other lanes of travel by a raised median.

- A crosswalk with handicap-accessible ramps and pedestrian signal equipment is provided across the Frontage Road northbound approach.

2.2.3 Existing Traffic Conditions

Traffic movement data were obtained from traffic studies conducted for the 275 Albany Street[1] project, located southeast of the Project site and the Ink Block[2] project, located immediately east of the Project site. The traffic volumes used in the Ink Block project were conducted in 2011 and were used as the basis for the existing traffic volumes. The peak hours for the traffic volumes are 8:00 – 9:00 a.m. and 5:00 – 6:00 p.m.

To account for traffic growth since the Ink Block data collection in 2011, the traffic volumes presented in the Ink Block traffic study were increased by one percent per year to develop the 2013 Existing conditions a.m. and p.m. peak hour traffic volumes. The background traffic growth rate of one percent is consistent with the background growth rate used in both the 275 Albany Street and Ink Block traffic studies.

Figure 2-2 and Figure 2-3 show the existing peak hour turning movement volumes for the study area intersections during the a.m. and p.m. peak hours, respectively. The traffic volume networks that were used as the basis for the 2013 Existing conditions volumes are provided in Appendix B.

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1 *Draft Environmental Impact Report - 275 Albany Street (EEA #14534)*; Epsilon Associates Inc. and Howard/Stein-Hudson Associates Inc.; November 30, 2012.

2 *Expanded Project Notification Form/Environmental Notification Form – Ink Block South End*; Vanasse Hangen Brustlin, Inc.; January 2012.

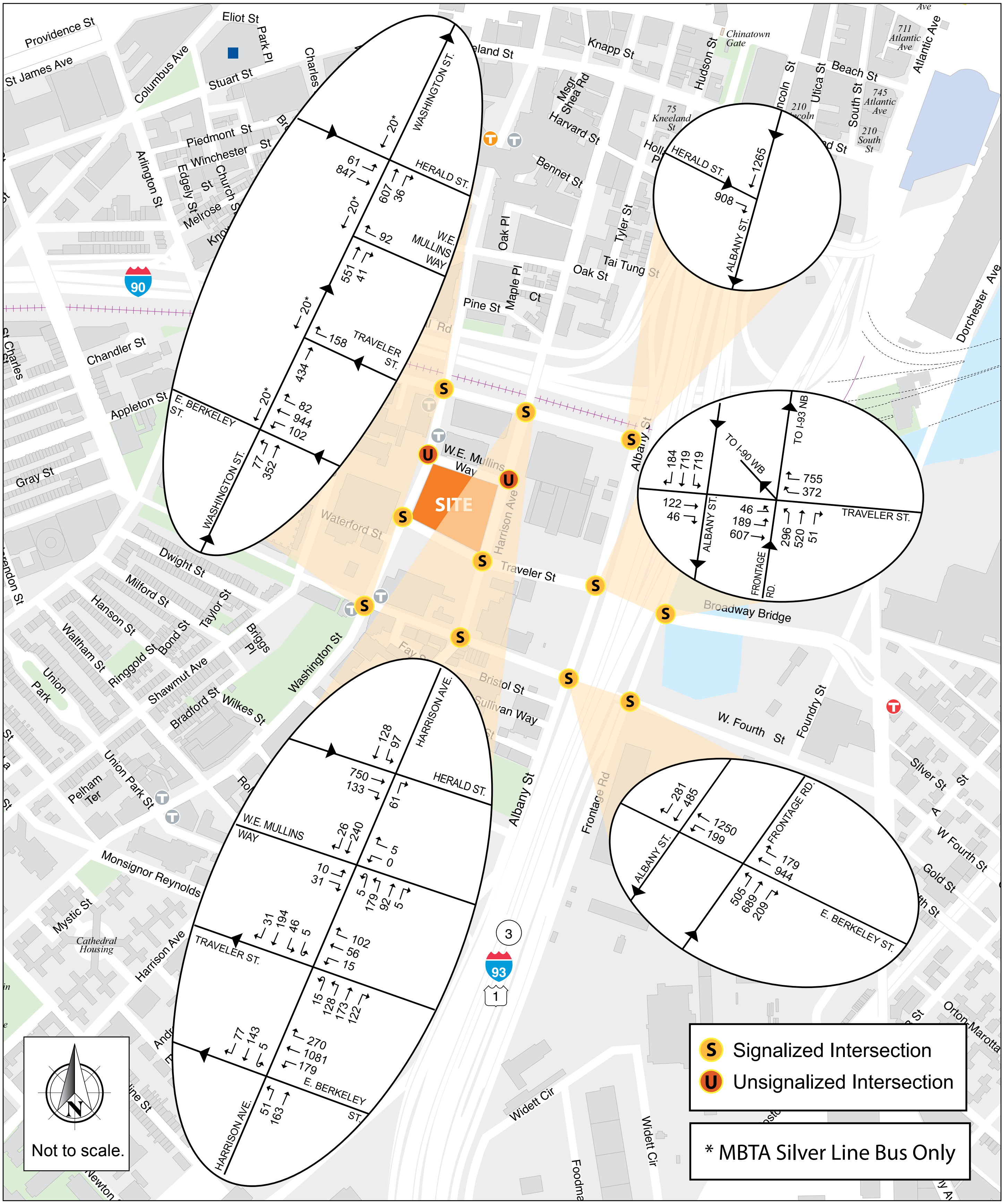

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Figure 2-2

Existing Conditions (2013) Turning Movement Volumes, a.m. Peak Hour (8:00-9:00 a.m.)

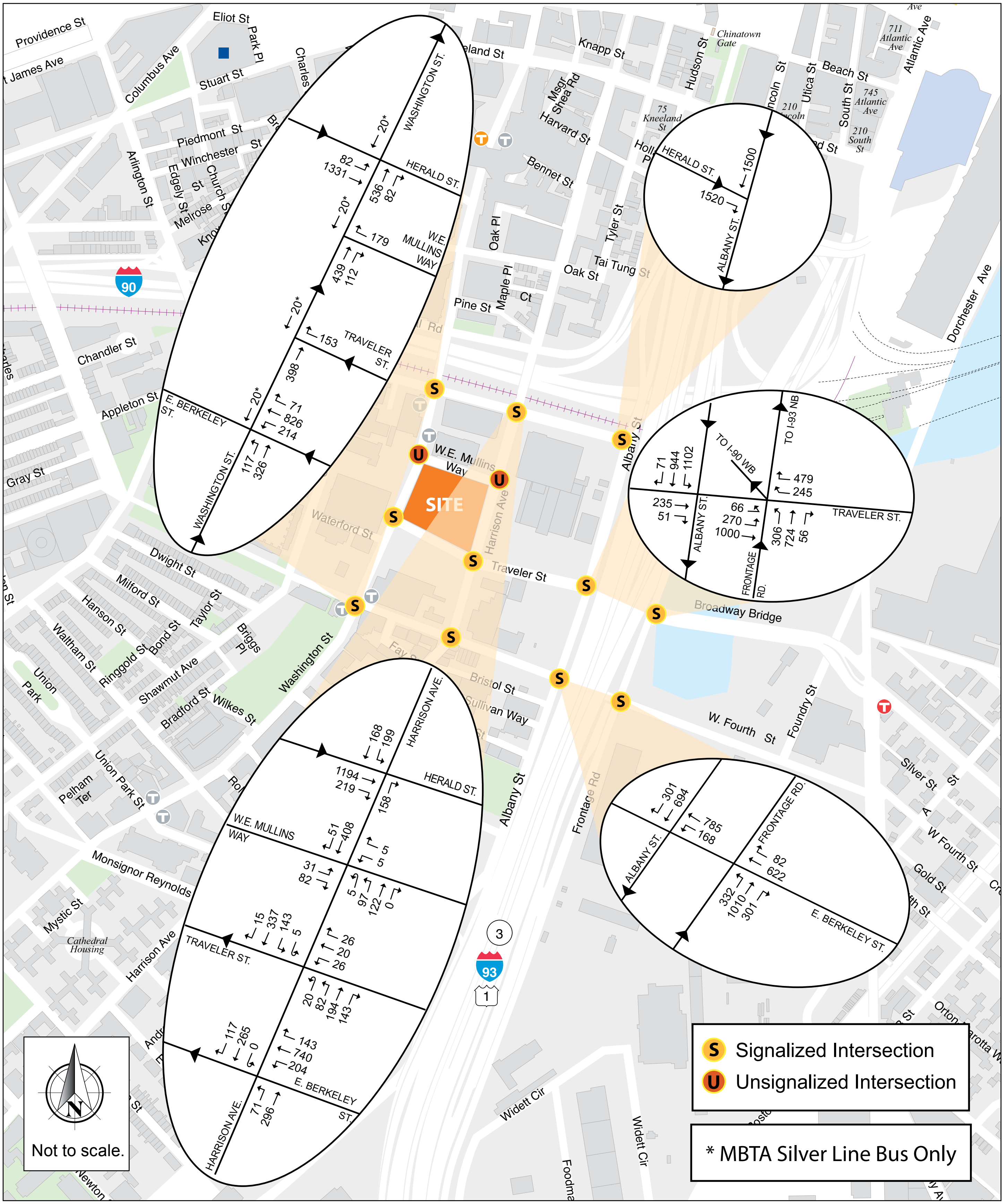

Figure 2-3

Existing Conditions (2013) Turning Movement Volumes, p.m. Peak Hour (5:00-6:00 p.m.)

2.2.4 *Existing Traffic Operations*

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay incurred by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 6) software package was used to calculate average delay and associated LOS at the study area intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2000 *Highway Capacity Manual* (HCM).

The volume-to-capacity (v/c) ratio is a measure of congestion at an intersection approach. A v/c ratio of one or greater indicates that the traffic volume on the intersection approach exceeds capacity.

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

The 95th percentile queue length, measured in feet, represents the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line during five percent of all signal cycles. The 95th percentile queue will not be seen during each cycle. The queue would be this long only five percent of the time and would typically not occur during off-peak hours.

Field observations were performed by HSH to collect intersection geometry such as number of turning lanes, lane length, and lane width. Signal timing and phasing used in this analysis were obtained from the BTD and through the field observations conducted by HSH.

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 2-1 displays the intersection level of service criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst (unacceptable) condition, with significant traffic delay. LOS D or better is typically considered acceptable in an urban area. However, LOS E or F is often typical for a stop controlled minor street that intersects a major roadway.

Table 2-1 Level of Service Criteria

Level of Service	Average Stopped Delay (sec./veh.)	
	Signalized Intersections	Unsignalized Intersections
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50
Source: 2000 Highway Capacity Manual, Transportation Research Board.		

Table 2-2 and Table 2-3 present the 2013 Existing condition operational analysis for the study area intersections during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix B.

As shown in Table 2-2, during the a.m. peak hour, the majority of the signalized intersections operate at LOS D or better. The intersections of Frontage Road/West Fourth Street/East Berkeley Street and Frontage Road/Traveler Street/Broadway Bridge both operate at an overall LOS F during the a.m. peak hour. All movements at the unsignalized intersections operate at LOS B or better during the a.m. peak hour.

As shown in Table 2-3, during the p.m. peak hour, the majority of the signalized intersections operate at LOS D or better. The intersections of Washington Street/Herald Street and Frontage Road/West Fourth Street/East Berkeley Street both operate at LOS F and the intersections of Harrison Street/Herald Street and Albany Street/Herald Street both operate at LOS E during the p.m. peak hour. All movements at the unsignalized intersections operate at LOS C or better during the a.m. peak hour.

Table 2-2 Existing Conditions (2013) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
East Berkeley Street/Washington Street	**C**	**32.7**			
E. Berkeley WB left/thru | thru | thru/right	D	36.9	0.70	288	m58
Washington NB left	C	21.6	0.20	23	92
Washington NB thru | bus-only thru	C	22.4	0.43	121	#387
Washington SB bus-only thru	C	20.9	0.05	6	31
Washington Street/Traveler Street	**A**	**1.8**			
Traveler right	A	0.3	0.16	0	0
Washington NB thru | thru | thru	A	2.5	0.15	12	19
Washington SB bus-only thru	A	2.5	0.05	3	5
Washington Street/Herald Street	**C**	**20.0**			
Herald EB left/thru | thru | thru	C	20.2	0.51	154	194
Washington NB thru | thru	C	20.7	0.51	156	206
Washington NB right	A	5.2	0.07	0	18
Washington SB thru	B	16.1	0.09	12	19
East Berkeley Street/Harrison Avenue	**C**	**30.8**			
E. Berkeley WB left/thru | thru | thru/right	D	36.5	0.93	337	#449
Harrison NB left/thru	C	23.8	0.44	107	209
Harrison SB thru	A	5.3	0.25	14	25
Harrison SB right	A	0.5	0.14	0	0
Harrison Avenue/Traveler Street	**C**	**23.0**			
Traveler WB left	B	19.3	0.03	5	25
Traveler WB left/thru	B	12.0	0.29	33	107
Harrison NB left/thru | thru/right	C	26.2	0.57	121	m139
Harrison SB left/thru | thru/right	C	24.8	0.50	105	141
Harrison Street/Herald Street	**C**	**21.7**			
Herald EB thru | thru | thru/right	C	23.2	0.47	212	263
Harrison NB right | right	A	0.1	0.07	0	m0
Harrison SB left	A	7.7	0.31	0	24
Harrison SB thru | thru	C	32.0	0.25	47	62
Albany Street/East Berkeley Street	**C**	**20.7**			
E. Berkeley WB left/thru | thru	C	32.6	0.98	624	m#692
Harrison SB thru | thru |thru/right	B	17.2	0.65	148	108

Table 2-2 Existing Conditions (2013) Level of Service Summary, a.m. Peak Hour (continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
Frontage Road/West Fourth Street/ East Berkeley Street	**E**	**71.3**			
W. Fourth WB thru | thru | thru/right	E	58.0	0.86	331	396
Frontage NB left	F	>80.0	>1.00	~474	#710
Frontage NB left/thru |thru/right	E	76.5	>1.00	~460	#600
Albany Street/Traveler Street	**B**	**14.3**			
Traveler EB thru | thru/right	E	60.8	0.68	90	103
Albany SB left	A	9.3	0.53	119	436
Albany SB left/thru | thru/right	A	7.6	0.53	123	376
Frontage Road/Traveler Street/Broadway Bridge	**F**	**>80.0**			
Traveler EB hard left to I-90 | left to I-93	F	>80.0	0.89	216	#301
Traveler EB thru | thru	A	9.6	0.35	141	74
Broadway WB bear right to I-90 | right to I-93	D	46.7	0.84	351	452
Broadway WB right to I-93	F	>80.0	>1.00	~941	#1114
Frontage NB thru to I-90 | thru to I-90	C	27.3	0.48	136	m143
Frontage NB bear right to I-93 |bear right to I-93| bear right to I-93/right	C	29.7	0.64	200	m209
Albany Street/Herald Street	**C**	**21.1**			
Herald EB right | right | right	B	16.9	0.69	83	146
Albany SB thru | thru | thru	C	24.3	0.69	241	294
Unsignalized Intersections					
Washington Street/William E. Mullins Way					
Mullins WB right	B	10.4	0.13	--	11
Washington NB thru | thru | thru/right	A	0.0	0.14	--	0
Washington SB bus-only thru	A	0.0	0.01	--	0
Harrison Avenue/Williams E. Mullins Way					
Mullins EB left/thru/right	B	12.6	0.13	--	11
Driveway WB left/thru/right	A	8.6	0.01	--	1
Harrison NB left/thru | thru/right	A	1.5	0.17	--	15
Harrison SB left/thru | thru/right	A	0.0	0.10	--	0

~ = 50th percentile volume exceeds capacity.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.

Table 2-3 Existing Conditions (2013) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
East Berkeley Street/Washington Street	**C**	**31.4**			
E. Berkeley WB left/thru | thru | thru/right	D	39.3	0.88	261	283
Washington NB left	B	12.9	0.26	36	85
Washington NB thru | bus-only thru	B	12.4	0.34	106	197
Washington SB bus-only thru	B	10.7	0.04	5	19
Washington Street/Traveler Street	**A**	**1.2**			
Traveler right	A	0.2	0.16	0	0
Washington NB thru | thru | thru	A	1.7	0.12	11	16
Washington SB bus-only thru	A	1.6	0.05	3	4
Washington Street/Herald Street	**F**	**>80.0**			
Herald EB left/thru | thru | thru	F	>80.0	0.87	319	384
Washington NB thru | thru	B	13.7	0.34	108	143
Washington NB right	B	11.2	0.13	26	51
Washington SB thru	B	11.5	0.07	10	16
East Berkeley Street/Harrison Avenue	**C**	**33.6**			
E. Berkeley WB left/thru | thru | thru/right	D	38.6	0.79	283	343
Harrison NB left/thru	D	35.8	0.76	234	#445
Harrison SB thru	C	25.7	0.40	129	235
Harrison SB right	A	4.1	0.19	0	28
Harrison Avenue/Traveler Street	**C**	**23.3**			
Traveler WB left	C	27.8	0.07	12	43
Traveler WB left/thru	B	16.6	0.12	9	46
Harrison NB left/thru | thru/right	B	16.0	0.45	81	113
Harrison SB left/thru | thru/right	C	29.4	0.67	166	206
Harrison Street/Herald Street	**E**	**66.1**			
Herald EB thru | thru | thru/right	F	>80.0	0.72	353	409
Harrison NB right | right	A	0.7	0.21	0	0
Harrison SB left	A	7.8	0.52	0	23
Harrison SB thru | thru	C	33.1	0.33	64	78
Albany Street/East Berkeley Street	**B**	**15.9**			
E. Berkeley WB left/thru | thru	B	10.2	0.72	60	110
Harrison SB thru | thru |thru/right	C	20.8	0.74	171	265

Table 2-3 Existing Conditions (2013) Level of Service Summary, p.m. Peak Hour (continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
Frontage Road/West Fourth Street/ East Berkeley Street	**F**	**>80.0**			
W. Fourth WB thru | thru | thru/right	D	41.7	0.72	186	235
Frontage NB left	C	28.8	0.60	210	324
Frontage NB left/thru |thru/right	F	>80.0	>1.00	~686	#829
Albany Street/Traveler Street	**C**	**21.8**			
Traveler EB thru | thru/right	D	54.0	0.77	138	143
Albany SB left	B	18.4	0.74	252	#846
Albany SB left/thru | thru/right	B	15.2	0.75	165	#767
Frontage Road/Traveler Street/Broadway Bridge	**C**	**27.6**			
Traveler EB hard left to I-90 | left to I-93	B	13.9	0.43	89	104
Traveler EB thru | thru	B	18.5	0.65	180	183
Broadway WB bear right to I-90 | right to I-93	B	13.3	0.40	106	145
Broadway WB right to I-93	C	20.1	0.69	223	307
Frontage NB thru to I-90 | thru to I-90	D	44.1	0.40	150	m128
Frontage NB bear right to I-93 |bear right to I-93| bear right to I-93/right	D	49.2	0.70	282	m242
Albany Street/Herald Street	**E**	**72.0**			
Herald EB right | right | right	F	>80.0	>1.00	~544	#668
Albany SB thru | thru | thru	C	27.0	0.80	305	369
Unsignalized Intersections					
Washington Street/William E. Mullins Way					
Mullins WB right	B	11.3	0.25	--	25
Washington NB thru | thru | thru/right	A	0.0	0.13	--	0
Washington SB bus-only thru	A	0.0	0.01	--	0
Harrison Avenue/Williams E. Mullins Way					
Mullins EB left/thru/right	C	16.8	0.38	--	44
Driveway WB left/thru/right	C	15.2	0.07	--	6
Harrison NB left/thru | thru/right	A	3.0	0.11	--	10
Harrison SB left/thru | thru/right	A	0.0	0.17	--	0

~ = 50th percentile volume exceeds capacity.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.

2.2.5 *Existing Parking and Curb Usage*

There are two existing off-street public parking facilities within a quarter-mile of the Project site: a surface lot with 89 spaces located on the north side of East Berkeley Street between Washington Street and Shawmut Avenue, and the Herald Street Garage consisting of 394 spaces located at the intersection of Herald Street and Shawmut Avenue. In addition, several off-street private parking lots and garages are located in the immediate Project vicinity, including the 300-space garage at 1000 Washington Street and the combined 260-space surface parking lots at 500 and 560 Harrison Avenue. Other private off-street parking lots in the immediate area include the approximately 72 space lot on the Project site and a 287 space lot at New England Medical Center along Harrison Avenue, which is expected to be developed within the next several years.

In addition to the existing parking, the Ink Block project is proposing to construct a garage and surface parking with a total of 411 parking spaces, 177 of which will be provided for the retail uses on that site and will be available to the public. The 275 Albany Street project is proposing to construct a three-level garage with 155 parking spaces that will be restricted to the residential uses of that project. MassDOT is also currently constructing a 450-space parking facility under I-93, east of the Project site.

Limited on-street public parking is available in the study area. Figure 2-4 illustrates the on-street parking regulations for on-street curb spaces adjacent to the study area intersections. As shown in Figure 2-4, the study area roadways contain a mix of resident parking, short-term parking, metered parking, commercial parking, unrestricted parking, time-restricted parking, two-hour parking, and areas with no parking. Traveler Street, adjacent to the site, is also designated for bus parking and is often occupied by several buses throughout the day.

2.2.6 *Existing Public Transportation*

The Project site is located near several public transportation options provided by the Massachusetts Bay Transportation Authority (MBTA), providing service to downtown Boston, the Back Bay, South Boston, and Cambridge. Three MBTA bus routes (routes 9, 11, and 47) travel within one block of the Project site, with stops along Herald Street and East Berkeley Street. The MBTA Silver Line provides service between Dudley Square in Roxbury and Downtown Crossing/South Station and travels along Washington Street with stops at Herald Street and East Berkeley Street. The MBTA Red Line Broadway Station is located about a third of a mile to the east of the Project site, providing service between Ashmont and Braintree to the south and Alewife Station in Cambridge to the north via downtown Boston. The MBTA Orange Line Tufts Medical Center Station is located about a quarter mile to the north of the Project site along Washington Street providing service between Forest Hills to the south and Oak Grove to the north via downtown Boston. In the

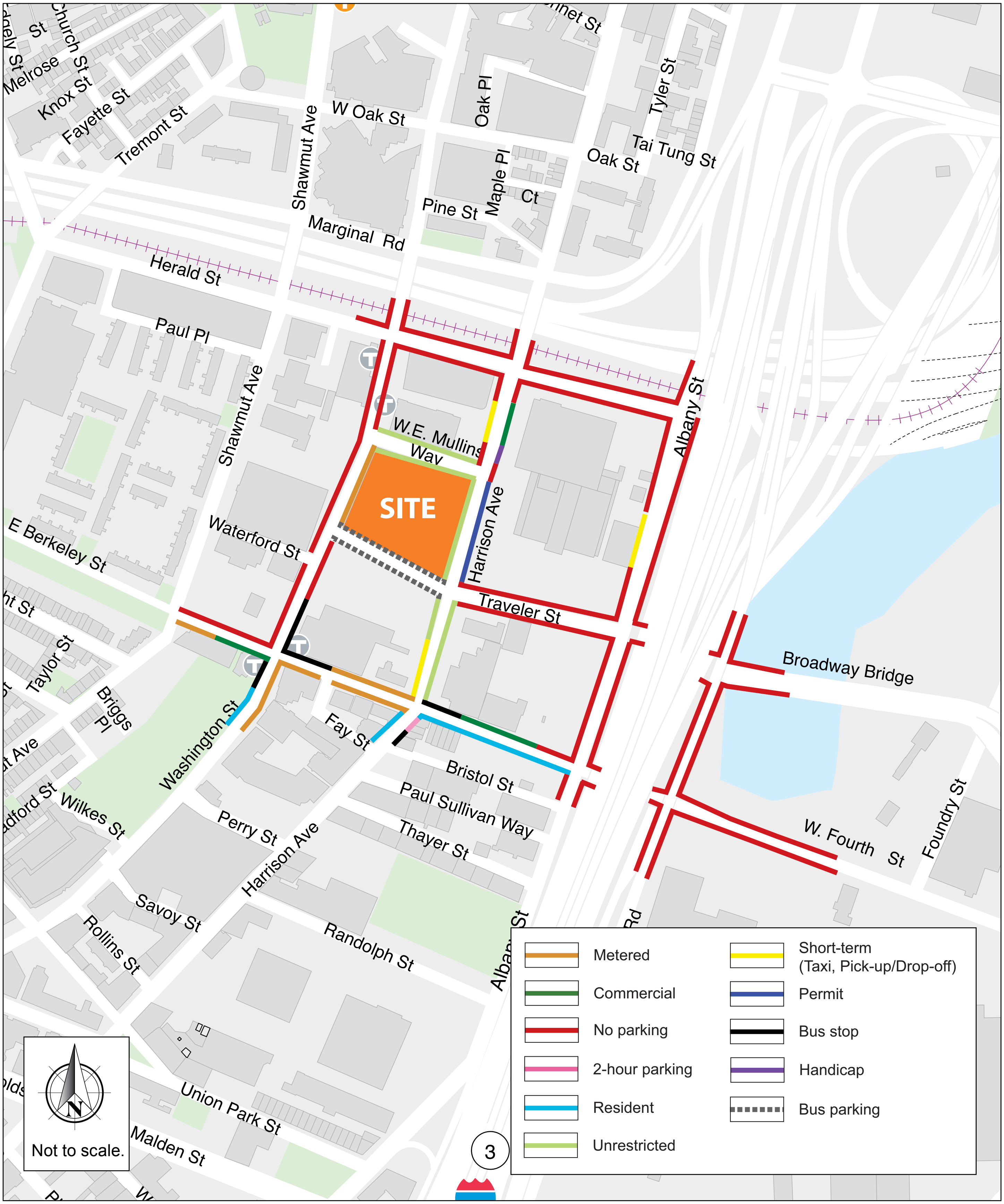

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Figure 2-4

On-street Parking Facilities

downtown area of Boston, the Red Line and Silver Line connect to the Orange and Green Lines, the regional commuter rail, and intercity bus services at South Station. Public transportation service summaries and frequencies are shown in Table 2-4. A map of the public transportation services in the vicinity of the Project site is provided in Figure 2-5.

Table 2-4 MBTA Transit Service in the Study Area

Transit Service	Description	Peak-hour Headway (in minutes) [1]
	Rapid Transit Routes	
Red Line	Alewife – Ashmont/Braintree	9
Orange Line	Forest Hills – Oak Grove	5
Silver Line	Dudley Square – Downtown Crossing/South Station	7-10
	Local Bus Routes	
9	City Point–Copley Square via Broadway Station	10 minutes or less
11	City Point–Downtown via Broadway Station	10 minutes or less
47	Central Square, Cambridge–Albany Street & Broadway Station	10 minutes or less

1 Headway is the time between trains or buses, as applicable.

2.2.7 Existing Pedestrian Conditions

The Project site is located on the block surrounded by Washington Street to the west, Harrison Avenue to the east, Traveler Street to the south, and William E. Mullins Way to the north. Sidewalks are generally in good condition surrounding the site and are provided along both sides of all roadways adjacent to the site. Marked crosswalks are also provided at the four intersections at each corner of the Project site, with pedestrian signal equipment and phasing at the signalized locations of Harrison Avenue/Traveler Street and Washington Street/Traveler Street.

Pedestrian counts were obtained from the traffic studies conducted for the 275 Albany Street project and the Ink Block project. The 2013 existing a.m. and p.m. peak-hour pedestrian volumes appear in Figure 2-6. As shown in Figure 2-6, pedestrian activity is heaviest along the Washington Street corridor between East Berkeley Street and Herald Street, along the MBTA Silver Line route.

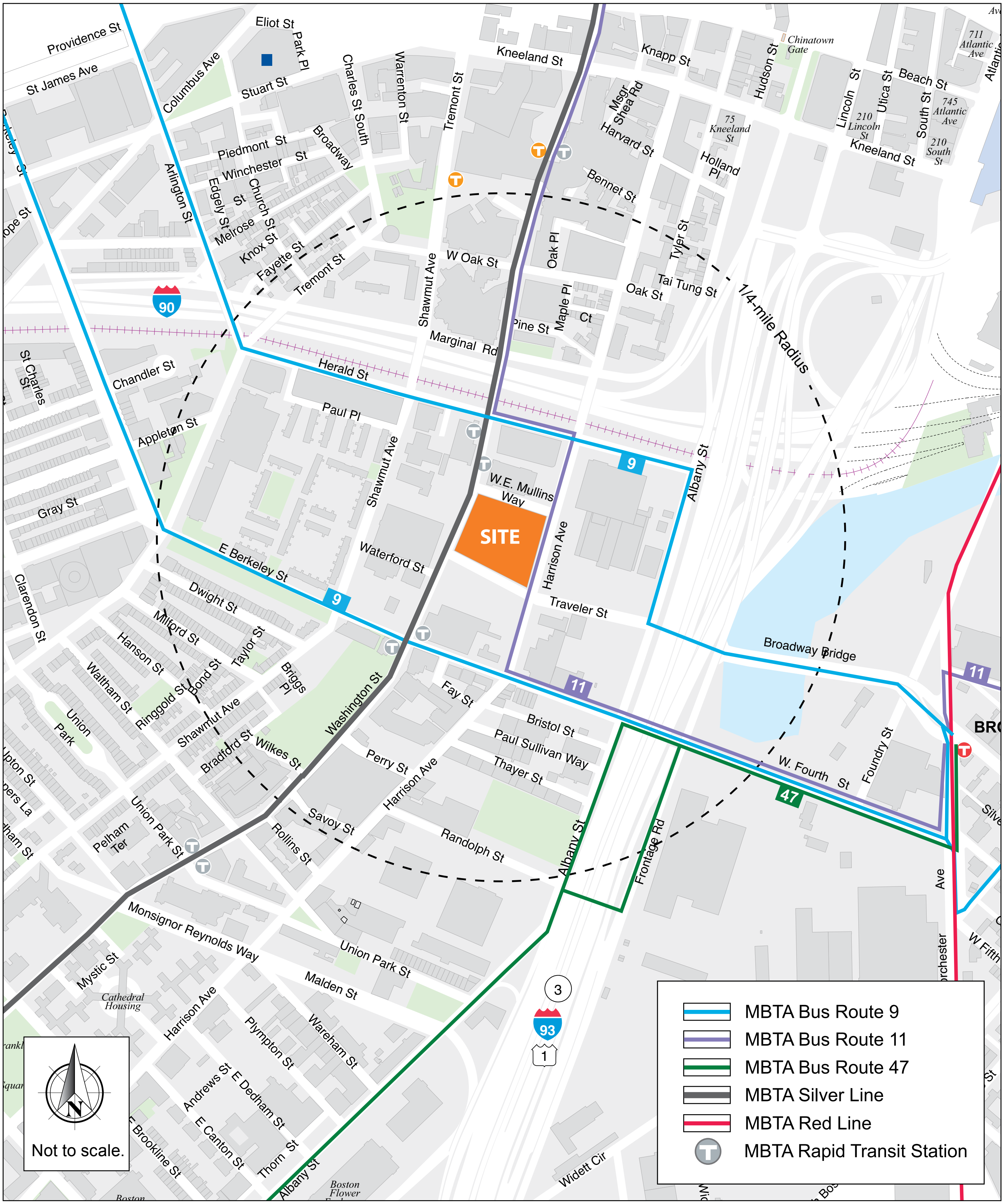

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Figure 2-5
Public Transportation in the Study Area

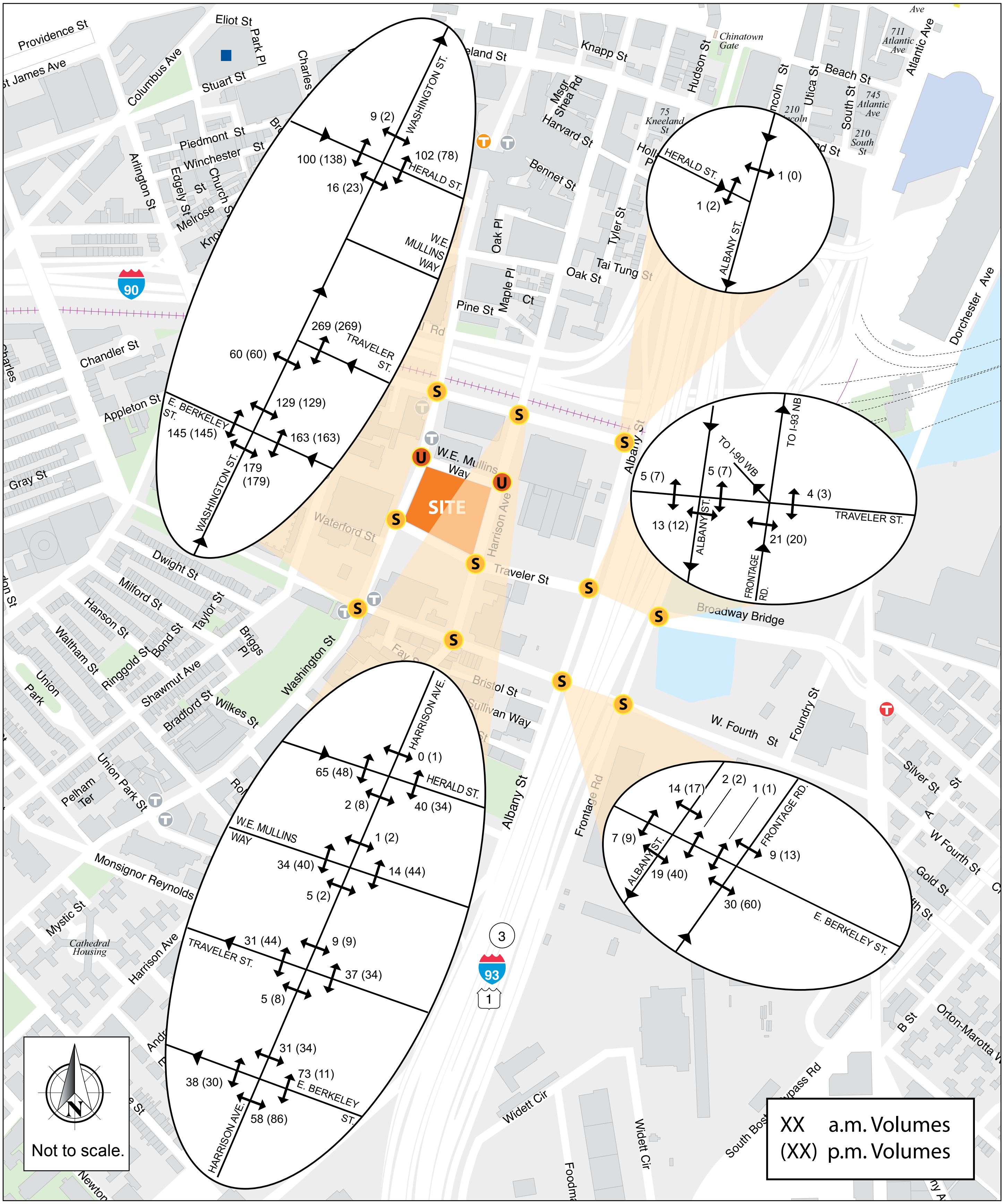

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Figure 2-6
Existing Conditions (2013) Pedestrian Volumes, a.m. and p.m. Peak Hours

2.2.8 Existing Bicycle Facilities

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project site is located one block to the northwest of the South Bay Harbor Trail. The South Bay Harbor Trail will ultimately connect the Fort Point District in South Boston to the Pierre Lallement Bike Path along the MBTA Orange Line/Southwest Corridor Park. Segments of the Trail are in place, including the Harborwalk section in South Boston and the Melnea Cass Bike Path in Roxbury. The incomplete connecting segment will operate along portions of the I-93 frontage roads between West Fourth Street and Biosquare Drive at Boston Medical Center.

In addition to the South Bay Harbor Trail, the following roadways within the study area are designated bicycle routes on the City of Boston's "Bike Routes of Boston" map:

- **Washington Street** is designated as an advanced route suitable for experienced riders and traffic-confident cyclists. Washington Street has shared lanes marked for use by cyclists and transit vehicles in both the northbound and southbound directions.

- **East Berkeley Street** is designated as an intermediate route suitable for riders with some on-road experience. No marked bicycle lanes are provided within the study area.

- **Herald Street** is designated as an advanced route suitable for experienced riders and traffic-confident cyclists. While no bicycle lanes are provided, they are planned.

Hubway is a bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 100 stations and 1,000 bicycles. There are three Hubway stations in close proximity to the Project site: at the intersection of Washington Street and Waltham Street, at the intersection of Tremont Street and East Berkeley Street, and along Dorchester Avenue at Gillette Park. Each station has 15 bicycle docks. A Hubway station is also proposed at the Ink Block development located opposite the Project site along Harrison Avenue.

Existing bicycling activity in the area is minimal. However, with the development of the Project site and the surrounding area, bicycling activity is expected to increase along the Harrison Avenue, Washington Street, Traveler Street, and East Berkeley Street corridors. As noted above, the Project site is located in proximity to the South Bay Harbor Trail and Hubway facilities.

2.2.9 Car Sharing Services

Car sharing, predominantly served by Zipcar in the Boston area, provides easy access to vehicular transportation for those who do not own cars. Vehicles are rented on an hourly or daily basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location.

The closest car sharing location to the Project site is at 500 Harrison Avenue, south of the Project site, and contains two vehicles. The nearby Zipcar locations and Hubway stations are shown in Figure 2-7.

2.2.10 Existing Site Trip Generation

The Project site currently contains an approximately 52,000 sf building housing an electrical supply distribution and retail center. Approximately 10,000 sf of the building is office space and 1,500 sf is retail space. In order to account for the effect of these uses on the trip generating characteristics of the Project, the existing vehicular trips were estimated using data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[3]. ITE provides data to estimate the total number of unadjusted vehicular trips associated with a development. In an urban setting well-served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit. The following ITE land use codes (LUCs) were used to estimate the trip generation characteristics of the existing uses on the site:

LUC 110 – General Light Industrial. The general light industrial land use includes facilities that are free-standing and devoted to a single use. The facilities have an emphasis on activities other than manufacturing and typically have minimal office space.

LUC 710 – General Office Building. The general office building land use was used for the office space associated with the existing site uses. The general office building land use encompasses a wide variety of office-related uses, and was selected as the most appropriate LUC to develop the trip generation characteristics for the existing office space on the Project site.

LUC 820 – Shopping Center. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. This land use was selected to develop the trip generation characteristics for the small retail space located on the Project site.

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

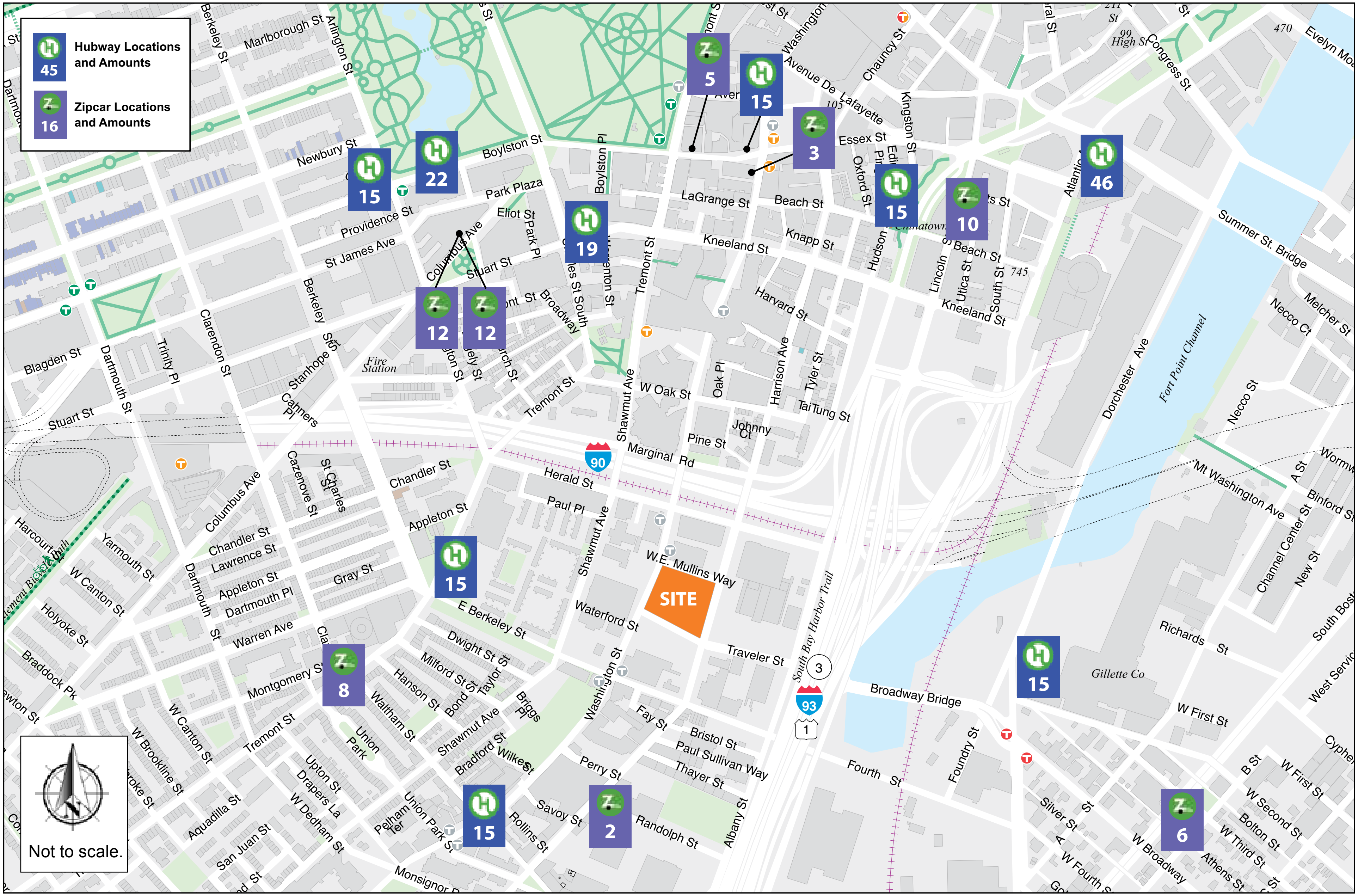

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Figure 2-7
Shared Bicycle/Cars in the Study Area

To develop the adjusted vehicular trips generated by the existing uses on the site, mode share data provided by BTD was used. The mode share data is used to develop the number of walk/bicycle, transit, and automobile trips and is presented in the *Future Conditions* section of this document (Section 2.3.2).

Based on the land use trip rates and travel mode share assumptions published by BTD, the existing trips are shown in Table 2-5.

Table 2-5 Trip Generation – Existing Land Uses

Land Use	Direction	Walk/Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
Light Industrial [1]	In	190	64	31
	Out	190	64	31
Office [2]	In	26	19	15
	Out	26	19	15
Retail [3]	In	34	11	7
	Out	34	11	7
Total Daily	**In**	**250**	**94**	**53**
	Out	**250**	**94**	**53**
a.m. Peak Hour				
Light Industrial	In	10	34	14
	Out	6	1	2
Office	In	1	8	6
	Out	1	0	1
Retail	In	0	1	0
	Out	0	0	0
Total a.m. Peak Hour	**In**	**11**	**43**	**20**
	Out	**7**	**1**	**3**
p.m. Peak Hour				
Light Industrial	In	6	1	2
	Out	11	36	14
Office	In	2	1	1
	Out	1	7	5
Retail	In	3	1	1
	Out	1	2	1
Total p.m. Peak Hour	**In**	**11**	**3**	**4**
	Out	**13**	**45**	**20**

1 Based on ITE LUC 110 – General Light Industrial for 40,500 sf.
2 Based on ITE LUC 710 – General Office Building for 10,000 sf.
3 Based on ITE LUC 820 – Shopping Center for 1,500 sf.

2.3 Future Conditions

For transportation impact analyses, it is standard practice to evaluate two future conditions: No Build condition (without the proposed Project) and Build condition (with the proposed Project). In accordance with BTD guidelines, these conditions are projected to a future date five years from the Existing condition year. For the evaluation of this Project, 2018 was selected as the horizon year for the future conditions analyses.

This section presents a description of the 2018 future conditions scenarios and includes an evaluation of the transportation facilities under the No Build and Build conditions.

2.3.1 No Build Condition

The No Build condition reflects a future scenario that incorporates any anticipated traffic volume changes independent of the Project and any planned infrastructure improvements that will affect travel patterns throughout the study area. Infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements. Traffic volume changes are based on two factors: an annual growth rate and growth associated with specific developments near the Project.

2.3.1.1 Background Traffic Growth

The methodology to account for future traffic growth, independent of the Project, consists of two parts. The first part of the methodology accounts for general background traffic growth that may be affected by changes in demographics, automobile usage, and automobile ownership. The second part of the methodology accounts for specific developments proposed in the vicinity of the Project site.

To develop the 2018 No Build condition traffic volumes, the 2017 Build condition traffic volumes were obtained from the 275 Albany Street traffic study for the following seven intersections:

- Washington Street/East Berkeley Street;
- Harrison Avenue/East Berkeley Street;
- Harrison Avenue/Traveler Street;
- Albany Street/East Berkeley Street;
- Albany Street/Traveler Street;
- Frontage Road/East Berkeley Street/West Fourth Street; and
- Frontage Road/Traveler Street/Broadway Bridge.

The 2017 Build conditions volumes from the 275 Albany Street study for these seven intersections include a background growth rate of one percent per year and traffic volumes from the following development projects:

- **Eleven West Broadway** – This development includes approximately 50 apartment units and approximately 8,000 sf of ground-floor retail space.

- **Parcel 24 (Chinatown)** – This residential development includes approximately 345 mixed-income residential units and approximately 5,500 sf of ground-floor retail space.

- **BioSquare II** – Boston Medical Center (BMC) and Boston University have engaged in a joint development project at BioSquare for research and business that will facilitate collaboration between researchers and clinicians. BioSquare currently consists of three biomedical research buildings plus two parking garages and some retail spaces. The biomedical research park in the South End may ultimately include up to 1.2 million square feet of research, laboratory, and office space. While future build-out is uncertain, to account for the possible near-term development within the BioSquare area, 530,000 sf of new medical office space was added.

- **Boston University Medical Center Institutional Master Plan** – Distinct from BioSquare, the Boston University Medical Center (BUMC) submitted a new 10-year Institutional Master Plan and PNF for a new approximately 48,000 sf energy facility, administration/clinical building, and new inpatient building. To account for partial completion of this master plan by 2014, an approximately 160,000 sf medical office building was incorporated into the future conditions.

- **157 Berkeley Street (Liberty Mutual)** – This project includes a new 22-story building with approximately 590,000 sf of office space and 205 parking spaces. The building was recently completed, but is not accounted for in the traffic volumes that form the basis of this study.

- **Shapiro Ambulatory Care Center** – This project is located on the corner of East Concord Street and Albany Street and was opened in March 2011. However, the traffic data that forms the basis of the turning movement volumes for this study was collected prior to its opening. Trips associated with this facility have been added to the future conditions traffic volume networks.

- **Ink Block** – This six-acre development includes approximately 475 residential units with ground floor retail and restaurant space including an approximately 50,000 sf grocery store. Ink Block is currently under construction and is expected to be complete by 2016.

- **275 Albany Street** – This project consists of a 20-story tower containing approximately 208 residential units and an 11-story mid-rise tower containing approximately 170 residential units plus approximately 6,800 sf of ground floor retail space.

The traffic volumes at these seven intersections were adjusted by applying the one percent per year background growth rate to develop the 2018 No Build condition traffic volumes.

The 2016 Build condition traffic volumes were obtained from the Ink Block traffic study for the remainder of the study area, including the following six intersections:

- Washington Street/Traveler Street;
- Washington Street/William E. Mullins Way;
- Washington Street/Herald Street;
- Harrison Avenue/William E. Mullins Way;
- Harrison Avenue/Herald Street; and
- Albany Street/Herald Street.

