PUBLIC NOTICE

The Boston Redevelopment Authority ("BRA"), d/b/a the Boston Planning and Development Agency ("BPDA"), pursuant to Section 80A-2 of the Boston Zoning Code ("Code"), hereby gives notice that an Expanded Project Notification Form ("PNF") for Large Project Review was received by the BPDA on July 30, 2019, from 566 Columbus LLC, an affiliate of New Boston Ventures LLC (the "Proponent"), for the 566 Columbus Avenue project (the "Proposed Project"), to be constructed on the approximately 23,000 square foot site (the Project site), located on the southwestern corner of the Columbus Avenue and Massachusetts Avenue intersection in the South End neighborhood of Boston (the "Project Site").

The Proposed Project will redevelop the Project Site with a new, six-story vibrant mixed-use commercial and residential building. The Proposed Project will feature a community-oriented ground floor with approximately 5,000 sf of commercial space, including a social enterprise café with outdoor seating, an art exhibit gallery open to the public, and new, improved and modern community space for the United South End Settlements. By purchasing the Project Site from the United South End Settlements ("USES"), the current owner, the Proponent will help secure USES' financial future. The Proposed Project will contain 66 residential homeownership units, 11 of which will be artist live/work spaces, and 42 below-grade parking spaces.

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

The PNF may be obtained from the BPDA website – www.bostonplans.org – or may be reviewed in the Office of the Secretary of the BPDA, Room 910, Boston City Hall, 9th Floor, Boston MA 02201, between 9:00 AM and 5:00 PM, Monday through Friday, except legal holidays. Public comments on the Expanded PNF, including the comments of public agencies, should be submitted in writing to Ebony Darosa, BPDA, at the address stated above, or via email at ebony.darosa@boston.gov, within thirty (30) days of the publication of this notice.

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

Teresa Polhemus
Executive Director/Secretary

EXPANDED PROJECT NOTIFICATION FORM

566 Columbus Avenue

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

Submitted by:
New Boston Ventures
540 Tremont Street, Suite 8
Boston, MA 02116

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

In Association with:
Boston Innovations Land LLC
J. Garland Enterprises LLC
Bargmann Hendrie + Archetype, Inc.
Exclusive Real Estate
Bevco
Jovita Fontanez
Joyce Ferriabough Bolling
Carol R. Johnson Associates, Inc.
McDermott, Quilty & Miller LLP
Howard Stein Hudson
Nitsch Engineering
Wozny/Barbar & Associates, Inc.
McPhail Associates, LLC

July 30, 2019

Epsilon
ASSOCIATES INC.

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July 30, 2019

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Chapter 1.0

Introduction/Project Description

1.0 INTRODUCTION/PROJECT DESCRIPTION

1.1 Introduction

566 Columbus LLC, an affiliate of New Boston Ventures LLC (the "Proponent"), proposes to redevelop an approximately 23,000 square foot property site at 566 Columbus Avenue in the South End neighborhood of Boston (the "Project Site"). By purchasing the Project Site from the United South End Settlements ("USES"), the current owner, the Proponent will help secure USES' financial future. This will further its historic mission by enabling USES to revitalize its other campus at 48 Rutland Street, one of its long time homes, and offer even more vital programs and services to hundreds of families and children – over 80% from communities of color, 70% low income – that it currently serves. These programs include early education, after-school, job training, individualized coaching and its Camp Hale summer camp.

The Project Site, located at the prominent intersection of Massachusetts Avenue and Columbus Avenue, will be redeveloped with a new six-story, approximately 89,700 square foot, 66-unit residential building, including 17% affordable home ownership units, with ground floor commercial space (the "Project"). More than 50% of the commercial space on the ground floor will be allocated to non-profits at an affordable rent, including an approximately 2,300 sf space donated to USES for a community meeting space and the Harriet Tubman gallery. Other ground floor uses will include a social enterprise café with outdoor seating to be named The Hi-Hat in honor of the famed jazz club that once occupied that corner, and an exhibit gallery open to the public. The ground floor and second floor will also include artist live/work units. It is anticipated that the Project will not require relief under the City of Boston Zoning Code (the "Zoning Code") other than an administrative Conditional Use Permit pursuant to Article 32, due to the Project Site's location within the Groundwater Conservation Overlay District.

The ground floor commercial uses will introduce transparency to the Project site and will activate the pedestrian experience at this corner. Streetscape features including street trees, light poles, trash/recycling receptacles, public bike racks and benches will be incorporated and/or enhanced as part of the Project's associated public realm improvements. A "pocket garden" is proposed to line the edge of the Project site along West Springfield Street. The Project's scale, massing and architectural treatment will complement and reinforce the character of the South End neighborhood. In addition to these public realm benefits, the Project will provide new housing, new affordable housing opportunities that exceed the City Inclusionary Development Policy ("IDP") requirements, affordable non-profit commercial space, and new construction and permanent jobs. The Proponent is also committed to assisting existing tenants with relocation and four of the six tenants have already signed new leases, contributing to community organizations, and engaging both MBE-owned and WBE-owned businesses. A significant percentage of investors in the Project will come from communities and individuals of color; over $1 million has already been raised from that source.

This Expanded Project Notification Form ("PNF") is being submitted to the Boston Redevelopment Authority ("BRA"), doing business as the Boston Planning and Development Agency ("BPDA"), to initiate review of the Project under Article 80B of the Boston Zoning Code, Large Project Review. The PNF offers a description of the Project, its minimal impacts and proposed mitigation strategies, and its substantial benefits to the City of Boston.

1.2 Project Identification

Address/Location:	566 Columbus Avenue
Developer:	566 Columbus LLC, an affiliate of New Boston Ventures LLC 540 Tremont Street, Suite 8 Boston, MA 02116 (617) 542-5300 Dennis Kanin David Goldman
Development Consultant:	Boston Innovations Land LLC 2164 Washington Street Roxbury, MA 02119 Richard Taylor
Architect:	J. Garland Enterprises LLC One Marina Park Drive, Suite 1410 Boston, MA 02210 (617) 851-1158 Jonathan Garland Bargmann Hendrie + Archetype, Inc. 9 Channel Center, Suite 300 Boston, MA 02210 (617) 350-0450 Joel Bargmann Kevin Triplett
Community Outreach:	Exclusive Real Estate 10 Derne Street Boston, MA 02114 (617) 263-1157 Harry Collings Jay Walsh

Article 80 Coordination & Management	Bevco 202 West Selden Street Boston, MA 02126 (617) 438-2767 Beverley Johnson
Community Liaison:	Jovita Fontanez 32 Dartmouth Street, #2 Boston, MA 02116 (617) 267-1193
Communications Consultant:	Joyce Ferriabough Bolling 564 Harold Street Roxbury, MA 02119
Landscape Architect:	Carol R. Johnson Associates, Inc. 21 Custom House Street, 3rd Floor Boston, MA 02110 (617) 896-2500 John N. Amodeo
Legal Counsel:	McDermott, Quilty & Miller LLP 28 State Street, Suite 802 Boston, MA 02109 (617) 946-4600 Joseph Hanley, Esq. Nicholas Zozula, Esq.
Permitting Consultants:	Epsilon Associates, Inc. 3 Clock Tower Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Cindy Schlessinger Talya Moked
Transportation and Parking Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Thomas Tinlin Ian McKinnon

Civil Engineer:	Nitsch Engineering 2 Center Plaza, Suite 430 Boston, MA 02108 (617) 338-0063 Deborah Danik
MEP/FP Engineer:	Wozny/Barbar & Associates, Inc. 1076 Washington Street Hanover, MA 02339 (781) 826-4144 Zbigniew Wozny
Geotechnical Consultant:	McPhail Associates, LLC 2269 Massachusetts Avenue Cambridge, MA 02140 (617) 868-1420 Scott Smith

1.3 Project Description

1.3.1 Project Site

The Project Site is an approximately 23,000 square foot lot that is bounded by Massachusetts Avenue to the west, Columbus Avenue to the north, West Springfield Street to the east, and four-story brick rowhouses at 220 West Springfield Street and 460 Massachusetts Avenue to the south. See Figure 1-1 for an aerial locus map. The Project Site includes an existing, three story building known as the Harriet Tubman House, which was built for USES in 1975 and which currently occupies the building. The front exterior of the existing building contains a mural painted by local artist Jameel Parker, which the Proponent will assist with reproduction or relocation.

The history of USES begins in 1891 with the establishment of the first settlement house in Boston. Additional settlement houses were soon founded in the South End, and these houses worked to improve housing and public health conditions, provided day care programs and other recreational and educational programs for children, and training programs for adults, among other social service activities. USES continues to strive for its founding vision, an inclusive community where neighbors from all walks of life work together so that all can thrive, while implementing a bold, new model designed to promote economic mobility and social capital to break the generational cycle of poverty. The sale of the Project Site will ensure their ability to continue carrying out this mission.

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

566 Columbus Avenue Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1-1
Aerial Locus Map

1.3.2 Area Context

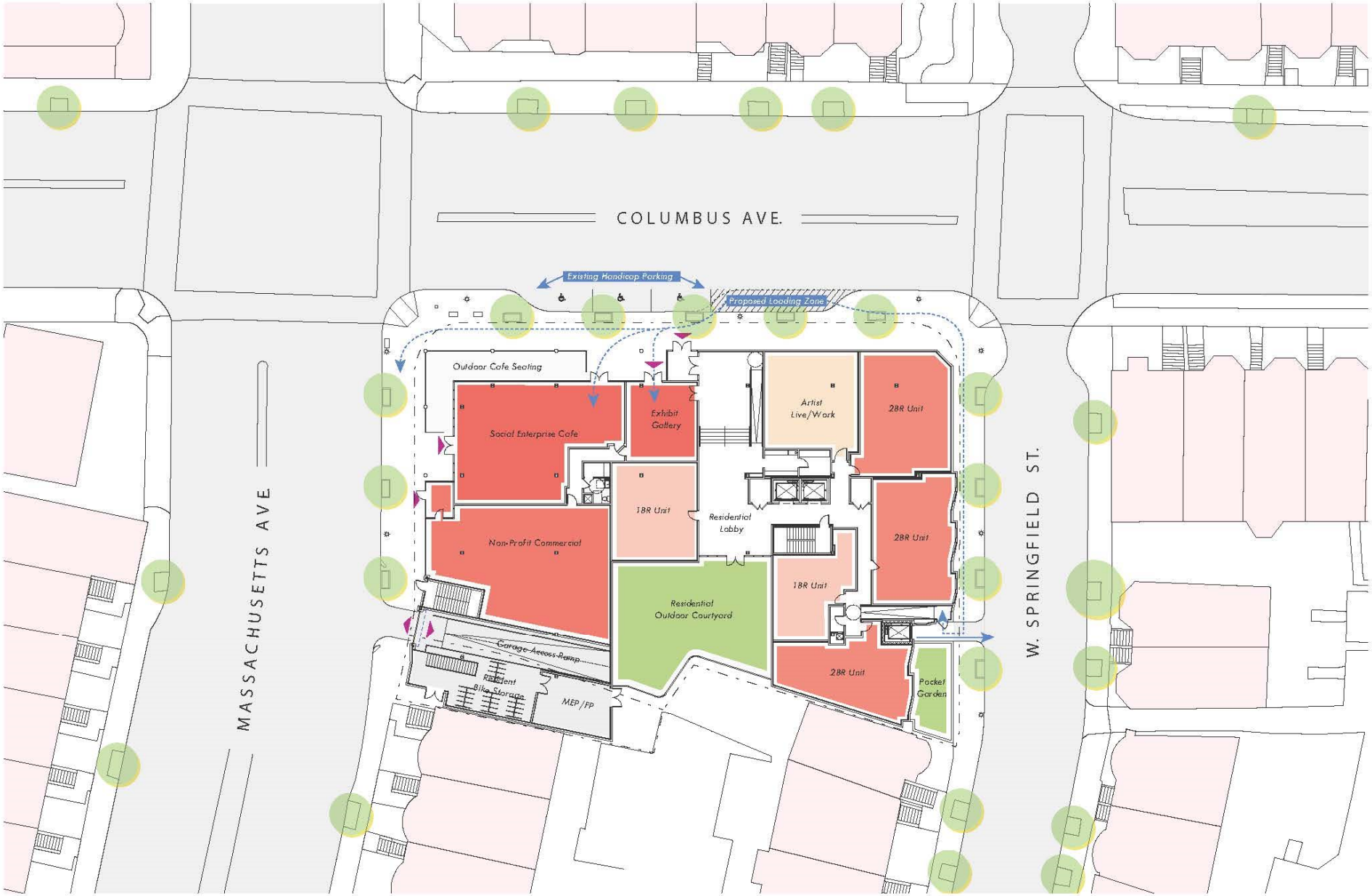
The Project Site is located within the South End Landmarks District. The area surrounding the Project Site contains a mix of three to six-story residential buildings with ground floor commercial space along Columbus Avenue and Massachusetts Avenue. The Project Site provides access to several public transit options including an MBTA bus stop adjacent to the site at the corner of Columbus and Massachusetts avenues. The Project Site is also an approximately three-minute walk from the MBTA Orange Line Massachusetts Avenue station and an approximately five-minute walk from the MBTA Green Line "E" Branch at Symphony Station.

1.3.3 Proposed Project

The Project Site will be redeveloped with an approximately 89,700 square foot vibrant mixed-use commercial and residential building. The new six-story building will be U-shaped, and will feature a community-oriented ground floor with approximately 5,000 sf of commercial space, including a social enterprise café with outdoor seating, an art exhibit gallery open to the public, and new, improved and modern community space for USES. The first two floors of the building will contain 11 affordable artist live/work spaces, providing convenient public access. The upper floors will include approximately 55 residential units with a mix of one, two, and three-bedroom homeownership units, for a total of 66 residential units in the building. Ample outdoor open space for the residents will be provided, with a shared courtyard at the ground level in the center of the "U", and elevated roof terraces and private balconies for each unit above the ground floor. The Project will include approximately 42 below-grade parking spaces. A ground floor plan is presented in Figure 1-2, and floor plans, elevations, and sections are provided in Appendix A.

The social enterprise café, to be officially named The Hi-Hat in honor of the famed jazz club that once occupied that corner, will be located at the corner of Columbus and Massachusetts avenues. The exhibit gallery will help to highlight the rich cultural heritage of the neighborhood. A "pocket garden" will line the edge of the Project Site along West Springfield Street, and will add a year-round visual amenity to the residential streetscape. The parking garage will be accessed via the existing curb cut off Massachusetts Avenue but will be scaled down substantially from its current configuration to provide additional public realm space along Massachusetts Avenue.

Streetscape features including street trees, light poles, trash/recycling receptacles, public bike racks and benches will be incorporated and/or enhanced as part of the Project's associated public realm improvements.



566 Columbus Avenue Boston, Massachusetts

Figure 1-2
Ground Floor Plan

1.4 Summary of Public Benefits

By purchasing the Project Site, the Proponent will enable the United South End Settlements to establish a new permanent home for the organization at its enlarged campus on Rutland Street and to continue to offer its wide array of vital services to the community. The Project will provide many other public benefits for the surrounding neighborhood and the City of Boston as a whole, both during construction, and on an ongoing basis upon its completion. These benefits include tenant relocation, contribution to neighborhood organizations, creation of new affordable housing and artist live/work housing, and others as described in Chapter 2.

Revitalization of United South End Settlements Rutland Street Campus - The revenue from the sale of 566 Columbus Avenue will support the revitalization of the 48 Rutland Street Campus, while also offering even more vital programs and services to hundreds of families and children. The new building at the expanded campus will be named the Harriet Tubman House.

Affordable Homeownership - The Proponent will set aside 17% of the affordable homeownership units, exceeding the City's 13% IDP requirement. A significant number of the affordable units will be set aside for live-work space for artists, like those who are displaced from the Piano Factory and other area locations.

Affordable Community Spaces - Includes an artist live-work gallery, an exhibition space and plaque to commemorate the rich multicultural history of the site, and 2,300 sf that will be donated back to USES for community gatherings and the Harriet Tubman Gallery.

Social Enterprise Café - An affordable social enterprise café that will be known as the Hi Hat after the famed jazz club that occupied the corner of Columbus and Massachusetts avenues prior to the construction of the current building.

Iconic Mural - New Boston will contribute generously to the relocation or reproduction of the mural.

Improved Street and Pedestrian Environment - A public plaza, improved sidewalks, and a "pocket park" are included in the Project.

Smart Growth/Transit-Oriented Development - The Project is consistent with smart-growth and transit-oriented development principles. The Project Site is well served by existing public transportation, including rapid transit and bus lines that provide easy access to the Project Site from the Greater Boston region.

1.5 City of Boston Zoning

1.5.1 Zoning Overview

The Project Site is located within the South End Neighborhood Zoning District's Community Commercial ("CC") and Multifamily Residential ("MFR") Subdistricts, with the larger 21,572 square foot parcel at 566 Columbus Avenue situated in the CC Subdistrict and the smaller 1,706 square foot parcel at 458 Massachusetts Avenue situated in the MFR Subdistrict. It is also further regulated as within the Groundwater Conservation Overlay ("GCOD"), Restricted Parking Overlay ("RPOD") and South End Landmark districts. Additionally, the Project Site is subject to City Ordinance 7.4-11 and the proposed Project requires Parks Design Review by the Boston Parks and Recreation Department due to the Project Site's proximity to the Wellington Green across Columbus Avenue and the Worcester Street Garden along Worcester Street.

While 42 off-street garage spaces are currently programmed to be in compliance with the Zoning Code requirements for off-street parking for the residential units, the final amount of off-street parking and loading will be reviewed and determined by the BPDA pursuant to the provisions of the Article 80 Large Project review process.

It is currently anticipated that the Project will not require relief under the Zoning Code other than an administrative Conditional Use Permit pursuant to Article 32, due to the Project site's location within the GCOD and required compliance with the same.

1.5.2 Boston Zoning Code – Use Requirements

The use regulations applicable in the above-referenced CC and MFR Subdistricts for the Project Site are found in Article 64, Table A (MFR) and Table B (CC) of the Zoning Code. In particular, both the CC Subdistrict and the MFR Subdistrict allow the proposed Multi-Family Residential Use for the Project at the Project Site; while most Ground Commercial uses are either Forbidden or Conditional at the smaller portion of the Project Site situated in the MFR Sub-district. However, "Allowed" commercial uses in the CC Subdistrict portion of the Project Site include, but are not limited to, a bank, day care center, community center, art gallery, fitness center, clinic, professional offices, restaurant, restaurant with takeout (small – total gross floor area not more than 1,000 square feet per restaurant), bakery, local retail business including liquor store, service uses, and trade shops. As such, the Project's proposed uses of "Social Enterprise Café", "Exhibition Gallery", and "Non-Profit and Other Commercial Space," are compliant within the CC Subdistrict. As many of these same uses are Forbidden or Conditional in the MFR Subdistrict, however, the Project has been carefully designed to limit the area and functionality of such Uses to that portion of the building in the larger parcel situated in the CC Subdistrict.

1.5.3 Boston Zoning Code – Dimensional Requirements

The Project will include up to approximately 89,700 square feet of gross floor area on a combined site that consists of approximately 23,278 square feet of land, for a resulting projected Floor Area Ratio (FAR) not to exceed 4.0 in the CC Subdistrict and 2.0 in the MFR Subdistrict. Current zoning establishes a maximum Floor Area Ratio (FAR) of 4.0 in the CC Subdistrict and 2.0 in the MFR Subdistrict.

Additionally, as detailed below in Table 1-1, the applicable dimensional regulations under the Zoning Code, Article 64, Table D (MFR) and Table E (CC) require no Minimum Lot Size, no Minimum Lot Area Per Dwelling Unit, no Minimum Lot Width, no Minimum Lot Frontage, no Minimum Front Yard, and no Minimum Side Yard; however, the Zoning Code does require a Maximum Building Height of 70 feet, a minimum Rear Yard Setback of 20 feet, and a Minimum Usable Open Space of 200 square feet per dwelling unit. As previously described, the Project has been proactively designed to comply with the dimensional regulation requirements under the Zoning Code.

For a project that is subject to Large Project Review, required off-street parking spaces and off-street loading facilities are expected to be determined as a part of the Large Project Review process in accordance with the provisions of Article 80 of the Boston Zoning Code. Design elements of the Proposed Project will also be reviewed pursuant to Large Project Review.

Please see Table 1-1 below for further details.

Table 1-1 CC and MFR Subdistrict - Dimensional Requirements

Dimensional Element	CC Subdistrict	MFR Subdistrict	Proposed Project	Zoning Relief Required?
Minimum Lot Size	None	None	21,572 sf; 1,706 sf	No
Minimum Lot Area Per Dwelling	None	None	N/A	No
Maximum Floor Area Ratio	4.0	2.0	86,288 sf *(566 Columbus)* 3,412 sf *(458 Mass Ave)*	No
Maximum Building Height	70 feet	70 feet	69'-11"	No
Minimum Lot Width	None	None	N/A	No
Minimum Lot Frontage	None	None	N/A	No

Table 1-1 CC and MFR Subdistrict - Dimensional Requirements (Continued)

Dimensional Element	CC Subdistrict	MFR Subdistrict	Proposed Project	Zoning Relief Required?
Minimum Front Yard	None	[2]	None *(566 Columbus)*[2] *(458 Mass Ave)*	No
Minimum Side Yard	None[1]	None	N/A	No
Minimum Rear Yard	20 feet[3]	20 feet	None[3a]	No
Minimum Usable Open Space per Dwelling Unit	200 sf (not including the live/work units)	200 sf (not including the live/work units)	Approximately 7,500 sf of usable open space accessible to all occupants between outdoor roof decks, courtyards and a pocket garden. Approx. 72 sf of usable open space will be accommodated at each unit by way of exterior private balconies and terraces; total of 11,000 sf of open space.	No
Minimum Number of Parking Spaces	0.7 per D/U	0.7 per D/U	42 spaces (0.76 per D/U)	No (Article 80)[4]
Off-Street Loading	Article 80	Article 80	Article 80	No (Article 80)[4]

(1) No side yard is required except in the case of a lot with a side lot line abutting a Residential Subdistrict, which shall have side yards as if it were in such abutting district. Every side yard so required that does not abut a street line shall, along every lot line on which such yard abuts, be at a level no higher than that of the lowest window sill of the lowest room designed for human occupancy or so occupied, and relying upon natural light or natural ventilation from windows opening on such yard.

(2) See Section 64-37.1 (Conformity with Existing Building Alignment). A bay window may protrude into a front yard.

(3) The Premises should be considered a "through lot" and therefore there is no applicable rear yard setback:

a. Rear Yards of Through Lots. The Front Yard requirements of this Article, and not the Rear Yard requirements, shall apply to that part of a Rear Yard that is also a Street Line, except in the case of a Rear Yard that abuts a Street less than twenty (20) feet in width.

b. Rear Yards of Certain Shallow Lots. For each full foot by which a Lot existing at the time this Article takes effect is less than one hundred (100) feet deep, six (6) inches shall be deducted from the depth otherwise required by this Article for the Rear Yard of such Lot; provided that in no event shall the Rear Yard of any such Lot be less than 10 feet deep.

(4) The applicable parking and loading provisions of Article 64 do not apply to the Proposed Project as they do not apply to proposed projects that are subject to Article 80 Large Project Review.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

To the Proponent's knowledge, there are no legal judgments or actions pending concerning the Project.

1.6.2 History of Tax Arrears on Property

There is no current or past history of tax arrears on property owned in Boston by the Proponent.

1.6.3 Site Control/ Public Easements

The Project site is bounded by utility easements for sewer, electric, telephone and gas. Additionally, there are two utilities that cross the Project site, electric and a Boston Water and Sewer Commission sanitary sewer main that is no longer active. Appendix B provides a legal description of the Project site's metes and bounds.

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 or Action
Local	
Boston Planning and Development Agency	Article 80 Review, Design Review and Execution of Related Agreements; Section 80B-6 Certification of Compliance; Board Authorization; Minor Modification to South End Urban Renewal Plan and Amendment to Land Disposition Agreement
Boston Parks Commission	Proposed Project within 100 feet of park subject to City Ordinance 7.4-11
Boston Public Safety Commission – Committee on Licenses	Garage License, Flammable Fuels
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan
Boston Department of Public Works Public Improvements Commission	Sidewalk Repair Plan; Curb-Cut Permit; Street/Sidewalk Occupancy Permit; Permit for Street Opening (as required)

Table 1-2 Anticipated Permits and Approvals (Continued)

Agency Name	Permit or Action
Local	
Boston Fire Department	Permits for Demolition, Approval of Fire Safety Equipment
Boston Water and Sewer Commission	GCOD Approval and Application; Approval for Sewer and Water and Connections; Construction Site Dewatering; and Storm Drainage
Boston Department of Inspectional Services	Demolition Permit; Building Permits; Certificates of Occupancy; Other Construction-Related Permits
Boston Zoning Board of Appeal	GCOD Permit Administrative Approval
Boston Landmarks Commission	Article 85 Demolition Delay Application for demolition of existing buildings on site; Certificate of Appropriateness from South End Landmark District Commission
State	
Department of Environmental Protection	Fossil Fuel Utilization permit (as required); Notice of Demolition/Construction
Massachusetts Water Resources Authority	Temporary Construction Dewatering Permit (if required); Sewer Use Discharge Permit (if required)

1.8 Schedule

It is anticipated that construction will begin in the fourth quarter of 2019. Once begun, construction is expected to last approximately 18 months.

Chapter 2.0

Community Engagement and Public Benefits

2.0 COMMUNITY ENGAGEMENT AND PUBLIC BENEFITS

2.1 Community Engagement

2.1.1 Community Engagement

The Proponent is committed to a "community-driven" development process that involves implementing a comprehensive and proactive level of engagement with residents, business establishments, and civic groups. This approach has served the Proponent well over the years with a broad level of community support for the new construction and renovation/re-use projects that they have developed. Their approach involves conducting early engagement during the conceptual phase of a project, primarily through one-on-one meetings with stakeholders.

Subsequent to the Proponent's selection as the redeveloper of the Project Site, they had implemented a Community Engagement Plan that involved presenting the Project's conceptual plan to over 100 business, residential, and civic groups, as well individuals who are influential leaders in the South End neighborhood. Their outreach has built a broad level of support, resulting in the collection of over 100 letters of support. A matrix of the letters of support received, as well as a matrix of community members the Proponent has met with are provided in Appendix C.

This level of community support is extremely encouraging during this early phase of the Project, and the Proponent along with the Project team looks forward to continuing engagement with the community during the Article 80 public process, utilizing neighborhood feedback to develop a project that enhances the quality of life of future residents of the Project, as well as abutters, and the broader neighborhood.

2.1.2 Political Engagement

Over the past several months, the Proponent has conducted Project briefings with City and State elected officials. The Project has been well received by these officials, and the team will continue to keep them informed throughout the public review process.

2.2 Public Benefits

By purchasing the Project Site, the Proponent will help secure USES' financial future. This will further its historic mission by enabling USES to revitalize its other campus at 48 Rutland Street, one of its long time homes, and offer even more vital programs and services to hundreds of families and children – over 80% from communities of color, 70% low income – that it currently serves. These programs include early education, after-school, job training, individualized coaching and its Camp Hale summer camp.

The Project will provide many other public benefits for the surrounding neighborhood and the City of Boston as a whole, both during construction, and on an ongoing basis upon its completion. These benefits include both urban design/public realm benefits, and community economic benefits.

2.2.1 Public Realm Benefits

Commitment to Honoring the Mural

The Proponent will contribute generously to the relocation or reproduction of the iconic mural that wraps around the front exterior the building today and is collaborating on the undertaking with Carolyn Parker, the widow of artist Jameel Parker who created the mural, and with internationally recognized Boston artist Paul Goodnight as well as with David Lee and USES.

Activated Ground Floor

The Proponent envisions a ground floor buzzing with activity that will feature a social enterprise café at the corner of Columbus and Massachusetts Avenue to be named The Hi-Hat in honor of the famed jazz club that once occupied that corner as well as an artist live/work gallery and an exhibit space open to the public that highlights the rich cultural heritage of the neighborhood.

High Quality Architecture

The Project will improve the urban design characteristics and aesthetic character of the Project Site surroundings through the introduction of high-quality architecture to the site.

Streetscape Improvements

Streetscape features including street trees, light poles, trash/recycling receptacles, public bike racks and benches will be incorporated and/or enhanced as part of the Project's associated public realm improvements.

2.2.2 Community Economic Benefits

Existing Tenant Relocation

There are six non-profit tenant organizations currently located in the building (there are no residential tenants). The Proponent has offered to help each of the non-profit tenants find affordable alternative space so that the services they contribute to the surrounding community will continue. The Proponent is providing the tenants with relocation assistance, rental subsidies and buildout reimbursement and has found acceptable space for five of the six non-profits, four of which have signed new leases. It is continuing its efforts to find acceptable space for the remaining tenant.

Affordable Housing and Artist live/Work Housing

Approximately 17% of the Project's residential units will be set aside for affordable homeownership, exceeding the City's 13% IDP requirements. In response to neighborhood input, a significant number of the affordable units will be set aside for live-work space for artists, many of whom are being displaced from other area locations.

Affordable Commercial Space

Over 50% of the commercial space on the ground floor of the Project will be dedicated to non-profit use at affordable rents – or in one case, no rent at all. The Proponent will donate approximately 2,300 sf of ground floor space to USES so that it can maintain a community gathering place and the Harriet Tubman gallery at the site in the new building. This will not be dependent on any subsidies from State or City housing agencies.

Contributions to Neighborhood Non-Profit Organizations

The Proponent is committed to providing a generous community benefits package that will include significant contributions to neighborhood organizations in the South End and Lower Roxbury that promote affordable rental housing or that serve the community in other important ways.

Boston Residents Jobs Policy and MBE/WBE Participation

The development team is a diverse one, and the Proponent will continue to engage both MBE-owned and WBE-owned businesses in this development.

Job Creation

The Project will create approximately 180 construction jobs and 28 permanent jobs.

Minority Investment

A significant percentage of investors in the Project will come from communities and individuals of color; over $1 million has already been raised from that source.

Chapter 3.0

Transportation

3.0 TRANSPORTATION

The Project team has conducted an evaluation of the transportation impacts of the proposed Project in the South End neighborhood of Boston. This transportation study adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and Boston Planning and Development Agency Article 80 Large Project Review process. This study includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity. The Project is not expected to have a significant impact on the existing neighborhood or surrounding transportation facilities. The study area intersections and approaches will continue to operate at the same levels of service during the weekday a.m. and p.m. peak hours as in the No-Build Condition. Additionally, the Project will have a minimal impact on MBTA Orange Line capacity and is providing bicycle parking within the garage.

3.1 Project Description

The Project Site is located on the corner of Massachusetts Avenue and Columbus Avenue. The Proponent is proposing to redevelop the Project Site with a six-story building of approximately 87,900 sf. The proposed mixed-use ground floor will contain approximately 2,300 sf of commercial office space and 2,700 sf of retail and exhibition space. The Project will contain approximately 66 homeownership residences, and 42 parking spaces will be provided in an underground parking garage.

3.1.1 Study Area

The transportation study area runs entirely along Massachusetts Avenue to the north and south of the Project Site, bounded at the northwest by St. Botolph Street and at the southeast by Tremont Street. The study area, shown in Figure 3-1, includes the following four intersections:

- Tremont Street/Massachusetts Avenue (signalized);
- Columbus Avenue/Massachusetts Avenue (signalized);
- Massachusetts Avenue/Pedestrian Crossing (signalized); and
- St. Botolph Street/Massachusetts Avenue (signalized).

3.1.2 Study Methodology

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

The Existing (2019) Condition analysis includes an inventory of the existing transportation conditions that was undertaken in the spring of 2019, such as traffic characteristics, parking, curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Existing counts for vehicles, bicycles, and pedestrians were collected at the study area intersections.

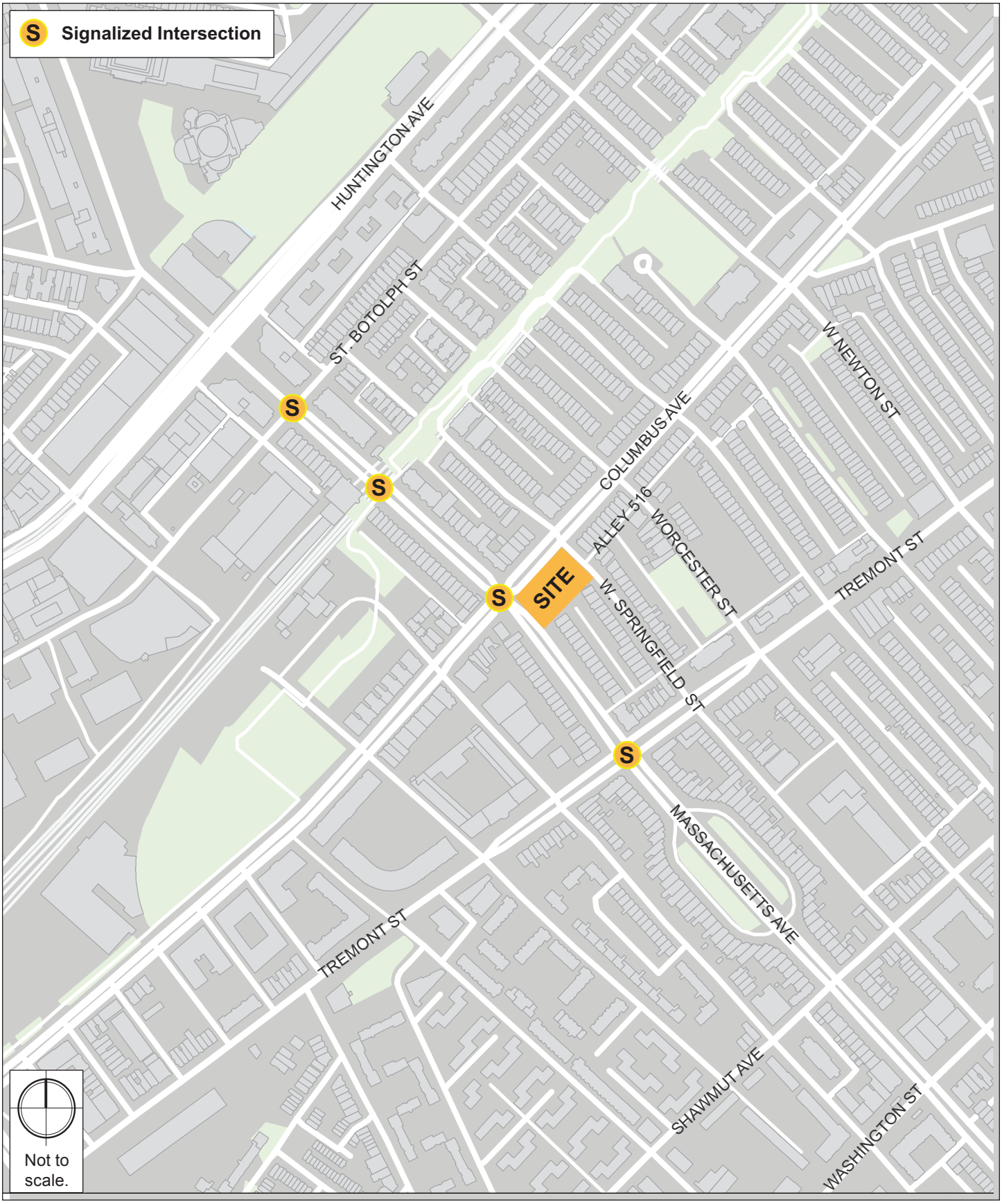


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Figure 3-1
Study Area Intersections

A traffic data collection effort forms the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. The long-term transportation impacts are evaluated for the year 2026, based on a seven-year horizon from the year of the filing of this traffic study.

The No-Build (2026) Condition analysis includes general background traffic growth, traffic growth associated with specific developments (not including this Project), and transportation improvements that are planned in the vicinity of the Project Site.

The Build (2026) Condition analysis includes the net change in traffic volume due to the addition of Project-generated trip estimates, to the traffic volumes developed as part of the No-Build (2026) Condition analysis. The transportation study identifies expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading and service operations.

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

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

3.2 Existing (2019) Condition

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

3.2.1 Existing Roadway Conditions

This section includes descriptions of the adjacent and nearby roadways that serve the Project Site.

Massachusetts Avenue is an urban principal arterial under City of Boston jurisdiction that runs primarily in a northwest-southeast direction between Columbia Road to the southeast and the Cambridge City line to the northwest, where it continues through Cambridge, Arlington, and Lexington. Sidewalks are provided along both sides of the roadway. On-street parking is generally provided in the vicinity of the Project Site. Painted bicycle lanes are also provided along both sides of Massachusetts Avenue in the vicinity of the Project Site. The corridor also hosts frequent bus transit with service adjacent to the site.

Tremont Street is an urban principal arterial under City of Boston jurisdiction that runs primarily in a northeast-southwest direction between Huntington Avenue to the southwest and Cambridge Street to the northeast. Within the study area, Tremont Street is a four-lane, two-way roadway.

On-street parking and sidewalks are provided along both sides of the roadway. Crosswalks with curb ramps, pedestrian signal equipment, and curb bulb outs are generally provided at all intersections.

Columbus Avenue is an urban principal arterial under City of Boston jurisdiction that runs primarily in a northeast-southwest direction between Park Plaza to the northeast and Northeastern University to the southwest. Within the study area, Columbus Avenue is a two-lane, two-way roadway with painted bicycle lanes provided along both sides. On-street parking and sidewalks are provided along both sides of the roadway.

St. Botolph Street is a local roadway under City of Boston jurisdiction that runs primarily in a northeast-southwest direction between Copley Place to the northeast and Northeastern University to the southwest. Within the study area, St. Botolph Street is an unmarked two-way roadway with on-street parking and sidewalks provided along both sides of the roadway.

3.2.2 Existing Intersection Conditions

The existing study area intersections are described below. Intersection characteristics such as traffic control, lane usage, pedestrian facilities, pavement markings, and adjacent land use are described.

Massachusetts Avenue/Tremont Street is a four legged intersection located south of the Project Site. The Tremont Street eastbound and westbound approaches, as well as the Massachusetts Avenue northbound and southbound approaches, all consist of three lanes, an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. The Massachusetts Avenue northbound and southbound approaches both provide a painted bicycle lane and green striping through the intersection to alert drivers to the presence of cyclists. Parking is provided along all approaches to the intersection. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Massachusetts Avenue/Columbus Avenue is a four legged intersection located adjacent to the west of the Project Site. The Columbus Avenue eastbound and westbound approaches both consist of two lanes, an exclusive left-turn lane and a shared through/right-turn lane, with a painted bicycle lane. The Massachusetts Avenue northbound and southbound approaches both consist of three lanes, a left-turn only lane, a through lane, and a through/right-turn lane, with a painted bicycle lane. Green striping is provided along each approach through the intersection to alert drivers to the presence of cyclists. Parking is provided along both Columbus Avenue approaches to the intersection. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches to the intersection.

Massachusetts Avenue/Pedestrian Crossing is a signalized midblock pedestrian crossing located northwest of the Project Site. The crossing provides convenient pedestrian crossings to transit riders at the Massachusetts Bay Transportation Authority (MBTA) Massachusetts Avenue Station and for users of the Southwest Corridor shared use path. The Massachusetts Avenue northbound

and southbound approaches to the intersection both consist of two through lanes and a bicycle lane. Parking is provided north of the pedestrian crossing on both sides of Massachusetts Avenue and bus stops with shelters are provided south of the pedestrian crossing on both sides of the road. Pedestrian ramps and push buttons are provided at both ends of the crosswalk.

Massachusetts Avenue/St. Botolph Street is a four legged intersection with four approaches located northwest of the Project Site. The St. Botolph Street eastbound and westbound approaches both consist of a single travel lane. The Massachusetts Avenue northbound approach consists of two lanes, a shared left-turn/through lane and a shared through/right-turn lane. The Massachusetts Avenue southbound approach consists of three lanes, an exclusive left-turn lane, a through lane, and a shared through/right-turn lane. Both Massachusetts Avenue approaches provide painted bike lines with green striping through the intersection to alert drivers to the presence of cyclists. Parking is provided along all approaches to the intersection. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across all approaches of the intersection.

3.2.3 Existing Parking

An inventory of the existing on-street parking in the vicinity of the Project Site was collected. The curb use surrounding the site consists of two-hour parking, resident/private parking, and several MBTA bus stops. The on-street parking regulations within the study area are shown in Figure 3-2.

3.2.4 Car Sharing Services

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

Car sharing, predominantly served by Zipcar in the Boston area, provides easy access to vehicular transportation for those who do not own cars. One Zipcar location is adjacent to the Project and three additional Zipcar locations are within a two to six-minute walk of the Project. The nearby car sharing locations in proximity of the Project Site are shown in Figure 3-3.

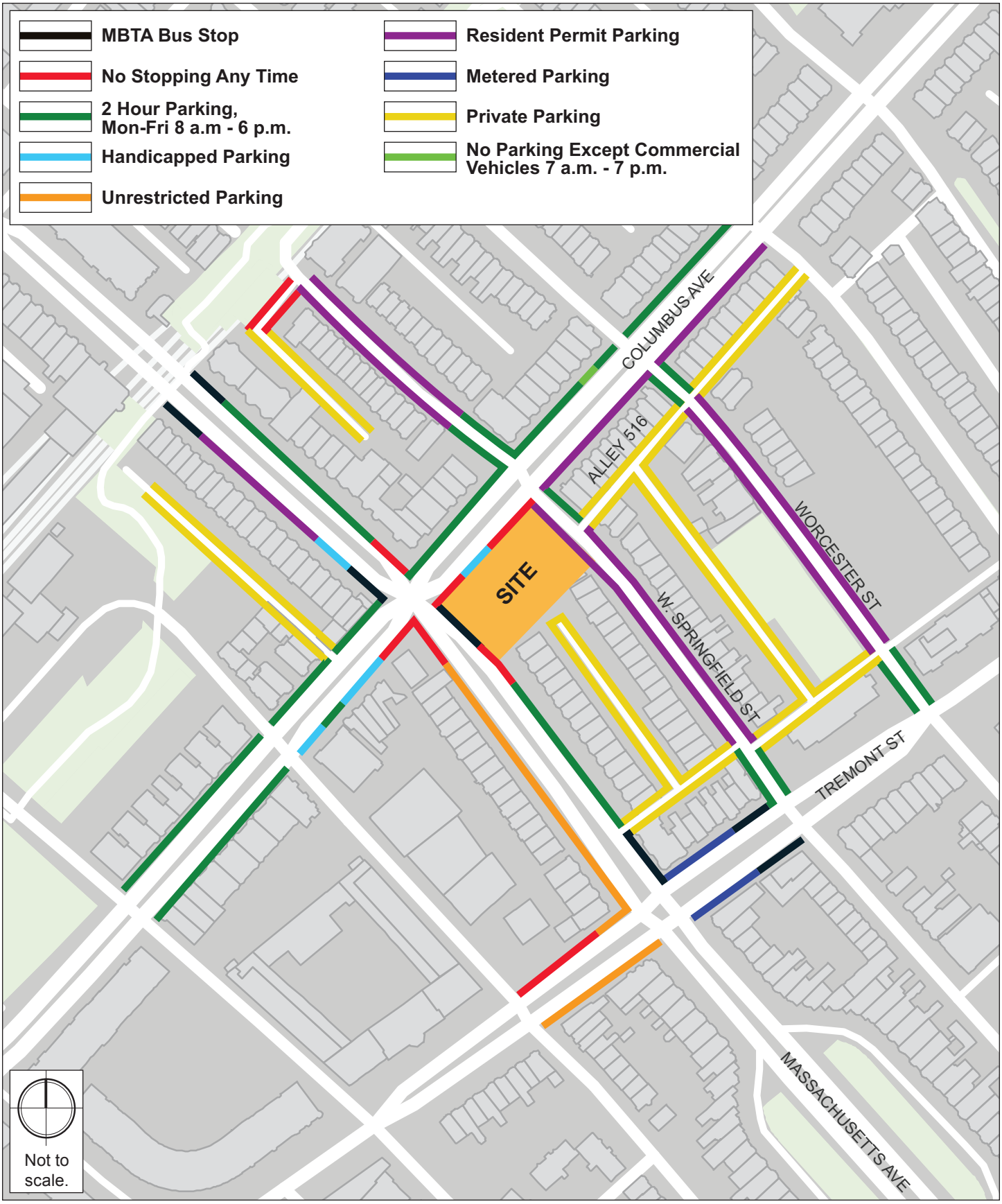

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Figure 3-2
Existing Curb Regulations

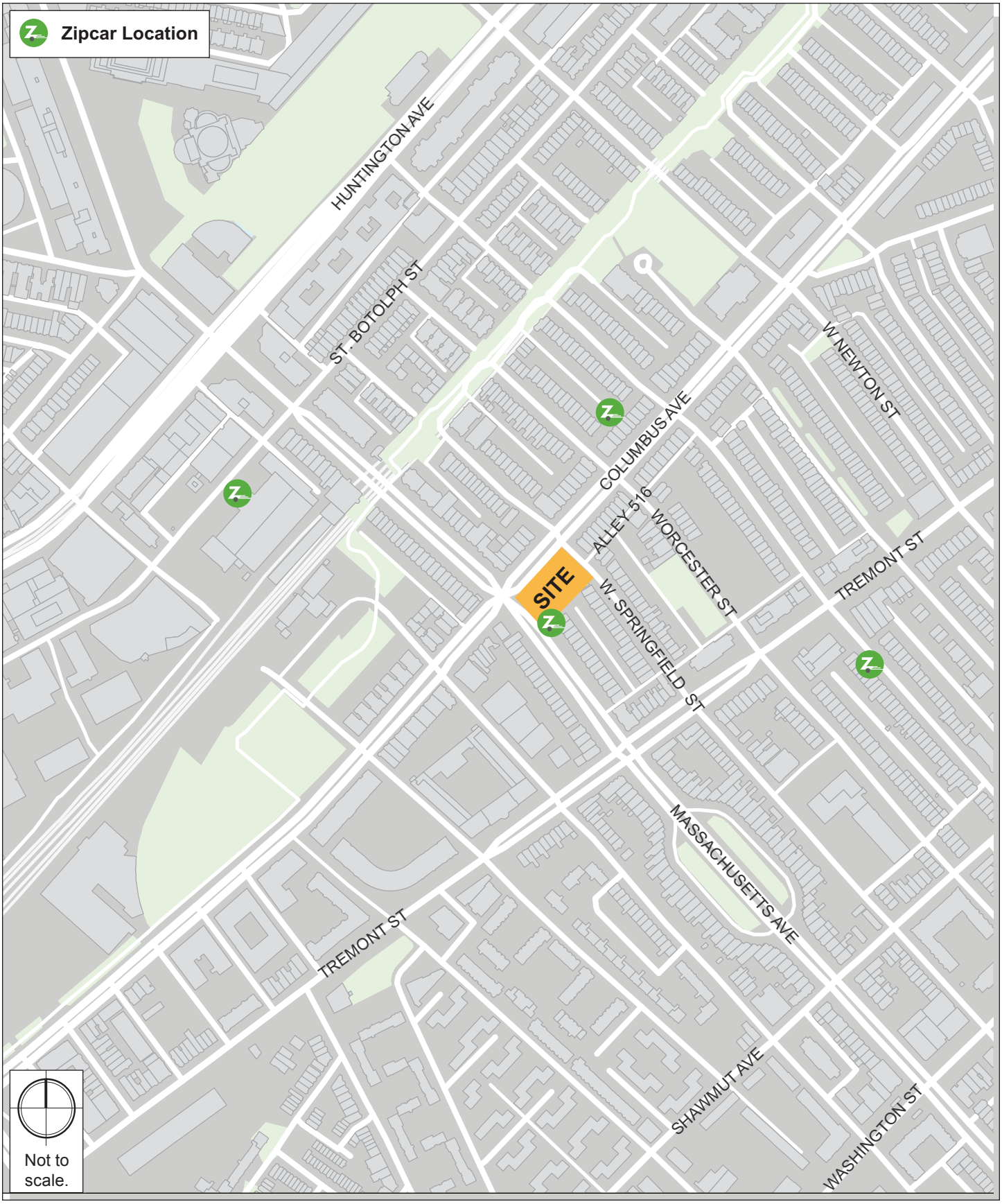

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Figure 3-3
Car Sharing Locations

3.2.5 Existing Traffic Data

Traffic volume data was collected in the study area intersections on May 21, 2019. Turning Movement Counts (TMCs) were conducted during the weekday a.m. and p.m. peak periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively) at the study area intersections. The TMCs collected vehicle classification including car, heavy vehicle, pedestrian, and bicycle movements. The detailed traffic counts for the study area intersections are provided in Appendix D.

In order to account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT were reviewed. The most recent (2017) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the May 2019 TMCs. The seasonal adjustment factor for roadways like the study area (Group U3 – Urban Principal Arterials) during the month of May is 0.92. This indicates that average month traffic volumes are approximately eight percent lower than the traffic volumes that were collected. The traffic counts were not adjusted to reflect average month conditions in order to provide an analysis consistent with the peak season traffic volumes. The MassDOT 2017 Weekday Seasonal Factors table is provided in Appendix D. The Existing (2019) Condition weekday a.m. and p.m. peak hour traffic volumes are shown in Figure 3-4 and Figure 3-5, respectively.

3.2.5.1 Existing Pedestrian Volumes and Accommodations

Sidewalks are provided along both sides of all the roadways in the study area. In general, the sidewalks provided along nearby roadways are in good condition with few cracks and level grades. The closest crosswalks to the Project Site are located at the signalized intersection of Columbus Avenue/Massachusetts Avenue, adjacent to the west corner of the Project Site, and at the unsignalized intersection of Columbus Avenue/Wellington Street/West Springfield Street, adjacent to the north corner of the Project Site. Wheelchair ramps are provided along all intersections within the study area. The Massachusetts Avenue pedestrian crossing connects to the Southwest Corridor Path, an approximately four-mile linear park between Back Bay and Forest Hills with a paved path.

To determine the amount of pedestrian activity within the study area, pedestrian counts were conducted concurrent with the TMCs on May 21, 2019 at the study area intersections and are presented in Figure 3-6.

3.2.5.2 Existing Bicycle Volumes and Accommodations

In recent years, bicycle use has increased dramatically throughout the City of Boston and is expected to continue growing. The Project Site is located near bicycle facilities and the following roadways within the study area have bike infrastructure providing added safety to cyclists. Massachusetts Avenue has bike lanes in both the northbound and southbound directions, as well as two-stage turn queue boxes and green striping through the intersection to alert drivers to the presence of cyclists. Columbus Avenue has bike lanes in both the eastbound

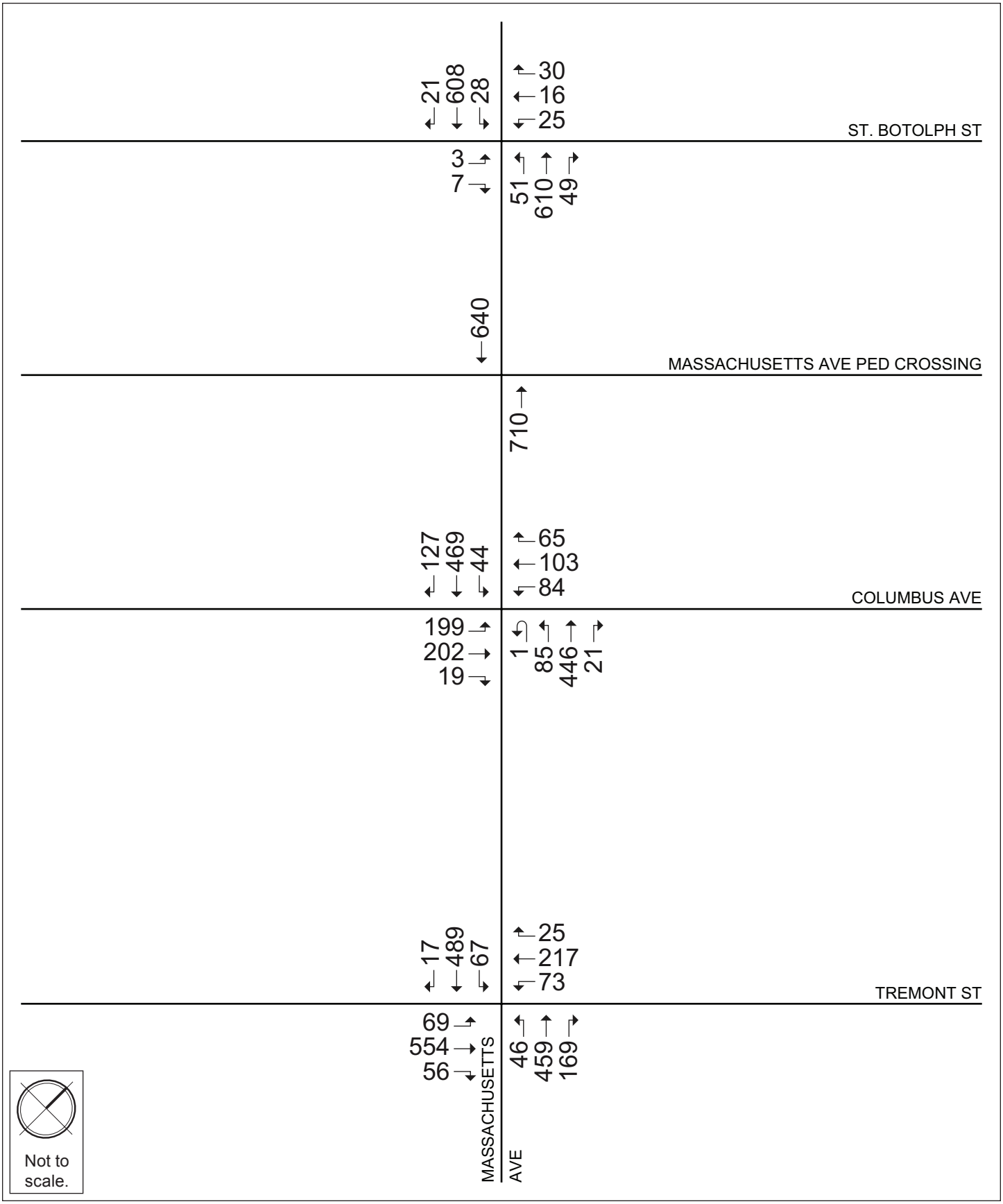

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Figure 3-4

Existing (2019) Condition Traffic Volumes, Weekday a.m. Peak Hour

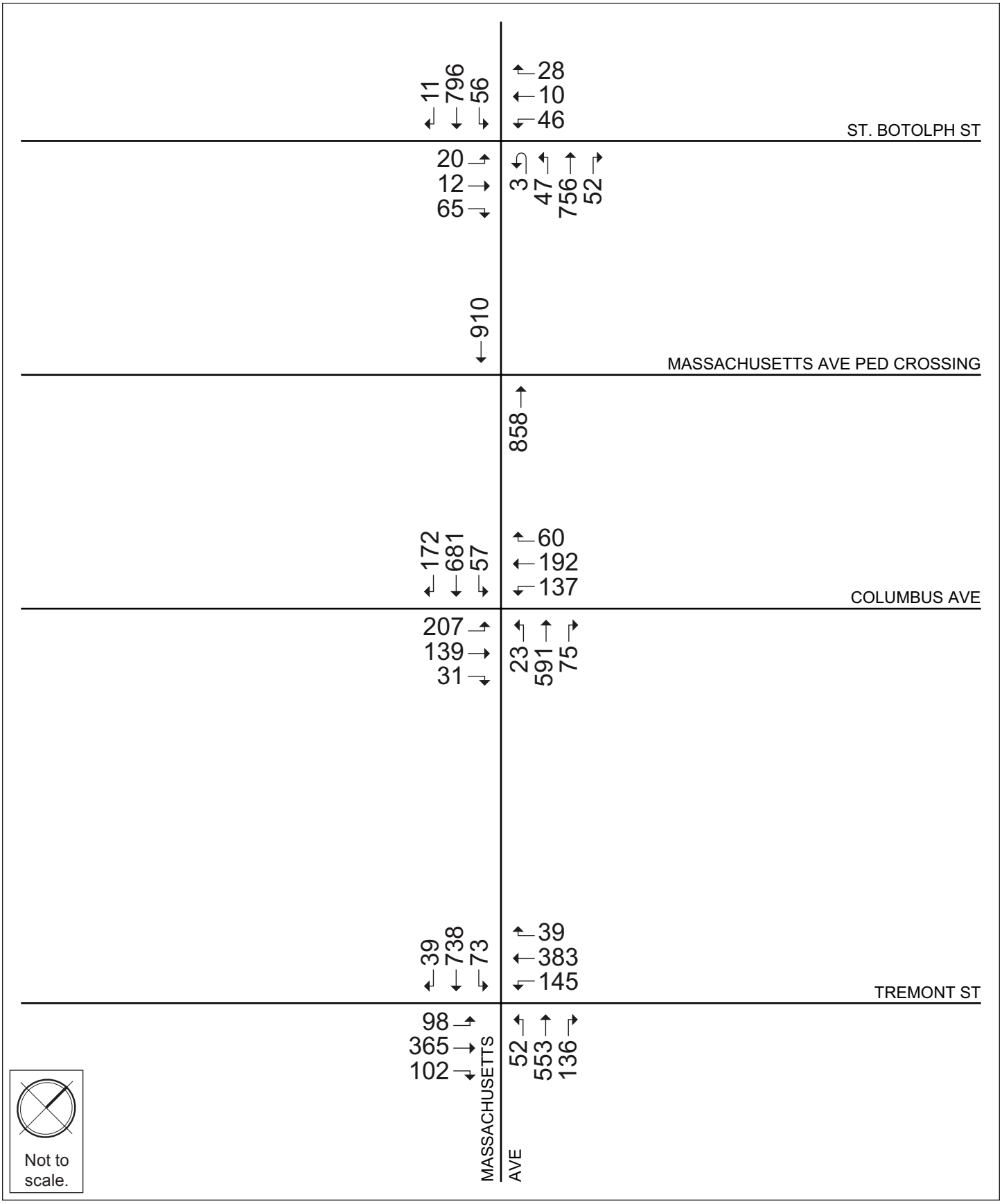

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Figure 3-5

Existing (2019) Condition Traffic Volumes, Weekday p.m. Peak Hour

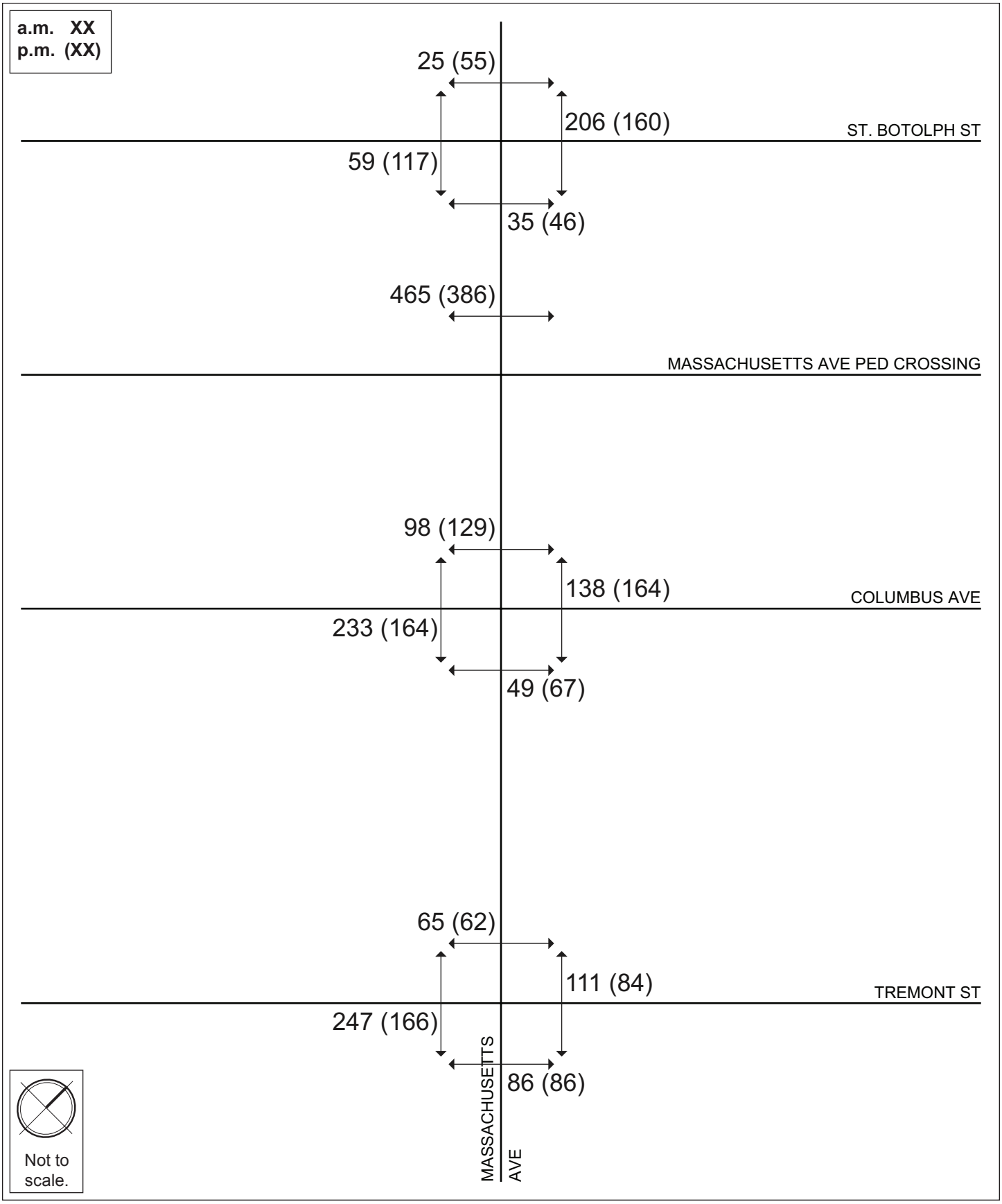

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Figure 3-6

Existing (2019) Condition Pedestrian Volumes, Weekday a.m. and p.m. Peak Hours

and westbound directions. At the intersection of Columbus Avenue/Massachusetts Avenue, two-stage turn queue boxes and green striping are provided. The nearby Southwest Corridor Path mentioned previously is also open to bicyclists.

