EXPANDED PROJECT NOTIFICATION FORM

45 TOWNSEND STREET

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

Submitted by:
KIC Roxbury, LLC 347 Congress Street . Boston, MA 02210

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

In Association with:

BevCo
Ground Inc.
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Studio G Architects
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Haley & Aldrich
Legacy Consultants
GO LOGIC
Howard Stein Hudson
Rubin and Rudman, LLP

July 12, 2017

Epsilon ASSOCIATES INC. 20TH ANNIVERSARY

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Table of Contents

Table of Contents

1.0 INTRODUCTION AND PROJECT DESCRIPTION 1-1
- 1.1 Introduction 1-1
- 1.2 Project Identification and Team 1-3
- 1.3 Project Summary 1-5
  - 1.3.1 Project Guiding Principles 1-5
  - 1.3.2 Project Description 1-5
  - 1.3.3 Proposed Development Program 1-9
  - 1.3.4 Site Access and Neighborhood Connectivity 1-9
  - 1.3.5 Site Improvements 1-10
  - 1.3.6 Summary of Sustainability and Resiliency 1-11
  - 1.3.7 Parking 1-11
  - 1.3.8 Anticipated Project Schedule 1-13
- 1.4 Summary of Public Benefits 1-13
- 1.5 Existing Site and Area Context 1-14
- 1.6 Planning and Zoning 1-19
  - 1.6.1 The Roxbury Strategic Master Plan 1-19
  - 1.6.2 Zoning Controls 1-19
  - 1.6.3 Article 80 Large Project Review 1-21
- 1.7 Legal Information 1-21
  - 1.7.1 Site Control and Easements 1-21
  - 1.7.2 Legal Judgements Adverse to the Proposed Project 1-22
  - 1.7.3 History of Tax Arrears on Property 1-22
- 1.8 Anticipated Permits and Approvals 1-22

2.0 TRANSPORTATION 2-1
- 2.1 Project Description 2-1
  - 2.1.1 Study Area 2-1
  - 2.1.2 Study Methodology 2-3
- 2.2 Existing Condition 2-3
  - 2.2.1 Existing Roadway Conditions 2-3
  - 2.2.2 Existing Intersection Conditions 2-5
  - 2.2.3 Existing Parking 2-7
    - 2.2.3.1 On-Street Parking and Curb Usage 2-7
    - 2.2.3.2 Car Sharing Services 2-7
  - 2.2.4 Existing Traffic Data 2-10
    - 2.2.4.1 Seasonal Adjustment 2-10

Table of Contents (Continued)

	2.2.5	Existing Vehicular Traffic Volumes	2-10
	2.2.6	Existing Bicycle Volumes and Accommodations	2-10
		2.2.6.1 Bicycle Sharing Services	2-14
	2.2.7	Existing Pedestrian Volumes and Accommodations	2-14
	2.2.8	Existing Public Transportation Services	2-14
	2.2.9	Existing (2016) Condition Traffic Operations Analysis	2-18
2.3	No-Build (2023) Condition		2-22
	2.3.1	Background Traffic Growth	2-22
	2.3.2	Specific Development Traffic Growth	2-23
	2.3.3	Proposed Infrastructure Improvements	2-23
	2.3.4	No-Build Traffic Volumes	2-23
	2.3.5	No-Build (2023) Condition Traffic Operations Analysis	2-27
2.4	Build (2023) Condition		2-29
	2.4.1	Site Access and Vehicle Circulation	2-30
	2.4.2	Project Parking	2-30
	2.4.3	Loading and Service Accommodations	2-30
	2.4.4	Trip Generation Methodology	2-32
	2.4.5	Mode Share	2-33
	2.4.6	Project Trip Generation	2-34
	2.4.7	Trip Distribution	2-35
	2.4.8	Build Traffic Volumes	2-35
	2.4.9	Bicycle Accommodations	2-35
	2.4.10	Build Condition Traffic Operations Analysis	2-35
2.5	Transportation Mitigation Measures		2-44
	2.5.1	Build Mitigated Condition Traffic Operations Analysis	2-45
2.6	Transportation Demand Management		2-48
2.7	Evaluation of Short-term Construction Impacts		2-49
3.0	**ENVIRONMENTAL PROTECTION**		**3-1**
3.1	Wind Analysis		3-1
	3.1.1	Introduction	3-1
	3.1.2	Site and Building Information	3-1
	3.1.3	Meteorological Data	3-2
	3.1.4	BPDA Wind Criteria	3-2
	3.1.5	Results	3-7
		3.1.5.1 Existing Pedestrian Wind Conditions	3-7
		3.1.5.2 Future Pedestrian Wind Conditions	3-9
	3.1.6	Summary	3-12
3.2	Shadow Analysis		3-12
	3.2.1	Methodology	3-12
	3.2.2	Vernal Equinox (March 21)	3-13

Table of Contents (Continued)

	3.2.3	Summer Solstice (June 21)	3-13
	3.2.4	Autumnal Equinox (September 21)	3-14
	3.2.5	Winter Solstice (December 21)	3-14
	3.2.6	Conclusions	3-15
3.3	Daylight Analysis		3-30
	3.3.1	Introduction	3-30
	3.3.2	Methodology	3-30
	3.3.3	Results	3-32
	3.3.4	Conclusions	3-37
3.4	Solar Glare		3-37
3.5	Air Quality		3-37
	3.5.1	Introduction	3-37
	3.5.2	National Ambient Air Quality Standards and Background Concentrations	3-37
		3.5.2.1 National Ambient Air Quality Standards	3-38
		3.5.2.2 Background Concentrations	3-39
	3.5.3	Stationary Sources	3-40
	3.5.4	Mobile Sources	3-41
		3.5.4.1 BPDA (BRA) Air Quality Analysis Requirements	3-41
		3.5.4.2 Methodology	3-42
		3.5.4.3 Air Quality Results	3-46
		3.5.4.4 Conclusions	3-46
3.6	Water Quality and Stormwater Management		3-47
3.7	Noise Impacts		3-48
	3.7.1	Introduction	3-48
	3.7.2	Noise Terminology	3-48
	3.7.3	Noise Regulations and Criteria	3-50
	3.7.4	Existing Conditions	3-51
		3.7.4.1 Noise Monitoring Methodology	3-51
		3.7.4.2 Noise Monitoring Locations	3-51
		3.7.4.3 Noise Monitoring Equipment	3-53
		3.7.4.4 Measured Background Noise Levels	3-53
	3.7.5	Future Conditions	3-55
		3.7.5.1 Overview of Potential Project Noise Sources	3-55
		3.7.5.2 Noise Modeling Methodology	3-59
		3.7.5.3 Future Sound Levels – Nighttime	3-59
		3.7.5.4 Future Sound Levels – Daytime	3-60
	3.7.6	Conclusions	3-62
3.8	Geotechnical		3-63
	3.8.1	Soil and Bedrock Conditions	3-63

Table of Contents (Continued)

	3.8.2	Groundwater	3-63
	3.8.3	Foundation Construction Methodology	3-63
3.9	Solid and Hazardous Waste		3-64
	3.9.1	Existing Conditions	3-64
	3.9.2	Solid Waste and Hazardous Waste	3-65
	3.9.3	Recycling	3-65
3.10	Construction Period Impacts		3-65
	3.10.1	Overview	3-65
	3.10.2	Construction Methodology/Public Safety	3-66
	3.10.3	Construction Schedule	3-66
	3.10.4	Construction Staging/Access	3-66
	3.10.5	Construction Mitigation	3-67
	3.10.6	Construction Air Quality	3-67
	3.10.7	Construction Noise	3-69
	3.10.8	Construction Vibration	3-69
	3.10.9	Construction Truck Routes and Deliveries	3-69
	3.10.10	Construction Employment and Worker Transportation	3-70
	3.10.11	Construction Waste	3-70
	3.10.12	Protection of Utilities	3-71
3.11	Rodent Control		3-71
3.12	Wildlife Habitat		3-71
4.0	**SUSTAINABLE DESIGN AND CLIMATE CHANGE RESILIENCE**		**4-1**
4.1	Overview		4-1
4.2	Regulatory Context		4-1
	4.2.1	Article 37	4-1
	4.2.2	BPDA Climate Change Preparedness and Resiliency Policy	4-1
4.3	Project Approach to Sustainability		4-2
4.4	Sustainable Design		4-2
	4.4.1	Building Energy Reduction	4-2
	4.4.2	High Performance Design	4-2
	4.4.3	Water Conservation	4-2
	4.4.4	Indoor Air Quality	4-4
4.5	Climate Change Resilience		4-4
	4.5.1	Introduction	4-4
	4.5.2	Extreme Heat Events	4-4
	4.5.3	Extreme Precipitation Events	4-5
	4.5.4	Drought Conditions	4-5
4.6	Site-Generated Energy		4-5
	4.6.1	Photovoltaics	4-5
	4.6.2	Combined Heat and Power	4-6

Table of Contents (Continued)

4.7 Green Building 4-6
4.7.1 Analysis of LEED Credits 4-7

5.0 URBAN DESIGN 5-1
5.1 Project Context 5-1
5.2 Evolution of Design 5-1
5.2.1 Preliminary Design Concepts 5-1
5.2.2 Current Design 5-2
5.3 Site Constraints 5-18
5.3.1 Urban Design Considerations 5-18
5.4 Building Design and Materials 5-21
5.5 Scale and Building Position 5-21
5.6 Public Realm Improvements 5-21
5.7 Landscape Design 5-22

6.0 COMMUNITY ENGAGEMENT AND PUBLIC BENEFITS 6-1
6.1 Community Engagement 6-1
6.1.1 Community Engagement Activities 6-1
6.1.2 Outreach to Community Leaders 6-1
6.1.3 Engagement with Elected Officials 6-2
6.2 Public Benefits 6-3
6.2.1 Community Benefits 6-3
6.2.2 Community Economic Benefits 6-4

7.0 INFRASTRUCTURE 7-1
7.1 Introduction 7-1
7.2 Wastewater 7-1
7.2.1 Existing Sewer System 7-1
7.2.2 Project Generated Sanitary Sewer Flow 7-1
7.2.3 Sanitary Sewer Connection 7-3
7.2.3.1 Sewer System Mitigation 7-3
7.3 Water System 7-3
7.3.1 Existing Water Service 7-3
7.3.2 Anticipated Water Consumption 7-5
7.3.3 Proposed Water Service 7-5
7.3.3.1 Water Supply Conservation and Mitigation 7-6
7.4 Storm Drainage System 7-6
7.4.1 Existing Storm Drainage System 7-6
7.4.2 Proposed Storm Drainage System 7-6

Table of Contents (Continued)

	7.5	Electrical Service	7-7
	7.6	Telecommunication Systems	7-7
	7.7	Gas Systems	7-7
	7.8	Utility Protection During Construction	7-7
8.0	**HISTORIC AND ARCHAEOLOGICAL RESOURCES**		**8-1**
	8.1	Existing Conditions	8-1
		8.1.1 Historic Resources within the Project Site	8-1
		8.1.2 Historic Resources in the Vicinity of the Project Site	8-3
		8.1.3 Archaeological Resources on the Project Site	8-7
	8.2	Impacts to Historic Resources	8-7
		8.2.1 Demolition of Historic Resources	8-7
		8.2.2 Urban Design	8-7
	8.3	Shadow Impacts	8-8
	8.4	Conclusion	8-8
9.0	**COORDINATION WITH OTHER GOVERNMENTAL AGENCIES**		**9-1**
	9.1	Architectural Access Board Requirements	9-1
	9.2	Massachusetts Environmental Policy Act (MEPA)	9-1
	9.3	Massachusetts Historical Commission State Register Review	9-1
	9.4	Boston Landmarks Commission	9-1
	9.5	Other Permits and Approvals	9-2

List of Figures

Figure 1.1-1	Aerial Locus	1-2
Figure 1.3-1	Proposed Site Layout	1-7
Figure 1.3-2	Site Access and Circulation	1-12
Figure 1.5-1	Existing Buildings	1-15
Figure 1.5-2	Site Topography	1-16
Figure 1.5-3	Area Open Space, Amenities, and Transit	1-17
Figure 1.5-4	Area Amenities	1-18
Figure 1.6-1	Zoning	1-20
Figure 2-1	Study Area Intersections	2-2
Figure 2-2	On-Street Parking Regulations	2-8
Figure 2-3	Car Sharing Services	2-9
Figure 2-4	Existing (2016) Condition Vehicular Traffic Volumes, Weekday a.m. Peak Hou	2-11
Figure 2-5	Existing (2016) Condition Vehicular Traffic Volumes, Weekday p.m. Peak Hour	2-12

List of Figures (Continued)

Figure 2-6	Existing (2016) Condition Bicycle Volumes, Weekday a.m. and p.m. Peak Hours	2-13
Figure 2-7	Bicycle Sharing Locations	2-15
Figure 2-8	Existing (2016) Condition Pedestrian Volumes, Weekday a.m. and p.m. Peak Hours	2-16
Figure 2-9	Public Transportation	2-17
Figure 2-10	Specific Background Project Locations	2-24
Figure 2-11	No-Build (2023) Condition Vehicular Traffic Volumes, Weekday a.m. Peak Hour	2-25
Figure 2-12	No-Build (2023) Condition Vehicular Traffic Volumes, Weekday p.m. Peak Hour	2-26
Figure 2-13	Site Access Plan	2-31
Figure 2-14	Trip Distribution Entering	2-36
Figure 2-15	Trip Distribution Exiting	2-37
Figure 2-16	Vehicle Trip Assignment, Weekday a.m. Peak Hou	2-38
Figure 2-17	Vehicle Trip Assignment, Weekday p.m. Peak Hour	2-39
Figure 2-18	Build (2023) Condition Vehicular Traffic Volumes, Weekday a.m. Peak Hour	2-40
Figure 2-19	Build (2023) Condition Vehicular Traffic Volumes, Weekday p.m. Peak Hour	2-41
Figure 3.1-1	Proposed Site Plan	3-3
Figure 3.1-2	Meteorological Data	3-4
Figure 3.1-3	General Wind Flow Phenomena Around Buildings	3-6
Figure 3.1-4	On-Site Wind Flow Patterns	3-8
Figure 3.1-5	Main Entrances and Accessible Outdoor Areas	3-10
Figure 3.2-1	Shadow Study - March 21, 9:00 a.m.	3-16
Figure 3.2-2	Shadow Study - March 21, 12:00 p.m.	3-17
Figure 3.2-3	Shadow Study - March 21, 3:00 p.m.	3-18
Figure 3.2-4	Shadow Study - June 21, 9:00 a.m.	3-19
Figure 3.2-5	Shadow Study - June 21, 12:00 p.m.	3-20
Figure 3.2-6	Shadow Study - June 21, 3:00 p.m.	3-21
Figure 3.2-7	Shadow Study - June 21, 6:00 p.m.	3-22
Figure 3.2-8	Shadow Study - September 21, 9:00 a.m.	3-23
Figure 3.2-9	Shadow Study - September 21, 12:00 p.m.	3-24
Figure 3.2-10	Shadow Study - September 21, 3:00 p.m.	3-25
Figure 3.2-11	Shadow Study - September 21, 6:00 p.m.	3-26
Figure 3.2-12	Shadow Study - December 21, 9:00 a.m.	3-27
Figure 3.2-13	Shadow Study - December 21, 12:00 p.m.	3-28
Figure 3.2-14	Shadow Study - December 21, 3:00 p.m.	3-29
Figure 3.3-1	Viewpoint and Area Context Viewpoints	3-31
Figure 3.3-2	Existing Conditions	3-34

List of Figures (Continued)

Figure 3.3-3	Proposed Conditions	3-35
Figure 3.3-4	Area Context Conditions	3-36
Figure 3.5-1	Intersection of Washington Street, Marcella Street, and Brinton Street	3-45
Figure 3.7-1	Noise Measurement Locations	3-52
Figure 3.7-2	Noise Modeling Locations	3-61
Figure 4.4-1	Sustainable Site Design	4-3
Figure 5.2-1	Townsend Street Perspective – Existing Conditions	5-3
Figure 5.2-2	Townsend Street Perspective – Entry	5-4
Figure 5.2-3	Townsend Street (West) Perspective – Existing Conditions	5-6
Figure 5.2-4	Townsend Street Perspective – Lobby and Café	5-7
Figure 5.2-5	Townsend Street (East) Perspective – Existing Conditions	5-8
Figure 5.2-6	Townsend Street Townhouses	5-9
Figure 5.2-7	Harrishof – Existing Conditions	5-10
Figure 5.2-8	Dennison Street Perspective	5-11
Figure 5.2-9	Harrishof Street Perspective – Existing Conditions	5-12
Figure 5.2-10	Harrishof Street Perspective	5-13
Figure 5.2-11	Harrishof Lobby	5-14
Figure 5.2-12	Dennison Sidewalk View	5-15
Figure 5.2-13	Harrishof Street Approach – Existing Conditions	5-16
Figure 5.2-14	Harrishof Street Approach – Proposed Conditions	5-17
Figure 5.2-15	Amenity Spine	5-19
Figure 5.7-1	Proposed Landscape Plan	5-24
Figure 7-1	BWSC Sewer System Map	7-2
Figure 7-2	Proposed Sanitary Sewer System	7-4
Figure 8-1	Historic Resources Map	8-4

List of Tables

Table 2-1	Existing Public Transportation Service Summary	2-18
Table 2-2	Vehicle Level of Service Criteria	2-18
Table 2-3	Existing (2016) Condition, Capacity Analysis Summary, a.m. Peak Hour	2-20
Table 2-4	Existing (2016) Condition, Capacity Analysis Summary, p.m. Peak Hour	2-21
Table 2-5	No-Build (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour	2-27
Table 2-6	No-Build (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour	2-28
Table 2-7	Expected Delivery Activity	2-30

List of Tables (Continued)

Table 2-8	Travel Mode Share	2-33
Table 2-9	Project Trip Generation	2-34
Table 2-10	Build (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour	2-42
Table 2-11	Build (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour	2-43
Table 2-12	Build Mitigated (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour	2-45
Table 2-13	Build Mitigated (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour	2-46
Table 3.1-1	Boston Planning and Development Agency Mean Wind Criteria*	3-5
Table 3.3-1	Daylight Analysis Results	3-32
Table 3.5-1	National (NAAQS) and Massachusetts (MAAQS) Ambient Air Quality Standards	3-38
Table 3.5-2	Observed Ambient Air Quality Concentrations and Selected Background Levels	3-40
Table 3.5-3	Summary of Microscale Modeling Analysis (Existing 2016)	3-46
Table 3.5-4	Summary of Microscale Modeling Analysis (No-Build 2023)	3-47
Table 3.5-5	Summary of Microscale Modeling Analysis (Build 2023)	3-47
Table 3.7-1	City Noise Standards, Maximum Allowable Sound Pressure Levels	3-50
Table 3.7-2	Summary of Measured Background Noise Levels – February 14, 2017 (Daytime) & February 15, 2017 (Nighttime)	3-54
Table 3.7-3	Modeled Noise Sources	3-56
Table 3.7-4	Modeled Sound Power Levels per Noise Source	3-57
Table 3.7-5	Noise Controls and Attenuation by Source	3-58
Table 3.7-6	Comparison of Future Predicted Project-Only Nighttime Sound Levels to the City of Boston Limits	3-60
Table 3.7-7	Comparison of Future Predicted Project-Only Daytime Sound Levels to City of Boston Noise Standards	3-62
Table 6.1-1	Community Outreach Meetings	6-2
Table 6.1-2	Elected Officials Outreach Meetings	6-3
Table 7-1	Projected Sanitary Sewer Flows	7-3
Table 8-1	State and National Register Resources in the Vicinity of the Project Area	8-3

List of Appendices

Appendix A Letter of Intent
Appendix B Site Survey
Appendix C Transportation
Appendix D Air Quality
Appendix E Climate Change Checklist
Appendix F Letters of Support
Appendix G Floor Plans
Appendix H Sections and Elevations
Appendix I Accessibility Checklist

Chapter 1.0

General Information and Project Description

1.0 INTRODUCTION AND PROJECT DESCRIPTION

1.1 Introduction

KIC Roxbury, LLC (the Proponent) proposes the redevelopment of the former Radius Specialty Hospital parcels in the Washington Park South neighborhood of Roxbury. The site consists of three contiguous parcels of land located at 45-47 Townsend Street (collectively, the Project Site), as shown on Figure 1.1-1. The redevelopment includes the demolition of the existing structures and the construction of a five to seven and one half story multi-wing, mixed-use building with ground-floor community gathering space, including a 1,000 square foot (sf) art gallery and function space, 1,500 square foot neighborhood café, 3,000 sf of co-working space, approximately 322 residential units and associated amenity space, and enclosed parking for approximately 217 vehicles (the Project). The Project will provide new open spaces, of which approximately 31,000 sf is accessible by the community, residential and neighborhood amenities, and a substantially improved streetscape and pedestrian experience along the Townsend Street corridor abutting the Project Site.

The Project will serve to reactivate the formerly institutional and now-dormant site with residential and community uses. Where the existing Site's conditions impose upon abutting parcels and the neighborhood, the Project has been thoughtfully designed to more appropriately integrate with the surrounding community. The Proponent has also taken the opportunity to create much needed housing in close proximity to public transportation while integrating community resources into the Project design.

The Project provides a number of public benefits, including new housing enriched by amenity spaces, off-site affordable home ownership units in compliance with the City's Inclusionary Development Policy (IDP), a community art gallery and function space, a locally-owned café, co-working space for local businesses and entrepreneurs, as well as new on-site open spaces, landscaping, and increased tax revenues. The Project's sustainability goals include certifiability at the Silver level under U.S. Green Council's (USGBC) Leadership in Energy and Environmental Design (LEED) v4 for BD+C: New Construction and Major Renovation rating system (LEED v4) [1], and focusing on strategies for significantly reducing energy consumption through both conservation and on-site generation. The Project will provide a healthy living environment for residents through the application of Passive House principles for building envelope and systems and, to the extent practical, the utilization of Living Building Challenge goals.

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

[1] The Project has applied for Certification at the Gold Level under LEED Version 3.

45 Townsend Street Boston, Massachusetts

Epsilon ASSOCIATES INC.

Figure 1.1-1

Aerial Locus Map

1.2 Project Identification and Team

The Proponent has assembled a diverse and community focused development Team which embodies the focus of the Lewis Family Foundation's long history of investing in and supporting Roxbury-based organizations. The Lewis Family Foundation, the philanthropic arm of the Proponent, has donated over $16 million to Roxbury, Dorchester and Mattapan non-profits with the key goals of i) doubling college graduation rates, and ii) Creating 500 jobs for youth with an average salary of $38,000 annually. The Foundation has been investing in Roxbury long before this project was conceived, and its investment will continue far beyond the completion of this Project. As part of their investment, the Proponent believes that the Project will generate substantial long-term community benefits within the neighborhood.

The Project team consists of:

Name /Location:	45 Townsend Street, Roxbury
Proponent:	KIC Roxbury, LLC 347 Congress Street Boston, Massachusetts 02210 Charlotte Lewis Kurt Therrien
Architect:	Studio G Architects The Brewery 179 Boylston Street Jamaica Plain, MA 02130 (617) 524-5558 Gail Sullivan, AIA Greg Smith, AIA Keihly Moore, LEED Green Associate D/R/E/A/M Collaborative LLC 236 Huntington Avenue, Suite 303 Boston, MA 02115 (617) 606-7029 Gregory Minot, AIA GO LOGIC PO Box 567 137 High Street, 3rd floor Belfast, Maine 04915 (207) 338-1566 Matt O'Malia

Landscape Architect:	Ground Inc. 6 Carlton Street Somerville, MA 02143 (617) 718-0889 Shauna Gillies-Smith
Legal Counsel:	Rubin and Rudman, LLP 50 Rowes Wharf Boston, Massachusetts 02110 (617) 330-7000 James H. Green, Esq.
Permitting Consultant:	Epsilon Associates, Inc. 3 Mill & Main, Suite 250 Maynard, MA 01754 (978) 897-7100 Cindy Schlessinger Douglas Kelleher Erik Rexford Fiona Vardy
Noise & Air Quality Analysis	Epsilon Associates, Inc. 3 Mill & Main, Suite 250 Maynard, MA 01754 (978) 897-7100 Richard Lampeter Clint Cyr Vincent Tino
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Civil Engineer:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 James Downing, PE
Transportation and Parking Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Brien J. Beisel, PTP Andrew Fabiszewski
Geotechnical Engineer:	Haley & Aldrich, Inc. 465 Medford Street Suite 2200 Boston, MA 02129 (617) 886-7400 Marya Gorczyca Denis Bell
Pre-Construction Services and Construction Management	JANEY, Co. 236 Huntington Avenue, Suite 417 Boston, MA 02115 (617) 267-6200 Greg Janey Bob White

1.3 Project Summary

1.3.1 Project Guiding Principles

The Proponent's vision for the Project is centered on creating exceptional value for future residents and establishing meaningful new connections between the Project Site and the surrounding neighborhood. To that end, the Project's guiding principles include the creation of housing that is enriched by amenity spaces and a community of residents. Through these guiding principles, the Proponent strives to provide a healthy living environment for residents while establishing a deeply sustainable and resilient Project.

1.3.2 Project Description

As noted above, the Project includes the demolition of the Radius Specialty Hospital structures, last occupied in 2014, and the removal of much of the former hospital's surface parking.

The Project includes approximately 380,000 sf of new structures with approximately 322 residential units organized into three residential wings that are connected by a spine of amenity spaces, as shown on Figure 1.3-1. The building wings vary in height from five stories to seven-and-a-half stories and, to minimize site disturbances during construction, are situated to make use of previously developed and excavated areas of the Site.

The Project includes approximately 4,500 sf of ground floor commercial space within the Townsend wing, comprised of a locally owned café and a co-working space for local entrepreneurs and businesses. The 1,000 sf Atrium Gallery is located at the second level of the Townsend wing. The Project also includes approximately 13,000 sf of indoor amenity space for residents, in addition to exterior decks, lawn and gathering spaces, a pool, and a landscaped green roof over the proposed parking garage.

Approximately 217 resident parking spaces are located in a three-story parking garage and three publicly accessible outdoor parking spaces reserved for Zipcar will be located at the Harrishof Plaza. Approximately three additional accessible and short-term parking spaces may be made available at Harrishof Plaza. An interior storage space for resident bikes will be provided for each residential unit, and bike racks will be conveniently located around the Site. The Proponent is also evaluating potential locations for a new Hubway bikeshare station.

The Site's topography presents unique redevelopment challenges that are overcome by the thoughtful design of the three residential wings interconnected by the Amenity Spine, as described below.

Townsend - The five-story, approximately 82,850 sf Townsend wing replaces the existing six-story Kaplan Building and the adjacent five-story Nurses' Residence. The Townsend wing parallels Townsend Street, following its curvature along much of the Project Site. The Townsend lobby is located at the center of the Townsend wing and serves as the main entrance to the Project. Just off the lobby, to the west, are the 1,500 sf local café and 3,000 sf co-working space. Residential townhouses are located at the eastern side of Townsend. The Atrium Gallery is located on the second floor.

Codman - The six-story approximately 77,000 sf Codman wing, situated behind the Townsend wing, replaces an existing hospital structure and occupies portions of what is currently a surface parking lot. Codman is accessed through the main entry lobby at Townsend.

45 Townsend Street **Boston, Massachusetts**

Figure 1.3-1
Proposed Site Layout

Harrishof - The approximately seven-and-a-half-story, 162,000 sf Harrishof wing is located at the top of the Site, partially on the location of an existing parking lot. The structure curves in the easterly direction to a position currently occupied by the former hospital's main entrance. A second entry lobby is located in the Harrishof wing adjacent to the Harrishof Plaza. The Plaza can be used for seasonal community events and serves as a passenger drop off area. The Harrishof wing also features a small roof-top deck with views toward Boston's skyline.

Amenity Spine - An amenity spine connects the residential wings at multiple floor levels with a series of shared spaces. A five-story atrium rises from the Townsend lobby and overlooks a green roof at the second level. An open stair links the Townsend lobby to the second floor where the approximately 1,000 sf Atrium Gallery will display local artists' work and provide flexible space for community events and other programming to be organized by building management. The Amenity Spine provides access to the parking garage at the second, third, and fourth floors, and to the Zen Garden Courtyard and green roof located over the proposed parking garage.

Resident Amenities - The Project offers residents approximately 13,000 sf of interior amenity space and 57,000 sf of exterior open space. The Townsend lobby has direct access to the neighborhood café and co-working space and its five-story atrium connects to the Atrium Gallery and a business networking center located at the second floor, as well as the Zen Garden Courtyard at the third floor. The atrium allows ample daylight from the north and, at the upper levels, from the south. The atrium also features star-like skylights in the roof.

The heart of the 45 Townsend community will be the Amenity Spine's fifth floor gathering spot, which includes a large community kitchen and dining area, lounges, dog grooming room, games room, and health club, and equipment and yoga space. These interior spaces wrap around and open to the south facing green roof located above the garage. The green roof provides patios and a pool for use by residents.

The fifth floor of the Amenity Spine also serves as a central hub that connects teach of the residential wings. This inviting space will be used by residents to exercise, read, meet, cook, relax, and socialize.

1.3.3 Proposed Development Program

Project Element	Approximate Dimension
Residential	361,500 sf*
Rental Units	322
Bedroom Count	418
Interior Residential Amenity	13,000 sf
Café	1,500 sf
Co-Working	3,000 sf
Atrium Gallery	1,000 sf
Total Square Footage	380,000 sf
Building Height	Up to 88 feet
Parking[+]	220 spaces

* sf calculations are consistent with gross floor area as defined by Section 2 of the Code.

[+] Three spaces reserved for Zipcar.

1.3.4 Site Access and Neighborhood Connectivity

The Project maintains Site access from both Townsend and Harrishof streets, though both entrances will be realigned to make more efficient use of the Site, and to provide a more welcoming entrance. Along Townsend Street there will be multiple points of pedestrian and bicycle access. An existing curb cut at the center of the Townsend Street frontage will be eliminated and a single curb cut will provide access to a loading and service area as well as parking at the lowest garage level of the Townsend wing. The entrance from Townsend Street serves as a publicly accessible two-way drive linking Townsend and Harrishof streets. The former hospital's gates at the Townsend Street entrance will be removed.

Near the top of the site, where Harrishof Street currently terminates at the property line, the Project will continue the Harrishof Street sidewalk and vehicle access onto the Site, creating a connection to Harrishof Plaza for passenger drop off, loading, and emergency vehicles access and turn around. Harrishof Plaza can also host neighborhood events such as block parties and barbecues, farmers' markets, and craft fairs.

Dennison Street is currently closed off from the Site by a rubble wall, and a new accessible pedestrian path linking Dennison Street to the Harrishof Plaza will be created. Adjacent to the Harrishof Plaza is a community orchard and garden, featuring plantings of fruit trees including Roxbury Russet apples, Bartlett Pears (developed in Dorchester), and other local fruit hybrids. The garden will include garden beds for strawberries and blueberries, in addition to gardening beds available to the community, public benches, and a walking path linking Dennison and Harrishof Streets to the orchard.

As noted above, the Townsend wing includes a neighborhood café and a co-working space. The neighborhood café, as the name suggests, is open to the public, but also has direct access from the residential lobby and the adjacent co-working space. The co-working space will support local businesses and entrepreneurs with shared meeting and work space, and other support services for small and growing businesses. The café, co-working space, and lobby share a large exterior patio at the Townsend Street side of the building. A second, smaller patio located on the interior of the Project Site is available for residents' use. The Atrium Gallery, located at the second floor of Townsend, offers space for art exhibits, neighborhood events, and community meetings. The Gallery overlooks a five-story atrium and will have an approximate occupancy of 50 people. In coordination with on-site management, this space will be made available to both residents and community members. The atrium will be lit from a series of skylights above as well as a north-facing cut out in the Townsend façade, and a south-facing glass wall at the top.

1.3.5 Site Improvements

Approximately 62% of the Site is currently covered by buildings and asphalt. Upon completion, impervious surface, including buildings, will be reduced to 34% of the total Project Site. As mentioned above, there are two curb cuts on Townsend Street that currently provide vehicle access to the Site. The Project proposes to reduce Site access to single curb cut on Townsend Street, thus adding on-street parking spaces and creating an improved streetscape.

Currently there is limited landscaping on the Site, and the Project will vastly improve landscaping, particularly along the Townsend Street frontage. Improvements include street trees and low shrubs as well as new puddingstone retaining walls, stairs and Americans with Disabilities Act (ADA) compliant walkways. Densely planted landscape buffers will be provided along property lines abutting residential neighbors, including at the eastern and western sides of Townsend, along the driveway between Townsend and Harrishof streets, and along the property line with Harrishof and Dennison streets.

Below-grade utilities are planned for the approximately 400 feet of frontage along Townsend Street, and the sidewalk, curb, and deteriorated retaining wall along the rear of the sidewalk will be replaced.

Outdoor lighting fixtures that minimize glare, light trespass, and night sky light pollution will be employed where feasible. The Site's exterior lighting plan has been carefully designed to avoid directing light onto neighboring parcels.

There is currently minimal stormwater management on the Site. The Project proposes to increase storm water retention by an approximate minimum of 6,800 cubic feet (cf) through the use of terraced rain gardens located at the face of the parking structure and other vegetated areas, including at the corner of the Site adjacent to Harrishof Street. The garage rain gardens additionally provide a visually pleasing planting screen for the structure. A

rain water collection system is planned for below the surface of the Zen Courtyard Garden, along the Townsend Street townhome entries, and below the Harrishof Plaza. Rain water will be utilized for irrigation of the green roof and other plantings and landscaping.

1.3.6 Summary of Sustainability and Resiliency

The Project strives to create a sustainable and healthy residential community which, in turn, complements the broader Washington Park South neighborhood. In demonstrating compliance with Article 37 of the Code, the Project's sustainability goals include constructing a LEED certifiable Project that substantially reduces energy consumption and that provides a healthy living environment for residents. The Project includes on-site renewable energy and is evaluating purchasing additional electricity from renewable sources. Analyses of the physical and financial feasibility for on-site combined heat and power (CHP), solar photovoltaic (PV) and thermal systems, new distributed electrical and thermal energy, and micro-grid systems are being conducted.

Application of Passive House principles for building envelope and systems, and Living Building Challenge goals will be utilized to the extent practical. The proposed design features passive solar strategies and a highly insulated envelope that minimizes the building's energy consumption. At strategic locations, the building has deep roof overhangs that reduce solar gain and increase roof-top area available for the installation of solar PV systems. An extensive vegetated roof system with a solar PV array will be installed to the south and east of the Harrishof viewing deck. Large windows provide ample daylight to all residential units and, as noted above, solar shading will be utilized at large glazed areas at the lobbies and amenity spaces to minimize unwanted solar gain. The building enclosure includes optimized envelope insulation, tight air sealing, and little or no thermal bridging. Lighting systems include energy efficient LED fixtures and EnergyStar rated or other highly efficient appliances will be installed.

1.3.7 Parking

A total of 217 parking spaces will be provided on three levels of structured parking for residents' vehicles. As shown on Figure 1.3-2, loading and delivery facilities are available at the first parking level below the Townsend wing and are accessed from the Townsend Street entry drive. Access to first and second levels of the parking garage is from the two-way drive connecting Townsend and Harrishof streets. Access to the third parking level is from Harrishof Plaza, where a second loading and delivery area is also provided. Publicly accessible parking spaces for a car-sharing program will also be provided at the Harrishof Plaza. Bicycle storage for one space per residential unit is provided at two locations on the Project Site; a large storage facility at the Harrishof Street entrance, and a smaller facility along Townsend Street. Each bicycle storage room has a small bike repair station.

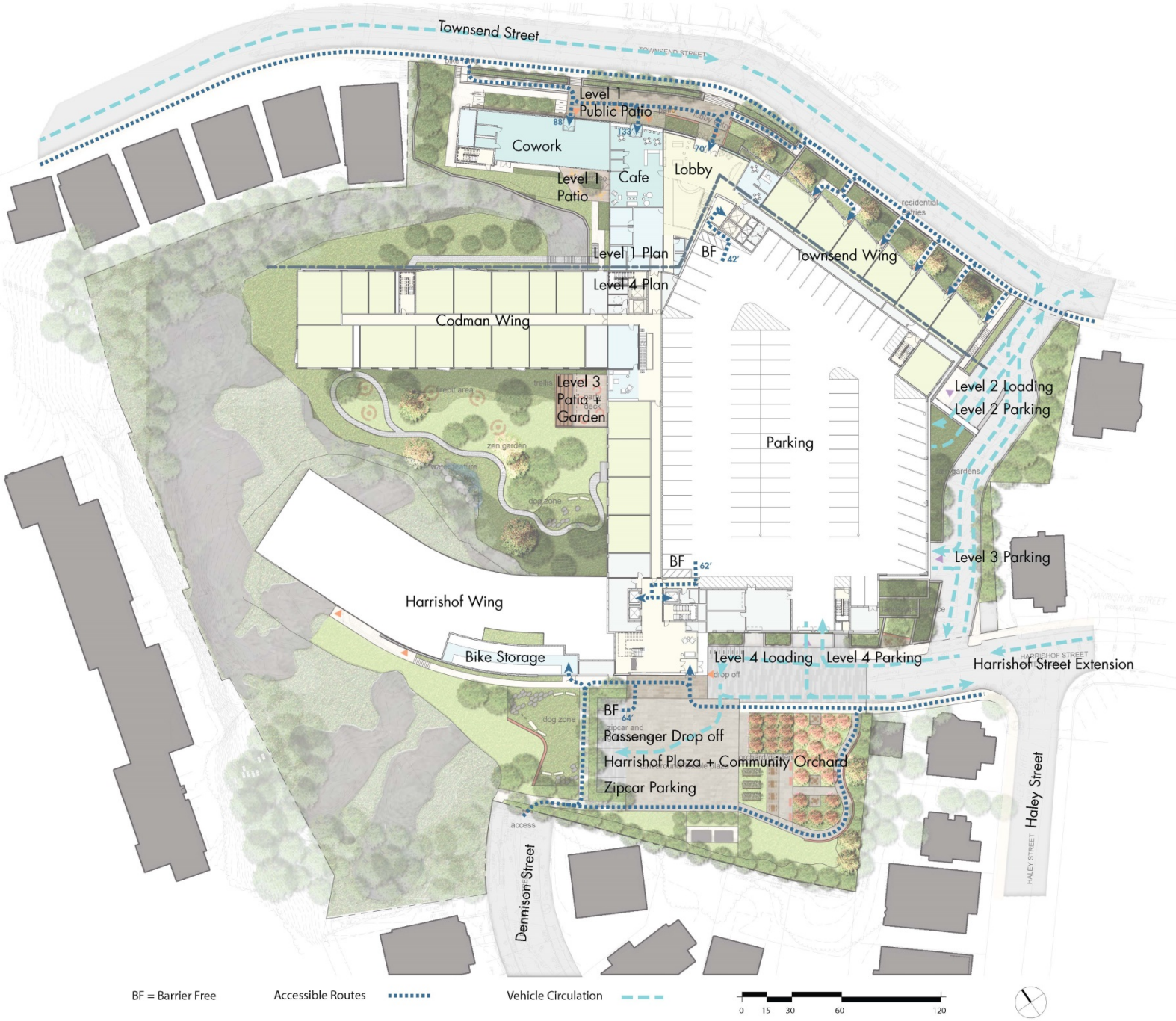

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Figure 1.3-2
Site Access and Circulation

1.3.8 Anticipated Project Schedule

Construction of the Project is estimated to commence in 2019 and conclude by 2021

1.4 Summary of Public Benefits

The Project will generate numerous 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. A more detailed description of public benefits is included in Chapter 6, including community economic benefits and neighborhood access and connectivity.

Smart Growth/Transit-Oriented Development - The Project is consistent with smart-growth and transit-oriented development principles. The Project Site is well served by existing public transportation, including major regional rapid transit, commuter rail, and bus lines that provide easy access to the Project Site from the Greater Boston region. Depending on demand for such a service, a shuttle from 45 Townsend to the Jackson Square MBTA Station may be incorporated into the programming.

Affordable Housing -The Proponent will comply with the Inclusionary Development Policy through the creation of an off-site income restricted homeownership project within walking distance of the Project. The Proponent has been working with Windale Developers, Inc. and Nuestra Comunidad Development Corporation in a joint effort to create 45 affordable home ownership units at Bartlett Yards, which is consistent with the goals of the Roxbury Strategic Master Plan to increase wealth through home ownership opportunities in the Roxbury neighborhood.

Improved Street and Pedestrian Environment - The Project will activate an underutilized, formerly institutional site with enhanced streetscapes that include landscaped sidewalks and new, publicly accessible open spaces located throughout the Project Site.

Sustainable Design/Green Building - The Proponent is committed to building a LEED certified project with a target of the Silver level under the LEED v4 rating system and Certification at the Gold level under LEED LEED v3, incorporating sustainable design features into the Project to preserve and protect the environment. The Project will deploy on-site renewable generation equipment, including a solar PV array.

Increased Employment - The Project will create approximately 500 construction jobs and approximately 18 permanent jobs upon stabilization. The inclusion of co-working, meeting/networking, and other community gathering spaces provides valuable support to local small businesses and entrepreneurs, as will anticipated annual local vendor contracts for landscaping, electrical, plumbing, and heating, ventilation, and air conditioning (HVAC) services.

Community Resources – In addition to the co-working and other networking spaces, the Project provides a neighborhood-scale café space, art gallery, and community meeting spaces, as well as publicly accessible open space located throughout the Project Site.

Community Economic Benefits – The Project will increase neighborhood market value, provide continued support of Roxbury based organizations and includes a diverse Project team.

1.5 Existing Site and Area Context

The approximately 4.85-acre (approximately 211,272 sf) Site is comprised of three parcels of land located to the west of Townsend Street. The Project Site is the former location of the Jewish Memorial Hospital and Rehabilitation Center, most recently operated by Radius Specialty Hospital until its closure in 2014. The former hospital buildings are currently vacant and will be demolished as part of the Project. The parcels front on Townsend Street, but also face the ends of Harrishof and Dennison streets at the rear of the Site (Figure 1.5-1). The Project Site is located between Washington and Walnut streets, two blocks south of Martin Luther King Boulevard.

The Site features ledge and prominent rock outcroppings and an elevation change of approximately 50 feet from the Townsend Street sidewalk to the top of the Site near Dennison Street. The rock outcroppings at some locations rise ten to twenty feet above the normative grade. A rock shoulder at the west side of the Site rises steeply above the grade then drops approximately 30 feet to Codman Park, located at the rear of the adjacent Academy Homes II development. The Project has been designed to minimize disturbances to the ledge to the greatest extent feasible. Site topography is shown on Figure 1.5-2.

As shown on Figure 1.5-3, the Project Site is in close proximity to a variety of neighborhood amenities, including Horatio Harris Park, located one half of a block to the east; Malcolm X Park, located two blocks to the northeast; Crawford Street and Ellis School Playgrounds, located three blocks to the south; and Marcella Playground is approximate one half mile to the north. The Seaver Street side of Franklin Park is also located approximately one half mile from the Project Site. The Southwest Corridor Park and bike path are also accessible at Jackson Square, and serve to link Townsend Street to Back Bay and Forest Hills.

Local schools include the Higginson-Lewis K-8 School at 131 Walnut Avenue, the David A. Ellis School at 302 Walnut Avenue, the Trotter Elementary School at 135 Humboldt Avenue, and Boston Latin Academy at 205 Townsend Street.

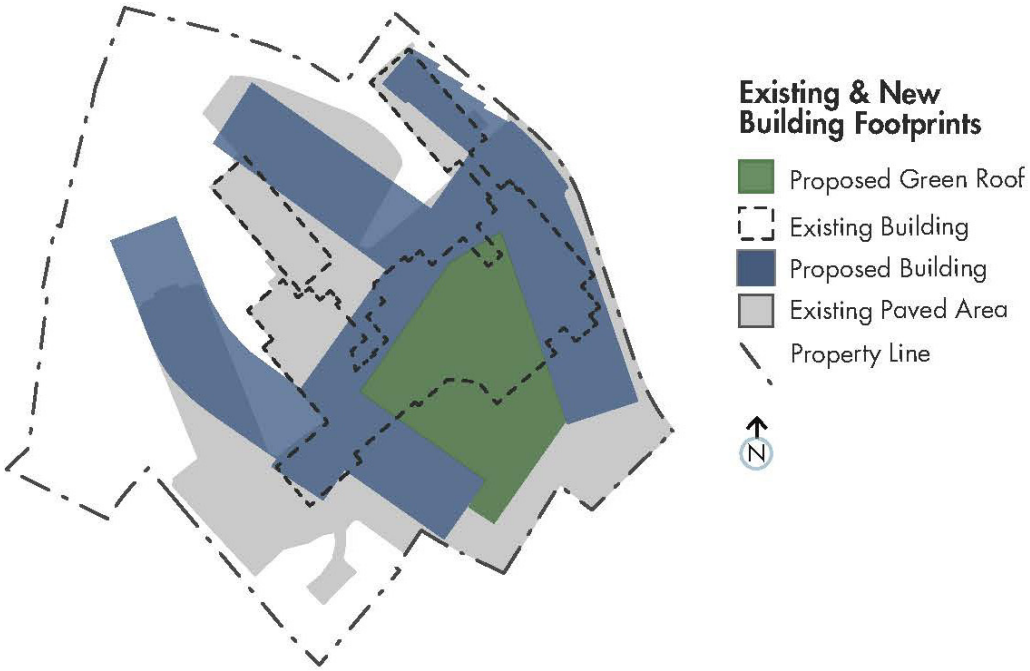
Nearby cultural resources include the Museum of National Center of Afro-American Artists, the Melnea Cass Recreational Complex including Shelburne Community Center, and the Reggie Lewis Track Center. The Roxbury YMCA is also in close proximity to the Project Site. Nearby, Dudley Square offers a branch of the Boston Public Library, the Boston Public School headquarters, restaurants, diverse business opportunities, and cultural events. The

Brewery Complex in Jamaica Plain is 0.9 miles away, offering a variety of businesses, a fitness center, and arts and cultural programming. Nearby amenities are shown on Figure 1.5-4.

Photo credit: Peter Vanderwarker

45 Townsend Street Boston, Massachusetts

Figure 1.5-1
Existing Buildings



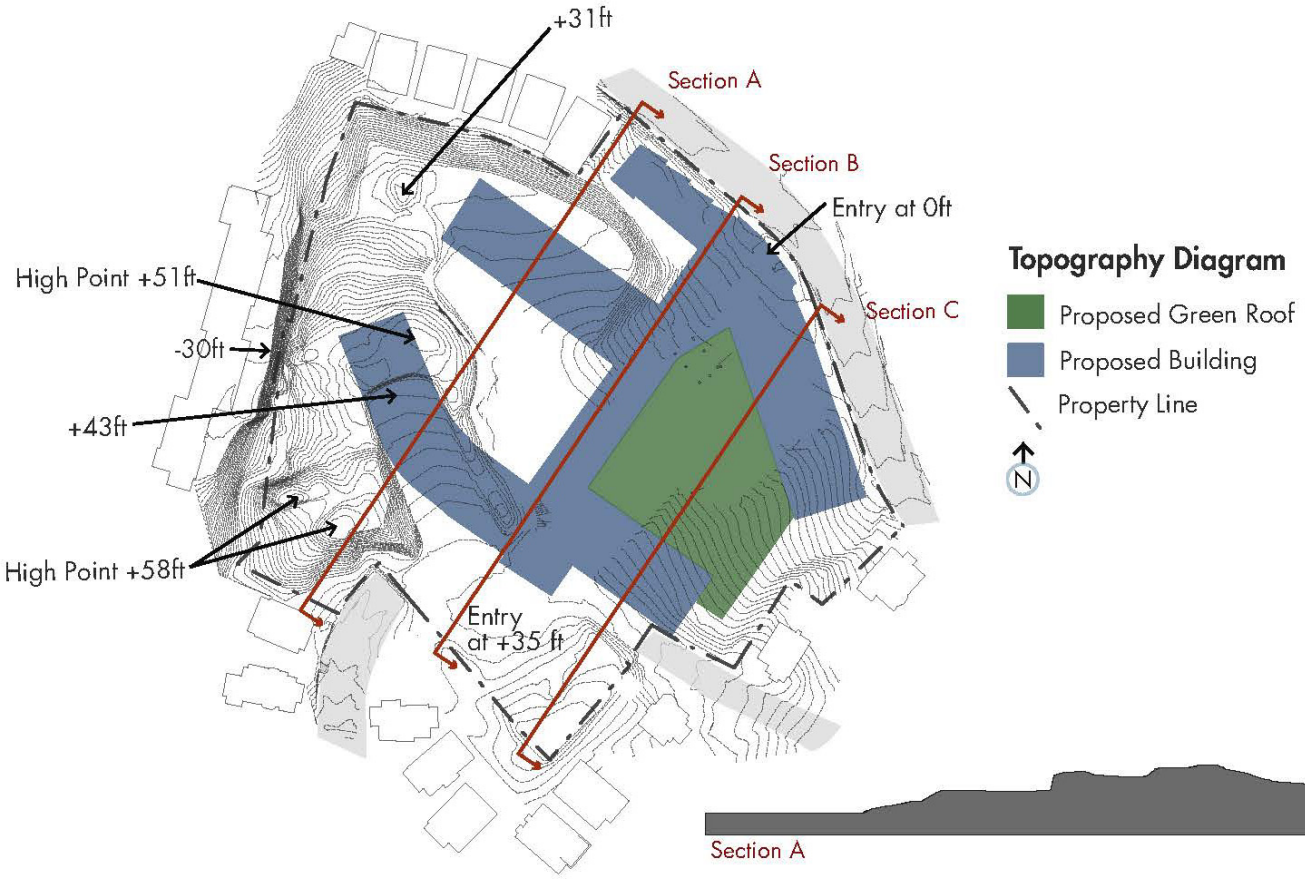


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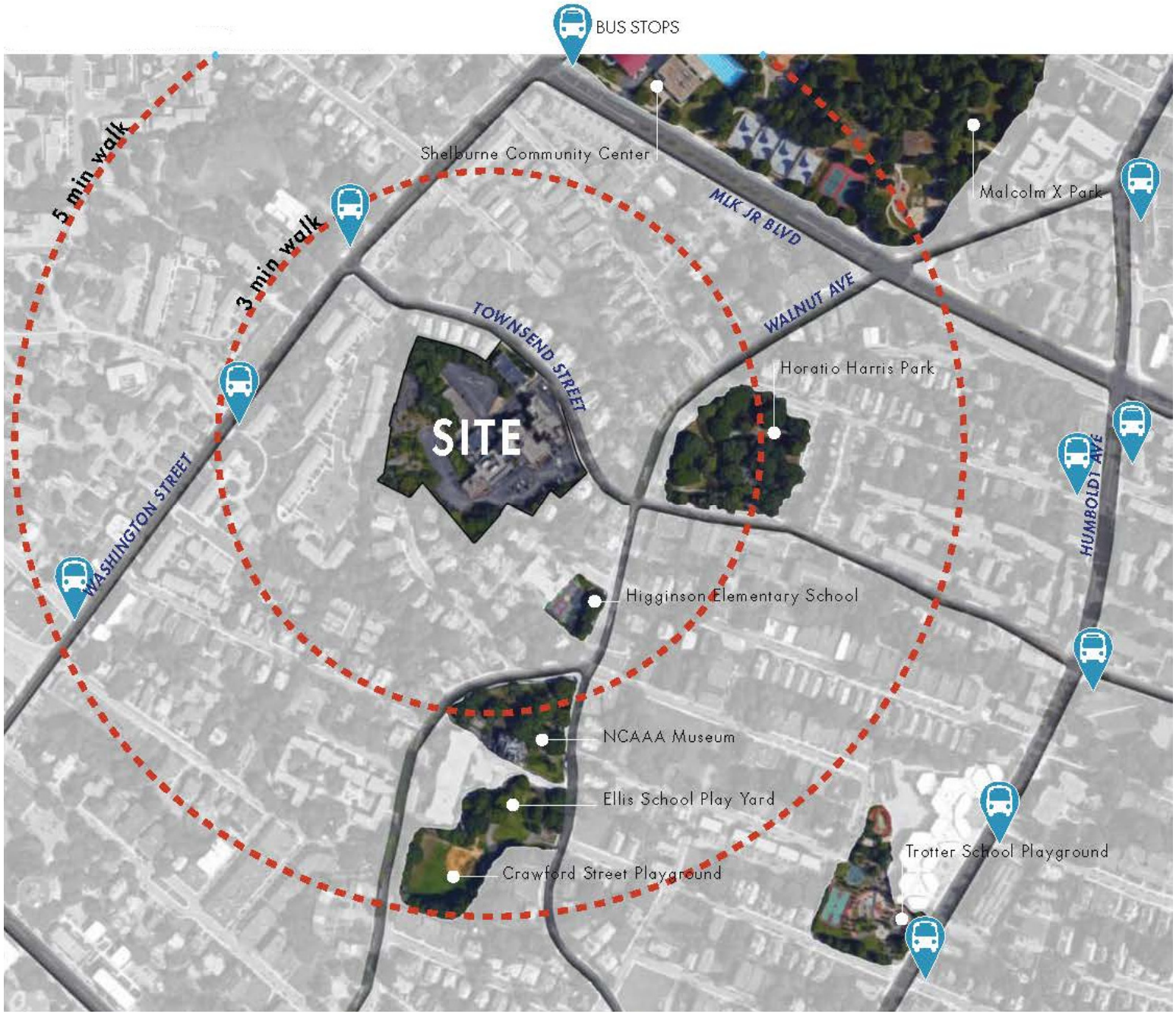
Figure 1.5-2
Site Topography



45 Townsend Street **Boston, Massachusetts**

Figure 1.5-3
Area Open Space, Amenities, and Transit

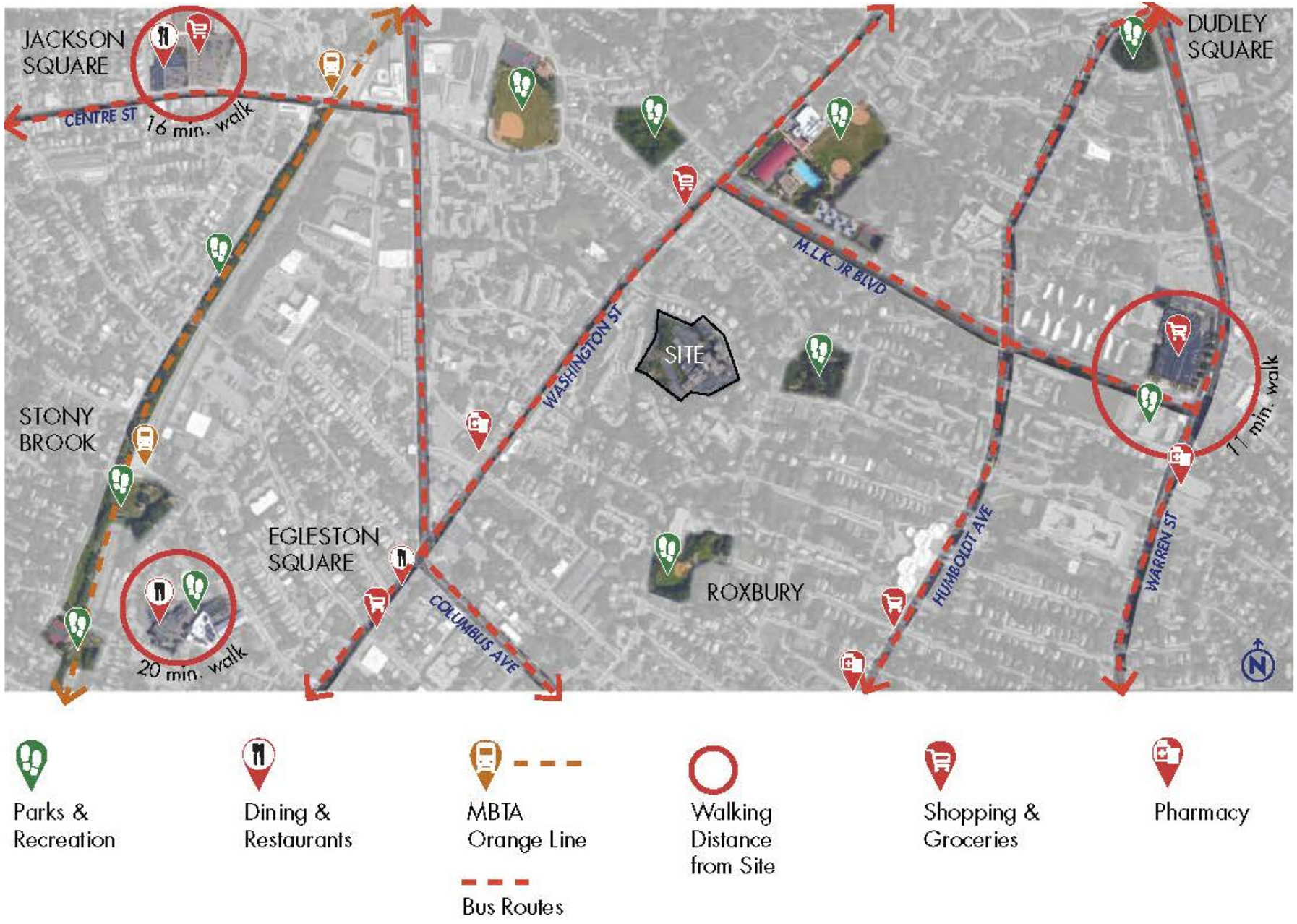


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Figure 1.5-4
Area Amenities

1.6 Planning and Zoning

1.6.1 The Roxbury Strategic Master Plan

The Project Site is located within the Washington Park South neighborhood sub-district of the Roxbury Strategic Master Plan (Plan) planning area. The Plan is intended to provide structure and guidance to current and future development efforts within the planning area. The Plan seeks to guide change and economic growth while providing a physical environment that is both attractive and safe. The Plan also emphasizes the importance of educational opportunities and job preparedness so that engagement with the civic, cultural, and economic life of the community and the greater City of Boston is far more attainable.

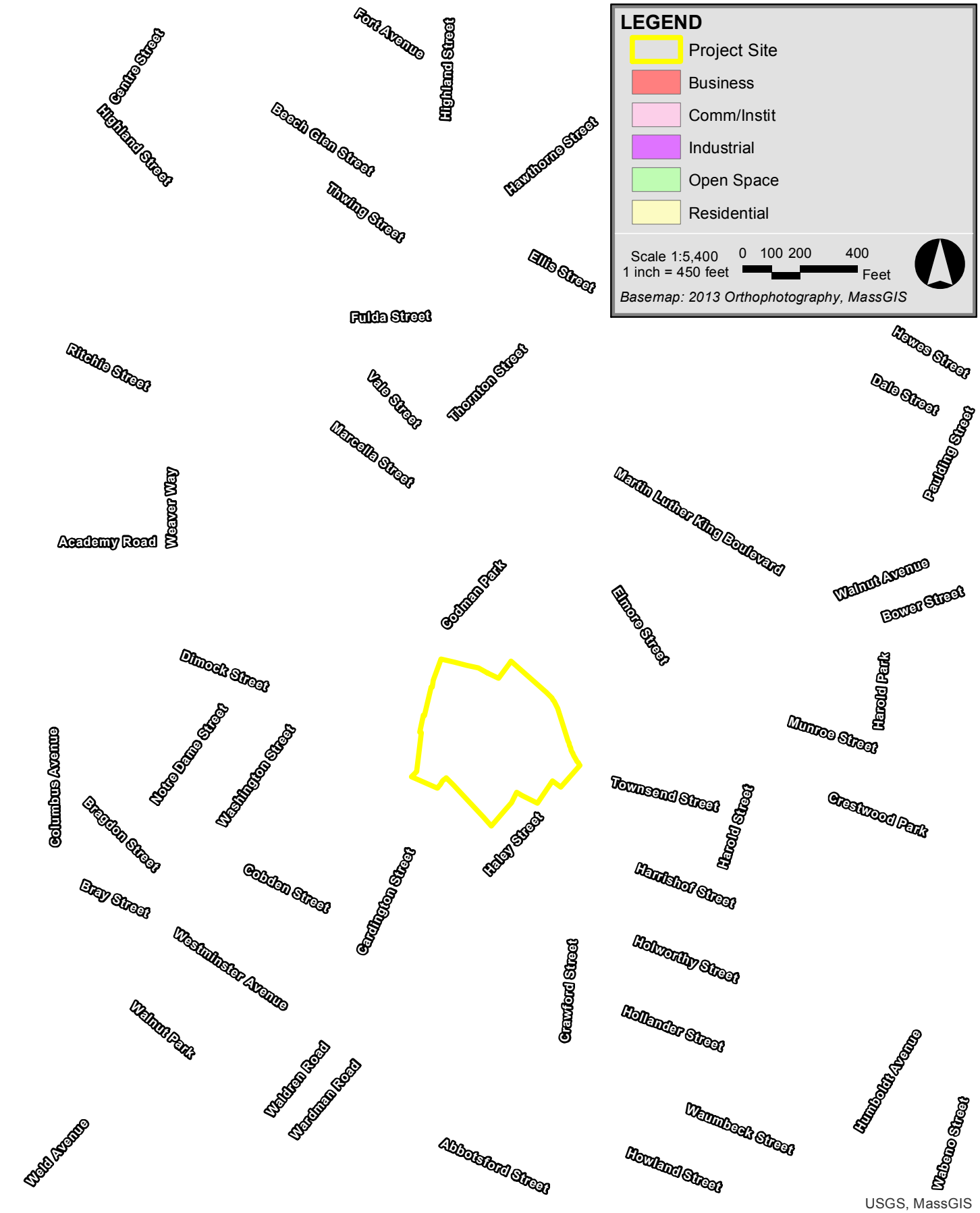
The Plan identifies a number of overall goals and objectives for the planning area, including the provision of a wider range of housing options for residents of diverse socioeconomic and age groups, and increasing the participation and empowerment of various groups and entities within the Roxbury community; including institutions, government agencies, and businesses. The Project embraces and furthers the goals of the Plan.

1.6.2 Zoning Controls

The Project Site is located within the Roxbury Neighborhood District, Article 50 of the Code (Article 50), and is shown on the City of Boston Zoning Map 6B/6C. As shown on the Title Survey, Parcels 1 and 3, which comprise the main portion (97%) of the Project Site, are situated within the Community Facilities Subdistrict ("CF District"). The smaller parcel known as Parcel 2 is located within the Residential 3F-4000 Subdistrict. Parcel 2 is now used for parking and the proposed uses for this area will continue to be landscaping and/or parking. No buildings are contemplated for this parcel. Therefore, the Project Site (exclusive of Parcel 2 containing 5,208 SF.) will be subject to the Community Facilities ("CF") subdistrict requirements. Zoning within proximity to the Project Site is shown on Figure 1.6-1.

Use. Table A Use Regulations of the Code applies to the Community Facility Subdistricts and multi-family residential use is an allowed use together with accessory parking. However, there are certain limitations with respect to certain retail uses, co-working, innovation and gallery space uses, and thus some of these uses will require Zoning Relief.

Dimensional - Regulations Table E of Article 50 sets forth the dimensional regulations applicable to the Townsend Street Community Facility District. Although a number of the dimensional requirements do not apply to the Project, as noted below, the Project is not in compliance with the height limitation of 45 feet, and is not in compliance with the



45 Townsend Street Boston, Massachusetts

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Figure 1.6-1
Zoning

interpretation of the Sections 50-44.13 and 50-44.14 of the Code, which apply the placement of more than one building on a lot. In view of the placement of four (or five) building wings which are interconnected, the City of Boston Inspection Services Department (ISD) may apply the dimensional requirements of Article 50 to each wing as if each wing were a building on a separate lot. Therefore, a calculation of height, density [Floor Area Ratio (FAR)], open space and rear yard setback requirements for each wing may result in a number of zoning citations from ISD, which will require Zoning Relief.

Parking - Generally, Table H of Article 50 requires one parking space for each dwelling unit. However, the Project is subject to Article 80 Large Project Review and parking is subject to determination by the Boston Planning & Development Agency.

Off-Street Loading - The off-street loading requirements set forth in Table I of Article 50 are to be addressed by the BPDA under Large Project Review.

Zoning Relief - As noted above, the Project does not comply with the use and dimensional requirements of the underlying zoning district, Community Facilities subdistrict. As a result, the Project will require Zoning Relief, as defined and provided for in the Code. The Zoning Relief will require review and recommendation by the BPDA through the Article 80B Large Project Review and Related Approvals Process. Such Zoning Relief, as recommended by the BPDA, would include appropriate permitting and approval standards necessary as part of the Zoning relief to insure that the Project as approved by the BPDA will be developed and constructed in accordance with such approvals and the Zoning Relief. As part of the Article 80B Large Project Review and Related Approvals Process, the Proponent and the BPDA will evaluate the Project's uses and dimensional requirements and a determination of the appropriate Zoning Relief required for the Project.

1.6.3 Article 80 Large Project Review

This Project is subject to Large Project Review pursuant to Article 80 of the Boston Zoning Code (the Code). The Proponent filed a Letter of Intent (LOI) with the BPDA in May of 2017. A copy of the LOI is included in Appendix A.

This EPNF is being submitted to the BPDA to initiate review of the Project under Article 80B, Large Project Review, of the Boston Zoning Code.

1.7 Legal Information

1.7.1 Site Control and Easements

Title to the property is held by KIC Roxbury LLC, a Delaware limited liability company, having an address at 347 Congress Street, Boston, MA 02210 (KIC Roxbury LLC). KIC Roxbury LLC acquired the property from the Receiver of the Property of Radius Specialty Hospital LLC and Radius Hospital Realty LLC on September 22, 2015 by Deed recorded at Suffolk Registry of Deeds, Book 55099, Page 233. As noted above, the property consists of

three parcels of land at 45 and 47 Townsend Street and Harrishof Street and according to the Title Survey, the Site contains approximately 211,277 sf or 4.85 acres of land. A survey of the Project Site is included in Appendix B.