The 2016 Build condition volumes for these intersections also include a background growth rate of one percent per year and traffic volumes from the development projects used in the 275 Albany Street traffic study. The Ink Block traffic study also included traffic volumes for the 275 Albany Street project as it was presented in the January 2010 PNF. The 275 Albany Street development program changed subsequent to the submittal of the Ink Block traffic study. To account for the more recent development program for the 275 Albany Street project at these six intersections, adjustments to the traffic volumes associated for that project were incorporated. The 2016 Build condition traffic volumes for these six intersections were then adjusted by applying the one percent per year background growth rate to develop the 2018 No Build condition traffic volumes.

A review of other nearby projects was conducted to account for any additional traffic growth expected from any projects that have been proposed since the submittal of the 275 Albany Street traffic study. Based on this review, the following additional projects are proposed near the Project site:

- **South Boston Boutique Hotel** – This project is located at 6 West Broadway and consists of a new approximately 156 room hotel.
- **22-26 West Broadway** – This project consists of a six-story building containing 31 residential apartment units and approximately 3,834 sf of ground floor retail space.

- **80 East Berkeley Street** – This project is located between Washington Street and Shawmut Avenue and will consist of the construction of an 11-story building comprising approximately 290,000 sf of office space and 18,000 sf of ground-level retail/restaurant uses. This project will replace an existing 89-space public surface parking lot and the adjacent auto repair shop. This project will also include a two-level, 200 car, below-grade parking garage that will maintain 89 spaces available to the public.

- **477-481 Harrison Avenue** – This proposed project consists of 18 residential condominium units and 20 parking spaces.

With the exception of the 80 East Berkeley Street project, traffic volumes for these projects are not expected to add significant traffic to the study area intersections and are assumed to be included in the general background growth rate. The traffic volumes associated with the 80 East Berkeley Street project were incorporated into the future conditions scenarios traffic volumes.

The methodology used to develop the 2018 traffic volumes was used to maintain consistency with the 275 Albany Street and Ink Block studies, and also accounts for the most up to date information regarding the latest build-out programs and newly proposed projects in the vicinity of the study area, most importantly the 80 East Berkeley Street project. A map of the locations of the background projects listed above is shown in Figure 2-8.

The 2018 No Build condition traffic volumes for the a.m. and p.m. peak hours are presented in Figure 2-9 and Figure 2-10, respectively.

2.3.1.2 Proposed Infrastructure Improvements

The Harrison Albany Corridor Strategic Plan is a planning study that was conducted by the BRA that presents various strategies for the redevelopment of the portion of the South End bounded by I-93/Albany Street to the east, the Massachusetts Turnpike to the north, Washington Street to the west, and Massachusetts Avenue to the south. The Project site is located in the New York Streets subdistrict of the Harrison Albany Corridor area, which is generally bound by East Berkeley Street to the south, Herald Street to the north, Shawmut Avenue to the west, and I-93 to the east. Through this planning effort, conceptual plans have been developed for the surrounding roadway network within the New York Streets subdistrict that will improve directionality within the area by eliminating one-way travel on some roadways. The conceptual plans show two-way travel along Traveler Street and the addition of a southbound vehicular travel lane along Washington Street. While it is anticipated that these improvements will be implemented in the long-term, they were not included in the five-year horizon future conditions analyzed in this study.

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Figure 2-8
Area Background Developments

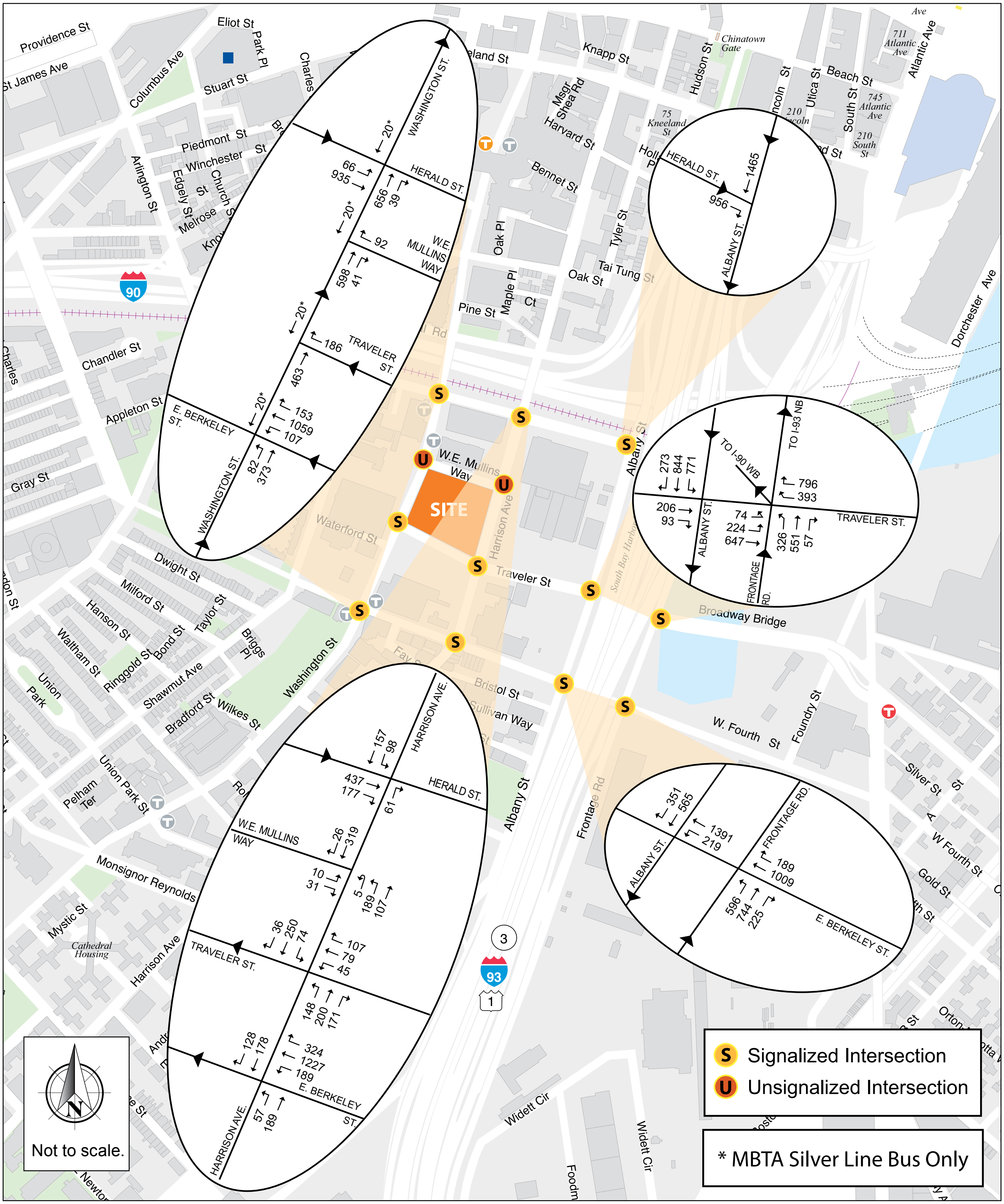

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Figure 2-9

No-Build Conditions (2018) Turning Movement Volumes, a.m. Peak Hour (8:00-9:00 a.m.)

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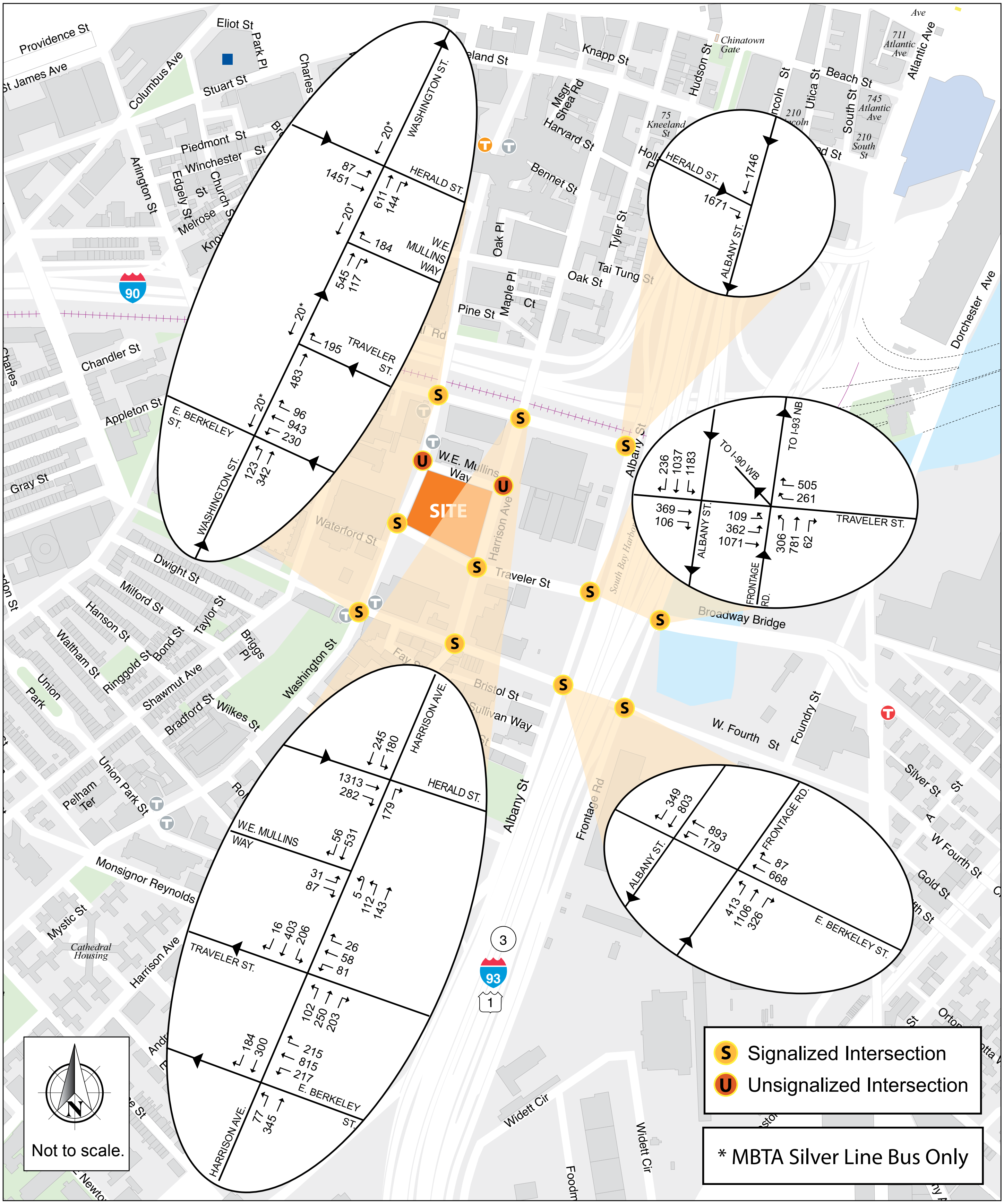

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Figure 2-10
No-Build Conditions (2018) Turning Movement Volumes, p.m. Peak Hour (5:00-6:00 p.m.)

2.3.1.3 No Build Condition Traffic Operations

The 2018 No Build condition scenario analysis uses the same traffic operations analysis methodology as the 2013 Existing condition scenario analysis. Table 2-6 and Table 2-7 present the 2018 No Build condition operations analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a worsening in LOS between the 2013 Existing condition and the 2018 No Build condition. The detailed analysis sheets are provided in Appendix B.

Table 2-6 No Build Condition (2018) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
East Berkeley Street/Washington Street	**C**	**23.3**			
E. Berkeley WB left/thru | thru | thru/right	B	18.5	0.62	126	m24
Washington NB left	C	33.5	0.30	42	104
Washington NB thru | bus-only thru	D	37.3	0.63	222	#483
Washington SB bus-only thru	C	30.6	0.07	10	33
Washington Street/Traveler Street	**A**	**1.8**			
Traveler right	A	0.3	0.19	0	0
Washington NB thru | thru | thru	A	2.6	0.16	13	20
Washington SB bus-only thru	A	2.5	0.05	3	5
Washington Street/Herald Street	**C**	**20.8**			
Herald EB left/thru | thru | thru	C	21.1	0.56	175	219
Washington NB thru | thru	C	21.5	0.55	173	226
Washington NB right	A	5.1	0.08	0	18
Washington SB thru	B	16.1	0.09	12	19
East Berkeley Street/Harrison Avenue	**D**	**51.8**			
E. Berkeley WB left/thru | thru | thru/right	E	65.0	>1.00	~461	#559
Harrison NB left/thru	C	26.3	0.52	126	243
Harrison SB thru	B	12.6	0.30	27	m82
Harrison SB right	A	2.6	0.22	0	m9
Harrison Avenue/Traveler Street	**C**	**28.8**			
Traveler WB left	B	19.1	0.08	17	54
Traveler WB left/thru	B	15.8	0.34	54	149
Harrison NB left/thru | thru/right	C	29.0	0.71	153	m155
Harrison SB left/thru | thru/right	D	36.4	0.75	145	188
Harrison Street/Herald Street	**B**	**18.2**			
Herald EB thru | thru | thru/right	B	17.4	0.32	128	169
Harrison NB right | right	A	0.1	0.06	0	m0
Harrison SB left	A	7.7	0.32	0	24
Harrison SB thru | thru	C	32.8	0.31	59	74

Table 2-6 No Build Condition (2018) Level of Service Summary, a.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
Albany Street/East Berkeley Street	**D**	**53.2**			
E. Berkeley WB left/thru | thru	E	74.2	>1.00	~754	m#595
Harrison SB thru | thru |thru/right	B	19.5	0.88dr	153	178
Frontage Road/West Fourth Street/ East Berkeley Street	**F**	**>80.0**			
W. Fourth WB thru | thru | thru/right	D	50.6	0.92	363	#458
Frontage NB left	F	>80.0	>1.00	~581	#826
Frontage NB left/thru |thru/right	F	>80.0	>1.00	~564	#706
Albany Street/Traveler Street	**C**	**23.7**			
Traveler EB thru | thru/right	E	66.5	0.79	158	161
Albany SB left	B	17.0	0.67	231	#765
Albany SB left/thru | thru/right	B	14.0	0.67	235	612
Frontage Road/Traveler Street/Broadway Bridge	**F**	**>80.0**			
Traveler EB hard left to I-90 | left to I-93	F	>80.0	>1.00	~303	#427
Traveler EB thru | thru	A	9.4	0.37	118	94
Broadway WB bear right to I-90 | right to I-93	D	52.1	0.89	381	#520
Broadway WB right to I-93	F	>80.0	>1.00	~1019	#1189
Frontage NB thru to I-90 | thru to I-90	C	28.4	0.54	153	m144
Frontage NB bear right to I-93 |bear right to I-93| bear right to I-93/right	C	30.7	0.71	217	m203
Albany Street/Herald Street	**C**	**22.2**			
Herald EB right | right | right	B	14.3	0.73	111	151
Albany SB thru | thru | thru	C	27.6	0.80	300	364
Unsignalized Intersections					
Washington Street/William E. Mullins Way					
Mullins WB right	B	10.6	0.13	--	12
Washington NB thru | thru | thru/right	A	0.0	0.15	--	0
Washington SB bus-only thru	A	0.0	0.01	--	0
Harrison Avenue/Williams E. Mullins Way					
Mullins EB left/right	B	12.9	0.13	--	11
Harrison NB left/thru | thru	A	2.5	0.19	--	17
Harrison SB thru | thru/right	A	0.0	0.14	--	0

~ = 50th percentile volume exceeds capacity.
\# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.
Shaded cells indicate a change in Level of Service from Existing conditions to No Build conditions.

Table 2-7 No Build Condition (2018) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
East Berkeley Street/Washington Street	**C**	**30.1**			
E. Berkeley WB left/thru | thru | thru/right	D	35.5	0.87	294	301
Washington NB left	B	16.5	0.30	43	103
Washington NB thru | bus-only thru	B	15.9	0.39	127	238
Washington SB bus-only thru	B	13.4	0.05	6	22
Washington Street/Traveler Street	**A**	**1.3**			
Traveler right	A	0.3	0.20	0	0
Washington NB thru | thru | thru	A	1.7	0.15	14	20
Washington SB bus-only thru	A	1.6	0.05	3	4
Washington Street/Herald Street	**F**	**>80.0**			
Herald EB left/thru | thru | thru	F	>80.0	0.94	363	#470
Washington NB thru | thru	B	14.3	0.39	127	166
Washington NB right	B	12.8	0.22	50	87
Washington SB thru	B	11.5	0.07	10	16
East Berkeley Street/Harrison Avenue	**D**	**42.4**			
E. Berkeley WB left/thru | thru | thru/right	D	46.1	0.91	342	#436
Harrison NB left/thru	E	59.2	0.95	320	#581
Harrison SB thru	C	28.5	0.45	150	270
Harrison SB right	A	4.4	0.28	0	31
Harrison Avenue/Traveler Street	**C**	**34.4**			
Traveler WB left	C	28.9	0.21	42	104
Traveler WB left/thru	C	23.7	0.21	34	93
Harrison NB left/thru | thru/right	B	19.4	0.60	108	147
Harrison SB left/thru | thru/right	D	48.7	>1.00dl	225	#313
Harrison Street/Herald Street	**F**	**>80.0**			
Herald EB thru | thru | thru/right	F	>80.0	0.81	399	m427
Harrison NB right | right	A	0.7	0.24	0	0
Harrison SB left	A	7.7	0.48	0	23
Harrison SB thru | thru	D	35.6	0.49	97	111
Albany Street/East Berkeley Street	**C**	**22.9**			
E. Berkeley WB left/thru | thru	B	15.8	0.81	98	473
Harrison SB thru | thru |thru/right	C	28.9	0.86	279	m315

Table 2-7 No Build Condition (2018) Level of Service Summary, p.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
Frontage Road/West Fourth Street/ East Berkeley Street	**F**	**>80.0**			
W. Fourth WB thru | thru | thru/right	D	47.8	0.78	203	254
Frontage NB left	D	35.7	0.75	287	437
Frontage NB left/thru |thru/right	F	>80.0	>1.00	~792	#937
Albany Street/Traveler Street	**F**	**>80.0**			
Traveler EB thru | thru/right	F	>80.0	0.88	224	225
Albany SB left	E	65.4	0.98	549	#1124
Albany SB left/thru | thru/right	D	45.6	0.98	565	#1026
Frontage Road/Traveler Street/Broadway Bridge	**D**	**41.0**			
Traveler EB hard left to I-90 | left to I-93	C	33.9	0.61	243	m144
Traveler EB thru | thru	D	52.8	0.70	318	m179
Broadway WB bear right to I-90 | right to I-93	B	13.9	0.43	128	156
Broadway WB right to I-93	C	21.8	0.72	273	336
Frontage NB thru to I-90 | thru to I-90	D	43.9	0.40	150	m117
Frontage NB bear right to I-93 |bear right to I-93| bear right to I-93/right	D	50.1	0.76	305	m241
Albany Street/Herald Street	**F**	**>80.0**			
Herald EB right | right | right	F	>80.0	>1.00	~647	#770
Albany SB thru | thru | thru	D	35.8	0.93	393	#513
Unsignalized Intersections					
Washington Street/William E. Mullins Way					
Mullins WB right	B	11.9	0.28	--	28
Washington NB thru | thru | thru/right	A	0.0	0.14	--	0
Washington SB bus-only thru	A	0.0	0.01	--	0
Harrison Avenue/Williams E. Mullins Way					
Mullins EB left/right	C	18.4	0.42	--	52
Harrison NB left/thru | thru	A	2.3	0.14	--	12
Harrison SB thru | thru/right	A	0.0	0.24	--	0

~ = 50th percentile volume exceeds capacity.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.
Shaded cells indicate a change in Level of Service from Existing conditions to No Build conditions.

As shown in Table 2-6, the majority of the signalized intersections will continue to operate at LOS D or better during the a.m. peak hour, with all movements at the unsignalized intersections continuing to operate at LOS B or better.

As shown in Table 2-7, the majority of the signalized intersections will continue to operate at LOS D or better during the p.m. peak hour. The movements at the unsignalized intersections will operate at LOS C or better, with the exception of the William E. Mullins Way eastbound approach to Harrison Avenue, which will worsen to LOS F.

The following summarizes the No Build peak hour intersection operations:

- **East Berkeley Street/Washington Street:** This intersection will continue to operate at an overall LOS C, with all movements expected to continue to operate at an acceptable LOS during both the a.m. and p.m. peak hours.

- **Washington Street/Traveler Street:** This intersection will continue to operate at an overall LOS A, with all movements expected to continue to operate at the same LOS as the Existing condition during both the a.m. and p.m. peak hours.

- **Washington Street/Herald Street:** This intersection will continue to operate at an overall LOS C, with all movements at the intersection expected to continue to operate at the same LOS as the Existing condition during the a.m. peak hour. During the p.m. peak hour, the intersection will continue to operate at an overall LOS F, with all movements expected to continue to operate at the same LOS as the Existing condition.

- **East Berkeley Street/Harrison Avenue:** This intersection will worsen from an overall LOS C to LOS D, with the East Berkeley Street westbound approach worsening from LOS D to LOS E and the Harrison Avenue southbound through movement worsening from LOS A to LOS B during the a.m. peak hour. During the p.m. peak hour, the intersection will worsen from an overall LOS C to LOS D, with the Harrison Avenue northbound approach worsening from LOS D to LOS E.

- **Harrison Avenue/Traveler Street:** This intersection will continue to operate at an overall LOS C during both the a.m. and p.m. peak hours. During the a.m. peak hour, all movements at this intersection are expected to continue to operate at the same LOS as the Existing condition. During the p.m. peak hour, the Harrison Avenue southbound approach will worsen from LOS C to LOS D.

- **Harrison Avenue/Herald Street:** This intersection will continue to operate at an acceptable overall LOS, with all movements expected to continue to operate at an acceptable LOS during the a.m. peak hour. During the p.m. peak hour, the intersection will worsen from an overall LOS E to LOS F, although no approaches will experience a worsening in LOS.

- **Albany Street/East Berkeley Street:** This intersection will worsen from an overall LOS C to LOS D, with the East Berkeley Street westbound approach worsening from LOS C to LOS E during the a.m. peak hour. During the p.m. peak hour, the intersection will operate at LOS C.

- **Frontage Road/West Fourth Street/East Berkeley Street:** This intersection will continue to operate at an overall LOS F, with all movements continuing to operate at the same LOS as the Existing condition during both the a.m. and p.m. peak hours.

- **Albany Street/Traveler Street:** This intersection will worsen from an overall LOS B to LOS C, with the Albany Street southbound approach worsening from LOS A to LOS B during the a.m. peak hour. During the p.m. peak hour, the intersection will worsen from an overall LOS C to LOS F, with the Traveler Street eastbound approach worsening from LOS D to LOS F, and the Albany Street northbound approach worsening from LOS B to LOS D and LOS E.

- **Frontage Road/Traveler Street/Broadway Bridge:** This intersection will continue to operate at an overall LOS F, with all movements continuing to operate at the same LOS as the Existing condition during the a.m. peak hour. During the p.m. peak hour, the intersection will worsen from an overall LOS C to LOS D, with the Traveler Street eastbound left-turning movements worsening from LOS B to LOS C and the Traveler Street eastbound through movements worsening from LOS B to LOS D.

- **Albany Street/Herald Street:** This intersection will continue to operate at an overall LOS C, with all movements expected to continue to operate at the same acceptable LOS as the Existing condition during the a.m. peak hour. During the p.m. peak hour, the intersection will worsen from an overall LOS E to LOS F, with the Albany Street southbound approach worsening from LOS C to LOS D.

- **Washington Street/William E. Mullins Way:** All movements at this intersection are expected to continue to operate at the same acceptable LOS as the Existing condition during both the a.m. and p.m. peak hours.

- **Harrison Avenue/William E. Mullins Way:** All movements at this intersection are expected to continue to operate at the same acceptable LOS as the Existing condition during both the a.m. and p.m. peak hours.

2.3.2 Build Condition

The Project will consist of approximately 602 residential apartment units and approximately 33,500 sf of restaurant/retail space. Parking for approximately 252 vehicles will be provided on-site with secure bicycle storage for approximately 612 bicycles. The 2018 Build condition reflects a future scenario that adds anticipated Project-generated trips to the 2018 No Build condition traffic volumes.

2.3.2.1 Site Access and Circulation

As shown in the Project site plan in Figure 2-11, vehicular access to and egress from the Project's parking garage will be provided on William E. Mullins Way. The parking garage will be restricted to the residential uses on the site. Public parking will not be provided in the garage.

Loading will occur on-site and will be accessed off of William E. Mullins Way. The loading bay will be located at street level underneath the proposed parking garage. All deliveries and trash pick-up will also occur on-site in the loading bay.

Pedestrian access to the Project will be provided along Washington Street, Harrison Avenue and Traveler Street, with additional access provided via the proposed pedestrian way that bisects the site, effectively creating two smaller blocks on the site. The pedestrian way will also provide a new connection between Harrison Avenue and Washington Street, allowing access between existing and future development along both of these corridors. The proposed pedestrian environment on the Project site is consistent with the Harrison Albany Corridor Strategic Plan by creating additional pedestrian connections and splitting large blocks throughout the area.

The Proponent will also improve all of the sidewalks that surround the site. Sidewalks along Harrison Avenue will be widened to approximately 20 feet. It is anticipated that the widened sidewalk will allow the proposed retail/restaurant uses to have some outdoor space during various times of the year. The increased sidewalk width along Harrison Avenue will improve the pedestrian experience throughout the corridor and will be beneficial to the proposed development in the vicinity of the site. Street trees will also be provided along the sidewalks that surround the Project site.

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Figure 2-11
Site Access Plan

2.3.2.2 Trip Generation Methodology

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

To estimate the number of trips expected to be generated by the Project, data published by ITE in the *Trip Generation Manual*[4] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

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

LUC 220 – Apartment. The apartment land use is a rental dwelling unit located within the same building with at least three other dwelling units. Trip generation estimates are based on average vehicular rates per unit.

LUC 820 – Shopping Center. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. Due to the Project's location and the existing and proposed land uses surrounding the site, the retail activity is expected to exhibit the trip generation characteristics of a portion of a shopping district. Therefore, LUC 820 is the most comparable category for trip generation. Trip generation estimates are based on average vehicular rates per 1,000 sf of gross leasable area.

LUC 932 – High-Turnover (Sit-Down) Restaurant. The high-turnover (sit-down) restaurant land use is defined as a full-service eating establishment with a typical stay duration of approximately one hour. Trip generation estimates are based on average vehicular rates per 1,000 sf of gross floor area.

Pass-By Trips are those trips already in the transportation network and not specifically destined to the particular land use. A pass-by capture rate of 25 percent was applied to the proposed retail uses (excluding the restaurant space) on the Project site.

For trip generation purposes, this study assumes that the ground-floor commercial space will consist of approximately 10,000 sf of restaurant space and 23,500 sf of retail space.

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[4] *Trip Generation Manual*, 9th Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.

2.3.2.3 Mode Share

The BTD publishes vehicle, transit, and walking mode split rates for different areas of Boston. The Project site is located within BTD's designated Area 3. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[5]. The BTD's travel mode share data for Area 3 are shown in Table 2-8.

Table 2-8 Travel Mode Shares

Land Use	Direction	Walk Share	Transit Share	Auto Share	Local Vehicle Occupancy Rate
Daily					
Apartment	In	42%	30%	28%	1.13
	Out	42%	30%	28%	1.13
Retail	In	59%	20%	21%	1.78
	Out	59%	20%	21%	1.78
Restaurant	In	59%	20%	21%	2.20
	Out	59%	20%	21%	2.20
a.m. Peak Hour					
Apartment	In	7%	52%	41%	1.13
	Out	51%	18%	31%	1.13
Retail	In	14%	46%	40%	1.78
	Out	58%	10%	32%	1.78
Restaurant	In	14%	46%	40%	2.20
	Out	58%	10%	32%	2.20
p.m. Peak Hour					
Apartment	In	51%	18%	31%	1.13
	Out	7%	52%	41%	1.13
Retail	In	58%	10%	32%	1.78
	Out	14%	46%	40%	1.78
Restaurant	In	58%	10%	32%	2.20
	Out	14%	46%	40%	2.20

[5] *Summary of Travel Trends: 2009 National Household Survey*; FHWA; Washington, D.C.; June 2011.

2.3.2.4 Project Trip Generation

The mode share percentages shown in Table 2-8 were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates. The trip generation for the Project by mode is shown in Table 2-9. The detailed trip generation information is provided in Appendix B.

Table 2-9 Trip Generation – Proposed Land Uses

Land Use	Direction	Walk/Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
Apartment [1]	In	897	640	529
	Out	897	640	529
Retail [2]	In	356	121	71
	Out	356	121	71
Restaurant [3]	In	744	252	121
	Out	744	252	121
Total Daily	**In**	**1,997**	**1,013**	**721**
	Out	**1,997**	**1,013**	**721**
a.m. Peak Hour				
Apartment	In	5	35	25
	Out	141	50	76
Retail	In	3	8	4
	Out	6	1	2
Restaurant	In	18	59	23
	Out	61	11	15
Total a.m. Peak Hour	**In**	**26**	**102**	**52**
	Out	**208**	**62**	**93**
p.m. Peak Hour				
Apartment	In	136	48	73
	Out	10	75	52
Retail	In	31	5	10
	Out	8	27	13
Restaurant	In	73	13	18
	Out	11	37	15
Total p.m. Peak Hour	**In**	**240**	**66**	**101**
	Out	**29**	**139**	**80**

1 Based on ITE LUC 220 – Apartment 602 units.
2 Based on ITE LUC 820 – Shopping Center for 23,500 sf.
3 Based on ITE LUC 932 – High-Turnover (Sit-Down) Restaurant for 10,000 sf.

2.3.2.5 Vehicle Trip Generation

To develop the overall trip generation characteristics of the Project site, the adjusted vehicular trips associated with the Project were estimated. The Project-generated vehicle trips are summarized in Table 2-10, with the detailed trip generation information provided in Appendix B.

Table 2-10 Project Vehicle Trip Generation

Time Period	Direction	Apartments [1]	Retail [2]	Restaurant [3]	Existing Trips	Net New Total
Daily	In	529	71	121	53	668
	Out	529	71	121	53	668
	Total	**1,058**	**142**	**242**	**106**	**1,336**
a.m. Peak Hour	In	25	4	23	20	32
	Out	76	2	15	3	90
	Total	**101**	**6**	**38**	**23**	**122**
p.m. Peak Hour	In	73	10	18	4	97
	Out	52	13	15	20	60
	Total	**125**	**23**	**33**	**24**	**157**

4 Based on ITE LUC 220 – Apartment for 602 units.
5 Based on ITE LUC 820 – Shopping Center for 23,500 sf.
6 Based on ITE LUC 932 – High-Turnover (Sit-Down) Restaurant for 10,000 sf.

As shown in Table 2-10, the Project is expected to generate approximately 1,336 net new daily vehicle trips (668 entering and 668 exiting), with 122 net new vehicle trips (32 entering and 90 exiting) during the a.m. peak hour and 157 net new vehicle trips (97 entering and 60 exiting) during the p.m. peak hour.

2.3.2.6 Trip Distribution

The trip distribution identifies the various travel paths for vehicles arriving and leaving the Project site. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 3. The trip distribution patterns are also generally consistent with the patterns presented in the 275 Albany Street project traffic study. The trip distribution pattern for the Project is illustrated in Figure 2-12.

The Project-generated vehicle trips were assigned to the study area roadway network based on the trip distribution patterns shown in Figure 2-12 and are shown in Figure 2-13 and Figure 2-14 for the a.m. and p.m. peak hours, respectively. The Project-generated trips were added to the 2018 No Build condition traffic volumes to develop the 2018 Build condition peak hour traffic volume networks, and are shown in Figure 2-15 and Figure 2-16 for the a.m. and p.m. peak hours, respectively.

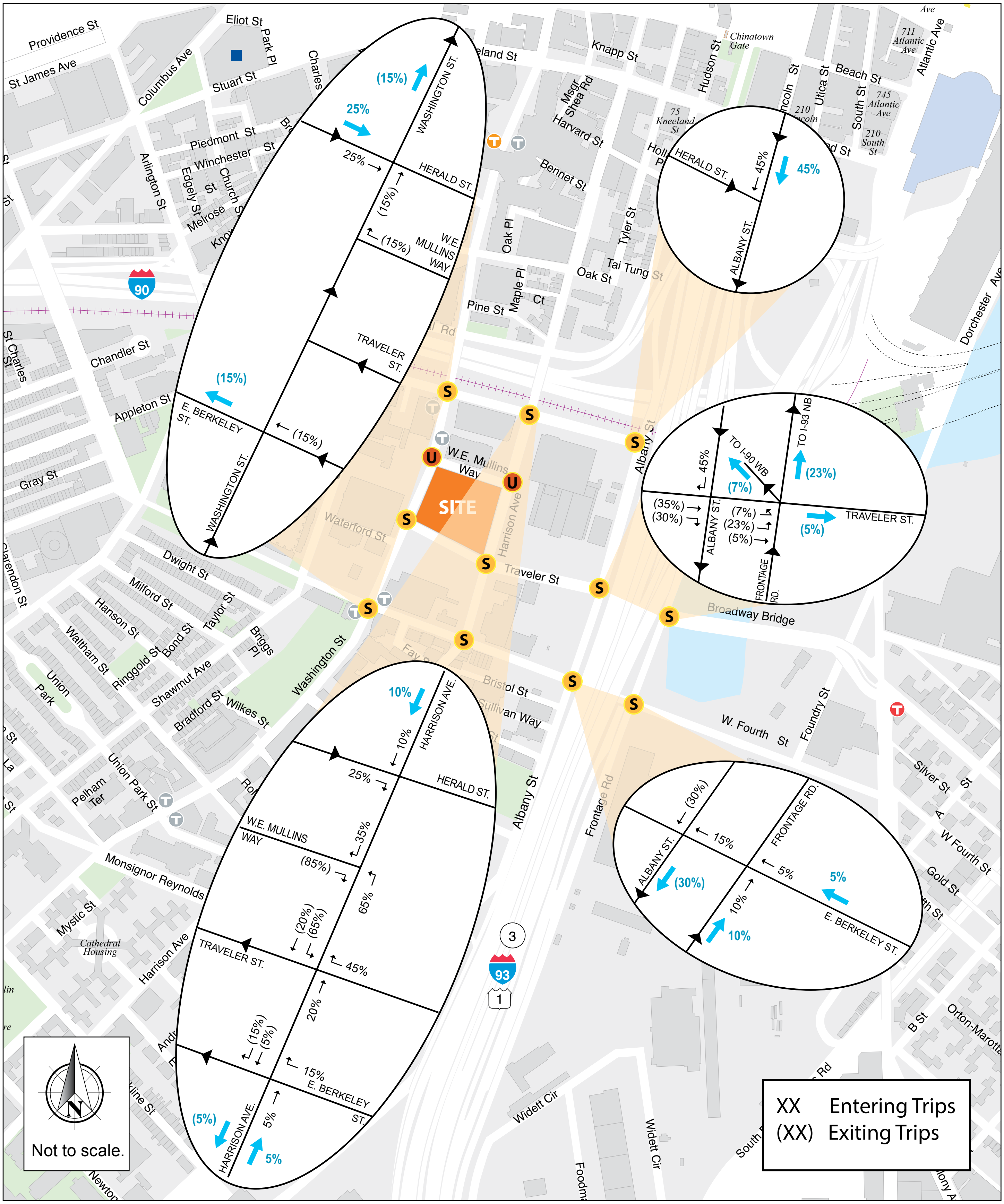

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Figure 2-12
Trip Distribution Map

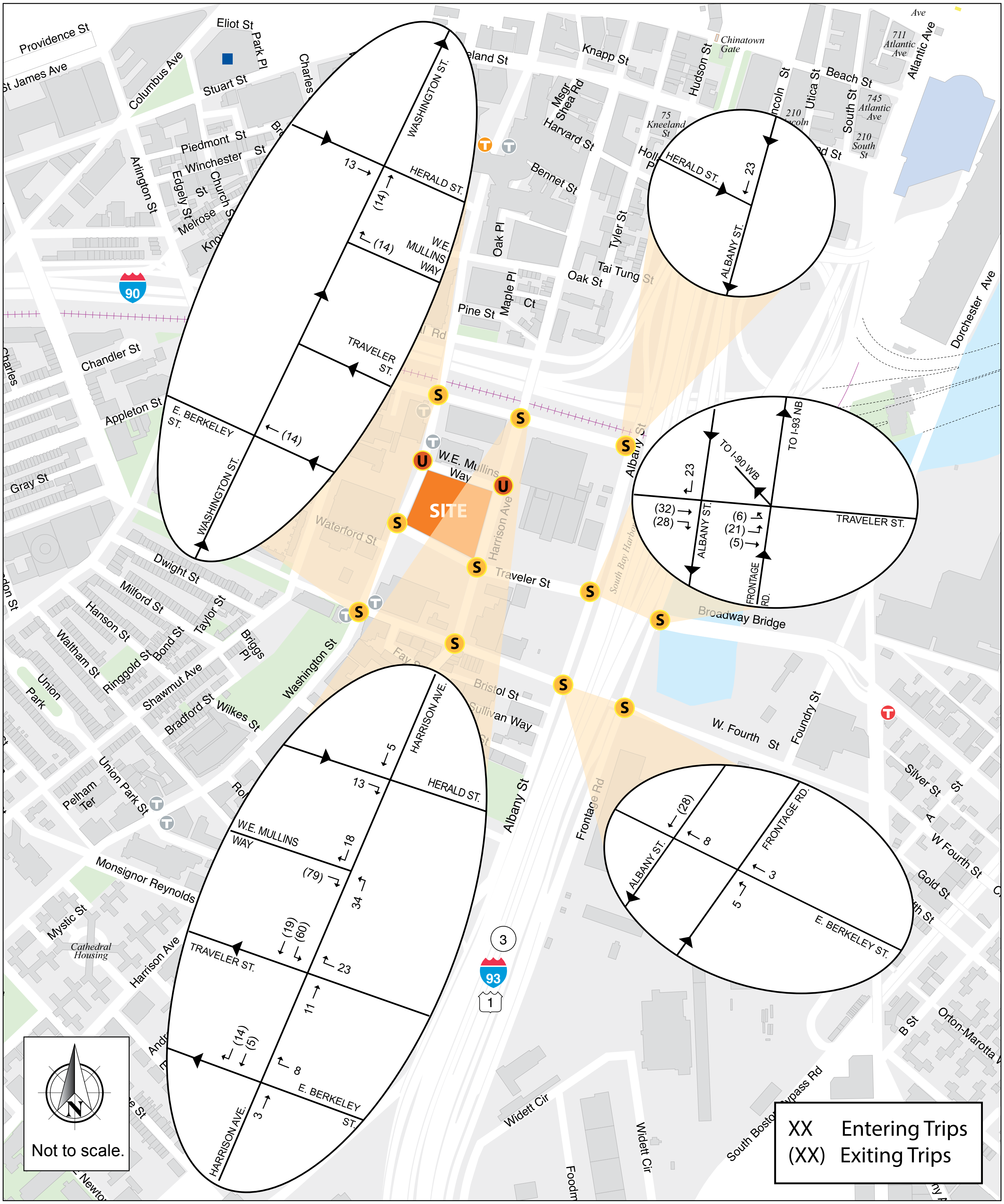

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Figure 2-13
Project Generated Trips, a.m. Peak Hour

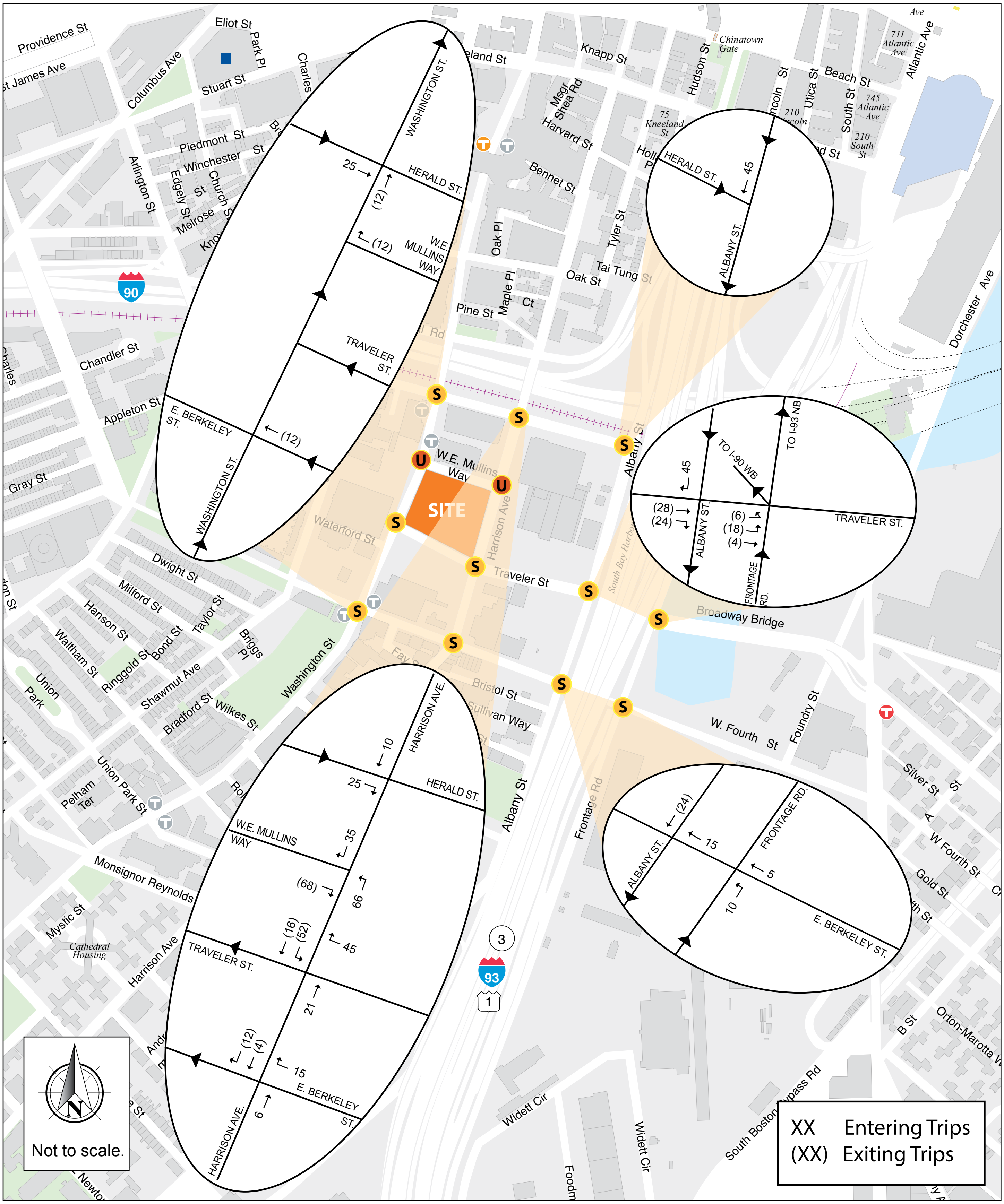

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Figure 2-14
Project Generated Trips, p.m. Peak Hour

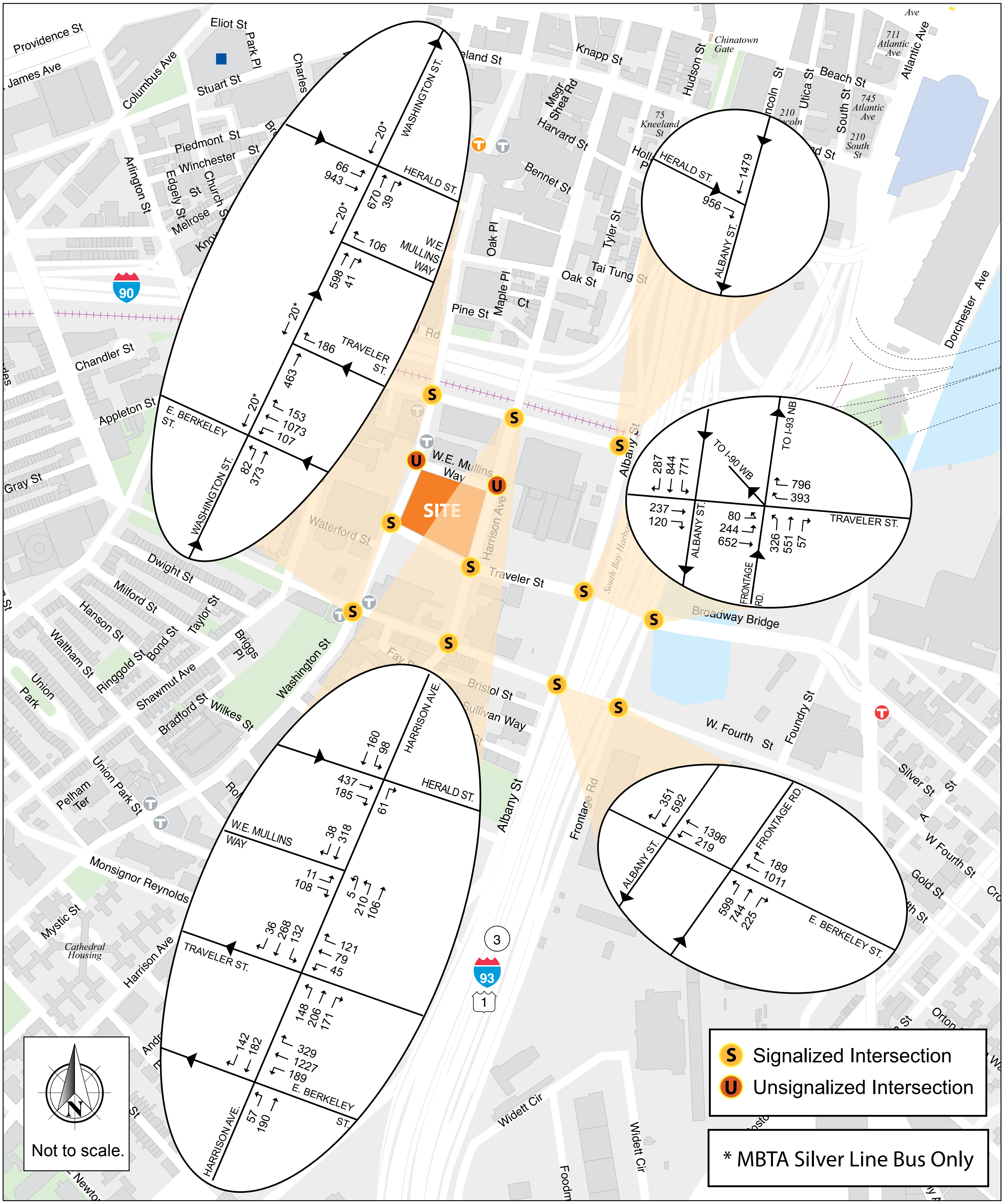

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Figure 2-15
Build Conditions (2018) Turning Movement Volumes, a.m. Peak Hour (8:00-9:00 a.m.)