To determine the amount of cyclist activity within the study area, bicycle counts were conducted concurrent with the TMCs on May 21, 2019 at the study area intersections and are presented in Figure 3-7.

The Project Site is also located in proximity to multiple bicycle sharing stations provided by BLUEbikes. BLUEbikes, formerly known as Hubway, is the Boston area's largest bicycle sharing service, which was launched in 2011 and currently consists of more than 2,500 shared bicycles at more than 260 stations throughout Boston, Brookline, Cambridge, and Somerville. The nearest BLUEbikes stations to the Project Site are located adjacent to the site on the corner of Columbus Avenue and Massachusetts Avenue, and on the corner of Tremont Street and Northampton Street, an approximately 5-minute walk from the site. The BLUEbikes stations located in proximity to the Project Site are shown in Figure 3-8.

3.2.6 Existing Public Transportation

The Project Site is well-served by the MBTA public transportation system. The Project Site is located an approximately three-minute walk northwest from Massachusetts Avenue Station, which provides access to the MBTA Orange Line and Bus Routes CT1, 1, and 170. Symphony Station, located an approximately five-minute walk northwest from the Project, provides access to the MBTA Green Line "E" Branch. Bus Route 39 provides service along Huntington Avenue, an approximately 5-minute walk northwest from the Project. Bus Route 43 provides service along Tremont Street, an approximately three-minute walk south from the Project.

MBTA Better Bus Project - In January of 2019, the MBTA proposed 47 changes to the system's bus network. As of April 2019, the Fiscal and Management Control Board approved 36 of the proposals to be implemented in late 2019 and early 2020. In proximity to the Project, Routes 1 and CT1 will be combined into a single route for more frequent and reliable service.

Figure 3-9 shows a map of all public transportation services located in proximity to the Project Site, and Table 3-1 provides a brief summary of all routes.

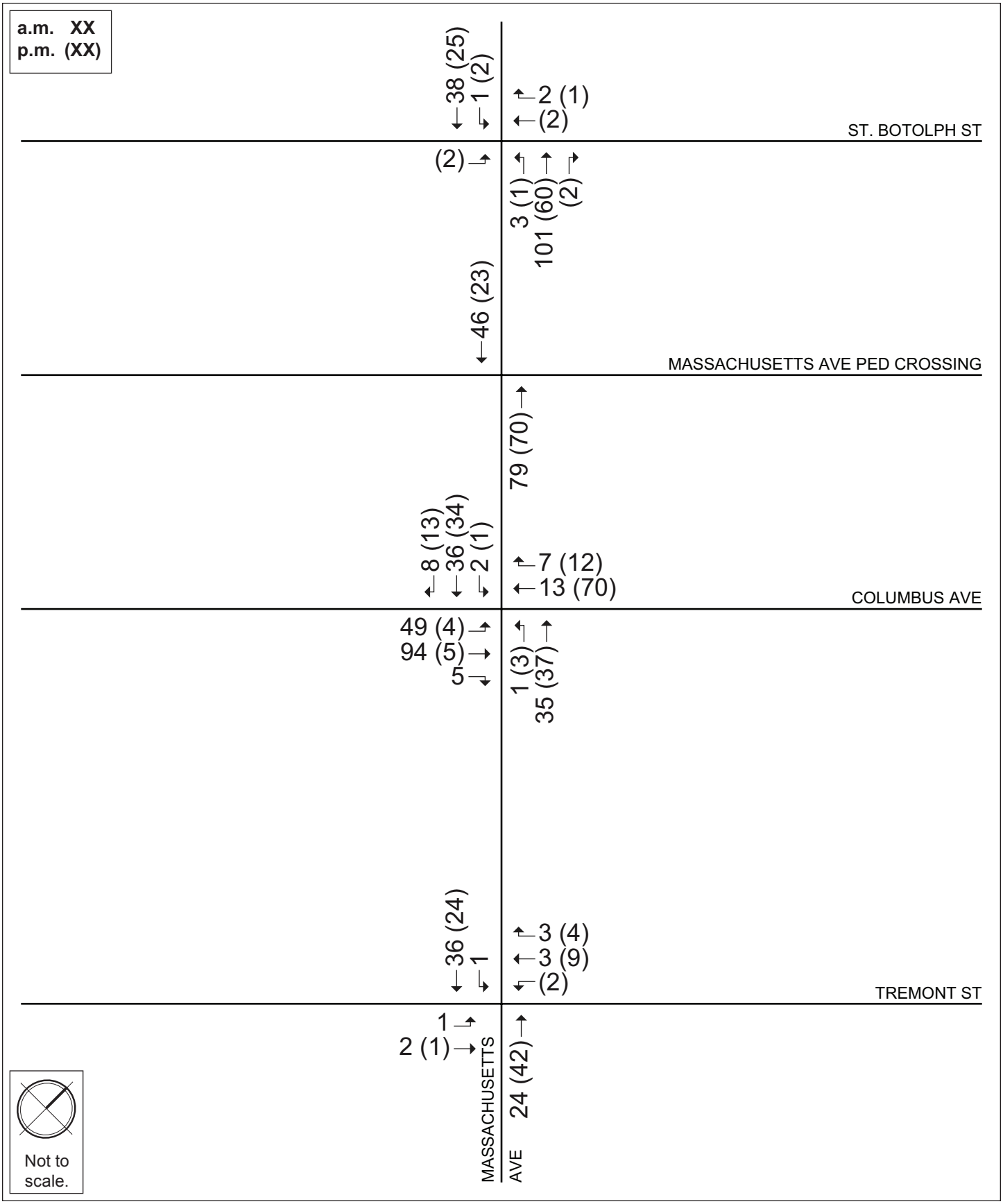

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Figure 3-7

Existing (2019) Condition Bicycle Volumes, Weekday a.m. and p.m. Peak Hours

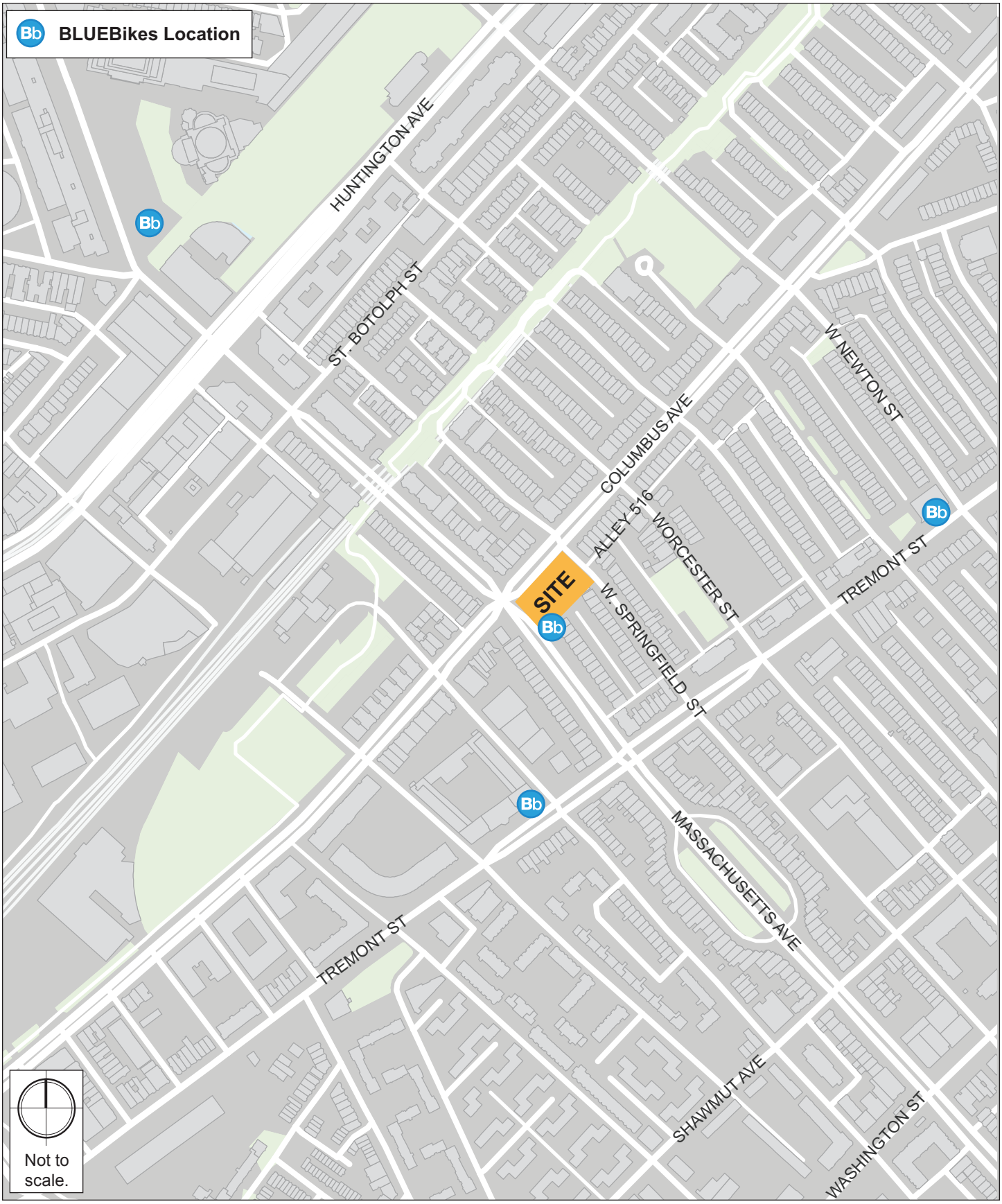

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Figure 3-8
Bike Sharing Locations

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Figure 3-9
Public Transportation

Table 3-1 Existing Public Transportation

Route	Description	Peak-hour Headway	Weekday Service Duration
Rapid Transit			
Orange Line	Forest Hills – Oak Grove	6	5:16 a.m. – 12:28 a.m.
Green Line – E Branch	Heath Street – Lechmere	6	5:01 a.m. – 12:47 a.m.
Local Bus Routes			
CT1	Central Square – Boston Medical Center	25	6:00 a.m. – 7:42 p.m.
1	Harvard – Dudley Station	9-10	4:37 a.m. – 1:27 a.m.
39	Forest Hills – Back Bay Station	10	4:28 a.m. – 1:23 a.m.
43	Ruggles – Downtown Boston	20-30	5:00 a.m. – 12:54 a.m.
170	Waltham – Dudley	25	6:15 a.m. – 6:11 p.m.

Headway is the time between service, Headways vary. Source: MBTA May 2019.

3.3 No-Build (2026) Condition

The No-Build (2026) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with background traffic growth independent of any specific project, traffic associated with other planned specific developments, and planned infrastructure improvements that will affect travel patterns throughout the study area. These infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements.

3.3.1 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. Based on a review of recent and historic traffic data collected for nearby projects and to account for any additional unforeseen traffic growth, a one-half percent per year annual traffic growth rate was used to develop the future conditions traffic volumes.

3.3.2 Specific Development Traffic Growth

The second part of the methodology identifies any specific planned developments that are expected to affect traffic patterns throughout the study area within the future analysis time horizon. Figure 3-10 shows the specific development projects in the vicinity of the study area, which are summarized below:

Douglass Park (Phase III) – This project is located to the southwest of the site and will consist of the construction of a 49,305 gsf, five-story building containing 44 residential units. This project is under construction.

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Figure 3-10
Background Projects

Northeastern University Columbus Avenue Student Housing – This project is located to the southwest of the Project Site and will consist of the construction of 800 student dorm beds and approximately 3,000 sf of ground floor commercial space. The project will replace an existing parking lot and provide no parking. This project is currently under construction.

252-264 Huntington Avenue – This project is located to the northwest of the Project Site and will consist a mixed-use building of the existing Boston University Theatre which will be expanded by 14,000 sf, 446 residential units, and 7,500 sf of ground floor retail/restaurant space with a below-grade garage able to accommodate up to 114 vehicles. This project has been approved by the BPDA.

Alexandra Hotel – This project is located to the southeast of the Project Site and will consist of an approximately 150 room, 13-story boutique hotel of approximately 66,000 sf with a ground-floor restaurant, rooftop amenity space, and conference rooms. This project has been approved by the BPDA.

Northeastern University EXP – This project is located to the southwest of the Project Site and will consist of an approximately 350,000 gsf academic development that will include space for research, classrooms, and offices. This project is currently under review by the BPDA.

3.3.3 Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby improvement projects in the vicinity of the study area.

Go Boston 2030 – As part of Go Boston 2030, the City's long-term mobility plan, several infrastructure improvements are proposed within the study area. Massachusetts Avenue has been identified as a top priority for the City of Boston's Vision Zero initiative to eliminate traffic fatalities by 2030. Columbus Avenue, Massachusetts Avenue, and Tremont Street have been identified as priority connections in the expansion of Boston's Better Bike Corridors to promote safe travel for bicyclists. Tremont Street has been additionally identified for implementation of Boston's *Complete Streets Guidelines* to improve travel for pedestrians, bicyclists, buses, and cars. The Tremont Street corridor is currently in the design process for roadway improvements, but these changes are not anticipated to affect the capacity of the primary project-adjacent intersection of Tremont Street/Massachusetts Avenue.

3.3.4 No-Build (2026) Condition Traffic Volumes

The one-half percent per year annual growth rate, compounded annually, was applied to the Existing (2019) Condition traffic volumes, then the traffic volumes associated with the background development projects were added to develop the No-Build (2026) Condition traffic volumes. The No-Build (2026) Condition weekday a.m. peak hour and p.m. peak hour traffic volumes are shown on Figure 3-11 and Figure 3-12, respectively.

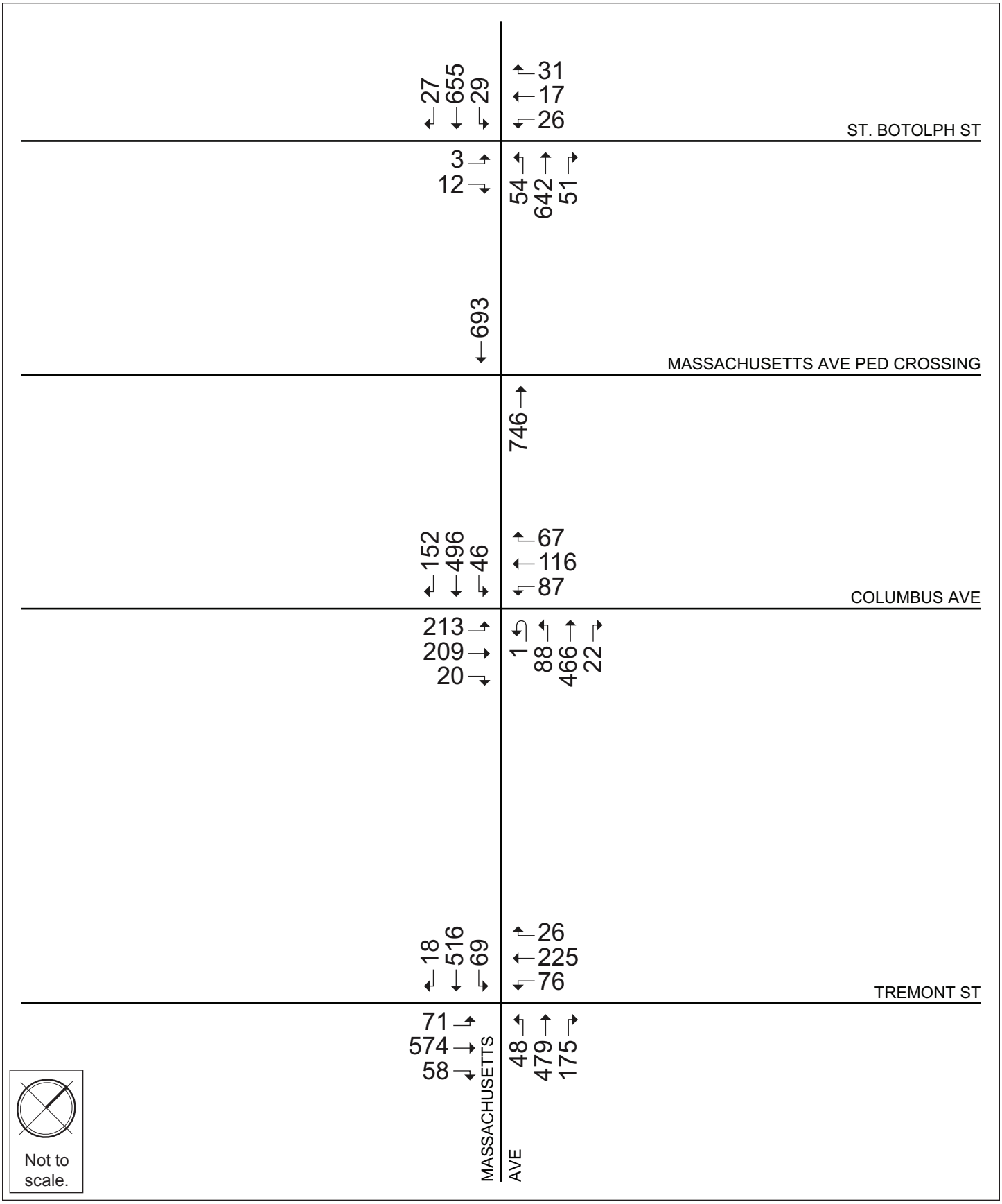

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Figure 3-11

No-build (2026) Condition Traffic Volumes, Weekday a.m. Peak Hour

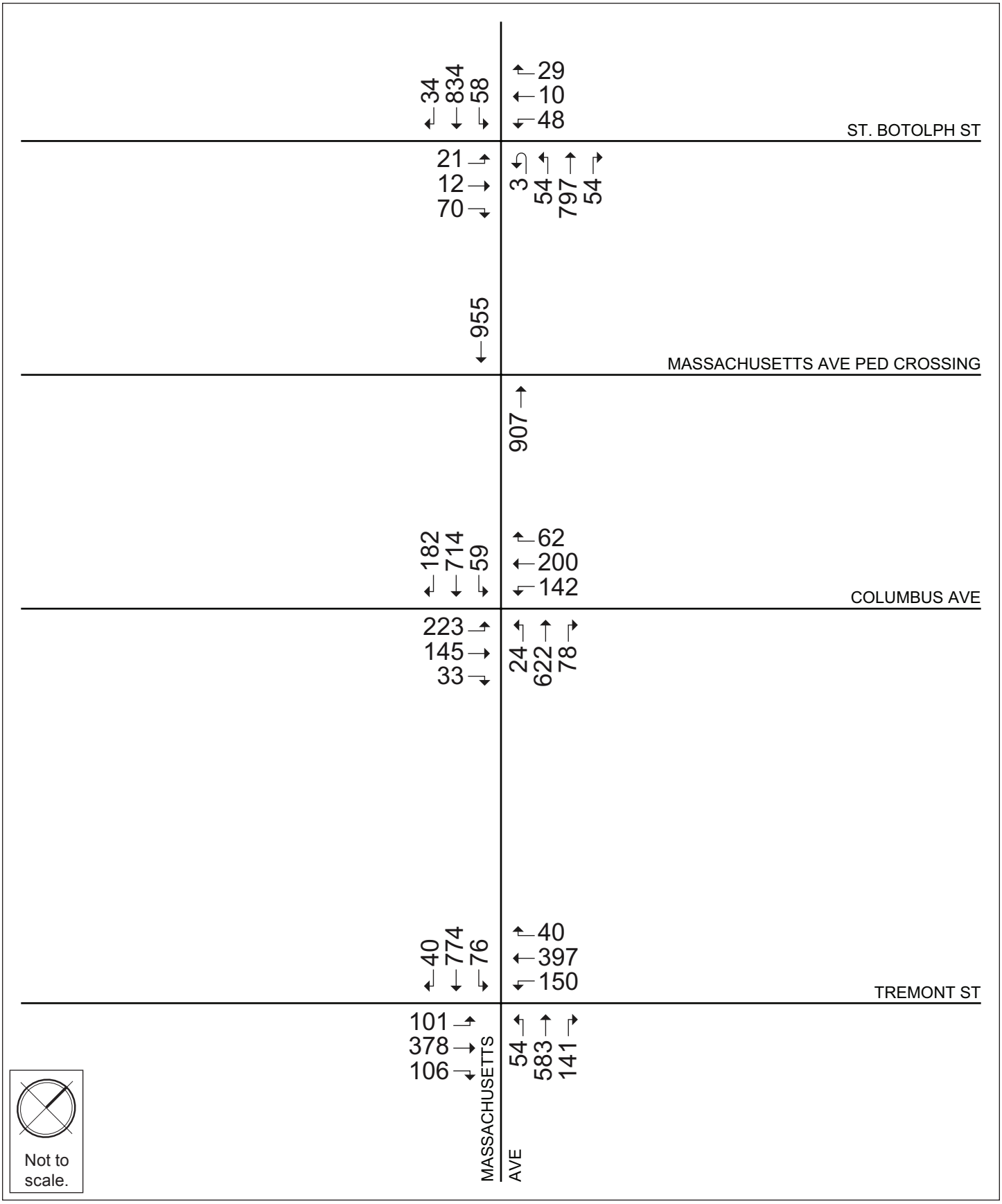

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Figure 3-12

No-build (2026) Condition Traffic Volumes, Weekday p.m. Peak Hour

3.4 Build (2026) Condition

As previously summarized, the Project will consist of approximately 2,300 sf of commercial office space and 2,700 sf of retail and exhibition space on the ground floor, 66 homeownership residences, and 42 parking spaces in an underground garage.

3.4.1 Site Access and Vehicle Circulation

Vehicular access to the Project Site will be provided by an existing curb cut off Massachusetts Avenue into the proposed underground parking garage with 42 parking spaces. Residential access for pedestrians will be provided by one entrance adjacent to Columbus Avenue. Four additional entrances, two on Columbus Avenue and two on Massachusetts Avenue, will be provided to access the commercial and retail space. Covered and secure bicycle storage will be provided adjacent to the site driveway. The site access plan is shown in Figure 3-13.

3.4.2 Project Parking

The parking goals developed by the BTD for this section of the South End, west of Tremont Street, are a maximum of 0.5 to 1.0 parking space per residential unit. As previously stated, the Project will provide 42 parking spaces in an underground garage, resulting in a parking ratio of approximately 0.64 parking spaces per residential unit, consistent with the BTD parking ratio maximum for the area.

3.4.3 Loading and Service Accommodations

Loading areas for resident move-in and move-out and commercial service access will be provided through an expanded curb cut modifications on Columbus Avenue. Trash service will be rolled out to the curb for removal.

3.4.4 Bicycle Accommodations

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements to provide secure bicycle parking for guests and employees and short-term bicycle racks for visitors. Based on BTD guidelines, the Project will supply a minimum of 66 secure/covered bicycle parking spaces, at a rate of one space per residential unit located in an easily accessed, dedicated storage area. Additional bike storage will be provided by way of outdoor bicycle racks accessible to visitors to the site in accordance with BTD guidelines.

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Figure 3-13
Site Plan

3.4.5 Trip Generation Methodology

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

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the Trip Generation Manual[1] 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 code (LUC) was used:

Land Use Code 221 – Multifamily Housing (Mid-Rise). Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and ten floors. Calculations of the number of trips use ITE's average rate per dwelling unit.

Land Use Code 710 – General Office Building. A general office building houses multiple tenants; it is a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. An office building or buildings may contain a mixture of tenants including professional services, insurance companies, investment brokers, and tenant services, such as a bank or savings and loan institution, a restaurant, or cafeteria and service retail facilities. Calculations of the number of trips use ITE's average rate per 1,000 sf.

Land Use Code 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 LUC is used generally for urban retail due to maintain a conservative trip generation assessment. Calculations of the number of trips use ITE's average rate per 1,000 sf.

3.4.6 Travel Mode Share

The US Census American Community Survey (ACS) provides mode share data on how specific census tracts commute to work. This data was used for the residential portion of the development instead of the BTD data, due to the proximity of the site to transit that is not reflected in BTD's Area 4 – Back Bay data. Since the ACS data is not provided for commercial uses, the BTD mode share data was used to establish how trips to and from the commercial space would be made.

[1] Trip Generation Manual, 10th Edition; Institute of Transportation Engineers; Washington, D.C.; 2017.

The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[2]. The travel mode shares are shown in Table 3-2.

Table 3-2 Travel Mode Shares

Land Use	Direction	Walk/ Bicycle Share	Transit Share	Auto Share	Vehicle Occupancy Rate
Daily					
Residential	In	40%	41%	19%	1.18
	Out	40%	41%	19%	
Office	In	55%	16%	29%	1.18
	Out	55%	16%	29%	
Retail	In	55%	16%	29%	1.82
	Out	55%	16%	29%	
a.m. Peak Hour					
Residential	In	40%	41%	19%	1.18
	Out	40%	41%	19%	
Office	In	57%	19%	24%	1.18
	Out	61%	13%	26%	
Retail	In	57%	19%	24%	1.82
	Out	61%	13%	26%	
p.m. Peak Hour					
Residential	In	40%	41%	19%	1.18
	Out	40%	41%	19%	
Office	In	61%	13%	26%	1.18
	Out	57%	19%	24%	
Retail	In	61%	13%	26%	1.82
	Out	57%	19%	24%	

3.4.7 Project Trip Generation

The mode share percentages shown in Table 3-2 were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates for the Project. The trip generation for the Project by mode is shown in Table 3-3. The detailed trip generation information is provided in Appendix D.

[2] Summary of Travel Trends: 2017 National Household Travel Survey; FHWA; Washington, D.C.; August 2018.

Table 3-3 Project Trip Generation

Land Use	Direction	Walk/ Bicycle Trips	Transit Trips	Vehicle Trips
Daily				
Residential	In	85	87	34
	Out	85	87	34
Commercial Office	In	7	2	3
	Out	7	2	3
Retail	In	52	15	15
	Out	52	15	15
Total	**In**	**144**	**104**	**52**
	Out	**144**	**104**	**52**
a.m. Peak Hour				
Residential	In	3	3	1
	Out	8	9	3
Commercial Office	In	1	0	1
	Out	0	0	0
Retail	In	2	1	1
	Out	1	0	1
Total	**In**	**6**	**4**	**3**
	Out	**9**	**9**	**4**
p.m. Peak Hour				
Residential	In	8	9	3
	Out	5	6	2
Commercial Office	In	0	0	0
	Out	1	0	1
Retail	In	6	1	1
	Out	5	2	1
Total	**In**	**14**	**10**	**4**
	Out	**11**	**8**	**4**

As shown in Table 3-3, there are 288 pedestrian/bicycle trips, 208 transit trips, and 104 vehicle trips throughout the day. During the a.m. peak hour, there are 15 pedestrian/bicycle trips (6 in and 9 out), 13 transit trips (4 in and 9 out), and 7 vehicle trips (3 in and 4 out). During the p.m. peak hour, there are 25 pedestrian/bicycle trips (14 in and 11 out), 18 transit trips (10 in and 8 out), and 8 vehicle trips (4 in and 4 out).

3.4.8 Trip Distribution

The trip distribution identifies the various travel paths for vehicles associated with the Project. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 4 – Back Bay, and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution for the Project is illustrated in Figure 3-14.

3.4.9 Build (2026) Condition Transit Volumes

Most transit users from the Project Site are anticipated to use the Orange Line to commute from the site. Existing 2016 Orange Line ridership, the most recent available data from the MBTA, was obtained and assessed to determine the impact the Project would have on transit. The ridership was grown at 1% per year to 2026, which is the future projected growth of transit ridership in the Long-Range Transportation Plan published by the Central Transportation Planning Staff. Capacity was determined based on the MBTA Service Delivery Policy 2017 which outlines vehicle load standards for each of the transit routes. The hourly capacity of the Orange Line trains is 8,460 passengers. The max hourly line load ridership at the Massachusetts Avenue station in both directions was assessed and results are shown in Table 3-4.

Table 3-4 Transit Analysis, Massachusetts Avenue MBTA Orange Line

Transit Route	Time Period and Direction		2016 Existing Ridership	2026 No-Build	Project Transit Trips	% Change	Volume to Capacity
Orange Line	a.m. Peak (8-9 a.m.)	NB	1474	1629	9	0.55%	0.19
		SB	5346	5905	4	0.07%	0.70
Orange Line	p.m. Peak (5-6 p.m.)	NB	4544	5020	8	0.16%	0.59
		SB	2400	2651	10	0.38%	0.31

As shown in Table 3-4, the impact of the Project on transit ridership is minimal and does not place the Orange Line over capacity at any point during the peak hours.

3.4.10 Build (2026) Condition Traffic Volumes

The new Project-generated trips for the a.m. and p.m. peak hours are shown in Figure 3-15 and Figure 3-16, respectively. The trip assignments were added to the No-Build (2026) Condition vehicular traffic volumes to develop the Build (2026) Condition vehicular traffic volumes. The Build (2026) Condition a.m. and p.m. peak hour traffic volumes are shown on Figure 3-17 and Figure 3-18, respectively.

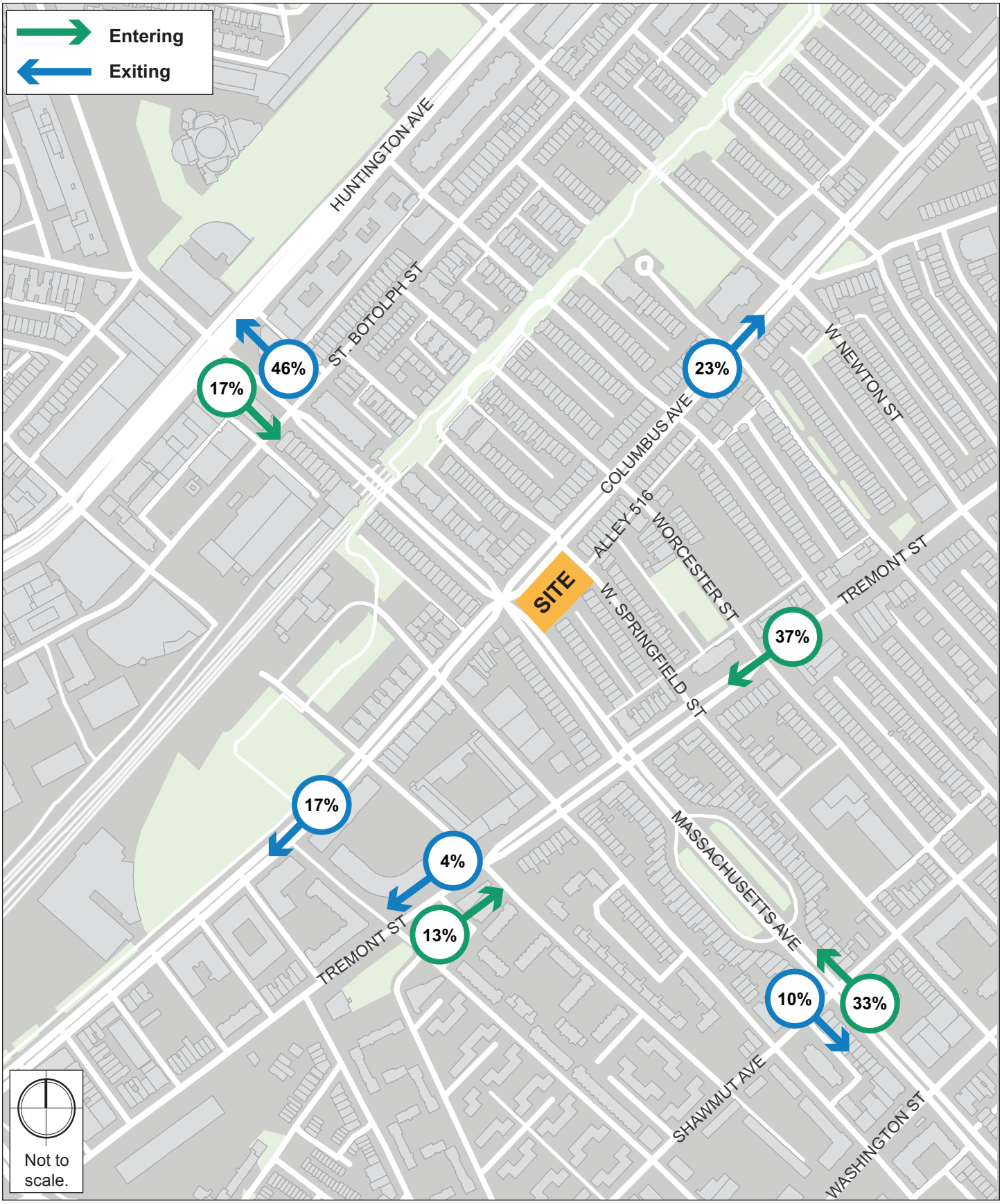

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Figure 3-14
Trip Distribution

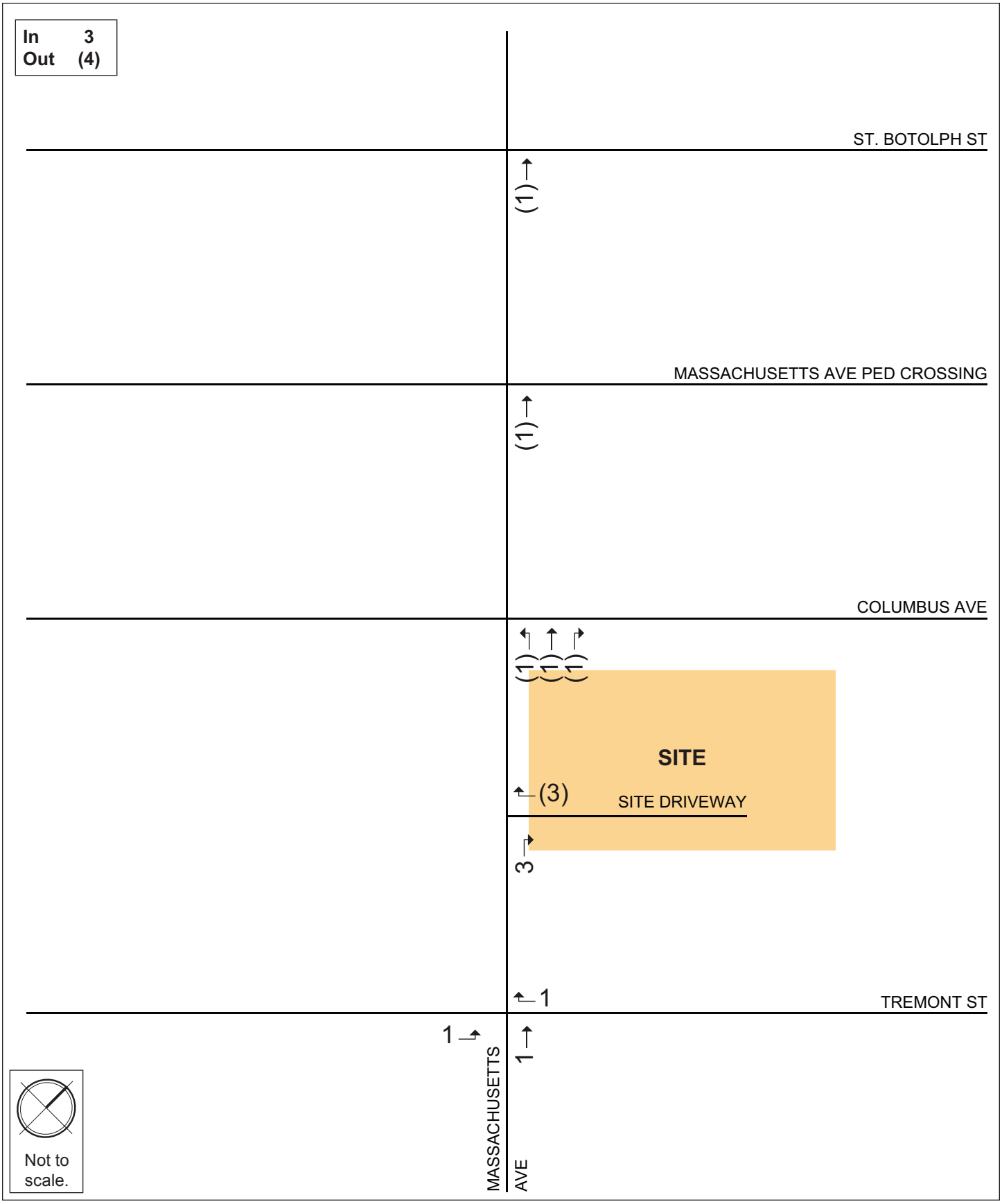

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Figure 3-15
Project-generated Trips, Weekday a.m. Peak Hour

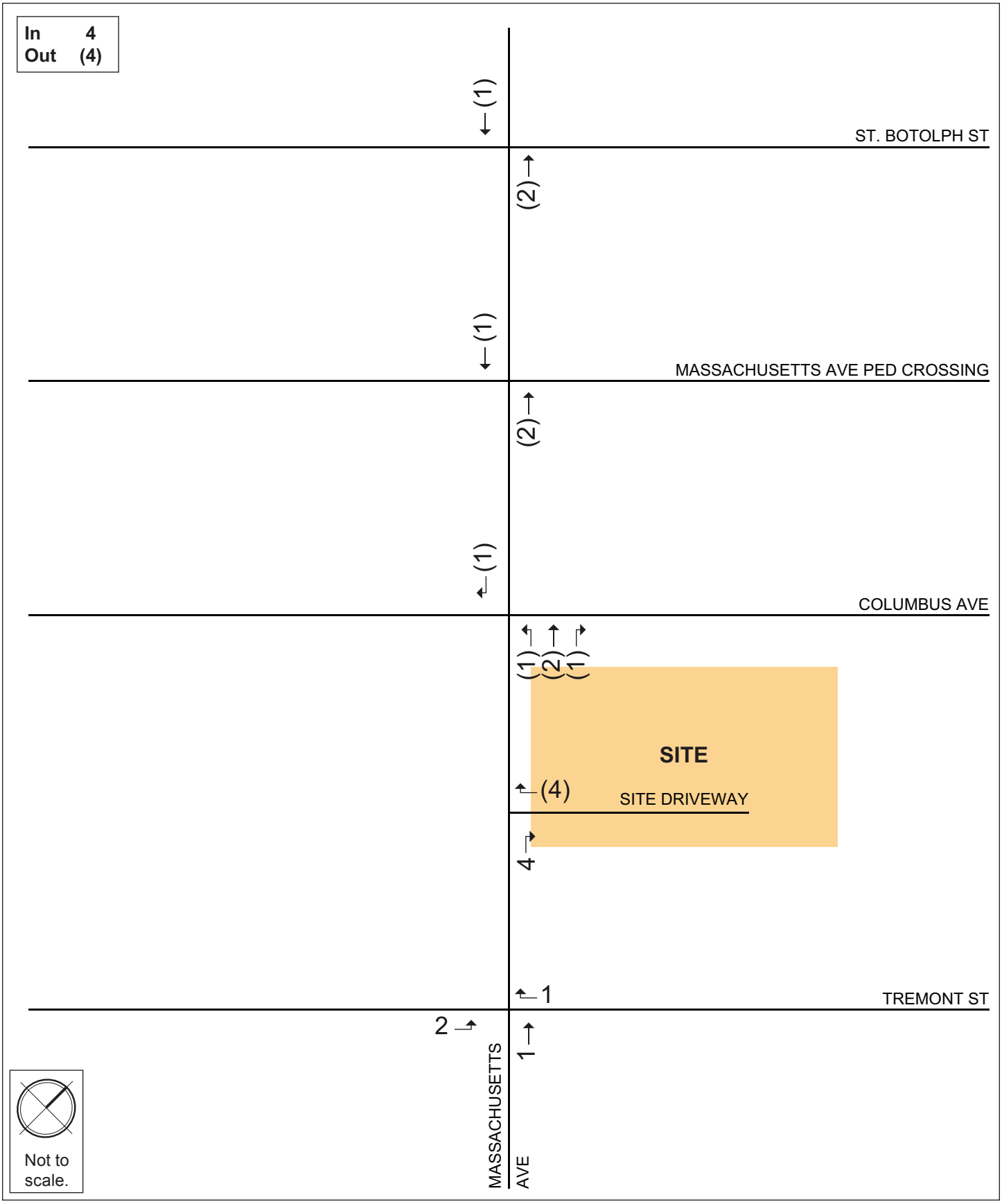

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Figure 3-16
Project-generated Trips, Weekday p.m. Peak Hour

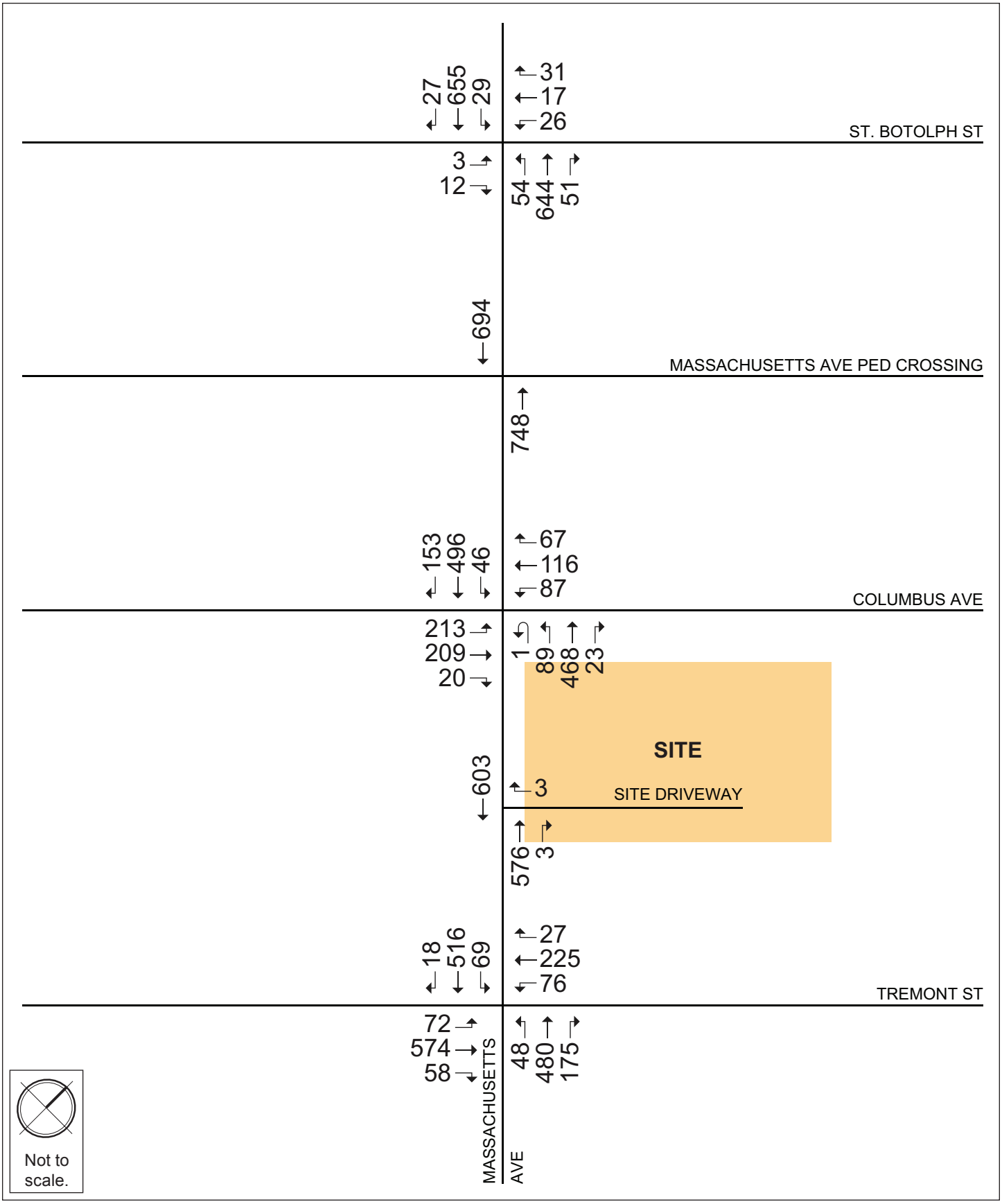

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Figure 3-17

Build (2026) Condition Traffic Volumes, Weekday a.m. Peak Hour

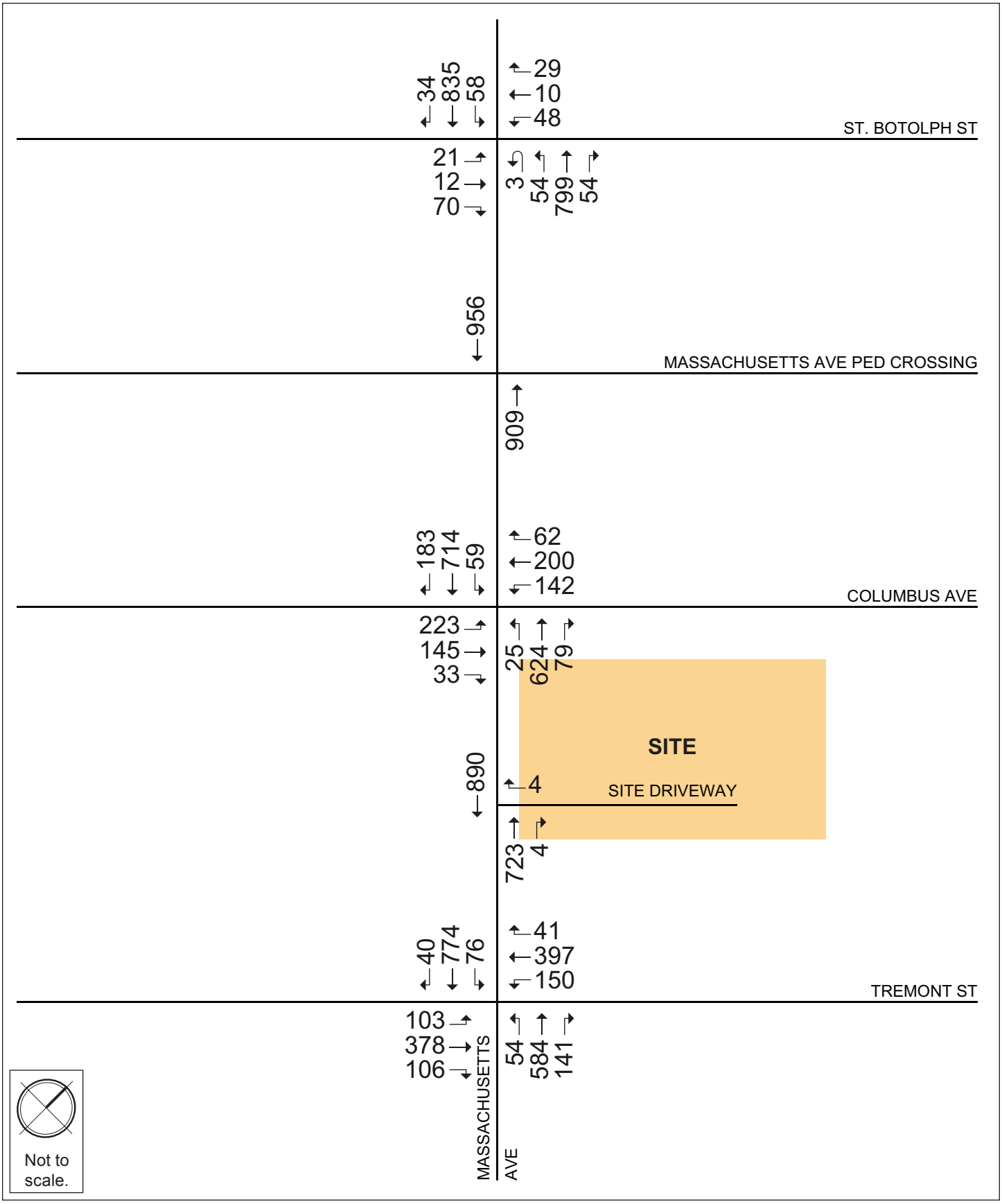

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Figure 3-18

Build (2026) Condition Traffic Volumes, Weekday p.m. Peak Hour

3.5 Traffic Capacity Analysis

Trafficware's Synchro (version 9) software package was used to calculate average delay and associated LOS at the study area intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2010 Highway Capacity Manual (HCM).

LOS designations are based on the average delay per vehicle for all vehicles entering an intersection. Table 3-5 displays the intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst 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 3-5 Vehicle Level of Service Criteria

Level of Service	Average Stopped Delay (sec/veh)	
	Signalized Intersection	Unsignalized Intersection
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: 2010 Highway Capacity Manual, Transportation Research Board.

In addition to delay and LOS, the operational capacity and vehicular queues are calculated and used to further quantify traffic operations at intersections. The following describes these other calculated measures.

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

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

The 95th percentile queue 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. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be

considered a "worst case" scenario. Queues at the intersection are generally below the 95th percentile queue throughout the course of the peak hour. It is also unlikely that the 95th percentile queues for each approach to the intersection will occur simultaneously.

Table 3-5 and Table 3-6 summarize the Existing (2019) Condition, the No-Build (2026) Condition, and the Build (2026) Condition capacity analysis for the study area intersection during the weekday a.m. and p.m. peak hours, respectively. The detailed analysis of the Synchro results is provided in Appendix C.

3.5.1 Existing (2019) Condition Traffic Capacity Analysis

As shown in Table 3-6 and Table 3-7, in the Existing (2019) Condition, all the study area intersections and approaches operate at acceptable levels of service (LOS D or better) during the weekday a.m. and p.m. peak hours except for one movement. At the intersection of Massachusetts Avenue/Columbus Avenue, the Columbus Avenue eastbound thru/right-turn movement operates at LOS E during the a.m. peak hour.

3.5.2 No-Build (2026) Condition Traffic Capacity Analysis

As shown in the No-Build (2026) Condition, most of the study area intersections and approaches continue to operate at the same levels of service during the weekday a.m. and p.m. peak hours with one exception. The delay at the intersection of Massachusetts Avenue/Columbus Avenue increases by approximately three seconds, degrading the LOS from LOS C to LOS D during the a.m. peak hour.

3.5.3 Build (2026) Condition Traffic Capacity Analysis

As shown in the Build (2026) Condition, all the study area intersections and approaches continue to operate at the same levels of service during the weekday a.m. and p.m. peak hours as in the No-Build (2026) Condition.