1.7.2 Legal Judgements Adverse to the Proposed Project

There are no legal judgements or actions pending concerning the Project.

1.7.3 History of Tax Arrears on Property

All taxes due for the property have been timely paid by the Proponent, including the Fiscal Year 2017 taxes. The Proponent is not in tax arrears on any property it owns within the City of Boson.

1.8 Anticipated Permits and Approvals

Agency Name	Permit / Approval
STATE	
Department of Environmental Protection	Plan Approval (if required); Fossil Fuel Utilization permit (as required); Notice of Demolition/Construction
Massachusetts Historical Commission	State Register Review, including Determination of No Adverse Effect or Memorandum of Agreement; Section 106 Review (if required)
Massachusetts Water Resources Authority	Temporary Construction Dewatering Permit (if required); Sewer Use Discharge Permit (if required)
LOCAL	
Boston Civic Design Commission	Review and approval pursuant to Article 28 of the Boston Zoning Code
Boston Fire Department	Fuel Storage Permit; Fire Alarm Permit; Blasting Permit (if required)
Boston Inspectional Service Department	Building Permit (Long Form); Demolition Permit; Certificate of Occupancy
Boston Public Improvement Commission/ Department of Public Works	Specific Repair Approvals; Discontinuances (if required); Permit for sign, awning, hood, canopy, or marquee, or other incursion over public right of way (as required); Street Layout (as required); Tieback/Earth Excavation Approvals (if required)
Boston Public Safety Commission, Committee on Licenses	Parking Garage Permit; License for Storage of Inflammables
Boston Public Works Department	Curb Cut Permits (if required); Street Opening Permits (if required)

Boston Planning and Development Agency	Review under Article 80, including Large Project Review, as required pursuant to Article 80B of the Zoning Code and PDA Plan Review, as required pursuant to Article 80C of the Zoning Code; Cooperation Agreement; Affordable Housing Agreement(s); Boston Residents Construction Employment Plan Agreement; Certifications of Consistency and Compliance
Boston Landmarks Commission	Article 85 Demolition Delay Review
Boston Transportation Department	Transportation Access Plan Agreement; Review and Approval of a Construction Management Plan
Boston Water and Sewer Commission	Sewer Extension/Connection Permit; Sewer Use Discharge Permit; Site Plan Approval; Temporary Construction Dewatering Permit (if required); Cross Connection/Backflow Prevention Approval
Boston Zoning Board of Appeal	Zoning and Building Code variance(s) (if required)

Chapter 2.0

Transportation

2.0 TRANSPORTATION

The Proponent engaged Howard Stein Hudson (HSH) to conduct an evaluation of the transportation impacts of the Project in the Roxbury neighborhood of Boston. This transportation study adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and the BPDA 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.

2.1 Project Description

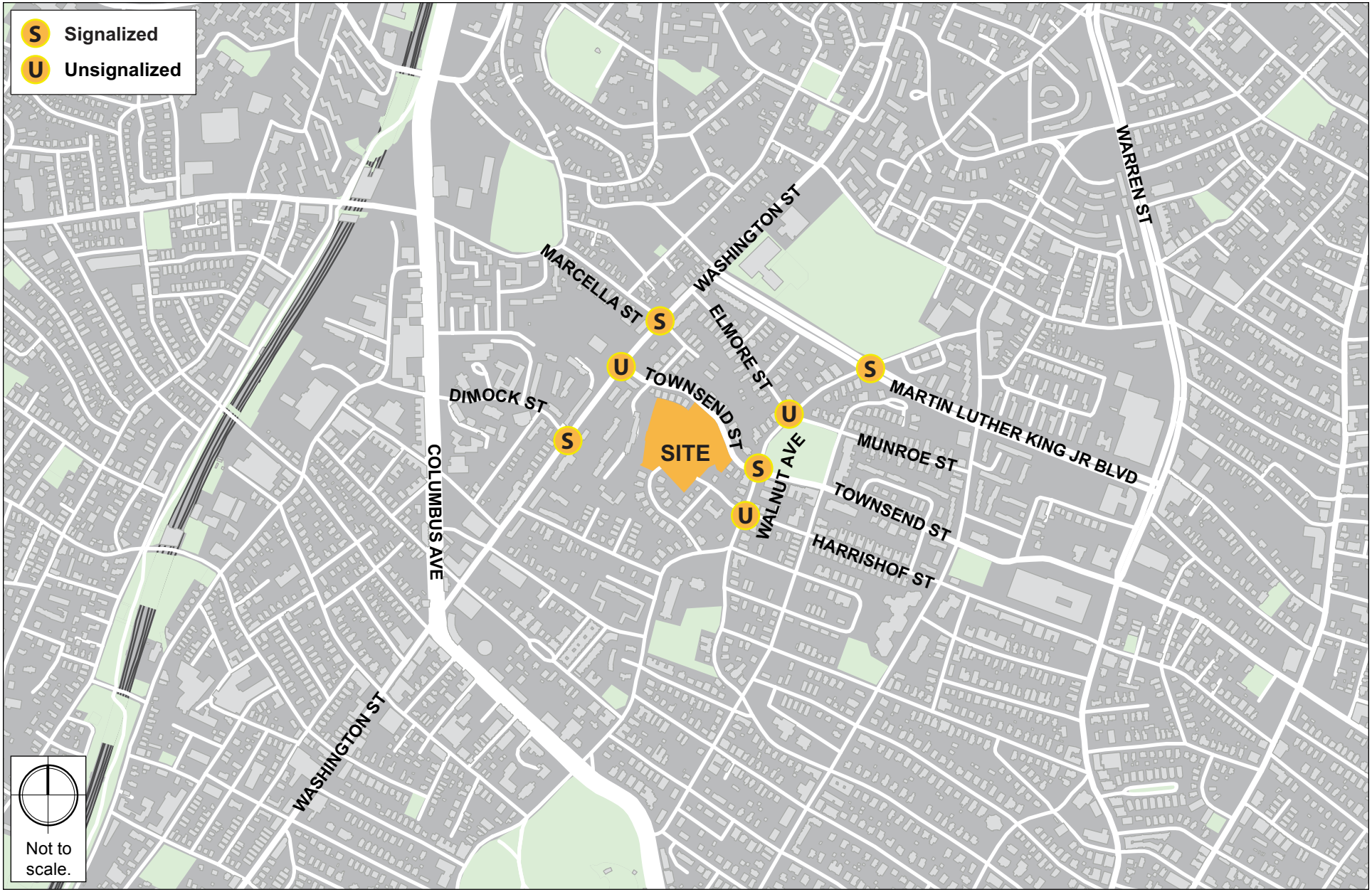
The Project Site consists of approximately five acres bounded by Townsend Street to the north, Walnut Avenue to the east, Codman Park to the west, and Harrishof Street to the south. The Project includes the demolition of the existing structures on site and the construction of residential apartments with resident and community amenities.

The Project consists of approximately 322 residential units, a 1,500 sf café and a 3,000 sf co-work office space. Approximately 220 parking spaces will be provided. Access to the garage is via the sloped driveway connecting Townsend Street and Harrishof Street with separate access points for each of the three levels of parking as the ground floor elevation changes.

2.1.1 Study Area

The transportation study area is in the Roxbury neighborhood and is bounded by Martin Luther King Jr. Boulevard to the north, Dimock Street to the south, Walnut Avenue to the east, and Washington Street to the west. The study area consists of the following seven intersections in the vicinity of the Project Site, also shown on Figure 2-1:

- Washington Street/Marcella Street/Brinton Street (signalized);
- Washington Street/Townsend Street (unsignalized);
- Washington Street/Dimock Street (signalized);
- Walnut Avenue/Martin Luther King Jr. Boulevard (signalized);
- Walnut Avenue/Elmore Street/Munroe Street (unsignalized);
- Walnut Avenue/Townsend Street (signalized); and
- Walnut Avenue/Harrishof Street (unsignalized).



45 Townsend Street Boston, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 2-1
Study Area Intersections

2.1.2 Study Methodology

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

The Existing (2016) Condition analysis includes an inventory of the existing transportation conditions 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. 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 2023, based on a seven-year horizon from the year of the filing of this traffic study.

The No-Build (2023) 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 (2023) Condition analysis includes an increase in traffic volume due to the addition of Project-generated trip estimates to the traffic volumes developed as part of the No-Build (2023) Condition analysis. The transportation study identified expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies.

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

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

2.2 Existing Condition

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

2.2.1 Existing Roadway Conditions

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

Washington Street is a two-way, two lane roadway located to the west of the Project Site that runs in a predominately north-south direction between Court Street to the north and Water Street to the south. Washington Street is classified as an urban principal arterial under BTD jurisdiction. In the vicinity of the Project Site, on-street parking is provided on both sides of Washington Street. There are MBTA bus stops along both sides of the roadway in the vicinity of the Project Site. Sidewalks exist on both sides of the roadway.

Walnut Avenue is a two-way, two lane roadway adjacent to the east of the Project Site that runs in a predominately north-south direction between Warren Street to the north and Peter Parley Road to the south. Walnut Avenue is classified as an urban collector under BTD jurisdiction. In the vicinity of the Project Site, on-street parking is provided along the western side of the roadway. Sidewalks are provided on both sides of Walnut Avenue.

Townsend Street is located north of the Project Site and is a one-way, one lane roadway between Washington Street and Walnut Avenue before becoming a two-way, two lane roadway east of Walnut Avenue. Townsend Street runs in a predominately east-west direction between Warren Street to the east and Washington Street to the west. Townsend Street is classified as an urban minor arterial under BTD jurisdiction. In the vicinity of the Project Site, on-street parking is provided along the southern side of the roadway. Sidewalks are provided on both sides of Townsend Street.

Martin Luther King Jr. Boulevard is a two-way, four lane roadway separated by a median located north of the Project Site that runs east-west between Warren Street to the east and Washington Street to the west. Martin Luther King Jr. Boulevard is classified as an urban minor arterial under BTD jurisdiction. In the vicinity of the Project Site, on-street parking is provided along both sides of the roadway. Sidewalks are provided on both sides of Martin Luther King Jr. Boulevard.

Dimock Street is a predominately one-way eastbound, one lane roadway located to the west of the Project Site that runs in an east-west direction between Amory Street to the east and Washington Street to the west. Adjacent to Washington Street, Dimock Street accommodates two-way traffic until Notre Dame Street. Dimock Street is classified as a local roadway under BTD jurisdiction. In the vicinity of the Project Site on the two-way section of Dimock Street, no on-street parking is provided. Along the one-way section of Dimock Street, on-street parking is provided on the north side of the roadway. Sidewalks are provided on both sides of Dimock Street.

Marcella Street is a two-way, two lane roadway that runs in a southeast to northwest direction between Washington Street to the southeast and Highland Street to the northwest before becoming a one-way, one lane roadway that runs between Highland Street to the southeast and Centre Street to the northwest. Marcella Street is classified as an urban collector under BTD jurisdiction. In the vicinity of the Project Site, on-street parking is not available. Sidewalks are provided on both sides of Marcella Street.

Brinton Street is a one-way westbound, one lane roadway located north of the Project Site that runs in a predominately east-west direction starting between Washington Street to the west and terminating 350 feet to the east. Brinton Street is classified as a local roadway under BTD jurisdiction. In the vicinity of the Project Site, on-street parking is provided along both sides of the roadway. Sidewalks are provided on both sides of Brinton Street.

Elmore Street is a one-way eastbound, one lane roadway located north of the Project Site that runs in a predominately east-west direction starting between Washington Street to the west and Walnut Avenue to the east. Elmore Street is classified as a local roadway under BTD jurisdiction. On-street parking and sidewalks are provided along both sides of the roadway.

Munroe Street is a one-way westbound, one lane roadway between Harold Street and Humboldt Avenue and a two-way, two lane roadway between Harold Street and Walnut Avenue. Munroe Street is classified as a local roadway under BTD jurisdiction. In the vicinity of the Project Site on-street parking is provided on the northern side of the street. Sidewalks are provided on both sides of Munroe Street.

Harrishof Street is a two-way, two lane roadway from the Project Site to Walnut Avenue. Between Walnut Avenue and Humboldt Avenue, Harrishof Street is a one-lane, one way eastbound roadway. Harrishof Street is classified as a local roadway under BTD jurisdiction. On-street parking is provided on the northern side of the roadway and sidewalks are provided along both sides of Harrishof Street.

2.2.2 Existing Intersection Conditions

Existing conditions at the study area intersections are described below.

Washington Street/Marcella Street/Brinton Street is a four-leg, signalized intersection with four approaches. The Marcella Street eastbound approach consists of one shared left-turn/right-turn lane. The Brinton Street westbound approach is one-way westbound and consists of one shared left-turn/through/right-turn lane. The Washington Street northbound approach consists of one shared left-turn/through lane, however, observations determined that there was some space for left turning vehicles to queue allowing through vehicles to continue past them. The Washington Street southbound approach consists of one shared through/right-turn lane however vehicles are able to use the MBTA bus stop area as a right-turn lane when there are no buses present. There are sidewalks along all approaches. Crosswalks, wheel chair ramps, and pedestrian signal equipment are provided at all approaches. There are MBTA Bus stops on both sides of the Washington Street southbound approach. On-street parking is provided along both sides of the Washington Street northbound approach and the Brinton Street westbound approach.

Washington Street/Townsend Street is a three-leg, unsignalized intersection with two approaches. The Washington Street northbound approach is a free movement consisting of one shared through/right-turn lane. The Washington Street southbound approach is a free movement consisting of one shared left-turn/through lane. The last leg of the intersection, Townsend Street, is one-way eastbound coming from Washington Street. There are sidewalks along all approaches. There are crosswalks and wheelchair ramps across the Washington Street northbound approach and Townsend Street. There are MBTA bus stops on both sides of the Washington Street northbound approach. On-street parking is permitted on both sides of the Washington Street southbound approach and on the southern side of Townsend Street.

Washington Street/Dimock Street is a three-leg, signalized intersection with three approaches. The Dimock Street eastbound approach consists of a shared left-turn/right-turn lane. The Washington Street northbound approach consists of a shared left-turn/through lane. The Washington Street southbound approach consists of a shared through/right-turn lane. There are sidewalks along both sides of each approach. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided across the Dimock Street eastbound and Washington Street southbound approaches. MBTA Bus Stops are located along the western side of the Washington Street northbound approach and the eastern side of the Washington Street southbound approach. On-street parking is provided on the Washington Street northbound and southbound approaches only.

Walnut Avenue/Martin Luther King Jr. Boulevard is a four-leg, signalized intersection with four approaches. The Martin Luther King Jr. Boulevard eastbound approach consists of a left-turn lane, two through lanes, and a channelized right-turn lane. The Martin Luther King Jr. Boulevard westbound approach consists of a left-turn lane, a through lane, and a shared through/channelized right-turn lane. The Walnut Avenue northbound approach operates as a left-turn lane and a through/right-turn lane and the southbound approach consists of a shared left-turn/through/right-turn lane. Sidewalks are provided along both sides of all approaches. Crosswalks, wheelchair ramps, and pedestrian signal equipment are provided at all approaches. On-street parking is provided along the Martin Luther King Jr. Boulevard eastbound and westbound approaches and the Walnut Avenue northbound approach.

Walnut Avenue/Elmore Street/Munroe Street is a four-leg, unsignalized intersection with four approaches. The Elmore Street eastbound approach is one-way eastbound and consists of one shared left-turn/through/right-turn lane. The Munroe Street westbound approach consists of one shared left-turn/right-turn lane. The Walnut Avenue northbound approach consists of one shared through/right-turn lane. The Walnut Avenue southbound approach consists of one shared left-turn/through lane. There are sidewalks and pedestrian ramps at all approaches. There are no crosswalks at the intersection. On-street parking is permitted at all approaches.

Walnut Avenue/Townsend Street is a four-leg, signalized intersection with four approaches. The Townsend Street eastbound approach is one-way eastbound and consists of one shared left-turn/through/right-turn lane. The Townsend Street westbound approach consists of one shared left-turn/right-turn lane. The Walnut Avenue northbound approach consists of one shared through/right-turn lane. The Walnut Avenue southbound approach consists of one shared left-turn/through lane. There are sidewalks along all approaches as well as crosswalks, wheelchair ramps, and pedestrian signal equipment at all approaches. On-street parking is permitted along the southern side of the Townsend Street eastbound and westbound approaches and along both sides of the Walnut Avenue northbound and southbound approaches.

Walnut Avenue/Harrishof Street is a four-leg, unsignalized intersection with three approaches. The Harrishof Street eastbound approach consists of one shared left-turn/through/right-turn lane. The Walnut Avenue northbound and southbound approaches consist of one shared left-turn/through/right-turn lane. There are sidewalks, pedestrian ramps, and crosswalks at all approaches of the intersection. On-street parking is permitted at all approaches of the intersection.

2.2.3 Existing Parking

An inventory of the existing on-street parking and car sharing services in the vicinity of the Project was collected. A description of each follows.

2.2.3.1 On-Street Parking and Curb Usage

On-street parking surrounding the Project Site consists of predominately unrestricted parking. The on-street parking regulations within the study area are shown in Figure 2-2.

2.2.3.2 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.

Zipcar is the primary company in the Boston car sharing market. There are currently two Zipcar locations within a half-mile walk of the Project Site. The nearby car sharing locations are shown in Figure 2-3.

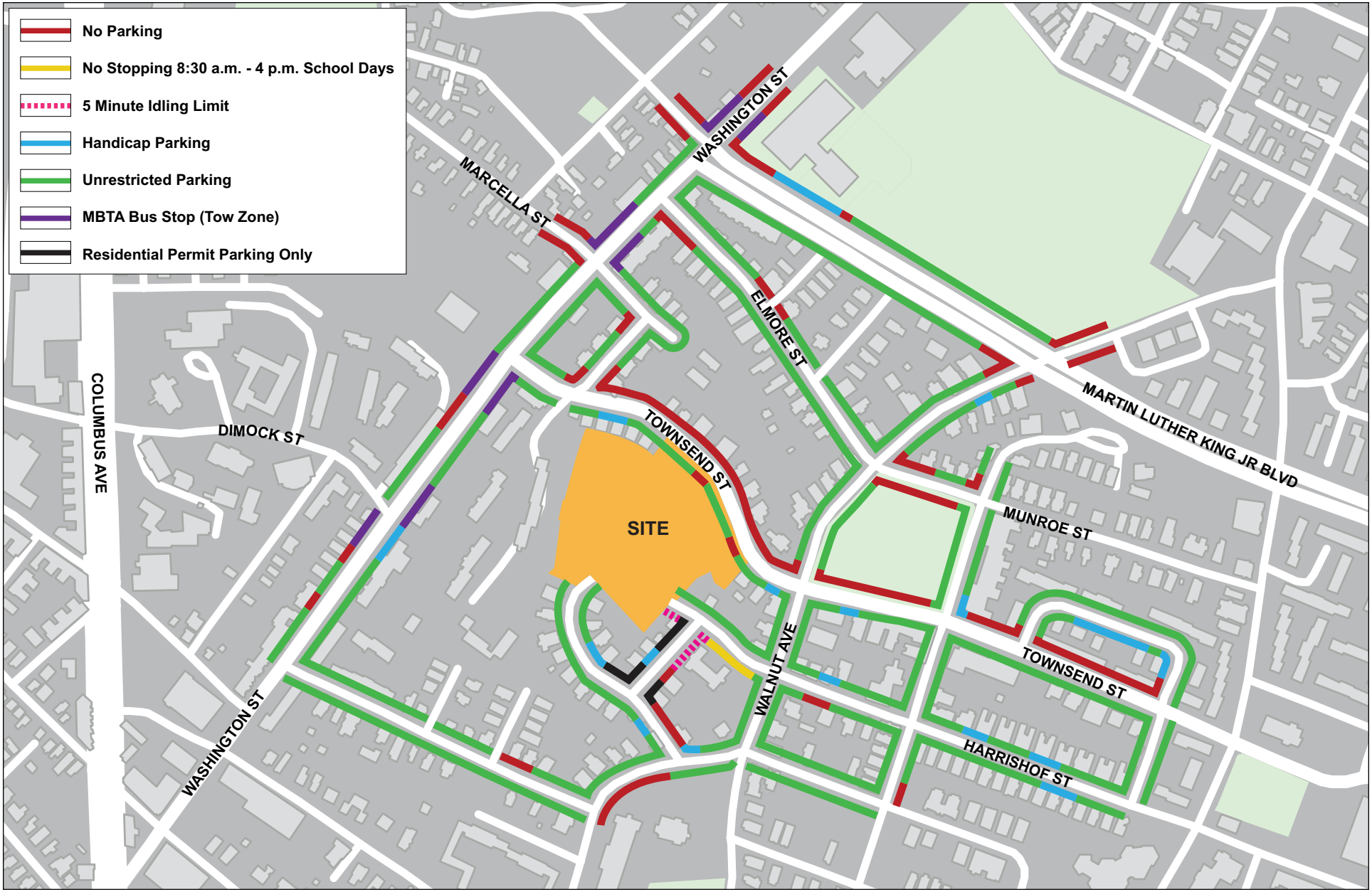


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Figure 2-2
On-Street Parking Regulations

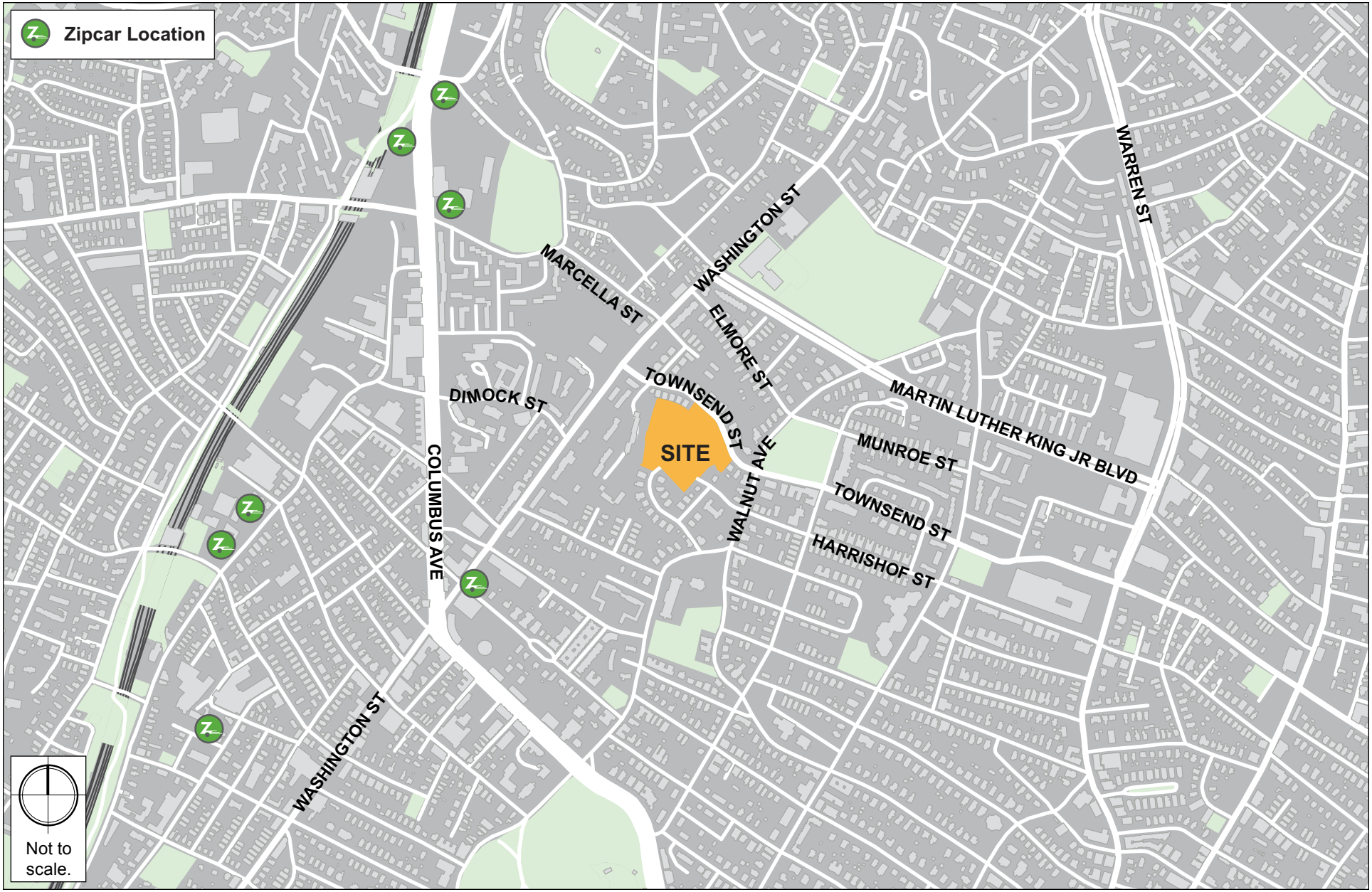

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Figure 2-3
Car Sharing Services

2.2.4 Existing Traffic Data

Traffic volume data was collected at the seven study area intersections on October 6, 2016. Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and weekday p.m. peak periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively). The traffic classification counts included car, heavy vehicle, pedestrian, and bicycle movements. The detailed traffic counts are provided in Appendix C, available upon request.

2.2.4.1 Seasonal Adjustment

To account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT was reviewed. The most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the October 2016 TMCs. The seasonal adjustment factor for roadways similar to the study area (Group 6) is 0.92. This indicates that average month traffic volumes are approximately eight percent less than the traffic volumes that were collected. Therefore, the traffic counts were not adjusted downward to reflect average month conditions and provide a conservatively high analysis consistent with the peak season traffic volumes. The MassDOT 2011 Weekday Seasonal Factors table is provided in Appendix C.

2.2.5 Existing Vehicular Traffic Volumes

The existing traffic volumes collected in October 2016 were balanced to develop the Existing (2016) Condition traffic volumes. The Existing (2016) weekday a.m. Peak Hour and weekday p.m. Peak Hour traffic volumes are shown in Figures 2-4 and Figure 2-5, respectively.

2.2.6 Existing Bicycle Volumes and Accommodations

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project Site is conveniently located in close proximity to several bicycle facilities. The City's "Bike Routes of Boston" map designates Walnut Street as an intermediate route with bicycle "sharrows," and Martin Luther King Jr. Boulevard as an intermediate route with dedicated bicycle lanes. Intermediate routes are considered suitable for riders with some on-road experience. The "Bike Routes of Boston" map also designates Townsend Street and Washington Street as advanced routes, which are considered suitable for experienced and traffic-confident cyclists.

Bicycle counts were conducted concurrently with the vehicular TMCs and are presented in Figure 2-6. As shown in the Figure 2-6, bicycle volumes are heaviest along Washington Street during the peak periods.

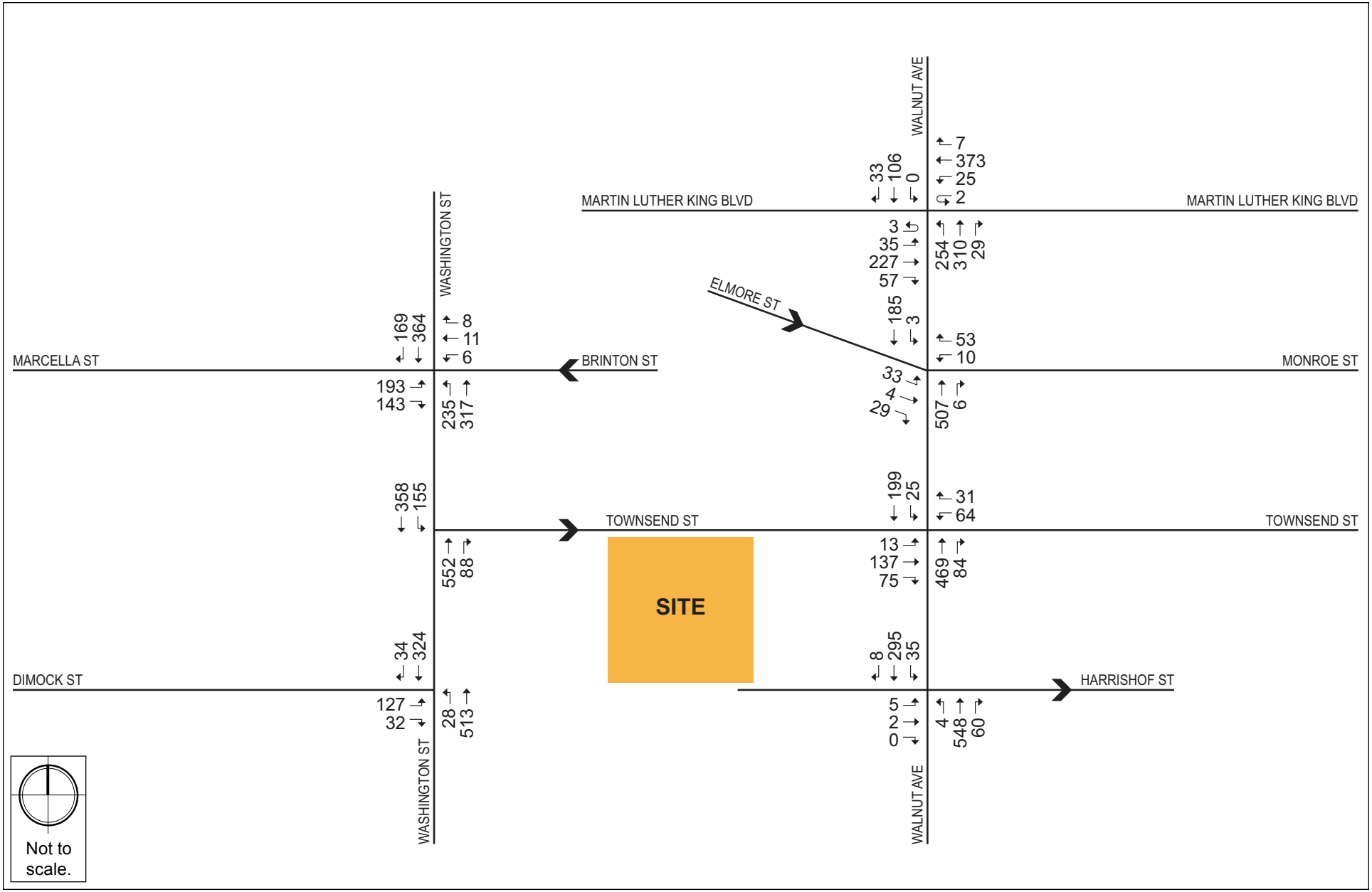

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Figure 2-4
Existing (2016) Condition Traffic Volumes, Weekday a.m. Peak Hour

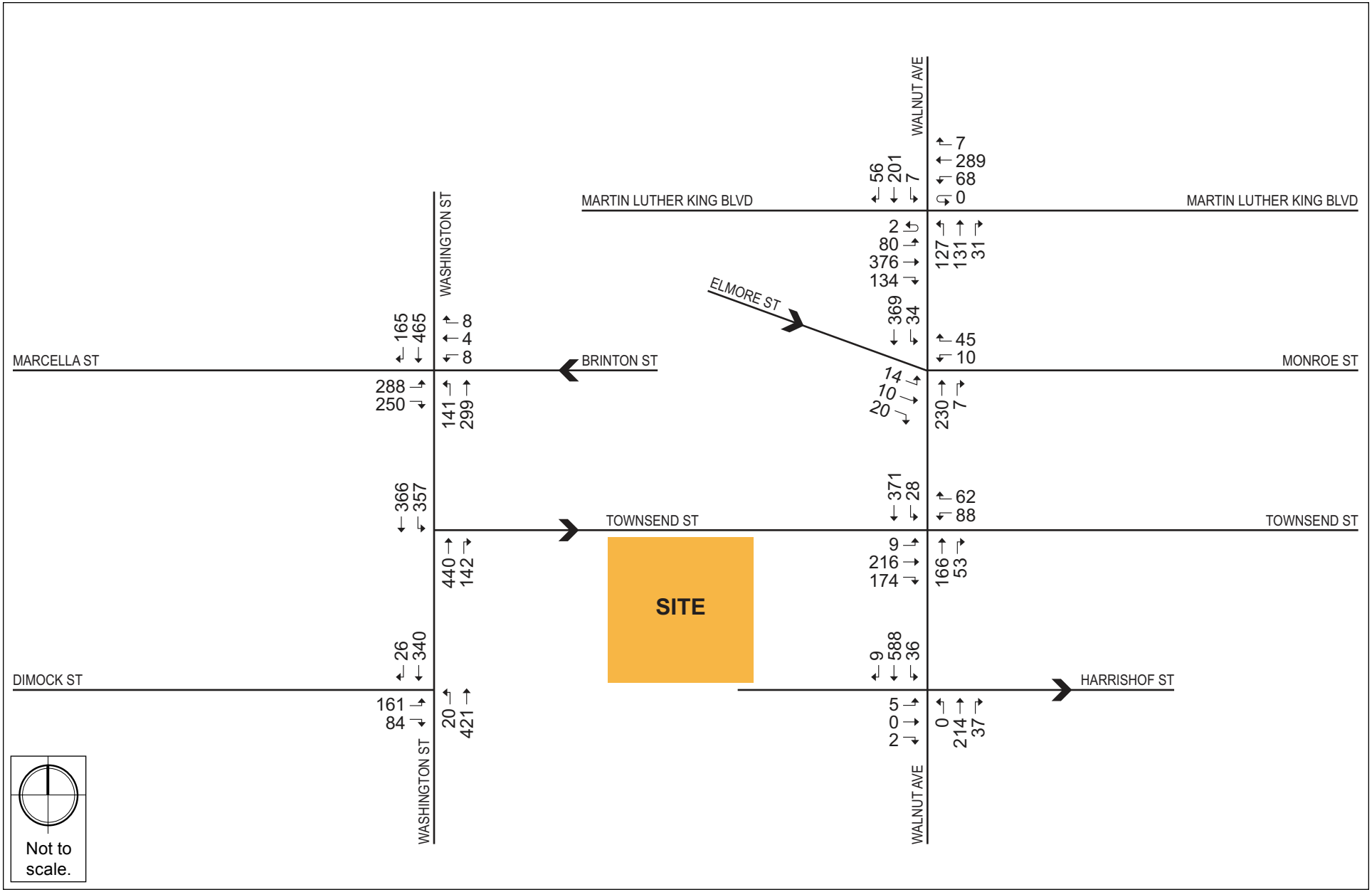

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Figure 2-5
Existing (2016) Condition Traffic Volumes, Weekday p.m. Peak Hour

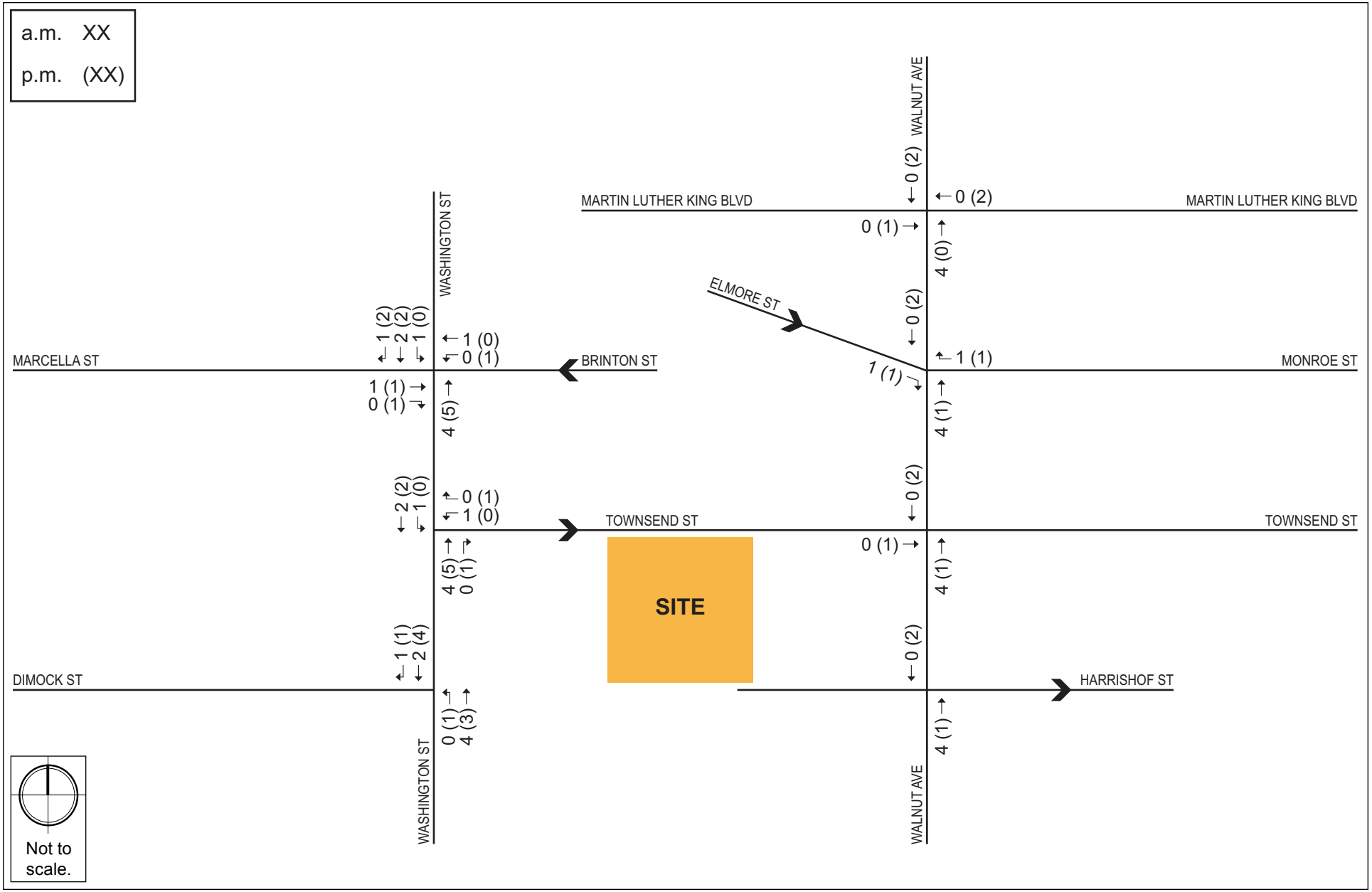

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Figure 2-6
Existing (2016) Condition Bicycle Volumes, Weekday a.m. and p.m. Peak Hours

2.2.6.1 Bicycle Sharing Services

The Project Site is also located in proximity to a Hubway bicycle sharing station. Hubway is the bicycle sharing system in the Boston area, which was launched in 2011 and now consists of over 140 stations and 1,300 bicycles. There are five Hubway locations within a half mile of the site, as shown on Figure 2-7. The Proponent is evaluating locations for an additional Hubway station.

2.2.7 Existing Pedestrian Volumes and Accommodations

In general, sidewalks are provided along all roadways in proximity to the Project Site and are in good condition. No excessive damage to sidewalks within the study area was observed. Crosswalks are provided at all study area intersections except Walnut Avenue/Elmore Street/Munroe Street. Pedestrian signal equipment is provided at each of the four signalized intersections within the study area.

To determine the level of pedestrian activity within the study area, pedestrian counts were conducted concurrently with the TMCs at the study area intersections. Those counts are presented in Figure 2-8. As shown in Figure 2-8, pedestrian activity is low throughout the study area. The intersection of Washington Street and Dimock Street had the largest pedestrian activity.

2.2.8 Existing Public Transportation Services

As noted above, the Project Site is located in Boston's Roxbury neighborhood, which generally has access to reliable public transportation opportunities. The Massachusetts Bay Transportation Authority (MBTA) Orange Line and several bus lines provide access to locations throughout the city. The closest Orange Line station is approximately one-half mile away.

The MBTA operates seven bus routes in close proximity to the Project Site. Figure 2-9 identifies the public transportation services located in close proximity of the Project Site, and Table 2-1 provides a brief summary of those routes.

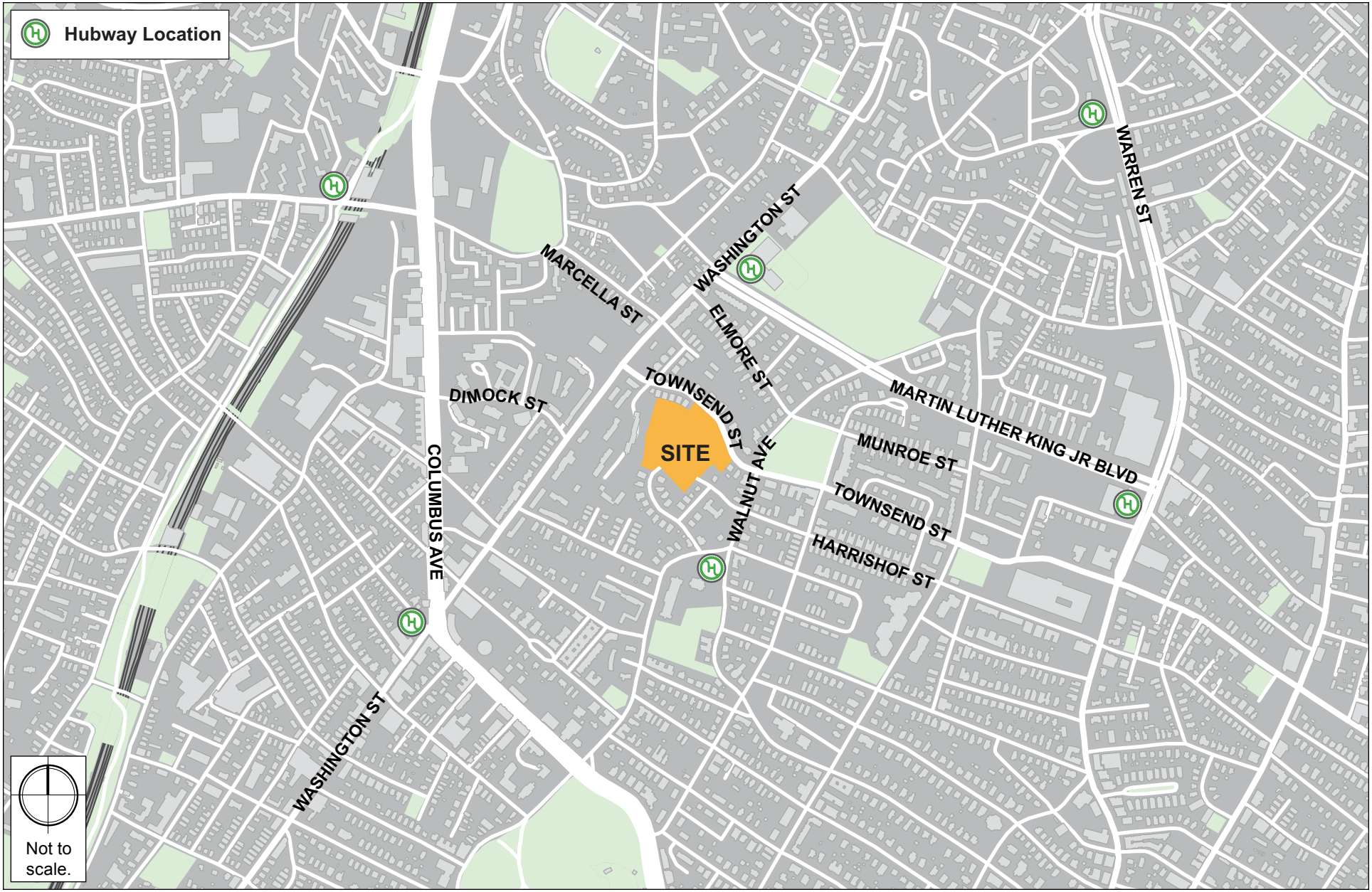

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Figure 2-7
Bicycle Sharing Locations

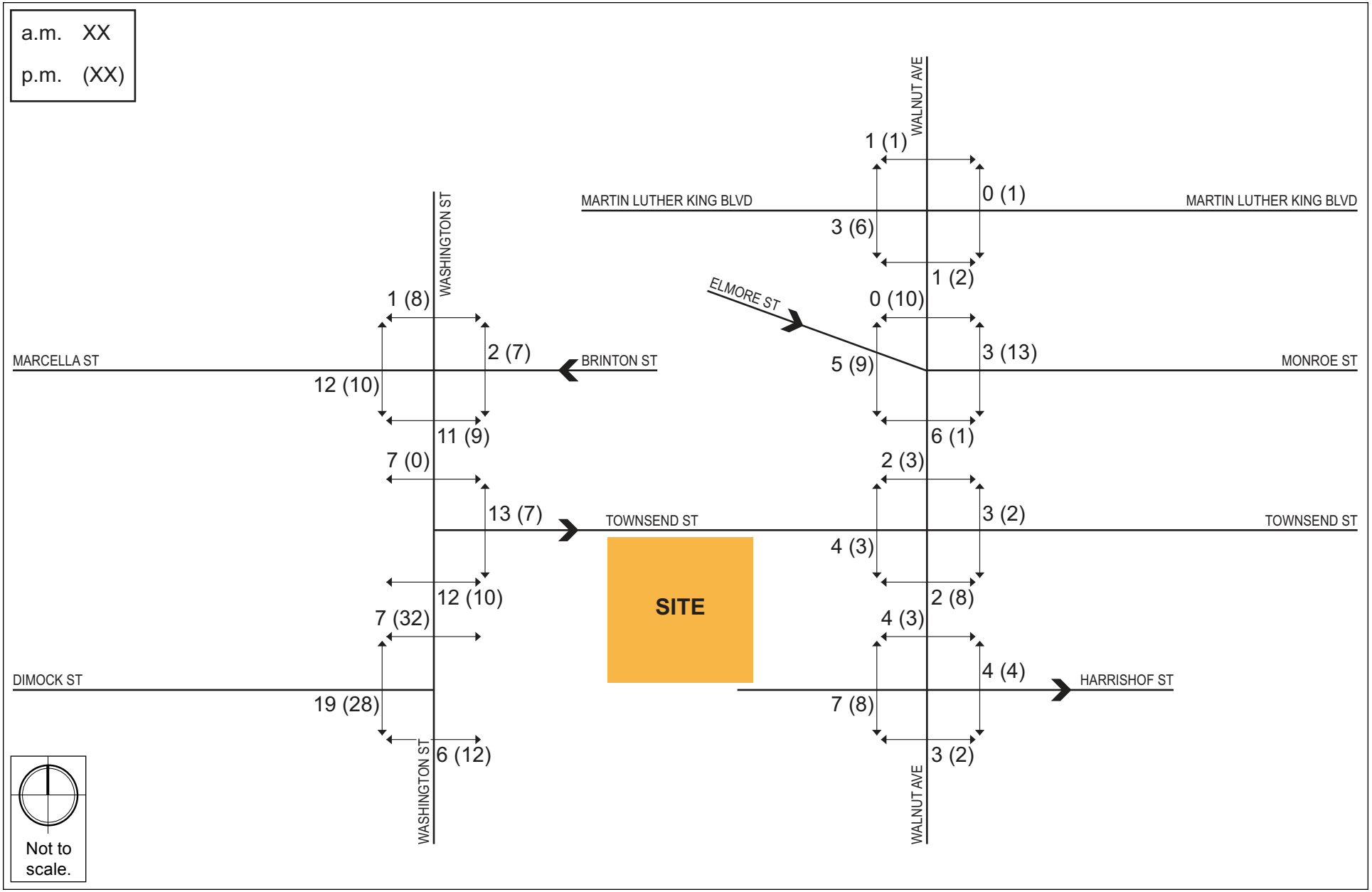

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Figure 2-8

Existing (2016) Condition Pedestrian Volumes, Weekday a.m. and p.m. Peak Hours

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Figure 2-9
Public Transportation

Table 2-1 Existing Public Transportation Service Summary

Transit Service	*Description*	*Rush-hour Headway (in minutes)**
Subway Routes		
Orange Line	Jackson Square Station	6-9
Bus Routes		
14	Roslindale Square – Heath Street via Dudley Station, Grove Hall, & Jackson Square Station	40-45
22	Ashmont Station – Ruggles Station via Talbot Avenue & Jackson Square	8-15
23	Ashmont Station – Ruggles Station via Washington Street	6-8
28	Mattapan Station – Ruggles Station via Dudley Station	7-10
29	Mattapan Station – Jackson Square Station	15-16
42	Forest Hills Station – Dudley Station via Washington Street	12-30
44	Jackson Square Station – Ruggles Station via Seaver Street & Humboldt Avenue	12-14

* Headway is the time between buses.

2.2.9 Existing (2016) Condition Traffic Operations Analysis

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay experienced by vehicles at intersections and along intersection approaches. 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 2000 Highway Capacity Manual (HCM).

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 2-2 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 desirable during the peak hours of traffic in urban and suburban settings.

Table 2-2 Vehicle Level of Service Criteria

Level of Service	*Average Stopped Delay (sec/veh)*	
	Signalized Intersections	*Unsignalized Intersections*
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: 2000 Highway Capacity Manual, Transportation Research Board.

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

The volume-to-capacity ratio (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 95th percentile queue, measured in feet, denotes the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line. This maximum queue occurs five percent, or less, of the time during the peak hour, and typically does not develop during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a "worst case" condition. Queues at an intersection are generally below the 95th percentile length throughout most of the peak hour. It is also unlikely that 95th percentile queues for each approach to an intersection occur simultaneously.

Table 2-3 and Table 2-4 summarize the Existing (2016) Condition capacity analysis for the study area intersection during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in Appendix C.

Table 2-3 Existing (2016) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Washington Street/Marcella Street/Brinton Street	**C**	**23.3**	-	-	-
Marcella Street EB left/right	D	53.7	0.89	169	#277
Brinton Street WB left/thru/right	C	20.8	0.07	9	29
Washington Street NB left	B	17.8	0.56	61	#263
Washington Street NB thru	B	12.0	0.39	81	161
Washington Street SB thru	B	16.8	0.39	196	160
Washington Street SB right	A	9.5	0.21	25	69
Washington Street/Dimock Street	**C**	**21.6**	-	-	-
Dimock Street EB left/right	D	52.9	0.72	111	157
Washington Street NB left/thru	B	18.9	0.59	257	439
Washington Street SB thru/right	B	10.4	0.40	43	180
Martin Luther King Jr. Boulevard/Walnut Avenue	**C**	**27.3**	-	-	-
Martin Luther King Jr. Blvd EB left	D	44.0	0.25	19	62
Martin Luther King Jr. Blvd EB thru | thru	B	18.6	0.16	28	103
Martin Luther King Jr. Blvd EB right	A	0.0	0.04	0	0
Martin Luther King Jr. Blvd WB left	D	43.8	0.19	13	49
Martin Luther King Jr. Blvd WB thru | thru/right	C	21.3	0.30	70	171
Walnut Avenue NB left	D	39.5	0.69	113	#358
Walnut Avenue NB thru/right	C	32.9	0.63	146	#410
Walnut Avenue SB left/thru/right	C	24.9	0.27	50	146
Townsend Street/Walnut Avenue	**B**	**16.2**	-	-	-
Townsend Street EB left/thru/right	C	25.9	0.63	55	150
Townsend Street WB left/right	B	13.7	0.42	4	46
Walnut Avenue NB thru/right	B	15.4	0.62	87	#443
Walnut Avenue SB left/thru	A	9.8	0.27	28	137
Unsignalized Intersections					
Washington Street/Townsend Street	-	-	-	-	-
Washington Street NB thru/right	A	0.0	0.41	-	0
Washington Street SB left/thru	A	4.9	0.19	-	18
Walnut Avenue/Elmore Street/Munroe Street	-	-	-	-	-
Elmore Street EB left/thru/right	C	15.1	0.17	-	15
Munroe Street WB left/right	B	12.8	0.13	-	11
Walnut Avenue NB thru/right	A	0.0	0.31	-	0
Walnut Avenue SB left/thru	A	0.2	0.00	-	0
Walnut Avenue/Harrishof Street	-	-	-	-	-
Harrishof Street EB left/thru/right	C	24.0	0.06	-	5
Walnut Avenue NB left/thru/right	A	0.1	0.00	-	0
Walnut Avenue SB left/thru/right	A	1.3	0.04	-	3

Grey Shading indicates LOS E or F.

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

95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.

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

Table 2-4 Existing (2016) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Washington Street/Marcella Street/Brinton Street	**D**	**41.8**	-	-	-
Marcella Street EB left/thru/right	E	57.0	0.96	314	#544
Brinton Street WB left/thru/right	B	14.8	0.04	6	21
Washington Street NB left	D	50.8	0.78	53	m#199
Washington Street NB thru	C	23.0	0.47	110	213
Washington Street SB thru	D	41.6	0.67	326	m353
Washington Street SB right	C	22.8	0.27	75	m89
Washington Street/Dimock Street	**C**	**28.0**	-	-	-
Dimock Street EB left/right	E	55.5	0.84	167	227
Washington Street NB left/thru	C	22.0	0.55	212	342
Washington Street SB thru/right	B	14.0	0.44	90	m169
Martin Luther King Jr. Boulevard/Walnut Avenue	**C**	**30.1**	-	-	-
Martin Luther King Jr. Blvd EB left	D	46.5	0.45	42	117
Martin Luther King Jr. Blvd EB thru | thru	C	21.7	0.29	71	184
Martin Luther King Jr. Blvd EB right	A	0.1	0.09	0	0
Martin Luther King Jr. Blvd WB left	D	46.1	0.39	34	99
Martin Luther King Jr. Blvd WB thru | thru/right	C	22.1	0.23	53	144
Walnut Avenue NB left	E	66.5	0.80	59	#229
Walnut Avenue NB thru/right	C	29.8	0.38	63	178
Walnut Avenue SB left/thru/right	D	39.0	0.70	131	#317
Townsend Street/Walnut Avenue	**C**	**21.6**	-	-	-
Townsend Street EB left/thru/right	C	30.5	0.79	110	#304
Townsend Street WB left/right	C	29.2	0.70	23	#133
Walnut Avenue NB thru/right	B	11.4	0.28	37	133
Walnut Avenue SB left/thru	B	15.7	0.52	89	287
Unsignalized Intersections					
Washington Street/Townsend Street	-	-	-	-	-
Washington Street NB thru/right	A	0.0	0.36	-	0
Washington Street SB left/thru	A	8.6	0.40	-	49
Walnut Avenue/Elmore Street/Munroe Street	-	-	-	-	-
Elmore Street EB left/thru/right	C	15.8	0.14	-	12
Munroe Street WB left/right	B	12.0	0.12	-	10
Walnut Avenue NB thru/right	A	0.0	0.16	-	0
Walnut Avenue SB left/thru	A	0.9	0.03	-	2
Walnut Avenue/Harrishof Street	-	-	-	-	-
Harrishof Street EB left/thru/right	C	19.6	0.05	-	4
Walnut Avenue NB left/thru/right	A	0.0	0.00	-	0
Walnut Avenue SB left/thru/right	A	0.8	0.03	-	2

Grey Shading indicates LOS E or F.

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

95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.

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

As shown in Table 2-3 and Table 2-4, the majority of intersections and approaches operate well within a desirable LOS under the Existing (2016) Condition with the following exceptions:

- The signalized intersection of **Washington Street/Marcella Street/Brinton Street** operates at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour. The Marcella Street eastbound approach operates at LOS D during the a.m. peak hour and LOS E during the p.m. peak hour. The longest queues at the intersection occur at the Marcella Street eastbound approach during the a.m. peak hour and p.m. peak hours.

- The signalized intersection of **Washington Street/Dimock Street** operates at LOS C during both the a.m. and p.m. peak hours. The Dimock Street eastbound approach operates at LOS E during the p.m. peak hour. The longest queues at the intersection occur at the Washington Street northbound approach during both peak hours.

- The signalized intersection of **Martin Luther King Jr. Boulevard/Walnut Avenue** operates at LOS C during both the a.m. and p.m. peak hours. The Walnut Avenue northbound approach operates at LOS E during the p.m. peak hour. The longest queues at the intersection occur at the Walnut Avenue northbound approach during the a.m. peak hour and the southbound approach during the p.m. peak hour.

2.3 No-Build (2023) Condition

The No-Build (2023) 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 may include roadway, public transportation, pedestrian or bicycle improvements.

2.3.1 Background Traffic Growth

The methodology to account for generic future background traffic growth, independent of this Project, may be affected by changes in demographics, smaller scale development projects, or projects unforeseen at this time. Based on a recent review of contemporary and historic traffic data, and to account for any additional unforeseen traffic growth, a traffic growth rate of one-half percent per year, compounded annually, was used.

2.3.2 Specific Development Traffic Growth

Traffic volumes associated with known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. Four such projects were specifically accounted for in the traffic volumes for future scenarios, while others were included in the general background traffic growth (the background projects are mapped on Figure 2-10):

Bartlett Place – This project consists of a multiple phase mixed-use development with approximately 20,000 sf of retail, 323 residential units, 22,000 sf of office space, and a 13,000 sf grocery store. Bartlett Place has been approved for development by the BPDA.

Bridge Boston Charter School – This project calls for the renovation of the former Roxbury Comprehensive Health Center into the new Bridge Boston Charter School. The project is currently under construction.

1785 Columbus Avenue – The proposed project will consist of the demolition of the two existing buildings and the construction of a five story social services building, primarily housing the Horizons for Homeless Children daycare center and supplemental office space as well as other social services. In addition, the project will include a small retail component and 146 underground parking spaces. This project is under review by the BPDA.

Amory Street Apartments – This project calls for the redevelopment of the BHA parcel located at 125 Amory Street. The redevelopment includes rehabilitating the current building and the construction of approximately 280 new residential units. This project is in early planning stages.

2.3.3 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. Based on this review, it was determined that no roadway improvements in the vicinity of the study area are being planned.

2.3.4 No-Build Traffic Volumes

To develop the No-Build (2023) Condition traffic volumes, the one-half percent per year annual growth rate, compounded annually, was applied to the Existing (2016) Condition traffic volumes, and the traffic volumes associated with the background development projects listed above were added.. The No-Build (2023) weekday morning and evening peak hour traffic volumes are shown on Figures 2-11 and Figure 2-12, respectively.

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Figure 2-10
Specific Background Project Locations

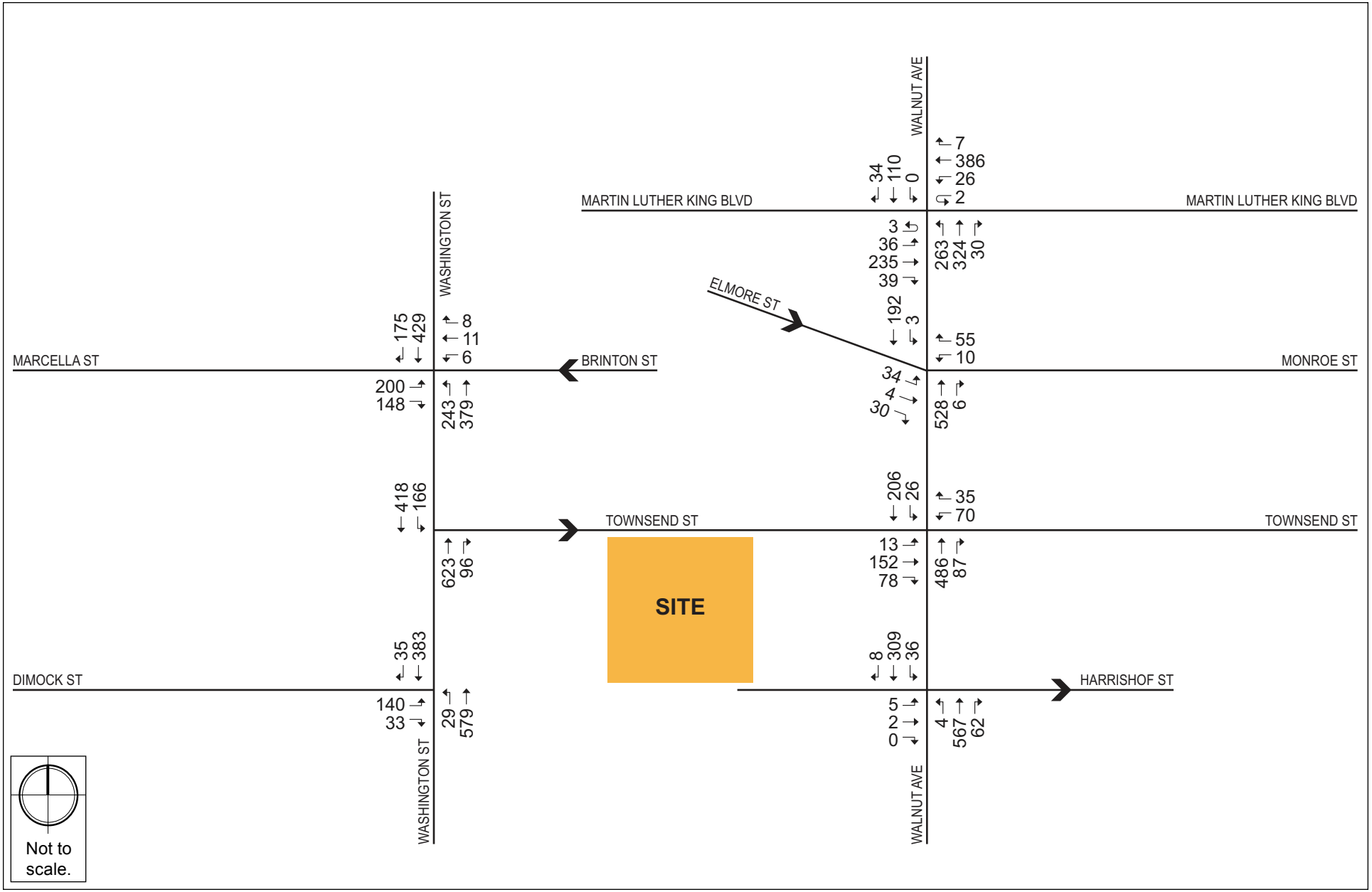

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Figure 2-11
No-Build (2023) Condition Traffic Volumes, Weekday a.m. Peak Hour

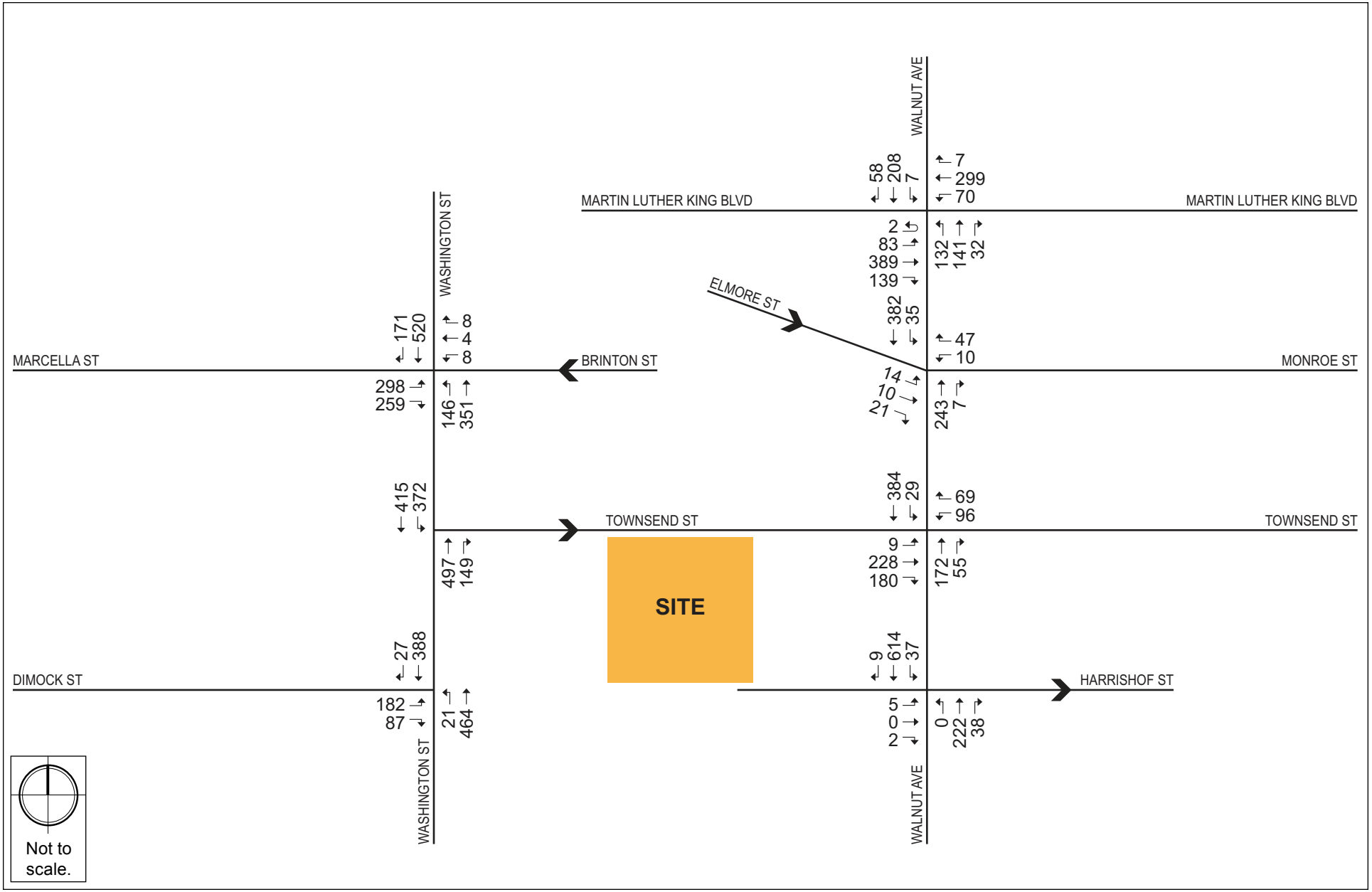

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Figure 2-12
No-Build (2023) Condition Traffic Volumes, Weekday p.m. Peak Hour

2.3.5 No-Build (2023) Condition Traffic Operations Analysis

The No-Build (2023) Condition analysis uses the same methodology as the Existing (2016) Condition capacity analysis, described above. Tables 2-5 and Table 2-6 present the No-Build (2023) Condition operations analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a decrease in LOS between the Existing (2016) Condition and the No-Build (2023) Condition to an LOS below LOS D. The detailed analysis sheets are provided in Appendix C.