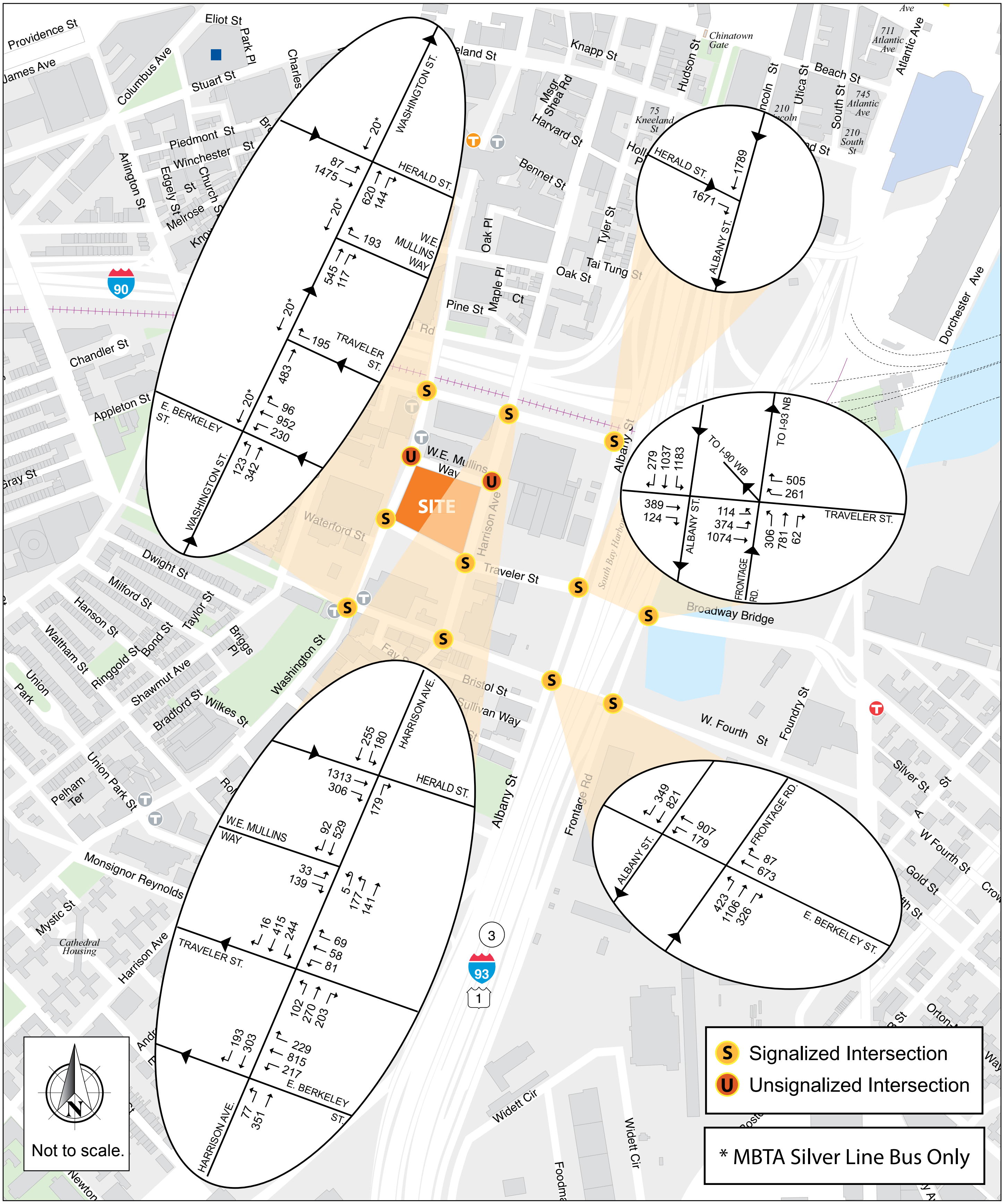

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Figure 2-16
Build Conditions (2018) Turning Movement Volumes, p.m. Peak Hour (5:00-6:00 p.m.)

2.3.2.7 Build Condition Traffic Operations

The 2018 Build condition scenario analyses use the same traffic operations analysis methodology as the 2013 Existing and 2018 No Build conditions scenario analyses. The results of the 2018 Build condition traffic analysis at study area intersections are presented in Table 2-11 and Table 2-12 for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a worsening in LOS between the 2018 No Build condition and the 2018 Build condition. The detailed analysis sheets are provided in Appendix B.

Table 2-11 Build Condition (2018) Level of Service Summary, a.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
East Berkeley Street/Washington Street	**C**	**21.5**			
E. Berkeley WB left/thru | thru | thru/right	B	15.3	0.60	101	m24
Washington NB left	D	35.1	0.32	44	104
Washington NB thru | bus-only thru	D	40.2	0.68	234	#483
Washington SB bus-only thru	C	31.2	0.07	10	33
Washington Street/Traveler Street	**A**	**1.8**			
Traveler right	A	0.3	0.19	0	0
Washington NB thru | thru | thru	A	2.6	0.16	13	20
Washington SB bus-only thru	A	2.5	0.05	3	5
Washington Street/Herald Street	**C**	**20.9**			
Herald EB left/thru | thru | thru	C	21.2	0.57	177	220
Washington NB thru | thru	C	21.7	0.56	178	233
Washington NB right	A	5.1	0.08	0	18
Washington SB thru	B	16.1	0.09	12	19
East Berkeley Street/Harrison Avenue	**D**	**52.3**			
E. Berkeley WB left/thru | thru | thru/right	E	65.8	>1.00	~463	#561
Harrison NB left/thru	C	26.5	0.53	127	#246
Harrison SB thru	B	16.1	0.31	56	m64
Harrison SB right	A	3.4	0.24	6	m7
Harrison Avenue/Traveler Street	**D**	**45.7**			
Traveler WB left	B	19.1	0.08	17	54
Traveler WB left/thru	B	15.8	0.37	58	158
Harrison NB left/thru | thru/right	C	30.3	0.75	155	m157
Harrison SB left/thru | thru/right	E	78.7	>1.00dl	~190	#267
Harrison Street/Herald Street	**B**	**18.3**			
Herald EB thru | thru | thru/right	B	17.4	0.33	130	171
Harrison NB right | right	A	0.1	0.06	0	m0
Harrison SB left	A	7.7	0.32	0	24
Harrison SB thru | thru	C	32.8	0.32	60	75

Table 2-11 Build Condition (2018) Level of Service Summary, a.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
Albany Street/East Berkeley Street	**D**	**53.2**			
E. Berkeley WB left/thru | thru	E	74.0	>1.00	~758	m#597
Harrison SB thru | thru |thru/right	C	20.7	0.88dr	140	197
Frontage Road/West Fourth Street/ East Berkeley Street	**F**	**>80.0**			
W. Fourth WB thru | thru | thru/right	D	50.9	0.92	364	#460
Frontage NB left	F	>80.0	>1.00	~583	#827
Frontage NB left/thru |thru/right	F	>80.0	>1.00	~566	#708
Albany Street/Traveler Street	**C**	**25.0**			
Traveler EB thru | thru/right	E	56.6	0.82	188	184
Albany SB left	B	19.6	0.70	270	#816
Albany SB left/thru | thru/right	B	16.5	0.70	274	#714
Broadway Bridge/Frontage Road/Traveler Street	**F**	**>80.0**			
Traveler EB hard left to I-90 | left to I-93	F	>80.0	>1.00	~355	#478
Traveler EB thru | thru	A	9.4	0.37	116	102
Broadway WB bear right to I-90 | right to I-93	D	52.1	0.89	381	#520
Broadway WB right to I-93	F	>80.0	>1.00	~1019	#1189
Frontage NB thru to I-90 | thru to I-90	C	28.4	0.54	153	m143
Frontage NB bear right to I-93 |bear right to I-93| bear right to I-93/right	C	30.7	0.71	217	m203
Albany Street/Herald Street	**C**	**22.4**			
Herald EB right | right | right	B	14.3	0.73	111	151
Albany SB thru | thru | thru	C	27.9	0.81	305	369
Unsignalized Intersections					
Washington Street/William E. Mullins Way					
Mullins WB right	B	10.7	0.15	--	14
Washington NB thru | thru | thru/right	A	0.0	0.15	--	0
Washington SB bus-only thru	A	0.0	0.01	--	0
Harrison Avenue/Williams E. Mullins Way					
Mullins EB left/right	B	12.7	0.30	--	31
Harrison NB left/thru | thru	A	2.6	0.21	--	20
Harrison SB thru | thru/right	A	0.0	0.14	--	0

~ = 50th percentile volume exceeds capacity.
\# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.
Shaded cells indicate a change in Level of Service from No Build conditions to Build conditions.

Table 2-12 Build Condition (2018) Level of Service Summary, p.m. Peak Hour

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
East Berkeley Street/Washington Street	**C**	**30.0**			
E. Berkeley WB left/thru | thru | thru/right	D	35.3	0.87	296	301
Washington NB left	B	16.7	0.30	43	104
Washington NB thru | bus-only thru	B	16.1	0.39	128	241
Washington SB bus-only thru	B	13.6	0.05	6	22
Washington Street/Traveler Street	**A**	**1.3**			
Traveler right	A	0.3	0.20	0	0
Washington NB thru | thru | thru	A	1.7	0.15	14	20
Washington SB bus-only thru	A	1.6	0.05	3	4
Washington Street/Herald Street	**F**	**>80.0**			
Herald EB left/thru | thru | thru	F	>80.0	0.96	372	#483
Washington NB thru | thru	B	14.4	0.40	130	170
Washington NB right	B	12.8	0.22	50	87
Washington SB thru	B	11.5	0.07	10	16
East Berkeley Street/Harrison Avenue	**D**	**43.8**			
E. Berkeley WB left/thru | thru | thru/right	D	46.9	0.92	347	#444
Harrison NB left/thru	E	64.0	0.97	331	#594
Harrison SB thru	C	28.9	0.46	153	273
Harrison SB right	A	4.4	0.29	0	31
Harrison Avenue/Traveler Street	**D**	**47.3**			
Traveler WB left	C	28.9	0.21	42	104
Traveler WB left/thru	C	20.6	0.32	43	118
Harrison NB left/thru | thru/right	C	20.3	0.63	113	153
Harrison SB left/thru | thru/right	E	75.3	>1.00dl	~266	#363
Harrison Street/Herald Street	**F**	**>80.0**			
Herald EB thru | thru | thru/right	F	>80.0	0.82	407	m426
Harrison NB right | right	A	0.7	0.24	0	0
Harrison SB left	A	7.7	0.48	0	23
Harrison SB thru | thru	D	36.0	0.51	101	115
Albany Street/East Berkeley Street	**C**	**23.5**			
E. Berkeley WB left/thru | thru	B	16.7	0.82	377	475
Harrison SB thru | thru |thru/right	C	29.2	0.87	274	m308

Table 2-12 Build Condition (2018) Level of Service Summary, p.m. Peak Hour (Continued)

Intersection	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (feet)	95th Percentile Queue (feet)
Signalized Intersections					
Frontage Road/West Fourth Street/ East Berkeley Street	**F**	**>80.0**			
W. Fourth WB thru | thru | thru/right	D	49.4	0.78	205	257
Frontage NB left	D	37.1	0.76	297	451
Frontage NB left/thru |thru/right	F	>80.0	>1.00	~792	#937
Albany Street/Traveler Street	**F**	**>80.0**			
Traveler EB thru | thru/right	F	>80.0	0.91	245	246
Albany SB left	F	>80.0	>1.00	601	#1151
Albany SB left/thru | thru/right	E	63.4	>1.00	618	#1052
Broadway Bridge/Frontage Road/Traveler Street	**D**	**43.6**			
Traveler EB hard left to I-90 | left to I-93	D	41.4	0.64	273	m142
Traveler EB thru | thru	E	58.3	0.71	333	m169
Broadway WB bear right to I-90 | right to I-93	B	14.5	0.44	132	156
Broadway WB right to I-93	C	22.9	0.74	281	336
Frontage NB thru to I-90 | thru to I-90	D	43.0	0.39	149	m117
Frontage NB bear right to I-93 |bear right to I-93| bear right to I-93/right	D	49.0	0.74	305	m241
Albany Street/Herald Street	**F**	**>80.0**			
Herald EB right | right | right	F	>80.0	>1.00	~649	#769
Albany SB thru | thru | thru	D	38.9	0.96	410	#535
Unsignalized Intersections					
Washington Street/William E. Mullins Way					
Mullins WB right	B	12.0	0.29	--	30
Washington NB thru | thru | thru/right	A	0.0	0.14	--	0
Washington SB bus-only thru	A	0.0	0.01	--	0
Harrison Avenue/Williams E. Mullins Way					
Mullins EB left/right	D	29.5	0.68	--	122
Harrison NB left/thru | thru	A	2.8	0.23	--	22
Harrison SB thru | thru/right	A	0.0	0.24	--	0

~ = 50th percentile volume exceeds capacity.
# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal.
Shaded cells indicate a change in Level of Service from No Build conditions to Build conditions.

As shown in Table 2-11, the majority of the signalized intersections will continue to operate with the same LOS as the No Build condition during the a.m. peak hour. The Harrison Avenue/Traveler Street intersection is expected to worsen from an overall LOS C to LOS D—which is considered acceptable in an urban environment, with the Harrison Avenue southbound through movements expected to worsen from LOS C to LOS E during the a.m. peak hour. All movements at the remaining study area intersections will not change between the No Build and Build conditions during the a.m. peak hour.

As shown in Table 2-12, the majority of the signalized intersections will continue to operate with the same LOS as the No Build condition during the p.m. peak hour as well. The Harrison Avenue/Traveler Street intersection is expected to worsen from an overall LOS C to LOS D—which is considered acceptable in an urban environment, with the Traveler Street westbound left-turn/through movements worsening from LOS B to LOS C and the Harrison Avenue southbound approach worsening from LOS D to LOS E.

No specific intersection or roadway improvements are necessary to accommodate the Project-generated traffic volumes.

2.3.2.8 Parking

The Project includes approximately 252 on-site parking spaces for building residents. Parking will be provided on-site in a four-level, above-ground garage accessed off of William E. Mullins Way. The on-site garage spaces will be for residents only. There will be no additional parking provided for the retail/restaurant uses at the Project site. The parking ratio of 0.42 parking spaces per unit is in line with the goals set forth in the Harrison Albany Corridor Strategic Plan[6] to create a "multimodal, non-auto-oriented mixed-use district." The Strategic Plan recommends a maximum parking ratio of 1.0 parking space per unit, with no defined minimum parking requirement. The current BTD district-based parking goals identify the maximum parking ratio to be 1.5 parking spaces per unit for projects in the South End, east of Tremont Street. However, the parking ratios do not distinguish between types of housing (i.e., for-sale condominiums vs. rental apartments). Current trends indicate that parking demand for rental apartments is about half that of for-sale condominiums (0.50 vs. 1.0 spaces per unit) in Boston's downtown neighborhoods. The 0.42 parking ratio proposed for the residential uses at the Project is consistent with current trends as well as the parking supply proposed in nearby developments such as Ink Block and the 275 Albany Street project.

[6] *Harrison Albany Corridor Strategic Plan*; Boston Redevelopment Authority; June 2012.

2.3.2.9 Public Transportation

Based on the transit mode shares presented earlier, the future transit trips associated with the Project were estimated and are summarized in Table 2-13.

Table 2-13 Project Transit Trips

Time Period	Direction	Apartments	Retail	Restaurant	Total
Daily	In	640	121	252	1,013
	Out	640	121	252	1,013
	Total	**1,280**	**242**	**504**	**2,026**
a.m. Peak Hour	In	35	8	59	102
	Out	50	1	11	62
	Total	**85**	**9**	**70**	**164**
p.m. Peak Hour	In	48	5	13	66
	Out	75	27	37	139
	Out	**123**	**32**	**50**	**205**

As shown in Table 2-13, the Project will generate an estimated 2,026 new transit trips on a daily basis. Approximately 164 new transit trips (102 alighting and 62 boarding) will occur during the a.m. peak hour and 205 new trips (66 alighting and 139 boarding) will occur during the p.m. peak hour.

The transit trips will be mostly dispersed between the Silver Line, the nearby MBTA bus routes, the Red Line station at Broadway, and the Orange Line station at Tufts Medical Center. The additional transit trips will be accommodated by the existing public transportation facilities that serve the Project study area.

2.3.2.10 Pedestrians

Based on the walk mode shares presented earlier, the future walk trips were estimated and are summarized in Table 2-14.

Table 2-14 Project Pedestrian Trips

Time Period	Direction	Apartments	Retail	Restaurant	Total
Daily	In	897	356	744	1,997
	Out	897	356	744	1,997
	Total	**1,794**	**712**	**1,488**	**3,994**
a.m. Peak Hour	In	5	3	18	26
	Out	141	6	61	208
	Total	**146**	**9**	**79**	**234**
p.m. Peak Hour	In	136	31	73	240
	Out	10	8	11	29
	Total	**146**	**39**	**84**	**269**

Over the course of a day, the Project will generate an estimated 3,994 new pedestrian trips and an additional 2,026 new transit trips that will require a walk to or from the site. This results in an additional 6,020 new pedestrian trips per day. Approximately 234 new pedestrian trips will occur during the a.m. peak hour and 269 new pedestrian trips will occur during the p.m. peak hour in addition to the 164 transit trips during the a.m. peak hour and 205 transit trips during the p.m. peak hour that will also require a walk to/from the site.

As shown on Figure 2-11, the Project site will be bisected by an east-west pedestrian way between Harrison Avenue and Washington Street, with a connection to Traveler Street to the south that will be restricted to pedestrians and bicyclists. The pedestrian way will improve connectivity and walkability in the area by providing an additional link between the existing and proposed development throughout this area of the Washington Street and Harrison Avenue corridors. The pedestrian way will also create two smaller blocks and will provide additional pedestrian connections throughout the area, consistent with the recommendations identified in the Harrison Albany Corridor Strategic Plan.

2.3.2.11 Bicycle Accommodations

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements to provide secure bicycle parking for residents and employees, and short-term bicycle racks for visitors. The Project will provide a total of 602 covered and secure bicycle storage spaces on-site for residents of the site and approximately 10 additional bicycle storage spaces on-site for employees of the retail/restaurant components of the Project. Additional storage will be provided by outdoor bicycle racks accessible to visitors to the site in accordance with BTD guidelines. As previously mentioned, a new Hubway station will be located across Harrison Avenue from the Project site at the Ink Block project, which is currently under construction.

All bicycle racks, signs, and parking areas will conform to BTD guidelines and will be located in safe, secure locations. The Proponent will work with BTD to identify the most appropriate quantity and location for bicycle racks on the Project site as part of the Transportation Access Plan Agreement (TAPA) process.

2.3.2.12 Build Condition Loading and Service Activity

Loading and service operations will occur on-site in a loading bay accessed off of William E. Mullins Way. As shown in Figure 2-11, the loading area is located at the rear of the site and will occur at street-grade below the proposed parking garage. Trash pickup will also take place in the loading bay. The loading bay along William E. Mullins Way is sized to serve 36-foot long single unit box trucks (SU-36). Residential move-in/move-out will be managed by building management and will occur from the loading bay. No loading activity will take place on the surrounding roadway network.

A summary of anticipated loading/service activity by land use is presented in Table 2-15; the sources of the assumptions are presented below. Delivery trip estimates were based on data provided in the Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area report[7]. Deliveries to the Project site will be mostly limited to SU-36 trucks and smaller delivery vehicles.

Restaurant. Restaurants depend on more frequent food deliveries from smaller trucks. Based on the CTPS report, restaurant uses generate approximately 0.70 light truck trips per 1,000 sf of floor area and 0.07 medium/heavy truck trips per 1,000 sf of gross floor area.

Retail. Different types of retail establishments exhibit different truck trip rates. The retail on the Project site is expected to be "storefront" retail and is expected to generate approximately 0.15 light truck trips per 1,000 sf of floor area and 0.15 medium/heavy truck trips per 1,000 sf of floor area.

Residential. Residential units primarily generate delivery trips related to small packages and prepared food. Based on the CTPS report, residential uses generate approximately 0.01 light truck trips per 1,000 sf of gross floor area and 0.001 medium/heavy truck trips per 1,000 sf of gross floor area.

Table 2-15 Delivery Activity by Land Use

Land Use	Number of Deliveries			General Delivery Times
	SU-30 or smaller	*Larger than SU-30*	*Total*	
Restaurant	7	1	8	10% before 7:00 a.m. 70% between 7:00 a.m. and 1:00 p.m. 20% after 1:00 p.m.
Retail	3	2	5	
Residential	5	0	5	
Total	**15**	**3**	**18**	

The Project is expected to generate approximately 18 deliveries per day. It is anticipated that the majority of these deliveries will occur between 7:00 a.m. and 1:00 p.m. These numbers do not include trash truck trips. Trash truck trips generally occur between 5:00 a.m. and 7:00 a.m. and do not coincide with the regular delivery activities.

2.4 Transportation Mitigation Measures

While the traffic impacts associated with the new trips are minimal, the Proponent will continue to work with the City of Boston to create a Project that efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

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7 *Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area*; Central Transportation Planning Staff; September 1993.

In support of the increased retail and commercial uses both on the Project site and at other proposed developments within the area, the Proponent is requesting that BTD eliminate the existing bus parking regulations along Traveler Street, on the south side of the Project site. Parking along Traveler Street between Washington Street and Harrison Avenue should also be designated as two-hour parking to accommodate the increased retail and commercial uses both on the Project site and at other proposed developments within the area. The reassignment of the parking regulations along Traveler Street will provide a safer pedestrian environment and are more appropriate for the future character of the neighborhood.

The Proponent is responsible for preparation of the 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 Proponent will work closely with BTD to determine the level of transportation mitigation that will be necessary to accommodate the Project. It is anticipated that the Harrison Albany Corridor Strategic Plan will be used as a basis for potential transportation improvements in the vicinity of the Project site. Any transportation improvements to be undertaken as part of this Project will be defined and documented in the TAPA.

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

2.5 Transportation Demand Management

The Proponent is committed to implementing Transportation Demand Management (TDM) measures to minimize automobile usage and Project related traffic impacts. TDM will be facilitated by the nature of the Project (which does not generate significant peak hour trips) and its proximity to numerous public transit alternatives.

On-site management will keep a supply of transit information (schedules, maps, and fare information) to be made available to the residents and patrons 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 Proponent is prepared to take advantage of good transit access in marketing the site to future residents by working with them to implement the following demand management measures to encourage the use of non-vehicular modes of travel.

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

- **Orientation Packets**: The Proponent will provide orientation packets to new residents and tenants containing information on available transportation choices, including transit routes/schedules and nearby Zipcar locations. On-site management will work with residents and tenants as they move in to help facilitate transportation for new arrivals.

- **Bicycle Accommodation**: The Proponent will provide bicycle storage in secure, sheltered areas for residents. Secure bicycle storage will also be made available to employees to encourage bicycling as an alternative mode of transportation. Subject to necessary approvals, public use bicycle racks for visitors will be placed near building entrances.

- **Electric Vehicle Charging**: The Proponent will provide electric vehicle charging stations on the Project site.

- **Transportation Coordinator**: The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries and will work with residents as they move in to raise awareness of public transportation, bicycling, and walking opportunities.

- **Project Web Site**: The web site will include transportation-related information for residents, workers, and visitors.

2.6 Evaluation of Short-term Construction Impacts

Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a CMP to be filed with BTD in accordance with the City's transportation maintenance plan requirements. The CMP will also address the need for pedestrian detours, lane closures, and/or parking restrictions, if necessary, to accommodate a safe and secure work zone.

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

- Construction workers will be encouraged to use public transportation and/or carpool;

- A subsidy for MBTA passes will be considered for full-time employees; and

- Secure spaces will be provided on-site for workers' supplies and tools so they do not have to be brought to the site each day.

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

Chapter 3.0

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

3.1.1 Introduction

Gradient Microclimate Engineering Inc. (GME) completed a Pedestrian Level Wind (PLW) study for the Project based on industry standard wind tunnel testing techniques, architectural drawings provided by the Project architect, surrounding context data obtained from the BRA, and recent site imagery.

Based on the wind tunnel test results, interpretation, and GME's experience with similar developments, the wind conditions at the majority of key grade-level locations within and surrounding the development site are expected to be acceptable for the intended pedestrian uses. A comparison of wind speeds under the No Build and Build conditions reveals that the introduction of the Project is not predicted to contribute to a reduction or an improvement in the overall wind conditions surrounding the site.

3.1.2 Study Methodology

3.1.2.1 Wind Tunnel Context Modeling

The general concept and approach to wind tunnel modeling is to provide building detail in the immediate vicinity of the study site on the surrounding model, and to rely on a length of wind tunnel upwind of the model to develop wind properties consistent with known turbulent intensity profiles that represent the surrounding terrain. For this study, the wind tunnel was configured to simulate atmospheric velocity profiles consistent with urban, suburban and open upwind terrain.

To conduct the wind tunnel study, a physical model of the Project and relevant surroundings was constructed at a scale of 1:400. The wind tunnel model, centered at the study site, includes all existing buildings and approved future developments (including the Ink Block development to the east of the study site) within a full-scale diameter of 2,700 feet. The existing building massing and approved future developments are defined according to mapping data acquired from the BRA. Figure 3.1-1 shows photographs of the wind tunnel model.

3.1.2.2 Wind Speed Measurements

The PLW assessment was performed by testing a total of 60 wind sensor locations for the No Build site massing and 90 for the Build massing on the scale model in GME's wind tunnel. Of the 90 sensors, 83 were placed at grade, while the remaining seven sensors were located at potential private patio areas at the podium level. Wind speed measurements were performed at each of the 90 sensors for 36 wind directions at 10° intervals. Appendix C includes the annual and seasonal wind data.

Mean and peak wind speed values for each location and wind direction were calculated from real-time pressure measurements, recorded at a sample rate of approximately 500 samples per second, and taken over a 60-second time period. This period at model-scale corresponds approximately to one hour in full-scale, which matches the time frame of full-scale meteorological observations. Measured mean and gust wind speeds at grade were referenced to the wind speed measured near the ceiling of the wind tunnel to generate mean and peak wind speed ratios. Ceiling height in the wind tunnel represents the depth of the boundary layer of wind flowing over the earth's surface, referred to as the gradient height. Within this boundary layer, mean wind speed increases up to the gradient height and remains constant thereafter.

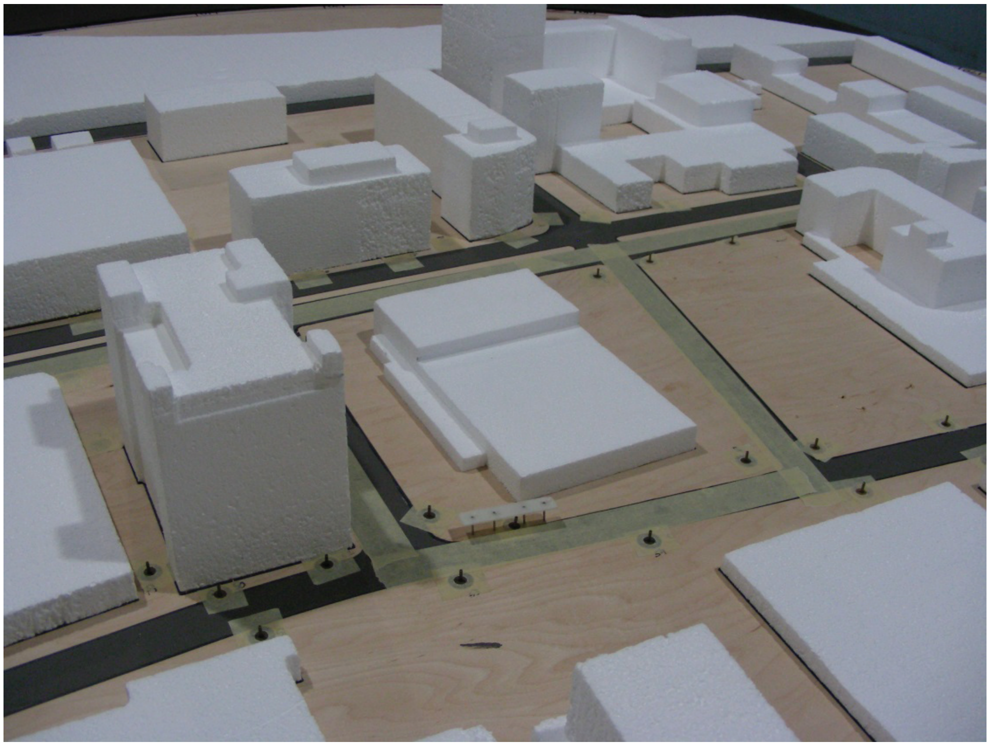
3.1.2.3 Meteorological Data Analysis

A statistical model for the wind climate in Boston was developed from approximately 40-years of hourly meteorological wind data recorded at Logan International Airport. Wind speed and direction data were analyzed for each month of the year in order to: (i) determine the statistically prominent wind directions and corresponding speeds, and (ii) characterize similarities between monthly weather patterns. Based on this portion of the analysis, the four seasons are represented by grouping data from consecutive months based on similarity of weather patterns, and not according to the traditional calendar method.

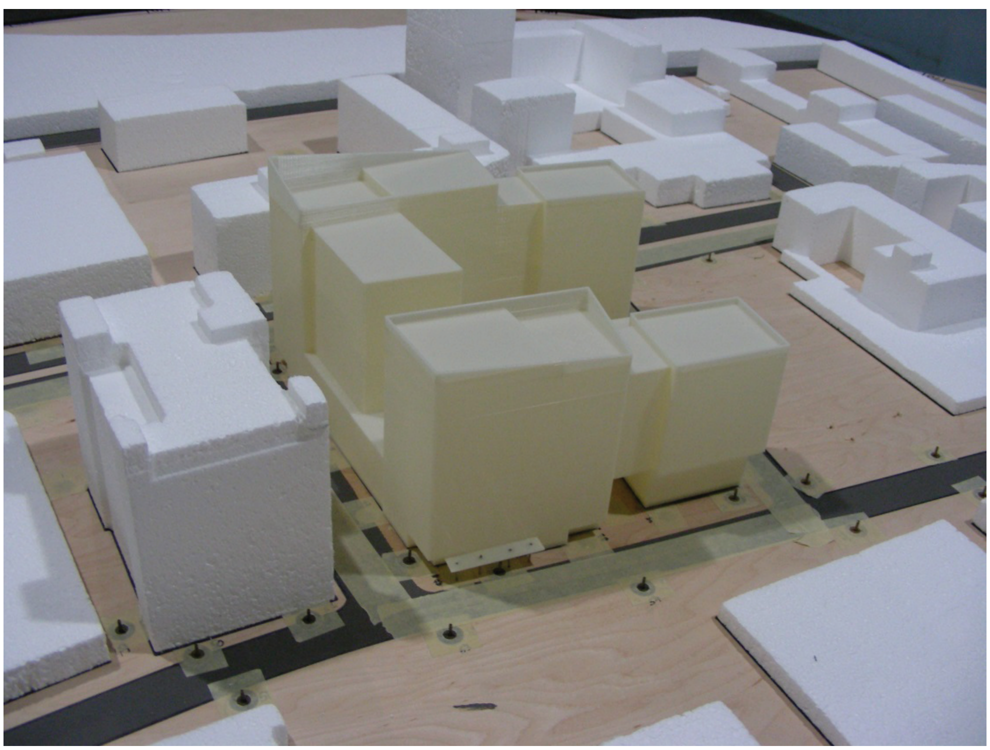
The statistical model of the Boston wind climate, which indicates the directional character of local winds on a seasonal and annual basis, is shown in Figures 3.1-2 and 3.1-3. The plots illustrate three contours representing three probability levels superimposed on a polar grid of wind speed at gradient height in miles per hour (mph). The three contours represent the mean hourly wind speed occurring once per month (innermost contour), once per year, and once every ten years (outermost contour). The preferred wind directions can be identified as the angular position where the given contour has the largest radial distance from the center. For Boston, the most common winds on annual basis occur for the northeast compass direction, followed by those from the west northwest, the south southwest, and the east southeast. The directional preference and relative magnitude of wind speed changes somewhat from season to season, with the winter and autumn displaying generally stronger winds. By convention in microclimate studies, wind direction refers to the wind origin (i.e., a north wind blows from north to south).

3.1.2.4 Pedestrian Comfort Assessment

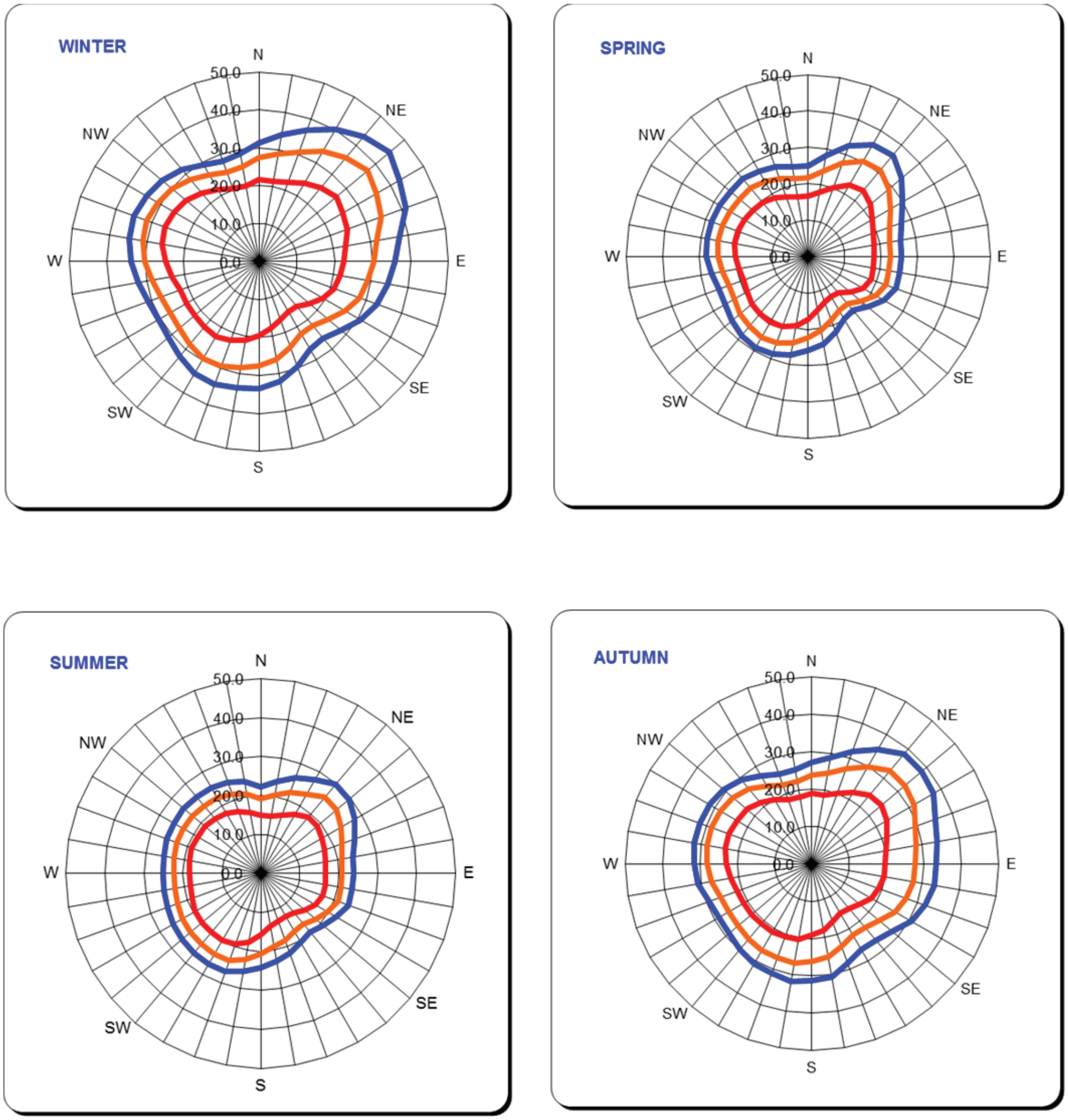
Pedestrian comfort criteria are based on mechanical wind effects without consideration of other meteorological conditions (i.e., temperature and relative humidity). The criteria provide an assessment of comfort, assuming that pedestrians are appropriately dressed for a specified outdoor activity during any given season. The BRA employs two separate standards for determining pedestrian wind comfort. The first standard relates to the effective wind gust velocity (calculated as the hourly mean wind speed plus 1.5 times the



No Build



Build

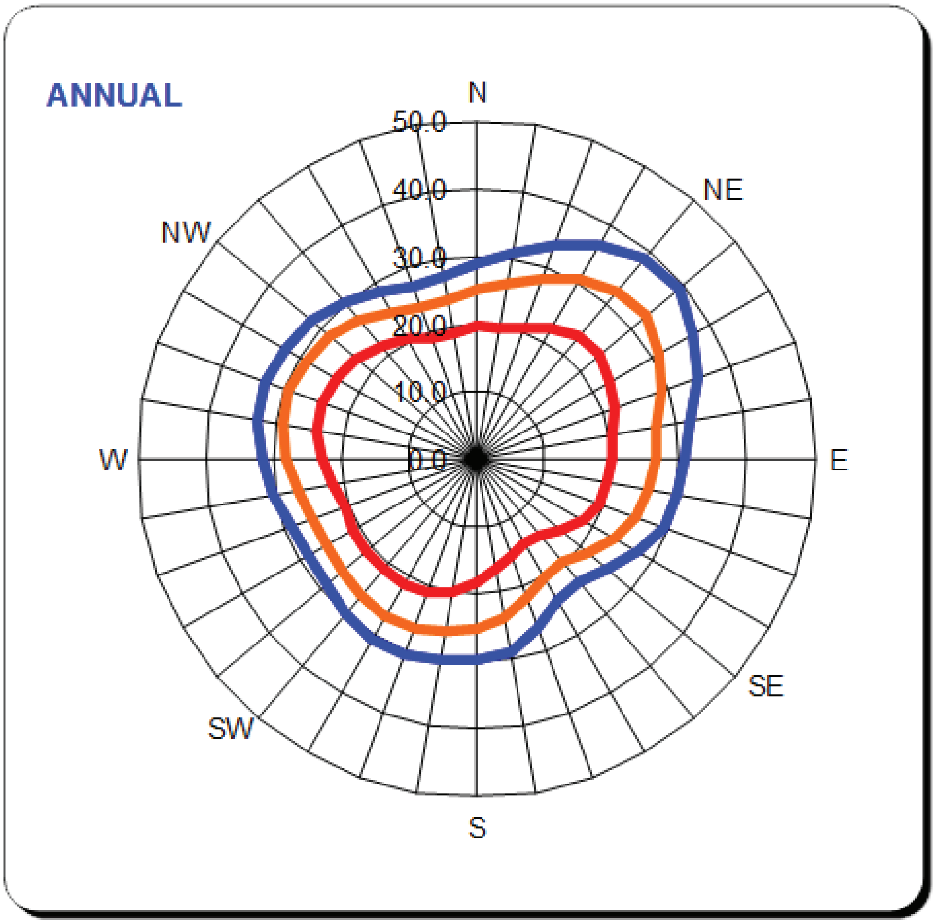


Notes:

1. Radial Distances Indicate Wind Speed In Miles Per Hour.
2. A Point Along The Innermost Contour Represents The Wind Speed Exceeded On Average 0.1% Of The Time Within a 10° Sector Centered On That Direction.
3. The Middle and Outermost Contours Represent Probability Levels of 0.01% and 0.001%, Respectively.

Figure 3.1-2

Seasonal Distribution of Winds



Notes:

1. Radial Distances Indicate Wind Speed In Miles Per Hour.
2. A Point Along The Innermost Contour Represents The Wind Speed Exceeded On Average 0.1% Of The Time Within a 10° Sector Centered On That Direction.
3. The Middle and Outermost Contours Represent Probability Levels of 0.01% and 0.001%, Respectively.

Figure 3.1-3
Annual Distribution of Winds

root mean square wind speed), stating that a threshold of 31 mph should not be exceeded more than one percent of the time. The second set of standards is based on the hourly mean wind speeds, and defines five pedestrian comfort classes and corresponding mean wind speed ranges. The comfort classes are defined in terms of standards for the hourly mean wind speed exceeded one percent of the time. The comfort classes and associated wind speed ranges are summarized as follows:

Comfortable for Sitting	≤ 12 mph
Comfortable for Standing	> 12 and ≤ 15 mph
Comfortable for Walking	> 15 and ≤ 19 mph
Uncomfortable for Walking	> 19 and ≤ 27 mph
Dangerous	> 27 mph

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

3.1.3 Results

3.1.3.1 No Build

An analysis of the No Build condition was performed at 60 sensor locations, including perimeter sidewalks and laneways, existing building entrances, and a children's play area. The No Build condition was modeled to include all recently approved developments in the study area (including the Ink Block immediately to the east of the study site) and with the current building at the study site present. The results of the No Build analysis are shown in Figure 3.1-4.

The analysis of the No Build condition shows that wind conditions in the surrounding area and around the Project site are generally suitable for walking or better. Seven locations located on Harrison Avenue north of Traveler Street and on Traveler Street east of Harrison Avenue in the No Build condition are predicted to be uncomfortable for walking (sensors 4, 5, 7, 13, 15, 16, and 58). No locations exceed the effective gust velocity criteria.

3.1.3.2 Comparison of No Build to Build

The Build condition was analyzed for the 60 sensor locations studied in the No Build condition, as well as for an additional 30 sensor locations around and on the Project (see Figures 3.1-5 to 3.1-7). Figure 3.1-6 includes additional sensor locations on the sidewalks surrounding the Project site, as well as the pedestrian way that crosses the site. Figure 3.1-7 shows the sensor locations on rooftop amenity areas.

The analysis of the Build condition shows that winds at the ground level in most locations are predicted to be comfortable for walking or better—80 of the 90 locations studied.

345 Harrison Avenue Boston, Massachusetts

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Figure 3.1-4

Annual Pedestrian Comfort, No Build

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Figure 3.1-5

Annual Pedestrian Comfort, Build

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Figure 3.1-6

Annual Pedestrian Comfort, Build Site Specific

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Figure 3.1-7

Annual Pedestrian Comfort, Build Above Grade Locations

Keeping in mind that the Project is not predicted to contribute to a reduction or an improvement in the overall wind conditions surrounding the site, specific locations are expected to experience a change in wind speeds between the No Build and Build conditions, and are outlined as follows.

- Along the Harrison Avenue corridor to the northeast of the site (denoted by sensors 3, 4, and 6) and on the pedestrian walkway between buildings immediately to the east (sensors 7 and 8), the introduction of the Project provides shielding from prevalent westerly winds. Accordingly, wind conditions at the noted locations are improved in the Build condition as compared to the No Build condition.

- On the Harrison Avenue sidewalk across from the site (sensors 9 through 11), the introduction of the Project creates a low-pressure region for westerly and easterly winds flowing around the buildings on each side of the road. Conditions remain comfortable for walking or better on an annual basis.

- On the Traveler Street sidewalk to the southeast of the site (sensors 12 and 13), the proposed Project shields westerly winds, resulting in improved conditions over the No Build condition.

- On the pedestrian walkway between buildings at the eastern side of the Project's pedestrian way (sensor 16), the proposed Project provides substantial blockage of direct westerly winds, as well as reducing easterly winds approaching the corridor. Correspondingly, wind conditions improve from uncomfortable under the No Build condition to comfortable for standing in the Build condition on an annual basis.

- At the intersection of Washington Street and East Berkeley Street to the southwest of the site (sensors 27 through 31), the Project provides shielding for the statistically common northeastern wind direction, resulting in an improvement of wind conditions over the No Build condition.

- Northwest and northeast winds flowing around the south corners of the Project create elevated wind speeds directly south of the site. At the corner of Traveler Street and Washington Street (sensor 33) and at the corner of Traveler Street and Harrison Avenue and along the Harrison Street sidewalk (sensors 34 and 35), increased wind speeds occur in the Build condition as compared to the No Build condition, but are comfortable for walking or better.

- At the northwest corner of the site (sensor 57), and on the Washington Street sidewalk adjacent to William E. Mullins Way (sensor 53), stronger northeast winds channeling between the Project and the adjacent building to the north are recorded with the introduction of the Project as compared to the No Build condition. Although the increase in wind speeds under the proposed massing is relatively small, the comfort criterion is reduced from comfortable for walking under the No

Build condition to uncomfortable for the Build condition. The Proponent will consider mitigation measures to improve wind conditions at these locations as the design progresses, if required.

- Also at the northwest corner of the development, the transit shelter (sensor 56) experiences an improvement in wind conditions upon introduction of the Project. On an annual basis, wind conditions improve from comfortable for walking under the No Build condition to comfortable for standing or better under the Build condition.

- On the sidewalk at the northeast corner of the development (sensor 58), southwestern winds are blocked by the Project, while eastern winds are deflected by the downwind massing. Overall, annual wind conditions improve from uncomfortable under the No Build condition to comfortable for standing under Build condition.

- On the sidewalk at the southeast corner of the site (sensor 59), winds accelerate past the building corner for southwestern and northeastern flows. The increased wind levels result in the annual comfort criteria increasing from comfortable for sitting under the No Build condition to uncomfortable for the Build condition. The effective gust velocity threshold is also exceeded on an annual basis at this location for the Build condition. The Proponent will consider mitigation measures to improve wind conditions at these locations as the design progresses, if required.

In general, the introduction of the Project results in relatively minor changes in wind comfort within and immediately surrounding the site, in some cases shifting existing stronger winds, while improving wind conditions over other pedestrian areas. In particular, the strong winds that are present near the intersection of Harrison Avenue and William E. Mullins Way, between buildings to the east of the site, and along the Traveler Street sidewalk to the southeast of the site under the No Build condition are improved under the Build condition. Increased wind speeds near the intersection of Harrison Avenue and Traveler Street, and near the intersection of William E. Mullins Way and Washington Street result in a reduction in pedestrian comfort for the Build condition as compared to the No Build condition. At locations further removed from the immediate site perimeter, the introduction of the Project has no significant influence on pedestrian wind conditions, either positive or negative.

In light of a comparison of the overall wind conditions surrounding the site under the No Build and Build condition, it is concluded that while the introduction of the Project does effect the wind conditions in certain locations, it does not contribute to an overall improvement or reduction in pedestrian wind conditions.

3.2 Shadow

3.2.1 Introduction and Methodology

As typically required by the BRA, a shadow impact analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 a.m., 12:00 noon, and 3:00 p.m.) during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox.

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. 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 3.2-1 to 3.2-14 at the end of this section.

The analysis shows that the Project's impacts will generally be limited to the immediately surrounding streets and sidewalks, as well as the new pedestrian way being developed on the site as part of the Project. The Project is not expected to cast any shadow on existing public open spaces in the surrounding area during any of the time periods studied.

3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, the Project will not cast shadow on any public open spaces in the area. New shadow from the Project will be cast to the northwest onto a small portion of William E. Mullins Way and its southern sidewalk, and across Washington Street and its sidewalks, including a bus stop at the corner of Washington Street and William E. Mullins Way.

At 12:00 p.m., the Project will not cast shadow on any public open spaces in the area. New shadow will be cast to the north onto William E. Mullins Way and its northern and southern sidewalks, and across Washington Street and its eastern and western sidewalks, including a bus stop at the corner of Washington Street and William E. Mullins Way.

At 3:00 p.m., the Project will not cast shadow on any public open spaces or bus stops in the area. New shadow will be cast to the northeast across William E. Mullins Way and its northern and southern sidewalks, and a portion of Harrison Avenue and its sidewalks.

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, the Project will not cast shadow on any public open spaces in the area. New shadow from the Project will be cast to the west across Washington Street and its sidewalks, including a bus stop at the corner of Washington Street and William E. Mullins Way, and a small portion of Traveler Street and its northern and southern sidewalks.

At 12:00 p.m., the Project will not cast shadow on any public open spaces in the area. New shadow will be cast to the north onto a portion of William E. Mullins Way and its southern sidewalk, and a portion of Washington Street and its eastern sidewalk, including a bus stop at the corner of William E. Mullins Way and Washington Street.

At 3:00 p.m., the Project will not cast shadow on any public open spaces or bus stops in the area. New shadow will be cast to the northeast onto a portion of William E. Mullins Way and its sidewalks, and a portion of Harrison Avenue and its eastern sidewalk.

At 6:00 p.m., the Project will not cast shadow on any public open spaces or bus stops in the area. New shadow will be cast to the east onto a small portion of William E. Mullins Way and its southern sidewalk, and across Harrison Avenue and its sidewalks.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m. during the autumnal equinox, the Project will not cast shadow on any public open spaces in the area. New shadow from the Project will be cast to the northwest onto a portion of William E. Mullins Way and its southern sidewalk, and across Washington Street and its sidewalks, including a bus stop at the corner of William E. Mullins Way and Washington Street.

At 12:00 p.m., the Project will not cast shadow on any public open spaces in the area. New shadow will be cast to the northwest across William E. Mullins Way and its sidewalks, and onto Washington Street and its eastern and western sidewalks, including a bus stop at the corner of William E. Mullins Way and Washington Street.