Table 3-6 Capacity Analysis Summary, Weekday a.m. Peak Hour

Intersection/Movement	Existing (2019) Condition					No-Build (2026) Condition					Build (2026) Condition				
	LOS	Delay (s)	V/C Ratio	Queues (ft) 50th	Queues (ft) 95th	LOS	Delay (s)	V/C Ratio	Queues (ft) 50th	Queues (ft) 95th	LOS	Delay (s)	V/C Ratio	Queues (ft) 50th	Queues (ft) 95th
Signalized Intersections															
Massachusetts Ave/Tremont St	**D**	**38.5**	**-**	**-**	**-**	**D**	**39.1**	**-**	**-**	**-**	**D**	**39.0**	**-**	**-**	**-**
Tremont St EB L	C	31.5	0.25	42	76	C	31.6	0.25	43	78	C	31.4	0.25	43	79
Tremont St EB T | T/R	D	52.1	0.82	266	#372	D	54.1	0.84	278	#394	D	54.1	0.84	278	#394
Tremont St WB L	D	47.3	0.44	43	79	D	50.3	0.48	46	82	D	50.3	0.48	46	82
Tremont St WB T | T/R	D	38.0	0.32	88	129	D	38.2	0.33	92	134	D	38.2	0.33	92	134
Mass Ave NB L	C	21.3	0.15	20	44	C	21.8	0.17	21	46	C	21.8	0.17	21	46
Mass Ave NB T | T/R	C	32.5	0.61	201	274	C	33.4	0.63	213	290	C	33.4	0.64	213	290
Mass Ave SB L	A	8.3	0.26	11	m19	A	8.1	0.28	12	m16	A	8.1	0.28	12	m16
Mass Ave SB T | T/R	C	33.8	0.47	125	134	C	32.3	0.49	124	153	C	32.3	0.49	124	154
Massachusetts Ave/Columbus Ave	**C**	**33.2**	-	-	-	**D**	**36.5**	-	-	-	**D**	**36.6**	-	-	-
Columbus Ave EB L	D	53.2	0.74	140	180	D	53.5	0.76	146	188	D	53.7	0.76	146	188
Columbus Ave EB T/R	E	60.8	0.77	189	262	E	61.9	0.78	195	#292	E	62.1	0.78	195	#293
Columbus Ave WB L	D	36.6	0.36	52	83	D	35.2	0.35	53	84	D	35.2	0.35	53	84
Columbus Ave WB T/R	D	47.1	0.60	119	191	D	49.6	0.64	132	213	D	49.7	0.64	132	213
Mass Ave NB L	B	10.3	0.32	14	m25	B	14.0	0.39	15	m24	B	14.2	0.39	16	m26
Mass Ave NB T | T/R	B	14.9	0.39	61	90	B	17.3	0.45	64	103	B	17.4	0.46	65	104
Mass Ave SB L	B	16.2	0.14	17	34	B	17.7	0.16	17	35	B	17.7	0.16	17	35
Mass Ave SB T | T/R	C	28.0	0.58	145	207	C	34.7	0.70	168	#260	C	34.9	0.71	168	#261
Massachusetts Ave/Ped Crossing	**A**	**6.1**	-	-	-	**A**	**6.4**	-	-	-	**A**	**6.4**	-	-	-
Mass Ave NB T | T	A	7.1	0.42	50	87	A	7.3	0.44	57	99	A	7.4	0.44	58	99
Mass Ave SB T | T	A	5.0	0.38	63	80	A	5.4	0.41	70	87	A	5.4	0.41	70	87
Massachusetts Ave/St. Botolph St	**B**	**13.3**	-	-	-	**B**	**13.9**	-	-	-	**B**	**13.9**	-	-	-
St Botolph St EB L/T/R	A	0.3	0.05	0	0	A	2.7	0.07	0	0	A	2.7	0.07	0	0
St Botolph St WB L/T/R	C	31.3	0.31	46	71	C	32.2	0.32	49	74	C	32.2	0.32	49	74
Mass Ave NB L/T | T/R	B	12.7	0.47	86	76	B	13.6	0.50	128	66	B	13.5	0.50	129	66
Mass Ave SB L	B	10.5	0.09	9	23	B	10.7	0.10	9	24	B	10.7	0.10	9	24
Mass Ave SB T | T/R	B	11.8	0.34	123	159	B	12.2	0.37	137	175	B	12.2	0.37	137	175

Table 3-7 Capacity Analysis Summary, Weekday p.m. Peak Hour

Intersection/Movement	Existing (2019) Condition					No-Build (2026) Condition					Build (2026) Condition				
	LOS	Delay (s)	V/C Ratio	Queues (ft) 50th	Queues (ft) 95th	LOS	Delay (s)	V/C Ratio	Queues (ft) 50th	Queues (ft) 95th	LOS	Delay (s)	V/C Ratio	Queues (ft) 50th	Queues (ft) 95th
Signalized Intersections															
Massachusetts Ave/Tremont St	**C**	**34.0**	**-**	**-**	**-**	**C**	**34.5**	**-**	**-**	**-**	**C**	**34.5**	**-**	**-**	**-**
Tremont St EB L	D	39.6	0.41	63	97	D	39.8	0.42	64	99	D	39.8	0.43	66	101
Tremont St T | T/R	D	51.1	0.77	204	255	D	51.1	0.77	213	#267	D	51.1	0.77	213	#267
Tremont St WB L	D	53.7	0.65	92	139	D	54.8	0.67	95	144	D	54.8	0.67	95	144
Tremont St WB T | T/R	D	47.9	0.65	176	236	D	47.7	0.65	183	244	D	47.5	0.65	183	244
Mass Ave NB L	C	25.2	0.22	22	49	C	27.3	0.25	23	50	C	27.2	0.24	23	50
Mass Ave NB T | T/R	C	32.4	0.59	227	306	C	33.9	0.63	244	325	C	33.9	0.63	244	326
Mass Ave SB L	B	11.3	0.28	15	m19	B	12.2	0.31	15	m19	B	12.2	0.31	15	m19
Mass Ave SB T | T/R	B	13.9	0.65	86	114	B	14.4	0.69	94	m113	B	14.4	0.69	94	m112
Massachusetts Ave/Columbus Ave	**D**	**37.0**	-	-	-	**D**	**40.7**	-	-	-	**D**	**40.7**	-	-	-
Columbus Ave EB L	D	46.1	0.67	120	173	D	47.6	0.70	128	187	D	47.5	0.70	128	187
Columbus Ave EB T/R	D	41.4	0.45	119	192	D	41.4	0.46	125	201	D	41.4	0.46	125	201
Columbus Ave WB L	C	29.2	0.38	81	117	C	28.7	0.38	82	122	C	28.7	0.38	82	122
Columbus Ave WB T/R	D	52.3	0.73	203	288	D	52.4	0.74	214	301	D	52.4	0.74	214	301
Mass Ave NB L	B	12.8	0.13	7	m12	B	14.5	0.14	6	m12	B	14.6	0.14	7	m12
Mass Ave NB T | T/R	C	31.3	0.68	141	245	C	34.7	0.74	160	#266	C	34.7	0.75	161	#270
Mass Ave SB L	C	21.5	0.25	17	45	C	24.4	0.28	19	49	C	24.6	0.28	19	49
Mass Ave SB T | T/R	D	36.5	0.84	331	#485	D	43.8	0.91	360	#523	D	43.9	0.91	361	#524
Massachusetts Ave/Ped Crossing	**A**	**2.1**	-	-	-	**A**	**2.1**	-	-	-	**A**	**2.1**	-	-	-
Mass Ave NB T | T	A	3.1	0.35	74	61	A	3.0	0.37	74	60	A	3.0	0.37	74	61
Mass Ave SB T | T	A	1.1	0.34	8	19	A	1.2	0.36	10	22	A	1.2	0.36	10	22
Massachusetts Ave/St Botolph St	**B**	**14.3**	-	-	-	**B**	**15.5**	-	-	-	**B**	**15.5**	-	-	-
St Botolph St EB L/T/R	B	18.5	0.32	24	68	B	18.2	0.34	25	70	B	18.2	0.34	25	70
St Botolph St WB L/T/R	D	39.8	0.43	65	93	D	41.0	0.45	68	97	D	41.0	0.45	68	97
Mass Ave NB L/T | T/R	B	12.0	0.55	107	125	B	14.2	0.61	107	141	B	14.3	0.61	107	142
Mass Ave SB L	B	13.3	0.23	20	45	B	14.0	0.25	21	48	B	14.0	0.25	21	48
Mass Ave SB T | T/R	B	12.7	0.41	171	213	B	13.2	0.45	189	235	B	13.2	0.45	190	236

3.6 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 vehicle 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 guests 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 implementing the following TDM 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:

- **Transportation Coordinator:** The Proponent will hire a transportation coordinator for the site. The transportation coordinator will oversee all transportation issues including parking, service and loading, deliveries, and implementing the TDM programs.

- **Project Web Site:** The web site will include transportation-related information for residents, visitors, and employees to promote transit use.

- **Orientation Packets:** The Proponent will provide orientation packets to new tenants containing information on available transportation choices, including public transportation routes/schedules, nearby vehicle sharing and bicycle sharing locations, and walking opportunities;

- **Zip Cars:** There are currently Zipcar spaces located within the site parking lot. The Proponent will look to maintain Zipcar spaces on the site to encourage reduced vehicle ownership among the tenants.

- **Electric Vehicles:** The Proponent will provide electric vehicle charging stations to exceed the BTD required 25 percent of total parking, and will have sufficient infrastructure capacity for future accommodation of 100% of the total parking spaces.

- **Transit Pass Programs**: The Proponent will encourage the tenants within the retail and office space to incentivize employees to use transit and will encourage MBTA pass subsidies to full-time employees.

3.7 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.

The Proponent will bring all abutting sidewalks and pedestrian ramps to the City of Boston standards in accordance with the Boston Complete Streets design guidelines. This will include the reconstruction and widening of the sidewalks where possible, the installation of new, accessible ramps, improvements to street lighting where necessary, planting of street trees, and providing bicycle storage racks surrounding the site, where appropriate. The Project's positive impacts include increased public realm, greater pedestrian amenities and safer garage access and egress.

The Proponent will work with the City to evaluate improvements to the current bus stop in front of the site along Massachusetts Avenue. The Proponent will consult with the MBTA and BET to evaluate the feasibility of moving the bus stop to the far side.

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

3.8 Evaluation of Short-term Construction Impacts

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

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

- Parking will not be provided on-site for construction workers;
- Construction workers will be encouraged to use public transportation and/or carpool;
- Consideration of a subsidy for MBTA passes for full-time employees; and
- Providing secure spaces on-site for workers' supplies and tools so they do not have to be brought to the site each day.

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

Chapter 4.0

Environmental Review Component

4.0 ENVIRONMENTAL REVIEW COMPONENT

4.1 Wind

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

The proposed Project is six stories and approximately 70 feet tall. The buildings in the area surrounding the Project Site range from three to five stories and are similar in height. The Project will include a series of roof terraces as well as new street trees, which will serve to deflect downwash winds and shield the building from upper level winds, both of which will prevent higher wind speeds from reaching the street. Therefore, the building is not anticipated to impact pedestrian-level winds in the surrounding area.

4.2 Shadow

4.2.1 Introduction and Methodology

As typically required by the BPDA, 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. Figures showing the net new shadow from the Project are provided in Figures 4.2-1 to 4.2-14 at the end of this section.

The results of the analysis show that new shadow from the Project will generally be limited to nearby streets and sidewalks. Of the 14 time periods studied, new shadow will be cast onto the Wellington Green during only one time period (December 21 at 12:00 p.m.), and onto the Massachusetts Avenue bus stop adjacent to the site during one time period (June 21 at 9:00 a.m.)

4.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, shadow from the Project will be cast to the northwest onto Columbus Avenue and its sidewalks. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

At 12:00 p.m., shadow from the Project will be cast to the north onto a sliver of Columbus Avenue and its southern sidewalk, and onto West Springfield Street and its sidewalks. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

At 3:00 p.m., shadow from the Project will be cast to the northeast onto a sliver of West Springfield Street and its sidewalks. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

4.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, shadow from the Project will be cast to the northwest onto Columbus Avenue and its southern sidewalk, and onto a sliver of Massachusetts Avenue and its eastern sidewalk. No new shadow will be cast onto open spaces in the vicinity of the Project. New shadow from the Project will be cast onto the bus stop on Massachusetts Avenue.

At 12:00 p.m., shadow from the Project will be minimal and cast to the north onto West Springfield Street and its western sidewalk. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

At 3:00 p.m., shadow from the Project will be cast to the east onto West Springfield Street and its eastern sidewalk. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

At 6:00 p.m., shadow from the Project will be cast to the southeast onto a small portion of West Springfield Street and its eastern sidewalk. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

4.2.4 Autumnal Equinox (September 21)

At 9:00 a.m., shadow from the Project will be cast to the northwest onto Columbus Avenue and its sidewalks. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

At 12:00 p.m., shadow from the Project will be cast to the north onto Columbus Avenue's southern sidewalk and onto West Springfield Street and its eastern sidewalk. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

At 3:00 p.m., shadow from the Project will be cast to the northeast onto a sliver of West Springfield Street and its eastern sidewalk. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

At 6:00 p.m., most of the area is under existing shadow. Shadow from the Project will be cast to the east. No new shadow will be cast onto nearby bus stops, open spaces, streets or sidewalks in the vicinity of the Project.

4.2.5 Winter Solstice (December 21)

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

At 9:00 a.m., shadow from the Project will be cast to the northwest onto Columbus Avenue and its sidewalks and onto Wellington Street and its sidewalks. No new shadow will be cast onto nearby bus stops or open spaces by the Project.

At 12:00 p.m., shadow from the Project will be cast to the north onto Columbus Avenue and its sidewalks. New shadow will be cast onto the very southern edge of the Wellington Green. No new shadow will be cast onto nearby bus stops or other open spaces in the vicinity of the Project.

At 3:00 p.m., shadow from the Project will be cast to the northeast onto a sliver of West Springfield Street and its sidewalks. No new shadow will be cast onto nearby bus stops or open spaces in the vicinity of the Project.

4.2.6 Conclusions

The shadow impact analysis looked at net new shadow created by the Project during 14 time periods and shows that new shadow from the Project will be limited to the streets and sidewalks adjacent to the Project Site. The Project will cast a small amount of new shadow onto the Wellington Green during only one of the fourteen time periods studied (December 21 at 12:00 p.m.), and onto the Massachusetts Avenue bus stop adjacent to the Project Site during one of the fourteen time periods studied (June 21 at 9:00 a.m.).

566 Columbus Avenue Boston, Massachusetts

Figure 4.2-1

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

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Figure 4.2-2

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

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Figure 4.2-3
Shadow Study: March 21, 3:00 p.m.

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Figure 4.2-4

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

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Figure 4.2-5
Shadow Study: June 21, 12:00 p.m.

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Figure 4.2-6
Shadow Study: June 21, 3:00 p.m.

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Figure 4.2-7

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

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JGE J. GARLAND ENTERPRISES LLC

Figure 4.2-8

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

566 Columbus Avenue Boston, Massachusetts

JGE J. GARLAND ENTERPRISES LLC

Figure 4.2-9

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

566 Columbus Avenue Boston, Massachusetts

JGE J. GARLAND ENTERPRISES LLC

Figure 4.2-10

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

566 Columbus Avenue Boston, Massachusetts

Figure 4.2-11

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

566 Columbus Avenue Boston, Massachusetts

Figure 4.2-12

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

566 Columbus Avenue Boston, Massachusetts

Figure 4.2-13

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

566 Columbus Avenue Boston, Massachusetts

Figure 4.2-14

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

4.3 Daylight Analysis

4.3.1 Introduction

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

Because the Project consists of replacing a low-rise building with a new, six-story mixed-use building, the Project will inherently increase daylight obstruction. However, the resulting conditions will be similar to or only slightly higher than what is typical of the area.

4.3.2 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.

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

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

566 Columbus Avenue Boston, Massachusetts

Epsilon Associates Inc.

Figure 4.3-1
Viewpoint Locations

- **Viewpoint 1:** View from the center of Massachusetts Avenue facing northeast toward the Project Site.
- **Viewpoint 2:** View from the center of Columbus Avenue facing south toward the Project Site.
- **Viewpoint 3:** View from the center of West Springfield Street facing southwest toward the Project Site.
- **Area Context Viewpoint AC1:** View from the center of Massachusetts Avenue facing northeast toward 492 Massachusetts Avenue.
- **Area Context Viewpoint AC2:** View from the center of Columbus Avenue facing northwest toward 557 Columbus Avenue.
- **Area Context Viewpoint AC3:** View from the center of West Springfield Street facing northeast toward 558 Columbus Avenue.

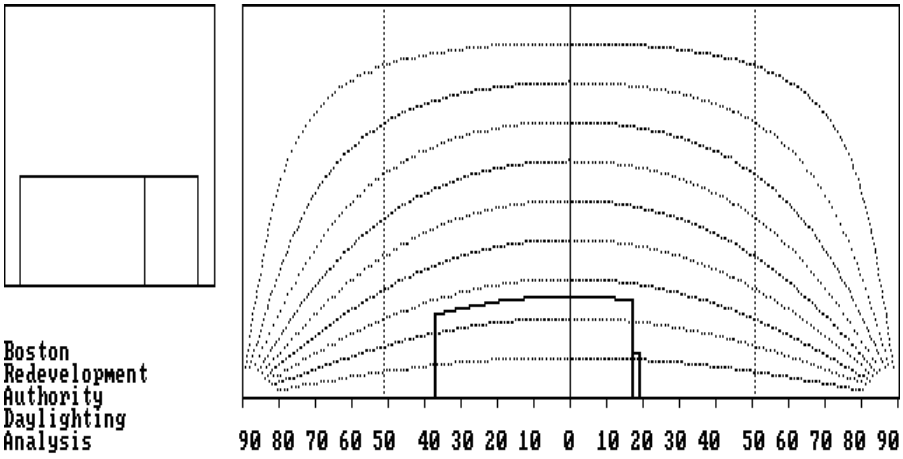
4.3.3 Results

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

Table 4.3-1 Daylight Analysis Results

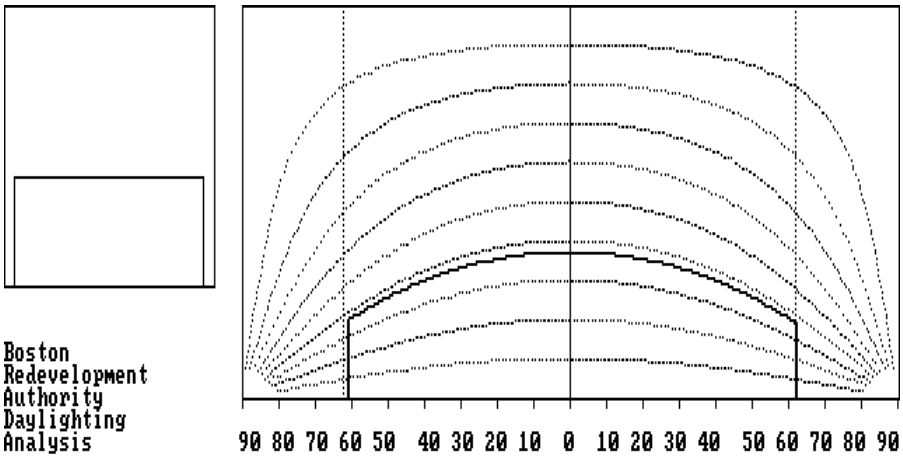
Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	View from the center of Massachusetts Avenue facing northeast toward the Project Site.	14.0%	58.5%
Viewpoint 2	View from the center of Columbus Avenue facing south toward the Project Site.	36.9%	61.5%
Viewpoint 3	View from the center of West Springfield Street facing southwest toward the Project Site.	48.1%	71.2%
Area Context Points			
AC1	View from the center of Massachusetts Avenue facing northeast toward 492 Massachusetts Avenue.	67.4%	N/A
AC2	View from the center of Columbus Avenue facing northwest toward 557 Columbus Avenue.	45.7%	N/A
AC3	View from the center of West Springfield Street facing northeast toward 558 Columbus Avenue.	65.2%	N/A

Viewpoint 1: View from the center of Massachusetts Avenue facing northeast toward the Project site



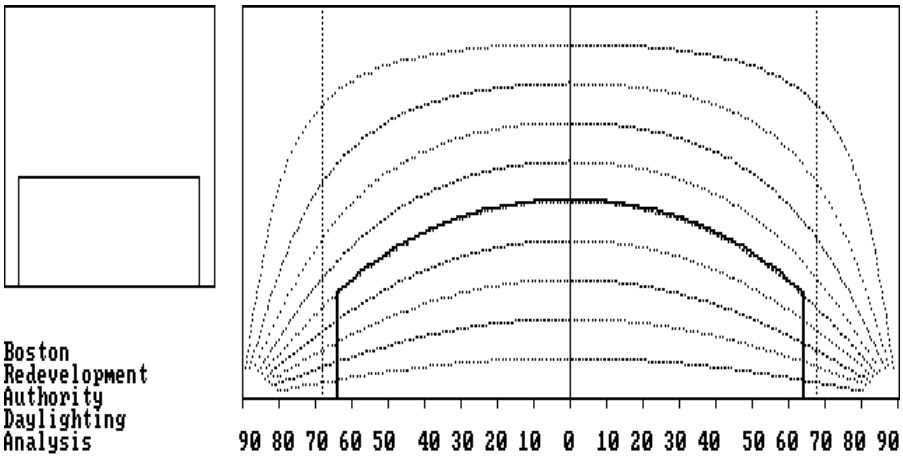
Obstruction of daylight by the building is 14.0 %

Viewpoint 2: View from the center of Columbus Avenue facing south toward the Project site



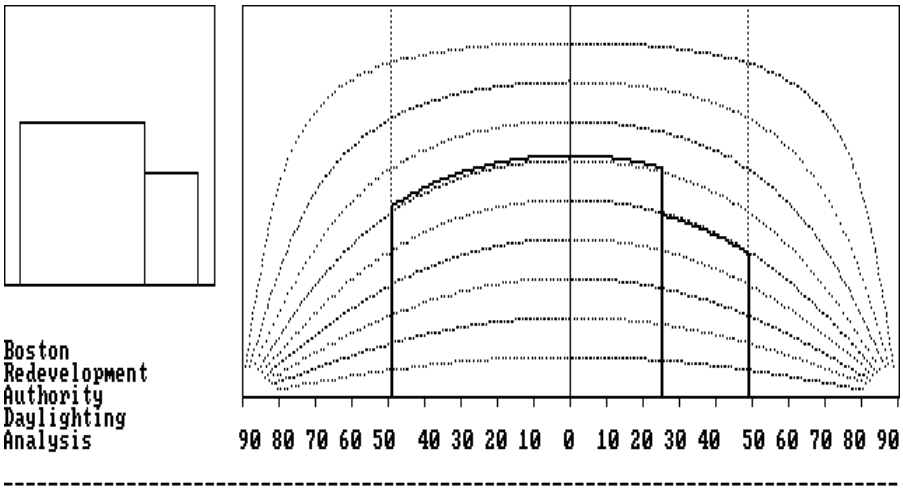
Obstruction of daylight by the building is 36.9 %

Viewpoint 3: View from the center of West Springfield Street facing southwest toward the Project site

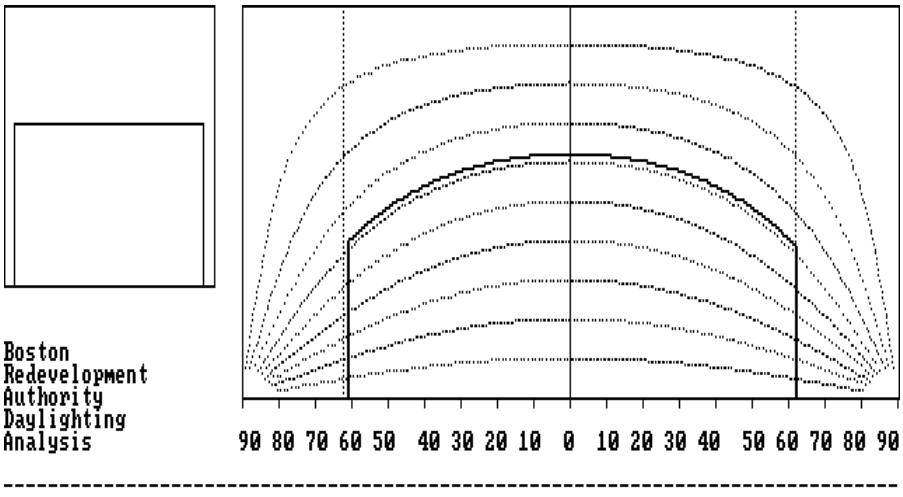


Obstruction of daylight by the building is 48.1 %

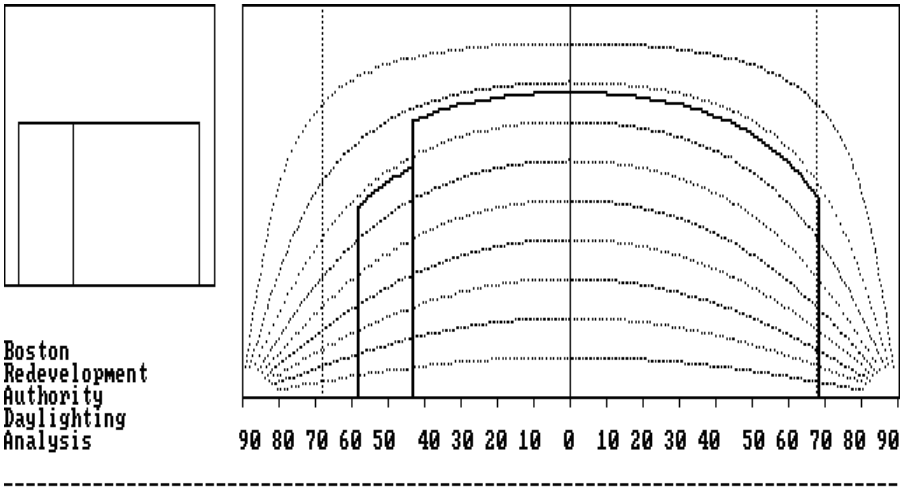
Viewpoint 1: View from the center of Massachusetts Avenue facing northeast toward the Project site



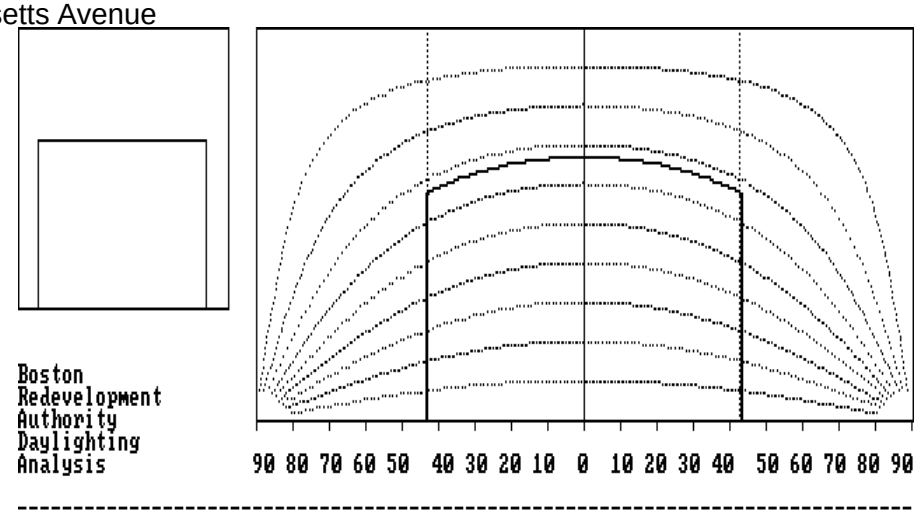
Viewpoint 2: View from the center of Columbus Avenue facing south toward the Project site



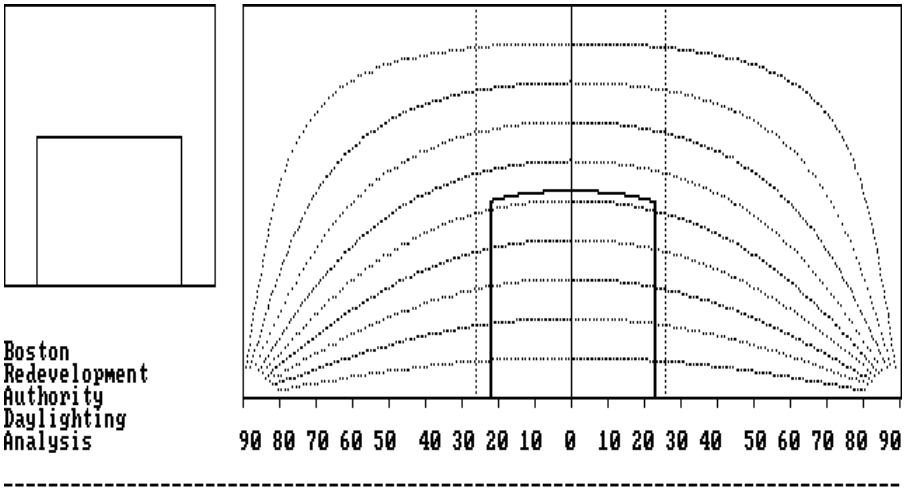
Viewpoint 3: View from the center of West Springfield Street facing southwest toward the Project site



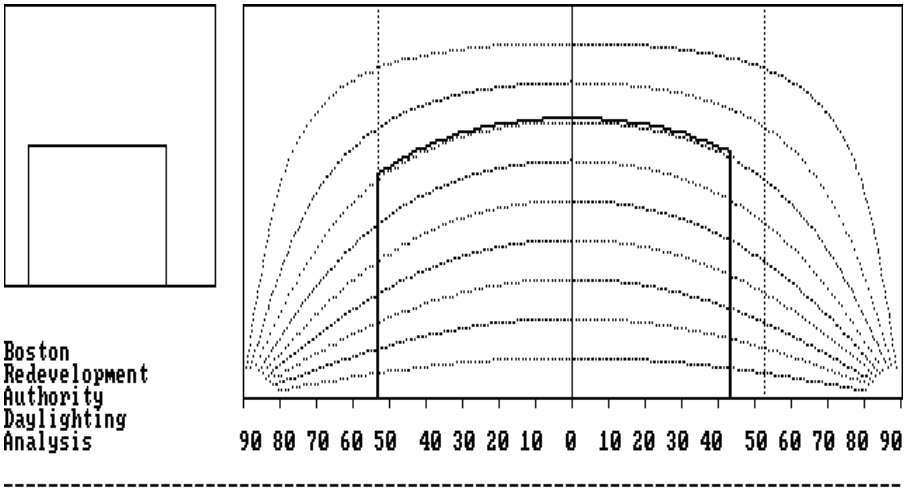
Area Context Viewpoint AC1: View from the center of Massachusetts Avenue facing northeast toward 492 Massachusetts Avenue



Area Context Viewpoint AC2: View from the center of Columbus Avenue facing northwest toward 557 Columbus Avenue



Area Context Viewpoint AC3: View from the center of West Springfield Street facing northeast toward 558 Columbus Avenue



Massachusetts Avenue – Viewpoint 1

Massachusetts Avenue runs along the southwestern edge of the Project Site. Viewpoint 1 was taken from the center of Massachusetts Avenue facing northeast toward the Project Site. The development of the Project will increase the daylight obstruction value to 58.5%. While this is an increase over existing conditions, the daylight obstruction value is consistent with other buildings in the area, including the Area Context buildings.

Columbus Avenue – Viewpoint 2

Columbus Avenue runs along the northern edge of the Project Site. Viewpoint 2 was taken from the center of Columbus Avenue facing south toward the Project Site. The development of the Project will increase the daylight obstruction value to 61.5%. While this is an increase over existing conditions, the daylight obstruction value is consistent with other buildings in the area, including the Area Context buildings.

West Springfield Street – Viewpoint 3

West Springfield Street runs along the northeastern edge of the Project Site. Viewpoint 3 was taken from the center of West Springfield Street facing southwest toward the Project Site. The development of the Project will increase the daylight obstruction value to 71.2%. While this is an increase over existing conditions, the daylight obstruction value is only slightly higher than Area Context buildings.

Area Context

The Project area consists primarily of low to mid-rise residential buildings with ground floor commercial space. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the three Area Context viewpoints described above and shown on Figure 4.3-1. The daylight obstruction values ranged from 45.7% for AC2 to 67.4% for AC1.

4.3.4 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 the Project will result in increased daylight obstruction over existing conditions with values of the Proposed Conditions similar to or slightly higher than the Area Context viewpoints, and typical of urban areas.

4.4 Solar Glare

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

4.5 Air Quality Analysis

The BPDA requires that project-induced impacts to ambient air quality be addressed. A microscale analysis is used to determine the effect on air quality of the increase in traffic generated by the Project. This microscale analysis may be required for a project at intersections where 1) project traffic would impact intersections or roadway links currently operating at Level of Service (LOS) D, E, or F or would cause LOS to decline to D, E, or F; 2) project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the project will generate 3,000 or more new average daily trips (ADT) on roadways providing access to a single location.

The proposed Project does not generate 3,000 ADT, nor does it increase traffic volumes by 10 percent or 100 vehicles per hour. As discussed in Chapter 3, all intersections studied will continue to operate at the same LOS as under the No Build conditions during both the a.m. and p.m. peak hours. Therefore, no quantitative analysis is required. Given the generally well-operating intersections, and the small increases in volume at the worst intersections, it is expected that there would be no violations of the NAAQS for CO at any intersections associated with Project-related traffic.

4.6 Stormwater/Water Quality

Please see Section 8.3.

4.7 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 25025C0079J indicates the FEMA Flood Zone Designations for the site area. The map shows that the Project is located in a Zone X, “Areas determined to be outside the 0.2% annual chance floodplain.”

The site does not contain wetlands.

4.8 Geotechnical Impacts

This section describes the anticipated site subsurface soil and groundwater conditions, planned below-grade construction activities for the Project, and mitigation measures for protection of adjacent structures and for avoiding adverse impacts to groundwater levels in the Project area during excavation and foundation construction. Elevations as referenced herein are in feet and refer to the Boston City Base datum.

4.8.1 Subsurface Soil Conditions

Based upon available subsurface data obtained from boreholes performed in the immediate vicinity of the Project area, it is anticipated that the site is underlain by a 5 to 15-foot thick fill deposit. The fill deposit is anticipated to be underlain by a 3 to 6-foot thick organic silt deposit, overlying a relatively thick marine clay deposit.

4.8.2 Groundwater

Groundwater levels in the South End neighborhood of Boston are periodically monitored by the Boston Groundwater Trust (BGwT) and are documented on the BGwT on-line database. The groundwater levels recorded by the BGwT in the vicinity of the Project Site from 2004 through 2019 ranged from about Elevation +5.9 to Elevation +8.2 at Well ID:21I-2062 located just northwest of the intersection between Massachusetts Avenue and Columbus Avenue; and from about Elevation +5.8 to Elevation +8.1 at Well ID: 21I-2116 located just northeast of the intersection between Columbus Avenue and West Springfield Street.

Groundwater levels at and near the Project 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 is located within the Groundwater Conservation Overlay District (GCOD) and accordingly, the Project will comply with requirements of Article 32 of the City of Boston Zoning Code.

4.8.3 Proposed Foundation Construction

It is anticipated that proposed building will be supported on a foundation system consisting of spread footings or a structural mat foundation. The lowest level slab will likely consist of a pressure-relieved slab-on-grade or a waterproofed structural mat designed to resist hydrostatic uplift pressure. The perimeter walls of the proposed building will be waterproofed to maintain the preconstruction groundwater levels outside the footprint of the building.

Construction of the below-grade level is anticipated to require an excavation approximately 16 feet deep over the majority of the footprint of the proposed building. The lateral earth support system is anticipated to consist of steel sheet piles extending into the marine clay deposit. The sheet piles will function as a cofferdam to provide a positive groundwater cut-off during the construction phase of the Project.

4.8.4 Potential Impacts during Excavation and Foundation Construction

Potential impacts during excavation and foundation construction include impacts to area groundwater levels, ground vibrations, noise, and ground movement due to excavation. The foundation design and construction will be conducted to limit potential adverse impacts to the adjacent streets, structures, and to groundwater levels.

The foundation design and preparation of the contract documents will be based on the encountered subsurface conditions, and engineering analyses performed to assess the potential impacts to adjacent structures and the surrounding groundwater levels. The subsurface conditions at the Project Site would be observed in borings and/or test pits.

Excavation for the below-grade portion of the structure is anticipated to extend up to about four to six feet below the site groundwater level. The sheet piles would extend into the marine clay deposit below the bottom the excavation to provide a groundwater cut-off during the construction period in order to minimize impact to the surrounding preconstruction groundwater level.

In consideration that the excavation depth will extend below the site groundwater level and that the excavation will be performed within a sheet pile cofferdam designed to serve as a groundwater cut-off, construction dewatering within the excavation is anticipated to be accomplished utilizing conventional sumping. Construction dewatering is anticipated to be relatively limited in duration and include relatively low flow.

In the event that dewatering effluent is discharged from the Project Site into the adjacent storm drains, a temporary construction dewatering permit will be obtained from the appropriate governing agencies prior to such discharge. Chemical testing of the effluent will be conducted in accordance with the permit criteria.

During excavation, all excess excavated soil will be managed for off-site disposal in accordance with current regulations and policies of the Massachusetts Department of Environmental Protection (MassDEP).

4.8.5 Mitigation Measures

Provisions will be incorporated into the design and construction documents to limit potential adverse impacts, including the following:

- The design team will conduct studies, prepare designs and specifications, and review contractor's submittals for conformance to the Project contract documents with specific attention to protection of nearby structures and facilities and to avoid lowering of preconstruction groundwater level. In particular, selection of the building foundation and excavation support systems and their details will be made with specific attention to mitigating adverse temporary and long-term impacts outside the Project Site.

- Performance criteria (threshold and limiting values) will be established in the Project specifications for the lateral excavation support system with respect to control of vertical and lateral movements, water-tightness, and the construction sequence of the below-grade portion of the work. The contractor will be required to develop, employ, and modify as necessary, construction means and methods and take all necessary steps during the work to protect nearby buildings and other facilities.

- Geotechnical instrumentation will be installed and monitored during the below-grade portion of the work to observe the performance of the excavation, adjacent buildings and structures, and area groundwater levels. Vertical and in some cases lateral movements of the ground, streets, buildings and other nearby structures will be monitored.

- Preconstruction condition surveys will be conducted, as needed, on buildings adjacent to the Project Site to establish existing building conditions prior to the commencement of below-grade construction.

- A vibration monitoring program will be implemented to document pre-construction ambient and construction phase vibrations. Vibration levels in the vicinity of the Project Site will be obtained prior to construction to establish "background" conditions. Vibration levels will be monitored, as needed, at various locations adjacent to the Project Site during demolition activities, or other potentially vibration-causing activities for conformance with the project documents. Vibration threshold values will be established in the Project specifications.

4.9 Solid and Hazardous Waste

4.9.1 Hazardous Waste

Prior to commencement of the work, a Phase II Environmental Site Assessment will be performed to determine if contaminated soils and/or groundwater are present. 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) will be performed under the provisions of MGL c21 /2C, OSHA, and the Massachusetts Contingency Plan (MCP) by specialty contractors experienced and licensed in handling materials of this nature. The soils transported off site will be legally disposed in accordance with the MCP and other regulatory requirements. Disposal of materials will be tracked via Material Shipping Records, Bills of Lading and/or other methods, as required to ensure their proper and legal disposal. Should evidence of a release of oil or hazardous materials be encountered that require notification to MassDEP, response actions would be performed in compliance with the MCP.

4.9.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of residential and commercial 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 96 tons of solid waste per year.

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

4.9.3 Recycling

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

4.10 Noise Impacts

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

Table 4.10-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the APCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. These maximum allowable sound pressure levels apply at the property line of the receiving property. Zoning District Standards are presented below in Table 4.10-1.

Table 4.10-1 City of Boston Zoning District Noise Standards, Maximum Allowable Sound Pressure Levels

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

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

Additionally, the MassDEP has the authority to regulate noise under 310 CMR 7.10, which is part of the Commonwealth's air pollution control regulations. According to MassDEP, "unnecessary" noise is considered an air contaminant and thus prohibited by 310 CMR 7.10. The MassDEP administers this regulation through Noise Policy DAQC 90-001 which limits a source to a 10-dBA increase above the L90 ambient sound level measured at the Project property line and at the nearest residences. The MassDEP policy further prohibits "pure tone" conditions where the sound pressure level in one octave-band is 3 dB or more than the sound levels in each of two adjacent bands.

Mechanical equipment has been selected to minimize noise levels and to greatly reduce levels relative to those generated by the existing building on the 566 Columbus Avenue site. New MEP equipment will be located on the new roof deck level, which will be approximately 20 feet higher than existing neighboring roofs, affording greater separation distance relative to the existing building configuration. New rooftop equipment will be centrally located to maximize distances from surrounding structures and will be enclosed with acoustic sound walls. Anticipated sound levels will be verified to ensure that equipment layouts, acoustic walls, and other mediating measures as required will significantly reduce site noise from its current level and to ensure that the Project complies with the requirements of the City of Boston noise ordinance.

4.11 Construction Impacts

4.11.1 Introduction

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

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

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

The Proponent will also establish a neighborhood advisory group to monitor the construction process.

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

4.11.2 Construction Methodology/Public Safety

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

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

4.11.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in the fourth quarter of 2019 and last for approximately 18 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. Notification should occur during normal business hours, Monday through Friday. It is noted that some activities such as finishing activities could run beyond 6:00 pm to ensure the structural integrity of the finished product; certain components must be completed in a single pour, and placement of concrete cannot be interrupted.

4.11.4 Construction Staging/Access

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

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

4.11.5 Construction Mitigation

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

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

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

4.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 180 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 51% of the total employee

work hours be for Boston residents, at least 40% of total employee work hours be for minorities and at least 12% of the total employee work hours be for women. The Proponent will enter into jobs agreements with the City of Boston.

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

4.11.7 Construction Truck Routes and Deliveries

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

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

4.11.8 Construction Air Quality

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

- Using wetting agents on areas of exposed soil on a scheduled basis;
- Using covered trucks;
- Minimizing spoils on the construction site;
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;

- Minimizing storage of debris on the site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

4.11.9 Construction Noise

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

Mitigation measures are expected to include:

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

4.11.10 Construction Vibration

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

4.11.11 Construction Waste

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

4.11.12 Protection of Utilities

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

4.11.13 Rodent Control

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

4.11.14 Wildlife Habitat

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

Chapter 5.0

Sustainable Design and Climate Change Resilience

5.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

5.1 Sustainable Design

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

A LEED checklist for the Project is included at the end of this section, and the narrative below outlines how the Project intends to achieve the prerequisites and credits for each credit category. The checklist will be updated regularly as the design develops and engineering assumptions are substantiated. At present, 49 points have been targeted as 'yes'. Additional credits, identified as "Likely" or "Maybe" on the checklist, will be evaluated as the design progresses.

The Project team has met and will continue to meet regularly to ensure that the team members from the various disciplines involved are all known to each other and collectively communicating. A sustainable design focused workshop will be held during schematic design and the team will review and confirm the sustainable design and energy efficiency goals and approaches for the Project. As the Project progresses, there will be regular design meetings to ensure the entire team is engaged throughout the design and construction process. Additionally, the Project team will meet with Eversource and National Grid to discuss the available incentive programs and potential Energy Conservation Measures for the proposed Project.

Location and Transportation

The proposed Project is located on a previously developed site in the City of Boston. It is in close proximity to several public services and has access to multiple MBTA bus routes and subway lines. Residents will have access to vehicle parking and bicycle storage within the parking garage.

Sensitive Land Protection: The Project is located on a previously developed parcel in a Boston neighborhood.

High Priority Site: The Project site is located in a HUD designated Difficult Development Area.

Surrounding Density and Diverse Uses: The Project site is located in a dense urban neighborhood and is within a ½-mile walking distance to at least eight services including retail establishments and restaurants. Additionally, the neighborhood in which the Project is located has a density of greater than 35,000 sf per acre of buildable land.

Access to Quality Transit: There are several modes of public transit located within easy walking distance of the Project Site, including the Massachusetts Avenue MBTA Orange line subway stop and the Symphony Hall Green line subway stop, which are located within 0.5 mile walking distance from the entry of the Project building. There are also multiple bus stops located within 0.25 mile walking distance.

Bicycle Facilities: The Project Site is located within a 200-yard walking distance from a bicycle network that connects to at least ten diverse uses and a transit hub. The Project will include four short-term bicycle storage spaces for visitors and long-term (covered) bicycle storage for at least 5% of all regular building occupants, including residents, will be provided.

Reduced Parking Footprint: The Project will include 42 below grade parking spaces for the residents. When compared to the baseline ratios recommended by the Parking Consultants Council, the Project is providing a reduction by over 60%.

Electric Vehicles: The Project will provide a minimum of 2% of all parking spaces with electrical vehicle supply equipment (EVSE). There are 42 parking spaces provided; at least two spaces will be designated for electric vehicle parking and charging.

Sustainable Sites

The Project Site is a previously developed urban parcel located in Boston. Light colored pedestrian oriented hardscape and vegetated open spaces will be provided to mitigate heat island impacts. Additionally, a rainwater management plan will be developed to address the rate, run off and quality of the site rainwater.

Construction Activity Pollution Prevention (prerequisite): During construction, the Project is required to provide a Storm Water Pollution Prevention Plan (SWPPP) per the City of Boston requirements. The construction team will develop and implement an Erosion and Sedimentation Control (ESC) Plan for the duration of construction.

Site Assessment: The Project team will complete an early site analysis that includes a study of the topography, hydrology, climate, vegetation, soils, human use and human health effects.

Open Space: The Project will include a landscaped courtyard and pocket park. In total the accessible outdoor space will be greater than or equal to 30% of the total site area (including building footprint). A minimum of 25% of the provided outdoor space will be vegetated or have overhead vegetated canopy.

Rainwater Management: The Project parcel is a Zero lot line site. The rainwater management and mitigation plan includes capture, storage and recharge of the rainwater collected from the building roof(s). The Project will manage up to 1.25" rainwater on site, which is equivalent to the 80th percentile of regional/local rainfall events for zero lot line projects.

Heat Island Reduction: To minimize effects on microclimates and human and wildlife habitats, heat island effect will be reduced by including below grade parking and specifying light colored roof and hardscape materials. Additionally, there is a small landscaped courtyard and portions of the roof may be vegetated.

Light Pollution Reduction: The exterior lighting design will comply with the City of Boston Zoning Code and include fixtures with compliant backlight, uplight and glare ratings.

Water Efficiency

The Project documents will include specifications for low flow and high efficiency plumbing fixtures within the Project to reduce the amount of potable water used throughout the building. The site will utilize native, adaptive, and/or drought tolerant plant species that require limited irrigation.

Outdoor Water Use Reduction (prerequisite): The Project will reduce landscape water demand by at least 30% from the calculated baseline for the site's peak watering month. Reductions will be achieved through plant species selection and irrigation system efficiency, as calculated by the Environmental Protection Agency (EPA) WaterSense Water Budget Tool.

Indoor Water Use Reduction (prerequisite): Flush and flow fixtures specified for the Project will enable the building to exceed the aggregate water consumption reduction requirement of 20% and will be WaterSense labeled, as applicable. Additionally, appliance and process water use will meet applicable requirements

Building-level Water Metering (prerequisite): Permanent whole building water use meters will be installed on the Project to measure potable water use within the building and from site irrigation. Monthly and annual summaries will be uploaded to Energy Star Portfolio Manager.

Outdoor Water Use Reduction: The Project will reduce landscape potable water demand by at least 50% from the calculated baseline for the site's peak watering month. Reductions will be achieved through plant species selection and irrigation system efficiency, as calculated by the Environmental Protection Agency (EPA) WaterSense Water Budget Tool.

Indoor Water Use Reduction: The Project will specify high-efficiency flush and flow water fixtures with a target to reduce overall annual potable water demand by 30% or more.

Water Metering: The Project will install permanent water meters for two or more water subsystems such as irrigation, domestic hot water or indoor plumbing fixtures.

Energy and Atmosphere

The Project will be designed with high efficiency building systems and a high performance building envelope. The proposed HVAC systems design for the residential units is Aquatherm units. The proposed lighting will target a lighting power density below code maximums through the use of

daylight dimming, carefully considered controls systems and LED fixtures. The preliminary energy use assessment has been conducted using whole building energy modeling. The proposed design must meet both the State Stretch Energy Code and LEED v4 criteria.

Fundamental Commissioning and Verification (prerequisite): A third party Commissioning Agent, (CxA) will be engaged by the owner for purposes of providing fundamental commissioning services for the building energy related systems including HVAC lighting and domestic hot water systems. The CxA will verify the building systems are installed, calibrated and perform to the building owners project requirements through verification and performance reviews of the systems to be commissioned.

Minimum Energy Performance (prerequisite): The Project will include a high performing envelope, efficient mechanical equipment, and efficient lighting fixtures. A whole building energy simulation will be used to assess the proposed design against the applicable reference standards. The Project will meet the Stretch Code requirement to be 10% better than current MA code in annual site energy use (using an ASHRAE Standard 90.1-2013 baseline, the Project is demonstrating an approximate 22% site energy use savings). This LEED prerequisite requires that projects achieve a minimum energy cost savings of 5% over an ASHRAE Standard 90.1-2010 baseline. The Project currently achieves 21% annual energy cost savings when compared to the ASHRAE 90.1-2010 baseline. The energy model will continue to be updated as the design progresses. New information regarding lighting power density, equipment, schedules, and site lighting will be incorporated into the model when applicable. Please refer to the Energy Model Summary provided in Appendix E.

Optimize Energy Performance: The preliminary energy model indicates that the Project achieves a total of eight points by demonstrating a 21% estimated annual energy cost savings over ASHRAE Standard 90.1-2010 baseline. The energy model will continue to be updated as the design progresses. New information regarding lighting power density, equipment, schedules, and site lighting will be incorporated into the model when applicable. The final iteration of the energy model submitted for LEED certification will be based on the Construction Documents. Please refer to the Energy Model Summary provided in Appendix E.

Materials and Resources

The Project will specify materials and products that are environmentally responsible and are transparent regarding the harvest and extraction of raw materials and the manufacturing processes. The design team will specify materials and products with environmental and health product declarations to help support a reduced impact of the development on the environment. Waste management will be addressed during demolition, construction and post occupancy.

Storage and Collection of Recyclables (prerequisite): Recyclables collected post occupancy will be accommodated in a centrally located room dedicated to the storage and collection of recyclables. Residents will be responsible for relocating recyclables from their units to a collection room

located on each respective floor. Building maintenance staff will be responsible for relocating recyclables from the residential collection rooms located on each floor and from the retail tenants to the central recycling storage room located on the ground level.

Construction and Demolition Waste Management Planning (prerequisite): The Construction Manager will be required to develop a compliant construction and demolition waste management plan that establishes waste diversion goals, specifies commingled versus site separated strategies, and enables the Project to divert least three waste streams comprising at least 50% of the onsite generated construction and demolition waste from area landfills.

Building Product Disclosure & Optimization: Environmental Product Declarations: The Project will specify and install at least 20 different permanently installed products with compliant Environmental Product Declarations sourced from at least five different manufacturers. Requirements for the CM to procure compliant materials will be included in the Project manual.

Building Product Disclosure & Optimization: Materials Ingredients: The Project will specify and install at least 20 different permanently installed products from at least five different manufacturers with compliant Health Product Declarations or similar disclosure documentation. Requirements for the CM to procure compliant materials will be included in the Project manual.

Construction and Demolition Waste Management: Prior to the start of construction, the Construction Manager will be required to develop and implement a compliant construction and demolition waste management plan that establishes waste diversion goals, specifies commingled versus separated strategies, and enables the Project to divert a minimum of three waste streams comprising 50% of the onsite generated construction and demolition waste from area landfills.

Indoor Environmental Quality:

The building will have a healthy interior environment generated through the use of low-VOC containing interior construction and finish materials and maintained through an efficient ventilation system in compliance with ASHRAE 62.1-2010. In compliance with local regulations, the building will be non-smoking, and no smoking will be allowed within 25 feet of the building.

During construction the Construction Manager will develop and implement a compliant Indoor Air Quality Management Plan for the construction and pre-occupancy phases of the Project.

The building envelope design includes large areas of vision glazing with ample access to daylight and views for the anticipated regularly occupied spaces. The buildings thermal comfort systems and controls will be designed to meet the requirements of ASHRAE 55-2010 for all applicable mechanically ventilated regularly occupied spaces.

Minimum Indoor Air Quality Performance (prerequisite): Mechanical ventilation for the residential units is provided by the Aquatherm units. The common areas will be supplied by a roof top unit. The ventilation meets minimum rates in the breathing zone and is met through the performance path as required by ASHRAE 62.1 2010, Ventilation for Acceptable Indoor Air Quality.

Environmental Tobacco Smoke Control (prerequisite): No smoking will be permitted in the building or within 25 feet of the building. This policy will be made clear to all residents, guests, employees and retail transients.

Enhanced IAQ Strategies: The Project will include the following:

- 10' long entryway systems to capture dirt and particulates entering the building at regularly used exterior entrances;
- Sufficient exhausting of each space where hazardous gases or chemicals may be present or used (e.g., housekeeping, welding rooms, copying and printing rooms); and
- MERV 13 filtration (or better) on each ventilation system that supplies outdoor air to occupied spaces

Low Emitting Materials: The Project will meet the threshold level of compliance with emissions and content standards for a minimum of three product categories through specification of materials and products with compliant VOC content and emissions for paints and coatings, flooring systems and composite wood. The technical specifications will include requirements for products with compliant VOC content and general emissions limits where applicable.

Construction Indoor Air Quality Management Plan: The Construction Manager will develop and implement a compliant Indoor Air Quality Management Plan for the construction phase 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 (Chapter 3). The permanently installed air handlers will not be operated during construction, and tobacco products will be prohibited within the building as well as within 25 feet of the building entrance.

All shared multi-occupant spaces will have lighting controls that enable occupants to adjust the lighting to meet group needs and preferences, with at least three lighting levels or scenes (on, off, midlevel).

Quality Views: The Project design will include large windows within the regularly occupied spaces within the residential units providing ample access to views.

Innovation in Design

The Project team will explore innovative approaches to design and maintenance including green housekeeping & pest management programs and purchasing lighting with low-mercury content. Additionally, the Project is eligible to achieve one credit point due to several team members being certified LEED AP with the BD+C specialty.

Regional Priority

Regional Priority Credits (RPCs) are established LEED credits designated by the USGBC to have priority for a particular area of the country. When a Project team achieves one of the designated RPCs, an additional credit is awarded to the Project. It is anticipated that the Project will achieve two regional priority credits for LT Surrounding Density and Diverse Uses and EA Optimize Energy Performance (above 17% annual cost savings).

5.2 Climate Change Preparedness

5.2.1 Introduction

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

A copy of the completed Climate Resiliency Checklist is included in Appendix F. Given the preliminary level of design, the responses are also preliminary and may be updated as the Project design progresses.

5.2.2 Sea Level Rise and Future Storms

According to the BPDA Sea Level Rise Flood Hazard Area Map, a portion of the Project Site along West Springfield Street is in a future Flood Hazard Area. The Sea Level Rise – Base Flood Elevation for the site, which is based on a 1% annual chance of flooding with 40 inches on sea level rise, is 18 feet Boston City Base (BCB). Existing sidewalk elevations near the proposed building entrances and garage entrance are at elevation 18.5 BCB or higher, which will make the Project less vulnerable to flooding. However, the Project will still take measures to minimize the impact of potential flooding at the site, including the following:

- Critical infrastructure will be located above the Base Flood Elevation for the site.
- The Project will incorporate water tight utility conduits, waste water back flow prevention, and storm water back flow prevention.
- In the case of a flooding event or power outage, dedicated amenity spaces will be on emergency power for people to congregate before MEP systems are reactivated.
- After a weather event, the building maintenance will survey the MEP systems to determine whether the systems were damaged and their operation is safe.

LEED v4 BD+C: New Construction

Project Checklist

Project Name: **566 Columbus Ave**
Address: Boston MA
Date: July 20, 2019

Y	?	N	Integrative Process		1
	0	1	Credit 1	Integrative Process	1

15	0	1	Location and Transportation		16
x	x	x	Credit 1	LEED for Neighborhood Development Location	16
1			Credit 2	Sensitive Land Protection	1
1		1	Credit 3	High Priority Site	2
5			Credit 4	Surrounding Density and Diverse Uses	5
5			Credit 5	Access to Quality Transit	5
1			Credit 6	Bicycle Facilities	1
1			Credit 7	Reduced Parking Footprint	1
1			Credit 8	Green Vehicles	1

8	0	2	Sustainable Sites		10
Y			Prereq 1	Construction Activity Pollution Prevention	Required
1			Credit 1	Site Assessment	1
		2	Credit 2	Site Development - Protect or Restore Habitat	2
1			Credit 3	Open Space	1
3			Credit 4	Rainwater Management	3
2			Credit 5	Heat Island Reduction	2
1			Credit 6	Light Pollution Reduction	1

4	2	5	Water Efficiency		11
Y			Prereq 1	Outdoor Water Use Reduction	Required
Y			Prereq 2	Indoor Water Use Reduction	Required
Y			Prereq 3	Building-Level Water Metering	Required
1		1	Credit 1	Outdoor Water Use Reduction	2
2	1	3	Credit 2	Indoor Water Use Reduction	6
	1	1	Credit 3	Cooling Tower Water Use	2
1			Credit 4	Water Metering	1

8	11	14	Energy and Atmosphere		33
Y			Prereq 1	Fundamental Commissioning and Verification	Required
Y			Prereq 2	Minimum Energy Performance	Required
Y			Prereq 3	Building-Level Energy Metering	Required
Y			Prereq 4	Fundamental Refrigerant Management	Required
	5	1	Credit 1	Enhanced Commissioning	6
8	2	8	Credit 2	Optimize Energy Performance	18
		1	Credit 3	Advanced Energy Metering	1
		2	Credit 4	Demand Response	2
	1	2	Credit 5	Renewable Energy Production	3
	1		Credit 6	Enhanced Refrigerant Management	1
	2		Credit 7	Green Power and Carbon Offsets	2

3	4	6	Materials and Resources		13
Y			Prereq 1	Storage and Collection of Recyclables	Required
Y			Prereq 2	Construction and Demolition Waste Management Planning	Required
	3	2	Credit 1	Building Life-Cycle Impact Reduction	5
1		1	Credit 2	Building Product Disclosure and Optimization - EPD	2
		2	Credit 3	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1		1	Credit 4	Building Product Disclosure and Optimization - Material Ingredients	2
1	1		Credit 5	Construction and Demolition Waste Management	2

5	2	9	Indoor Environmental Quality		16
Y			Prereq 1	Minimum Indoor Air Quality Performance	Required
Y			Prereq 2	Environmental Tobacco Smoke Control	Required
2			Credit 1	Enhanced Indoor Air Quality Strategies	2
1		2	Credit 2	Low-Emitting Materials	3
1			Credit 3	Construction Indoor Air Quality Management Plan	1
		2	Credit 4	IAQ Assessment	2
	1		Credit 5	Thermal Comfort	1
	1	1	Credit 5	Interior Lighting	2
		3	Credit 5	Daylight	3
1			Credit 5	Quality Views	1
		1	Credit 5	Acoustic Performance	1

4	2	0	Innovation		6
	1		Credit 1	Innovation Credit: O+M Starter Kit	1
1			Credit 2	Innovation Credit: Innovative Purchasing, Lamps	1
1			Credit 3	Innovation Credit: EP for Heat Island	1
	1		Credit 4	Innovation Credit: TBD	1
1			Credit 5	Pilot Credit: Integrative Analysis of Building Materials	1
1			Credit 6	LEED Accredited Professional	1

2	2	0	Regional Priority (earn up to 4 points)		4
1			Credit 1	EAc2 Optimize Energy Performance (17%/8 pts)	1
	1		Credit 2	LTc3 High Priority Site (2 points)	1
	1		Credit 3	LTc4 Surrounding Density and Diverse Uses (4 pts)	1
1			Credit 4	0	1

49	23	38	TOTALS	Possible Points:	110

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

5.2.3 Drought Conditions

The Climate Ready Boston report predicts that in Boston, there may be between 25 to 90 days over 90 degrees by 2070, compared to an average of 11 days per year over 90 degrees between 1971 to 2000. The Project design will include measures to adapt to these conditions, including installing high performance HVAC equipment, high performance building envelope, and new landscaping to reduce the urban heat island effect.