Table 2-5 No-Build (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Washington Street/Marcella Street/Brinton Street	**C**	**25.0**	-	-	-
Marcella St EB left/right	D	54.6	0.90	176	#306
Brinton St WB left/thru/right	C	20.5	0.07	9	29
Washington Street NB left	C	24.8	0.67	60	#306
Washington Street NB thru	B	13.9	0.47	94	190
Washington Street SB thru	B	18.4	0.47	248	226
Washington Street SB right	B	10.2	0.22	30	m69
Washington Street/Dimock Street	**C**	**23.1**	-	-	-
Dimock Street EB left/right	D	53.1	0.72	109	171
Washington Street NB left/thru	C	21.1	0.66	309	#574
Washington Street SB thru/right	B	13.5	0.46	65	m235
Martin Luther King Jr. Boulevard/Walnut Avenue	**C**	**27.4**	-	-	-
Martin Luther King Jr. Blvd EB left	D	44.2	0.26	19	63
Martin Luther King Jr. Blvd EB thru | thru	B	18.9	0.17	29	106
Martin Luther King Jr. Blvd EB right	A	0.1	0.04	0	0
Martin Luther King Jr. Blvd WB left	D	44.0	0.20	14	50
Martin Luther King Jr. Blvd WB thru | thru/right	C	21.8	0.32	72	177
Walnut Avenue NB left	D	39.1	0.69	119	#378
Walnut Avenue NB thru/right	C	32.8	0.63	154	#439
Walnut Avenue SB left/thru/right	C	24.8	0.26	52	152
Townsend Street/Walnut Avenue	**B**	**17.4**	-	-	-
Townsend Street EB left/thru/right	C	26.1	0.64	61	163
Townsend Street WB left/right	B	15.2	0.46	7	54
Walnut Avenue NB thru/right	B	16.9	0.66	96	#490
Walnut Avenue SB left/thru	B	10.5	0.29	31	150
Washington Street/Townsend Street	-	-	-	-	-
Washington Street NB thru/right	A	0.0	0.46	-	0
Washington Street SB left/thru	A	5.6	0.23	-	22

Table 2-5 No-Build (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour (Continued)

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Unsignalized Intersections					
Walnut Avenue/Elmore Street/Munroe Street	-	-	-	-	-
Elmore Street EB left/thru/right	C	15.8	0.18	-	16
Munroe Street WB left/right	B	13.1	0.14	-	12
Walnut Avenue NB thru/right	A	0.0	0.33	-	0
Walnut Avenue SB left/thru	A	0.2	0.00	-	0
Walnut Avenue/Harrishof Street	-	-	-	-	-
Harrishof Street EB left/thru/right	D	25.5	0.06	-	5
Walnut Avenue NB left/thru/right	A	0.1	0.00	-	0
Walnut Avenue SB left/thru/right	A	1.4	0.04	-	3

Grey Shading indicates decrease to LOS E or F.

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

95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.

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

Table 2-6 No-Build (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Washington Street/Marcella Street/Brinton Street	**D**	**52.4**	-	-	-
Marcella Street EB left/right	E	57.9	0.97	~342	#573
Brinton Street WB left/thru/right	B	14.8	0.04	6	21
Washington Street NB left	F	>80.0	>1.00	~123	m#242
Washington Street NB thru	C	26.5	0.57	138	250
Washington Street SB thru	D	45.2	0.78	370	m372
Washington Street SB right	C	22.4	0.29	78	m85
Washington Street/Dimock Street	**C**	**28.2**	-	-	-
Dimock Street EB left/right	E	55.5	0.83	166	252
Washington Street NB left/thru	C	23.5	0.61	242	391
Washington Street SB thru/right	B	15.2	0.50	122	m189
Martin Luther King Jr. Boulevard/Walnut Avenue	**C**	**30.0**	-	-	-
Martin Luther King Jr. Blvd EB left	D	46.1	0.46	42	119
Martin Luther King Jr. Blvd EB thru | thru	C	21.5	0.29	71	190
Martin Luther King Jr. Blvd EB right	A	0.1	0.10	0	0
Martin Luther King Jr. Blvd WB left	D	45.8	0.40	34	102
Martin Luther King Jr. Blvd WB thru | thru/right	C	21.9	0.24	53	150
Walnut Avenue NB left	E	68.4	0.82	61	#234
Walnut Avenue NB thru/right	C	30.8	0.41	68	190
Walnut Avenue SB left/thru/right	D	38.5	0.68	121	#337

Table 2-6 No-Build (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour (Continued)

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Townsend Street/Walnut Avenue	**C**	**22.9**	-	-	-
Townsend Street EB left/thru/right	C	30.6	0.79	119	#330
Townsend Street WB left/right	C	34.1	0.75	28	#156
Walnut Avenue NB thru/right	B	12.0	0.30	41	138
Walnut Avenue SB left/thru	B	16.9	0.55	98	301
Unsignalized Intersections					
Washington Street/Townsend Street	-	-	-	-	-
Washington Street NB thru/right	A	0.0	0.40	-	0
Washington Street SB left/thru	A	9.9	0.45	-	59
Walnut Avenue/Elmore Street/Munroe Street	-	-	-	-	-
Elmore Street EB left/thru/right	C	16.0	0.15	-	13
Munroe Street WB left/right	B	12.2	0.13	-	11
Walnut Avenue NB thru/right	A	0.0	0.17	-	0
Walnut Avenue SB left/thru	A	1.0	0.03	-	2
Walnut Avenue/Harrishof Street	-	-	-	-	-
Harrishof Street EB left/thru/right	C	20.7	0.05	-	4
Walnut Avenue NB left/thru/right	A	0.0	0.00	-	0
Walnut Avenue SB left/thru/right	A	0.8	0.03	-	2

Grey Shading indicates decrease to LOS E or F.
~ 50th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.

As shown in Table 2-5 and Table 2-6, the following operational deficiencies are expected under the No-Build (2023) Condition:

- The signalized intersection of **Washington Street/Marcella Street/Brinton Street** will continue to operate at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour. The Washington Street northbound left-turn lane will decrease to LOS F during the p.m. peak hour. The longest queues at the intersection will continue to occur at the Washington Street northbound approach during both the a.m. and p.m. peak hours.

2.4 Build (2023) Condition

As previously mentioned, the proposed Project will consist of the demolition of the former Radius Hospital and the construction of approximately 322 residential units, a 1,500 sf café, and a 3,000 sf co-work office space. Parking between the Townsend and Harrishof wings will provide approximately 220 parking spaces.

2.4.1 Site Access and Vehicle Circulation

Vehicular access to the garage will be provided via a new driveway connecting Townsend Street and Harrishof Street. Vehicles will be able to access the driveway and enter or exit the garage from both Townsend Street and Harrishof Street. Vehicle pick-up/drop-off area will be provided at the end of Harrishof Street.. Primary pedestrian access is located along Townsend Street, with additional access provided off of Harrishof Street. The site plan is shown in Figure 2-13.

2.4.2 Project Parking

The parking goals developed by the BTD for this section of Roxbury are a maximum of 1.00 to 1.50 parking spaces per residential unit. With on-site parking for approximately 217 vehicles, the Project will have a parking ratio of 0.7 spaces per residential unit.

2.4.3 Loading and Service Accommodations

A loading and delivery area will be accessed via the driveway off of Townsend Street. Delivery estimates for the residential building were based on data provided in the Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study (CTPS) Area report[1]. Deliveries to the Project Site will be limited to mostly SU-36 trucks and smaller delivery vehicles.

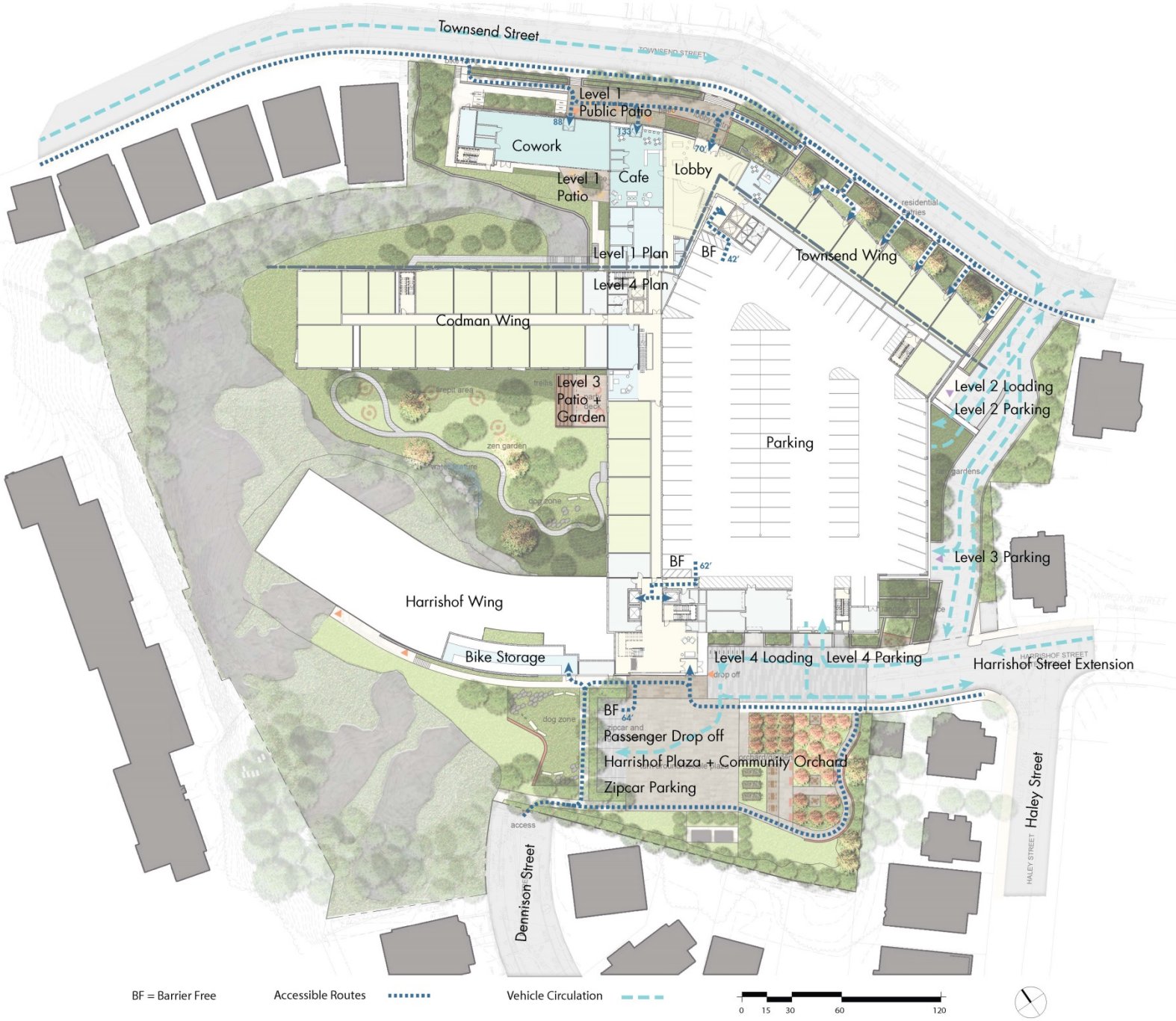
Residential - Residential units primarily generate delivery trips related to small packages and prepared food. Based on the CTPS report, residential uses generate approximately 0.01 light truck trips per 1,000 sf of gross floor area and 0.001 medium/heavy truck trips per 1,000 sf of gross floor area.

A summary of anticipated loading/service activity by land use is presented in Table 2-7.

Table 2-7 Expected Delivery Activity

Land Use	*Number of Deliveries*	*General Delivery Times*
Residential/Commercial	4	10% before 7:00 a.m. 70% between 7:00 a.m. and 1:00 p.m. 20% after 1:00 p.m.

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



45 Townsend Street **Boston, Massachusetts**

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Figure 2-13
Site Access Plan

Based on the CTPS data and John Hancock data, the Project is expected to generate approximately four deliveries per day, one of which is expected to be a medium/heavy truck. It is anticipated that the majority of these deliveries will occur between 7:00 a.m. and 1:00 p.m. The numbers do not include trash truck trips.

2.4.4 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*[2] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

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

Land Use Code 200 – Apartment. The apartment land use includes rental dwelling units located within the same building with at least three other dwelling units. Calculations of the number of trips use ITE's average rate per residential unit.

Land Use Code 710 – General Office Building. The General Office Building land use code is defined as a building with multiple tenants where affairs of business, industrial organizations, professional persons, or firms are conducted. Calculations of the number of trips use ITE's average rate per 1,000 sf. For the Proposed Project, the General Office Building trip generation estimates are used for the proposed 3,000 sf of Co-working space.

Land Use Code 820 – Shopping Center. The Shopping Center land use code is defined as an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Shopping center trip generation estimates are based on average vehicle rates per square footage of retail space. Calculations of the number of trips use ITE's average rate per 1,000 sf. For the Proposed Project, the Shopping Center trip generation estimates are used for the proposed 1,500 sf Café.

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

2.4.5 Mode Share

BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located in the westerly portion of designated Area 15 – South End/Roxbury. The daily residential mode shares were based on US Census Journey to Work data. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[3]. The person trips were then distributed to different modes according to the mode shares shown in Table 2-8.

Table 2-8 Travel Mode Share

Land Use		*Walk/Bicycle Share*	*Transit Share*	*Auto Share*	*Vehicle Occupancy Rate*
Daily					
Residential	In	26%	17%	57%	1.13
	Out	26%	17%	57%	1.13
Office	In	18%	24%	58%	1.13
	Out	18%	24%	58%	1.13
Retail	In	35%	12%	53%	1.78
	Out	35%	12%	53%	1.78
a.m. Peak					
Residential	In	27%	19%	54%	1.13
	Out	27%	29%	44%	1.13
Office	In	18%	27%	55%	1.13
	Out	17%	40%	43%	1.13
Retail	In	36%	13%	51%	1.78
	Out	37%	21%	42%	1.78
p.m. Peak					
Residential	In	27%	29%	44%	1.13
	Out	27%	19%	54%	1.13
Office	In	17%	40%	43%	1.13
	Out	18%	27%	55%	1.13
Retail	In	37%	21%	42%	1.78
	Out	36%	13%	51%	1.78

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

2.4.6 Project Trip Generation

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

Table 2-9 Project Trip Generation

Land Use		*Walk/Bicycle Trips*	*Transit Trips*	*Vehicle Trips*
Daily				
Residential[1]	In	314	206	611
	Out	314	206	611
Office[2]	In	3	5	10
	Out	3	5	10
Retail[3]	In	20	7	17
	Out	20	7	17
Total	In	337	218	638
	Out	337	218	638
a.m. Peak Hour				
Residential	In	10	7	18
	Out	40	43	58
Office	In	1	1	3
	Out	1	0	0
Retail	In	1	0	1
	Out	1	0	1
Total	In	12	8	22
	Out	42	43	59
p.m. Peak Hour				
Residential	In	39	43	58
	Out	21	15	38
Office	In	1	0	0
	Out	1	1	3
Retail	In	2	1	1
	Out	1	1	2
Total	In	42	44	59
	Out	23	17	43

1. ITE Trip Generation Rate, 9th Edition, LUC 220 (Apartment), 322 units.
2. ITE Trip Generation Rate, 9th Edition, LUC 710 (General Office Building), 3,000 square feet.
3. ITE Trip Generation Rate, 9th Edition, LUC 820 (Shopping Center), 1,500 square feet.

As shown in Table 2-9, there is expected to be 674 new pedestrian/bicycle trips, 436 new transit trips, and 1,276 new vehicle trips throughout the day. During the a.m. peak hour, there is expected to be 54 pedestrian trips (12 in and 42 out), 51 transit trips (8 in and 43 out), and 81 vehicle trips (22 in and 59 out). During the p.m. peak hour, there is expected to be 65 pedestrian trips (42 in and 23 out), 61 transit trips (44 in and 17 out), and 102 vehicle trips (59 in and 43 out).

2.4.7 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 15 and trip distribution patterns presented in traffic studies for nearby projects. The trip distribution patterns for the Project are illustrated in Figure 2-14 and Figure 2-15.

2.4.8 Build Traffic Volumes

The vehicle trips were distributed through the study area. The Project-generated trips for the a.m. and p.m. peak hours are shown in Figure 2-16 and Figure 2-17, respectively. The trip assignments were added to the No-Build (2023) Condition vehicular traffic volumes to develop the Build (2023) Condition vehicular traffic volumes. The Build (2023) Condition a.m. and p.m. peak hour traffic volumes are shown on Figure 2-18 and Figure 2-19, respectively.

2.4.9 Bicycle Accommodations

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements to provide secure bicycle parking for residents and short-term bicycle racks for visitors. Based on BTD guidelines, the Project will supply a secure bicycle parking/storage space for each residential unit in addition to public bicycle racks located throughout the Project Site.

2.4.10 Build Condition Traffic Operations Analysis

The Build (2023) Condition analysis uses the same methodology as the Existing (2016) Condition and No-Build (2023) Condition analysis. Table 2-10 and Table 2-11 present the Build (2023) Condition capacity analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a worsening in LOS between the No-Build (2023) Condition and the Build (2023) Condition. The detailed analysis sheets are provided in Appendix C.

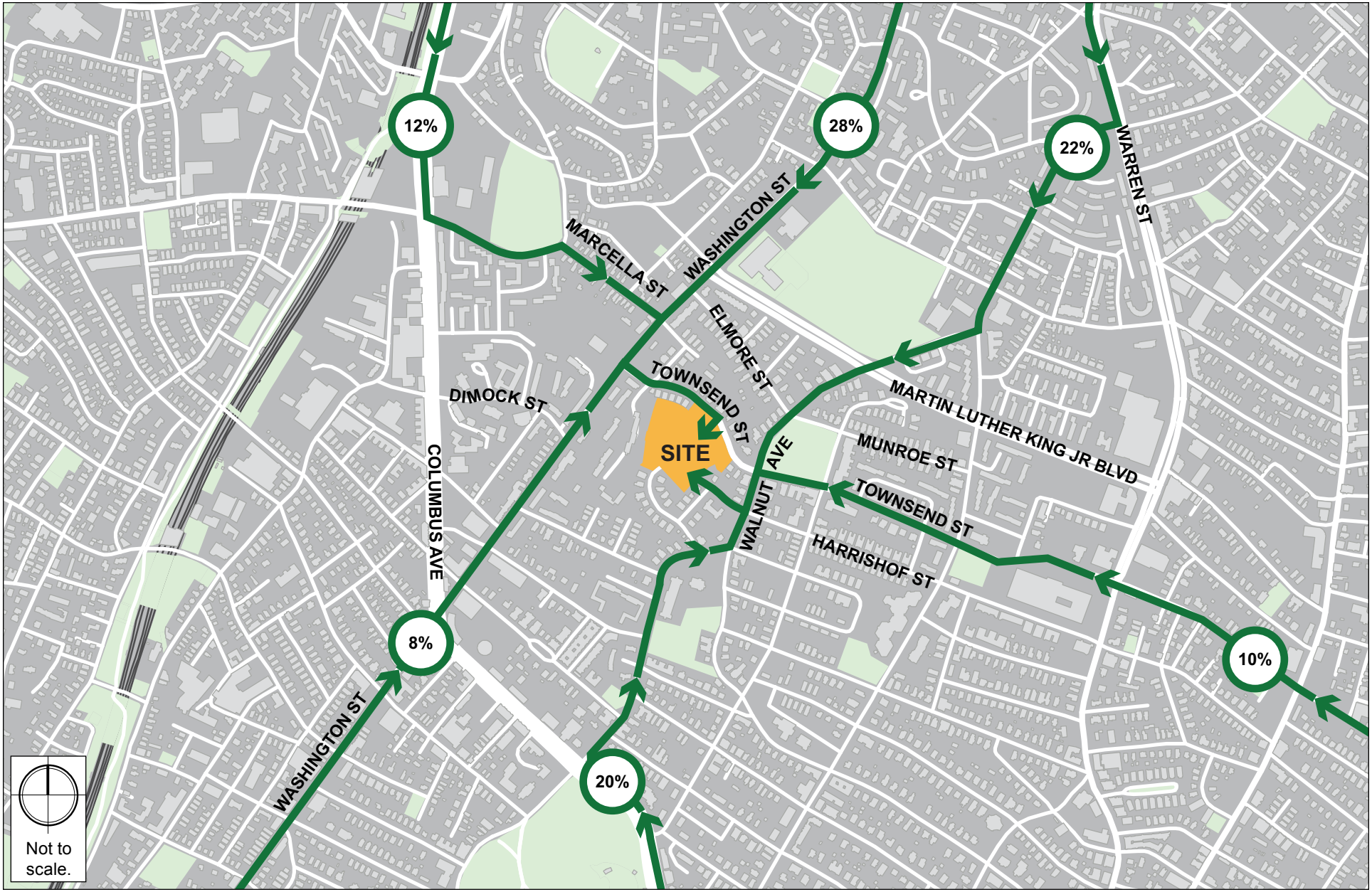

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Figure 2-14
Entering Vehicle Trip Distribution

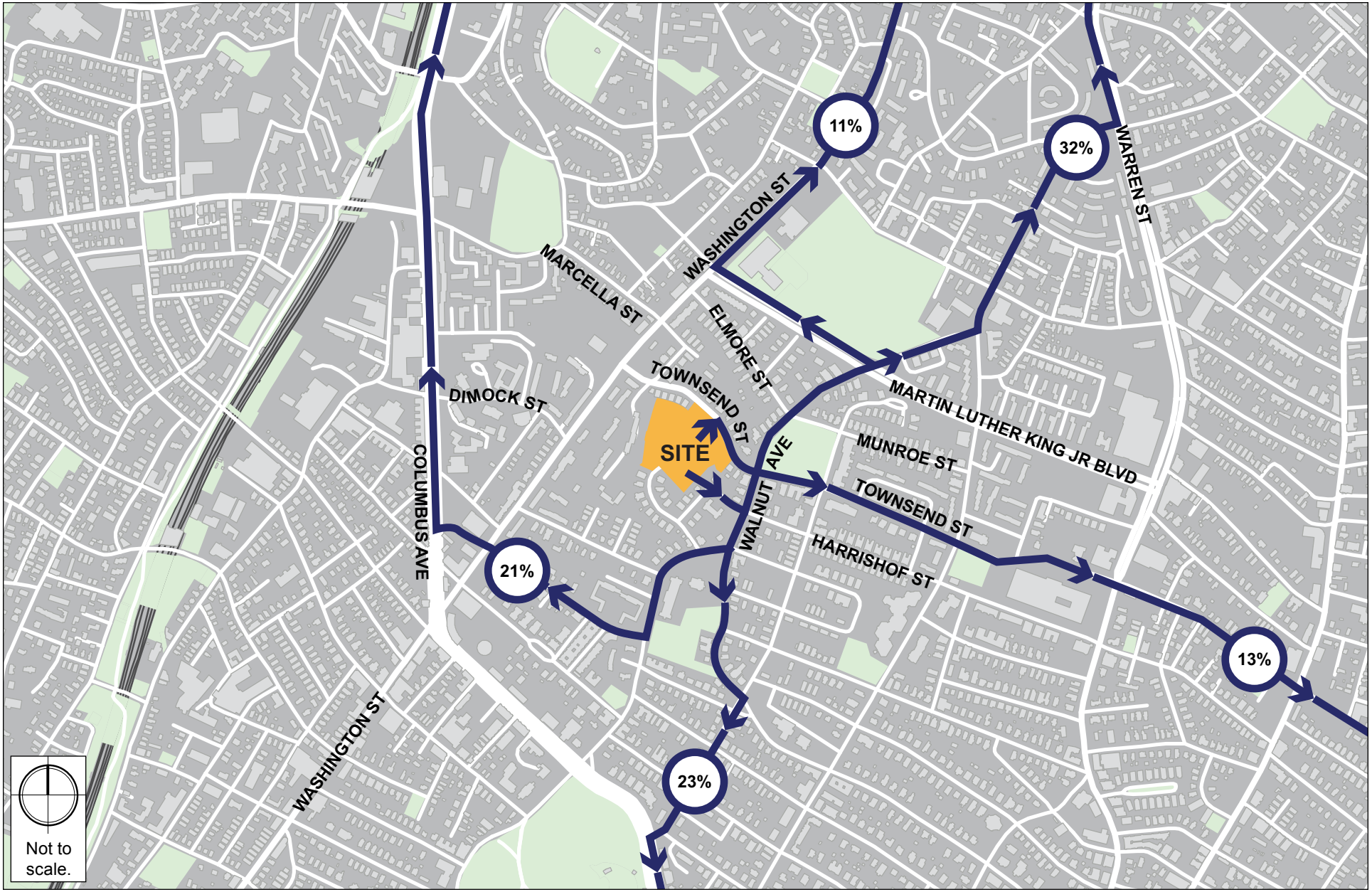

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Figure 2-15
Exiting Vehicle Trip Distribution

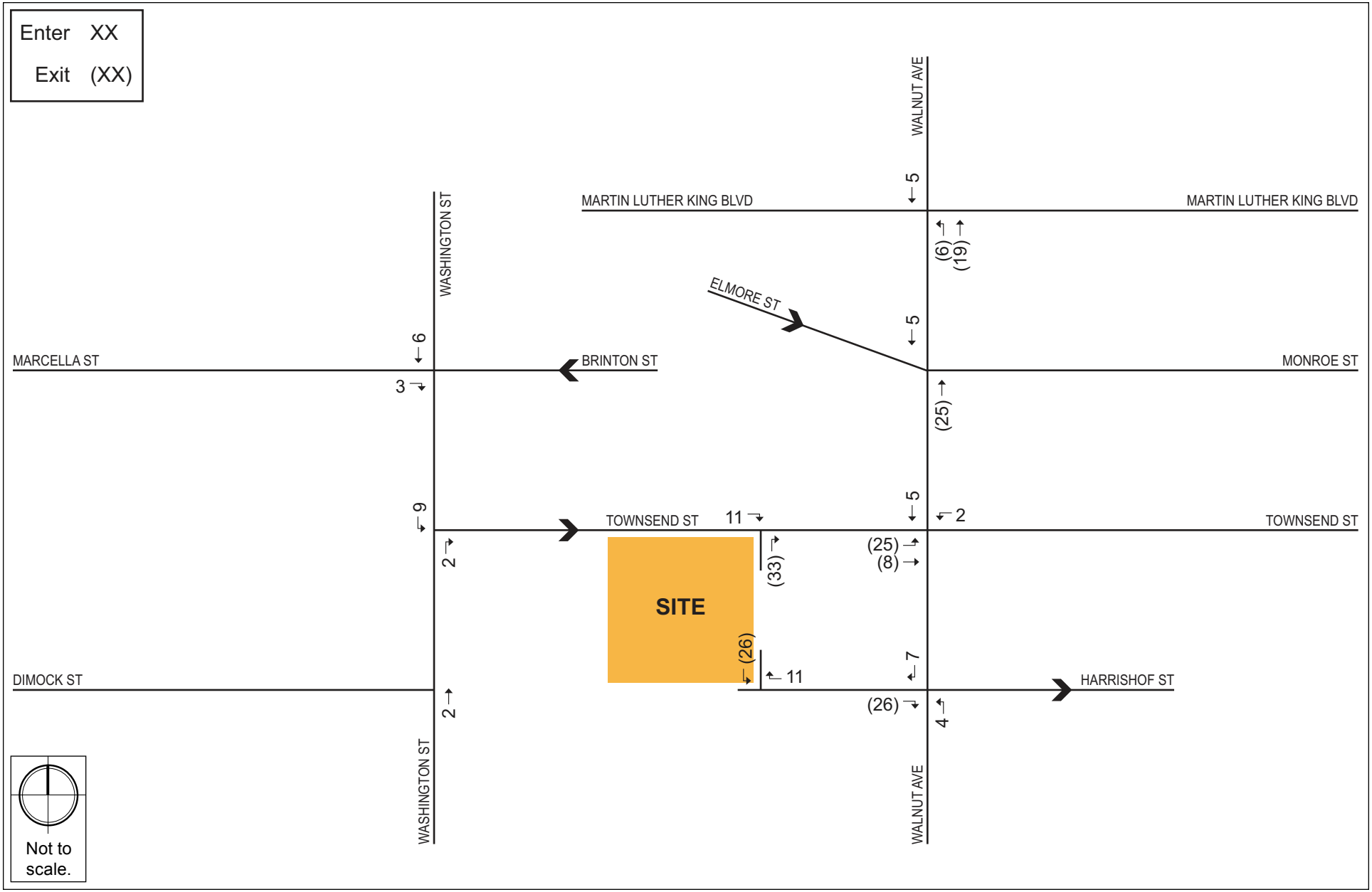

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Figure 2-16
Project-generated Vehicle Trips, Weekday a.m. Peak Hour

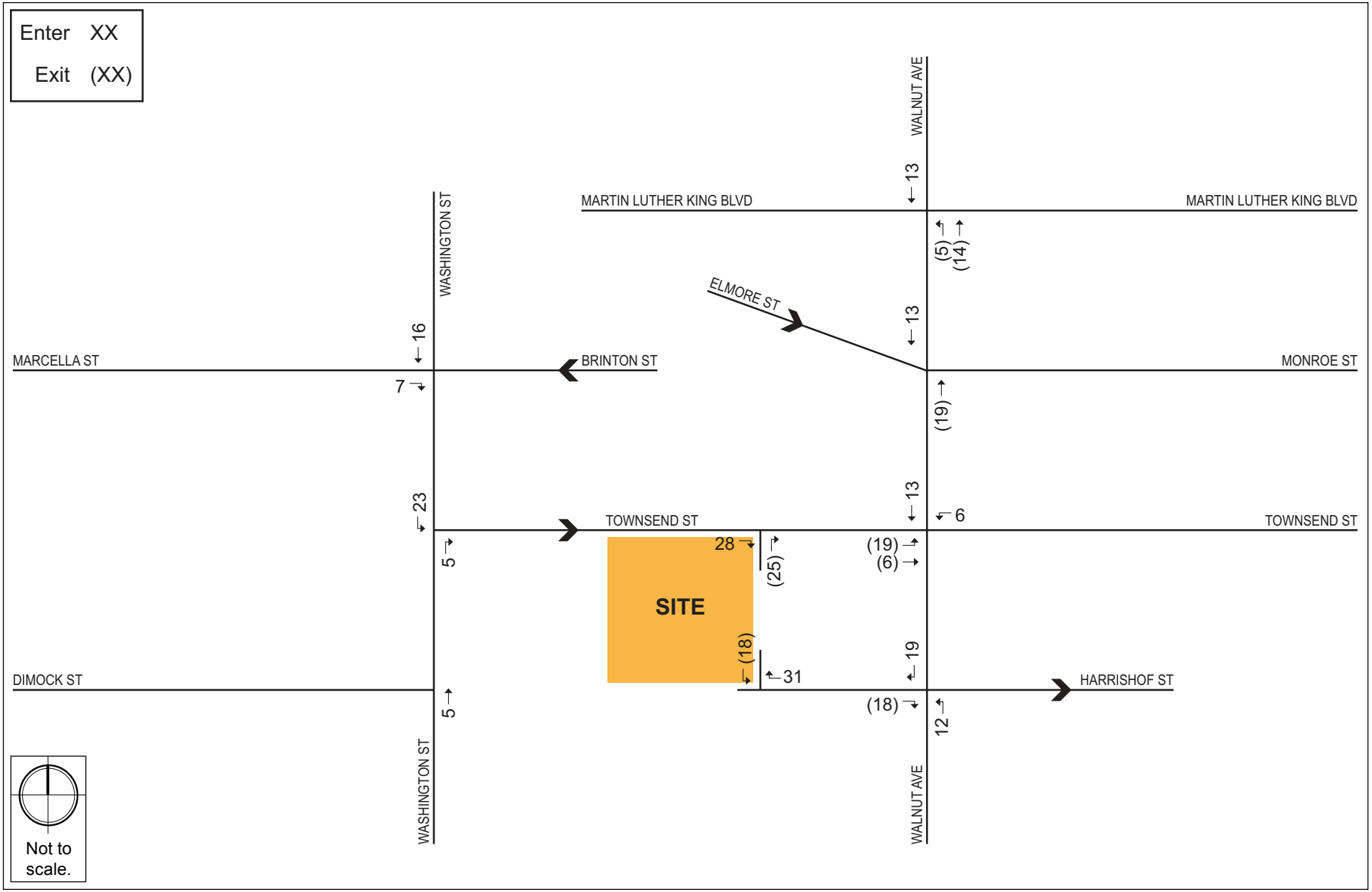

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Figure 2-17
Project-generated Vehicle Trips, Weekday p.m. Peak Hour

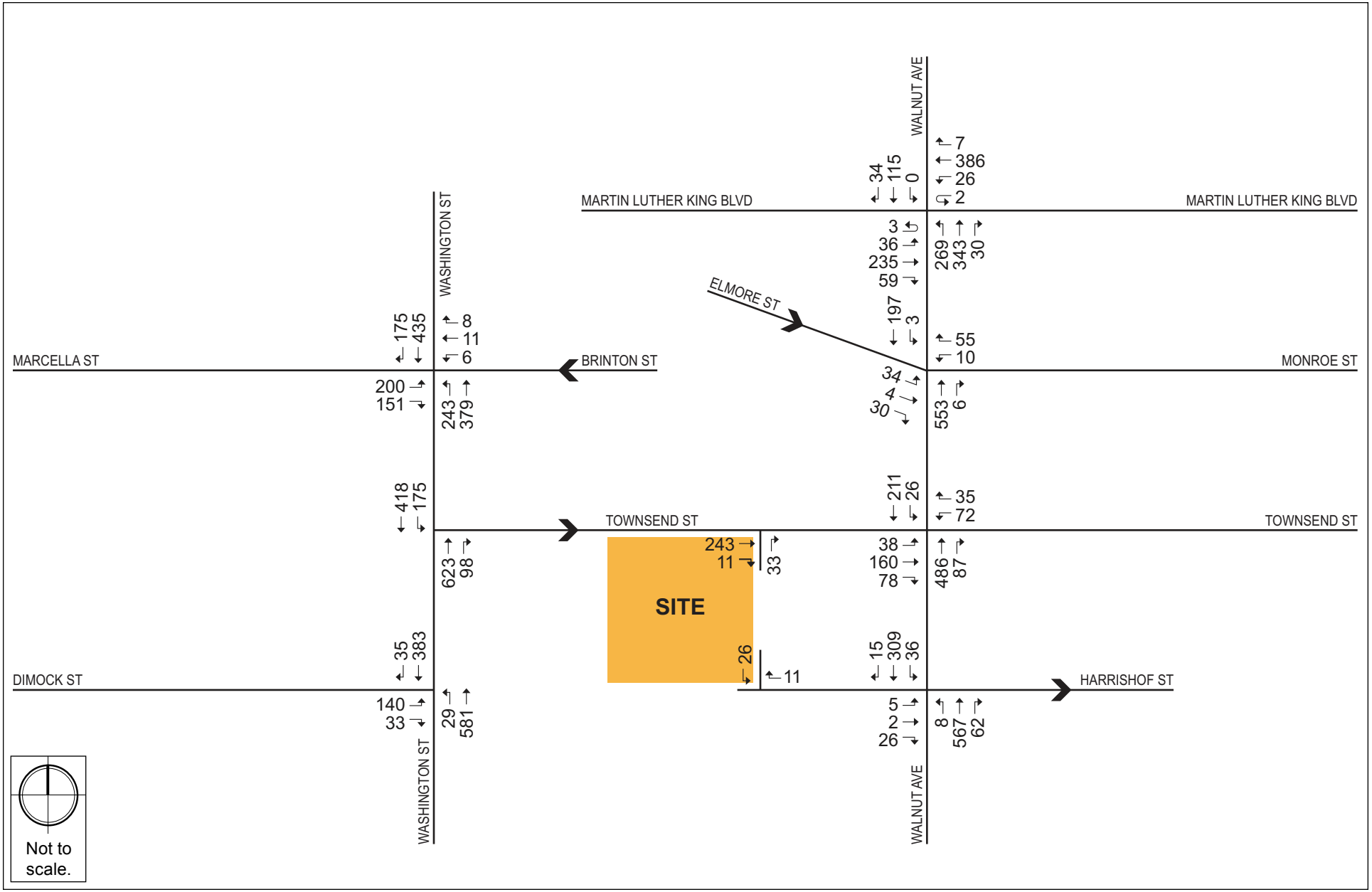

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Figure 2-18
Build (2023) Condition Traffic Volumes, Weekday a.m. Peak Hour

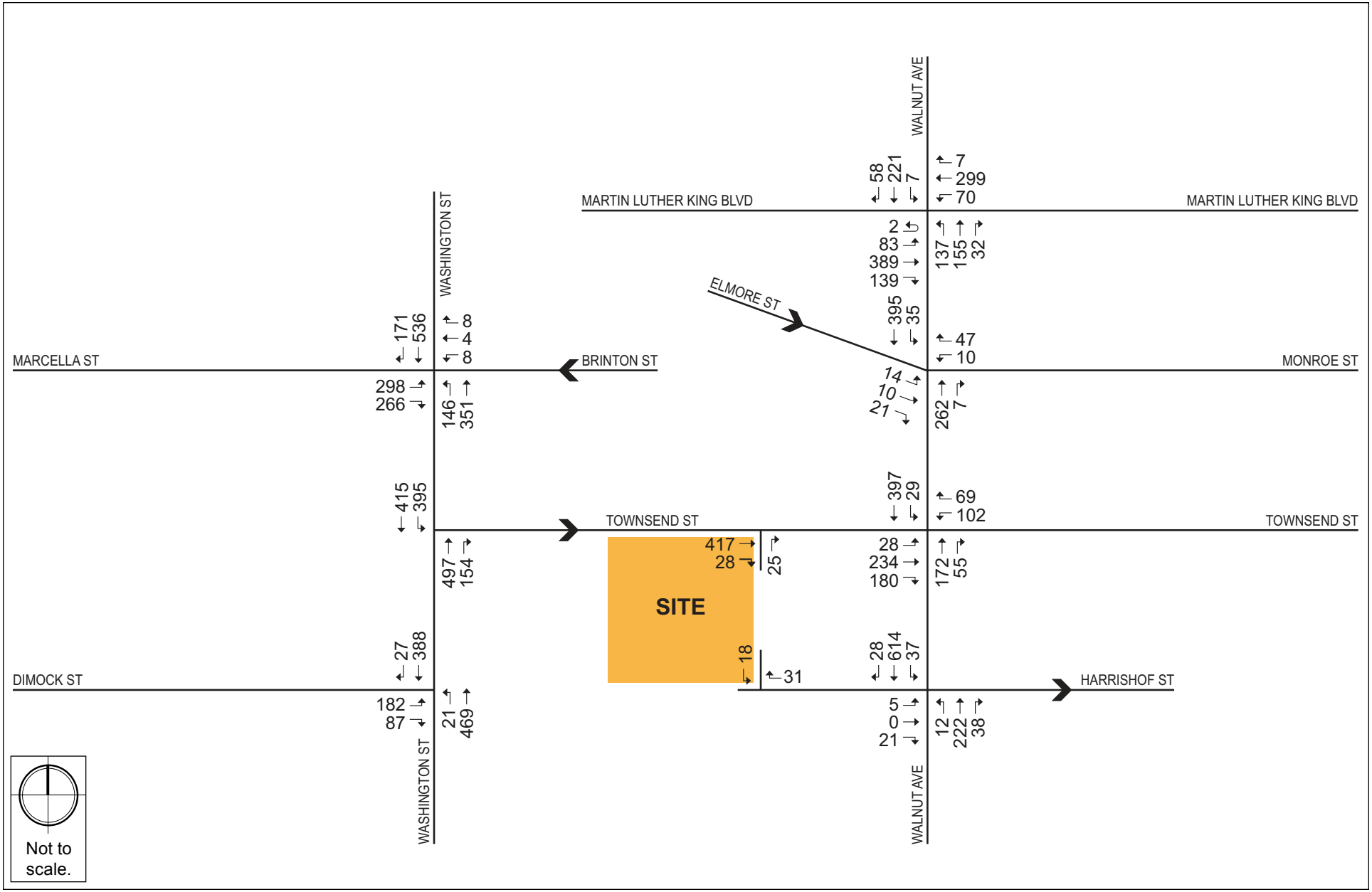

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Figure 2-19
Build (2023) Condition Traffic Volumes, Weekday p.m. Peak Hour

Table 2-10 Build (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Washington Street/Marcella Street/Brinton Street	**C**	**25.3**	-	-	-
Marcella Street EB left/right	D	54.9	0.90	177	#312
Brinton Street WB left/thru/right	C	20.5	0.07	9	29
Washington Street NB left	C	25.9	0.69	61	#309
Washington Street NB thru	B	14.0	0.47	94	190
Washington Street SB thru	B	18.7	0.48	258	238
Washington Street SB right	B	10.2	0.22	30	m69
Washington Street/Dimock Street	**C**	**23.2**	-	-	-
Dimock Street EB left/right	D	53.1	0.72	109	171
Washington Street NB left/thru	C	21.1	0.66	311	#576
Washington Street SB thru/right	B	13.8	0.46	70	m236
Martin Luther King Jr. Boulevard/Walnut Avenue	**C**	**28.0**	-	-	-
Martin Luther King Jr. Blvd EB left	D	44.2	0.26	19	63
Martin Luther King Jr. Blvd EB thru | thru	B	18.9	0.17	29	106
Martin Luther King Jr. Blvd EB right	A	0.1	0.04	0	0
Martin Luther King Jr. Blvd WB left	D	44.0	0.20	14	50
Martin Luther King Jr. Blvd WB thru | thru/right	C	21.8	0.32	72	177
Walnut Avenue NB left	D	40.4	0.72	123	#389
Walnut Avenue NB thru/right	C	33.9	0.66	166	#472
Walnut Avenue SB left/thru/right	C	24.9	0.27	54	157
Townsend Street/Walnut Avenue	**B**	**18.9**	-	-	-
Townsend Street EB left/thru/right	C	28.6	0.70	74	190
Townsend Street WB left/right	B	14.7	0.46	8	55
Walnut Avenue NB thru/right	B	18.3	0.68	105	#510
Walnut Avenue SB left/thru	B	11.4	0.30	34	160
Unsignalized Intersections					
Washington Street/Townsend Street	-	-	-	-	-
Washington Street NB thru/right	A	0.0	0.47	-	0
Washington Street SB left/thru	A	5.9	0.24	-	24
Walnut Avenue/Elmore Street/Munroe Street	-	-	-	-	-
Elmore Street EB left/thru/right	C	16.1	0.19	-	17
Munroe Street WB left/right	B	13.4	0.14	-	12
Walnut Avenue NB thru/right	A	0.0	0.34	-	0
Walnut Avenue SB left/thru	A	0.2	0.00	-	0
Walnut Avenue/Harrishof Street	-	-	-	-	-
Harrishof Street EB left/thru/right	B	14.3	0.13	-	11
Walnut Avenue NB left/thru/right	A	0.2	0.01	-	1
Walnut Avenue SB left/thru/right	A	1.4	0.04	-	3

Grey Shading indicates decrease to LOS E or F.

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

95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.

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

Table 2-11 Build (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Washington Street/Marcella Street/Brinton Street	**E**	**60.3**	-	-	-
Marcella Street EB left/right	E	57.3	0.97	~369	#582
Brinton Street WB left/thru/right	B	14.8	0.04	6	21
Washington Street NB left	F	>80.0	>1.00	~135	m#254
Washington Street NB thru	C	27.0	0.58	139	250
Washington Street SB thru	D	46.7	0.81	383	m380
Washington Street SB right	C	22.1	0.29	78	m83
Washington Street/Dimock Street	**C**	**28.3**	-	-	-
Dimock Street EB left/right	E	55.5	0.83	166	252
Washington Street NB left/thru	C	23.7	0.61	246	397
Washington Street SB thru/right	B	15.3	0.50	127	m182
Martin Luther King Jr. Boulevard/Walnut Avenue	**C**	**28.8**	-	-	-
Martin Luther King Jr. Blvd EB left	D	48.9	0.49	45	119
Martin Luther King Jr. Blvd EB thru | thru	C	23.3	0.32	78	190
Martin Luther King Jr. Blvd EB right	A	0.1	0.10	0	0
Martin Luther King Jr. Blvd WB left	D	48.3	0.43	36	102
Martin Luther King Jr. Blvd WB thru | thru/right	C	23.5	0.27	58	150
Walnut Avenue NB left	D	48.1	0.67	64	#241
Walnut Avenue NB thru/right	C	29.1	0.36	75	206
Walnut Avenue SB left/thru/right	D	35.1	0.63	145	#363
Townsend Street/Walnut Avenue	**C**	**23.7**	-	-	-
Townsend Street EB left/thru/right	C	31.7	0.80	131	#368
Townsend Street WB left/right	C	31.6	0.73	31	#163
Walnut Avenue NB thru/right	B	12.5	0.30	48	138
Walnut Avenue SB left/thru	B	18.4	0.59	122	#343
Unsignalized Intersections					
Washington Street/Townsend Street	-	-	-	-	-
Washington Street NB thru/right	A	0.0	0.40	-	0
Washington Street SB left/thru	B	10.6	0.48	-	67
Walnut Avenue/Elmore Street/Munroe Street	-	-	-	-	-
Elmore Street EB left/thru/right	C	16.4	0.16	-	14
Munroe Street WB left/right	B	12.4	0.13	-	12
Walnut Avenue NB thru/right	A	0.0	0.18	-	0
Walnut Avenue SB left/thru	A	1.0	0.03	-	2
Walnut Avenue/Harrishof Street	-	-	-	-	-
Harrishof Street EB left/thru/right	C	16.2	0.12	-	10
Walnut Avenue NB left/thru/right	A	0.6	0.01	-	1
Walnut Avenue SB left/thru/right	A	0.8	0.03	-	2

Grey Shading indicates decrease to LOS E or F.

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

95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.

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

As shown in Table 2-10 and Table 2-11, the following operational deficiencies are expected under the Build (2023) Condition:

- The signalized intersection of **Washington Street/Marcella Street/Brinton Street** will continue to operate at LOS C during the a.m. peak hour and will decrease to LOS E during the p.m. peak hour. The Marcella Street eastbound approach will continue to operate at LOS E and the Washington Street northbound left-turn lane will continue to operate at LOS F during the p.m. peak hour. The longest queues at the intersection will continue to occur at the Marcella Street eastbound approach during both the a.m. and p.m. peak hours.

2.5 Transportation Mitigation Measures

Although the traffic impacts associated with the new trips are minimal (generating less than two vehicle trips per minute during the peak hours), the Proponent will continue to work with the City of Boston so that the Project efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

The Proponent is responsible for preparation of a Transportation Access Plan Agreement (TAPA), which formalizes the findings of the Project's 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 Project expects to contribute to certain mitigation measures that improve the existing transportation conditions in the Project area. Potential additional mitigation measures that could be appropriate for a project with this level of impact include:

- Pedestrian improvements in the area as described below;
- Traffic signal timing improvements in the area, including improving the signal coordination along Washington Street and concurrent pedestrian phasing;
- Increasing the number of Resident Permit Parking spaces through the installation of new signage;
- Bicycle improvements in the area, including exploring the feasibility of contraflow bike lanes on Townsend Street; and/or
- Traffic signal infrastructure improvements in the area.

Additional mitigation measures may be discussed with BTD as the Project moves through the permitting process. All mitigation measures will be detailed in the TAPA.

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

2.5.1 Build Mitigated Condition Traffic Operations Analysis

The Build Mitigated (2023) Condition analysis uses the same methodology as the Existing (2016) Condition, No-Build (2023) Condition, and Build (2023) Condition analysis. Table 2-12 and Table 2-13 present the Build Mitigated (2023) Condition capacity analysis for the a.m. and p.m. peak hours, respectively. The black shaded cells in the tables indicate an improvement in LOS between the Build (2023) Condition and the Build Mitigated (2023) Condition. The detailed analysis sheets are provided in Appendix C.

Table 2-12 Build Mitigated (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Washington Street/Marcella Street/Brinton Street	**B**	**19.1**	-	-	-
Marcella St EB left/right	D	47.7	0.85	191	266
Brinton St WB left/thru/right	B	17.3	0.06	9	25
Washington Street NB left	B	14.4	0.54	80	134
Washington Street NB thru	A	10.2	0.41	93	179
Washington Street SB thru	B	12.1	0.41	91	310
Washington Street SB right	A	6.7	0.20	10	m110
Washington Street/Dimock Street	**B**	**13.6**	-	-	-
Dimock Street EB left/right	D	53.0	0.72	109	171
Washington Street NB left/thru	A	8.6	0.55	153	296
Washington Street SB thru/right	A	4.5	0.38	50	111
Martin Luther King Jr. Boulevard/Walnut Avenue	**C**	**25.3**	-	-	-
Martin Luther King Jr. Blvd EB left	D	36.6	0.20	13	59
Martin Luther King Jr. Blvd EB thru | thru	C	21.5	0.20	24	113
Martin Luther King Jr. Blvd EB right	A	0.1	0.04	0	0
Martin Luther King Jr. Blvd WB left	D	36.4	0.14	10	47
Martin Luther King Jr. Blvd WB thru | thru/right	C	24.5	0.40	62	#195
Walnut Avenue NB left	C	34.2	0.74	87	#290
Walnut Avenue NB thru/right	C	26.9	0.68	116	326
Walnut Avenue SB left/thru/right	B	18.4	0.28	38	125
Townsend Street/Walnut Avenue	**B**	**18.9**	-	-	-
Townsend Street EB left/thru/right	C	28.6	0.70	74	190
Townsend Street WB left/right	B	14.7	0.46	8	55
Walnut Avenue NB thru/right	B	18.3	0.68	105	#510
Walnut Avenue SB left/thru	B	11.4	0.30	34	160

Table 2-12 Build Mitigated (2023) Condition, Capacity Analysis Summary, a.m. Peak Hour (Continued)

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Unsignalized Intersections					
Washington Street/Townsend Street	-	-	-	-	-
Washington Street NB thru/right	A	0.0	0.47	-	0
Washington Street SB left/thru	A	5.7	0.23	-	23
Walnut Avenue/Elmore Street/Munroe Street	-	-	-	-	-
Elmore Street EB left/thru/right	C	16.9	0.20	-	18
Munroe Street WB left/right	B	13.6	0.14	-	12
Walnut Avenue NB thru/right	A	0.0	0.34	-	0
Walnut Avenue SB left/thru	A	0.2	0.00	-	0
Walnut Avenue/Harrishof Street	-	-	-	-	-
Harrishof Street EB left/thru/right	B	14.3	0.13	-	11
Walnut Avenue NB left/thru/right	A	0.2	0.01	-	1
Walnut Avenue SB left/thru/right	A	1.4	0.04	-	3

Grey shading indicates decrease to LOS E or F. Black shading indicates an improvement in LOS.

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

95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.

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

Table 2-13 Build Mitigated (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Washington Street/Marcella Street/Brinton Street	**C**	**26.5**	-	-	-
Marcella Street EB left/right	D	54.1	0.96	313	#539
Brinton Street WB left/thru/right	B	11.7	0.04	5	18
Washington Street NB left	C	29.1	0.63	57	#169
Washington Street NB thru	B	16.8	0.46	135	209
Washington Street SB thru	B	11.4	0.65	138	m141
Washington Street SB right	A	3.7	0.25	14	m20
Washington Street/Dimock Street	**B**	**17.8**	-	-	-
Dimock Street EB left/right	D	49.6	0.79	163	234
Washington Street NB left/thru	B	10.4	0.47	137	267
Washington Street SB thru/right	A	5.1	0.39	64	m107
Martin Luther King Jr. Boulevard/Walnut Avenue	**C**	**26.8**	-	-	-
Martin Luther King Jr. Blvd EB left	D	38.2	0.41	30	#131
Martin Luther King Jr. Blvd EB thru | thru	C	23.8	0.39	61	188
Martin Luther King Jr. Blvd EB right	A	0.1	0.10	0	0
Martin Luther King Jr. Blvd WB left	D	38.2	0.36	24	#108

Table 2-13 Build Mitigated (2023) Condition, Capacity Analysis Summary, p.m. Peak Hour (Continued)

Intersection/Approach	*LOS*	*Delay (s)*	*V/C Ratio*	*50th Percentile Queue (ft)*	*95th Percentile Queue (ft)*
Signalized Intersections					
Martin Luther King Jr. Blvd WB thru | thru/right	C	24.1	0.33	46	147
Walnut Avenue NB left	D	50.4	0.76	45	#181
Walnut Avenue NB thru/right	C	23.0	0.41	53	161
Walnut Avenue SB left/thru/right	C	31.3	0.72	102	257
Townsend Street/Walnut Avenue	**C**	**23.4**	-	-	-
Townsend Street EB left/thru/right	C	30.5	0.80	124	#350
Townsend Street WB left/right	C	29.9	0.72	28	#156
Walnut Avenue NB thru/right	B	12.9	0.31	43	142
Walnut Avenue SB left/thru	B	19.2	0.60	108	#357
Unsignalized Intersections					
Washington Street/Townsend Street	-	-	-	-	-
Washington Street NB thru/right	A	0.0	0.40	-	0
Washington Street SB left/thru	B	10.3	0.47	-	65
Walnut Avenue/Elmore Street/Munroe Street	-	-	-	-	-
Elmore Street EB left/thru/right	C	16.5	0.16	-	14
Munroe Street WB left/right	B	12.5	0.13	-	12
Walnut Avenue NB thru/right	A	0.0	0.18	-	0
Walnut Avenue SB left/thru	A	1.0	0.03	-	2
Walnut Avenue/Harrishof Street	-	-	-	-	-
Harrishof Street EB left/thru/right	C	16.2	0.12	-	10
Walnut Avenue NB left/thru/right	A	0.6	0.01	-	1
Walnut Avenue SB left/thru/right	A	0.8	0.03	-	2

Grey shading indicates decrease to LOS E or F. Black shading indicates an improvement in LOS.
~ 50th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
# 95th percentile volume exceeds capacity. Queue shown is the maximum after two cycles.
m Volumes for 95th percentile queue is metered by upstream signal.

As shown in Table 2-12 and Table 2-13, the following operational improvements are expected under the Build Mitigated (2023) Condition:

- The signalized intersection of **Washington Street/Marcella Street/Brinton Street** will improve to LOS B during the a.m. peak hour and LOS C during the p.m. peak hour. All of the approaches will now operate at LOS D or better. The longest queues at the intersection will now occur at the Washington Street southbound approach during the a.m. peak hour and will continue to occur at the Marcella Street eastbound approach during the p.m. peak hour.

- The signalized intersection of **Washington Street/Dimock Street** will improve to LOS B during both the a.m. and p.m. peak hours. All of the approaches will now operate at LOS D or better. The longest queues at the intersection will continue to occur at the Washington Street northbound approach.

2.6 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 trips) and its proximity to numerous public transit alternatives.

On-site management will keep a supply of transit information (schedules, maps, and fare information) to be made available to the residents and patrons of the Project 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 Project Site to future residents by working with them to implement the following TDM measures to encourage the use of non-vehicular modes of travel. The primary alternative transportation modes to be encouraged will be public transportation, bicycling, and walking.

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

- The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries, and will work with tenants as they move in to help facilitate transportation for new arrivals and raise awareness of public transportation, bicycling, and walking opportunities;

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

- Provide an annual (or more frequent) newsletter or bulletin summarizing transit, ridesharing, bicycling, alternative work schedules, and other travel options;

- Provide information on travel alternatives for employees and visitors via the Internet and in the building lobby;

- Provide covered, secure bicycle storage for building occupants;

- Provide on-site external bicycle racks for visitors;

- Encourage employers to subsidize on-site full-time employees' purchase of monthly transit passes;

- Promote to commercial tenants that, as employers, they can save on payroll-related taxes and provide employee benefits when they offer transportation benefits such as subsidized public transportation;

- Provide electric vehicle charging stations for 5 percent of the parking spaces in the garage and sufficient infrastructure capacity for future accommodation of at least 15 percent of the total parking spaces; and

- Vehicle Sharing Program: The Proponent will explore the feasibility of providing spaces in the garage for a car sharing service.

2.7 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 CMP to be filed with BTD in accordance with the City's transportation maintenance plan requirements.

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

- Limited construction worker parking on-site;

- Encouragement of worker carpooling;

- Consideration of a subsidy for MBTA passes for full-time employees; and

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

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

Chapter 3.0

Environmental Protection

3.0 ENVIRONMENTAL PROTECTION

3.1 Wind Analysis

3.1.1 Introduction

A qualitative assessment for the proposed Project was prepared by Rowan Williams Davies & Irwin Inc. (RWDI). The Project is expected to meet the effective gust criterion, have minimal impact on wind conditions in the immediate surroundings, and have little to no impact on conditions in the extended surroundings.

This qualitative assessment is based on the following:

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

This qualitative approach provides a screening-level estimation of potential wind conditions.

3.1.2 Site and Building Information

The Project Site, currently occupied by a number of multi-story structures, is located in the Roxbury neighborhood, south of Townsend Street and east of Codman Park and is situated at a higher elevation relative to its surroundings; which in all directions comprise of lowrise residential buildings and dense, large street-trees. "Project North" is approximately 40° off

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

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

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

Geographic North, as indicated on Figure 3.1-1. Hereafter, references to building features and surroundings will be based on Project North, while references to wind directions will be based on Geographic North.

The Project consists of four connected buildings ranging in height from five to seven-and-a-half stories (Figure 3.1-1). The Project is taller than the surroundings but generally comparable in height to the existing building on Townsend Street. Towards the south, the proposed buildings are located on elevated ground, and therefore appear much taller than the surroundings. Key pedestrian areas of interest include public sidewalks, main entrances, green roofs and gardens on the Project Site

3.1.3 Meteorological Data

Wind statistics at Boston Logan International Airport between 1990 and 2015 were analyzed and Figure 3.1-2 graphically depicts the distributions of wind frequency and directionality for the four seasons and for the annual period. When all winds are considered (regardless of speed), winds from the northwest and southwest quadrants are predominant. Northeasterly winds are also relatively frequent in the spring.

Strong winds with mean speeds greater than 20 mph (red bands in the figures) are prevalent from the west-northwest direction throughout the year, while the strong winds from the southwest and northeast are also common.

3.1.4 BPDA Wind Criteria

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

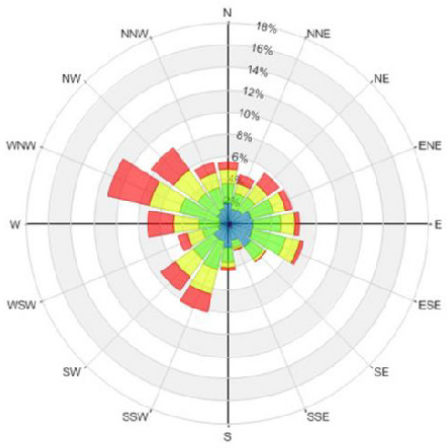
First, the BPDA wind design guidance criterion states that an effective gust velocity (hourly-mean wind speed + 1.5 times the root mean square wind speed) of 31 mph should not be exceeded more than one percent of the time. This criterion is hereby referred to as the gust criterion.

The second set of criteria used by the BPDA to determine the acceptability of specific locations is based on the work of Melbourne[4]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed), as shown in Table 3.1-1 below.

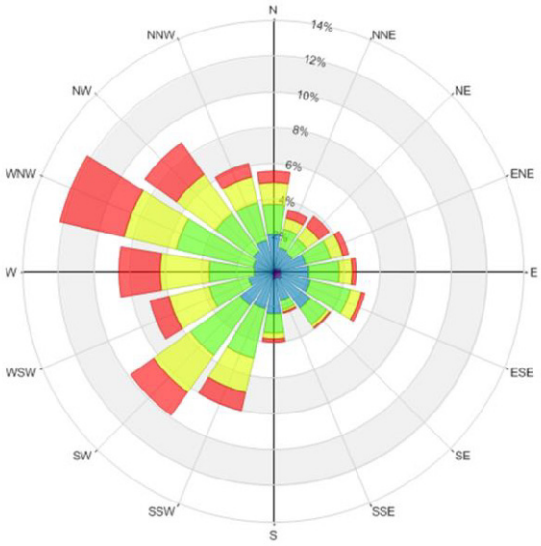
[4] Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions", Journal of Industrial Aerodynamics, 3 (1978) 241-249.

45 Townsend Street **Boston, Massachusetts**

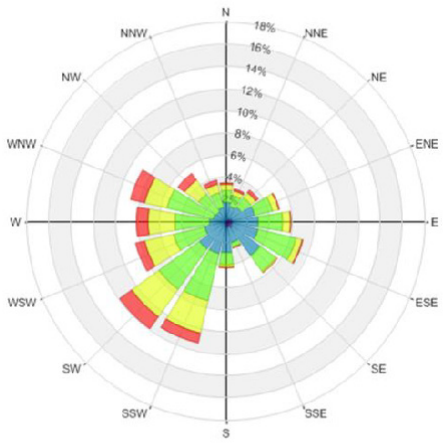
Figure 3.1-1
Rendering of the Proposed Development



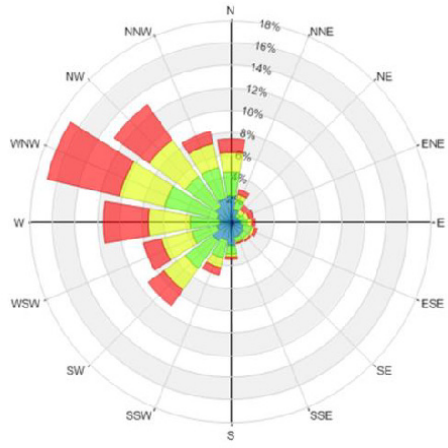
Spring (March to May)



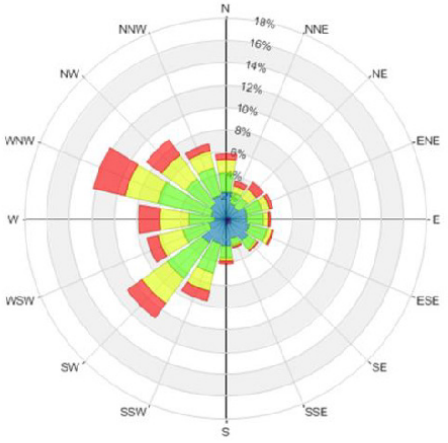
Annual Winds



Summer (June to August)



Winter (December to February)



Fall (September to November)

Table 3.1-1 Boston Planning and Development Agency Mean Wind Criteria*

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

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

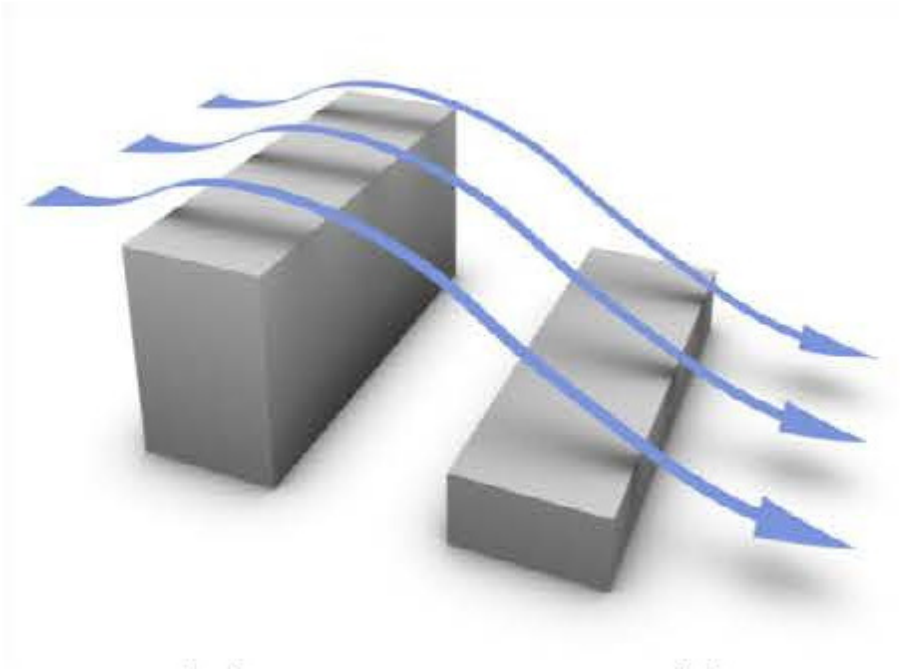
Pedestrians on sidewalks will be active, and wind speeds comfortable for walking are appropriate at these locations. Lower wind speeds comfortable for standing are desired for building entrances where people are apt to linger. For any outdoor amenity at and above grade, low wind speeds comfortable for sitting or standing are desired in the summer months when such amenity space is typically in use. Wind speeds rated "Uncomfortable for Walking" and/or "Dangerous" are higher than desirable for any pedestrian activity.

The following discussion on pedestrian wind conditions is based on the annual wind climate. Typically the summer and fall winds tend to be more comfortable than the annual winds while the winter and spring winds are less comfortable than the annual winds.