At 3:00 p.m., the Project will not cast shadow on any public open spaces or bus stops in the area. New shadow will be cast to the northeast across William E. Mullins Way and its sidewalks, and across Harrison Avenue and its sidewalks.

At 6:00 p.m., the Project will not cast shadow on any public open spaces or bus stops in the area. Most of the area is under existing shadow. New shadow will be cast to the northeast across a portion of William E. Mullins Way and its sidewalks, across Harrison Avenue and its sidewalks, and onto a portion of Interstate 93.

3.2.5 Winter Solstice (December 21)

At 9:00 a.m. during the winter solstice, the Project will not cast shadow on any public open spaces in the area. New shadow from the Project will be cast to the northwest across a small portion of William E. Mullins Way and its sidewalks, and onto a portion of Washington Street and its sidewalks. A bus stop at the corner of William E. Mullins Way and Washington Street is under existing shadow, and will continue to be under shadow.

At 12:00 p.m., the Project will not cast shadow on any public open spaces in the area. New shadow will be cast to the north across a portion of William E. Mullins Way and its sidewalks, and across Washington Street and its sidewalks. A bus stop at the corner of William E. Mullins Way and Washington Street is under existing shadow, and will continue to be under shadow.

At 3:00 p.m., the Project will not cast shadow on any public open spaces or bus stops in the area. New shadow will be cast to the northeast across a very minor portion of William E. Mullins Way and its sidewalks, a portion of Harrison Avenue and its sidewalks, a very small portion of Herald Street and its sidewalks, and a small portion of the Massachusetts Turnpike.

3.2.6 Conclusions

The shadow impact analysis looked at net new shadow created by the Project during fourteen time periods. The analysis shows that the Project's impacts will generally be limited to the immediately surrounding streets and sidewalks and the new pedestrian way to be constructed on the site as part of the Project. The Project is not expected to cast any shadow on existing public open spaces outside the Project site during any of the time periods studied.

Figure 3.2-1

Shadow Study: March 21, 9 a.m.

345 Harrison Avenue Boston, Massachusetts

cbt

Figure 3.2-2

Shadow Study: March 21, 12 p.m.

345 Harrison Avenue Boston, Massachusetts

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Figure 3.2-3

Shadow Study: March 21, 3 p.m.

345 Harrison Avenue Boston, Massachusetts

cbt

Figure 3.2-4

Shadow Study: June 21, 9 a.m.

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Figure 3.2-5

Shadow Study: June 21, 12 p.m.

Figure 3.2-6

Shadow Study: June 21, 3 p.m.

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Figure 3.2-7

Shadow Study: June 21, 6 p.m.

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Figure 3.2-8

Shadow Study: September 21, 9 a.m.

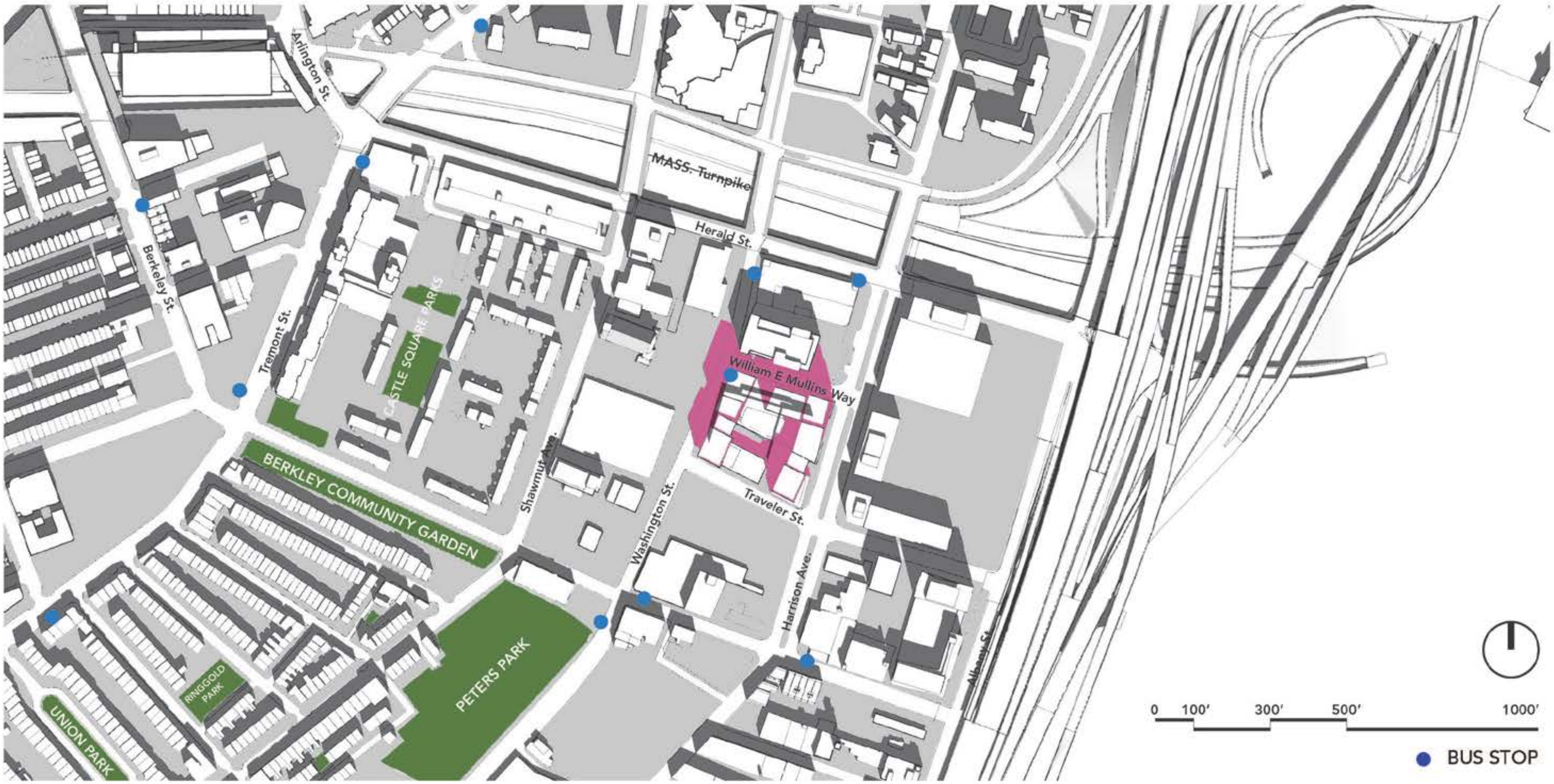
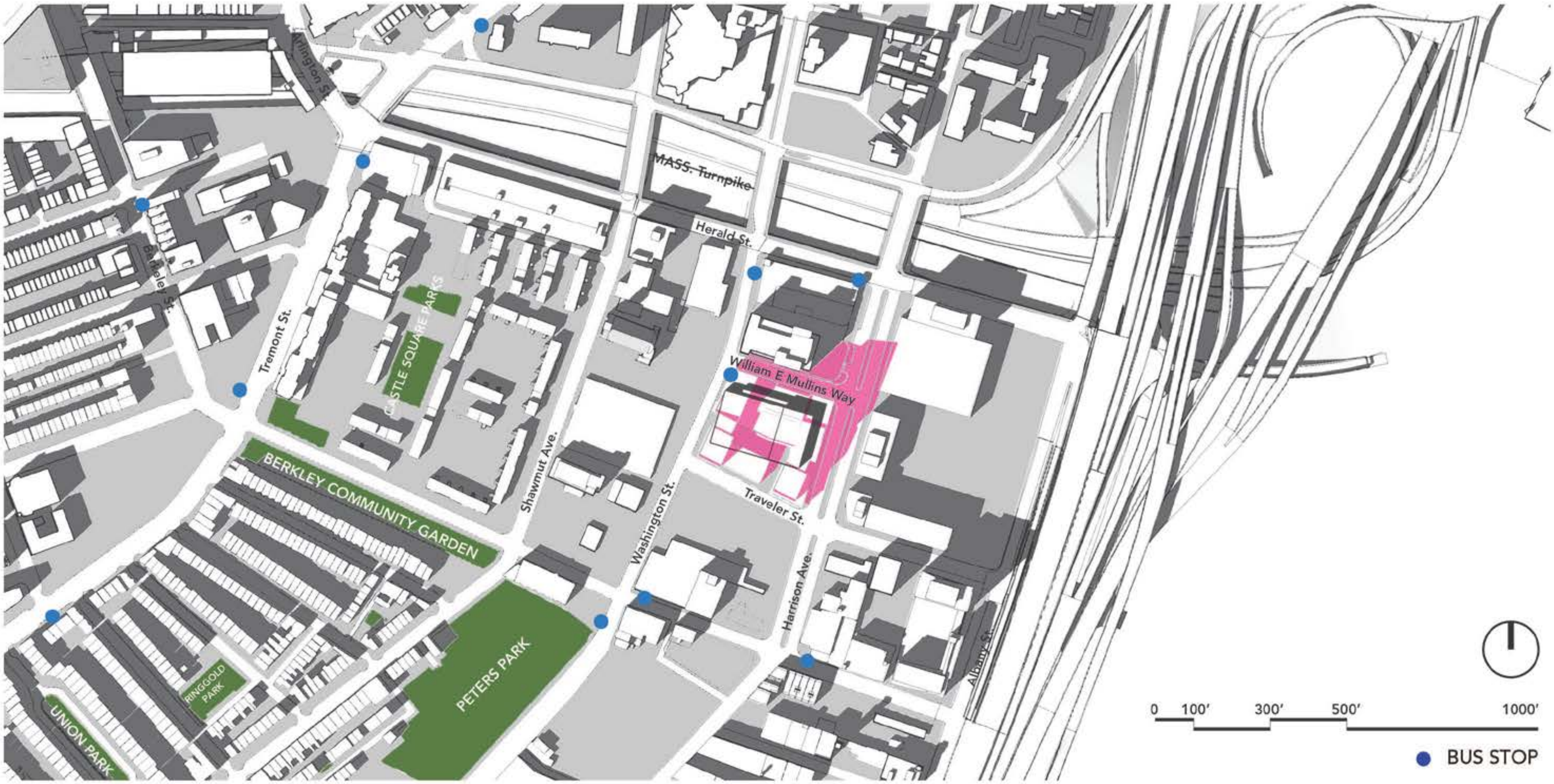


Figure 3.2-9

Shadow Study: September 21, 12 p.m.



345 Harrison Avenue Boston, Massachusetts

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Figure 3.2-10

Shadow Study: September 21, 3 p.m.

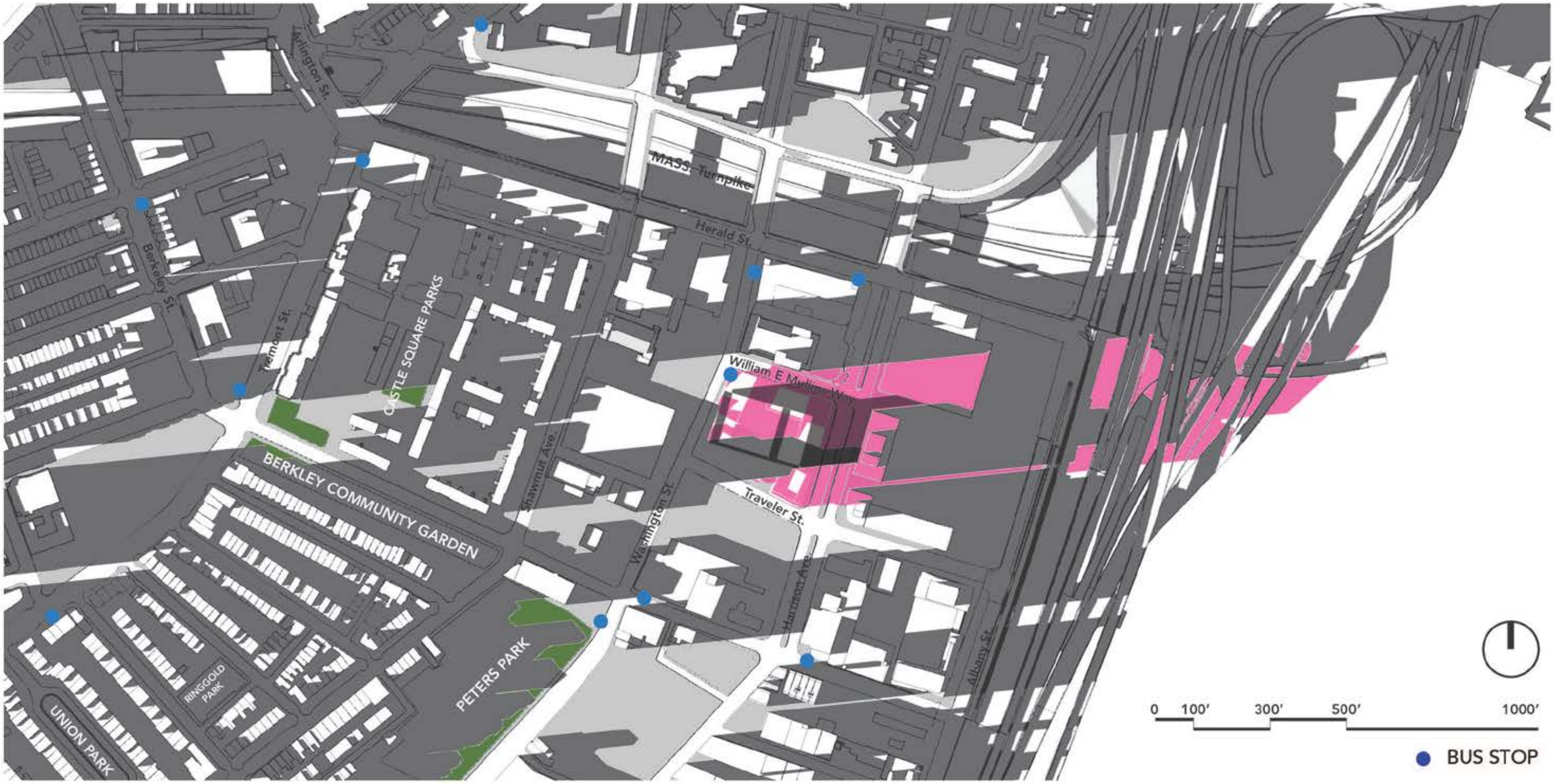

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Figure 3.2-11

Shadow Study: September 21, 6 p.m.

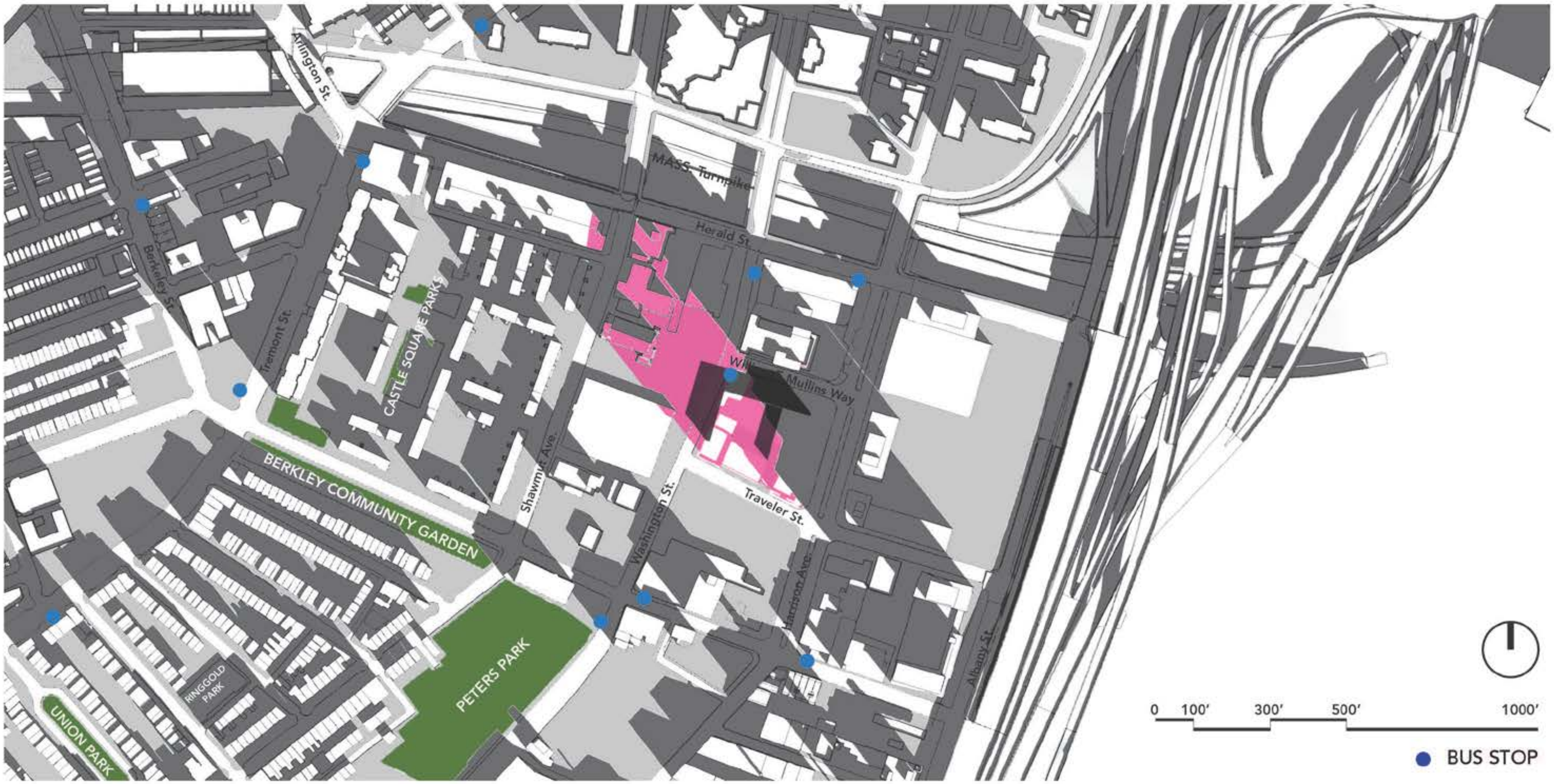

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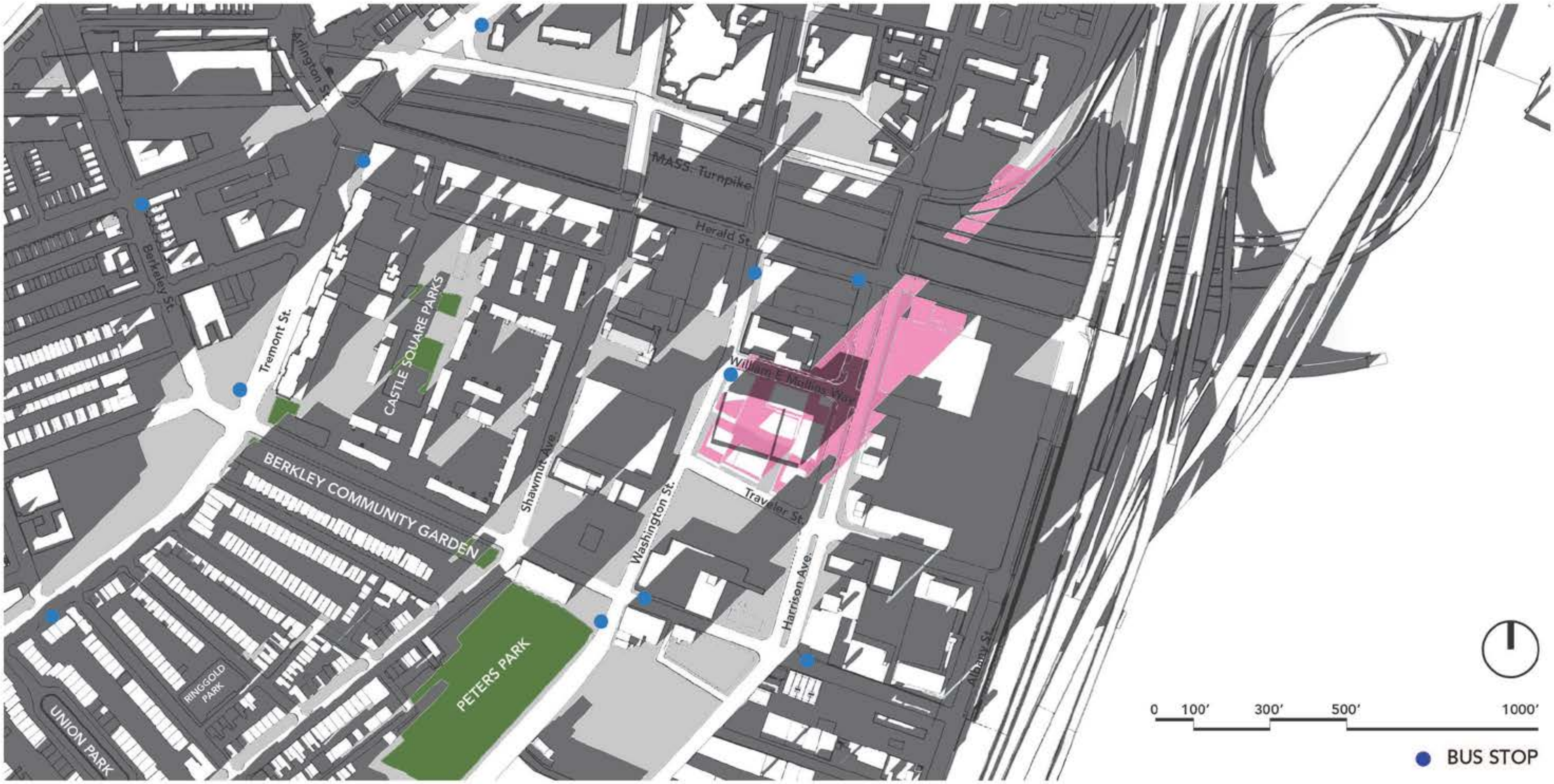
Figure 3.2-12

Shadow Study: December 21, 9 a.m.

Figure 3.2-13

Shadow Study: December 21, 12 p.m.



345 Harrison Avenue Boston, Massachusetts

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Figure 3.2-14

Shadow Study: December 21, 3 p.m.

3.3 Daylight

3.3.1 Introduction

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of daylight reaching the streets and the sidewalks in the immediate vicinity of a project site. The daylight analysis for the Project considers the existing and proposed conditions, as well as typical daylight obstruction values of the surrounding area.

Because the Project site currently consists of a low-rise building and a parking lot, the proposed Project will increase daylight obstruction; however, the resulting conditions will be typical of the area and other urban areas.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[1]. This program measures the percentage of “sky dome” that is obstructed by a project and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways centered on the proposed building. The façade of the building facing the viewpoint, including heights, setbacks, corners and other features, is plotted onto a base map using lateral and elevation angles. The two-dimensional base map generated by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 to 100 percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

The analysis compares three conditions: Existing Conditions; Proposed Conditions; and the context of the area.

Four viewpoints were chosen to evaluate the daylight obstruction for the Existing and Proposed Conditions, one each from Harrison Avenue, Traveler Street, Washington Street and William E. Mullins Way. Four area context points were considered in order to provide a basis of comparison to existing conditions in the surrounding area. The viewpoint and area context viewpoints were taken in the following locations and are shown on Figure 3.3-1 at the end of this section.

---

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

- **Viewpoint 1**: View from Harrison Avenue facing west toward the Project site
- **Viewpoint 2**: View from Traveler Street facing northeast toward the Project site
- **Viewpoint 3**: View from Washington Street facing east toward the Project site
- **Viewpoint 4**: View from William E. Mullins Way facing south toward the Project site
- **Area Context Viewpoint AC1**: View from Washington Street facing east toward the building at 1000 Washington Street
- **Area Context Viewpoint AC2**: View from East Berkeley Street facing northeast toward the building at 246 East Berkeley Street
- **Area Context Viewpoint AC3**: View from East Berkeley Street facing southwest toward the building at 209-225 East Berkeley Street
- **Area Context Viewpoint AC4**: View from Traveler Street facing southwest toward the building at 33 Traveler Street

3.3.3 Results

The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 to 3.3-4 at the end of this section illustrate the BRADA results for each analysis.

Table 3.3-1 Daylight Analysis Results

Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	Harrison Avenue facing west toward the site	12.7%	44.8%
Viewpoint 2	Traveler Street facing northeast toward the site	11.8%	42.2%
Viewpoint 3	Washington Street facing east toward the site	17.2%	70.8%
Viewpoint 4	William E. Mullins Way facing south toward the site	10.8%	57.4%

Table 3.3-1 Daylight Analysis Results (Continued)

Area Context Points		Existing Conditions	Proposed Conditions
AC1	Washington Street facing east toward the building at 1000 Washington Street	86.4%	N/A
AC2	East Berkeley Street facing northeast toward the building at 246 East Berkeley Street	67.9%	N/A
AC3	View from East Berkeley Street facing southwest toward the building at 209-225 East Berkeley Street	60.8%	N/A
AC4	Traveler Street facing southwest toward the building at 33 Traveler Street	80.6%	N/A

Harrison Avenue- Viewpoint 1

Harrison Avenue runs along the eastern edge of the Project site. Viewpoint 1 was taken from the center of Harrison Street facing west toward the Project. The site is currently occupied by a low-rise building that only occupies a portion of the site and has a daylight obstruction value of 12.7%. The development of the Project will increase the daylight obstruction value to 44.8%. While this is an increase over existing conditions, the daylight obstruction value for the Project is less than other areas in the Project vicinity, including the Area Context viewpoints.

Traveler Street- Viewpoint 2

Traveler Street runs along the southern edge of the Project site. Viewpoint 2 was taken from the center of Harrison Street facing northeast toward the Project. The existing daylight obstruction is 11.8%. The Project will increase the daylight obstruction value to 42.2%, the lowest of the four viewpoints studied because the entrance to the pedestrian way on the site allows for a view of the sky.

Washington Street- Viewpoint 3

Washington Street runs along the western edge of the Project site. Viewpoint 3 was taken from the center of Washington Street facing east toward the Project site. The existing site has a daylight obstruction value of 17.2%. The Project will increase the daylight obstruction value to 70.8%. While this is an increase over existing conditions, the daylight obstruction value for the Project is consistent with other areas in the Project vicinity, including the Area Context viewpoints.

William E. Mullins Way- Viewpoint 4

William E. Mullins Way runs along the northern edge of the Project site. Viewpoint 4 was taken from the center of William E. Mullins Way facing south toward the Project site. The existing daylight obstruction value is 10.8%. The Project will increase the daylight obstruction value to 57.4%. While this is an increase over existing conditions, the daylight obstruction value for the Project is consistent with other areas in the Project vicinity, including the Area Context viewpoints. It is anticipated that this road will experience less pedestrian traffic compared to the other surrounding streets, as evidenced by locating the parking garage entrances and loading from this roadway and the need to minimize pedestrian-vehicle conflicts.

Area Context Views

The surrounding area around the Project site is densely populated, and proposed projects in the immediate vicinity of the Project site will increase the density of the surrounding area. 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 3.3-1. The daylight obstruction values ranged from 60.8% for AC3 to 86.4% for AC1. Daylight obstruction values for the Project are consistent with the Area Context values.

3.3.4 Conclusions

The daylight analysis conducted for the Project describes existing and proposed 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 the daylight obstruction values within the surrounding area and typical of densely built urban areas. The increased daylight obstruction value is mainly due to proposed density and characteristics of the massing which is consistent with other projects in the area.

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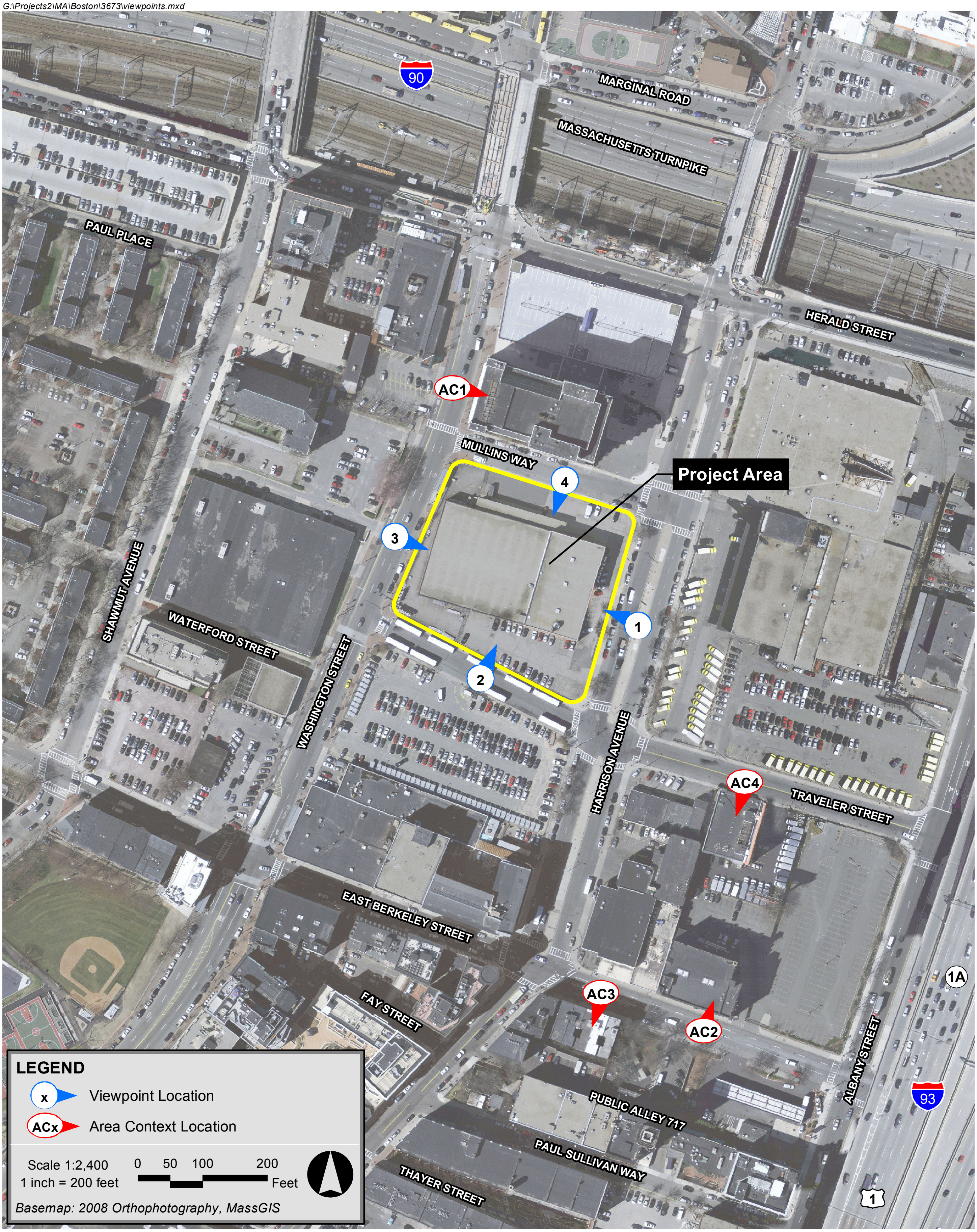

345 Harrison Avenue Boston, Massachusetts

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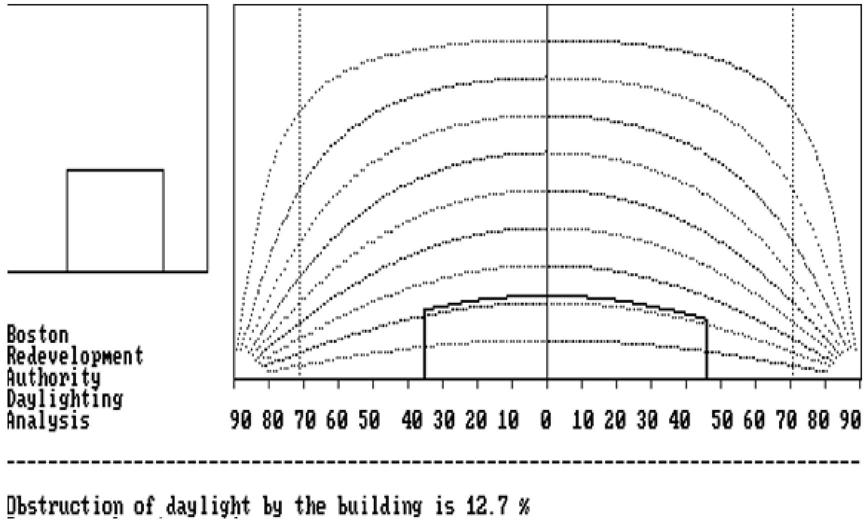
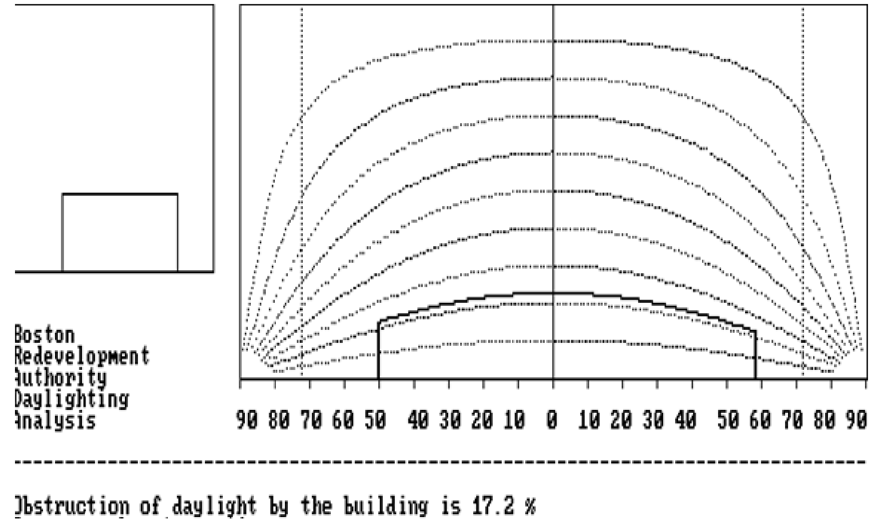
Figure 3.3-1

Daylight Analysis - Viewpoint Locations

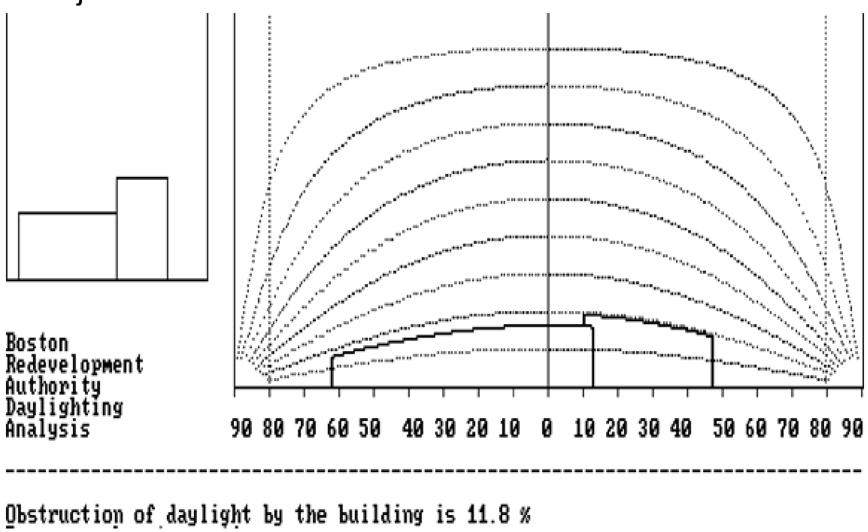
Viewpoint 1: View from Harrison Avenue facing west toward the Project site



Viewpoint 3: View from Washington Street facing east toward the Project site



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



Viewpoint 4: View from William E. Mullins Way facing south toward the Project site

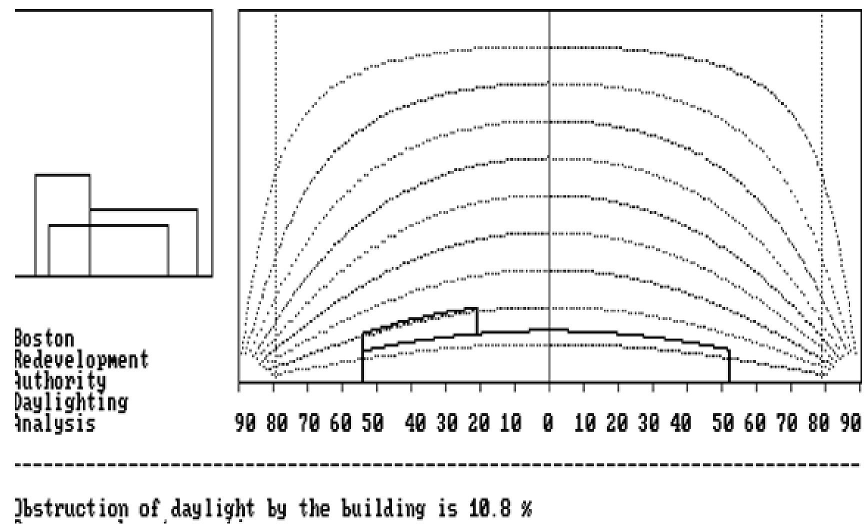
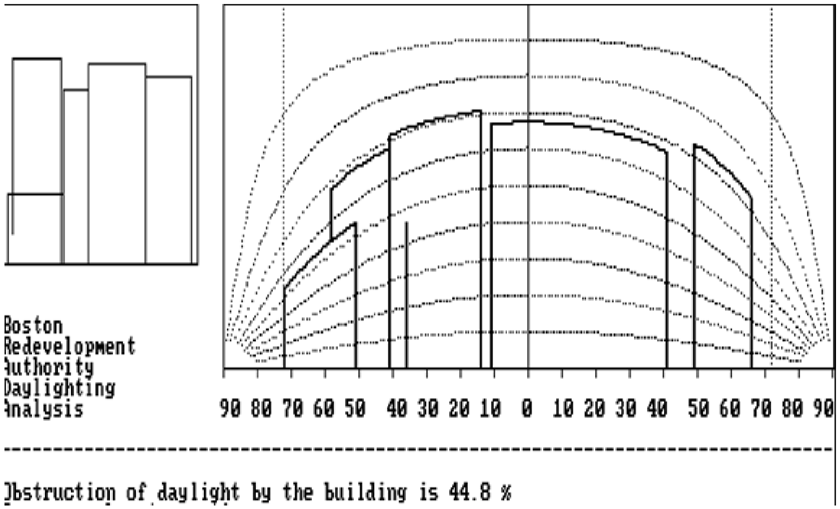


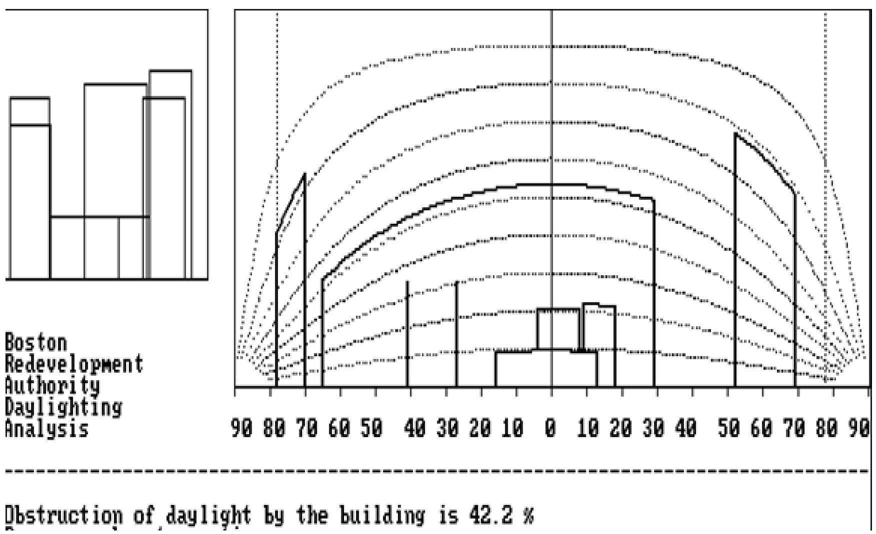
Figure 3.3-2

Existing Condition

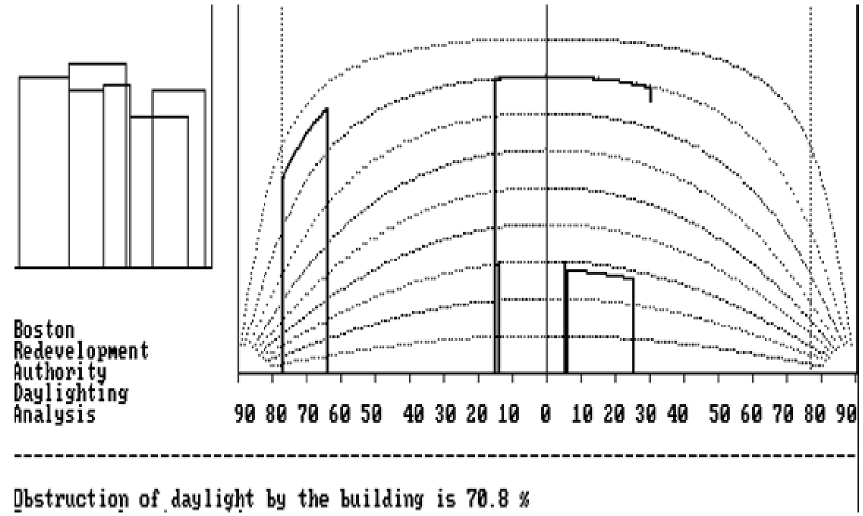
Viewpoint 1: View from Harrison Avenue facing west toward the Project site



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



Viewpoint 3: View from Washington Street facing east toward the Project site



Viewpoint 4: View from William E. Mullins Way facing south toward the Project site

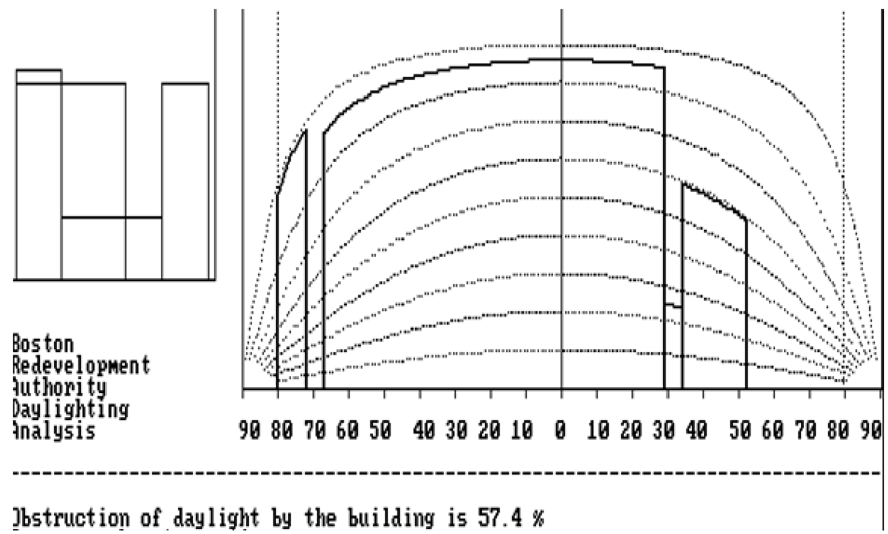
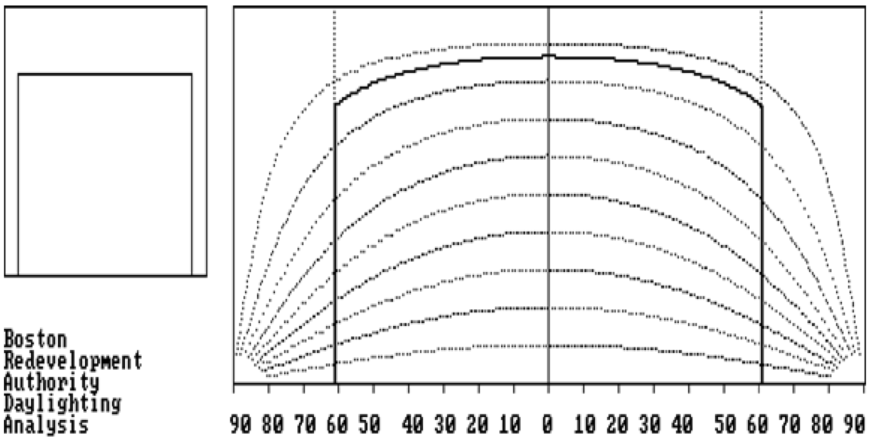


Figure 3.3-3

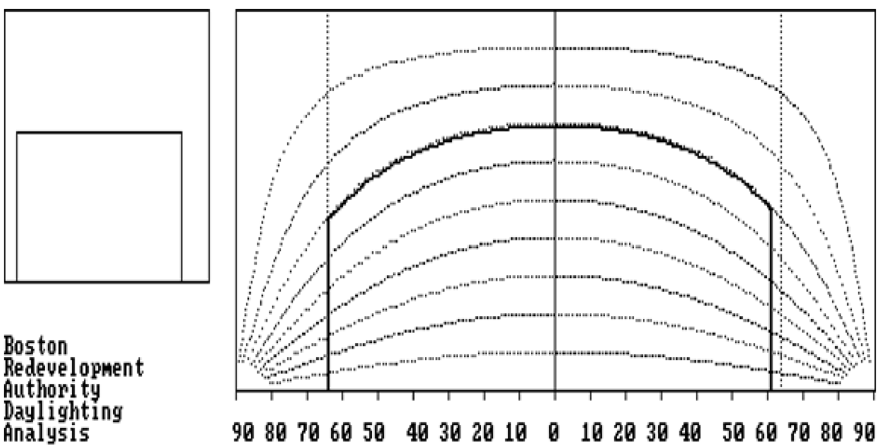
Proposed Condition

Area Context 1: View from Washington Street facing east toward the building at 1000 Washington Street



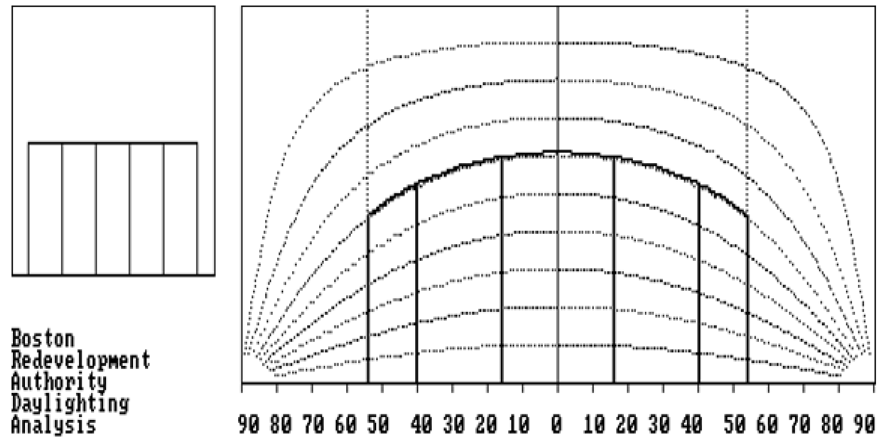
Obstruction of daylight by the building is 86.4 %

Area Context 2: View from East Berkeley Street facing northeast toward the building at 246 East Berkeley Street



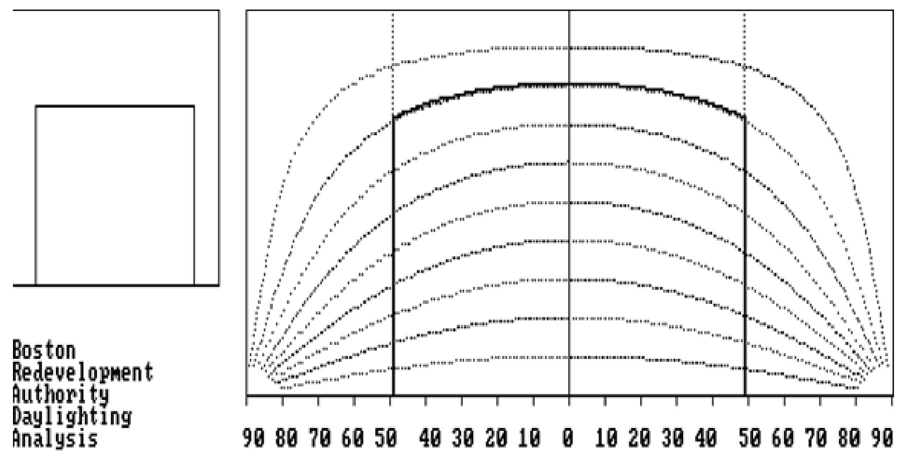
Obstruction of daylight by the building is 67.9 %

Area Context 3: View from East Berkeley Street facing southwest toward the building at 209-225 East Berkeley Street



Obstruction of daylight by the building is 60.8 %

Area Context 4: View from Traveler Street facing southwest toward the building at 33 Traveler Street



Obstruction of daylight by the building is 80.6 %

3.4 Solar Glare

The Project materials are still being studied and glazing of the windows will be determined as the design progresses. Due to the type of potential glass and glazing used, solar glare impacts are not currently anticipated.