5.2.4 High Heat Days

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

Chapter 6.0

Urban Design

6.0 URBAN DESIGN

6.1 Development Overview

The following chapter outlines the urban design and public realm objectives for the Project and includes plans, elevations, diagrams and neighborhood perspective views. The existing building is shown in Figure 6-1. The proposed 89,700 sf redevelopment of 566 Columbus Avenue comprises a new six-story "U" building with a vibrant, publicly-oriented ground floor and 66 homeownership units above. The ground floor is designed with just over 5,000 sf of commercial space including a social enterprise café with additional outdoor seating at the Massachusetts Avenue/Columbus Avenue corner, non-profit commercial space for USES, and a changing exhibits gallery open to the public. Artist live/work units will also occupy space on the first two floors to facilitate convenient public access. Outdoor open space will be distributed vertically throughout the development which includes; a ground level courtyard for building residents, a pocket garden at the Northeast corner of the site along West Springfield Street and a series of upper level roof decks, balconies and terraces. Not only does the Project seek to comply with underlying zoning; its scale, massing and architectural treatment complement and reinforce the character of the South End neighborhood, while re-introducing an energized public realm experience at street level—reminiscent of the days when the former Hi-Hat Barbeque occupied the Massachusetts Avenue/Columbus Avenue corner in the late 40s/early 50s.

6.2 Context & Vision

Located at the prominent intersection of Massachusetts Avenue and Columbus Avenue—the Project Site offers a tremendous opportunity to provide a mixed-use development anchor that connects, supports and aligns with the values and cultural history of the South End. Ensuring that the public realm components are programmed as a genuine reflection of the community and designed to foster public interaction is a primary driver of the urban design and pedestrian experience for the Project. Figure 6-2 illustrates the realization that much of Boston (including the South End) is developed with an urban strategy of bookended blocks. As major thoroughfares through the South End such as Huntington Avenue, Columbus Avenue, Tremont Street and Washington Street intersect Massachusetts Avenue, the buildings at the corners are typically one or two stories taller than those more internal to their respective streets—thus "bookending the blocks". The redevelopment at 566 Columbus Avenue embraces this strategy with a maximum building height of approximately 70 feet, as is seen in Figure 6-3.

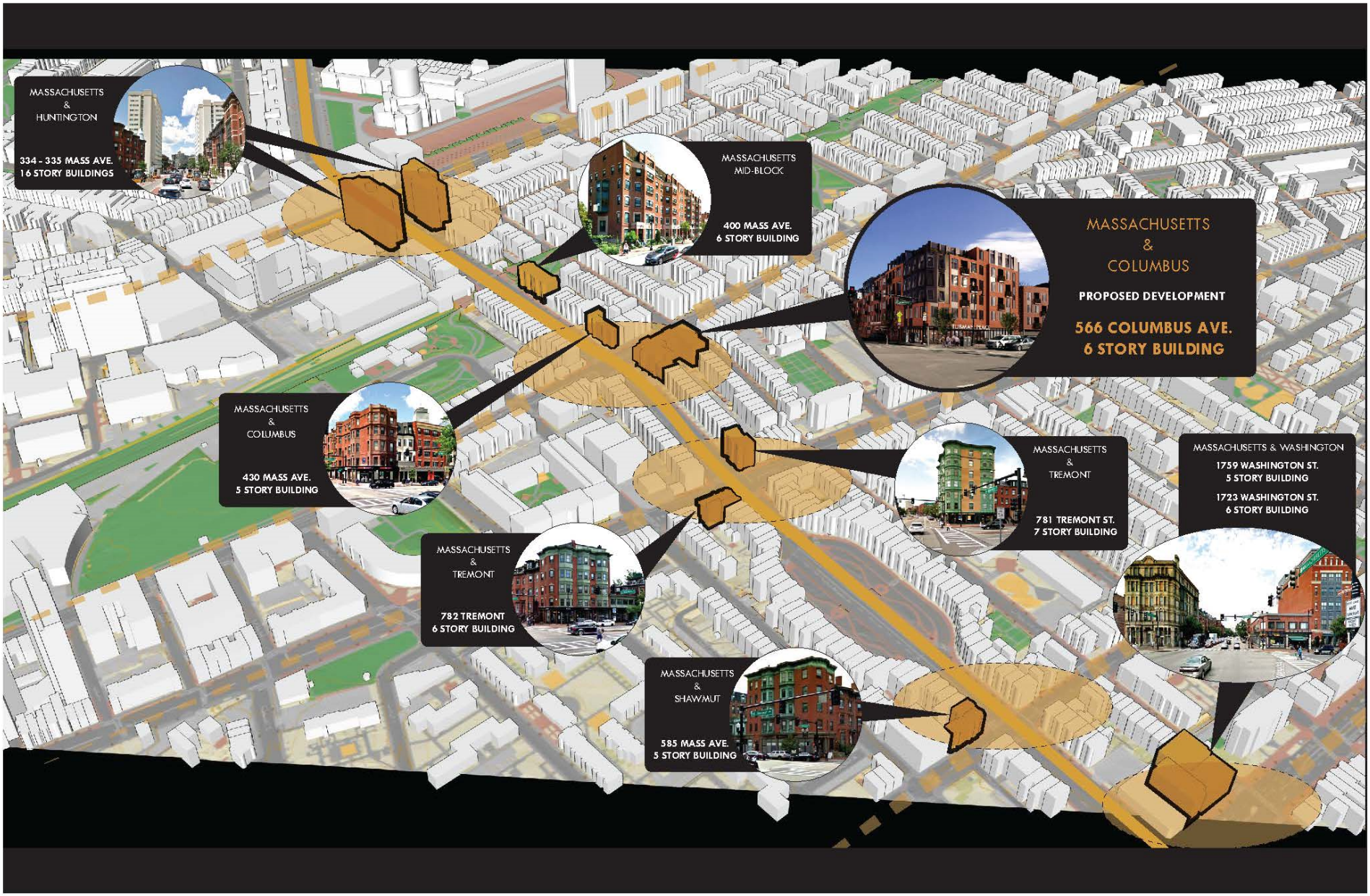
6.3 Architectural Character

The exterior design employs the use of durable warm-tone materiality such as masonry and terracotta panels with color, detail and modulation designed to complement the existing neighborhood context while also creating a strong presence and visual identity at the corner. The design embodies a nod to the traditional semi-circular and/or semi-hexagonal bays commonly seen in the neighborhood with modest undulation along the street wall—creating depth and

566 Columbus Avenue Boston, Massachusetts

JGE J. GARLAND ENTERPRISES LLC

Figure 6-1
Existing Conditions



566 Columbus Avenue Boston, Massachusetts

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Figure 6-2

Scale, Massing, and Neighborhood Context

566 Columbus Avenue Boston, Massachusetts

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Figure 6-3
View from Massachusetts and Columbus Avenues

rhythm while maintaining design consistency. The adjacent multistory brownstone buildings provide significant design inspiration from color tone and materiality to detail and ornamentation. Such compositional elements have informed the exterior design but have been executed with a clean contemporary aesthetic.

6.4 Urban Design Objectives

As illustrated in Figures 6-4 and 6-5, the Project's urban design objectives can be categorized in four major themes;

1. **Activating the Public Realm**: Introducing transparency to the ground level allows spaces like the café, exhibit gallery, non-profit commercial and residential lobby to play an active role in activating the pedestrian experience at the corner of Massachusetts Avenue and Columbus Avenue. Streetscape features including street trees, light poles, trash/recycling receptacles, public bike racks and benches will be incorporated and/or enhanced as part of the Project's associated public realm improvements.

2. **A Building with "Multiple Fronts":** Given the location of the site, the building will front on multiple primary streets; Massachusetts Avenue, Columbus Avenue and West Springfield Street—all equally significant yet uniquely different street front conditions. As a result, there is no rear or back facing façade. Figures 6-6 to 6-8 illustrate subtle shifts in architectural treatment in response to the various street front conditions while maintaining a cohesive volumetric design approach across the building. Transparent storefront glazing at the ground floor is mostly apparent along Massachusetts Avenue and the southern portion of Columbus Avenue while the balance of Columbus Avenue and West Springfield Street employ a consistent punched window rhythm in response to the residential uses along adjacent edges. The proposed building is setback at the Northeast corner to align with the street-wall of existing brownstone residences along West Springfield Street as seen in Figure 6-9 and introduces a landscaped pocket garden as a public visual amenity.

3. **Expression of the Attic Story**: In keeping with much of the architectural character of the South End the proposed building illustrates a change in materiality and articulation at the upper levels to create a signature roof line and massing composition. As seen in Figure 6-3, the dark metal materiality migrates down the façade to further break down the massing and establish hierarchy at the Massachusetts Avenue/Columbus Avenue corner. The attic story is designed to express a sense of modernized crenellations creating visual depth and shadow and a change in architectural treatment at upper levels consistent with the character of the neighborhood.

566 Columbus Avenue Boston, Massachusetts

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Figure 6-4
Urban Design Objectives

566 Columbus Avenue Boston, Massachusetts

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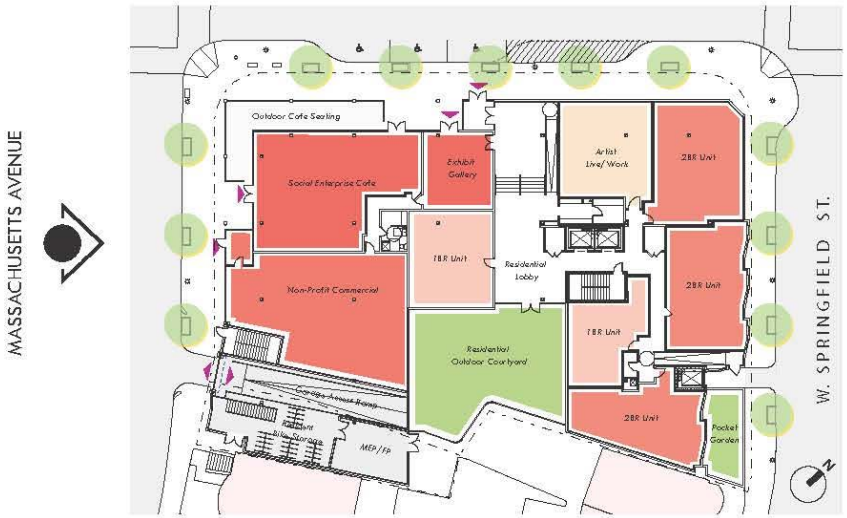
Figure 6-5
Urban Design Objectives



566 Columbus Avenue Boston, Massachusetts

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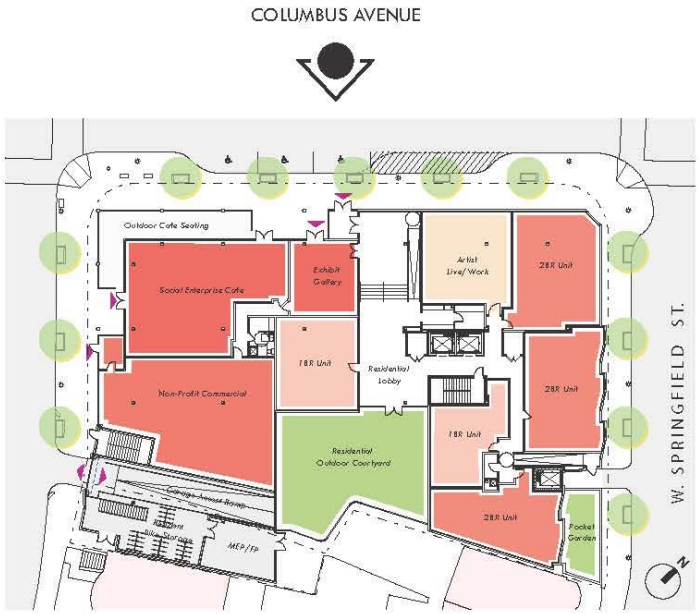
Figure 6-6
Massachusetts Avenue Elevation



566 Columbus Avenue Boston, Massachusetts

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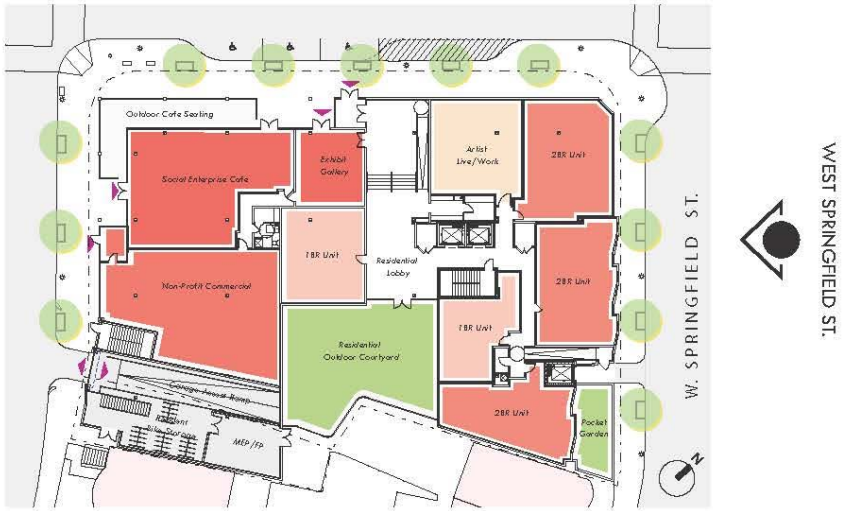
Figure 6-7
Columbus Avenue Elevation



566 Columbus Avenue Boston, Massachusetts

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Figure 6-8
West Springfield Street Elevation

566 Columbus Avenue Boston, Massachusetts

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Figure 6-9
View from West Springfield Street

4. **Warm Tone Materiality**: The proposed exterior design incorporates the use of terracotta and masonry façade materials comprised of reds, browns and warm gray blends to relate to the predominant hues of the neighborhood. Upper level balconies, railings and darker metal attic story materiality act as accent elements to the warm tone field colors. This general approach to façade articulation is well established throughout the South End—however this Project seeks to execute such methodologies in a modern composition.

In summary, this Project seeks to establish and reinforce a number of urban design goals with a few included below:

- Create a vibrant, mixed-use development through an interactive and pedestrian friendly streetscape that will diversify and engage the neighborhood;
- Articulate the massing and materials to create a vertical façade modulation consistent with the look, feel and comprehensive character of the South End while maintaining a modern composition;
- Craft unique yet contextual publicly accessible spaces to promote and invite users to gather, interact and collaborate with each other; and
- Develop a signature contribution to the South End neighborhood that improves the corner, actively engages the public realm and is delivered through a robust community consensus process.

Chapter 7.0

Historic and Archaeological Resources

7.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

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

7.1 Project Site

The Project Site includes an existing three-story masonry building. The Project Site is located within the South End Landmark District (SELD), a local historic district designated by the Boston Landmarks Commission (BLC) in 1983. The Project Site is also located within the South End District, which was listed in the National Register of Historic Places in 1973. The Project Site is bound by Massachusetts Avenue to the west, Columbus Avenue to the north, West Springfield Street to the east, and four-story brick row houses at 220 West Springfield Street and 460 Massachusetts Avenue to the south.

7.1.1 Historic Resources within the Project Site

There are no historic resources located on the Project Site. The existing three-story building on the Site was constructed in 1975 as the headquarters of the United South End Settlements (USES), centralizing their programs and services. The building is located in Boston's South End, planned in 1848 and primarily developed between 1850 and 1873 as a residential neighborhood of single-family row houses. The neighborhood later diversified with the addition of multi-family housing and limited commercial, industrial, and institutional uses, but is recognized as the largest remaining Victorian urban residential neighborhood in the United States. Prior to the construction of the existing building, the Site held 19th century row houses similar in scale, material, and character to the historic row houses typical of the South End. The Site was within the Boston Redevelopment Authority's 1960s South End Urban Renewal Area and was acquired by the agency for clearance and redevelopment pursuant to the renewal plan. The Project is similar to the conceptual footprint included in the 1964 Urban Renewal Plan for the South End.

Due to the building's age and lack of architectural significance, it is considered a non-contributing resource within the South End National Register District. Citing the building's non-contributing status, the SELD Commission voted to approve the demolition of the existing building at a hearing held on June 4, 2019.

7.1.2 Historic Resources within the Vicinity of the Project Site

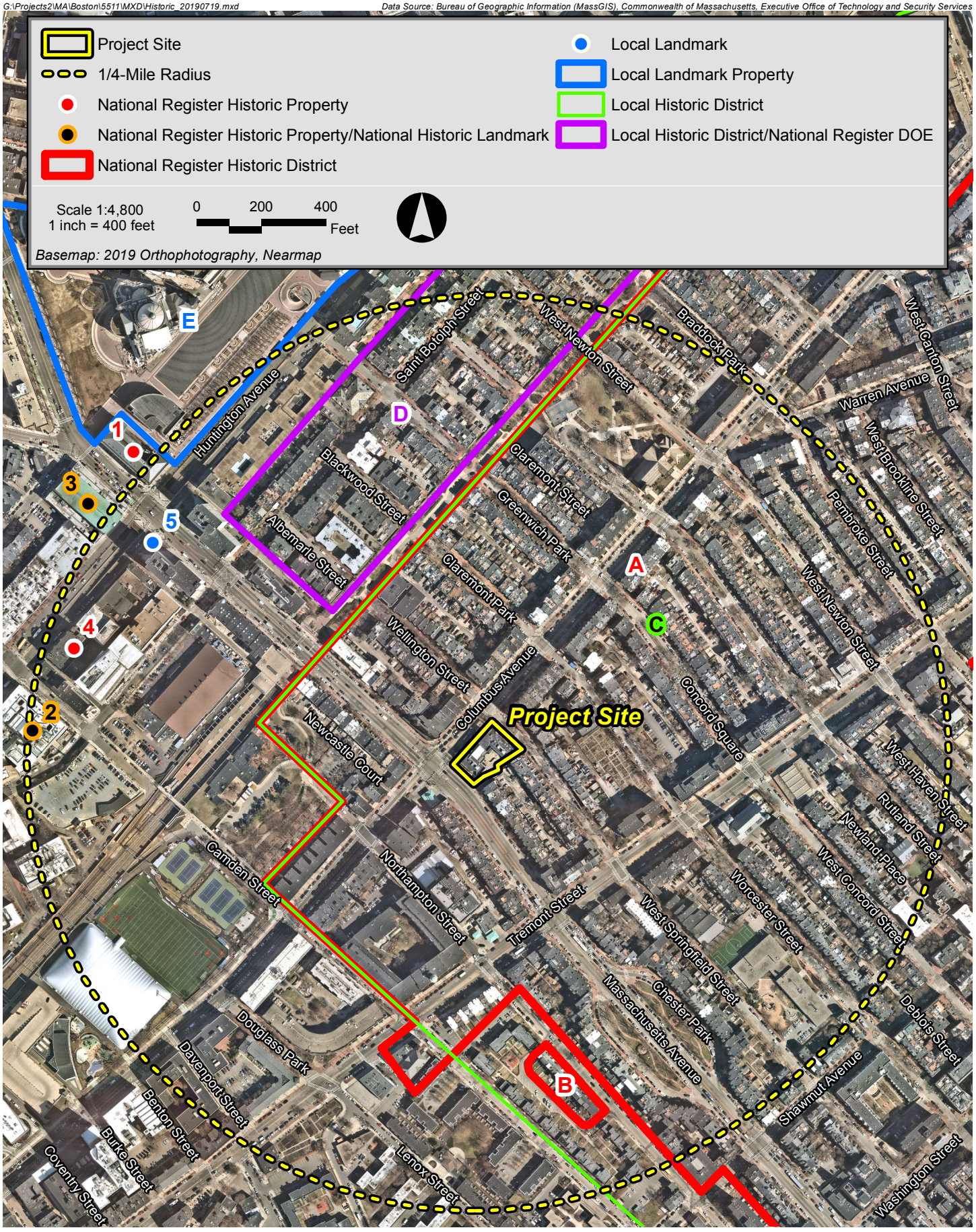
As noted above, the Project Site is located within the South End Landmark District and is also located within the National Register-listed South End District.

Additional historic resources in the vicinity of the Project Site include several historic districts and landmarks, listed in Table 7-1 and depicted in Figure 7-1.

Table 7-1 Historic Resources

Map No.	Historic Resource	Address	Designation
A	South End District	Bound by Massachusetts and Harrison Ave.s, East and West Brookline, Tremont, Upton, Malden and Union Park Sts, Shawmut Ave., Dwight and Berkeley St.s	National Register District
B	South End District (Boundary Increase)	220-224 Northampton Street	National Register District
C	South End Landmark District	Roughly bounded by Camden St., Harrison Ave.. and East Berkeley and Tremont St.s	Local Historic District
D	Saint Botolph Street Area	Roughly bounded by Harcourt St., Penn Central Railroad, alley north of Massachusetts Ave. and alley east Huntington Ave.	Local Historic District
E	Christian Science Center Complex	Bound by Huntington Avenue, Horticultural Hall, Massachusetts Avenue, Clearway Street, Dalton Street, and Belvidere Street	Local Landmark
1	Horticultural Hall	300 Massachusetts Avenue	National Register Individual Property
2	New England Conservatory of Music	290 Huntington Avenue/30 Gainsborough Street	National Historic Landmark, National Register Individual Property
3	Symphony Hall	301 Massachusetts Avenue	National Register Individual Property, National Historic Landmark
4	The Riviera	270 Huntington Avenue	National Register Individual Property
5	Street Clock	333 Massachusetts	Local Landmark

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



566 Columbus Avenue Boston, Massachusetts

Epsilon Associates Inc.

Figure 7-1

Historic Resources Map

7.1.3 Archaeological Resources on the Project Site

The site is a previously developed urban parcel. A review of the MACRIS archaeological base maps on June 18, 2019 revealed no known archaeological sites located at the Project Site.

7.2 Impacts to Historic Resources

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

7.2.1 Demolition of Historic Resources

The Project does not include the demolition of any historic resources. The demolition of the existing building on the Project Site, constructed in 1975, was approved by the SELD Commission on June 4, 2019 subject to receipt of other required approvals. The design of the new building will be subject to review by the SELD Commission.

7.2.2 Urban Design

The Project involves the construction of a six-story, approximately 89,700 square foot building built on a U-shaped plan with an interior courtyard. The building will feature ground floor commercial space including a social enterprise café, non-profit commercial space, and art gallery space accessible to the public. The upper floors will contain 66 residential units. Below-grade parking will be located under the building.

As the building is within the SELD, its design is subject to review by the SELD Commission. The exterior design will be consistent with SELD standards and criteria for new construction and will reinforce and enhance the streetscape of the South End in a modern composition. As designed, the exterior of the building will use warm toned red, brown, and gray masonry and terracotta panels, a palette sympathetic to nearby masonry buildings. The building features a change in materiality at the upper levels typical of the neighborhood. A modest undulation at the street wall evokes the bowfront bays common in the South End neighborhood, creating a further sense of depth and rhythm.

The building tailors architectural treatments at Massachusetts Avenue, Columbus Avenue, and West Springfield Streets to respond to unique street front conditions. Glazing is used at the ground floor along Massachusetts Avenue and a portion of Columbus Avenue, while the remainder of Columbus and Massachusetts Avenues have punched window rhythm responsive to adjacent buildings. The height of the proposed building is lowered at the south end of the Massachusetts Avenue elevation where the building meets an adjacent multi-story brownstone building. The building façade will be stepped back at its southwest corner to align with the street wall of historic buildings along West Springfield Street.

The Project activates the public realm by incorporating transparent materials along Massachusetts and Columbus Avenues, allowing interior spaces to play an active role in the pedestrian experience. Streetscape features will be incorporated or improved as part of the Project, including street trees, light poles, trash receptacles, and public bike racks and benches. Additional public realm space will be created along Massachusetts Avenue by narrowing the curb cut for parking access. A pocket garden will be located at the building's West Springfield Street elevation, consistent with the traditional front yards of properties along the residential street.

7.3 Shadow Impacts

Shadow impact analyses were conducted to demonstrate the anticipated impacts from the Project. These consisted of standard shadow studies done for March 21, June 21, September 21, and December 21 at 9:00 a.m., 12:00 p.m., and 3:00 p.m. as well as at 6:00 p.m. during the summer solstice and vernal equinox.

As discussed in Section 4.2, the shadow analysis for the Project demonstrates that net new shadow will be modest in extent and duration. New shadow will be limited to adjacent streets and sidewalks, and the Project will not cast new shadow onto nearby open spaces. The results of these shadow studies are included in Section 4.2 and shown in Figures 4.2-1 to 4.2-14.

Chapter 8.0

Infrastructure

8.0 INFRASTRUCTURE

8.1 Wastewater

8.1.1 Existing Sewer System

The Boston Water and Sewer Commission (BWSC) currently maintains dedicated sanitary sewer mains adjacent to the Project Site.

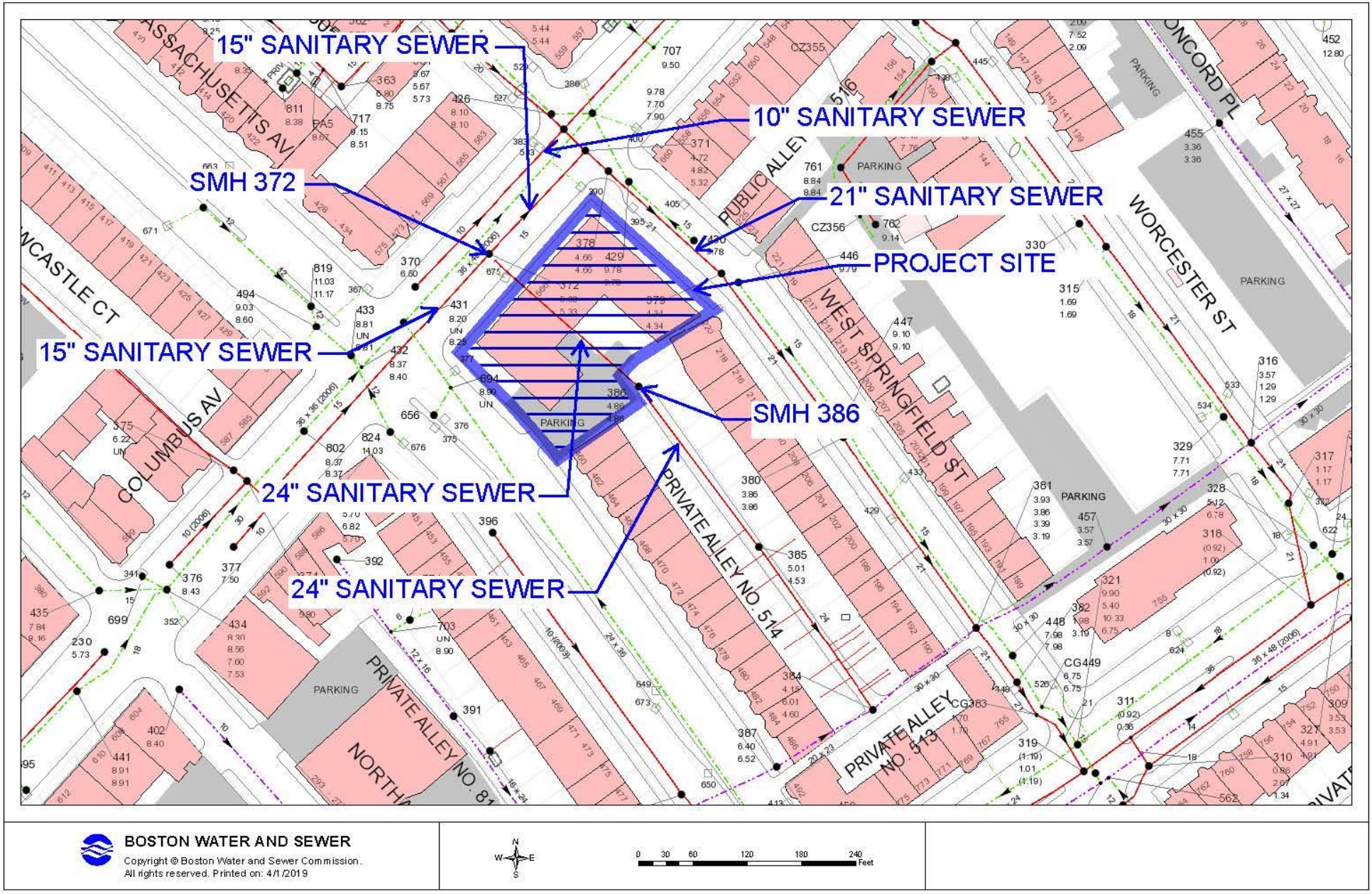
There are two BWSC sanitary sewer mains in Columbus Avenue adjacent to the site: a 15-inch main on the Project side of the street and a 10-inch main on the opposite side of the street. Both mains flow northeasterly toward West Springfield Street and are collected by a 21-inch sanitary sewer main running southeasterly in West Springfield Street.

The 15-inch sanitary sewer main in Columbus Avenue is intercepted by a manhole, BWSC sewer manhole 372 (SMH 372), in front of the Project Site to connect to a 24-inch sanitary sewer. The 24-inch sanitary sewer flows southeasterly and under the existing building at 566 Columbus Avenue to connect to the 24-inch sanitary sewer main running in Private Alley Number 514 at SMH 386.

The Proponent has had discussions with BWSC about the existing 24-inch sewer main running under the building between Columbus Avenue SMH 372 and Private Alley Number 514 SMH 386. BWSC record plans and the existing sewer system mapping indicate that the BWSC intended to disconnect the 24-inch sewer main running under the building from SMH 372 as part of the combined sewer separation project shown on plans dated March 1977. In order to determine if the 24-inch sewer main running under the building was still connected to SMH 372 in Columbus Avenue the Proponent conducted an investigation in April of 2019. The investigation included visual and video inspection of the existing SMH 372 and the 24-inch sewer main running under the building to SMH 386. The investigation indicated that the 24-inch sewer pipe had not been disconnected from SMH 372, active building service connections to the 24-inch main between the two manholes appeared to only service the existing building, there was low flow in the pipe, and portions of the existing 24-inch pipe were in poor condition. A Memorandum detailing the investigation and copies of the video inspection were submitted to BWSC for discussion and BWSC internal investigation. The Proponent will continue discussions with BWSC about the disconnection of the 24-inch sewer main from SHM 372 and removal of the portion of 24-inch sewer main between SMH 372 and SMH 386.

The sewer flows in the BWSC sanitary sewer mains adjacent to the site ultimately flow to the Massachusetts Water Resources Authority (MWRA) Deer Island Waste Water Treatment Plant for treatment and disposal.

The existing sewer system is illustrated in Figure 8-1.



566 Columbus Avenue Boston, Massachusetts

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Figure 8-1

Existing Sewer System

8.1.2 Anticipated Project Generated Sanitary Sewer Flow

The Project's sewage generation rates were estimated using 310 CMR 15.00 for the proposed building program. 310 CMR 15.00 lists typical sewage generation values for the proposed building use, as shown in Table 8-1. Typical generation values are conservative values for estimating the sewage flows from new construction. The Project will include one new 107-bedroom (65 unit) residential building, with a small café and commercial space. The existing site is comprised of an existing community building with active sewage generation.

The Proponent will coordinate with the BWSC on the design and capacity of the proposed connections to the BWSC sewer system. The Project is expected to generate an increase in wastewater flows of approximately 11,955 gallons per day from the existing condition.

Table 8-1 Proposed Sewer Generation

Use	Size/Unit	310 CMR Value (gpd/unit)	Total Flow (gpd)
Existing Building			
Office/Community	25,264 square feet	75 gpd/1,000 sf	1,895
		Total Existing Sewer Flows	**1,895**
Proposed Building			
Residential Units	109 bedrooms	110 gpd/bedroom	11,990
Café	50 seats	35 gpd/seat	1,750
Commercial	2,200 square feet	50 gpd/1,000 sf	110
		Total Proposed Sewer Flows	**13,850**

Increase in Sewer Flows	**11,735 gpd**

8.1.3 Proposed Sanitary Sewer Services

New sewer services for the Project will connect to the existing BWSC sanitary sewer mains in Columbus Avenue and/or West Springfield Street. There are no anticipated negative impacts to the BWSC sewer system with the proposed increase in sanitary sewage associated with the Project.

Improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's Site Plan Review process for the Project, including continued discussions of the 24-inch sewer main running under the building. This process will include a comprehensive design review of the proposed service connections, an assessment of Project demands and system capacity, and the establishment of service accounts.

8.2 Water System

8.2.1 Existing Water System

The BWSC maintains water mains adjacent to the Project Site and provides water service to the Project. There are five water systems within the City, and these provide service to portions of the City based on ground surface elevation. The five systems are Southern Low (commonly known as low service and abbreviated SL), Southern High (commonly known as high service and abbreviated SH), southern extra high, northern low, and northern high.

There are three BWSC water mains in Massachusetts Avenue: 8-inch Southern Low (SL 8 DICL 1975), 24-inch Southern Low (SL 24 PCI 1883 (1972), and 8-inch Southern Low (SL 8 PCI 1901). There are two BWSC water mains in Columbus Avenue: 30-inch Southern High [SH 30 PCI 1914 (1972)] and 12-inch Southern Low (SL 12 DIC 2006). There is one BWSC water main in West Springfield Street: 12-inch Southern Low (SL 12 DICL 1986). These mains are part of an interconnected Southern High and Southern Low system adjacent to the Project Site.

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

8.2.2 Anticipated Water Consumption

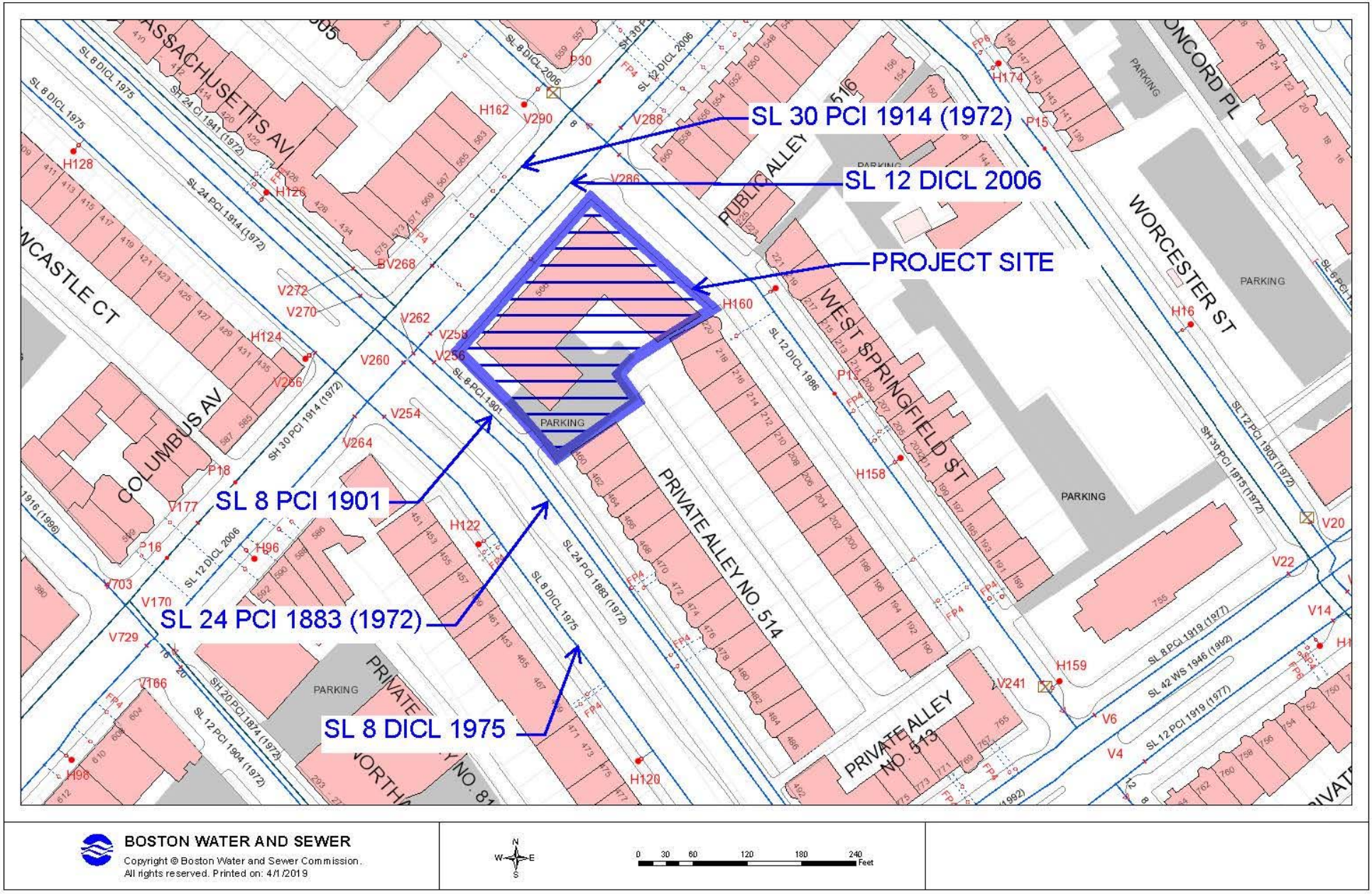
The Project's water demand estimate for domestic services is based on the Project's estimated sewage generation, described above. A conservative factor of 1.1 (10%) is applied to the estimated average daily wastewater flows calculated with 310 CMR 15.00 values to account for consumption, system losses and other usages to estimate an average daily water demand. The Project's estimated domestic water demand is 15,235 gallons per day, or an increase of 13,151 gallons per day from the existing building.

8.2.3 Proposed Water Services

The domestic and fire protection water services for the Project will connect to the existing BWSC water mains in Massachusetts Avenue, Columbus Avenue, and/or West Springfield Street.

The Project's impacts to the existing water system will be reviewed as part of the BWSC's Site Plan Review process. There are no anticipated water capacity impacts to the BWSC water system with the increase in water demand associated with the Project.

The domestic and fire protection water service connections required for the Project will meet the applicable City and State codes and standards, including cross-connection and backflow prevention. Compliance with the standards for the water system service connections will be reviewed as part of BWSC's Site Plan Review Process. This review will include sizing of domestic water and fire protection services, calculation of meter sizing, backflow prevention design, and location of hydrants and fire department connections that conform to BWSC and Boston Fire Department requirements.



566 Columbus Avenue Boston, Massachusetts

Figure 8-2

Existing Water System

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

New meters will be installed with Meter Transmitter Units (MTU's) as part of the BWSC's Automatic Meter Reading (AMR) system.

8.3 Storm Drainage System

8.3.1 Existing Storm Drainage System

There is an existing 24" x 36" storm drain main in Massachusetts Avenue flowing northwesterly to connect to a 36" x 48" storm drain main in Columbus Avenue. There is a 15-inch storm drain in West Springfield Street flowing northwesterly to connect to the 36" x 48" storm drain main in Columbus Avenue. The sewer flows in the BWSC storm drain mains adjacent to the site ultimately flow to the Charles River.

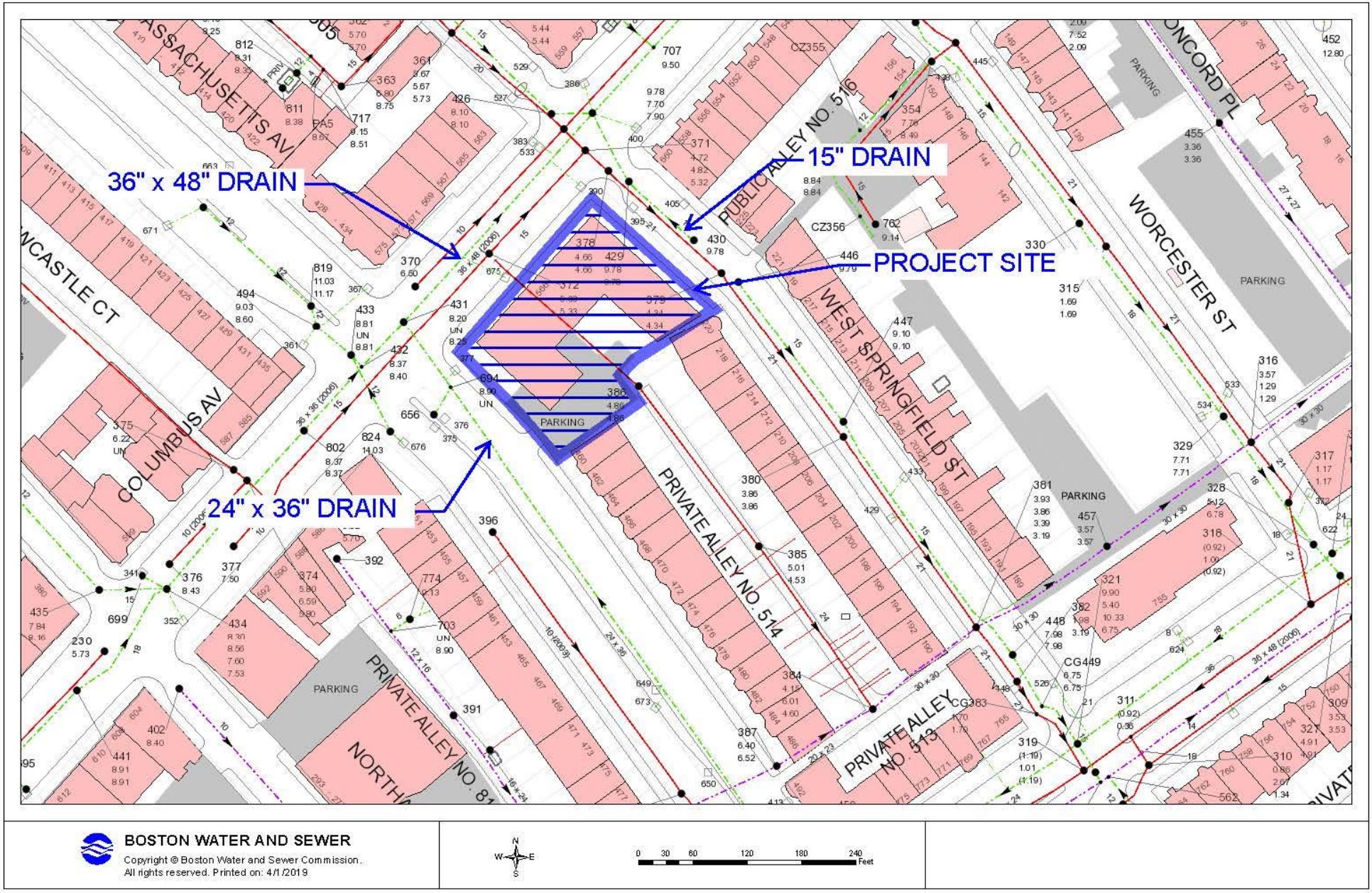
The existing water system is illustrated in Figure 8-3.

8.3.2 Proposed Storm Drainage System

The majority of the existing site is covered by building or parking lot with small landscaped beds on the site and is approximately 90% impervious. The Project will meet or reduce the existing peak rates and volumes of runoff from the site and promote recharge to the greatest extent possible.

The Project will mitigate 1.25-inch depth of stormwater runoff from impervious areas of the site to the greatest extent possible to meet BWSC requirements. The majority of the proposed site is comprised of building roof which will collect stormwater with internal drains and route it to a stormwater recharge system prior to overflow to the BWSC drainage system. It is anticipated that the stormwater recharge systems will work to passively infiltrate runoff into the ground with a gravity recharge system or infiltrate runoff into the ground with a combination of stormwater storage tank in the building to pump runoff into recharge wells to provide infiltration. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge and volume from the Project Site in the developed condition compared to the existing condition.

Improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's Site Plan Review process. The process will include a comprehensive design review of the proposed service connections, and assessment of Project demands and system capacity.



566 Columbus Avenue Boston, Massachusetts

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Figure 8-3

Existing Stormwater System

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

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

8.3.3 Groundwater Conservation Overlay District

The BPDA oversees proposed projects within the Groundwater Conservation Overlay District (GCOD) under Zoning Article 32. The Project parcel is located within the GCOD. The purpose of the article is to prevent deterioration of and, where necessary, promote the restoration of, groundwater levels in the city of Boston, to protect and enhance the city's historic neighborhoods and structures, reduce surface water runoff and water pollution and maintain public safety.

The Project will comply with Article 32, which requires infiltration of at least 1-inch of stormwater over the site and protection of existing groundwater elevations within the site or adjacent to it. The Project will promote infiltration of stormwater into the ground by capturing within a suitably designed system a volume of rainfall equivalent to approximately 1.25-inches across the surface area of the lot to be occupied by the Project. The Project will result in no negative impact on groundwater levels within the lot in question or adjacent lots, subject to the terms of any (i) dewatering permit or (ii) cooperation agreement entered into by the Proponent and the BPDA, to the extent that such agreement provides standards for groundwater protection during construction.

8.3.4 State Stormwater Standards

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

A brief explanation of each Policy Standard and the system compliance is provided below:

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

Compliance: The Project will comply with this Standard. The design will incorporate the appropriate stormwater treatment and no new untreated stormwater will be directly discharged to, nor will erosion be caused to wetlands or waters of the Commonwealth as a result of stormwater discharges related to the Project.

Standard #2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR.

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

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

Compliance: The Project will comply with 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).

Compliance: The Project will comply with this Standard. Within the Project's limit of work, there will be mostly building roof, paved sidewalk, and driveway areas. Runoff from paved vehicular areas that would contribute unwanted sediments or pollutants to the existing storm drain system will be collected by deep sump, hooded catch basins and conveyed through water *quality units before discharging into the BWSC system.*

Standard #5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Compliance: The Project will comply with this Standard. The Project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, page 1-6).

Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

Compliance: The Project will comply with this Standard. The Project will not discharge untreated stormwater to a critical or sensitive area.

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

Compliance: The Project is a new development and thus this standard is not applicable.

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

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

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

Compliance: The Project will comply with this standard. An O&M Plan including long-term BMP operation requirements will be prepared to provide proper maintenance instructions to maintain a functional stormwater management system.

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

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

8.4 Electrical Service

Electrical service will be coordinated with the utility company. Per record documents, there is an existing electrical service running under the existing building from Columbus Avenue to Public Alley Number 514. Relocation or removal and disposal of any existing electrical services within the site will be reviewed and approved by the utility provider.

8.5 Telecommunication Systems

Telecommunication service will be coordinated with the telecommunication providers.

8.6 Gas Systems

Natural gas service will be coordinated with the utility company as required.

8.7 Utility Protection During Construction

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

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

Chapter 9.0

Coordination with other Governmental Agencies

9.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

9.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board and will be designated to comply with the standards of the Americans with Disabilities Act. The Accessibility Checklist is provided in Appendix G.

9.2 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. Current plans do not call for the Project to receive any state permits, state funding or involve any state land transfers.

9.3 Massachusetts Historical Commission

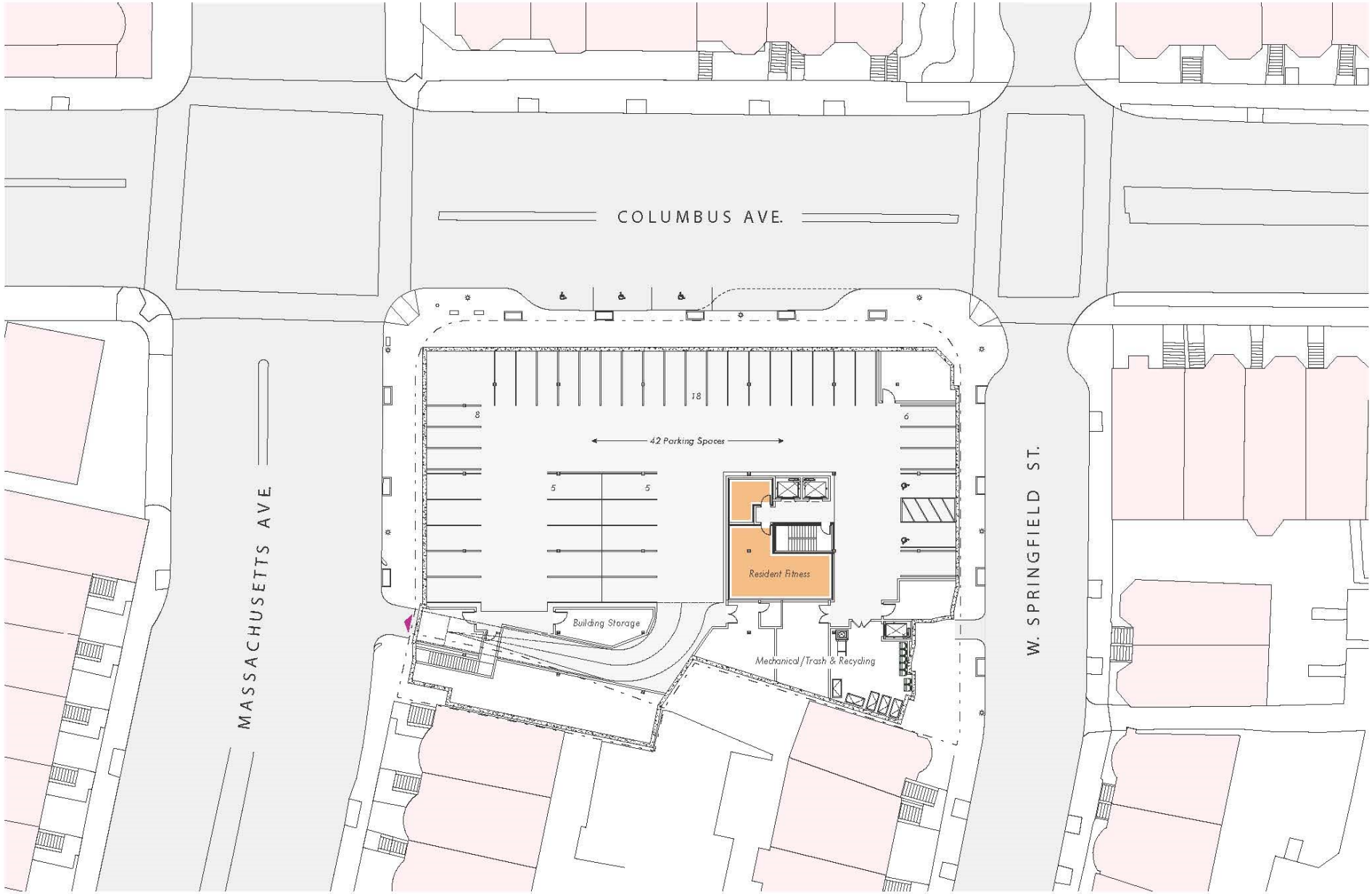
The Proponent does not anticipate that the Project will require any state or federal licenses, permits or approvals, and does not anticipate utilizing any state or federal funds. Therefore, review by the Massachusetts Historical Commission (MHC) is not anticipated at this time. In the event that state or federal licenses, permits, approvals or funding is involved, the Proponent will file an MHC Project Notification Form to initiate review of the Project.

9.4 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 BPDA as part of the Article 80 process.