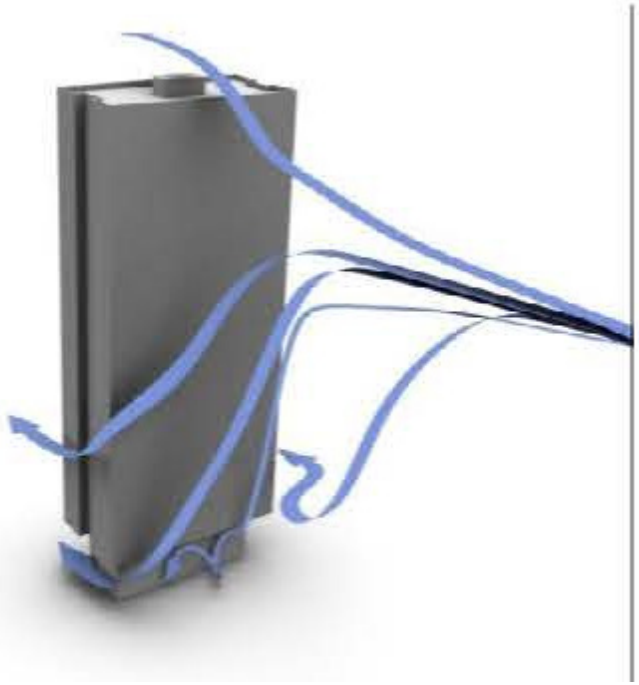
Background

Predicting wind speeds and frequencies of occurrence is complicated. It involves the assessment of building geometry, orientation, position and height of surrounding buildings, upwind terrain, and the local wind climate. Over the years, RWDI has conducted thousands of wind tunnel model studies on pedestrian wind conditions around buildings, yielding a broad knowledge base. This knowledge has been incorporated into RWDI's proprietary software that allows, in many situations, for a screening-level qualitative estimation of pedestrian wind conditions without wind tunnel testing.

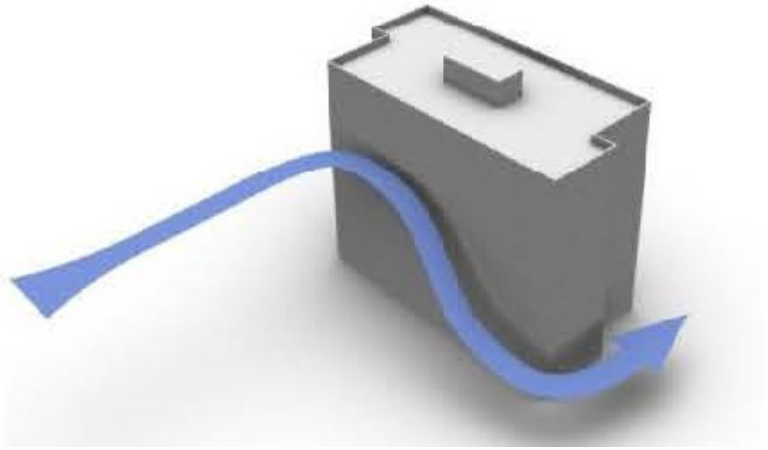
Wind generally tends to flow over dense arrays of buildings of even height (Figure 3.1-3a). Buildings taller than their surroundings tend to intercept the stronger winds at higher elevations and redirect them to the ground level. Such a Downwashing Flow (Figure 3.1-3b) is the main cause for increased wind activity around buildings at the pedestrian level. Oblique winds also cause wind accelerations around the downwind building corners (Figure 3.1-3c). If these building/wind combinations occur for prevailing winds, there is a greater potential for increased wind activity and uncomfortable conditions. Stepping the windward façade (Figure 3.1-3d) is a positive design strategy that is often used for wind control. However, increased wind activity will be created on the lower windward roofs or terraces where low wind speeds are typically desired for amenity use.



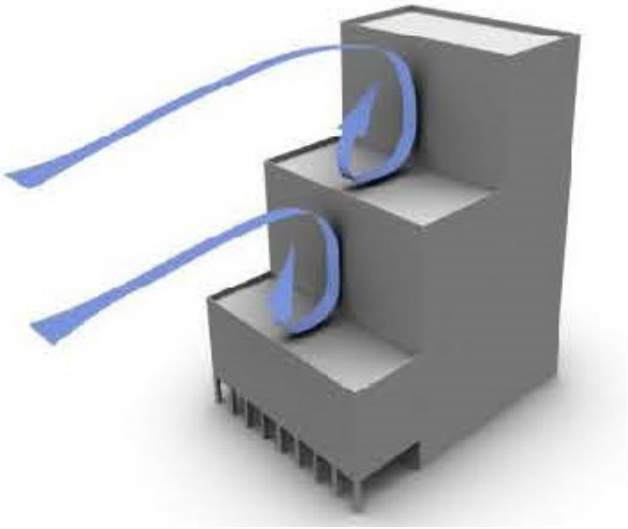
a) Wind Flow over Low-rise Buildings



b) Downwashing Flow



c) Corner Acceleration



d) Stepped Façade

Figure 3.1-3
General Wind Flow Phenomena around Buildings

Flow Patterns

The following discussions on potential wind conditions around the proposed Project focus on a comparative assessment of the impact of the proposed Project in relation to the existing site. The most frequent and strongest winds in the area are from the west-northwest and northeast directions, and occur during the winter and spring seasons.

Winds from the southwest are also frequent, but less likely to cause uncomfortable or unacceptable wind conditions on the site. The wind flow patterns of the predominant west-northwest (red arrows) and northeast (green arrows) winds around the existing site are shown in Figure 3.1-4a, and around the proposed Project are shown in Figure 3.1-4b, each with reference to geographic north.

3.1.5 Results

As described in additional detail below, because of the proposed height of the Project and its surroundings, it is predicted that wind speeds on and around the project will meet the effective gust criterion and the proposed Project will not cause any adverse wind conditions in the neighboring areas. In relation to the existing wind conditions on and around the site, the Project is expected to have minimal impact on wind conditions in the immediate surroundings and will have little to no impact on conditions in the extended surroundings.

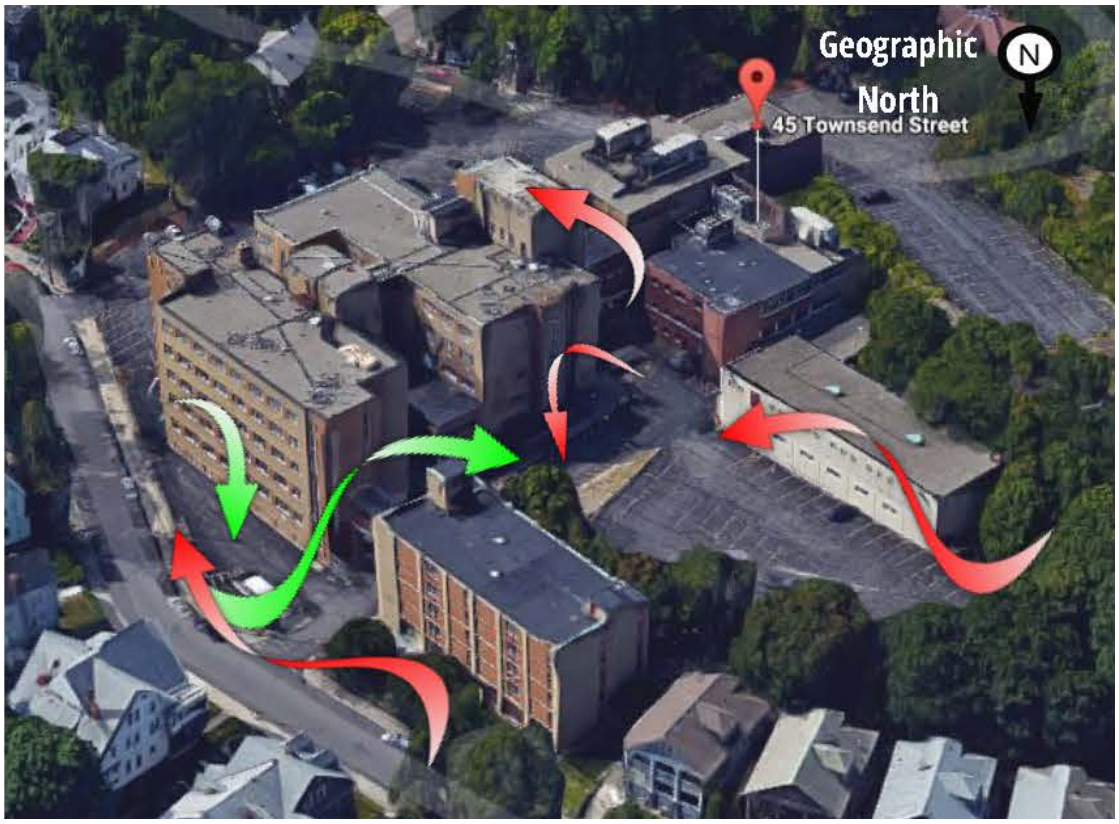
3.1.5.1 Existing Pedestrian Wind Conditions

Wind conditions around the existing site are predicted to be appropriate for pedestrian activities. Wind speeds are expected to meet the effective gust criterion on an annual basis.

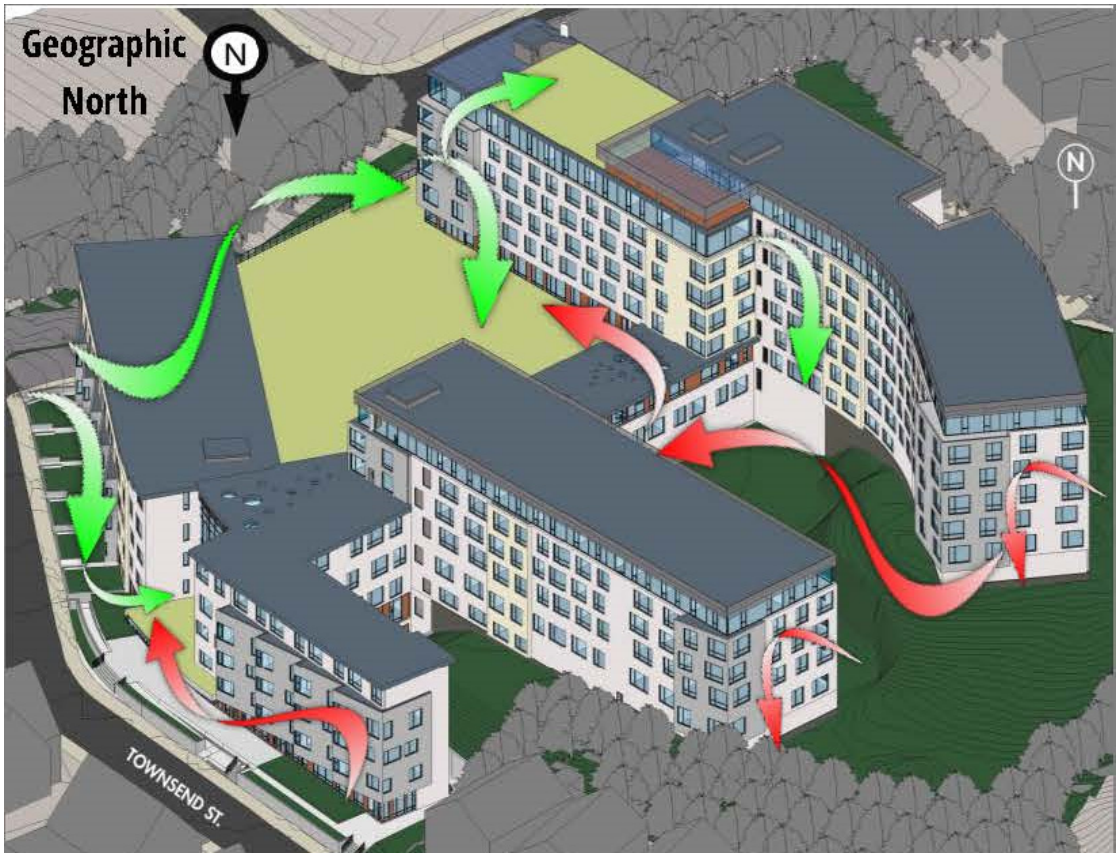
In regard to mean wind speeds, winds around the existing site are expected to be comfortable for standing at most areas during the warmer months. This is in large part due to the nature of the surrounding neighborhoods, which are comprised primarily of low-rise buildings of generally even height and streets densely lined by trees. The closely spaced buildings protect the streets from high wind activity as winds have the tendency to flow over the uniform terrain (Figure 3.1-3a). The dense trees around the proposed site would further lower the wind activity during the warmer months.

As noted above, wind speeds are seasonally stronger during the colder months, and without the protection afforded by leafed out trees, the streets are relatively more exposed. Therefore winds during the winter are likely to be rated comfortable for walking, and would be acceptable as the area would not be used for prolonged activities.

a) Existing Conditions



b) Proposed Conditions



45 Townsend Street Boston, Massachusetts

Figure 3.1-4
On-Site Wind Flow Patterns

3.1.5.2 Future Pedestrian Wind Conditions

Effective Gust

The proposed Project is similar in height to the existing buildings on Townsend Street. Although all of the Project's structures are comparable in height, because the Site slopes upward in the southerly direction, those structures furthest from Townsend Street are elevated above the surroundings. This results in a stepped form that reduces the impact of winds from the northeast. To a large extent, the buildings on the south side of the Site shelter the outdoor green spaces from winds from the southwest.

The proposed structures are also oriented so that their most narrow facades face the prevailing westerly winds. This orientation reduces façade area from which winds will downwash, thereby reducing the occurrence of downwash related winds.

The exposed building corners are subject to corner acceleration, however, due to the dense surroundings and moderate height of the proposed buildings, the impact is not expected to be a concern. It is predicted that wind speeds on and around the Project will meet the effective gust criterion.

Mean Speed

The addition of the Project will likely improve wind conditions to the east of the Project Site, because the Project shelters that area from the prevailing westerly winds. Because the proposed building on Townsend Street is comparable in height to the existing building at that location, it is expected that wind conditions on Townsend Street will remain unchanged from the existing conditions. The interaction of winds with the Project will result in increased wind activity at the exposed building corners on the west extremities of the buildings and the northern corners of the Townsend wing, but is expected to result in suitable wind conditions.

Overall, winds are predicted to continue to be comfortable for standing in the warmer months and comfortable for walking in the colder months. This includes conditions on the Project Site as well as the surrounding sidewalks. The following is a discussion on key outdoor areas of interest and the appropriateness of the predicted wind conditions for the intended usage of those areas.

Main Entrance - Main entrances of the Project are indicated in Figure 3.1-5, with lobby access and retail entrance on Townsend Street at Level 1, garden access on the west at Level 3, lobby access at the south end at Level 4 and green roof access on the east at Level 5. Townhouse entrances are located along Townsend Street on the east half of the Townsend wing of the Project. The Townsend wing and southern lobby entrances are

45 Townsend Street **Boston, Massachusetts**

Figure 3.1-5
Main Entrances and Accessible Outdoor Areas

designed with closed vestibules. Additionally, the Townsend Lobby entrance also features a canopy with walls on both sides of the entrance, which provides additional reduction in wind impacts.

The Townsend Street entrances are exposed to winds from the northeast and northwest. During the warmer months, due to the protection afforded by the dense trees in the vicinity, it is likely that wind conditions would be comfortable for standing, which is appropriate for an entrance use. During the colder months, as a result of the increased exposure due to the lack of landscaping, as well as the seasonally stronger winds, wind speeds would be rated comfortable for walking, and thus higher than desirable for an entrance use. However, canopy side-walls and coniferous landscaping in the form of hedges are being considered for reducing wind impact at the main entrance. In addition, the closed vestibules provide a protected area for patrons to wait on particularly windy days. Additional modifications are also being considered such as recessing the townhouse entrances from the main façade in order to provide a protected transition to the ambient environment. These features create localized areas at the entrances protected from the direct impact of the prevailing winds.

The southern lobby entrance and access points for the green roof are on the downwind side of the proposed structures relative to the westerly winds that are predominant in the warmer months. The garden access on the east side is not expected to be significantly affected by the prevailing winds due to its protected location owing to the elevated, buildings around the garden access. Wind conditions are predicted to be comfortable for standing in the summer when these outdoor areas will be used frequently.

Outdoor Gardens and On-Site - The proposed Project includes large open spaces accessible to residents and site visitors. The two main areas intended for frequent patron activities are the garden to the west, accessed from Level 3, and the green roof to the east, accessed from Level 5 (see Figure 3.1-5).

The green roof is on the downwind side of the adjacent building, largely protected from the prevailing westerly winds. However, during the warmer months it will be influenced by winds from the northwest, deflected by the taller buildings that it abuts (See flow patterns in Figure 3.1-3b. It is anticipated that trees, hedges and other forms of landscaping will be incorporated into the design of the space. Strategically placed landscaping will enhance wind conditions in outdoor areas making it comfortable for passive patron activities. The garden on the west side is at a lower elevation than the rest of the site to the west. Such a sunken location and the protection afforded by buildings and trees to the west is expected to result in wind conditions appropriate for passive use of the area during the warmer months. During the winter these outdoor areas are not likely to be used for passive activities in the colder months. and anticipated windier conditions are acceptable.

Impact on Surroundings - The proposed Project is moderate in height and the buildings are surrounded by large on-site open spaces. Wind accelerations are expected at the building corners and are expected to be localized to areas immediately around the buildings, particularly to the north and west of the buildings. Nonetheless, wind speeds are anticipated to be suitable for the intended uses of these areas. As noted above, in relation to the existing wind conditions on and around the site, the proposed Project is expected to have minimal impact on wind conditions in the immediate surroundings, and little to no impact on conditions in the extended surroundings.

3.1.6 Summary

Given the project height and its surroundings, it is predicted that wind speeds on and around the Project will meet the effective gust criterion and the Project will not cause any adverse wind conditions in the neighboring areas.

Overall wind conditions are anticipated to be similar to those that currently prevail on and around the site- comfortable for standing in the warmer months and comfortable for walking in the colder months. These conditions are appropriate for the activity expected on the sidewalks throughout the year. Conditions predicted for the outdoor green areas and entrances are also appropriate for the warmer months when people frequent these areas more often. During the colder months, the higher wind speeds are acceptable in the garden and green roof as these areas won't be in use.

The main entrance to the building is served by a closed vestibule, a design feature will allow patrons to wait comfortably on windy days.

The proposed Project is expected to have little to no impact on wind conditions in the extended surroundings.

3.2 Shadow Analysis

3.2.1 Methodology

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

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

The shadow analysis identified existing and net new shadow that will be created by the Project, illustrating the likely shadow impact of the Project on existing conditions. The analysis focuses on nearby open spaces, sidewalks, and bus stops, adjacent to and in the vicinity of the Project Site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 through 3.2-14 at the end of this section.

The analysis shows new shadow from the Project will generally be limited to nearby streets, sidewalks, portions of abutting properties, as well as the Project Site. Twelve of the fourteen time periods studied have no shadow impacts on public open spaces or bus stops. New shadow will be cast onto portions of Horatio Harris Park at 6 p.m. on the Autumnal Equinox. The only time period which indicates shadow impacts on a bus stop is December 21 at 9:00 a.m.

3.2.2 Vernal Equinox (March 21)

On the vernal equinox, the sun remains relatively low in the sky which will cause Project-related net new shadow at 9:00 a.m. to be cast across portions of the Academy Homes II site, to the west of the Project Site, and the houses at 29-35 Townsend Street (Figure 3.2-1). No new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 12:00 p.m., areas of net new shadow will rotate northward and will be cast on a small portion of the south side of Townsend Street with limited shadow cast on the rear yards of the houses at 21-35 Townsend Street and the Project Site (Figure 3.2-2). No new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., new shadow will be cast across portions of Townsend Street, portions of the parcels at 29-35 Townsend Street and the parcels at 32-50 and 60 Townsend Street (Figure 3.2-3). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

3.2.3 Summer Solstice (June 21)

On the summer solstice, morning sun will cast shadow onto a portion of Academy Homes II and the parcel at 35 Townsend Street (Figure 3.2-4). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

By 12:00 p.m., shadows will rotate to the north but will remain confined to the Project Site (Figure 3.2-5). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m. on the summer solstice, shadows will fall over portions of the southern side of Townsend Street (Figure 3.2-6). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

By 6:00 p.m., new shadow will extend in the easterly direction over portions of the parcels at 40-60 Townsend Street, including Townsend Street and its sidewalks (Figure 3.2-7). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

3.2.4 Autumnal Equinox (September 21)

On the autumnal equinox, morning sun will cast new shadow across Academy Homes II (Figure 3.2-8). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

By 12:00 p.m., areas of new shadow will rotate northward and will fall across portions of the parcels at 21-35 Townsend Street and a small portion of Townsend Street in front of the Project Site (Figure 3.2-9). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., new shadow will be cast across portions of Townsend Street and its sidewalks, portions of the houses at 29-35 Townsend Street, and the parcels at 32-50 and 60 Townsend Street (Figure 3.2-10). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

New shadow at 6:00 p.m. will extend to parcels near the intersection of Monroe Street and Walnut Avenue, and an area of Horatio Harris Park (Figure 3.2-11). No net new shadow will be cast onto bus stops in the vicinity of the Project.

3.2.5 Winter Solstice (December 21)

The low angle sun during the winter solstice will cause new shadow to be cast across the parcels at 17-35 and 14-20 Townsend Street, portions of Academy Homes II, 2870 Washington Street, Townsend Street and its sidewalks, and potentially a narrow band of shadow will be cast on the bus top at the intersection of Washington and Townsend streets (Figure 3.2-12). No net new shadow will be cast onto public open spaces in the vicinity of the Project.

Mid-day shadows will fall across the parcels at 17-35 and 14-50 Townsend Street, and Townsend Street and its sidewalks (Figure 3.2-13). No net new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

At 3:00 p.m., narrow bands of new shadow will fall across various parcels to the north of the Project Site, between Townsend and Elmore Street, portions of Townsend and Elmore Streets and their sidewalks (Figure 3.2-14). No new shadow will be cast onto public open spaces or bus stops in the vicinity of the Project.

3.2.6 Conclusions

New shadow from the Project will generally be limited to the immediately surrounding streets and sidewalks, as well as parcels abutting the Project Site. Twelve of the fourteen time periods studied have no shadow impacts on public open spaces or bus stops. A limited amount of new shadow is cast onto the Washington Street/Townsend Street bus stop during the morning of December 21. New shadow will also be cast onto Horatio Harris Park at 6:00 p.m. on the autumnal equinox. New shadow from the Project is mostly incremental and minor as compared to existing conditions.

45 Townsend Street **Boston, Massachusetts**

Figure 3.2-1
Shadow Study, March 21, 9:00 a.m.

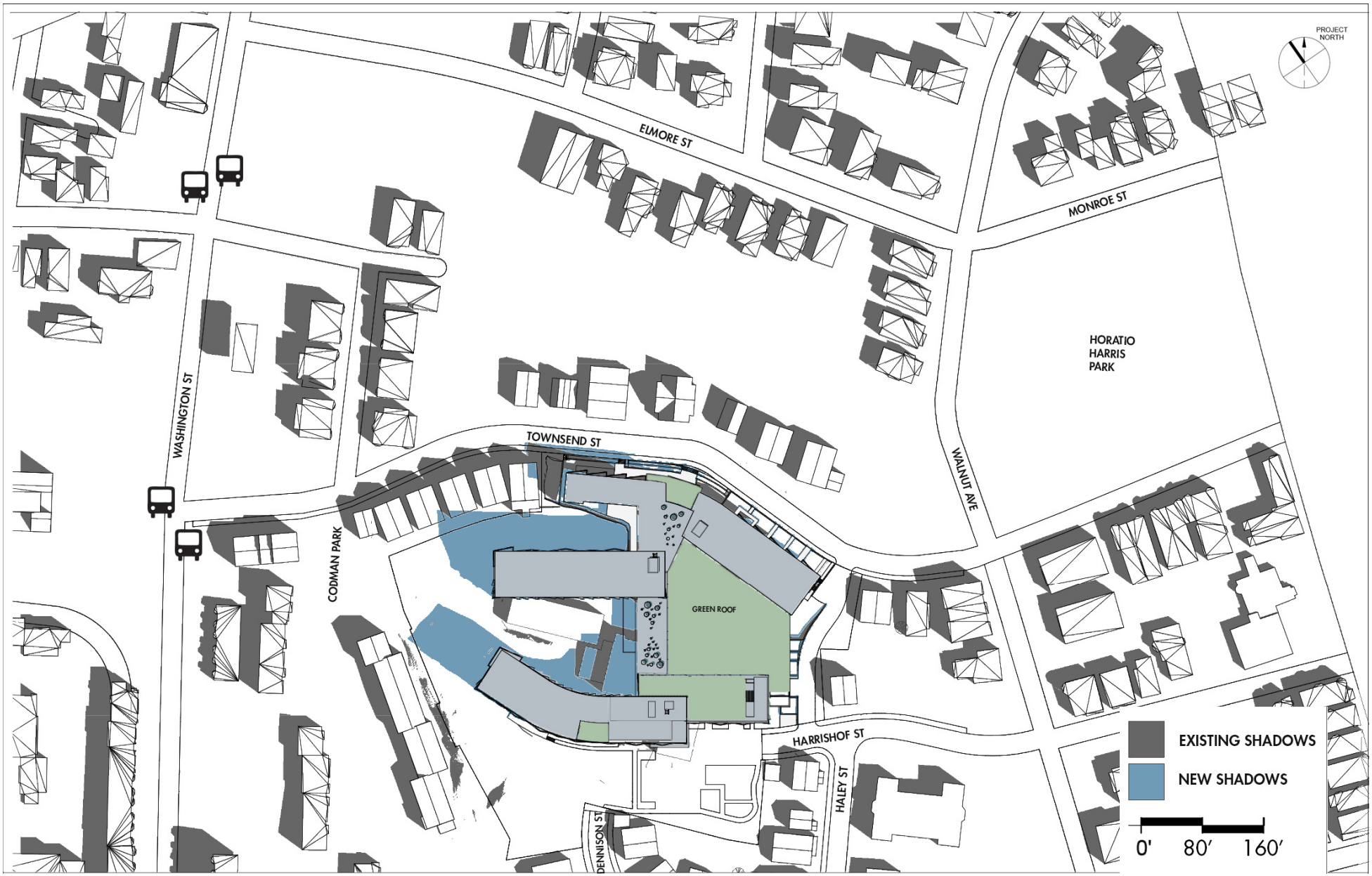


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Figure 3.2-2
Shadow Study, March 21, 12:00 p.m.

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Figure 3.2-3
Shadow Study, March 21, 3:00 p.m.

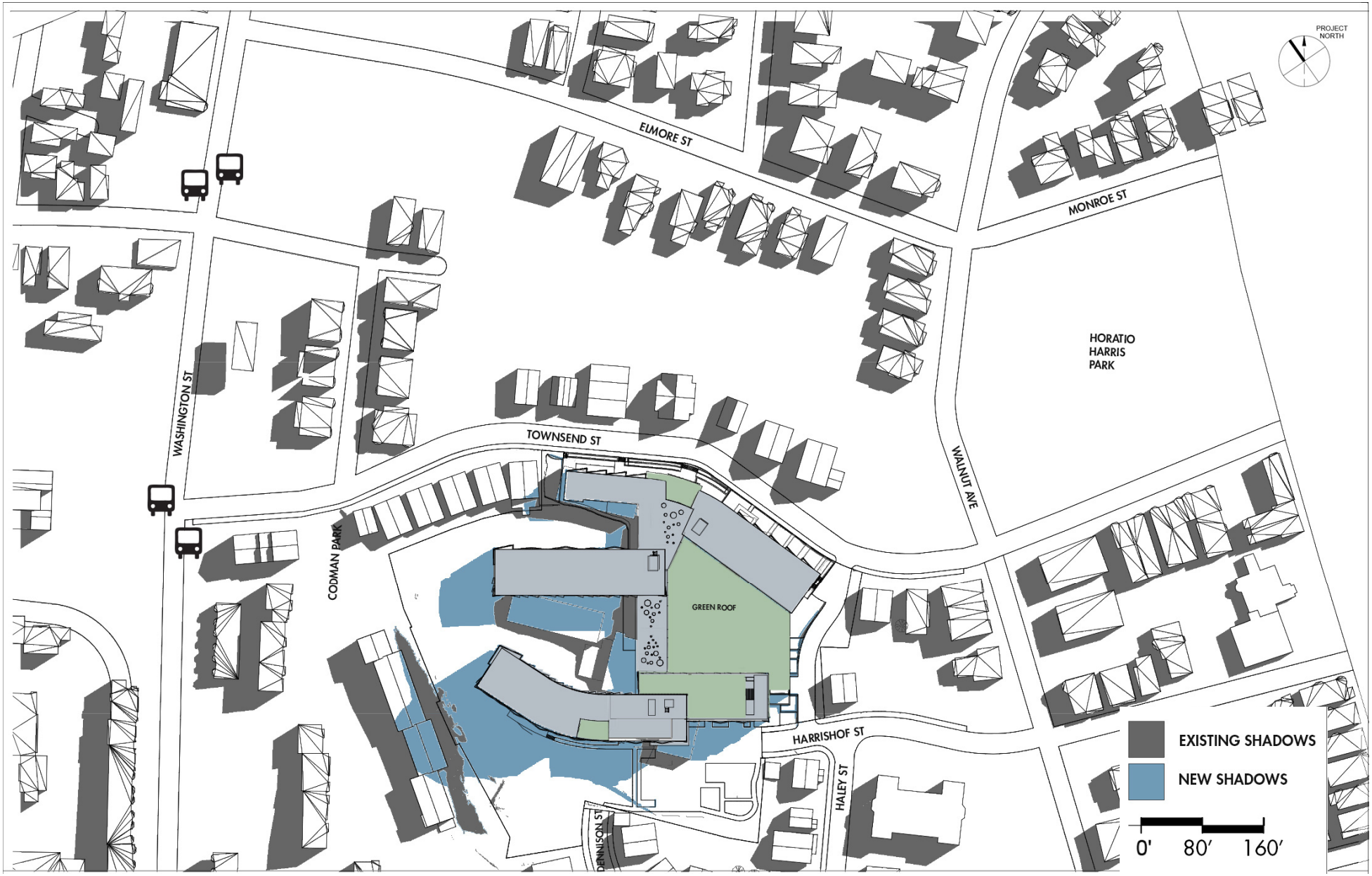

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Figure 3.2-4
Shadow Study, June 21, 9:00 a.m.

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Figure 3.2-5
Shadow Study, June 21, 12:00 p.m.

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Figure 3.2-6
Shadow Study, June 21, 3:00 p.m.

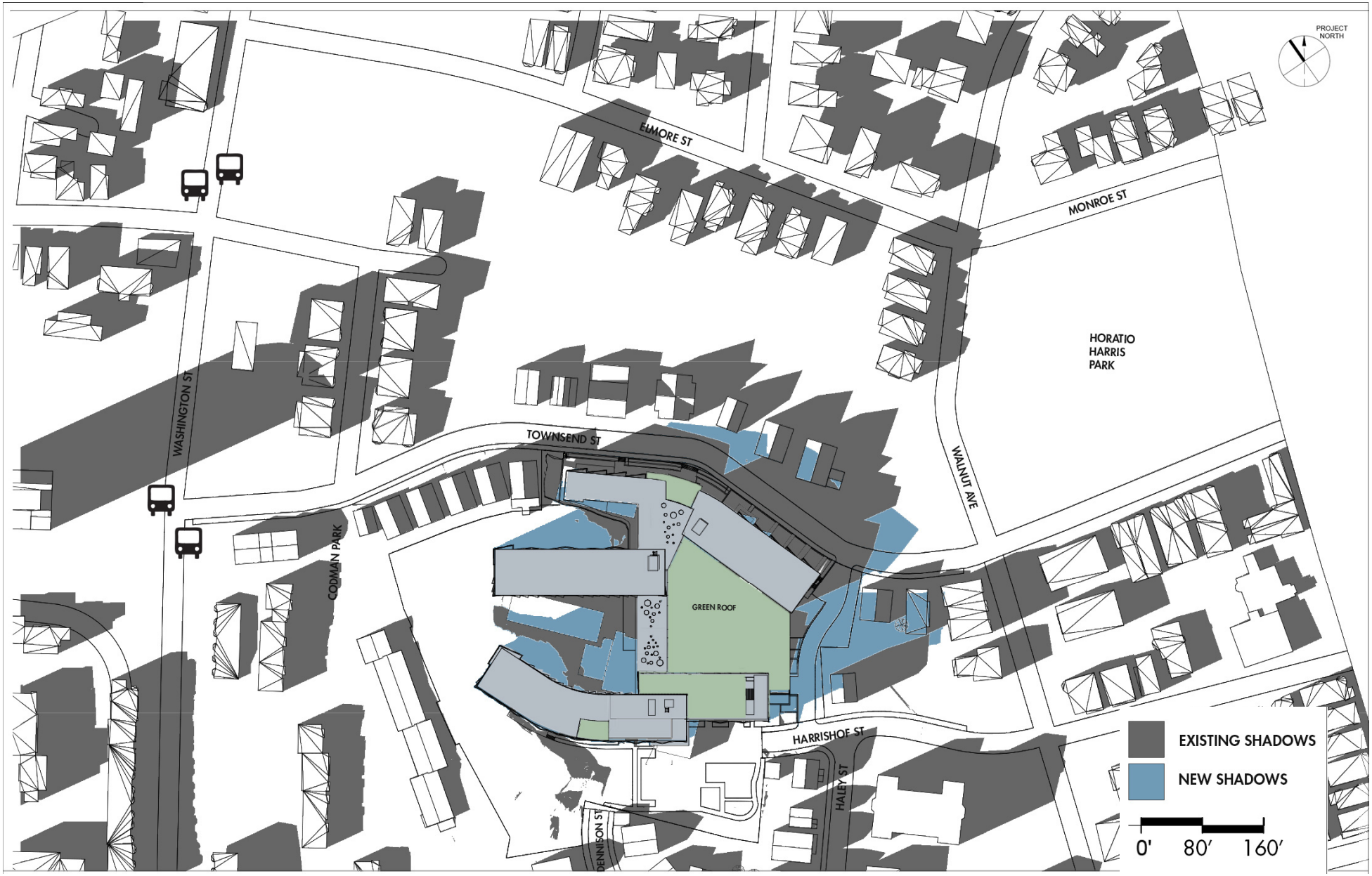

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Figure 3.2-7
Shadow Study, June 21, 6:00 p.m.

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Figure 3.2-8
Shadow Study, September 21, 9:00 a.m.

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Figure 3.2-9
Shadow Study, September 21, 12:00 p.m.

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Figure 3.2-10
Shadow Study, September 21, 3:00 p.m.

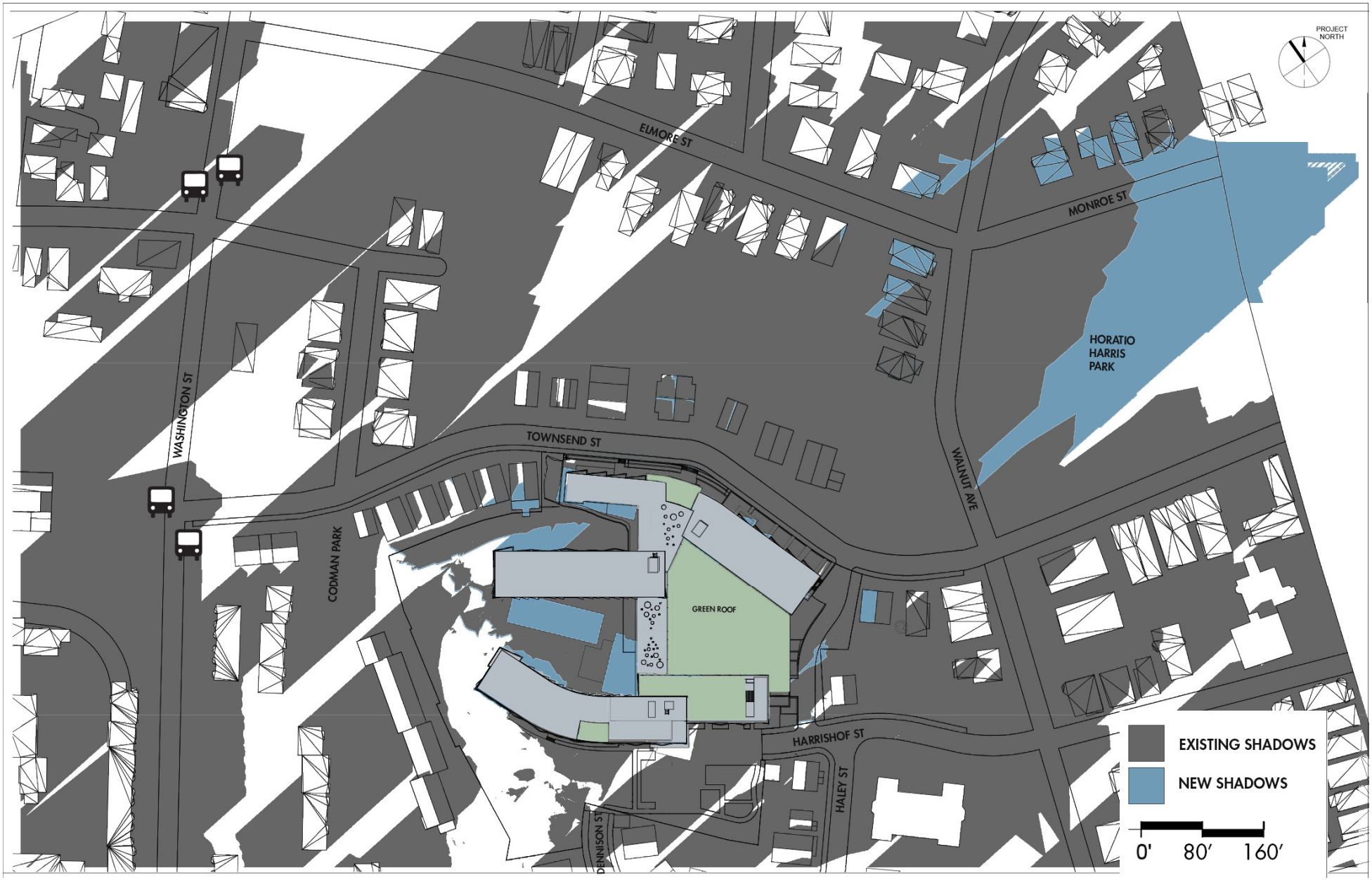

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Figure 3.2-11
Shadow Study, September 21, 6:00 p.m.

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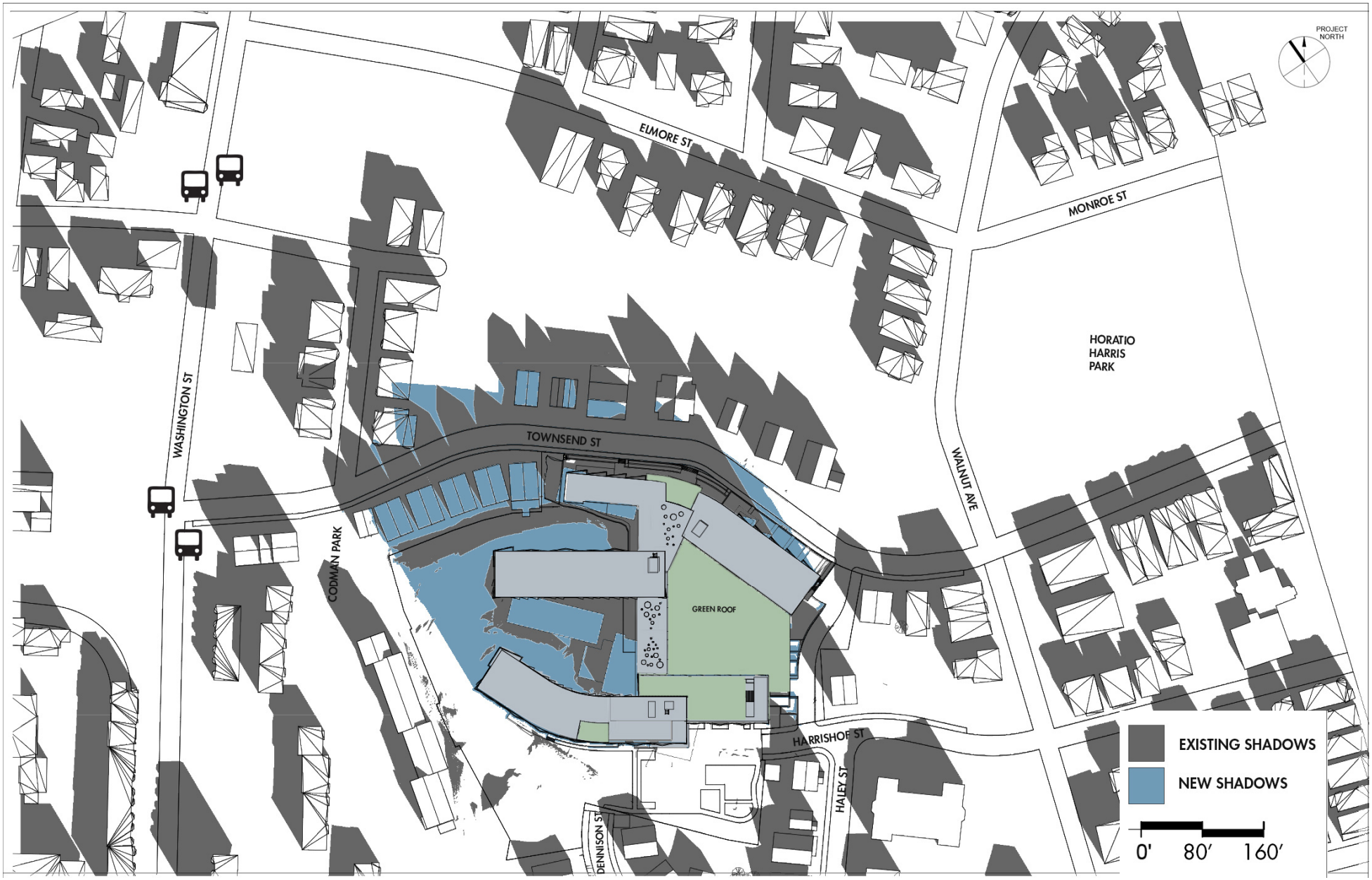
Figure 3.2-12
Shadow Study, December 21, 9:00 a.m.



45 Townsend Street **Boston, Massachusetts**

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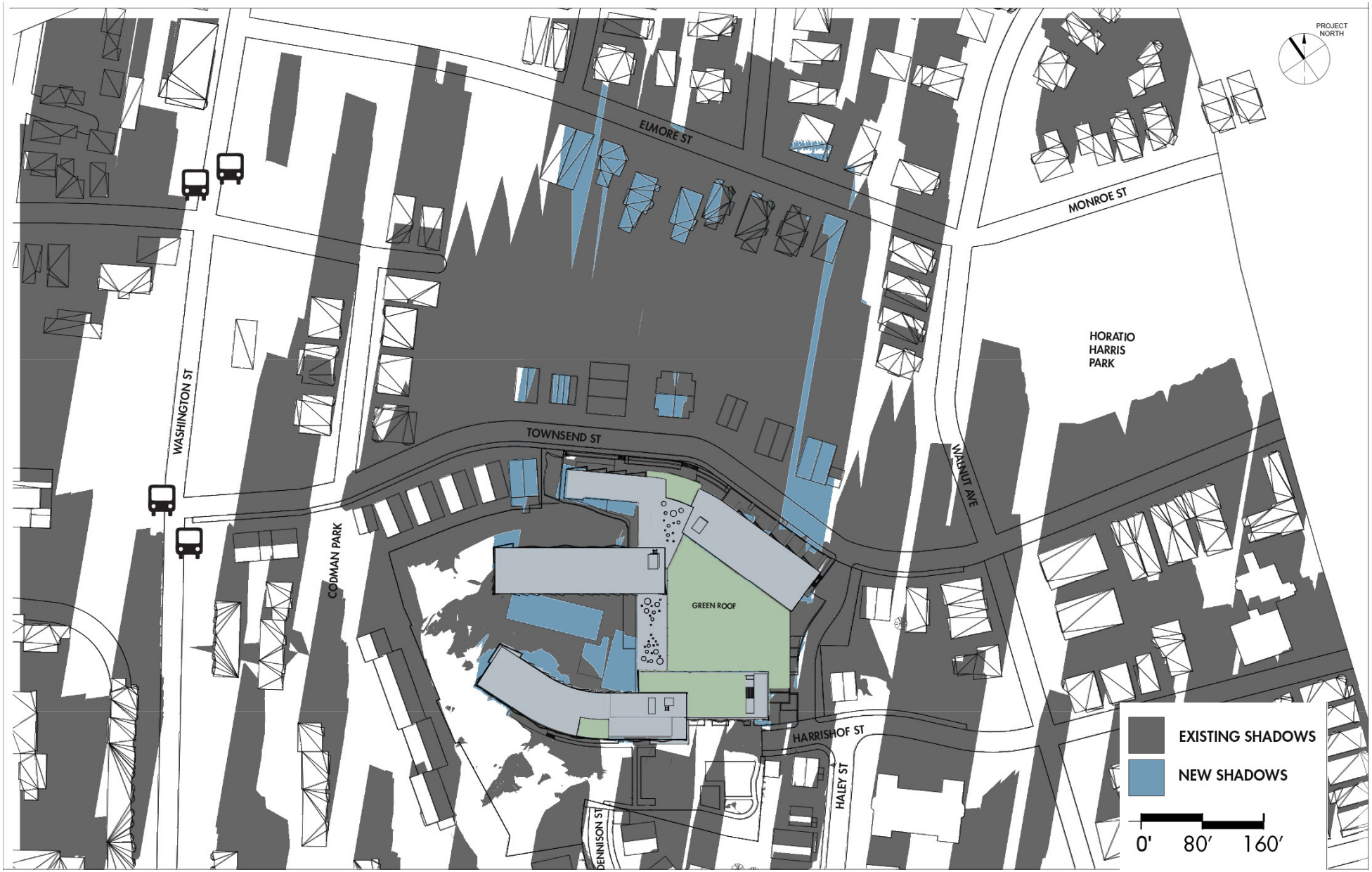
Figure 3.2-13
Shadow Study, December 21, 12:00 p.m.



45 Townsend Street **Boston, Massachusetts**

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Figure 3.2-14
Shadow Study, December 21, 3:00 p.m.

3.3 Daylight Analysis

3.3.1 Introduction

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

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[5]. This program measures the percentage of "sky dome" that is obstructed by a project, and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways, and 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 zero- to 100-percent based upon the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

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

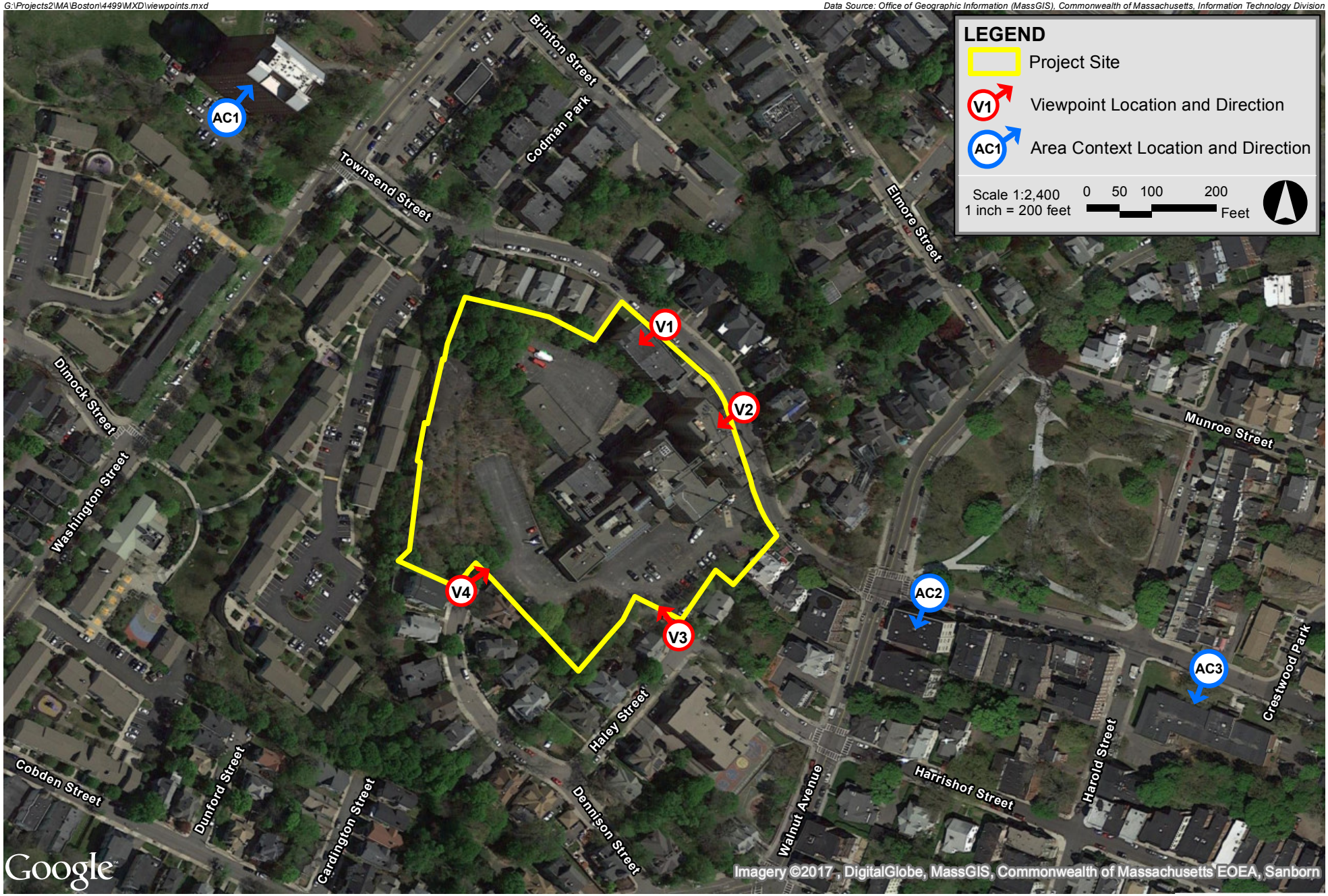
Four viewpoints were chosen to evaluate the daylight obstruction for the Existing and Proposed Conditions. Three area context points were considered to provide a basis of comparison to existing conditions in the surrounding area. The viewpoint and area context viewpoints were taken in the following locations and are shown in Figure 3.3-1.

- **Viewpoint 1:** View from the center of Townsend Street facing southwest toward the Project site.
- **Viewpoint 2:** View from the center of Townsend Street facing southwest toward the Project site.

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

G:\Projects2\MA\Boston\4499\MXD\viewpoints.mxd

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



45 Townsend Street Roxbury, Massachusetts

Epsilon Associates Inc.

Figure 3.3-1

Viewpoint and Area Context Locations

- **Viewpoint 3:** View from the center of Harrishof Street facing northwest toward the Project site.

- **Viewpoint 4:** View from the center of Dennison Street facing northeast toward the Project site.

- **Area Context Viewpoint AC1:** View from the center of Dimock Place facing northeast toward 2875 Washington Street.

- **Area Context Viewpoint AC2:** View from the center of Townsend Street facing southeast toward 250 Walnut Avenue.

- **Area Context Viewpoint AC3:** View from the center of Townsend Street facing southwest toward 135 Townsend Street.

3.3.3 Results

The results for each viewpoint are described in Table 3.3-1. Figures 3.3-2 through 3.3-4 illustrate the BRADA results for each analysis.

Table 3.3-1 Daylight Analysis Results

Viewpoint Locations		Daylight Obstruction (Percent)	
		Existing Conditions	*Proposed Conditions*
Viewpoint 1	View from the center of Townsend Street facing southwest toward the Project site	35.4%	75.1%
Viewpoint 2	View from the center of Townsend Street facing southwest toward the Project site	34.3%	58.6%
Viewpoint 3	View from the center of Harrishof Street facing northwest toward the Project site	6.9%	8.7%
Viewpoint 4	View from the center of Dennison Street facing northeast toward the Project site	3.4%	23.9%
Area Context Points			
AC1	View from the center of Dimock Place facing northeast toward 2875 Washington Street	90.8%	N/A
AC2	View from the center of Townsend Street facing southeast toward 250 Walnut Avenue	67.9%	N/A
AC3	View from the center of Townsend Street facing southwest toward 135 Townsend Street	61.5%	N/A

Townsend Street – Viewpoint 1

Townsend Street runs along the northern edge of the Project site. Viewpoint 1 was taken from the center of Townsend Street facing southwest toward the Project site. This portion of the Project site has an existing daylight obstruction of 35.4%. The Project will increase the daylight obstruction value to 75.1%. The daylight obstruction value is within the range of the daylight obstruction values of other buildings in the area, including the Area Context buildings.

Townsend Street – Viewpoint 2

Townsend Street runs along the northern edge of the Project site. Viewpoint 2 was taken from the center of Townsend Street facing southwest toward the Project site. This portion of the Project site has an existing daylight obstruction of 34.3%. The Project will increase the daylight obstruction value to 58.6%. The daylight obstruction value is similar to the daylight obstruction value of other buildings in the area, and is less than the Area Context buildings.

Harrishof Street – Viewpoint 3

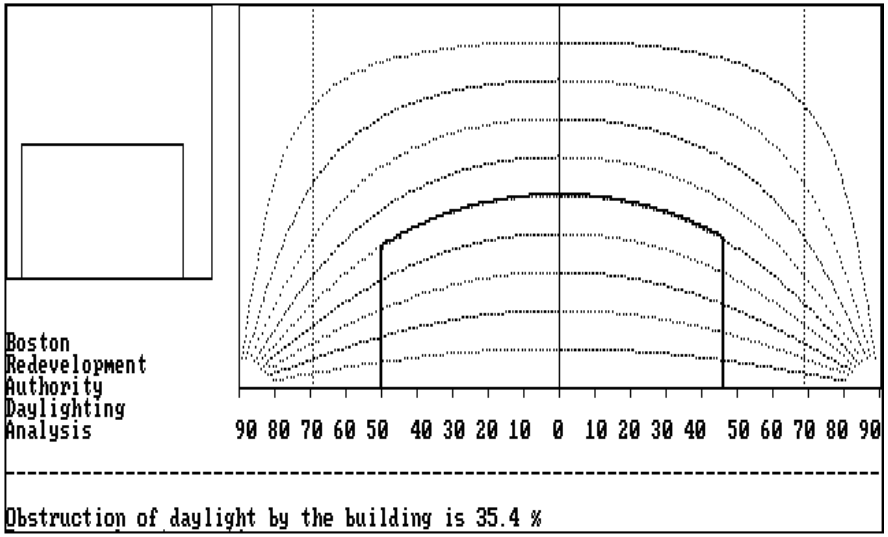
Harrishof Street runs along the southeastern edge of the Project site. Viewpoint 3 was taken from the center of Harrishof Street facing northwest toward the Project site. This portion of the Project site has an existing daylight obstruction of 6.9% due to the distance of the existing buildings from the center of Harrishof Street. The Project will increase the daylight obstruction value only slightly to 8.7%. The daylight obstruction value is significantly less than the daylight obstruction value of other buildings in the area, including the Area Context buildings.

Dennison Street – Viewpoint 4

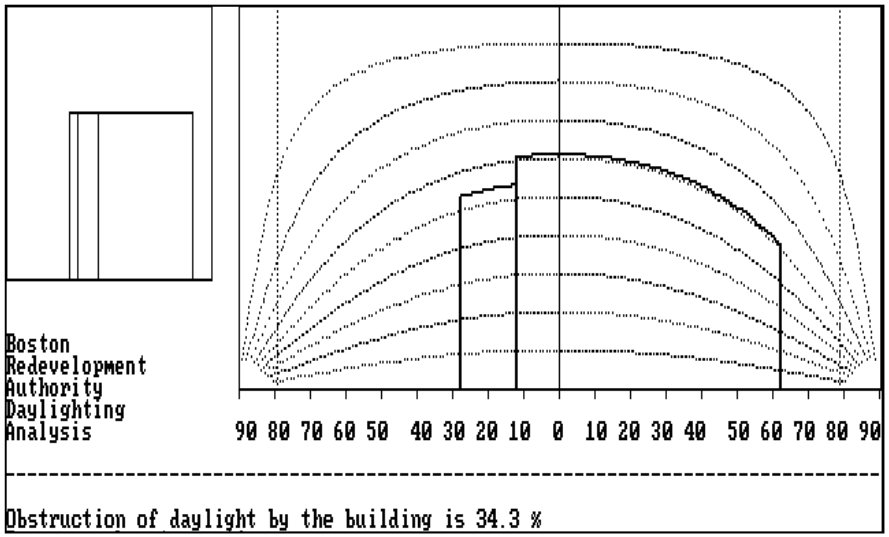
Dennison Street runs along the western edge of the Project site. Viewpoint 4 was taken from the center of Dennison Street facing northeast toward the Project site. This portion of the Project site has an existing daylight obstruction of 3.4% due to the distance of the existing buildings from the center of Dennison Street. The Project will increase the daylight obstruction value to 23.9%. The daylight obstruction value is less than the daylight obstruction value of other buildings in the area, including the Area Context buildings.

Area Context Viewpoints

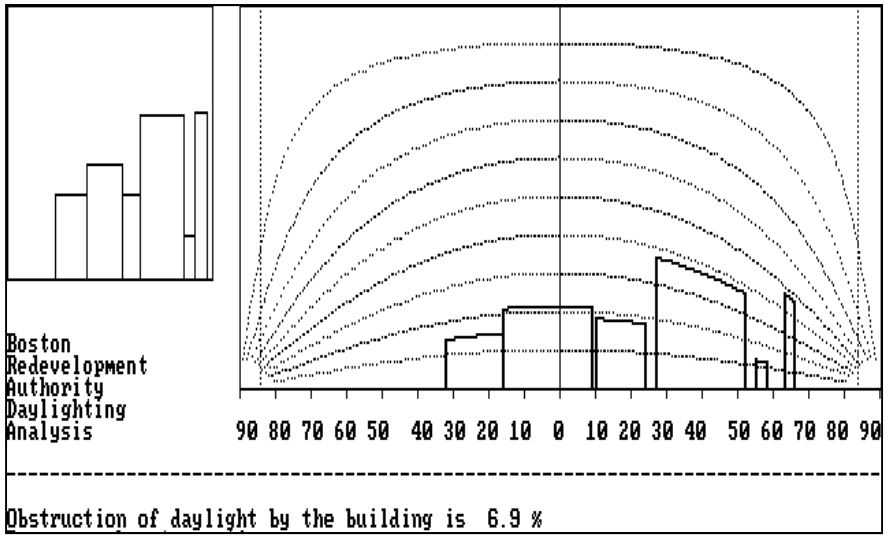
The Project site is located in an area with a mix of relatively low density residential and institutional uses. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the three Area Context Viewpoints described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 61.5% for AC3 to 90.8% for AC1. Daylight obstruction values for the Project are consistent with the Area Context values.



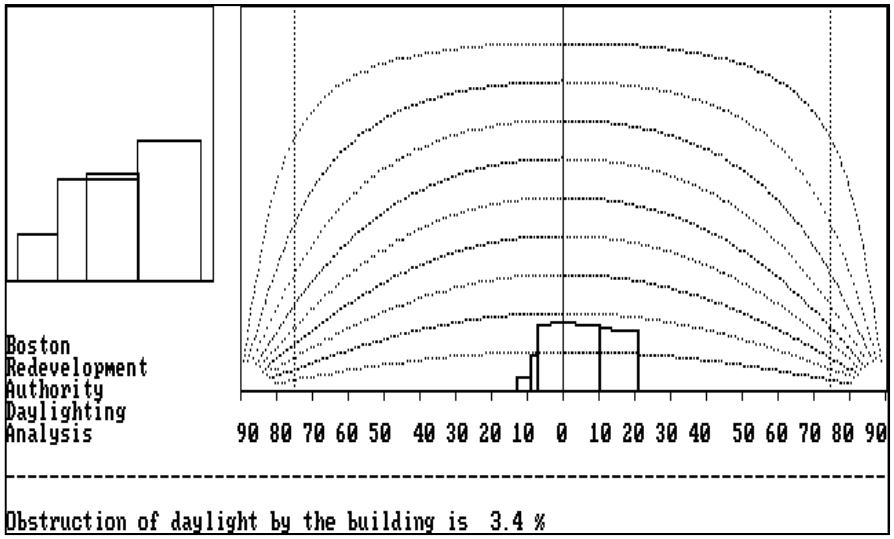
Viewpoint 1 (Existing): View from Townsend Street facing southwest toward the Project site



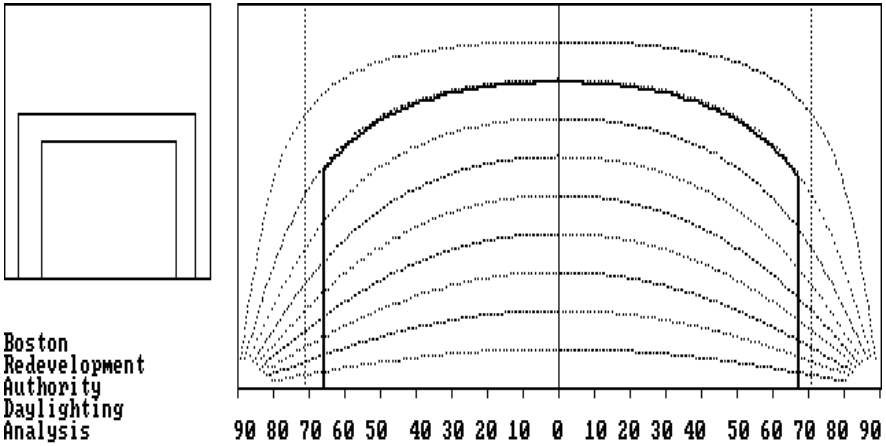
Viewpoint 2 (Existing): View from Townsend Street facing southwest toward the Project site



Viewpoint 3 (Existing): View from Harrishof Street facing northwest toward the Project site

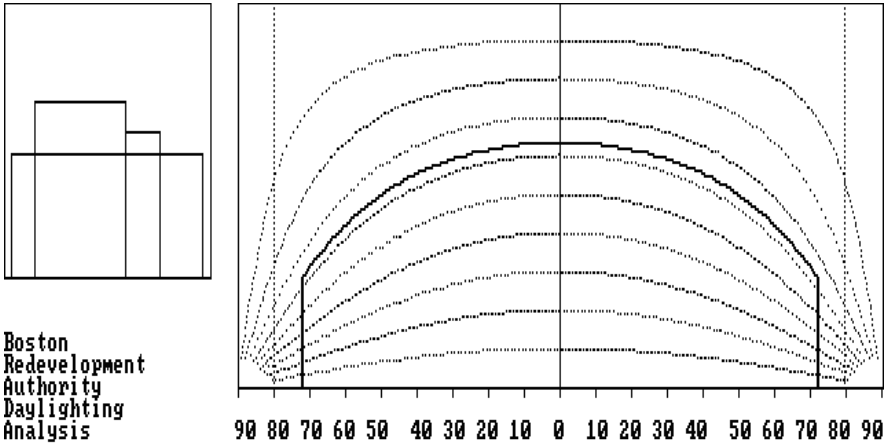


Viewpoint 4 (Existing): View from Dennison Street facing northeast toward the Project site



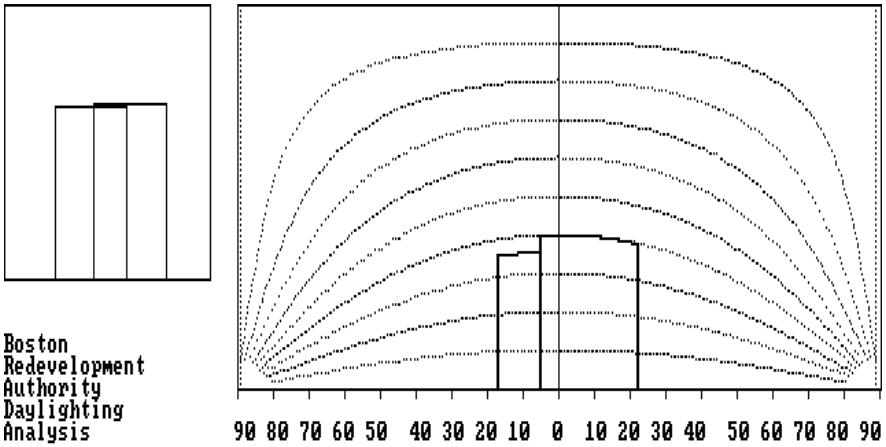
Obstruction of daylight by the building is 75.1 %

Viewpoint 1 (Proposed): View from Townsend Street facing southwest toward the Project site



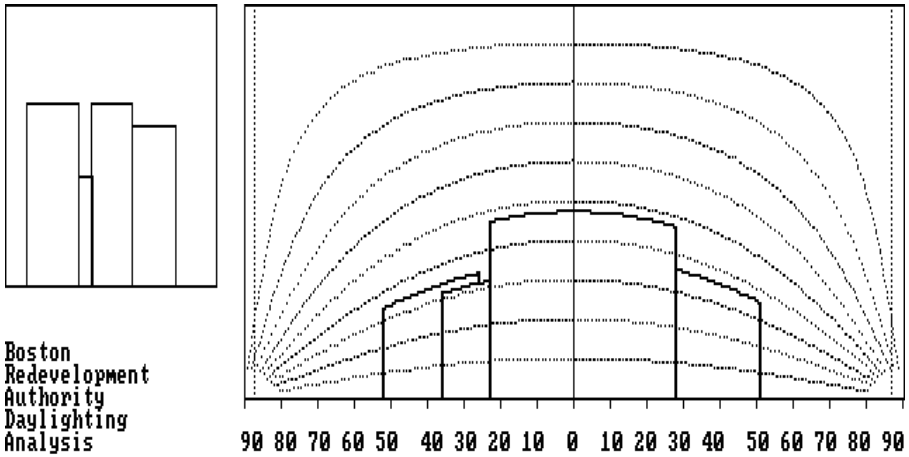
Obstruction of daylight by the building is 58.6 %

Viewpoint 2 (Proposed): View from Townsend Street facing southwest toward the Project site



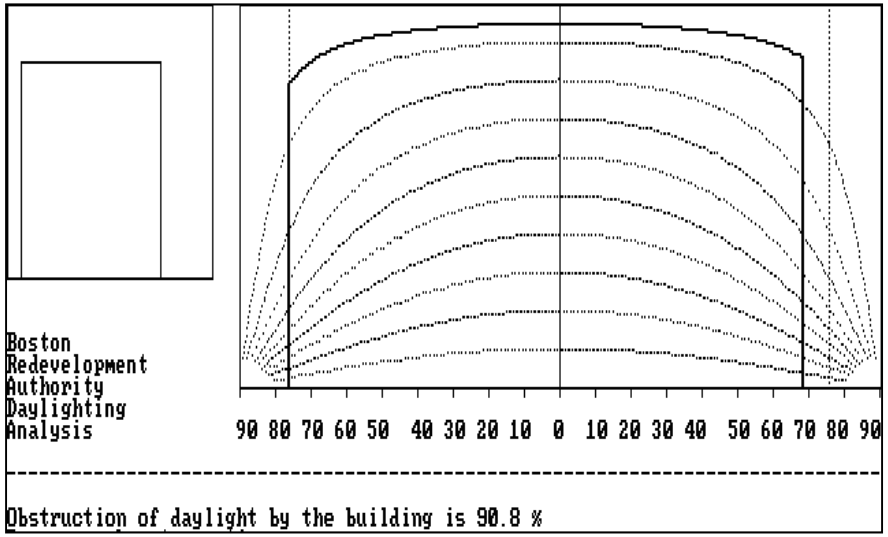
Obstruction of daylight by the building is 8.7 %

Viewpoint 3 (Proposed): View from Harrishof Street facing northwest toward the Project site

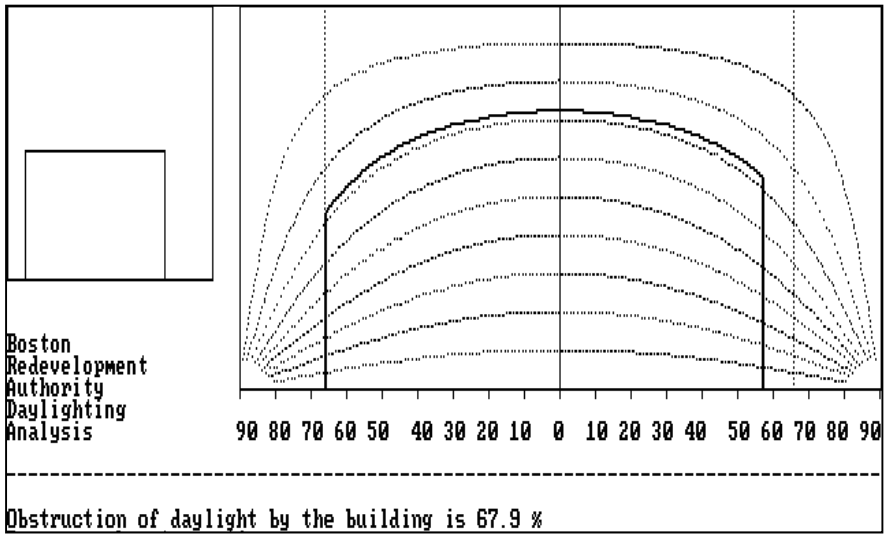


Obstruction of daylight by the building is 23.9 %

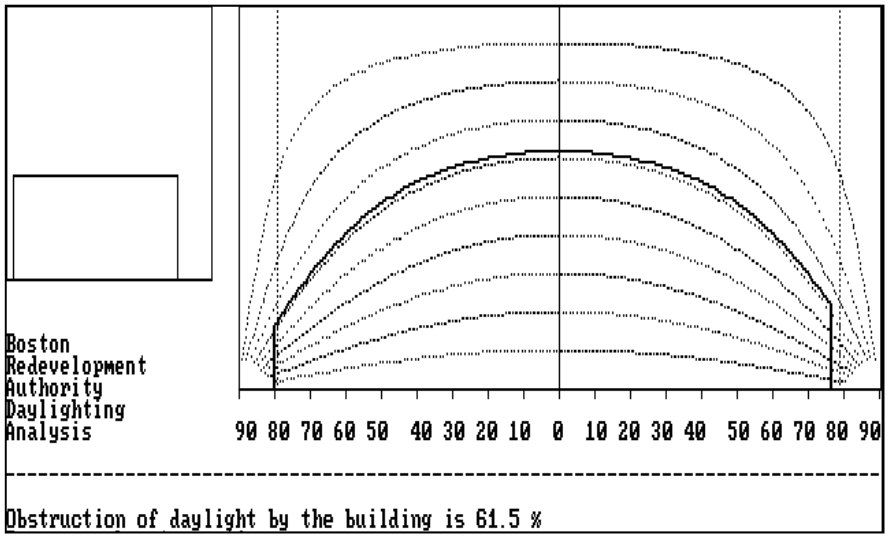
Viewpoint 4 (Proposed): View from Dennison Street facing northeast toward the Project site



AC1: View from Dimock Place facing northeast toward 2875 Washington Street



AC2: View from Townsend Street facing southeast toward 250 Walnut Avenue



AC3: View from Townsend Street facing southwest toward 135 Townsend Street

3.3.4 Conclusions

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project site and in the surrounding area. The results of the BRADA analysis indicate that while the development of the Project will result in increased daylight obstruction over existing conditions, the resulting conditions will be similar to or less than the daylight obstruction values within the surrounding area. The design includes setbacks from the streets, space between buildings, and a variety of heights that allow for views of the sky.

3.4 Solar Glare

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

3.5 Air Quality

3.5.1 Introduction

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

The project doesn't generate enough traffic to require a mesoscale vehicle emissions quantification analysis. However, the project does affect local intersections operating at LOS D or worse. Therefore, a microscale analysis of carbon monoxide is required.

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

Therefore, an analysis of existing air quality in the area is presented.

3.5.2 National Ambient Air Quality Standards and Background Concentrations

Background air quality concentrations and federal air quality standards were utilized to conduct the above air quality impact analyses. Federal National Ambient Air Quality Standards (NAAQS) were developed by the U.S. Environmental Protection Agency (EPA) to protect the human health against adverse health effects with a margin of safety. The modeling methodologies were developed in accordance with the latest Massachusetts

Department of Environmental Protection (MassDEP) modeling policies and Federal modeling guidelines.[6] The following sections outline the NAAQS standards and detail the sources of background air quality data.

3.5.2.1 National Ambient Air Quality Standards

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

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

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

Table 3.5-1 National (NAAQS) and Massachusetts (MAAQS) Ambient Air Quality Standards

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

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

Table 3.5-1 National (NAAQS) and Massachusetts (MAAQS) Ambient Air Quality Standards (Continued)

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)		MAAQS ($\mu g/m^3$)	
		Primary	Secondary	Primary	Secondary
CO	8-hour (3)	10,000	Same	10,000	Same
	1-hour (3)	40,000	Same	40,000	Same
Ozone	8-hour (8)	**147**	Same	**235**	Same
Pb	3-month (1)	1.5	Same	1.5	Same

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

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

3.5.2.2 Background Concentrations

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

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

Background concentrations were determined from the closest available monitoring stations to the proposed development. The closest monitor is at Harrison Avenue in Boston, roughly 1.6 miles northeast of the Project. This site samples for all pollutants. A summary of the background air quality concentrations are presented in Table 3.5-2.

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

Pollutant	Averaging Time	2012	2013	2014	Background Concentration ($\mu g/m^3$)	NAAQS	Percent of NAAQS
SO_2 (1)(6)	1-Hour (5)	28.6	32.2	24.6	28.5	196.0	15%
	3-Hour	25.4	56.3	22.8	56.3	1300.0	4%
	24-Hour	13.1	13.4	11.3	13.4	365.0	4%
	Annual	2.8	2.8	2.1	2.8	80.0	4%
PM-10	24-Hour	34.0	61.0	28.0	61.0	150.0	41%
	Annual	15.1	13.9	12.4	15.1	50.0	30%
PM-2.5	24-Hour (5)	15.9	12.7	19.0	15.9	35.0	45%
	Annual (5)	7.3	6.0	8.8	7.4	12.0	61%
NO_2 (3)	1-Hour (5)	94.0	95.9	99.6	96.5	188.0	51%
	Annual	32.8	29.6	28.1	32.8	100.0	33%
CO (2)	1-Hour	2145.3	1963.1	1560.9	2145.3	40000.0	5%
	8-Hour	1375.2	1489.8	1031.4	1489.8	10000.0	15%
Ozone (4)	8-Hour	115.8	106.0	109.9	115.8	147.0	79%
Lead	Rolling 3-Month	0.006	0.014	0.016	0.016	0.15	10%

Notes:
From 2012-2014 EPA's AirData Website
(1) SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.
(2) CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.
(3) NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.
(4) O_3 reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1963 $\mu g/m^3$.
(5) Background level is the average concentration of the three years.
(6) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

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

3.5.3 Stationary Sources

Stationary sources of air pollution are typically units that combust fuel. In this case, these sources consist of heating and hot water units and emergency electrical generators. Cooling towers, although not a combustion source, are a source of particulate emissions.

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

3.5.4 Mobile Sources

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

Mobile sources of air pollution include emissions from vehicle traffic associated with the project.

3.5.4.1 BPDA (BRA) Air Quality Analysis Requirements

BPDA guidelines[7] state:

> *A mesoscale analysis predicting the change in regional emissions of volatile organic compounds ("VOCs") and nitrogen oxides ("NOx") should be performed for projects that generate more than 10,000 vehicle trips per day. The above analyses shall be conducted in accordance with the modeling protocols established by the Massachusetts Department of Environmental Protection ("DEP") and the U.S. Environmental Protection Agency ("EPA").*

For this project, the vehicle trip threshold is not exceeded. Therefore a mesoscale analysis was not required.

BPDA guidelines also state:

> *A microscale analysis predicting localized carbon monoxide concentrations should be performed, including identification of any locations projected to exceed the National or Massachusetts Ambient Air Quality Standards, for projects in which: 1) project traffic would impact intersections or roadway links currently operating at Level of Service ("LOS") D, E, or F or would cause LOS to decline to D, E, or F; 2) project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the project will generate 3,000 or more new average daily trips on roadways providing access to a single location.*

For this Project, the transportation analysis shows that project traffic affects one intersection either currently operating at LOS D or worse, or projected to operate at LOS D or worse for future cases. Therefore a microscale analysis was required.

[7] Boston Redevelopment Authority, BRA Development Review Guidelines, 2006

3.5.4.2 Methodology

Microscale Analysis

The BPDA typically requests an analysis of the effect on air quality of the increase in traffic generated by projects subject to Large Project Review. The microscale analysis involves modeling of carbon monoxide (CO) emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The analysis for the Project followed the procedure outlined in U.S. EPA's intersection modeling guidance.[8]

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

Baseline (2016) and future year (2023) emission factor data calculated from the MOVES model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersection.

Existing background values of CO at the nearest monitor location at Harrison Avenue were obtained from MassDEP. CAL3QHC results were then added to background CO values of 1.9 ppm (one-hour) and 1.3 ppm (eight-hour), as provided by MassDEP, to determine total air quality impacts due to the Project. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and 9 ppm (eight-hour).

The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[9]

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

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

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

Intersection Selection

As stated previously, a "microscale" analysis is typically required for the Project at intersections where 1) Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F or would cause LOS to decline to D, E, or F; 2) Project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the Project will generate 3,000 or more new average daily trips on roadways providing access to a single location.

One signalized intersection included in the traffic study meets the above conditions (see Chapter 2). The traffic volumes and LOS calculations provided in Chapter 2 form the basis of evaluating the traffic data versus the microscale thresholds. The intersection found to meet the criteria is the intersection of Washington Street, Marcella Street, and Brinton Street.

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

The CAL3QHC model's queueing algorithm is not designed for unsignalized intersections. Therefore analysis of intersections where no signal exists was not performed.

Emissions Calculations (MOVES)

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

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

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

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

Receptors & Meteorology Inputs

A set of 153 receptors was placed in the vicinity of the modeled intersection. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersection. The roadway links and receptor locations of the modeled intersection are presented in Figure 3.5-1.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[11], a wind speed of one meter per second, stability class D (4), and a mixing height of 1,000 meters were used. To account for the intersection geometry, wind directions from 0° to 350°, every 10° were selected. A surface roughness length of 321 centimeters was selected.[12]

Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at signalized intersections, worst-case meteorological conditions, and traffic input data. The one-hour concentrations were scaled by a factor of 0.9 to estimate eight-hour concentrations.[13] The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs.

For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 1.9 ppm (2,145 μg/m3) for one-hour and 1.3 ppm (1,490 μg/m3) for eight-hour CO.

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

[12] U.S. EPA, *User's Guide for CAL3QHC Version 2: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. EPA –454/R-92-006 (Revised), September 1995.

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

45 Townsend Street **Boston, MA**

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Figure 3.5-1

Intersection of Washington Street, Marcella Street, and Brinton Street.

3.5.4.3 Air Quality Results

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 3.5-3 through 3.5-5 for the 2016 and 2023 scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.9.[14]

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.3 ppm) plus background (1.9 ppm) is 2.2 ppm. The highest eight-hour traffic-related concentration predicted in the area of the Project for the modeled conditions (0.3 ppm) plus background (1.3 ppm) is 1.6 ppm. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

3.5.4.4 Conclusions

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

Table 3.5-3 Summary of Microscale Modeling Analysis (Existing 2016)

Intersection	*Peak*	*CAL3QHC Modeled CO Impacts (ppm)*	*Monitored Background Concentration (ppm)*	*Total CO Impacts (ppm)*	*NAAQS (ppm)*
1-Hour					
Washington Street, Marcella Street, and Brinton Street	AM	0.3	1.9	2.2	35
	PM	0.3	1.9	2.2	35
8-Hour					
Washington Street, Marcella Street, and Brinton Street	AM	0.3	1.3	1.6	9
	PM	0.3	1.3	1.6	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

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

Table 3.5-4 Summary of Microscale Modeling Analysis (No-Build 2023)

Intersection	*Peak*	*CAL3QHC Modeled CO Impacts (ppm)*	*Monitored Background Concentration (ppm)*	*Total CO Impacts (ppm)*	*NAAQS (ppm)*
1-Hour					
Washington Street, Marcella Street, and Brinton Street	AM	0.1	1.9	2.0	35
	PM	0.2	1.9	2.1	35
8-Hour					
Washington Street, Marcella Street, and Brinton Street	AM	0.1	1.3	1.4	9
	PM	0.2	1.3	1.5	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

Table 3.5-5 Summary of Microscale Modeling Analysis (Build 2023)

Intersection	*Peak*	*CAL3QHC Modeled CO Impacts (ppm)*	*Monitored Background Concentration (ppm)*	*Total CO Impacts (ppm)*	*NAAQS (ppm)*
1-Hour					
Washington Street, Marcella Street, and Brinton Street	AM	0.1	1.9	2.0	35
	PM	0.2	1.9	2.1	35
8-Hour					
Washington Street, Marcella Street, and Brinton Street	AM	0.1	1.3	1.4	9
	PM	0.2	1.3	1.5	9
Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.					

3.6 Water Quality and Stormwater Management

Section 7.4 includes information on the proposed stormwater management system and water quality.

3.7 Noise Impacts

3.7.1 Introduction

A sound level assessment was conducted that included a baseline sound monitoring program to measure existing sound levels in the vicinity of the Project, computer modeling to predict operational sound levels from proposed mechanical equipment, and a comparison of future, predicted Project sound levels to applicable City of Boston Zoning District Noise Standards.

This analysis, which complies with BPDA requirements for noise studies, indicates that with appropriate noise controls, predicted sound levels from the Project will comply with local noise regulations.

3.7.2 Noise Terminology

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

The decibel scale is logarithmic to accommodate the wide range of sound intensities observed in the environment. A property of the decibel scale is that the sound pressure levels of two distinct sounds are not purely additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a three-decibel increase (53 dB), not a doubling (100 dB). Thus, every three-decibel change in sound level represents a doubling or halving of sound energy. A change in sound level of less than three dB is generally imperceptible to the human ear.

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

The sound level meter used to measure noise is a standardized instrument.[15] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various circumstances. The most commonly used weighting network is the A-weighting because it most closely approximates how the human ear responds to sound at various frequencies, described in Hertz (Hz). A-weighted sound levels, reported in "dBA", emphasize middle frequencies (i.e., middle pitched—around 1,000 Hertz sounds), and de-emphasize lower and higher frequencies and are broadly accepted for sound level measurements and permitting efforts.

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

Because sounds in the environment vary with time, they are usually described with more than simply a single number. Two methods are used for describing variable sounds, exceedance levels and the equivalent level, both of which are derived from a large number of moment-to-moment, A-weighted sound level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where n can have a value between 0 and 100 in terms of percentage. Several sound level metrics that are commonly reported in community noise studies are described below.

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

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

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

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

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

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

3.7.3 Noise Regulations and Criteria

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 considered 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 and is considered in this noise study.

Table 3.7-1 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. Table 3.7-1, below, identifies the maximum allowable sound pressure levels when measured at the property line of the receiving property. The "Residential Zoning District" limits apply to any lot located within a residential zoning district or to any residential use located in another zone except an Industrial Zoning District, according to Regulation 2.2. Similarly, per Regulation 2.3, business limits apply to any lot located within a business zoning district not in residential or institutional use.

Table 3.7-1 City Noise Standards, Maximum Allowable Sound Pressure Levels

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

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

3.7.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project. Existing noise sources in the vicinity of the Project site include: vehicular traffic along local roadways (including Townsend Street, Walnut Road, Harrishof Street, Haley Street, and Codman Park); birds; barking dogs (daytime only); vegetation rustle; pedestrian traffic; mechanical noise from nearby structures including the existing structures on the Project parcel; and the general city soundscape.

3.7.4.1 Noise Monitoring Methodology

Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Daytime measurements were scheduled to avoid peak traffic conditions. Sound level measurements were made on Tuesday, February 14, 2017 during the daytime (1:00 p.m. to 3:15 p.m.) and on Wednesday, February 15, 2017 during nighttime hours (12:00 a.m. to 2:00 a.m.). All measurements were 20 minutes in duration.

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

3.7.4.2 Noise Monitoring Locations

The selection of the noise monitoring locations was based upon a review of zoning and land use in the Project area. Four noise monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. These measurement locations are depicted on Figure 3.7-1 and described below.

- **Location 1** is at the southeast corner of Townsend Street and Codman Park, outside of #15 Townsend Street and is representative of the closest residential neighborhoods west of the Project (inclusive of the Codman Park project.

- **Location 2** is outside of #30 Townsend Street, along the northern sidewalk of Townsend Street northeast of the proposed Project, and in direct line of sight to the Project parcel. This location is representative of the closest residential use north of the Project.

45 Townsend Street Boston, Massachusetts

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Figure 3.7-1
Noise Measurement Locations

- **Location 3** is at the southwest corner of Haley Street and Harrishof Street, in front of #1 Haley Street, and in direct line of sight to the Project parcel. This location is representative of the closest residences to the east of the Project (inclusive of the Higginson Elementary School and the Huggins Lewis School).

- **Location 4** is located at the far northern end of Dennison Street, on the western sidewalk, north of #40 Dennison Street, and across from #35 Dennison Street. This

- location is representative of the residential receptors south of the Project and is in direct line of sight of the Project parcel.

3.7.4.3 Noise Monitoring Equipment

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

3.7.4.4 Measured Background Noise Levels

Baseline noise monitoring results are presented in Table 3.7-2, and summarized below:

- The daytime residual background (L_{90}) measurements ranged from 38 to 46 dBA;

- The nighttime residual background (L_{90}) measurements ranged from 35 to 39 dBA;

- The daytime equivalent level (L_{eq}) measurements ranged from 46 to 66 dBA;

- The nighttime equivalent level (L_{eq}) measurements ranged from 40 to 63 dBA;

Table 3.7-2 Summary of Measured Background Noise Levels – February 14, 2017 (Daytime) & February 15, 2017 (Nighttime)

Location	Period	Start Time	LA_{eq}	LA_{max}	LA_{10}	LA_{50}	LA_{90}	L_{90} Sound Pressure Level by Octave-Band Center Frequency (Hz)								
								31.5	63	125	250	500	1k	2k	4k	8k
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB
1	Day	1:24 PM	56	74	59	51	46	59	51	44	42	39	40	36	30	25
2	Day	1:53 PM	64	84	68	55	43	53	46	44	40	38	37	33	28	26
3	Day	2:23 PM	46	71	45	42	41	51	46	44	41	36	35	31	25	23
4	Day	2:54 PM	66	78	71	59	38	53	46	40	38	35	32	28	24	24
1	Night	12:16 AM	50	75	50	43	39	50	44	37	36	36	34	30	25	23
2	Night	12:43 AM	63	89	59	39	35	46	42	36	35	32	31	25	19	21
3	Night	1:13 AM	40	56	42	39	38	47	45	40	40	35	31	25	20	21
4	Night	1:41 AM	40	55	43	37	36	47	41	37	36	33	31	27	21	21

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

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Tuesday, February 14, 2017	44 °F	31%	Clear	Calm
Nighttime	Wednesday, February 15, 2017	28 °F	68%	Partly cloudy	West @ 0-2 MPH

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	3047
Microphone	Larson Davis	377B20	130579
Preamp	Larson Davis	PRM831	23825
Calibrator	Larson Davis	Cal200	7146

3.7.5 Future Conditions

3.7.5.1 Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project will consist of ventilation, heating, cooling, and emergency power noise sources. All Project-related noise sources will be within the buildings. Ventilation apertures associated with noise sources will discharge sound at various heights and at various facades and rooftops of the Project.

Table 3.7-3 provides a list of the anticipated major sources of sound. Sound power levels used in the acoustical modeling of each piece of equipment are presented in Table 3.7-4. Sound power level data were generally provided by the manufacturer of each piece of equipment or assumed by Epsilon and based on comparable equipment. An A-weighted sound power level was provided for the variable refrigerant flow (VRF) units; however, octave-band sound power levels were estimated by correlating levels from a comparable mechanical unit. Sound power levels for a 22,500 cubic-feet per minute (CFM) and a 35,000 CFM energy recovery ventilator (ERV) from an unknown manufacturer were supplied for the noise model. The 22,000 CFM unit levels were used in the model for the 26,000 CFM, 25,000 CFM, and 22,000 CFM ERVs. The sound power levels for the mechanical component and for the exhaust of the generator were calculated using the sound pressure levels provided by the manufacturer at reference distances.

The Project includes various noise-control measures to achieve compliance with the applicable noise regulations. As the design progresses, specifications for mechanical equipment and noise controls may change; however, appropriate measures will be taken to ensure compliance with the City of Boston Noise Standards. For the acoustical model, duct losses were calculated and subtracted from two Project noise sources because of the substantial distance between the source and the sound outlet. These sources are the garage exhaust fan where sound power levels exit the Harrishof East building rooftop and the 1st floor 35,000 CFM ERV intake, which projects sound out of the Townsend building rooftop. The garage intake fans will each be attenuated through acoustical louvers. As a noise-control measure for the sensitive receptors to the south of the Project, the garage exhaust fan outlet will be on the west side of the Harrishof East stairwell structure. No additional noise control will be required for the 1st floor 35,000 CFM ERV intake; however, the exhaust of the ERV will be attenuated through a three-foot duct silencer and further attenuated at the building façade with an acoustical louver. The 3rd floor 26,000 CFM ERV intake and exhaust will each be attenuated through acoustical louvers and the exhaust sound path will additionally utilize a three-foot duct silencer. The 3rd floor 25,000 CFM ERV is externally ventilated to 4th floor louvers. The intake and exhaust of this unit will be attenuated through three-foot duct silencers and acoustical louvers. Two 22,000 CFM ERVs will be on the 5th floor of the Harrishof West building. The units will be ventilated to an acoustical intake louver and an acoustical exhaust louver. The six VRF units on the northern façade of the Codman building will be mitigated either through a sound mitigation package supplied by the vendor or through the selection of quieter equipment from an

alternate manufacturer. The VRF condenser louver on the eastern Townsend building façade will be of acoustical attenuating quality. The in-building emergency generator sound levels will be controlled using an enclosure and an acoustical louver on the ventilation opening. An exhaust duct silencer will also be installed for the generator. To further limit impacts from the standby generator, its required routine, periodic testing will be conducted during daytime hours, when background sound levels are highest to reduce impacts on the community. A summary of all the noise attenuation expected for the Project is presented in Table 3.7-5.

Table 3.7-3 Modeled Noise Sources

Noise Source	Quantity	Approximate Location	Size/Capacity
Garage Ventilation Intake Fan	2	3rd Floor level on eastern façade of open garage	33,000 CFM
Garage Ventilation Exhaust Fan	2	Harrishof East building rooftop on western side of stairwell exit structure (~78′ tier) [noise-control design]	33,000 CFM
1st Floor Energy Recovery Ventilator (ERV) Intake	1	Townsend building, East wing rooftop (60′ tier)	35,000 CFM
1st Floor Energy Recovery Ventilator (ERV) Exhaust	1	Townsend building, East wing 3rd Floor southeastern façade	35,000 CFM
3rd Floor Energy Recovery Ventilator (ERV) Intake	1	Codman building 3rd Floor northern façade	26,000 CFM
3rd Floor Energy Recovery Ventilator (ERV) Exhaust	1	Codman building 3rd Floor northern façade	26,000 CFM
3rd Floor Energy Recovery Ventilator (ERV) Intake – 4th Flr Vent	1	Harrishof East building 4th Floor southern façade (ERV on 3rd Floor)	25,000 CFM
3rd Floor Energy Recovery Ventilator (ERV) Exhaust – 4th Flr Vent	1	Harrishof East building 4th Floor southern façade (ERV on 3rd Floor)	25,000 CFM
5th Floor Energy Recovery Ventilator (ERV) Intake	2	Harrishof West building 5th Floor northeastern façade	22,000 CFM
5th Floor Energy Recovery Ventilator (ERV) Exhaust	2	Harrishof West building 5th Floor southwestern façade	22,000 CFM
Variable Refrigerant Flow (VRF) Unit	6	Codman building northern façade (one on each floor)	6,300 CFM
Variable Refrigerant Flow (VRF) Unit	7	Harrishof West building northern façade (one on each floor)	6,300 CFM
Variable Refrigerant Flow (VRF) Condenser Vent	1	Townsend building, East wing 1st Floor southeastern façade	16,000 CFM
Emergency Generator – Mechanical	1	Harrishof East building 4th Floor in-building	750 kW
Emergency Generator – Exhaust	1	10′ above roof of Harrishof East building	750 kW

Table 3.7-4 Modeled Sound Power Levels per Noise Source

Noise Source	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
		31.5[7]	63	125	250	500	1k	2k	4k	8k
Garage Ventilation Intake Fan[1]	91	86	86	95	88	90	86	83	75	70
Garage Ventilation Exhaust Fan[1]	98	88	88	97	93	100	90	85	77	70
1st Floor Energy Recovery Ventilator (ERV) Intake[2]	98	100	100	96	92	98	91	89	89	82
1st Floor Energy Recovery Ventilator (ERV) Exhaust[2]	93	90	90	87	97	91	85	84	82	77
3rd Floor Energy Recovery Ventilator (ERV) Intake[3]	93	90	90	89	91	90	88	85	83	78
3rd Floor Energy Recovery Ventilator (ERV) Exhaust[3]	102	93	93	92	97	96	100	90	88	82
3rd Floor Energy Recovery Ventilator (ERV) Intake – 4th Flr Vent[3]	93	90	90	89	91	90	88	85	83	78
3rd Floor Energy Recovery Ventilator (ERV) Exhaust – 4th Flr Vent[3]	102	93	93	92	97	96	100	90	88	82
5th Floor Energy Recovery Ventilator (ERV) Intake[3]	93	90	90	89	91	90	88	85	83	78
5th Floor Energy Recovery Ventilator (ERV) Exhaust[3]	102	93	93	92	97	96	100	90	88	82
Variable Refrigerant Flow (VRF) Unit – All[4]	81	89	89	88	84	79	74	71	65	57
Variable Refrigerant Flow (VRF) Condenser Vent[5]	86	94	94	92	88	83	79	75	70	62
Emergency Generator - Mechanical[6]	116	108	108	113	112	111	113	109	105	100
Emergency Generator - Exhaust[6]	121	85	85	111	121	117	116	115	106	87

Notes:

Sound power levels do not include the mitigation identified in Table 3.7-5.

1. Greenheck QEID-44-80-C300 33,000 CFM fan.
2. Unknown manufacturer of 35,000 CFM unit provided by Studio G Architects.
3. Unknown manufacturer of 22,500 CFM unit provided by Studio G Architects. No sound levels for an equally-sized unit were provided.
4. Octave-band sound power levels were estimated by correlating levels from a 10-ton ACCU to the 10-ton Daikin VRF spec sheet provided with an A-weighted sound power level of 81 dBA.
5. No data provided. Sound power levels were estimated by using a combination of three (3) 6,300 CFM/10-ton VRFs (i.e., 10-ton ACCU sound power levels) to achieve 16,000 CFM at the louver.
6. Caterpillar C27 750 kW generator package spec sheet of sound pressure levels converted to sound power levels.
7. No data provided by manufacturer. Octave-band sound level assumed to be equal to dB level in 63 Hz band.

Table 3.7-5 Noise Controls and Attenuation by Source

Noise Source	Form of Mitigation	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Garage Vent Intake Fan	Louver[1]	0[11]	6	12	15	21	24	27	25	20
Garage Vent Exhaust Fan	Duct Loss[2]	8[12]	8	6	4	4	4	4	4	4
1st Floor ERV Intake	Duct Loss[3]	6[12]	6	5	3	3	3	3	3	3
1st Floor ERV Exhaust	Duct Silencer[4]	0[11]	6	10	16	26	33	34	29	18
1st Floor ERV Exhaust	Louver[5]	0[11]	5	4	5	6	9	13	14	13
3rd Floor ERV Intake	Louver[1]	0[11]	6	12	15	21	24	27	25	20
3rd Floor ERV Exhaust	Duct Silencer[4]	0[11]	6	10	16	26	33	34	29	18
3rd Floor ERV Exhaust	Louver[5]	0[11]	5	4	5	6	9	13	14	13
3rd Floor ERV Intake – 4th Flr Vent	Duct Silencer[6]	0[11]	8	13	22	30	37	34	23	13
3rd Floor ERV Intake – 4th Flr Vent	Louver[5]	0[11]	5	4	5	6	9	13	14	13
3rd Floor ERV Exhaust – 4th Flr Vent	Duct Silencer[4]	0[11]	6	10	16	26	33	34	29	18
3rd Floor ERV Exhaust – 4th Flr Vent	Louver[5]	0[11]	5	4	5	6	9	13	14	13
5th Floor ERV Intake	Louver[7]	0[11]	6	6	8	10	14	18	16	15
5th Floor ERV Exhaust	Louver[1]	0[11]	6	12	15	21	24	27	25	20
VRF Units – Six (6) Codman Building units only	Alternative/ Modified Unit[8]	0	0	0	2	3	5	7	7	5
VRF Condenser Vent	Louver[5]	0[11]	5	4	5	6	9	13	14	13
Emergency Generator – Mechanical	Enclosure[9]	5	10	20	20	20	20	20	20	20
Emergency Generator - Mechanical	Louver[7]	0[11]	6	6	8	10	14	18	16	15
Emergency Generator - Exhaust	Duct Silencer[10]	0[11]	5	8	23	41	45	47	45	36

Notes:

1. Assumed IAC Noishield™ Model 2R Acoustic louver
2. Epsilon-calculated estimate of acoustical duct losses using data from the Hoover & Keith Inc. Noise Control for Buildings and Manufacturing Plants course materials. Straight, round duct with over 90-inch diameter conservatively assumed for 80-foot path distance.
3. Epsilon-calculated estimate of acoustical duct losses using data from the Hoover & Keith Inc. Noise Control for Buildings and Manufacturing Plants lecture notes. Straight, round duct with over 90-inch diameter conservatively assumed for 56-foot path distance.
4. Assumed Commercial Acoustics model 3HPA duct silencer at +2000fpm face velocity

5. Assumed IAC Slimshield™ Model SL-4 Acoustic louver
6. Assumed Commercial Acoustics model 3HPA duct silencer at -2000fpm face velocity
7. Assumed IAC Slimshield™ Model SL-6 Acoustic louver
8. The Proponent will consult with the manufacturer to identify mitigation options to achieve at least the attenuation values presented or select a unit from an alternate manufacturer meeting the modeled attenuation level.
9. The Proponent will consult with a manufacturer to identify acoustical enclosure options to achieve at least the attenuation values presented.
10. Assumed Price model CM/12C absorptive duct silencer at +4000fpm face velocity
11. No data available. Octave-band attenuation is conservatively assumed to be 0 dB.
12. No duct loss attenuation available. Octave-band attenuation assumed to be same as 63 Hz level.

3.7.5.2 Noise Modeling Methodology

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

Breakout noise through exterior Project walls was not included in the noise model, whereas it is assumed that building wall construction will provide sufficient noise reduction for sources within the Project buildings. Therefore, breakout noise is assumed insignificant comparatively to externally-ventilated noise sources.

3.7.5.3 Future Sound Levels – Nighttime

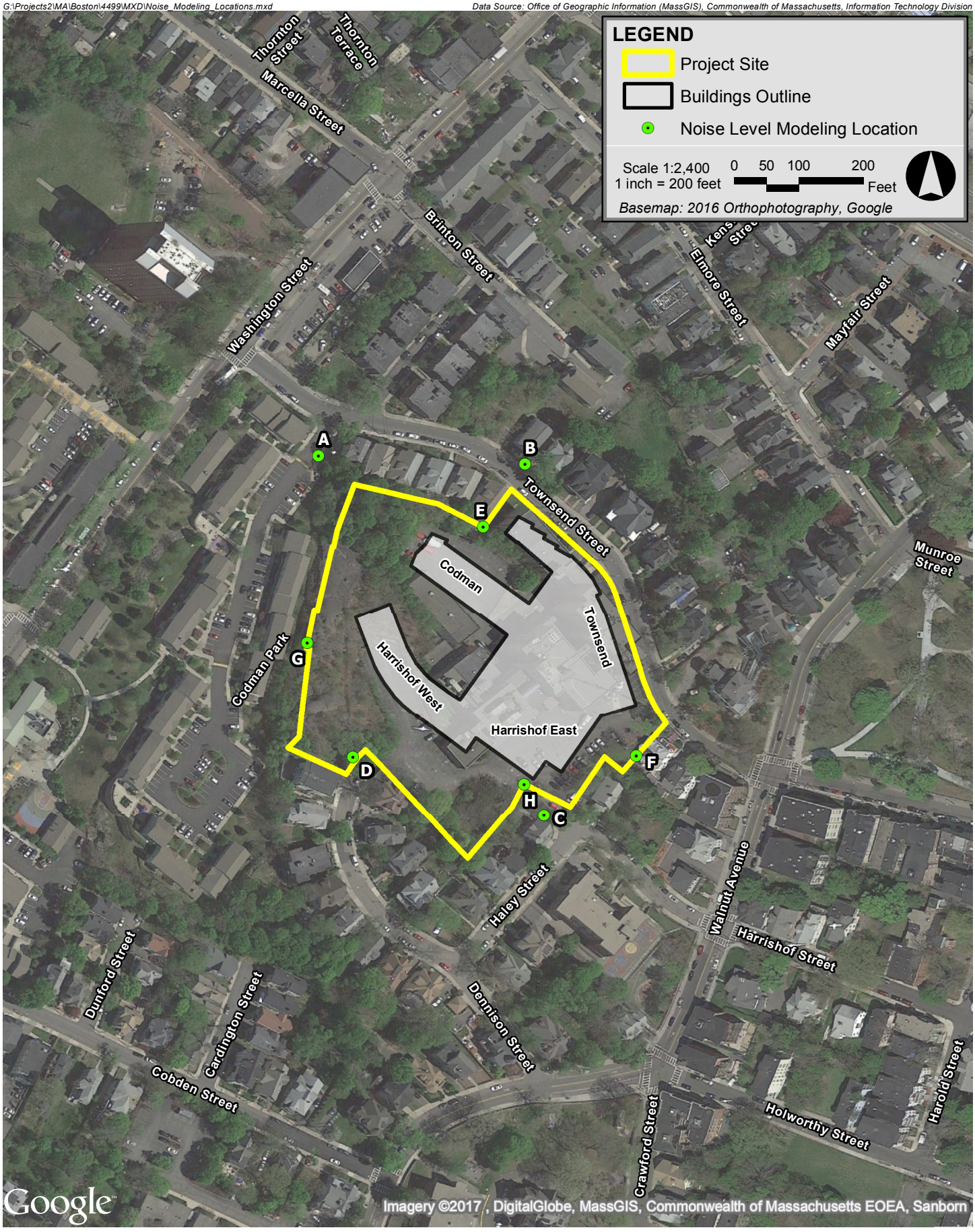
The analysis of sound levels at night considered all of the mechanical equipment without the emergency generator running, to simulate typical nighttime operating conditions at nearby receptors. Eight modeling locations were included in the analysis. Locations A through D are identical to measurement Locations 1 through 4. Four additional modeling locations, E through H, were added for additional residential uses in the vicinity of the Project. The modeling receptors, which correspond to the residential uses in the community, are depicted in Figure 3.7-2. The predicted exterior Project-only sound levels range from 35 to 47 dBA at nearby receptors. The City of Boston Residential limits have been applied to each of these locations. Predicted sound levels from Project-related equipment are within the broadband and octave-band nighttime limits under the City Noise Standards at the modeling locations. The evaluation is presented in Table 3.7-6.

Table 3.7-6 Comparison of Future Predicted Project-Only Nighttime Sound Levels to the City of Boston Limits

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	38	52	49	46	39	35	33	28	19	0
B	Residential	35	56	50	44	37	32	25	18	17	11
C	Residential	46	61	54	52	46	46	37	30	23	17
D	Residential	45	54	46	44	42	46	36	29	20	8
E	Residential	47	64	60	57	50	44	39	33	27	22
F	Residential	46	63	57	55	49	44	37	31	25	18
G	Residential	39	51	44	37	41	35	36	23	22	16
H	Residential	45	64	53	50	46	45	34	29	24	19
City of Boston Limits	**Residential**	**50**	**68**	**67**	**61**	**52**	**46**	**40**	**33**	**28**	**26**

3.7.5.4 Future Sound Levels – Daytime

As previously noted, the emergency generator will only operate during the day for brief, routine testing when the background sound levels are higher, or during an interruption of power from the electrical grid. A second analysis combined the noise from the Project's mechanical equipment and its emergency generator to reflect worst-case conditions. The sound levels were calculated at the same receptors as in the nighttime analysis, and were evaluated against daytime City of Boston limits. The predicted exterior Project-only daytime sound levels range from 35 to 56 dBA at nearby receptors. Predicted sound levels from Project-related equipment are within the daytime broadband and octave-band limits under the City Noise Standards at each of the modeling locations. This evaluation is presented in Table 3.7-7.



45 Townsend Street Boston, Massachusetts

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Figure 3.7-2
Noise Modeling Locations

Table 3.7-7 Comparison of Future Predicted Project-Only Daytime Sound Levels to City of Boston Noise Standards

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	39	52	49	47	40	35	33	28	19	0
B	Residential	35	56	50	44	37	32	25	18	17	11
C	Residential	53	69	59	62	57	48	45	38	35	27
D	Residential	47	62	52	56	49	47	39	32	25	14
E	Residential	47	64	60	57	50	44	39	33	27	22
F	Residential	46	64	57	56	49	44	37	31	25	18
G	Residential	39	52	45	41	42	35	36	23	22	16
H	Residential	56	75	64	65	60	52	49	42	40	34
City of Boston Limits	**Residential**	**60**	**76**	**75**	**69**	**62**	**56**	**50**	**45**	**40**	**38**

3.7.6 Conclusions

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

Predicted mechanical equipment noise levels from the proposed Project at each receptor location, taking into account attenuation due to distance, structures, and noise-control measures, are expected to be at or below the octave-band requirements of City of Boston Noise Standards. The predicted sound levels from Project-related equipment, as modeled, are expected to remain below 50 dBA at residences during nighttime hours. Although this Project is anticipated to result in increases to the existing sound levels in the community, the sound levels due to equipment associated with the Project are predicted to meet the residential zoning limits for sound for the City of Boston at the nearest residential receptors.

At this time, while the mechanical equipment and noise controls have been refined, they are still conceptual in nature. During the final design phase of the Project, mechanical equipment and noise controls will be specified and designed to meet the applicable broadband limit and the corresponding octave-band limits of the City of Boston Noise Standards.

3.8 Geotechnical

3.8.1 Soil and Bedrock Conditions

The topography and subsurface conditions at the Project Site are primarily controlled by a glaciated bedrock knob comprised of Roxbury Conglomerate, a hard and slightly weathered rock type that is commonly found within the Boston Basin. Overburden soils above the bedrock are comprised of fill material (materials that have been modified or disturbed by former site construction, grading or filling) and glacial till deposited directly on the bedrock surface.

Bedrock is exposed on the northwest and west side of the site abutting the adjacent Academy Homes II Development and other private homes on Dennison Street. Smaller exposed rock outcrops were observed along the northern perimeter of the Site.

3.8.2 Groundwater

Groundwater was not observed at the Site as the Site generally consists of an elevated bedrock knob, above the surrounding topography. Locally, groundwater may exist several feet below the ground surface in areas with soil cover. If present, the groundwater likely flows approximately over the bedrock surface or following the ground surface gradients.

The project is not located in the Groundwater Conservation Overlay District (GCOD) and therefore is not subject to requirements of Article 32 of the Code. As the existing groundwater level is likely below the level of planned excavations, impacts to groundwater levels are not anticipated.

Some local dewatering may be required during the construction process to manage and remove surface water (precipitation) runoff into the open/uncovered below grade building footprint. To the extent possible, the Project will attempt to recharge/infiltrate that water into the ground outside the new building construction footprint. Construction dewatering will be performed in accordance with applicable Massachusetts Water Resources Authority (MWRA), EPA, BWSC and MassDEP regulations and policies. Waterproofing, where necessary, will be installed against the exterior face of the portions of structures which extend below observed and predicted groundwater levels as a permanent groundwater cut-off measure.

3.8.3 Foundation Construction Methodology

The proposed buildings are planned to be founded on shallow footings bearing directly on bedrock, or on thin layer of compacted structural fill overlying the bedrock. It is the intent of the project to minimize bedrock removal to the extent possible, and step the proposed foundations into the site topography and existing bedrock surfaces to limit rock excavation.

If bedrock excavation is required, mechanical excavation using hoe-rams, or similar techniques will be used. This technique will be employed as it is anticipated to have negligible impact to offsite structures in the surrounding community. However, the project will also develop a monitoring program and monitor vibrations during any vibration generating activity. If, depending on final site grading, additional bedrock excavation is needed, controlled blasting may be employed. If controlled blasting is employed, the project would conform to all requirements of the City of Boston Fire Department and the Massachusetts State Fire Code.

3.9 Solid and Hazardous Waste

3.9.1 Existing Conditions

A documented release of #4 fuel oil was reported at the site on March 25, 1997 and Release Tracking Number (RTN) 3-14939 was assigned to the site. Massachusetts Contingency Plan (MCP) compliance related to RTN 3-14939 was achieved on May 16, 2007 with the filing of a Class A-1 Response Action Outcome (RAO) with MassDEP. The RAO asserts that a condition of No Significant Risk was achieved at the site. The source of the release was identified and repaired, and no further impacts were observed after the release, nor are they likely in the future. The release has been remediated to pre-existing or "background" conditions, thus achieving a level of No Significant Risk to human health, and the public welfare and safety or the environment. Site closure does not rely on an Activity and Use Limitation (AUL) and no further Response Actions were necessary to maintain either a level of No Significant Risk or a Permanent Solution.

A second RTN (3-17534) was assigned to the Site following a release of #4 fuel oil reported to MassDEP in February of 1999. Remediation activities included the removal of a 10,000 gallon underground storage tank (UST) and 300 cubic yards of impacted soils. A Phase II Comprehensive Site Assessment was conducted in October and November of 2005 which resulted in the preparation of a Method 1 Risk Characterization. This risk characterization concluded that a condition of No Significant Risk is present at the site. Contamination was not reduced to background conditions, and no Post-RAO active operation or maintenance was proposed. An AUL was not required for this release because the Exposure Point Concentrations (EPCs) were below Method 1 Standards for unrestricted future uses.

Additional characterization of the sites' soil and groundwater will be conducted once site work commences and, if necessary, soil and groundwater will be managed in accordance with applicable local, state, and federal laws and regulations. During excavation, all soils exported from the site will be managed for off-site disposal in accordance with the current regulations and policies of MassDEP. Asbestos and hazardous materials evaluations have been conducted and will be reviewed with the Project's Construction Management group prior to commencing demolition activities. All asbestos containing materials (ACM) or other hazardous materials, and USTs will be removed in accordance with local, state, and federal regulations by a Massachusetts-licensed abatement contractor.

3.9.2 Solid Waste and Hazardous Waste

The Project will generate solid waste typical of residential and commercial/retail uses. Solid waste is expected to include waste paper, cardboard, glass bottles, and food. Recyclable materials will be recycled through a program implemented by building management.

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

3.9.3 Recycling

The Proponent has developed an enhanced recyclable materials collection program for building residents and building maintenance. The building will include single-stream recycling collection for standard recycling items such as beverage containers, bottles, jars, plastic, paper and cardboard. The building will also include a collection area for nonstandard recyclable materials, including clothing, batteries and light bulbs.

3.10 Construction Period Impacts

3.10.1 Overview

In compliance with the City's Construction Management Program a Construction Management Plan (CMP) will be submitted to the BTD once final Project plans are developed and the construction schedule is finalized. The construction contractor will be required to comply with the details and conditions of the approved CMP.

Adequate 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, systems for the protection of existing utilities, and control of noise and dust.

During the construction phase of the Project, the Proponent will provide the name, telephone number, and address of a contact person to communicate with on issues related to the construction. The construction contact will be responsible for responding to the questions/comments/complaints of the residents and businesses in the neighborhood.

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

3.10.2 Construction Methodology/Public Safety

As noted above, construction methodologies that ensure public safety and protect the immediately surrounding area will be employed. 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.

3.10.3 Construction Schedule

Construction of the Project is estimated to commence during 2019 with completion during 2021.

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 of performing such work. It is noted that some activities such as finishing activities could run beyond 6:00 p.m. to ensure the structural integrity of the finished product; certain components must be completed in a single pour, and placement of concrete cannot be interrupted.

3.10.4 Construction Staging/Access

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

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

3.10.5 Construction Mitigation

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

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 Boston Harbor" plaques will be installed at storm drains that are replaced or installed as part of the Project.

3.10.6 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.

Wheel wash stations will be installed at construction site exit areas and maintained by the contractor as needed. All trucks leaving the site must have all dirt/mud removed from the wheels and undercarriage of the truck prior to leaving the site. In addition, any loads containing soil for off-site disposal will be covered. Construction vehicles and equipment will not be permitted to be washed in the streets outside of the Project site. Excess water from the wheel wash stations will be managed, and catch basins in the surrounding street will be protected from potential runoff from the cleaning operations.

Air quality impacts during construction may also include diesel exhaust emissions from heavy construction equipment. Massachusetts law (MGL Chapter 90, Section 16A and 310 CMR 7.11 requires that vehicles idle for no more than five minutes. There are a number of exceptions for "necessary" idling (e.g., repairs, deliveries, refrigeration). "Necessary idling" also includes idling to assure that the vehicle is safe to drive (e.g., defrosting a windshield). The penalties for violating the anti-idling law can range from $100 (MGL Chapter 90, Section 16A) to as much as $25,000 (MGL Chapter 111, Section 142A). Drivers and/or companies can be held responsible for paying the fine and local police have the authority to enforce the law, as do health officials or other officials who hold enforcement authority.

To reduce engine idling, the selected contractor(s) will be notified of the Massachusetts anti-idling regulations. Any excessive idling will be done at the contractor's own risk.

In addition to emitting smog-forming pollutants, construction equipment engines produce more than 25 percent of all diesel fine particulate matter (PM) pollution in Massachusetts. Fine PM contributes to the state's already high rate of asthma and is also a probable carcinogen. In response to these health and environmental impacts, MassDEP requires contractors working on projects financed by the State Revolving Fund (SRF) to install retrofit pollution controls in their construction equipment engines.

Due to this requirement, many large construction firms in Massachusetts have installed pollution controls on their fleet of heavy construction equipment. Firms who can show that their fleet consists of retrofitted equipment will be given preference in the selection process.

Construction will not proceed until the contractor has submitted a certified list of the non-road diesel-powered construction equipment that will be retrofitted with emission control devices to the Proponent. The list of equipment is not available given the early phase of the Project. The list will include the following information:

- Contractor/Sub-Contractor name;
- Equipment number, type, make, model, and engine rating;
- Start and end date of equipment use; and
- Emission control device make, model and EPA verification number.

Contractors will also submit fuel slips to the Proponent demonstrating that ultra-low sulfur diesel is being used.

3.10.7 Construction Noise

The Proponent is committed to mitigating noise impacts from the construction of the Project. Temporarily 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 and 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.

3.10.8 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.

3.10.9 Construction Truck Routes and Deliveries

Truck traffic will vary throughout the construction period and will depend on the construction activity being performed. The construction management 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.

3.10.10 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 500 construction jobs will be created over the length of construction. The developer of each Project component will make reasonable good-faith efforts to have at least 51% of the total employee work hours available for Boston residents. The Proponent is committed to maximizing opportunities for minority subcontractors who have expertise in a particular trade to get contractual opportunities during the construction phase of the project. To that end, at least 40% of total employee work hours available for minorities and at least 12% of the total employee work hours available for women.

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.

3.10.11 Construction Waste

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

3.10.12 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 Massachusetts Water Resources Authority (MWRA), BWSC, Boston Public Works, Dig Safe, and the governing utility company requirements. All necessary permits will be obtained before the commencement of the specific utility installation. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer and drain facilities will be reviewed by BWSC as part of its Site Plan Review process.

3.11 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.

3.12 Wildlife Habitat

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

Chapter 4.0

Sustainable Design and Climate Change Protection

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE RESILIENCE

4.1 Overview

This section describes how the Project has been designed to meet the requirements of Article 37 of the Code and how it will achieve certifiability under the USGBC LEED v4 rating system and certification at the Gold level under the LEED v3 rating system. Potential site-generated energy technologies are also described, as well as measures to improve the Project resiliency under future climate conditions.

The Project achieves a high level of sustainability through the redevelopment of an underutilized institutional site in a manner that addresses anticipated climate change impacts. The Project provides improved public access and engagement, encourages the use of alternative modes of transportation and is located in close proximity to public transportation infrastructure that is easily accessible to pedestrians. The Project additionally creates a high-quality indoor environment for residents and guests, and promotes health and wellness through provision of on-site amenity spaces conducive to healthy and active lifestyles.

4.2 Regulatory Context

4.2.1 Article 37

Article 37 established the Interagency Green Building Committee (IGBC) to advise the BPDA and the Inspectional Services Department (ISD) on project compliance with the City's green building and climate-change policies and requirements. The Project's climate change preparedness and resiliency documentation is reviewed by the IGBC to determine whether the proposed project is consistent with Article 37 and related climate, sustainability, and resilience policies.

Article 37 requires project proponent to complete a LEED scorecard to demonstrate that the project meets the minimum requirements to achieve a LEED Certified level, though a project is not required to register or certifying the project with the USGBC. Appendix A of Article 37 delineates Boston Green Building Credits, which are as Boston-specific credits that can contribute a point towards a project's LEED "Certifiable" point total.

4.2.2 BPDA Climate Change Preparedness and Resiliency Policy

Projects subject to Article 80 review are required to complete the BPDA's Climate Change Preparedness and Resiliency Checklist for New Construction (Checklist). As a critical component of the Project's sustainable design and climate change resiliency evaluation, the checklist aids in the assessment potential impacts that might arise under future climate conditions, and helps to identify project resiliency, preparedness, and/or mitigation measures early in the design stage. The Checklist is also reviewed by the IGBC.

4.3 Project Approach to Sustainability

The Project hopes to be a model for sustainable multi-family residential development in Boston and a robust sustainability analysis is being performed by the Project team. By optimizing the proposed building's envelope, systems, and living spaces, the Proponent will add to the City's collective understanding of vibrant, healthy, and sustainable living environments in Boston. A number of the Project's sustainable site design initiatives are detailed on Figure 4.4-1, below.

4.4 Sustainable Design

4.4.1 Building Energy Reduction

Beyond the USGBC LEED and Article 37 Requirements described above, the Project team is working to significantly reduce the Project's energy use. Energy use reductions provide benefits to the Project's residents by reducing their individual utility bills and increasing their comfort in their homes.

4.4.2 High Performance Design

Passive House design principles are being utilized to maximize the performance of the building envelope. These design principles include the use of optimized insulation, high-performance windows, tight air sealing, and reduced thermal bridging; all of which contribute to exceptional thermal comfort within the structure. Passive solar design strategies such as solar shading, orientation, and natural ventilation are being implemented to further offset energy use. Building systems are optimized for the Project. Utilizing a variable refrigerant flow (VRF) system with heat recovery and energy recovery ventilation, and a high-efficiency gas-fired domestic hot water (DHW) system, the Project will achieve substantial efficiency in building operations. Individual metering of resident water and power will offer direct feedback on use of those utilities and, with a better understand their energy footprint, offer tenants improved tracking and control of their energy footprint.

4.4.3 Water Conservation

Despite the significant rock outcroppings and slope that define the Site's topography, the Project team is committed to retention and reuse of stormwater water for irrigation. The Project will significantly reduce impacts on the City's stormwater systems through the installation of rain gardens, cisterns, and large green roof areas. Reuse of stormwater for irrigation will also reduce consumption of potable water for those same activities.

The Project will utilize high-efficiency water conserving toilets, faucets, and other fixtures to meet and exceed LEED requirements.

45 Townsend Street **Boston, Massachusetts**

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Figure 4.4-1
Sustainable Site Design

4.4.4 Indoor Air Quality

Resident health and indoor quality are important considerations for the design of the building. Fresh air will be supplied to all occupied spaces via energy recovery ventilation and large operable windows. Where practical, low and/or no-volatile organic compound (VOC) indoor finish materials will be selected in compliance with the Living Future Institute's Living Building Challenge goals. A no smoking policy will contribute to indoor health and air quality.

4.5 Climate Change Resilience

4.5.1 Introduction

Climate change conditions considered by the Project team include higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe rainfall events, and increased wind gusts. The Site is not located in proximity to a Federal Emergency Management Agency (FEMA) designated Flood Hazard Area.

The expected life of the Project is anticipated to be approximately 50 years. Therefore, the Proponent planned for climate-related conditions projected 50 years into the future. A copy of the Climate Change Checklist is included in Appendix E. Given the preliminary level of design, the responses to the Checklist are also preliminary.

4.5.2 Extreme Heat Events

The Intergovernmental Panel on Climate Change (IPCC) has predicted that in Massachusetts the number of days with temperatures greater than 90°F will increase from the current five-to-twenty days annually, to thirty-to-sixty days annually.[1] The Project design will incorporate a number of measures to minimize the impact of high temperature events, including:

- Planting shade trees around the site;
- Installing a high performance building envelope;
- Installing higher performance light and controls, including automatic LED lighting control;
- Incorporating energy recovery ventilation; and

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

- Specifying high albedo roof tops and green roofs to minimize the heat island effect.

4.5.3 Extreme Precipitation Events

As a result of climate change, the Northeast is expected to experience an increased frequency of intense storms that generate significant volumes of precipitation. Increase precipitation events have the potential to overwhelm stormwater infrastructure capacity and result in inland flooding events with the potential to damage buildings. Improper conveyance of stormwater during precipitation events may also cause overflows of combined sewer systems that allow wastewater from buildings connected to the combined sewer to discharge to local waterways, or surcharging of the system causing overflow at other locations.

To mitigate this, the Proponent will take measures to minimize stormwater runoff. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site, including volumes anticipated during extreme precipitation events. The Project's landscape design, including green roofs and other design features, promote stormwater recharge and retention to the greatest extent feasible at the Project Site.

4.5.4 Drought Conditions

Although more intense rain storms are predicted, extended periods of drought are also predicted due to climate change. Under the high emissions scenario, the occurrence of droughts lasting one to three months could 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 building will include water conserving fixtures.

4.6 Site-Generated Energy

4.6.1 Photovoltaics

As a means of offsetting electrical use, a solar photovoltaic (PV) array is being considered for the residential building wings. The Proponent is still evaluating the feasibility and size of the PV system, including the availability of grants and other funding to off-set anticipated procurement and installation costs.

With a total of approximately 84,074 sf of roof area, approximately 32,548 sf would be devoted to the green roofs, amenity space, and mechanical equipment. The remaining 53,548 sf is being considered for rooftop solar equipment. Additionally, approximately 50% of the remaining space would be set aside for space around and between the panels. Therefore, approximately 26,774 sf would be available for rooftop solar. The Proponent will continue to evaluate the PV system, including financial incentives and considerations of the electrical network, as the design develops. The scale of the PV system may depend on the cost of component and incentives at the time of construction, and will be re-evaluated closer to the start of construction.

4.6.2 Combined Heat and Power

The use of combine heat and power (CHP) systems, also known as co-generation systems, is being evaluated to determine feasibility for the Project. CHP systems generate electricity and useful thermal energy in a single, integrated system. CHP systems are most advantageous for facilities that have a hot water demand year-round, such as the proposed Project. Therefore, a CHP system to power the base hot water load of the building is currently being considered. This CHP system would operate via natural gas to produce hot water and electricity, and would primarily provide domestic hot water. Since CHP produces electricity using less expensive natural gas, but generates usable heat less efficiently than a conventional natural gas boiler, the net impact would be a slight increase of 1% to 2% in energy use, and a slight decrease of 1% to 2% in energy costs and carbon emissions. Additional analysis will be done in later stages of design to further evaluate the energy and financial implications of a CHP system.

4.7 Green Building

The Proponent intends to incorporate sustainable design and construction principles and practices into the proposed Project. To demonstrate compliance with Article 37 of the Code, the Proponent is also targeting a LEED Silver rating under LEED v4. The LEED rating system tracks the suitable 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, Regional Priority.

The following is a summary of the Project team's approach to achieving a LEED v4 "Certifiable" building for the Project. A credit-by-credit analysis of how the LEED Certifiable designation will be achieved is provided below and a LEED scorecard is provided at the end of this section. The Proponent is committed to developing projects that are sustainably designed and energy efficient with interior environments that are healthy for the residents, employees, and visitors.

As required under Article 37 of the Code, projects that are subject to Article 80B, Large Project Review, shall be certifiable under the LEED v4 certification system. There are eight categories in the LEED certification guidelines: Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation in Design Process and the additional Regional Priority Credits. The Project is targeting several credits which span the categories and enable the project to meet Article 37 requirements as described below. The Project's LEED v4 scorecard is also included below.

The Project is currently anticipating achieving a certification at the Silver level, by targeting 56 credit points. Additional credit points, listed as "maybe" on the scorecard, are still under consideration by the Project team Please refer to the attached LEED-NC v4 scorecard

included at the end of this document for further information. In addition to reaching the LEED v4 Silver level, the team has submitted to the USGBC under LEED v3 and is tracking a Gold level of certification with 78 credit points under that certification system.

The Proponent and the Project design team have evaluated, and will continue to evaluate and incorporate sustainable design and energy conservation as the design process continues.

4.7.1 Analysis of LEED Credits

Integrative Process (IP):

The Project team meets regularly to ensure the team members from the various disciplines involved are all known to each other and collectively communicating. Sustainable design focused workshops were held early on to assist the team in establishing shared sustainable design and energy efficiency goals for the Proposed Project.

Location and Transportation (LT):

The project site is located in the Roxbury neighborhood of Boston. Locally, the project has access to the MBTA bus routes #42 and #44 to the west and east, respectively.

The Proposed Project connects via sidewalks and paved pathways to the local residential neighborhood, improving pedestrian and cyclist safety. The Project also provides secured indoor bicycle storage and repair stations, and is evaluating locations for a new Hubway bikeshare station. Exterior short and long-term bicycle storage is planned for occupants of the project. The immediate neighborhood provides a variety of services with pedestrian and cyclist access.

The Proposed Project earns points for Sensitive Land Protection, High Priority Site, Access to Diverse Uses, Reducing Parking Footprint, the provision of Bicycle Facilities, and Green Vehicles.

Sustainable Sites (SS):

The Proposed Project site is a previously developed parcel located on the hill between Washington and Walnut streets, with unique site and grading conditions.

The proposed project shall incorporate low-impact site features that will properly capture and infiltrate rainwater to improve groundwater recharge levels when compared to the existing site.

A site rainwater management plan will be developed to address the rate and quality of the stormwater. The Project is planning to significantly reduce the rainwater runoff by directing it into a below grade re-charge/collection tank. Additionally, the rainwater will be absorbed through surface on-grade landscaping.

The roof and hardscape materials will include light-colored surfaces to reduce the overall heat island effect impact on the Project site.

The Proposed Project earns points for Site Assessment, Site Development, Open Space, and attention to reducing the site's Heat Island Effect.

Water Efficiency (WE):

The Proposed Project will reduce potable water use for both sewage conveyance and irrigation needs. Both whole-building and end-use water metering will be installed. The Project team will also specify low flow/high efficiency plumbing fixtures, including water closets, showers, and lavatory faucets to reduce potable water use for indoor fixtures.

The Site's landscape design will use a mixture of turf and drought tolerant trees, shrubs, and groundcover that a well suited to the local environment. The planned irrigation system will be designed to use at least 50% less potable water when compared to a mid-summer baseline.

Energy and Atmosphere (EA):

The building design will include high-performance strategies for the building envelope that follow the principles of Passive House design, including high-performance insulation, triple-glazed windows, reduction in thermal bridging, and air tightness. A combination of LED lighting with controls, highly efficient VRF systems within residential units, and low-flow plumbing fixtures (to reduce DHW demand) will be employed to help reduce the buildings overall Energy Utilization Index and annual consumption, and to meet the Massachusetts "Stretch" Energy code when compared to American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1-2013. Full mechanical ventilation is planned for the Project in both residential units and base building spaces. Attention to ensuring daylighting availability within all spaces will result in a reduction of required lighting power density for most activities within the building.

The building owner will engage a Commissioning Agent during the design phase to review the proposed design as compared to the Owner's Project Requirements (OPR) and Basis of Design (BOD) and ultimately confirm the building systems are installed and function as intended and desired.

Only refrigerants with low global warming and ozone depleting potential will be specified for use in building systems equipment.

The Project is considering options for renewable energy systems, including on-site solar PV rooftop arrays. The project is also considering options for CHP to be included in the system design.

Materials and Resources (MR):

The Proposed Project will specify materials and products that are environmentally responsible and transparent regarding the harvest and extraction of raw materials, ingredient reporting, and the manufacture processes. The design team will endeavor to 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 both during construction and post occupancy. The construction manager will provide a construction waste management plan to divert a minimum 75% of the construction and demolition debris comprised of at least five different waste streams.

Post occupancy, collected recyclables will be accommodated within a dedicated area of the project.

The Project achieves points in Building Product Disclosure & Optimization (through the use of Environmental Product Declarations (EPDs) as well as sourcing of Raw Materials) and will achieve at least one point for Construction Waste Management during the Construction phase of the project.

Indoor Environmental Quality (IEQ):

The Project 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 and campus policy, each building will be non-smoking and no smoking will be allowed within 25 feet of the building.

Additionally, during construction the Construction Manager will develop and implement a compliant Indoor Air Quality (IAQ) Management Plan for the construction phase of the project.

The building envelope design includes large areas of vision glazing and openings to the exterior for quality views in various directions for occupants of all regularly occupied spaces.

The Proposed Project earns points for ensuring the installation of Low Emitting Materials, implementation of a Construction IAQ Management Plan during construction, occupant controllability of the interior lighting, and will achieve one point for the Quality of Views provided to occupants.

Innovation & Design Processes (ID):

The Project will explore innovative approaches to design and building maintenance including considering a Green Housekeeping Policy and Educational component.

The Proposed Project intends to achieve all six of the available Innovation in Design credits with a combination of Exemplary Performance, Innovative strategies, and pursuit of LEED Pilot Credits or approaches from other Rating Systems.

Regional Priority Credits (RP):

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.

Applicable Regional priority credits for the project site include:

- SS Protect or Restore Habitat (2pt threshold)
- EA Optimize Energy Performance (8pt threshold)

Boston Green Building Credits:

The Boston Green Building Credits were established in Appendix A to Article 37 as Boston-specific credits that can contribute a point towards a project's LEED "Certifiable" point total. One point may be awarded for each of the following four categories: Modern Grid; Historic Preservation; Groundwater Recharge; and Modern Mobility.

Modern Grid

The team is currently investigating the overall impact level of a CHP system for use within the Project.

Historic Preservation

The Project is not eligible for this credit since it is a new construction project.

Groundwater Recharge

The team will explore whether or not the proposed Project can provide 50% greater recharge than required under Article 32-6.

Modern Mobility

The team will explore Transportation Demand Management options available and appropriate for the Project.

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

Project Scorecard

45 Townsend Street

February 27th, 2017

Y	?	N			
1			Credit	Integrative Process	1

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

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

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

20	7	6	Energy and Atmosphere		33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
5	1		Credit	Enhanced Commissioning	6
11	1	6	Credit	Optimize Energy Performance	18
	1		Credit	Advanced Energy Metering	1
	2		Credit	Demand Response	2
3			Credit	Renewable Energy Production	3
	1		Credit	Enhanced Refrigerant Management	1
1	1		Credit	Green Power and Carbon Offsets	2

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

6	9	1	Indoor Environmental Quality		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
1	1		Credit	Enhanced Indoor Air Quality Strategies	2
2	1		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
1	1		Credit	Indoor Air Quality Assessment	2
	1		Credit	Thermal Comfort	1
1	1		Credit	Interior Lighting	2
	2	1	Credit	Daylight	3
	1		Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

6	0	0	Innovation		6
5			Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

2	1	1	Regional Priority		4
		1	Credit	Regional Priority: Access to Quality Transit (1pt threshold)	1
	1		Credit	Regional Priority: Building Life-Cycle Impact Reduction (2pt threshold)	1
1			Credit	Regional Priority: Optimize Energy (8 pt threshold)	1
1			Credit	Regional Priority: Protect or Restore Habitat (2pt threshold)	1

56	31	23	TOTALS	Possible Points:	110

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

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Project Context

The Project Site is situated in a densely built residential area of the Garrison/Trotter neighborhood in Roxbury, and is well-suited for new housing. The Site is located within a five minute walk to Washington Street and its multiple bus routes; a fifteen minute walk to the Jackson Square MBTA Orange Line Station, a Stop and Shop Supermarket, and the Southwest Corridor Park and bike path connecting Forest Hills to Back Bay. Dudley Square, with the Bruce Bolling Building, Boston Public Schools headquarters, a variety of other businesses, restaurants and cafes, is also a fifteen minute walk to the north.

There are ample opportunities to access public open space near the Project Site, including Horatio Harris Park, half a block away on the corner of Walnut Avenue; Malcolm X Park, located two blocks away; and Crawford Street and Ellis School Playgrounds, located three blocks away. The Project Site is one half mile from the Seaver Street entrance to Franklin Park.

5.2 Evolution of Design

5.2.1 Preliminary Design Concepts

The Project design has evolved in response to the neighborhood's concerns and desires, and the needs and desires of future residents.

A variety of concept diagrams were tested for organizing approximately 300 units on the site. Concepts included organizing separate apartment buildings along a new road connecting Townsend, Harrishof, and Dennison streets; a pair of U-shaped apartment buildings creating shared interior courtyards; and a series of simple 'bars' stepping up the steeply sloped site. A single building was preferred, however, to ensure that all residents have indoor access to the shared amenity spaces. The interconnected wings are also seen as a means of enhancing a sense of community among residents.

Centralized schemes, such as the U-shaped buildings, were determined infeasible because the Site's slope required excessive stepping of the building. Schemes connecting Townsend with both Harrishof and Dennison streets were also determined infeasible because of the grade change between the streets; connecting them would require the excavation of substantial volumes of ledge, resulting in significant negative impacts on neighbors during construction.

The proposed series of residential bars set at different grades and stepping up the hill was determined to work best. Linking the residential bars with an amenity spine that ascends the Site is the preferred design concept for providing a single building on the steeply sloped site. Floor plans are included as Appendix F and building sections and exterior elevations are included as Appendix G.

To reduce the Project's carbon footprint, much consideration was given early in the design process to maintaining and repurposing certain existing structures. However, these structures are inadequate to meet the functional needs of the Project; namely, their proximity to abutting houses along Townsend Street, and their position relative to Townsend Street made designing a positive streetscape infeasible.

Subsequent design iterations explored three- and four-story townhouse wings at Townsend Street on either side of a five story façade of the amenity spine. At the top of the hill, two residential wings were located on relatively flat areas of the site, again, to minimize ledge removal. Further site and structural investigations reshaped the Project, and the two upper wings were combined into a single curved wing. The design pulls the building further from Dennison Street neighborhood while avoiding ledge outcroppings.

Valuable feedback on the design was gathered at a series of community meetings. Key concerns expressed at these meetings include minimizing vehicular traffic to and from the site, maximizing on-site parking, and minimizing building heights. Community members were enthusiastic about the efforts to create a pedestrian friendly streetscape along Townsend Street, and expressed interest in access to open space on the Project Site.

5.2.2 Current Design

Although the Project goals have remained consistent, the design has evolved to best meet the program needs while also minimizing impacts on neighbors and promoting a healthy and sustainable residential development.

The design comprises three residential wings linked by the Amenity Spine. The first wing, known as Townsend, is curved to follow the bend of Townsend Street; the second wing, known as Codman, sits to the south of Townsend on the site of former parking lot; the third wing, known as Harrishof, is located at the top of the Site and is situated to face both Harrishof and Dennison streets.

Townsend - The five-story Townsend wing replaces the existing six-story Kaplan Building and the adjacent and connected five-story Nurses' Residence (Figure 5.2-1).

45 Townsend Street **Boston, Massachusetts**

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Figure 5.2-1
Townsend Street Perspective – Existing Conditions

45 Townsend Street **Boston, Massachusetts**

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Figure 5.2-2
Townsend Street Perspective - Entry

Above the Townsend lobby, a relief in the façade breaks the proposed building into two distinct sections, as shown on Figure 5.2-2. The Townsend lobby serves as the main entrance to the Project. At the approximate location of the existing Nurses' Residence building (Figure 5.2-3), and connected to the proposed Townsend lobby are the 1,500 sf café and 3,000 sf co-working space (Figure 5.2-4).

Replacing the Kaplan Building (Figure 5.2-5), duplex townhouses are located at the eastern side of Townsend, approximately six of those townhouses will have entries and front yards along Townsend Street (Figure 5.2-6), reinforcing the Project's neighborhood scale along the Townsend Street frontage.

The Roxbury puddingstone retaining wall along Townsend Street, spanning from Washington to Walnut Avenues, will be replaced with a new puddingstone wall to maintain the continuity of the streetscape. The main entrance to Townsend is accessed via stairs and walkways located along Townsend Street and provide access to the bike storage, co-working space, café, and Townsend lobby. Two landscaped areas frame the façade of the co-working space, and at the front of Townsend a café patio that provides seating walls and bistro tables.

Codman - The six-story, approximately 77,000 sf Codman wing is situated south of the Townsend wing and replaces an existing hospital structure. Codman occupies portions of what is currently a surface parking lot. Codman is accessed through the Townsend Lobby.

Harrishof -The seven to seven and a half-story, Harrishof wing includes approximately 162,000 sf of residential and amenity space. The western section of the proposed structure (Harrishof West) is sited at an existing parking lot (Figure 5.2-7), and curves in an easterly direction to intersect the Amenity Spine. The curvature of the Harrishof wing pulls the structure away from Dennison Street (Figure 5.2-8). Facing and aligned with the end of Dennison Street is a four-story recess in the building's façade. As with Townsend, the recess features a green roof and serves to divide Harrishof West into two distinct sections. At the structure's eastern end (Harrishof East), a third section of the structure preserves the existing view corridor (Figure 5.2-9) by a step back in the façade that aligns the section with Harrishof Street (Figure 5.2-10). This allows for additional open space to accommodate Harrishof Plaza (Figure 5.2-11) and the proposed community orchard and garden. The profile of the Harrishof structure has been minimized in order to create additional sky view for Harrishof and Haley Street residents.

The structure has also been pulled as far as possible away from Dennison Street while avoiding the ledge outcroppings surrounding the structure. Landscaping, pedestrian paths, and open space within the Harrishof Plaza create a generous buffer between Dennison Street and the Project Site (Figure 5.2-12).

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Figure 5.2-3
Townsend Street (West) Perspective – Existing Conditions

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Figure 5.2-4
Townsend Street Perspective – Lobby and Cafe

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Figure 5.2-5
Townsend Street (East) Perspective – Existing Conditions

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Figure 5.2-6
Townsend Street Perspective - Townhouses

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Figure 5.2-7
Harrishof- Existing Conditions

45 Townsend Street **Boston, Massachusetts**

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Figure 5.2-8
Dennison Street Perspective

45 Townsend Street **Boston, Massachusetts**

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Figure 5.2-9
Harrishof Street Perspective – Existing Conditions

45 Townsend Street **Boston, Massachusetts**

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Figure 5.2-10
Harrishof Street Perspective

45 Townsend Street **Boston, Massachusetts**

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Figure 5.2-11
Harrishof Lobby

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Figure 5.2-12
Dennison Sidewalk View

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Figure 5.2-13
Harrishof Street Approach – Existing Conditions

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Figure 5.2-14
Harrishof Street Approach – Proposed Conditions

The existing site access from Harrishof Street (Figure 5.2-13) will be realigned to provide a more functional and aesthetically pleasing entrance to the site (Figure 5.2-14) The lower level of Harrishof East, near the Harrishof Street entrance, provides access to the third level of the parking garage. Loading and service areas are also included in the lower level of Harrishof East. The ground floor of Harrishof West includes a two-story lobby with

pedestrian access from the adjacent entry Harrishof Plaza. The Plaza also provides access for emergency vehicles and can serve as a flexible community function space for farmers' markets and other seasonal neighborhood events.

Harrishof East features a roof-top viewing deck accessible from the Harrishof lobby elevators and stairs. The viewing deck is screened from abutters and is oriented to the north, taking advantage of views of downtown Boston. An extensive vegetated roof system with a solar PV array will be installed to the south and east of the viewing deck.

Amenity Spine - Interior connections among the proposed wings are accomplished by an Amenity Spine that links the Townsend Lobby with the Harrishof Lobby. Through the Amenity Spine, additional connections are made to ground level of residential areas, common spaces located at several locations, and to the second, third, and fourth level of the adjacent parking garage (Figure 5.2-15).

5.3 Site Constraints

In addition to the rock outcroppings and shallow depth to bedrock, an elevation change of 43 feet from Townsend Street to the proposed Harrishof Plaza presents several unique design challenges. The proposed layout of the site and building forms are intended to make the most efficient use of the Project Site.

Key design strategies for minimizing ledge removal included utilizing existing excavations and leveling completed by the prior site operators. The Project has been laid out in multiple wings in order to maximize the reuse of these excavated and leveled areas. To the greatest degree practical, the building's wings are designed to avoid or minimize excavation for structural foundations.

5.3.1 Urban Design Considerations

The Site's topography, however, provides views to downtown Boston and the Muddy River parklands from many of the residential units. The view shed extends north to downtown Boston, west to the Arboretum, Muddy River and Brookline, and south to the Blue Hills. The proposed design seeks to maximize these views from residential units. The sloped Site also increases solar exposure and allows for passive solar design features that enhance the building's energy performance.

Figure 5.2-15
Amenity Spine

This large site on a rocky hillside has always been unique in its neighborhood. In the 1800's the Site was a pastoral estate with a single house owned by Walter Dasham. The neighborhood in that era was more densely built than it is today, with Washington and other nearby streets were lined with rowhouses and closely built wood houses. With enormous rock outcroppings and ledge just below the surface, the Site was difficult to break into the smaller parcels typical of the neighborhood and therefore it remained a single large property, developed for an institutional use over the ensuing decades. As a result, the Site has little or no relationship with its abutters and the surrounding neighborhood.

The former hospital facilities gradually expanded from the center of the Site, where the Dasham House had been located, in an outward direction. As a result, the Nurses' Residence and the Kaplan Building were located with scant regard for the Townsend street wall and rhythm. The Project, while remaining unique in the context of the neighborhood,

has been designed to offer a more gracious relationship to its neighbors, and to invite them onto the Site. The Townsend wing parallels the street, which bends significantly at the Site, and establishes a four story masonry datum that relates to the four-story brick apartment buildings along this side of Townsend Street.

A two-way drive linking Townsend to Harrishof Street will provide access to the parking garage, loading areas, and Harrishof Plaza. The driveway will be publically accessible to help relieve vehicle congestion which is understood to be problematic during school drop-off and pick-up times.

Harrishof Street currently terminates at the Site property line. The Project will connect Harrishof Street to the proposed two-way drive, and extend the Harrishof sidewalk on to the Project Site to create a continuous pedestrian connection between Harrishof and Dennison Streets. The Harrishof Plaza, designed with pavers of different colors and textures, will greet residents and visitors to the two-story Lobby. South of the plaza will be the orchard and community garden. These features will bring residents of the Project together with their neighbors from Dennison, Harrishof, Townsend, Haley and other nearby streets to enjoy a walk, community gardening, an event or a chance to sit under the fruit trees in the small orchard on a summer day.

The Project creates an improved and pedestrian friendly streetscape along Townsend Street. The co-working office, café and lobby are enclosed by a wall of glass and wood that illuminate the spaces, invites people in, and provides a glow of activity. As noted above, the puddingstone retaining wall will be replaced and new stairs and walkways providing access to the lobby, co-working space, café, and bike storage will be constructed. The area between the sidewalk and the building façade features large planted areas with trees and shrubs to screen the ground floor.

5.4 Building Design and Materials

The building is designed with a consistent material palette, though some local variations are used in response to the specific conditions of the Site's different street faces. To meet certain sustainability goals, the Project will utilize cladding systems that efficiently manages moisture and energy transfer through the wall assembly.

The outward faces of the Harrishof and Codman wings will feature shallow projecting bays that create a ripple across the façade, with corresponding shadow lines below the projection. The inward facades of the Harrishof and Codman wings feature 'window wedges' that project from structure at varying depths and angles, deeper at the top and shallower below, creating a varied façade with changing shadow lines over the day and seasons.

To minimize the appearance of upper level massing, the top floor of each wing is set back 18 inches from the façade of the level below. The top floors are typically finished with a triple-glazed, floor-to-ceiling window wall system with spandrel panels as needed. Cladding materials will be selected so that the upper floors appear to recede from view. In some locations the roof will have a parapet extending above and below the plane of the roof; the extension below the plane of the roof to serve as solar shade.

Rooftop equipment has been minimized and the primary Heating Ventilation and Air Conditioning (HVAC) equipment is located in the basement and service areas of the various wings.

The Project's sustainability goals Project include designing for a long building life cycle with highly durable, easily maintained materials. Windows will be thermally broken aluminum, as will the certain curtainwalls, the window wall system topping each wing, and the storefront at ground floor.

5.5 Scale and Building Position

The Proposed structure varies in height from three stories, and approximately 40 feet in high at the amenity spine, to seven-and-a-half stories, and approximately 88 feet in height at Harrishof. Due to the Site's substantial grade change, the wing foundations are situated at different elevations. Due to ledge at the western edges of the Site, there are partial ground floors at the Harrishof and Codman wings. The fourth and fifth floors link to all residential wings.

5.6 Public Realm Improvements

As described above, vehicle entrances at Townsend and Harrishof streets will be realigned to provide a more welcoming entrance and make more efficient use of the Site. Along Townsend Street, there will be multiple points of pedestrian and bicycle access. Two existing curb cuts on Townsend Street are being replaced with a single curb cut that

provides access to the two-way drive linking Townsend and Harrishof streets. The Project proposes to remove the gates previously utilized by the hospital to close off the site, and will provide neighborhood access to the new two-way drive.

Along Townsend Street, the Project will provide trees on the Project Site in front of the townhouse units as well as the lobby, café, and co-working office, allowing for a wider, more pedestrian friendly sidewalk. In addition to the new trees, a variety of shrubs and perennials will be featured in densely planted beds to add visual interest to the site and screen the ground floor occupants along Townsend Street. The planting beds also allow for improved stormwater retention and infiltration.

Near the top of the Site, where Harrishof Street currently terminates at the property line, the Harrishof Street sidewalk will continue onto the site along the south side of the site access drive. The access drive extends to the paved Harrishof Plaza which will include Zipcar spaces and barrier-free parking reserved for accessible vehicles. Dennison Street is currently was closed off from the Site by a rubble wall. The Project will provide a new pedestrian path linking Dennison Street to the Plaza, and the orchard and community garden. The orchard and community garden feature Roxbury Russet apples, Bartlett Pears (developed in Dorchester), and other local fruit hybrids, and will include garden beds for strawberries and blueberries, in addition to community gardening beds, sitting areas and a walking path.

5.7 Landscape Design

All edges of the site will feature new plantings and improved landscaping. Native plant species will be utilized to the greatest degree possible. Landscape lighting at appropriate locations will ensure public safety while not intruding on neighbors. The Site's lighting has been selected to protect the night sky and minimize light pollution.

The Project will add densely planted landscape buffers along the east and west parcel boundaries to provide additional privacy for the abutting properties. A shared concrete stair at the west of the Project Site on Townsend Street will be replaced with a new separate concrete stair for the abutting property, and a new combined stair and bike ramp for the Project. The two new stairways will be separated by a landscape buffer.

Along the eastern Site boundary, there will be a new pedestrian path and planting beds adjacent to the two-way driveway. A continuous planted buffer follows the driveway up the hill.

New landscaping and plantings will screen the abutting properties along Dennison Street and the proposed walkway from Dennison Street to the Harrishof Plaza has been designed to provide Site access and permeability while protecting the privacy of the Dennison Street neighborhood

Open spaces for use by residents are situated in more private locations on the Site. A green roof gathering space includes a series of decks and patios accessible from the interior amenity spaces. The green roof is located above the parking garage and wrapped on two sides by resident amenities spaces.

The green roof also features a natural swimming pool surrounded by sunbathing decks. The pool will be filtered by hydraulic and biological processes through an adjacent biologically active living system which provides the conditions for an ideal mix of beneficial microorganisms, aquatic flora, and fauna. The active green roof is set back a minimum of 15 feet from the parking garage edge with a screened buffer of shrubs and plants. Figure 5.7-1 is a Landscape Plan.

Accessed from the third floor of the amenity spine, the passive Zen Garden Courtyard will feature a small patio, fire pits, a walking path, and views of the sunset beyond the high rock outcroppings at the westerly side of the Site. The Zen Garden Courtyard also includes a water feature that serves as part of the Site's storm water management system.

45 Townsend Street **Boston, Massachusetts**

ground

Figure 5.7-1
Proposed Landscape Plan

Chapter 6.0

Community Outreach

6.0 COMMUNITY ENGAGEMENT AND PUBLIC BENEFITS

6.1 Community Engagement

Since the summer of 2016, the Proponent has conducted an extensive community engagement process with a goal of maximizing neighborhood feedback regarding all aspects of the Project, and highlighting the Project's community and economic benefits. Prior to initiating the community engagement process, the Proponent was committed to fostering dialogue with the neighborhood grounded in transparency, integrity, and which responds to key concerns on a timely basis.

The Proponent has engaged with the residents and political leadership in a comprehensive manner, and looks forward to continuing this vitally important dialogue with neighborhood residents and elected officials during the Article 80 public comment period. A number of community members have already provided letters in support of the Proposed Project, here included in Appendix H.

6.1.1 Community Engagement Activities

Based on a strategy that maximizes opportunities for neighborhood residents and leaders to remain informed about the Project and to provide important feedback to the developer, the Proponent approached community-based organizations and direct abutters as the key stakeholders in this effort. It is important to note that site abutter attendance at each of the three site abutter meetings have been attended by between 35-40 people, which is a very good representation of the residents who live in close proximity to the Project Site.

Over the past eight months, the Proponent has implemented this community outreach strategy by scheduling meetings in a variety of different forums, as described below. As a result of this outreach, a number of community members and organizations have provided letters of support for the Project.

6.1.2 Outreach to Community Leaders

Between June 2016 and April 2017, the Proponent met with the following community-based organizations that have a significant voice and level of influence in the neighborhood.

Table 6.1-1 Community Outreach Meetings

Community Leaders/Group	Date of Meeting
Roxbury Strategic Master Plan Oversight Committee Co-Chairs Jorge Martinez and Norm Stembridge	March 29. 2017
Reverend David Wright and Reverend Hines	March 29, 2017
Garrison Trotter Neighborhood Association	June 12, 2016
Alfreda Harris, The John A. Shelburne Community Center	August 17, 2016; November 21, 2016
Alfreda Harris, Louis Elisa, Robert Lewis, Jr.	October 11, 2016
Boston Fire Marshall	November 16, 2016
Site Abutters	**Date of Meeting**
45 Townsend Street "Meet & Greet"	October 25, 2016
45 Townsend Street Abutters Meeting #2	November 15, 2016
45 Townsend Street Abutters Meeting #3	December 12, 2016
Jean Maguire	February 7, 2017
Jeep Jones	February 24, 2017
Council Towers Residents Group	February 28, 2017
Presentation at Garrison Trotter Neighborhood Association Meeting	March 12, 2017

6.1.3 Engagement with Elected Officials

In addition to maintaining an ongoing dialogue with neighborhood residents and organizations, the Proponent is also committed to keeping elected officials informed on Project updates and the community engagement process. To that end, the Proponent has met with elected officials who represent the district in which the Project is located, as noted below.

Table 6.1-2 Elected Officials Outreach Meetings

Elected Official	Date of Meeting
Representative Chynah Tyler	June 5, 2017
Councilor Tito Jackson and Ms. Nichelle Sadler	May 3, 2017
Representative Elizabeth Malia	May 2, 2017
Senator Sonia Chang Diaz	May 1, 2017
Senator Sonia Chang-Diaz	August 30, 2016
Councilor Tito Jackson	October 5, 2016
Joint Project Briefing with Representative Elizabeth Malia and Former Representative Gloria Fox and	October 31, 2016
Anthony Thomas, Senior Legislative Aide, Office of Senator Sonya Chang-Diaz	January 24, 2017
Marcus Johnson, Legislative Aide, Office of Representative Chynah Tyler	January 24, 2015

6.2 Public Benefits

The Project will generate a myriad of public benefits for the surrounding neighborhoods and the City of Boston as a whole, both during construction and on an ongoing basis upon completion. As outlined below, these public benefits fall into three general categories: Urban Design/Public Realm, Economic/Community Benefits, and Sustainable Design.

6.2.1 Community Benefits

The Project will provide a variety of community amenities and benefits. Of paramount importance to the Proponent is creating neighborhood connectivity in a manner that accommodates current residents while generating a lively and physically attractive environment. Some of the key benefits and amenities include:

Housing and Affordability

- Approximately 322 new housing units enriched by amenity spaces.

- The Proponent will comply with the Inclusionary Development Policy through the creation of an off-site income restricted homeownership project within walking distance of the Project. The Proponent has been working with Windale Developers, Inc. and Nuestra Comunidad Development Corporation in a joint effort to create 45 affordable home ownership units at Bartlett Yards, which is consistent with the goals of the Roxbury Strategic Master Plan to increase wealth through home ownership opportunities in the Roxbury neighborhood.

Neighborhood Access and Connectivity

- Neighborhood Café - A 1,500 sf café will be available as a gathering place for neighborhood residents to enjoy.

- Co-Work Space - A 3,000 sf business incubator and convenient co-work space will be a resource for local residents to start and grow their businesses.

- Atrium Gallery/Community Room - A 1,000 sf gallery featuring the work of local artists will be an integral part of the Project. This room will also be made available to neighborhood residents.

6.2.2 Community Economic Benefits

Increase Neighborhood Market Value

- The reactivation of this vacant parcel will increase home values in the Townsend Street neighborhood, enliven the streetscape, and provide tangible amenities for neighborhood residents.

Continued Support of Roxbury-Based Organizations

The Lewis Family Foundation, the philanthropic arm of the Proponent, has donated over $16 million to Roxbury, Dorchester, and Mattapan non-profits, with a goal to more than double college graduation rates and create 500 jobs for youth with an average salary of $38,000 annually.

Wealth Creation/Economic Benefits for Local Business Enterprises

The Proponent is committed to leveraging the Project to the maximum extent possible to achieve their goal of generating economic opportunity for local minority and women-owned business enterprises (M/WBE). This goal is consistent with the wealth-creation and economic development goals of the Roxbury Strategic Master Plan (RSMP).

Diverse Project Team

In an effort to ensure that wealth-creation and economic benefits are generated, over 50% of the Project team is comprised of minority and women-owned firms (M/WBE) who are responsible for managing a variety of complex facets of the Project, including design, construction management, and the Article 80 process. These contract opportunities will help local M/WBE firms build capacity and achieve a higher level of financial prosperity, leading to larger contract opportunities.

As further evidence of the Proponent's commitment to the neighborhood, they are exploring potential post-construction opportunities for local business enterprises to provide support for the Project. Some opportunities that are being explored include landscaping, janitorial services, and food services.

Construction Trade Diversity

The Proponent is committed to maximizing opportunities for minority subcontractors who have expertise in a particular trade to get contractual opportunities during the construction phase of the project. This commitment will help minority subcontractors to build operating and bonding capacity along with financial prosperity.

Planning for outreach to minority and female subcontractors has been developed with the input of two Project team members who are also Board members of the Massachusetts Minority Contractors Association (MMCA). The advice and guidance of these two team members provides a substantial opportunity for the Proponent to maximize the participation of local business enterprises on the Project.

Construction Workforce Diversity

Construction jobs created by the Project will facilitate economic opportunity and wealth creation. Just as importantly, it is anticipated that the Project will generate opportunities for entry-level tradespeople to access a career path within the construction industry.

In accordance with the City's Construction Jobs Ordinance, and consistent with the Proponent's commitment to recruiting a diverse construction workforce, hiring plans are being developed to ensure the hiring of local residents, minorities, and women meets or exceeds City requirements.

The recruitment effort will include a "walk-on" process to encourage potential workers to apply for work at the job site. Additionally, the Proponent will work with construction job advocacy organizations and conduct job fairs.

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

7.1 Introduction

The existing infrastructure surrounding the site appears sufficient to service the needs of the Proposed Project. The following sections describe the existing sewer, water, and drainage systems surrounding the site and explain how these systems will service the development. The analysis also discusses any anticipated Project-related impacts on the utilities and identifies mitigation measures to address these potential impacts.

A detailed infrastructure analysis will be performed when the Project proceeds into the Design Development Phase. The Project's team will coordinate with the appropriate utilities to address the capacity of the area utilities to provide services for the new building. A Boston Water and Sewer Commission (BWSC) Site Plan and General Service Application is required for the new water, sanitary sewer, and storm drain connections. In addition, a Storm Water Pollution Prevention Plan will be submitted specifying best management measures for protecting the BWSC drainage systems during construction.

A Drainage Discharge Permit Application is required from BWSC for any construction dewatering. The appropriate approvals from the MassDEP, and the U.S. Environmental Protection Agency (EPA) will also be sought.

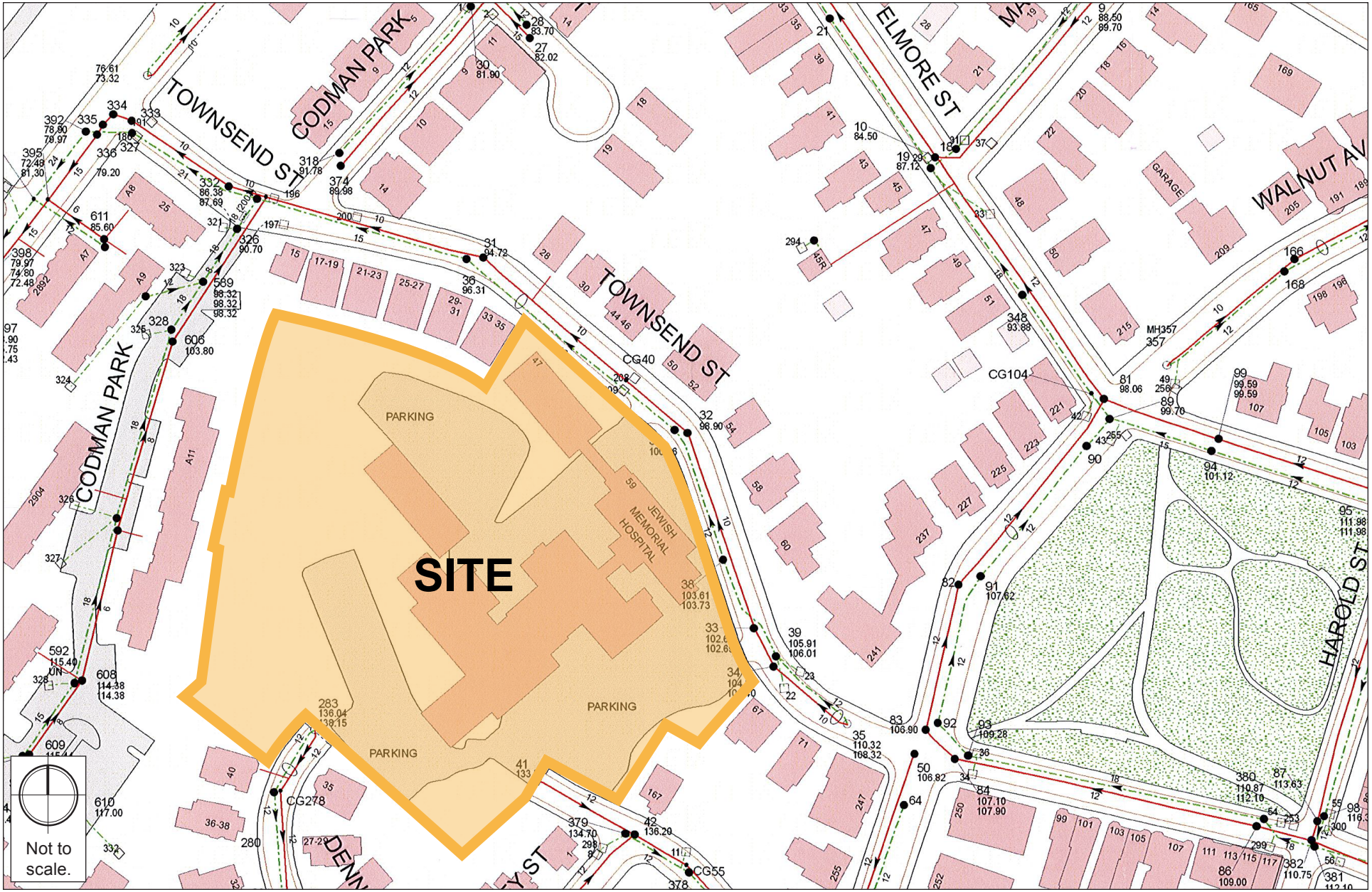
7.2 Wastewater

7.2.1 Existing Sewer System

The Boston Water and Sewer Commission owns and maintains the sanitary sewer system adjacent to the site on Townsend Street (See Figure 7-1). BWSC record drawings indicate an existing 10-inch sanitary sewer line as it runs westerly along Townsend Street to the North of the Project. Existing 12-inch BWSC sewers are located to the south of the Project on Harrishof Street and Dennison Street and they run in a southerly direction. The existing site consists of a surface parking lot and multiple buildings that presently have a two sanitary sewer connections.

7.2.2 Project Generated Sanitary Sewer Flow

The existing Project Site consists of a surface parking lot and abandoned buildings therefore there are no existing sanitary flows generated. The Project will generate an estimated 48,905 gallons per day (gpd) based on design sewer flows provided in 310 CMR 15.000- The State Environmental Code, Title 5 and the proposed building program as summarized in Table 7-1.



45 Townsend Street Boston, Massachusetts

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Figure 7-1
BWSC Sewer System Map

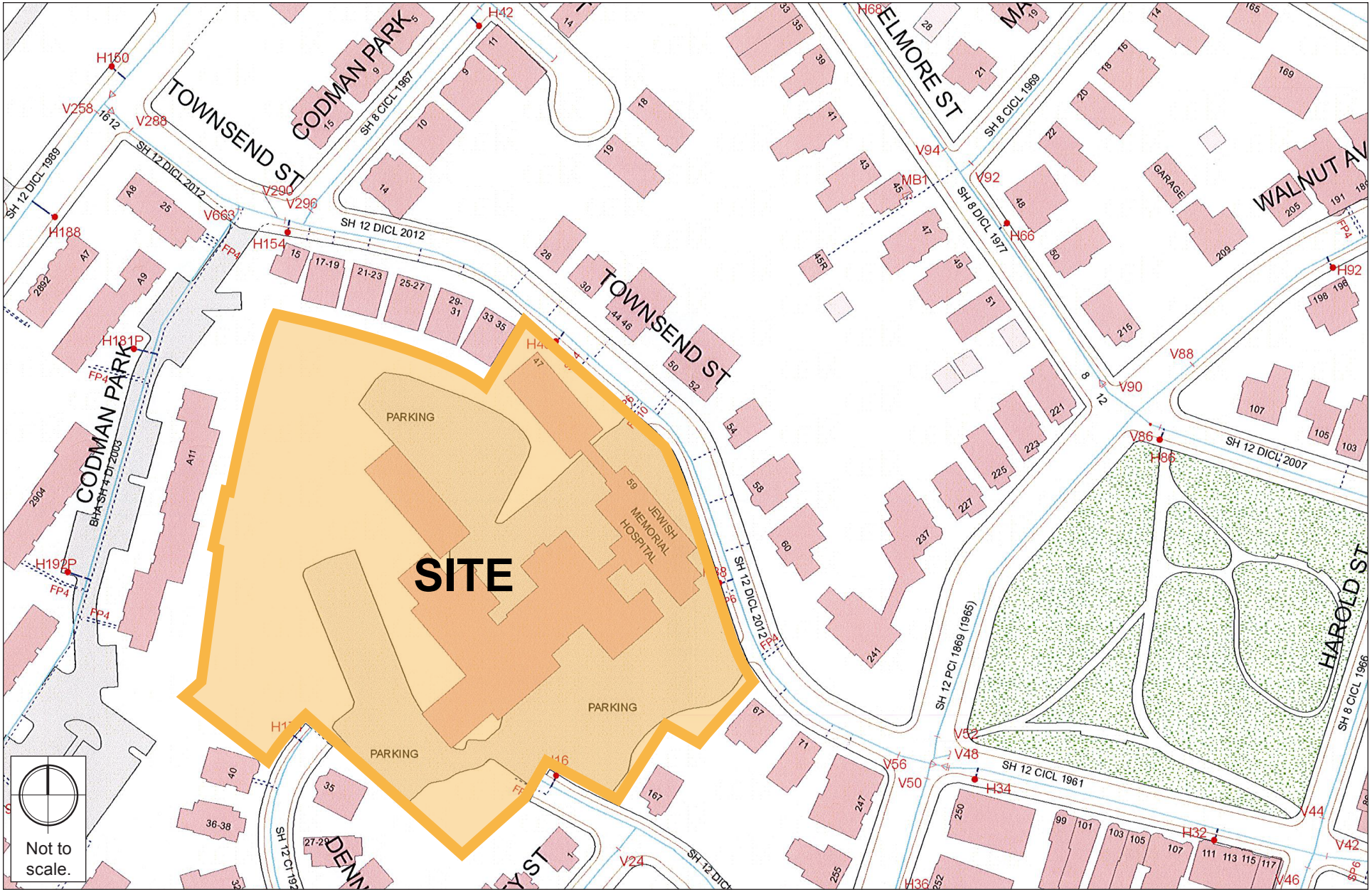

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Figure 7-2
BWSC Water System Map

Table 7-1 Projected Sanitary Sewer Flows

Use	Quantity	Unit Flow Rate	Estimated Maximum Daily Flow (gpd)
Residential	418 beds	110 gpd/bedroom	45,980 gpd
Cafe	1,500sf (20sf/seat) 75seats	35gpd/seat	2625gpd
Gallery (Museum)	1,000sf	75 gpd/1,000sf	75 gpd
Office (co-working)	3,000sf	75 gpd/1,000sf	225 gpd
Total			**48,905 gpd**

7.2.3 Sanitary Sewer Connection

It is anticipated that the proposed building's sanitary services will tie into the 10-inch sanitary sewer main in Townsend Street. Final locations and sizes of the services will be provided on a Site Plan during the detailed design phase and submitted to BWSC for review and approval. Parking garage floor drains will be routed through an oil and sand trap in accordance with the BWSC's Requirements for Site Plans, prior to discharge to the BWSC sanitary sewer system

The Proponent will submit a Site Plan to the BWSC for review and approval. Based on the proposed estimated sanitary flow, which is greater than 15,000 gpd, BWSC will require the removal of infiltration/inflow (I/I) at a minimum ratio minimum 4:1 ratio of I/I removed to wastewater generated.

7.2.3.1 Sewer System Mitigation

The Project will be LEED certifiable in accordance with the BPDA's Article 37 Green Building program. As such, various measures for water conservation and wastewater reduction such as low-flow toilets and urinals, restricted flow faucets, and sensor operated sinks, toilets, and urinals may be incorporated in order to meet the LEED requirements. Specific water conservation and wastewater reduction measures to be included in the Project will be more fully defined as the building designs develop.

7.3 Water System

7.3.1 Existing Water Service

The water mains in the vicinity of the Project Site are owned and maintained by BWSC (see Figure 7-2). BWSC record drawings indicate there is an existing 12-inch ductile iron concrete lined (DICL) pipe installed in 2012 in Townsend Street, an existing 12-inch DICL in Harrishof Street, and an existing 12 inch cast iron (CI) pipe installed in 1926 in Dennison Street. The water mains are part of the Southern High service network. The existing site currently has five existing water service connections.

The site is within the service radius of several hydrants. There are two hydrants (H38 and H40) adjacent to the northeast of the site on Townsend Street, a hydrant (H16) adjacent to the south east of the site on Harrishof Street, and a hydrant (H171) adjacent to the south of the site on Dennison Street. The Proponent will confirm that the hydrants are sufficient for the development with BWSC and the Boston Fire Department (BFD) during the detailed design phase.

The BWSC record flow test data containing actual flow and pressure for hydrants within the vicinity of the site will be requested by the Proponent. If hydrant flow data is not available for any hydrants located near the project site, as the design progresses, the Proponent will request hydrant flows be conducted by the BWSC adjacent to the site. Hydrant flow data must be less than a year old to be used as a design tool. The Proponent will confirm that the flow and pressure is sufficient for the redevelopment and coordinate any proposed changes with BWSC and the Boston Fire Department (BFD) during the detailed design phase.

7.3.2 Anticipated Water Consumption

The Project's water demand estimate for domestic services is based on the project's estimated sewage generation, plus a factor to account for consumption, system losses, and other usages to estimate an average water demand. The total estimated water demand is 48,905 gpd. The water for the Project will be supplied by BWSC.

Based on initial discussions with BWSC, there are no expected water capacity problems in the vicinity of the Project site. Prior to full design, this will be confirmed via flow testing by BWSC. The Project's engineer will coordinate water demand and availability with BWSC during the Site Plan Approval process to ensure the Project needs are met while maintaining adequate water flows to the surrounding neighborhood.

7.3.3 Proposed Water Service

It is anticipated that the domestic water and fire protection services for the Project will be directly tapped from the 12-inch water main in Townsend Street. The water supply systems servicing the building will be gated so as to minimize public hazard or inconvenience in the event of a water main break. Final locations and sizes of the services will be provided on a Site Plan during the detailed design phase and submitted to BWSC for review and approval.

Water service to the building will be metered in accordance with BWSC's requirements. The property owner will provide a suitable location for a Meter Transmission Unit (MTU) as part of BWSC's Automatic Meter Reading System. A backflow preventer will be installed on the fire protection service and will be coordinated with BWSC's Cross Connection Control Department.

7.3.3.1 Water Supply Conservation and Mitigation

As noted above, the Project will be LEED certifiable in accordance with the BPDA's Article 37 Green Building program. As such, various water conservation measures such as low-flow toilets and urinals, restricted flow faucets, and sensor operated sinks, toilets, and urinals may be incorporated in order to meet the LEED water conservation requirements. Specific water conservation measures to be included in the Project will be more fully described as the building designs develop. Water usage for landscape irrigation will be significantly reduced by the selection of native and adaptive plantings, and using soil moisture sensors as part of the irrigation system.

7.4 Storm Drainage System

7.4.1 Existing Storm Drainage System

The BWSC owns and maintains the storm sewer systems adjacent to the site (See Figure 7-1). There are existing 12-inch storm drain mains along Townsend Street, Harrishof Street, and Dennison Street.

The existing site contains approximately 1.28 acres vegetated with grass, trees, and brush. The remaining existing site consists of approximately 0.65 acres of ledge with some vegetation, 1.87 acres of bituminous concrete parking lots, and 1.03 acres of buildings.

The majority of the stormwater runoff generated from paved areas flows overland to the drainage network on Townsend Street. There is only catch basin onsite collecting stormwater runoff from impervious surfaces. Stormwater runoff from ledge outcroppings and vegetated areas generally flow overland to either the onsite paved areas or adjacent sites and streets.

7.4.2 Proposed Storm Drainage System

The Project is expected to substantially improve the water quality and will meet the Boston Water and Sewer Commission Site Plan requirements. The existing storm drain utility infrastructure surrounding the Site appears to be of adequate capacity to service the needs of the Project. The Project will result in a decrease in impervious area, and will improve the quality and attenuate the quantity of stormwater runoff being discharged to BWSC storm drain system through the installation of an on-site infiltration system. It is anticipated that the equivalent of 1 inch over the site's impervious area can be recharged.

In addition to the installation of an on-site infiltration system, stormwater runoff will be treated through the use of deep sump catch basins and water quality treatment units. An operation and maintenance plan will be developed to support the long-term functionality of the proposed stormwater management system.

7.5 Electrical Service

Eversource owns and maintains the electrical transmission system in the vicinity of the Proposed Project. There is existing overhead service in the Project Area. It is expected that electrical service can be provided by Eversource. Electric power supply design, and any upgrades that may be required, will be further coordinated with Eversource as the design for each phase progresses. The Proponent will investigate energy conservation measures, including high efficiency lighting.

7.6 Telecommunication Systems

Comcast and RCN provide telephone service in the Project area. It is anticipated that telephone service can be provide by any of the providers. Any upgrades will be coordinated with the provider. Telephone systems will be reviewed with the provider as the design progresses.

Comcast and RCN provide cable and internet service in the Project area. It is expected that Comcast and/or RCN can provide services to the Project Site. Any upgrade required to the services will be coordinated with the services providers.

7.7 Gas Systems

The Project is not expected to require steam service and there is no steam infrastructure in the Project area.

National Grid provides natural gas in the Project area. National Grid owns and maintains a 12-inch, carbon steel gas main in Townsend Street that provides three existing connections to the existing buildings and a 3-inch, carbon steel gas main in Harrishof Street that provides a connection to one of the existing buildings on the south side of the Project. The Project is expected to use natural gas for heating and domestic hot water. It is expected that there is adequate supply of natural gas in the area. The actual size and location of the building services will be coordinated with National Grid.

7.8 Utility Protection During Construction

The contractor will notify utility companies and call "Dig-Safe" prior to excavation. During construction, infrastructure will be protected using sheeting and shoring, temporary relocations and construction staging as required. The construction contractor will be required to coordinate all protection measures, temporary supports, and temporary shutdowns of all utilities with the appropriate utility owners and/or agencies. The construction contractor will also be required to provide adequate notification to the utility owner prior to any work commencing on their utility. Also, in the event a utility cannot be maintained in service during switch over to a temporary or permanent system, the construction contractor will be required to coordinate the shutdown with the utility owners and Project abutters to minimize impacts and inconveniences.

Chapter 8.0

Historic and Archaeological Resources

8.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

8.1 Existing Conditions

The Project Site is located on the south side of Townsend Street, southwest of Washington Street, in the Roxbury section of Boston. The surrounding area is residential in character, with a variety of late nineteenth century and early twentieth century single- and multi-family dwellings. A significant transportation-related resource is also present within the Project area.

8.1.1 Historic Resources within the Project Site

The Project Site includes the two five-story buildings at 45 and 59 Townsend Street. It additionally includes surface parking areas and land area encompassing approximately 4.85 acres. Constructed incrementally in the years between 1947 and 1985, the buildings were designed by the architects Herman L. Feer (1895-1962) and his partner and successor William E. Nast (1901-2002).

The institution known for most of its existence as the Jewish Memorial Hospital originated in 1913 as the Roxbury Ladies' Bikur Cholim Association. Defined as "visiting the sick," the Hebrew phrase refers to a Talmudic *mitzvah* or commandment to offer aid and comfort to the ill; bikur cholim (or "holim," as it is more commonly rendered today) societies exist in Jewish communities throughout the world. The Roxbury association's founders recognized that recent Jewish immigrants often lacked access to medical care; moreover, many Orthodox Jews refused treatment in hospitals where kosher food and rabbinic chaplaincy services were not available.

What began as a service organization to meet these and other medical and social-service needs within the community soon grew; in 1928 the Association acquired a building at 59 Townsend Street that had recently been vacated by Beth Israel Hospital following that institution's relocation to the Longwood medical area. An originally residential three-story brick cube below a dormered hip roof, this property reopened the following year as the 42-bed Bikur Cholim Hospital although evidently taken down to accommodate the present buildings on the site, its date of demolition is unknown). Initially focusing on custodial services for the indigent elderly and chronically ill, 85 percent of the new hospital's patients received free care. As it grew over the next decade to accommodate 65 beds as well as radiology, laboratory and physiotherapy departments, the facility was renamed to reflect its expanding role in the community, becoming the Jewish Memorial Hospital in 1937.

The institutional mission of the Jewish Memorial Hospital continued to evolve throughout the post-World War II period; the earliest surviving portions of its physical plant date from these years. Entering a research affiliation with Tufts Medical School in 1949, the hospital

established a professional social services department; also at this time it began to offer rehabilitation, hydrotherapy and occupational therapy to its acute-care patients in addition to an outpatient clinic.

As its clinical services expanded to include more innovative therapies, the profile of the hospital accordingly rose with it. In 1950, the aging Post-Impressionist painter Raoul Dufy traveled from France for arthritis treatment at Jewish Memorial; the pioneering cortisone injections he received there enabled him to continue his career. Two years later, the first successful hip-replacement surgery in greater Boston was performed at the hospital.

Later still, pulmonology and neuropsychiatry departments were added, and a pediatric-rehab unit for developmentally disabled children was opened as well. By the end of the 1960s, Jewish Memorial had grown to 207 inpatient beds; its compact Townsend Street campus included a nurses' residence, Orthodox chapel and laundry annex while its kitchen prepared more than 800 kosher meals daily for patients and staff.

By the time of its closure in the late 1990s Jewish Memorial's physical plant had become a rambling complex of connected buildings generally four to five stories in height, corresponding to the sloping topography of the Townsend Street site. While minimally ornamented and inconsistent in detail, the buildings are somewhat unified by their flat roofs and buff-brick elevations. Masonry coursing does not quite match on several of the latter, visibly indicating the later construction of additional floors. If fenestration is expressed uniformly in its mill-finished aluminum material, it is conspicuously irregular in its configuration. This includes horizontal ribbon windows at certain elevations while others are organized vertically with masonry spandrels, projecting concrete piers and enameled metal or fiberglass panels.

Though clinically up-to-date for their time, the box-like design of the flat-roofed hospital buildings emphasized functionality to the virtual exclusion of aesthetic considerations. Jewish Memorial's expansion occurred on an ad-hoc basis, responding to the shifting requirements of its patient community, rather than as successive steps along a clearly charted institutional course. This impromptu approach is perhaps best exemplified by the enclosed pedestrian bridge connecting the second floors of the main hospital with the nurses' residence above the service drive.

As a result of this haphazard design approach, the already utilitarian buildings at 45 and 59 Townsend Street were not improved by the various additions they absorbed. Indeed, their accretive nature is evident from the mismatched fenestration and masonry coursing evident at virtually every elevation. The placement of major entrances on flank elevations accessible from the parking area, rather than on those opening directly onto Townsend Street, gives the buildings a remote and somewhat defensive air. This attribute serves to compound the mid-twentieth century hospital's uneasy visual relationship with its late nineteenth-century residential context, from which it differs in virtually every respect.

Considerably larger in scale, dissimilar in use and remote from other institutions, the former Jewish Memorial campus is, for all its long and benevolent history, an aesthetically incongruous presence within its neighborhood.

8.1.2 Historic Resources in the Vicinity of the Project Site

Several historic resources included in the State and National Registers of Historic Places exist within a quarter-mile radius of the Project site. These include: the Sewall Maternity Building and Dr. Marie E. Zakrzewska Medical Building of the former New England Hospital for Women and Children, now known as the Dimock Community Health Center; Abbotsford, also known as the Center for Afro-American Arts, at 300 Walnut Avenue; the Boston Elevated Railway Egleston Substation at 3025 Washington Street. Also within this radius are the Roxbury Highlands Historic District and Harriswood Crescent.

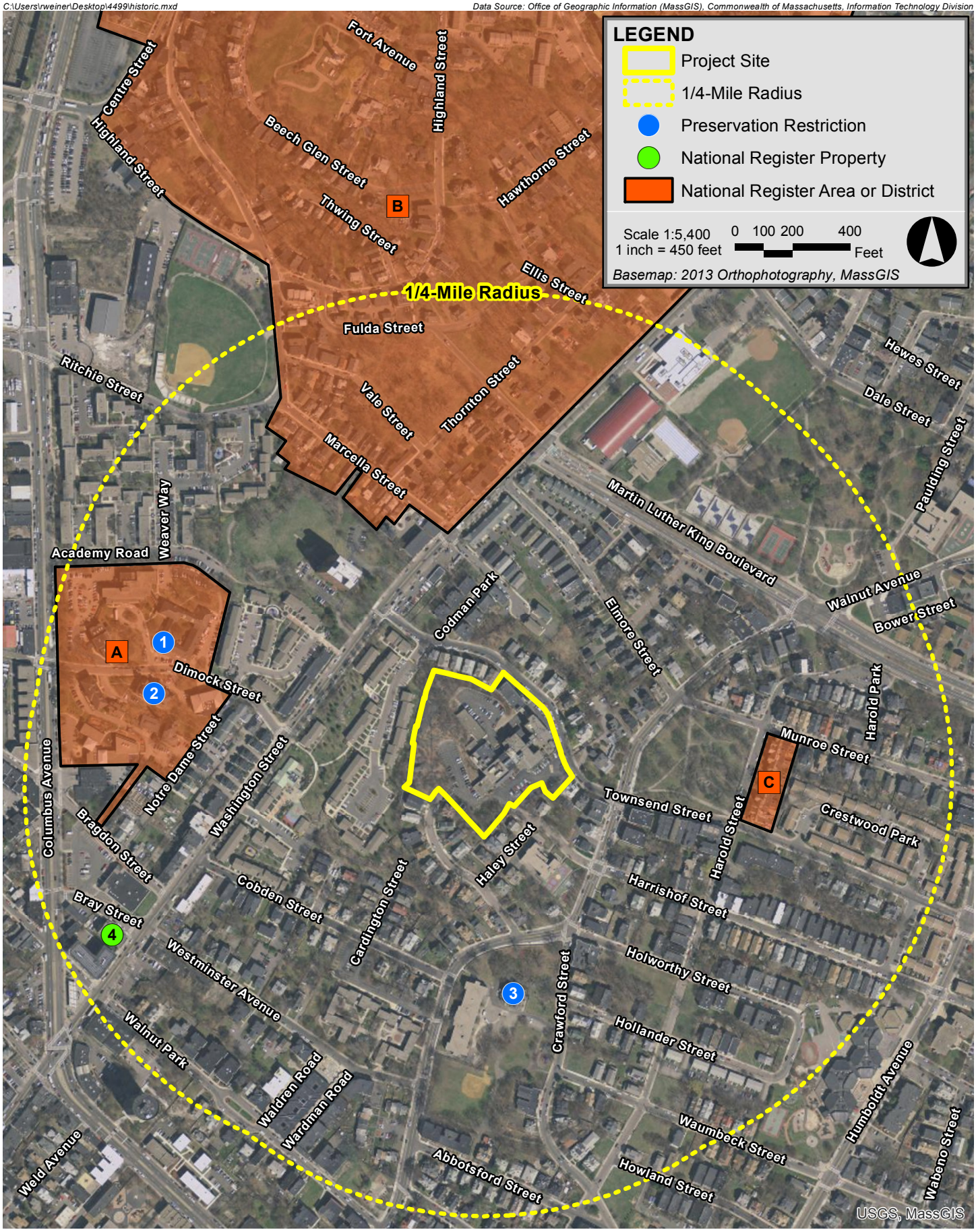
Table 8-1 lists State and National Register-listed properties and historic districts located within a quarter-mile radius of the Project site. The individually listed properties are assigned numbers, which correspond to Figure 8-1. Figure 8-1 also identifies the locations of the State and National Register-listed historic districts within a quarter mile of the Project site; these are indicated by letters.

Table 8-1 State and National Register Resources in the Vicinity of the Project Area

No.	Historic Resource	Address	Designation
1	Sewall Maternity Building	55 Dimock St.	NRDIS, NHL, PR
2	Dr. Marie E. Zakrzewska Medical Building	55 Dimock St.	NRDIS, NHL, PR
3	Abbotsford	300 Walnut Ave.	NR, PR
4	Boston Elevated Railway Egleston Substation	3025 Washington St.	NR
A	New England Hospital for Women and Children	Dimock Community Health Center	NRDIS, NHL, PR
B	Roxbury Highlands Historic District	Columbus Ave., Washington & Dudley Sts.	NRDIS
C	Harriswood Crescent	Harold, Monroe & Townsend Sts.	NR

Designation Legend:	
NR	Individually listed on the National Register of Historic Places
NRDIS	National Register of Historic Places historic district
NHL	National Historic Landmark
PR	Preservation Restriction

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



45 Townsend Street Boston, Massachusetts

Epsilon Associates Inc.

Figure 8-1
Historic Resources Map

Named for an early administrator of the New England Hospital for Women and Children, the **Sewall Maternity Building** at 55 Dimock Street was completed in 1892 to the designs of Dorchester architect John Fox. Constructed of red brick, its cubic central mass is capped by a hipped roof culminating in a louvered cupola; one- and two-story wings extend to the side and rear, creating courtyards. Colonial Revival in style, the building's asymmetrical front elevation balances an entry with broken-pediment surround to the left with a tall chimney to the right. The subject of a preservation restriction in 1986, the Sewall Maternity Building was designated a National Historic Landmark in 1991.

An elaborate example of the Ruskin Gothic style, the **Dr. Marie E. Zakrzewska Building** occupies a prominent hillside site from which its corner turret surveys the historic complex of the former New England Hospital for Women and Children. Maintained today as the centerpiece of its successor institution, the Dimock Community Health Center, the Zakrzewska Building is named for one of the founding physicians of the former hospital. As completed in 1872 to the designs of noted Boston architects Cummings & Sears, the building is a lively composition of sandstone-trimmed red brick crowned by a polychrome slate roof. Although chiefly of aesthetic interest today, its tiered porches overlooking Dimock Street originally provided a healthful, open-air therapeutic environment for the hospital's inpatients. Subject to a preservation restriction established in 1986, the Zakrzewska Building attained National Historic Landmark designation in 1991.

Dating also from 1872, **Abbotsford** at 300 Walnut Avenue was originally known as Oakbend when built as the residence of local banker Aaron Williams, Jr. Designed in the High Victorian Gothic style by Boston architect Alden Frink, the building's exterior walls are of Roxbury puddingstone quarried nearby; the same material is also used for the retaining walls encircling the property. Notable for its soaring tower, which is visible from a considerable distance, the building's roof also bristles with ornamental gables, dormers and chimneys. Following a period of use by the City of Boston as a boys' reformatory after 1924, the mansion-scaled building had been vacant for some time when acquired by the National Center for Afro-American Artists in 1976. Listed on the National Register of Historic Places since 1987, Abbotsford has been subject to a preservation restriction since 2012.

Completed in 1909, the former **Egleston Substation** of the Boston Elevated Railway, located at 3025 Washington Street, represents a historic typology adapted for a modern use. In this case, the powerhouse of an urban mass-transit system appears in the guise of an early Renaissance basilica such as one might find in the Tuscan countryside. Set on a shoulder-high water table of cast stone, its stucco elevations are bordered by red brick; the same material defines the colossal entry arch of the narrow front elevation. The removal of the elevated rail line that once stood to the left of the building has served to underscore the resemblance to its ecclesiastical prototype. Since converted as a media center for a regional cable television network, the Egleston Substation was listed on the National Register of Historic Places in 2010.

Operated today as the Dimock Community Health Center, the **New England Hospital for Women and Children** was first established in 1862. In addition to its individually designated Sewall and Zakrzewska buildings (above), the health center complex comprises eight major buildings built on a 9-acre parcel over a 58-year period. These include other works by John Fox and Cummings & Sears in the Stick and Georgian Revival idioms popular at their respective times of construction. Dotted by mature trees and outcroppings of Roxbury puddingstone, the health center's topography presents a picturesque, campus-like appearance providing a measure of relief from the urban context. It was designated a National Register district in 1995.

Listed in the National Register in 1989, the **Roxbury Highlands Historic District** is bounded roughly by Roxbury Street, Anita Terrace, Centre, Highland, Marcella and Washington Streets. Its approximately 170 acres is interrupted by puddingstone outcroppings and laid out in streets whose winding contours correspond to the hilly topography.

Architecturally the area is particularly rich in the residential building types and styles fashionable in the century between 1830 and 1930 although a handful of significant earlier resources are also present. Among these are the Federal-style First Church of Roxbury, completed in 1804, and several nearby houses of the same period in John Eliot Square.

Greek Revival houses both small and substantial are numerous throughout the district, including several temple-fronted examples with monumental pediments and columned porticoes. A small number of steep-roofed, cottage-scaled Gothic Revival houses may be found scattered throughout the area as well. Better represented are examples of the Italianate style, indicated by their bracketed cornices and entry porches. Quoining and paneled friezes appear on many examples.

The more florid Second Empire idiom, distinctive for its double-pitched mansard roof, is also abundant in both frame and masonry sub-types; the latter often appear as rowhouses with façade bays of cylindrical or angled profile. This type is well illustrated by the marble-fronted row at 28-44 Cedar Street. Single- and multi-family houses in the classically derived Queen Anne and Classical Revival styles were built in the closing years of the nineteenth century.

After 1900 large masonry apartment blocks began to appear throughout the Highlands. Their handsome façades, typically of red or buff brick, may include round or angled bay projections as well as a variety of ornamental motifs borrowed from antiquity, such as columns, pilasters and projecting cornices.

Facing rocky Horatio Harris Park on Harold Street between Monroe and Townsend Streets, **Harriswood Crescent** is a contiguous row of fifteen related houses. Their robust design fuses the Romanesque and Tudor styles in brick, half-timbered stucco and stone. Completed in 1890 to the specifications of the prolific Boston architect J. Williams Beal, this row has been regarded as a successor to the Tontine Crescent, Charles Bulfinch's early

nineteenth-century speculative development which once stood on Franklin Street in Boston's central business district. It also demonstrates an affinity to terrace-house developments in contemporary Britain, particularly those of Richard Norman Shaw. Harriswood Crescent was included in the National Register of Historic Places in 1986.

8.1.3 Archaeological Resources on the Project Site

The Project Site is a previously developed urban parcel. There are no known archaeological resources listed in the State and National Registers of Historic Places or included in the Inventory within the Project Site.

8.2 Impacts to Historic Resources

The Project includes the demolition of the buildings which now occupy the site, whose addresses are 45 and 59 Townsend Street. Both were purpose-built circa 1950, with later accretions, for the defunct Jewish Memorial Hospital; no. 45 (the "Rubenstein building") serving primarily as a nurses' residence and no. 59 (the "Kaplan building") as the hospital proper, including laundry and kitchen facilities. Neither is included in the MHC Inventory or the State or National Registers of Historic Places.

8.2.1 Demolition of Historic Resources

In that sizeable portions of both buildings now occupying the Project Site (45 and 59 Townsend Street) are greater than 50 years old, their removal will require Article 85/Demolition Delay review by the Boston Landmarks Commission (BLC). At the appropriate time the proponent will file an Article 85 application with the BLC.

8.2.2 Urban Design

Introducing more than 320 units of much-needed housing above approximately 4,500 square feet of retail space on the steeply sloping former hospital site, the proposed Project will be a welcome addition to the neighborhood. Significantly, its design does not mimic the nineteenth-century wood-frame dwellings that typify the area. Rather than attempting to erase the historic juxtaposition of types and uses within the context, the new construction aims to reinterpret the corresponding differences in scale, material and detail that have long been familiar here.

At the same time, the Project has been approached with considerable sensitivity to the site's challenging topography, minimizing disturbance to the ledge outcroppings of Roxbury puddingstone that define its character. The new construction's orientation to Townsend Street also represents a considerable improvement. Whereas the old healthcare facility stood at something of a remove from its hillside neighbors with its major entrances located well within the complex, the Project's front door will be a major feature of the façade, approached directly from the public sidewalk. The Project's provision of ground-floor commercial space, raised on a retaining wall of puddingstone, will foster further

engagement with the street. This retail activity will in turn enliven the pedestrian experience as it enhances the Project's visual and economic integration with the surrounding community.

The Project's materials palette has also been selected to complement that of the area's existing architecture while avoiding the literal imitation that would falsely appropriate its history. Thus a rich variety of materials—including masonry, various metals, mahogany and glass—will respond in a modern idiom to the brick, clapboard and shingle spoken by the existing housing stock. Similarly, in contrast to the flat, minimal detailing of the former hospital, the Project will embrace its three-dimensionality to acknowledge the ornamentation of its late nineteenth- and twentieth-century neighbors. Its elevations will accordingly be animated by such projecting and receding elements as bays, cornices and pavilions. While less gratuitously decorative than those of the past, these features and their resulting shadow lines will extend a satisfying aesthetic bridge between the new and the old.

There are no anticipated urban design impacts to any other historic resources within the vicinity of the Project site.

8.3 Shadow Impacts

Shadow analyses were undertaken to demonstrate the anticipated impacts from the Project. These consisted of standard shadow studies done for the spring equinox, summer solstice, autumn equinox and winter solstice at 9:00 A.M., 12:00 P.M. (noon), and 3:00 P.M., as well as 6:00 P.M. for the summer solstice and autumn equinox.

These studies demonstrated that net new shadow is limited in both degree and duration. Modestly extending existing shadow, it is typically cast southwesterly across the Project Site itself, with only peripheral impacts to the north side of Townsend Street. Otherwise, at 6:00 P.M. at the fall equinox, shadow is cast to the northeast onto Horatio Harris Park. On the winter solstice, some new shadow encroaches on Washington Street to the west of the site at 9:00 A.M., and to Elmore Street to the north at 3:00 P.M. In that both areas are already substantially in shade at these times, the new shadows are considered to be minor. Moreover, there are no shadow impacts on any historic resources within a quarter-mile radius of the Project site.

8.4 Conclusion

The Project has been sensitively designed to be responsive to and harmonious with its context. The building will have minimal impacts to the surrounding area and will represent a significant visual enhancement to the area.

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 Architectural Access Board and the standards of the Americans with Disabilities Act. The Accessibility Checklist is included in Appendix I.

9.2 Massachusetts Environmental Policy Act (MEPA)

The Proposed Project as presently designed is not subject to review in accordance with the requirements of the Massachusetts Environmental Policy Act, MGL c. 30, §§61-62H (MEPA), and the MEPA regulations at 301 CMR 11.00 (the "MEPA Regulations"). The Proponent is not seeking state or federal sources of funding to enable the Project and that the Project does not require an Agency Action, the Proponent does not contemplate filing with MEPA for the proposed activities.

MEPA applies to certain actions undertaken and certain permits granted by agencies, departments, boards, commissions, and authorities of the Commonwealth of Massachusetts and other authorities or political subdivisions of the Commonwealth. According to the MEPA Regulations, MEPA review is required if a project exceeds certain thresholds specified in the MEPA Regulations and the project involves a state agency transferring an interest in real property, providing financial assistance or issuing a permit or approval. MEPA review is generally only required if a state agency approval is required and the project exceeds a MEPA threshold. Specifically, pursuant to 301 CMR 11.01(2)(b), the MEPA office only has jurisdiction when "the subject matter of the review threshold is conceptually or physically related to the subject matter of one or more required [permits from a state agency]."

The Proponent will continue to assess the need for MEPA review as Project planning progresses.

9.3 Massachusetts Historical Commission State Register Review

If the Project requires issuance of a permit or license by a state body, review by Massachusetts Historical Commission under State Register review regulations (950 CMR 71.00) may be required. In necessary, the Project will commence MHC review through the filing of a MHC Project Notification Form in accordance with 950 CMR 71.00.

9.4 Boston Landmarks Commission

The Proponent will seek Boston Landmarks Commission approval for demolition of the four buildings on the Project Site as part of the Project.

9.5 Other Permits and Approvals

Section 1.7 provides a list of agencies from which it is anticipated that permits and approvals for the Project will be sought.

Appendix A

Letter of Intent

KIC
KENSINGTON
INVESTMENT
COMPANY INC.
SINCE 1983

One team working together to build strong communities

Alnoba: Where inspiration meets action

The Farm at Eastman's Corner

Grand Circle Cruise Line

Grand Circle Foundation

Grand Circle Travel

The Lewis Family Foundation

Overseas Adventure Travel

Pinnacle Leadership Center

May 5, 2017

Brian P. Golden, Director
Boston Planning & Development Agency
One City Hall Square
Boston, MA 02201

Re: Letter of Intent to File PNF
45 Townsend Street Project
45 Townsend Street, Roxbury Neighborhood District

Dear Director Golden:

Please accept this letter as a Letter of Intent under Article 80 of the Boston Zoning Code ("Code") submitted to the Boston Planning & Development Agency pursuant to the Executive Order entitled: "An Order Relative to the Provision of Mitigation by Development Projects in Boston" for the filing of a EPNF for the 45 Townsend Street Project ("Proposed Project").

KIC Roxbury LLC, a Delaware limited liability company, having an address at 347 Congress Street, Boston, MA 02210 ("KIC Roxbury") is pleased to submit this Letter of Intent for 45 Townsend Street, a proposed residential development to be developed on the former site of the Jewish Memorial Hospital and Radius Specialty Hospital at 45-47 Townsend Street in Roxbury.

KIC Roxbury acquired the property from the Receiver of the Property of Radius Specialty Hospital LLC and Radius Hospital Realty LLC on September 24, 2015. Radius Specialty Hospital had ceased operating the 207 bed hospital and the Receiver called for an auction of the property in August 2015. KIC Roxbury was the successful bidder at the auction, and has worked with its consultants and development team since its September, 2015 acquisition to develop a residential re-use plan for the property, and has

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May 5, 2017

conducted numerous pre-filing meetings with the abutters and the local neighborhood community.

The property consists of three Assessor parcels of land at 45-47 Townsend Street and Harrishof Street and contains a total site area of approximately 211,277 s.f. or 4.85 acres ("Site"). The Proposed Project will consist of the demolition of the existing hospital buildings (5 structures containing approx. 159,000 SF) and the construction of a new "single" structure containing approximately 380,000 SF with 5 building elements of various heights from 5 to 7 1/2 stories and 60 to 90 feet, for up to 322 market rate rental units (studios, one-bedroom, two-bedroom and three-bedroom) and 217 structured parking spaces. The Proposed Project will also contain café (locally-operated) space, community gathering space and co-working space (locally-operated) for residents and the neighborhood. Other project amenities include 24 hour front desk and on-site security, gathering spaces for exhibitions, kitchen & dining area, games room with billiards, reading nooks and lending library, TVs, multiple sitting areas, with fireplace, access to outdoors, coffee & tea bar, fitness center and Yoga studio, outdoor pool, meeting spaces for study and work, computer area with printing and outdoor BBQs and sitting areas.

KIC Roxbury is committed to complying with the Mayor's Inclusionary Development Program (IDP) by creating an off-site Affordable Home Ownership Residential Project within walking distance of the site.

KIC Roxbury is committed to a sustainable design program to meet LEED certification/Near Net Zero Energy by incorporating solar power on the roofs and thickly insulated walls and windows. Daily shuttle transportation to Jackson Sq. Orange Line, approximately 300 bike racks and 3 zip car rentals on-site will enhance the transportation amenities of the proposed project. The Proposed Project will conform to Article 37 of the Boston Zoning Code - Green Building and Climate Resiliency Guidelines and incorporate LEED building strategies and practices.

KIC Roxbury has assembled a diverse and community focused development team, which includes:

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May 5, 2017

- Kensington Investment Company, Owner/Developer.
- Lewis Family Foundation, Owner Philanthropy and Community Investment.
- Studio G Architects-Gail Sullivan, Project Architects (WBE).
- D/R/E/A/M Collaborative-Greg Minott, Associate Architects (MBE).
- G-O Logic, Matt O'Malia, Owner Advisor, Sustainable Architecture.
- Legacy Consultants-Alfreda Harris (MBE).
- Janey Construction Management and Consulting-Greg Janey, Construction Management: (MBE).
- BevCo Associates-Beverley Johnson, Article 80 Management, Government and Community Relations (M/W/BE).
- Ground Inc., Landscape Architects, Shauna Gillies-Smith (WBE).

The Lewis Family Foundation has a history of investing in and supporting Roxbury-based organizations and has donated over $16 million to Roxbury, Dorchester and Mattapan non-profits with the key goals of i) doubling college graduation rates, and ii) Creating 500 jobs for youth with an average salary of $38,000 annually. The Foundation has been investing in Roxbury long before this project was conceived, and will continue to invest long term. As part of this investment, we believe that the Proposed Project will generate the following long-term community benefits to the neighborhood:

- Development team is over 50% minority / women owned firms including Beverley Johnson [BevCo], Alfreda Harris [Legacy Consulting], Greg Janey [JaneyCo.], Greg Minott [D/R/E/A/M Collaborative], Gail Sullivan [Studio-G], Connie Kastelnik [CK Communication], Shauna Gillies-Smith [Ground Inc.].

- Sustainable design LEED Certified [near net zero energy] to reduce resident energy costs;

- Locally run Café & Locally run Co-working space and Community Gathering space open to the neighborhood,

347 Congress Street, Boston, MA 02210 | T: 617.790.3900 | kicboston.com

KENSINGTON
INVESTMENT
COMPANY INC.
SINCE 1983

May 5, 2017

- Permanent jobs in 2021 including 14 Kensington Investment Company employees with salaries in the $45K to $115K range, 2-3 full time café jobs at $40K+, 2 full time jobs at co-working space $40K+,
- Support of entrepreneurs and local businesses – co-working for 30 people, annual vendor contracts in the $200K+ range [HVAC, MEP, Landscape etc.]
- Construction Jobs in 2019-2021 – over 500 construction jobs, committed to local jobs, local contractors and diversity,
- Neighborhood Connectivity – Reactivate vacant parcel, open up park near Harrishof Street and increase neighborhood home values

In accordance with Section 80B of the Code, the Proposed Project constitutes a large project and is subject to Large Project Review, and pursuant to the provisions of Section 80B-5.4 of the Code, KIC Roxbury intends to file a EPNF with the BPDA.

We look forward to working with the BPDA, City agencies, our neighbors and the Roxbury Community during the Article 80 review of the Proposed Project.

Thank you for your consideration of this letter.

Sincerely,

KIC Roxbury, LLC

By: _____

cc:
Jonathan Greeley, Director of Development Review
Dana Whiteside, Deputy Director Community Economic Development
Courtney Sharpe, Senior Planner, Roxbury & Mattapan.

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Appendix B

Survey

LEGEND

BERM	BITUMINOUS CONCRETE BERM
BIT CONC	BITUMINOUS CONCRETE
CB	CATCHBASIN
CLF	CHAIN LINK FENCE
CONC	CONCRETE
GC	GRANITE CURB
GG	GAS GATE
GR	GUARD RAIL
HH	HAND HOLE
HYD	HYDRANT
LP	LIGHT POLE
LS	LANDSCAPED
LST	LANDSCAPE TIMBER
M	METAL COVER
MH	MANHOLE
OW	OBSERVATION WELL
P	POST
PL	PLANTER
RET	RETAINING
S	SIGN
SMH	SEWER MANHOLE
T8	8" TREE
TRANS	TRANSFORMER
UP	UTILITY POLE
V	VENT
WG	WATER GATE
.....	OVERHEAD WIRE

SCHEDULE B – Section II OF COMMONWEALTH LAND TITLE INSURANCE COMPANY'S COMMITMENT FILE No. B15–196

[2] Title to and rights of the public and others entitled thereto in and to so much of the insured premises lying within the bounds of Townsend Street, Harrishof Street and the adjoining streets or ways. AFFECTS LOCUS AS SHOWN.

[6] Rights of Omnipoint Communication, Inc. pursuant to a Memorandum of Lease and Option dated January 23, 2007, recorded in Book 41430, Page 47. LOCATION UNKNOWN.

[7] Rights of T–Mobile Northeast LLC pursuant to a Memorandum of Lease recorded October 3, 2013 in Book 52200, Page 41. LOCATION UNKNOWN.

EXHIBIT A OF COMMONWEALTH LAND TITLE INSURANCE COMPANY'S COMMITMENT FILE No. B15–196.

PARCEL 1
The land in the Roxbury District of said Boston, with the buildings thereon, now No. 45 Townsend Street, and bounded and described as follows:

Beginning at a point on the westerly side of Townsend Street at the Northeasterly corner of the premises on said street at land now or formerly of Anthony Varnerin, thence turning and running in an easterly and southeasterly direction by said Townsend Street, 289.64 feet to land now or formerly of Celia Green as shown on a plan of said premises entitled "Plan of an Estate in Roxbury formerly owned by Henry B. Dennison," by D.W. Hyde, surveyor dated November 30, 1915, recorded with Suffolk Deeds, December 6, 1915 in Book 3923, Page 627; thence turning and running southwesterly by said land now or late of Celia Green, 99.66 feet to a stone bound; thence running northwesterly by land now or formerly of Edward A. Shea 36 feet to a stone bound; thence turning and running more northerly on land now or formerly of Annie Weinstein, 30 feet to a stone bound; thence turning and running Southwesterly by said land now or formerly of Annie Weinstein, 39.24 feet to a stone bound; thence turning and running more southwesterly on said land of Weinstein 83.17 feet to a stone bound at the easterly side of Harrishof Street; thence turning and running Northwesterly by the easterly side of Harrishof Street, 22.81 feet to a corner; thence turning and running southwesterly by the northwesterly end of Harrishof Street, 40 feet to a corner; thence turning and running southeasterly by the westerly side of Harrishof Street, 4.45 feet to a stone bound; thence turning and running southwesterly by lands now or formerly of the heirs of John F. Good, A. M. Herlihy and David Manna, 109.49 feet to a corner; thence turning and running northwesterly by land now or formerly of James Hewins to land now or formerly of Alice E. B. Curtis, 39.50 feet; thence turning and running still more northwesterly by said land now or formerly of A. E. B. Curtis and by lands now or formerly of H.A. Bagley, C. and C. Mercadante and by the northeasterly end of Dennison Street, 190.25 feet to a corner; thence turning and running southwesterly by the northwesterly line of Dennison Street by a curved line 57.70 feet to land now or formerly of J.M. Erskine, thence turning and running northwesterly by said land now or formerly of Erskine, 104.30 feet to land now or formerly of H.P. Nordly, thence turning and running northeasterly by said land now or formerly of Nordly and by land now or formerly of Rund, 27 feet to a point; thence turning still more northeasterly by said land now or formerly of Rund and by lands now or formerly of F. S. Rund, M. T. Nourse, E. A and L.G. Fisher, C.O. Ring, J. A. Gilmore, 155.70 feet to a point; thence turning still more northeasterly by said land now or late of J. A. Gilmore and by land now or formerly of the East Boston Young Men's Loan Association and Katherine C. O'Meally, 156.30 feet to a point; thence turning and running southeasterly by land now or formerly of said Anthony Varnerin 272.17 feet to a stone bound; thence turning and running northeasterly by said land now or formerly of Varnerin by two courses, 85 feet and 154.50 feet to the place of beginning.

PARCEL 2
The land with buildings in Boston, Suffolk County, Massachusetts about five thousand two hundred eight (5208) square feet of land on the northerly side of Harrishof Street, between an estate now or formerly of Joseph Sawyer numbered one hundred sixty–seven (167), and an estate now or formerly of Roxbury Ladies' Bikur Cholim Association numbered forty–five (45) Townsend Street, recorded with Suffolk Deeds.

Said Land is situated in Block 225–225E, Section, in the Roxbury District shown in the Boston Assessors Books of plans of said City, filed in the Suffolk Registry of Deeds.

PARCEL 3
A certain parcel of land with the buildings thereon situated in that part of Boston, Suffolk County, Massachusetts, formerly Roxbury, and bounded and described as follow:

NORTHEASTERLY: by Townsend Street, one hundred fifty–five and 26/100 (155.26) feet more or less;

SOUTHEASTERLY: by land now or formerly of Dennison by two lines measuring respectively one hundred fifty–four and 50/100 (154.50) feet and eighty–five (85) feet;

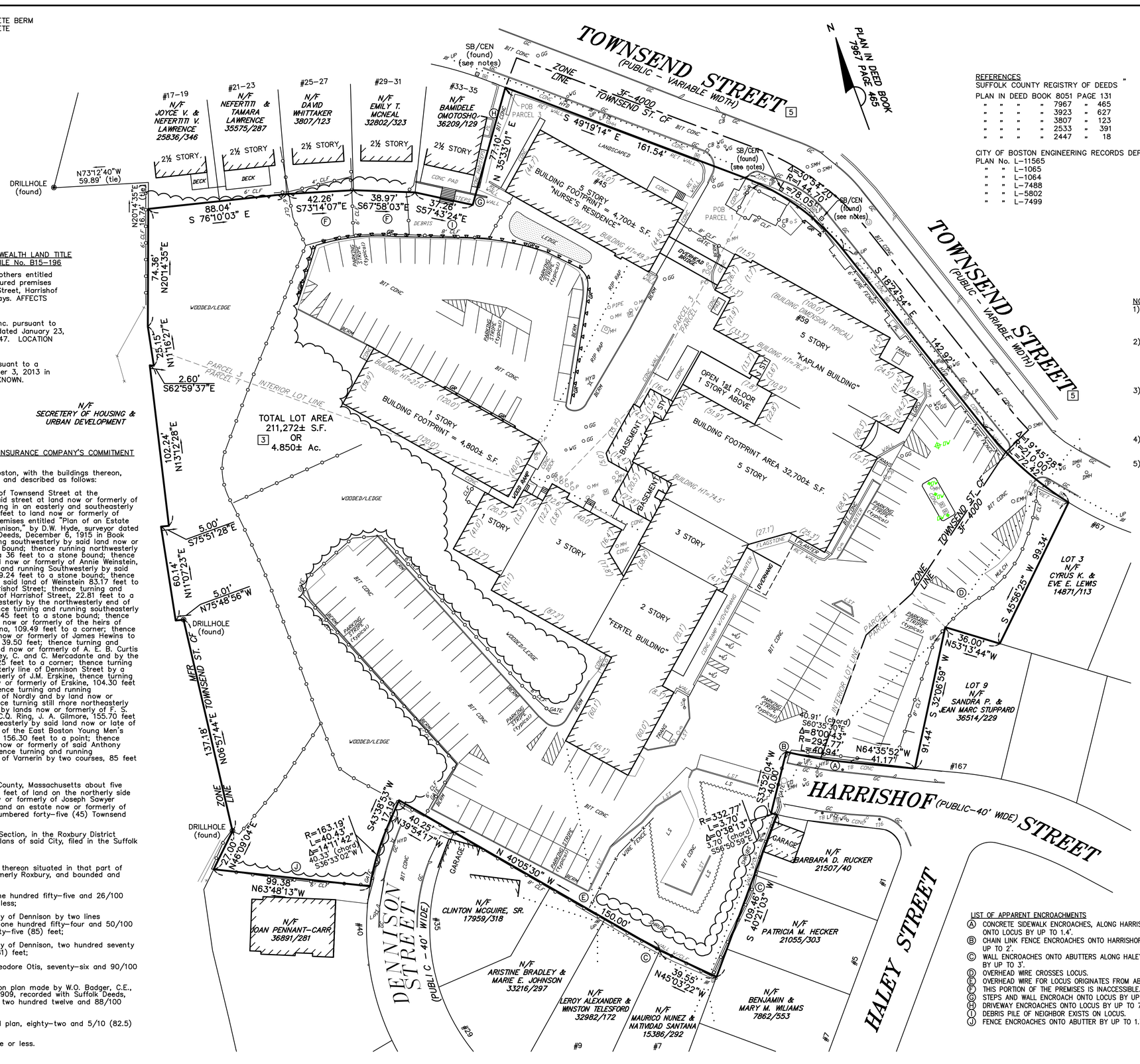
SOUTHWESTERLY: by land now or formerly of Dennison, two hundred seventy one and 81/100 (271.81) feet;

NORTHWESTERLY: by land formerly of Theodore Otis, seventy–six and 90/100 (76.90) feet;

NORTHEASTERLY: by Lots 1–5 inclusive on plan made by W.O. Badger, C.E., dated September 20, 1909, recorded with Suffolk Deeds, Book 3398, Page 440, two hundred twelve and 88/100 (212.88) feet; and

NORTHWESTERLY: again by Lot 5 on said plan, eighty–two and 5/10 (82.5) feet.

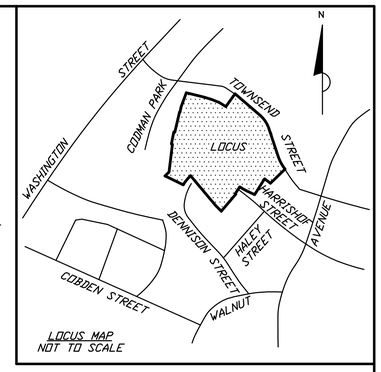
Containing 52,469 square feet of land more or less.



REFERENCES
SUFFOLK COUNTY REGISTRY OF DEEDS "

PLAN IN DEED BOOK 8051 PAGE 131
" " " " 7967 " 465
" " " " 3923 " 627
" " " " 3807 " 123
" " " " 2533 " 391
" " " " 2447 " 18

CITY OF BOSTON ENGINEERING RECORDS DEPARTMENT
PLAN No. L–11565
" " L–1065
" " L–1064
" " L–7488
" " L–5802
" " L–7499



LOCUS MAP
NOT TO SCALE

NOTES
1) THE PARCEL SHOWN HEREON IS LOCATED IN ZONE X UNSHADED AS SHOWN ON FLOOD INSURANCE RATE MAP No. 25025C0079G, EFFECTIVE DATE SEPTEMBER 28, 2009.

2) THE STONE BOUNDS FOUND ON TOWNSEND STREET DO NOT APPEAR TO FIT ANY LAYOUTS ON FILE WITH THE CITY OF BOSTON, DEPARTMENT OF PUBLIC WORKS, ENGINEERING RECORDS DIVISION. THE PROPERTY LINES SHOWN HEREON ARE PER A PLAN RECORDED WITH THE SUFFOLK COUNTY REGISTRY OF DEEDS, DEED BOOK 7967 PAGE 465.

3) OWNER: RADIUS HOSPITAL REALTY, LLC
DEED BOOK 49846 PAGE 173
ASSESSOR'S PARCEL ID 1101787000
" " " 1101776000
" " " 1101777000

4) TOTAL NUMBER OF PARKING SPACES = 161
157 REGULAR & 4 HANDICAP

5) FROM A VISUAL OBSERVATION OF ABOVE GROUND APPURTENANCES ONLY, WATER, SEWER, DRAIN, ELECTRICITY AND TELEPHONE UTILITIES ARE AVAILABLE IN TOWNSEND STREET.

LIST OF APPARENT ENCROACHMENTS
(A) CONCRETE SIDEWALK ENCROACHES, ALONG HARRISHOF STREET, ONTO LOCUS BY UP TO 1.4'.
(B) CHAIN LINK FENCE ENCROACHES ONTO HARRISHOF STREET BY UP TO 2'.
(C) WALL ENCROACHES ONTO ABUTTERS ALONG HALEY STREET BY UP TO 3'.
(D) OVERHEAD WIRE CROSSES LOCUS.
(E) OVERHEAD WIRE FOR LOCUS ORIGINATES FROM ABUTTER.
(F) THIS PORTION OF THE PREMISES IS INACCESSIBLE.
(G) STEPS AND WALL ENCROACH ONTO LOCUS BY UP TO 8'.
(H) DRIVEWAY ENCROACHES ONTO LOCUS BY UP TO 7'.
(I) DEBRIS PILE OF NEIGHBOR EXISTS ON LOCUS.
(J) FENCE ENCROACHES ONTO ABUTTER BY UP TO 1.7'.

To: KENSINGTON INVESTMENT COMPANY, INC., KIC ROXBURY LLC, AND COMMONWEALTH LAND TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH 'MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS,' JOINTLY ESTABLISHED AND ADOPTED BY ALTA, ACSM AND NSPS IN 1999, AND INCLUDES ITEMS 2, 3, 4, 6, 7(A), 7(B)(1), 7(C), 8, 9, 10 AND 11 (A) (LOCATION OF UTILITIES PER VISIBLE, ABOVE–GROUND, ON–SITE OBSERVATION) OF TABLE A THEREOF. PURSUANT TO THE ACCURACY STANDARDS AS ADOPTED BY ALTA, NSPS AND ACSM AND IN EFFECT ON THE DATE OF THIS CERTIFICATION, UNDERSIGNED FURTHER CERTIFIES THAT THE POSITIONAL UNCERTAINTIES RESULTING FROM THE SURVEY MEASUREMENTS MADE ON THE SURVEY DO NOT EXCEED THE ALLOWABLE POSITIONAL TOLERANCE.

8/21/2015
MICHAEL PUSTIZZI, PLS — DATE

COMMONWEALTH OF MASSACHUSETTS
MICHAEL A. PUSTIZZI #46505
REGISTERED PROFESSIONAL LAND SURVEYOR

THE JEWISH MEMORIAL HOSPITAL AND REHABILITATION CENTER

ALTA/ACSM LAND TITLE SURVEY IN BOSTON, MA

ROXBURY DISTRICT
(SUFFOLK COUNTY)

SCALE: 1"= 30' DATE: AUGUST 21, 2015

0 30 60 90 120 ft

Precision Land Surveying, Inc.
32 Turnpike Road
Southborough, Massachusetts 01772
TELE NO.: (508) 460–1789 FAX NO.:(508) 970–0096

3520TI1.DWG

Appendix C

Transportation

Appendix C is available upon request.

Appendix D

Air Quality

AIR QUALITY APPENDIX

Introduction

This Air Quality Appendix provides modeling assumptions and backup for results presented in Section 4.5 of the report. Included within this documentation is a brief description of the methodology employed along with pertinent calculations and data used in the emissions and dispersion calculations supporting the microscale air quality analysis.

Motor Vehicle Emissions

The EPA MOVES computer program generated motor vehicle emissions used in the garage stationary source analysis along with the mobile source CAL3QHC modeling and mesoscale analysis. The model input parameters were provided by MassDEP. Emission rates were derived for 2016 and 2023 for speed limits of idle, 10, 15, and 25 mph for use in the microscale analyses.

MOVES CO Emission Factor Summary

Carbon Monoxide Only

		2016	2023
Free Flow	25 mph	2.849	1.921
Right Turns	10 mph	4.447	2.956
Left Turns	15 mph	3.823	2.586
Queues	Idle	9.997	4.102

Notes: Winter CO emission factors are higher than Summer and are conservatively used
Urban Unrestricted Roadway type used

CAL3QHC

For the intersection studied, the CAL3QHC model was applied to calculate CO concentrations at sensitive receptor locations using emission rates derived in MOVES. The intersection's queue links and free flow links were input to the model along with sensitive receptors at all locations nearby each intersection. The meteorological assumptions input into the model were a 1.0 meter per second wind speed, Pasquill-Gifford Class D stability combined with a mixing height of 1000 meters. For each direction, the full range of wind directions at 10 degree intervals was examined. In addition, a surface roughness (Z_0) of 321 cm was used for the intersection. Idle emission rates for queue links were based on 0 mph emission rates derived in MOVES. Emission rates for speeds of 10, 15, and 25 mph were used for right turn, left turn, and free flow links, respectively.

Kensington Townsend Street - Boston, MA
Background Concentrations

POLLUTANT	AVERAGING TIME	Form	2013	2014	2015	Units	ppm/ppb to $\mu g/m^3$ Conversion Factor	2013-2015 Background Concentration ($\mu g/m^3$)	Location
SO_2 [1][6]	1-Hour [5]	99th %	10.9	12.3	9.4	ppb	2.62	28.5	Harrison Ave., Boston
	3-Hour	H2H	9.7	21.5	8.7	ppb	2.62	56.3	Harrison Ave., Boston
	24-Hour	H2H	5	5.1	4.3	ppb	2.62	13.4	Harrison Ave., Boston
	Annual	H	1.1	1.1	0.8	ppb	2.62	2.8	Harrison Ave., Boston
PM-10	24-Hour	H2H	34	61	28	$\mu g/m^3$	1	61	Harrison Ave., Boston
	Annual	H	15.1	13.9	12.4	$\mu g/m^3$	1	15.1	Harrison Ave., Boston
PM-2.5	24-Hour [5]	98th %	15.9	12.7	19	$\mu g/m^3$	1	15.9	Harrison Ave., Boston
	Annual [5]	H	7.3	6.0	8.8	$\mu g/m^3$	1	7.4	Harrison Ave., Boston
NO_2 [3]	1-Hour [5]	98th %	50	51	53	ppb	1.88	96.5	Harrison Ave., Boston
	Annual	H	17.4	15.8	15.0	ppb	1.88	32.8	Harrison Ave., Boston
CO [2]	1-Hour	H2H	1.9	1.7	1.4	ppm	1146	2145.3	Harrison Ave., Boston
	8-Hour	H2H	1.2	1.3	0.9	ppm	1146	1489.8	Harrison Ave., Boston
Ozone [4]	8-Hour	H4H	0.059	0.054	0.056	ppm	1963	115.8	Harrison Ave., Boston
Lead	Rolling 3-Month	H	0.006	0.014	0.016	$\mu g/m^3$	1	0.016	Harrison Ave., Boston

Notes:
From 2013-2015 EPA's AirData Website

[1] SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.

[2] CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.

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

[4] O_3 reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1963 $\mu g/m^3$.

[5] Background level is the average concentration of the three years.

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

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

Appendix E

Climate Change Checklist

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at http://www.cityofboston.gov/climate

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/)
3. Army Corps of Engineers guidance on sea level rise (http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf)
4. Proceeding of the National Academy of Science, "Global sea level rise linked to global temperature", Vermeer and Rahmstorf, 2009 (http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf)
5. "Hotspot of accelerated sea-level rise on the Atlantic coast of North America", Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 (http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf)
6. "Building Resilience in Boston": Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 (http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf)

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond "Yes" to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current Climate Change Preparedness & Resiliency Checklist.

Climate Change Resiliency and Preparedness Checklist

A.1 - Project Information

Project Name:	**Townsend Street Residential**
Project Address Primary:	**45 Townsend St.**
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	**Kurt Therrien** **EVP / President Real Estate / The Kensington Investment Company, Inc. /** ktherrien@kicboston.com / (617) 790-3912

A.2 - Team Description

Owner / Developer:	**Kensington Investment Company**
Architect:	**Studio G Architects**
Engineer (building systems):	**Buro Happold**
Sustainability / LEED:	**The Green Engineer Inc.**
Permitting:	**Epsilon Assoc.**
Construction Management:	**TBD**
Climate Change Expert:	**An integrated design team approach was used.**

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

PNF / Expanded PNF Submission	~~Draft / Final Project Impact Report Submission~~	~~BRA Board Approved~~	~~Notice of Project Change~~
~~Planned Development Area~~	~~BRA Final Design Approved~~	~~Under Construction~~	~~Construction just completed:~~

A.4 - Building Classification and Description

List the principal Building Uses:	Residential
List the First Floor Uses:	Residential Lobby/Amenity, Service/Loading, Retail

What is the principal Construction Type – select most appropriate type?

~~Wood Frame~~	~~Masonry~~	**Steel Frame**	**Concrete**

Describe the building?

Site Area:	**201,307 SF**	Building Area:	**380,000 GSF**
Building Height (top of last occupiable floor):	**249 Ft. (top of roof)***	Number of Stories (last occupiable floor):	**8 Flrs.**
First Floor Elevation (reference Boston City Base):	**112 feet**	Are there below grade spaces/levels, if yes how many:	**Yes/ 1 level**

*Building height measured from grade is approximately 88 feet.

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:	**New Construction**	~~Core & Shell~~	~~Healthcare~~	~~Schools~~
	~~Retail~~	~~Homes Midrise~~	~~Homes~~	~~Other~~
Select LEED Outcome:	~~Certified~~	**Silver**	~~Gold~~	~~Platinum~~

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	***Yes*** / ~~No~~	Certified:	***Yes*** / ~~No~~

A.6 - Building Energy

What are the base and peak operating energy loads for the building?

Electric:	**3,370,000 (kWh)**	Heating:	**1388 (MMBtu/hr)**
What is the planned building Energy Use Intensity:	**43.31 (kbtu/SF)**	Cooling:	***1231*** **(MMBtu/hr)**

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	**750 (kW)**	Heating:	**0.5 (MMBtu/hr)**
		Cooling:	**10 (Tons/hr)**

What is nature and source of your back-up / emergency generators?

Electrical Generation:	**750 (kW)**		Fuel Source:	**Diesel Fuel**
System Type and Number of Units:	**Combustion Engine**	~~Gas Turbine~~	~~Combine Heat and Power~~	***1*** *(Units)*

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 – Analysis

What is the full expected life of the project?

Select most appropriate:	~~10 Years~~	~~25 Years~~	**50 Years**	~~75 Years~~

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:	~~10 Years~~	**25 Years**	~~50 Years~~	~~75 Years~~

What time span of future Climate Conditions was considered?

Select most appropriate:	~~10 Years~~	~~25 Years~~	**50 Years**	~~75 Years~~

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

7 /91 Deg.

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

95 Deg.	1 Days	6 Events / yr.

What Drought characteristics will be used for project planning – Duration and Frequency?

30-90 Days	0.2 / yr.

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

±45 *Inches / yr.*	±6.4 *Inches*	0.5 *Events / yr.*

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

105 mph Peak Wind	*10 Hours*	*0.25 Events / yr.*

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:	45.8 % (estimate)
How is performance determined:	IES VE model with ASHRAE 90.1-2013 baseline

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

Select all appropriate:	High performance building envelope	LED Lighting and Efficient Design	Daylight controls	EnergyStar equip. / appliances
	Energy recovery ventilation	Demand Controlled Ventilation	VRF for heating and cooling	No active heating
Describe any added measures:	Condensing Domestic Hot water heaters			

What are the insulation (R) values for building envelope elements?

Roof:	R = 30	Walls / Curtain Wall Assembly:	R = 35
Foundation:	F - 0.510 R-20 for 24in	Basement / Slab:	F-0.510 / R-20 for 24 in
Windows:	R-4 / U-0.25, SHGC-0.22	Doors:	N/A

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

	On-site Solar PV	On-site Solar Thermal		
Describe any added measures:	N/A			

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems? **Not be considered at this time.**

Select all appropriate:	Connected to local electrical grid	Connected to local natural gas grid		

Will the building remain operable without utility power for an extended period?

	Yes	If yes, for how long:	*TBD Days*
If Yes, is building "Islandable?	TBD		
If Yes, describe strategies:	TBD		

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

Select all appropriate:	Solar oriented – longer south walls	Prevailing winds oriented	External shading devices	Tuned glazing,
	~~Building cool zones~~	Operable windows	Natural ventilation	Building shading
	~~Potable water for drinking / food preparation~~	~~Potable water for sinks / sanitary systems~~	~~Waste water storage capacity~~	High Performance Building Envelope
Describe any added measures:	Feasibility of a "cool room" will be studied			

What measures will the project employ to reduce urban heat-island effect?

Select all appropriate:	High reflective paving materials	Shade trees & shrubs	High reflective roof materials	Vegetated roofs
Describe other strategies:	N/A			

What measures will the project employ to accommodate rain events and more rainfall?

Select all appropriate:	On-site retention systems & ponds	~~Infiltration galleries & areas~~	~~Vegetated water capture systems~~	Vegetated roofs
Describe other strategies:	Rainwater harvesting			

What measures will the project employ to accommodate extreme storm events and high winds?

Select all appropriate:	~~Hardened building structure & elements~~	Buried utilities ~~& hardened infrastructure~~	~~Hazard removal & protective landscapes~~	Soft & permeable surfaces (water infiltration)
Describe other strategies:	N/A			

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

	No

Describe site conditions?

Site Elevation – Low/High Points:	109/171.2 *Boston City Base Elev.(Ft.)*
Building Proximity to Water:	±6,504 *Ft.*

Is the site or building located in any of the following?

Coastal Zone:	No	Velocity Zone:	No
Flood Zone:	No	Area Prone to Flooding:	No

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs:	No	Future floodplain delineation updates:	*No*

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

12,776 Ft *	***Per preliminary maps.**

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. Otherwise you have completed the questionnaire; thank you!

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise:	*Ft.*	Frequency of storms:	*per year*

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:	*Boston City Base Elev.(Ft.)*	First Floor Elevation:	*Boston City Base Elev. (Ft.)*

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

	Yes / No	If Yes, to what elevation	*Boston City Base Elev. (Ft.)*
If Yes, describe:			

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

Systems located above 1st Floor.	Water tight utility conduits	Waste water back flow prevention	Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Yes / No

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

Yes / No		If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

	Yes / No
If Yes, describe:	

Will the building remain occupiable without utility power during an extended period of inundation:

	Yes / No	If Yes, for how long:	*days*

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:	*Yes / No*	Hardened / Resilient Ground Floor Construction	Temporary shutters and or barricades	Resilient site design, materials and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:	*Yes / No*	Surrounding site elevation can be raised	Building ground floor can be raised	Construction been engineered
Describe additional strategies:				

Has the building been planned and designed to accommodate future resiliency enhancements?

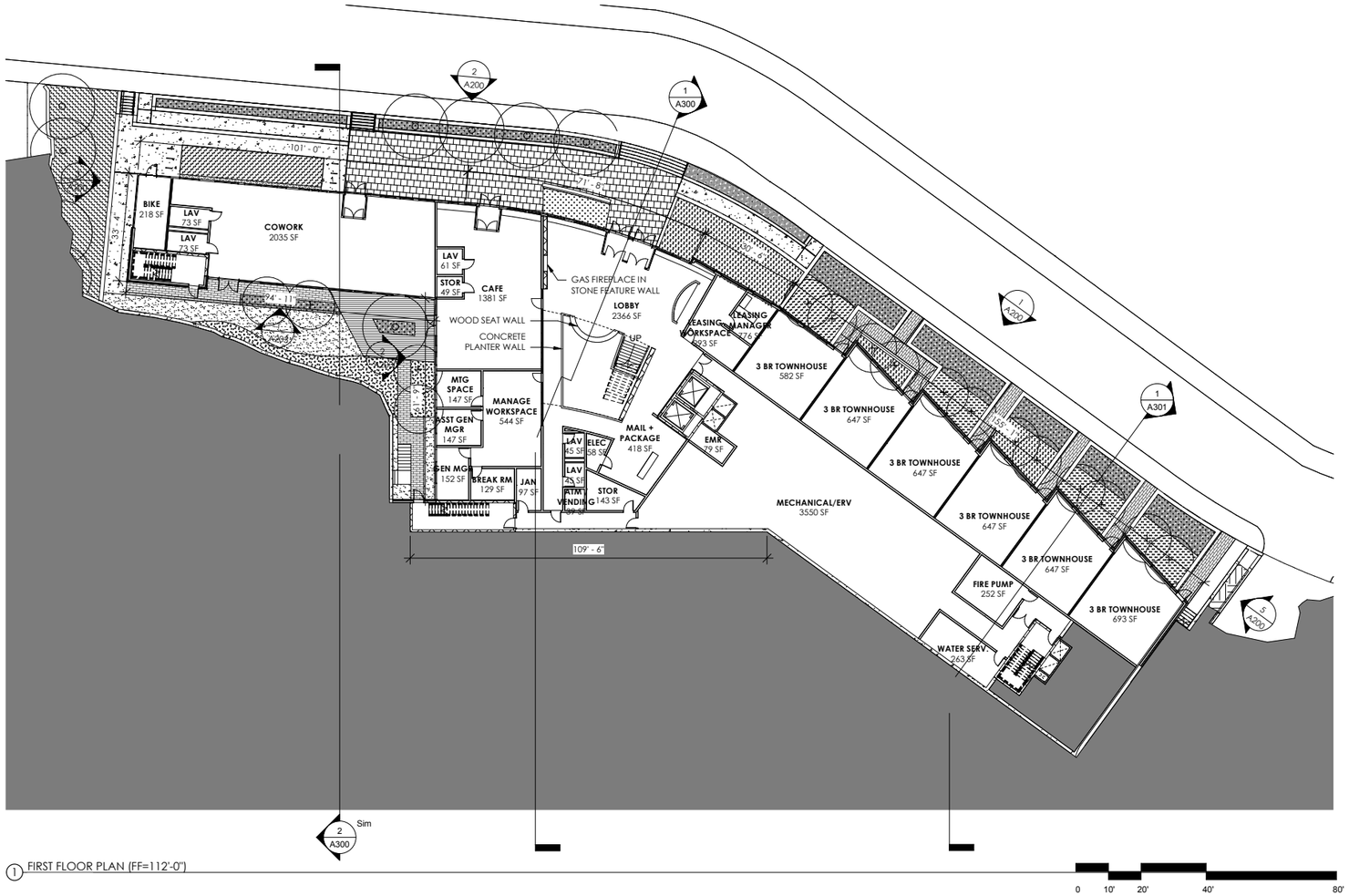
Select appropriate:	***Yes*** */ No*	**Solar PV**	**Solar Thermal**	Clean Energy / CHP System(s)
		Potable water storage	Wastewater storage	Back up energy systems & fuel
Describe any specific or additional strategies:				

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

Appendix F

Floor Plans



1 FIRST FLOOR PLAN (FF=112'-0")

0 10' 20' 40' 80'

PROJECT NORTH

1ST FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 1	Townsend	3 BR TOWNHOUSE	6
Grand total: 6			

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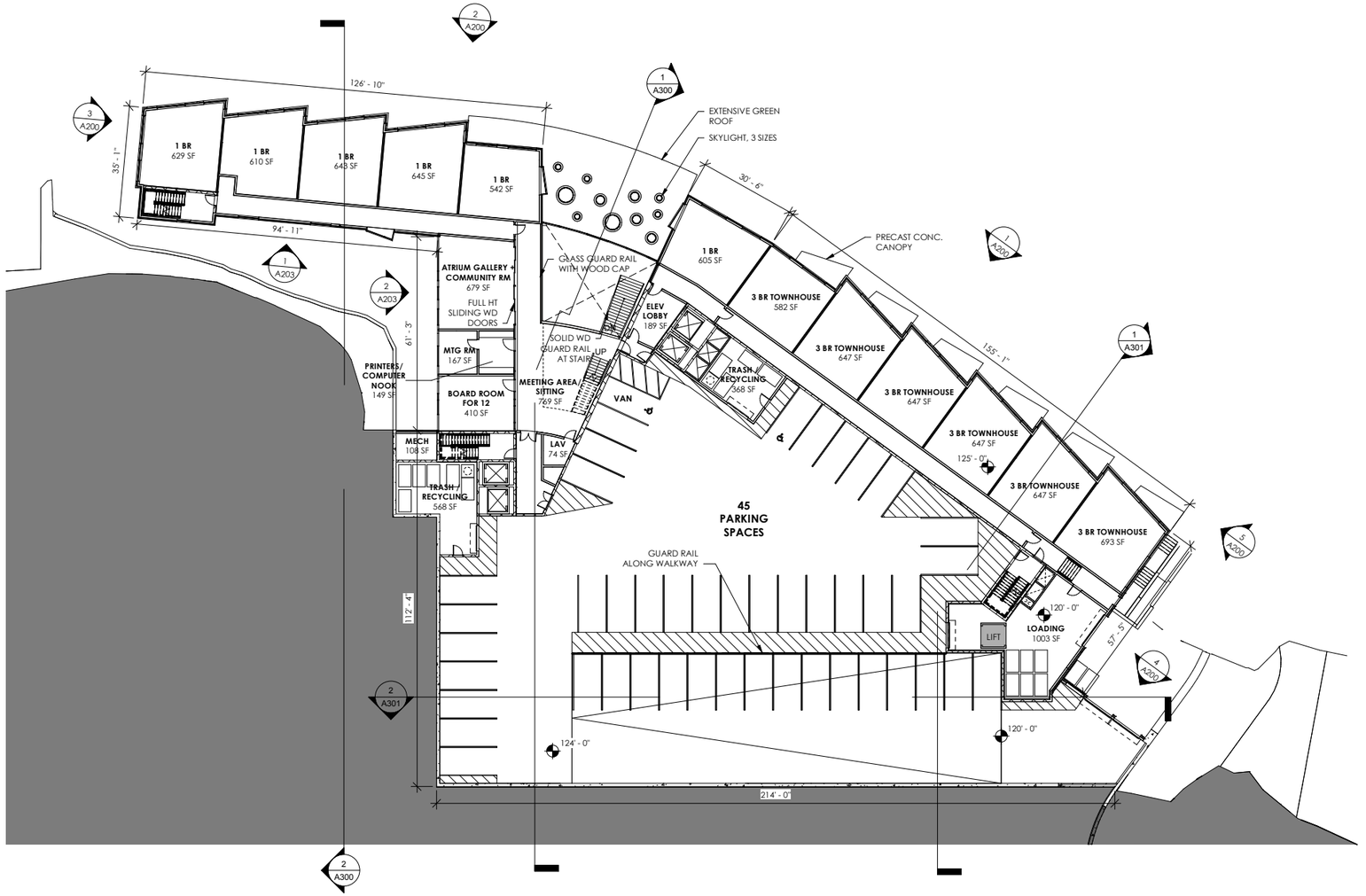
KIC KENSINGTON INVESTMENT COMPANY INC.

45 TOWNSEND STREET DEVELOPMENT
KENSINGTON INVESTMENT COMPANY
FIRST FLOOR PLAN
APRIL 21, 2017

A101

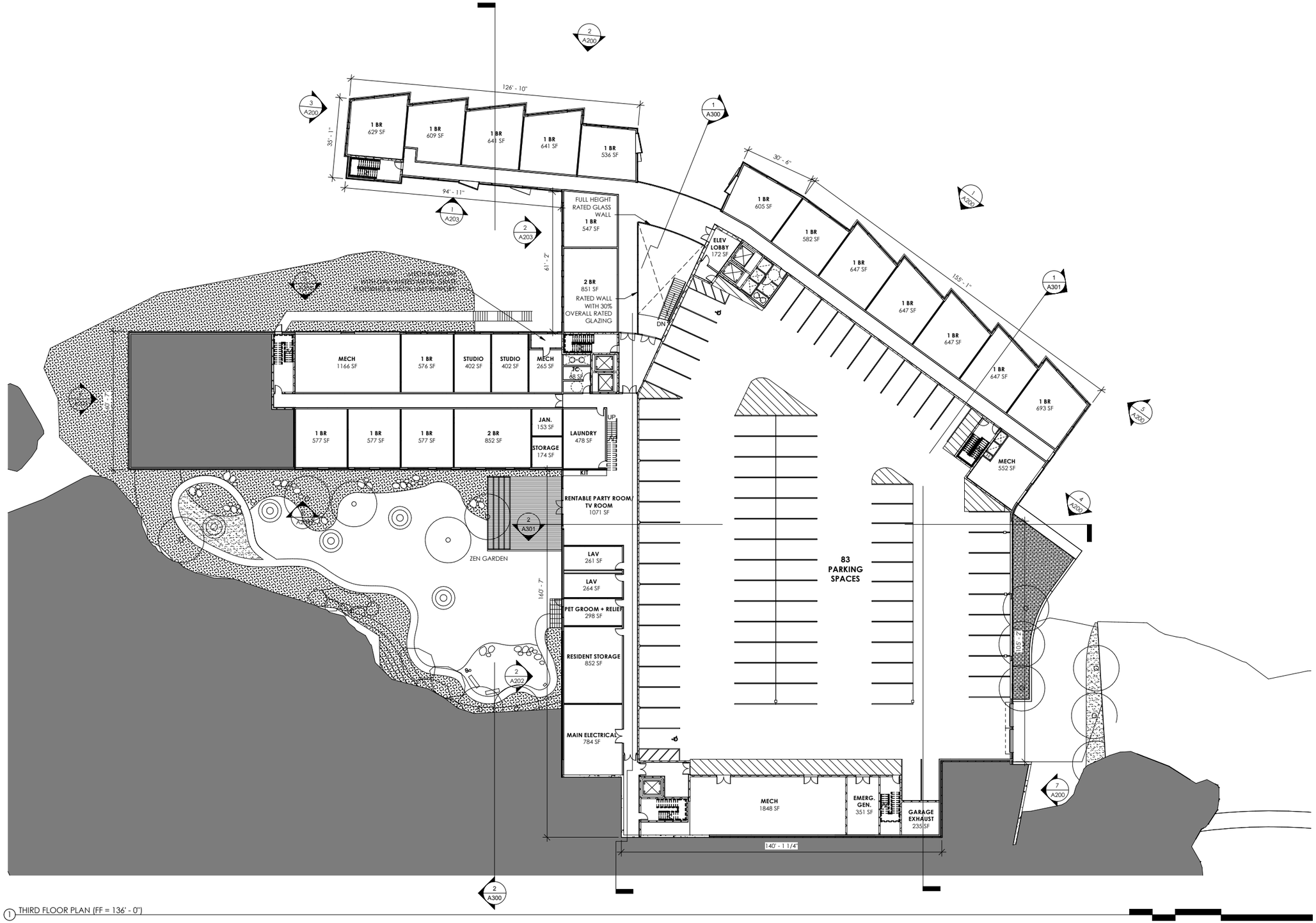


1 SECOND FLOOR PLAN (FF=124' - 0")

0 10' 20' 40' 80'

PROJECT NORTH

1ST FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 1	Townsend	3 BR TOWNHOUSE	6
Grand total: 6			



1 THIRD FLOOR PLAN (FF = 136' - 0")

3RD FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 3	Amenity	1 BR	1
Level 3	Amenity	2 BR	1
Level 3	Codman	1 BR	4
Level 3	Codman	2 BR	1
Level 3	Codman	STUDIO	2
Level 3	Townsend	1 BR	12
Grand total: 21			

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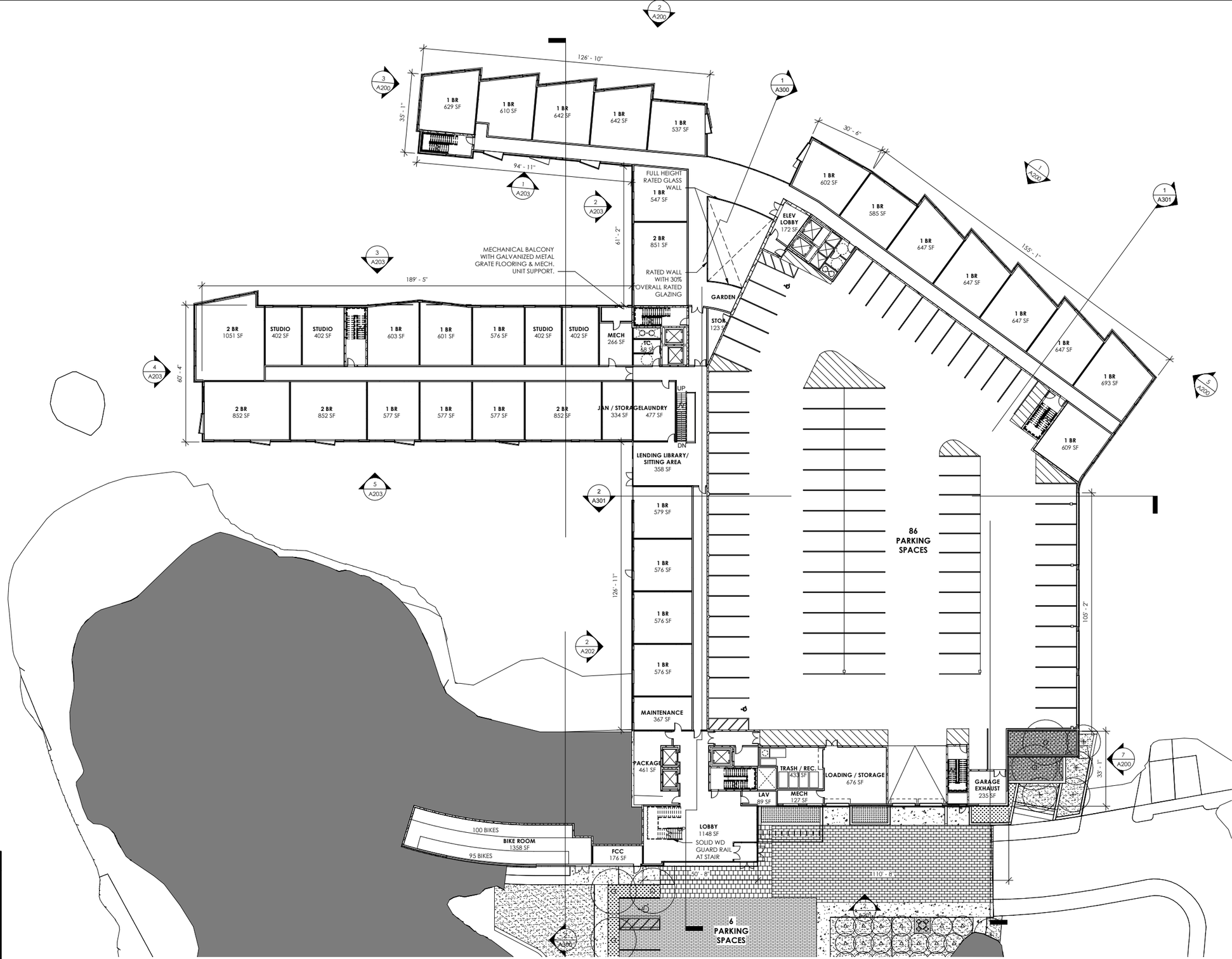
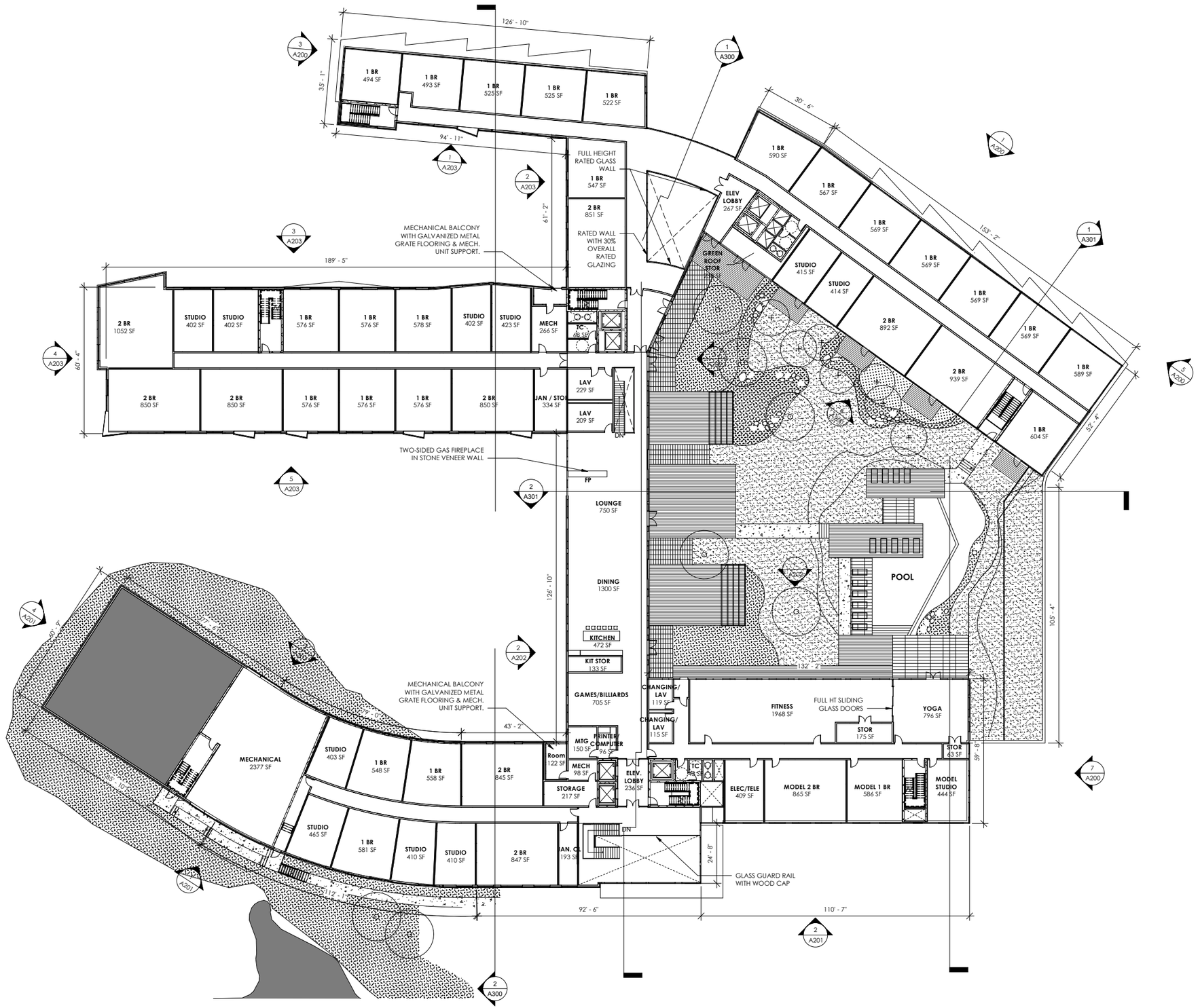
45 TOWNSEND STREET DEVELOPMENT
KENSINGTON INVESTMENT COMPANY
THIRD FLOOR PLAN
APRIL 21, 2017

A103



1 FOURTH FLOOR PLAN (FF = 148' - 0")

4TH FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 4	Amenity	1 BR	5
Level 4	Amenity	2 BR	1
Level 4	Codman	1 BR	6
Level 4	Codman	2 BR	4
Level 4	Codman	STUDIO	4
Level 4	Townsend	1 BR	13
Grand total: 33			

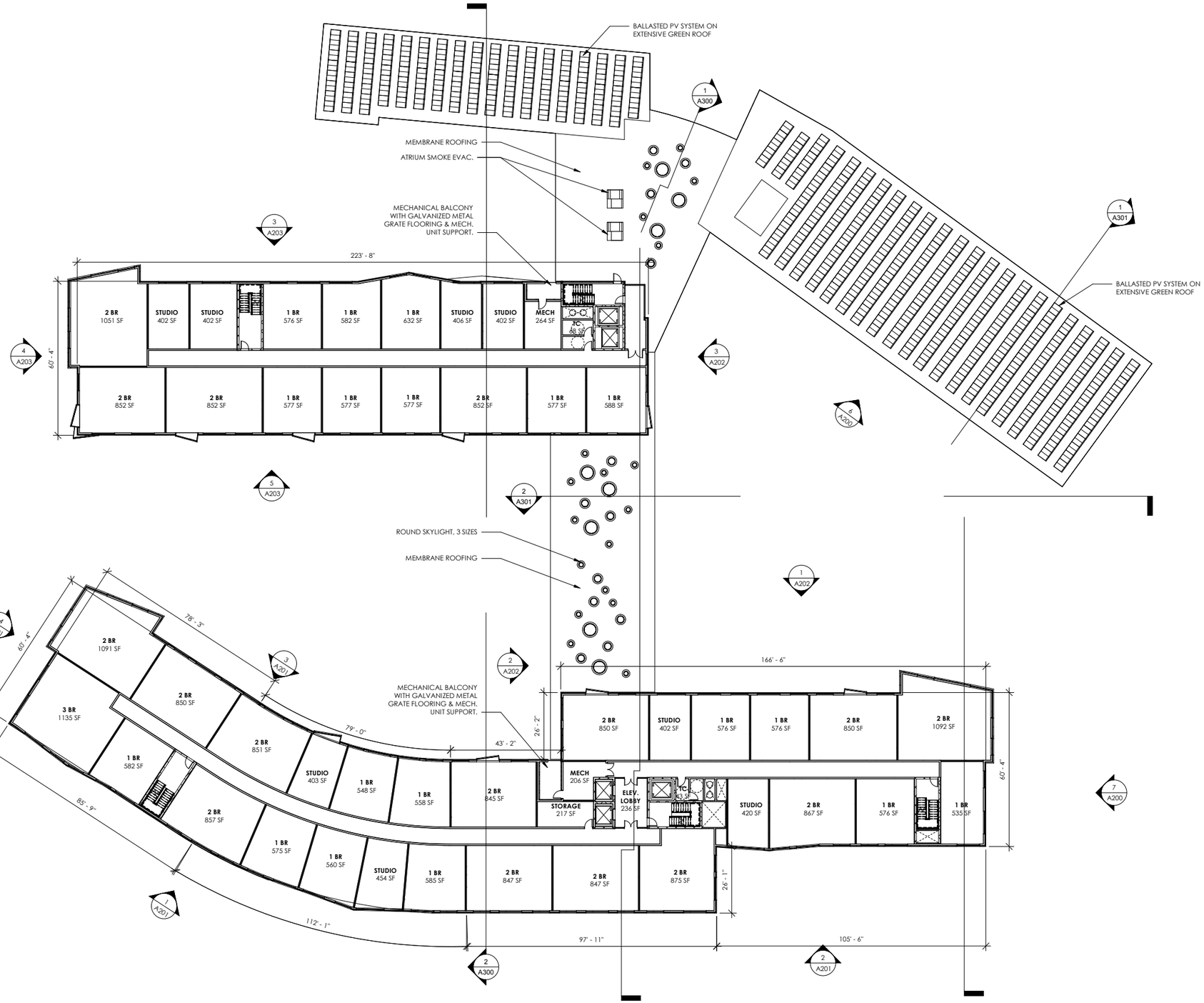


1 FIFTH FLOOR PLAN (FF = 162' - 0")

0 10' 20' 40' 80'

PROJECT NORTH

5TH FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 5	Amenity	1 BR	1
Level 5	Amenity	2 BR	1
Level 5	Codman	1 BR	6
Level 5	Codman	2 BR	4
Level 5	Codman	STUDIO	4
Level 5	Harrishof	1 BR	3
Level 5	Harrishof	2 BR	2
Level 5	Harrishof	STUDIO	4
Level 5	Townsend	1 BR	13
Level 5	Townsend	2 BR	2
Level 5	Townsend	STUDIO	2
Grand total: 42			

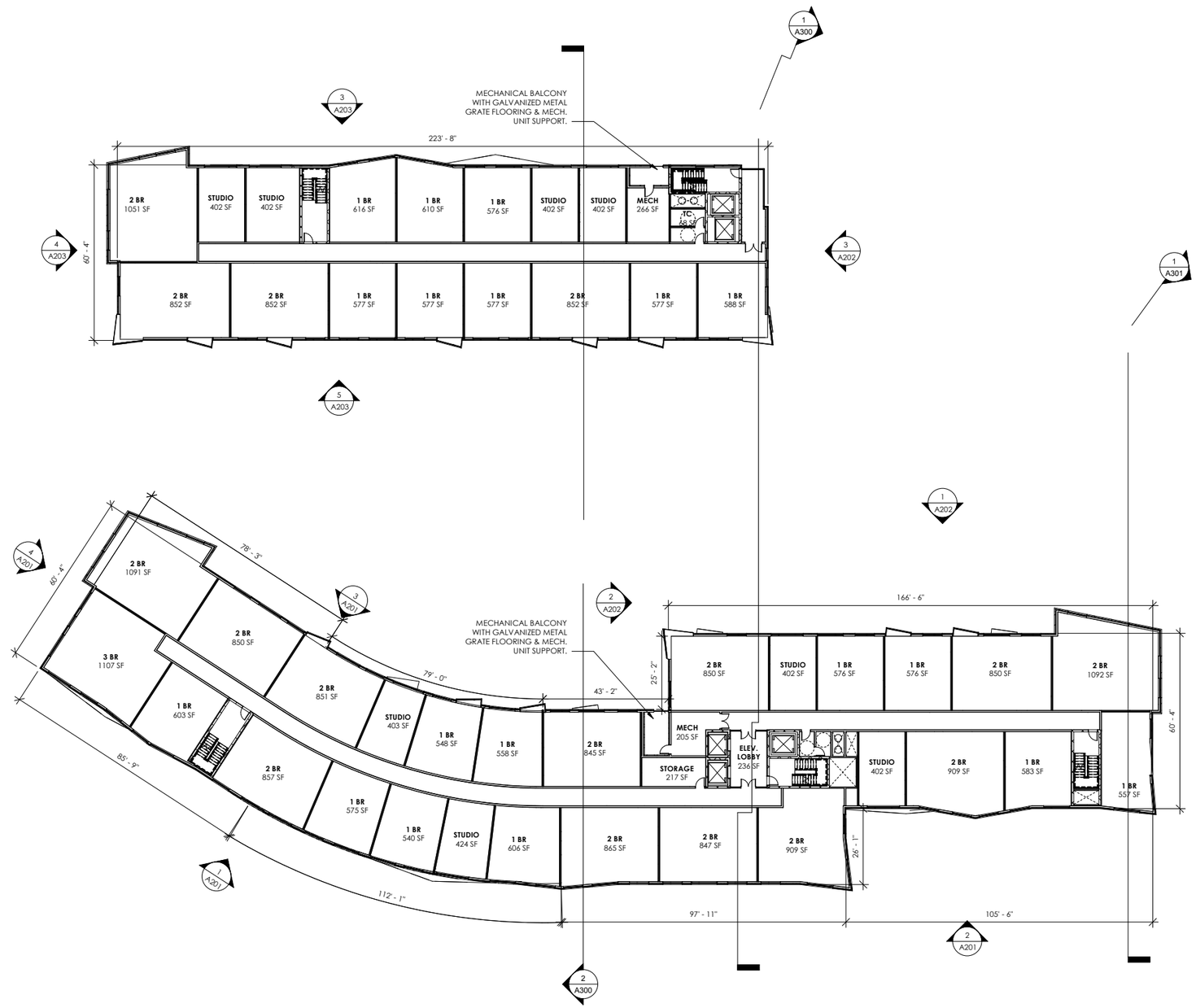


1 SIXTH FLOOR PLAN (FF = 173' - 0")

0 10' 20' 40' 80'

PROJECT NORTH

6TH FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 6	Codman	1 BR	8
Level 6	Codman	2 BR	4
Level 6	Codman	STUDIO	4
Level 6	Harrishof	1 BR	10
Level 6	Harrishof	2 BR	12
Level 6	Harrishof	3 BR	1
Level 6	Harrishof	STUDIO	4
Grand total: 43			

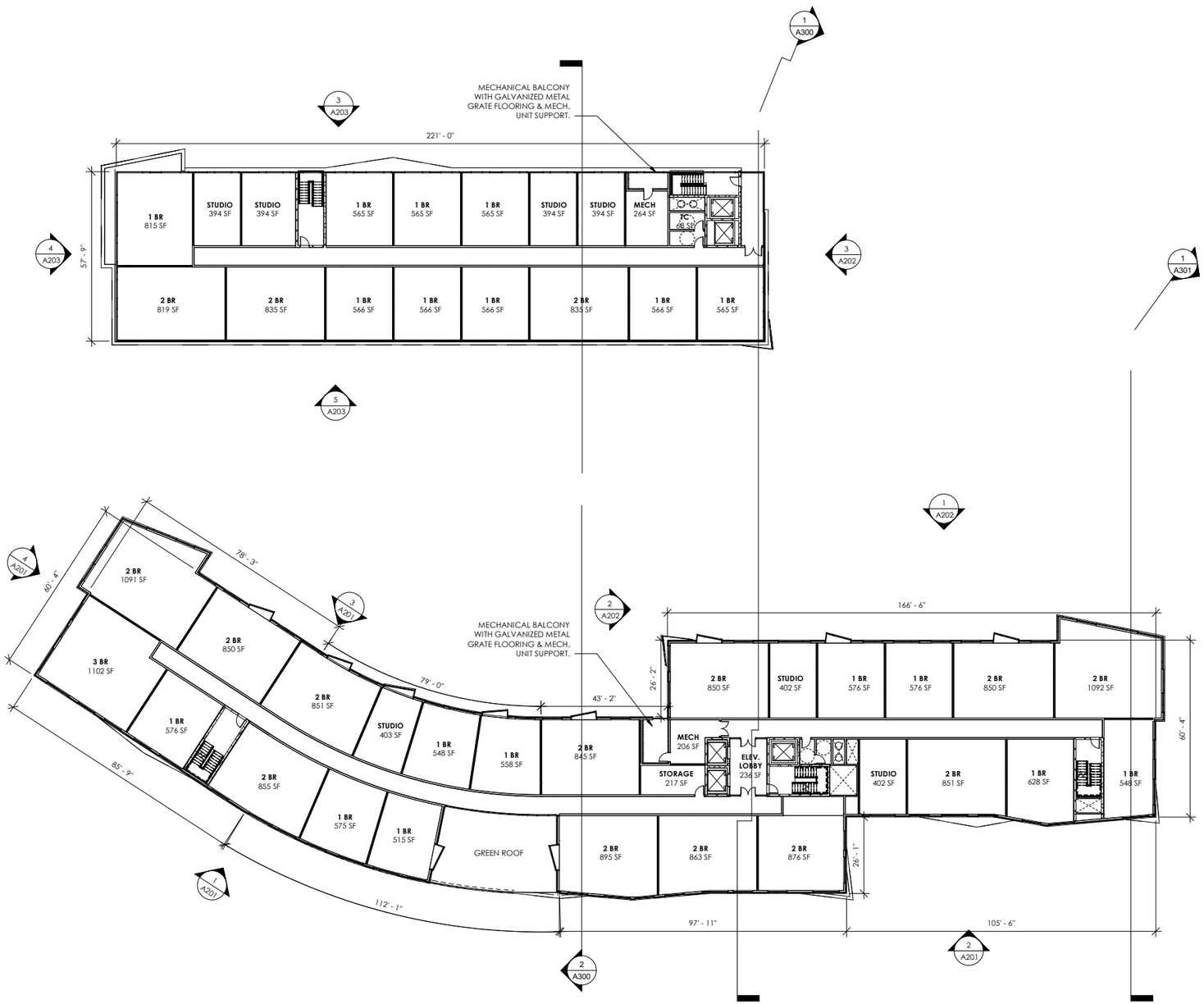


1 SEVENTH FLOOR PLAN (FF = 184' - 0")

0 10' 20' 40' 80'

PROJECT NORTH

7TH FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 7	Codman	1 BR	8
Level 7	Codman	2 BR	4
Level 7	Codman	STUDIO	4
Level 7	Harrishof	1 BR	10
Level 7	Harrishof	2 BR	12
Level 7	Harrishof	3 BR	1
Level 7	Harrishof	STUDIO	4
Grand total: 43			

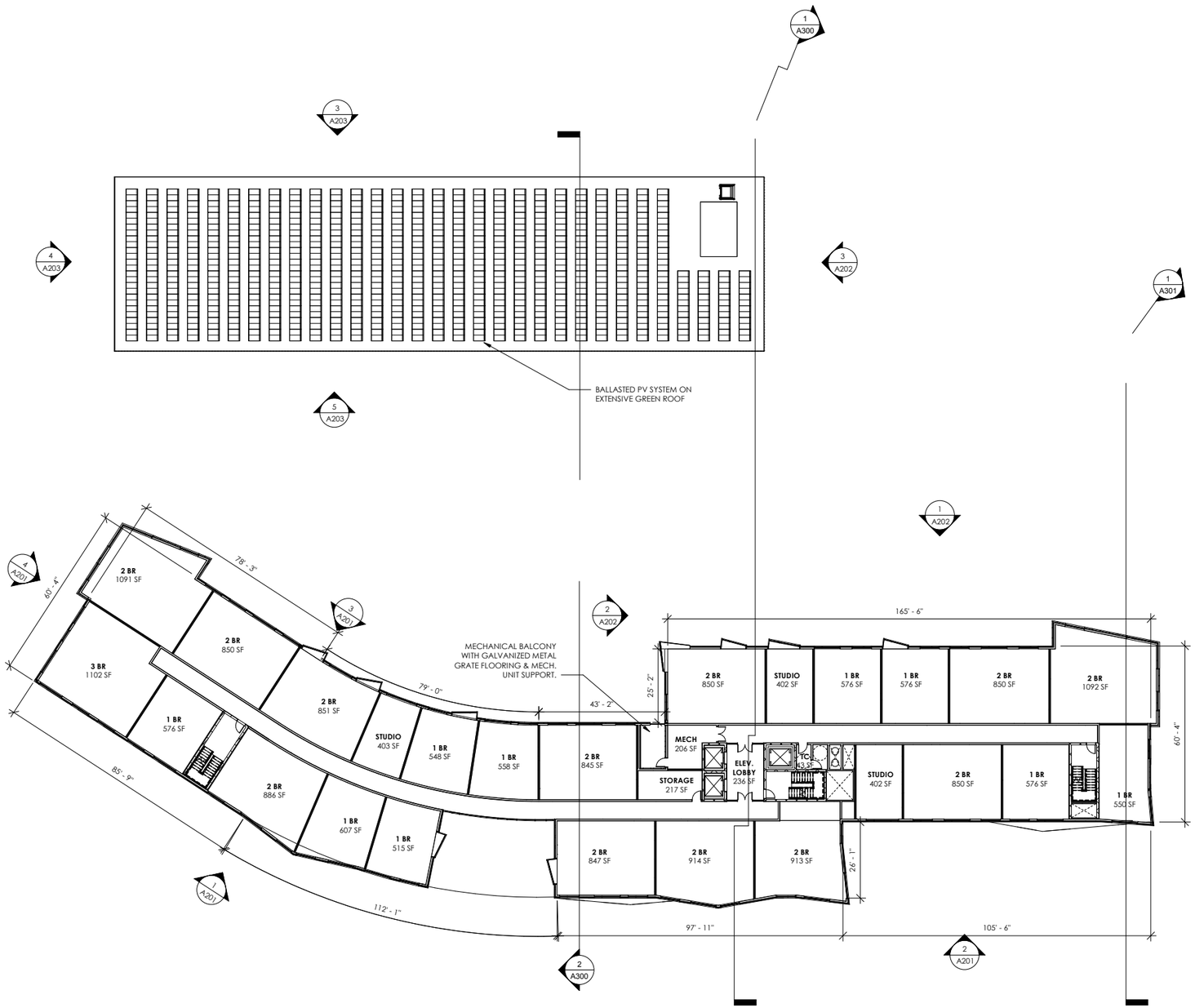


8TH FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 8	Codman	1 BR	9
Level 8	Codman	2 BR	3
Level 8	Codman	STUDIO	4
Level 8	Harrishof	1 BR	9
Level 8	Harrishof	2 BR	12
Level 8	Harrishof	3 BR	1
Level 8	Harrishof	STUDIO	3
Grand total: 41			

1 EIGHTH FLOOR PLAN (FF = 195' - 0")

0 10' 20' 40' 80'

PROJECT NORTH



9TH FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 9	Harrishof	1 BR	9
Level 9	Harrishof	2 BR	12
Level 9	Harrishof	3 BR	1
Level 9	Harrishof	STUDIO	3
Grand total: 25			

1 NINTH FLOOR PLAN (FF = 206' - 0")

0 10' 20' 40' 80'

PROJECT NORTH

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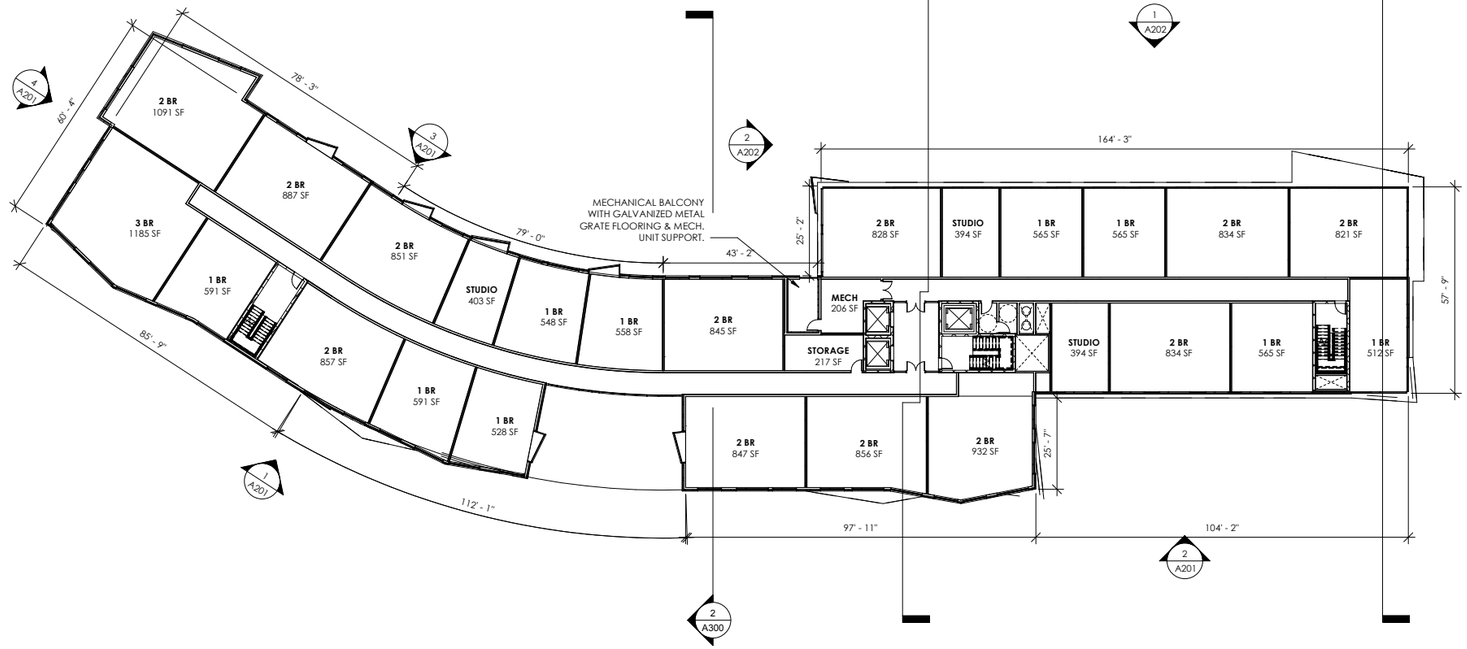
KIC KENSINGTON INVESTMENT COMPANY INC.

45 TOWNSEND STREET DEVELOPMENT
KENSINGTON INVESTMENT COMPANY
NINTH FLOOR PLAN
APRIL 21, 2017

A109



10TH FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 10	Harrishof	1 BR	9
Level 10	Harrishof	2 BR	12
Level 10	Harrishof	3 BR	1
Level 10	Harrishof	STUDIO	3
Grand total: 25			

1 TENTH FLOOR PLAN (FF = 217' - 0")

0 10' 20' 40' 80'

PROJECT NORTH

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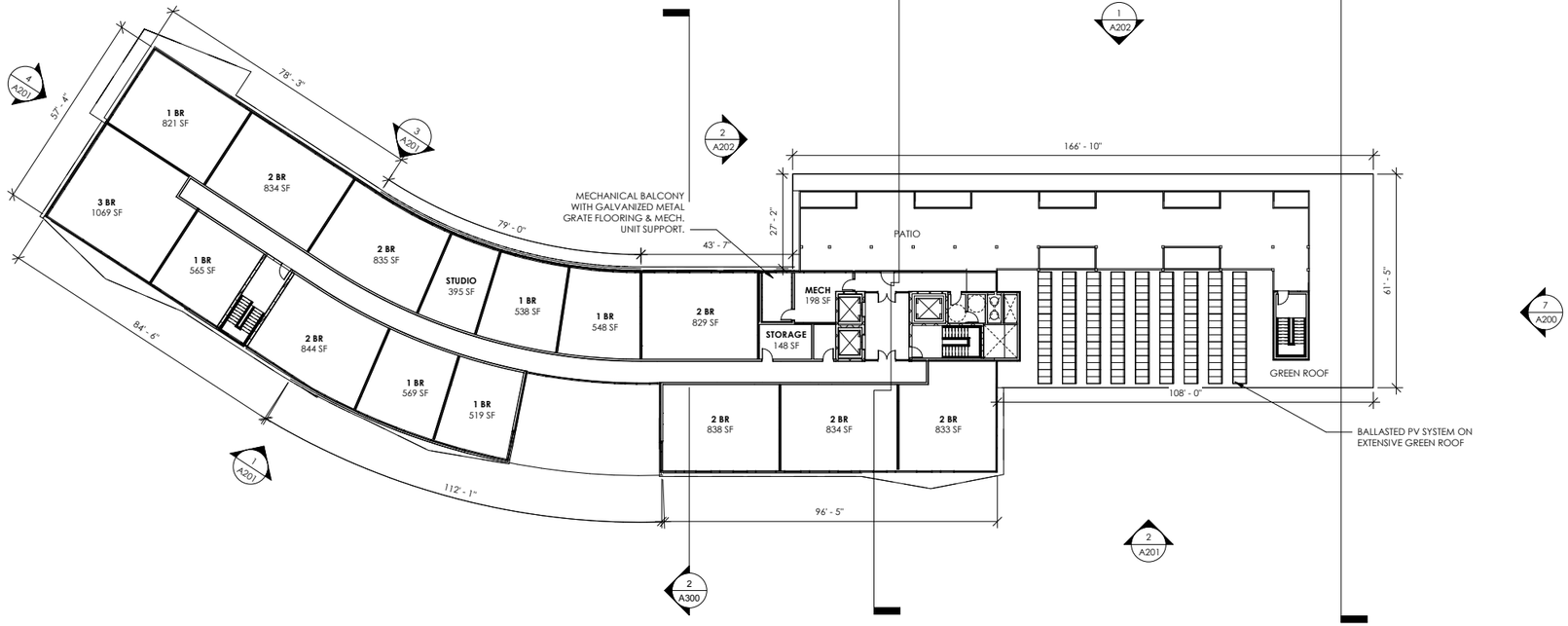
KIC KENSINGTON INVESTMENT COMPANY INC.

45 TOWNSEND STREET DEVELOPMENT
KENSINGTON INVESTMENT COMPANY
TENTH FLOOR PLAN
APRIL 21, 2017

A110

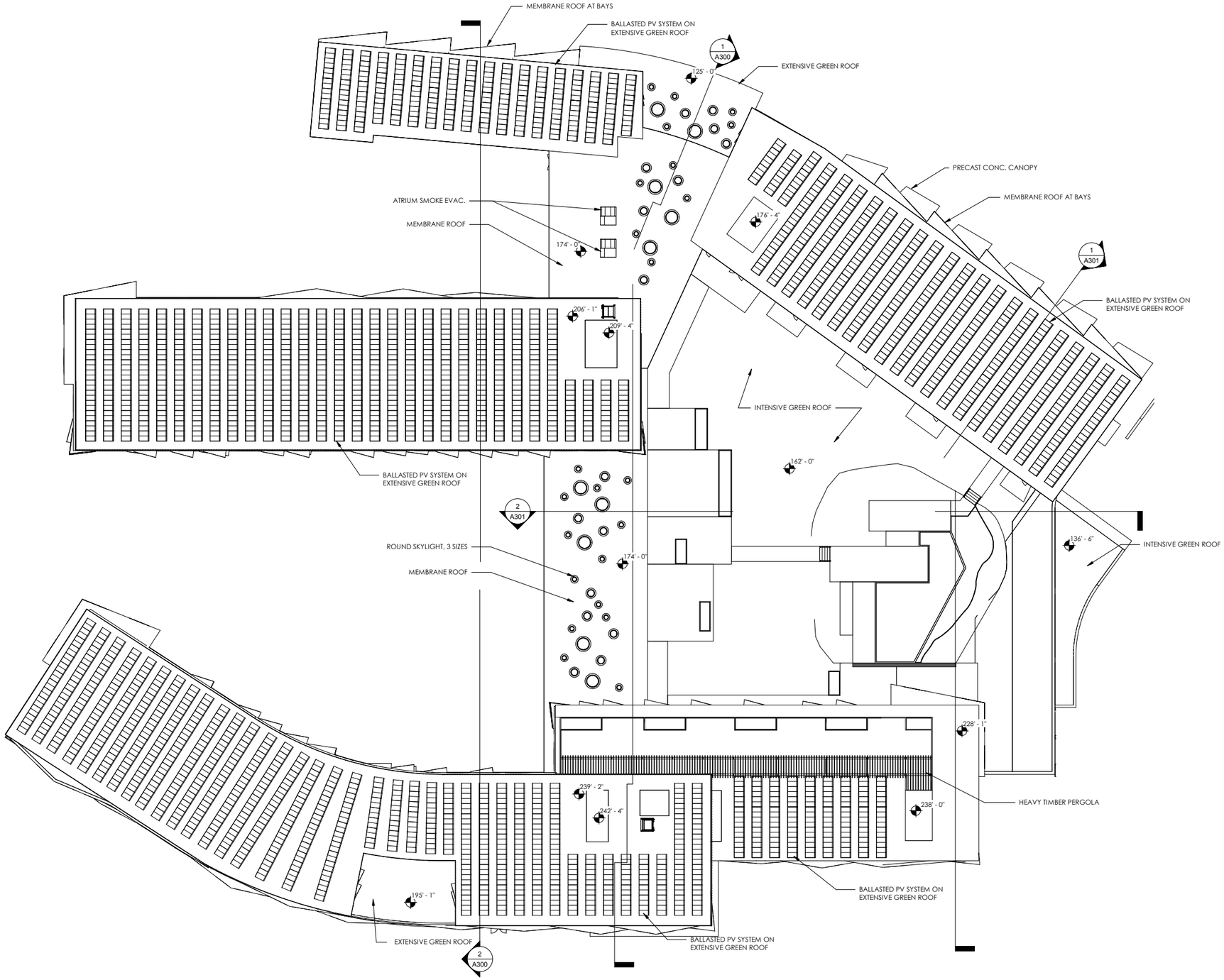


1 ELEVENTH FLOOR PLAN (FF = 228' - 0")

0 10' 20' 40' 80'

PROJECT NORTH

11TH FLOOR RESIDENTIAL UNITS			
Level	Wing	Unit Type	Count
Level 11	Harrishof	1 BR	6
Level 11	Harrishof	2 BR	7
Level 11	Harrishof	3 BR	1
Level 11	Harrishof	STUDIO	1
Grand total: 15			



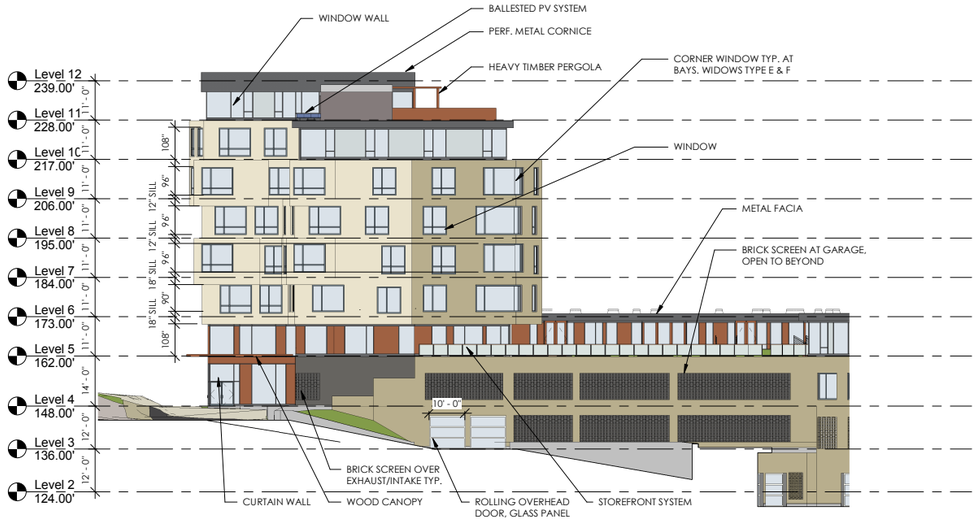
1 ROOF PLAN

0 10' 20' 40' 80'

PROJECT NORTH

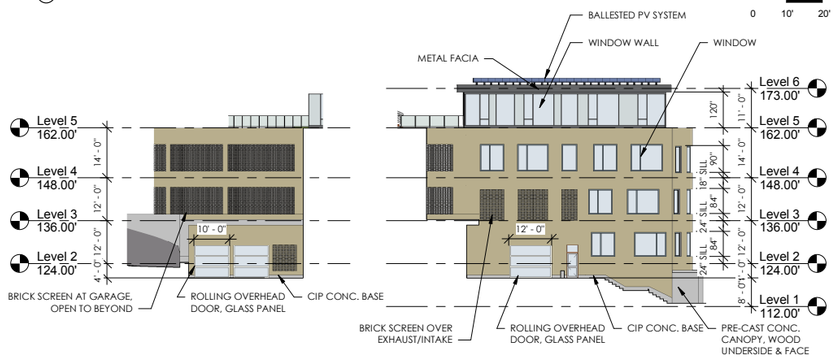
Appendix G

Sections and Elevations



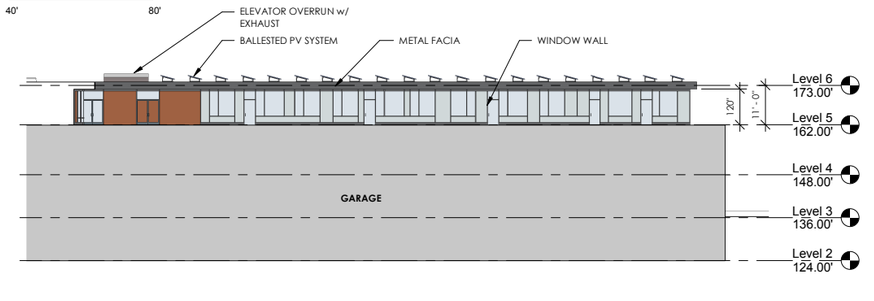
7 HARRISHOF WING EAST - EAST ELEVATION

0 10' 20' 40' 80'



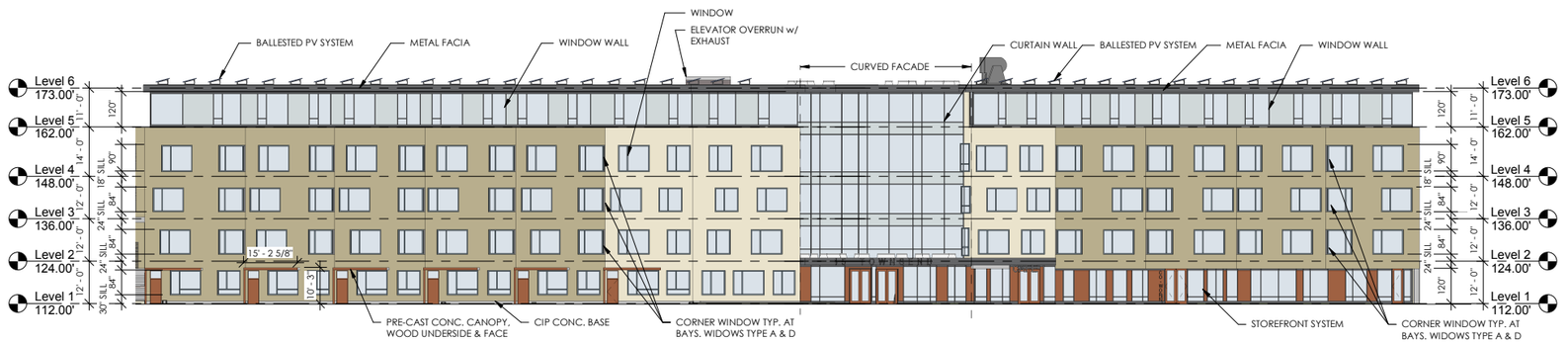
4 TOWNSEND GARAGE - ENTRANCE ELEVATION

5 TOWNSEND WING - EAST ELEVATION



6 TOWNSEND WING - SOUTH ELEVATION

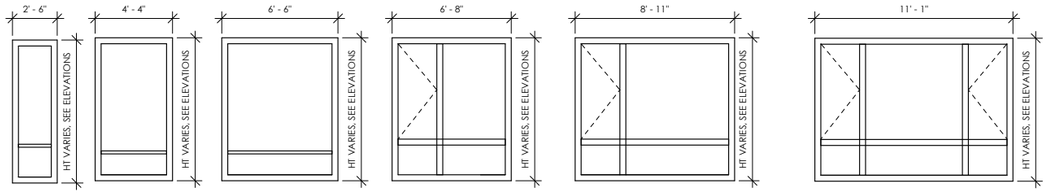
0 10' 20' 40' 80'



1 TOWNSEND EAST WING - NORTH ELEVATION

2 TOWNSEND WING WEST - NORTH ELEVATION

0 10' 20' 40' 80'



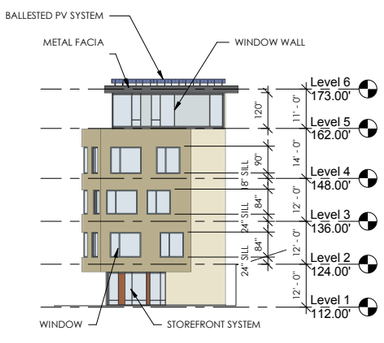
EXTERIOR COLOR LEGEND

WALL TYPES

- EXT-1 - ULTRA HIGH PERFORMANCE CONCRETE PANEL, 2 CUSTOM COLORS, 3 FINISHES
- EXT-2 - BRICK, LIGHT COLOR
- EXT-2 - BRICK, DARK COLOR

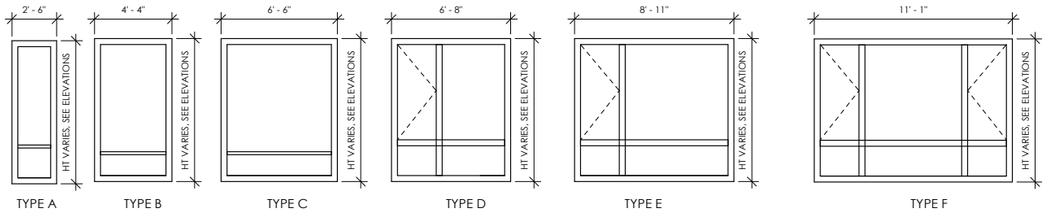
FINISH MATERIALS

- WOOD - MAHOGANY
- METAL
- GLASS - CLEAR
- GLASS - SPANDREL



3 TOWNSEND WING - WEST ELEVATION

0 10' 20' 40' 80'



WINDOW LEGEND

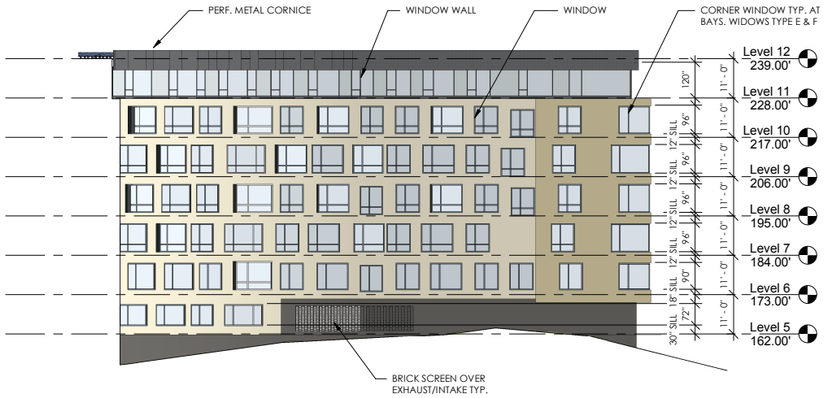
EXTERIOR COLOR LEGEND

WALL TYPES

- EXT-1 - ULTRA HIGH PERFORMANCE CONCRETE PANEL, 2 CUSTOM COLORS, 3 FINISHES
- EXT-2 - BRICK, LIGHT COLOR
- EXT-2 - BRICK, DARK COLOR

FINISH MATERIALS

- WOOD - MAHOGANY
- METAL
- GLASS - CLEAR
- GLASS - SPANDREL



3 HARRISHOF WING WEST - NORTH ELEVATION

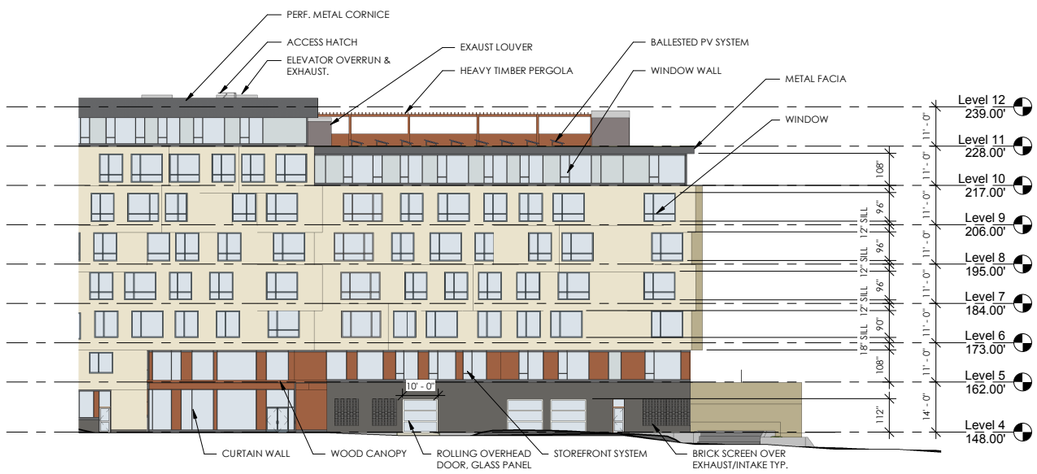
0 10' 20' 40' 80'

4 HARRISHOF WING WEST - WEST ELEVATION

0 10' 20' 40' 80'

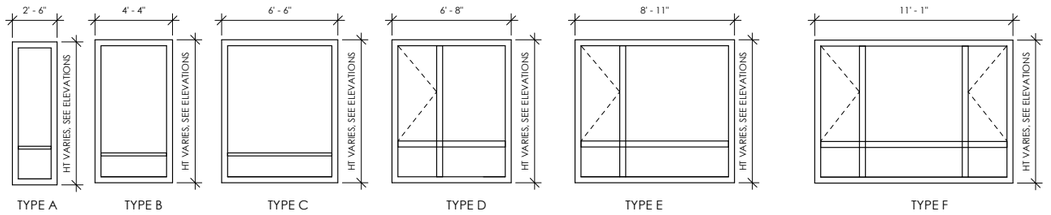
1 HARRISHOF WING WEST - SOUTH ELEVATION

0 10' 20' 40' 80'



2 HARRISHOF WING EAST - SOUTH ELEVATION

0 10' 20' 40' 80'



WINDOW LEGEND

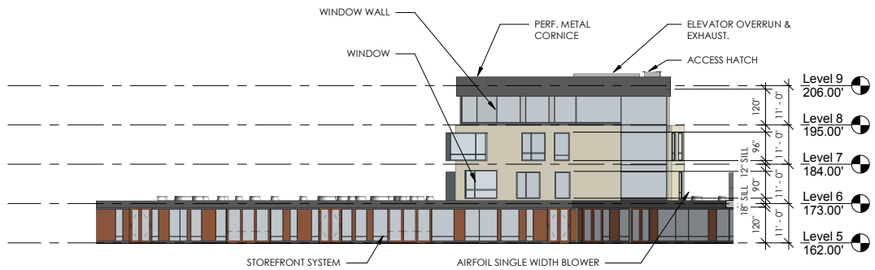
EXTERIOR COLOR LEGEND

WALL TYPES

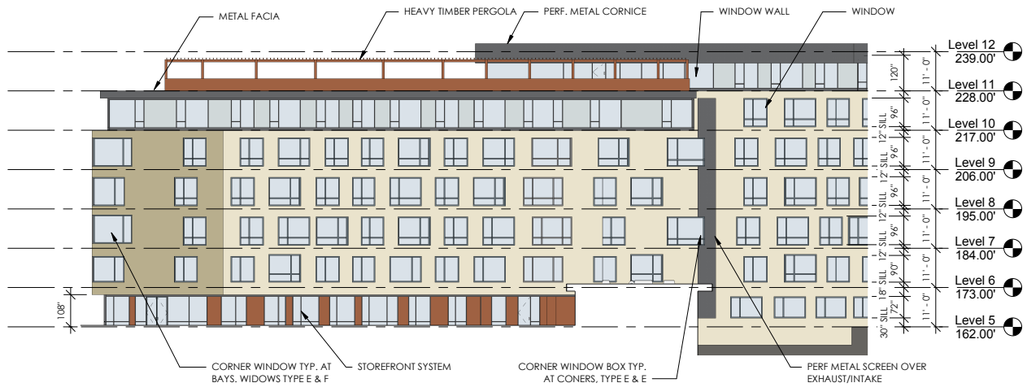
- EXT-1 - ULTRA HIGH PERFORMANCE CONCRETE PANEL, 2 CUSTOM COLORS, 3 FINISHES
- EXT-2 - BRICK, LIGHT COLOR
- EXT-2 - BRICK, DARK COLOR

FINISH MATERIALS

- WOOD - MAHOGANY
- METAL
- GLASS - CLEAR
- GLASS - SPANDREL

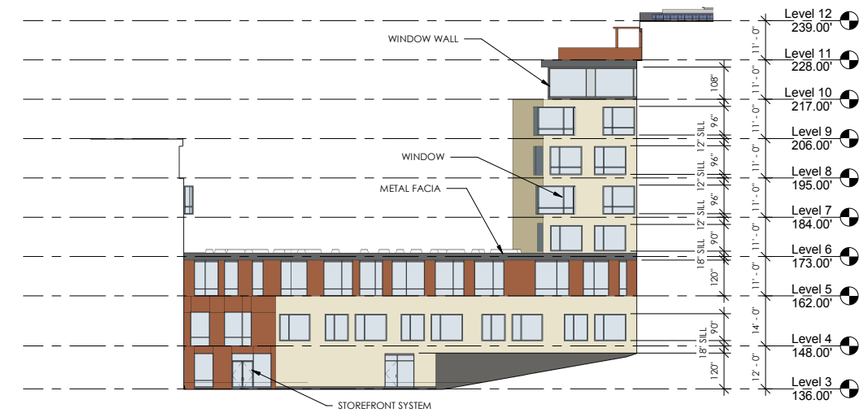


3 CODMAN WING - EAST ELEVATION



1 HARRISHOF WING EAST - NORTH ELEVATION

0 10' 20' 40' 80'

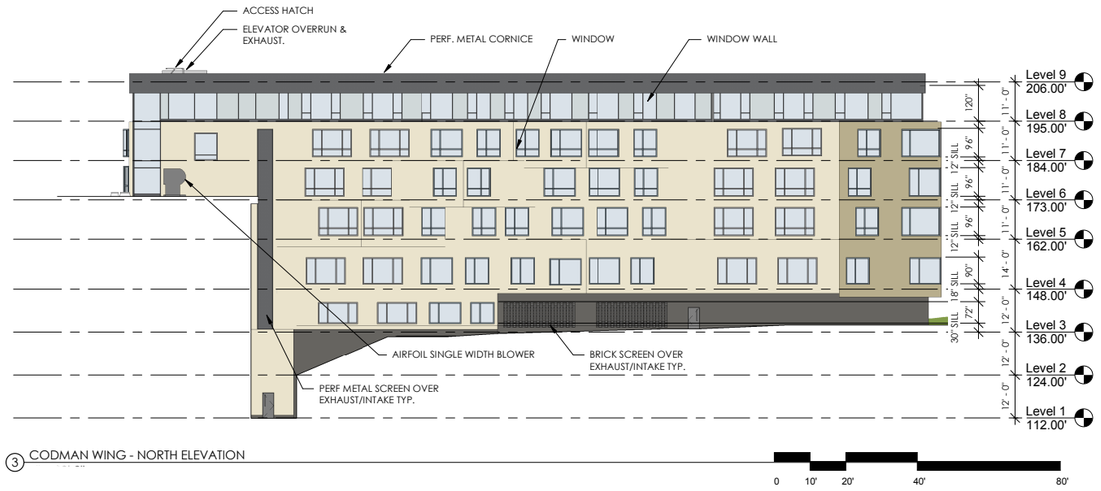


2 HARRISHOF WING EAST - WEST ELEVATION

0 10' 20' 40' 80'

5 CODMAN WING - SOUTH ELEVATION

0 10' 20' 40' 80'



3 CODMAN WING - NORTH ELEVATION

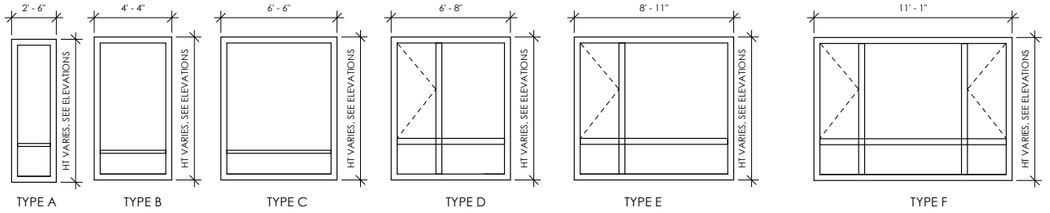
0 10' 20' 40' 80'

1 TOWNSEND WING - TOWNSEND COURTYARD SOUTH ELEVATION

0 10' 20' 40' 80'

2 TOWNSEND WING - TOWNSEND COURTYARD EAST ELEVATION

0 10' 20' 40' 80'



WINDOW LEGEND

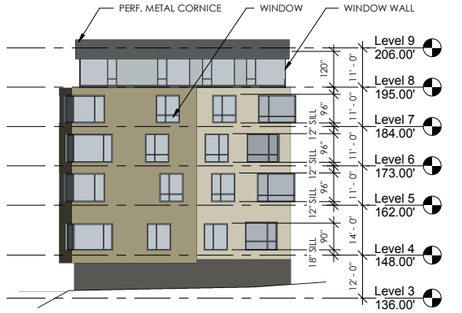
EXTERIOR COLOR LEGEND

WALL TYPES

- EXT-1 - ULTRA HIGH PERFORMANCE CONCRETE PANEL, 2 CUSTOM COLORS, 3 FINISHES
- EXT-2 - BRICK, LIGHT COLOR
- EXT-2 - BRICK, DARK COLOR

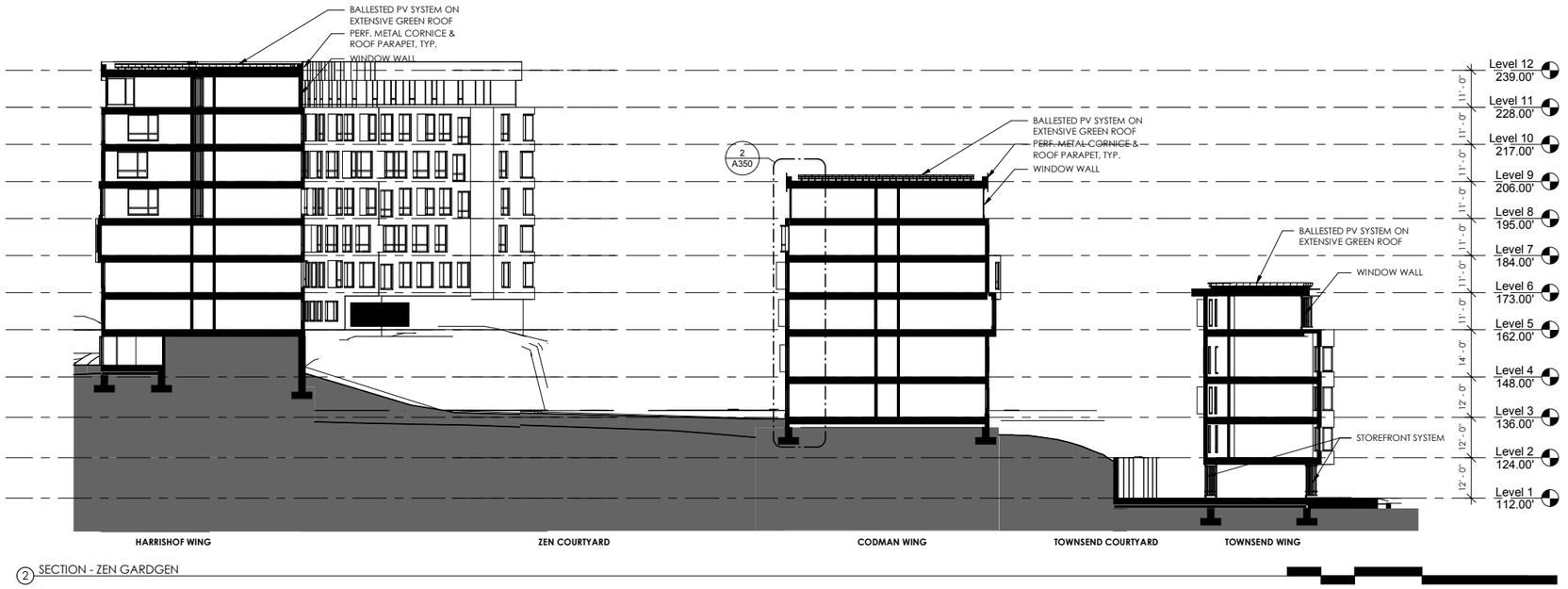
FINISH MATERIALS

- WOOD - MAHOGANY
- METAL
- GLASS - CLEAR
- GLASS - SPANDREL

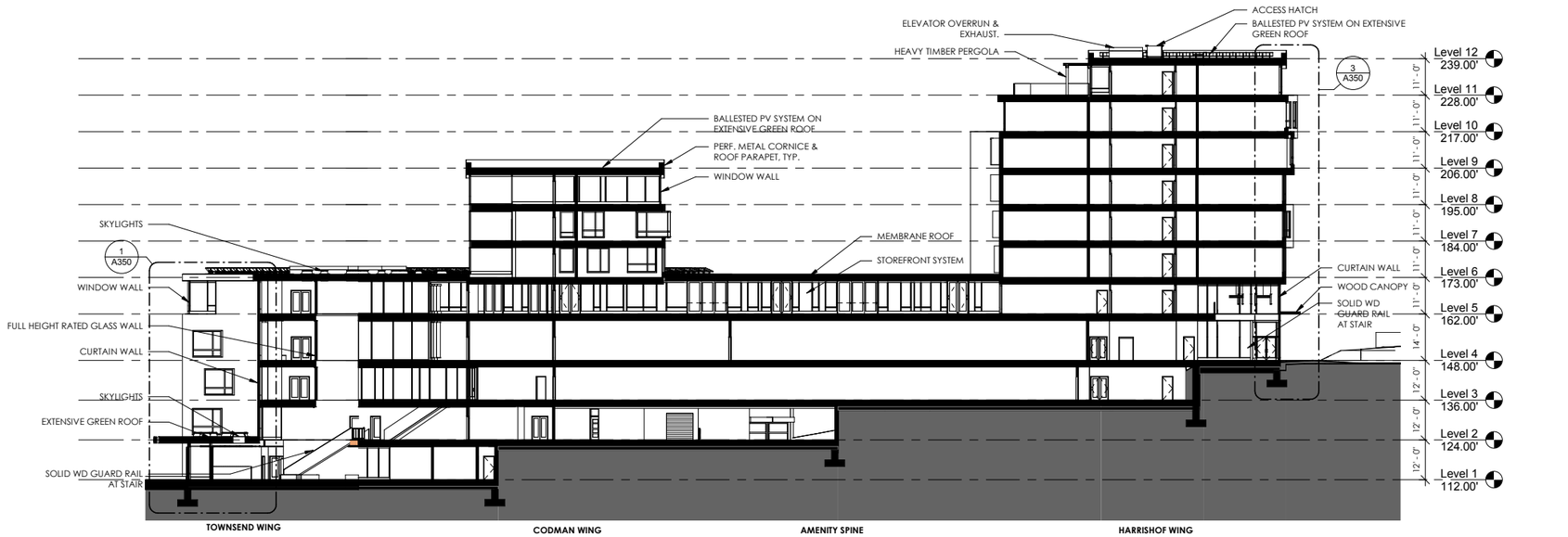


4 CODMAN WING - WEST ELEVATION

0 10' 20' 40' 80'



2 SECTION - ZEN GARDGEN



1 SECTION - AMENITY SPINE

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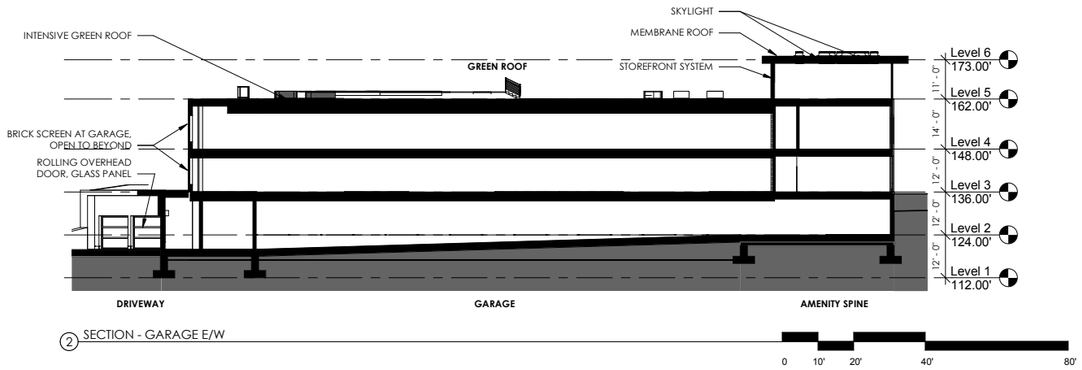
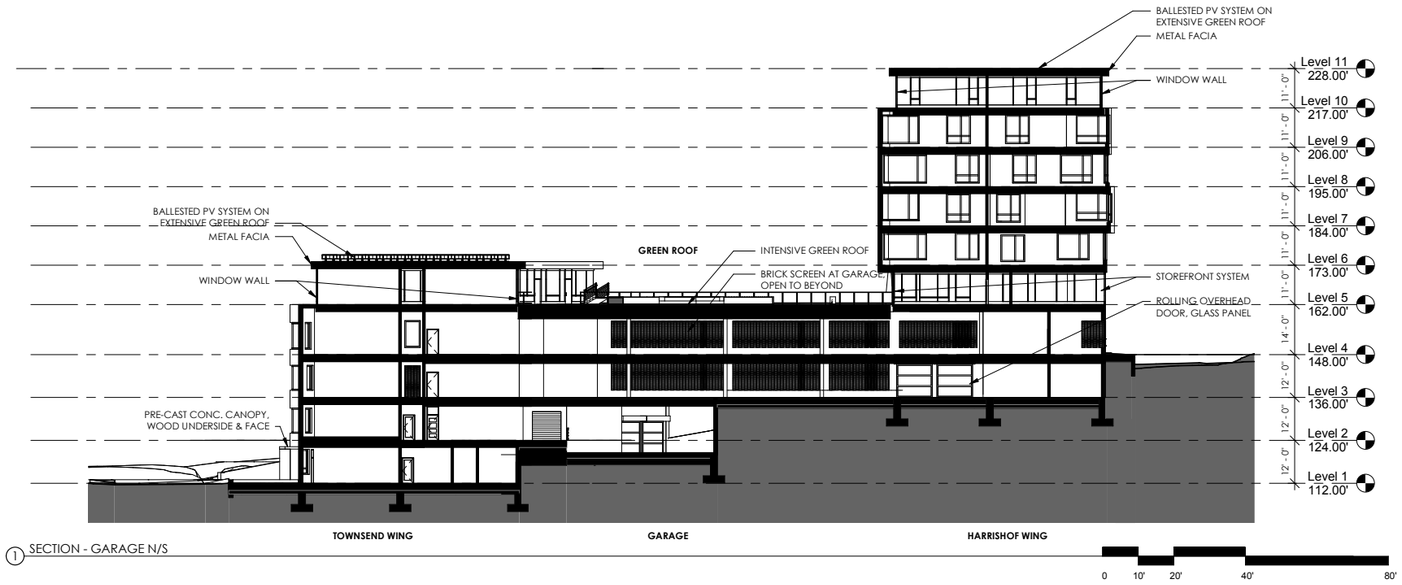
KIC KENSINGTON INVESTMENT COMPANY INC.

45 TOWNSEND STREET DEVELOPMENT
KENSINGTON INVESTMENT COMPANY
BUILDING SECTIONS
APRIL 21, 2017

A300



2 SECTION - GARAGE E/W



1 SECTION - GARAGE N/S

Appendix H

Letters of Support

MASSACHUSETTS MINORITY CONTRACTORS ASSOCIATION, INC.

1452 Dorchester Ave., 4th Floor ■ Boston, MA 02124 ■ Tel: 617-287-2400 ■ Fax: 617-287-2402 ■ www.MassMCA.org

April 10, 2017

Brian Golden
Director
Boston Planning and Development Agency
One City Hall Square, 9th Floor
Boston, MA 02201

Dear Director Golden:

On behalf of the Massachusetts Minority Contractors Association (MMCA), I am pleased to submit this letter of support for the 45 Townsend Street project.

As you may be aware, the MMCA has a policy of only supporting developers of new construction projects who have made a written commitment to maximize business opportunities for minority and female subcontractors and professional service firms through the life cycle of a project (pre-construction, construction, and post-construction). Therefore, we are encouraged to know that over 50% of the current project team is comprised of minority and female-owned firms. Just as importantly, Kensington Development Company (KIC) has made a written commitment distributed to the abutting residential and business community to maximize M/WBE participation during the construction phase of the project, and to provide post-construction contract opportunities in areas such as landscaping, electrical, and plumbing. As with all projects that the MMCA publicly supports, we will closely monitor the KIC's fulfilment of their commitment as the project continues to advance.

It's also important to note that the 45 Townsend Street development program will include an exciting mix of rental housing and affordable homeownership units, along with neighborhood-based retail that will provide connectivity with existing residents, and a community room/cultural space for neighborhood activities.

Based on the merits of the project, and the developer's commitment to continue providing minority and female-owned businesses with contract opportunities, we urge the BPDA to approve the 45 Townsend Street Article 80 filing.

Sincerely,

Maxime Charles
Co-Vice-President

March 20, 2017

Brian Golden
Director
Boston Planning and Development Agency
One City Hall Square, 9th Floor
Boston, MA 02201

RE: Letter of Support for 45 Townsend Street Project

Dear Director Golden:

As a resident of Boston and the Founder and President of The BASE, a nonprofit in the Roxbury community, I wholeheartedly support Kensington Investment Company's (KIC) proposal to build at 45 Townsend Street in Roxbury. This is an amazing project as they will provide approximately 320 units of high quality, environmentally sustainable, 100% market-rate rentals, and approximately 45 affordable homeownership units within walking distance of the project site. Other key project components will include approximately 220 parking spaces (.7), two retail sites - approximately 1,500 square foot neighborhood café, approximately 3,500 square foot Co-Work space, and a free community room and cultural space for 30 neighbors for meetings and events.

I am inspired by this proposal and what it will do for the community of Roxbury. The 45 Townsend Street project will provide over 500 construction jobs and over 50% of the project team is comprised of minority and women-owned firms. Also, when the project is completed KIC will provide $200K in local vendor contracts annually, creating opportunity in and around Roxbury. This entire project will also increase neighborhood home values and provide so many amenities in Roxbury.

I purposely started The BASE in Roxbury, to show the greatness in this neighborhood. KIC and the Lewis Family Foundation, the philanthropic arm of KIC, have been supportive of us from the very beginning, as they are one of our biggest investors. We have been able to serve over 800 black and Latino youth and send over 130 to college, directly because of the support we have received from the Lewis Family Foundation.

Based on the merits of this innovative and exciting project, I urge the BPDA to approve the 45 Townsend Street Article 80 filing.

Sincerely,

Robert Lewis, Jr.
President + Founder, The BASE

Cc:
Senator Sonia Chang-Diaz
Representative Elizabeth Malia
Boston City Councilor Tito Jackson

February 2017

Brian Golden
Director
Boston Planning and Development Agency
One City Hall Square, 9th Floor
Boston, MA 02201

RE: Letter of Support for 45 Townsend Street Project

Dear Director Golden:

As a direct abutter and resident of the Roxbury community, I am writing to express my strong support for Kensington Investment Company's (KIC) proposal to build approximately 320 units of high quality, environmentally sustainable, 100% market-rate rentals at 45 Townsend Street in Roxbury, and approximately 45 affordable homeownership units within walking distance of the project site. The market-rate unit mix will be comprised of studios, and one, two, and three-bedrooms. Other key project components will include approximately 220 parking spaces (.7), two retail sites - approximately 1,500 square foot neighborhood café, approximately 3,500 square foot Co-Work space, and a free community room and cultural space for 30 neighbors for meetings and events.

Over the past six months, KIC and the project team have obtained feedback from neighborhood residents and other stakeholders in a variety of forums, including a June 2016 presentation before the Garrison Trotter Neighborhood Association and three meetings with site abutters on October 25th, November 15th, and December 12, 2016.

The Lewis Family Foundation, the philanthropic arm of KIC, commitment to this neighborhood started long before the 45 Townsend Street project was envisioned. Over the past 4 years, the Foundation has invested $3.2 million annually to non-profit organizations in the neighborhoods of Roxbury, Dorchester and Mattapan based on its goal to more than double college graduation rates and to support the creation of approximately 500 jobs. Additionally, KIC has a strong record of operating high-quality rental housing in Boston's neighborhoods of Dorchester, Mattapan, Chinatown, and Back Bay.

Just as importantly, the 45 Townsend Street Project will generate economic benefits to support the financial growth and expansion of local businesses. The strength of this commitment is evidenced by the fact that over 50% of the project team is comprised of minority and women-owned firms. KIC is also committed to maximizing local resident participation as part of the construction workforce in accordance with the City of Boston's new *Construction Jobs Ordinance,* as well as exploring post-construction opportunities for local businesses, such as plumbing, electrical, HVAC, painting, landscaping and janitorial services and professional staffing of property management, leasing and concierge positions.

Based on the merits of this innovative and exciting project, I urge the BPDA to approve the 45 Townsend Street Article 80 filing.

Sincerely,

Name Clarence J. Jones
Address 2809 Washington St.

Cc:
Senator Sonia Chang-Diaz
Representative Elizabeth Malia
Boston City Councilor Tito Jackson

One City Hall Square, 9th Floor
Boston, MA 02201

Council Towns Residents
February 28, 2017
(Signatures Attached)

RE: Letter of Support for 45 Townsend Street Project

Dear Director Golden:

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Based on the merits of this innovative and exciting project, I urge the BPDA to approve the 45 Townsend Street Article 80 filing.

Sincerely,

Name Evelyn Thorpe
Address 2875 Washington St #11H
Roxbury

Cc:
Senator Sonia Chang-Diaz
Representative Elizabeth Malia
Boston City Councilor Tito Jackson

Feb 28, 2017 Council Towers Residents Sig Natures for 45 Townsend Letter of Support

1. Janice Chinn Apt 11D
2. Canyce Cunningham Apt. 10C
3. Willie Mitchell Apt 6I
4. Harold Brown 16-C
5. Kadie Green-Blyden 10:B
6. Florence Wright 17J
7. Phyllis Felder 7-B
8. Elibetha Lewery 9-E
9. Dorothy Carter 3-H
10. Dolores Murphy 5A
11. Emeline Kinsler 2C
12. John Greenaway 2:A
13. Carol Wharton-Brown 2B
    Joann Waters 7A
14. William Shalaz 9F
15. Curtis Bluff 6B
16. Evelyn Thorpe 17H
17. Carrie Mitchell 14C
18. Mary White 11J
19. Neil Page 14-I

One City Hall Square, 9th Floor
Boston, MA 02201

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Based on the merits of this innovative and exciting project, I urge the BPDA to approve the 45 Townsend Street Article 80 filing.

Sincerely,

Name Charlie Teller
Address 79 Fort Ave Mox. MA 02119

Cc:
Senator Sonia Chang-Diaz
Representative Elizabeth Malia
Boston City Councilor Tito Jackson

February 2017

Brian Golden
Director
Boston Planning and Development Agency
One City Hall Square, 9th Floor
Boston, MA 02201

RE: Letter of Support for 45 Townsend Street Project

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Based on the merits of this innovative and exciting project, I urge the BPDA to approve the 45 Townsend Street Article 80 filing.

Sincerely,

Name Diane Galloway
Address 2730 Washington St
Roxbury, Mass. 02119

Cc:
Senator Sonia Chang-Diaz
Representative Elizabeth Malia
Boston City Councilor Tito Jackson

JSCC

John Shelburne Community Council

2730 Washington St. Roxbury, Mass 02119

3/13/17

To: Director Golden,

We the Shelburne Staff and Council members do support the project at 45 Townsend Street.

The Shelburne Center has been a part of the community for over 40 years and feel this project will be a great asset to this community.

Diane Galloway
Administrative Coordinator

Cc: Board Members

Phone #: (617) 635 – 5214

Fax #: (617) 635 – 5224

April 28 2017

Mr. Brian Golden
Director
Boston Planning and Development Agency
One City Hall Square, 9th Floor
Boston, MA 02201

RE: Letter of Support for 45 Townsend Street Project

Dear Director Golden:

As a direct abutter and resident of the Roxbury community, I am writing to express my strong support for Kensington Investment Company's (KIC) proposal to build approximately 310 units of high quality, environmentally sustainable, 100% market-rate rentals at 45 Townsend Street in Roxbury, and approximately 45 affordable homeownership units within walking distance of the project site. The market-rate unit mix will be comprised of studios, and one, two, and three-bedrooms. Other key project components will include approximately 220 parking spaces (.7), two retail sites - approximately 1,500 square foot neighborhood café, approximately 3,500 square foot Co-Work space, and a free community room and cultural space for 30 neighbors for meetings and events.

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Just as importantly, the 45 Townsend Street Project will generate economic benefits to support the financial growth and expansion of local businesses. The strength of this commitment is evidenced by the fact that over 50% of the project team is comprised of minority and women-owned firms. KIC is also committed to maximizing local resident participation as part of the construction workforce in accordance with the City of Boston's new *Construction Jobs Ordinance.*

- From 2019 -2021 the project will create over 500 Construction Jobs
- In 2021, annually, the project will create 14 Full time Management & Concierge Jobs ranging from $45K-$115k, 5-6 Fulltime Café & Co Working Jobs starting at $40K, space for 30 entrepreneurs to start businesses at the Co-Work & over $200K in local vendor contracts annually from landscaping, plumbing, electrical & HVAC.

Based on the merits of this innovative and exciting project, I urge the BPDA to approve the 45 Townsend Street Article 80 filing.

Sincerely,
Name: [illegible]

Address: 35 Townsend St
Roxbury, MA 02119

CC:
Senator Sonia Chang-Diaz
Representative Elizabeth Malia
Boston City Councilor Tito Jackson

April____ 2017

Mr. Brian Golden
Director
Boston Planning and Development Agency
One City Hall Square, 9th Floor
Boston, MA 02201

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Based on the merits of this innovative and exciting project, I urge the BPDA to approve the 45 Townsend Street Article 80 filing.

Sincerely,
Name: DocuSigned by: Nilsun Depina 1CA1A7CD1892450...

Address: 33 Townsend St
Roxbury, MA 02119

CC:
Senator Sonia Chang-Diaz
Representative Elizabeth Malia
Boston City Councilor Tito Jackson

Appendix I

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.

Article 80 | ACCESSIBILTY CHECKLIST

1. Project Information:

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

Project Name:	**45 Townsend**
Primary Project Address:	**45 Townsend Street, Boston MA 02119**
Total Number of Phases/Buildings:	**1**
Primary Contact (Name / Title / Company / Email / Phone):	**Kurt Therrien, President of Real Estate – Kensington Investment Company** **ktherrien@kicboston.com, (617) 790 – 3912**
Owner / Developer:	**Kensington Investment Company**
Architect:	**Studio G Architects**
Civil Engineer:	**Howard Stein Hudson**
Landscape Architect:	**Ground, Inc.**
Permitting:	**Epsilon Associates, Inc.**
Construction Management:	**Janey Construction Management and Consulting, Inc.**

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.	**Not at this time.**

2. Building Classification and Description:

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

What are the dimensions of the project?

Site Area:	**211,307 SF**	Building Area:	**380,000 GSF**
Building Height:	**Varies (88 ft. max.)**	Number of Stories:	**Varies (8 floors max.)**

First Floor Elevation:	**Varies (lowest = 112'-0")**	Is there below grade space:		**Yes (Unoccupied)**
What is the Construction Type? (Select most appropriate type)				
	Wood Frame	Masonry	**Steel Frame**	Concrete
What are the principal building uses? (IBC definitions are below – select all appropriate that apply)				
	Residential – One - Three Unit	**Residential - Multi-unit, Four +**	Institutional	Educational
	Business	Mercantile	Factory	Hospitality
	Laboratory / Medical	Storage, Utility and Other		
List street-level uses of the building:	**Residential Units, Residential Lobbies, Commercial (office space) and Retail (Café)**			

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 currently occupied by an unoccupied hospital complex. The neighborhood is predominately residential, comprised of single family and multi-family homes. The site is defined by ledge and rock outcroppings, with a 45' grade change from the Townsend Street sidewalk to the top of the hill at Dennison Street.**
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	**- Jackson Square T Stop - Orange Line (0.7 miles)** **- Bus Lines 32, 34, 36, 42, 44 (0.2 – 0.3 miles)**
List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others:	**Higginson Elementary School, Museum of the National Center of Afro-American Artists, Academy Homes II housing development, Council Tower senior housing development**
List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	**Shelburne Community Center, Melnea Cass Recreational Complex**

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	**No**

district? ***If yes,*** identify which 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:	**None within site to remain.**
Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? ***If yes,*** provide description and photos:	**No**
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,etc	**Yes - Neighborhood Residential**
What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:	**8'-0" (frontage – 1'-0", pedestrian – 5'-0", furnishing – 2'-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?	**Frontage – Public: landscape and concrete, Private: landscape and pavers** **Pedestrian – Private: pavers and concrete** **Furnishing –Private: landscape and pavers**
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	**No sidewalks will be programmed for the pedestrian right-of-way.**

If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	**No variance anticipated at this time.**
Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details.	**Yes, Townsend and Harrishof streets require road and sidewalk work, removal of one curb cut, change of another. Civil consultant HSH will coordinate PIC permitting.**
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?	**217 in garage on 3 levels.** **3 shared car (Zipcar or similar)** **3 short term, are barrier-free at the Harrishof lobby.**
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?	**5 van accessible in garage, 1 van accessible at the Harrishof lobby.**
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?	**At the Harrishof lobby**
Has a drop-off area been identified? ***If yes,*** will it be accessible?	**Yes, the drop off area at the Harrishof Lobby will be accessible (with one accessible van space)**
7. Circulation and Accessible Routes: *The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability with neighbors*.	
Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	**Flush condition**

Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe.* ***If no,*** what is the reason?	**Yes. There are two entry lobbies, one at Townsend street, one at Harrishof street. Both have concierges. Both are fully accessible.**
If project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package.	**To be developed as project progresses. The project as a whole is universally designed.**
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?	**322**
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?	**All units are rentable. The IDP approach is being developed with the City of Boston. It will meet either 13% on site or 15% off site, home ownership.**
If a residential development, how many accessible Group 2 units are being proposed?	**17, representing all types: studio, 1BR, 2BR, 3BR flat, and 3BR duplex townhouse.**
If a residential development, how many accessible Group 2 units will also be IDP units? ***If none***, describe reason.	**To be determined. If on site, at least one of each type would be accessible IDP.**
If a hospitality development, how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? ***If yes,*** provide amount and location of equipment.	**N/A**
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. ***If yes***, provide reason.	**No. All units are designed to meet FHA Group 1 requirements.**
Are there interior elevators, ramps or lifts	**Yes – multiple elevators are used to provide access from entry lobbies**

located in the development for access around architectural barriers and/or to separate floors? ***If yes***, describe:	**and the parking garage to all amenity spaces, and to residential floors.**
9. Community Impact: *Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community*.	
Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives?	**Yes – adjacent to Harrishof Street there will be publically accessible open space with accessible walking paths, sitting areas, an orchard, and gardens. A small plaza provides emergency turnaround and is designed to accommodate neighborhood events such as farmer's markets. The second floor Atrium Gallery will display local artwork and be available for community events and meetings.**
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 built interior and exterior spaces will be fully accessible in the development. The site is steeply sloped and there are several areas of rock outcroppings. Where these occur, the site is developed and inaccessible except where egress stairs are required.**
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, and there will be multi-stall lavatories with barrier-free stalls and sinks.**
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?	**The proposed plan has not yet been reviewed with the Disability Commissioner or their Architectural Access staff.**
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?	**The proposed plan has not yet been presented.**
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. **See Attached**
Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project. • • • •

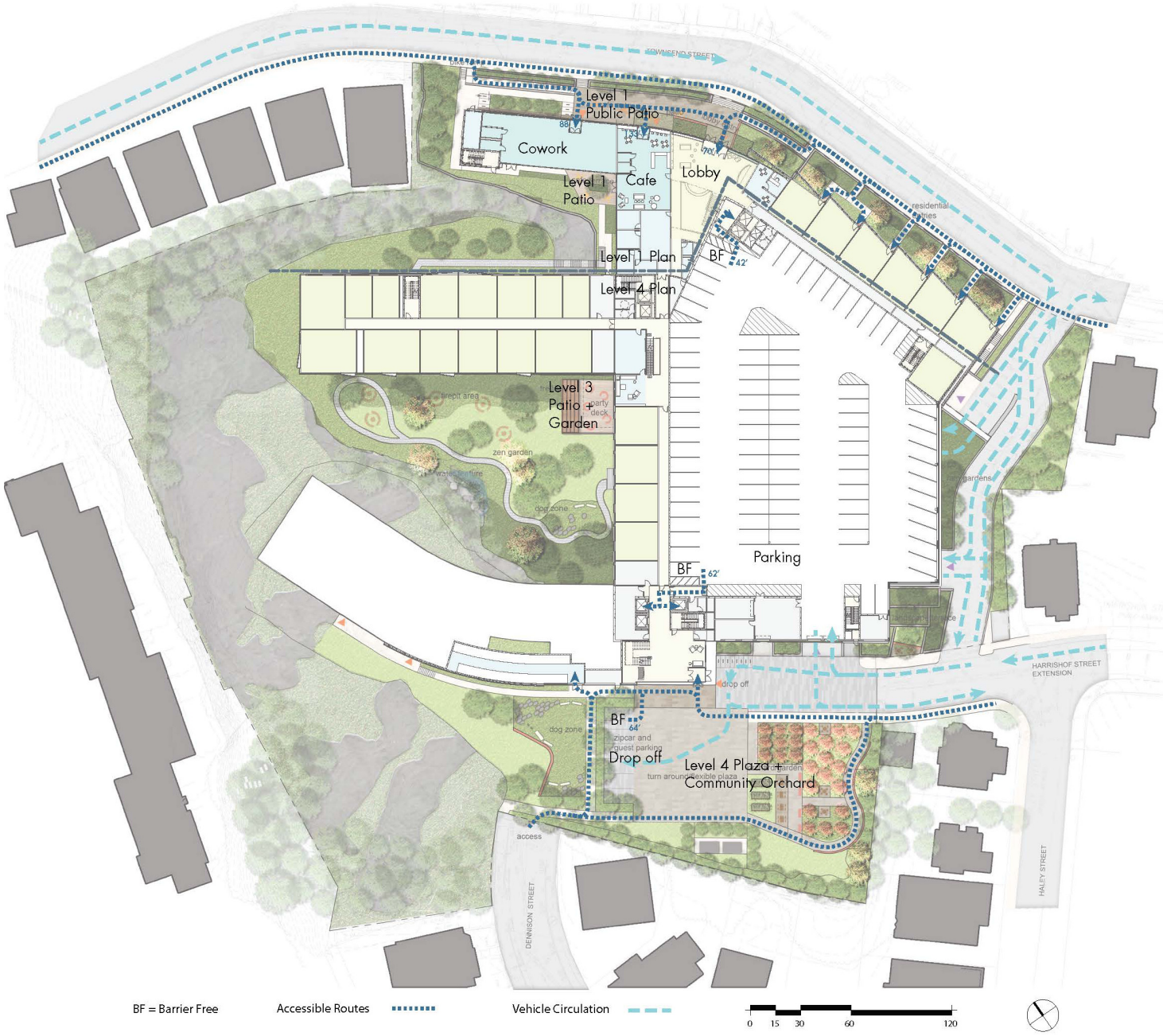
This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to help achieve ideal accessibility and to ensure that all buildings, sidewalks, parks, and open 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



45 Townsend Street Boston, Massachusetts

Accessible Routes Site Plan with Parking

45 Townsend Street Boston, Massachusetts

Accessible Routes Site Plan with Green Spaces

45 Townsend Street Boston, Massachusetts

Group 2 Unit Locations From Accessible Entry