3.5 Air Quality

3.5.1 Introduction

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

3.5.1.1 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, Environmental Protection Agency (EPA) promulgated National Ambient Air Quality Standards (NAAQS) for these criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM-10 and PM-2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 3.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS.

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

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

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

Table 3.5-1 National Ambient Air Quality Standards

Pollutant	Averaging Period	National Ambient Air Quality Standards and Massachusetts Ambient Air Quality Standards (micrograms per cubic meter)	
		Primary	Secondary
NO_2	Annual [1]	100	Same
	1-hour [7]	188	None
SO_2	Annual [1,8]	80	None
	24-hour [2,8]	365	None
	3-hour [2]	None	1,300
	1-hour [7]	195	None
PM-10 [6]	Annual	50	Same
	24-hour [3]	150	Same
PM-2.5	Annual [4]	12	15
	24-hour [5]	35	Same
CO	8-hour [2]	10,000	Same
	1-hour [2]	40,000	Same
Ozone	8-hour [3]	235	Same
Pb	3-month [1]	1.5	Same

Notes:
[1] Not to be exceeded.
[2] Not to be exceeded more than once per year.
[3] Not to be exceeded more than an average of one day per year over three years.
[4] Not to be exceeded by the arithmetic average of the annual arithmetic averages from three successive years.
[5] Not to be exceeded based on the 98th percentile of data collection.
[6] Due to a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM10 standard in 2006 (effective December 17, 2006). However, the annual standard remains codified in 310 CMR 6.00.
[7] Not to be exceeded. Based on the three-year average of the 98th (NO_2) or 99th (SO_2) percentile of the daily maximum one-hour concentrations.
[8]The Annual and 24-hour SO_2 standards were revoked on June 2, 2010. However, these standards remain in effect until one year after an area is designated for the one-hour standard, unless currently in nonattainment.
Source: 40 CFR 50 and 310 CMR 6.00

3.5.1.2 Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP in their Annual Air Quality Reports was obtained for 2007 to 2011. MassDEP guidance specifies the use of the latest three years of available monitoring data from within 10 km of the Project site.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS 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 μg/m3. For annual PM-2.5 averages, the average of the highest yearly observations was used as the background concentration. A new one-hour NO_2 standard was recently promulgated. To attain this standard, the three-year average of the 98th percentile of the maximum daily one-hour concentrations must not exceed 188 µg/m3.

Background concentrations were determined from the closest available monitoring stations to the proposed development. The closest monitor is located at Harrison Avenue in Boston. A summary of the background air quality concentrations is presented in Table 3.5-2.

Table 3.5-2 Observed Ambient Air Quality Concentrations and Selected Background Levels

Pollutant	Averaging Time	2010	2011	2012	Background Concentration ($\mu g/m^3$)	Location
SO_2 (1)(7)(8)	1-Hour	63.2	93.3	55.4	93.3	Harrison Ave., Boston
	3-Hour	62.4	54.6	72.8	72.8	Harrison Ave., Boston
	24-Hour	22.9	33.5	20.5	33.5	Harrison Ave., Boston
	Annual	4.2	3.3	2.9	4.2	Harrison Ave., Boston
PM-10	24-Hour	50.0	42.0	72.0	72.0	Harrison Ave., Boston
	Annual	14.1	14.8	14.1	14.8	Harrison Ave., Boston
PM-2.5	24-Hour (4)	22.5	20.9	20.6	21.3	Harrison Ave., Boston
	Annual (5)	8.3	8.5	8.3	8.3	Harrison Ave., Boston
NO_2 (3)	1-Hour (6)	116.6	139.1	126.0	139.1	Harrison Ave., Boston
	Annual	32.1	34.8	29.7	34.8	Harrison Ave., Boston
CO (2)	1-Hour	3306	2816	2622	3306	Harrison Ave., Boston
	8-Hour	2394	2166	2166	2394	Harrison Ave., Boston

Notes: From 2007-2012 MassDEP Annual Data Summaries

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

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

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

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

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

6 Maximum annual one-hour concentrations.

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

8 The 2010 - 2012 SO_2 three-hour value is not reported. Years 2007-2009 used instead.

Air quality is generally good in the area, with all of the ambient concentrations well below their respective NAAQS. For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 2.9 ppm (3306 µg/m3) for one-hour and 2.1 ppm (2394 µg/m3) for eight-hour CO.

3.5.2 Methodology

3.5.2.1 Microscale Analysis

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

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period and nine ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analysis for the Project followed the procedure outlined in U.S. EPA's intersection modeling guidance.[2]

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

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

Existing background values of CO at the nearest monitor location at Kenmore Square were obtained from MassDEP. CAL3QHC results were then added to background CO values of 2.9 ppm (one-hour) and 2.1 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).

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

The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[3]

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

Intersection Selection

As stated previously, a "microscale" analysis is typically required for the Project at intersections 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.

Four signalized intersections included in the traffic study meet the above conditions (see Chapter 2). The traffic volumes and LOS calculations provided in Chapter 2 form the basis of evaluating the traffic data versus the microscale thresholds. The intersections found to meet the criteria for inclusion in the microscale analysis include:

- The intersection of Herald Street and Washington Street;
- The intersection of East Berkeley Street and Frontage Road;
- The intersection of Traveler Street and Frontage Road; and,
- The intersection of Herald Street and Albany Street.

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

Emissions Calculations (MOBILE6.2)

The EPA MOBILE6.2 computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOBILE6.2 model are based on motor vehicle operations typical of daily periods. The Commonwealth's statewide annual Inspection and Maintenance (I&M) program was included, as well as the state specific vehicle age registration distribution. The input files for MOBILE6.2 for the existing (2013) and build year (2018) are provided by MassDEP. As is typical, minor edits to the files were necessary to allow the program to output emission factors for the various speeds used in the analyses.

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

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

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

Receptors & Meteorology Inputs

Sets of up to 200 receptors were placed in the vicinity of each of the modeled intersections. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersection. The roadway links and receptor locations of the modeled intersections are presented in Figures 3.5-1 through 3.5-4.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[4], a wind speed of one meter per second, stability class D (4), and a mixing height of 1,000 meters was used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 321 centimeters was selected for all four intersections.[5]

Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at intersections, worst-case meteorological conditions, and traffic input data. The one-hour concentrations were scaled by a factor of 0.7 to estimate eight-hour concentrations.[6] The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs. The CAL3QHC input parameters are also described in Appendix D.

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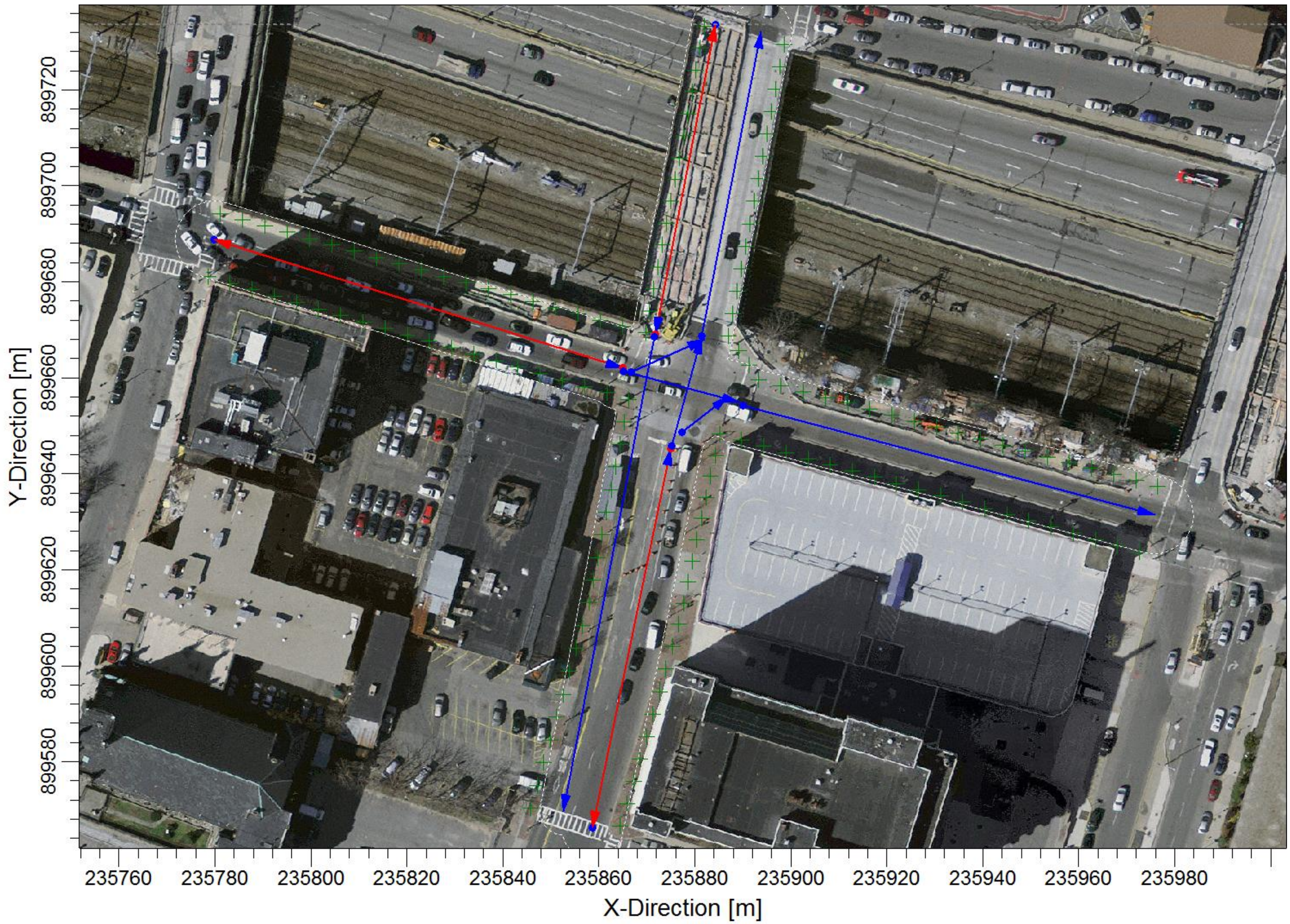
4 U.S. EPA, *Guideline for Modeling Carbon Monoxide from Roadway Intersections.* EPA-454/R-92-005, November 1992.

5 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.

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

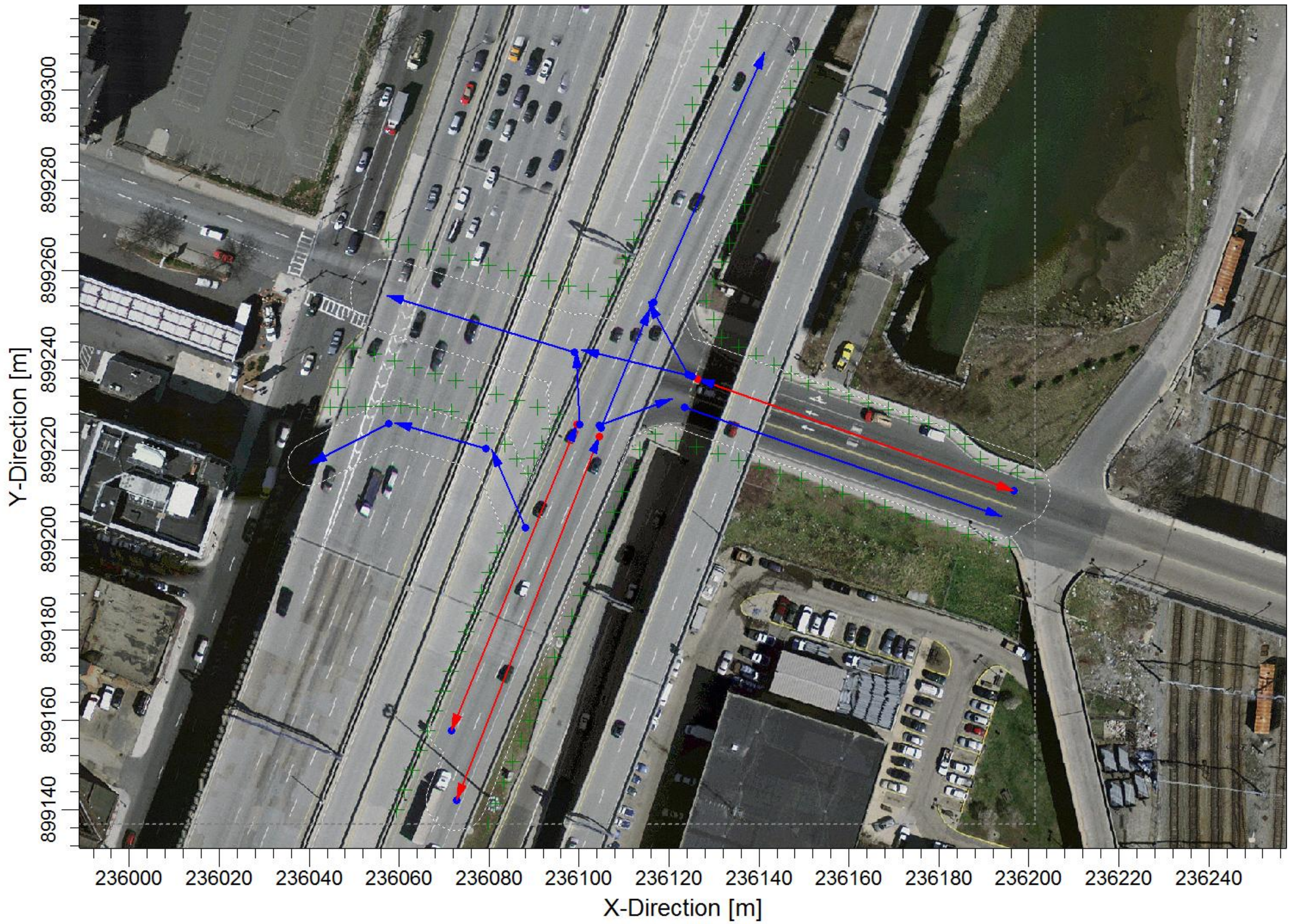


345 Harrison Avenue Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.5-1

Link and Receptor Locations for CAL3QHC modeling of Intersection of Herald St. & Washington St.

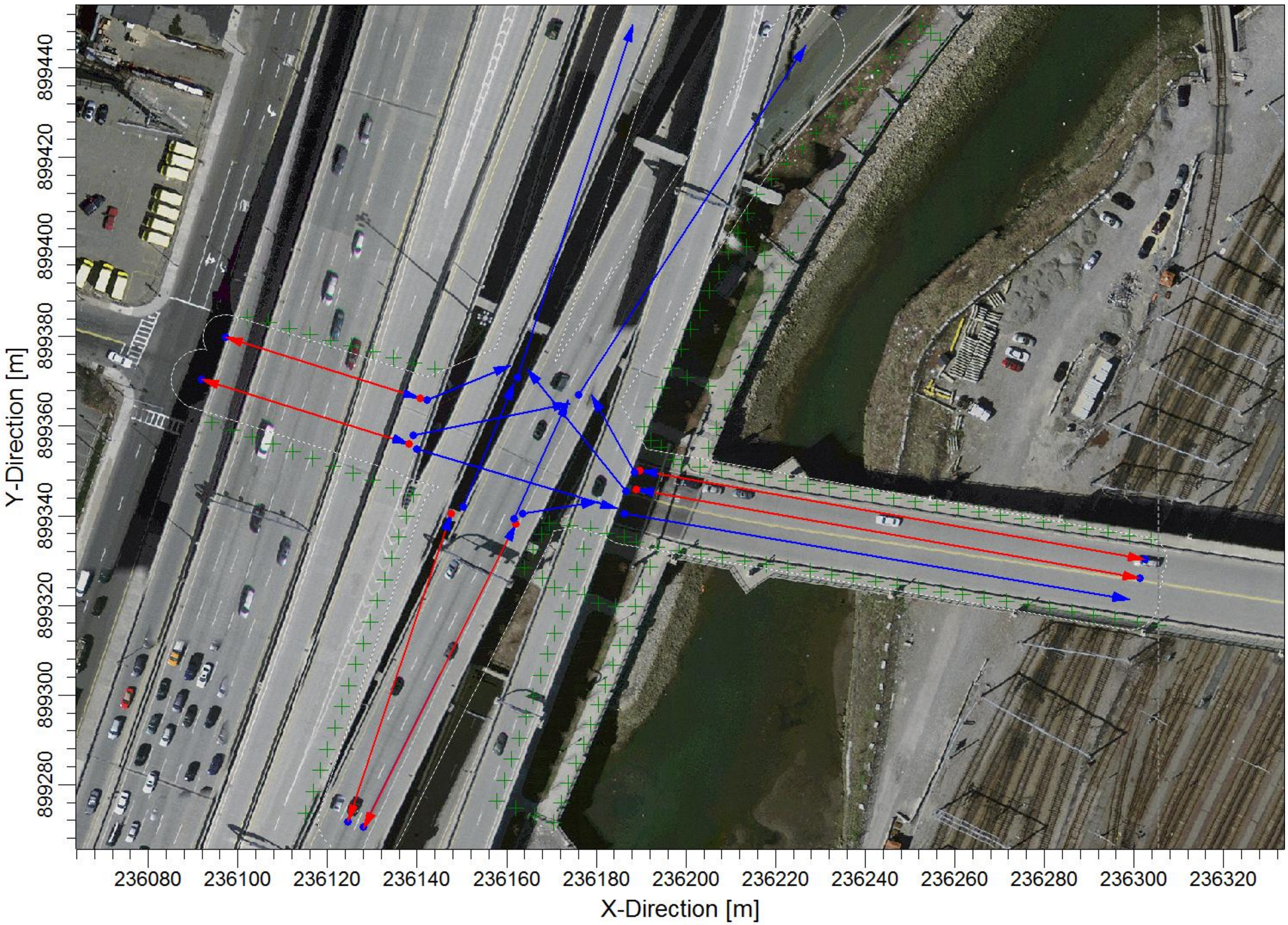


345 Harrison Avenue **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 3.5-2

Link and Receptor Locations for CAL3QHC modeling of Intersection of E. Berkeley St. & Frontage Rd.



345 Harrison Avenue Boston, Massachusetts

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Figure 3.5-3

Link and Receptor Locations for CAL3QHC modeling of Intersection of Traveler St. & Frontage Rd.

345 Harrison Avenue Boston, Massachusetts

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Figure 3.5-4

Link and Receptor Locations for CAL3QHC modeling of Intersection of Herald St. & Albany St.

3.5.3 Air Quality Results

3.5.3.1 Microscale Analysis

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 3.5-3 through 3.5-5 for the 2013 and 2018 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.7.[7]

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the Project, for the modeled conditions (2.4 ppm) plus background (2.9 ppm) is 5.3 ppm for all afternoon peak hour cases at the intersection of Herald Street and Albany Street. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (1.7 ppm) plus background (2.1 ppm) is 3.8 ppm for at the same location and scenarios. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

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

3.5.4 Conclusions

3.5.4.1 Microscale Analysis

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

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

Table 3.5-3 Summary of Microscale Modeling Analysis (Existing 2013)

Intersection	*Peak*	*CAL3QHC Modeled CO Impacts (ppm)*	*Monitored Background Concentration (ppm)*	*Total CO Impacts (ppm)*	*NAAQS (ppm)*
1-Hour					
Herald Street and Washington Street	AM	1.4	2.9	4.3	35
	PM	2.1	2.9	5.0	35
East Berkeley Street and Frontage Road	AM	1.6	2.9	4.5	35
	PM	1.5	2.9	4.4	35
Traveler Street and Frontage Road	AM	1.5	2.9	4.4	35
	PM	1.5	2.9	4.4	35
Herald Street and Albany Street	AM	1.8	2.9	4.7	35
	PM	2.4	2.9	5.3	35
8-Hour					
Herald Street and Washington Street	AM	1.0	2.1	3.1	9
	PM	1.5	2.1	3.6	9
East Berkeley Street and Frontage Road	AM	1.1	2.1	3.2	9
	PM	1.1	2.1	3.2	9
Traveler Street and Frontage Road	AM	1.1	2.1	3.2	9
	PM	1.1	2.1	3.2	9
Herald Street and Albany Street	AM	1.3	2.1	3.4	9
	PM	1.7	2.1	3.8	9

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

Table 3.5-4 Summary of Microscale Modeling Analysis (No-Build 2018)

Intersection	*Peak*	*CAL3QHC Modeled CO Impacts (ppm)*	*Monitored Background Concentration (ppm)*	*Total CO Impacts (ppm)*	*NAAQS (ppm)*
1-Hour					
Herald Street and Washington Street	AM	1.3	2.9	4.2	35
	PM	2.0	2.9	4.9	35
East Berkeley Street and Frontage Road	AM	1.5	2.9	4.4	35
	PM	1.5	2.9	4.4	35
Traveler Street and Frontage Road	AM	1.4	2.9	4.3	35
	PM	1.3	2.9	4.2	35
Herald Street and Albany Street	AM	1.7	2.9	4.6	35
	PM	2.4	2.9	5.3	35
8-Hour					
Herald Street and Washington Street	AM	0.9	2.1	3.0	9
	PM	1.1	2.1	3.2	9
East Berkeley Street and Frontage Road	AM	1.1	2.1	3.2	9
	PM	1.0	2.1	3.1	9
Traveler Street and Frontage Road	AM	1.0	2.1	3.1	9
	PM	0.9	2.1	3.0	9
Herald Street and Albany Street	AM	1.2	2.1	3.3	9
	PM	1.7	2.1	3.8	9

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

Table 3.5-5 Summary of Microscale Modeling Analysis (Build 2018)

Intersection	*Peak*	*CAL3QHC Modeled CO Impacts (ppm)*	*Monitored Background Concentration (ppm)*	*Total CO Impacts (ppm)*	*NAAQS (ppm)*
1-Hour					
Herald Street and Washington Street	AM	1.3	2.9	4.2	35
	PM	2.0	2.9	4.9	35
East Berkeley Street and Frontage Road	AM	1.5	2.9	4.4	35
	PM	1.4	2.9	4.3	35
Traveler Street and Frontage Road	AM	1.3	2.9	4.4	35
	PM	1.3	2.9	4.2	35
Herald Street and Albany Street	AM	1.7	2.9	4.6	35
	PM	2.4	2.9	5.3	35
8-Hour					
Herald Street and Washington Street	AM	0.9	2.1	3.0	9
	PM	1.4	2.1	3.5	9
East Berkeley Street and Frontage Road	AM	1.1	2.1	3.2	9
	PM	1.0	2.1	3.1	9
Traveler Street and Frontage Road	AM	1.1	2.1	3.2	9
	PM	0.9	2.1	3.0	9
Herald Street and Albany Street	AM	1.2	2.1	3.3	9
	PM	1.7	2.1	3.8	9

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

3.5.5 Stationary Sources

It is expected that the majority of stationary sources (boilers, engines, etc) would be subject to the MassDEP's Environmental Results Program (ERP).

The ERP regulation applies to new emergency generators greater than 37 kW. The regulation is similar to the boiler ERP in that new engines are subject to emission standards, recordkeeping, certification, and compliance with the MassDEP noise policy. Since the generator maximum rating capacity will be greater than the ERP limit of 37 kW, it will be subject to the ERP program. Per the ERP, the generator owner will limit operation of the generator to less than 300 hours per year and submit a certification form to MassDEP within 60 days of installation.

3.6 Stormwater/Water Quality

Please see Section 7.3 for information on stormwater and water quality impacts.

3.7 Flood Hazard Zones/Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the site located in the City of Boston - Community Panel Number 25025C0077G indicates the FEMA Flood Zone Designations for the site area. The map shows that the Project is located in a Zone X, Area of Minimal Flooding.

The site does not contain wetlands.

3.8 Geotechnical/Groundwater

3.8.1 Introduction

This section describes existing site conditions, subsurface soil and groundwater conditions, planned below-grade construction activities for the Project, and procedures for monitoring and protecting adjacent structures and maintaining groundwater levels in the Project area during excavation and foundation construction, and following construction completion.

3.8.2 Existing Site Conditions

The Project site consists of a single land parcel totaling approximately two acres bounded by Washington Street to the west; William E. Mullins Way to the north; Harrison Avenue to the east; and Traveler Street to the south. A two-story masonry clad, steel-framed and concrete structure occupies most of the central portion of the site and the area around the building is essentially paved. The building was constructed in 1959 for Graybar Electric Company (Graybar) — a distributor of electrical, communications and data networking products — and currently continues to be utilized by Graybar for that purpose. Existing site grades are generally level around the building perimeter at approximately El. 16 Boston City Base (BCB) datum, gently sloping down toward the building along the north side to facilitate truck loading/unloading activities.

The existing building on the Project site will be demolished and removed to accommodate the Project.

3.8.3 Subsurface Soil and Bedrock Conditions

Based on subsurface data obtained at the site during a test boring exploration program undertaken in 1959 for the existing building and in 2012 for the proposed Project, the general subsurface profile anticipated to be encountered at the site is listed in Table 3.8-1 in order of increasing depth below the ground surface.

Table 3.8-1 Subsurface Soil and Bedrock Conditions in the Project Area

Generalized Subsurface Strata	Approximate Depth Below Ground Surface to Top of Stratum (ft)	Approximate Thickness (ft)
Miscellaneous (Urban) Fill	Not Applicable	4 to 12
Organic Soils	4 to 12	0 to 12
Marine (Clay) Deposits	8 to 16	50 to 75
Glacial Deposits	85 to 90	0 to 5
Bedrock	70 to 95	Not Applicable

Generalized descriptions of the strata are described below:

- Miscellaneous (Urban) Fill – The Project site consists of land reclaimed as part of filling undertaken in the early 1800s (South Cove) and 1850s (Back Bay). The composition of this material varies, but typically consists of loose to medium dense, brown to gray, poorly graded SAND with silt and gravel, and/ or medium dense brown silty SAND with gravel, and/or medium dense gray to black sandy SILT with gravel, and having varying amounts of concrete, cinders, metal, brick, and other miscellaneous materials. Buried building demolition debris, rubble from pre-existing buildings, and remnant foundation walls, slabs and utilities may also be encountered within and beneath the footprint of former rowhouse buildings that occupied the site until construction of the existing building.

- Organic Soils – The organic soils, where encountered, are generally comprised of a dark gray/black sandy silt containing varying amounts of shell fragments and wood fibers.

- Marine (Clay) Deposits – The clay, known locally as Boston Blue Clay, is yellow-brown and very stiff to stiff at the top of the stratum ("crust"), becoming olive gray to gray and softer with depth, and is generally described as lean CLAY with occasional seams of sandy silt/silty sand.

- ♦ Glacial Deposits – Where encountered, the glacial deposits are described as a dense to medium dense gray poorly graded SAND and/or silty clayey SAND.
- ♦ Bedrock – Bedrock is anticipated to be encountered at depths of approximately 70 to 95 feet.

3.8.4 Existing Groundwater Conditions

The Project site is located in the South End neighborhood, which is part of Boston's Groundwater Conservation Overlay District (GCOD). The GCOD, which is governed by Article 32 of the Boston Zoning Code, includes those areas in Boston having wood pile supported buildings that are potentially susceptible to the possible effects of depressed groundwater levels. Groundwater levels need to be above the tops of the wood piles to keep the piles submerged and lessen the potential for the wood to decay. Groundwater levels in the vicinity of the Project site are monitored by the Boston Groundwater Trust (BGwT), an entity that tracks and reports groundwater levels in the GCOD. The Project will comply with the standards and requirements set forth in Article 32 of the Code. The Proponent will obtain a written determination from the Boston Water and Sewer Commission (BWSC) as to whether the Project meets the standards and requirements of Article 32. In addition, the Proponent will demonstrate that the Project meets the requirements of Section 32-6 of the Code by obtaining a stamped certification from a Massachusetts registered engineer that the requirements of Section 32-6 of the Code are met. The Proponent will provide both a copy of the written determination from BWSC and a copy of the stamped certification from a Massachusetts registered engineer to the BRA and the Boston Groundwater Trust prior to the issuance of a Certification of Consistency. As such, the Project will be deemed to be in compliance with Article 32 of the Code and will not need a conditional use permit from the Board of Appeal for Article 32 purposes.

Recent groundwater level measurements in observation wells in proximity to the Project site have ranged from about El. 3.5 to El. 8.5 (BCB). Groundwater levels at and near the site could be influenced by leakage into and out of sewers, storm drains, water utilities, and other below-grade structures, and environmental factors such as precipitation, season, and temperature.

The Project will include infiltration systems to meet this requirement. These systems will be sized to retain and infiltrate a volume of stormwater equivalent to one-inch over the site impervious areas. The Project team will meet with the Boston Groundwater Trust to review conceptual plans for GCOD compliance as the design progresses. Sufficient area exists on-site to provide the required storage volume in the area between the building and/or under the building where no basement is proposed.

3.8.5 Proposed Foundations and Below Ground Construction

The Project includes two buildings, as mentioned previously, the Harrison Avenue Building and the Washington Street building.

The Harrison Avenue building is a 14-story structure occupying a footprint on the site of approximately 45,000 sf; no underground space is planned. The lowest floor level is planned to be constructed to match current existing grades of streets and sidewalks surrounding the site.

The Washington Street building is a 13-story structure with no underground space planned. The lowest floor level is planned to be constructed to match current existing grades of streets and sidewalks surrounding the site.

Limited and relatively shallow excavation will be required for anticipated pile caps and grade beams, and site improvements. The foundation system selected for the new building is anticipated to be comprised of deep foundations extending through the glacial deposits and bearing in the bedrock.

Due to the nature of the near surface fill soils, pre-excavation will be performed in advance of installing deep foundations. The intent of the pre-excavation is to remove foundations and other buried obstructions from former site buildings that could interfere with installation of deep foundations.

3.8.6 Groundwater Protection

During the construction of new foundations, no dewatering will be required for any of the options being considered. Some local dewatering may be required during excavation and construction of pile caps, grade beams and site improvements to manage and remove surface water (precipitation) runoff; most excavations, with the possible exception of elevator pits and some utilities are expected to be above groundwater levels. To the extent possible, the Project would attempt to recharge/infiltrate water into the ground on the site. New elevator pits extending below the lowest level floor slab will be waterproofed. No foundation drains or other features that could withdraw groundwater long term will be used.

The proposed construction is not anticipated to adversely impact groundwater levels on or near the site, temporarily or permanently.

3.8.7 Protection of Existing Structures

The proposed construction is not expected to impact foundations of adjacent or nearby structures. Only surficial, temporary excavations are required for installation of shallow building elements (pile caps, grade beams. Elevator pits, and utilities. New foundation installations will be performed in a manner that should not adversely impact any adjacent facilities.

3.8.8 Noise, Vibrations and Dust

Below-grade construction will be performed using conventional methods and procedures. New foundation installation (if deep, drilled-in elements) will use non-displacement drilling methods that will not result in significant noise or vibrations. New foundation installation (if deep, driven elements) will need to use pile driving that can sometimes generate vibration and noise in excess of background. Performance criteria will be established in the Contract Documents for controlling vibrations and noise to within City-acceptable limits.

Short-term air quality impacts from fugitive dust may be. Plans for controlling fugitive dust, including mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of any excavated soils by covered trucks will be utilized as necessary.

3.8.9 Monitoring

The Proponent recognizes the importance for maintaining and monitoring groundwater levels, as well as performance of the construction. The Proponent is committed to monitoring water levels in observation wells in the vicinity of the site at regular intervals before and during construction activities. When Project construction begins, groundwater observation wells will be monitored regularly for the duration of the below-grade construction period, and will provide the water level data to the Boston Groundwater Trust, if requested.

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.

3.9 Solid and Hazardous Waste

3.9.1 Classification and Removal of Hazardous Materials

Prior to commencement of the work, investigations will be performed at the site and in the area of the existing building to evaluate the presence of contaminated soils, groundwater, asbestos, lead paint, or other hazardous materials that may exist. If such materials are present, they will be characterized based on the type, composition, and level of the contaminants. Work plans will be prepared by appropriately licensed professionals to identify the means and methods for safe removal and legal disposal or recycling of these materials.

Abatement and disposal of hazardous materials (or hazardous waste) discovered in the existing building will be performed prior to demolition of the building by specialty contractors experienced and licensed in removing and handling these materials.

Excess soils generated from excavations on site and not reused on site will be legally transported off site and disposed of in accordance with the Massachusetts Contingency Plan and other applicable regulatory requirements. Disposal of excess excavated soil materials will be tracked via Bills of Lading or other methods, as required to ensure their proper and legal transport and disposal in accordance with MassDEP regulations.

3.9.2 Solid Waste

The Project will generate solid waste typical of residential, restaurant and retail uses. Solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by building management. The Project will generate approximately 610 tons of solid waste per year.

With the exception of household hazardous wastes typical of residential and retail developments (e.g., cleaning fluids and paint), the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials. Typical waste generated by the uses will be handled in compliance with all local, state and federal regulations.

The Project will include space in the trash room on each floor for recycling, as well as space in the main trash room of each building for recycling.

3.10 Noise

3.10.1 Introduction

The sound level assessment included a baseline sound monitoring program to measure existing sound levels in the vicinity of the Project site, computer modeling to predict operational sound levels from mechanical equipment associated with the Project, and a comparison of future Project sound levels to applicable noise regulations, including the City of Boston Zoning District Noise Standards and the MassDEP Noise Policy.

This analysis, which is consistent with BRA requirements for noise studies, indicates that predicted noise levels from the Project with appropriate noise controls will comply with both state and local regulations.

3.10.2 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 information 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. Related to this is the fact that 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.[8] 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 B- 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

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[8] *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.

A-weighting network of the sound level meter, in dBA. A-weighted sound levels emphasize the middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower- and higher-frequencies.

Because the sounds in our environment vary with time, they cannot simply be represented with a single number. In fact, there are several methods used for quantifying variable sounds which are commonly reported in community noise assessments, as defined below.

- L_{eq}, the equivalent level, in dBA, 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.

- L_{90} is the sound level, in dBA, exceeded 90 percent of the time in a given measurement period. The L90, or residual sound level, is close to the lowest sound level observed when there are no obvious nearby intermittent noise sources.

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

- L_{10} is the sound level, in dBA, exceeded only 10 percent of the time in a given measurement period. The L10, or intrusive sound level, is close to the maximum sound level observed due to occasional louder intermittent noises, like those from passing motor vehicles.

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

By employing various noise metrics it is possible to separate prevailing, steady sounds (the L_{90}) from occasional louder sounds (L_{10}) in the noise environment. This analysis treats all noise sources from the Project as though the emissions will be steady and continuous, described most accurately by the L_{90} exceedance level.

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 octave frequency bands being those established by standard. To facilitate the noise-control design process, the estimates of noise levels in this analysis are also presented in terms of octave-band sound pressure levels.

3.10.3 Noise Regulations and Criteria

The primary set of regulations relating to the potential increase in noise levels is the City of Boston Zoning District Noise Standards (City of Boston Code – Ordinances: Section 16–26 Unreasonable Noise and City of Boston Air Pollution Control Commission Regulations for the Control of Noise in the City of Boston). Results of the baseline ambient sound level survey and the modeled Project sound levels were compared to the City of Boston Zoning District Noise Standards. Separate regulations within the Standards provide criteria to control different types of noise. Regulation 2 is applicable to the effects of the Project, as completed, and is considered in this noise study. Table 3.10-1 includes the Zoning District Standards.

Table 3.10-1 City of Boston Zoning District Noise Standards, Maximum Allowable Sound Pressure Levels

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

Notes:

Noise standards are extracted from Regulation 2.5, City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976.

All standards apply at the property line of the receiving property.

dB and dBA based on a reference sound pressure of 20 micropascals.

'Daytime' refers to the period between 7:00 a.m. and 6:00 p.m. daily, excluding Sunday.

Additionally, MassDEP has the authority to regulate noise under 310 CMR 7.10, which is part of the Commonwealth's air pollution control regulations. According to MassDEP, "unnecessary" noise is considered an air contaminant and thus prohibited by 310 CMR 7.10. MassDEP administers this regulation through Noise Policy DAQC 90-001 which limits a source to a 10-dBA increase above the L90 ambient sound level measured at the Project property line and at the nearest residences. The MassDEP policy further prohibits "pure tone" conditions where the sound pressure level in one octave-band is three dB or more greater than the sound levels in each of two adjacent bands.

3.10.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project, located within the South End neighborhood of Boston, Massachusetts. Existing noise sources in the vicinity of the Project site currently include: vehicular traffic along local roadways; birds; wind noise; light leaf rustle; aircraft flyovers; pedestrian conversation and foot traffic; mechanical equipment located on the surrounding buildings; industrial loading/unloading activities; and the general noises of the City.

3.10.4.1 Noise Monitoring Methodology

Sound level measurements were made on Monday, July 8, 2013 during the daytime (12:00 p.m. to 4:00 p.m.) and on Tuesday, July 16, 2013 during nighttime hours (12:00 a.m. to 4:00 a.m.). 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. All measurements were 20 minutes in duration.

Sound levels were measured 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.

3.10.4.2 Noise Monitoring Locations

The selection of the noise monitoring locations was based upon a review of zoning and land use in the Project area. Seven 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 3.10-1 and described below.

- Location ST-1 was located at the southwest corner of the South Cove Manor Apartment garage along Shawmut Avenue. This location was selected to represent sound levels at residential receptors along Shawmut Avenue northwest of the Project.

- Location ST-2 was located on the sidewalk of the Waterford Place Apartments along Shawmut Avenue. This location was selected to represent sound levels at residential receptors along Shawmut Street west of the Project.

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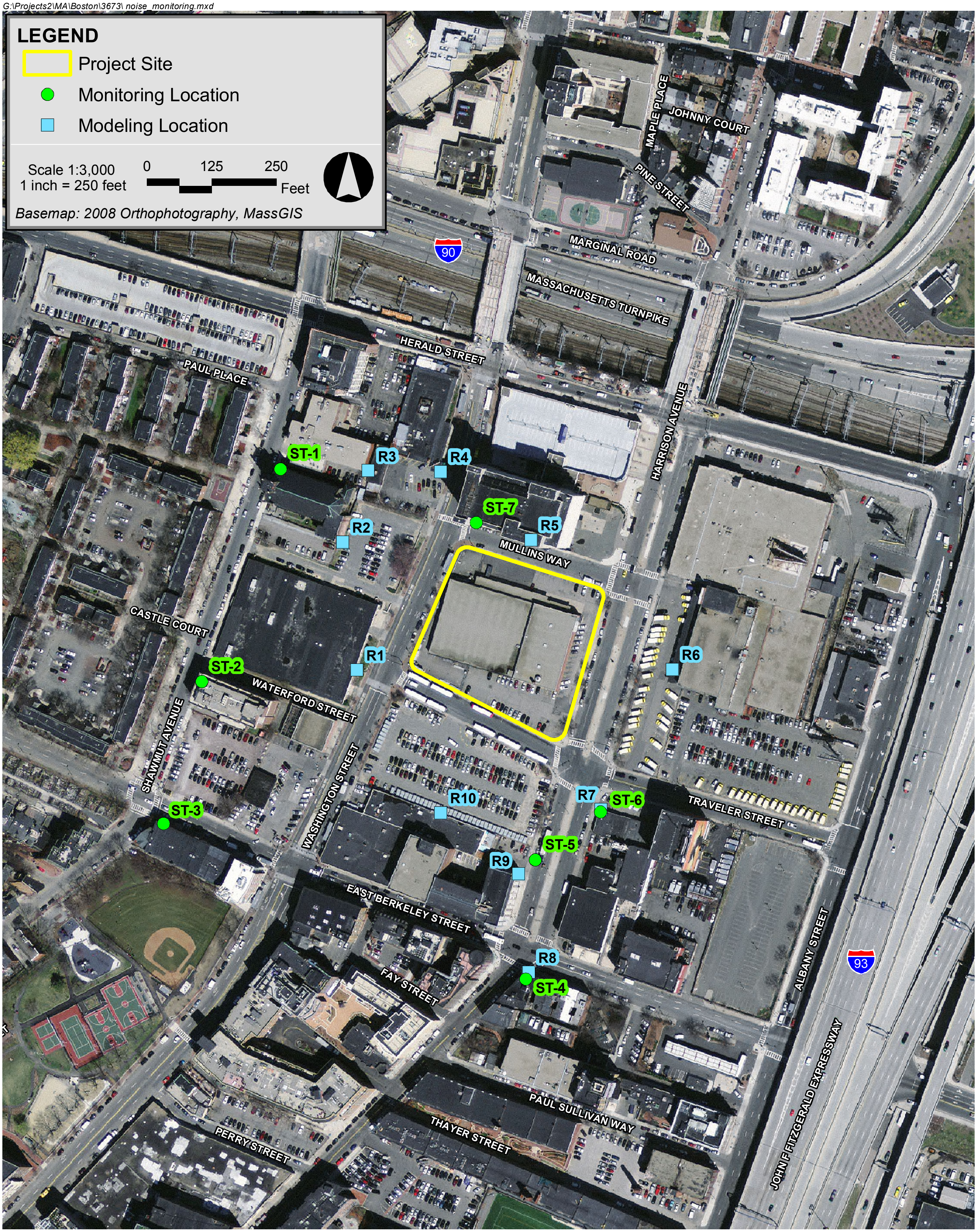

345 Harrison Avenue Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 3.10-1

Noise Monitoring & Modeling Locations

- Location ST-3 was located east of Shawmut Avenue along East Berkeley Street. This location was selected to represent sound levels at residential receptors along East Berkeley Street southwest of the Project.

- Location ST-4 was located at the southwest corner of the intersection of East Berkeley Street and Harrison Avenue. This location was selected to represent sound levels at residential receptors along East Berkeley Street south of the Project.

- Location ST-5 was located on the western sidewalk of Harrison Avenue just north of East Berkeley Street. This location was selected to represent sound levels at residential receptors along Harrison Avenue south of the Project.

- Location ST-6 was located along the eastern sidewalk of Harrison Avenue just south of Traveler Street. This location was selected to represent sound levels at industrial and commercial receptors along Harrison Avenue east and southeast of the Project.

- Location ST-7 was located at the northeast corner of Washington Street and William E. Mullins Way. This location was selected to represent sound levels at commercial receptors along Washington Street north of the Project.

3.10.4.3 Noise Monitoring Equipment

A Larson Davis Model 831 sound level meter equipped with a PRM831 Type I Preamplifier, a 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 American National Standards Institute (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 (Leq, L90, etc.) were calculated for each 20-minute sampling period, with octave-band sound levels corresponding to the same data set processed for the broadband levels.

3.10.4.4 Measured Background Noise Levels

Baseline noise monitoring results are presented in Table 3.10-2, and summarized below:

- The daytime residual background (L90 dBA) measurements ranged from 58 to 63 dBA;

- The nighttime residual background (L90 dBA) measurements ranged from 52 to 58 dBA;

- The daytime equivalent level (Leq dBA) measurements ranged from 63 to 74 dBA;

- The nighttime equivalent level (Leq dBA) measurements ranged from 55 to 62 dBA;

Table 3.10-2 Summary of Measured Background Noise Levels

Location	Period	Start Time	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{90} Sound Pressure Level by Octave-Band								
								32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
ST-1	Day	1:34 PM	64	75	66	63	60	64	65	62	60	57	55	50	46	37
ST-2	Day	1:11 PM	63	86	65	59	58	66	65	62	56	54	54	49	43	34
ST-3	Day	12:47 PM	70	91	72	63	59	64	65	62	57	55	55	50	45	34
ST-4	Day	4:23 PM	74	101	72	66	63	70	70	65	61	59	58	54	48	39
ST-5	Day	3:42 PM	65	84	66	63	61	69	69	64	58	56	54	52	54	44
ST-6	Day	3:16 PM	67	92	68	63	61	69	72	68	60	57	56	51	42	31
ST-7	Day	2:49 PM	71	98	70	64	60	68	68	65	60	56	56	51	44	35
ST-1	Night	12:10 AM	58	77	59	57	56	58	62	60	59	53	50	46	40	34
ST-2	Night	12:33 AM	55	72	56	53	52	58	60	58	52	49	46	41	34	26
ST-3	Night	12:56 AM	59	79	60	55	54	57	62	61	55	51	47	41	35	29
ST-4	Night	2:42 AM	60	77	61	59	58	63	64	62	57	55	53	48	40	31
ST-5	Night	2:20 AM	59	76	60	58	57	63	64	62	57	54	51	47	40	32
ST-6	Night	1:57 AM	60	73	63	57	55	62	64	62	57	52	49	44	36	26
ST-7	Night	1:31 AM	62	89	58	54	53	59	61	61	54	50	47	41	33	25

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Monday, July 08, 2013	81.1 °F	64%	Partly Cloudy	0-5 mph
Nighttime	Tuesday, July 16, 2013	81.8 °F	68%	Clear	0-6 mph

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	3047
Microphone	Larson Davis	377B20	LW130579
Preamp	Larson Davis	PRM831	23825
Calibrator	Larson Davis	CAL200	7147

3.10.5 Future Conditions

3.10.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project will include rooftop ventilation, cooling, and emergency power noise sources. The upper roof of the Washington Street building is anticipated to contain one cooling tower, two energy recovery ventilators (ERVs), two garage exhaust fans, one kitchen exhaust fan, and two general roof exhaust fans. The lower roof of the Washington Street building is anticipated to contain one ERV and one garage exhaust fan. The upper roof of the Harrison Avenue building is anticipated to contain one cooling tower, three ERVs, two garage exhaust fans, one kitchen exhaust fan, three general roof fans, and one loading dock exhaust fan.

One emergency diesel generator is anticipated to be located on the upper roof of each building (total of two) in a dedicated weather-proof, sound-attenuating enclosure, exhausted vertically. It is assumed that these generators will only operate during the day for brief, routine testing when background sound levels will be higher or during an emergency interruption of the electrical grid when other rooftop mechanical equipment will not be operating.

Mitigation will be applied to sources as needed, to ensure compliance with the applicable noise regulations. The noise control features assumed in this analysis, as described in Table 3.10-6, were a generator enclosure and a critical-grade generator exhaust silencer. No credit was taken for penthouse screening walls.

A tabular summary of the modeled mechanical equipment proposed for the Project is presented below in Table 3.10-3. Sound power level data for each unit, as provided by the manufacturer or calculated from provided sound pressure level data, is presented for both buildings in Tables 3.10-4 and 3.10-5, respectively. Sound power levels of those units for which data was not provided were assumed based on data for similar or representative equipment. The approximate locations of the mechanical equipment were provided by the Project team in a preliminary roof plan.