Appendix A

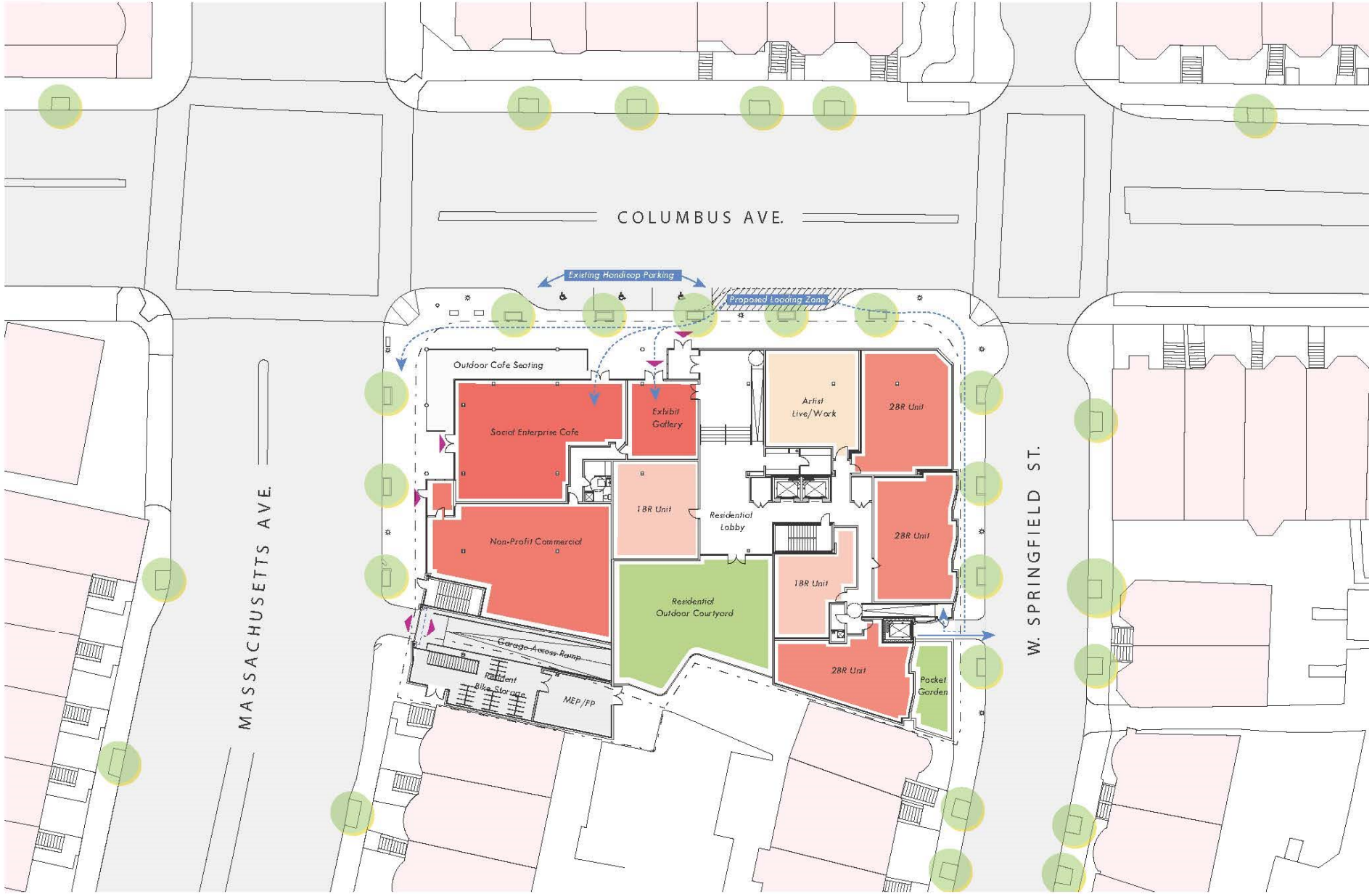
Floor Plans and Section



566 Columbus Avenue Boston, Massachusetts

JGE J. GARLAND ENTERPRISES LLC

Basement Plan



566 Columbus Avenue Boston, Massachusetts

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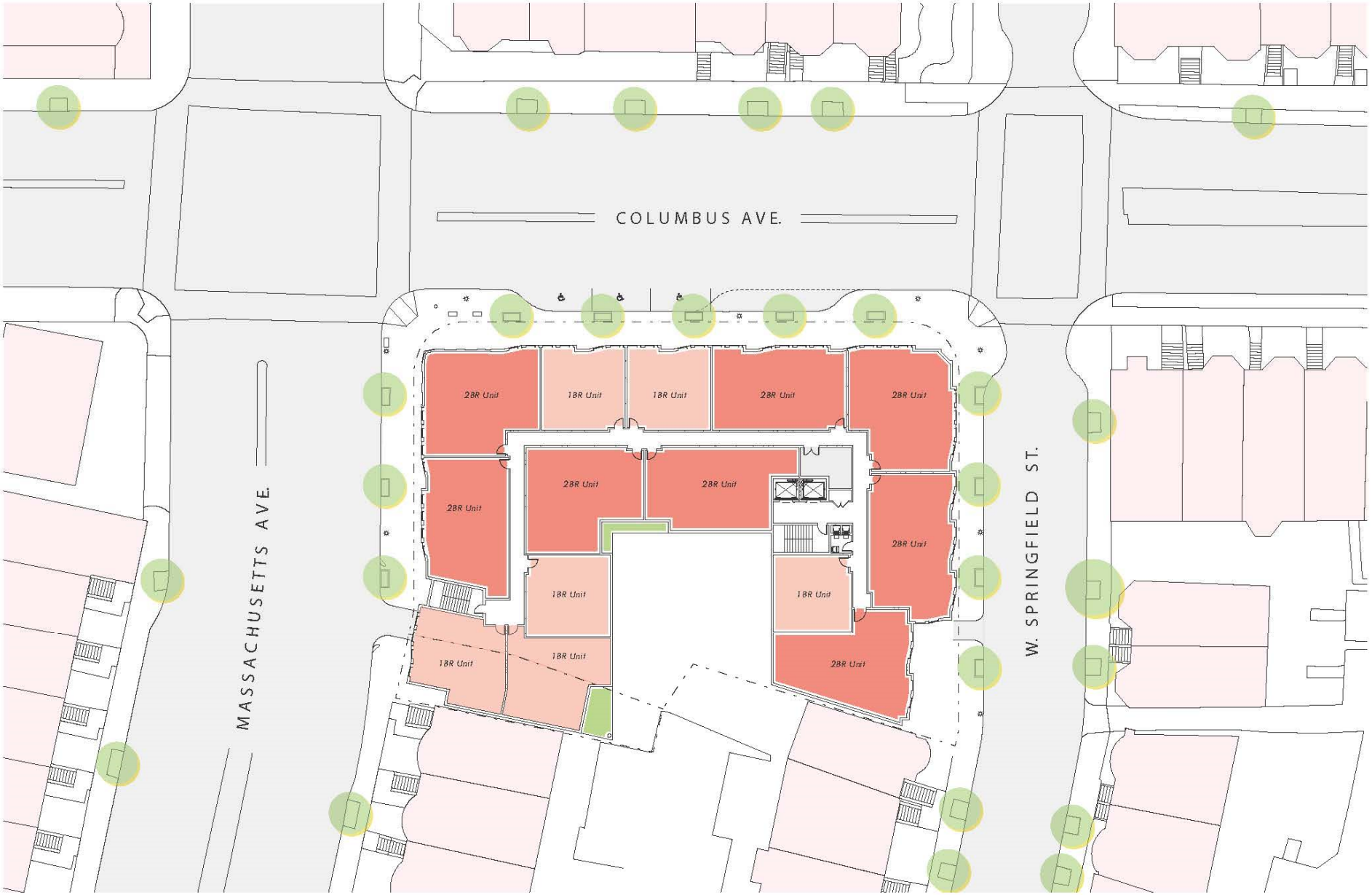
Ground Floor Plan

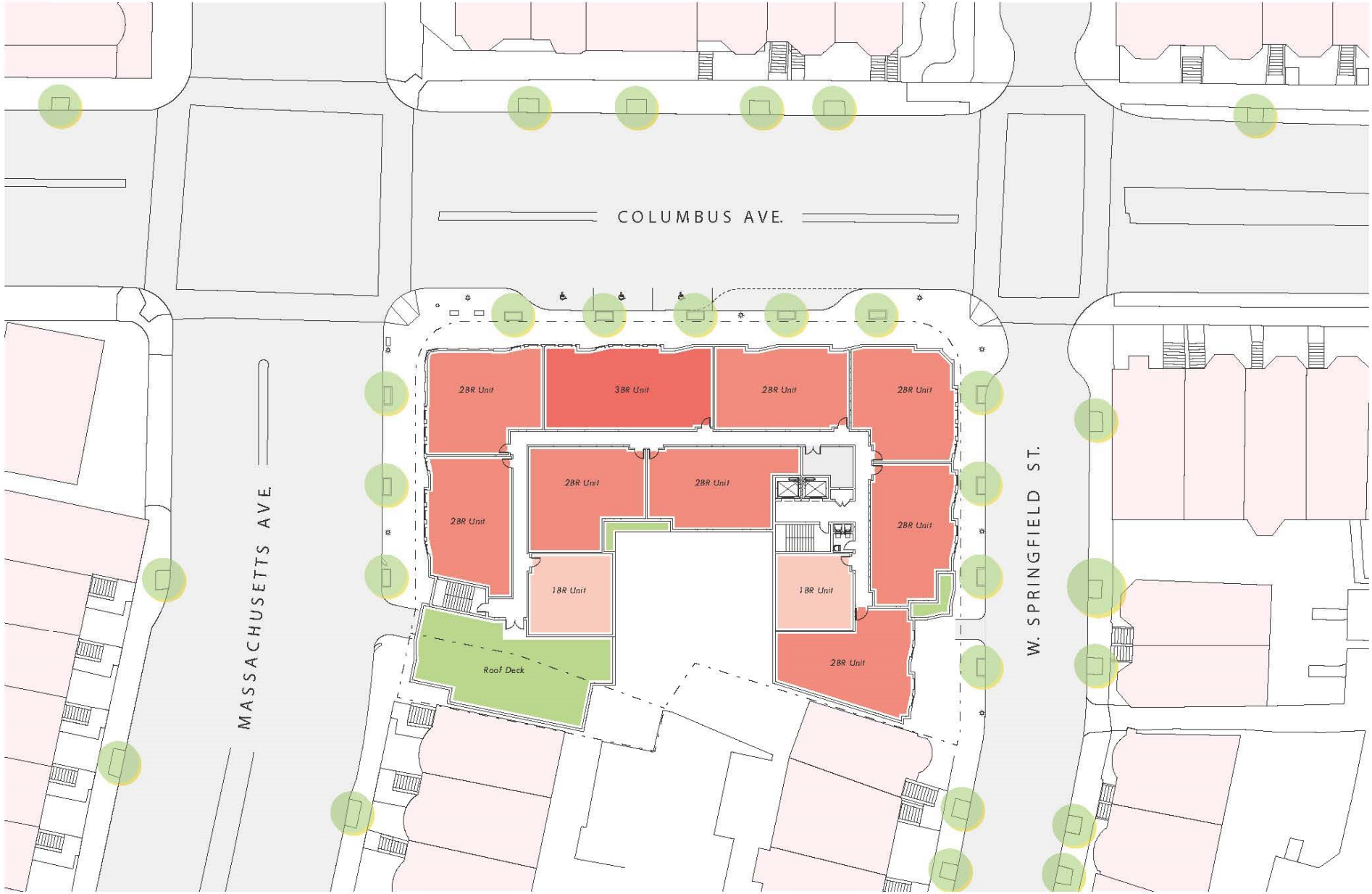
566 Columbus Avenue Boston, Massachusetts

JGE J. GARLAND ENTERPRISES LLC

Second Floor Plan



566 Columbus Avenue Boston, Massachusetts



566 Columbus Avenue Boston, Massachusetts

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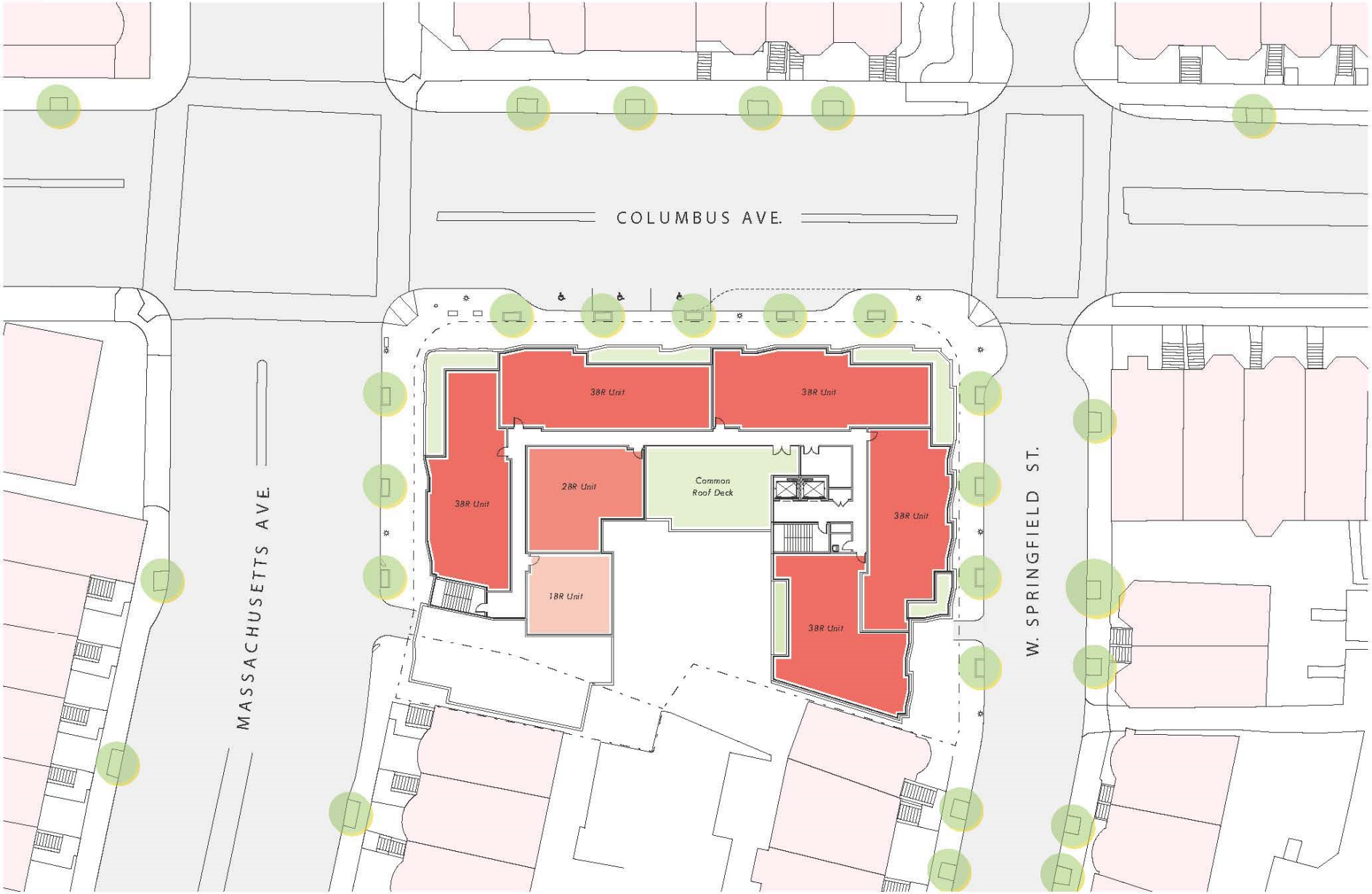
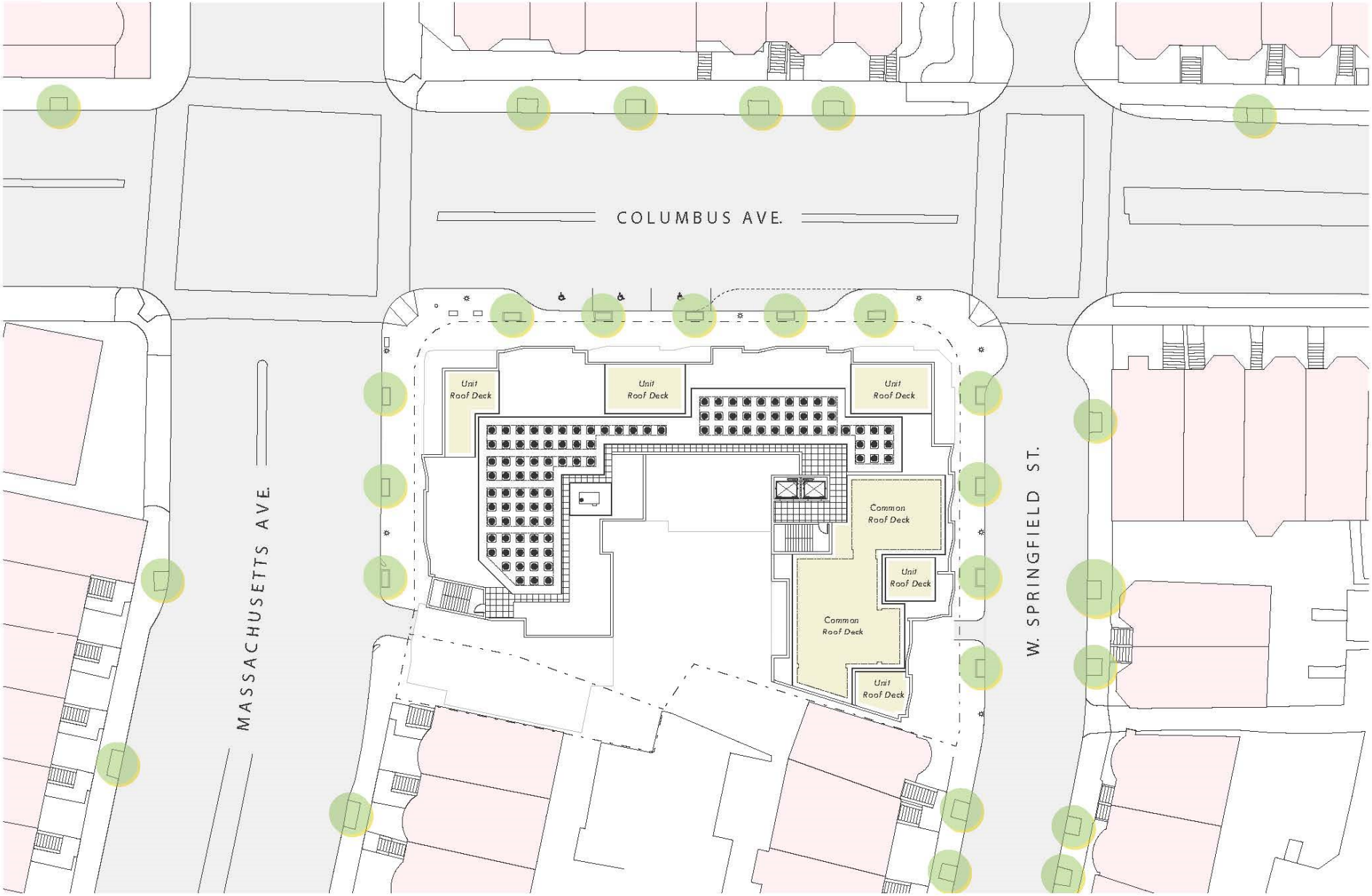
Fifth Floor Plan



566 Columbus Avenue Boston, Massachusetts

JGE J. GARLAND ENTERPRISES LLC

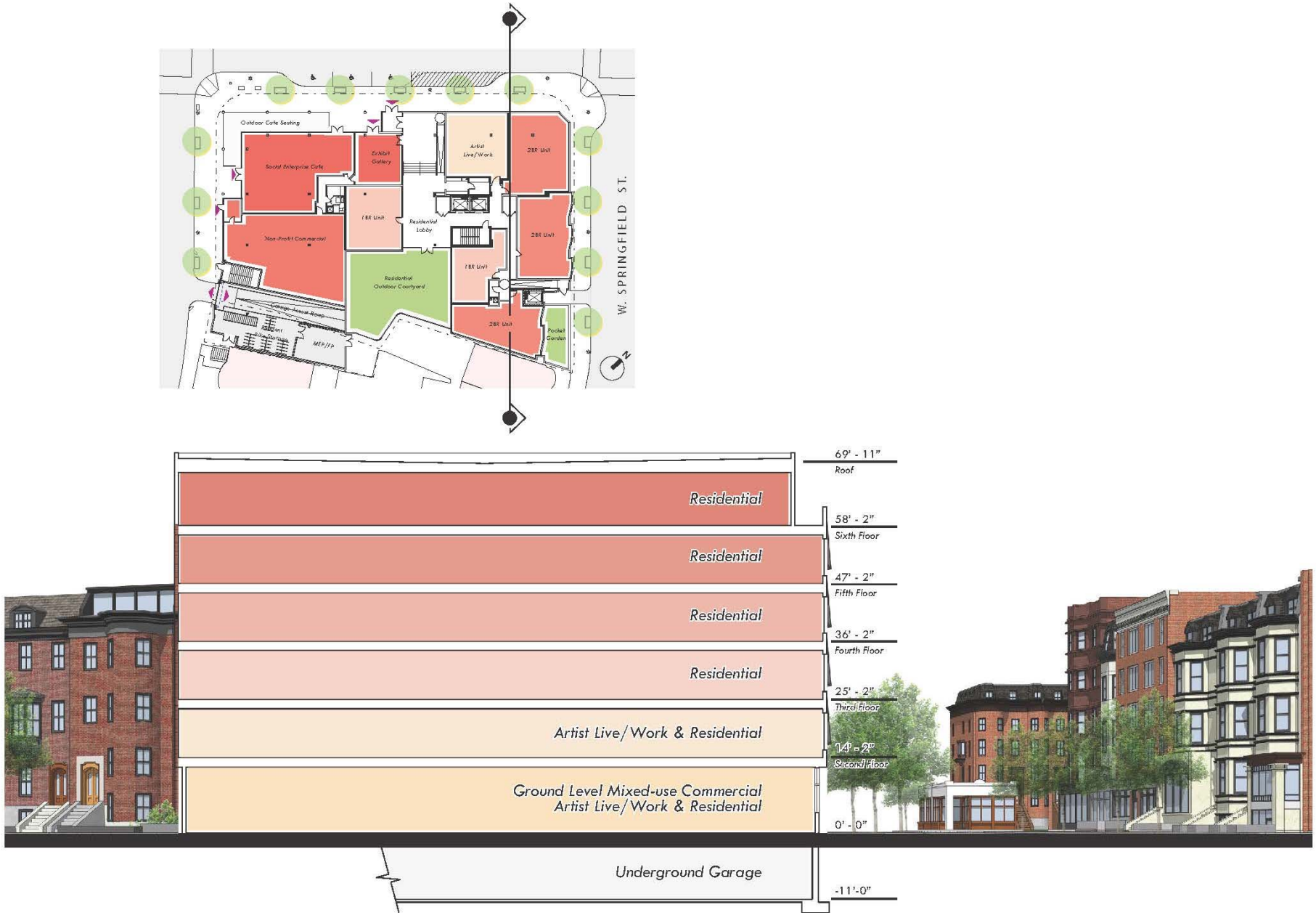
Sixth Floor Plan



566 Columbus Avenue Boston, Massachusetts

JGE J. GARLAND ENTERPRISES LLC

Roof Plan



566 Columbus Avenue Boston, Massachusetts

Appendix B

Metes and Bounds

PROPOSED LEGAL DESCRIPTION FOR: 566 COLUMBUS AVENUE

A CERTAIN PARCEL OF LAND LOCATED IN COMMONWEALTH MASSACHUSETTS, SUFFOLK COUNTY, CITY OF BOSTON, AND BEING BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A REMOTE POINT OF BEGINNING: THE NORTHWESTERLY BRICK BUILDING CORNER OF 560 COLUMBUS AVENUE, HAVING A MASS. STATE PLANE COORDINATE N:2,949,589.1235, E:769,465.9442;

THENCE S34°27'29W", A DISTANCE OF 51.20 FEET TO THE POINT OF BEGINNING OF 566 COLUMBUS AVENUE, SAID POINT BEING A POINT OF CURVATURE ON THE WESTERLY SIDELINE OF WEST SPRINGFIELD STREET, HAVING A MASS. STATE PLANE COORDINATE OF N:2,949,546.9092, E:769,436.9765;

THENCE S47°42'44"E, A DISTANCE OF 117.99 FEET ALONG SAID WESTERLY SIDELINE OF WEST SPRINGFIELD STREET TO A POINT;

THENCE S36°08'35"W, A DISTANCE OF 5.18 FEET ALONG SAID WESTERLY SIDELINE OF WEST SPRINGFIELD STREET TO A POINT HAVING A MASS. STATE PLANE COORDINATE N:2,949,463.3381, E:769,527.3158;

THENCE S59°33'00"W, A DISTANCE OF 90.64 FEET TO A POINT ON THE EASTERLY SIDELINE OF A TEN FOOT WIDE PASSAGEWAY;

THENCE S13°19'16"E, A DISTANCE OF 17.70 FEET TO A POINT ON THE WESTERLY SIDELINE OF SAID 10 FOOT WIDE PASSAGEWAY;

THENCE S36°08'35"E, A DISTANCE OF 14.65 FEET ALONG THE WESTERLY SIDELINE OF SAID TEN FOOT WIDE PASSAGEWAY TO A POINT;

THENCE S53°56'25"W, A DISTANCE OF 87.00 FEET TO A POINT ON THE EASTERLY SIDELINE OF MASSACHUSETTS AVENUE HAVING A MASS. STATE PLANE COORDINATE N:2,949,337.1332, E:769,391.5617;

THENCE N36°08'35"W, A DISTANCE OF 29.76 FEET ALONG SAID EASTERLY SIDELINE OF MASSACHUSETTS AVENUE TO A POINT;

THENCE N47°45'38"W, A DISTANCE OF 78.27 FEET ALONG SAID EASTERLY SIDELINE OF MASSACHUSETTS AVENUE TO A POINT OF CURVATURE HAVING A MASS. STATE PLANE COORDINATE N:2,949,413.7826, E:769,316.0614;

THENCE ALONG A CURVE TO THE RIGHT HAVING A RADIUS OF 17.00 FEET, AN ARC LENGTH OF 26.70 FEET, AND A CENTRAL ANGLE OF 90°00'17" WITH A CHORD BEARING OF N02°45'29"W, A CHORD DISTANCE OF 24.04 FEET TO A POINT OF TANGENCY SAID POINT BEING A POINT ON THE SOUTHERLY SIDELINE OF COLUMBUS AVENUE;

THENCE N42°14'40"E, A DISTANCE OF 145.84 FEET ALONG SAID SOUTHERLY SIDELINE OF COLUMBUS AVENUE TO A POINT OF CURVATURE;

THENCE ALONG A CURVE TO THE RIGHT HAVING A RADIUS OF 17.00 FEET, AN ARC LENGTH OF 26.72 FEET, AND A CENTRAL ANGLE OF 90°02'36" WITH A CHORD BEARING OF N87°15'58"E, A CHORD DISTANCE OF 24.05 FEET TO THE POINT OF BEGINNING.

ABOVE DESCRIBED PARCEL CONTAINS 23,278 PLUS OR MINUS SQUARE FEET.

Appendix C

Community Engagement Matrices

566 Columbus Avenue
Community Engagement Activities
As of July 16, 2019

BUSINESS ENTITIES & NON-PROFIT ORGANIZATIONS
1. South End Forum: Includes the following members: Ellis NA; Blackstone Franklin NA; Claremont NA; Worcester Square NA; East Berkeley NA; Hurley Block NA; Chester Square NA; Union Park NA; Pilot Block NA; 8 Streets NA. The project team also met individually with some of these groups.
2. United South End Artists
3. SEBA
4. United South End Settlements
5. Castle Square Neighborhood Association
6. Inquilinos Boricuas en Accion (IBA)
7. Pine Street Inn
8. Wally's Café
9. SRV Restaurant (Owner: James Cochener)
10. People's Baptist Church
11. Dudley Square Main Streets
12. United Neighbors of Lower Roxbury
COMMUNITY LEADERS
1. Mel King
2. Paul Goodnight
3. Freida Garcia
4. Byron Rushing
5. Steve Fox
6. Bob Barney
7. Carol Blair
8. David Stone
9. Ted Pietras
10. Robin Johnson
11. Carolyn Parker
12. Hakan Sjoo
ELECTED OFFICIALS
1. State Representative Jon Santiago
2. State Representative Aaron
3. Boston City Councilor Kim Janey

566 COLUMBUS AVENUE
SUPPORTER LIST
As of 7/29/19

NAME		ADDRESS
1. Vanessa Calderon-Rosado-CEO	Inquilinos Boricuas en Accion (IBA)	405 Shawmut Avenue, Boston, MA
2. Mike Wasserman-Exec. Dir.	Boston Debate League	566 Columbus Avenue, Boston, MA
3. David Schwartz	East Coast Realty	555 Columbus Avenue, Boston, MA
4. Jason Webb-Former Director	Dudley Neighbors, Inc.	550 Dudley Street, Roxbury, MA
5. Tony Hernandez-Director	Dudley Neighbors, Inc.	550 Dudley Street, Roxbury, MA
6. Eve Ward	South End Business Alliance	19 Union Park, Boston, MA
7. Nia Grace-Owner/Operator	Darryl's Corner Bar and Kitchen	604 Columbus Avenue, Boston, MA
8. Soonyoung You-President	Bijan Cleaners	567 Columbus Avenue, Boston, MA
9. Deborah Backus-Exec. Dir.	Castle Square Neighborhood Association	476 Tremont Street, Boston, MA
10. Lyndia Downie-President	Pine Street Inn	444 Harrison Avenue, Boston, MA
11. Jennifer Taibi, Co-Chair	United South End Artists	87 Marlborough Street, Boston, MA
12. Rebecca Roth Gullo	Banyan Restaurant	553 Tremont Street, Boston, MA
13. Al Desti	South End Food Emporium	469 Columbus Avenue, Boston, MA
14. Vassilis Kamperides	Columbus Dry Cleaners	465 Columbus Avenue, Boston, MA
15. Ken Oringer-Owner	Toro	234 W. Newton Street #5, Boston, MA
16. Loic LeGarrec-Owner	Petit Robert Bistro	480 Columbus Avenue, Boston, MA
17. James Cochener-Owner	SRV	569 Columbus Avenue, Boston, MA
18. Bill Kasper-Owner	Urban Property Management	35 Fay Street, Boston, MA
19. Robin Johnson	Hingham Savings Bank	540 Tremont Street, Boston, MA
20. David Stone & Jennifer Watson		64 East Brookline Street #4, Boston, MA
21. Jane Bolt		41 Thorndike Street, Boston, MA
22. Santa Soto		12 Westminster Street #2, Boston, MA
23. Celis Suazo		9 Lattimore Court, Boston, MA
24. Suzanne Lynch		25 Trotter Court, Boston, MA
25. Jim Alexander & Thomas Stocker		257 Northhampton Street #702, Boston, MA
26. Chris Byrne & Angela Feraco		771 Tremont Street, Boston, MA
27. Ivy O'Connor		765 A Tremont Street #2, Boston, MA
28. Gary Bailey		10 Columbus Square #1, Boston, MA
29. Toni Crothall		4 East Concord Street, Boston, MA
30. Joyce Lee		32 Rutland Street, Boston, MA
31. Brian Gokey		503 Shawmut Avenue

32. Jackie Cox-Crite		130 Dartmouth Street #812, Boston, MA
33. Kenneth Kruckemeyer		12 Holyoke Street, Boston, MA
34. Joan & Edwin Tiffany		19 Braddock Park, Boston, MA
35. Catherin Mesner		18 Wellington Street #2, Boston, MA
36. Richard Stern		31 Rutland Street, Boston, MA
37. Steve Sheinkopf		39 Greenwich Park, Boston, MA
38. Jennifer Coplon		735 Harrison Avenue #401, Boston, MA
39. Norin Razzaque		190 W. Springfield Street $1, Boston, MA
40. Jeffrey W. Hamilton, Jr.		94 Worcester Street #1, Boston, MA
41. Rob Hagan		103 W. Springfield Street, Boston, MA
42. John Meunier		45 W. Newton Street #5, Boston, MA
43. Chris Flynn		121 W. Concord Street, Boston, MA
44. Dosenia Smith		465 Columbus Avenue, Boston, MA
45. Ben Clough		199 W. Newton Street, Boston, MA
46. Bryan Quinlan		45 Concord Square, Boston, MA
47. Mike Reardon		45 Concord Square, Boston, MA
48. Michael Byers		47 Concord Square, Boston, MA
49. Colton Dwyer		17 Gray Street #2, Boston, MA
50. Matt Cloutier		529 Columbus Avenue #17, Boston, MA
51. Brian Burn		32 Traveler Street, Boston, MA
52. Chris Gonzales		192 W. Brookline Street #2, Boston, MA
53. Robyn Varney		1692 Washington Street #1, Boston, MA
54. Aaron Edwards		140 Shawmut Avenue #1G, Boston, MA
55. Song Han		1672 Washington Street #201, Boston, MA
56. Travis Chernak		1313 Washington Street #503, Boston, MA
57. John Casagrande		11 Wellington Street, Boston, MA
58. Jodi Solomon		29 Hanson Street, Boston, MA
59. Steven Bertozzi		1313 Washington Street #420, Boston, MA
60. Jaseal Boldec		538 Tremont Street, Boston, MA
61. Richard Tarulli		1313 Washington Street #420, Boston, MA
62. Patrick Planeta		535 Albany Street #101C, Boston, MA
63. Allison Picott		140 Shawmut Avenue #1E, Boston, MA
64. Nicolas Farrell		613 Columbus Avenue #6, Boston, MA
65. Carly O'Shaughnessy		345 Harrison Avenue, Boston, MA
66. Kevin Corkery		25 Holyoke Street #5, Boston, MA
67. Michael Goldstein		140 Shawmut Avenue #1E, Boston, MA

68. Paula Bartlett		300 Harrison Avenue #337, Boston, MA
69. Adam Glick		15 Holyoke Street #3, Boston, MA
70. Ricardo Rodriguez & Michael Kelley		100 Arlington Street, Boston, MA
71. Vera Martin		243 Shawmut Avenue, Boston, MA
72. Brandon Miller		27 Worcester Street #1, Boston, MA
73. Heather Govern		1688 Washington Street #2, Boston, MA
74. Shannon Varney		140 Shawmut Avenue #1D, Boston, MA
75. Nicholas Boretti		725 Harrison Avenue, Boston, MA
76. Bernard Petersen		7 Dwight Street #1, Boston, MA
77. Alicia D'Alba		38 Dartmouth Street #3, Boston, MA
78. Jackie Bullis		90 Waltham Street #3, Boston, MA
79. James Flanagan		30 Union Park #203, Boston, MA
80. William T. Stern		350 Harrison Avenue, Boston, MA
81. Brooke Wurst		27 Wareham Street #303, Boston, MA
82. Heather Lynch		32 Traveler Street #608, Boston, MA
83. Mark E. Walsh		140 Shawmut Avenue #8B, Boston, MA
84. LeeAnn Miller		30 Dalton Street #2601, Boston, MA
85. Richard Miller		30 Dalton Street #2601, Boston, MA
86. Phil Spinks		1313 Washington Street #316, Boston, MA
87. Adam Stillman		35 Fay Street #10, Boston, MA
88. Matthew E. Hart		31 Hanson Street #3, Boston, MA
89. Cheryl Dickinson		189 West Canton Street, Boston, MA
90. Mary Ellen Hassell		185 Warren Avenue #1, Boston, MA
91. Jamie Curtis		32 Traveler Street #508, Boston, MA
92. Jen Girvin		68 Chandler Street
93. Camille Preston		USES
94. Don Gorton		138 Chandler Street #4, Boston, MA
95. Peter Forkner		16 Durham Street, Boston, MA
96. Daniel Gerardi		30 Union Park #501, Boston, MA
97. Jacqueline Fantuzzi		111 Pembroke Street, Boston, MA
98. Jordyne Wu		7 Claremont Park, Boston, MA
99. Harold J. McCarty		25 Claremont Park, Boston, MA
100. Felicia Faison & Nyles Nedd		96 Dartmouth Street #6, Boston, MA
101. Marissa Andrew		195 Savin Hill Avenue #7, Boston, MA
102. Audrey Evans		11 Greenwich Park, Boston, MA

103. Alina Wolhardt		535 Albany Street, Boston, MA
104.Nyshija Barboza		66 Hudson Street #810, Boston, MA
105.Corey Smith		82 Fairmount Street #1, Boston, MA
106.Mark Doherty		133 Pembroke Street, Boston, MA
107.Crandon Leahy		17 Gray Street #2, Boston, MA
108.Justin Hautaniemi		66 Waltham Street #40, Boston, MA
109.Rob Kutner		345 Harrison Avenue, Boston, MA
110.Marco Eberth		17 Gray Street #1, Boston, MA
111.Jeanne M. Pelletier, Esq.		4 Pelham Terrace, Boston, MA

Appendix D

Transportation

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 1
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	St Botolph Street
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

BOSTON TRAFFIC DATA
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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				St Botolph Street Eastbound				St Botolph Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	22	126	9	0	6	109	4	0	0	0	3	0	7	2	9
7:15 AM	0	15	148	5	0	7	130	6	0	0	0	3	0	5	4	5
7:30 AM	0	9	134	15	0	4	143	3	0	1	1	4	0	6	3	4
7:45 AM	0	16	156	19	0	6	135	5	0	1	0	3	0	5	3	6
8:00 AM	0	8	169	10	0	7	154	7	0	0	0	2	0	4	4	5
8:15 AM	0	17	133	11	0	8	162	4	0	1	0	0	0	12	2	11
8:30 AM	0	10	152	9	0	7	157	5	0	1	0	2	0	4	7	8
8:45 AM	1	16	136	12	0	8	131	6	0	1	0	1	0	7	2	8

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				St Botolph Street Eastbound				St Botolph Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	9	209	6	0	20	171	5	0	3	6	16	0	8	5	9
4:15 PM	1	8	190	12	0	14	192	2	0	4	2	23	0	9	2	10
4:30 PM	0	11	216	9	0	16	196	3	0	5	3	16	0	16	2	5
4:45 PM	0	16	167	15	0	15	212	4	0	7	1	14	0	3	4	4
5:00 PM	2	12	183	16	0	11	196	2	0	4	6	12	0	18	2	9
5:15 PM	0	11	176	18	0	9	169	6	0	5	1	20	0	7	4	4
5:30 PM	0	10	194	23	0	10	179	9	0	4	7	21	0	15	5	10
5:45 PM	0	12	165	11	0	9	170	6	0	4	1	8	0	2	2	9

AM PEAK HOUR 7:45 AM to 8:45 AM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				St Botolph Street Eastbound				St Botolph Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**51**	**610**	**49**	**0**	**28**	**608**	**21**	**0**	**3**	**0**	**7**	**0**	**25**	**16**	**30**
PHF	**0.93**				**0.94**				**0.63**				**0.71**			
HV %	**0.0%**	**2.0%**	**9.5%**	**2.0%**	**0.0%**	**0.0%**	**9.7%**	**4.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.0%**	**0.0%**	**3.3%**

PM PEAK HOUR 4:15 PM to 5:15 PM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				St Botolph Street Eastbound				St Botolph Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	3	**47**	**756**	**52**	**0**	**56**	**796**	**11**	**0**	**20**	**12**	**65**	**0**	**46**	**10**	**28**
PHF	**0.91**				**0.93**				**0.84**				**0.72**			
HV %	**0.0%**	**0.0%**	**4.1%**	**0.0%**	**0.0%**	**1.8%**	**4.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.5%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 1
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	St Botolph Street
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

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HEAVY VEHICLES

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				St Botolph Street Eastbound				St Botolph Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	2	23	0	0	0	15	0	0	0	0	0	0	0	0	1
7:15 AM	0	1	13	0	0	0	15	1	0	0	0	0	0	0	0	0
7:30 AM	0	1	19	0	0	0	16	0	0	0	0	1	0	1	0	0
7:45 AM	0	1	13	0	0	0	17	0	0	0	0	0	0	0	0	1
8:00 AM	0	0	14	0	0	0	13	1	0	0	0	0	0	0	0	0
8:15 AM	0	0	17	1	0	0	14	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	14	0	0	0	15	0	0	0	0	0	0	1	0	0
8:45 AM	0	1	18	2	0	0	14	0	0	0	0	0	0	0	0	0

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

AM PEAK HOUR 7:00 AM to 8:00 AM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				St Botolph Street Eastbound				St Botolph Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**5**	**68**	**0**	**0**	**0**	**63**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**2**
PHF	**0.73**				**0.94**				**0.25**				**0.75**			

PM PEAK HOUR 4:30 PM to 5:30 PM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				St Botolph Street Eastbound				St Botolph Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**31**	**0**	**0**	**2**	**35**	**3**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
PHF	**0.65**				**0.77**				**0.25**				**0.00**			

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 1
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	St Botolph Street
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

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PEDESTRIANS & BICYCLES

	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					St Botolph Street Eastbound					St Botolph Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	10	0	5		0	5	0	3		0	0	0	4		0	1	0	30	
7:15 AM	0	20	0	3		0	7	0	12		0	0	0	6		0	0	0	36	
7:30 AM	0	18	0	2		0	6	0	5		0	1	0	15		0	0	0	38	
7:45 AM	1	20	0	11		0	15	0	10		0	0	0	12		0	0	0	43	
8:00 AM	0	28	0	9		0	12	0	8		0	0	0	6		0	0	0	61	
8:15 AM	2	19	0	7		1	5	0	4		0	0	0	9		0	0	0	54	
8:30 AM	0	34	0	8		0	6	0	3		0	0	0	32		0	0	2	48	
8:45 AM	0	26	0	4		0	8	0	4		0	0	0	41		0	0	0	37	

	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					St Botolph Street Eastbound					St Botolph Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	3	0	10		0	3	0	8		0	1	0	10		0	0	0	31	
4:15 PM	0	13	1	9		1	8	0	15		0	0	0	17		0	1	0	48	
4:30 PM	0	13	1	17		1	7	0	16		0	0	0	22		0	0	0	40	
4:45 PM	0	15	0	10		0	6	0	15		0	0	0	36		0	0	1	33	
5:00 PM	1	19	0	10		0	4	0	9		2	0	0	42		0	1	0	39	
5:15 PM	0	27	0	19		0	6	0	11		0	0	0	33		1	0	0	53	
5:30 PM	0	12	0	23		0	5	0	13		0	0	0	38		0	0	0	41	
5:45 PM	0	23	0	6		0	5	1	14		0	0	0	11		0	0	1	37	

AM PEAK HOUR[1]	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					St Botolph Street Eastbound					St Botolph Street Westbound				
7:45 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:45 AM	3	101	0	35		1	38	0	25		0	0	0	59		0	0	2	206	

PM PEAK HOUR[1]	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					St Botolph Street Eastbound					St Botolph Street Westbound				
4:15 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:15 PM	1	60	2	46		2	25	0	55		2	0	0	117		0	2	1	160	

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

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 2
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	MBTA Station
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	157	0	0	0	119	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	168	0	0	0	138	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	158	0	0	0	153	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	191	0	0	0	143	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	187	0	0	0	160	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	161	0	0	0	174	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	171	0	0	0	163	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	165	0	0	0	140	0	0	0	0	0	0	0	0	0

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	224	0	0	0	195	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	211	0	0	0	225	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	236	0	0	0	228	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	198	0	0	0	229	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	213	0	0	0	228	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	205	0	0	0	196	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	227	0	0	0	215	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	188	0	0	0	180	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**710**	**0**	**0**	**0**	**640**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.93**				**0.92**				**0.00**				**0.00**			
HV %	**0.0%**	**0.0%**	**10.1%**	**0.0%**	**0.0%**	**0.0%**	**10.2%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 4:15 PM to 5:15 PM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**858**	**0**	**0**	**0**	**910**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.91**				**0.99**				**0.00**				**0.00**			
HV %	**0.0%**	**0.0%**	**4.0%**	**0.0%**	**0.0%**	**0.0%**	**4.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 2
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	MBTA Station
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

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HEAVY VEHICLES

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	33	0	0	0	14	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	22	0	0	0	18	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	21	0	0	0	19	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	15	0	0	0	19	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	16	0	0	0	17	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	23	0	0	0	13	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	18	0	0	0	16	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	17	0	0	0	16	0	0	0	0	0	0	0	0	0

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Eastbound				Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	7	0	0	0	12	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	8	0	0	0	9	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	12	0	0	0	7	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	7	0	0	0	12	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	7	0	0	0	9	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	9	0	0	0	9	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	10	0	0	0	7	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	6	0	0	0	8	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:00 AM to 8:00 AM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**91**	**0**	**0**	**0**	**70**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.69**				**0.92**				**0.00**				**0.00**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Eastbound				Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**34**	**0**	**0**	**0**	**40**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.71**				**0.83**				**0.00**				**0.00**			

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 2
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	MBTA Station
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

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PEDESTRIANS & BICYCLES

	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	7	0	0		0	11	0	67		0	0	0	0		0	0	0	0	
7:15 AM	0	14	0	0		0	6	0	85		0	0	0	0		0	0	0	0	
7:30 AM	0	17	0	0		0	9	0	150		0	0	0	0		0	0	0	0	
7:45 AM	0	13	0	0		0	8	0	103		0	0	0	0		0	0	0	0	
8:00 AM	0	20	0	0		0	11	0	137		0	0	0	0		0	0	0	0	
8:15 AM	0	20	0	0		0	14	0	112		0	0	0	0		0	0	0	0	
8:30 AM	0	26	0	0		0	13	0	113		0	0	0	0		0	0	0	0	
8:45 AM	0	24	0	0		0	10	0	118		0	0	0	0		0	0	0	0	

	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Eastbound					Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	3	0	0		0	3	0	93		0	0	0	0		0	0	0	0	
4:15 PM	0	19	0	0		0	7	0	60		0	0	0	0		0	0	0	0	
4:30 PM	0	15	0	0		0	2	0	96		0	0	0	0		0	0	0	0	
4:45 PM	0	12	0	0		0	3	0	86		0	0	0	0		0	0	0	0	
5:00 PM	0	24	0	0		0	11	0	144		0	0	0	0		0	0	0	0	
5:15 PM	0	36	0	0		0	8	0	141		0	0	0	0		0	0	0	0	
5:30 PM	0	20	0	0		0	10	0	123		0	0	0	0		0	0	0	0	
5:45 PM	0	28	0	0		0	6	0	102		0	0	0	0		0	0	0	0	

AM PEAK HOUR[1]	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Eastbound					Westbound				
7:45 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:45 AM	0	79	0	0		0	46	0	465		0	0	0	0		0	0	0	0	

PM PEAK HOUR[1]	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Eastbound					Westbound				
4:15 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:15 PM	0	70	0	0		0	23	0	386		0	0	0	0		0	0	0	0	

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

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 3
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	Columbus Avenue
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Columbus Avenue Eastbound				Columbus Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	10	103	12	0	4	101	14	0	47	33	10	0	15	35	7
7:15 AM	0	19	88	16	0	8	112	18	0	69	50	5	0	24	22	11
7:30 AM	0	27	108	4	0	9	128	16	0	40	49	8	0	17	31	10
7:45 AM	0	24	113	4	0	7	111	25	0	61	59	4	0	26	26	17
8:00 AM	0	17	114	5	0	12	116	32	0	52	43	8	0	23	28	21
8:15 AM	0	26	106	8	0	14	129	31	0	42	49	3	0	16	29	13
8:30 AM	1	18	113	4	0	11	113	39	0	44	51	4	0	19	20	14
8:45 AM	0	23	111	3	0	11	106	23	0	40	48	7	0	18	23	14

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Columbus Avenue Eastbound				Columbus Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	3	2	136	17	0	12	150	33	0	68	26	7	0	37	46	20
4:15 PM	1	3	154	18	0	21	162	42	0	43	32	6	0	39	60	14
4:30 PM	0	7	167	15	0	10	178	40	0	52	36	9	0	28	32	17
4:45 PM	0	6	134	17	0	15	166	48	0	50	35	10	0	36	50	14
5:00 PM	0	7	136	25	0	11	175	42	0	62	36	6	0	34	50	15
5:15 PM	1	10	145	20	0	14	137	45	0	48	39	10	0	51	57	12
5:30 PM	0	5	153	18	0	10	157	48	0	63	45	8	0	31	48	11
5:45 PM	0	3	148	20	0	9	132	39	0	32	38	7	0	42	47	8

AM PEAK HOUR 7:45 AM to 8:45 AM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Columbus Avenue Eastbound				Columbus Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**85**	**446**	**21**	**0**	**44**	**469**	**127**	**0**	**199**	**202**	**19**	**0**	**84**	**103**	**65**
PHF	**0.98**				**0.92**				**0.85**				**0.88**			
HV %	**0.0%**	**18.8%**	**14.1%**	**0.0%**	**0.0%**	**13.6%**	**10.4%**	**8.7%**	**0.0%**	**1.5%**	**1.5%**	**21.1%**	**0.0%**	**6.0%**	**1.9%**	**7.7%**

PM PEAK HOUR 4:15 PM to 5:15 PM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Columbus Avenue Eastbound				Columbus Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	1	**23**	**591**	**75**	**0**	**57**	**681**	**172**	**0**	**207**	**139**	**31**	**0**	**137**	**192**	**60**
PHF	**0.91**				**0.99**				**0.91**				**0.86**			
HV %	**0.0%**	**0.0%**	**5.1%**	**1.3%**	**0.0%**	**5.3%**	**4.6%**	**1.2%**	**0.0%**	**0.0%**	**5.8%**	**3.2%**	**0.0%**	**0.7%**	**2.1%**	**5.0%**

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 3
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	Columbus Avenue
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

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HEAVY VEHICLES

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Columbus Avenue Eastbound				Columbus Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	1	19	1	0	1	7	1	0	2	5	1	0	1	1	0
7:15 AM	0	0	16	4	0	1	9	1	0	0	0	0	0	1	1	1
7:30 AM	0	1	21	0	0	5	14	0	0	0	6	0	0	2	1	1
7:45 AM	0	4	12	0	0	1	15	1	0	0	1	1	0	1	0	2
8:00 AM	0	1	18	0	0	3	11	3	0	0	1	2	0	2	2	2
8:15 AM	0	5	19	0	0	1	11	4	0	2	1	1	0	1	0	0
8:30 AM	0	6	14	0	0	1	12	3	0	1	0	0	0	1	0	1
8:45 AM	0	1	21	0	0	2	12	1	0	3	2	0	0	2	1	1

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Columbus Avenue Eastbound				Columbus Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	5	2	0	0	13	1	0	0	0	0	0	3	2	1
4:15 PM	0	0	4	0	0	1	8	1	0	0	1	0	0	0	2	1
4:30 PM	0	0	12	0	0	0	5	0	0	0	2	0	0	0	1	2
4:45 PM	0	0	9	0	0	1	8	1	0	0	3	0	0	1	1	0
5:00 PM	0	0	5	1	0	1	10	0	0	0	2	1	0	0	0	0
5:15 PM	0	1	5	0	0	0	10	0	0	0	1	0	0	2	1	1
5:30 PM	0	0	8	0	0	0	9	0	0	1	1	0	0	0	1	1
5:45 PM	0	0	4	0	0	1	6	0	0	0	3	0	0	0	1	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Columbus Avenue Eastbound				Columbus Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**11**	**70**	**0**	**0**	**10**	**51**	**8**	**0**	**2**	**9**	**4**	**0**	**6**	**3**	**5**
PHF	**0.84**				**0.91**				**0.63**				**0.58**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Columbus Avenue Eastbound				Columbus Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**30**	**2**	**0**	**2**	**34**	**3**	**0**	**0**	**6**	**0**	**0**	**4**	**6**	**4**
PHF	**0.67**				**0.70**				**0.50**				**0.58**			

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 3
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	Columbus Avenue
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

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PEDESTRIANS & BICYCLES

	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Columbus Avenue Eastbound					Columbus Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	6	0	9		0	6	0	15		1	0	0	28		0	0	2	12	
7:15 AM	0	11	0	8		0	7	1	19		4	9	1	27		1	1	0	20	
7:30 AM	0	7	0	7		2	5	1	23		6	6	1	39		0	1	1	23	
7:45 AM	0	6	0	13		0	7	2	21		7	13	3	48		0	4	2	30	
8:00 AM	0	13	0	12		0	3	0	26		14	20	1	61		0	4	1	32	
8:15 AM	0	8	0	13		1	16	2	23		18	31	1	65		0	2	2	34	
8:30 AM	1	8	0	11		1	10	4	28		10	30	0	59		0	3	2	42	
8:45 AM	1	13	0	10		2	10	0	24		9	32	1	63		0	2	2	31	

	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Columbus Avenue Eastbound					Columbus Avenue Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	2	0	12		0	6	0	17		1	6	0	49		2	13	3	32	
4:15 PM	2	13	0	10		1	11	4	23		1	0	0	28		0	14	1	20	
4:30 PM	0	11	0	18		0	9	4	31		0	2	0	48		0	13	2	47	
4:45 PM	1	7	0	19		0	5	1	35		0	2	0	23		0	25	2	49	
5:00 PM	0	6	0	20		0	9	4	40		3	1	0	65		0	18	7	48	
5:15 PM	0	12	0	23		0	8	1	37		2	2	0	55		1	26	6	53	
5:30 PM	1	7	0	25		0	6	4	42		0	3	0	75		1	21	4	55	
5:45 PM	1	6	0	21		2	15	5	36		3	2	0	69		1	24	7	53	

AM PEAK HOUR[1]	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Columbus Avenue Eastbound					Columbus Avenue Westbound				
7:45 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:45 AM	1	35	0	49		2	36	8	98		49	94	5	233		0	13	7	138	

PM PEAK HOUR[1]	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Columbus Avenue Eastbound					Columbus Avenue Westbound				
4:15 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:15 PM	3	37	0	67		1	34	13	129		4	5	0	164		0	70	12	164	

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

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 4
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	Tremont Street
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

BOSTON TRAFFIC DATA
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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Tremont Street Eastbound				Tremont Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	20	98	25	0	9	114	3	0	22	61	15	0	21	65	5
7:15 AM	0	16	103	39	0	13	122	6	0	14	78	12	1	19	57	6
7:30 AM	0	16	110	30	0	17	128	8	0	16	106	13	0	14	52	13
7:45 AM	0	12	116	47	0	18	121	2	0	18	143	19	0	16	61	7
8:00 AM	0	13	112	39	0	19	125	3	0	17	153	18	1	18	42	7
8:15 AM	0	10	119	40	0	17	129	2	0	15	120	10	0	19	62	6
8:30 AM	0	11	112	43	0	13	114	10	0	19	138	9	0	20	52	5
8:45 AM	0	17	107	49	0	14	108	9	0	17	120	14	0	11	48	13

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Tremont Street Eastbound				Tremont Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	12	125	30	0	16	172	9	0	19	95	18	0	33	88	14
4:15 PM	0	19	134	29	0	20	177	11	0	32	94	16	1	34	97	10
4:30 PM	0	10	146	36	0	22	185	8	0	36	103	25	0	39	83	7
4:45 PM	0	11	130	37	0	19	193	9	0	18	89	20	0	37	112	9
5:00 PM	0	17	137	29	0	18	182	15	0	20	80	23	0	31	87	11
5:15 PM	0	14	140	34	0	14	178	7	0	24	93	34	0	38	101	12
5:30 PM	0	13	143	37	0	12	173	11	0	17	70	30	1	29	84	16
5:45 PM	0	10	132	21	0	10	165	6	0	22	93	22	0	27	90	17

AM PEAK HOUR 7:45 AM to 8:45 AM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Tremont Street Eastbound				Tremont Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**46**	**459**	**169**	**0**	**67**	**489**	**17**	**0**	**69**	**554**	**56**	**1**	**73**	**217**	**25**
PHF		**0.96**				**0.97**				**0.90**				**0.91**		
HV %	**0.0%**	**6.5%**	**13.5%**	**8.3%**	**0.0%**	**11.9%**	**12.9%**	**0.0%**	**0.0%**	**11.6%**	**4.3%**	**8.9%**	**0.0%**	**11.0%**	**3.7%**	**0.0%**

PM PEAK HOUR 4:30 PM to 5:30 PM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Tremont Street Eastbound				Tremont Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**52**	**553**	**136**	**0**	**73**	**738**	**39**	**0**	**98**	**365**	**102**	**0**	**145**	**383**	**39**
PHF		**0.96**				**0.96**				**0.86**				**0.90**		
HV %	**0.0%**	**1.9%**	**4.9%**	**0.0%**	**0.0%**	**5.5%**	**4.7%**	**2.6%**	**0.0%**	**1.0%**	**4.1%**	**2.9%**	**0.0%**	**2.1%**	**3.7%**	**0.0%**

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 4
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	Tremont Street
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
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www.BostonTrafficData.com

HEAVY VEHICLES

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Tremont Street Eastbound				Tremont Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	1	15	3	0	0	10	0	0	4	6	0	0	3	1	0
7:15 AM	0	1	17	4	0	0	8	0	0	3	6	0	0	0	1	2
7:30 AM	0	2	15	4	0	1	15	2	0	1	6	0	0	0	4	0
7:45 AM	0	1	13	1	0	2	18	0	0	1	5	1	0	3	1	0
8:00 AM	0	2	16	3	0	2	16	0	0	4	6	2	0	1	1	0
8:15 AM	0	0	13	9	0	3	18	0	0	2	8	1	0	1	3	0
8:30 AM	0	0	20	1	0	1	11	0	0	1	5	1	0	3	3	0
8:45 AM	0	2	8	2	0	0	12	0	0	5	5	2	0	1	6	0

	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Tremont Street Eastbound				Tremont Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	6	1	0	0	17	0	0	0	6	0	0	0	3	0
4:15 PM	0	0	3	2	0	0	6	0	0	0	4	0	0	2	1	0
4:30 PM	0	0	11	0	0	1	6	0	0	1	3	0	0	2	7	0
4:45 PM	0	0	6	0	0	1	7	0	0	0	4	1	0	1	4	0
5:00 PM	0	1	4	0	0	1	11	1	0	0	5	1	0	0	1	0
5:15 PM	0	0	6	0	0	1	11	0	0	0	3	1	0	0	2	0
5:30 PM	0	0	8	0	0	1	9	0	0	0	2	2	0	0	3	0
5:45 PM	0	0	1	0	0	1	5	0	0	0	3	0	0	0	3	0

AM PEAK HOUR 7:30 AM to 8:30 AM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Tremont Street Eastbound				Tremont Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**5**	**57**	**17**	**0**	**8**	**67**	**2**	**0**	**8**	**25**	**4**	**0**	**5**	**9**	**0**
PHF	**0.90**				**0.92**				**0.77**				**0.88**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Massachusetts Avenue Northbound				Massachusetts Avenue Southbound				Tremont Street Eastbound				Tremont Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**26**	**3**	**0**	**2**	**36**	**0**	**0**	**1**	**17**	**1**	**0**	**5**	**15**	**0**
PHF	**0.66**				**0.56**				**0.79**				**0.56**			

Client:	Vannesa Kello
Project #:	388_C33_HSH
BTD #:	Location 4
Location:	South End, Boston, MA
Street 1:	Massachusetts Avenue
Street 2:	Tremont Street
Count Date:	5/21/2019
Day of Week:	Tuesday
Weather:	Partly Sunny, 65°F

BOSTON TRAFFIC DATA
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PEDESTRIANS & BICYCLES

	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Tremont Street Eastbound					Tremont Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
7:00 AM	0	4	0	6		0	4	0	3		1	1	0	17		0	0	0	12	
7:15 AM	0	3	0	7		0	8	0	2		0	0	0	18		0	0	0	22	
7:30 AM	0	3	0	11		0	3	0	4		0	2	0	36		0	0	0	18	
7:45 AM	0	7	0	10		1	13	0	13		0	0	0	20		0	2	0	31	
8:00 AM	0	8	0	9		0	8	0	12		0	1	0	40		0	0	2	36	
8:15 AM	0	4	0	42		0	7	0	10		1	0	0	70		0	1	0	28	
8:30 AM	0	5	0	25		0	8	0	30		0	1	0	117		0	0	1	16	
8:45 AM	0	6	0	15		0	7	0	22		0	5	0	23		0	0	1	12	

	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Tremont Street Eastbound					Tremont Street Westbound				
Start Time	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
4:00 PM	0	3	0	19		0	2	0	6		0	0	0	17		0	5	0	18	
4:15 PM	0	15	0	15		0	6	0	12		0	0	0	26		0	1	0	21	
4:30 PM	0	7	0	20		0	3	0	9		0	0	0	48		1	2	1	23	
4:45 PM	0	8	0	18		0	2	0	8		0	0	0	46		0	0	1	20	
5:00 PM	0	16	0	19		0	11	0	17		0	0	0	30		1	6	2	23	
5:15 PM	0	11	0	29		0	8	0	28		0	1	0	42		0	1	0	18	
5:30 PM	0	13	0	16		0	5	0	22		0	0	0	24		0	4	0	25	
5:45 PM	0	13	0	26		2	9	0	24		0	0	0	41		0	3	0	31	

AM PEAK HOUR[1]	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Tremont Street Eastbound					Tremont Street Westbound				
7:45 AM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
8:45 AM	0	24	0	86		1	36	0	65		1	2	0	247		0	3	3	111	

PM PEAK HOUR[1]	Massachusetts Avenue Northbound					Massachusetts Avenue Southbound					Tremont Street Eastbound					Tremont Street Westbound				
4:30 PM																				
to	Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED		Left	Thru	Right	PED	
5:30 PM	0	42	0	86		0	24	0	62		0	1	0	166		2	9	4	84	

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

Massachusetts Highway Department
Statewide Traffic Data Collection
2017 Weekday Seasonal Factors

Factor Group	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Axle Factor
R1	1.30	1.23	1.21	1.04	0.98	0.92	0.86	0.81	0.95	0.99	1.03	1.10	0.80
R2	0.95	0.96	0.98	0.97	0.97	0.93	0.97	0.94	0.96	0.90	0.92	0.93	0.96
R3	1.05	1.01	1.04	0.99	0.94	0.93	0.91	0.92	0.96	0.94	1.01	1.03	0.97
R4-R7	1.10	1.07	1.09	1.00	0.95	0.89	0.88	0.87	0.92	0.95	1.04	1.09	0.93
U1-Boston	1.01	1.04	0.99	0.94	0.93	0.92	0.96	0.93	0.94	0.93	0.95	0.98	0.95
U1-Essex	1.04	1.05	1.00	0.96	0.93	0.89	0.90	0.90	0.93	0.93	0.98	1.03	0.90
U1-Southeast	1.07	1.05	1.02	0.97	0.95	0.90	0.89	0.88	0.92	0.94	0.98	1.01	0.97
U1-West	1.00	0.96	0.94	0.92	0.93	0.92	0.95	0.93	0.92	0.92	0.97	0.97	0.89
U1-Worcester	1.10	1.10	1.04	0.97	0.95	0.94	0.93	0.91	0.95	0.96	0.98	1.04	0.89
U2	1.01	1.03	0.98	0.95	0.93	0.91	0.94	0.92	0.95	0.95	0.95	0.97	0.98
U3	1.03	1.05	1.01	0.95	0.92	0.90	0.94	0.93	0.93	0.92	0.96	0.99	0.96
U4-U7	1.06	1.05	1.02	0.96	0.92	0.89	0.95	0.95	0.92	0.92	0.98	1.03	0.98
Rec - East	1.18	1.17	1.08	1.03	0.95	0.87	0.83	0.83	0.97	0.98	1.19	1.19	0.98
Rec - West	1.30	1.23	1.32	1.18	0.95	0.82	0.70	0.69	0.97	0.96	1.16	1.15	0.95

Round off:
0-999 = 10
>1000 = 100

U = Urban
R = Rural

1 - Interstate
2 - Freeway and Expressway
3 - Other Principal Arterial
4 - Minor Arterial
5 - Major Collector
6 - Minor Collector
7 - Local Road and Street

Recreational - East Group - Cape Cod (all towns) including the town of Plymouth south of Route 3A (stations 7014,7079,7080,7090,7091,7092,7093,7094,7095,7096,7097,7108 and 7178), Martha's Vineyard and Nantucket.

Recreational - West Group - Continuous Stations 2 and 189 including stations 1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1113,1114,1116,2196,2197 and 2198.

7/26/2019

566 Columbus Avenue

Trip Generation Assessment

HOWARD STEIN HUDSON

26-Jul-2019

XXX Means Columns U, X, and AA do not sum to Column R; hard code adjustements are needed

XX HARD CODED TO BALANCE (Manually change formatting)

Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Assumed National Vehicle Occupancy Rate[1]	Unadjusted Person-Trips	Primary Person-Trips	Transit Share[3]	Transit Person-Trips	Walk/Bike/ Other Share[3]	Walk/ Bike/ Other Trips	Auto Share[3]	Auto Person-Trips	Assumed Local Auto Occupancy Rate[5]	Total Adjusted Private Auto Trips
Daily Peak Hour																
Multifamily Housing (Mid Rise)[7]	65	Total		5.440	354	1.18	**418**	**418**	41%	**170**	40%	**168**	19%	**80**	1.18	**68**
	units	In	50%	2.720	177	1.18	**209**	**209**	41%	**85**	40%	**84**	19%	**40**	1.18	**34**
		Out	50%	2.720	177	1.18	**209**	**209**	41%	**85**	40%	**84**	19%	**40**	1.18	**34**
Office Building[8]	2.2	Total		9.740	22	1.18	**26**	**26**	16%	**4**	55%	**14**	29%	**8**	1.18	**6**
	KSF	In	50%	4.870	11	1.18	**13**	**13**	16%	**2**	55%	**7**	29%	**4**	1.18	**3**
		Out	50%	4.870	11	1.18	**13**	**13**	16%	**2**	55%	**7**	29%	**4**	1.18	**3**
Shopping Center[9]	2.7	Total		37.750	104	1.82	**190**	**190**	16%	**30**	55%	**104**	29%	**56**	1.82	**30**
	KSF	In	50%	18.875	52	1.82	**95**	**95**	16%	**15**	55%	**52**	29%	**28**	1.82	**15**
		Out	50%	18.875	52	1.82	**95**	**95**	16%	**15**	55%	**52**	29%	**28**	1.82	**15**
Total		Total			**480**		**634**	**634**		**204**		**286**		**144**		**104**
		In			**240**		**317**	**317**		**102**		**143**		**72**		**52**
		Out			**240**		**317**	**317**		**102**		**143**		**72**		**52**
AM Peak Hour																
Multifamily Housing (Mid Rise)[7]	65	Total		0.360	23	1.18	**27**	**27**		**11**		**11**		**5**	1.18	**4**
	units	In	26%	0.094	6	1.18	**7**	**7**	41%	**3**	40%	**3**	19%	**1**	1.18	**1**
		Out	74%	0.266	17	1.18	**20**	**20**	41%	**8**	40%	**8**	19%	**4**	1.18	**3**
Office Building[8]	2.2	Total		1.16	2	1.18	**2**	**2**		**0**		**1**		**1**	1.18	**1**
	KSF	In	86%	0.998	2	1.18	**2**	**2**	19%	**0**	57%	**1**	24%	**1**	1.18	**1**
		Out	14%	0.162	0	1.18	**0**	**0**	13%	**0**	61%	**0**	26%	**0**	1.18	**0**
Shopping Center[9]	2.7	Total		0.94	3	1.82	**6**	**6**		**1**		**3**		**2**	1.82	**2**
	KSF	In	62%	0.583	2	1.82	**4**	**4**	19%	**1**	57%	**2**	24%	**1**	1.82	**1**
		Out	38%	0.357	1	1.82	**2**	**2**	13%	**0**	61%	**1**	26%	**1**	1.82	**1**
Total		Total			**28**		**35**	**35**		**12**		**15**		**8**		**7**
		In			**10**		**13**	**13**		**4**		**6**		**3**		**3**
		Out			**18**		**22**	**22**		**8**		**9**		**5**		**4**
PM Peak Hour																
Multifamily Housing (Mid Rise)[7]	65	Total		0.440	28	1.18	**33**	**33**		**14**		**13**		**6**	1.18	**5**
	units	In	61%	0.268	17	1.18	**20**	**20**	41%	**8**	40%	**8**	19%	**4**	1.18	**3**
		Out	39%	0.172	11	1.18	**13**	**13**	41%	**6**	40%	**5**	19%	**2**	1.18	**2**
Office Building[8]	2.2	Total		1.15	2	1.18	**2**	**2**		**0**		**1**		**1**	1.18	**1**
	KSF	In	16%	0.184	0	1.18	**0**	**0**	13%	**0**	61%	**0**	26%	**0**	1.18	**0**
		Out	84%	0.966	2	1.18	**2**	**2**	19%	**0**	57%	**1**	24%	**1**	1.18	**1**
Shopping Center[9]	2.7	Total		3.81	10	1.82	**18**	**18**		**3**		**11**		**4**	1.82	**2**
	KSF	In	48%	1.829	5	1.82	**9**	**9**	13%	**1**	61%	**6**	26%	**2**	1.82	**1**
		Out	52%	1.981	5	1.82	**9**	**9**	19%	**2**	57%	**5**	24%	**2**	1.82	**1**
Total		Total			**40**		**53**	**53**		**17**		**25**		**11**		**8**
		In			**22**		**29**	**29**		**9**		**14**		**6**		**4**
		Out			**18**		**24**	**24**		**8**		**11**		**5**		**4**

1. 2017 National vehicle occupancy rates - 1.18:home to work; 1.82: family/personal business; 1.82: shopping; 2.1 social/recreational
2. Based on ITE Trip Generation Handbook, 3rd Edition method
3. Mode shares based on peak-hour BTD Data for Area 4
4. Vehicle Trips = 70% Private Auto and 30% Taxi. Taxi trip rate based on CTPS Taxi activity rates for Hotel lane use, as adopted by Central Artery/Tunnel Project
5. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates
6. For taxi cabs, 1.2 passengers per cab. (2.2 minus 1 driver equals 1.2)
7. ITE Trip Generation Manual, 10th Edition, LUC 221 (Multifamily Housing Mid-Rise (3-10 floors)), average rate
8. ITE Trip Generation Manual, 10th Edition, LUC 710 (General Office Building), average rate
9. ITE Trip Generation Manual, 10th Edition, LUC 820 (Shopping Center), average rate

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations														
Traffic Volume (vph)	69	554	56	73	217	25	46	459	169	67	489	17		
Future Volume (vph)	69	554	56	73	217	25	46	459	169	67	489	17		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	190		0	200		0	120		0	120		0		
Storage Lanes	2		0	2		0	2		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.88	0.99		0.97	0.98		0.88	0.96		0.96	0.99			
Frt		0.986			0.985			0.960			0.995			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1612	3358	0	1626	3360	0	1687	2954	0	1612	3157	0		
Flt Permitted	0.536			0.162			0.358			0.272				
Satd. Flow (perm)	802	3358	0	269	3360	0	560	2954	0	443	3157	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		8			9			45			3			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		778			529			664			584			
Travel Time (s)		17.7			12.0			15.1			13.3			
Confl. Peds. (#/hr)	65		86	86		65	247		111	111		247		
Confl. Bikes (#/hr)			2			3			24			36		
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.96	0.96	0.96	0.97	0.97	0.97		
Heavy Vehicles (%)	12%	4%	9%	11%	4%	0%	7%	14%	8%	12%	13%	0%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	77	616	62	80	238	27	48	478	176	69	504	18		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	77	678	0	80	265	0	48	654	0	69	522	0		
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5		2	1		2	1		4	7
Permitted Phases	5			5			1			1				
Detector Phase	6	5		6	5		2	1		2	1			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		1.0	1.0
Minimum Split (s)	12.5	26.0		12.5	26.0		12.5	35.0		12.5	35.0		6.0	6.0
Total Split (s)	20.0	26.0		20.0	26.0		20.0	42.0		20.0	42.0		6.0	6.0
Total Split (%)	16.7%	21.7%		16.7%	21.7%		16.7%	35.0%		16.7%	35.0%		5%	5%
Maximum Green (s)	15.5	21.0		15.5	21.0		15.5	37.0		15.5	37.0		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.5		1.0	1.5		1.0	1.5		1.0	1.5		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.0		4.5	5.0		4.5	5.0		4.5	5.0			
Lead/Lag	Lag	Lead		Lag	Lead			Lag			Lag			Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	None	Ped		None	Ped		None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		5.0			5.0			10.0			10.0		4.0	4.0
Flash Dont Walk (s)		16.0			16.0			20.0			20.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0			0			0		0	0
Act Effct Green (s)	38.5	29.5		38.5	29.5		51.0	42.5		51.0	42.5			
Actuated g/C Ratio	0.32	0.25		0.32	0.25		0.42	0.35		0.42	0.35			
v/c Ratio	0.25	0.82		0.44	0.32		0.15	0.61		0.26	0.47			
Control Delay	31.5	52.1		47.3	38.0		21.3	32.5		8.3	33.8			
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay	31.5	52.1		47.3	38.0		21.3	32.5		8.3	33.8			
LOS	C	D		D	D		C	C		A	C			
Approach Delay		50.0			40.2			31.8			30.8			
Approach LOS		D			D			C			C			
Queue Length 50th (ft)	42	266		43	88		20	201		11	125			
Queue Length 95th (ft)	76	#372		79	129		44	274		m19	134			
Internal Link Dist (ft)		698			449			584			504			
Turn Bay Length (ft)	190			200			120			120				
Base Capacity (vph)	409	831		277	832		418	1076		366	1121			
Starvation Cap Reductn	0	0		0	0		0	0		0	0			
Spillback Cap Reductn	0	0		0	0		0	0		0	0			
Storage Cap Reductn	0	0		0	0		0	0		0	0			
Reduced v/c Ratio	0.19	0.82		0.29	0.32		0.11	0.61		0.19	0.47			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 40 (33%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 38.5 Intersection LOS: D
Intersection Capacity Utilization 71.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Massachusetts Avenue & Tremont Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations															
Traffic Volume (vph)	199	202	19	84	103	65	1	85	446	21	44	469	127		
Future Volume (vph)	199	202	19	84	103	65	1	85	446	21	44	469	127		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	200		0		120		0	120		0		
Storage Lanes	1		0	1		0		2		0	1		0		
Taper Length (ft)	25			25				25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.88	0.98		0.95	0.92			0.85	0.98		0.86	0.88			
Frt		0.987			0.942				0.993			0.968			
Flt Protected	0.950			0.950				0.950			0.950				
Satd. Flow (prot)	1770	1778	0	1703	1579	0	0	1520	3109	0	1583	2813	0		
Flt Permitted	0.469			0.312				0.303			0.413				
Satd. Flow (perm)	770	1778	0	534	1579	0	0	411	3109	0	591	2813	0		
Right Turn on Red			Yes			Yes				Yes			Yes		
Satd. Flow (RTOR)		3			23				4			28			
Link Speed (mph)		30			30				30			30			
Link Distance (ft)		648			1188				584			566			
Travel Time (s)		14.7			27.0				13.3			12.9			
Confl. Peds. (#/hr)	98		49	49		98	49	233		138	138		233		
Confl. Bikes (#/hr)			94			13				35			36		
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.98	0.98	0.98	0.98	0.92	0.92	0.92		
Heavy Vehicles (%)	2%	2%	21%	6%	2%	8%	0%	19%	14%	0%	14%	10%	9%		
Parking (#/hr)						0				0			0		
Adj. Flow (vph)	234	238	22	95	117	74	1	87	455	21	48	510	138		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	234	260	0	95	191	0	0	88	476	0	48	648	0		
Turn Type	pm+pt	NA		pm+pt	NA		custom	pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5			2	1		2	1		4	7
Permitted Phases	5			5			1 2	1			1				
Detector Phase	6	5		6	5		1 2	2	1		2	1			
Switch Phase															
Minimum Initial (s)	8.0	8.0		8.0	8.0			8.0	8.0		8.0	8.0		4.0	4.0
Minimum Split (s)	12.5	25.0		12.5	25.0			12.5	30.5		12.5	30.5		6.0	6.0
Total Split (s)	25.0	25.0		25.0	25.0			20.0	38.0		20.0	38.0		6.0	6.0
Total Split (%)	20.8%	20.8%		20.8%	20.8%			16.7%	31.7%		16.7%	31.7%		5%	5%
Maximum Green (s)	20.5	19.5		20.5	19.5			15.5	32.5		15.5	32.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	2.0		1.0	2.0			1.0	2.0		1.0	2.0		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.5		4.5	5.5			4.5	5.5		4.5	5.5			
Lead/Lag		Lag			Lag				Lag			Lag		Lead	Lead
Lead-Lag Optimize?		Yes			Yes				Yes			Yes		Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	2.0		2.0	2.0
Recall Mode	None	Ped		None	Ped			None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0				10.0			10.0		4.0	4.0
Flash Dont Walk (s)		17.0			17.0				15.0			15.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0				0			0		0	0
Act Effct Green (s)	34.9	22.8		34.9	22.8			56.6	47.2		56.6	47.2			
Actuated g/C Ratio	0.29	0.19		0.29	0.19			0.47	0.39		0.47	0.39			
v/c Ratio	0.74	0.77		0.36	0.60			0.32	0.39		0.14	0.58			
Control Delay	53.2	60.8		36.6	47.1			10.3	14.9		16.2	28.0			
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	53.2	60.8		36.6	47.1			10.3	14.9		16.2	28.0			
LOS	D	E		D	D			B	B		B	C			
Approach Delay		57.2			43.6				14.2			27.2			
Approach LOS		E			D				B			C			
Queue Length 50th (ft)	140	189		52	119			14	61		17	145			
Queue Length 95th (ft)	180	262		83	191			m25	90		34	207			
Internal Link Dist (ft)		568			1108				504			486			
Turn Bay Length (ft)				200				120			120				
Base Capacity (vph)	454	341		396	319			361	1225		442	1123			
Starvation Cap Reductn	0	0		0	0			0	0		0	0			
Spillback Cap Reductn	0	0		0	0			0	0		0	0			
Storage Cap Reductn	0	0		0	0			0	0		0	0			
Reduced v/c Ratio	0.52	0.76		0.24	0.60			0.24	0.39		0.11	0.58			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 44 (37%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 33.2		Intersection LOS: C	
Intersection Capacity Utilization 71.0%		ICU Level of Service C	
Analysis Period (min) 15			

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Massachusetts Avenue & Columbus Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑			↑↑	
Traffic Volume (vph)	0	0	710	0	0	640	
Future Volume (vph)	0	0	710	0	0	640	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95	
Frt							
Flt Protected							
Satd. Flow (prot)	0	0	3282	0	0	3282	
Flt Permitted							
Satd. Flow (perm)	0	0	3282	0	0	3282	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)							
Link Speed (mph)	30		30			30	
Link Distance (ft)	137		566			306	
Travel Time (s)	3.1		12.9			7.0	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.92	0.92	
Heavy Vehicles (%)	2%	2%	10%	0%	0%	10%	
Adj. Flow (vph)	0	0	763	0	0	696	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	763	0	0	696	
Turn Type			NA			NA	
Protected Phases			1			1	2
Permitted Phases							
Detector Phase			1			1	
Switch Phase							
Minimum Initial (s)			8.0			8.0	5.0
Minimum Split (s)			36.0			36.0	22.5
Total Split (s)			36.0			36.0	24.0
Total Split (%)			60.0%			60.0%	40%
Maximum Green (s)			31.5			31.5	20.0
Yellow Time (s)			3.5			3.5	2.0
All-Red Time (s)			1.0			1.0	2.0
Lost Time Adjust (s)			0.0			0.0	
Total Lost Time (s)			4.5			4.5	
Lead/Lag			Lead			Lead	Lag
Lead-Lag Optimize?			Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0
Recall Mode			C-Max			C-Max	Ped
Walk Time (s)							7.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)			33.5			33.5	
Actuated g/C Ratio			0.56			0.56	
v/c Ratio			0.42			0.38	
Control Delay			7.1			5.0	
Queue Delay			0.0			0.0	
Total Delay			7.1			5.0	
LOS			A			A	
Approach Delay			7.1			5.0	
Approach LOS			A			A	
Queue Length 50th (ft)			50			63	
Queue Length 95th (ft)			87			80	
Internal Link Dist (ft)	57		486			226	
Turn Bay Length (ft)							
Base Capacity (vph)			1832			1832	
Starvation Cap Reductn			0			0	
Spillback Cap Reductn			0			0	
Storage Cap Reductn			0			0	
Reduced v/c Ratio			0.42			0.38	

Intersection Summary

Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 43 (72%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 6.1		Intersection LOS: A	
Intersection Capacity Utilization 23.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Massachusetts Avenue & Pedestrian Crossing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø4
Lane Configurations														
Traffic Volume (vph)	3	0	7	25	16	30	51	610	49	28	608	21		
Future Volume (vph)	3	0	7	25	16	30	51	610	49	28	608	21		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0	0		0	70		0		
Storage Lanes	0		0	0		0	0		0	2		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		0.95			0.96			0.96		0.87	0.99			
Frt		0.907			0.943			0.990			0.995			
Flt Protected		0.985			0.983			0.996		0.950				
Satd. Flow (prot)	0	1623	0	0	1680	0	0	3141	0	1805	3247	0		
Flt Permitted		0.939			0.902			0.846		0.318				
Satd. Flow (perm)	0	1533	0	0	1514	0	0	2658	0	525	3247	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		50			30			10			4			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		600			401			306			559			
Travel Time (s)		13.6			9.1			7.0			12.7			
Confl. Peds. (#/hr)	25		35	35		25	59		206	206		59		
Confl. Bikes (#/hr)									101			38		
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.93	0.93	0.93	0.94	0.94	0.94		
Heavy Vehicles (%)	0%	0%	0%	4%	0%	3%	2%	10%	2%	0%	10%	5%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	5	0	11	35	23	42	55	656	53	30	647	22		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	16	0	0	100	0	0	764	0	30	669	0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA			
Protected Phases		5			5			2			2		1	4
Permitted Phases	5			5			2			2				
Detector Phase	5	5		5	5		2	2		2	2			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0		4.0	4.0
Minimum Split (s)	28.5	28.5		28.5	28.5		24.5	24.5		24.5	24.5		6.0	6.0
Total Split (s)	38.0	38.0		38.0	38.0		70.0	70.0		70.0	70.0		6.0	6.0
Total Split (%)	31.7%	31.7%		31.7%	31.7%		58.3%	58.3%		58.3%	58.3%		5%	5%
Maximum Green (s)	33.5	33.5		33.5	33.5		65.5	65.5		65.5	65.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0	0.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5			
Lead/Lag	Lag	Lag		Lag	Lag		Lag	Lag		Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max		Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0		4.0	4.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		10.0	10.0		10.0	10.0		0.0	0.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0		0	0
Act Effct Green (s)		24.0			24.0			73.5		73.5	73.5			
Actuated g/C Ratio		0.20			0.20			0.61		0.61	0.61			
v/c Ratio		0.05			0.31			0.47		0.09	0.34			
Control Delay		0.3			31.3			11.6		10.5	11.8			
Queue Delay		0.0			0.0			1.1		0.0	0.0			
Total Delay		0.3			31.3			12.7		10.5	11.8			
LOS		A			C			B		B	B			
Approach Delay		0.3			31.3			12.7			11.8			
Approach LOS		A			C			B			B			
Queue Length 50th (ft)		0			46			86		9	123			
Queue Length 95th (ft)		0			71			76		23	159			
Internal Link Dist (ft)		520			321			226			479			
Turn Bay Length (ft)										70				
Base Capacity (vph)		464			444			1631		321	1990			
Starvation Cap Reductn		0			0			589		0	0			
Spillback Cap Reductn		0			0			0		0	0			
Storage Cap Reductn		0			0			0		0	0			
Reduced v/c Ratio		0.03			0.23			0.73		0.09	0.34			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 53 (44%), Referenced to phase 2:NBSB, Start of Green			
Natural Cycle: 65			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Massachusetts Avenue & St. Botolph Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations														
Traffic Volume (vph)	98	365	102	145	383	39	52	553	136	73	738	39		
Future Volume (vph)	98	365	102	145	383	39	52	553	136	73	738	39		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	190		0	200		0	120		0	120		0		
Storage Lanes	2		0	2		0	2		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.93	0.96		0.95	0.98		0.96	0.97		0.97	0.99			
Frt		0.967			0.986			0.970			0.992			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1787	3230	0	1770	3359	0	1770	3277	0	1703	3376	0		
Flt Permitted	0.294			0.224			0.196			0.244				
Satd. Flow (perm)	512	3230	0	397	3359	0	349	3277	0	426	3376	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		25			7			27			5			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		778			529			664			584			
Travel Time (s)		17.7			12.0			15.1			13.3			
Confl. Peds. (#/hr)	62		86	86		62	166		84	84		166		
Confl. Bikes (#/hr)			1			9			42			24		
Peak Hour Factor	0.86	0.86	0.86	0.90	0.90	0.90	0.96	0.96	0.96	0.96	0.96	0.96		
Heavy Vehicles (%)	1%	4%	3%	2%	4%	0%	2%	5%	0%	6%	5%	3%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	114	424	119	161	426	43	54	576	142	76	769	41		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	114	543	0	161	469	0	54	718	0	76	810	0		
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5		2	1		2	1		4	7
Permitted Phases	5			5			1			1				
Detector Phase	6	5		6	5		2	1		2	1			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		1.0	1.0
Minimum Split (s)	12.5	23.0		12.5	23.0		12.5	35.0		12.5	35.0		6.0	6.0
Total Split (s)	20.0	23.0		20.0	23.0		20.0	45.0		20.0	45.0		6.0	6.0
Total Split (%)	16.7%	19.2%		16.7%	19.2%		16.7%	37.5%		16.7%	37.5%		5%	5%
Maximum Green (s)	15.5	18.0		15.5	18.0		15.5	40.0		15.5	40.0		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.5		1.0	1.5		1.0	1.5		1.0	1.5		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.0		4.5	5.0		4.5	5.0		4.5	5.0			
Lead/Lag	Lag	Lead		Lag	Lead			Lag			Lag			Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	None	Ped		None	Ped		None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0			10.0			10.0		4.0	4.0
Flash Dont Walk (s)		16.0			16.0			20.0			20.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0			0			0		0	0
Act Effct Green (s)	37.1	25.6		37.1	25.6		52.7	44.2		52.7	44.2			
Actuated g/C Ratio	0.31	0.21		0.31	0.21		0.44	0.37		0.44	0.37			
v/c Ratio	0.41	0.77		0.65	0.65		0.22	0.59		0.28	0.65			
Control Delay	39.6	51.1		53.7	47.9		25.2	32.4		11.3	13.9			
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay	39.6	51.1		53.7	47.9		25.2	32.4		11.3	13.9			
LOS	D	D		D	D		C	C		B	B			
Approach Delay		49.1			49.4			31.9			13.7			
Approach LOS		D			D			C			B			
Queue Length 50th (ft)	63	204		92	176		22	227		15	86			
Queue Length 95th (ft)	97	255		139	236		49	306		m19	114			
Internal Link Dist (ft)		698			449			584			504			
Turn Bay Length (ft)	190			200			120			120				
Base Capacity (vph)	342	708		314	721		358	1224		378	1246			
Starvation Cap Reductn	0	0		0	0		0	0		0	0			
Spillback Cap Reductn	0	0		0	0		0	0		0	0			
Storage Cap Reductn	0	0		0	0		0	0		0	0			
Reduced v/c Ratio	0.33	0.77		0.51	0.65		0.15	0.59		0.20	0.65			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 99 (83%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 34.0		Intersection LOS: C	
Intersection Capacity Utilization 70.5%		ICU Level of Service C	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

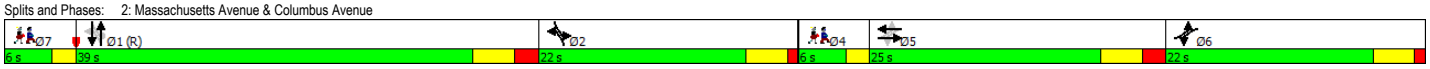
Splits and Phases: 1: Massachusetts Avenue & Tremont Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations															
Traffic Volume (vph)	207	139	31	137	192	60	1	23	591	75	57	681	172		
Future Volume (vph)	207	139	31	137	192	60	1	23	591	75	57	681	172		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	200		0		120		0	120		0		
Storage Lanes	1		0	1		0		2		0	1		0		
Taper Length (ft)	25			25				25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.90	0.97		0.92	0.93			0.92	0.95		0.91	0.91			
Frt		0.973			0.964				0.983			0.970			
Flt Protected	0.950			0.950				0.950			0.950				
Satd. Flow (prot)	1805	1708	0	1787	1652	0	0	1805	3228	0	1719	3067	0		
Flt Permitted	0.333			0.526				0.143			0.214				
Satd. Flow (perm)	568	1708	0	908	1652	0	0	250	3228	0	352	3067	0		
Right Turn on Red			Yes			Yes				Yes			Yes		
Satd. Flow (RTOR)		8			11				11			26			
Link Speed (mph)		30			30				30			30			
Link Distance (ft)		648			1188				584			566			
Travel Time (s)		14.7			27.0				13.3			12.9			
Confl. Peds. (#/hr)	129		67	67		129	67	164		164	164		164		
Confl. Bikes (#/hr)			5			70				37			34		
Peak Hour Factor	0.91	0.91	0.91	0.86	0.86	0.86	0.91	0.91	0.91	0.91	0.99	0.99	0.99		
Heavy Vehicles (%)	0%	6%	3%	1%	2%	5%	0%	0%	5%	1%	5%	5%	1%		
Parking (#/hr)						0				0			0		
Adj. Flow (vph)	227	153	34	159	223	70	1	25	649	82	58	688	174		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	227	187	0	159	293	0	0	26	731	0	58	862	0		
Turn Type	pm+pt	NA		pm+pt	NA			pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5			2	1		2	1		4	7
Permitted Phases	5			5				1			1				
Detector Phase	6	5		6	5			2	1		2	1			
Switch Phase															
Minimum Initial (s)	8.0	8.0		8.0	8.0			8.0	8.0		8.0	8.0		4.0	4.0
Minimum Split (s)	12.5	25.0		12.5	25.0			12.5	30.5		12.5	30.5		6.0	6.0
Total Split (s)	22.0	25.0		22.0	25.0			22.0	39.0		22.0	39.0		6.0	6.0
Total Split (%)	18.3%	20.8%		18.3%	20.8%			18.3%	32.5%		18.3%	32.5%		5%	5%
Maximum Green (s)	17.5	19.5		17.5	19.5			17.5	33.5		17.5	33.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	2.0		1.0	2.0			1.0	2.0		1.0	2.0		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.5		4.5	5.5			4.5	5.5		4.5	5.5			
Lead/Lag		Lag			Lag				Lag			Lag		Lead	Lead
Lead-Lag Optimize?		Yes			Yes				Yes			Yes		Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	2.0		2.0	2.0
Recall Mode	None	Ped		None	Ped			None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0				10.0			10.0		4.0	4.0
Flash Dont Walk (s)		17.0			17.0				15.0			15.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0				0			0		0	0
Act Effct Green (s)	42.9	28.7		42.9	28.7			48.7	39.7		48.7	39.7			
Actuated g/C Ratio	0.36	0.24		0.36	0.24			0.41	0.33		0.41	0.33			
v/c Ratio	0.67	0.45		0.38	0.73			0.13	0.68		0.25	0.84			
Control Delay	46.1	41.4		29.2	52.3			12.8	31.3		21.5	36.5			
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	46.1	41.4		29.2	52.3			12.8	31.3		21.5	36.5			
LOS	D	D		C	D			B	C		C	D			
Approach Delay		44.0			44.2				30.7			35.5			
Approach LOS		D			D				C			D			
Queue Length 50th (ft)	120	119		81	203			7	141		17	331			
Queue Length 95th (ft)	173	192		117	288			m12	245		45	#485			
Internal Link Dist (ft)		568			1108				504			486			
Turn Bay Length (ft)				200				120			120				
Base Capacity (vph)	403	414		484	403			348	1074		370	1031			
Starvation Cap Reductn	0	0		0	0			0	0		0	0			
Spillback Cap Reductn	0	0		0	0			0	0		0	0			
Storage Cap Reductn	0	0		0	0			0	0		0	0			
Reduced v/c Ratio	0.56	0.45		0.33	0.73			0.07	0.68		0.16	0.84			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 94 (78%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 37.0 Intersection LOS: D
Intersection Capacity Utilization 76.4% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Massachusetts Avenue & Columbus Avenue



Lane Group	NBT	NBR	SBL	SBT	SWL	SWR	Ø2
Lane Configurations							
Traffic Volume (vph)	858	0	0	910	0	0	
Future Volume (vph)	858	0	0	910	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	3471	0	0	3471	0	0	
Flt Permitted							
Satd. Flow (perm)	3471	0	0	3471	0	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)							
Link Speed (mph)	30			30	30		
Link Distance (ft)	566			306	137		
Travel Time (s)	12.9			7.0	3.1		
Peak Hour Factor	0.91	0.91	0.99	0.99	0.92	0.92	
Heavy Vehicles (%)	4%	0%	0%	4%	0%	0%	
Adj. Flow (vph)	943	0	0	919	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	943	0	0	919	0	0	
Turn Type	NA			NA			
Protected Phases	1			1			2
Permitted Phases							
Detector Phase	1			1			
Switch Phase							
Minimum Initial (s)	8.0			8.0			5.0
Minimum Split (s)	36.0			36.0			22.5
Total Split (s)	96.0			96.0			24.0
Total Split (%)	80.0%			80.0%			20%
Maximum Green (s)	91.5			91.5			20.0
Yellow Time (s)	3.5			3.5			2.0
All-Red Time (s)	1.0			1.0			2.0
Lost Time Adjust (s)	0.0			0.0			
Total Lost Time (s)	4.5			4.5			
Lead/Lag	Lead			Lead			Lag
Lead-Lag Optimize?	Yes			Yes			Yes
Vehicle Extension (s)	3.0			3.0			3.0
Recall Mode	C-Max			C-Max			Ped
Walk Time (s)							7.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)	93.5			93.5			
Actuated g/C Ratio	0.78			0.78			
v/c Ratio	0.35			0.34			
Control Delay	3.0			0.9			
Queue Delay	0.2			0.2			
Total Delay	3.1			1.1			
LOS	A			A			
Approach Delay	3.1			1.1			
Approach LOS	A			A			
Queue Length 50th (ft)	74			8			
Queue Length 95th (ft)	61			19			
Internal Link Dist (ft)	486			226	57		
Turn Bay Length (ft)							
Base Capacity (vph)	2704			2704			
Starvation Cap Reductn	762			874			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.49			0.50			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 69 (58%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.35			
Intersection Signal Delay: 2.1		Intersection LOS: A	
Intersection Capacity Utilization 28.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Massachusetts Avenue & Pedestrian Crossing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø4
Lane Configurations															
Traffic Volume (vph)	20	12	65	46	10	28	3	47	756	52	56	796	11		
Future Volume (vph)	20	12	65	46	10	28	3	47	756	52	56	796	11		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0		0		0	70		0		
Storage Lanes	0		0	0		0		0		0	1		0		
Taper Length (ft)	25			25				25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		0.93			0.94				0.96		0.92	0.99			
Frt		0.910			0.955				0.991			0.998			
Flt Protected		0.990			0.973				0.997		0.950				
Satd. Flow (prot)	0	1599	0	0	1710	0	0	0	3339	0	1770	3448	0		
Flt Permitted		0.926			0.754				0.833		0.249				
Satd. Flow (perm)	0	1476	0	0	1287	0	0	0	2774	0	428	3448	0		
Right Turn on Red			Yes			Yes				Yes			Yes		
Satd. Flow (RTOR)		77			21				9			2			
Link Speed (mph)		30			30				30			30			
Link Distance (ft)		600			401				306			559			
Travel Time (s)		13.6			9.1				7.0			12.7			
Confl. Peds. (#/hr)	55		46	46		55	46	117		160	160		117		
Confl. Bikes (#/hr)						2				60			25		
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.91	0.91	0.91	0.91	0.93	0.93	0.93		
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	0%	4%	0%	2%	4%	0%		
Parking (#/hr)			0			0				0			0		
Adj. Flow (vph)	24	14	77	64	14	39	3	52	831	57	60	856	12		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	115	0	0	117	0	0	0	943	0	60	868	0		
Turn Type	Perm	NA		Perm	NA		Perm	Perm	NA		Perm	NA			
Protected Phases		5			5				2			2		1	4
Permitted Phases	5			5			2	2			2				
Detector Phase	5	5		5	5		2	2	2		2	2			
Switch Phase															
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0	10.0		10.0	10.0		4.0	4.0
Minimum Split (s)	28.5	28.5		28.5	28.5		24.5	24.5	24.5		24.5	24.5		6.0	6.0
Total Split (s)	38.0	38.0		38.0	38.0		70.0	70.0	70.0		70.0	70.0		6.0	6.0
Total Split (%)	31.7%	31.7%		31.7%	31.7%		58.3%	58.3%	58.3%		58.3%	58.3%		5%	5%
Maximum Green (s)	33.5	33.5		33.5	33.5		65.5	65.5	65.5		65.5	65.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0		1.0	1.0		0.0	0.0
Lost Time Adjust (s)		0.0			0.0				0.0		0.0	0.0			
Total Lost Time (s)		4.5			4.5				4.5		4.5	4.5			
Lead/Lag	Lag	Lag		Lag	Lag		Lag	Lag	Lag		Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max	C-Max		C-Max	C-Max		Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		10.0	10.0	10.0		10.0	10.0		4.0	4.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		10.0	10.0	10.0		10.0	10.0		0.0	0.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0		0	0
Act Effct Green (s)		24.0			24.0				73.5		73.5	73.5			
Actuated g/C Ratio		0.20			0.20				0.61		0.61	0.61			
v/c Ratio		0.32			0.43				0.55		0.23	0.41			
Control Delay		18.5			39.8				11.9		13.3	12.7			
Queue Delay		0.0			0.0				0.1		0.0	0.0			
Total Delay		18.5			39.8				12.0		13.3	12.7			
LOS		B			D				B		B	B			
Approach Delay		18.5			39.8				12.0			12.8			
Approach LOS		B			D				B			B			
Queue Length 50th (ft)		24			65				107		20	171			
Queue Length 95th (ft)		68			93				125		45	213			
Internal Link Dist (ft)		520			321				226			479			
Turn Bay Length (ft)											70				
Base Capacity (vph)		467			374				1702		262	2112			
Starvation Cap Reductn		0			0				148		0	0			
Spillback Cap Reductn		0			0				0		0	0			
Storage Cap Reductn		0			0				0		0	0			
Reduced v/c Ratio		0.25			0.31				0.61		0.23	0.41			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 69 (58%), Referenced to phase 2:NBSB, Start of Green			
Natural Cycle: 75			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 78.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Massachusetts Avenue & St. Botolph Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations														
Traffic Volume (vph)	71	574	58	76	225	26	48	479	175	69	516	18		
Future Volume (vph)	71	574	58	76	225	26	48	479	175	69	516	18		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	190		0	200		0	120		0	120		0		
Storage Lanes	2		0	2		0	2		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.88	0.99		0.97	0.98		0.89	0.96		0.96	0.99			
Frt		0.986			0.984			0.960			0.995			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1612	3358	0	1626	3355	0	1687	2955	0	1612	3157	0		
Flt Permitted	0.524			0.145			0.338			0.256				
Satd. Flow (perm)	786	3358	0	241	3355	0	533	2955	0	418	3157	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		8			9			45			3			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		778			529			664			584			
Travel Time (s)		17.7			12.0			15.1			13.3			
Confl. Peds. (#/hr)	65		86	86		65	247		111	111		247		
Confl. Bikes (#/hr)			2			3			24			36		
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.96	0.96	0.96	0.97	0.97	0.97		
Heavy Vehicles (%)	12%	4%	9%	11%	4%	0%	7%	14%	8%	12%	13%	0%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	79	638	64	84	247	29	50	499	182	71	532	19		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	79	702	0	84	276	0	50	681	0	71	551	0		
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5		2	1		2	1		4	7
Permitted Phases	5			5			1			1				
Detector Phase	6	5		6	5		2	1		2	1			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		1.0	1.0
Minimum Split (s)	12.5	26.0		12.5	26.0		12.5	35.0		12.5	35.0		6.0	6.0
Total Split (s)	20.0	26.0		20.0	26.0		20.0	42.0		20.0	42.0		6.0	6.0
Total Split (%)	16.7%	21.7%		16.7%	21.7%		16.7%	35.0%		16.7%	35.0%		5%	5%
Maximum Green (s)	15.5	21.0		15.5	21.0		15.5	37.0		15.5	37.0		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.5		1.0	1.5		1.0	1.5		1.0	1.5		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.0		4.5	5.0		4.5	5.0		4.5	5.0			
Lead/Lag	Lag	Lead		Lag	Lead			Lag			Lag			Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	None	Ped		None	Ped		None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		5.0			5.0			10.0			10.0		4.0	4.0
Flash Dont Walk (s)		16.0			16.0			20.0			20.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0			0			0		0	0
Act Effct Green (s)	38.5	29.5		38.5	29.5		51.0	42.5		51.0	42.5			
Actuated g/C Ratio	0.32	0.25		0.32	0.25		0.42	0.35		0.42	0.35			
v/c Ratio	0.25	0.84		0.48	0.33		0.17	0.63		0.28	0.49			
Control Delay	31.6	54.1		50.3	38.2		21.8	33.4		8.1	32.3			
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay	31.6	54.1		50.3	38.2		21.8	33.4		8.1	32.3			
LOS	C	D		D	D		C	C		A	C			
Approach Delay		51.8			41.0			32.6			29.6			
Approach LOS		D			D			C			C			
Queue Length 50th (ft)	43	278		46	92		21	213		12	124			
Queue Length 95th (ft)	78	#394		82	134		46	290		m16	153			
Internal Link Dist (ft)		698			449			584			504			
Turn Bay Length (ft)	190			200			120			120				
Base Capacity (vph)	404	831		270	831		409	1074		357	1119			
Starvation Cap Reductn	0	0		0	0		0	0		0	0			
Spillback Cap Reductn	0	0		0	0		0	0		0	0			
Storage Cap Reductn	0	0		0	0		0	0		0	0			
Reduced v/c Ratio	0.20	0.84		0.31	0.33		0.12	0.63		0.20	0.49			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 40 (33%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 100			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 39.1		Intersection LOS: D	
Intersection Capacity Utilization 72.4%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Massachusetts Avenue & Tremont Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations															
Traffic Volume (vph)	213	209	20	87	116	67	1	88	466	22	46	496	152		
Future Volume (vph)	213	209	20	87	116	67	1	88	466	22	46	496	152		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	200		0		120		0	120		0		
Storage Lanes	1		0	1		0		2		0	1		0		
Taper Length (ft)	25			25				25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.89	0.98		0.96	0.92			0.87	0.98		0.87	0.87			
Frt		0.987			0.945				0.993			0.965			
Flt Protected	0.950			0.950				0.950			0.950				
Satd. Flow (prot)	1770	1775	0	1703	1593	0	0	1519	3109	0	1583	2768	0		
Flt Permitted	0.434			0.297				0.252			0.384				
Satd. Flow (perm)	719	1775	0	509	1593	0	0	350	3109	0	554	2768	0		
Right Turn on Red			Yes			Yes				Yes			Yes		
Satd. Flow (RTOR)		3			21				4			33			
Link Speed (mph)		30			30				30			30			
Link Distance (ft)		648			1188				584			566			
Travel Time (s)		14.7			27.0				13.3			12.9			
Confl. Peds. (#/hr)	98		49	49		98	49	233		138	138		233		
Confl. Bikes (#/hr)			94			13				35			36		
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.98	0.98	0.98	0.98	0.92	0.92	0.92		
Heavy Vehicles (%)	2%	2%	21%	6%	2%	8%	0%	19%	14%	0%	14%	10%	9%		
Parking (#/hr)						0				0			0		
Adj. Flow (vph)	251	246	24	99	132	76	1	90	476	22	50	539	165		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	251	270	0	99	208	0	0	91	498	0	50	704	0		
Turn Type	pm+pt	NA		pm+pt	NA		custom	pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5			2	1		2	1		4	7
Permitted Phases	5			5			1 2	1			1				
Detector Phase	6	5		6	5		1 2	2	1		2	1			
Switch Phase															
Minimum Initial (s)	8.0	8.0		8.0	8.0			8.0	8.0		8.0	8.0		4.0	4.0
Minimum Split (s)	12.5	25.0		12.5	25.0			12.5	30.5		12.5	30.5		6.0	6.0
Total Split (s)	25.0	25.0		25.0	25.0			20.0	38.0		20.0	38.0		6.0	6.0
Total Split (%)	20.8%	20.8%		20.8%	20.8%			16.7%	31.7%		16.7%	31.7%		5%	5%
Maximum Green (s)	20.5	19.5		20.5	19.5			15.5	32.5		15.5	32.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	2.0		1.0	2.0			1.0	2.0		1.0	2.0		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.5		4.5	5.5			4.5	5.5		4.5	5.5			
Lead/Lag		Lag			Lag				Lag			Lag		Lead	Lead
Lead-Lag Optimize?		Yes			Yes				Yes			Yes		Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	2.0		2.0	2.0
Recall Mode	None	Ped		None	Ped			None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0				10.0			10.0		4.0	4.0
Flash Dont Walk (s)		17.0			17.0				15.0			15.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0				0			0		0	0
Act Effct Green (s)	36.9	23.2		36.9	23.2			52.1	42.4		52.1	42.4			
Actuated g/C Ratio	0.31	0.19		0.31	0.19			0.43	0.35		0.43	0.35			
v/c Ratio	0.76	0.78		0.35	0.64			0.39	0.45		0.16	0.70			
Control Delay	53.5	61.9		35.2	49.6			14.0	17.3		17.7	34.7			
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	53.5	61.9		35.2	49.6			14.0	17.3		17.7	34.7			
LOS	D	E		D	D			B	B		B	C			
Approach Delay		57.9			44.9				16.8			33.6			
Approach LOS		E			D				B			C			
Queue Length 50th (ft)	146	195		53	132			15	64		17	168			
Queue Length 95th (ft)	188	#292		84	213			m24	103		35	#260			
Internal Link Dist (ft)		568			1108				504			486			
Turn Bay Length (ft)				200				120			120				
Base Capacity (vph)	447	346		393	325			322	1102		405	1000			
Starvation Cap Reductn	0	0		0	0			0	0		0	0			
Spillback Cap Reductn	0	0		0	0			0	0		0	0			
Storage Cap Reductn	0	0		0	0			0	0		0	0			
Reduced v/c Ratio	0.56	0.78		0.25	0.64			0.28	0.45		0.12	0.70			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 44 (37%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 36.5 Intersection LOS: D
Intersection Capacity Utilization 71.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Massachusetts Avenue & Columbus Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑			↑↑	
Traffic Volume (vph)	0	0	746	0	0	693	
Future Volume (vph)	0	0	746	0	0	693	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95	
Frt							
Flt Protected							
Satd. Flow (prot)	0	0	3282	0	0	3282	
Flt Permitted							
Satd. Flow (perm)	0	0	3282	0	0	3282	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)							
Link Speed (mph)	30		30			30	
Link Distance (ft)	137		566			306	
Travel Time (s)	3.1		12.9			7.0	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.92	0.92	
Heavy Vehicles (%)	2%	2%	10%	0%	0%	10%	
Adj. Flow (vph)	0	0	802	0	0	753	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	802	0	0	753	
Turn Type			NA			NA	
Protected Phases			1			1	2
Permitted Phases							
Detector Phase			1			1	
Switch Phase							
Minimum Initial (s)			8.0			8.0	5.0
Minimum Split (s)			36.0			36.0	22.5
Total Split (s)			36.0			36.0	24.0
Total Split (%)			60.0%			60.0%	40%
Maximum Green (s)			31.5			31.5	20.0
Yellow Time (s)			3.5			3.5	2.0
All-Red Time (s)			1.0			1.0	2.0
Lost Time Adjust (s)			0.0			0.0	
Total Lost Time (s)			4.5			4.5	
Lead/Lag			Lead			Lead	Lag
Lead-Lag Optimize?			Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0
Recall Mode			C-Max			C-Max	Ped
Walk Time (s)							7.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)			33.5			33.5	
Actuated g/C Ratio			0.56			0.56	
v/c Ratio			0.44			0.41	
Control Delay			7.3			5.1	
Queue Delay			0.0			0.2	
Total Delay			7.3			5.4	
LOS			A			A	
Approach Delay			7.3			5.4	
Approach LOS			A			A	
Queue Length 50th (ft)			57			70	
Queue Length 95th (ft)			99			87	
Internal Link Dist (ft)	57		486			226	
Turn Bay Length (ft)							
Base Capacity (vph)			1832			1832	
Starvation Cap Reductn			0			399	
Spillback Cap Reductn			0			0	
Storage Cap Reductn			0			0	
Reduced v/c Ratio			0.44			0.53	

Intersection Summary

Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 43 (72%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 6.4		Intersection LOS: A	
Intersection Capacity Utilization 24.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Massachusetts Avenue & Pedestrian Crossing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø4
Lane Configurations														
Traffic Volume (vph)	3	0	12	26	17	31	54	642	51	29	655	27		
Future Volume (vph)	3	0	12	26	17	31	54	642	51	29	655	27		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0	0		0	70		0		
Storage Lanes	0		0	0		0	0		0	2		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		0.94			0.96			0.96		0.88	0.99			
Frt		0.893			0.943			0.990			0.994			
Flt Protected		0.990			0.983			0.996		0.950				
Satd. Flow (prot)	0	1595	0	0	1680	0	0	3143	0	1805	3240	0		
Flt Permitted		0.957			0.897			0.834		0.302				
Satd. Flow (perm)	0	1533	0	0	1506	0	0	2622	0	505	3240	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		50			30			10			5			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		600			401			306			559			
Travel Time (s)		13.6			9.1			7.0			12.7			
Confl. Peds. (#/hr)	25		35	35		25	59		206	206		59		
Confl. Bikes (#/hr)									101			38		
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.93	0.93	0.93	0.94	0.94	0.94		
Heavy Vehicles (%)	0%	0%	0%	4%	0%	3%	2%	10%	2%	0%	10%	5%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	5	0	19	37	24	44	58	690	55	31	697	29		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	24	0	0	105	0	0	803	0	31	726	0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA			
Protected Phases		5			5			2			2		1	4
Permitted Phases	5			5			2			2				
Detector Phase	5	5		5	5		2	2		2	2			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0		4.0	4.0
Minimum Split (s)	28.5	28.5		28.5	28.5		24.5	24.5		24.5	24.5		6.0	6.0
Total Split (s)	38.0	38.0		38.0	38.0		70.0	70.0		70.0	70.0		6.0	6.0
Total Split (%)	31.7%	31.7%		31.7%	31.7%		58.3%	58.3%		58.3%	58.3%		5%	5%
Maximum Green (s)	33.5	33.5		33.5	33.5		65.5	65.5		65.5	65.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0	0.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5			
Lead/Lag	Lag	Lag		Lag	Lag		Lag	Lag		Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max		Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0		4.0	4.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		10.0	10.0		10.0	10.0		0.0	0.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0		0	0
Act Effct Green (s)		24.0			24.0			73.5		73.5	73.5			
Actuated g/C Ratio		0.20			0.20			0.61		0.61	0.61			
v/c Ratio		0.07			0.32			0.50		0.10	0.37			
Control Delay		2.7			32.2			12.1		10.7	12.2			
Queue Delay		0.0			0.0			1.5		0.0	0.0			
Total Delay		2.7			32.2			13.6		10.7	12.2			
LOS		A			C			B		B	B			
Approach Delay		2.7			32.2			13.6			12.1			
Approach LOS		A			C			B			B			
Queue Length 50th (ft)		0			49			128		9	137			
Queue Length 95th (ft)		0			74			66		24	175			
Internal Link Dist (ft)		520			321			226			479			
Turn Bay Length (ft)										70				
Base Capacity (vph)		464			442			1609		309	1986			
Starvation Cap Reductn		0			0			581		0	0			
Spillback Cap Reductn		0			0			0		0	0			
Storage Cap Reductn		0			0			0		0	0			
Reduced v/c Ratio		0.05			0.24			0.78		0.10	0.37			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 53 (44%), Referenced to phase 2:NBSB, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 13.9		Intersection LOS: B	
Intersection Capacity Utilization 71.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Massachusetts Avenue & St. Botolph Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations														
Traffic Volume (vph)	101	378	106	150	397	40	54	583	141	76	774	40		
Future Volume (vph)	101	378	106	150	397	40	54	583	141	76	774	40		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	190		0	200		0	120		0	120		0		
Storage Lanes	2		0	2		0	2		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.93	0.96		0.95	0.98		0.96	0.97		0.98	0.99			
Frt		0.967			0.986			0.971			0.993			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1787	3230	0	1770	3360	0	1770	3282	0	1703	3380	0		
Flt Permitted	0.286			0.215			0.171			0.219				
Satd. Flow (perm)	500	3230	0	382	3360	0	306	3282	0	383	3380	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		25			7			26			5			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		778			529			664			584			
Travel Time (s)		17.7			12.0			15.1			13.3			
Confl. Peds. (#/hr)	62		86	86		62	166		84	84		166		
Confl. Bikes (#/hr)			1			9			42			24		
Peak Hour Factor	0.86	0.86	0.86	0.90	0.90	0.90	0.96	0.96	0.96	0.96	0.96	0.96		
Heavy Vehicles (%)	1%	4%	3%	2%	4%	0%	2%	5%	0%	6%	5%	3%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	117	440	123	167	441	44	56	607	147	79	806	42		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	117	563	0	167	485	0	56	754	0	79	848	0		
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5		2	1		2	1		4	7
Permitted Phases	5			5			1			1				
Detector Phase	6	5		6	5		2	1		2	1			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		1.0	1.0
Minimum Split (s)	12.5	23.0		12.5	23.0		12.5	35.0		12.5	35.0		6.0	6.0
Total Split (s)	20.0	23.0		20.0	23.0		20.0	45.0		20.0	45.0		6.0	6.0
Total Split (%)	16.7%	19.2%		16.7%	19.2%		16.7%	37.5%		16.7%	37.5%		5%	5%
Maximum Green (s)	15.5	18.0		15.5	18.0		15.5	40.0		15.5	40.0		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.5		1.0	1.5		1.0	1.5		1.0	1.5		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.0		4.5	5.0		4.5	5.0		4.5	5.0			
Lead/Lag	Lag	Lead		Lag	Lead			Lag			Lag			Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	None	Ped		None	Ped		None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0			10.0			10.0		4.0	4.0
Flash Dont Walk (s)		16.0			16.0			20.0			20.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0			0			0		0	0
Act Effct Green (s)	38.1	26.3		38.1	26.3		51.7	43.2		51.7	43.2			
Actuated g/C Ratio	0.32	0.22		0.32	0.22		0.43	0.36		0.43	0.36			
v/c Ratio	0.42	0.77		0.67	0.65		0.24	0.63		0.31	0.69			
Control Delay	39.8	51.1		54.8	47.7		27.2	33.9		12.2	14.4			
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay	39.8	51.1		54.8	47.7		27.2	33.9		12.2	14.4			
LOS	D	D		D	D		C	C		B	B			
Approach Delay		49.1			49.5			33.5			14.2			
Approach LOS		D			D			C			B			
Queue Length 50th (ft)	64	213		95	183		23	244		15	94			
Queue Length 95th (ft)	99	#267		144	244		50	325		m19	m113			
Internal Link Dist (ft)		698			449			584			504			
Turn Bay Length (ft)	190			200			120			120				
Base Capacity (vph)	342	728		313	742		339	1199		359	1221			
Starvation Cap Reductn	0	0		0	0		0	0		0	0			
Spillback Cap Reductn	0	0		0	0		0	0		0	0			
Storage Cap Reductn	0	0		0	0		0	0		0	0			
Reduced v/c Ratio	0.34	0.77		0.53	0.65		0.17	0.63		0.22	0.69			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 99 (83%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 34.5 Intersection LOS: C
Intersection Capacity Utilization 70.9% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Massachusetts Avenue & Tremont Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations														
Traffic Volume (vph)	223	145	33	142	200	62	24	622	78	59	714	182		
Future Volume (vph)	223	145	33	142	200	62	24	622	78	59	714	182		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	200		0	120		0	120		0		
Storage Lanes	1		0	1		0	2		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.90	0.97		0.92	0.93			0.95		0.92	0.91			
Frt		0.972			0.965			0.983			0.970			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1805	1706	0	1787	1655	0	1805	3229	0	1719	3065	0		
Flt Permitted	0.322			0.517			0.110			0.181				
Satd. Flow (perm)	553	1706	0	895	1655	0	209	3229	0	301	3065	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		8			11			11			26			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		648			1188			584			566			
Travel Time (s)		14.7			27.0			13.3			12.9			
Confl. Peds. (#/hr)	129		67	67		129	164		164	164		164		
Confl. Bikes (#/hr)			5			70			37			34		
Peak Hour Factor	0.91	0.91	0.91	0.86	0.86	0.86	0.91	0.91	0.91	0.99	0.99	0.99		
Heavy Vehicles (%)	0%	6%	3%	1%	2%	5%	0%	5%	1%	5%	5%	1%		
Parking (#/hr)						0			0			0		
Adj. Flow (vph)	245	159	36	165	233	72	26	684	86	60	721	184		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	245	195	0	165	305	0	26	770	0	60	905	0		
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5		2	1		2	1		4	7
Permitted Phases	5			5			1			1				
Detector Phase	6	5		6	5		2	1		2	1			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		4.0	4.0
Minimum Split (s)	12.5	25.0		12.5	25.0		12.5	30.5		12.5	30.5		6.0	6.0
Total Split (s)	22.0	25.0		22.0	25.0		22.0	39.0		22.0	39.0		6.0	6.0
Total Split (%)	18.3%	20.8%		18.3%	20.8%		18.3%	32.5%		18.3%	32.5%		5%	5%
Maximum Green (s)	17.5	19.5		17.5	19.5		17.5	33.5		17.5	33.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.5		4.5	5.5		4.5	5.5		4.5	5.5			
Lead/Lag		Lag			Lag			Lag			Lag		Lead	Lead
Lead-Lag Optimize?		Yes			Yes			Yes			Yes		Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0
Recall Mode	None	Ped		None	Ped		None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0			10.0			10.0		4.0	4.0
Flash Dont Walk (s)		17.0			17.0			15.0			15.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0			0			0		0	0
Act Effct Green (s)	44.5	29.5		44.5	29.5		47.2	38.2		47.2	38.2			
Actuated g/C Ratio	0.37	0.25		0.37	0.25		0.39	0.32		0.39	0.32			
v/c Ratio	0.70	0.46		0.38	0.74		0.14	0.74		0.28	0.91			
Control Delay	47.5	41.4		28.7	52.4		14.3	34.7		24.4	43.7			
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay	47.5	41.4		28.7	52.4		14.3	34.7		24.4	43.7			
LOS	D	D		C	D		B	C		C	D			
Approach Delay		44.8			44.1			34.0			42.5			
Approach LOS		D			D			C			D			
Queue Length 50th (ft)	128	125		82	214		6	160		19	360			
Queue Length 95th (ft)	187	201		122	301		m12	#266		49	#523			
Internal Link Dist (ft)		568			1108			504			486			
Turn Bay Length (ft)				200			120			120				
Base Capacity (vph)	403	425		487	414		331	1035		349	993			
Starvation Cap Reductn	0	0		0	0		0	0		0	0			
Spillback Cap Reductn	0	0		0	0		0	0		0	0			
Storage Cap Reductn	0	0		0	0		0	0		0	0			
Reduced v/c Ratio	0.61	0.46		0.34	0.74		0.08	0.74		0.17	0.91			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 94 (78%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 40.6		Intersection LOS: D	
Intersection Capacity Utilization 78.6%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Massachusetts Avenue & Columbus Avenue