Table 3.10-3 Modeled Noise Sources

Noise Source	Quantity	Location	Size/Capacity per Unit
Energy Recovery Ventilator	6	Washington Street building Upper Roof (x2) & Lower Roof (x1), Harrison Avenue building Upper Roof (x3)	6,200 & 8,500 CFM
Cooling Tower	2	Washington Street building Upper Roof (x1), Harrison Block Upper Roof (x1)	282 & 428 Ton
Garage Exhaust Fan	5	Washington Street building Upper Roof (x2) & Lower Roof (x1), Harrison Avenue building Upper Roof (x2)	11,500 & 15,000 CFM
Kitchen Exhaust Fan	2	Washington Street building Upper Roof (x1), Harrison Avenue building Upper Roof (x1)	5,000 CFM
General Roof Exhaust Fan	5	Washington Street building Upper Roof (x2), Harrison Avenue building Upper Roof (x3)	2,500 CFM
Loading Dock Exhaust Fan	1	Harrison Avenue building Upper Roof	3,000 CFM
Emergency Generator	2	Washington Street building Upper Roof (x1), Harrison Avenue building Upper Roof (x1)	550 kW

Table 3.10-4 Modeled Sound Power Levels per Unit – Washington Block

Noise Source	Broadband	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
Energy Recovery Ventilator - Type I[1]	99	99	99	98	98	98	92	88	86	81
Cooling Tower[2]	95	105	105	101	95	93	87	85	80	75
Garage Exhaust Fan[3]	73	86	86	78	72	70	69	64	58	52
Kitchen Exhaust Fan[4]	82	81	81	85	82	81	76	74	67	63
General Roof Exhaust Fan[5]	81	88	88	83	82	79	76	72	69	66
Emergency Generator – Mechanical[6] (Enclosed)	71	85	85	79	75	66	60	57	55	49
Emergency Generator – Exhaust[7] (Open)	117	108	108	108	111	110	113	109	109	97

Notes:
1. AAON 22.0" Star Plenum Exhaust Fan, 8,500 CFM
2. BAC Series 1500 Model 15282 with Whisper Quiet Fan
3. Greenheck Model SWB-344-50 Backward Inclined Centrifugal Utility Fan, 11,500 CFM
4. Greenheck Model Cube-360XP-30 Belt Drive Upblast Centrifugal Roof Exhaust Fan, 5,000 CFM
5. Greenheck Model GB-200HP-20 Belt Drive Centrifugal Roof Exhaust Fan, 2,500 CFM
6. Caterpillar Diesel Generator Set (DM8518), 600 kW, SA Canopy
7. Caterpillar Diesel Generator Set (SR4B Generator/C27 TA Engine), 800 kW, Open Exhaust

Table 3.10-5 Modeled Sound Power Levels per Unit – Harrison Block

Noise Source	Broadband	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
Energy Recovery Ventilator - Type I[1]	99	99	99	98	98	98	92	88	86	81
Energy Recovery Ventilator - Type II[2]	93	94	94	91	95	91	85	83	80	75
Cooling Tower[3]	98	108	108	104	98	96	90	88	84	78
Garage Exhaust Fan[4]	75	87	87	80	74	71	70	66	59	52
Kitchen Exhaust Fan[5]	82	81	81	85	82	81	76	74	67	63
General Roof Exhaust Fan[6]	81	88	88	83	82	79	76	72	69	66
Loading Dock Exhaust Fan[7]	76	86	86	78	76	73	69	66	65	62
Emergency Generator – Mechanical[8] (Enclosed)	71	85	85	79	75	66	60	57	55	49
Emergency Generator – Exhaust[9] (Open)	117	108	108	108	111	110	113	109	109	97

Notes:

1. AAON 22.0" Star Plenum Exhaust Fan, 8,500 CFM
2. AAON 22.0" Star Plenum Exhaust Fan, 6,200 CFM
3. BAC Series 1500 Model 15425 with Whisper Quiet Fan
4. Greenheck Model SWB-349-75 Backward Inclined Centrifugal Utility Fan, 15,000 CFM
5. Greenheck Model Cube-360XP-30 Belt Drive Upblast Centrifugal Roof Exhaust Fan, 5,000 CFM
6. Greenheck Model GB-200HP-20 Belt Drive Centrifugal Roof Exhaust Fan, 2,500 CFM
7. Greenheck Model SWB-222-15 Backward Inclined Centrifugal Utility Fan, 3,000 CFM
8. Caterpillar Diesel Generator Set (DM8518), 600 kW, SA Canopy
9. Caterpillar Diesel Generator Set (SR4B Generator/C27 TA Engine), 800 kW, Open Exhaust

Table 3.10-6 Attenuation Values Used for Noise Modeling (dB)

Noise Control	Noise Source	Noise Reduction (dB) per Octave-band Center Frequency (Hz)								
		32	63	125	250	500	1000	2000	4000	8000
Exhaust Silencer[1]	Emergency Generator Exhaust	-	20	35	35	27	20	20	22	22

Notes:

JB Series Critical Grade Silencer (JB-18)

3.10.5.2 Noise Modeling Methodology

Noise impacts from mechanical equipment associated with the Project were predicted using Cadna/A noise calculation software (DataKustik Corporation, 2005). This software, which uses the ISO 9613-2 international standard for sound propagation (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation), offers a refined set of computations accounting for local topography, ground attenuation, drop-off with distance, barrier shielding, diffraction around building edges, reflection off building facades, and atmospheric absorption of sound from multiple noise sources.

An initial analysis considered all of the mechanical equipment without the emergency generators running, to simulate typical nighttime operating conditions at nearby receptors. A second analysis combined the mechanical equipment and the emergency generators, to reflect worse-case daytime conditions during brief, routine, testing of the generators.

3.10.5.3 Noise Modeling Results

Ten modeling locations with a height of 1.5 meters above-grade were included in both analyses, consisting of nearby residential, commercial, and industrial locations, and were evaluated against the applicable daytime or nighttime background sound levels and noise limits. Figure 3.10-1 shows the locations of each modeled receptor as well as the monitoring locations selected for background measurements.

In both scenarios, the predicted future sound levels (Project + background) are well below the MassDEP criteria of 10 dBA over the measured background L_{90} sound levels at all sensitive receptor locations. This evaluation, with and without the emergency generators, is presented in Tables 3.10-7a and b, respectively. The Project's mechanical equipment is not expected to create or exacerbate any "pure-tone" conditions as defined by MassDEP when combined with existing background sound levels at these locations. Predicted sound levels combining Project and background sources are shown with and without the emergency generators in Tables 3.10-8a and b, respectively. Additionally, modeled sound levels from Project equipment are within the most stringent broadband and octave-band residential zoning limits for the City of Boston at the closest residential receptors and also meet the business and industrial limits where applicable. This evaluation is presented with and without the emergency generators in Tables 3.10-9a and b, respectively.

Table 3.10-7a MassDEP Compliance Evaluation (*With* Emergency Generator)

Receptor ID	Land Use	Representative Background ID	Evaluation Period	Measured Background Noise Level	Modeled Project-Only Noise Level	Combined Project + Background Noise Level	Project Impact[1]	Meets MassDEP Noise Policy?
				dBA	dBA	dBA	dBA	
R1	Business	ST-7	Day	60	43	60	0	YES
R2	Residential	ST-7	Day	60	49	60	0	YES
R3	Residential	ST-7	Day	60	48	60	0	YES
R4	Business	ST-7	Day	60	39	60	0	YES
R5	Business	ST-7	Day	60	43	60	0	YES
R6	Business	ST-6	Day	61	42	61	0	YES
R7	Industrial	ST-6	Day	61	42	61	0	YES
R8	Residential	ST-4	Day	63	39	63	0	YES
R9	Residential	ST-5	Day	61	44	61	0	YES
R10	Business	ST-6	Day	61	42	61	0	YES

1. Calculation of increase over background performed using data rounded to nearest whole decibel.

Table 3.10-7b MassDEP Compliance Evaluation (*Without* Emergency Generator)

Receptor ID	Land Use	Representative Background ID	Evaluation Period	Measured Background Noise Level	Modeled Project-Only Noise Level	Combined Project + Background Noise Level	Project Impact[1]	Meets MassDEP Noise Policy?
				dBA	dBA	dBA	dBA	
R1	Business	ST-7	Night	53	42	53	0	YES
R2	Residential	ST-7	Night	53	40	53	0	YES
R3	Residential	ST-7	Night	53	40	53	0	YES
R4	Business	ST-7	Night	53	36	53	0	YES
R5	Business	ST-7	Night	53	43	53	0	YES
R6	Business	ST-6	Night	55	38	55	0	YES
R7	Industrial	ST-6	Night	55	41	55	0	YES
R8	Residential	ST-4	Night	58	38	58	0	YES
R9	Residential	ST-5	Night	57	43	57	0	YES
R10	Business	ST-6	Night	55	42	55	0	YES

[1] Calculation of increase over background performed using data rounded to nearest whole decibel.

Table 3.10-8a MassDEP "Pure Tone" Evaluation: Combined Project + Background Levels (*With* Emergency Generator)

Receptor ID	Land Use	Period	dBA	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
				dB	dB	dB	dB	dB	dB	dB	dB	dB
R1	Business	Day	60	68	68	65	60	57	56	51	44	35
R2	Residential	Day	61	69	68	65	60	57	56	51	45	35
R3	Residential	Day	61	69	68	65	60	57	56	51	44	35
R4	Business	Day	60	68	68	65	60	56	56	51	44	35
R5	Business	Day	60	68	68	65	60	57	56	51	44	35
R6	Business	Day	61	70	72	68	60	57	56	51	43	31
R7	Industrial	Day	61	69	72	68	60	57	56	51	42	31
R8	Residential	Day	63	70	70	65	61	59	58	54	48	39
R9	Residential	Day	61	69	69	64	58	56	54	52	54	44
R10	Business	Day	61	69	72	68	60	57	56	51	42	31

Table 3.10-8b MassDEP "Pure Tone" Evaluation: Combined Project + Background Levels (*Without* Emergency Generator)

Receptor ID	Land Use	Period	dBA	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
				dB	dB	dB	dB	dB	dB	dB	dB	dB
R1	Business	Night	53	60	62	61	54	51	47	42	34	25
R2	Residential	Night	53	60	62	61	54	50	47	42	34	25
R3	Residential	Night	53	60	62	61	54	50	47	41	33	25
R4	Business	Night	53	59	61	61	54	50	47	41	34	25
R5	Business	Night	53	61	62	61	54	51	47	42	34	25
R6	Business	Night	55	62	64	62	57	52	49	44	36	26
R7	Industrial	Night	55	62	64	62	57	53	49	44	36	26
R8	Residential	Night	58	63	64	62	57	55	53	48	40	31
R9	Residential	Night	57	64	64	63	57	54	51	47	40	32
R10	Business	Night	55	62	64	62	58	53	50	44	36	26

Table 3.10-9a City of Boston Compliance Evaluation: Project-Only Modeling Results (*With* Emergency Generator)

Receptor ID	Land Use	Period	dBA	32 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
				dB	dB	dB	dB	dB	dB	dB	dB	dB
R1	Business	Day	43	59	54	48	43	40	33	28	22	9
R2	Residential	Day	49	56	52	48	43	40	34	28	21	6
R3	Residential	Day	48	57	54	50	45	42	36	30	22	5
R4	Business	Day	39	56	52	46	41	37	33	27	21	5
R5	Business	Day	43	58	53	47	43	40	34	29	24	12
R6	Business	Day	42	57	55	50	44	40	34	28	22	7
R7	Industrial	Day	42	59	55	50	46	43	38	31	24	5
R8	Residential	Day	39	49	46	42	40	38	33	26	17	0
R9	Residential	Day	44	57	52	49	45	43	37	31	24	6
R10	Business	Day	42	56	52	48	45	41	34	30	24	10
City of Boston Noise Limits	**Residential**	Day	60	76	75	69	62	56	50	45	40	38
		Night	50	68	67	61	52	46	40	33	28	26
	Residential/Industrial	Day	65	79	78	73	68	62	56	51	47	44
		Night	55	72	71	65	57	51	45	39	34	32
	Business	Day	65	79	78	73	68	62	56	51	47	44
		Night	65	79	78	73	68	62	56	51	47	44
	Industrial	Day	70	83	82	77	73	67	61	57	53	50
		Night	70	83	82	77	73	67	61	57	53	50

Table 3.10-9b City of Boston Compliance Evaluation: Project-Only Modeling Results (*Without* Emergency Generator)

Receptor ID		Land Use	Period	dBA	32 Hz dB	63 Hz dB	125 Hz dB	250 Hz dB	500 Hz dB	1000 Hz dB	2000 Hz dB	4000 Hz dB	8000 Hz dB
R1		Business	Night	42	53	51	47	45	42	33	27	21	9
R2		Residential	Night	40	52	50	46	42	41	32	25	18	4
R3		Residential	Night	40	54	52	47	43	40	31	24	17	1
R4		Business	Night	36	50	48	42	38	36	28	22	17	4
R5		Business	Night	43	58	55	48	45	41	35	31	26	14
R6		Business	Night	38	53	51	45	41	38	29	23	19	7
R7		Industrial	Night	41	52	50	45	44	41	32	26	19	5
R8		Residential	Night	38	47	46	42	40	38	30	23	14	0
R9		Residential	Night	43	54	52	49	45	43	35	30	23	6
R10		Business	Night	42	54	52	48	45	41	34	29	24	10
City of Boston Noise Limits	Residential		Day	60	76	75	69	62	56	50	45	40	38
			Night	50	68	67	61	52	46	40	33	28	26
	Residential/Industrial		Day	65	79	78	73	68	62	56	51	47	44
			Night	55	72	71	65	57	51	45	39	34	32
	Business		Day	65	79	78	73	68	62	56	51	47	44
			Night	65	79	78	73	68	62	56	51	47	44
	Industrial		Day	70	83	82	77	73	67	61	57	53	50
			Night	70	83	82	77	73	67	61	57	53	50

3.10.6 Conclusions

Baseline noise levels were measured in the vicinity of the Project site and were compared to predicted noise levels based on information provided by the manufacturers of representative mechanical equipment or estimated from the equipment's capacity. With appropriate mitigation (as described in Section 3.10.5.1), the Project is not expected to introduce significant outdoor mechanical equipment noise into the surrounding community.

Results of the analysis indicate that noise levels from the Project at the nearest receptors will be equal to or below the City of Boston Noise Zoning requirements based on land use, and will comply with MassDEP A-weighted and tonal noise limits. The results presented in Section 3.10.5.3 indicate that the Project is not anticipated to impact the existing acoustical environment.

At this time, the mechanical equipment and noise controls are conceptual in nature and, during the final design phase of the Project, will be specified to meet the applicable City of Boston and MassDEP noise limits. Additional mitigation may include the selection of quieter units, acoustical louvers, screening walls, mufflers, or equipment enclosures, as needed.

3.11 Construction

3.11.1 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 construction contact will be a person responsible for responding to the questions/comments/complaints of the residents and businesses in the neighborhood.

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

3.11.2 Construction Methodology/Public Safety

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

It may be necessary to occasionally occupy pedestrian walkways and portions of the surrounding streets. 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.

3.11.3 Construction Schedule

Construction is anticipated by the second quarter of 2014, and will occur over approximately 26 months.

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

3.11.4 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.

3.11.5 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.

3.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 300 to 450 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 50% of the total employee work hours be for Boston residents, at least 25% of total employee work hours be for minorities and at least 10% of the total employee work hours be for women. The Proponent will enter into a Boston Permanent Employment Agreement 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 contractor 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.

3.11.7 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 and 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.

3.11.8 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. 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.

3.11.9 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 with 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 to protect sensitive locations by shielding or distance.

3.11.10 Construction Vibration

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.

3.11.11 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.

3.11.12 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.

3.11.13 Rodent Control

A rodent extermination certificate will be filed with the 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.

3.11.14 Wildlife Habitat

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

Chapter 4.0

Sustainable Design and Climate Change Preparedness

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE

4.1 Green Building

The Project team is committed to developing a building that is sustainably designed, energy efficient, environmentally conscience and healthy for the residents and employees. As required under Article 37 of the Boston Zoning Code, projects that are subject to Article 80B, Large Project Review, shall be U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) certifiable. The Project will use the LEED NC v2009 to show compliance with Article 37. There are seven categories in the LEED certification guidelines: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation in Design Process and the additional Regional Priority Credits.

The following is a detailed credit-by-credit analysis of the Project team's approach for achieving LEED NC v2009 at the "Certifiable" level. The Project is targeting several credits which span the seven categories and enable the Project to meet the requirements as described below. Credits listed in italics are under consideration at this time and will be reviewed as the Project design develops. The preliminary LEED NC v2009 checklist is included at the end of this section. Please note that this is an initial credit checklist and applicable credits may change as the building design advances.

Sustainable Sites

<u>SS Prerequisite 1 Construction Activity Pollution Prevention:</u> The Construction Manager (CM) will compile and submit an Erosion and Sedimentation Control (ESC) Plan for construction activities related to the demolition of existing and the construction of new buildings specific to the Project. The ESC Plan will conform to the erosion and sedimentation requirements of the 2003 EPA Construction General Permit.

<u>SS Credit 1 Site Selection:</u> The Project site is located on a previously developed parcel in Boston on the edge of the South End, Theater District, Chinatown and Downtown Crossing. The Project is not a habitat for threatened or endangered species, is not within 100 feet of wetlands, and is not public parkland.

<u>SS Credit 2 Development Density and Community Connectivity:</u> The Project site is in downtown Boston; the surrounding community is replete with services including restaurants, shops, theaters, colleges, galleries, medical offices, hospitals, places of worship, daycares, pharmacies, and post offices.

<u>SS Credit 3 Brownfield Redevelopment:</u> The Project site may be classified as a Brownfield or contaminated site and will be assessed for hazardous materials.

SS Credit 4.1 Alternative Transportation, Public Transportation Access: The Tufts Medical Center station on the MBTA Orange Line is located approximately 0.3 miles from the Project site; the Broadway station on the MBTA Red Line is located 0.4 miles from the Project site. Several MBTA bus routes stop within less than 0.1 mile of the Project site, including the number 9 and 11 buses.

SS Credit 4.2 Alternative Transportation, Bicycle Storage and Changing Rooms: Covered bicycle storage will be located within the building footprint within the first six floors of the new building. Some residential units may contain designated storage areas for bicycles. The quantity of bicycle storage areas will be equal to or greater than 15% of the number of residential occupants.

SS Credit 4.3 Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles: The new multi-level parking garage located on floors one through four may have designated preferred parking spaces for low emitting and fuel-efficient vehicles representing 5% of the total vehicle capacity of the parking structure. The low-emitting and fuel efficient vehicles would have a minimum green score of 40 from the ACEEE Annual Rating Guide or be a ZEV (zero emissions vehicle).

SS Credit 4.4 Alternative Transportation, Parking Capacity: The parking garage capacity has been designed to be lower than minimum local zoning requirements. The garage may include infrastructure and support programs to facilitate shared vehicle use such as a car-share service.

SS Credit 6.1 Stormwater Design, Quantity Control: The Project will decrease stormwater runoff by 25% from the two-year 24-hour design storm.

SS Credit 6.2 Stormwater Design, Quality Control: The Project is located within the Groundwater Conservation Overlay District. Stormwater will be captured from the roofs and channeled to a recharge storage tank where it will be recharged into the groundwater table through a recharge system. The groundwater recharge system will both reduce the amount of stormwater channeling directly to the stormwater system and treat the stormwater being recharged into the groundwater. The BMPs used to treat the runoff will remove 80% of the total suspended solids (TSS).

SS Credit 7.1 Heat Island Effect, Non-Roof: The Project places 100% of parking in a parking structure on floors 1 through 4.

SS Credit 7.2 Heat Island Effect, Roof: The roofs may be a high-albedo material (minimum SRI of 78) to help minimize solar heat gain and urban heat island effects. There will also be various vegetated roof surfaces to further help minimize solar heat gain.

Water Efficiency

WE Prerequisite 1 Water Use Reduction, 20% Reduction: Through the use of low-flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements.

WE Credit 1.1 Water Efficient Landscaping, Reduce by 50%: The Project will reduce potable water consumption used for irrigation by using native or adapted plant species.

WE Credit 1.2 Water Efficient Landscaping, No Potable Use or No Irrigation: The Project will not have a permanent irrigation system. The roof top and patio planter boxes may have drought tolerant plant materials that may require occasional watering by hand.

WE Credit 3.1 Water Use Reduction: Specified fixtures will include high efficiency toilets, low-flow lavatory and kitchen faucets and ultra low-flow showerheads. The Project is targeting an overall water savings of 30% above the calculated baseline.

Energy and Atmosphere

EA Prerequisite 1 Fundamental Commissioning of the Building Energy Systems: A third party Commissioning Agent (CxA) will be engaged by the owner for purposes of providing both basic and enhanced commissioning services for the building energy related systems including Heating Ventilation Air Conditioning & Refrigeration (HVAC & R), lighting and domestic hot water systems. The CxA will verify the building systems are installed, calibrated and perform to the building owners' Project requirements.

EA Prerequisite 2 Minimum Energy Performance: The building performance rating will demonstrate a minimum of a 20% improvement when compared to the baseline building performance when calculated using the rating method in Appendix G of ANSI/ASHREA/IESNA Standard 90.1-2007.

Prerequisite 3 Fundamental Refrigerant Management: The specifications for refrigerants used in the building HVAC & R systems will not permit the use of CFC based refrigerants.

EA Credit 1 Optimize Energy Performance: The designed building systems will target a performance level which is a minimum of 20% improvement over a baseline building performance rating, (as established in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2007). The team will develop a whole building energy model to demonstrate the expected performance rating of the designed building systems.

EA Credit 3 Enhanced Commissioning: The CxA may be part of the Project team from early on in the Project process. The CxA's role may include reviewing the owner's Project requirements, creating, distributing and implementing a commissioning plan, and performing a design review of the design development and construction documents.

EA Credit 4 Enhanced Refrigerant Management: Long life, high efficiency mechanical equipment will be specified for the HVAC & R systems and the refrigerants specified for the systems will have low ozone-depletion and global warming potentials.

Materials and Resources

MR Prerequisite 1 Storage and Collection of Recyclables: Storage of collected recyclables will be accommodated in the lower level of the building in the loading dock. There will be a recycling program and adequate storage for collected recyclable materials within the building, including but not limited to paper, corrugated cardboard, glass, plastic and metals.

MR Credits 2.1 and 2.2 Construction Waste Management: Prior to the start of construction, the Construction Manager (CM) will prepare a Construction Waste Management plan which will endeavor to divert as much demolition debris and construction waste from area landfills as possible.

MR Credits 4.1 Recycled Content: The Project specifications will require materials to include pre- and/or post-consumer recycled content. During construction, material submittals will include a document indicating the percentage of both pre- and post-consumer recycled content. The CM will track the recycled content for each material with a Project target to achieve 10% recycled content materials based on overall Project material costs.

MR Credit 5.1 Regional Materials: The Project specifications will indicate materials to be extracted, harvested, recovered and manufactured within a 500 mile radius of the job site. The CM will track the source location for each material with a Project target to achieve 10% regional materials based on overall Project material costs.

Indoor Environmental Quality

EQ Prerequisite 1 Minimum Indoor Air Quality (IAQ) Performance: The building mechanical systems are designed to meet or exceed the requirements of ASHRAE Standard 62.1-2007 sections 4 through 7 and/or applicable building codes in order to comply with the prerequisites.

EQ Prerequisite 2 Environmental Tobacco Smoke (ETS) Control: The common areas within the building will be non-smoking environments.

EQ Credit 1 Outdoor Air Delivery Monitoring: The Project will incorporate permanent CO_2 sensors and measuring devices to provide feedback on the performance of the HVAC system. Devices will be programmed to generate an alarm when the conditions vary by 10% from a set point. The residential units will have operable windows. The units will be ventilated through a combination of both mechanical and natural ventilation.

EQ Credit 3.1 Construction IAQ Management Plan (during construction): The CM will develop an Indoor Air Quality Management Plan for the construction and preoccupancy phases of the Project to meet or exceed the recommended Control Measures of the SMACNA IAQ Guidelines for Occupied buildings Under Construction 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter3). Absorptive materials stored on site will be protected from moisture damage.

EQ Credit 3.2 Construction IAQ Management Plan (before occupancy): After the completion of construction and prior to occupancy, either baseline IAQ testing or a full building flush-out will be conducted to demonstrate contaminant maximum concentrations are not exceeded.

EQ Credits 4.1-4.3 Low Emitting Materials: The Project specifications will set Volatile Organic Compound (VOC) limits for adhesives and sealants, paints and coatings, and *may also include flooring systems*.

EQ Credit 5 Indoor Chemical and Pollutant Source Control: The Project will be designed to minimize and control the entry of pollutants into the building and to contain chemical use areas. All janitors' closet doors will be constructed to minimize leakage, and the wall around each closet will not have openings above to prevent leakage. At every main, high-volume entryway there will be special floor mats to prevent outside materials from being carried into the building.

EQ Credit 6.1 Controllability of Systems, Lighting: The Project will provide individual lighting controls for regularly occupied spaces. The controls may include vacancy/occupancy sensors or daylight dimming controls. Multi-occupant user spaces will have multi-level lighting controls for modifying light levels as necessary for the various uses.

EQ Credit 6.2 Controllability of Systems, Thermal Comfort: It is the intent of the design to provide individual temperature controls for regularly occupied spaces. Each residential unit will have a main thermostat control and operable windows. All regularly-occupied common areas will have thermostat controls.

EQ Credit 7.1 Thermal Comfort Design: The building HVAC design will be in compliance with ASHRAE 55.

EQ Credit 8.1 Daylight and Views, Daylight for 75% of spaces: It is the intent of the design to locate regularly occupied spaces along the perimeter. The residential units will have large windows to provide ample daylight for the occupants.

Innovation & Design (ID)

The team has identified several possible ID credits which are listed below, (limited to five ID credits total):

ID Credit 1.1 Exemplary Performance for SSc4.1: The Project site is located within 0.5 miles of existing multiple commuter rail lines and two subway lines (Orange and Red), with a frequency of service of over 200 transit rides per day.

ID Credit 1.2 Exemplary Performance for SSc7.1: The Project places 100% of parking under cover.

ID Credit 1.3 Low Mercury lighting: Building Facilities/Maintenance will establish a lighting purchasing plan to limit the levels of mercury containing lamps purchased for the building.

ID Credit 2 LEED Accredited Professional (required ID credit for LEED certification): A LEED AP will provide administrative services to oversee the LEED credit documentation process.

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. RPCs applicable to the Boston area include: SSc3, SSc6.1 SSc7.1, SSc7.2, EAc2 and MRc1.1. The Project anticipates one RPC for SSc7.1-Heat Island Effect, Non-Roof.

4.2 Climate Change Preparedness

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

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

The BRA recently began asking project proponents to complete an on-line questionnaire regarding their project’s climate change preparedness. A copy of the completed questionnaire 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.

Sea Level Rise

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

Weather Conditions

As a result of Climate Change, the Northeast is expected to experience more frequent and intense storms. In order to mitigate this, the Project will decrease stormwater runoff by providing areas of green roof and landscape plantings where none currently exists. In addition, subsurface storage will be provided to meet the GCOD requirement of one inch over the site's impervious areas. This volume will further reduce stormwater runoff by providing the opportunity for on-site detention and infiltration. Main electrical rooms will be located above the ground on the first floor of each building, and emergency generators will be located on the roof in order to prevent exposure to flood waters. In the case of an extreme weather event, the emergency generator is sized to support life safety systems for 96 hours.

The proposed Project will also employ steps to greatly reduce water consumption in case of drought conditions, and is targeting a 30 percent reduction compared to the baseline case. Landscape design, the appropriate use of indigenous plants, and a high-efficiency irrigation system will reduce water use for irrigation by approximately 50% and minimal potable water will be used for irrigation. While these measures will not protect against a regional drought, they will incrementally lessen demand on the MWRA system.

High Heat Days and Cost of Energy

The IPCC has predicted that in Massachusetts, the number of days with temperatures greater than 90°F will increase from five to twenty days annually, to thirty to sixty days annually. In order to prepare for this, the Project will reduce the heat island effect by placing parking spaces in a parking garage with portions covered by a green roof will reduce the amount of impervious pavement on the Project site compared to the existing condition. The Project is anticipating the use of light-colored paving materials on the pedestrian-oriented hardscape, and a high-albedo roofing material on rooftops that do not have a green roof, in order to

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

absorb less heat. The Project will also have vegetated roof surfaces, which can reduce energy use in addition to reducing the heat island effect.

In order to minimize the Project's impact on Climate Change, the Project's energy performance is anticipated to be at 20 percent better than code minimum energy performance as required by the Stretch Energy Code. All facades will implement materials with high thermal performance for both glazing and opaque wall areas. The design team will engage the utility providers to explore opportunities for incentives to help implement energy efficient systems and energy recovery equipment which help to reduce peak loads and overall demands

Energy modeling for the Project has not yet been completed; however, as indicated on the LEED Checklist, the Proponent will strive to reduce the Project's overall energy demand and GHG emissions that contribute to global warming. The Project's proposed TDM program described in Section 2.5 will also help to lessen fossil fuel consumption.

LEED 2009 for New Construction and Major Renovations

Project Checklist

345 Harrison Ave. Boston, MA 02118

July 8th 2013

Y	?	N	Sustainable Sites		Possible Points: 26
18	5	3			
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
	1		Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
	3		Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
		1	Credit 5.1	Site Development—Protect or Restore Habitat	1
		1	Credit 5.2	Site Development—Maximize Open Space	1
1			Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
	1		Credit 7.2	Heat Island Effect—Roof	1
		1	Credit 8	Light Pollution Reduction	1

2	2	2	Water Efficiency		Possible Points: 10
Y			Prereq 1	Water Use Reduction—20% Reduction	
	2		Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
2			Credit 3	Water Use Reduction	2 to 4

7	5	2	Energy and Atmosphere		Possible Points: 35
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
5			Credit 1	Optimize Energy Performance	1 to 19
		1	Credit 2	On-Site Renewable Energy	1 to 7
	2		Credit 3	Enhanced Commissioning	2
2			Credit 4	Enhanced Refrigerant Management	2
	3		Credit 5	Measurement and Verification	3
		1	Credit 6	Green Power	2

3		5	Materials and Resources		Possible Points: 14
Y			Prereq 1	Storage and Collection of Recyclables	
		1	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
1			Credit 2	Construction Waste Management	1 to 2
		1	Credit 3	Materials Reuse	1 to 2

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

10	2	3	Indoor Environmental Quality		Possible Points: 15
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
		1	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
	1		Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
		1	Credit 8.2	Daylight and Views—Views	1

4		2	Innovation and Design Process		Possible Points: 6
1			Credit 1.1	Innovation in Design: Specific Title	1
1			Credit 1.2	Innovation in Design: Specific Title	1
1			Credit 1.3	Innovation in Design: Specific Title	1
		1	Credit 1.4	Innovation in Design: Specific Title	1
		1	Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

1		3	Regional Priority Credits		Possible Points: 4
1			Credit 1.1	Regional Priority: Specific Credit	1
		1	Credit 1.2	Regional Priority: Specific Credit	1
		1	Credit 1.3	Regional Priority: Specific Credit	1
		1	Credit 1.4	Regional Priority: Specific Credit	1

45	14	20	Total	Possible Points: 110

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

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

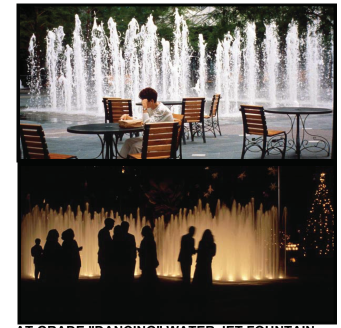
5.1 Urban Design and Architectural Style

The Project site at 345 Harrison Avenue currently consists of a two-story brick building with a warehouse used by Graybar Electric Company and surface parking. The area around the site generally includes industrial buildings used for light manufacturing and as warehouses, with two new mixed-use developments in the immediate vicinity. As previously described, transforming the underutilized site into an approximately 602-unit residential Project with ground floor retail will continue the revitalization of this area of the South End, creating a connection between a vibrant downtown and the growing South End urban neighborhood. The Project will improve pedestrian connectivity and circulation in the neighborhood, introduce a mix of vibrant 18/7 uses by bringing significant residential space along with neighborhood retail, and will serve as a vital physical and economic link between the Downtown, Chinatown, and South End neighborhoods. Together with the Ink Block development across Harrison Avenue and other nearby developments, the site has the potential to change and revitalize this area of the South End.

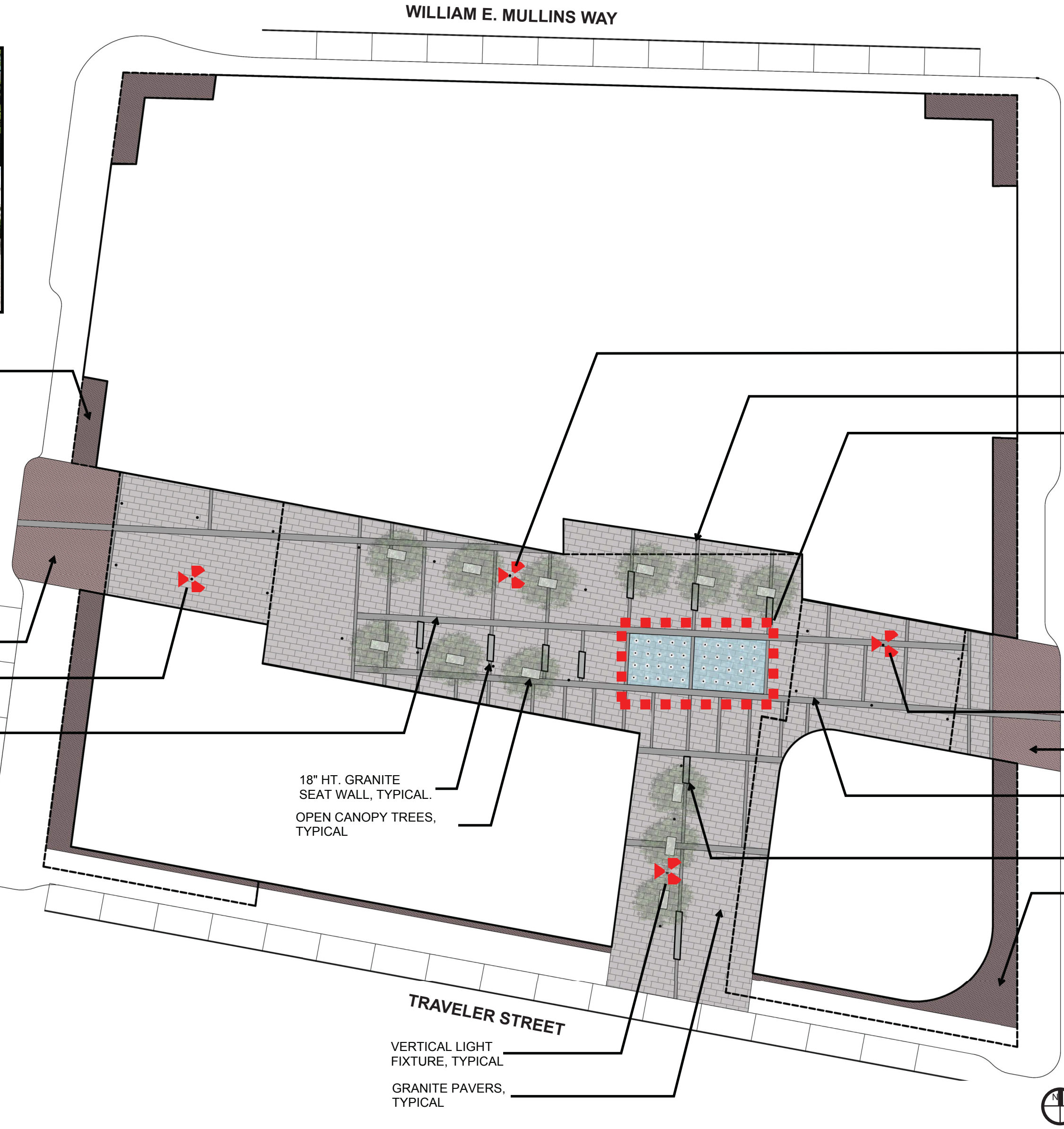
The primary urban design goal of the Project is to enhance the public realm around and inside the Project site, and develop appropriately scaled buildings for the area. The massing of the Project has been broken up creating smaller blocks and activated streetscapes with street level retail space along Washington Street, Harrison Avenue and Traveler Street. A pedestrian way running east-west will be reminiscent of South End alleyways, and will enhance pedestrian connectivity by breaking up an existing "mega-block" and improving walkability (see Figure 5-1). The street layout includes pavers that align the pedestrian way with the historic street grid (see Figure 5-2). The Project will return the scale of this block closer to the 1908 pattern of tightly gridded streets.

The building faces of both buildings are setback a minimum of 10 feet from the property line along Traveler Street to provide a more generous streetscape and to encourage pedestrian activities (see Figures 5-3 and 5-4). The ground floor is setback from the face of the building above at the corners of the Project site in order to encourage placemaking opportunities. Traffic on the pedestrian way will be limited to pedestrians and cyclists. Portions of the pedestrian way will be open to the sky and lined with trees and landscape elements to provide a continuous through-block connection linking the sidewalks along Harrison Avenue and Washington Street and, via a north-south pedestrian connection, on to Traveler Street. Open air retail uses will flow into the pedestrian way from all directions and will converge at the middle, where a public fountain or similar landscape element will be designed to support a public/private outdoor gathering and social space (see Figures 5-5 through 5-7).

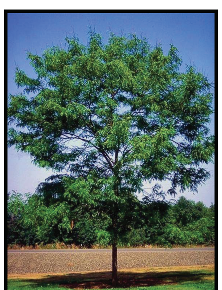
VERTICAL LIGHT FIXTURES



AT GRADE "DANCING" WATER JET FOUNTAIN



GRANITE SEAT WALL



OPEN CANOPY TREES

345 Harrison Avenue **Boston, Massachusetts**

Figure 5-1

Site Plan

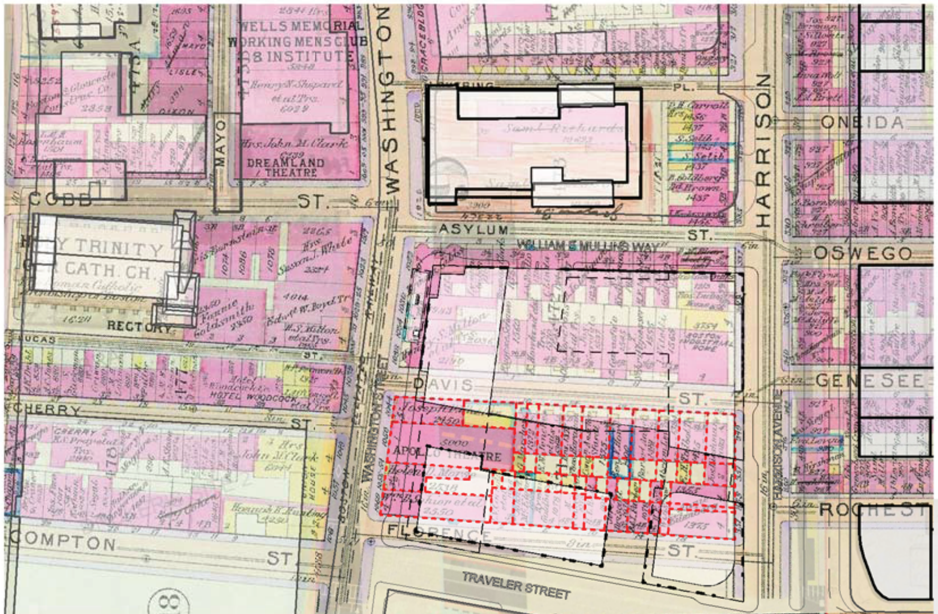


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Figure 5-2
Historic Street Grid

345 Harrison Avenue **Boston, Massachusetts**

Figure 5-3

View from the Corner of Harrison Avenue and Traveler Street

cbt

345 Harrison Avenue Boston, Massachusetts

Figure 5-4

View from the Corner of Harrison Avenue and William E. Mullins Way

cbt

345 Harrison Avenue   Boston, Massachusetts

Figure 5-5

View of the Pedestrian Way from Harrison Avenue

cbt

345 Harrison Avenue Boston, Massachusetts

Figure 5-6

View of the Pedestrian Way from Traveler Street

cbt

345 Harrison Avenue   Boston, Massachusetts

Figure 5-7

View from Inside the Pedestrian Way

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The buildings on the new separated blocks will then be broken down into multiple smaller buildings that relate to the neighborhoods they face. The mass of the buildings steps down on the south side along Traveler Street to allow natural daylight to enter the site and to maintain a relationship with the building heights of the lower residential buildings of the South End. The mass steps up on the north and east corners to create a focal point for the Project and to relate to the taller buildings of Downtown (see Figures 5-8 through 5-12). The scale of the buildings is further broken down through accents of metal panel and curtainwall at key locations. Both buildings are anticipated to be predominantly clad in modern materials, such as metal, glass, precast concrete, and/or brick with punched metal windows.

The 14-story Harrison Avenue building is composed of colored precast panels with complementary metal panel. It will be an L-shaped precast building that visually interlocks with a five story brick base building that starts mid-block and wraps onto Traveler Street. The precast, brick, and metal offer a sense of weight and permanence to the buildings, with the use of brick giving a nod to the industrial history of the site. At the same time, the patterning of these materials evokes the eclectic character of the neighborhood. The retail base will have large storefront windows highlighted with metal canopies that mark entries and provide shelter for pedestrians. Lighting in the garage will be designed to be largely invisible from the pedestrian areas.

The Washington Street building is similarly composed of colored precast panels with complementary metal panel and curtainwall. The building includes a 13-story portion that faces Washington Street and a lower portion that runs along Traveler Street clad in brick to relate to the Harrison Avenue building.

5.2 Streetscape/Landscape Design

The streetscapes around the Project are designed to tie together buildings, trees, street lights, and furniture to enhance the character of the area with the intent of creating enriching public spaces and support the multimodal transportation network.

Paving on site will be concrete except at residential lobby entrances and corners, where the paving will vary in order to celebrate the adjacent uses. Each street will be defined by different tree species, but with consistent sizes. Further street definition will be provided through varied lighting, but with consistent sizing/spacing and light output. Trees and utility connections will be coordinated to allow trees where no obstructions exist. Where utilities prohibit tree growth, semi-randomized low planter systems will be incorporated. The low planter size/spacing will be customized for each location, and site furnishing such as bicycle racks, trash receptacles, etc., will be designed to complement those arrangements

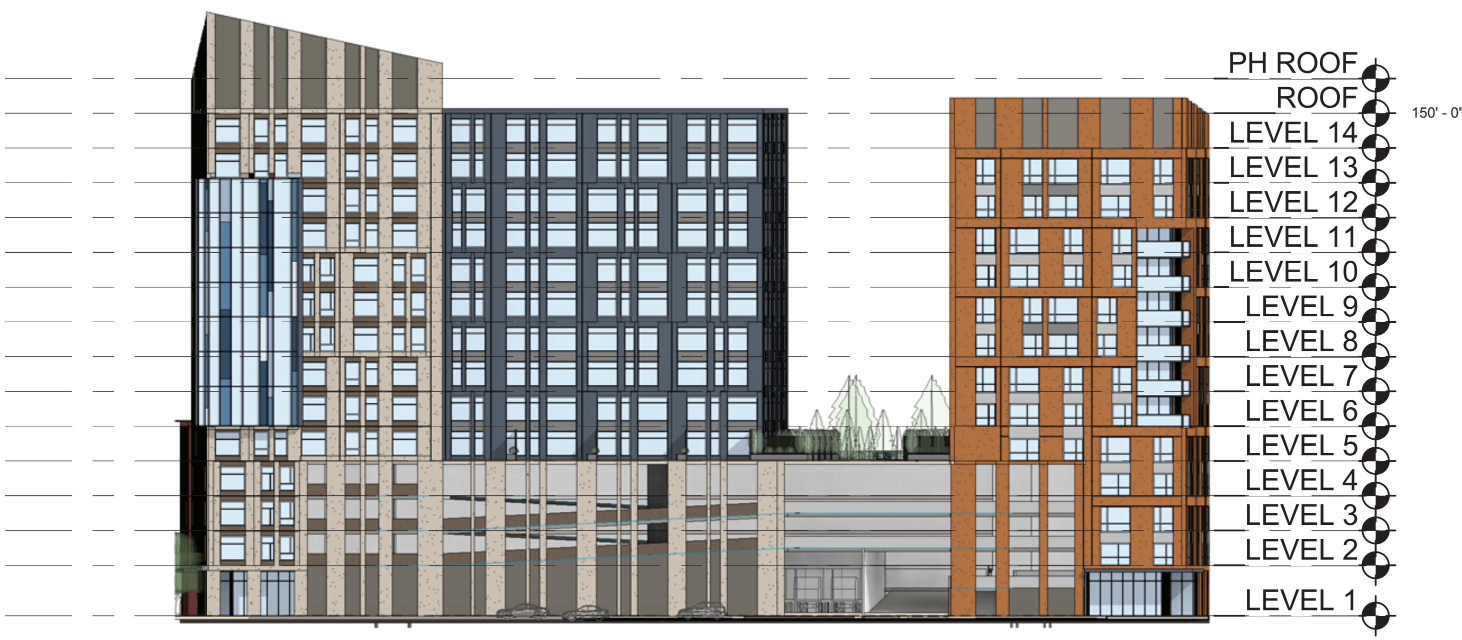

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Figure 5-8

Elevations from Traveler Street and William E. Mullins Way

Figure 5-9

Elevations from Washington Street and Harrison Avenue

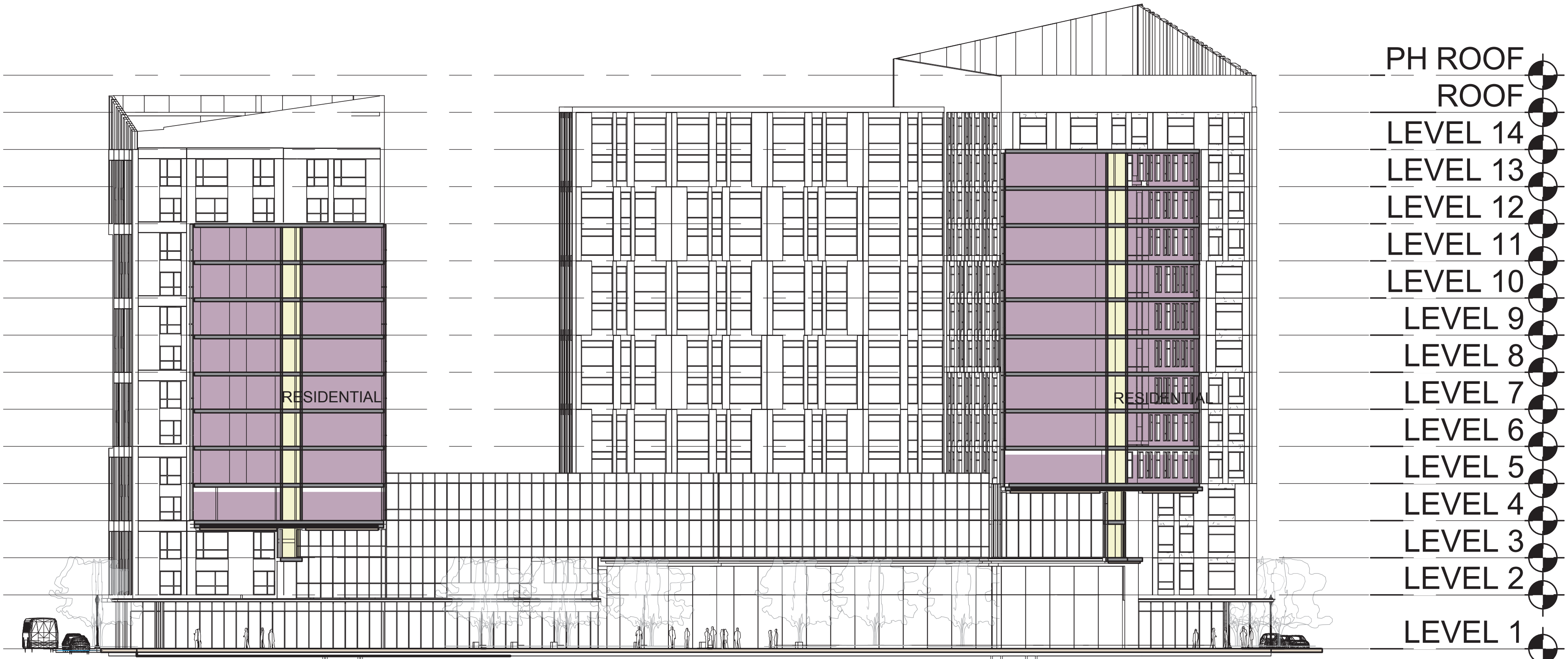

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Figure 5-10

East/West Section Looking North

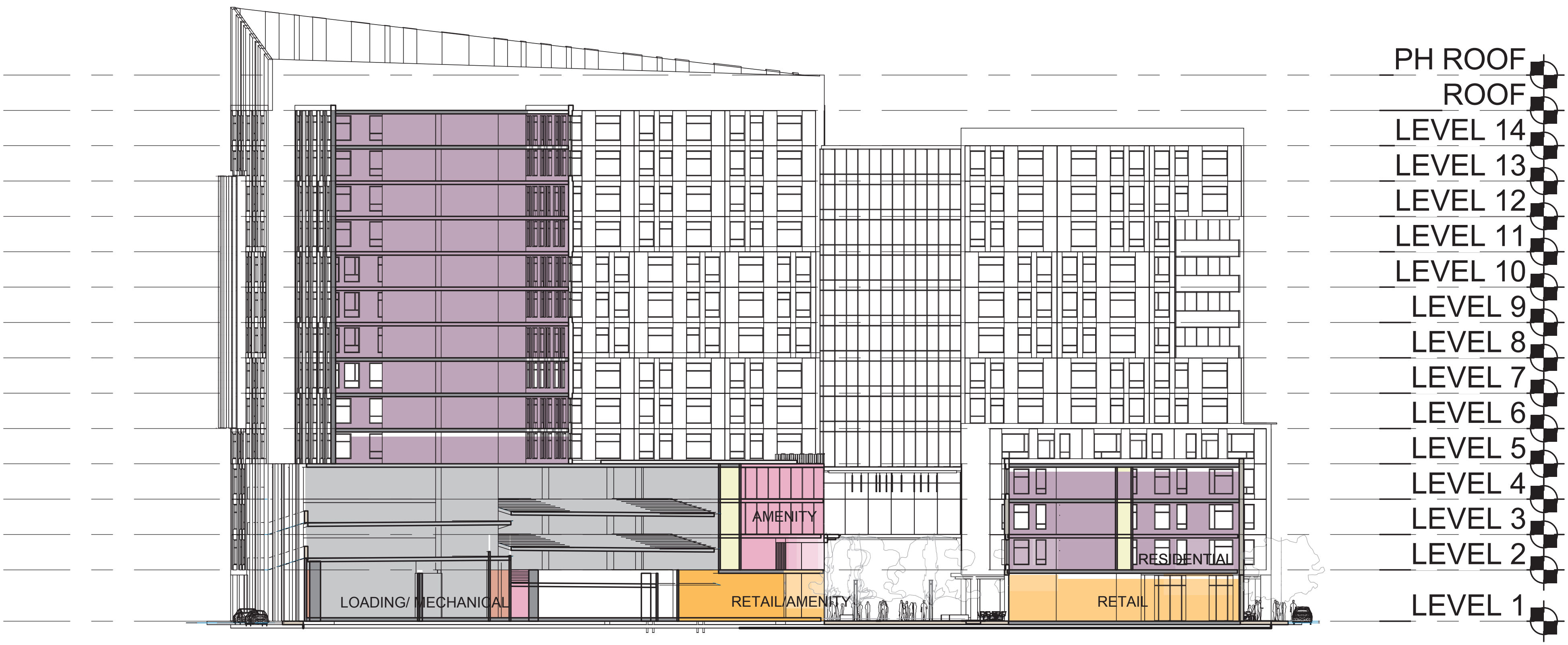

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Figure 5-11

North/South Elevation Looking East

345 Harrison Avenue **Boston, Massachusetts**

Figure 5-12

Aerial Rendering – Washington and Traveler Streets

cbt

and the flow of pedestrians along the sidewalks. Opportunities to incorporate way-finding elements and art in certain locations, as well as to celebrate and enhance the burgeoning arts district, will be explored. A larger central landscape element, such as a fountain, will be located at the middle of the pedestrian way.

5.3 Use Corridors

Traveler Street is envisioned as a "Green Use Corridor," and as such, is designed to encourage way-finding and connections between the residential South End, the Fort Point Channel, and adjacent South Boston neighborhoods. It will be lined with trees and have a sidewalk that is approximately 16 feet wide. The retail storefronts will be set back in certain locations on the ground level to increase sidewalk width and improve the quality of the pedestrian environment.

Washington Street and Harrison Avenue are designed as "Retail and Creative Use Corridors". Ground floor retail spaces will be designed with open and transparent storefronts. In addition to restaurants, retail spaces will likely include art galleries, artist work space, architecture studios and other small businesses that bring jobs to this part of the South End and contribute to the eclectic character of the neighborhood. The MBTA Silver Line stop at the corner of Washington Street and William E. Mullins Way will be supported by the retail use. Ample sidewalk space will be provided in order to reinforce this vital public transit link. Structured parking is screened from the street view. Loading activities are relegated to William E. Mullins Way. Where possible, streets will be lined with a single row of trees and have sidewalks that are approximately 10 to 16 feet wide.

William E. Mullins Way is envisioned as a cross connector street that is less busy than the other streets surrounding the Project. Sidewalks are designed as 8 to 10 feet wide and will be consistent with the existing character and scale of the local streets. The overall streetscape quality will be improved by adding lighting and trees as the width permits. Careful consideration will be paid to the overlap of pedestrians, bicyclists, and vehicles along this block. The Project will provide new bicycle facilities designed around the City of Boston Transportation Department Bicycle Parking Guidelines.

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This section describes the historic and archaeological resources within and adjacent to the Project site, and describes the potential effects of the Project on these resources.

6.1 Project Site

The Project site is an approximately two-acre parcel of land located at 345 Harrison Avenue that encompasses a two-story masonry clad, steel-framed and concrete structure constructed in 1959 for Graybar Electric Company. The remainder of the site is paved and used for surface parking.

The Project site is directly bounded by William E. Mullins Way to the north, Harrison Avenue to the east, Traveler Street to the south, and Washington Street to the west, and is located near the intersections of I-90 (Massachusetts Turnpike) and I-93 (Southeast Expressway). The site is at a transition point between the surrounding neighborhoods, with the Chinatown and Downtown neighborhoods located to the north of the Project site across I-90, the Fort Point Channel and South Boston neighborhoods to the east across I-93, and the South End to the southwest.

The site is located within the South End Harrison/Albany Protection Area (Protection Area), an area that was established to protect views of the adjacent South End Landmark District, to ensure that new development or major alterations adjacent to the District are architecturally compatible in massing, setback, and height, and to protect light and air circulation within the District. Building demolitions, the height and setback of new construction, and changes to topography, and landscaping within the Protection Area are subject to review by the South End Landmark District Commission (SELDC).

The property is also located within the South End Industrial Area, a grouping of late nineteenth- to early twentieth-century brick industrial buildings with related tenement and worker housing. The South End Industrial Area is included in the Inventory of Historic and Archaeological Assets, maintained by the Massachusetts Historical Commission (MHC). The area was surveyed by the Boston Landmarks Commission (BLC) in 1997 and was recommended as potentially eligible for listing in the National Register of Historic Places. The period of significance for the South End Industrial Area is 1875-1947. The building at 345 Harrison Avenue, constructed in 1959, is not identified as a contributing resource to the area.

Neither the South End Harrison/Albany Protection Area nor the South End Industrial Area is listed in the State or National Registers of Historic Places.

6.2 Historic Resources in the Project Vicinity

The South End Landmark District and the South End National Register Historic District are located south and west of the Project site. The South End Harrison/Albany Protection Area and the South End Industrial Area have similar boundaries; however, the South End Industrial Area does not extend west of Shawmut Avenue. Located to the north of the Project site, on the opposite side of I-90, is the John Wells Rowhouses located within Boston's Chinatown neighborhood. The rowhouses are included in the Inventory.

Table 6-1 below and Figure 6-1 identify the historic resources in the vicinity of the Project site.

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

Resource	Designation
South End Harrison/Albany Protection Area	Landmark District Protection Area
South End Landmark District	Landmark District, State Register of Historic Places
South End Historic District	State and National Registers of Historic Places
South End Industrial Area	MHC Inventory
John Wells Rowhouses	MHC Inventory

6.3 Impacts to Historic Resources

6.3.1 Urban Design

As described in Chapter 5, the Project site encompasses a two-story industrial building. The area in the vicinity of the site is devoted to industrial buildings and surface parking, with two new mixed-use developments in the immediate vicinity. The Project will redevelop the underutilized site into a residential development with ground floor retail, continuing the revitalization of this area and creating a connection between a vibrant downtown and the South End neighborhood.

The primary urban design goal of the Project is to enhance the public realm around and inside the Project site, and develop appropriately scaled buildings for the area. The massing of the Project has been broken up creating smaller blocks and activated streetscapes with street level retail space along Washington Street, Harrison Avenue and Traveler Street. An at-grade open-air pedestrian way running east-west between Harrison Avenue and Washington Street with a connector to Traveler Street is proposed to be reminiscent of South End alleyways and will enhance pedestrian connectivity and walkability. The Project will return the scale of this block closer to the 1908 historic pattern of tightly gridded streets.

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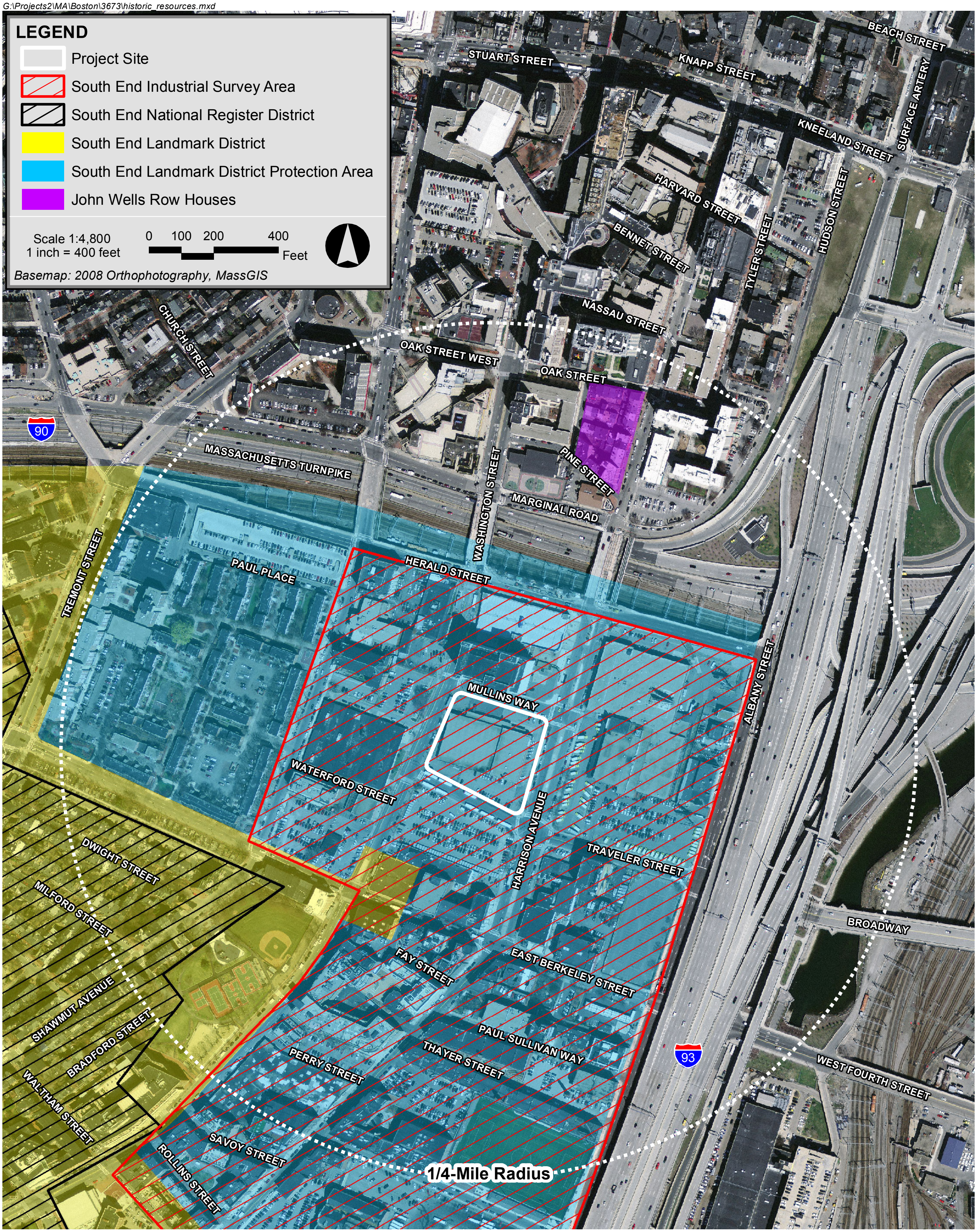


345 Harrison Avenue Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 6-1
Historic Resources

The mass of both buildings steps down on the south side along Traveler Street to allow natural daylight to enter the site and to maintain a relationship with the building heights of the lower residential buildings of the South End. The mass steps up on the north and east to relate to the taller buildings of Downtown. The scale of the buildings is further broken down through metal panel and curtainwall accents. Both buildings are anticipated to be predominantly clad in modern materials, such as metal, glass, precast concrete, and/or brick with punched metal windows.

The Project will be visible from the adjacent South End Landmark and South End National Register districts; however, it is not expected to introduce elements that are visually incompatible with the adjacent districts. As envisioned, the Project will be respectful of and complement the historic and architectural character of the South End neighborhood, and its uses, massing, and height will help to serve as a transition between the heart of the South End and the City's Downtown and Chinatown neighborhoods.

6.3.2 Shadow

As described in Section 3.2, an analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 am, 12:00 noon, and 3:00 pm) during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox. The analysis focused in particular on major pedestrian areas, as well as the sidewalks, plazas, and public open space adjacent to and in the vicinity of the Project site. The shadow analysis described in Section 3.2 presents existing shadow as well as net new shadow from the Project to illustrate the incremental impact of the Project.

Results of the shadow analysis indicate that the Project will not cause substantial impacts to the Protection Area and no impacts to the South End Landmark and South End National Register districts (see Figures 3.2-1 through 3.2-14). In general, new shadow from the Project will largely be limited to the immediate surrounding public ways and sidewalks of Washington Street, William E. Mullins Way, and Harrison Avenue. Some additional new shadow will be cast onto portions of adjacent properties immediately to the west, north, and east of the Project.

6.4 Archaeological Resources

The Project site consists of a previously developed urban parcel. No previously identified archaeological resources are located within the Project site. Due to previous development activities and disturbances, including site grading activities, it is not anticipated that the site contains significant archaeological resources. No impacts to archaeological resources are anticipated as a result of the Project.

6.5 Status of Project Reviews with Historical Agencies

6.5.1 Boston Landmarks Commission Article 80 Review

The submission of this Expanded PNF initiates review of the Project by the BLC under the City's Article 80 review process.

6.5.2 South End Landmark District Commission Review

The Project is located within the South End Harrison/Albany Protection Area, which is administered by the SELDC. As noted above, SELDC review of projects within the Protection Area focuses on demolition, land coverage, height of structures, landscape, and topography. The Proponent anticipates submitting an application for a SELDC advisory opinion during the Article 80 review process to ensure that the Project is consistent with the standards and criteria established for the Protection Area.

6.5.3 Massachusetts Historical Commission Review

The MHC has review authority over projects requiring state funding, licensing, permitting, and/or approvals that may have direct or indirect impacts to properties listed in the State Register of Historic Places (M.G. L. Chapter 9, Sections 27-27c, as amended). An MHC PNF will be submitted following submittal of the BRA PNF to initiate the review process. To facilitate the State Register review process, the MHC PNF will be submitted concurrently to the MHC and SELDC.

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

This chapter describes the infrastructure systems that will support the Project. The following utilities are evaluated: wastewater, water, stormwater, natural gas, electricity, and telecommunications. In addition, as discussed in Chapter 3, Environmental Protection, consideration is given to the sustainable elements of the energy supply provision for the Project.

The final design process for the Project will include required engineering analyses and will adhere to applicable protocols and design standards, ensuring that the proposed buildings are properly supported by, and in turn properly use the utility infrastructure of the City and private utilities. Detailed design of the Project-related utility systems will proceed in conjunction with the final design of the buildings and their interior mechanical systems.

The systems discussed below include those owned or managed by the Boston Water and Sewer Commission (BWSC), private utility companies, and on-site infrastructure systems. There will be close coordination among these entities and with the Project engineers and architects during the construction process.

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

7.1 Wastewater

7.1.1 Existing Sewer System

Local sanitary sewer service in the City is provided by the BWSC. The site is adjacent to sewer mains in the public streets. These mains include a 15-inch sewer line located in William E. Mullins Way that was newly laid in 2010 and an 18-inch sewer located in Washington Street.

The location of existing services from the site are not currently known.

7.1.2 Project-Generated Sanitary Sewer Flow

The Project as currently proposed includes a mix of residential, retail and restaurant uses. Table 7-1 summarizes the proposed sanitary sewer generation based upon 314 CMR 7.15. The rate includes an assumption that the retail component space will include approximately 10,000 square feet of restaurant space. The total proposed generation of 101,750 gallons per day results in a net increase in flow of 99,825 gallons per day over the existing site use. Initial discussions with BWSC staff have indicated that the existing infrastructure adjacent to the Project site has the capacity to handle the anticipated increase in sewage generated by the Project. Any food service tenants will have individual exterior grease traps installed on-site in accordance with the BWSC's design criteria.

Table 7-1 Existing and Future Sewer Generation

Program Type	Units	Generation Rate	Sewer Generation (GPD)
Existing			
Factory/Industrial	55 Employees	20 GPD/Employee	1,100
Office Dry Goods Retail	10,000 sf 1,500 sf	75 GPD/KSF 50 GPD/KSF	750 75
Total			**1,925**
Proposed			
Residential[1]	795 Bedrooms	110 GPD/Bedroom	87,450
Dry Goods Retail[1]	23,500 sf	50 GPD/KSF	1,175
Restaurant[1]	375 seats	35 GPD/seat	13,125
Total			**101,750**
Net Change			**99,825**

Note: Based on DEP 314 CMR 7.15 flow calculation factors.
1 Assumes (2) 5,000 square feet restaurant spaces totaling 375 seats as part of the retail component (estimated at 33,500 sf)

7.1.3 Sanitary Sewer Connection

Given the location of existing BWSC mains, new sanitary system connections will be located in William E. Mullins Way and Washington Street. Any food service tenants will have individual grease traps installed in accordance with BWSC's design criteria.

7.2 Water System

7.2.1 Existing Water Service

Domestic and fire protection water is currently provided to the site by the BWSC. There are five different water systems/service districts 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. The water mains in the vicinity of the Project site are part of either the southern high or southern low service systems.

The building is currently served by a six-inch fire protection lateral connected to the 12-inch southern low service main in Traveler Street, which was laid in 1910.

The building domestic water connections are not currently known.

7.2.2 Anticipated Water Consumption

The Project's domestic water demand is based on the estimated sewage generation (101,750 gallons per day, as presented in Table 7-1 above) with an added factor of 10 percent for consumption, system losses, and other use. Based upon these assumptions, the Project will require approximately 111,925 gallons per day. However, the Project will use high efficiency toilets, low-flow lavatory and kitchen faucets and ultra low-flow showerheads. The Project is targeting an overall water savings of 30% above the calculated baseline as calculated under LEED.

7.2.3 Proposed Water Service

The Project site is adequately serviced by several water mains in the adjacent streets. It is anticipated that the Project will have two sets of fire protection and domestic water connections, connected to both the mains in Harrison Avenue and Washington Street. These mains are expected to have adequate capacity to serve the Project.

7.3 Storm Drainage System

7.3.1 Existing Storm Drainage System

The site is currently serviced by a 60-inch drain line in Traveler Street that flows into a regulator in Albany Street before discharging to CSO#068 and the Fort Point Channel. There is a 24-inch drain line in Harrison Avenue and a 15-inch drain line in William E. Mullins Way, both of which were recently replaced. Additionally, there is a 24-inch line in Washington Street. All of these drain lines connect to the Traveler Street main with the same ultimate discharge at CSO#068.

The existing site is mostly impervious to rainfall infiltration and includes an existing closed drainage system connecting to the BWSC system.

7.3.2 Proposed Storm Drainage System

Construction of the Project will result in a significant decrease in the rate and quantity of stormwater runoff from the site. A new closed drainage system including deep-sumped catch basins, water quality Best Management Practices (BMPs) and subsurface infiltration will capture and infiltrate water to the ground. As part of BWSC's review process, the Proponent will consider measures wherever applicable to minimize flows from the site.

7.3.3 Groundwater Conservation Overlay District

The Project is located within the Groundwater Conservation Overlay District (GCOD) as defined in Article 32 of the Zoning Code. This zoning article sets forth requirements promoting the infiltration of runoff from impervious site areas within the district. To meet the requirements of this Article, projects within the district must infiltrate to the ground a volume equivalent to one-inch over the site impervious areas.

The Project will include infiltration systems to meet this requirement. These systems will be sized to retain and infiltrate a volume of stormwater equivalent to one-inch over the site impervious areas. The Proponent will contact the Boston Groundwater Trust to discuss compliance with Article 32.

7.3.4 State Stormwater Standards

In 1996, MassDEP issued the Stormwater Policy that established Stormwater Management Standards aimed at encouraging recharge and preventing stormwater discharges from causing or contributing to the pollution of the surface waters and groundwaters of the Commonwealth. In 1997, MassDEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy. In 2008, MassDEP revised the Stormwater Management Standards and Massachusetts Stormwater Handbook to promote increased stormwater recharge, the treatment of more runoff from polluting land uses, low impact development (LID) techniques, pollution prevention, removal of illicit discharges to stormwater management systems, and improved operation and maintenance of stormwater best management practices (BMPs). MassDEP applies the Stormwater Management Standards pursuant to its authority under the Wetlands Protection Act, M.G.L. c. 131, § 40, and the Massachusetts Clean Waters Act, M.G.L .c. 21, §§ 26-53. The revised Stormwater Management Standards have been incorporated in the Wetlands Protection Act Regulations, 310 CMR 10.05(6)(k) and the Water Quality Certification Regulations, 314 CMR 9.06(6)(a).

To demonstrate the ways in which the Project will be consistent with the Stormwater Management Policy, a discussion of each Stormwater Management Standard follows:

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.

The Project will treat the runoff contributed by paved and rooftop areas within the boundaries of the Project site through appropriate stormwater measures, including subsurface infiltration.

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 10.04.

The Project will include subsurface infiltration systems to further promote infiltration of stormwater resulting in a reduction of runoff rates.

Standard #3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally 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.

The Stormwater Management Standards require the infiltration of 0.6 inch of runoff over the impervious areas of the site for the best soil types (Type A soils). Given that the Project will infiltrate one-inch over the impervious area the Project, exceeds the required infiltration volume for this Standard.

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.

For the purposes of TSS removal, rooftop runoff is considered to be clean. Rooftop runoff will discharge directly to the infiltration system. Site runoff will be treated through structural BMPs as required for pretreatment prior to infiltration.

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.*

The Project is not considered a land use with higher potential pollutant load (LUHPPL).

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.

The Project site does not contain any of the critical areas identified above.

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 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.

The Project is considered a redevelopment; however, it will be in compliance with the stormwater management standards to the maximum extent practicable as described herein.

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.

The Project-related construction documents will include measures and specifications regarding erosion and sediment controls and barriers (e.g., silt fence, hay bales, and catch basin sacks). Construction dewatering discharges will be appropriately controlled and discharged in accordance with National Pollutant Discharge Elimination System (NPDES), state and local dewatering standards.

Standard #9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

An Operation and Maintenance plan will be developed for both construction and post-development, which will include, at a minimum, system ownership information, parties responsible for operation and maintenance, and inspection and maintenance schedules. Routine maintenance is expected to include catch basin cleaning, stormwater control cleaning, and removal of debris from outlets. It is also expected that pedestrian and vehicular access ways will be swept appropriately to control sand applied during winter months.

Measures aimed at minimizing the disposition of site soils to off-site areas, primarily the surrounding streets and existing drainage collection systems, will be a part of the City's required Construction Management Plan. In addition, the Proponent will apply for all appropriate permits for construction activity and dewatering. All efforts will be made to contain sediment, pollutants, and any other construction-related materials within the site. Stabilized construction exits will be installed at each access point of the work areas to minimize off-site transport of soil by construction vehicles. These exits will remain in place until site areas have been stabilized. In addition, the Proponent will use BMPs during construction including installing silt sacks on catch basins, a truck-trailer wheel wash station, anti-tracking pads, and covering material piles.

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

The Project site does not include any known illicit discharges. If any illicit discharges are encountered during the construction process, they will be eliminated.

7.4 Electrical Service

NSTAR 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 Harrison Avenue and Washington Street to serve the Project. The Proponent will work with NSTAR to confirm adequate system capacity as design is finalized.

7.5 Telecommunications Systems

The Proponent will select private telecommunications companies to provide telephone, cable, and data services. There are several potential candidates with substantial downtown Boston networks capable of providing service. Upon selection of a provider or providers, the Proponent will coordinate service connection locations and obtain appropriate approvals.

7.6 Gas Systems

National Grid has gas services in Washington Street, Traveler Street and Harrison Avenue adjacent to the site. The design of the building's HVAC system is not yet developed and thus expected demands are not yet known. The Proponent will work with National Grid to confirm adequate system capacity as design is finalized.

7.7 Utility Protection During Construction

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 BWSC, BPWD, the Dig-Safe Program, and governing utility company requirements. All necessary permits will be obtained before the commencement of work. 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.

Chapter 8.0

Coordination with other Governmental Agencies

8.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

8.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board and will be designated to comply with the standards of the Americans with Disabilities Act.

8.2 Massachusetts Environmental Policy Act (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.

8.3 Boston Civic Design Commission

The Project will comply with the provisions of Article 28 of the Boston Zoning Code. This PNF will be submitted to the Boston Civic Design Commission by the BRA as part of the Article 80 process.

Appendix A

Site Survey

UTILITY NOTES:

EXISTING UTILITIES, WHERE SHOWN HEREON, ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPERLY LOCATING AND COORDINATING ANY ON-SITE ACTIVITY WITH DIG-SAFE AND THE APPROPRIATE UTILITY COMPANY AND MAINTAINING EXISTING UTILITY SYSTEM SERVICE. DIG-SAFE SHALL BE NOTIFIED PER THE COMMONWEALTH OF MASSACHUSETTS STATUTE CHAPTER 82, SECTION 40, AT 1-888-344-7233. NO GUARANTEE IS IMPLIED OR INTENDED AS TO THE ACCURACY, LOCATION OR THAT ALL UTILITIES AND/OR SUBSURFACE STRUCTURES ARE SHOWN. THE CONTRACTOR SHALL VERIFY SIZE, LOCATION AND INVERTS OR UTILITIES AND STRUCTURES AS REQUIRED PRIOR TO THE START OF CONSTRUCTION.

PLAN REFERENCES

1. PLAN OF LAND ENTITLED "ALTA/ACSM LAND TITLE SURVEY PLAN OF LAND 300 HARRISON AVENUE IN BOSTON, MASSACHUSETTS – BOSTON HERALD". PREPARED BY BSC GROUP, INC FOR NATIONAL DEVELOPMENT, DATED MARCH 5, 2007 (BSC FILE NO. 1327400TI.DWG).

RECORD OWNER

GRAYBAR ELECTRIC COMPANY, INC.
BK 7478 PG 299
CERT. NO. 66571

GENERAL NOTES

1. THIS PLAN IS BASED UPON ON-THE-GROUND SURVEYS PERFORMED BY BSC GROUP, INC IN JANUARY 2012.

2. THERE ARE 53 PARKING SPACES AND 1 HANDICAPPED SPACE ON SITE.

LEGEND

BIT CONC	BITUMINOUS CONCRETE
	CATCH BASIN
CONC	CONCRETE
CO	CLEAN OUT
	DECIDUOUS TREE
D	DRAIN MANHOLE
E	ELECTRIC HANDHOLE
GC	GRANITE CURB
	HANDICAP PARKING SPACE
	HYDRANT
	LIGHT POLE
	MANHOLE
M	METAL POST
(R)	RECORD INFORMATION
	SIGN
	TRAFFIC CONTROL BOX
	TRAFFIC SIGNAL
	TRASH CAN
W	WATER GATE
—X—	CHAIN LINK FENCE
	STEEL GUARDRAIL
12	SCHEDULE B2 EXCEPTION NUMBER
10	PARKING COUNT

SURVEYORS CERTIFICATE

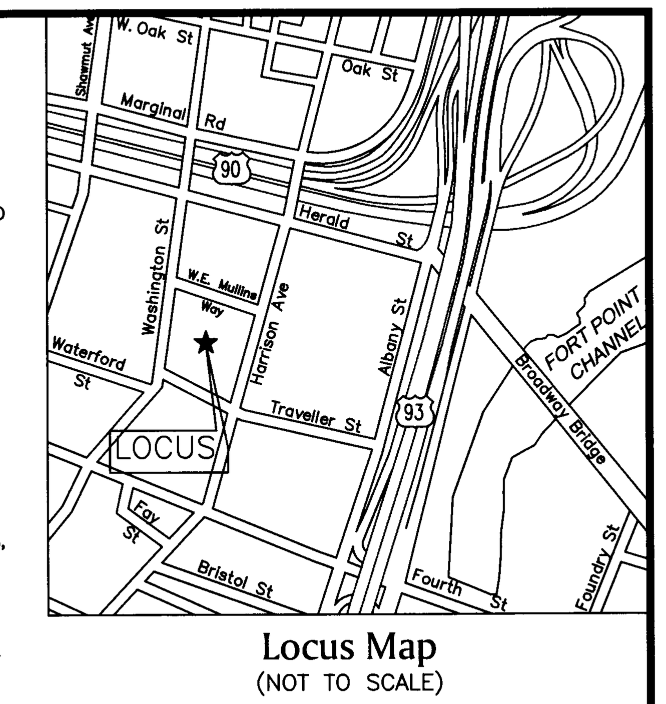
THE UNDERSIGNED HEREBY CERTIFIES TO FIDELITY NATIONAL INSURANCE COMPANY AND F8345 HARRISON OWNER, LLC, AS FOLLOWS:

i. THIS IS TO CERTIFY TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION, AND BELIEF THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS AND INCLUDES ITEMS 2, 3, 4, 7(A), 7(B)(1), 8, 9, 10, 11(A), AND 13 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED JANUARY, 2011;
ii. THAT THE SURVEY IS AN ACCURATE SURVEY OF ALL OF THE REAL PROPERTY LEGALLY DESCRIBED THEREIN;
iii. THAT THE SURVEY MAP PROPERLY AND ACCURATELY INDICATES AND LOCATES: (A) ALL VISIBLE, ABOVE-GROUND IMPROVEMENTS ON THE REAL PROPERTY AS OF THE DATE OF THE SURVEY; AND (B) FOUNDATIONS, PARKING SPACES, LOADING DOCKS AND OTHER VISIBLE, ABOVE-GROUND STRUCTURES AND IMPROVEMENTS ON THE PROPERTY SURVEYED;
iv. THAT THE SURVEY MAP WAS PREPARED UNDER THE DIRECT SUPERVISION AND CONTROL OF THE UNDERSIGNED FROM AN ACTUAL INSTRUMENT SURVEY MADE OF THE REAL PROPERTY LEGALLY DESCRIBED THEREIN;
v. THAT THERE ARE NO VISIBLE, ABOVE-GROUND ENCROACHMENTS ACROSS PROPERTY LINES EXCEPT AS SHOWN HEREON;
vi. THE UNDERSIGNED HAS RECEIVED AND EXAMINED A COPY OF TITLE INSURANCE COMMITMENT CASE NUMBER 08-0229 ISSUED BY FIDELITY NATIONAL INSURANCE COMPANY, EFFECTIVE DATE OF SEPTEMBER 19, 2008; THAT THE SURVEY MAP PROPERLY DESIGNATES AND LOCATES ALL VISIBLE OR RECORDED EASEMENTS, RIGHTS-OF-WAY, PARTY WALLS AND RESTRICTED AREAS AS OF THE DATE OF THE SURVEY AND AS LISTED ON THE TITLE COMMITMENT, TO THE EXTENT THEY CAN BE LOCATED; THE SUBJECT PROJECT DESCRIBED IN THIS SURVEY IS THE SAME LAND DESCRIBED IN THE TITLE INSURANCE COMMITMENT;
vii. INGRESS AND EGRESS TO THE SUBJECT PROPERTY IS PROVIDED BY HARRISON AVENUE AND WILLIAM E. MULLINS WAY UPON WHICH THE PROPERTY ABUTS, THE SAME BEING A PAVED AND PUBLIC STREETS;
viii. SAID DESCRIBED PROPERTY IS LOCATED WITHIN AN AREA HAVING A ZONE DESIGNATION X AND ARE BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA), ON THE FLOOD INSURANCE RATE MAP FOR COMMUNITY NO. 250286, PANEL NO. 77G, EFFECTIVE DATE SEPTEMBER 25, 2009, WHICH IS THE CURRENT FLOOD INSURANCE RATE MAP FOR THE COMMUNITY IN WHICH SAID PREMISES IS SITUATED;

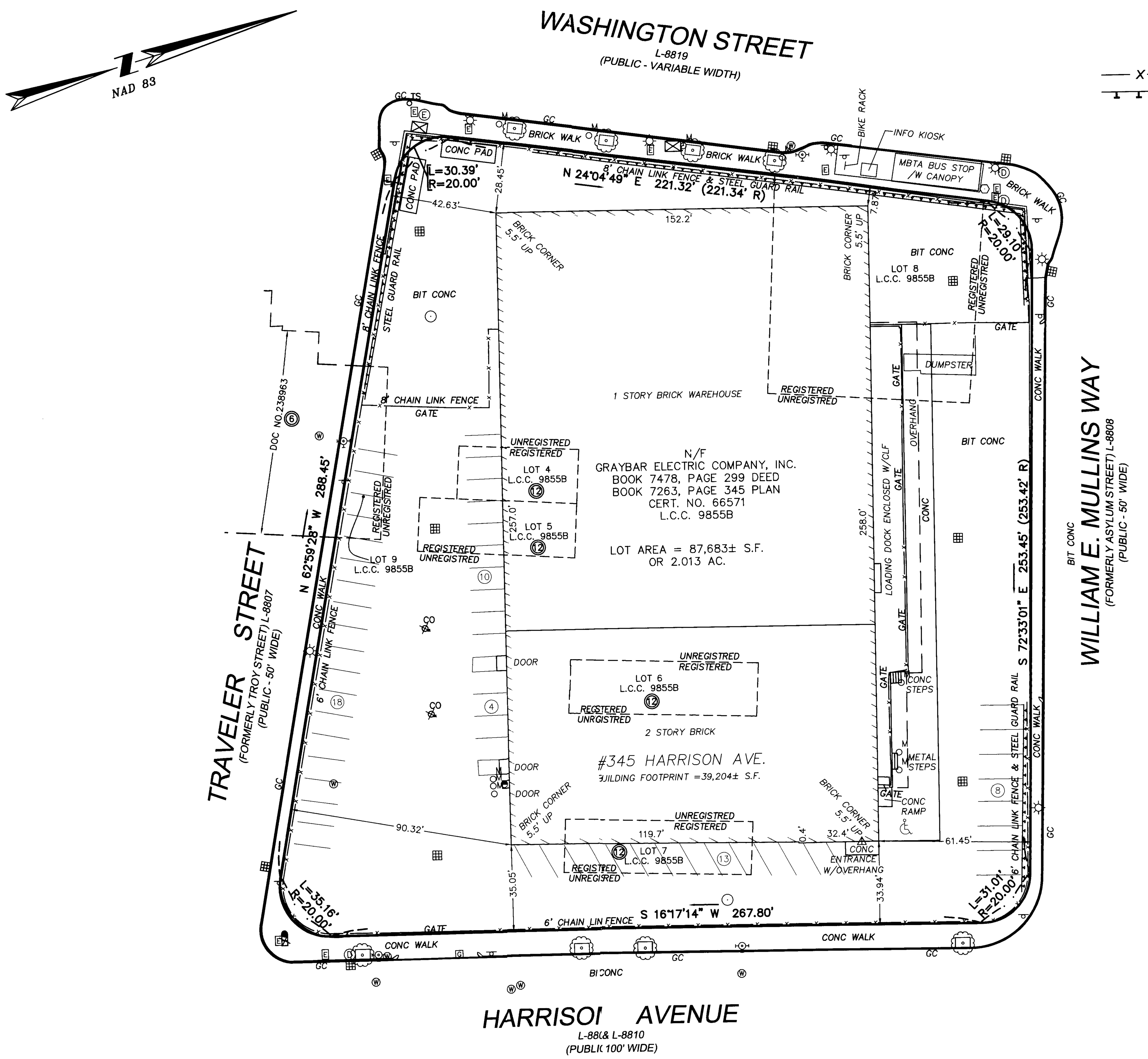
COMMONWEALTH OF MASSACHUSETTS — SEAN EWALD No. 47143 — PROFESSIONAL LAND SURVEYOR

REGISTERED LAND SURVEYOR
FOR BSC GROUP, INC.

05/29/2012
DATE



Locus Map
(NOT TO SCALE)



PROPERTY DESCRIPTION PER TITLE COMMITMENT EXHIBIT A

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND, SITUATE, LYING AND BEING IN THE CITY OF BOSTON, COUNTY OF SUFFOLK AND COMMONWEALTH OF MASSACHUSETTS, DESIGNATED AS PARCEL NO. 2 ON A PLAN ENTITLED "URBAN RENEWAL DIVISION, BOSTON HOUSING AUTHORITY NEW YORK STREETS PROJECT, UR MASS. 2-1, LAND DISPOSITION PLAN" BY HAYDEN, HARDING AND BUCHANAN, INC. CONSULTING ENGINEERS, BOSTON 35, MASSACHUSETTS DATED 3/6/1957, REVISIONS 6/26/1957, RECORDED IN THE SUFFOLK REGISTRY OF DEEDS, BOOK 7263, PAGE 345, AND MORE PARTICULARLY BOUNDED AND DESCRIBED AS FOLLOWS:

NORTHWESTERLY BY WASHINGTON STREET 221.34 FEET; NORTHERLY BY THE CURVED INTERSECTION OF WASHINGTON STREET AND ASYLUM STREET 29.10 FEET; NORTHEASTERLY BY ASYLUM STREET 253.42 FEET; EASTERLY BY THE CURVED INTERSECTION OF ASYLUM STREET AND HARRISON AVENUE 31.01 FEET; SOUTHEASTERLY BY HARRISON AVENUE 267.80 FEET; SOUTHERLY BY THE CURVED INTERSECTION OF HARRISON AVENUE AND TROY STREET 35.16 FEET AND SOUTHWESTERLY BY TROY STREET 288.45 FEET; WESTERLY BY THE CURVED INTERSECTION OF TROY STREET AND WASHINGTON STREET 30.39 FEET. SAID PARCEL CONTAINS ACCORDING TO SAID PLAN 87,683.36 SQUARE FEET. WITHIN THE ABOVE DESCRIBED PARCEL ARE THE FOLLOWING PARCELS OF REGISTERED LAND:

THAT CERTAIN PARCEL OF LAND SITUATED IN BOSTON IN THE COUNTY OF SUFFOLK AND COMMONWEALTH OF MASSACHUSETTS, BOUNDED AND DESCRIBED AS FOLLOWS:

NORTHEASTERLY	FORTY-FOUR AND 17/100 (44.17) FEET;
SOUTHEASTERLY	SIXTY-THREE AND 82/100 (63.82) FEET;
SOUTHWESTERLY	TWENTY-ONE AND 92/100 (21.92) FEET;
NORTHWESTERLY	FIFTEEN (15) FEET;
SOUTHWESTERLY	TWENTY-ONE AND 94/100 (21.94) FEET; AND
NORTHWESTERLY	FORTY-EIGHT AND 11/100 (48.11) FEET ALL BY LAND NOW OR FORMERLY OF CEREL-DRUKER REDEVELOPMENT CORPORATION.

SAID LAND IS SHOWN AS LOTS FOUR (4) AND FIVE (5) ON A SUBDIVISION PLAN DRAWN BY BOWES AND BROSNAHAN, SURVEYORS, DATED APRIL 30,1959, AS APPROVED BY THE COURT, FILED IN THE LAND REGISTRATION OFFICE AS PLAN NUMBER 9855-B, A COPY OF A PORTION OF WHICH IS FILED WITH CERTIFICATE OF TITLE NUMBER 65484.

ALSO ANOTHER PARCEL OF LAND SITUATE IN SAID BOSTON BOUNDED AND DESCRIBED AS FOLLOWS:

NORTHEASTERLY	TWENTY-ONE AND 65/100 (21.65) FEET;
SOUTHEASTEKLY	SEVENTY-EIGHT AND 69/100 (78.69) FEET;
SOUTHWESTERLY	NINE AND 38/100 (9.38) FEET;
NORTHWESTERLY	0.19 (0.19) FEET;
SOUTHWESTERLY	TEN AND 08/100 (10.08) FEET;
SOUTHEASTERLY	0.16 (0.16) FEET;
SOUTHWESTERLY	TWO AND 30/100 (2.30) FEET; AND
NORTHWESTERLY	SEVENTY-EIGHT AND 56/100 (78.56) FEET ALL BY LAND NOW OR FORMERLY OF CEREL-DRUKER REDEVELOPMENT CORPORATION.

SAID LAND IS SHOWN AS LOT SIX (6) ON PLAN NUMBER 9855-B ABOVE MENTIONED.

ALSO ANOTHER PARCEL OF LAND SITUATED IN SAID BOSTON BOUNDED AND DESCRIBED AS FOLLOWS:

NORTHEASTERLY	TWENTY-ONE AND 67/100 (21.67) FEET;
SOUTHEASTERLY	SEVENTY-NINE AND 11/100 (79.11) FEET;
SOUTHWESTERLY	TWENTY-ONE AND 67/100 (21.67) FEET; AND
NORTHWESTERLY	SEVENTY-EIGHT AND 97/100 (78.97) FEET ALL BY LAND NOW OR FORMERLY OF CEREL-DRUKER REDEVELOPMENT CORPORATION.

SAID LAND IS SHOWN AS LOT SEVEN (7) ON PLAN NUMBER 9855-B ABOVE MENTIONED.

ALSO ANOTHER PARCEL OF LAND SITUATED IN SAID BOSTON BOUNDED AND DESCRIBED AS FOLLOWS:

NORTHWESTERLY	BY THE SOUTHEASTERLY LINE OF WASHINGTON STREET, EIGHTY-FIVE AND FORTY-SIX (85.46) FEET;
NORTHEASTERLY	EIGHTY-TWO AND 31/100 (82.31) FEET;
SOUTHEASTERLY	EIGHTY-ONE AND 87/100 (81.87) FEET; AND
SOUTHWESTERLY	EIGHTY-EIGHT AND 59/100 (88.59) FEET ALL BY LAND NOW OR FORMERLY OF CEREL-DRUKER REDEVELOPMENT CORPORATION.

SAID LAND IS SHOWN AS LOT EIGHT (8) ON PLAN NUMBER 9855-B ABOVE MENTIONED. THE LAST ABOVE DESCRIBED PARCEL OF LAND IS SUBJECT TO A TAKING BY THE CITY OF BOSTON FOR HIGHWAY PURPOSES IN SAID WASHINGTON STREET UNDER ORDER DATED DECEMBER 12, 1956, FILED AND REGISTERED AS DOCUMENT NO. 238964.

ALSO ANOTHER PARCEL OF LAND SITUATED IN SAID BOSTON BOUNDED AND DESCRIBED AS FOLLOWS:

SOUTHWESTERLY	BY TROY STREET, SEVENTY AND 50/100 (70.50) FEET;
NORTHWESTERLY	NINE AND 68/100 (9.68) FEET;
NORTHEASTERLY	SEVENTY (70) FEET; AND
SOUTHEASTERLY	EIGHTEEN AND 03/100 (18.03) FEET ALL BY LAND NOW OR FORMERLY OF CEREL-DRUKER REDEVELOPMENT CORPORATION.

SAID LAND IS SHOWN AS LOT NINE (9) ON PLAN NUMBER 9855-B ABOVE MENTIONED.

SCHEDULE B - SECTION 2 EXCEPTIONS FROM COVERAGE

THE FOLLOWING EXCEPTIONS AFFECT THE SUBJECT PROPERTY AND ARE AS ITEMIZED IN SCHEDULE B-SECTION 2, ACCORDING TO FIDELITY NATIONAL INSURANCE COMPANY, FILE NUMBER 08-0229 WITH EFFECTIVE DATE OF JANUARY 18, 2012.

6. TAKING BY THE CITY OF BOSTON FOR HIGHWAY PURPOSES IN TROY STREET DATED DECEMBER 12, 1956, FILED AS DOCUMENT NO. 238963. (PLOTTED)

7. RIGHTS, AGREEMENTS AND CONDITIONS SET FORTH OR REFERRED TO IN DEED FROM BOSTON REDEVELOPMENT AUTHORITY AND CEREL-DRUKER REDEVELOPMENT CORPORATION DATED DECEMBER 26, 1957, FILED AS DOCUMENT NO. 231801, AS AFFECTED BY COMPLETION AND SATISFACTION CERTIFICATE FILED AS DOCUMENT NO. 243660. (NOT PLOTTABLE)

8. RIGHTS, AGREEMENTS, CONDITIONS, RESTRICTIONS AND RESERVATIONS SET FORTH OR REFERRED TO IN DEED FROM CEREL-DRUKER REDEVELOPMENT CORPORATION TO CD BUILDING CORPORATION DATED JUNE 4, 1959, FILED AS DOCUMENT NO. 239725, AS AFFECTED BY COMPLETION AND SATISFACTION CERTIFICATE FILED AS DOCUMENT NO. 243660. (NOT PLOTTABLE)

9. COVENANTS SET FORTH OR REFERRED TO IN DEED FROM CD BUILDING CORPORATION TO GRAYBAR ELECTRIC COMPANY, INC., DATED MAY 20, 1960, AND FILED AS DOCUMENT NO. 243661. (NOT PLOTTABLE)

10. AGREEMENT BY AND BETWEEN CEREL-DRUKER REDEVELOPMENT CORPORATION AND CD BUILDING CORPORATION DATED JUNE 19, 1959, FILED AS DOCUMENT NO. 239731. (NOT PLOTTABLE)

11. AGREEMENT BY AND BETWEEN CEREL-DRUKER REDEVELOPMENT CORPORATION AND GRAYBAR ELECTRIC COMPANY, INC., DATED MARCH 10, 1959 FILED AS DOCUMENT NO. 239732. (NOT PLOTTABLE)

12. LACK OF ACCESS TO PARCELS 4, 5, 6, AND 7 EXCEPT BY OTHER LAND OF THE CURRENT OWNER. (PLOTTED)

13. ENCROACHMENT OF FENCE ALONG TRAVELER STREET AS SHOWN ON PLAN ENTITLED "PLAN OF LAND IN BOSTON, MASS. DATED MAY 3, 1990 BY EVERETT M. BROOKS CO. INC. C.E.'S. (NOT PLOTTABLE)

14. DELETED

ALTA/ACSM LAND TITLE SURVEY

345 HARRISON AVENUE

IN

BOSTON
MASSACHUSETTS
(SUFFOLK COUNTY)

JANUARY 30, 2012

PREPARED FOR:

F8345 HARRISON OWNER, LLC

BSC GROUP
15 Elkins Street
Boston, Massachusetts
02127
617 896 4300

SCALE: 1" = 30'
0 3.75 7.5 15 METERS
0 15 30 60 FEET

PROJ. MGR.: S EWALD		
FIELD: L VERSOY		
CALC./DESIGN: M HASSANOVA		
DRAWN: M HASSANOVA		
CHECK: S EWALD		
FILE: P:\Prj\1339900\S\B\1339900TI		
DWG. NO: 1339900TI	FILED:	SHEET
JOB. NO: 1-3399.00		1 OF 1

Appendix B

Transportation Appendix

The Technical Appendix for Transportation is available upon request.