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR	Ø2
Lane Configurations	↑↑			↑↑			
Traffic Volume (vph)	907	0	0	955	0	0	
Future Volume (vph)	907	0	0	955	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	3471	0	0	3471	0	0	
Flt Permitted							
Satd. Flow (perm)	3471	0	0	3471	0	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)							
Link Speed (mph)	30			30	30		
Link Distance (ft)	566			306	137		
Travel Time (s)	12.9			7.0	3.1		
Peak Hour Factor	0.91	0.91	0.99	0.99	0.92	0.92	
Heavy Vehicles (%)	4%	0%	0%	4%	0%	0%	
Adj. Flow (vph)	997	0	0	965	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	997	0	0	965	0	0	
Turn Type	NA			NA			
Protected Phases	1			1			2
Permitted Phases							
Detector Phase	1			1			
Switch Phase							
Minimum Initial (s)	8.0			8.0			5.0
Minimum Split (s)	36.0			36.0			22.5
Total Split (s)	96.0			96.0			24.0
Total Split (%)	80.0%			80.0%			20%
Maximum Green (s)	91.5			91.5			20.0
Yellow Time (s)	3.5			3.5			2.0
All-Red Time (s)	1.0			1.0			2.0
Lost Time Adjust (s)	0.0			0.0			
Total Lost Time (s)	4.5			4.5			
Lead/Lag	Lead			Lead			Lag
Lead-Lag Optimize?	Yes			Yes			Yes
Vehicle Extension (s)	3.0			3.0			3.0
Recall Mode	C-Max			C-Max			Ped
Walk Time (s)							7.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)	93.5			93.5			
Actuated g/C Ratio	0.78			0.78			
v/c Ratio	0.37			0.36			
Control Delay	2.8			1.0			
Queue Delay	0.2			0.2			
Total Delay	3.0			1.2			
LOS	A			A			
Approach Delay	3.0			1.2			
Approach LOS	A			A			
Queue Length 50th (ft)	74			10			
Queue Length 95th (ft)	61			22			
Internal Link Dist (ft)	486			226	57		
Turn Bay Length (ft)							
Base Capacity (vph)	2704			2704			
Starvation Cap Reductn	762			810			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.51			0.51			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 69 (58%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 2.1		Intersection LOS: A	
Intersection Capacity Utilization 30.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Massachusetts Avenue & Pedestrian Crossing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø4
Lane Configurations															
Traffic Volume (vph)	21	12	70	48	10	29	3	54	797	54	58	834	34		
Future Volume (vph)	21	12	70	48	10	29	3	54	797	54	58	834	34		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0		0		0	70		0		
Storage Lanes	0		0	0		0		0		0	1		0		
Taper Length (ft)	25			25				25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		0.93			0.94				0.96		0.93	0.99			
Frt		0.908			0.955				0.991			0.994			
Flt Protected		0.990			0.973				0.997		0.950				
Satd. Flow (prot)	0	1594	0	0	1711	0	0	0	3341	0	1770	3404	0		
Flt Permitted		0.927			0.732				0.806		0.230				
Satd. Flow (perm)	0	1473	0	0	1250	0	0	0	2688	0	400	3404	0		
Right Turn on Red			Yes			Yes				Yes			Yes		
Satd. Flow (RTOR)		83			21				8			5			
Link Speed (mph)		30			30				30			30			
Link Distance (ft)		600			401				306			559			
Travel Time (s)		13.6			9.1				7.0			12.7			
Confl. Peds. (#/hr)	55		46	46		55	46	117		160	160		117		
Confl. Bikes (#/hr)						2				60			25		
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.91	0.91	0.91	0.91	0.93	0.93	0.93		
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	0%	4%	0%	2%	4%	0%		
Parking (#/hr)			0			0				0			0		
Adj. Flow (vph)	25	14	83	67	14	40	3	59	876	59	62	897	37		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	122	0	0	121	0	0	0	997	0	62	934	0		
Turn Type	Perm	NA		Perm	NA		Perm	Perm	NA		Perm	NA			
Protected Phases		5			5				2			2		1	4
Permitted Phases	5			5			2	2			2				
Detector Phase	5	5		5	5		2	2	2		2	2			
Switch Phase															
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0	10.0		10.0	10.0		4.0	4.0
Minimum Split (s)	28.5	28.5		28.5	28.5		24.5	24.5	24.5		24.5	24.5		6.0	6.0
Total Split (s)	38.0	38.0		38.0	38.0		70.0	70.0	70.0		70.0	70.0		6.0	6.0
Total Split (%)	31.7%	31.7%		31.7%	31.7%		58.3%	58.3%	58.3%		58.3%	58.3%		5%	5%
Maximum Green (s)	33.5	33.5		33.5	33.5		65.5	65.5	65.5		65.5	65.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0		1.0	1.0		0.0	0.0
Lost Time Adjust (s)		0.0			0.0				0.0		0.0	0.0			
Total Lost Time (s)		4.5			4.5				4.5		4.5	4.5			
Lead/Lag	Lag	Lag		Lag	Lag		Lag	Lag	Lag		Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max	C-Max		C-Max	C-Max		Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		10.0	10.0	10.0		10.0	10.0		4.0	4.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		10.0	10.0	10.0		10.0	10.0		0.0	0.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0		0	0
Act Effct Green (s)		24.0			24.0				73.5		73.5	73.5			
Actuated g/C Ratio		0.20			0.20				0.61		0.61	0.61			
v/c Ratio		0.34			0.45				0.60		0.25	0.45			
Control Delay		18.2			41.0				14.2		14.0	13.2			
Queue Delay		0.0			0.0				0.1		0.0	0.0			
Total Delay		18.2			41.0				14.2		14.0	13.2			
LOS		B			D				B		B	B			
Approach Delay		18.2			41.0				14.2			13.2			
Approach LOS		B			D				B			B			
Queue Length 50th (ft)		25			68				108		21	189			
Queue Length 95th (ft)		70			97				141		48	235			
Internal Link Dist (ft)		520			321				226			479			
Turn Bay Length (ft)											70				
Base Capacity (vph)		471			364				1649		245	2086			
Starvation Cap Reductn		0			0				53		0	0			
Spillback Cap Reductn		0			0				0		0	0			
Storage Cap Reductn		0			0				0		0	0			
Reduced v/c Ratio		0.26			0.33				0.62		0.25	0.45			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 69 (58%), Referenced to phase 2:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 15.4		Intersection LOS: B	
Intersection Capacity Utilization 81.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Massachusetts Avenue & St. Botolph Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations														
Traffic Volume (vph)	72	574	58	76	225	27	48	480	175	69	516	18		
Future Volume (vph)	72	574	58	76	225	27	48	480	175	69	516	18		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	190		0	200		0	120		0	120		0		
Storage Lanes	2		0	2		0	2		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.93	0.99		0.97	0.99		0.89	0.96		0.96	0.99			
Frt		0.986			0.984			0.960			0.995			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1612	3358	0	1626	3384	0	1687	2955	0	1612	3157	0		
Flt Permitted	0.523			0.145			0.338			0.255				
Satd. Flow (perm)	826	3358	0	241	3384	0	533	2955	0	416	3157	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		8			9			45			3			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		778			529			664			584			
Travel Time (s)		17.7			12.0			15.1			13.3			
Confl. Peds. (#/hr)	65		86	86		65	247		111	111		247		
Confl. Bikes (#/hr)			2			3			24			36		
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.96	0.96	0.96	0.97	0.97	0.97		
Heavy Vehicles (%)	12%	4%	9%	11%	4%	0%	7%	14%	8%	12%	13%	0%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	80	638	64	84	247	30	50	500	182	71	532	19		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	80	702	0	84	277	0	50	682	0	71	551	0		
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5		2	1		2	1		4	7
Permitted Phases	5			5			1			1				
Detector Phase	6	5		6	5		2	1		2	1			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		1.0	1.0
Minimum Split (s)	12.5	26.0		12.5	26.0		12.5	35.0		12.5	35.0		6.0	6.0
Total Split (s)	20.0	26.0		20.0	26.0		20.0	42.0		20.0	42.0		6.0	6.0
Total Split (%)	16.7%	21.7%		16.7%	21.7%		16.7%	35.0%		16.7%	35.0%		5%	5%
Maximum Green (s)	15.5	21.0		15.5	21.0		15.5	37.0		15.5	37.0		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.5		1.0	1.5		1.0	1.5		1.0	1.5		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.0		4.5	5.0		4.5	5.0		4.5	5.0			
Lead/Lag	Lag	Lead		Lag	Lead			Lag			Lag			Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	None	Ped		None	Ped		None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		5.0			5.0			10.0			10.0		4.0	4.0
Flash Dont Walk (s)		16.0			16.0			20.0			20.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0			0			0		0	0
Act Effct Green (s)	38.5	29.5		38.5	29.5		51.0	42.5		51.0	42.5			
Actuated g/C Ratio	0.32	0.25		0.32	0.25		0.42	0.35		0.42	0.35			
v/c Ratio	0.25	0.84		0.48	0.33		0.17	0.64		0.28	0.49			
Control Delay	31.4	54.1		50.3	38.2		21.8	33.4		8.1	32.3			
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay	31.4	54.1		50.3	38.2		21.8	33.4		8.1	32.3			
LOS	C	D		D	D		C	C		A	C			
Approach Delay		51.7			41.0			32.6			29.5			
Approach LOS		D			D			C			C			
Queue Length 50th (ft)	43	278		46	92		21	213		12	124			
Queue Length 95th (ft)	79	#394		82	134		46	290		m16	154			
Internal Link Dist (ft)		698			449			584			504			
Turn Bay Length (ft)	190			200			120			120				
Base Capacity (vph)	414	831		270	838		409	1074		357	1119			
Starvation Cap Reductn	0	0		0	0		0	0		0	0			
Spillback Cap Reductn	0	0		0	0		0	0		0	0			
Storage Cap Reductn	0	0		0	0		0	0		0	0			
Reduced v/c Ratio	0.19	0.84		0.31	0.33		0.12	0.64		0.20	0.49			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 40 (33%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 39.0 Intersection LOS: D
Intersection Capacity Utilization 72.4% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Massachusetts Avenue & Tremont Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations															
Traffic Volume (vph)	213	209	20	87	116	67	1	89	468	23	46	496	153		
Future Volume (vph)	213	209	20	87	116	67	1	89	468	23	46	496	153		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	200		0		120		0	120		0		
Storage Lanes	1		0	1		0		1		0	1		0		
Taper Length (ft)	25			25				25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.89	0.98		0.96	0.92			0.87	0.98		0.87	0.87			
Frt		0.987			0.945				0.993			0.965			
Flt Protected	0.950			0.950				0.950			0.950				
Satd. Flow (prot)	1770	1775	0	1703	1593	0	0	1519	3108	0	1583	2766	0		
Flt Permitted	0.433			0.295				0.252			0.382				
Satd. Flow (perm)	717	1775	0	506	1593	0	0	350	3108	0	552	2766	0		
Right Turn on Red			Yes			Yes				Yes			Yes		
Satd. Flow (RTOR)		3			21				4			33			
Link Speed (mph)		30			30				30			30			
Link Distance (ft)		648			1188				584			566			
Travel Time (s)		14.7			27.0				13.3			12.9			
Confl. Peds. (#/hr)	98		49	49		98	49	233		138	138		233		
Confl. Bikes (#/hr)			94			13				35			36		
Peak Hour Factor	0.85	0.85	0.85	0.88	0.88	0.88	0.98	0.98	0.98	0.98	0.92	0.92	0.92		
Heavy Vehicles (%)	2%	2%	21%	6%	2%	8%	0%	19%	14%	0%	14%	10%	9%		
Parking (#/hr)						0				0			0		
Adj. Flow (vph)	251	246	24	99	132	76	1	91	478	23	50	539	166		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	251	270	0	99	208	0	0	92	501	0	50	705	0		
Turn Type	pm+pt	NA		pm+pt	NA		custom	pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5			2	1		2	1		4	7
Permitted Phases	5			5			1 2	1			1				
Detector Phase	6	5		6	5		1 2	2	1		2	1			
Switch Phase															
Minimum Initial (s)	8.0	8.0		8.0	8.0			8.0	8.0		8.0	8.0		4.0	4.0
Minimum Split (s)	12.5	25.0		12.5	25.0			12.5	30.5		12.5	30.5		6.0	6.0
Total Split (s)	25.0	25.0		25.0	25.0			20.0	38.0		20.0	38.0		6.0	6.0
Total Split (%)	20.8%	20.8%		20.8%	20.8%			16.7%	31.7%		16.7%	31.7%		5%	5%
Maximum Green (s)	20.5	19.5		20.5	19.5			15.5	32.5		15.5	32.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5			3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	2.0		1.0	2.0			1.0	2.0		1.0	2.0		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.5		4.5	5.5			4.5	5.5		4.5	5.5			
Lead/Lag		Lag			Lag				Lag			Lag		Lead	Lead
Lead-Lag Optimize?		Yes			Yes				Yes			Yes		Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	2.0		2.0	2.0
Recall Mode	None	Ped		None	Ped			None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0				10.0			10.0		4.0	4.0
Flash Dont Walk (s)		17.0			17.0				15.0			15.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0				0			0		0	0
Act Effct Green (s)	36.9	23.1		36.9	23.1			52.1	42.4		52.1	42.4			
Actuated g/C Ratio	0.31	0.19		0.31	0.19			0.43	0.35		0.43	0.35			
v/c Ratio	0.76	0.78		0.35	0.64			0.39	0.46		0.16	0.71			
Control Delay	53.7	62.1		35.2	49.7			14.2	17.4		17.7	34.9			
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	53.7	62.1		35.2	49.7			14.2	17.4		17.7	34.9			
LOS	D	E		D	D			B	B		B	C			
Approach Delay		58.1			45.0				16.9			33.7			
Approach LOS		E			D				B			C			
Queue Length 50th (ft)	146	195		53	132			16	65		17	168			
Queue Length 95th (ft)	188	#293		84	213			m26	104		35	#261			
Internal Link Dist (ft)		568			1108				504			486			
Turn Bay Length (ft)				200				120			120				
Base Capacity (vph)	446	345		392	325			322	1100		404	998			
Starvation Cap Reductn	0	0		0	0			0	0		0	0			
Spillback Cap Reductn	0	0		0	0			0	0		0	0			
Storage Cap Reductn	0	0		0	0			0	0		0	0			
Reduced v/c Ratio	0.56	0.78		0.25	0.64			0.29	0.46		0.12	0.71			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 44 (37%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 36.6 Intersection LOS: D
Intersection Capacity Utilization 71.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Massachusetts Avenue & Columbus Avenue

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations							
Traffic Volume (vph)	0	0	748	0	0	694	
Future Volume (vph)	0	0	748	0	0	694	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95	
Frt							
Flt Protected							
Satd. Flow (prot)	0	0	3282	0	0	3282	
Flt Permitted							
Satd. Flow (perm)	0	0	3282	0	0	3282	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)							
Link Speed (mph)	30		30			30	
Link Distance (ft)	137		566			306	
Travel Time (s)	3.1		12.9			7.0	
Peak Hour Factor	0.92	0.92	0.93	0.93	0.92	0.92	
Heavy Vehicles (%)	2%	2%	10%	0%	0%	10%	
Adj. Flow (vph)	0	0	804	0	0	754	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	804	0	0	754	
Turn Type			NA			NA	
Protected Phases			1			1	2
Permitted Phases							
Detector Phase			1			1	
Switch Phase							
Minimum Initial (s)			8.0			8.0	5.0
Minimum Split (s)			36.0			36.0	22.5
Total Split (s)			36.0			36.0	24.0
Total Split (%)			60.0%			60.0%	40%
Maximum Green (s)			31.5			31.5	20.0
Yellow Time (s)			3.5			3.5	2.0
All-Red Time (s)			1.0			1.0	2.0
Lost Time Adjust (s)			0.0			0.0	
Total Lost Time (s)			4.5			4.5	
Lead/Lag			Lead			Lead	Lag
Lead-Lag Optimize?			Yes			Yes	Yes
Vehicle Extension (s)			3.0			3.0	3.0
Recall Mode			C-Max			C-Max	Ped
Walk Time (s)							7.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)			33.5			33.5	
Actuated g/C Ratio			0.56			0.56	
v/c Ratio			0.44			0.41	
Control Delay			7.4			5.1	
Queue Delay			0.0			0.2	
Total Delay			7.4			5.4	
LOS			A			A	
Approach Delay			7.4			5.4	
Approach LOS			A			A	
Queue Length 50th (ft)			58			70	
Queue Length 95th (ft)			99			87	
Internal Link Dist (ft)	57		486			226	
Turn Bay Length (ft)							
Base Capacity (vph)			1832			1832	
Starvation Cap Reductn			0			399	
Spillback Cap Reductn			0			0	
Storage Cap Reductn			0			0	
Reduced v/c Ratio			0.44			0.53	

Intersection Summary

Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 60			
Offset: 43 (72%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 6.4		Intersection LOS: A	
Intersection Capacity Utilization 24.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Massachusetts Avenue & Pedestrian Crossing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø4
Lane Configurations														
Traffic Volume (vph)	3	0	12	26	17	31	54	644	51	29	655	27		
Future Volume (vph)	3	0	12	26	17	31	54	644	51	29	655	27		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0	0		0	70		0		
Storage Lanes	0		0	0		0	0		0	2		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		0.94			0.96			0.96		0.88	0.99			
Frt		0.893			0.943			0.990			0.994			
Flt Protected		0.990			0.983			0.996		0.950				
Satd. Flow (prot)	0	1595	0	0	1680	0	0	3143	0	1805	3240	0		
Flt Permitted		0.957			0.897			0.834		0.301				
Satd. Flow (perm)	0	1533	0	0	1506	0	0	2623	0	504	3240	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		50			30			10			5			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		600			401			306			559			
Travel Time (s)		13.6			9.1			7.0			12.7			
Confl. Peds. (#/hr)	25		35	35		25	59		206	206		59		
Confl. Bikes (#/hr)									101			38		
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.93	0.93	0.93	0.94	0.94	0.94		
Heavy Vehicles (%)	0%	0%	0%	4%	0%	3%	2%	10%	2%	0%	10%	5%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	5	0	19	37	24	44	58	692	55	31	697	29		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	24	0	0	105	0	0	805	0	31	726	0		
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA			
Protected Phases		5			5			2			2		1	4
Permitted Phases	5			5			2			2				
Detector Phase	5	5		5	5		2	2		2	2			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0		4.0	4.0
Minimum Split (s)	28.5	28.5		28.5	28.5		24.5	24.5		24.5	24.5		6.0	6.0
Total Split (s)	38.0	38.0		38.0	38.0		70.0	70.0		70.0	70.0		6.0	6.0
Total Split (%)	31.7%	31.7%		31.7%	31.7%		58.3%	58.3%		58.3%	58.3%		5%	5%
Maximum Green (s)	33.5	33.5		33.5	33.5		65.5	65.5		65.5	65.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0		0.0	0.0
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0			
Total Lost Time (s)		4.5			4.5			4.5		4.5	4.5			
Lead/Lag	Lag	Lag		Lag	Lag		Lag	Lag		Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max		C-Max	C-Max		Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0		4.0	4.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		10.0	10.0		10.0	10.0		0.0	0.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0		0	0
Act Effct Green (s)		24.0			24.0			73.5		73.5	73.5			
Actuated g/C Ratio		0.20			0.20			0.61		0.61	0.61			
v/c Ratio		0.07			0.32			0.50		0.10	0.37			
Control Delay		2.7			32.2			12.0		10.7	12.2			
Queue Delay		0.0			0.0			1.5		0.0	0.0			
Total Delay		2.7			32.2			13.5		10.7	12.2			
LOS		A			C			B		B	B			
Approach Delay		2.7			32.2			13.5			12.1			
Approach LOS		A			C			B			B			
Queue Length 50th (ft)		0			49			129		9	137			
Queue Length 95th (ft)		0			74			66		24	175			
Internal Link Dist (ft)		520			321			226			479			
Turn Bay Length (ft)										70				
Base Capacity (vph)		464			442			1610		308	1986			
Starvation Cap Reductn		0			0			581		0	0			
Spillback Cap Reductn		0			0			0		0	0			
Storage Cap Reductn		0			0			0		0	0			
Reduced v/c Ratio		0.05			0.24			0.78		0.10	0.37			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 53 (44%), Referenced to phase 2:NBSB, Start of Green			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 13.9		Intersection LOS: B	
Intersection Capacity Utilization 71.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Massachusetts Avenue & St. Botolph Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations														
Traffic Volume (vph)	103	378	106	150	397	41	54	584	141	76	774	40		
Future Volume (vph)	103	378	106	150	397	41	54	584	141	76	774	40		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	190		0	200		0	120		0	120		0		
Storage Lanes	2		0	2		0	2		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.96	0.96		0.95	0.99		0.96	0.97		0.98	0.99			
Frt		0.967			0.986			0.971			0.993			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1787	3230	0	1770	3388	0	1770	3282	0	1703	3380	0		
Flt Permitted	0.284			0.215			0.171			0.219				
Satd. Flow (perm)	512	3230	0	382	3388	0	306	3282	0	383	3380	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		25			8			26			5			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		778			529			664			584			
Travel Time (s)		17.7			12.0			15.1			13.3			
Confl. Peds. (#/hr)	62		86	86		62	166		84	84		166		
Confl. Bikes (#/hr)			1			9			42			24		
Peak Hour Factor	0.86	0.86	0.86	0.90	0.90	0.90	0.96	0.96	0.96	0.96	0.96	0.96		
Heavy Vehicles (%)	1%	4%	3%	2%	4%	0%	2%	5%	0%	6%	5%	3%		
Parking (#/hr)			0			0			0			0		
Adj. Flow (vph)	120	440	123	167	441	46	56	608	147	79	806	42		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	120	563	0	167	487	0	56	755	0	79	848	0		
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5		2	1		2	1		4	7
Permitted Phases	5			5			1			1				
Detector Phase	6	5		6	5		2	1		2	1			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		1.0	1.0
Minimum Split (s)	12.5	23.0		12.5	23.0		12.5	35.0		12.5	35.0		6.0	6.0
Total Split (s)	20.0	23.0		20.0	23.0		20.0	45.0		20.0	45.0		6.0	6.0
Total Split (%)	16.7%	19.2%		16.7%	19.2%		16.7%	37.5%		16.7%	37.5%		5%	5%
Maximum Green (s)	15.5	18.0		15.5	18.0		15.5	40.0		15.5	40.0		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.5		1.0	1.5		1.0	1.5		1.0	1.5		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.0		4.5	5.0		4.5	5.0		4.5	5.0			
Lead/Lag	Lag	Lead		Lag	Lead			Lag			Lag			Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes			Yes			Yes			Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	None	Ped		None	Ped		None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0			10.0			10.0		4.0	4.0
Flash Dont Walk (s)		16.0			16.0			20.0			20.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0			0			0		0	0
Act Effct Green (s)	38.1	26.3		38.1	26.3		51.7	43.2		51.7	43.2			
Actuated g/C Ratio	0.32	0.22		0.32	0.22		0.43	0.36		0.43	0.36			
v/c Ratio	0.43	0.77		0.67	0.65		0.24	0.63		0.31	0.69			
Control Delay	39.8	51.1		54.8	47.5		27.2	33.9		12.2	14.4			
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay	39.8	51.1		54.8	47.5		27.2	33.9		12.2	14.4			
LOS	D	D		D	D		C	C		B	B			
Approach Delay		49.1			49.3			33.5			14.3			
Approach LOS		D			D			C			B			
Queue Length 50th (ft)	66	213		95	183		23	244		15	94			
Queue Length 95th (ft)	101	#267		144	244		50	326		m19	m112			
Internal Link Dist (ft)		698			449			584			504			
Turn Bay Length (ft)	190			200			120			120				
Base Capacity (vph)	345	728		313	749		339	1199		359	1221			
Starvation Cap Reductn	0	0		0	0		0	0		0	0			
Spillback Cap Reductn	0	0		0	0		0	0		0	0			
Storage Cap Reductn	0	0		0	0		0	0		0	0			
Reduced v/c Ratio	0.35	0.77		0.53	0.65		0.17	0.63		0.22	0.69			

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 99 (83%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 34.5 Intersection LOS: C
Intersection Capacity Utilization 70.9% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Massachusetts Avenue & Tremont Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø4	Ø7
Lane Configurations														
Traffic Volume (vph)	223	145	33	142	200	62	25	624	79	59	714	183		
Future Volume (vph)	223	145	33	142	200	62	25	624	79	59	714	183		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	200		0	120		0	120		0		
Storage Lanes	1		0	1		0	1		0	1		0		
Taper Length (ft)	25			25			25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor	0.90	0.97		0.92	0.93			0.95		0.92	0.91			
Frt		0.972			0.965			0.983			0.969			
Flt Protected	0.950			0.950			0.950			0.950				
Satd. Flow (prot)	1805	1706	0	1787	1655	0	1805	3228	0	1719	3061	0		
Flt Permitted	0.322			0.517			0.110			0.179				
Satd. Flow (perm)	553	1706	0	895	1655	0	209	3228	0	298	3061	0		
Right Turn on Red			Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)		8			11			11			26			
Link Speed (mph)		30			30			30			30			
Link Distance (ft)		648			1188			584			566			
Travel Time (s)		14.7			27.0			13.3			12.9			
Confl. Peds. (#/hr)	129		67	67		129	164		164	164		164		
Confl. Bikes (#/hr)			5			70			37			34		
Peak Hour Factor	0.91	0.91	0.91	0.86	0.86	0.86	0.91	0.91	0.91	0.99	0.99	0.99		
Heavy Vehicles (%)	0%	6%	3%	1%	2%	5%	0%	5%	1%	5%	5%	1%		
Parking (#/hr)						0			0			0		
Adj. Flow (vph)	245	159	36	165	233	72	27	686	87	60	721	185		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	245	195	0	165	305	0	27	773	0	60	906	0		
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA			
Protected Phases	6	5		6	5		2	1		2	1		4	7
Permitted Phases	5			5			1			1				
Detector Phase	6	5		6	5		2	1		2	1			
Switch Phase														
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0		4.0	4.0
Minimum Split (s)	12.5	25.0		12.5	25.0		12.5	30.5		12.5	30.5		6.0	6.0
Total Split (s)	22.0	25.0		22.0	25.0		22.0	39.0		22.0	39.0		6.0	6.0
Total Split (%)	18.3%	20.8%		18.3%	20.8%		18.3%	32.5%		18.3%	32.5%		5%	5%
Maximum Green (s)	17.5	19.5		17.5	19.5		17.5	33.5		17.5	33.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0		0.0	0.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Lost Time (s)	4.5	5.5		4.5	5.5		4.5	5.5		4.5	5.5			
Lead/Lag		Lag			Lag			Lag			Lag		Lead	Lead
Lead-Lag Optimize?		Yes			Yes			Yes			Yes		Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0
Recall Mode	None	Ped		None	Ped		None	C-Max		None	C-Max		Ped	Ped
Walk Time (s)		2.0			2.0			10.0			10.0		4.0	4.0
Flash Dont Walk (s)		17.0			17.0			15.0			15.0		0.0	0.0
Pedestrian Calls (#/hr)		0			0			0			0		0	0
Act Effct Green (s)	44.5	29.5		44.5	29.5		47.2	38.2		47.2	38.2			
Actuated g/C Ratio	0.37	0.25		0.37	0.25		0.39	0.32		0.39	0.32			
v/c Ratio	0.70	0.46		0.38	0.74		0.14	0.75		0.28	0.91			
Control Delay	47.5	41.4		28.7	52.4		14.6	34.7		24.6	43.9			
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0			
Total Delay	47.5	41.4		28.7	52.4		14.6	34.7		24.6	43.9			
LOS	D	D		C	D		B	C		C	D			
Approach Delay		44.8			44.1			34.1			42.7			
Approach LOS		D			D			C			D			
Queue Length 50th (ft)	128	125		82	214		7	161		19	361			
Queue Length 95th (ft)	187	201		122	301		m12	#270		49	#524			
Internal Link Dist (ft)		568			1108			504			486			
Turn Bay Length (ft)				200			120			120				
Base Capacity (vph)	403	425		487	414		331	1035		348	992			
Starvation Cap Reductn	0	0		0	0		0	0		0	0			
Spillback Cap Reductn	0	0		0	0		0	0		0	0			
Storage Cap Reductn	0	0		0	0		0	0		0	0			
Reduced v/c Ratio	0.61	0.46		0.34	0.74		0.08	0.75		0.17	0.91			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 94 (78%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 95			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 40.7		Intersection LOS: D	
Intersection Capacity Utilization 78.6%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Massachusetts Avenue & Columbus Avenue

Lane Group	NBT	NBR	SBL	SBT	SWL	SWR	Ø2
Lane Configurations							
Traffic Volume (vph)	909	0	0	956	0	0	
Future Volume (vph)	909	0	0	956	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00	
Frt							
Flt Protected							
Satd. Flow (prot)	3471	0	0	3471	0	0	
Flt Permitted							
Satd. Flow (perm)	3471	0	0	3471	0	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)							
Link Speed (mph)	30			30	30		
Link Distance (ft)	566			306	137		
Travel Time (s)	12.9			7.0	3.1		
Peak Hour Factor	0.91	0.91	0.99	0.99	0.92	0.92	
Heavy Vehicles (%)	4%	0%	0%	4%	0%	0%	
Adj. Flow (vph)	999	0	0	966	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	999	0	0	966	0	0	
Turn Type	NA			NA			
Protected Phases	1			1			2
Permitted Phases							
Detector Phase	1			1			
Switch Phase							
Minimum Initial (s)	8.0			8.0			5.0
Minimum Split (s)	36.0			36.0			22.5
Total Split (s)	96.0			96.0			24.0
Total Split (%)	80.0%			80.0%			20%
Maximum Green (s)	91.5			91.5			20.0
Yellow Time (s)	3.5			3.5			2.0
All-Red Time (s)	1.0			1.0			2.0
Lost Time Adjust (s)	0.0			0.0			
Total Lost Time (s)	4.5			4.5			
Lead/Lag	Lead			Lead			Lag
Lead-Lag Optimize?	Yes			Yes			Yes
Vehicle Extension (s)	3.0			3.0			3.0
Recall Mode	C-Max			C-Max			Ped
Walk Time (s)							7.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							0
Act Effct Green (s)	93.5			93.5			
Actuated g/C Ratio	0.78			0.78			
v/c Ratio	0.37			0.36			
Control Delay	2.8			1.0			
Queue Delay	0.2			0.2			
Total Delay	3.0			1.2			
LOS	A			A			
Approach Delay	3.0			1.2			
Approach LOS	A			A			
Queue Length 50th (ft)	74			10			
Queue Length 95th (ft)	61			22			
Internal Link Dist (ft)	486			226	57		
Turn Bay Length (ft)							
Base Capacity (vph)	2704			2704			
Starvation Cap Reductn	763			809			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.51			0.51			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 69 (58%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.37			
Intersection Signal Delay: 2.1		Intersection LOS: A	
Intersection Capacity Utilization 30.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Massachusetts Avenue & Pedestrian Crossing

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø4
Lane Configurations															
Traffic Volume (vph)	21	12	70	48	10	29	3	54	799	54	58	835	34		
Future Volume (vph)	21	12	70	48	10	29	3	54	799	54	58	835	34		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		0	0		0		0		0	70		0		
Storage Lanes	0		0	0		0		0		0	1		0		
Taper Length (ft)	25			25				25			25				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	1.00	0.95	0.95		
Ped Bike Factor		0.93			0.94				0.96		0.93	0.99			
Frt		0.908			0.955				0.991			0.994			
Flt Protected		0.990			0.973				0.997		0.950				
Satd. Flow (prot)	0	1594	0	0	1711	0	0	0	3342	0	1770	3404	0		
Flt Permitted		0.927			0.732				0.805		0.230				
Satd. Flow (perm)	0	1473	0	0	1250	0	0	0	2685	0	400	3404	0		
Right Turn on Red			Yes			Yes				Yes			Yes		
Satd. Flow (RTOR)		83			21				8			5			
Link Speed (mph)		30			30				30			30			
Link Distance (ft)		600			401				306			559			
Travel Time (s)		13.6			9.1				7.0			12.7			
Confl. Peds. (#/hr)	55		46	46		55	46	117		160	160		117		
Confl. Bikes (#/hr)						2				60			25		
Peak Hour Factor	0.84	0.84	0.84	0.72	0.72	0.72	0.91	0.91	0.91	0.91	0.93	0.93	0.93		
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	0%	4%	0%	2%	4%	0%		
Parking (#/hr)			0			0				0			0		
Adj. Flow (vph)	25	14	83	67	14	40	3	59	878	59	62	898	37		
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	122	0	0	121	0	0	0	999	0	62	935	0		
Turn Type	Perm	NA		Perm	NA		Perm	Perm	NA		Perm	NA			
Protected Phases		5			5				2			2		1	4
Permitted Phases	5			5			2	2			2				
Detector Phase	5	5		5	5		2	2	2		2	2			
Switch Phase															
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0	10.0		10.0	10.0		4.0	4.0
Minimum Split (s)	28.5	28.5		28.5	28.5		24.5	24.5	24.5		24.5	24.5		6.0	6.0
Total Split (s)	38.0	38.0		38.0	38.0		70.0	70.0	70.0		70.0	70.0		6.0	6.0
Total Split (%)	31.7%	31.7%		31.7%	31.7%		58.3%	58.3%	58.3%		58.3%	58.3%		5%	5%
Maximum Green (s)	33.5	33.5		33.5	33.5		65.5	65.5	65.5		65.5	65.5		4.0	4.0
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5		3.5	3.5		2.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0		1.0	1.0		0.0	0.0
Lost Time Adjust (s)		0.0			0.0				0.0		0.0	0.0			
Total Lost Time (s)		4.5			4.5				4.5		4.5	4.5			
Lead/Lag	Lag	Lag		Lag	Lag		Lag	Lag	Lag		Lag	Lag		Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes		Yes	Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	Ped	Ped		Ped	Ped		C-Max	C-Max	C-Max		C-Max	C-Max		Ped	Ped
Walk Time (s)	7.0	7.0		7.0	7.0		10.0	10.0	10.0		10.0	10.0		4.0	4.0
Flash Dont Walk (s)	17.0	17.0		17.0	17.0		10.0	10.0	10.0		10.0	10.0		0.0	0.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0		0	0
Act Effct Green (s)		24.0			24.0				73.5		73.5	73.5			
Actuated g/C Ratio		0.20			0.20				0.61		0.61	0.61			
v/c Ratio		0.34			0.45				0.61		0.25	0.45			
Control Delay		18.2			41.0				14.2		14.0	13.2			
Queue Delay		0.0			0.0				0.1		0.0	0.0			
Total Delay		18.2			41.0				14.3		14.0	13.2			
LOS		B			D				B		B	B			
Approach Delay		18.2			41.0				14.3			13.2			
Approach LOS		B			D				B			B			
Queue Length 50th (ft)		25			68				107		21	190			
Queue Length 95th (ft)		70			97				142		48	236			
Internal Link Dist (ft)		520			321				226			479			
Turn Bay Length (ft)											70				
Base Capacity (vph)		471			364				1647		245	2086			
Starvation Cap Reductn		0			0				50		0	0			
Spillback Cap Reductn		0			0				0		0	0			
Storage Cap Reductn		0			0				0		0	0			
Reduced v/c Ratio		0.26			0.33				0.63		0.25	0.45			

Intersection Summary

Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 69 (58%), Referenced to phase 2:NBSB, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 15.5		Intersection LOS: B	
Intersection Capacity Utilization 81.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Massachusetts Avenue & St. Botolph Street

Appendix E

Preliminary Energy Model

566 Columbus Ave Street Baseline To Proposed Cost Summary Sheet Option 1

Date: 7/08/2019

END USE	Averaged Baseline			Proposed With Exceptional Calculation			Precentage Improvement Baseline to Proposed With Exceptional Calculation	
	Energy Elec. (KWHr) Gas (Therm)	Energy Consumption (MBH)	Energy Cost ($/ Year)	Energy Elec. (KWHr) Gas (Therm) (BEPU)	Energy Consumption (MBH)	Energy Cost ($/ Year) (ES-D)	Energy (%)	Cost (%)
Electricty	**854,661.00**	2,916,957.99	$184,350.00	**670,207.00**	2,287,416.49	$144,564.00	21.58%	21.58%
Natural Gas	**25,629**	256.29	$38,598.00	**19,402**	194.02	$29,220.00	24.30%	24.30%
Steam								
Hot Water								
Other								
Building Total		**2,917,214**	**$222,948**		**2,287,611**	**$173,784**		22.05%

Appendix F

Climate Change Resiliency Checklist

Boston Planning & Development Agency
Climate Resiliency Report Summary

Submitted: 07/29/2019 18:33:14

A.1 - Project Information

Project Name:	566 Columbus Avenue			
Project Address:	566 Columbus Avenue			
Filing Type:	Initial (PNF, EPNF, NPC or other substantial filing)			
Filing Contact:	Talya Moked	Epsilon Associates	tmoked@epsilonassociates.com	9784616223
Is MEPA approval required?	No	MEPA date:		

A.2 - Project Team

Owner / Developer:	566 Columbus LLC
Architect:	J. Garland Enterprises and Bargmann Hendrie Archetype
Engineer:	Wozny Barbar & Associates
Sustainability / LEED:	The Green Engineer
Permitting:	Epsilon Associates, Inc.
Construction Management:	TBD

A.3 - Project Description and Design Conditions

List the principal Building Uses:	Residential
List the First Floor Uses:	Non-profit commercial, café, art gallery, residential lobby and units
List any Critical Site Infrastructure and or Building Uses:	

Site and Building:

Site Area (SF):	23278	Building Area (SF):	89700
Building Height (Ft):	70	Building Height (Stories):	6
Existing Site Elevation – Low (Ft BCB):	12.0	Existing Site Elevation – High (Ft BCB):	20.8
Proposed Site Elevation – Low (Ft BCB):	18.0	Proposed Site Elevation – High (Ft BCB):	20.8
Proposed First Floor Elevation (Ft BCB):	18.87	Below grade spaces/levels (#):	1

Article 37 Green Building:

LEED Version - Rating System:	LEED v4	LEED Certification:	
Proposed LEED rating:	Certified	Proposed LEED point score (Pts.):	49

Boston Planning & Development Agency
Climate Resiliency Report Summary

boston planning & development agency

Building Envelope:

When reporting R values, differentiate between R discontinuous and R continuous. For example, use "R13" to show R13 discontinuous and use R10c.i. to show R10 continuous. When reporting U value, report total assembly U value including supports and structural elements.

Roof:	30 ci	Exposed Floor :	
Foundation Wall:	10 ci	Slab Edge (at or below grade):	10 ci

Vertical Above-grade Assemblies (%'s are of total vertical area and together should total 100%):

Area of Opaque Curtain Wall & Spandrel Assembly:	5	Wall & Spandrel Assembly Value:	R 20
Area of Framed & Insulated / Standard Wall:	62	Wall Value:	20
Area of Vision Window:	40	Window Glazing Assembly Value:	241
		Window Glazing SHGC:	87
Area of Doors:	1	Door Assembly Value :	46

Energy Loads and Performance

For this filing – describe how energy loads & performance were determined	Energy model (EQUEST) prepared by Wozny Barbar, project MEP Engineers		
Annual Electric (kWh):	670207	Peak Electric (kW):	217.6
Annual Heating (MMbtu/hr):	1320	Peak Heating (MMbtu):	0.8
Annual Cooling (Tons/hr):	34144	Peak Cooling (Tons):	33.9
Energy Use - Below ASHRAE 90.1 - 2013 (%):	22.05	Have the local utilities reviewed the building energy performance?:	No
Energy Use - Below Mass. Code (%):	12.05	Energy Use Intensity (kBtu/SF):	23.6

Back-up / Emergency Power System

Electrical Generation Output (kW):	35	Number of Power Units:	1
System Type (kW):	Standby generator	Fuel Source:	Propane

Emergency and Critical System Loads (in the event of a service interruption)

Electric (kW):	30	Heating (MMbtu/hr):	
		Cooling (Tons/hr):	

B – Greenhouse Gas Reduction and Net Zero / Net Positive Carbon Building Performance

Reducing greenhouse gas emissions is critical to avoiding more extreme climate change conditions. To achieve the City's goal of carbon-neutrality by 2050 the performance of new buildings will need to progressively improve to carbon net zero and net positive.

B.1 – GHG Emissions - Design Conditions

For this filing - Annual Building GHG Emissions (Tons):

For this filing - describe how building energy performance has been integrated into project planning, design, and engineering and any supporting analysis or modeling:

The Project team has prepared a preliminary model created by Wozny Barbar to define overall building loads, and energy systems were selected to provide highly efficient delivery, control, and adaptability for user comfort.

Describe building specific passive energy efficiency measures including orientation, massing, building envelop, and systems:

Orientation and fenestration patterns minimize glazing on south façade, street trees and landscaping will screen facades to reduce heat gain.

Describe building specific active energy efficiency measures including high performance equipment, controls, fixtures, and systems:

90% Efficient natural gas rooftop water heaters will be used for domestic hot water, 80% Effective natural gas rooftop unit will condition shared corridors, emergency generator will be propane fueled.

Describe building specific load reduction strategies including on-site renewable energy, clean energy, and storage systems:

Building designed as PV ready, should it become financially feasible.

Describe any area or district scale emission reduction strategies including renewable energy, central energy plants, distributed energy systems, and smart grid infrastructure:

not applicable

Describe any energy efficiency assistance or support provided or to be provided to the project:

The Project team will engage with Eversource to identify applicable utility incentive programs for the Project.

B.2 - GHG Reduction - Adaptation Strategies

Describe how the building and its systems will evolve to further reduce GHG emissions and achieve annual carbon net zero and net positive performance (e.g. added efficiency measures, renewable energy, energy storage, etc.) and the timeline for meeting that goal (by 2050):

We anticipate the electric grid that serves Boston will continue to evolve to become more reliant on electricity generated from non-combustion sources. The building will be designed to convert to all-electric operations using grid provided electricity. The building will be PV ready including space to accommodate future energy storage devices.

C - Extreme Heat Events

Annual average temperature in Boston increased by about 2˚F in the past hundred years and will continue to rise due to climate change. By the end of the century, the average annual temperature could be 56° (compared to 46° now) and the number of days above 90° (currently about 10 a year) could rise to 90.

C.1 – Extreme Heat - Design Conditions

Temperature Range - Low (Deg.):	8.5	Temperature Range - High (Deg.):	90.6
Annual Heating Degree Days:	5512	Annual Cooling Degree Days	776

What Extreme Heat Event characteristics will be / have been used for project planning

Days - Above 90° (#):	60	Days - Above 100° (#):	30
Number of Heatwaves / Year (#):	6	Average Duration of Heatwave (Days):	5

Describe all building and site measures to reduce heat-island effect at the site and in the surrounding area:

Reduction of glazed area and exterior shading will be considered.

C.2 - Extreme Heat – Adaptation Strategies

Describe how the building and its systems will be adapted to efficiently manage future higher average temperatures, higher extreme temperatures, additional annual heatwaves, and longer heatwaves:

The high efficiency HVAC systems will be able to maintain comfortable living and working conditions during extreme temperature events.

Describe all mechanical and non-mechanical strategies that will support building functionality and use during extended interruptions of utility services and infrastructure including proposed and future adaptations:

The high performance building envelope will enable the residences to maintain a livable temperature for a short duration power outage. The emergency generator will provide service to life-safety systems. The residential units will have operable windows to provide ventilation in the event of a power outage.

D - Extreme Precipitation Events

From 1958 to 2010, there was a 70 percent increase in the amount of precipitation that fell on the days with the heaviest precipitation. Currently, the 10-Year, 24-Hour Design Storm precipitation level is 5.25”. There is a significant probability that this will increase to at least 6” by the end of the century. Additionally, fewer, larger storms are likely to be accompanied by more frequent droughts.

Boston Planning & Development Agency

Climate Resiliency Report Summary

boston planning & development agency

D.1 – Extreme Precipitation - Design Conditions

What is the project design precipitation level? (In. / 24 Hours)	5.15

Describe all building and site measures for reducing storm water run-off:

On site storm water retention, street trees, and planted areas will be designed to minimize storm water run off.

D.2 - Extreme Precipitation - Adaptation Strategies

Describe how site and building systems will be adapted to efficiently accommodate future more significant rain events (e.g. rainwater harvesting, on-site storm water retention, bio swales, green roofs):

Additional storm water retention capacity will be studied

E – Sea Level Rise and Storms

Under any plausible greenhouse gas emissions scenario, the sea level in Boston will continue to rise throughout the century. This will increase the number of buildings in Boston susceptible to coastal flooding and the likely frequency of flooding for those already in the floodplain.

Is any portion of the site in a FEMA Special Flood Hazard Area?	No	What Zone:	
What is the current FEMA SFHA Zone Base Flood Elevation for the site (Ft BCB)?			
Is any portion of the site in the BPDA Sea Level Rise Flood Hazard Area (see SLR-FHA online map)?	Yes		

If you answered YES to either of the above questions, please complete the following questions.
Otherwise you have completed the questionnaire; thank you!

E.1 – Sea Level Rise and Storms – Design Conditions

Proposed projects should identify immediate and future adaptation strategies for managing the flooding scenario represented by the Sea Level Rise Flood Hazard Area (SLR-FHA), which includes 3.2' of sea level rise above 2013 tide levels, an additional 2.5" to account for subsidence, and the 1% Annual Chance Flood. After using the SLR-FHA to identify a project's Sea Level Rise Base Flood Elevation, proponents should calculate the Sea Level Rise Design Flood Elevation by adding 12" of freeboard for buildings, and 24" of freeboard for critical facilities and infrastructure and any ground floor residential units.

What is the Sea Level Rise - Base Flood Elevation for the site (Ft BCB)?	18.0		
What is the Sea Level Rise - Design Flood Elevation for the site (Ft BCB)?	20.0	First Floor Elevation (Ft BCB):	18.87
What are the Site Elevations at Building (Ft BCB)?	18.65	What is the Accessible Route Elevation (Ft BCB)?	18.87

Describe site design strategies for adapting to sea level rise including building access during flood events, elevated site areas, hard and soft barriers, wave / velocity breaks, storm water systems, utility services, etc.:

The existing site is not located in a 100 year flood zone or wave/velocity zones. The BPDA SLR-BFE for the site is elevation 18.0. Existing sidewalk elevations near the proposed building entrances and garage entrance are at elevation 18.5 or higher.

Describe how the proposed Building Design Flood Elevation will be achieved including dry / wet flood proofing, critical systems protection, utility service protection, temporary flood barriers, waste and drain water back flow prevention, etc.:

Critical Utilities will be located above the critical flood level

Describe how occupants might shelter in place during a flooding event including any emergency power, water, and waste water provisions and the expected availability of any such measures:

Dedicated amenity spaces will be on emergency power for people to congregate before MEP systems are reactivated.

Describe any strategies that would support rapid recovery after a weather event:

After weather event, the building maintenance shall survey the MEP systems to determine whether the systems were damaged and their operation is safe.

E.2 – Sea Level Rise and Storms – Adaptation Strategies

Describe future site design and or infrastructure adaptation strategies for responding to sea level rise including future elevating of site areas and access routes, barriers, wave / velocity breaks, storm water systems, utility services, etc.:

As City of Boston determines to raise street levels exterior walkways will be modified to provide access to the building.

Describe future building adaptation strategies for raising the Sea Level Rise Design Flood Elevation and further protecting critical systems, including permanent and temporary measures:

Building entries will be modified to align with raised exterior walkways as required.

Thank you for completing the Boston Climate Change Checklist!

For questions or comments about this checklist or Climate Change best practices, please contact:
John.Dalzell@boston.gov

Appendix G

Accessibility Checklist

Article 80 – Accessibility Checklist

A requirement of the Boston Planning & Development Agency (BPDA)
Article 80 Development Review Process

The Mayor's Commission for Persons with Disabilities strives to reduce architectural, procedural, attitudinal, and communication barriers that affect persons with disabilities in the City of Boston. In 2009, a Disability Advisory Board was appointed by the Mayor to work alongside the Commission in creating universal access throughout the city's built environment. The Disability Advisory Board is made up of 13 volunteer Boston residents with disabilities who have been tasked with representing the accessibility needs of their neighborhoods and increasing inclusion of people with disabilities.

In conformance with this directive, the BDPA has instituted this Accessibility Checklist as a tool to encourage developers to begin thinking about access and inclusion at the beginning of development projects, and strive to go beyond meeting only minimum MAAB / ADAAG compliance requirements. Instead, our goal is for developers to create ideal design for accessibility which will ensure that the built environment provides equitable experiences for all people, regardless of their abilities. As such, any project subject to Boston Zoning Article 80 Small or Large Project Review, including Institutional Master Plan modifications and updates, must complete this Accessibility Checklist thoroughly to provide specific detail about accessibility and inclusion, including descriptions, diagrams, and data.

For more information on compliance requirements, advancing best practices, and learning about progressive approaches to expand accessibility throughout Boston's built environment. Proponents are highly encouraged to meet with Commission staff, prior to filing.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
   http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Massachusetts State Building Code 780 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html
4. Massachusetts Office of Disability – Disabled Parking Regulations
   http://www.mass.gov/anf/docs/mod/hp-parking-regulations-summary-mod.pdf
5. MBTA Fixed Route Accessible Transit Stations
   http://www.mbta.com/riding_the_t/accessible_services/
6. City of Boston – Complete Street Guidelines
   http://bostoncompletestreets.org/
7. City of Boston – Mayor's Commission for Persons with Disabilities Advisory Board
   www.boston.gov/disability
8. City of Boston – Public Works Sidewalk Reconstruction Policy
   http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
9. City of Boston – Public Improvement Commission Sidewalk Café Policy
   http://www.cityofboston.gov/images_documents/Sidewalk_cafes_tcm3-1845.pdf

Glossary of Terms:

1. ***Accessible Route*** – A continuous and unobstructed path of travel that meets or exceeds the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 20
2. ***Accessible Group 2 Units*** – Residential units with additional floor space that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 9.4
3. ***Accessible Guestrooms*** – Guestrooms with additional floor space, that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 8.4
4. ***Inclusionary Development Policy (IDP)*** – Program run by the BPDA that preserves access to affordable housing opportunities, in the City. For more information visit: http://www.bostonplans.org/housing/overview
5. ***Public Improvement Commission (PIC)*** – The regulatory body in charge of managing the public right of way. For more information visit: https://www.boston.gov/pic
6. ***Visitability*** – A place's ability to be accessed and visited by persons with disabilities that cause functional limitations; where architectural barriers do not inhibit access to entrances/doors and bathrooms.

1. Project Information:

If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.

Project Name:	566 Columbus Avenue
Primary Project Address:	566 Columbus Ave. Boston MA 02118
Total Number of Phases/Buildings:	1/1
Primary Contact (Name / Title / Company / Email / Phone):	Jonathan Garland, President, J. GARLAND ENTERPRISES, jgarland@jgarlandenterprises.com, 617-851-1158
Owner / Developer:	566 Columbus LLC, an affiliate of New Boston Ventures LLC
Architect(s):	J. GARLAND ENTERPRISES LLC: Design Architect/ BARGMANN HENDRIE & ARCHETYPE INC.: Architect of Record
Civil Engineer:	Nitsch Engineering Inc.
Landscape Architect:	Carol R. Johnson Associates Inc.
Permitting:	Epsilon Associates
Construction Management:	TBD

At what stage is the project at time of this questionnaire? Select below:

☑PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BPDA Board Approved
BPDA Design Approved	Under Construction	Construction Completed:

Do you anticipate filing for any variances with the Massachusetts Architectural Access Board (MAAB)? ***If yes,*** identify and explain.	No

2. Building Classification and Description:

This section identifies preliminary construction information about the project including size and uses.

What are the dimensions of the project?

Site Area:	*23,278 SF*	Building Area:	*89,700 GSF Includes parking garage*
Building Height:	*70 Ft.*	Number of Stories:	*6 Flrs.*
First Floor Elevation:	18.87' / 20'	Is there below grade space:	*Yes*

What is the Construction Type? (Select most appropriate type)				
	☑Wood Frame	Masonry	☑Steel Frame Podium	Concrete
What are the principal building uses? (IBC definitions are below – select all appropriate that apply)				
	Residential – One - Three Unit	☑Residential - Multi-unit, Four +	Institutional	Educational
	☑Business	☑Mercantile	Factory	Hospitality
	Laboratory / Medical	Storage, Utility and Other		
List street-level uses of the building:	*Non-profit commercial, café, art gallery, residential lobby and units*			

3. Assessment of Existing Infrastructure for Accessibility:

This section explores the proximity to accessible transit lines and institutions, such as (but not limited to) hospitals, elderly & disabled housing, and general neighborhood resources. Identify how the area surrounding the development is accessible for people with mobility impairments and analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.

Provide a description of the neighborhood where this development is located and its identifying topographical characteristics:	The Project site is located in the South End neighborhood of Boston at the intersection of Massachusetts Avenue and Columbus Avenue. The Project site is bounded along Massachusetts Avenue, Columbus Avenue and West Springfield Street with concrete and brick paved sidewalks and accessible curb ramps at all intersections.
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	MBTA Bus Stop: Mass. Ave. & Columbus Ave. Routes 1 & 170: **0.0 Miles from Project site** MBTA Bus Stop: Mass. Ave. & Tremont St. Routes 1, 170 & CT1: **0.09 Miles from Project site** Massachusetts Avenue Orange Line Subway Station: **012 Miles from Project site** MBTA Bus Stop: Mass. Ave. Station Routes 1, 170 & CT1: **0.12 Miles from Project site** MBTA Bus Stop: Mass. Ave. & St. Botolph St. Routes 1, 170 & CT1: **019 Miles from Project site** MBTA Bus Stop: Mass. Ave. & Huntington Ave. Route 39: **0.25 Miles from Project site** MBTA Bus Stop: Mass. Ave. & Washington St. Routes 1 & CT1: **0.35 Miles from Project site** Ruggles Station Orange Line, Commuter Rail and Bus: **0.50 Miles from Project site**
List the surrounding institutions: hospitals, public housing, elderly and disabled housing	South End Apartments, Piano Craft Guild, Northeastern University, Mandela Homes, Parmelee Court Homes, Historic South End Apartments, Langham

developments, educational facilities, others:	Court, Claremont Park Apartments, Boston Medical Center, South End Community Health Center
List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	Columbus Avenue AME Zion Church, Boston South End Branch Library, People's Baptist Church, South End Fitness Center, Blackstone Community Center, Boston Center for the Arts
4. Surrounding Site Conditions – Existing: *This section identifies current condition of the sidewalks and pedestrian ramps at the development site.*	
Is the development site within a historic district? ***If yes,*** identify which district:	Yes, South End Landmark District
Are there sidewalks and pedestrian ramps existing at the development site? ***If yes***, list the existing sidewalk and pedestrian ramp dimensions, slopes, materials, and physical condition at the development site:	There are existing sidewalks and pedestrian ramps. Existing sidewalks will be disturbed only as needed for utility connections from street to building, for an extension of an existing layby on Columbus Avenue, narrowing the curb cut on Massachusetts Avenue, and for building construction. Existing pedestrian ramps at the corners of Massachusetts Avenue/Columbus Avenue, and Columbus Avenue/West Springfield Street will remain and be undisturbed. a. Massachusetts Avenue Sidewalk: width varies: i. 10'-7" back of curb to property line ii. 14'-5" back of curb to closest face of proposed building iii. 23'-6" back of curb to recessed face of proposed building b. Columbus Avenue Sidewalk: width varies: i. 3'-2 1/2" back of curb to property line (at existing layby) ii. 12'-3 ¼" back of curb to closest face of proposed building (at existing layby) iii. 22'-5" back of curb to recessed face of proposed building (at existing layby) iv. 10'-7 ¼" back of curb to property line (beyond existing layby) v. 19'-2 3/4" back of curb to closest face of proposed building (beyond existing layby) vi. 32'-5" back of curb to recessed face of proposed building (beyond existing layby) c. West Springfield Street: width varies: i. 8'-0" back of curb to property line ii. 8'-6" back of curb to closest face of proposed building iii. 10'-0 1/4" back of curb to recessed face of proposed building d. Pedestrian Ramp: Corner of Massachusetts Avenue/Columbus Avenue: i. Material: Concrete: Medium Gray integral color ii. Detectible Warning Composite Panel cast in concrete: Light Gray color iii. Ramp Dimensions:

	1. Center panel 5' wide by 7' deep, with 4' x 5' concrete landing at top 2. Wings: 5' wide x 7' deep (Curb height ranges from 4.8"-5.5") e. Pedestrian Ramp: Corner of Columbus Avenue/West Springfield Street i. Material: white concrete: ii. Detectible Warning Panel: none iii. Ramp Dimensions: 1. Center Panel: 5'wide x 6' deep (no concrete landing at the top.) 2. Wings: 5' wide x 6' deep (Curb height 5.8")
Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? ***If yes,*** provide description and photos:	Sidewalks are existing to remain. Existing sidewalks will be disturbed only as needed for utility connections from street to building, for an extension of an existing layby on Columbus Avenue, and for building construction. Existing pedestrian ramps will remain and be undisturbed. The Project is in the South End Landmark District. Composite Detectible Warning Panels in the South End Landmark District can be Red. The Pedestrian Ramps are compliant for dimensions, slope and ramp material, but not for the Detectible Warning Panel. However, existing curb ramps will remain and be undisturbed. a) Pedestrian Ramp: Corner of Massachusetts Avenue/Columbus Avenue: b) Pedestrian Ramp: Corner of Columbus Avenue/West Springfield Street:

5. Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps around the development site. Sidewalk width contributes to the degree of comfort walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Wider sidewalks allow people to walk side by side and pass each other comfortably walking alone, walking in pairs, or using a wheelchair.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? ***If yes***, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard.	The proposed sidewalks will be consistent with the Boston Complete Streets Guidelines where disturbed and reconstructed. a) Massachusetts Avenue will be consistent with Downtown Mixed Use, though most ground level floors of Mass Ave within the South End are residential, with retail only at some intersections. b) Columbus Avenue will be consistent with Neighborhood Main Street, though most ground level floors of Columbus Avenue are residential, with only episodic ground floor retail. c) West Springfield Street will be consistent with Neighborhood Residential Street.
What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:	The longitudinal slopes of each road's sidewalk are essentially level. A breakdown of slopes and dimension of the proposed sidewalks and their zones is as follows: a. Massachusetts Avenue: iv. Sidewalk cross-slope: < 2%. v. Sidewalk longitudinal slope: approximately .5% vi. Frontage depth: 3'-10" (13'-0" at building recess) vii. Pedestrian Zone width: 7'-7" viii. Furnishing Zone: 3'-0" b. Columbus Avenue: i. Sidewalk cross-slope: < 2%.

	ii. Sidewalk longitudinal slope: approximately .4% iii. Frontage depth: 13'-2" at building recess iv. Pedestrian Zone width: 8'-0" v. Furnishing Zone: 4'-2-1/2" at layby, 11' 7 ¼" beyond layby c. West Springfield Street: i. Sidewalk cross-slope: < 2%. ii. Sidewalk longitudinal slope: approximately .7% iii. Frontage depth: 2'-0 ¼" at the building recess iv. Pedestrian Zone width: 5'-0" v. Furnishing Zone: 3'-0"
List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way?	Because the Project Site is in the South End Landmark District, which regulates pavement in the public way, and will require brick where there is brick already, wherever new pavement is required within the sidewalk zones, the Frontage Zone, the Pedestrian Zone and the Furnishing Zone will be brick, using the approved City Standard saw-cut brick being used elsewhere. Per the Complete Streets Guidelines, there will be an 18"-24"permeable paver strip at the back of curb using brick detailed for that purpose. The only exception to that will be the 10' wide curb cut/apron and driveway providing access to the proposed garage entry, which is currently concrete pavement and will be proposed as concrete, On Massachusetts Avenue, Columbus Avenue, and West Springfield Street, where there is Frontage Zone, the pavement within the Frontage Zone and also a portion of the Pedestrian Zone is on private property. The remainder of the Pedestrian Zones and the entire Furnishing Zone on all three streets are in the City of Boston right-of-way.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	A sidewalk café is proposed at the corner of Massachusetts Avenue and Columbus Avenue, however, it is entirely within the Frontage Zone and on private property. It will not intrude into the Pedestrian Zone.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	Yes
Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details.	The Project will go through PIC for Specific Repairs for sidewalk surface improvements, License for Temporary Earth Support, and may require a Pedestrian Easement.
6. Accessible Parking: *See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability – Disabled Parking Regulations*.	

What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage?	A total of 42 parking spaces will be provided as part of the Project, all of which will be constructed on-site, in a garage under the building.
What is the total number of accessible spaces provided at the development site? How many of these are "Van Accessible" spaces with an 8 foot access aisle?	Two accessible parking spaces will be provided, one of which is van accessible with an 8' access aisle.
Will any on-street accessible parking spaces be required? ***If yes,*** has the proponent contacted the Commission for Persons with Disabilities regarding this need?	No
Where is the accessible visitor parking located?	Two accessible on-street parking spaces exist along the Columbus Avenue edge of the site within the public right of way. The development team intends to make use of these spaces as accessible visitor parking.
Has a drop-off area been identified? ***If yes,*** will it be accessible?	See above response.
7. Circulation and Accessible Routes: *The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability with neighbors.*	
Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	Cafe Entrance: Flush Condition Non-profit Commercial Entrance: Flush Condition Art Exhibit Gallery Entrance: Flush Condition Residential Lobby Entrance: Stairs and Accessible Ramp
Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe.* ***If no,*** what is the reason?	Yes
If project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package.	Not yet determined.
8. Accessible Units (Group 2) and Guestrooms: (If applicable) *In order to facilitate access to housing and hospitality, this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing and hotel rooms.*	

What is the total number of proposed housing units or hotel rooms for the development?	66 housing units. No hotel rooms.
If a residential development, how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP (Inclusionary Development Policy) units?	66 for sale homeownership units, no rental units. 55 market units / 11 IDP units (which represents 17% affordability)
If a residential development, how many accessible Group 2 units are being proposed?	0 Group 2 Units. Exempt per MAAB 521 CMR 9.00 Multiple Dwellings, Section 9.4: Group 2 Dwelling Units: In *multiple dwelling*s that are for rent, hire, or lease (but not for sale) and contain 20 or more units, at least 5% of the *dwelling unit*s must be *Group 2A* units.
If a residential development, how many accessible Group 2 units will also be IDP units? ***If none***, describe reason.	0 Group 2 Units. Exempt per MAAB 521 CMR 9.00 Multiple Dwellings, Section 9.4: Group 2 Dwelling Units: In *multiple dwelling*s that are for rent, hire, or lease (but not for sale) and contain 20 or more units, at least 5% of the *dwelling unit*s must be *Group 2A* units.
If a hospitality development, how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? ***If yes,*** provide amount and location of equipment.	N/A
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. ***If yes,*** provide reason.	Yes. 5 of the 7 top floor units have private roof decks that are to be accessed via internal stairs from within the respective unit.
Are there interior elevators, ramps or lifts located in the development for access around architectural barriers and/or to separate floors? ***If yes,*** describe:	Yes. The development includes a dual bank of elevators providing accessible access to all floors including the garage level and the high roof deck. An accessible ramp will also be provided from the sidewalk up to the finished floor elevation at the ground level residential lobby. All other roof decks, terraces and balconies will have barrier free flush conditions.

9. Community Impact:

Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community.

Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives?	Streetscape features including street trees, light poles, trash/recycling receptacles, public bike racks and benches will be incorporated and/or enhanced as part of the Project's associated public realm improvements.
What inclusion elements does this development provide for persons with disabilities in common social and open spaces? Example: Indoor seating and TVs in common rooms; outdoor seating and barbeque grills in yard. Will all of these spaces and features provide accessibility?	All indoor and outdoor common spaces will be accessible.
Are any restrooms planned in common public spaces? ***If yes,*** will any be single-stall, ADA compliant and designated as "Family"/ "Companion" restrooms? ***If no***, explain why not.	Yes, yes.
Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? ***If yes,*** did they approve? ***If no,*** what were their comments?	Not yet.
Has the proponent presented the proposed plan to the Disability Advisory Board at one of their monthly meetings? Did the Advisory Board vote to support this project? ***If no,*** what recommendations did the Advisory Board give to make this project more accessible?	Not yet.

10. Attachments

Include a list of all documents you are submitting with this Checklist. This may include drawings, diagrams, photos, or any other material that describes the accessible and inclusive elements of this project.

Provide a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations, including route distances. See attached.
Provide a diagram of the accessible route connections through the site, including distances. See attached
Provide a diagram the accessible route to any roof decks or outdoor courtyard space? (if applicable) See attached.
Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry. N/A
Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project.

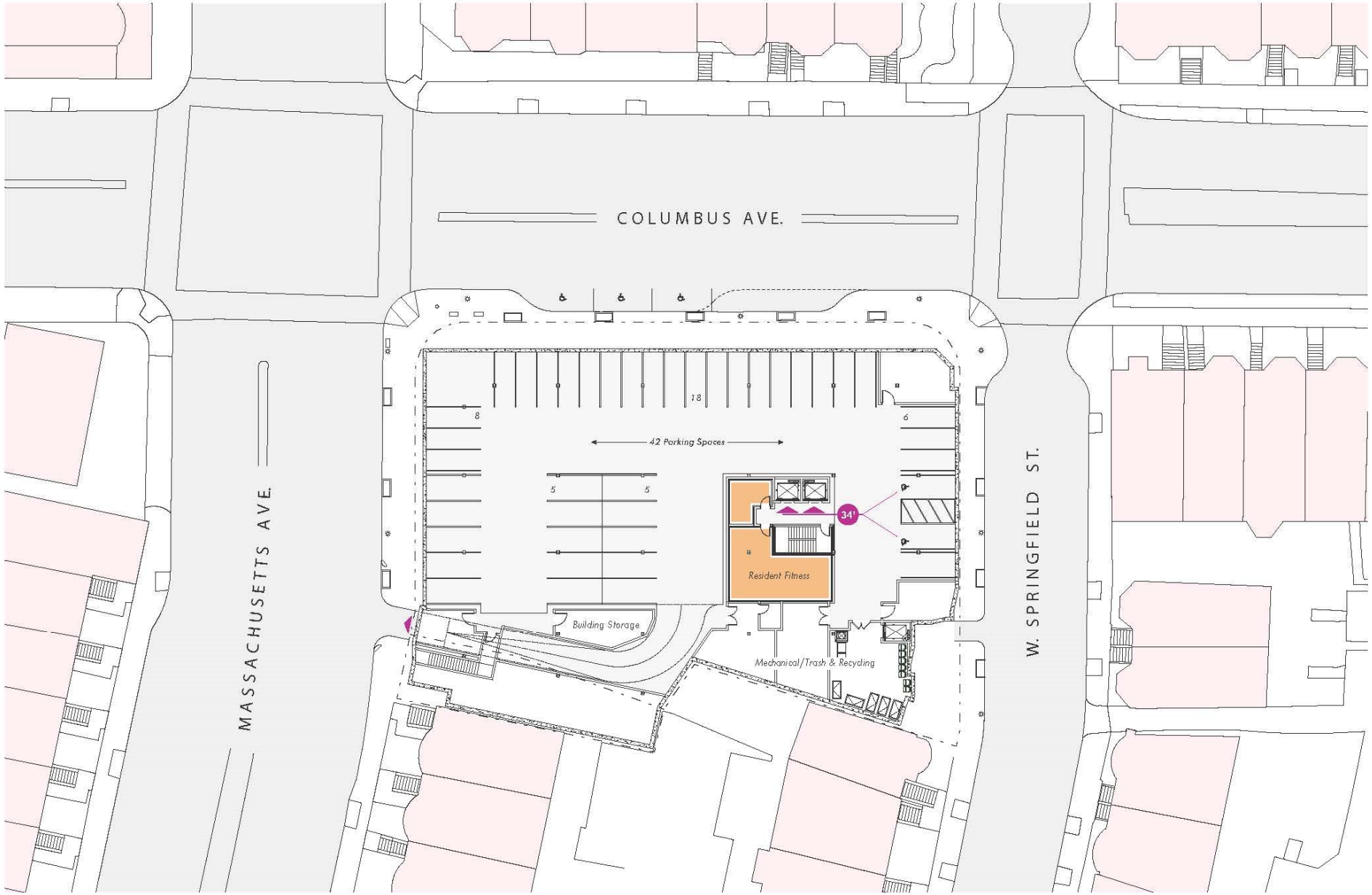
This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to help achieve ideal accessibility and to ensure that all buildings, sidewalks, parks, and open spaces are usable and welcoming to Boston's diverse residents and visitors, including those with physical, sensory, and other disabilities.

For questions or comments about this checklist, or for more information on best practices for improving accessibility and inclusion, visit www.boston.gov/disability, or our office:

The Mayor's Commission for Persons with Disabilities
1 City Hall Square, Room 967,
Boston MA 02201.

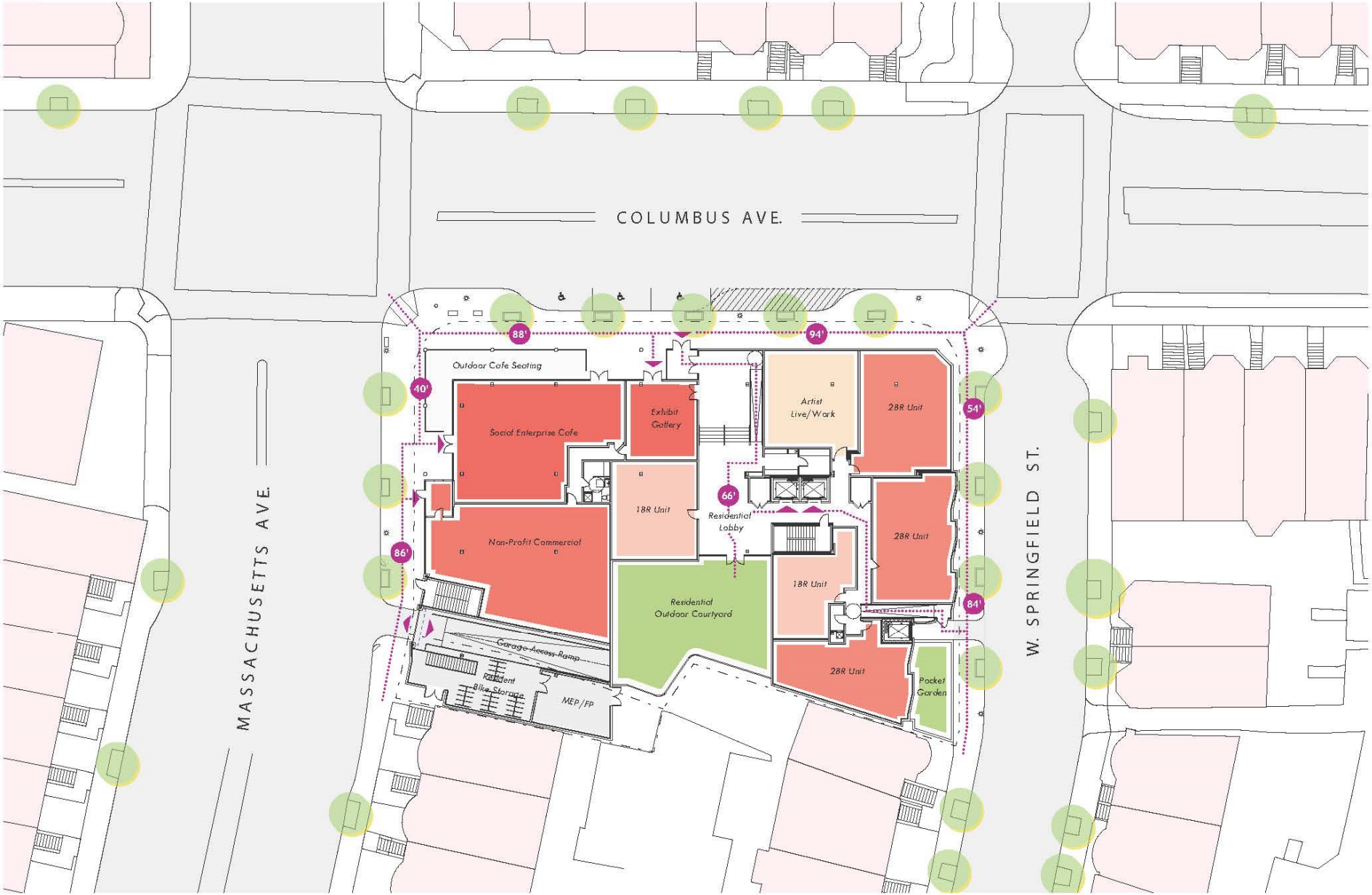
Architectural Access staff can be reached at:

accessibility@boston.gov | patricia.mendez@boston.gov | sarah.leung@boston.gov | 617-635-3682



566 Columbus Avenue Boston, Massachusetts

0 10 20 40

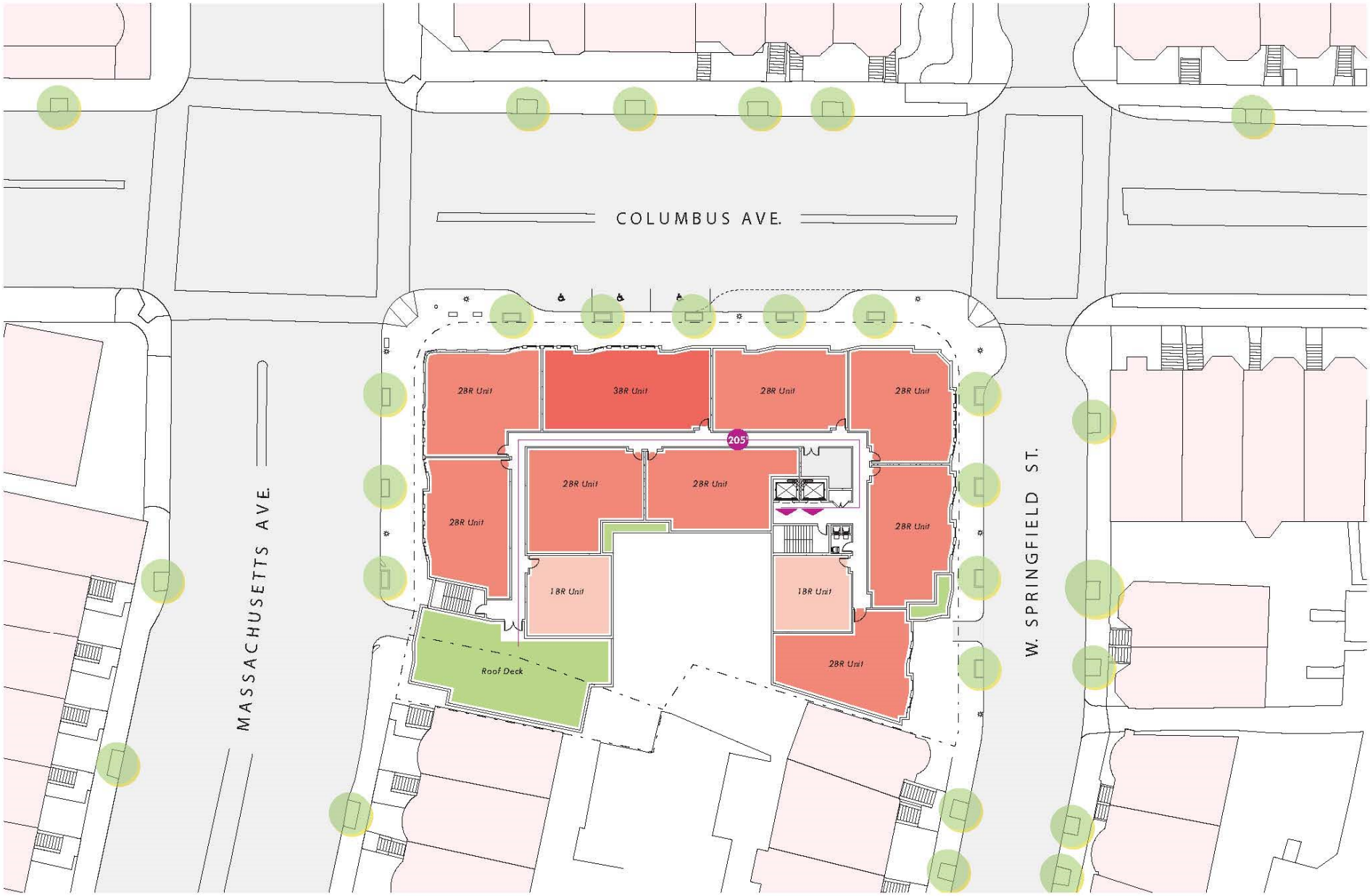


566 Columbus Avenue Boston, Massachusetts

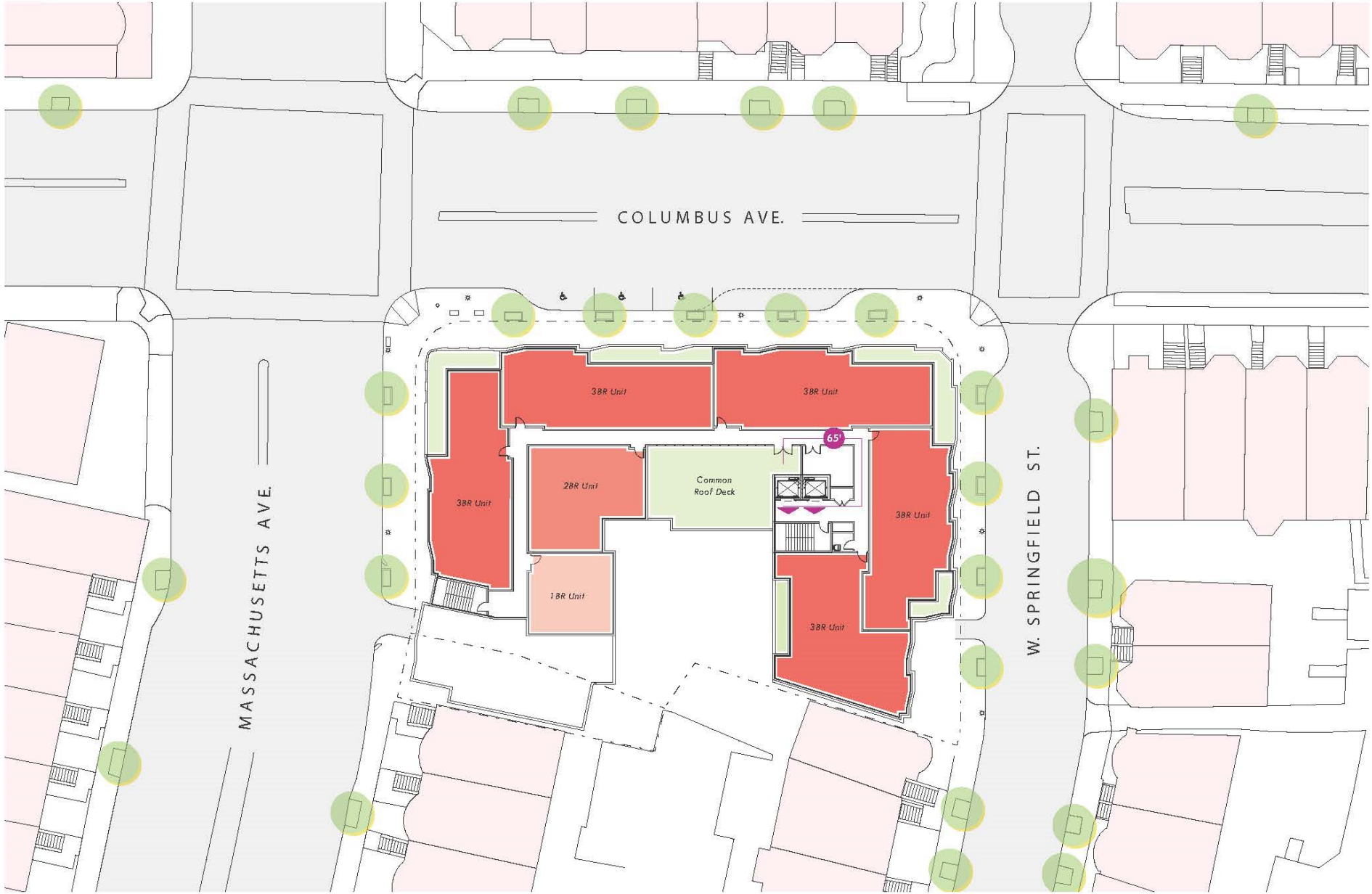
N 0 10 20 40

JGE J. GARLAND ENTERPRISES LLC

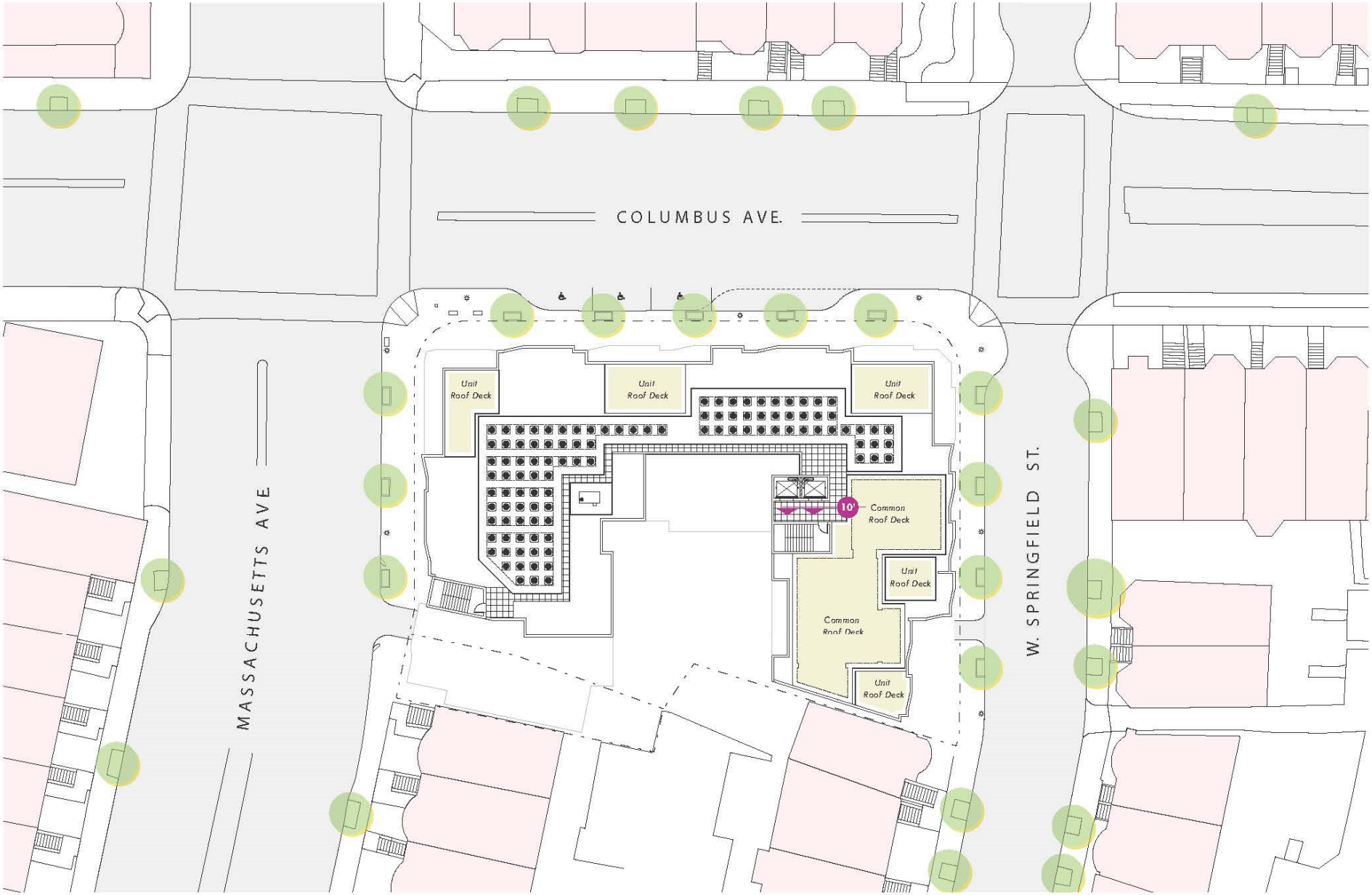
Accessibility - Ground Floor Plan



566 Columbus Avenue Boston, Massachusetts



566 Columbus Avenue Boston, Massachusetts



566 Columbus Avenue Boston, Massachusetts

Appendix H

Smart Utilities Checklist

Boston Smart Utilities Checklist

Date Submitted:	07/29/2019 22:41:46
Submitted by:	tmoked@epsilonassociates.com

Background

The Smart Utilities Checklist will facilitate the Boston Smart Utilities Steering Committee's review of:

a) compliance with the Smart Utilities Policy for Article 80 Development Review, which calls for the integration of five (5) Smart Utility Technologies (SUTs) into Article 80 developments

b) integration of the Smart Utility Standards

More information about the Boston Smart Utilities Vision project, including the Smart Utilities Policy and Smart Utility Standards, is available at:
www.http://bostonplans.org/smart-utilities

Note: Any documents submitted via email to manuel.esquivel@boston.gov will not be attached to the pdf form generated after submission, but are available upon request.

Part 1 - General Project Information

1.1 Project Name	566 Columbus Avenue
1.2 Project Address	566 Columbus Avenue
1.3 Building Size (square feet) **For a multi-building development, enter total development size (square feet)*	89700
1.4 Filing Stage	Initial Filing (i.e., PNF)
1.5 Filing Contact Information	
1.5a Name	Talya Moked

Boston Smart Utilities Checklist

1.5b Company	Epsilon Associates
1.5c E-mail	tmoked@epsilonassociates.com
1.5d Phone Number	9784616223

1.6 Project Team

1.6a Project Owner/Developer	566 Columbus LLC, an affiliate of New Boston Ventures LLC
1.6b Architect	J. Garland Enterprises and Bargmann Hendrie Archetype
1.6c Permitting	Epsilon Associates, Inc.
1.6d Construction Management	

Part 2 - District Energy Microgrids

Fill out this section if the proposed project's total development size is equal to or greater than 1.5 million square feet.

Note on submission requirements timeline:

Feasibility Assessment Part A should be submitted with PNF or any other initial filing.

Feasibility Assessment Part B should be submitted with any major filing during the Development Review stage (i.e., DPIR)

District Energy Microgrid Master Plan Part A should be submitted before submission of the Draft Board Memorandum by the BPDA Project Manager (Note: Draft Board Memorandums are due one month ahead of the BPDA Board meetings)

District Energy Microgrid Master Plan Part B should be submitted before applying for a Building Permit

Please email submission to manuel.esquivel@boston.gov

2.1 Consultant Assessing/Designing District Energy Microgrid (if applicable)	Not applicable

Boston Smart Utilities Checklist

2.2 Latest document submitted	
2.3 Date of latest submission	
2.4 Which of the following have you had engagement/review meetings with regarding District Energy Microgrids? (select all that apply)	
2.5 What engagement meetings have you had with utilities and/or other agencies (i.e., MA DOER, MassCEC) regarding District Energy Microgrids? (Optional: include dates)	
2.6 Additional Information	

Part 3 - Telecommunications Utilidor

Fill out this section if the proposed project's total development size is equal to or greater than 1.5 million square feet OR if the project will include the construction of roadways equal to or greater than 0.5 miles in length.

Please submit a map/diagram highlighting the sections of the roads on the development area where a Telecom Utilidor will be installed, including access points to the Telcom Utilidor (i.e., manholes)

Please email submission to manuel.esquivel@boston.gov

3.1 Consultant Assessing/Designing Telecom Utilidor (if applicable)	Not applicable
3.2 Date Telecom Utilidor Map/Diagram was submitted	

Boston Smart Utilities Checklist

3.3 Dimensions of Telecom Utilidor (include units)	
3.3a Cross-section (i.e., diameter, width X height)	
3.3b Length	
3.4 Capacity of Telecom Utilidor (i.e., number of interducts, 2 inch (ID) pipes, etc.)	
3.5 Which of the following have you had engagement/review meetings with regarding the Telecom Utilidor? (select all that apply)	
3.6 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding the Telecom Utilidor? (Optional: include dates)	
3.7 Additional Information	

Part 4 - Green Infrastructure

Fill out this section if the proposed project's total development size is equal to or greater than 100,000 square feet.

Please submit a map/diagram highlighting where on the development Green Infrastructure will be installed.

Please email submission to manuel.esquivel@boston.gov

4.1 Consultant Assessing/Designing Green Infrastructure (if applicable)	Nitsch Engineering

Boston Smart Utilities Checklist

4.2 Date Green Infrastructure Map/Diagram was submitted	
4.3 Types of Green Infrastructure included in the project (select all that apply)	Not applicable, most of the site will be covered by building and only includes a small portion of sidewalks not located over building structure.
4.4 Total impervious area of the development (in square inches)	3352032
4.5 Volume of stormwater that will be retained (in cubic inches)* **Note: Should equal to at least "Total impervious area (entered in section 4.4)" times "1.25 inches"*	4190040
4.6 Which of the following have you had engagement/review meetings with regarding Green Infrastructure? (select all that apply)	
4.7 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding Green Infrastructure? (Optional: include dates)	
4.8 Additional Information	

Part 5 - Adaptive Signal Technology (AST)

Fill out this section if as part of your project BTD will require you to install new traffic signals or make significant improvements to the existing signal system.

Please submit a map/diagram highlighting the context of AST around the proposed development area, as well as any areas within the development where new traffic signals will be installed or where significant improvements to traffic signals will be made.

Please email submission to manuel.esquivel@boston.gov

Boston Smart Utilities Checklist

5.1 Consultant Assessing/Designing Adaptive Signal Technology (if applicable)	Not applicable
5.2 Date AST Map/Diagram was submitted	
5.3 Describe how the AST system will benefit/impact the following transportation modes	
5.3a Pedestrians	
5.3b Bicycles	
5.3c Buses and other Public Transportation	
5.3d Other Motorized Vehicles	
5.4 Describe the components of the AST system (including system design and components)	
5.5 Which of the following have you had engagement/review meetings with regarding AST? (select all that apply)	
5.6 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding AST? (Optional: include dates)	
5.7 Additional Information	

Part 6 - Smart Street Lights

Fill out this section if as part of your project PWD and PIC will require you to install new street lights or make significant improvements to the existing street light system.

Boston Smart Utilities Checklist

Please submit a map/diagram highlighting where new street lights will be installed or where improvements to street lights will be made.

Please email submission to manuel.esquivel@boston.gov

6.1 Consultant Assessing/Designing Smart Street Lights (if applicable)	Not Applicable – there are already smart street lights installed on Columbus Avenue in front of the project.
6.2 Date Smart Street Lights Map/Diagram was submitted	
6.3 Which of the following have you had engagement/review meetings with regarding Smart Street Lights? (select all that apply)	
6.4 What engagement meetings have you had with utilities and/or other agencies (i.e., State agencies) regarding Smart Street Lights? (Optional: include dates)	
6.5 Additional Information	

Part 7 - Smart Utility Standards

The Smart Utility Standards set forth guidelines for planning and integration of SUTs with existing utility infrastructure in existing or new streets, including cross-section, lateral, and intersection diagrams. The Smart Utility Standards are intended to serve as guidelines for developers, architects, engineers, and utility providers for planning, designing, and locating utilities. The Smart Utility Standards will serve as the baseline for discussions on any deviations from the standards needed/proposed for any given utility infrastructure.

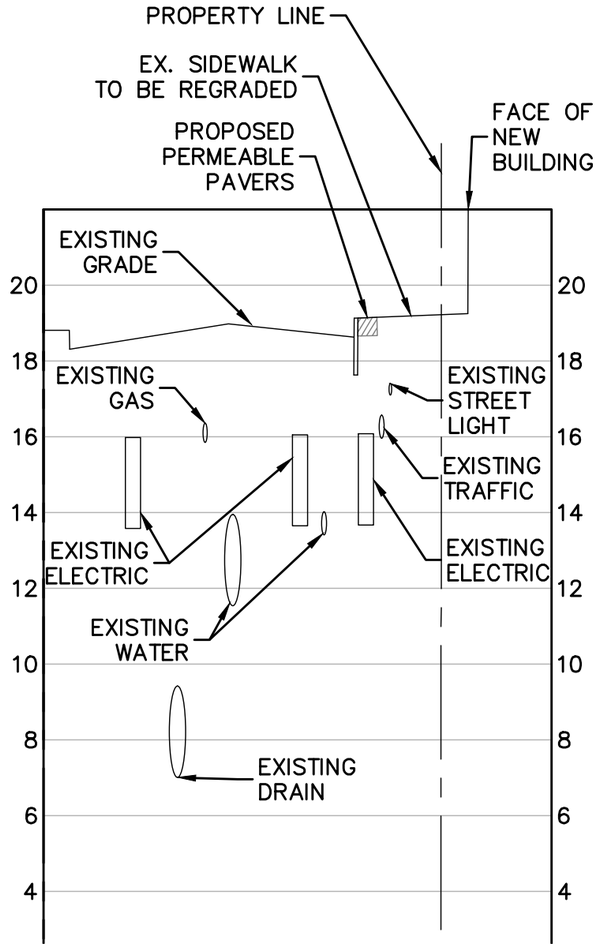
Please submit typical below and above grade cross section diagrams of all utility infrastructure in the proposed development area (including infrastructure related to the applicable SUTs).

Please submit typical below and above grade lateral diagrams of all utility infrastructure in the proposed development area (including infrastructure related to the applicable SUTs).

Boston Smart Utilities Checklist

Please email submission to manuel.esquivel@boston.gov

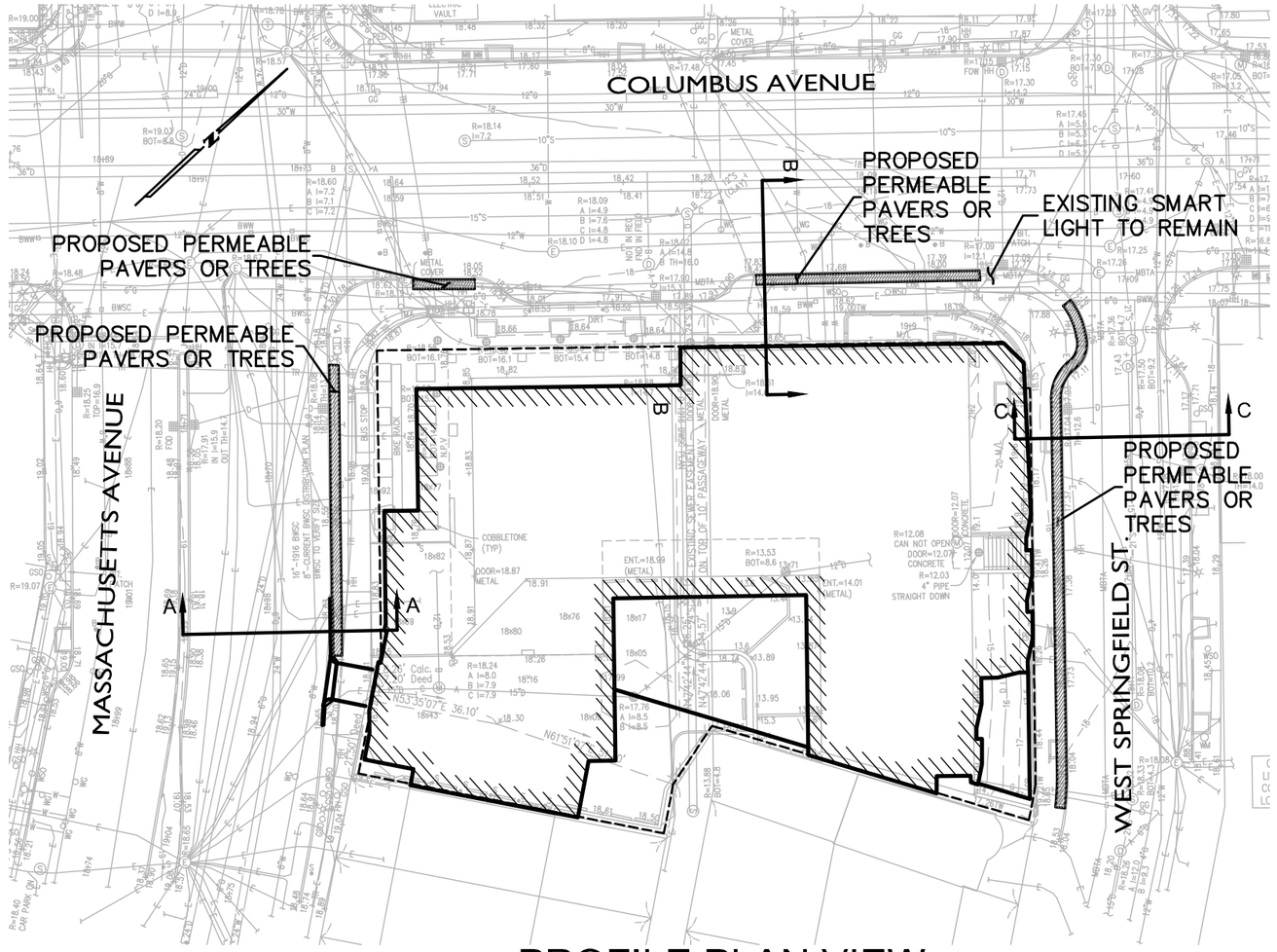
7.1 Date Cross Section Diagram(s) was submitted	07/29/2019
7.2 Date Lateral Diagram(s) was submitted	
7.3 Additional Information	



UTILITY PROFILE MASS. AVE.
SECTION A-A

HORIZONTAL SCALE SCALE: 1"=20'
VERTICAL SCALE SCALE: 1"=4'

SCALE:
1" = 20'
20 10 0 20 40
4 2 0 4 8
1"=4'



PROFILE PLAN VIEW

SCALE: 1"=40'

NOTE: UTILITY DEPTHS MAY VARY THIS SKETCH IS BASED ON AVAILABLE RECORD INFORMATION AND TYPICAL PRACTICES.

SCALE:
1" = 40'
40 20 0 40 80

Nitsch Engineering
www.nitscheng.com
2 Center Plaza, Suite 430
Boston, MA 02108
T: (617) 338-0063
F: (617) 338-6472

- Civil Engineering
- Land Surveying
- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

566 COLUMBUS AVENUE REDEVELOPMENT PROJECT

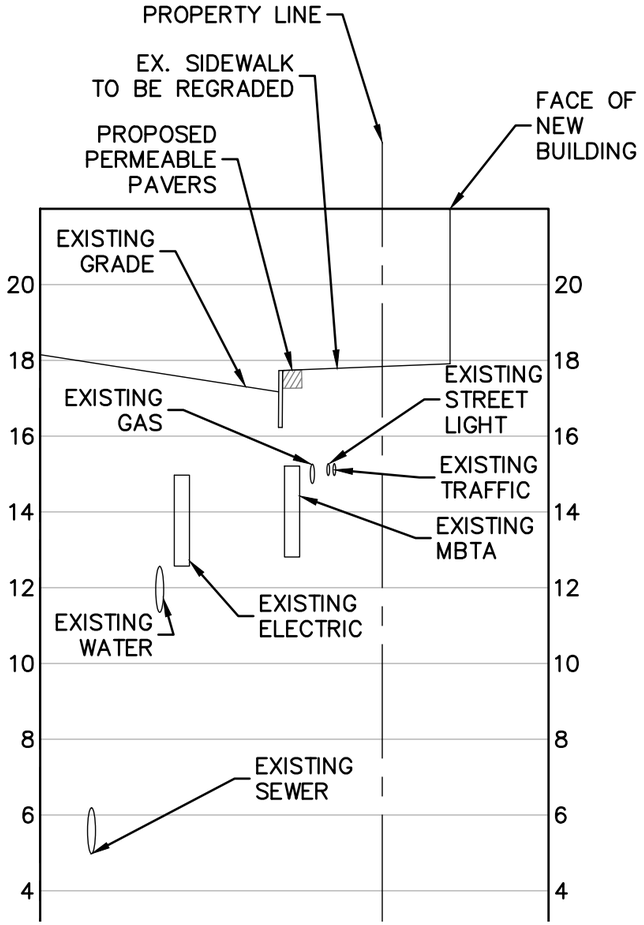
GREEN INFRASTRUCTURE UTILITY PROFILE - MASS. AVE.
566 COLUMBUS AVENUE, BOSTON, MA

PREPARED FOR:
BPDA

PROJECT #	13490
FILE:	13490BPDA.DWG
SCALE:	AS NOTED
DATE:	07/24/2019
PROJECT MGR:	DMD
SURVEYOR:	NITSCH
DRAFTED BY:	ZM
CHECKED BY:	DMD

SHEET:

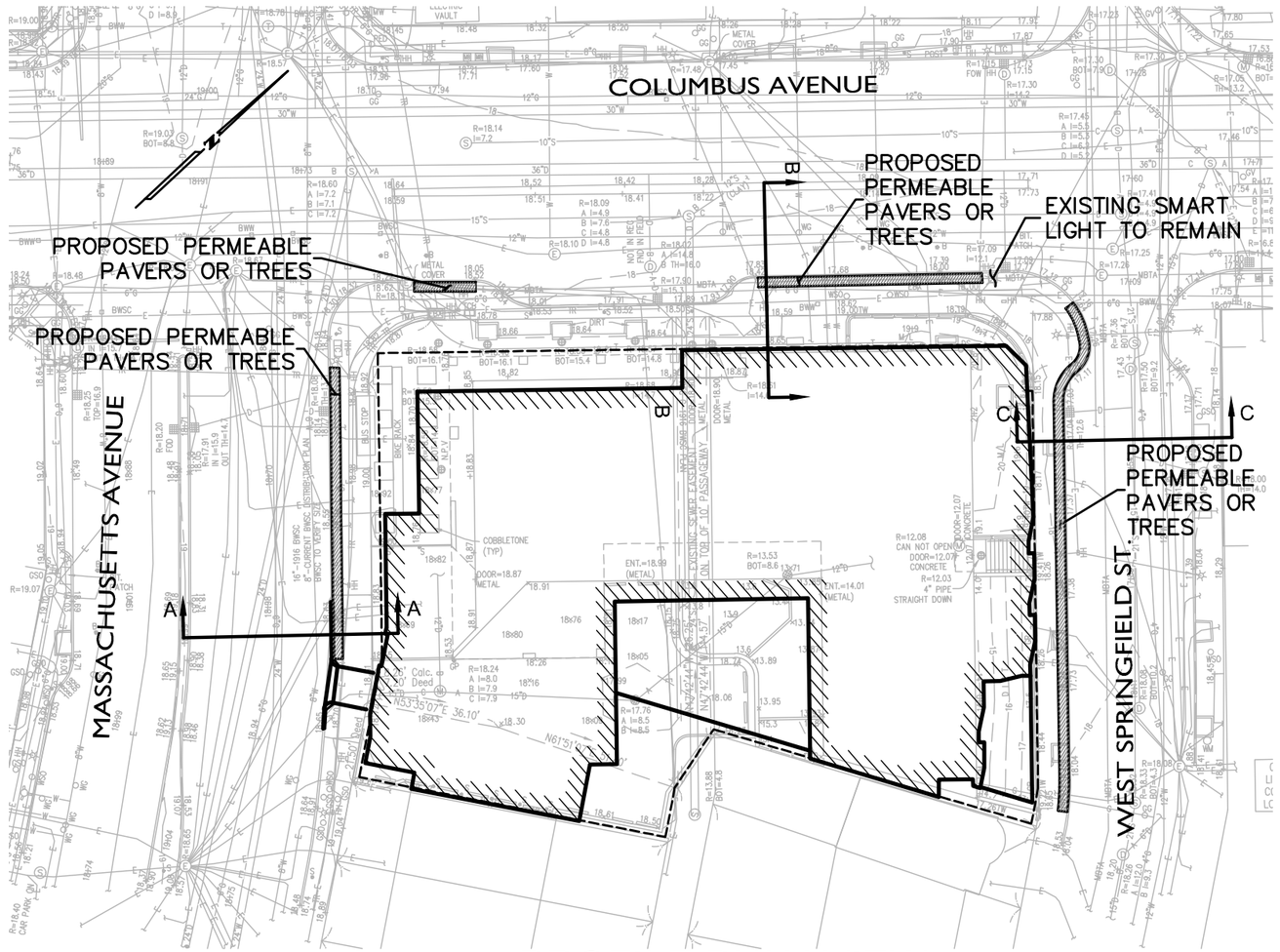
SU-1



UTILITY PROFILE COLUMBUS AVE.
SECTION B-B

HORIZONTAL SCALE SCALE: 1"=20'
VERTICAL SCALE SCALE: 1"=4'

SCALE:
1" = 20'
20 10 0 20 40
4 2 0 4 8
1"=4'



PROFILE PLAN VIEW

SCALE: 1"=40'

NOTE: UTILITY DEPTHS MAY VARY THIS SKETCH IS BASED ON AVAILABLE RECORD INFORMATION AND TYPICAL PRACTICES.

SCALE:
1" = 40'
40 20 0 40 80

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- Transportation Engineering
- Structural Engineering
- Green Infrastructure
- Planning
- GIS

566 COLUMBUS AVENUE REDEVELOPMENT PROJECT

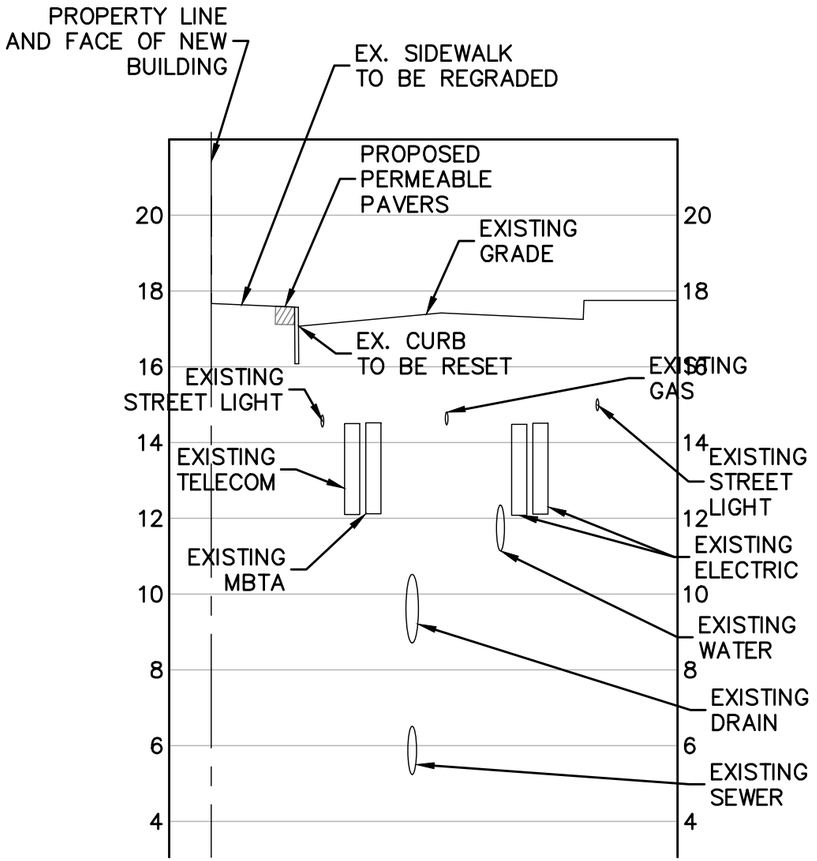
GREEN INFRASTRUCTURE UTILITY PROFILE - COLUMBUS AVE.
566 COLUMBUS AVENUE, BOSTON, MA

PREPARED FOR:
BPDA

PROJECT #	13490
FILE:	13490BPDA.DWG
SCALE:	AS NOTED
DATE:	07/24/2019
PROJECT MGR:	DMD
SURVEYOR:	NITSCH
DRAFTED BY:	ZM
CHECKED BY:	DMD

SHEET:

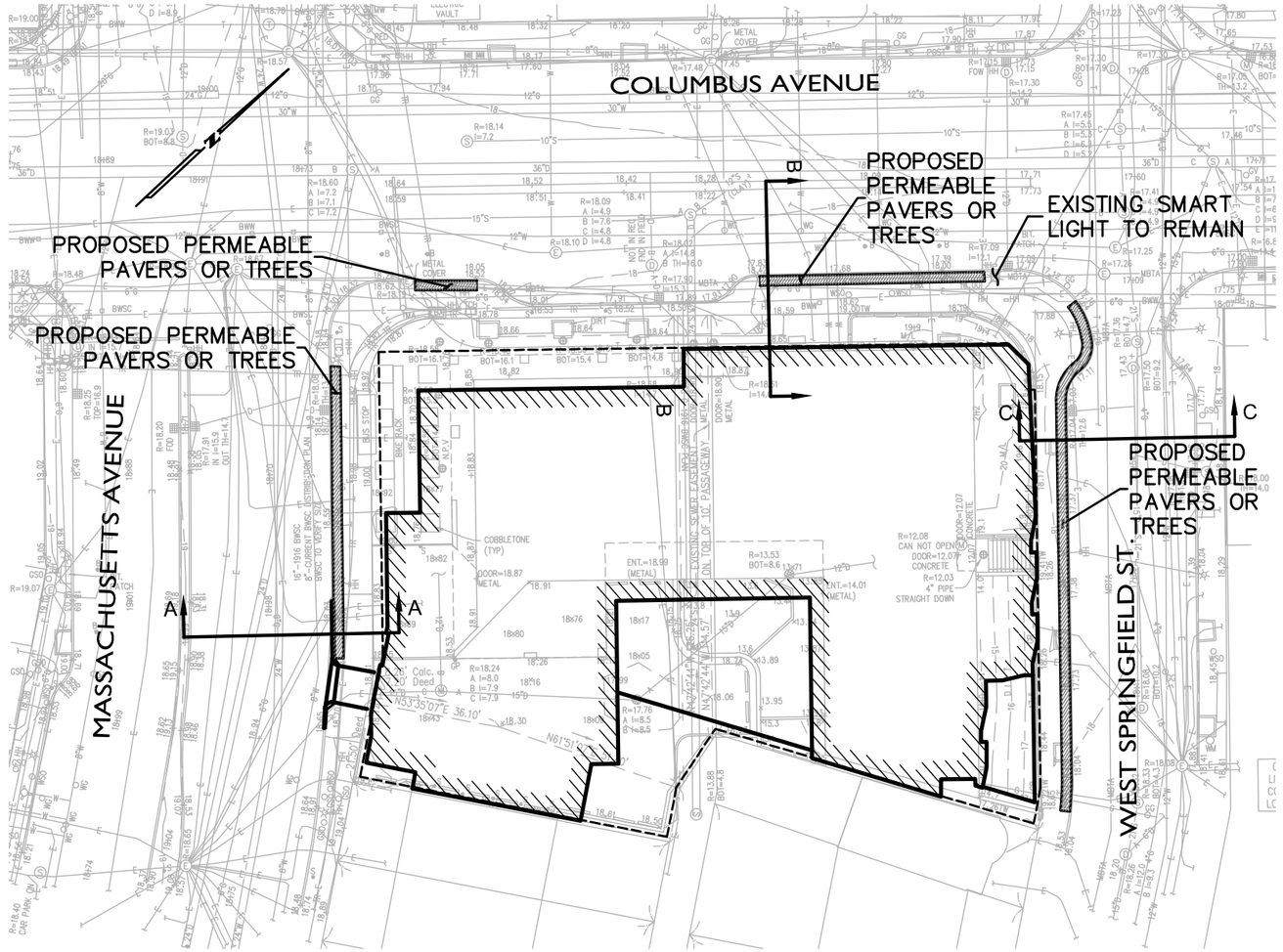
SU-2



UTILITY PROFILE WEST SPRINGFIELD ST.
SECTION C-C

HORIZONTAL SCALE SCALE: 1"=20'
VERTICAL SCALE SCALE: 1"=4'

SCALE:
1" = 20'
20 10 0 20 40
4 2 0 4 8
1"=4'



PROFILE PLAN VIEW

SCALE: 1"=40'

NOTE: UTILITY DEPTHS MAY VARY THIS SKETCH IS BASED ON AVAILABLE RECORD INFORMATION AND TYPICAL PRACTICES.

SCALE:
1" = 40'
40 20 0 40 80

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- Structural Engineering
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- Planning
- GIS

566 COLUMBUS AVENUE REDEVELOPMENT PROJECT

GREEN INFRASTRUCTURE UTILITY PROFILE - W. SPRINGFIELD ST.
566 COLUMBUS AVENUE, BOSTON, MA

PREPARED FOR:
BPDA

PROJECT #	13490
FILE:	13490BPDA.DWG
SCALE:	AS NOTED
DATE:	07/24/2019
PROJECT MGR:	DMD
SURVEYOR:	NITSCH
DRAFTED BY:	ZM
CHECKED BY:	DMD

SHEET:

SU-3

Appendix I

Broadband Ready Checklist

13				*07/29/2019 18:52:38*
		Form Publisher Template		
07/29/2019				

This is a simple template document automatically generated by Form Publisher.
Feel free to personalize it like any other Google Spreadsheet.

Questions list:	
Project Name::	
Project Address Primary: :	
Project Address Additional: :	
Project Contact (name / Title / Company / email / phone): :	
Expected completion date:	
Owner / Developer:	566 Columbus LLC, an affiliate of New Boston Ventures LLC
Architect:	J. GARLAND ENTERPRISES LLC: Design Architect/ BARGMANN HENDRIE & ARCHETYPE INC.: Architect of Record
Engineer (building systems)::	Wozny Barbar & Associates
Permitting::	Epsilon Associates, Inc
Construction Management:	
Number of Points of Entry:	1
Locations of Points of Entry:	Parking deck, east of elevator band
Quantity and size of conduits:	4 four-inc
Location where conduits connect (e.g. building-owned manhole, carrier-specific manhole or stubbed at property line) :	Stubbed at property line
Other information/comments:	
Do you plan to conduct a utility site assessment to identify where cabling is located within the street? This information can be helpful in determining the locations of POEs and telco rooms. Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.:	Yes
Number of risers:	3
Distance between risers (if more than one):	6 inches
Dimensions of riser closets:	Unknown
Riser or conduit will reach to top floor :	Yes
Number and size of conduits or sleeves within each riser:	Three 4 inch
Proximity to other utilities (e.g. electrical, heating):	Adjacent to electric room
Other information/comments:	
What is the size of the telecom room?:	7'-5" x 3'-5", too small
Describe the electrical capacity of the telecom room (i.e. # and size of electrical circuits):	Uknown

Will the telecom room be located in an area of the building containing one or more load bearing walls?:	Unknown			
Will the telecom room be climate controlled? :	Unknown			
If the building is within a flood-prone geographic area, will the telecom equipment will be located above the floodplain?:	Unknown			
Will the telecom room be located on a floor where water or other liquid storage is present?:	Unknown			
Will the telecom room contain a flood drain?:	Unknown			
Will the telecom room be single use (telecom only) or shared with other utilities?:	Unknown			
Other information/comments:				
Will building/developer supply common inside wiring to all floors of the building? :	No			
If yes, what transmission medium (e.g. coax, fiber)? Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.:	Coax & UTP (CAT6)			
Is the building/developer providing wiring within each unit? :	Yes			
If yes, what transmission medium (e.g. coax, fiber)? Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.:	Coax & UTP (CAT6)			
Will the building conduct any RF benchmark testing to assess cellular coverage?:	Unknown			
Will the building allocate any floor space for future in-building wireless solutions (DAS/small cell/booster equipment)?:	Unknown			
Will the building be providing an in-building solution (DAS/ Small cell/ booster)? :	Unknown			
If so, are you partnering with a carrier, neutral host provider, or self-installing?:	Neutral host provider			
Will you allow cellular providers to place equipment on the roof?:	Unknown			
Will you allow broadband providers (fixed wireless) to install equipment on the roof? :	Unknown			
Will you allow broadband providers (fixed wireless) to install equipment on the roof? :	Unknown			
Date contacted:	2019-07-01			
Does Comcast intend to serve the building?:	Yes			
Transmission Medium:	Fiber			
If no or unknown, why?:				
Date contacted:	2019-07-01			
Does RCN intend to serve the building?:	Unknown			
Transmission Medium:	Fiber			

If no or unknown, why?:				
Date contacted:	2019-07-01			
Does Verizon intend to serve the building?:	Yes			
Transmission Medium:	Fiber			
If no or unknown, why?:				
Date contacted:	2019-07-01			
Does netBlazr intend to serve the building?:	Unknown			
Transmission Medium:	Fiber			
If no or unknown, why?:				
Date contacted:	2019-07-01			
Does WebPass intend to serve the building?:				
Transmission Medium:	Fiber			
If no or unknown, why?:				
Date contacted:	2019-07-01			
Does Starry intend to serve the building?:	Unknown			
Transmission Medium:	Fiber			
If no or unknown, why?:				
Do you plan to abstain from exclusivity agreements with broadband and cable providers? :	No			
Do you plan to make public to tenants and prospective tenants the list of broadband/cable providers who serve the building?:	Yes			