Appendix C

Wind Appendix

Annual						
SENSOR	WIND SPEED RANGE (mph)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	10	3	0	0	0	Walking
2	2	1	0	0	0	Standing
3	7	3	1	0	0	Walking
4	12	5	2	0	1	Uncomfortable
5	18	7	3	1	1	Uncomfortable
6	3	0	0	0	0	Standing
7	19	8	2	0	1	Uncomfortable
8	3	1	0	0	0	Standing
9	2	0	0	0	0	Standing
10	1	0	0	0	0	Sitting
11	2	0	0	0	0	Standing
12	15	6	1	0	0	Walking
13	11	5	2	0	1	Uncomfortable
14	10	3	1	0	0	Walking
15	23	10	3	0	1	Uncomfortable
16	22	10	3	0	1	Uncomfortable
17	5	1	0	0	0	Standing
18	3	1	0	0	0	Standing
19	3	1	1	0	0	Standing
20	1	0	0	0	0	Sitting
21	8	2	0	0	0	Walking
22	1	0	0	0	0	Sitting
23	0	0	0	0	0	Sitting
24	0	0	0	0	0	Sitting
25	1	0	0	0	0	Sitting
26	1	0	0	0	0	Sitting
27	9	3	0	0	0	Walking
28	3	1	1	0	0	Standing
29	2	0	0	0	0	Standing
30	8	3	1	0	1	Walking
31	2	1	0	0	0	Standing
32	1	0	0	0	0	Sitting
33	1	0	0	0	0	Sitting
34	1	0	0	0	0	Sitting

Annual						
SENSOR	WIND SPEED RANGE (mph)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	2	1	0	0	0	Standing
36	0	0	0	0	0	Sitting
37	1	0	0	0	0	Sitting
38	3	0	0	0	0	Standing
39	9	2	0	0	0	Walking
40	2	1	0	0	0	Standing
41	4	1	0	0	0	Standing
42	1	0	0	0	0	Sitting
43	4	1	0	0	0	Standing
44	0	0	0	0	0	Sitting
45	2	0	0	0	0	Standing
46	9	4	1	0	1	Walking
47	2	0	0	0	0	Standing
48	10	3	1	0	0	Walking
49	11	5	1	0	1	Walking
50	1	0	0	0	0	Sitting
51	7	2	1	0	0	Walking
52	1	0	0	0	0	Sitting
53	6	2	0	0	0	Walking
54	0	0	0	0	0	Sitting
55	0	0	0	0	0	Sitting
56	5	2	0	0	0	Walking
57	13	5	1	0	0	Walking
58	7	4	2	0	1	Uncomfortable
59	1	0	0	0	0	Sitting
60	1	0	0	0	0	Sitting

Spring						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	6	1	0	0	0	Standing
2	2	0	0	0	0	Standing
3	7	2	0	0	0	Walking
4	13	5	1	0	0	Walking
5	15	6	2	0	1	Uncomfortable
6	2	0	0	0	0	Standing
7	12	4	1	0	0	Walking
8	2	0	0	0	0	Standing
9	1	0	0	0	0	Sitting
10	1	0	0	0	0	Sitting
11	1	0	0	0	0	Sitting
12	11	4	1	0	0	Walking
13	11	5	1	0	0	Walking
14	7	2	0	0	0	Walking
15	22	9	2	0	0	Uncomfortable
16	17	7	2	0	1	Uncomfortable
17	3	0	0	0	0	Standing
18	2	0	0	0	0	Standing
19	3	1	0	0	0	Standing
20	0	0	0	0	0	Sitting
21	4	1	0	0	0	Standing
22	1	0	0	0	0	Sitting
23	0	0	0	0	0	Sitting
24	0	0	0	0	0	Sitting
25	1	0	0	0	0	Sitting
26	1	0	0	0	0	Sitting
27	8	2	0	0	0	Walking
28	3	1	0	0	0	Standing
29	2	0	0	0	0	Standing
30	7	2	1	0	0	Walking
31	2	0	0	0	0	Standing
32	1	0	0	0	0	Sitting
33	0	0	0	0	0	Sitting
34	0	0	0	0	0	Sitting

Spring						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	1	0	0	0	0	Sitting
36	0	0	0	0	0	Sitting
37	0	0	0	0	0	Sitting
38	2	0	0	0	0	Standing
39	4	1	0	0	0	Standing
40	2	0	0	0	0	Standing
41	2	0	0	0	0	Standing
42	0	0	0	0	0	Sitting
43	2	0	0	0	0	Standing
44	0	0	0	0	0	Sitting
45	1	0	0	0	0	Sitting
46	8	3	1	0	0	Walking
47	1	0	0	0	0	Sitting
48	8	2	0	0	0	Walking
49	9	3	1	0	0	Walking
50	1	0	0	0	0	Sitting
51	7	2	0	0	0	Walking
52	0	0	0	0	0	Sitting
53	3	1	0	0	0	Standing
54	0	0	0	0	0	Sitting
55	0	0	0	0	0	Sitting
56	3	1	0	0	0	Standing
57	8	2	0	0	0	Walking
58	8	4	2	0	1	Uncomfortable
59	0	0	0	0	0	Sitting
60	0	0	0	0	0	Sitting

Summer						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	4	1	0	0	0	Standing
2	1	0	0	0	0	Sitting
3	4	1	0	0	0	Standing
4	10	3	1	0	0	Walking
5	10	3	1	0	0	Walking
6	2	0	0	0	0	Standing
7	10	3	0	0	0	Walking
8	1	0	0	0	0	Sitting
9	1	0	0	0	0	Sitting
10	1	0	0	0	0	Sitting
11	1	0	0	0	0	Sitting
12	7	2	0	0	0	Walking
13	6	2	1	0	0	Walking
14	4	1	0	0	0	Standing
15	17	6	1	0	0	Walking
16	13	4	1	0	0	Walking
17	1	0	0	0	0	Sitting
18	1	0	0	0	0	Sitting
19	2	1	0	0	0	Standing
20	0	0	0	0	0	Sitting
21	3	1	0	0	0	Standing
22	0	0	0	0	0	Sitting
23	0	0	0	0	0	Sitting
24	0	0	0	0	0	Sitting
25	0	0	0	0	0	Sitting
26	0	0	0	0	0	Sitting
27	6	1	0	0	0	Standing
28	2	1	0	0	0	Standing
29	1	0	0	0	0	Sitting
30	4	1	0	0	0	Standing
31	1	0	0	0	0	Sitting
32	0	0	0	0	0	Sitting
33	0	0	0	0	0	Sitting
34	0	0	0	0	0	Sitting

Summer						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	1	0	0	0	0	Sitting
36	0	0	0	0	0	Sitting
37	0	0	0	0	0	Sitting
38	2	0	0	0	0	Standing
39	3	1	0	0	0	Standing
40	1	0	0	0	0	Sitting
41	2	0	0	0	0	Standing
42	0	0	0	0	0	Sitting
43	1	0	0	0	0	Sitting
44	0	0	0	0	0	Sitting
45	0	0	0	0	0	Sitting
46	5	2	0	0	0	Walking
47	1	0	0	0	0	Sitting
48	6	1	0	0	0	Standing
49	5	2	0	0	0	Walking
50	1	0	0	0	0	Sitting
51	5	1	0	0	0	Standing
52	0	0	0	0	0	Sitting
53	2	0	0	0	0	Standing
54	0	0	0	0	0	Sitting
55	0	0	0	0	0	Sitting
56	2	0	0	0	0	Standing
57	6	1	0	0	0	Standing
58	6	3	1	0	0	Walking
59	0	0	0	0	0	Sitting
60	0	0	0	0	0	Sitting

Autumn						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	9	3	0	0	0	Walking
2	2	1	0	0	0	Standing
3	7	3	1	0	1	Walking
4	10	4	1	0	1	Walking
5	17	7	3	1	1	Uncomfortable
6	3	0	0	0	0	Standing
7	19	8	2	0	1	Uncomfortable
8	4	1	0	0	0	Standing
9	2	0	0	0	0	Standing
10	1	0	0	0	0	Sitting
11	2	0	0	0	0	Standing
12	14	6	1	0	1	Walking
13	11	5	2	0	1	Uncomfortable
14	9	3	1	0	0	Walking
15	21	10	3	0	1	Uncomfortable
16	22	10	3	0	1	Uncomfortable
17	5	1	0	0	0	Standing
18	2	1	0	0	0	Standing
19	3	2	1	0	1	Walking
20	1	0	0	0	0	Sitting
21	8	2	0	0	0	Walking
22	1	0	0	0	0	Sitting
23	0	0	0	0	0	Sitting
24	0	0	0	0	0	Sitting
25	1	0	0	0	0	Sitting
26	1	0	0	0	0	Sitting
27	9	3	0	0	0	Walking
28	4	2	1	0	0	Walking
29	2	0	0	0	0	Standing
30	8	3	1	0	1	Walking
31	2	1	0	0	0	Standing
32	1	0	0	0	0	Sitting
33	1	0	0	0	0	Sitting
34	1	0	0	0	0	Sitting

Autumn						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	2	1	0	0	0	Standing
36	0	0	0	0	0	Sitting
37	1	0	0	0	0	Sitting
38	3	0	0	0	0	Standing
39	9	2	0	0	0	Walking
40	2	1	0	0	0	Standing
41	4	1	0	0	0	Standing
42	0	0	0	0	0	Sitting
43	4	1	0	0	0	Standing
44	0	0	0	0	0	Sitting
45	2	0	0	0	0	Standing
46	9	3	1	0	1	Walking
47	2	0	0	0	0	Standing
48	9	3	1	0	0	Walking
49	11	5	1	0	1	Walking
50	1	0	0	0	0	Sitting
51	7	3	1	0	0	Walking
52	1	0	0	0	0	Sitting
53	6	1	0	0	0	Standing
54	0	0	0	0	0	Sitting
55	0	0	0	0	0	Sitting
56	4	1	0	0	0	Standing
57	12	5	1	0	0	Walking
58	6	3	1	0	1	Walking
59	1	0	0	0	0	Sitting
60	0	0	0	0	0	Sitting

Winter						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	15	5	1	0	0	Walking
2	4	1	0	0	0	Standing
3	8	3	1	0	1	Walking
4	13	6	2	0	1	Uncomfortable
5	22	10	4	1	2	Uncomfortable
6	4	1	0	0	0	Standing
7	25	13	4	0	1	Uncomfortable
8	5	1	0	0	0	Standing
9	3	1	0	0	0	Standing
10	1	0	0	0	0	Sitting
11	2	0	0	0	0	Standing
12	20	9	3	0	1	Uncomfortable
13	14	7	3	1	1	Uncomfortable
14	14	5	1	0	0	Walking
15	26	12	5	1	2	Uncomfortable
16	28	15	6	1	2	Uncomfortable
17	7	2	0	0	0	Walking
18	4	2	0	0	0	Walking
19	4	2	1	0	1	Walking
20	2	0	0	0	0	Standing
21	13	5	1	0	0	Walking
22	2	0	0	0	0	Standing
23	1	0	0	0	0	Sitting
24	1	0	0	0	0	Sitting
25	1	0	0	0	0	Sitting
26	2	1	0	0	0	Standing
27	10	4	1	0	0	Walking
28	4	2	1	0	1	Walking
29	3	1	0	0	0	Standing
30	10	4	1	0	1	Walking
31	3	1	0	0	0	Standing
32	1	0	0	0	0	Sitting
33	1	0	0	0	0	Sitting
34	3	0	0	0	0	Standing

Winter						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	3	1	0	0	0	Standing
36	0	0	0	0	0	Sitting
37	1	0	0	0	0	Sitting
38	4	1	0	0	0	Standing
39	14	4	1	0	0	Walking
40	3	1	0	0	0	Standing
41	5	1	0	0	0	Standing
42	1	0	0	0	0	Sitting
43	5	2	0	0	0	Walking
44	0	0	0	0	0	Sitting
45	3	0	0	0	0	Standing
46	12	5	2	0	1	Uncomfortable
47	3	1	0	0	0	Standing
48	12	5	1	0	1	Walking
49	15	7	2	0	2	Uncomfortable
50	2	0	0	0	0	Standing
51	9	3	1	0	1	Walking
52	1	0	0	0	0	Sitting
53	10	3	0	0	0	Walking
54	1	0	0	0	0	Sitting
55	1	0	0	0	0	Sitting
56	7	3	1	0	0	Walking
57	18	8	2	0	1	Uncomfortable
58	8	4	2	1	2	Uncomfortable
59	2	0	0	0	0	Standing
60	1	0	0	0	0	Sitting

Annual						
SENSOR	WIND SPEED RANGE (mph)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	8	2	0	0	0	Walking
2	2	1	0	0	0	Standing
3	3	1	0	0	0	Standing
4	4	1	0	0	0	Standing
5	10	4	2	0	1	Uncomfortable
6	1	0	0	0	0	Sitting
7	5	1	0	0	0	Standing
8	0	0	0	0	0	Sitting
9	5	1	0	0	0	Standing
10	8	2	0	0	0	Walking
11	9	3	0	0	0	Walking
12	1	0	0	0	0	Sitting
13	11	5	1	0	0	Walking
14	7	2	0	0	0	Walking
15	18	7	2	0	1	Uncomfortable
16	3	1	0	0	0	Standing
17	4	1	0	0	0	Standing
18	2	1	0	0	0	Standing
19	2	1	0	0	0	Standing
20	1	0	0	0	0	Sitting
21	3	1	0	0	0	Standing
22	1	0	0	0	0	Sitting
23	1	0	0	0	0	Sitting
24	0	0	0	0	0	Sitting
25	1	0	0	0	0	Sitting
26	2	1	0	0	0	Standing
27	5	1	0	0	0	Standing
28	1	0	0	0	0	Sitting
29	1	0	0	0	0	Sitting
30	3	1	0	0	0	Standing
31	1	0	0	0	0	Sitting
32	1	0	0	0	0	Sitting
33	9	3	0	0	0	Walking
34	4	1	0	0	0	Standing

Annual						
SENSOR	WIND SPEED RANGE (mph)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	6	3	1	0	1	Walking
36	1	0	0	0	0	Sitting
37	0	0	0	0	0	Sitting
38	2	0	0	0	0	Standing
39	8	2	0	0	0	Walking
40	2	0	0	0	0	Standing
41	3	1	0	0	0	Standing
42	1	0	0	0	0	Sitting
43	3	1	0	0	0	Standing
44	0	0	0	0	0	Sitting
45	1	0	0	0	0	Sitting
46	8	3	1	0	1	Walking
47	2	0	0	0	0	Standing
48	13	5	1	0	0	Walking
49	10	5	1	0	1	Walking
50	4	1	0	0	0	Standing
51	7	2	1	0	0	Walking
52	1	0	0	0	0	Sitting
53	8	4	2	0	1	Uncomfortable
54	1	0	0	0	0	Sitting
55	0	0	0	0	0	Sitting
56	2	0	0	0	0	Standing
57	10	5	2	0	1	Uncomfortable
58	3	0	0	0	0	Standing
59	21	11	4	1	2	Uncomfortable
60	1	0	0	0	0	Sitting
61	18	8	3	0	1	Uncomfortable
62	13	4	1	0	0	Walking
63	1	0	0	0	0	Sitting
64	1	0	0	0	0	Sitting
65	3	2	1	0	0	Walking
66	15	7	2	0	1	Uncomfortable
67	5	3	1	0	1	Walking
68	1	0	0	0	0	Sitting

Annual						
SENSOR	WIND SPEED RANGE (mph)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
69	1	0	0	0	0	Sitting
70	1	0	0	0	0	Sitting
71	10	4	1	0	0	Walking
72	2	0	0	0	0	Standing
73	4	1	0	0	0	Standing
74	0	0	0	0	0	Sitting
75	5	2	1	0	1	Walking
76	2	0	0	0	0	Standing
77	9	3	0	0	0	Walking
78	0	0	0	0	0	Sitting
79	1	0	0	0	0	Sitting
80	0	0	0	0	0	Sitting
81	0	0	0	0	0	Sitting
82	1	0	0	0	0	Sitting
83	4	1	0	0	0	Standing
84	11	5	1	0	1	Walking
85	0	0	0	0	0	Sitting
86	11	5	1	0	0	Walking
87	21	12	5	0	2	Uncomfortable
88	22	12	5	1	3	Uncomfortable
89	6	3	2	0	1	Uncomfortable
90	2	1	0	0	0	Standing

Spring						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	5	1	0	0	0	Standing
2	2	0	0	0	0	Standing
3	3	1	0	0	0	Standing
4	3	1	0	0	0	Standing
5	9	4	2	0	1	Uncomfortable
6	0	0	0	0	0	Sitting
7	2	0	0	0	0	Standing
8	0	0	0	0	0	Sitting
9	2	0	0	0	0	Standing
10	6	1	0	0	0	Standing
11	7	2	0	0	0	Walking
12	1	0	0	0	0	Sitting
13	9	4	1	0	0	Walking
14	5	1	0	0	0	Standing
15	17	6	1	0	0	Walking
16	2	0	0	0	0	Standing
17	2	0	0	0	0	Standing
18	2	0	0	0	0	Standing
19	2	0	0	0	0	Standing
20	0	0	0	0	0	Sitting
21	1	0	0	0	0	Sitting
22	0	0	0	0	0	Sitting
23	1	0	0	0	0	Sitting
24	0	0	0	0	0	Sitting
25	1	0	0	0	0	Sitting
26	1	0	0	0	0	Sitting
27	4	1	0	0	0	Standing
28	1	0	0	0	0	Sitting
29	1	0	0	0	0	Sitting
30	2	0	0	0	0	Standing
31	0	0	0	0	0	Sitting
32	1	0	0	0	0	Sitting
33	4	1	0	0	0	Standing
34	2	1	0	0	0	Standing

Spring						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	6	3	1	0	1	Walking
36	0	0	0	0	0	Sitting
37	0	0	0	0	0	Sitting
38	1	0	0	0	0	Sitting
39	4	1	0	0	0	Standing
40	1	0	0	0	0	Sitting
41	2	0	0	0	0	Standing
42	0	0	0	0	0	Sitting
43	2	1	0	0	0	Standing
44	0	0	0	0	0	Sitting
45	0	0	0	0	0	Sitting
46	7	3	1	0	0	Walking
47	1	0	0	0	0	Sitting
48	12	4	1	0	0	Walking
49	8	3	1	0	0	Walking
50	3	0	0	0	0	Standing
51	6	2	0	0	0	Walking
52	0	0	0	0	0	Sitting
53	8	4	1	0	0	Walking
54	0	0	0	0	0	Sitting
55	0	0	0	0	0	Sitting
56	1	0	0	0	0	Sitting
57	9	4	2	0	0	Uncomfortable
58	1	0	0	0	0	Sitting
59	22	11	3	0	1	Uncomfortable
60	1	0	0	0	0	Sitting
61	15	7	2	0	1	Uncomfortable
62	8	2	0	0	0	Walking
63	1	0	0	0	0	Sitting
64	1	0	0	0	0	Sitting
65	4	2	1	0	0	Walking
66	13	4	1	0	0	Walking
67	5	3	1	0	0	Walking
68	0	0	0	0	0	Sitting

Spring						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
69	1	0	0	0	0	Sitting
70	0	0	0	0	0	Sitting
71	6	2	0	0	0	Walking
72	2	0	0	0	0	Standing
73	2	0	0	0	0	Standing
74	0	0	0	0	0	Sitting
75	5	2	1	0	0	Walking
76	1	0	0	0	0	Sitting
77	5	1	0	0	0	Standing
78	0	0	0	0	0	Sitting
79	0	0	0	0	0	Sitting
80	0	0	0	0	0	Sitting
81	0	0	0	0	0	Sitting
82	0	0	0	0	0	Sitting
83	2	1	0	0	0	Standing
84	10	4	1	0	0	Walking
85	0	0	0	0	0	Sitting
86	8	3	1	0	0	Walking
87	15	7	2	0	1	Uncomfortable
88	23	11	4	0	2	Uncomfortable
89	7	4	1	0	1	Walking
90	2	0	0	0	0	Standing

Summer						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	3	1	0	0	0	Standing
2	1	0	0	0	0	Sitting
3	1	0	0	0	0	Sitting
4	2	1	0	0	0	Standing
5	5	2	1	0	0	Walking
6	0	0	0	0	0	Sitting
7	1	0	0	0	0	Sitting
8	0	0	0	0	0	Sitting
9	1	0	0	0	0	Sitting
10	5	1	0	0	0	Standing
11	5	1	0	0	0	Standing
12	0	0	0	0	0	Sitting
13	5	2	0	0	0	Walking
14	3	0	0	0	0	Standing
15	12	4	0	0	0	Walking
16	1	0	0	0	0	Sitting
17	1	0	0	0	0	Sitting
18	1	0	0	0	0	Sitting
19	1	0	0	0	0	Sitting
20	0	0	0	0	0	Sitting
21	1	0	0	0	0	Sitting
22	0	0	0	0	0	Sitting
23	0	0	0	0	0	Sitting
24	0	0	0	0	0	Sitting
25	0	0	0	0	0	Sitting
26	1	0	0	0	0	Sitting
27	3	0	0	0	0	Standing
28	0	0	0	0	0	Sitting
29	0	0	0	0	0	Sitting
30	1	0	0	0	0	Sitting
31	0	0	0	0	0	Sitting
32	0	0	0	0	0	Sitting
33	3	1	0	0	0	Standing
34	1	0	0	0	0	Sitting

Summer						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	3	2	1	0	0	Walking
36	0	0	0	0	0	Sitting
37	0	0	0	0	0	Sitting
38	1	0	0	0	0	Sitting
39	3	0	0	0	0	Standing
40	1	0	0	0	0	Sitting
41	1	0	0	0	0	Sitting
42	0	0	0	0	0	Sitting
43	1	0	0	0	0	Sitting
44	0	0	0	0	0	Sitting
45	0	0	0	0	0	Sitting
46	4	2	0	0	0	Walking
47	1	0	0	0	0	Sitting
48	8	2	0	0	0	Walking
49	5	1	0	0	0	Standing
50	3	0	0	0	0	Standing
51	4	1	0	0	0	Standing
52	0	0	0	0	0	Sitting
53	5	2	1	0	0	Walking
54	0	0	0	0	0	Sitting
55	0	0	0	0	0	Sitting
56	1	0	0	0	0	Sitting
57	5	2	1	0	0	Walking
58	1	0	0	0	0	Sitting
59	17	7	2	0	0	Uncomfortable
60	0	0	0	0	0	Sitting
61	10	4	1	0	0	Walking
62	5	1	0	0	0	Standing
63	0	0	0	0	0	Sitting
64	0	0	0	0	0	Sitting
65	2	1	0	0	0	Standing
66	11	3	0	0	0	Walking
67	3	1	0	0	0	Standing
68	0	0	0	0	0	Sitting

Summer						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
69	0	0	0	0	0	Sitting
70	0	0	0	0	0	Sitting
71	4	1	0	0	0	Standing
72	1	0	0	0	0	Sitting
73	1	0	0	0	0	Sitting
74	0	0	0	0	0	Sitting
75	3	1	0	0	0	Standing
76	0	0	0	0	0	Sitting
77	3	0	0	0	0	Standing
78	0	0	0	0	0	Sitting
79	0	0	0	0	0	Sitting
80	0	0	0	0	0	Sitting
81	0	0	0	0	0	Sitting
82	0	0	0	0	0	Sitting
83	1	0	0	0	0	Sitting
84	7	2	0	0	0	Walking
85	0	0	0	0	0	Sitting
86	8	3	0	0	0	Walking
87	11	5	1	0	0	Walking
88	18	8	2	0	1	Uncomfortable
89	4	2	1	0	0	Walking
90	1	0	0	0	0	Sitting

Autumn						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	7	2	0	0	0	Walking
2	2	1	0	0	0	Standing
3	3	1	0	0	0	Standing
4	3	1	0	0	0	Standing
5	10	4	2	0	1	Uncomfortable
6	1	0	0	0	0	Sitting
7	5	1	0	0	0	Standing
8	0	0	0	0	0	Sitting
9	5	1	0	0	0	Standing
10	8	2	0	0	0	Walking
11	9	3	1	0	0	Walking
12	1	0	0	0	0	Sitting
13	11	5	1	0	0	Walking
14	7	2	0	0	0	Walking
15	17	7	2	0	1	Uncomfortable
16	3	1	0	0	0	Standing
17	5	1	0	0	0	Standing
18	2	1	0	0	0	Standing
19	2	1	0	0	0	Standing
20	1	0	0	0	0	Sitting
21	3	1	0	0	0	Standing
22	1	0	0	0	0	Sitting
23	1	0	0	0	0	Sitting
24	1	0	0	0	0	Sitting
25	1	0	0	0	0	Sitting
26	2	1	0	0	0	Standing
27	5	1	0	0	0	Standing
28	2	1	0	0	0	Standing
29	1	0	0	0	0	Sitting
30	3	1	0	0	0	Standing
31	1	0	0	0	0	Sitting
32	1	0	0	0	0	Sitting
33	8	2	0	0	0	Walking
34	4	1	0	0	0	Standing

Autumn						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	7	3	2	0	1	Uncomfortable
36	1	0	0	0	0	Sitting
37	0	0	0	0	0	Sitting
38	2	0	0	0	0	Standing
39	7	2	0	0	0	Walking
40	2	0	0	0	0	Standing
41	3	1	0	0	0	Standing
42	1	0	0	0	0	Sitting
43	3	1	0	0	0	Standing
44	0	0	0	0	0	Sitting
45	1	0	0	0	0	Sitting
46	8	3	1	0	1	Walking
47	2	1	0	0	0	Standing
48	13	5	1	0	0	Walking
49	10	4	1	0	1	Walking
50	5	1	0	0	0	Standing
51	7	2	1	0	0	Walking
52	1	0	0	0	0	Sitting
53	8	4	2	0	1	Uncomfortable
54	1	0	0	0	0	Sitting
55	0	0	0	0	0	Sitting
56	2	0	0	0	0	Standing
57	10	4	2	0	1	Uncomfortable
58	3	0	0	0	0	Standing
59	20	10	4	1	2	Uncomfortable
60	1	0	0	0	0	Sitting
61	17	8	3	0	1	Uncomfortable
62	13	4	1	0	0	Walking
63	1	0	0	0	0	Sitting
64	1	0	0	0	0	Sitting
65	4	2	1	0	1	Walking
66	14	7	2	0	1	Uncomfortable
67	5	3	1	0	1	Walking
68	1	0	0	0	0	Sitting

Autumn						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
69	1	0	0	0	0	Sitting
70	1	0	0	0	0	Sitting
71	10	4	1	0	0	Walking
72	2	0	0	0	0	Standing
73	4	1	0	0	0	Standing
74	0	0	0	0	0	Sitting
75	5	2	1	0	1	Walking
76	2	1	0	0	0	Standing
77	9	2	0	0	0	Walking
78	0	0	0	0	0	Sitting
79	1	0	0	0	0	Sitting
80	0	0	0	0	0	Sitting
81	0	0	0	0	0	Sitting
82	1	0	0	0	0	Sitting
83	4	1	0	0	0	Standing
84	10	5	1	0	1	Walking
85	0	0	0	0	0	Sitting
86	11	5	1	0	1	Walking
87	21	11	4	0	2	Uncomfortable
88	22	12	5	1	3	Uncomfortable
89	6	4	2	0	1	Uncomfortable
90	2	1	0	0	0	Standing

Winter						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
1	12	4	1	0	1	Walking
2	3	1	0	0	0	Standing
3	4	2	1	0	0	Walking
4	4	2	1	0	0	Walking
5	14	6	2	1	1	Uncomfortable
6	2	0	0	0	0	Standing
7	9	2	0	0	0	Walking
8	0	0	0	0	0	Sitting
9	9	2	0	0	0	Walking
10	12	4	0	0	0	Walking
11	12	5	1	0	1	Walking
12	2	0	0	0	0	Standing
13	14	6	2	0	1	Uncomfortable
14	10	3	1	0	0	Walking
15	21	9	3	0	1	Uncomfortable
16	4	1	0	0	0	Standing
17	6	2	0	0	0	Walking
18	3	1	0	0	0	Standing
19	3	1	0	0	0	Standing
20	1	0	0	0	0	Sitting
21	5	1	0	0	0	Standing
22	1	0	0	0	0	Sitting
23	1	0	0	0	0	Sitting
24	1	0	0	0	0	Sitting
25	1	1	0	0	0	Sitting
26	3	1	0	0	0	Standing
27	6	2	0	0	0	Walking
28	2	1	0	0	0	Standing
29	1	0	0	0	0	Sitting
30	5	1	0	0	0	Standing
31	1	0	0	0	0	Sitting
32	2	0	0	0	0	Standing
33	14	5	1	0	0	Walking
34	6	2	0	0	0	Walking

Winter						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
35	8	4	2	1	1	Uncomfortable
36	2	0	0	0	0	Standing
37	1	0	0	0	0	Sitting
38	3	1	0	0	0	Standing
39	12	3	0	0	0	Walking
40	2	1	0	0	0	Standing
41	5	1	0	0	0	Standing
42	1	0	0	0	0	Sitting
43	4	1	0	0	0	Standing
44	0	0	0	0	0	Sitting
45	1	0	0	0	0	Sitting
46	11	4	2	0	1	Uncomfortable
47	3	1	0	0	0	Standing
48	17	7	2	0	1	Uncomfortable
49	14	7	2	0	2	Uncomfortable
50	6	2	0	0	0	Walking
51	10	3	1	0	1	Walking
52	1	0	0	0	0	Sitting
53	10	5	2	1	1	Uncomfortable
54	2	0	0	0	0	Standing
55	1	0	0	0	0	Sitting
56	3	0	0	0	0	Standing
57	14	6	3	1	2	Uncomfortable
58	5	1	0	0	0	Standing
59	23	13	5	1	3	Uncomfortable
60	2	0	0	0	0	Standing
61	24	12	4	1	2	Uncomfortable
62	20	8	1	0	1	Walking
63	2	0	0	0	0	Standing
64	2	0	0	0	0	Standing
65	4	2	1	0	1	Walking
66	17	9	3	0	1	Uncomfortable
67	5	3	2	0	1	Uncomfortable
68	2	0	0	0	0	Standing

Winter						
SENSOR	WIND SPEED RANGE (km/h)					COMFORTABLE ACTIVITIES
	Mean				Gust	
	> 12	> 15	> 19	>27	> 31	
69	1	0	0	0	0	Sitting
70	2	0	0	0	0	Standing
71	14	6	1	0	1	Walking
72	3	1	0	0	0	Standing
73	7	2	0	0	0	Walking
74	0	0	0	0	0	Sitting
75	6	3	1	0	1	Walking
76	3	1	0	0	0	Standing
77	14	5	1	0	0	Walking
78	1	0	0	0	0	Sitting
79	2	0	0	0	0	Standing
80	1	0	0	0	0	Sitting
81	1	0	0	0	0	Sitting
82	1	0	0	0	0	Sitting
83	6	2	0	0	0	Walking
84	14	7	3	0	1	Uncomfortable
85	0	0	0	0	0	Sitting
86	13	7	2	0	1	Uncomfortable
87	29	17	7	1	4	Uncomfortable
88	23	14	6	1	4	Uncomfortable
89	7	4	2	1	2	Uncomfortable
90	3	1	0	0	1	Standing

Appendix D

Air Quality Appendix

AIR QUALITY APPENDIX

Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 3.5 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale air quality analysis.

Motor Vehicle Emissions

The EPA MOBILE6.2 computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2013 and 2018 for speed limits of 2.5, 10, 15, and 30 mph for use in the microscale analyses. The 10 mph rate was used to estimate parking garage emissions.

CAL3QHC

For the intersections studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOBILE6.2. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness (z_0) of 321 cm was used for all intersections. Idle emission rates for queue links were based on 2.5 mph emission rates derived in MOBILE6.2 and converted from grams per mile to grams per hour. Emission rates for speeds of 10, 15, and 30 mph were used for right turn, left turn, and free flow links, respectively.

Graybar 345 Harrison Ave. - Boston, MA
Calculation of Microscale Modeling Emission Factors
Summary of MOBILE6 Output

Carbon Monoxide Only

Queues	Idle
Free Flow	30 mph
Right Turns	10 mph
Left Turns	15 mph

Winter	2013	2018	Units
Idle	46.840	42.335	g/hr
2.5 mph	18.736	16.934	g/mile
10 mph	10.195	9.284	g/mile
15 mph	9.193	8.380	g/mile
30 mph	8.237	7.521	g/mile

Note: Winter CO emission factors are higher than Summer and are conservatively used

Graybar	2012 Existing AM Peak			2012 Existing PM Peak		
Intersections (Signalized and *Unsignalized*)	LOS	Delay (Sec)	Traffic Volume	LOS	Delay (Sec)	Traffic Volume
1: East Berkeley Street & Washington Street	C	32.7	1577	C	31.4	1574
2: Traveler Street & Washington Street	A	1.8	612	A	1.2	571
4: Herald Street & Washington Street	C	20.0	1571	F	>80	2051
5: East Berkeley Street & Harrison Avenue	C	30.8	1969	C	33.6	1836
6: Traveler Street & Harrison Avenue	C	23.0	887	C	23.3	1011
8: Herald Street & Harrison Avenue	C	21.7	1169	E	66.1	1938
9: East Berkeley Street & Albany Street	C	26.7	2215	B	16.4	1948
10: East Berkeley Street & Frontage Road	F	>80	2664	F	>80	2413
11: Traveler Street & Albany Street	B	14.3	1790	C	21.8	2403
12: Traveler Street & Frontage Road	F	>80	2835	C	27.6	3146
13: Herald Street & Albany Street a.m. Peak Hour	B	21.1	2173	F	>80	3020

LOS is HCM value for signalized intersections and ICU value for unsignalized intersections.
Color Code:
Red = Signalized intersections at LOS D or worse.
Green = Top 3 signalized intersections based on volume.

Graybar

Intersections (Signalized and *Unsignalized*)	2022 No Build AM Peak LOS	Delay (Sec)	Traffic Volume	2022 No Build PM Peak LOS	Delay (Sec)	Traffic Volume
1: East Berkeley Street & Washington Street	C	26.7	1727	C	30.3	1713
2: Traveler Street & Washington Street	A	1.8	665	A	1.2	633
4: Herald Street & Washington Street	C	20.6	1681	F	>80	2239
5: East Berkeley Street & Harrison Avenue	D	47.3	2225	D	42.3	2112
6: Traveler Street & Harrison Avenue	C	27.0	1079	C	31.5	1315
8: Herald Street & Harrison Avenue	B	18.3	896	F	>80	2133
9: East Berkeley Street & Albany Street	D	50.2	2490	C	22.6	2208
10: East Berkeley Street & Frontage Road	F	>80	2747	F	>80	2595
11: Traveler Street & Albany Street	C	23.6	2167	F	>80	2925
12: Traveler Street & Frontage Road	F	>80	3068	D	41.0	3457
13: Herald Street & Albany Street a.m. Peak Hour	C	21.9	2398	F	>80	3375

LOS is HCM value for signalized intersections and ICU value for unsignalized intersections.
Color Code:
Red = Signalized intersections at LOS D or worse.
Green = Top 3 signalized intersections based on volume.

Graybar

Intersections (Signalized and *Unsignalized*)	2022 Build AM Peak LOS	Delay (Sec)	Traffic Volume	No-Build to Build Volume % Increase	2022 Build PM Peak LOS	Delay (Sec)	Traffic Volume	No-Build to Build Volume % Increase
1: East Berkeley Street & Washington Street	C	26.1	1739	1%	C	30.3	1719	0%
2: Traveler Street & Washington Street	A	1.8	665	0%	A	1.2	633	0%
4: Herald Street & Washington Street	C	20.7	1694	1%	F	>80	2265	1%
5: East Berkeley Street & Harrison Avenue	D	47.5	2243	1%	D	43.5	2136	1%
6: Traveler Street & Harrison Avenue	D	36.7	1151	5%	D	37.7	1403	7%
8: Herald Street & Harrison Avenue	B	18.3	899	0%	F	>80	2161	1%
9: East Berkeley Street & Albany Street	D	50.5	2514	1%	C	23.0	2237	1%
10: East Berkeley Street & Frontage Road	F	>80	2748	0%	F	>80	2607	0%
11: Traveler Street & Albany Street	C	24.5	2220	2%	F	>80	2988	2%
12: Traveler Street & Frontage Road	F	>80	3094	1%	D	42.5	3472	0%
13: Herald Street & Albany Street a.m. Peak Hour	C	22.0	2402	0%	F	>80	3410	1%

LOS is HCM value for signalized intersections and ICU value for unsignalized intersections.
Color Code:
Red = Signalized intersections at LOS D or worse.
Green = Top 3 signalized intersections based on volume.

Graybar

Intersections (Signalized)	2012 Existing AM Peak			2012 Existing PM Peak		
	LOS RANK	COMB. RANK	Traffic Volume RANK	LOS RANK	COMB. RANK	Traffic Volume RANK
1: East Berkeley Street & Washington Street	3	10	7	5	14	9
2: Traveler Street & Washington Street	11	22	11	11	22	11
4: Herald Street & Washington Street	3	11	8	1	6	5
5: East Berkeley Street & Harrison Avenue	3	8	5	5	13	8
6: Traveler Street & Harrison Avenue	3	13	10	5	15	10
8: Herald Street & Harrison Avenue	3	12	9	4	11	7
9: East Berkeley Street & Albany Street	3	6	3	10	16	6
10: East Berkeley Street & Frontage Road	1	3	2	1	4	3
11: Traveler Street & Albany Street	9	15	6	5	9	4
12: Traveler Street & Frontage Road	1	2	1	5	6	1
13: Herald Street & Albany Street a.m. Peak Hour	9	13	4	1	3	2

Graybar

Intersections (Signalized)	2022 No Action AM Peak LOS RANK	2022 No Action AM Peak COMB. RANK	2022 No Action AM Peak Traffic Volume RANK	2022 No Action PM Peak LOS RANK	2022 No Action PM Peak COMB. RANK	2022 No Action PM Peak Traffic Volume RANK
1: East Berkeley Street & Washington Street	5	12	7	8	17	9
2: Traveler Street & Washington Street	11	22	11	11	22	11
4: Herald Street & Washington Street	5	13	8	1	6	5
5: East Berkeley Street & Harrison Avenue	3	8	5	6	14	8
6: Traveler Street & Harrison Avenue	5	14	9	8	18	10
8: Herald Street & Harrison Avenue	10	20	10	1	8	7
9: East Berkeley Street & Albany Street	3	6	3	8	14	6
10: East Berkeley Street & Frontage Road	1	3	2	1	5	4
11: Traveler Street & Albany Street	5	11	6	1	4	3
12: Traveler Street & Frontage Road	1	2	1	6	7	1
13: Herald Street & Albany Street a.m. Peak Hour	5	9	4	1	3	2

Graybar

Intersections (Signalized)	2022 Build AM Peak			2022 Build PM Peak		
	LOS RANK	COMB. RANK	Traffic Volume RANK	LOS RANK	COMB. RANK	Traffic Volume RANK
1: East Berkeley Street & Washington Street	6	13	7	9	18	9
2: Traveler Street & Washington Street	11	22	11	11	22	11
4: Herald Street & Washington Street	6	14	8	1	6	5
5: East Berkeley Street & Harrison Avenue	3	8	5	6	14	8
6: Traveler Street & Harrison Avenue	3	12	9	6	16	10
8: Herald Street & Harrison Avenue	10	20	10	1	8	7
9: East Berkeley Street & Albany Street	3	6	3	9	15	6
10: East Berkeley Street & Frontage Road	1	3	2	1	5	4
11: Traveler Street & Albany Street	6	12	6	1	4	3
12: Traveler Street & Frontage Road	1	2	1	6	7	1
13: Herald Street & Albany Street a.m. Peak Hour	6	10	4	1	3	2

Graybar

Intersections (Signalized)	All Modeled Cases Worst 3 By LOS	All Modeled Cases Worst 3 By ADT	All Modeled Cases Overall
1: East Berkeley Street & Washington Stree	36	84	48
2: Traveler Street & Washington Street	66	132	66
4: Herald Street & Washington Street	17	56	39
5: East Berkeley Street & Harrison Avenue	26	65	39
6: Traveler Street & Harrison Avenue	30	88	58
8: Herald Street & Harrison Avenue	29	79	50
9: East Berkeley Street & Albany Street	36	63	27
10: East Berkeley Street & Frontage Roac	6	23	17
11: Traveler Street & Albany Street	27	55	28
12: Traveler Street & Frontage Road	20	26	6
13: Herald Street & Albany Street a.m. Peak Hour	23	41	18

Graybar 345 Harrison Ave - Boston, MA
Background Concentrations

Background Concentrations								
POLLUTANT	AVERAGING TIME	2010	2011	2012	Units	ppb or ppm to $\mu g/m^3$ Conversion Factor	Background Concentration ($\mu g/m^3$)	Location
SO_2 (1)(7)(8)	1-Hour	24.3	35.9	21.3	ppb	2.6	93.3	Harrison Ave., Boston
	3-Hour	24	21	28	ppb	2.6	72.8	Harrison Ave., Boston
	24-Hour	8.8	12.9	7.9	ppb	2.6	33.5	Harrison Ave., Boston
	Annual	1.6	1.26	1.12	ppb	2.6	4.2	Harrison Ave., Boston
PM-10	24-Hour	50	42	72	$\mu g/m^3$	1	72.0	Harrison Ave., Boston
	Annual	14.1	14.8	14.1	$\mu g/m^3$	1	14.8	Harrison Ave., Boston
PM-2.5	24-Hour (4)	22.5	20.9	20.6	$\mu g/m^3$	1	21.3	Harrison Ave., Boston
	Annual (5)	8.25	8.48	8.27	$\mu g/m^3$	1	8.3	Harrison Ave., Boston
NO_2 (3)	1-Hour (6)	62	74	67	ppb	1.88	139.1	Harrison Ave., Boston
	Annual	17.05	18.49	15.8	ppb	1.88	34.8	Harrison Ave., Boston
CO (2)	1-Hour	2.9	2.5	2.3	ppm	1140	3306	Harrison Ave., Boston
	8-Hour	2.1	1.9	1.9	ppm	1140	2394	Harrison Ave., Boston

Notes: From 2007-2011 MA DEP Annual Data Summaries

[1] SO_2 reported in ppm or ppb. Converted to $\mu g/m^3$ using factor of 1 ppb = 2.6 $\mu g/m^3$.

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

[3] NO_2 reported in ppm or ppb. Converted to $\mu g/m^3$ using factor of 1 ppb = 1.88 $\mu g/m^3$.

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

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

[6] Maximum annual 1-hr concentrations.

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

[8] The 2010 - 2012 SO_2 3-hr value is not reported. Years 2007-2009 used instead.

Due to excessive size CAL3QHC, and MOBILE6.2 input and output files are available on digital media upon request.

Appendix E

Climate Change Preparedness Questionnaire

Boston Climate Change Preparedness Questionnaire - New Construction

2. Project Information

1. Project Name and Location

Project Name : Graybar
Project Address : 345 Harrison Avenue

2. Project Contact:

Name : Ogden Hunnewell
Title : Executive Vice President
Company : Nordblom Company
Email Address : tmoked@epsilonassociates.com
Phone Number : (781) 272-4000

3. Project Contact:

Name : Ogden Hunnewell
Title : Executive Vice President
Company : Nordblom Company
Email Address : tmoked@epsilonassociates.com
Phone Number : (781) 272-4000

4. Team Description:

Owner / Developer : F8345 Harrison Owner LLC
Architect : CBT Architects
Engineer (building systems) : RW Sullivan
Sustainability / LEED : CBT Architects
Permitting : Epsilon Associates, Inc.
Construction Management : John Moriarty and Associates

3. New Page

5. Is this project a:

Single building

6. At what phase is this project?

PNF Submitted

4. Phased, multi-building project

Project Identification

5. Single building project

7. Project Identification:

Project Name : Graybar
Primary Project Address : 345 Harrison Avenue

6. Master Plan

Project Identification

7. Institutional Master Plan

Project Identification

8. Building Classification and Description

8. Building Uses - check all appropriate uses:

Retail
Residential - Multi-unit, Four plus

9. Building First Floor Uses - list all:

Retail

10. Construction Type – select most appropriate type:

Steel Frame

11. Building Size: do not include commas

Site Area (Square Feet) : 2 Acres
Building Area (Square Feet) : 569,400
Building Height (Feet) : 150
Number of Stories (Floors) : 14
First Floor Elevation (feet above sea level)(Boston City Base Elev.)(Ft.) : 10
Number of below grade levels : 1

9. Green Building

12. Which LEED Rating System(s) has or will your project use (by area for projects using multiple rating systems):

	Rating System
Primary Use	LEED 2009 for New Construction
Secondary Use	
Additional Uses	

13. What are the projected LEED Rating System Outcome(s):

	Rating System
Primary Use	Certified
Secondary Use	
Additional Uses	

14. Is or will the Project Register with the US Green Building Council

No

15. Is or will the Project Seek US Green Building Council Certification:

No

10. Higher Temperatures and Heat Waves - Analysis and General Strategies

16. Analysis Sources:

17. What time span of Climate Change was considered:

None

18. Analysis Conditions:

What Low Temperature will be used for project planning (degrees) : 7
What High Temperature will be used for project planning (degrees) : 87.6

19. What Extreme Heat Event characteristics will be used for project planning:

Peak High (degrees) : 91
Duration (days) : 1% of the time

20. What measures will the project employ to reduce urban heat-island effect:

High reflective paving materials
Shade trees
High reflective roof materials
Vegetated roof materials

21. Will the project be able to manage hotter and more humid summers without increasing its electrical load; if so how?

No

22. Will the building remain operable without utility power for an extended period; if so for how long and by what strategies?

If Yes, for how long (days) and describe strategies: 4 days using a generator

11. High Temperatures and Heat Waves - Active and Passive Strategies

23. What will be the overall energy performance of the project or building (percentage above code)

20%

24. How will project energy performance be determined

Whole Building Energy Model

25. What specific measures will the project employ to reduce building energy consumption

High performance lighting
Automatic lighting controls
High performance HVAC equipment
Energy recovery ventilation
Describe any added measures: Operable windows

26. What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure

None

27. Will the project employ Smart Grid Infrastructure and / or Systems

No

28. Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure

Operable windows (including emergency only)

29. List the R values for building envelope elements:

12. Sea-Level Rise and Storms – location analysis and description

30. Location Description:

Site Elevation - low point (feet above sea level)(Boston City Base Elev.)(Ft.) : 12

31. Location Classification - is the site or building located in any of the following:

	Yes	No
Coastal Zone		X
Velocity Zone		X
Flood Zone		X
Area Prone to Flooding		X

32. Are updates in the floodplain delineation due to climate change likely to change the classification of the site or building location:

No

33. What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding (horizontal distance in feet)

900 ft

13. Sea-Level Rise and Storms – analysis and general strategies

Analysis Sources:

What time span of Climate Change and Rising Sea-Levels was considered:

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

14. Sea-Level Rise and Storms - Building Flood Proofing

Will the building remain occupiable without utility power during a period of extended inundation:

Will the proposed ground floor be raised in response to Sea Level Rise:

Will the proposed ground floor be raised in response to Sea Level Rise:

Will lower building levels be constructed in a manner to prevent water penetration:

Describe measures and strategies intended to ensure the integrity of critical building systems during a flood or severe storm event:

Were the differing effects of fresh water and salt water flooding considered:

Will the project site and building(s) be accessible during periods of inundation or limited circulation and / or access to transportation:

Describe any additional Building Floor Proofing strategies?

15. Sea-Level Rise and Storms - Building Resiliency and Adaptability

Will the building be able to withstand severe storm impacts and endure temporary inundation

Will the building include additional structural capacity and or building systems to accommodate future on-site renewable and or clean energy sources; if so what:

Can the site and building be reasonably modified to increase Building Flood Proofing; if so how:

Describe any additional Building Resiliency and Adaptability strategies: