Draft Project
Impact Report

Volume I

Submitted Pursuant to
Article 80 of the
Boston Zoning Code

Prudential Center Redevelopment

Exeter Residences & 888 Boylston

Phases 6 & 4a

Boston, MA

Submitted to:
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Submitted by:
Boston Properties, Inc.
800 Boylston Street
Boston, MA 02199

Prepared by:
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In association with:
Goulston & Storrs
Boston, MA

CBT
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Boston, MA

AvalonBay Communities, Inc.
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Introduction/ Executive Summary

1.1 Introduction

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Project Overview

BP Prucenter Acquisition LLC, an affiliate of Boston Properties, Inc. and the owner of Prudential Center, proposes to further enhance one of Boston's most important mixed-use commercial and residential developments through an update of the Prudential Center Development Plan by developing the Exeter Residences and the 888 Boylston Street office building at the Prudential Center.

These proposed buildings embody a sustainable, low impact development approach to meeting market and neighborhood demands while enhancing local economic growth and vitality. The Exeter Residences is a transit-oriented and sustainable residential development which directly responds to the City's and neighborhood's desires for additional mixed-income housing in the Back Bay and specifically, at The Prudential Center. 888 Boylston is a modification of the Boylston Office Building approved in the original 1990 Development Plan, making it a viable office building to meet today's office standards and tenant demands for office space in the Back Bay. In addition to utilizing a highly sustainable design approach, the Project takes advantage of the unique site location to provide density and height immediately adjacent to transit connections and to desirable amenities for office tenants within the Prudential Center and within walking distance all on a site that has been previously designated for intense development.

The Prudential Center Development Plan for PDA No. 37 (the "**Development Plan**") was originally reviewed under Article 31, predecessor to Article 80, of the Boston Zoning Code beginning in 1986 and culminating in final approval in 1990. Since 1990, the Development Plan has evolved through various amendments and approvals as the Development Plan phases for 111 Huntington Avenue, the Shaw's Supermarket, The Belvidere at The Prudential Center, and the Mandarin Oriental Boston Hotel and Residences have been constructed. The Exeter Residences

represents a new development component which achieves the vision of the Phase 6 Master Plan for PDA No. 37 which was approved under Article 80 in 2002. 888 Boylston represents a modification of the previously approved Boylston Office Building, which was approved as the Phase 4a development component for PDA No. 37 in 1990. Together, the proposed Exeter Residences and 888 Boylston and related improvements to the Boylston Arcade will add 377,559 square feet (SF) of area additional to the existing approved Development Plan.

Since acquiring Prudential Center in 1998, Boston Properties has continued to enhance and improve the Project as a significant mixed use office, residential and retail center, and an iconic element of Boston. The Prudential Center is an important part of the community and economy in the Back Bay, supporting local businesses and helping to make the Back Bay a 24 hour-7 day per week ("**24/7**") live, work and play environment. Each phase of development within the Prudential Center has been undertaken to satisfy a demand in the market for a particular product.

The Exeter Residences will be developed, owned and operated by AvalonBay Communities as part of the Avalon at the Prudential Center apartment community, which includes the Boylston, Fairfield, and Gloucester buildings. The Exeter Residences, with its primary entrance along Exeter Street, is the development component located within the area designated as Phase 6 within the Prudential Center complex. The building will be situated in between the loading dock for the Lord & Taylor building (760 Boylston Street) and the Exeter Street entrance to the Prudential Center's North Garage. Since the submission of the Notice of Project Change/Project Notification Form ("**NPC/PNF**"), in response to comments received during the NPC/PNF public comment period the Exeter Residences has been reduced in height by 3 residential stories or 29 feet. The Exeter Residences presented in this DPIR is 27 residential stories rising 311 feet in height, and containing approximately 242,000 SF of space. The addition of the Exeter Residences will enhance the existing residential neighborhood at the Prudential Center, currently including the Boylston, Fairfield and Gloucester Buildings owned by AvalonBay Communities, The Belvidere at Prudential Center, and the Mandarin Oriental Residences and Apartments. The Exeter Residences will respond to the demand for additional mixed-income housing opportunities in the Back Bay; AvalonBay will set aside 25% of the total apartments in the Exeter Residences as affordable. The building's location is one block west of Copley Square and one half block south of Boylston Street, providing a diverse mix of shopping, restaurants and services to support an urban walkable lifestyle. The development will create housing, well-served by mass transit and existing infrastructure. The building will enliven the pedestrian experience on Exeter Street and create a new pedestrian connection between Prudential Center Plaza and Exeter Street via a monumental public stairway and elevator.

Consistent with the Development Plan, 888 Boylston is the development component located within the area designated as Phase 4a within the Prudential Center complex

and will be located along Boylston Street between the Boylston Arcade entrance and the Hynes Convention Center. 888 Boylston will continue to consist of an office building with retail and lobby space at the street and plaza levels, as originally approved in 1990. Since the submission of the Notice of Project Change/Project Notification Form, in response to comments received 888 Boylston has been reduced in height by 2 stories or 23 feet. 888 Boylston as presented in this DPIR will be a 17 story structure rising 242 feet in height, and adding 6 stories and approximately 134,559 SF of space to the previously approved building. Further, the third and fourth stories will have the option of being either office or retail space depending upon retail tenant demand. The additional space will result in a total area for Phase 4a of approximately 422,052 SF. Additional height can be accommodated at the site due to the building's generous setback from Boylston Street. Consistent with the BRA's urban design comments, the proposed height acts as a visual transition from Boylston Street to the tall Prudential Tower located immediately behind 888 Boylston.

The additional height for 888 Boylston is a direct response to the type of office space that Class A tenants require in the City of Boston. Providing Class A office space that meets the market demand will keep these tenants in Boston where they might otherwise move to another city. Retaining such tenants will have a positive impact on the economic health of the Back Bay and the City of Boston.

The 888 Boylston development consists of public space improvements from the new Mandarin Oriental Boston to the Hynes Convention Center. The Boylston Arcade, which is contained within the area designated as Phase 4b within the Prudential Center complex, will be enhanced, resulting in an addition of 1,000 SF.

This Draft Project Impact Report ("**DPIR**") contains updated information on the design for the Exeter Residences and 888 Boylston reflecting the modifications to the height, density and design which respond to the comments received, presents the additional studies requested, and provides a comprehensive evaluation of potential impacts and measures that will be undertaken to mitigate those impacts. This DPIR is guided by the February 15, 2008 Scoping Determination issued by the Director of the Boston Redevelopment Authority ("**BRA**"), and is intended to be responsive to the comments, instructions and additional requirements of BRA staff, Public Agencies of the City and PruPAC. This DPIR contains a Volume I - DPIR, Volume II - Response to Comments and a Technical Appendices. Further, this DPIR is also intended to respond to substantive comments received from the members of the public. Please see Volume II, Response to Comments. This DPIR is intended to augment and supplement the documentation presented in the Notice of Project Change/Project Notification Form, which was filed with the BRA on August 27, 2007. Where appropriate, this DPIR directs the reader to relevant sections of the NPC/PNF to reflect the initial studies performed in connection with the proposed the Exeter Residences and 888 Boylston as described in the NPC/PNF. However, the reader is asked to keep in mind that the reduced height and density of the Project

will lessen the impacts of those matters discussed in the cited chapters of the NPC/PNF.

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Summary of Project Changes

Since the filing of the NPC/PNF, the Proponent has made several changes to the Exeter Residences and 888 Boylston in response to community and agency comments, and as a result of additional design work by the buildings' architects.

Exeter Residences

The Proponent has listened to the feedback from the BRA, PruPAC and other City officials regarding the design of the Exeter Residences and has responded accordingly. Exeter Residences is a modern residential building that compliments the existing buildings at the Prudential Center, while taking architectural cues from its immediate neighbors. Exeter Residences will be a part of the high spine of the Back Bay, which includes Trinity Place and the AvalonBay residential buildings.

The current design is 27 stories (311 ft) which represents a reduction of 3 residential stories or 29 ft from the height proposed in the NPC/PNF. The Exeter Residences will not be visible from the Boston Public Library courtyard. The revised design has simplified the massing and integrated the top of the building into the glass curvature element of the previously proposed building. The façade has been redesigned to include a repetitive window pattern more indicative of a residential building. The northern corner of the building has been rounded to help mitigate the wind impacts. The building is also clad in glass to take advantage of the building's solar orientation and sweeping views of the Back Bay, the Charles River and Cambridge. Proposed changes to Exeter Street and Blagden Street will help to create a more pedestrian friendly experience and mitigate wind impacts.

888 Boylston

The Proponent also has listened to feedback from the BRA, PruPAC and other City officials regarding the design of 888 Boylston and has responded accordingly. In response to design and scoping comments from the BRA, PruPAC and other City officials, the Proponent is proposing the following design modifications. The current design is 17 stories (242 feet) which represents a reduction of 2 stories or 23 feet from the height proposed in the NPC/PNF. The curve of the glass façade has been relaxed to address the comments that the previously proposed design curve was too taut and forced. A retail podium now clearly differentiates the retail from the office tower and acknowledges the need to relate to the pedestrian scale of the plaza. The problematic corners of previous plaza schemes have been remedied by creating a

stepped storefront that eliminates the taper towards the corners cause by the curved storefront. Additional proposed street-level retail will now activate the corner adjacent to the Boylston Arcade entrance and a proposed restaurant on the first floor of the Hynes Convention Center will open onto the plaza with seasonal dining. Other improvements include a remodeled Boylston Arcade entrance to give this major entrance to the Prudential Center more presence on Boylston Street and to relate it architecturally to 888 Boylston. The plaza design is envisioned as a "hardscape" plaza with street trees and planting near Boylston Street and featured amenities such as seating, fountains and decorative lighting to satisfy the public's desire for open space with a pedestrian scale and ambience.

1.2 History of the Prudential Center / The Prudential Center Today

The history of the Prudential Center is discussed in Section 1.4 of the NPC/PNF.

The approved Prudential Center Development Plan is divided into six project phases, with two phases divided into subphases:

- Phases la and lb (111 Huntington and Retail Expansion) have been constructed;
- Phase 2 (Shaw's Supermarket) has been constructed;
- Phase 3 (Belvidere Residences) has been constructed;
- Phase 4a (888 Boylston) received schematic design approval from the BRA on July 12, 2001;
- Phases 4b and 5 (Mandarin Oriental Boston) is under construction and is nearing completion; and
- Phase 6 (Development between East Ring Road and Exeter Street) was approved on the Master Plan level, subject to further approval on the Development Plan level.

Today the Prudential Center complex consists of the 52-story Prudential Tower and surrounding one-story retail shops (800 Boylston); one 25-story office building (101 Huntington), one 36 story office building (111 Huntington), three 26-story apartment buildings (the Boylston, Fairfield and Gloucester Buildings), one 11 story residential building (The Belvidere Residences), two department stores (Lord & Taylor and Saks Fifth Avenue) and a retail arcade, the Sheraton Hotel, a Shaw's Supermarket (53 Huntington), and an underground garage divided into two halves (north and south) by the Massachusetts Turnpike. The north and south garages are connected by a pedestrian tunnel, and by retail/commercial space at the Plaza level. Two-mixed use housing, hotel and retail structures, each 13 stories connected by a low-rise structure (the Mandarin Oriental Boston) are under construction and nearing completion for the fall of 2008. Since acquiring the Prudential Center in 1998, Boston Properties has redeveloped, or has caused to be redeveloped, almost all of the 4500 feet of street

frontage surrounding the Prudential Center. These two buildings represent the last 325 feet of street frontage from the original Prudential Center.

1.3 Summary of Project Public Benefits

Exeter Residences responds to the needs of the community for additional mixed-income housing in the Back Bay, and exceeds the requirements of the Mayor's Executive Order on Affordable Housing through a combination of new on-site affordable housing construction and affordable restrictions at other residential buildings within Prudential Center owned by AvalonBay. Affordable housing is discussed in further detail in Chapters 2 and 8.

The Exeter Residences will include construction of a public pedestrian connection between Exeter Street and the plaza level of the Prudential Center via a grand stairway and public elevator. This connection will further the Development Plan goal to integrate and connect the Prudential Center to the surrounding neighborhoods. The presence of the Exeter Residences' front door on Exeter Street and this new public connection to the plaza will help transform the pedestrian experience along Exeter Street. Additional proposed improvements to Exeter Street will include street trees, new sidewalk materials and curb line improvements in front of the property, and improved street lighting. The Proponent is also proposing street trees at the intersection of Blagden Street and Exeter Street. These upgrades to Exeter and Blagden Streets will enhance the pedestrian experience, integrate Exeter Street into the Back Bay aesthetic and mitigate wind impacts.

888 Boylston responds to the market demand of a changing office market by locating new office space in a dense urban location well served by transit and supported by a multitude of amenities within walking distance. Office space of adequate size with options for expansion, views and access to amenities is in demand for tenants who desire an enhanced locale in which they can live, work and play. 888 Boylston will appeal to a segment of the market looking for this type of space. 888 Boylston will benefit local businesses since the office tenants will frequent local restaurants, shops, and services. In addition, a new multi-use, pedestrian friendly plaza area in front of the building will replace the last remnants of the original 1960's design and enhance the public realm by providing a new active "front door" to the Prudential Center.

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Jobs and Housing Linkage

The Exeter Residences and 888 Boylston will contribute both a jobs and housing exaction to mitigate the effects of new large-scale real estate development. Based on its Development Impact Uses, as defined in Article 80B-7, the Exeter Residences will contribute approximately $2,089 in jobs linkage and $10,468 in housing linkage. 888

Boylston, including the Boylston Arcade improvements of Phase 4b, will contribute approximately $500,321 in jobs linkage and $2,504,315 in housing linkage. Together the two buildings will contribute approximately $502,410 in job linkage payments and $2,514,783 in housing linkage payments.

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Community Benefits Fund

The original Development Plan and Cooperation Agreement established a Community Benefits Fund, intended to maintain the vitality of the impacted neighborhoods and improve the quality of life in the City. The original contribution for Phase 4a was $195,361. Although not required to have done so, Boston Properties has already contributed $104,036 reflecting a portion of the Community Benefits Payment attributable to Phase 4a. In connection with the Project being approved under this DPIR, AvalonBay will contribute $302,500 to the fund and Boston Properties will contribute an additional $169,449 for use by the community. Together, the two buildings will contribute approximately $667,780 for the Community Benefits Fund.

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Real Estate Taxes and Jobs

The Exeter Residences is anticipated to generate annual real estate taxes to the City of approximately $470,000. 888 Boylston is anticipated to generate $4,025,000 annually in real estate taxes. The developments combined will contribute $4,495,000 in annual real estate taxes to the City of Boston.

In addition to construction jobs, when completed 888 Boylston will add up to approximately 1,600 permanent office jobs to the Back Bay.

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Public Realm Improvements

Both Exeter Residences and 888 Boylston incorporate pedestrian and streetscape improvements, which will serve to enliven the existing streetscape along Boylston and Exeter Streets. The Exeter Residences will incorporate a public stairway and elevator to allow pedestrians to directly access the Prudential Center plaza level from Exeter Street. 888 Boylston will create a new "front door" for the Prudential Center by enhancing the pedestrian plaza connecting the Hynes Convention Center and the entrance to the Boylston Arcade. The new entrance and plaza, as envisioned, represents approximately $8 million worth of public realm improvements. In addition, both owners have committed $200,000 donations per building for a total of $400,000 to be dedicated to future or on-going Boylston Street Improvement projects in recognition of the importance that Boylston Street has for the Back Bay.

Public benefits are discussed in further detail in Chapter 8 and summarized in **Table 8-1**.

1.4 Summary of DPIR Project Studies / Organization of DPIR

In response to the BRA Scoping Determination, the Proponent has performed the following additional studies and provided the following additional information in this DPIR to augment information submitted as part of the NPC/PNF.

- An expanded discussion of anticipated permits and approvals is provided in Chapter 2, including square footage built to date, existing FAR calculations and future FAR calculations taking the proposed buildings into account.
- An updated urban design discussion for the Exeter Residences and 888 Boylston as it relates to the Prudential Center Development Plan is provided. Design details are contained in Chapter 3, including how the Project will address the specific design requirements called for by the district zoning.
- Chapter 4 updates and supplements the transportation study included in the NPC/PNF. This includes additional detail on existing and proposed Exeter/Blagden Street operations; pedestrian and bicycle operational evaluations, garage capacity and management information; and measures employed to accommodate new parking nests. Information on the added transit trips represented by the Project (effect on Green Line capacity), and Transportation Demand Management (TDM) measures also have been included.
- Updated environmental studies were conducted to include three building height scenarios as related to wind, shadow and daylight analyses: 1) no build, 2) 155 feet (existing zoning height) and 3) proposed building heights. The studies also evaluate shadow and daylight effects on the existing internal plaza and courtyard areas proximate to the existing AvalonBay buildings. Solar glare has been reviewed with respect to the Exeter Residences for the 155 feet and proposed Project height building scenarios. Details on each study are further described in Chapter 5, Environmental Protection.
- In response to requests for additional detail the Environmental Protection Chapter 5 also addresses earth retention system and construction methodologies.
- Further analysis of soil and groundwater impacts is included in Chapter 6, including groundwater mitigation/management, monitoring and recharge.
- A more detailed description of sustainable design practices is provided in Chapter 7, including LEED Certification Silver Standard for 888 Boylston, and Article 37 compliance for the Exeter Residences.
- Additional information relating to the affordable housing commitments for Exeter Residences is provided in Chapter 8, including location and size of new/additional units, affordable rent levels, market rents, waiting lists, marketing/advertising.

- Included in this submission is a Response to Comments document (Please see Volume II) that addresses issues and requests for further information raised by City reviewing agencies, PruPAC and members of the public.

In addition, in cases where additional information regarding matters discussed in the NPC/PNF was not requested, the relevant section of the NPC/PNF is cross-referenced to provide the reader with appropriate context and information.

1.5 Project Proponent

Information regarding Boston Properties and AvalonBay is contained in Section 1.7 of the NPC/PNF.

1.6 Project Teams

The Project Teams are identified in Section 1.8 of the NPC/PNF.

1.7 Community Outreach

The Proponent is committed to soliciting input from the surrounding neighborhoods, City agencies, and PruPAC, an umbrella organization of community groups and also serving as the Impact Advisory Group. Since proposing the Exeter Residences and 888 Boylston modifications in August 2007, the Proponent has had over 30 meetings with members of the community and elected officials. Neighborhood groups included the following:

- PruPAC
- Back Bay Association
- Bay Village Neighborhood Association
- Claremont Neighborhood Association
- Fenway Community Development Association
- St. Boltoph Neighborhood Association
- Boston Public Library
- Massachusetts Convention Center Authority
- Boston Groundwater Trust
- Saunders Hotel Group

2 Project Description

This chapter was prepared for the DPIR to supplement the Notice of Project Change and Project Notification Form chapters documented in the NPC/PNF. Specifically, this section updates the NPC/PNF and provides detail regarding the Exeter Residences and 888 Boylston updated building programs, project public benefits and regulatory review. The remaining Project information pursuant to Article 80 Large Project review guidelines is contained in Chapters 2 and 3 of the original NPC/PNF document.

2.1 Project Description and Changes since NPC/PNF

■

Exeter Residences

The Exeter Residences will provide approximately 240,670 SF of residential space comprising of up to 188 apartments, as well as approximately 1,330 SF of retail and common space, for a total of approximately 242,000 SF. The building will contain 27 residential stories, standing at a height of 311 feet which represents a reduction of 3 stories or 29 ft from the building proposed in the NPC/PNF. It will have entrances on Exeter Street, the plaza level between Lord & Taylor and the Gloucester Building, and a vehicular drop-off area under the plaza currently used by residents and guests of the Gloucester Building. Private access will also be provided to the building from the garage parking for residents of the Exeter Residences. The retail space will be located on the ground level on Exeter Street. The Exeter Residences will create the pedestrian connection between Exeter Street and the Prudential Center via a public staircase and elevator. Figures relating to the Exeter Residences can be found at the end of Chapter 3, Urban Design.

Parking for the Exeter Residences will be established through the introduction of managed parking areas and reconfiguration of the existing residential parking nests within the Prudential Center North Garage, providing for up to 132 spaces at a ratio of 0.7 spaces per dwelling unit for a maximum of 188 dwelling units (the total parking spaces will be adjusted accordingly if there are less than 188 apartments).

Vehicle access to and from the nests will remain as currently in existence, and residents will have direct elevator access from within the Exeter Residences to the residential parking nests. Services for the building will be provided using the existing Shaw's Loading dock. This dock currently supports Shaw's Supermarket and the Gloucester residential building and has adequate capacity for the Exeter Residences.

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888 Boylston

The proposed modification to the 888 Boylston building approved as part of the 1990 Development Plan will add six stories, for a total of 17 stories, with a height of 242 feet, consisting of approximately an additional 142,004 SF of office space, a decrease of approximately 8,719 SF of retail space, and an increase of approximately 1,274 SF of common area, for a total of approximately 134,559 SF of additional area than the previously approved office building. This additional space will result in a total area within Phase 4a of approximately 362,000 SF of office space, approximately 40,271 SF of retail space, and approximately 19,781 SF of common area, for a total of approximately 422,052 SF. Retail and lobby space will be located at the street and plaza levels containing 42,000 SF. The space on the third and fourth floors may be developed either as retail space or as office space, depending on market demand. Accordingly, the retail space may range from 40,000 to 100,000 SF and the office space may range from 304,000 to 362,000 SF. Figures relating to 888 Boylston can be found at the end of Chapter 3, Urban Design.

Pedestrians will be able to access the street level retail from either the public plaza or the Boylston Arcade. The street level entry will also provide access to the arcade level retail. Both the office lobby and retail space have extensive glass exterior walls to allow high visibility into the building interacting with the plaza street and enhancing vitality along Boylston Street.

In order to provide parking for 888 Boylston, a mezzanine parking level will be inserted into the existing Green level of the North Garage. Both the mezzanine parking level and the Green level will be designed to accommodate managed parking, thereby increasing the parking capacity of the garage within the 888 Boylston building footprint and within the existing confines of the garage. The mezzanine deck will be valet accessible only and will be accessed via a ramp from the Green level only, so that no additional access ramps or curb cuts from the street will be required. Service for the building will be provided by the existing North Loading dock which has capacity for 888 Boylston site.

Improvements to the Boylston Arcade, which is part of the area designated as Phase 4b under the Development Plan, is also proposed related to 888 Boylston. These improvements will add 1,000 SF for a total of approximately 423,052 SF of improvements to Phases 4a and 4b.

2.2 Regulatory Context, Zoning and Permitting

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Article 80 Process and Filings

This DPIR is being submitted under Article 80 of the Boston Zoning Code (the "**Code**") pursuant to the Scoping Determination issued by the Director of the BRA on February 15, 2008 in order to provide more detailed Project information, present the results of additional requested studies and respond to comments received from governmental agencies, PruPAC and members of the community on the August 27, 2007 NPC/PNF. The current filing seeks review under the provisions of Section 80A-6 (Notice of Project Change) and Section 80B-5 (Large Project Review). Contemporaneously with the filing of this DPIR, a Fourth Amendment to the Development Plan is being submitted to the BRA for review under Article 80C-7. This Fourth Amendment to the Development Plan will seek approval of Phase 6 on a Development Plan level, previously approved in 2002 on a Master Plan level; approval of a modification of Phase 4a, previously approved in the 1990 Development Plan for PDA No. 37; and approval of a modification of Phase 4b, previously approved in 2002 on a Master Plan level.

Phase 4a, including the previously approved Boylston Office Building, was described in the Prudential Center Redevelopment Planned Development Area Final Project Impact Report/Environmental Impact Report (Prudential FPIR/FEIR) prepared in connection with the original adoption of the 1990 Development Plan (Prudential Center Redevelopment, Final Project and Environmental Impact Report, EOEA §7208 submitted November 13, 1989, by The Prudential Property Company, Inc. for the Prudential Insurance Company of America. The BRA Final Adequacy Determination was issued on April 27, 1990). The 888 Boylston site occupies a portion of the areas designated for construction under Phase 4a, some of which was constructed between 1990 and 1993. Phase 6, including Exeter Residences, has not previously been subject to Large Project Review under Article 80B. The 2002 Master Plan recognized that a further amendment to the Development Plan would be required to implement Phase 6.

Finally, although not part of the Article 80 process, the BRA will be asked to approve a text amendment to Article 41 of the Boston Zoning Code in connection with the Project, to approve height within the Planned Development Area (PDA) as proposed for the Project and to allow the size of floorplate above 155-feet to be determined through the Design Review process.

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Anticipated Permits and Approvals

Table 2-1 contains a list of agencies from which permits or other actions are anticipated.

Table 2-1 Anticipated Permits

Agency	Approval
City of Boston	
Boston Redevelopment Authority	Article 80A Notice of Project Change
Boston Redevelopment Authority	Article 80B Large Project Review / DIP Agreement Amendment / Affordable Housing Agreement
Boston Redevelopment Authority	Article 80C Review for Amendment to Development Plan (including incorporation of requirements related to Groundwater Conservation Overlay District – Article 32)
Boston Redevelopment Authority, Boston Zoning Commission and Mayor	Fourth Amendment to Development Plan for PDA No: 37
Boston Zoning Commission and Mayor	Zoning Text Amendment
Boston Civic Design Commission	Schematic Plan Design Review
Boston Redevelopment Authority	Design Review
Boston Transportation Department	Transportation Access Plan Agreement Amendment Traffic Signal Control Agreement (if required) Traffic/Construction Management Plan
Boston Landmarks Commission	Article 85 (Demolition Delay) Review
Boston Air Pollution Control Commission	Amendment to Exemption of Parking Spaces for Residents / Employees / Visitors for increased parking spaces
Public Safety Commission	Amendment to permit to erect and maintain parking structure for increased parking spaces
Joint Committee on Licenses	Amendment to inflammable storage permit for increased parking spaces
Public Improvement Commission	Approval of Improvements in Public Way
Boston Board of Appeal (or state appeal board)	Building Code Variance for Subdivision
Boston Water and Sewer Commission	Site Plan Approval (water and sewer connection permits) Cross Connection permits (if required) Construction Dewatering Permit (if required)
Boston Fire Department	Fire Prevention Permits
Boston Public Works Department	Street Opening/Occupancy Permit
Inspectional Services Department	Demolition Permit Subdivision Permit Building Permit

Commonwealth of Massachusetts	
MEPA Office, Executive Office of Environmental Affairs	Approval of Notice of Project Change
Massachusetts Historical Commission	Determination of No Adverse Effect for MEPA Notice of Project Change (if required)
Department of Environmental Protection	Sewer Extension/Connection Self-Certification
Mass Highway Department	Traffic Signal Permit (if required)
Massachusetts Water Resource Authority	Construction Dewatering Permit (if required)
Federal Government	
Federal Aviation Administration	FAA Determination of No Hazard for buildings and cranes (in excess of 200')
Environmental Protection Agency	National Pollution Discharge Elimination System General Permit for stormwater and for construction dewatering (if required)

This table presents a preliminary list of permits and approvals from state and local governmental agencies, which are presently expected to be required for the Project, based on Project information currently available. It is possible that not all of these permits or actions will be required, or that additional permits or actions may be needed all of which may become evident during Project design and development.

Most of the permits listed above are customary in case of an office building or residential building in Boston in a PDA. However, the following additional explanation is provided either to indicate the status of on-going permitting or to provide information on the Project elements giving rise to a specific permit in instances where it may not be clear.

Boston Zoning Commission

Article 41 currently provides for a maximum 155-feet building height within a PDA in the Huntington Avenue/Prudential Center District (except for a single building--, viz. 111 Huntington Avenue Office Building, which was permitted to be 465 feet) and currently limits floorplates above 155 feet to 22,500 SF in average gross floor area (GFA) and no single floor above 155 feet may exceed 25,000 SF. The Project will require a recommendation by the BRA to the Boston Zoning Commission for adoption of a Text Amendment to Article 41 to permit the increased height for the Exeter Residences and 888 Boylston and to permit the size of floorplates above 155-feet to be determined in the Design Review process. This approval will be sought simultaneously with approval by the Boston Zoning Commission of the Fourth Amendment to Development Plan.

Boston Civic Design Commission (BCDC)

BCDC review began during review of the NPC/PNF on November 6, 2007 and the Project was referred to Design Subcommittee. Meetings with the Design Subcommittee are ongoing.

Massachusetts State Building Code Variances

The land owned by an affiliate of Boston Properties at Prudential Center is known as Land Court Parcel 18. Both the site of the Exeter Residences and 888 Boylston are part of this larger Parcel. In connection with construction of these two buildings, it is anticipated that the land on which they are located, as well as the below grade portions of the garage, will be subdivided from Parcel 18 to create new lots, in order to facilitate standard commercial real estate transactions such as ground leases and financing. It is anticipated that the Exeter Residences and 888 Boylston may each be built close to or on the lot lines separating these newly subdivided lots from the remainder of Lot 18, and that the subsurface garage will cross the lot lines below grade without fire walls at the lot lines.

The State Building Code generally requires physical separation of a certain distance of buildings from the lot lines. In cases in which such physical separation is not feasible, a variance from the provisions of the building code may be granted if equivalence from a life/safety vantage point is demonstrated. Similar variances were granted in connection with prior phases of the Prudential Center redevelopment, such as the Mandarin Oriental Boston, as each Phase has been subdivided from the former larger Prudential Center parcel.

Massachusetts Environmental Policy Act (MEPA)

The Proponent has met with MEPA to discuss the proposed Exeter Residences and 888 Boylston additions and of the currently pending Article 80 review. The Prudential Center underwent MEPA review in connection with the original Project in 1990. Although the current Project would not exceed current MEPA threshold standards and therefore would not require review if it were a new Project, since the Project includes a modification of previously approved Phase 4a, a Notice of Project Change will be filed with MEPA as a continuation of the original Prudential Center Project filings. The Proponent intends to file a formal Notice of Project Change with MEPA subsequent to completion of the Article 80 process.

■

Consistency with Article 41 – Huntington Avenue / Prudential Center District

The Prudential Center Site is located within the Huntington Avenue/Prudential Center District under Article 41 of the Code and is within PDA No. 37 under the Development Plan for the Prudential Center Redevelopment, and, accordingly, has the designation of "D" on the Zoning Map. The site also lies within the Groundwater Conservation Overlay District and Restricted Parking Overlay District. Additionally,

the Exeter Residences and 888 Boylston are subject to the provisions of Article 37 pertaining to Green Buildings.

The Huntington Avenue Prudential Center District Zoning (Article 41) established the goals and requirements for projects within a Planned Development Area relevant to the Exeter Residences and 888 Boylston. Compliance of the Project with the design goals of Article 41 is addressed in Chapter 3. Compliance with the other goals will be achieved as follows:

- Section 41-12(2) provides for a maximum FAR of 6 within a PDA and a maximum building height of 155 feet (except for a single building--viz. the 111 Huntington Avenue Office Building which was permitted to be 465 feet). The FAR of the Prudential Center as a whole will not exceed the FAR of 6 after construction of the Project. The Proponents are proposing a text amendment to this Section to permit the increased height for the Exeter Residences and 888 Boylston.

- Section 41-14(1) provides that a Development Plan for a PDA must provide a certain amount of new housing, that at least 10% of the new dwelling units be Affordable or that a dollar contribution be made to the Neighborhood Housing Trust for affordable housing, and that at least 0.7 off-street parking spaces be provided for each new on-site dwelling unit. The Exeter Residences meets or exceeds each of these provisions.

- Section 41-14(2) provides that a Development Plan for a PDA must provide , either directly or through funding, for substantial street improvements to streets adjacent to and in the vicinity of the PDA. These improvements are intended to improve use of the affected streets by pedestrians. 888 Boylston will improve Boylston Street in accordance with the Boylston Street Master Plan and, as noted above, the Exeter Residences will include improvements to Exeter Street. Taken as a whole, the Development Plan for the PDA also includes other improvements to streets adjacent to and in the vicinity of the Prudential Center. Furthermore, both Boston Properties and AvalonBay are each contributing $200,000 for the Boylston Street improvements.

- Section 41-16(1) provides, in pertinent part, that no new building should cast shadows for more than two hours from 8 AM to 2:30 PM on any day from March 21 through September 21 on any portion of dedicated public parkland (with certain exceptions related to areas which are cast in shadow by structures in existence on March 20, 1990 or which would not be cast in shadow by buildings conforming to the as-of-right limits of Article 41). As discussed in Chapter 5, no new shadows are cast on dedicated public parkland for more than two hours on any day from March 21 through September 21.

- Section 41-16(2) provides that a project shall not cause ground-level ambient wind speeds to exceed certain specified standards. As discussed in Chapter 5, these standards are met for the Project, and the Project improves existing situations where the specified levels are exceeded under the No-Build condition.

- Section 41-16(3) provides that a Transportation Access Plan be executed for a project in the PDA. As discussed in Chapter 4, the Prudential Center is subject to an existing TAPA, which will be amended to reflect the proposed Project.

- Section 41-16(4) requires that proposed projects be generally designed and arranged as to limit the reduction of light and air surrounding Landmarks and Historic Buildings and to minimize the shadow impact on their facades. Chapter 6 of the NPC/PNF contains a listing of Landmarks and Historic Buildings in the vicinity of the Project. As discussed in Chapter 6, these standards are met.

- Section 41-16(5) requires that each proposed project enhances the pedestrian environment. As discussed in this Chapter and Chapters 3 and 8 the Project improves the pedestrian environment by inclusion of the monumental staircase and elevator on Exeter Street, the Boylston Street plaza, interior retail uses, and sidewalk and street improvements.

- Section 41-16(6) requires that projects be subject to review by the Boston Civic Design Commission. BCDC review for both buildings is underway.

- Section 41-17 provides that uses, including ground floor uses, may be governed by the provisions of an approved Development Plan.

- Sections 41-19 and 41-20 provide that parking and loading within a PDA is established by the Development Plan.

■

Details Regarding Floor Area Ratio and Square Footage

The maximum Floor Area Ratio (FAR) allowed for Prudential Center is calculated on a site-wide basis for all land within PDA No. 37. Following completion of Phases 1, 2, 3, 4a, 4b, 5, and the Exeter Residences, the FAR of the Prudential Center Site will be 5.93, which is below the maximum FAR of 6 permitted under Section 41-12 of the Code.

The square footage of prior phases, which has also been described and approved in prior amendments and minor modification letters to the Development Plan, and the square footage of the proposed Project, are as follows:

Table 2-2 Development Plan Areas

Phase	Floor Area (SF)	Total (SF)
Buildings in Existence as of 1990 (the date of adoption of the Original Development Plan)	4,131,000 SF	
Additions / Demolitions to 1990 Existing Buildings (net area):		
Sheraton Hotel	10,000 SF	
Avalon Residential Buildings	1,394 SF	
Lord & Taylor/Saks (renovations)	7,691 SF	
Lord & Taylor take-back (area to be demolished and rebuilt with Exeter Residences)	(9,251 SF)	
Boylston take-back (area to be demolished and rebuilt with 888 Boylston)	(13,773 SF)	
Existing Improvements as of 1990, as expanded		4,127,061 SF
Development Plan Improvements:		
Phase 1 (Development Component 111 Huntington)	1,062,532 SF	
Phase 2 (Development Component Shaw's Supermarket)	57,235 SF	
Phase 3 (Development Component 100 Belvidere)	197,412 SF	
Phase 4a (Development Component 888 Boylston)	287,493 SF (Previously approved by Development Plan) 134,559 SF (Proposed Increase)[1]	
Phase 4b and 5:		
(Development Component The Mandarin Oriental Boston)	512,177 SF	
(Boylston Arcade Extension)	1,000 SF	
Phase 6 (Development Component Exeter Residences)	242,000 SF[2]	
TOTAL GROSS FLOOR AREA		6,621,469 SF

The entire Prudential Center Site contains 1,116,222 SF of area.[3]

FAR is determined by dividing the Total Gross Floor Area by the area of a site delineated in square feet. In the case of PDA No. 37, the FAR after construction of

[1] This area includes the 13,773 SF Boylston take-back area to be rebuilt.
[2] This area includes the 9,251 SF Lord & Taylor take-back area to be rebuilt.
[3] The 1990 Development Plan incorrectly stated that the Site contained 1,080,211 SF. The 1990 Development Plan appears to have omitted the separate lot areas for each of the 3 Avalon buildings (Fairfield--12,032 SF; Boylston--11,951 SF; Gloucester--12,028 SF). The correction of this scrivener's error was corrected by the BRA in a letter from Director O'Brien dated March 24, 1999 and also is reflected in the 3rd Amendment to Development Plan approved by the BRA in 2002.

the Project is determined by dividing 6,621,469 SF by 1,116,222 SF, resulting in an FAR of 5.93.

$$\text{FAR} = \frac{\text{Total Gross Floor Area (SF)}}{\text{Area of Site (SF)}}$$

$$\text{FAR} = \frac{6{,}621{,}469 \text{ (SF)}}{1{,}116{,}222 \text{ (SF)}} = 5.93$$

■

Consistency with Development Plans

Simultaneously with the submission of this DPIR, a proposed Fourth Amendment to the Development Plan is being submitted to the BRA. This proposed Fourth Amendment will modify the Development Plan for PDA No. 37 in the following respects: (i) to approve Exeter Residences as the development component of Phase 6 of the Development Plan (which to date has only been approved at the Master Plan level), and (ii) to modify the previous approvals of 888 Boylston contained in the 1990 Development Plan to reflect changes in the design and the increased height and gross floor area of 888 Boylston as well as to approve the additional Boylston Arcade area in Phase 4b.

The Fourth Amendment describes in detail the height, dimensions, gross floor area, design, parking and loading, vehicle and pedestrian circulation, streetscape, and open spaces associated with Exeter Residences and 888 Boylston, as well as housing and jobs contributions and affordable housing creation. In addition, the Fourth Amendment provides updated information with respect to any relevant modifications to the overall Prudential Center, such as project phases and the site-wide FAR.

■

Consistency with Article 32 – Groundwater Conservation Overlay District

The Development Plan specifically addresses the manner in which Exeter Residences and 888 Boylston will comply with the groundwater conservation requirements with respect to infiltration of rainwater and impacts on groundwater levels contained in Article 32 of the Code. Groundwater conservation is discussed in further detail in Chapter 5 and 6 of this DPIR.

■

Article 37 – Green Building Design

The Exeter Residences and 888 Boylston will comply with Article 37 of the Code pertaining to Green Buildings. In addition to location, development density and proximity to mass transit, both buildings are designed with features to reduce energy consumption and air pollution. They will enhance the interior environment with natural daylight, and promote water efficiency and reduce heat loss. Sustainable design for both buildings is discussed in further detail in Chapter 7 of this DPIR.

2.3 Project Alternatives

As directed by the BRA Scoping Determination, this DPIR considers the following Project Alternatives in particular as related to wind, shadow, and daylight analysis:

- No Build (i.e. existing conditions)
- 155 Feet (i.e. zoning height)
- Proposed Program.

The "Proposed Program" on which the analysis of shadow and daylight are based is the Proposed Program as presented in this DPIR. The "Proposed Program" on which the analysis of wind is based is a slightly more intensive program of 19 stories and 265 feet in height for 888 Boylston and 28 stores and 320 feet in height for the Exeter Residences. Although the Proposed Program as presented in this DPIR has been reduced from those parameters, the impacts of the more intensive Proposed Program were satisfactory as to wind. Since the impacts of the modified Proposed Program discussed in this DPIR will be less than the impacts of the taller and denser proposal, the wind analysis has not been further redone to reflect the currently reduced program.

3
Urban Design

This chapter was prepared for the DPIR to supplement the Urban Design chapter documented in the NPC/PNF. Specifically, this section updates the NPC/PNF to present the modified height, density and design which has evolved since the NPC/PNF and provides detail regarding the urban context of Exeter Residences and 888 Boylston. The remaining information studied pursuant to Article 80 Large Project review guidelines is contained in Chapter 4 of the original NPC/PNF document.

3.1 Introduction

The following section outlines the design basis, process and references for the proposed buildings. The zoning for the site is determined by Article 41 and the Development Plan for PDA No. 37 and is specifically intended to "encourage large-scale private redevelopment of the obsolete Prudential Center while ensuring high-quality design." The PruPAC design review process and subsequent public comments since the filing of the NPC/PNF have shaped the designs for Exeter Residences and 888 Boylston and form the basis of the revisions included in this DPIR.

3.2 Urban Context – Exeter Residences

The proposed Exeter Residences is located on the eastern edge of the Prudential Center Planned Development Area (PDA No. 37) and is bounded by Exeter Street to the east; a parking garage entrance to the south; the Lord & Taylor department store and loading dock to the north; and a pedestrian plaza to the west. The building will rise in a footprint that integrates with parts of the existing Prudential Center parking garage entrance and a portion of the Lord & Taylor department store as depicted in **Figure 3-1**. All related figures for Exeter Residences are reproduced at the end of this chapter.

The Exeter Residences site is an exceptional example of a sustainable approach to creating housing opportunities within the Back Bay. The building will be built over an existing structure which makes the building a redevelopment as contrasted with a

green field development. The site is well positioned to encourage alternative transportation choices such as walking and the use of public transit. A multitude of businesses that would support the residents including shopping, restaurants, professional offices and personal services are within walking distance of the site. Furthermore, the Exeter Residences will comply with the City's Article 37 Green Building requirements.

The Project infills a vacant plaza edge along Exeter Street currently fronted with loading docks, parking entrances and mechanical equipment. The proposed building will replace these undesirable uses with an interactive, pedestrian friendly street that will complement the pedestrian passageways within Prudential Center by creating a pedestrian connection between the Boston Public Library, Blagden Street and Copley Place to the east and the Prudential Center to the west. The Exeter Residences will also enhance the pedestrian experience between Boylston Street to the north and Huntington Avenue to the south.

As depicted on **Figures 3-1** thru **3-4**, the building's Exeter Street two-story glass lobby is on axis with Blagden Street and completes a view corridor from Copley Square. The ground floor includes a lobby for residents and guests with storefront exposure on Exeter Street. Residents will be able to access the Exeter building from Exeter Street, the plaza level, the existing "keyhole" residential drop-off and directly from the parking garage.

A grand public stairway and elevator provide a new, mid-block pedestrian connection from Exeter Street to the Prudential Center plaza between the Gloucester residential building and the Lord & Taylor department store. The stairs' location and dimension were the subject of considerable discussion and study. The final solution directs the pedestrian to the central axis of the plaza through an arcade at the southern end of the building. This arcade is a light-filled portal to the plaza and creates a synergy between the private (building) and public (stairway), activating the building's edge and creating mid-block permeability in the street wall.
The Exeter Residences will enliven the pedestrian experience on Exeter Street and will create new pedestrian connections between the Prudential Center and Copley Square, enhancing the pedestrian environment for the neighborhood as a whole. The development will create up to 188 units of housing in a building with an area of approximately 242,000 square feet within 27 residential stories. The comprehensive mass transit infrastructure nearby will minimize the development's impact on vehicular traffic. Parking for the Exeter Residences will be accommodated below grade within the existing Prudential Center North garage, and loading will be shared with the existing Shaw's Supermarket loading dock, which also currently serves AvalonBay's Gloucester building.

Design Development

The Proponent has listened to the feedback from PruPAC, City agencies and members of the public regarding the design of the Exeter Residences and has responded accordingly. Since the filing of the NPC/PNF, the building has been modified in the following respects: reduction in height by three residential stories, curving of the north eastern façade, simplification of the forms, and integration of the top of the building into the base and creation of a residential window pattern.

In addition, the massing of the building has been simplified to respond to comments that the collaged volumes of the previous scheme were not iconic. The new design is symmetrical about its North / South axis and rises to an articulated crown that recalls some of the celebrated pre-war skyscrapers such as Rockefeller Center and the Empire State building. The penthouse stories are predominantly glass and curve slightly to soften the line of the building as it meets the sky. The east and west facades are now identical, which responds to several comments that the western façade seemed like the back of the building, while the eastern facade seemed like the front. The vertical fins that define the top now stretch down three stories into the shaft of the building; this facilitates the integration of the mechanical penthouse into the total building, as many of the PruPAC committee members suggested.

Height and Massing

The Project's proposed height profile along Exeter Street is common in Boston and other cities. The Exeter Residences site is mid block between Huntington Avenue and Boylston Streets. Placing the greatest height at the middle of the block allows the whole block to step down as it moves toward the edges that define the block. In this particular case, the taller Exeter Residences will step down to the 120' tall Lenox Hotel and allow more daylight to reach Boylston Street. Similarly, moving south along the street, the Exeter Residences will step down to meet the single story Shaw's Supermarket.

For example, both the 0-50 and 50-200 blocks of Federal Street in Boston's financial district illustrate this massing strategy. Specifically, the 50-200 block of Federal Street is centered on the tallest building, 101 Federal Street. 101 Federal Street is flanked by 75 Federal Street on the right, at about two-thirds its height, and 133 Federal Street and a City parking garage on the left. 133 Federal Street is about half as tall as 101 Federal Street and the garage is two stories. All of these buildings come out to meet the street with little or no setback. Currently, the City is exploring the possibilities of a 1,000 foot tall, eighty story building on the garage site.

The mass of the Exeter Residences building is rectangular in plan at approximately 125 feet by 80 feet covering a footprint area of 10,000 square feet. The 27 residential stories sit atop a two level plinth which includes the building entrance and retail on the street level and amenities spaces at the third level. The roof of the building at 311 feet will rise slightly above the neighboring residential towers. Elevations of Exeter Residences are depicted in **Figures 3-12** thru **3-15,** with a view from Boylston Street which includes Exeter Residences and 888 Boylston shown in **Figure 3-16**.

The base of the building is defined by a monumental stairway cut through the building to allow a public promenade connection from Exeter Street to the plaza and an enclosed glass box that contains the lobby, the residential amenities and 1,330 square feet of street level retail space. Instead of the existing condition of blank walls, mechanical vents, and an inaccessible plaza above, pedestrians will now be able to enjoy transparent, active storefronts as they pass by to access the plaza above via the stair in the arcade. As many suggested in the public comment period, the stairway is now accompanied by a public elevator that allows handicapped accessibility to the plaza at this location as well. The height of the base continues the line defined by the belt course that defines the base of the Lenox Hotel. **Figures 3-1** and **3-2** offer perspective illustrations of the base showing the monumental stair and the lobby with the amenities level above.

The building's shaft is comprised of a precast fame that defines double height openings, which were derived from double height groupings of windows on the adjacent Lenox Hotel. Each living room and bedroom has large expanses of glass, allowing deep daylight penetration into the residences and dramatic views from them. **Figures 3-1** and **3-4** are perspective views of Exeter Residences from Blagden Street and Boylston Street, respectively.

The crown of the building is defined by a series of metal fins, or buttresses, that accentuate the vertical expression of the tower and finish the building against the sky. These vertical fins will be illuminated at night, which will further reinforce the building's iconic presence on the skyline. The mechanical penthouse is integrated into the building's underlying architecture by the fins. **Figures 3-4, 3-5 and 3-7** show detailed views of the top of the building.

■

Character and Materials

In response to feedback suggesting that the design team should create a building with more residential character, the building currently presented in this DPIR has simplified the materials and window pattern of the pre-cast sections of the building. After extensive discussions about how this might be accomplished in a modern building, it was concluded that the double height groupings of windows in a masonry façade would be the most effective way to capture this expression. The extraordinary location of this Project demands that the building capitalize on the

abundant city and river views with as much glass as possible; however an all glass skin might be more appropriate for a commercial office building, but is not appropriate for a residential building. The previous design had horizontal precast concrete bands, which many thought were too analogous to suburban ribbon-window office buildings. Therefore, the current proposal creates a frame of two windows grouped vertically, making a direct architectural reference to the adjacent Lenox hotel and lending the building overall vertical proportions characteristic of prototypical residential buildings.

The Exeter Residences is a predominantly masonry building with a stepped profile reminiscent of prewar American skyscrapers. This masonry shaft however, is made more dramatic by cantilevered glass bays that rise up the entirety of the north façade. These glass bays capitalize on views while interlocking with masonry volumes to activate the building's geometry. The solid, masonry volume with double height windows forms the primary shaft of the building, while the glass volumes create a slender and elegant proportion when the building is seen from a distance along Commonwealth Avenue, the Charles River and beyond to Cambridge.

The building's fenestration and materials celebrate the vertical dimension while maintaining a residential scale. Contemporary materials and construction techniques will mark this building as a 21st century example of urban high-rise residential architecture.

The base of the building mediates dual roles as a plinth for the tower and a pedestrian friendly street wall responding to the adjacent context of the classically articulated Lenox Hotel to the north and the Shaw's Supermarket to the south. It seeks to create a transparent face to Exeter Street, inviting pedestrians into the lobby and through to the Prudential Center plaza beyond. It is clad almost entirely with transparent glass, and framed by a stone edge at the stair and above the third floor. The residential entry is defined by a cantilevered glass and metal canopy with building signage mounted on pin letters above as depicted in **Figure 3-2**.

A new, monumental public stairway and elevator provide an important mid-block connection through the base of the building between Blagden Street and the Prudential Center. It is an exterior, arcaded stair that will provide continuous pedestrian access from the street to the plaza and will be an integral part of the pedestrian network throughout the Prudential Center. Additionally, the Proponent will provide a public elevator adjacent to the proposed stair. **Figures 3-9** and **3-10** illustrate the ground level and plaza level plans, respectively.

The precast concrete panels will be a warm, sandy cream color designed to complement the colors of the precast concrete cladding the Trinity Place residences and the brick, limestone and granite cladding the Boston Public Library. The glass will be as transparent as possible, with a low-e coating to maximize daylight penetration while minimizing glare and heat gain. The metal mullions and fins will

be a silver or champagne metallic paint finish that will be visually compatible with the masonry. The window frames are set nearly flush with the cladding for a modern presentation and are glazed in areas with metal panel to lighten the building visually. Operable windows will be part of each residence further animating the façades.

Landscaping

The Exeter Residences is sited within the footprint of existing structures and will have a direct connection at its second level to the plaza bounded by the Gloucester residential tower, East Ring Road, and the Lord & Taylor department store. The plaza will remain an urban, predominately hardscape, outdoor space and Exeter Residences will strengthen the definition of its eastern edge. A new stair and elevator through the base of the building provides a direct mid-block connection from the plaza to Exeter Street. This new connection will improve pedestrian access to the southern entrance of Lord & Taylor from Exeter Street and Copley Square.

The proposed improvements to Exeter Street will help to further transform the street from a service road to a pedestrian oriented street with a traditional Back Bay design. The Exeter Street sidewalk in front of the Exeter Residences will retain its urban feel but will benefit from an improved street wall with the glass frontage of residential and retail uses. Brick paving on the sidewalk will articulate the building entrance and retail spaces.

The design team is proposing to plant street trees on the western and eastern edge of Exeter Street. Street trees are also proposed at the corner of Blagden and Exeter Streets to create a more pedestrian friendly walking experience, and visually connect the two sides of the street. All plant materials will be selected from indigenous species based upon urban hardiness, and low to no irrigation requirements. The enhanced sidewalks shown in **Figures 3-9** and **3-10** will improve the appearance, condition, quality of design and materials, and accessibility and visibility of Exeter Street.

3.3 Urban Context – 888 Boylston

888 Boylston is proposed to be a 17 story mixed use office and retail building, incorporating two levels of underground parking, street and arcade level retail space, a third and fourth levels designed to accommodate either retail or office uses and 13 to 15 levels of office space above. Situated between the Mandarin Oriental Boston and the Hynes Convention Center, the building is set back 92 feet from the Boylston Street curb (77 feet from the property line) to create a new pedestrian scaled street

level plaza which will replace the existing, two-level plaza, as depicted in **Figures 3-17** thru **3-19**. All figures related to 888 Boylston are found at the end of this chapter.

The 888 Boylston site also stands as an exceptional site choice for sustainable office and retail use given its relationship to existing mass transit and highway infrastructure the substantial office space at the Prudential Center and walking access to restaurants, retail and neighborhood services which will surely be used by the office tenants. These features will serve to minimize traffic impacts on city streets. The proposed building will be built over an existing structure which makes the site a redevelopment as contrasted with green field development. Therefore, no previously-undeveloped land resources are being used. People working on-site will have a number of transit alternatives including the Green line, Commuter Rail, Orange line and bus service. Currently the building is well positioned to attain LEED® Certification, with the intention to achieve LEED® Silver standing, based on qualifying for a significant number of points in each LEED-CS (Core & Shell) category.

As conceived, the building will be a foreground element to the Prudential Tower, with a curved glass curtainwall contrasting with the adjacent masonry structures on Boylston Street. The curved façade will reduce the apparent width of the building, will complete the Boylston Street frontage, and will create a dynamic relationship between the Mandarin Oriental Boston and the Hynes Convention Center as depicted in **Figure 3-20**.

A street level plaza in front of 888 Boylston will punctuate the streetscape with open space and feature a remodeled Arcade Entrance announcing the Prudential Center arcade network and connections to 600,000 SF of retail. The Boylston Arcade Entrance will also provide access to street level retail in the Mandarin Oriental Boston and 888 Boylston buildings. The plaza design will balance direct access to the office lobby and first floor retail with the desire to create a flexible outdoor space that always feels "inhabited" through the use of public amenities such as movable seating, fountains, planting and lighting. The Massachusetts Convention Center Authority has proposed a restaurant in the northeast corner of the Hynes Convention Center with the desire to have seasonal dining on the plaza. The plaza is also intended to allow retail tenants within 888 Boylston similar outdoor uses in helping to achieve a dynamic plaza edge and street presence. Planting areas will be focused near Boylston Street to create a visual buffer from vehicular traffic and to punctuate the Boylston Street Improvements Plan. **Figures 3-21** and **3-22** present the street level and arcade level plans for 888 Boylston, respectively.

Escalators in the office lobby bring pedestrians up to a second floor office lobby, directly connected to the Boylston Arcade and the new Newbury Arcade running along the Mandarin Oriental Boston to a new entrance to Lord & Taylor. In this way the building expands and benefits from the powerful urban connectivity represented by the arcade network. Arcade level retail within 888 Boylston connects directly to

the Boylston Arcade and adds diversity to the retail by offering larger tenant spaces. The opportunity to connect directly to the food court offers increased diversity there as well.

A new parking deck is proposed to be installed within the 2 story volume of the Green-level parking garage. Increasing the underground parking capacity below the building and the plaza within the envelope of the existing Prudential Center garage addresses the additional parking load of a new office space, without adding curb cuts.

Loading dock capacity for the building is provided within the existing North Loading Dock, accessed from Boylston Street.

■

Design Development

The Proponent has listened to the feedback from PruPAC, City agencies and members of the public regarding the design of 888 Boylston and has responded accordingly. Since the filing of the NPC/PNF, the building has been modified by reduction in height be two stories, the curve of the glass façade has been relaxed to present a gentler expression to the street, and the two story base has been redesigned as a distinct podium expression from the building above.

Boston Properties has implemented a number of design changes since approval of the Boylston Office Building in the 1990 Development Plan, the approval of design for a building on this site in 2001 and the NPC/PNF submittal in 2007. Originally proposed at 11 stories over 1 parking level, the building was expanded to 19 stories over 2 parking levels (but within the existing Prudential Center garage) in the 2007 NPC/PNF filing and is now being proposed as 17 stories over 2 parking levels.

In the previous schemes of 2001 and 2007, the building design respected certain easements related to the Hynes Convention Center thereby creating a "dark" corner adjacent to the Hynes Convention Center. Recently, the Massachusetts Convention Center Authority ("**MCCA**") has relaxed the required easements in exchange for rights to use a portion of the plaza for seasonal dining and for service access to the Prudential Center North Loading Dock. The exchange of concessions by the MCCA and Boston Properties has allowed positive advancement of the building and plaza design. This has allowed the dark corner to be moved forward and the area activated by the MCCA's restaurants.

Height and Massing

In response to the comments by PruPAC and other commenters, the height and massing of the building have been changed from the 2007 NPC/PNF. The height of the 888 Boylston has been reduced from 19 to 17 stories, the curve of the glass facade has been relaxed to present a gentler expression to the street, and the two story base has been redesigned as a distinct podium expression from the building above.

The building will have a height of 242 feet. 888 Boylston is a predominantly vertical reading building that contrasts with the horizontal nature of its neighbors. It serves as a foreground element to the Prudential Tower and provides a unique backdrop to the new plaza**. Figures 3-17** through **3-20** provide perspective views of 888 Boylston and its relationship to the Prudential Center, the surrounding neighborhood and Boston's skyline.

The Boylston Street façade is gently curved in order to preserve light and views for the Mandarin Oriental Boston and the Hynes Convention Center. The Hynes Rotunda remains in view from the street. Curving the façade will reduce 888 Boylston's perceived width on Boylston Street, and it will also place new emphasis on the relationship between the neighboring buildings. In addition, this configuration opens up views down Boylston Street from within the building. A veil of glass defines this façade, which is suspended in front of a larger, more solid mass that includes the penthouse. **Figures 3-24** thru **3-27** offer detailed Elevations of 888 Boylston.

Due to the MCCA easement modifications, the northwest corner of the podium has been brought forward to eliminate the "dark" corner against the Hynes previously proposed in the NPC/PNF. A proposed restaurant in the northeast corner of the Hynes will spill out unto the plaza with seasonal dining to enliven the plaza. Additional retail has also been added to the northeast corner of 888 Boylston to provide more activity to that area of the plaza. The third floor is set back from the curved façade above articulating a transition between the podium and main portion of the building. The third and fourth floors are designed to be either retail space or office space. A typical office floor for 888 Boylston is depicted in **Figure 3-23**.

A stepped south elevation follows the footprint of the turnpike and offers corner offices with views to the Christian Science Center, mitigating against the proximity of the Prudential Tower. The orthogonal nature of the south, east and west facades returns the building to the Prudential Center and Back Bay grid, and will be a more conventional aluminum curtainwall system with both metal panel and glass, and aluminum mullion caps. Corner windows are emphasized with clear glazing brought to the floor.

Character and Materials

The curved, glass curtainwall system with cantilevered glass edges presents a strikingly fresh and modern appearance on Boylston Street in contrast with the heavy masonry appearance of its neighboring buildings. The curved façade is envisioned as a segmented glass veil suspended in front of the structure, and the glass is cantilevered beyond the horizontal and vertical corners of the building to emphasize this veil-like quality. The "veil" is envisioned as completely butt glazed, without any mullion caps, and is entirely clear (i.e. vision) glass. The building structure and life within the building will enrich this neutral tableau. Clear floor to ceiling glass at the first two floors gives the retail and office lobby a dynamic presence on the plaza as well.

An arc of round support columns penetrate the orthogonally designed retail podium, providing articulation and scale at the base of the structure. By stepping back from the retail storefront, the building expresses the clear programmatic distinction between the first two retail floors and the office tower, and presents a reduced scale at the plaza level. Large canopies projecting from the facade announce the office lobby and retail entries, again offering elements that reduce the building to a pedestrian scale at the plaza. Site Sections and Cross Sections for 888 Boylston are presented in **Figures 3-28** thru **3-31**.

Landscaping

The urban plaza fronting on Boylston Street will serve as a central element for the current 888 Boylston landscaping features. The plaza space must serve a multitude of uses including: office entrance, retail entrances, restaurant patio seating, events related to the Prudential Center, and passive recreation. The space is imagined predominantly as a multi-use hardscape, with plantings designed to address the solar orientation of this public space. Street trees and plantings near the street will punctuate the Boylston Street Improvements Plan, and moveable seating, fountains and lighting will add satisfying color, texture and pattern. Paving is varied, with granite, concrete and perhaps recessed 'light' pavers to achieve a varied presentation by day and by night. The pedestrian light fixtures proposed are both functional and sculptural, thus enlivening the space throughout the day. A proposed restaurant in the northeast corner of the Hynes Convention Center will have a designated area for seasonal dining on the plaza and future retail tenants of 888 Boylston will be encouraged to propose similar uses on the plaza. The retail spaces and office lobby fronting the plaza will be clearly visible and easily accessible. Furthermore, the existing entrance to the Prudential Center arcade network will be remodeled to achieve greater presence on Boylston Street and to relate to the architecture and plaza design of 888 Boylston as depicted in **Figure 3-21.**

3.4 Open Space, Pedestrian Ways & Amenities

The Prudential Center is distinctive in Boston for its expansive network of interior shopping arcades, an amenity that will be expanded by 888 Boylston. Both new buildings are designed to integrate with, and take best advantage of the strong existing pedestrian network at each location.

The Exeter Residences will significantly improve the pedestrian experience along Exeter Street. The proposed retail use at the base of the tower and residential lobby will help activate the street and a new monumental stair and elevator to the plaza will open up Exeter Street to the heart of the Prudential Center. This new connection enables pedestrians to move from Exeter Street to East Ring Road at mid-block.

The 888 Boylston building will bring new retail opportunities to the Boylston Arcade, and will add an additional lobby and connection to the street to the network. The retail space layout offers the potential to draw both food court tenants, full-scale restaurants and both small and large retail tenants to both the Boylston Arcade and Boylston Street. The option of retail space on the third and fourth floors also allows for a larger retailer or department store use in the building.

The existing plaza at this location is a two level construction admitting some sun to Boylston Street at the beginning and end of the day but offering little in the way of urbanity to either the street or the Prudential Center. By lining the plaza with new retail all on the same level, the street edge achieves continuity and will receive an increased level of activity. The proposed plaza design responds to both scoping comments and a new synergy with the Hynes Convention Center which has proposed a restaurant facing the plaza. Visibility of the retail and office lobby from the street will be a consideration in plant selection.

3.5 Parking

All new parking supporting the Exeter Residences and 888 Boylston will be located within the current garage limits, resulting in no change to the existing garage footprint. Further, no changes to the existing access points into and out of the garages are proposed as reflected in **Figure 4-20** and **4-21** within Chapter 4. In addition the parking modifications are not expected to notably change travel patterns and access routes within the garage.

The parking for the Exeter Residences of up to 132 spaces will be established through the introduction of managed parking areas and reconfiguration of the existing residential parking nests within the Prudential Center North Garage. Generally, access to and from the nests will remain the same. Parking nests will be integrated

with the elevator core for the new building ensuring easy access from car to elevator for residents.

The parking for 888 Boylston of 177 new spaces will be accomplished by adding an additional parking level within the existing space. The existing Green level of the Prudential Center parking garage was constructed with an 18-foot floor to floor dimension within the footprint of 888 Boylston. This Project envisions insertion of a mezzanine parking level within this space. Both the mezzanine level and the Green level will be managed parking thereby increasing the parking capacity of the garage within the existing garage footprint. The mezzanine deck would be valet accessible only. Access will be via a ramp from the Green level only, and no additional access ramps or curb cuts from the street are required.

The parking modifications will not reduce the Prudential Center Garage's capacity for public parking.

3.6 Conformance with Specific Design Requirements of the Huntington Avenue Prudential Center District Zoning

The Huntington Avenue Prudential Center District Zoning (Article 41) established a number of design goals in Section 41-12(2) and 41-18 for projects within a Planned Development Area relevant to the Exeter Residences and 888 Boylston, specifically the following:

- Section 41-12(2) provides for a maximum FAR of 6 within a PDA and a maximum building height of 155 feet (except for a single building--viz. the 111 Huntington Avenue Office Building which was permitted to be 465 feet). The FAR of the Prudential Center as a whole will not exceed the FAR of 6 after construction of the Project. The Proponent is proposing a text amendment to this Section to permit the proposed increased height for the Exeter Residences and 888 Boylston.

- Section 41-18(1) provides that Street Wall Continuity within a PDA shall be at a depth from the curb line stipulated in the Development Plan. The 4th Amendment to Development Plan will establish requirements applicable to Street Wall Continuity. In addition, Section 41-18(1) permits recesses and bays approved through Large Project Review as appropriate to the creation of visually interesting designs or accommodation of specific ground level functions.

- Section 41-18(2) pertains to Street Wall Height, which is a concept only relevant to Sky Plane Setbacks, and Section 41-18(4)(a) regulates Sky Plane Setbacks on Exeter Street and Boylston Street. Under Section 41-18(4)(a), Sky Plane Setbacks, including the requirements of Section 41-18(4)(b) relating to Entrance Elements,

are determined during the course of design review by the BRA.

- Section 41-18(3) provides for display windows on Boylston Street excluding permitted Lobby Entrance Area, with sufficient individual storefront entrances to encourage active pedestrian use as certified by the BRA during Large Project Review. Except for active storefront uses, glazed portions of Display Window Areas must be 2 feet deep and used for display of goods and services or for display of exhibits and announcements.

- Section 41-18(4)(c) pertaining to rear yard setbacks does not apply in a PDA.

- Section 41-18(4)(f) provides that above 155' the average gross floor area per floor cannot exceed 22,500 SF and no single floor above such height can exceed 25,000 SF. Exeter Residences complies with these parameters with an average floor plate of 9,100 SF and no floor plate exceeding 10,500 SF. The floor plates for 888 Boylston measure approximately 24,000 SF above 155-feet. The Proponent will propose a zoning text amendment with approval of the Fourth Amendment to modify this parameter.

Conformance with other provisions of Article 41 relating to matters other than design is discussed in Chapter 2.

3.7 Conformance with the Boylston Street Improvements Master Plan

The Boylston Street Improvements Master Plan established a number of goals relevant to 888 Boylston, most notably the following:

- To enhance the retail vitality of Boylston Street and improve its visible quality and overall image.
- To enhance the pedestrian experience by installing street amenities.
- To establish specific design criteria for sidewalks, open spaces, signs and plantings.

888 Boylston proposes to reinvigorate an existing plaza with paving and planting materials relating to those in the Boylston Street Master Plan. Street trees will complete the Boylston Street Planting Plan, and specimen trees within the plaza will add satisfying color, texture and pattern. The plaza itself is imagined as an expansion of and welcoming addition to the Boylston Street sidewalk environment, with a new retail edge that directly addresses the Boylston Street Master Plan emphasis on enhanced retail vitality. The pedestrian experience is addressed with benches, shade, paving variety, and the newly established continuity of the Boylston Street façade. Furthermore, in support of the Boylston Street Improvements Project

each Proponent has agreed to make a contribution of $200,000 dedicated to this effort, for a total contribution of $400,000.

Figure 3-1
View from Exeter Street

Figure 3-2

View from Blagden Street at Boston Public Library

Figure 3-3

View from Blagden Street at Trinity Place

Figure 3-4
View from Boylston Street

Figure 3-5

View from Boylston Street looking over Lord & Taylor

Figure 3-6
Plaza View Rendering

Figure 3-7

View over Boston Public Library

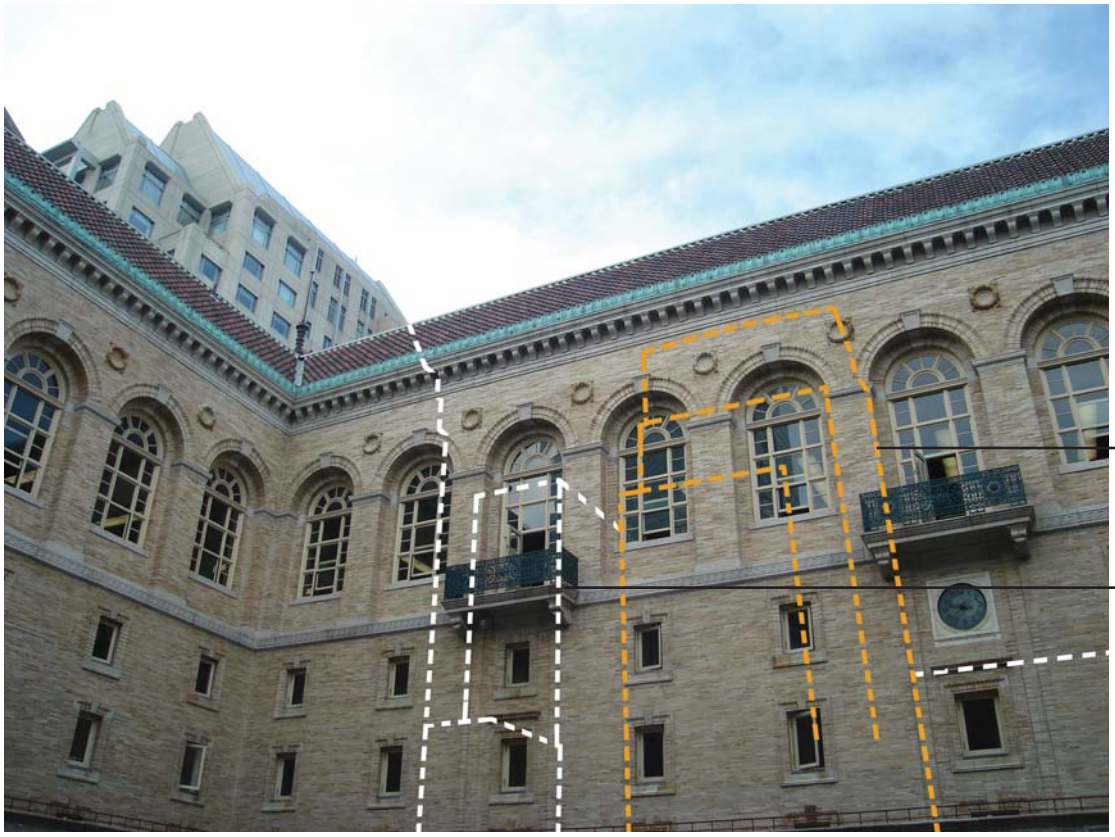

Figure 3-8

Boston Public Library
Courtyard Sight line Study

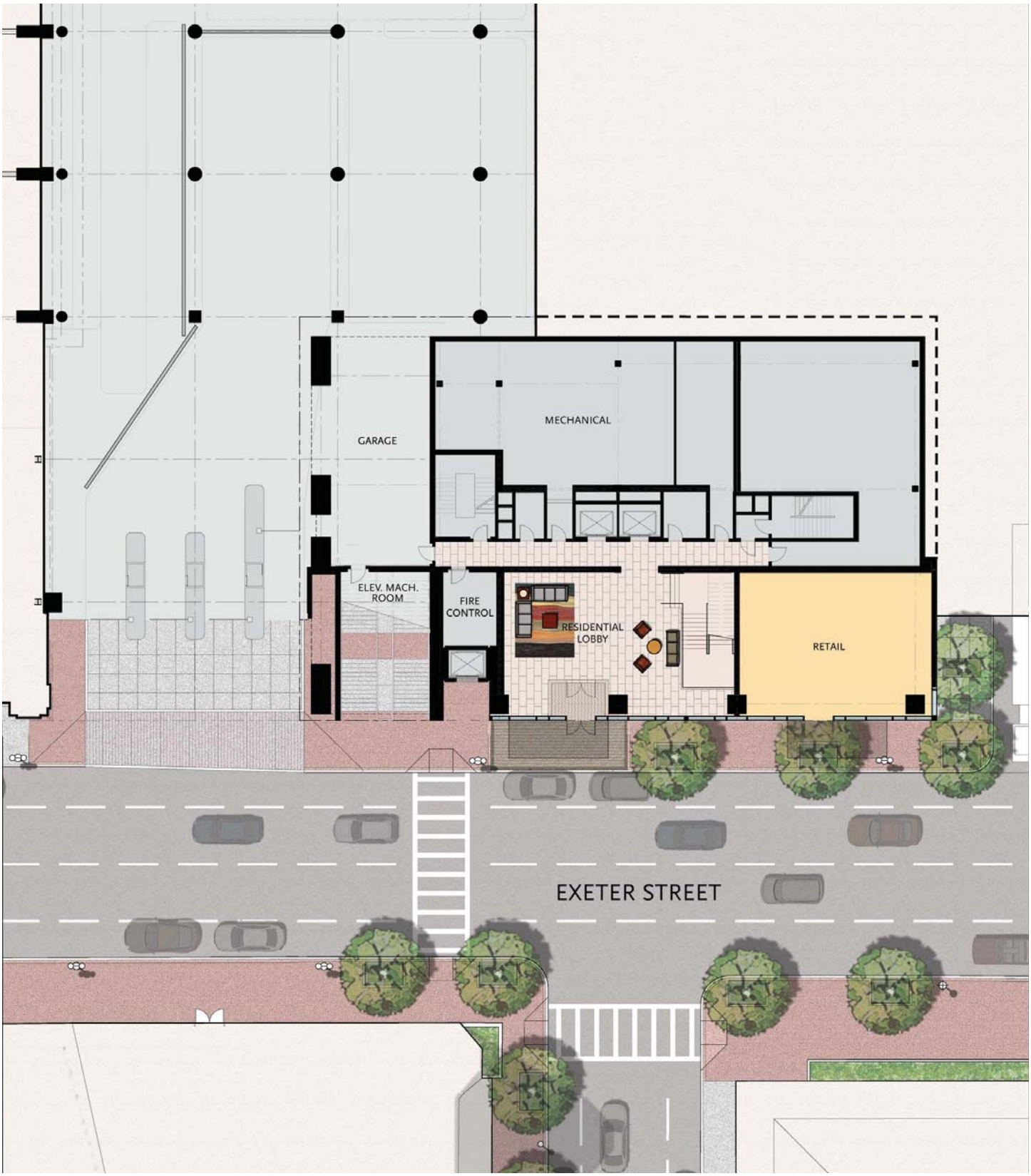

Figure 3-9

Ground Level Plan

Figure 3-10
Plaza Level Plan

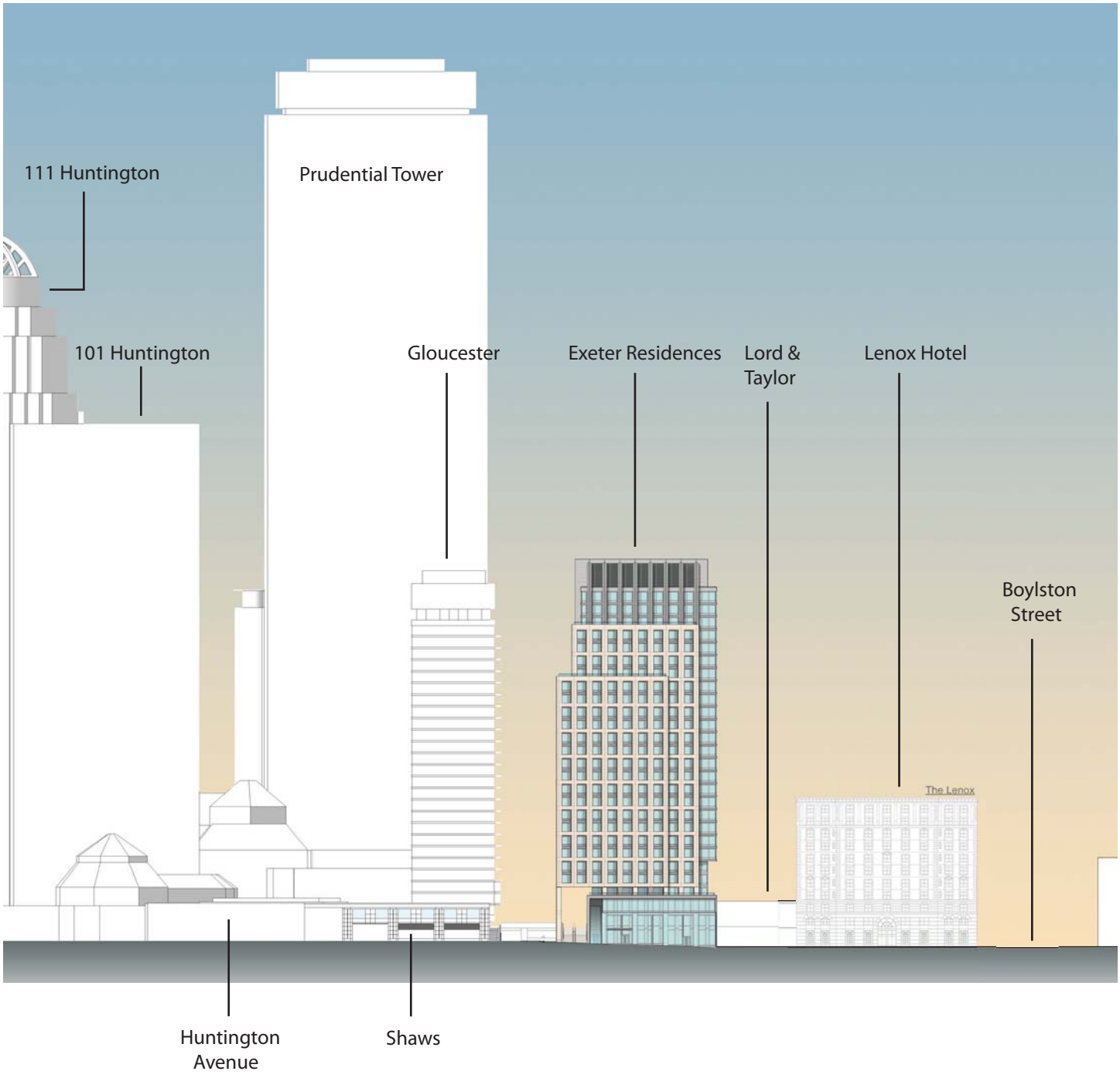

Figure 3-11

View from Exeter Street

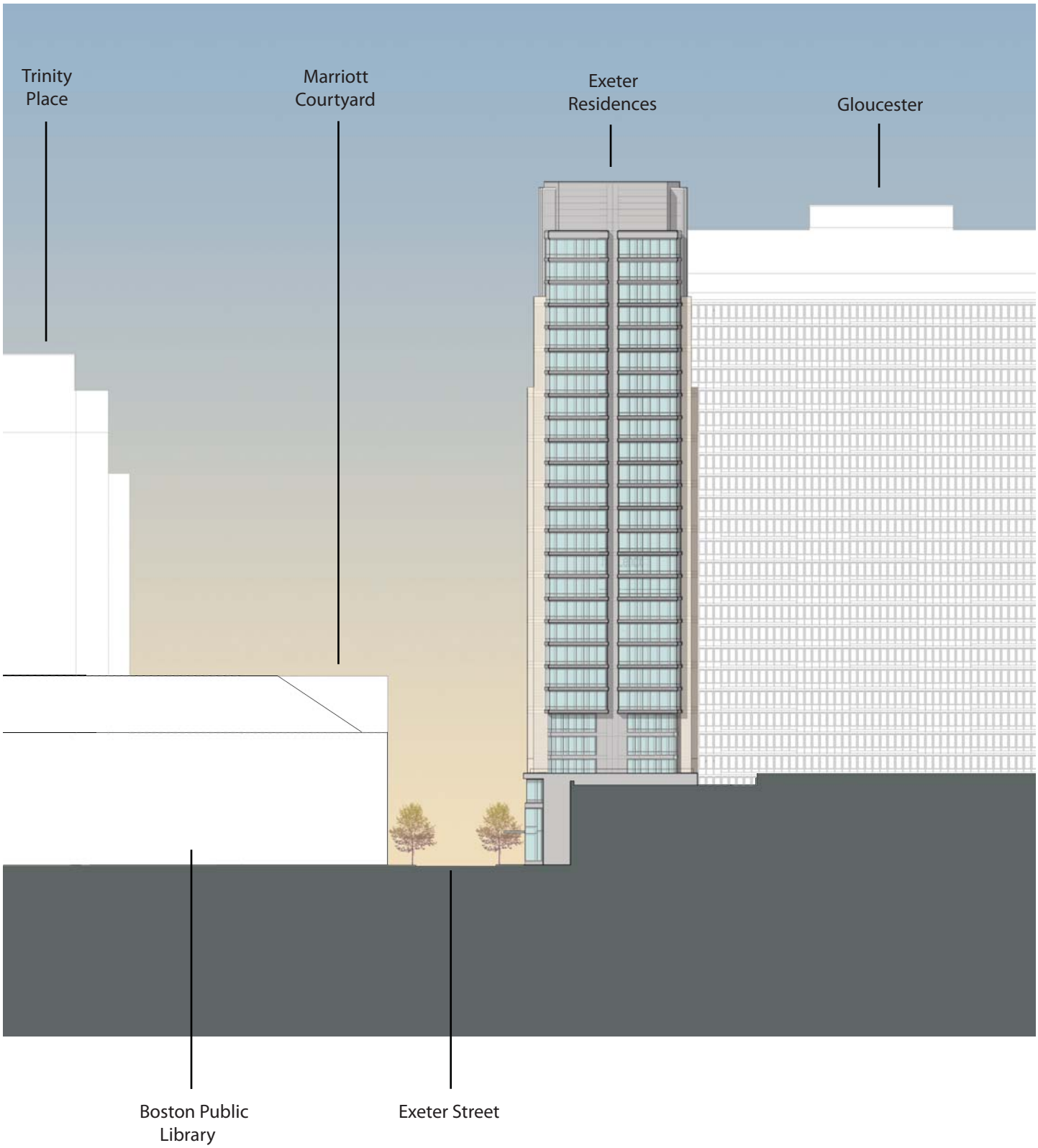

Figure 3-12
North Elevation

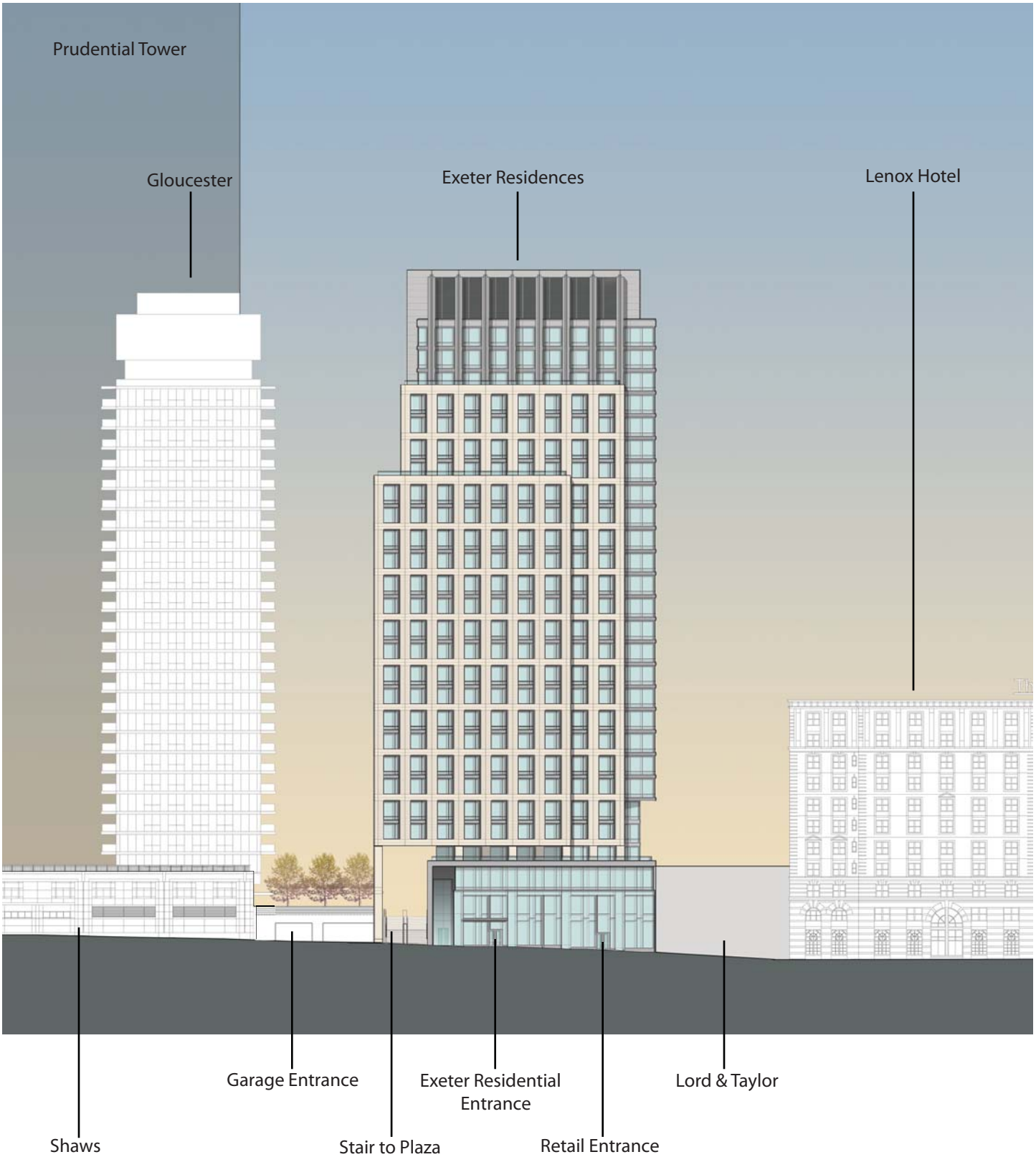

Figure 3-13

East Elevation

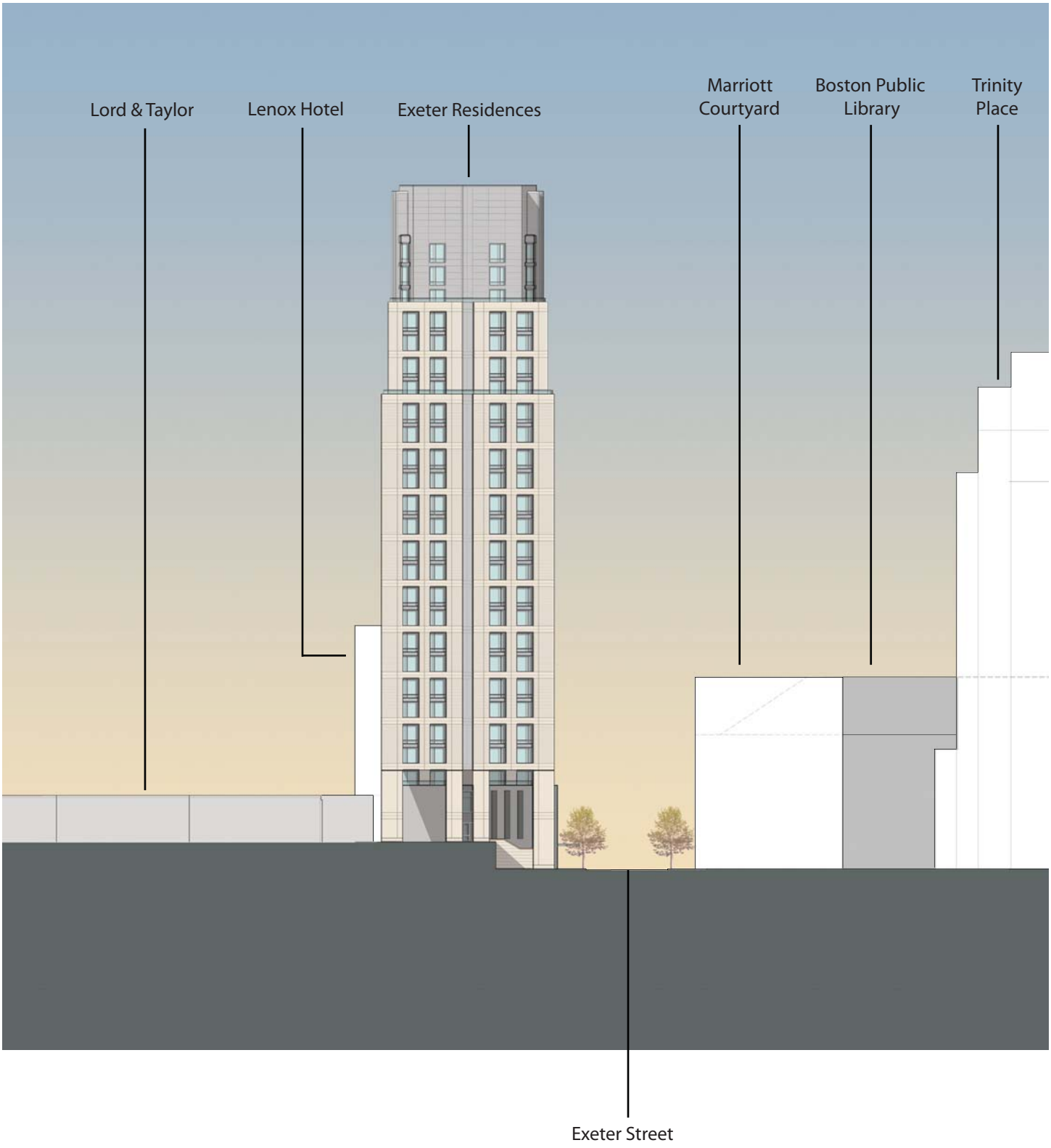

Figure 3-14
South Elevation

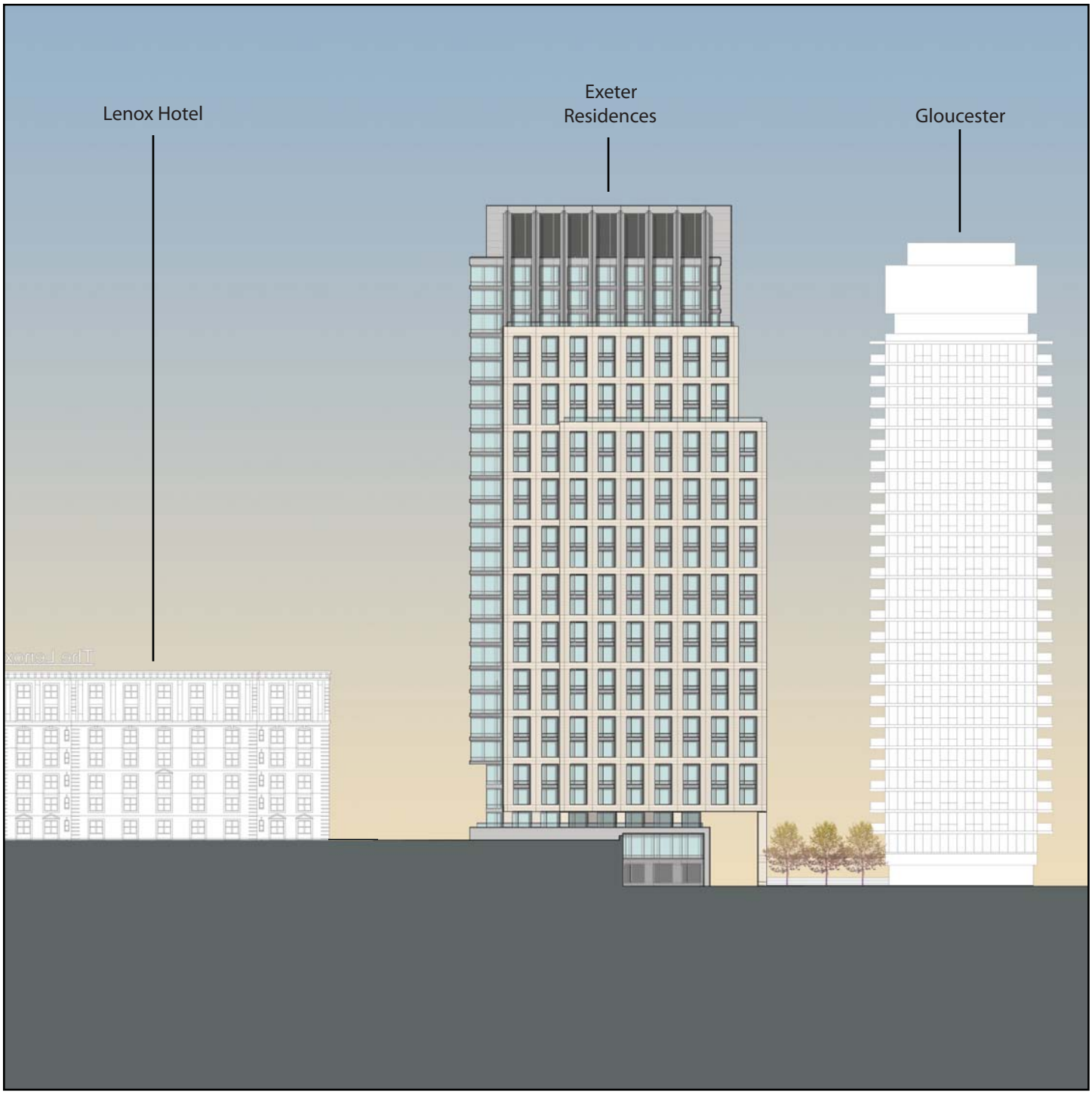

Figure 3-15
West Elevation

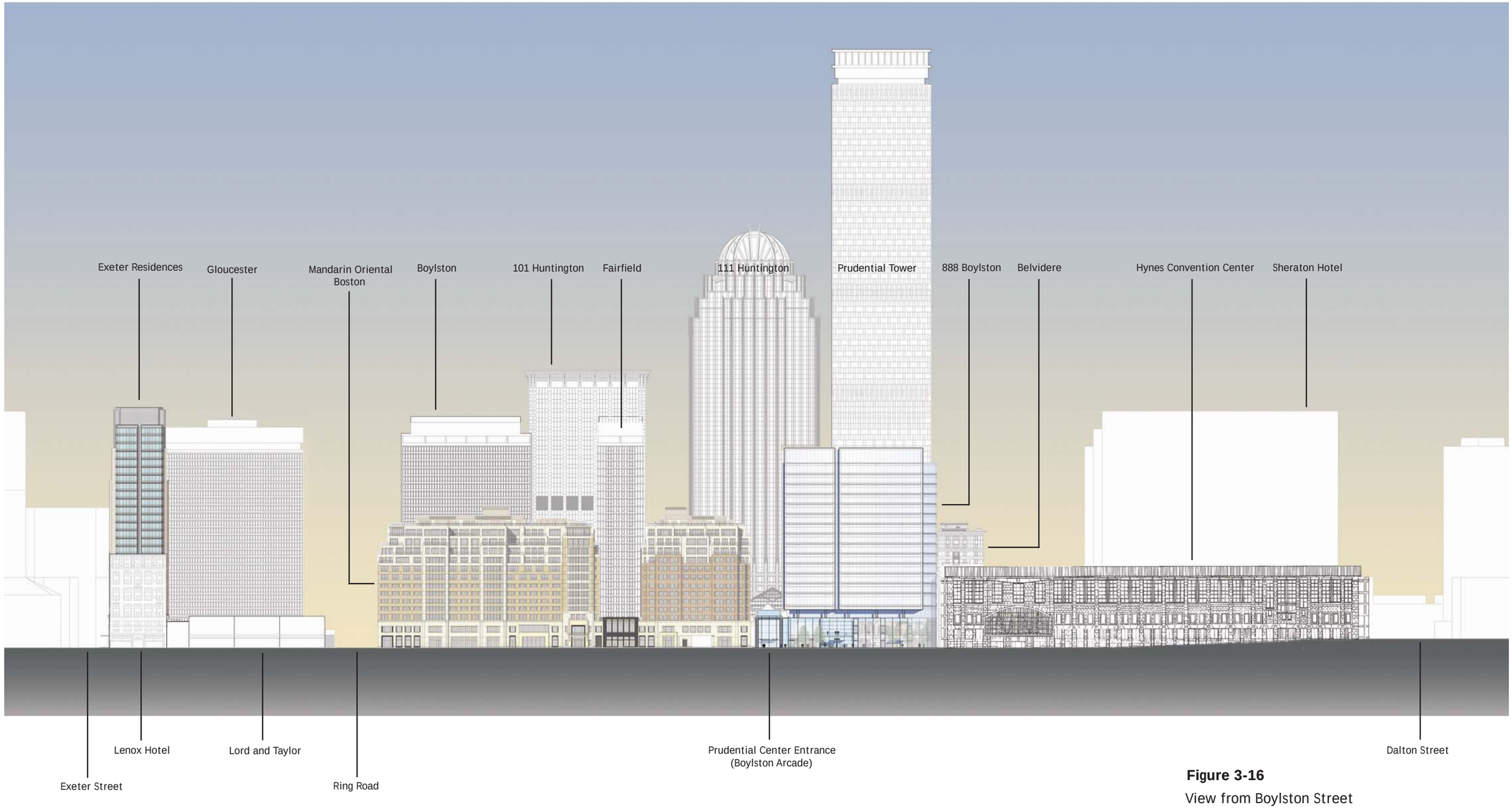

Figure 3-16

View from Boylston Street

Figure 3-17
Plaza View 1 - 888 Boylston

Figure 3-18
Plaza View 2 - 888 Boylston

Figure 3-19
Night Retail - 888 Boylston

Figure 3-20

Building View - 888 Boylston

Exeter Residences \ 888 Boylston | DPIR

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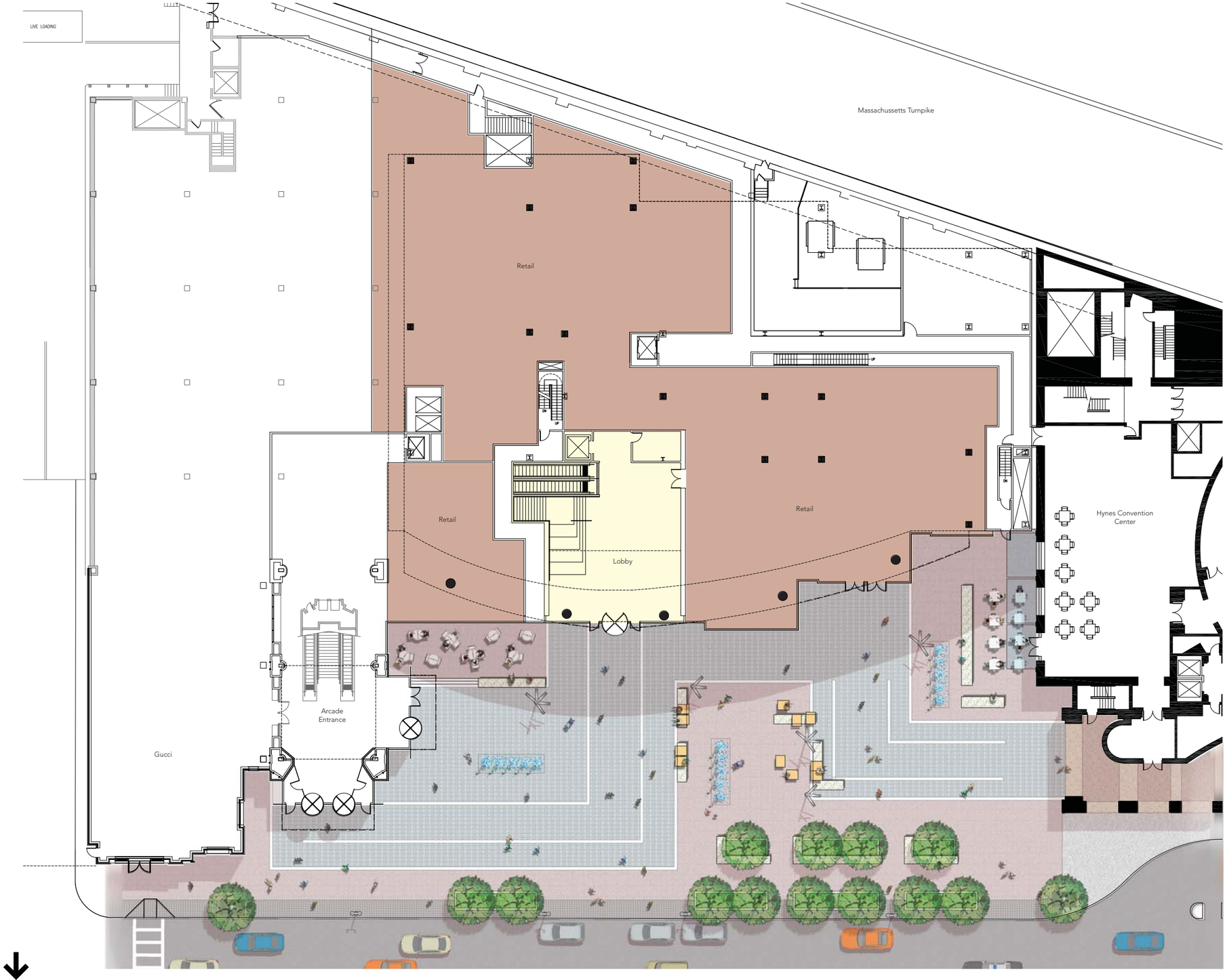
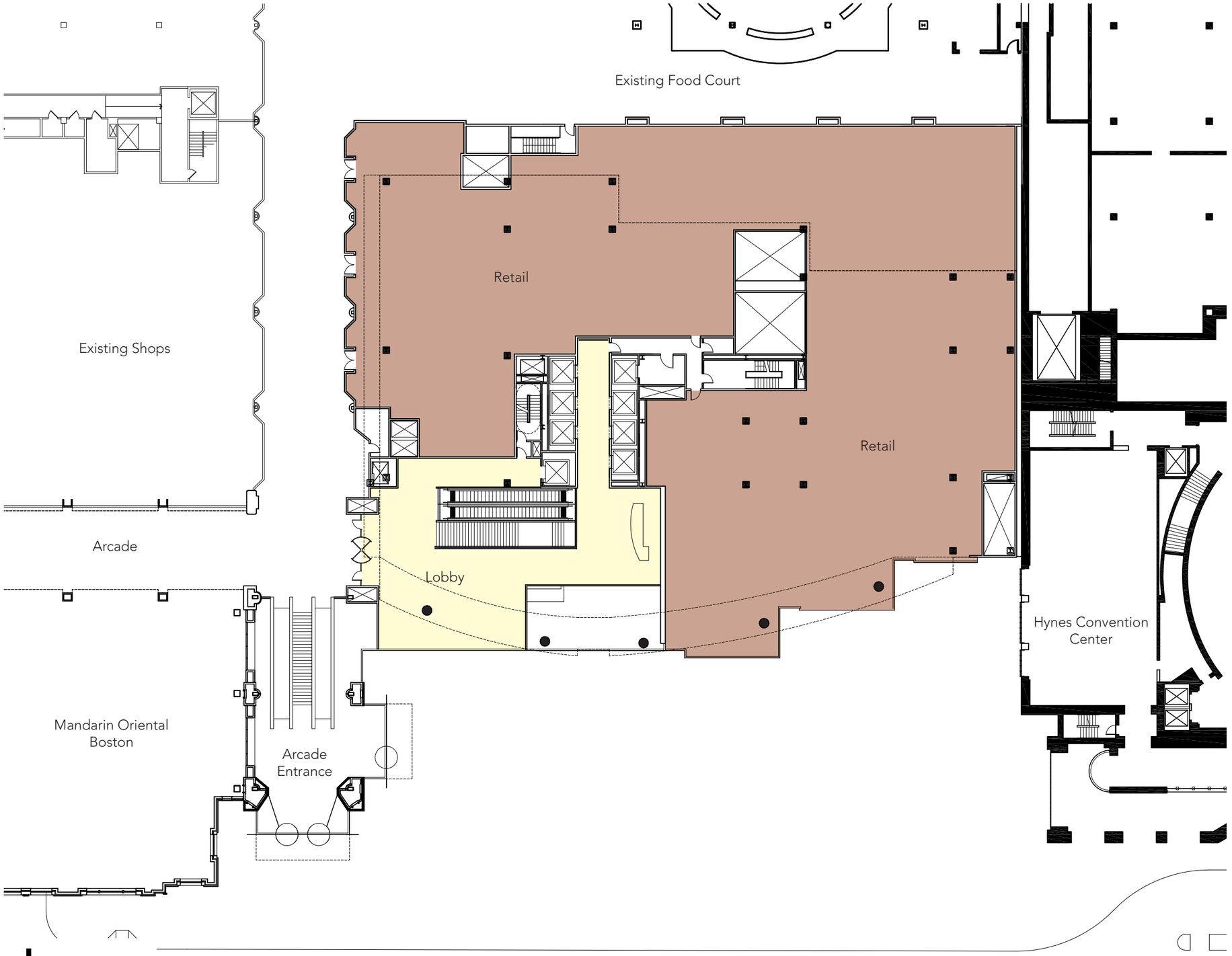


Legend

- Lobby
- Retail
- Office
- Residential

Figure 3-21
Street Level - 888 Boylston



Legend

- Lobby
- Retail
- Office
- Residential

Figure 3-22
Arcade Level - 888 Boylston

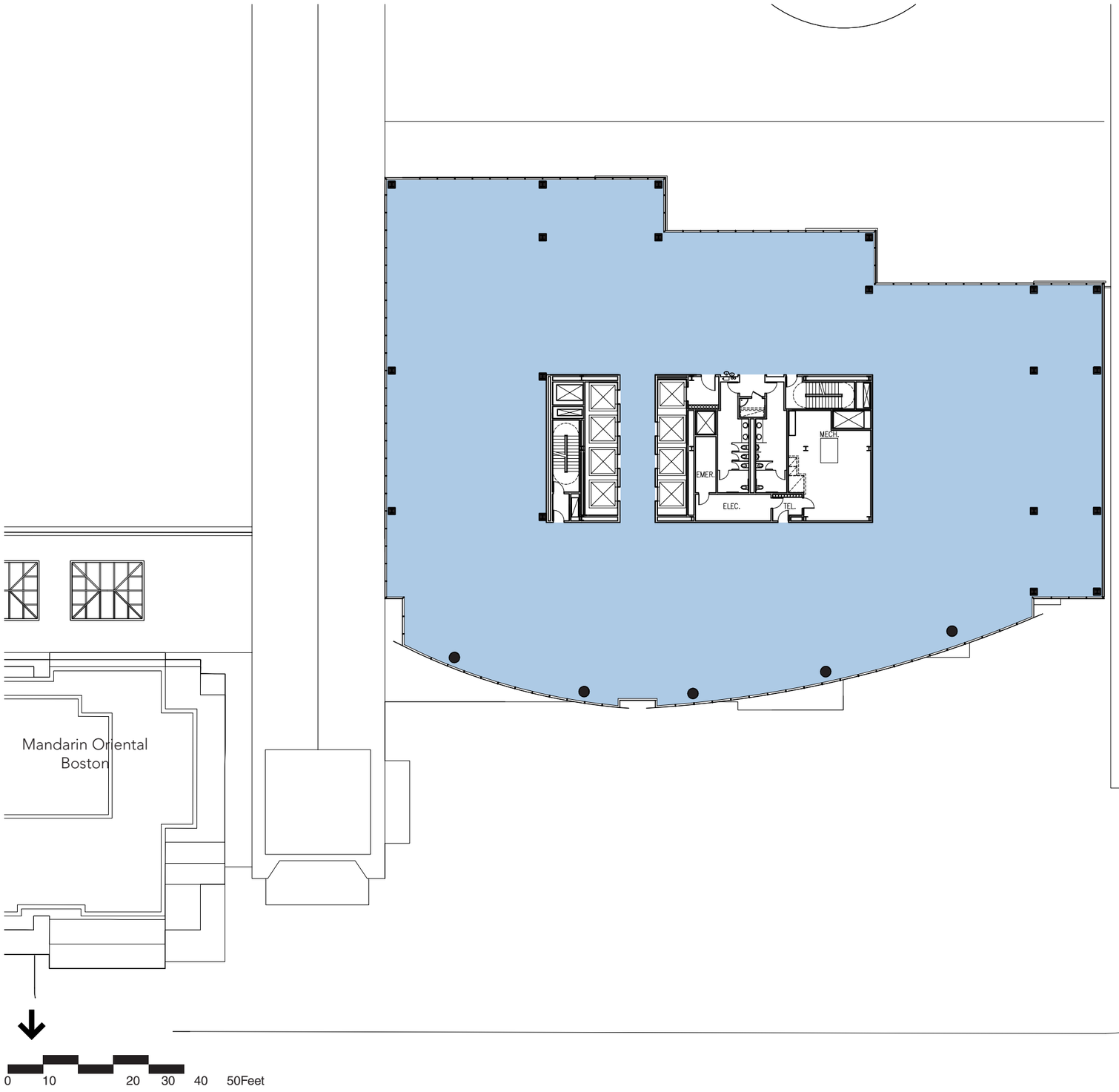


Figure 3-23
Typical Office Floor - 888 Boylston

Figure 3-24
North Elevation - 888 Boylston

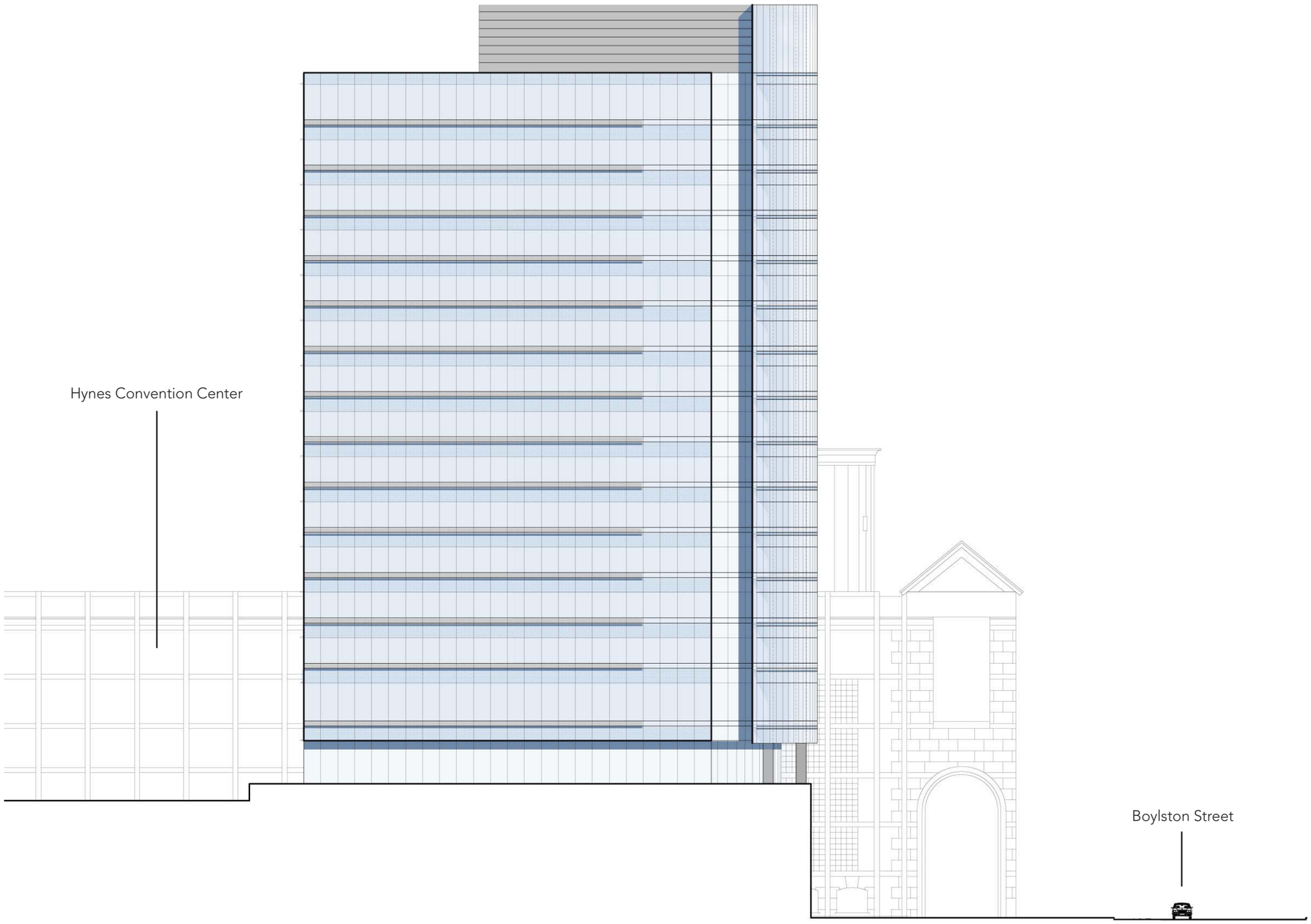


Figure 3-25
East Elevation - 888 Boylston

0 10 20 30 40 50Feet

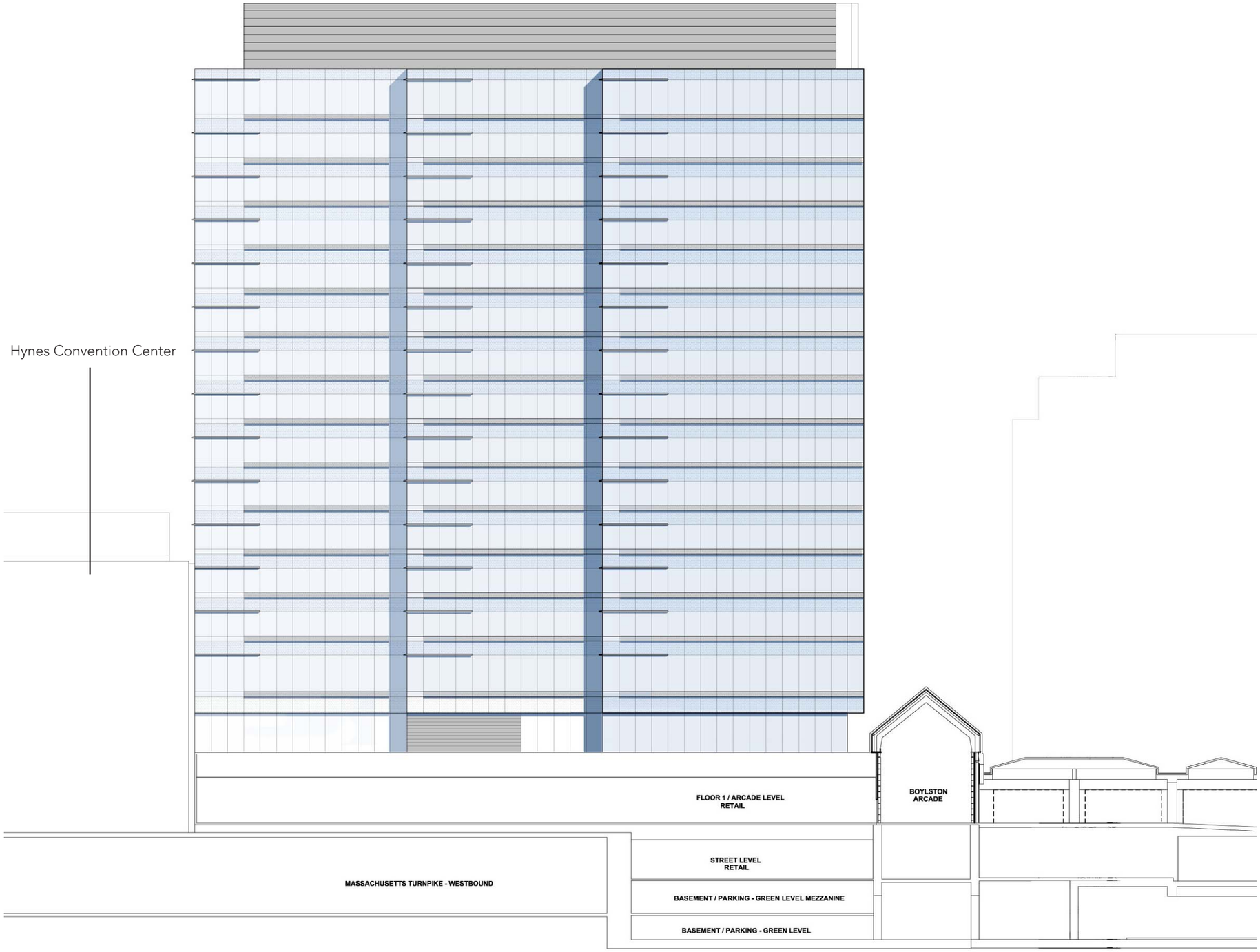


Figure 3-26
South Elevation - 888 Boylston

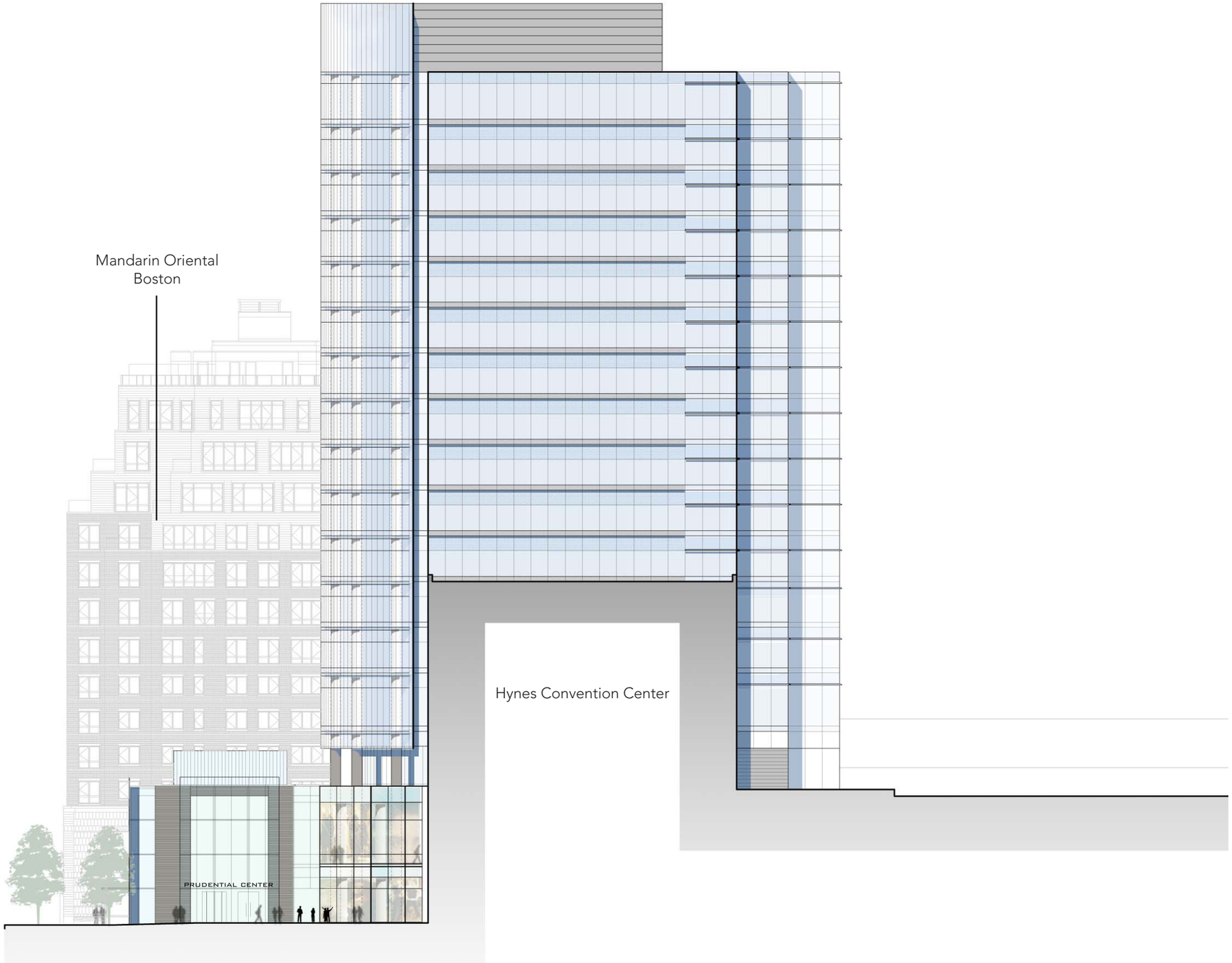


Figure 3-27
West Elevation - 888 Boylston

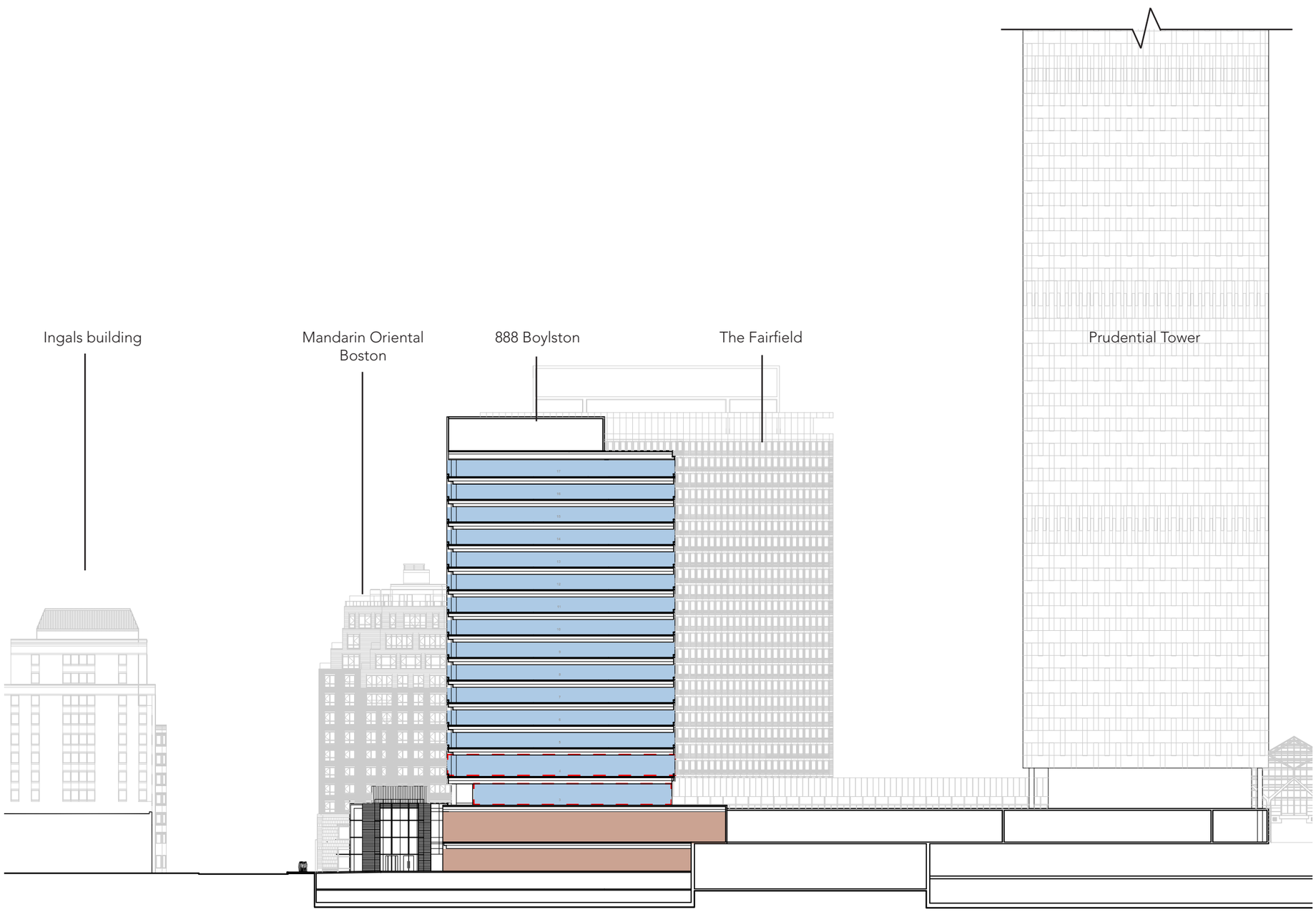


Figure 3-28
Site Section North/South - 888 Boylston

Legend

- Lobby
- Retail
- Office
- Residential
- Office/Retail

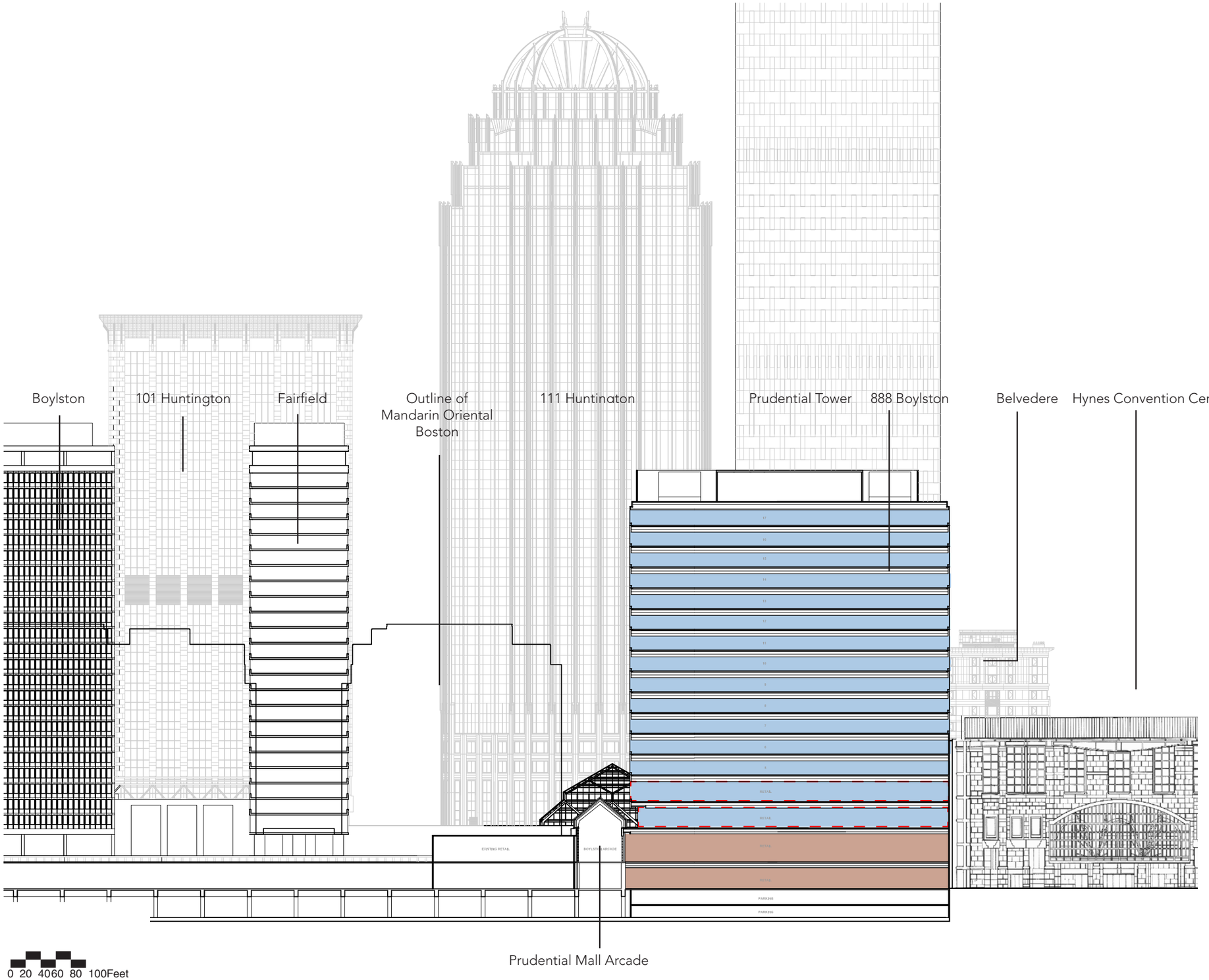
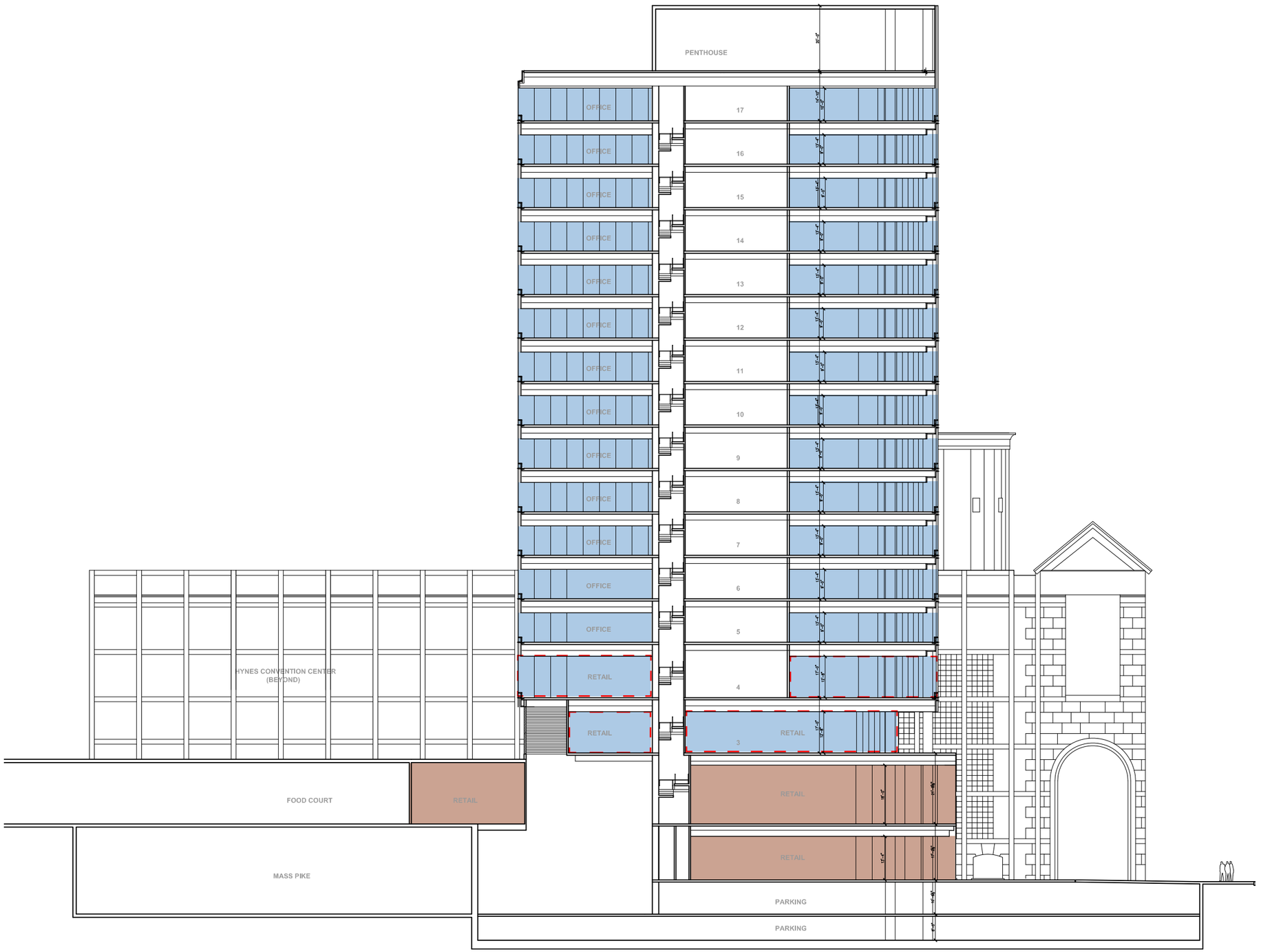


Figure 3-29
Site Section East/West - 888 Boylston

Exeter Residences \ 888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

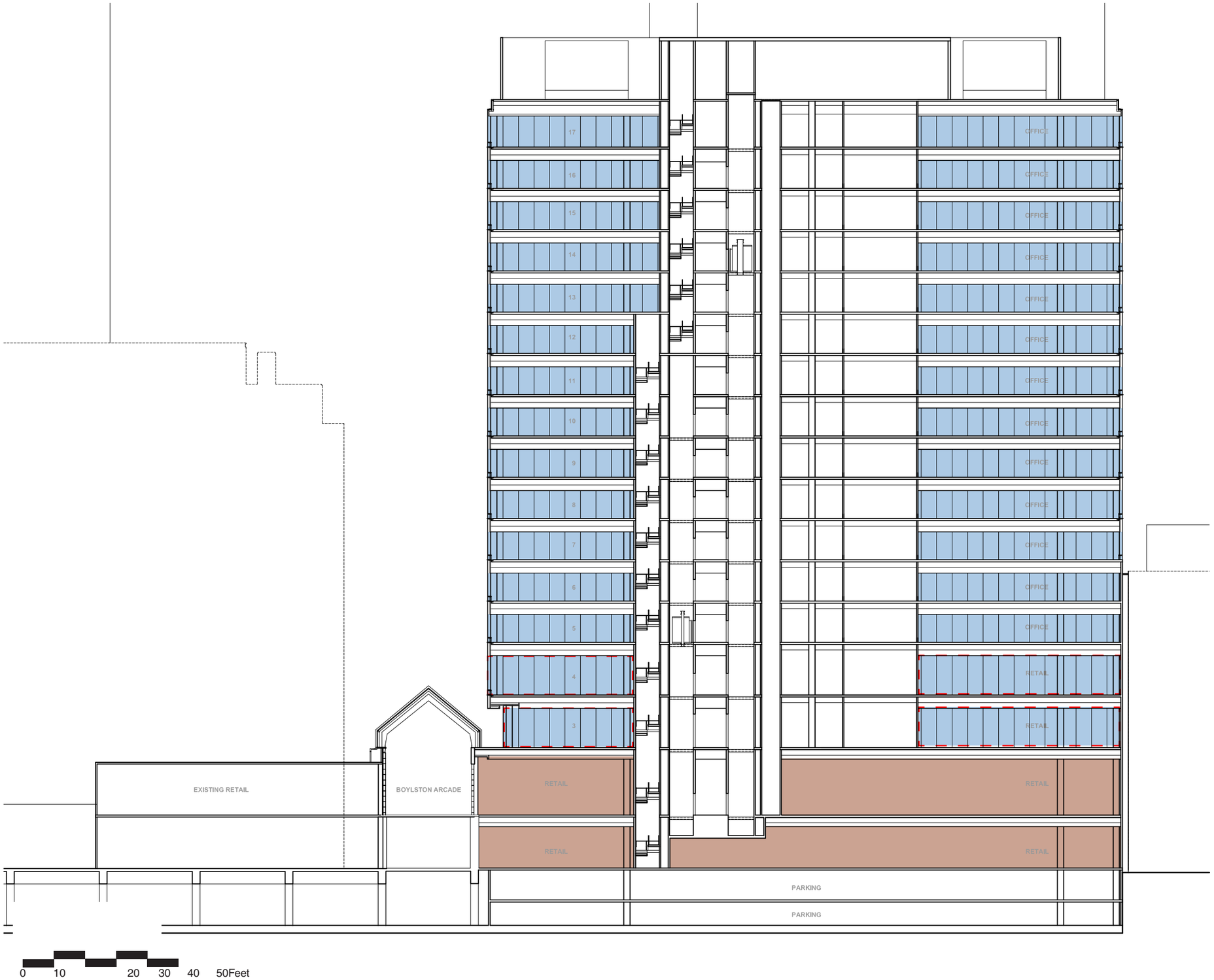


Legend

- Lobby
- Retail
- Office
- Residential
- Office/Retail

0 10 20 30 40 50Feet

Figure 3-30
Cross Section North/South - 888 Boylston



Legend

- Lobby
- Retail
- Office
- Residential
- Office/Retail

Figure 3-31
Cross Section East/West - 888 Boylston

4 Transportation

This chapter was prepared for the DPIR to supplement the Transportation chapter documented in the NPC/PNF. Specifically, this section updates the NPC/PNF and provides detail regarding the additional scoped items requested by the Boston Redevelopment Authority and City agencies. This includes additional detail on existing and proposed Exeter/Blagden Street operations; pedestrian and bicycle operational evaluations, garage capacity and management information; and measures employed to accommodate new parking nests. Information regarding the added transit trips represented by the Project (effect on Green Line capacity), and Transportation Demand Management (TDM) measures also has been included. The remaining transportation analyses studied pursuant to Article 80 Large Project review guidelines are located in Chapter 5 of the original NPC/PNF document with additional information in the **Technical Appendices**.

4.1 Introduction

This chapter presents an evaluation and summary of existing and future transportation infrastructure and operations. It quantifies and discusses the differences between the transportation impacts of the approved Prudential Center Redevelopment project and the augmented program, which proposes new construction as Phase 6 (Exeter Residences) and includes modifications to Phase 4a (888 Boylston).

The Project site is exceptionally located as a Transit Oriented Development (TOD) site with convenient access to four branches of the Green Line, as well as the Orange Line and the Commuter Rail at Back Bay Station. Various bus routes are available at the Prudential Center enabling diverse access. The context of the site, within easy reach of a wide range of services and retail establishments, limits vehicle trips and promotes pedestrian and public transit use.

This chapter supplements the transportation study included in the NPC/PNF for the Project pursuant to Article 80 of the City of Boston Zoning Code.

This chapter specifically addresses the Scoping Determination that was issued by the Boston Redevelopment Authority (BRA) on February 15th, 2008. Specifically, this

Chapter includes additional detail on existing and proposed Exeter/Blagden Street operations; pedestrian and bicycle operational evaluations, garage capacity and management information; and measures employed to accommodate new parking nests. Information on the added transit trips represented by the Project (effect on Green Line capacity), and Transportation Demand Management (TDM) measures also have been included.

This study also addresses issues raised by the Boston Transportation Department (BTD) dated December, 14th, 2007, the PruPAC Committee Reports and by the City Agency Comments. Key issues discussed in this DPIR relate to vehicular and pedestrian operations and parking and queuing conditions along Exeter Street and Blagden Street.

As discussed in Chapter 1 of this DPIR, the Prudential Center Development Plan updated through 2002, did not contain specific plans for a development component for Phase 6. The approved Phases 4a included 219,996 square feet of office space, 48,990 square feet of retail space on two floors and 18,507 square feet of common space.

The current proposal for the Exeter Residences (Phase 6) is up to 188 apartments of residential housing in a building with a total area of 240,670 residential square feet in 27 residential stories with 1,330 square feet of ground floor retail. The total area is 242,000 square feet.

The proposed program for 888 Boylston will add to the previously approved building 142,044 SF of office, 1,274 SF of common and reduce the retail component by 8,719 SF for a total of 134,559 SF. The space on the third and fourth floors may be developed either as retail or office depending on the market demand. Accordingly, the retail space may range from 40,000 to 100,000 S.F. and the office may range from 304,000 to 362,000 S.F.

This chapter covers vehicular traffic, pedestrian access, public transportation and parking conditions along Exeter Street., Boylston Street and Huntington Avenue in the vicinity of the two sites. Future operating conditions were evaluated to determine any potential deficiencies and to identify any appropriate mitigation measures.

The location of the two proposed buildings is depicted in **Figure 4-1**.

In order to fully assess the incremental demand and related transportation network performance, each new program component (Exeter Residences and the new program related to 888 Boylston) was presented individually and then together, in the original analysis, submitted with the NPC/PNF.

However, in response to comments on the NPC/PNF, this DPIR includes a supplemental analysis of the Exeter Street corridor between Boylston Street and Huntington Avenue which, for simplicity, evaluates the impact of site generated trips for the full build condition (Exeter Street up to 188 apartments and 17 stories for 888 Boylston together). This supplemental analysis also provides a detailed analysis of the Exeter Street and Blagden Street intersection.

4.2 Summary of Key Transportation Findings

The transportation analysis conducted for the Exeter Residences and 888 Boylston and included in the NPC/PNF demonstrated that adequate roadway capacity exists along Boylston Street and Huntington Avenue as well as the study area intersections, during peak hour traffic conditions. The supplemental analysis completed, and included in this DPIR, further indicates that Exeter Street and Blagden Street also show adequate capacity for handling peak traffic conditions. The small difference in site-generated vehicles, pedestrian and transit trips compared to the development program approved in the original Development Plan can be accommodated within the existing transportation networks. A summary of key findings of the transportation analysis as originally presented in NPC/PNF for the two buildings and supplemental analyses conducted for the Exeter Street/Blagden Street intersection is as follows:

- The highest combination of background and site-generated traffic will occur during the evening commuter peak hour between the hours of 4:00 to 6:00 PM, representing the critical analysis period for the Exeter Residences and 888 Boylston.

- The Exeter Residences program alone will generate approximately 20 vehicle trips in the weekday morning peak hour and 26 vehicle trips in the weekday evening peak hour while the 888 Boylston program is expected to generate approximately 199 and 201 vehicle trips during the weekday morning and evening peak hours respectively. The Exeter Residences and 888 Boylston together are projected to generate 219 vehicle trips during the weekday morning peak hour and 227 vehicle trips during the evening peak hour. Compared to the originally approved Development Plan program (which included an 11-story Boylston Street building) the Exeter Residences and 888 Boylston Street represent a net increase of 83 vehicle trips in the morning peak hour and 80 vehicle trips in the evening peak hour. It is anticipated that a majority of the trips made to the site will be transit or pedestrian (walking) trips.

- The traffic analyses were conducted to evaluate the impacts of the Exeter Residences and 888 Boylston buildings. The signalized intersections along Exeter Street will operate at an acceptable level of service (LOS) of D or better, during

the weekday morning and evening as well as during the midday Saturday peak hour under the future build conditions. Under the future build conditions the intersection of Exeter Street at Blagden Street will operate at LOS C during the weekday morning and at LOS E during the weekday evening and midday Saturday peak periods.BTD is in the process of performing signal timing and phasing changes in the Back Bay area and it is anticipated that these modifications will improve operating conditions to acceptable levels of service D or better at these study area locations.

- Vehicular access to the parking associated with the Exeter Residences residential building will be primarily via Exeter Street while East Ring Road will serve as the primary vehicular access point for the parking associated with the 888 Boylston building.

- The sidewalk area along the frontage of the two proposed buildings has been designed with adequate capacity to serve the residential, retail and office pedestrian uses.

- The Exeter Residences will include the addition of up to 132 new parking spaces located in a residential "nest" similar to the existing parking nests that serve the other Avalon residential buildings. These additional spaces will be established through re-organization and management of the existing Avalon at the Prudential Center garage nest spaces. 888 Boylston will provide 177 new spaces by an insertion of a mezzanine parking deck and management of existing parking areas in the proximity of the proposed building space. The parking for 888 Boylston will also be located in a nest area separate from public and residential parking.

- All parking supporting the Exeter Residences and 888 Boylston will be established within the current Prudential Center garage limits. No changes to the existing access points into and out of the garages are proposed. In addition, the parking modifications are not expected to notably change travel patterns and access routes within the garage. Furthermore, the Project modifications will not reduce the Prudential Center Garage's capacity for public parking.

- The street level of 888 Boylston offers an office lobby entrance and a significant retail space entered from the plaza to insure a dynamic plaza edge and street presence. Additional information on the design of the Boylston plaza is contained in the Urban Design section in Chapter 3 of this DPIR. The lobby offers a direct link, via escalators, to the Boylston Arcade, the Newbury Arcade, the Mandarin Oriental Boston and the interior plaza spaces within the Prudential Center.

- The Proponent is committed to providing and enhancing a wide array of Transportation Demand Management (TDM) measures offered to employees and

residents as a means to encourage the use of alternative transportation modes. The TDM measures will also include the installation of bike racks and signage at appropriate locations near the proposed buildings to accommodate bicycle users and to promote bicycling to the sites. A detailed list of TDM actions is presented in the NPC/PNF and Section 4.7, Transportation Demand Management in this DPIR.

- New transit trips will be distributed among all available transit lines, thereby minimizing the impact on the Green Line capacity.

4.3 Study Methodology

The initial study which included six signalized intersections along Boylston Street and Huntington Avenue, was conducted in three distinct stages (Existing Conditions, Future Design Conditions and Mitigated Conditions), and the results were presented in the transportation section of the NPC/PNF. The initial study was based on a more intense program based on up to 200 apartments for the Exeter Residences and 19 stories for 888 Boylston. To address comments from City agencies and neighborhood groups on operational issues on Blagden Street, an additional intersection (Exeter Street at Blagden Street) has been investigated and included in the traffic analyses for this DPIR. This supplemental analysis follows the same methodology as presented in the NPC/PNF and is based on a "Proposed Program" of 17 stories for 888 Boylston and up to 188 apartments for the Exeter Residences, which is slightly less intensive than the Proposed Program presented in NPC/PNF.

Study Area

The study area for the transportation study in this DPIR includes the following roadway corridors:

- Boylston Street
- Huntington Avenue
- Exeter Street
- Blagden Street

Roadway characteristics, vehicular activities and pedestrian facilities were inventoried and analyzed for the area along the above listed roadways.

The following intersections were evaluated and included in the traffic analyses:

- Boylston Street at Exeter Street,
- Huntington Avenue at Exeter Street/ Stuart Street,

- Exeter Street at Blagden Street.

Figure 4-2 illustrates the study area roadways and intersections for the traffic, pedestrian and parking assessments.

■

Design Analysis Condition

The analysis of the Prudential Center Redevelopment project approved under the original Development Plan and the currently proposed program focused on the weekday morning, weekday evening and Saturday peak commute hours, because the peak traffic generating periods were projected to be consistent with these times. The weekday evening peak hour represents the critical transportation analysis condition for the new program, which is the period of greatest combined area traffic and site-generated traffic. Impacts to transportation facilities in the study area are projected to be less during off-peak times when overall traffic volumes are much lower. This design condition is consistent with the analyses presented in the NPC/PNF document.

■

Vehicular Traffic

This transportation study analyzed and compared traffic operations under the 2011 Build condition for the original Development Plan program, including the approved Phase 4a (11 story building), with traffic operations under the 2011 Build Condition using the development program for Phases 6 (27 story building and up to 188 apartments) and 4a (17 story building).

4.4 Existing Conditions

As described in the following sections, the traffic analysis includes roadway geometrics, traffic controls, peak hour traffic, pedestrian and bicycle flows, transit availability and utilization, trip generation and trip distribution as well as parking and loading services. The initial part of this section describes existing access characteristics of the proposed development. Subsequent sections describe and quantify transportation characteristics of the entire study area as required by the BTD for a DPIR.

Extensive supplemental field observations were conducted in spring of 2008, with focus on the Exeter Street corridor between Boylston Street and Huntington Avenue including the intersection of Exeter Street and Blagden Street. Detailed discussion of the data effort is presented in the following sections.

■

Existing Transportation Infrastructure

This section describes the existing transportation infrastructure including roadway conditions, intersection conditions, parking, crash analysis, public transportation, and pedestrian and bicycle conditions.

Existing Roadway Conditions

The principal roadways investigated in this DPIR and illustrated in **Figure 4-2**, are briefly described below. The description of the roadways includes physical characteristics, geometric conditions and traffic control measures.

Boylston Street

Boylston Street is a principal arterial beginning at its intersection with Brookline Avenue in the Fenway neighborhood to the west and ending at its intersection with Washington Street in Chinatown to the east. Near the site, Boylston Street traverses one-way eastbound with five 10-foot lanes and a total width of approximately 50 feet. Currently portions of Boylston Street are under construction and reduced to two through-lanes. Under normal conditions, through traffic operations occur in three lanes, with two lanes being used for parking if allowed and/or parking maneuvers. The signalized intersections on Boylston Street are interconnected as part of the city's computerized signal system. Sidewalks varying in width from 10 feet to 18 feet exist along both sides of Boylston Street.

Huntington Avenue

Huntington Avenue is a major arterial traveling from Dartmouth Street in Back Bay and ending south of the Longwood Medical Area before becoming South Huntington Avenue. Near the site, Huntington Avenue is two to three lanes wide in each direction south of Exeter Street and one-way southbound with four travel lanes north of Exeter Street. The signalized intersections on Huntington Avenue are interconnected as part of the City's computerized signal system. Sidewalks varying in width from 12 feet to 18 feet exist along both sides of Huntington Avenue.

Exeter Street

Exeter Street is a one-way roadway running perpendicular to Boylston Street beginning at Beacon Street in the Back Bay and ending at the intersection with Huntington Avenue in the south. The roadway width varies across the entire length and crosses Boylston Street running southward, with a width of approximately 25

feet. After the intersection with Boylston Street, two travel lanes are formed, 13 feet each, with parking on both sides totaling a width of 42 feet. The roadway is controlled by signals at the Boylston Street and Huntington Avenue intersections. Metered parking is available on both sides of Exeter Street with various loading activities occurring during the off-peak hours. Traffic on Exeter Street is usually light until 8:00 AM. It becomes slightly congested around 8:45 AM. Loading operations for the Shaw's Supermarket and the residential buildings occur at the corner of Huntington Avenue and Exeter Street. These loading operations do not cause major delay or queues on Exeter Street as the trucks arrive sporadically between the hours of 4:00 AM and 2:00 PM. However, unexpected valet service and deliveries combined with truck operations at the Copley Square and Marriott hotels, tend to create some minor delays, due to double parking of vehicles along Exeter Street.

Blagden Street

Blagden Street is a one-way roadway running parallel to Boylston Street in the westbound direction. It begins at its intersection with Dartmouth Street in the east, ending at its intersection with Exeter Street to the west. Blagden Street has one 16 foot travel lane and metered parking on both sides of the roadway, totaling a width of 32 feet. Sidewalks varying in width from 6 feet to 11 feet exist along both sides of Blagden Street.

Study Area Intersections

The supplemental study area intersections that are included in the analysis are described below and illustrated in **Figure 4-3**. The description of the intersections includes physical characteristics, geometric conditions, pedestrian facilities and traffic control measures.

Boylston Street at Exeter Street

The Boylston Street/Exeter Street intersection is a four-legged intersection that operates under a three-phase signal control, including a pedestrian phase. At this intersection, Boylston Street operates in a one-way eastbound direction, and Exeter Street operates in a one-way southbound direction. Metered parking is provided along the north side of Boylston Street, and along both sides of Exeter Street just north of the intersection and on the east side of Exeter Street just south of the intersection. Valet parking for the Lenox Hotel is located along the southeast corner of this intersection. Pedestrian crosswalks are provided along three approaches of the intersection. Sidewalks are located along both sides of Boylston Street and Exeter Street. Sidewalk width on Exeter Street ranges between eight feet on the west side and 18 feet on the east side.

Huntington Avenue at Exeter Street/Stuart Street

The Huntington Avenue at Exeter Street/Stuart Street intersection is a six-legged intersection that operates under a four-phase signal control with pedestrians crossing concurrently with un-opposing vehicle phases. The southbound Exeter Street approach provides two unmarked travel lanes. Stuart Street operates eastbound away from the intersection with three receiving lanes. Huntington Avenue is one-way and provides four westbound travel lanes to the east of the intersection and is two-way with three approach lanes to the west of the intersection. Parallel to Huntington Avenue's westbound approach is Hotel Drive which serves the Copley Square Hotel and provides one travel lane in the westbound direction. The Copley Parking garage is located to the south of the intersection with its entrance and exit controlled by the signal. On-street, metered parking is allowed on both sides of Exeter Street. The Boston Duck Tours main pickup and drop-off location is located on the northwest side of the intersection, along Huntington Avenue. Pedestrian crosswalks are provided along all of the approaches of the intersection. Sidewalks are located along both sides of Huntington Avenue, Exeter Street and Stuart Street.

Observations at this intersection undertaken for the NPC/PNF document process indicated that the signal timings present internal to the controller did not match the BTD's UTCS programming. In addition, pedestrian crossing times especially across Huntington Avenue are insufficient, causing operational and safety issues. However, BTD is currently in the process of re-programming the signal timing and phasing for the entire Back Bay area which BTD believes should improve the operational and safety issues in the area.

Exeter Street at Blagden Street

The Exeter Street/Blagden Street intersection is a three-legged unsignalized intersection, where Exeter Street operates as a one-way southbound direction, and Blagden Street operates in a one-way westbound direction. Metered parking is provided along both sides of Exeter and Blagden Streets. Pedestrian crosswalks with wheelchair ramps are provided on both approaches of the intersection. Sidewalks are located along both sides of Exeter Street and Blagden Street.

■

Existing Traffic Conditions

An extensive transportation data collection program was conducted in April of 2008. This new data supplements the original traffic counts that were collected in September of 2006 for the NPC/PNF document, as well as support the development of existing condition traffic networks. This additional effort included manual turning movement counts for the intersection of Exeter Street at Blagden Street, an automatic

traffic recorder count on Blagden Street between Exeter Street and Dartmouth Street, as well as bicycle counts on Boylston Street, Huntington Avenue, intersection of Boylston and Exeter, intersection of Exeter and Blagden and intersection of Exeter and Huntington Avenue. In addition to the counts, extensive field observations were conducted over a one week period on Blagden Street and Exeter Street to observe operations related to vehicle queuing, parking, pedestrian and bicycle activities and loading. Traffic count locations are illustrated in **Figure 4-4**.

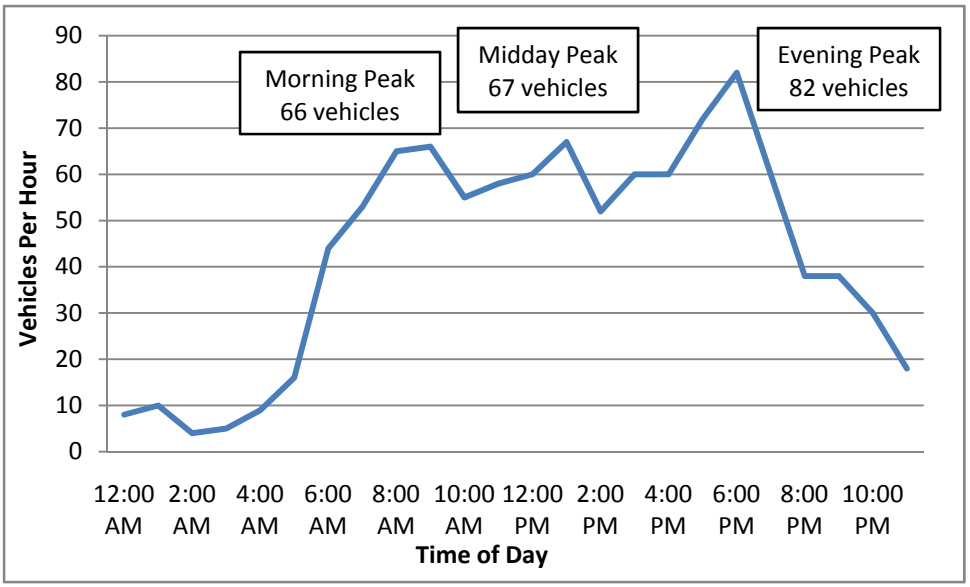
Turning Movement Volumes

Turning movement counts (TMCs) were conducted at the supplemental intersection of Blagden Street and Exeter Street from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM on Thursday April, 3rd and 2:00 PM to 6:00 PM on Saturday March 29th. In addition VHB staff conducted peak hour counts in May 2008 at intersections Boylston Street/Exeter Street and Huntington Avenue/Exeter Street to supplement the original 2006 count data. In order to successfully supplement the initial traffic model as presented in the NPC/PNF with 2006 data, the 2008 counts collected for the Exeter Street and Blagden Street intersection were reduced by 1% per year for two years, to represent 2006 Existing Condition. This 2 percent reduction is consistent with the growth rate used in the NPC/PNF document for this Project. This growth rate was approved by BTD staff to be appropriate for the analyses used in the DPIR. **Figures 4-5** and **4-6** present the resulting Weekday and Saturday peak hour traffic volumes.

Hourly Traffic Variation

Hourly traffic variations on Blagden Street were identified by conducting one automatic traffic recorder (ATR) count over a 48-hour period from April 2, 2008 to April 4, 2008. This data serves as the basis for identifying the critical design period for the intersection with Exeter Street, and illustrates the pattern of traffic flow in the study area as influenced by other nearby activities. The weekday ATR count summary is presented in **Figure 4-7**.

Figure 4-7
Average Weekday Daily Traffic Summary on Blagden Street



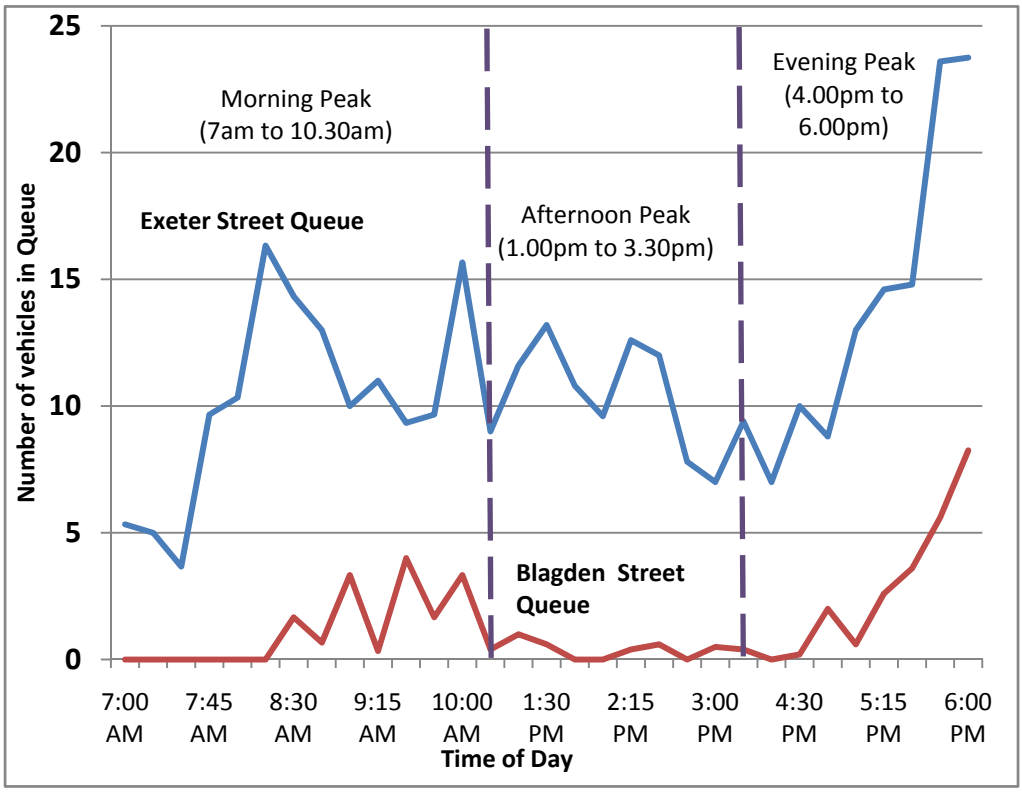
The ATR data indicates that traffic activity on Blagden Street peaked around 6:00 PM, which is consistent with the evening commuter travel period. There were 82 vehicles during the evening peak hour. Traffic flow was less during the morning commuter travel period between 8:00 AM to 9:00 AM, with 66 vehicles per hour.

As presented in the NPC/PNF document, Huntington Avenue volumes peaked in the eastbound direction between 6:00 PM and 7:00 PM with 1,270 vehicles and in the westbound direction between 5:00 PM and 6:00 PM with 688 vehicles. During the morning, the Huntington Avenue eastbound direction peaked between 8:00 AM and 9:00 AM with 1,014 vehicles while the westbound direction did not peak until the period of 11:00 AM to 12:00 PM with 618 vehicles. According to the TMCs, performed on Saturday, traffic was heaviest around 4:00 PM at the majority of the study intersections along Boylston Street and Huntington Avenue.

Observed Intersection Queue Lengths

Intersection queue lengths were observed by VHB on Exeter Street and Blagden Street over several days during the weeks of April 7, April 14, and May 5, 2008. The collected data is presented in **Figure 4-8** below. Collection periods included the morning peak 7:00 AM to 10:00 AM, afternoon peak 1:00 PM to 3:00 PM, and evening peak 4:00 PM to 6:00 PM.

Figure 4-8
Average Weekday Queue Lengths on Exeter Street and Blagden Street



As presented in the figure above, the Exeter Street queue peaks around 8:00 AM during the morning, 1:30 PM during the early afternoon and 6:00 PM in the evening peak hour. Similarly, the queues on Blagden Street increase slightly around 9:30 AM during the morning, and 6:00 PM in the evening peak hour. The maximum queue on Blagden Street was observed to be 8 cars at 6:00 PM. During the rest of the day, hardly any queues were observed on Blagden Street. It should be noted that queues on Blagden Street are directly related to the queues on Exeter Street, since a red traffic signal on Exeter Street at Huntington Avenue intersection causes a queue to form on Exeter Street which ends up limiting the flow of Blagden Street traffic. Double parked vehicles and crossing pedestrians are another cause for increased queuing on both streets. With both Exeter Street travel lanes undisturbed, about 1000 feet of storage length is available, which results in available queue storage for about 50 cars total (25 cars per lane). During the observation period the average queue lengths reached a maximum of 24 vehicles total (12 each lane) never backing up to Boylston Street.

Observed Traffic Flow Disturbances

As mentioned in the previous section, queue lengths on Exeter and Blagden Streets were caused not only by the red signal at Huntington Avenue, but by double parked vehicles which also contributed to less than ideal traffic flow. During the April 2008 data collection, in addition to queue length observations, several traffic flow disturbances (in this case double parked vehicles), were also recorded. VHB staff logged the number of vehicles that were double parked (related to the Copley Square and Marriott hotels valet, delivery or loading operations) on Exeter Street and Blagden Street, for seven days. The observed data collection sheets are provided in the **Technical Appendices**.

The logs show that in fact double parking on the street does hinder traffic flow, and therefore increases queue length, since vehicles have to merge from one lane into the other in order to pass double parked cars. The merging in turn slows the traffic and causes a slight delay. Although this delay caused minor interruption to traffic operations, the overall operations on Exeter Street and Blagden Street did not significantly change the level of service. Detailed field logs are included in the **Technical Appendices**.

■

Existing Traffic Operations

Level-of-service (LOS) is the term used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including roadway geometry, speed, travel delay, freedom to maneuver and safety. Level-of-service provides an index to the operational qualities of a roadway segment or an intersection. Level-of-service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. The evaluation criteria used to analyze area intersections and roadways are based on the 2000 *Highway Capacity Manual* (HCM)[1] and the latest version of the SYNCHRO traffic software (version 6.0), LOS D or better are considered to be acceptable levels of service.

Level-of-service designation is calculated differently for signalized and unsignalized intersections and for roadway links. For signalized intersections, the analysis considers the operation of each lane or lane group entering the intersection and the level-of-service designation is for overall conditions at the intersection. For un-signalized intersections; however, the analysis assumes that traffic on the mainline is not affected by traffic on the side streets. The level-of-service is only determined for left turns from the main street and all movements from the minor street. The overall

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[1] Transportation Research Board, Highway Capacity Manual, Special Report 209, Washington, D.C., 2000

level-of-service designation is for the most critical movement which is most often the left turn out of the side street**. Table 4-1** shown below, presents level of service criteria as set by the HCM.

Table 4-1
Level of Service Criteria

Level of Service	Unsignalized Intersection Delay (sec/veh)	Signalized Intersection Delay (sec/veh)
A	0-10	0-10
B	>10-15	>10-20
C	>15-25	>20-35
D	>25-35	>35-55
E	>35-50	>55-80
F	>50	>80

Source: Highway Capacity Manual (Transportation Research Board, 2000).

The analysis utilizes the evening peak hour as the worst case scenario for analyzing network performance, since the study area performs better in the morning peak hour. This is consistent with the findings of the FEIR for the Prudential Center and the NPC/PNF.

Table 4-2 presents a summary of the results of the existing conditions analysis. It should be noted that since the filing of the NPC/PNF, BTD had made several changes to the signal timing and phasing sequence to the signalized intersections in the Back Bay area. The traffic analyses presented in this DPIR were performed using an adjusted SYNCHRO model which includes signal timing and phasing adjustments as recently implemented by BTD for the entire Back Bay area. As presented in the table below, all study area intersections operate at acceptable levels of service (LOS D or better) under the existing condition during the weekday morning, weekday evening and Saturday peak. Detailed Synchro reports are included in the **Technical Appendices**.

Table 4-2
2006 Existing Condition Capacity Analysis Summary
(Signalized Intersections)

	2006 Existing Conditions		
	V/C*	Delay**	LOS***
MORNING PEAK HOUR			
Boylston Street/ Exeter Street	0.35	20.9	C
Huntington Avenue / Exeter Street / Stuart Street	0.45	40.0	D
EVENING PEAK HOUR			
Boylston Street/ Exeter Street	0.48	19.6	B
Huntington Avenue / Exeter Street / Stuart Street	0.57	33.4	C
SATURDAY PEAK HOUR			
Boylston Street/ Exeter Street	0.49	21.4	C
Huntington Avenue / Exeter Street / Stuart Street	0.76	42.5	D

* Volume-to-Capacity ratio.
** Average vehicle delay expressed in seconds per vehicle.
*** Level-of-service.

Table 4-3
2006 Existing Condition Capacity Analysis Summary
(Unsignalized Intersections)

	Critical	2006 Existing Conditions		
	Movement	Demand*	Delay**	LOS***
MORNING PEAK HOUR				
Exeter Street/ Blagden Street	Westbound-LT[1]	30	14.8	B
EVENING PEAK HOUR				
Exeter Street/ Blagden Street	Westbound-LT[1]	50	31.4	D
SATURDAY PEAK HOUR				
Exeter Street/ Blagden Street	Westbound-LT[1]	65	29.8	D

* Volume at critical movement.
** Average vehicle delay expressed in seconds per vehicle.
*** Level-of-service.
[1] LT – Left Turn

Table 4-3 presents a summary of the results of the existing conditions analysis, for unsignalized intersection Exeter Street at Blagden Street. The most critical intersection movement operates at an acceptable level of service (LOS D or better) under the existing condition, during the weekday morning, weekday evening and Saturday peak.

■

Public Transportation

The two buildings are well served by public transportation. This includes three Massachusetts Bay Transportation Authority (MBTA) bus lines, the orange and green subway lines and commuter rail service, as shown in **Figure 4-9**. All four branches of the Green Line are accessible at Copley Station, located within one-quarter mile of the Exeter Residences and slightly over one-quarter mile from 888 Boylston.

Additionally, the Boston College (B), Cleveland Circle (C) and Riverside (D) branches can be accessed at the Hynes Convention Center station located within one-quarter mile of 888 Boylston and within one-half mile of the Exeter Residences. The Arborway (E) branch can be accessed from the Prudential Station located within one-quarter mile of both buildings.

Access to the Orange Line as well as the Attleboro/Stoughton, Needham and Framingham/Worcester Commuter Rail lines is possible from Back Bay Station located on Dartmouth Street less than one-half mile from the two sites. The Prudential Center can be accessed completely indoors from Back Bay Station via an underground tunnel. The Orange Line provides service north through Boston and Charlestown to the northern suburbs and south through Roxbury to Jamaica Plain.

Three MBTA bus routes serve the immediate areas near the site. Route 39 travels from Back Bay station near the Project site to Forest Hills station to the south. It operates along both Huntington Avenue and Boylston Street near the site and runs with 5 minute headways during the peak hours. Route 55 carries passengers from Park Street station to the Fenway neighborhood and typically operates with 30 minute headways throughout the day. It also operates along both Huntington Avenue and Boylston Street near the site. Route 9 provides service between City Point in South Boston and Copley Station. It uses East Ring Road within the site to turn around and operates with headways of approximately 10 minutes during the peak commuting periods.

■

Pedestrians and Bicycles

In accordance with the Scoping Determination and comments received on the NPC/PNF document, pedestrian and bicycle activities were observed and recorded

at the study area intersections during the weekday morning, weekday evening and Saturday peak hours. The following section discusses pedestrian and bicycle facilities and details peak hour flows in the study area.

Existing Pedestrian Facilities

The Boylston Street and Huntington Avenue corridors experience a significant amount of pedestrian activity in the vicinity of the Project area. The Prudential Center Redevelopment, currently overseen by the Proponent, has constructed a substantial number of improvements to accommodate pedestrians including the retail arcade network, the connections to Back Bay station and Copley Place and numerous streetscape improvements improving the public pedestrian environment. These improvements enable pedestrian connections between the surrounding neighborhoods and to the services at the Prudential Center.

Peak Hour Pedestrian Volumes

Pedestrian intersection crossing volume counts were conducted concurrently with traffic volume counts, and were supplemented with field observations. The 2006 Existing Condition Weekday Morning, Evening and Saturday Peak Hour Pedestrian Volumes are shown in **Figures 4-10** and **4-11**, respectively.

Intersection Pedestrian Level of Service Analysis

A quantitative assessment of pedestrian level of service (LOS) was conducted for all crosswalks at signalized study area intersections of Boylston Street at Exeter Street, and Huntington Avenue at Exeter Street. LOS is represented by a letter grade ranging from "A" (best) to "F" (worst) that is based upon the delay that pedestrians experience at the intersection while waiting to cross. LOS D is considered to be an acceptable level of service. LOS "E" and "F" are generally considered to be associated with long delay, and therefore high likelihood of non-compliance.

The methodology for conducting pedestrian LOS analysis is based on the 2000 Highway Capacity Manual (HCM). The HCM does not apply to zebra striped crosswalks at unsignalized intersections since Massachusetts law requires vehicles to yield to pedestrians in crosswalk. The HCM methodology takes into account the total walk time pedestrians endure during each signal cycle and the crossing distances. The volume of pedestrians is not considered in the LOS criteria for signalized intersections.

Table 4-4 below, as taken from the HCM, provides LOS criteria for signalized and unsignalized intersections, based on delay.

Table 4-4
Pedestrian Level of Service (LOS) Criteria

Level-of- Service	Signalized Pedestrian Delay (in seconds)
A	<10
B	10-20
C	20-30
D	30-40
E	40-60
F	>60

Source: 2000 HCM

Table 4-5 presents a summary of the pedestrian analyses for signalized study intersections for the morning, weekday evening and Saturday midday peak hours under Existing (2006) conditions.

Table 4-5
Pedestrian Level of Service Summary, Existing (2006) Weekday Condition

Intersection	Crosswalk	Morning Peak Hour Average Pedestrian Delay (seconds)	Morning Peak Hour LOS[1]	Evening Peak Hour Average Pedestrian Delay (seconds)	Evening Peak Hour LOS[1]	Saturday Peak Hour Average Pedestrian Delay (seconds)	Saturday Peak Hour LOS[1]
Boylston Street at	North	43.2	E	43.2	E	38.3	D
Exeter Street	South	43.2	E	43.2	E	38.3	D
	East	46.1	E	46.1	E	41.1	E
	West	46.1	E	46.1	E	41.1	E
Huntington Avenue at	North	47	E	47	E	43	E
Exeter Street	South	51	E	51	E	47	E
	East	48	E	48	E	44	E
	West	49	E	49	E	45	E

1 Pedestrian Level-of-Service

As shown in **Table 4-5,** the crosswalks at the intersections of Boylston Street and Exeter Street currently operate at LOS E during the weekday peak hours under existing conditions, and for the Saturday peak the intersection of Boylston and Exeter operates at LOS E in the east/west direction and LOS D in the north/south direction.

The pedestrian LOS at Huntington Avenue at Exeter Street operates at LOS E for all weekday and Saturday peak periods.

The primary reason for the LOS E at the study area intersections is the fact that both intersections operate at a cycle length of 100 seconds in the AM and PM peaks, and 90 seconds on Saturday and pedestrians have to wait to cross concurrently with the vehicles, resulting in longer delays for the pedestrians. These conditions for pedestrians at signalized intersections would be expected to prevail in the future, absent any changes in pedestrian accommodations, or changes in signal phasing or timing. However, it is anticipated that pedestrian level of service will improve upon the implementation of BTD's signal timing and phasing re-programming which is currently underway for the Back Bay area.

Pedestrian Traffic Variation

Pedestrian traffic variations near the site were identified by conducting morning (7am to 10am), afternoon (1pm to 3pm), and evening (4pm to 6pm) counts over several days during the weeks of April 7, April 14 and May 5, 2008, on both the Exeter Street and Blagden Street sidewalks. The pedestrian counts conducted for the morning, afternoon and evening peak hours on a 15 minute basis, showed that pedestrian activity was low to medium, for most of the study period. Low activity for the purposes of this study is defined as less than twenty pedestrians, and medium activity is between twenty and one hundred pedestrians. A slight increase in pedestrian traffic was recorded during only one day of the observation period. This increase occurred on a Friday afternoon (two days before the Boston Marathon), where about thirty pedestrians were observed walking on the Exeter Street sidewalks. This increased pedestrian activity is a typical and can be attributed to visitors and supporters of the Marathon. Detailed count sheets are available in the **Technical Appendices**.

Bicycle Accommodations

There are no specific on-street or off-street bicycle facilities in the study area, and cyclists must generally share travel lanes with vehicular traffic. However, overall, Back Bay is supported by the Paul White bicycle path along the Charles River, connections through Boston Common to Downtown and Beacon Hill, and the South-West corridor bike path from Forest Hills to Back Bay station.

There are approximately nine bicycle racks in various locations in the public realm within the study area, including Boylston Street and Huntington Avenue that provide short-term bicycle parking. Bicycle racks in the Project site are shown in **Figure 4-2**.

Peak Hour Bicycle Volumes

Morning, evening and Saturday peak hour bicycle counts were conducted at each of the study area intersections. Peak hour bicycle volumes are presented in **Figures 4-12** and **4-13** for the morning, evening, and Saturday peak hours, respectively.

To quantify bicycle activity at key locations, bicycle counts were conducted in May 2008 at:

- The intersection of Boylston Street and Exeter Street
- The intersection of Exeter Street and Blagden Street
- The intersection of Exeter Street and Huntington Avenue
- Boylston Street between Fairfield Street and Gloucester Street
- Huntington Avenue between Belvidere Street and East Ring Road

The counts were performed during the AM and PM peak traffic hours on Thursday May 1, 2008 and during the midday peak on Saturday, May 3, 2008. The weather conditions were good on both days. The bicycle counts, similar to pedestrian and vehicle counts, were reduced (one percent per year) from year 2008 to year 2006, in order to correspond to data presented in the NPC/PNF. As illustrated in **Figures 4-12** and **4-13**, bicycle volumes are highest along Boylston Street.

■

Loading

As illustrated in the NPC/PNF, the Exeter Residences and 888 Boylston developments will utilize existing loading dock areas within the Prudential Center to accommodate the proposed program demands. Specifically, the Exeter Residences will utilize the Shaw's Supermarket dock (Shaw's dock, illustrated in **Figure 4-14**) and 888 Boylston will make use of the Prudential Center North Dock (also referred to as the "D-Block", illustrated in **Figure 4-15**). A detailed discussion on loading bays was presented in the NPC/PNF.

At present, a formalized agreement exists between the Proponent and Shaw's Supermarket, establishing the operation and use of the dock to support the Gloucester Apartments and the proposed Exeter Residences. The Shaw's Supermarket and the residential units have complementary uses and AvalonBay will coordinate with Shaw's to schedule deliveries to prevent any overcrowding on local streets.

Exeter Residences and 888 Boylston Street have been designed to accommodate all loading and delivery functions in a safe and efficient manner. Truck routes and hours of deliveries will be coordinated to minimize truck activity during the commuter peak hours. Reasonable efforts will be made to use service vendors

currently delivering in the vicinity of the proposed buildings in an effort to reduce the overall number of new trucks in the area.

Dock Management

To maximize the efficiency of the Shaw's and D-Block docks, dock management will continue to be provided by a dock master. The dock master will be responsible for enforcing dwell times, coordinating with dock users, scheduling deliveries and maintaining the flow of the loading area operation to avoid impacts on areas outside the loading area. Dock management will also address periodic "surges" in activity that may occur, and will serve to provide a "buffer" if actual arrival patterns and/or dwell times vary from those used in the analysis presented in the NPC/PNF. Detailed loading area and peak daily delivery requirements were presented in the NPC/PNF.

In summary, the current dock layouts at the Shaw's and D-Block loading area will provide adequate dock spaces and conform to the requirements of the Development Plan.

4.5 Future Conditions

This section intended to supplement the original discussion of future conditions as presented in the NPC/PNF which describes the context of the future transportation infrastructure that will serve the Prudential Center and the proposed Project. The first part of this section provides a summary of area transportation infrastructure improvements that are currently planned, are under design, or are under construction by the City of Boston, the MBTA, or other proponents in the area. Subsequent sections provide a summary of the development of supplemental 2011 Full Build conditions, including morning, evening and Saturday peak hour traffic activity, parking supply and demands, loading service activities, future pedestrian and bicycle activities and future transit options. The future 2011 Build Condition was developed and evaluated within this context to help identify additional roadway, pedestrian, and transit improvements that may be needed to mitigate identified transportation impacts generated by the Project.

■

Area Developments and Transportation Improvements

Key planned improvements within the Project area include the following:

- Boylston Street Corridor – The roadway improvements included as part of the Mandarin Oriental Boston project to the Boylston Street Corridor will improve pedestrian safety and flow by moving the existing pedestrian signal at Fairfield

Street to the loading area entrance. The Prudential FPIR/FEIR and Development Plan do not incorporate any changes to pedestrian crossings. The signal relocation planned for the Mandarin Oriental Boston project, will move the crosswalk from Fairfield Street to west of the loading entrance, more closely matching the pedestrian desire path. The relocated signal will also formalize vehicle access to and from the Mandarin Oriental Boston loading area which will also serve as the service access for 888 Boylston.

- New Garage Entrance –A new garage entrance/exit has been established on East Ring Road as part of the Mandarin Oriental Boston which provides direct access to the Green Level parking where the parking nest for the 888 Boylston building will be located. The original Boylston Street entrance did not provide an exit from the Green Level. In contrast, the East Ring Road entrance will provide direct access to both the Blue and Green Levels (entrance and exit). Blue Level access will be used by the Mandarin Oriental Boston.

The East Ring Road garage entrance location allows more efficient access to the garage than was proposed in the original Development Plan. Vehicles wishing to access the garage from downtown and the MassPike can come via Huntington Avenue and East Ring Road as opposed to circulating around the Prudential Center or through the Back Bay.

This new garage entrance was also designed to avoid any queuing of vehicles on East Ring Road. The ticket dispensers/card readers for the entrance location are located at the bottom of the ramp on the Green Level providing a stacking area within the garage for ten to twelve cars on the ramp. One entering, one exiting and one reversible lane will be provided so that at peak times, two card reader/ticket dispensers will be available for entering vehicles.

- Boylston Street and East Ring Road Intersection - Upon completion of the Mandarin Oriental Boston, the intersection of East Ring Road with Boylston Street will be reconfigured to form a T-type intersection. This reconfiguration will serve to slow traffic and re-align the street edge to match the sidewalk improvements that were part of the Shaw's Supermarket project. This concurrent effort will formalize the street configuration, strengthen the pedestrian corridors and address existing operational issues.

- Dartmouth Street – The City of Boston recently redefined Dartmouth Street as a one way operational roadway in a northwesterly direction, heading towards the Charles River, near the library. This reversal in the street direction is anticipated to improve vehicular access and operations along Boylston Street and in the vicinity of the proposed two buildings.

- BTD Signal Timing Programming – The City of Boston Transportation Department is currently in the process of re-programming the signal timing and

phasing for signalized intersections in the Back Bay area. This effort includes modification to vehicle and pedestrian timings, offsets and time of day operation that will enhance the overall vehicle operations and pedestrian safety.

- MBTA Capital Investment Program – In the Draft FY 2006-FY 2011 Capital Investment Program document, the MBTA announced that it is planning on purchasing No. 8 size trains for the Green Line, in order to increase capacity.

Green Line Capacity

The Proponent has met with representatives of the MBTA to discuss Green Line operations and capacity. The Project site is served by all four branches of the Green Line via the Copley Square, Hynes and Prudential stations. The E-Line and Prudential station are the closest to the Prudential Center site.

The MBTA representatives stated that the MBTA has made a number of improvements to the Green line, many in the last year, to improve capacity, efficiency and speed of the system. One of the operational goals is not to leave any riders behind due to overcrowded trains. They acknowledged this has been a problem in the past, most notably during peak periods. Due to physical and management improvements the MBTA has greatly reduced overcrowding.

Improvements identified by the MBTA include the following:

- Installation of ticket machines at all local stops. This has dramatically improved operations at the Prudential stop where previously, ticket sales occurred on the train car, which became a bottleneck during peak periods.
- Institution of a policy where all cars running on the E-line are two-car trains, thereby increasing capacity.
- An increase in the number of trains running during the peak hour on the E-line from 20 to 36.
- Institution of a staffing and scheduling policy to ensure that 5-minute headways are being maintained during peak hours.
- Use of the "Write to the Top" campaign to identify system operational shortfalls and allow the MBTA staff to address issues more expeditiously. This program encourages writing or emailing the MBTA (in this case greenline@mbta.com) with comments, complaints and suggestions. The MBTA representative noted that they use this as a barometer of MBTA satisfaction.
- Implementation of track-work improvements to increase speed and efficiency, most notably on the D-line.

Background Traffic

Growth rate and Planned Developments used in the analyses are consistent with BTD requirements and calculations presented in the NPC/PNF.

■

Trip Generation

Trip generation was presented in great detail in the previously submitted NPC/PNF document. The proposed program in this DPIR for Exeter Residences is 27 stories and up to 188 apartments while the 888 Boylston program is 17 stories which includes 2 floors of retail. A summary of the Project generated trips for both the Exeter Residences and 888 Boylston Street is depicted in **Table 4-6** below.

Table 4-6
Vehicle-Trip Generation Summary

Time Period/Use	Vehicle-Trips: No Build Approved Development Plan Program	Vehicle-Trips: Proposed Development Plan Program
MORNING PEAK HOUR		
Exeter Residences Site		
Residential	n/a	20
Retail	n/a	0
Sub-Total	n/a	20
888 Boylston Site		
Office	131	194
Retail	6	5
Sub-Total	137	199
Total	137	219
EVENING PEAK HOUR		
Exeter Residences Site		
Residential	n/a	24
Retail	n/a	2
Sub-Total	n/a	26
888 Boylston Site		
Office	121	179
Retail	27	22
Sub-Total	148	201
Total	148	227

Table 4-6 Vehicle-Trip Generation Summary
Continued

Time Period/Use	Vehicle-Trips: No Build Approved Development Plan Program	Vehicle-Trips: Proposed Development Plan Program
SATURDAY PEAK HOUR		
Exeter Residences Site		
Residential	n/a	26
Retail	n/a	1
Sub-Total	n/a	27
888 Boylston Site		
Office	37	54
Retail	36	30
Sub-Total	73	84
Total	73	111

The trip generation estimates presented above takes into account the reduction in trips due to pass-by or internal trip reduction. For example, the retail component in particular is expected to have some portion of trips resulting from passers-by or internal trips. Therefore a twenty-five (25) percent reduction was applied to the retails trips to adjust for these pass-by and internal trips which are based on ITE's survey data that balances volumes by constraining internal trip making to levels that are realistic for the given mix of land uses. This is also consistent with standard engineering practices and the EOEEA/EOTC guidelines. It should be noted, however, that the actual number of vehicle trips generated for both buildings is expected to be much less than the number predicted by BTD rates, given the fact that the Prudential Center environment is very conducive to pedestrian and transit modes. For example, a survey of a portion of the office tenants in the Prudential Center indicated higher transit use and less likelihood to drive than the BTD rates predict. Therefore, the traffic generation estimates contained in this DPIR are likely more conservative than the actual amount of traffic that will be generated by the buildings.

■

2011 Build Condition Traffic Operations

The site-generated traffic volumes, shown in **Figures 4-16** and **4-17**, were assigned to the roadway network and combined with the background traffic volumes to develop the 2011 Build peak hour traffic volume networks. **Figures 4-18** and **4-19** illustrate the volumes for the proposed program.

Measuring existing traffic volumes and projecting additional future traffic volumes quantifies traffic flow within the study area. To assess quality of flow on Exeter Street and Blagden Street, roadway capacity analyses were conducted with respect to 2006 Conditions and projected 2011 Build traffic volume conditions for the proposed programs for the site. Capacity analyses provide an indication of how well the roadway facilities serve the traffic demands placed upon them. Roadway operating conditions are classified by calculated levels-of-service.

The traffic analysis for the proposed programs were based on the Exeter Residences up to 188 apartments and 888 Boylston at 17 stories.

Signalized Intersections

Capacity analyses for the two signalized intersections along Exeter Street were conducted for the full build program condition, which includes Exeter Residences and 888 Boylston. **Table 4-7** summarizes the results of the signalized intersection capacity analysis for this scenario and compares it to what was approved under Phase 4a of the approved Development Plan.

Table 4-7 2011 Build Condition Capacity Analysis Summary (Signalized Intersections)

	2011 Build Condition with both Exeter Residences and 888 Boylston Street					
	No Build - With Approved Development Program [1]			With Proposed Development Program		
	V/C*	Delay**	LOS***	V/C	Delay	LOS
MORNING PEAK HOUR						
Boylston Street/ Exeter Street	0.38	16.7	B	0.39	16.7	B
Huntington Avenue / Exeter Street / Stuart Street	0.48	37.1	D	0.49	37.0	D
EVENING PEAK HOUR						
Boylston Street/ Exeter Street	0.55	20.9	C	0.56	20.8	C
Huntington Avenue / Exeter Street / Stuart Street	0.63	33.8	C	0.64	33.9	C
SATURDAY PEAK HOUR						
Boylston Street/ Exeter Street	0.54	22.9	C	0.55	22.7	C
Huntington Avenue / Exeter Street / Stuart Street	0.83	51.5	D	0.84	50.9	D

Based on SYNCHRO software
1 Includes background projects The Columbus Center, The Clarendon and Mandarin Oriental Boston
* Volume-to-Capacity ratio.
** Average vehicle delay expressed in seconds per vehicle.
*** Level-of-service.

As can be seen in the table above for the proposed development, the intersection of Boylston Street at Exeter Street operates at LOS B in the morning and LOS C during

the evening and Saturday midday peak hours. The intersection of Huntington Avenue at Exeter Street also operates at LOS C during the evening peak hour and LOS D during the morning and Saturday midday peak hours. Compared to the approved program, no degradation of LOS is anticipated.

It should be noted that since the filing of the NPC/PNF, BTD has been in the process of making changes to the signal timing and phasing sequence to the signalized intersections in the Back Bay area, including the intersection of Huntington Avenue at Exeter Street. The traffic analyses presented in this DPIR were performed using an adjusted SYNCHRO model which includes signal timing and phasing adjustments as recently programmed by BTD for the entire Back Bay area.

Unsignalized Intersections

Capacity analyses for the unsignalized supplemental intersection of Exeter Street and Blagden Street were conducted for the full build program condition, which includes both 888 Boylston and the Exeter Residences. **Table 4-8** summarizes the results of the unsignalized intersection capacity analysis for this scenario and compares it to what was approved under Phase 4a of the approved Development Plan.

Table 4-8
2011 Build Condition Capacity Analysis Summary (Unsignalized Intersections)

	2011 Build Condition with both Exeter Residences and 888 Boylston Street					
	No Build - With Approved Development Program [1]			With Proposed Development Program		
	Demand*	Delay**	LOS***	Demand	Delay	LOS
MORNING PEAK HOUR Exeter Street at Blagden St.	30 WB-LT	15.2	C	30 WB-LT	15.7	C
EVENING PEAK HOUR Exeter Street at Blagden St.	55 WB-LT	35.4	E	55 WB-LT	43.0	E
SATURDAY PEAK HOUR Exeter Street at Blagden St.	70 WB-LT	35.9	E	70 WB-LT	45.8	E

Based on SYNCHRO software
1 Includes background projects The Columbus Center, The Clarendon and Mandarin Oriental Boston & 888 Boylston @ 11 stories
* Demand for critical movement
** Average vehicle delay expressed in seconds per vehicle.
*** Level-of-service.

As can be seen in the table above for proposed development, the critical movement at the intersection of Exeter Street at Blagden Street operates at an LOS C during the morning peak and LOS E during the evening peak and Saturday peak hours.

Compared to the approved program, the analyses for the Exeter Street/Blagden Street intersection indicate no changes in LOS under the current development program.

■

Site Access and Loading

Parking for both the Exeter Residences and 888 Boylston will be provided within the limits of the existing Prudential Center Garage. No changes to the entry locations are proposed. Access to the residential parking nest for Exeter Residences will be via Exeter Street, whereas parking access for the 888 Boylston building will be from East Ring Road via the direct ramp installed as part of the Mandarin Oriental Boston project.

Similarly, loading and service access for both of the new buildings will be provided in existing loading docks. The Exeter Residences will utilize the existing loading dock in Shaw's Supermarket building on Exeter Street, which also serves AvalonBay's Gloucester building. The 888 Boylston building will share the North Loading Dock with the adjacent Mandarin Oriental Boston, retail uses and the Fairfield apartment building.

Loading and parking access for the Exeter Residences and 888 Boylston buildings is consistent with the approved Development Plan.

An updated loading plan for the D-Block dock, reconfigured as part of the Mandarin Oriental Boston project, has been included as **Figure 4-15** in response to comments received on the NPC/PNF.

■

Parking

AvalonBay owns and operates the Gloucester, Fairfield and Boylston residential buildings within the Prudential Center. Parking for residents of these buildings is accommodated in residential nests located within the North garage. The additional parking for the Exeter Residences will be incorporated within the existing residential nests parking.

Upon the construction of Exeter Residences building, up to 132 new parking spaces for the Exeter Residences will be established through a combination of reconfiguring the existing garage nests and managed parking techniques. This parking will utilize managed areas consistent with the parking management plan being implemented in the garage as a whole. No on-street parking will be permitted in front of the proposed Exeter Residences building.

The current development program for 888 Boylston proposes a total of 235 parking spaces to be used by the office component of Phase 4a. This is an increase of 177 parking spaces additional to the 58 parking spaces which had been approved for Phase 4a under the Development Plan. The current development program will provide 0.65 spaces per 1000 square feet of office space based on the square footage of office space. The parking supply is based on 15 floors of office space and 2 floors of retail space. If additional retail space is implemented, the parking will be reduced to commensurate with the reduction in office space. For every 1000 SF of office space that is reduced due to a corresponding increase in retail (3rd or 4th floors), the number of parking spaces will be reduced by 0.65 spaces.

All parking necessary to support the 888 Boylston building program will be provided within the existing garage limits. The existing Green level of the Prudential Center parking garage was constructed with an 18 foot floor to floor dimension within the footprint of 888 Boylston. The revised building provides for the insertion of a mezzanine parking deck within this space, increasing the parking capacity of the garage within the building footprint. The mezzanine deck would be valet accessible only, allowing for a typical managed parking operation. Access will be via a ramp from the Green level only, and no additional access ramps or curb cuts from the street are planned. A forty (40) feet No-standing and No-Stopping curb area is proposed in front of the 888 Boylston building entrance to accommodate pick-up and drop-off activities for 888 Boylston and the Prudential Center Arcade.

The approved Development Plan including the Mandarin Oriental Boston, provides for 986 spaces for residential, 2,067 commercial spaces and 867 reserved as employee/tenant spaces for a total of 3,920 spaces, of which 58 are attributable to Phase 4a. With the addition of 177 spaces as part of the 888 Boylston program and up to 132 spaces as part of the Exeter Residences program, the total parking spaces available within the Prudential Center parking garages will be up to 4,229 spaces (1,118 residential, 2,067 commercial, 1,044 employee/tenant). **Figure 4-20 and 4-21** illustrate the access and egress points for parking for the proposed two buildings.

■

Pedestrian Analysis

The approved Development Plan for the Prudential Center Redevelopment project includes a comprehensive set of pedestrian ways that provide access and circulation to and through the area. The current proposal generally supports and maintains the previously planned pedestrian routes and patterns, with some modification that will enhance pedestrian access and safety in the area. In particular, the Exeter Residences will provide a public stairway and elevator which will enable access from Exeter Street to The Prudential Center Plaza. The Exeter Residences will include streetscape improvements along Exeter Street to create a sense of arrival through location of the building entry, and landscaping improvements. The most prominent changes along Boylston Street include improvements to the sidewalk in front of the proposed 888

Boylston site to create an inviting public plaza, and upgrades to the Prudential Center Arcade entrance.

Pedestrian Trip Generation Impact of Current Proposal

As shown in **Table 4-9**, the current residential, retail and office plan for the Exeter Residences and 888 Boylston buildings is expected to generate approximately 246, 284 and 159 additional pedestrian trips during the weekday morning, weekday evening and Saturday peak hours, respectively. This represents an increase of 35.7% over the total approved Development Plan program in the morning peak hour and 21.4% in the evening peak period.

Table 4-9 Pedestrian-Trip Generation Comparison
Development Plan Program vs. Current Program

	Prudential Center Approved Development Program	Approved Program Phase 4a	Proposed Program Phase 4a	Proposed Program Phase 6	Proposed Program Phase s 4a & 6
MORNING					
Enter	186	97	145	16	161
Exit	77	15	22	63	85
Total	263	112	167	79	246
EVENING					
Enter	176	33	43	65	107
Exit	401	99	141	35	177
Total	577	132	184	100	284
SATURDAY					
Enter	n/a	43	50	32	82
Exit	n/a	39	45	32	77
Total	n/a	82	95	64	159

The increase in pedestrian trips associated with the Exeter Residences and 888 Boylston should be easily accommodated by the existing pedestrian facilities existing in and around the Prudential Center and future improvements by the Mandarin Oriental Boston, 888 Boylston and Exeter Residences and is unlikely to have any real impact to the pedestrian environment. Compared with the overall existing pedestrian traffic along Boylston Street, the additional pedestrian trips due to the proposed buildings represents approximately 7.2% increase during the morning peak hour and an approximate increase of 6.3% during the evening peak hour.

The importance of walking as a mode of travel for all users of the Prudential Center will prevail under the proposed Project.

■

Transit Analysis

The process of analyzing the public transit system capacity/availability near the Prudential Center includes determining the transit trips that the proposed Project will generate as well as quantify the capacity of existing transit services. The following section presents both the trip generation and capacity analysis in detail.

■

Transit Trip Generation

The approved Development Plan for the Prudential Center Redevelopment project included extensive analysis of the existing transit system and planned improvements to make the system more attractive and easier to use. The FEIR/FPIR also examined the extent to which the entire Prudential Center Redevelopment project would impact the system in future years. As presented in the Mandarin Oriental Boston NPC/PNF January 2002, it was projected that total ridership on all peak load segments would be at or below planning capacity in the evening peak hour in 1999, and that the impact of the Prudential Center Redevelopment project on the transit system's peak load segments would be no more than one percent of the planning capacity of each line. **Table 4-10** summarizes the impacts of the Exeter Residences and 888 Boylston on transit ridership as compared to the original redevelopment program.

Table 4-10 Transit-Trip Generation Comparison
Development Plan Program vs. Proposed Program

	Development Plan	Approved Phase 4a Program	Proposed Phase 4a Program	Proposed Phase 6 Program	Proposed Phases 4a and 6 Program
MORNING					
Enter	2,811	145	218	4	222
Exit	263	22	32	15	46
Total	3,074	167	246	19	268
EVENING					
Enter	552	40	53	16	69
Exit	3,173	139	203	9	211
Total	3,725	179	256	25	280
SATURDAY					
Enter	n/a	25	31	15	46
Exit	n/a	22	28	15	42
Total	n/a	47	59	30	88

As shown in **Table 4-10**, under the full build analysis scenario, the Exeter Residences and 888 Boylston buildings would generate 268, 280 and 88 additional transit trips during the weekday morning, weekday evening and Saturday peak hours, respectively. Although such increases may be detectable, any additional activity is unlikely to have any real impact to the transit system.

Bus System Capacity

Bus route capacity is a function of vehicle size and frequency of service. The peak hour capacities estimated in this table are based on a bus capacity of 60 passengers for a standard MBTA bus. The service rush-hour frequencies and ridership presented in **Table 4-11**, are based on the most current MBTA publications.

Table 4-11
MBTA Bus Routes Peak Hour Utilization (Existing Conditions)

	Frequency (buses)		Capacity (passengers)		Hourly Ridership (passengers)		Utilization	
Route and Direction	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
#9 – City Point to Copley Square via Broadway Station [1]								
Inbound	9	7	540	420	393	148	73%	35%
Outbound	8	8	480	480	247	386	51%	80%
#39 – Forrest Hills Station to Back Bay Station via Huntington Avenue [2]								
Inbound	13	13	780	780	768	624	98%	80%
Outbound	13	13	780	780	432	964	55%	123%
#55 – Jersey & Queensberry Streets to Copley Square or Park Street [3]								
Inbound	4	3	240	180	145	44	60%	24%
Outbound	4	3	240	180	28	70	12%	39%

[1] Ridership for this route obtained from MBTA Comprehensive Ridecheck Program (Spring 2006)
[2] Ridership for this route obtained from MBTA Comprehensive Ridecheck Program (Winter 2005)
[3] Ridership for this route obtained from MBTA Comprehensive Ridecheck Program (Fall 2000)

As shown in **Table 4-11**, the existing bus service passenger loads are greater than the available capacity on Routes 39 in the outbound direction only. This may not accurately reflect existing conditions since the hourly ridership for this route was last provided by the MBTA in 2005. With the installation of the Charlie Card machines on local buses, the MBTA has the ability to monitor passenger loads and adjust schedules as needed to meet customer demands. It is anticipated that with the expected growth in this area, including the proposed Exeter Residences and 888 Boylston, the MBTA will adjust its bus operations to provide more frequent service if needed.

Green Line Capacity

Subway route capacity is a function of vehicle size and the frequency of service. The Green Line peak hour capacities for the B Line, C Line, D Line and E Line are based on a vehicle capacity of 100 passengers per car or 200 passengers per a two-car trainset. This assumes a conservative analysis since the D Line often provides three-car trains during the peak hours.

Consistent with the bus analysis, the subway service rush-hour frequencies and ridership information, presented in **Table 4-12** are based on the most current schedules and publications available from the MBTA.

Table 4-12
MBTA Green Line Peak Hour Utilization (Existing Conditions)

	Frequency[1]	Peak Hour Capacity[2]	Peak Hour Ridership	Utilization
Green Line				
Inbound	104	8,736	8,104 AM Peak	93%
Outbound	104	8,736	7,386 PM Peak	85%

1 – cars per hour, source: MBTA Bus Routes schedules and comprehensive Ridecheck Program (Winter 2000)

2- in number of passengers

As shown in **Table 4-12**, there is adequate capacity on the D Line and E Line to accommodate the peak hour loads. This analysis assumes that all trains arrive on schedule and that passengers are evenly distributed throughout the hour. In reality, passenger loads can vary and some trains become more congested than others. However, over the course of the hour, there is an adequate train capacity to meet the demand.

With the new Charlie Card system, the MBTA has the ability to monitor passenger loads and adjust schedules as needed to meet the customer demands. It is anticipated that with the expected growth in the Back Bay, the MBTA will provide more frequent service and increase the frequency of the three-car trainsets on the D Line as needed. With the construction of the proposed Urban Ring project, new connections will be made available within the MBTA system which will help to alleviate existing demands on major components of the public transportation system, which will eventually provide additional capacity to the Green Line operating in the Back Bay area.

As presented in **Table 4-10**, the Exeter Residences and 888 Boylston buildings together will increase the planned transit ridership for the entire redevelopment program by 3.1% during the morning peak and 2.6% during the evening peak. This

increase should not have a significant impact on overall peak hour transit ridership since there is sufficient capacity within the MBTA transit services to accommodate this increase.

4.6 Proposed Improvements

The Proponent will commit to providing the following mitigation related to signal timing and coordination modifications to improve pedestrian safety and vehicular operations along the Boylston Street and Huntington Avenue within the Project limits. The following list includes the transportation improvements proposed in the NPC/PNF and updated as a result of additional analysis and comments raised during the NPC/PNF review.

The following matters will be reviewed with BTD and, subject to approval of BTD, will be finalized in the TAPA.

Huntington Avenue at Exeter Street and Stuart Street

- In conjunction with ongoing signal timing and phasing re-programming for the Back Bay area, coordinate with BTD to adjust pedestrian timings to provide sufficient time for pedestrian to cross Huntington Avenue.
- Coordinate with *MassHighway* and the City of Boston to implement a right turn on red for Exeter Street right turning movements into southbound Huntington Avenue.

Huntington Avenue at East Ring Road

- Perform electrical testing of loop detectors to determine status of loop detectors. (Intersection is currently operating pre-timed as all fuses are missing from detector amplifiers. Due to this existing defective condition, the intersection is not operating at its optimal level). Providing loops or video detection that are operational will enable this intersection to operate efficiently.
- Review and modify central UTCS timings to comply with fixed internal restrictions on local controllers
- Intersection is operating "Manual Free". Repair communication to get intersection operating on central UTCS.
- Develop backup coordination and time-of-day programming consistent with central UTCS programming and implement in local controller.

The above improvements were recommended in the NPC/PNF based on the field investigation performed prior to the recent BTD's signal timing and phasing re-programming initiative. It is however requested that BTD review the deficiencies

present at this location and implement the recommended improvements accordingly. Commitments to improvements will be discussed with BTD during the TAPA submission process.

Huntington Avenue, Boylston Street and Exeter Street Improvements

- In conjunction with ongoing signal timing and phasing re-programming for the Back Bay area, coordinate with BTD to adjust and modify signal timings and offsets along Boylston Street and Huntington Avenue for the study area intersections to comply with recent changes that may have occurred to timings as part of the traffic analyses for Exeter Residences and 888 Boylston Street site generated trips.
- The Proponent will coordinate with BTD to provide signage related to parking restrictions and commercial loading along the frontage of the two proposed buildings on Boylston Street and Exeter Street
- The Proponent will coordinate with BTD in enforcing no double parking along Exeter Street between Boylston Street and Huntington Avenue
- The Proponent will coordinate with City of Boston to provide a forty (40) feet No-standing and No-Stopping curb area in front of the Exeter Residences and 888 Boylston building entrances to accommodate pick-up and drop-off activities for the proposed buildings and the Prudential Center Arcade.
- The Proponent will coordinate with BTD to upgrade pavement markings on Exeter Street to include striping for crosswalks, parking, turning lanes and center line.
- The Proponent will coordinate with BTD to provide ADA compliant accessible ramps at the driveway location leading to the parking access for the Exeter Residences.

4.7 Transportation Demand Management

The Transportation Access Plan Agreement (TAPA) for the Prudential Center Redevelopment has established a comprehensive TDM program for the Prudential Center. Based on the transportation analysis provided above, the Exeter Residences and the proposed change in the program for 888 Boylston will have only a minor impact on the transportation system and will not require any changes in the previously approved transportation mitigation measures, except as suggested as part of the proposal discussed in this DPIR. In conjunction with the existing TAPA for the Prudential Center site, the Proponent will commit to implementing TDM elements and activities to reduce Single Occupancy Vehicles and encourage transit use.

Overall as discussed above, upon completion of the proposed Exeter Residences and 888 Boylston buildings, the traffic impacts are expected to be minor. The updated

TDM measures include those identified in the NPC/PNF updated and supplemented with pedestrian and bicycle improvements/accommodations. Transportation Demand Management (TDM) and trip reduction strategies are proposed with the goal of further minimizing the Project's overall impact.

Exeter Residences TDM Programs

- The existing TAPA for Prudential Center will be amended to reflect the addition of the Exeter Residences and outline the TDM measures to be implemented by AvalonBay for residents of the new building.
- Provide transit information on-site such as MBTA and water shuttle information on the building owners or building management's web site and/or mailings and newsletter to residents.
- Coordinate with neighboring residential buildings in the Prudential Center to make available car sharing options such as zip-car for residents.
- Provide secure bicycle racks and storage area protected from elements, as necessary to meet demand.

888 Boylston TDM Programs

- Boston Properties will continue to participate in the ABC TMA for Prudential Center including 888 Boylston.
- The Transportation Coordinator will provide TDM programs and services and coordinate the provision of ABC TMA programs to tenants and employees of 888 Boylston.
- The Transportation Coordinator will encourage office tenants to offer employees compressed work weeks, flextime, staggered work hours and telecommuting programs and transit subsidies.
- On-site sale of MBTA T-passes and T-visitor passes will continue at the Prudential Center.
- Prudential Center will continue to provide a link to MBTA transit information on its website.
- The Transportation Coordinator will provide new tenant orientation materials and newsletters for distribution to employees of 888 Boylston.
- Tenants will be encouraged to offer subsidies of MBTA passes and private commuter bus and boat fares in the amount of 25% to all employees.
- Information for marketing materials, bike maps, T-schedules will continue to be provided at the Prudential Center's customer service desk located in the Center Court area of the arcades.
- The Transportation Coordinator will encourage tenants to establish pre-tax payroll deduction plan for sale of MBTA passes to all employees.
- The Transportation Coordinator will work through the ABC TMA to provide employee matching vanpools and carpools.
- Preferential carpool and vanpool parking for employees of 888 Boylston will be provided.
- A Guaranteed Ride Home program for non-drivers and van/carpool users will be provided to employees through the ABC TMA.

- Provide parking spaces in the Prudential Center garage for employee and resident car sharing, such as Zipcar.
- Provide secure bicycle racks protected from elements, as necessary to meet demand.
- Provide an annual transportation fair for office tenants for learning about the transportation options at Prudential Center.

Pedestrian Improvements

As discussed in Chapter 3, the Proponent will define and enhance pedestrian facilities to provide for pedestrian improvements as follows:

- Sidewalks and pedestrian promenade areas will be provided along all frontages to the buildings including a monumental staircase and elevator along Exeter Street, and raised sidewalk across the North Garage entrance/exit.
- Streetscape improvements will be provided including updated street lighting and aesthetic features.
- Full handicapped access will be provided on-site to and from the buildings. Wheelchair ramp access will also be provided near the proposed building entrances.
- A new entrance way to the Prudential Center interior arcade network will be built in connection with the proposed Boylston Arcade.

Bicycle Accommodations

The Exeter Residences will include provision of safe, secure, weather protected bicycle racks and/or storage lockers within the buildings premises. Signs will be provided at appropriate locations around the Exeter Residences building directing bicyclists to bicycle storage facilities. For Exeter Residences, a bicycle storage room will be provided for residents. 888 Boylston, will provide bicycle racks as necessary to meet demand. In conjunction with BTD's signal timing and phasing re-programming effort, the Proponent will coordinate with BTD to include bicycle detection and associated signs and pavement markings along Boylston Street.

0 200 400 Feet

Figure 4-1
Site Location Map

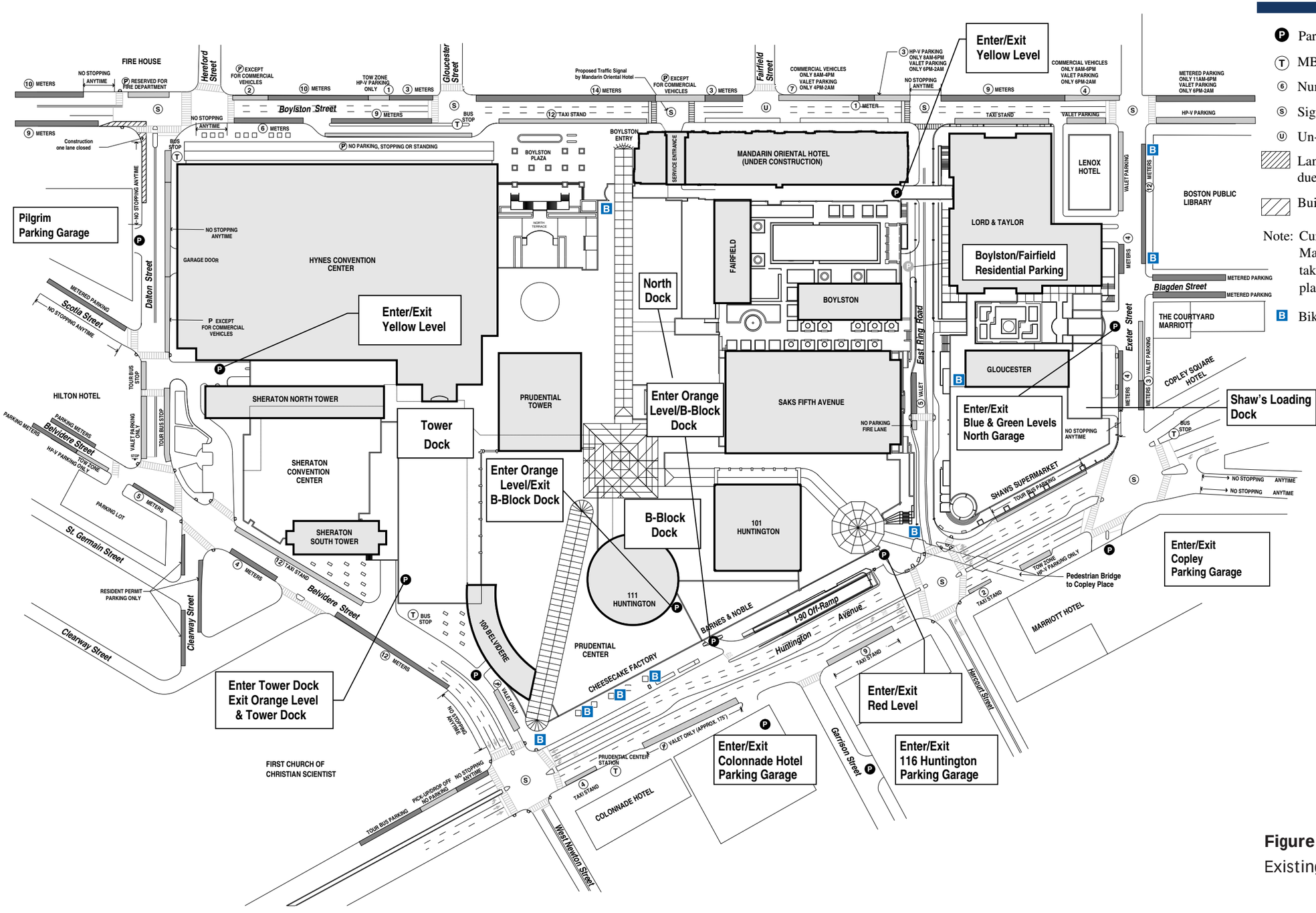


Figure 4-2
Existing Conditions

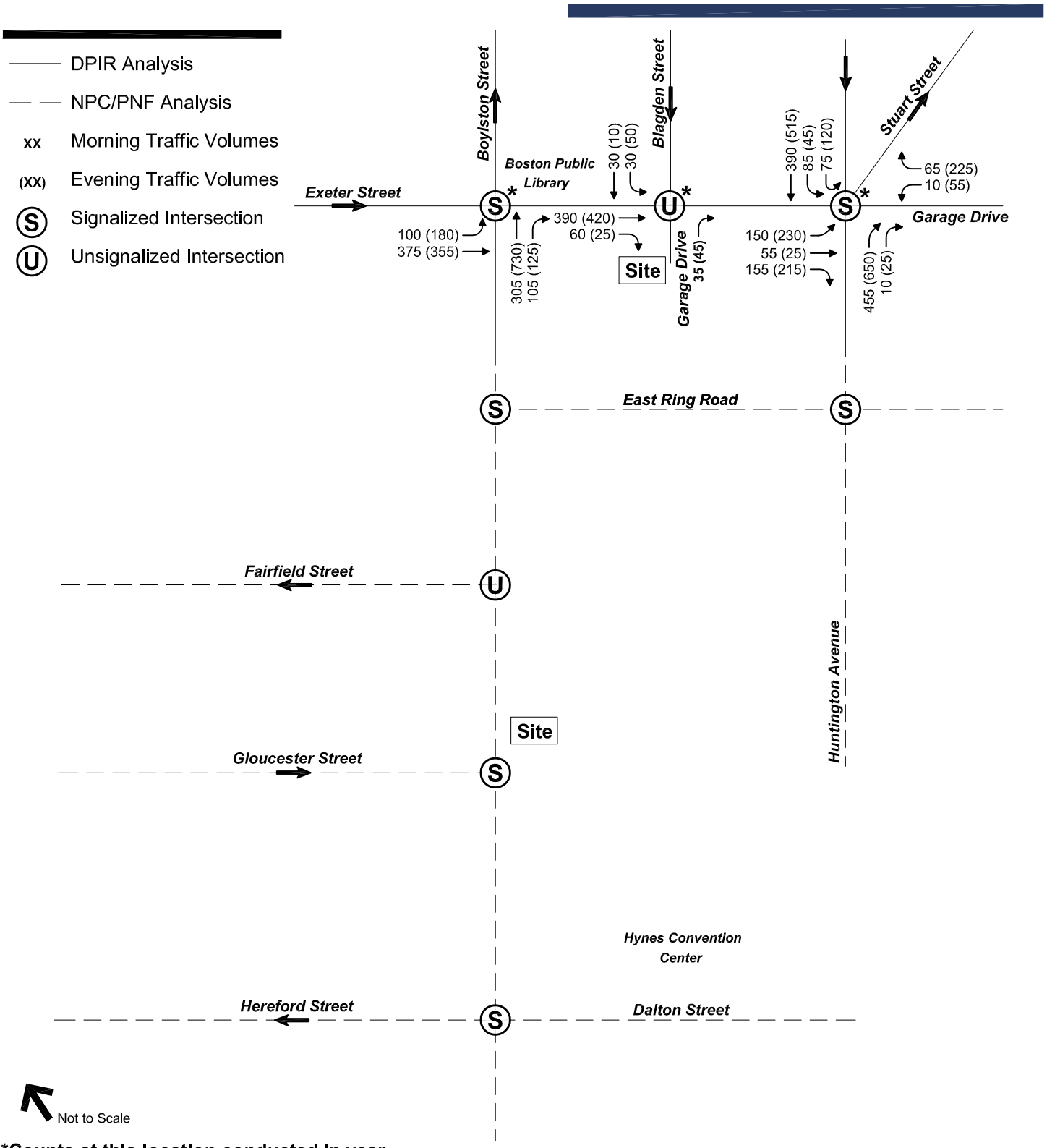
Not to Scale

Figure 4-3

Supplemental Study Area Locations

Figure 4-4

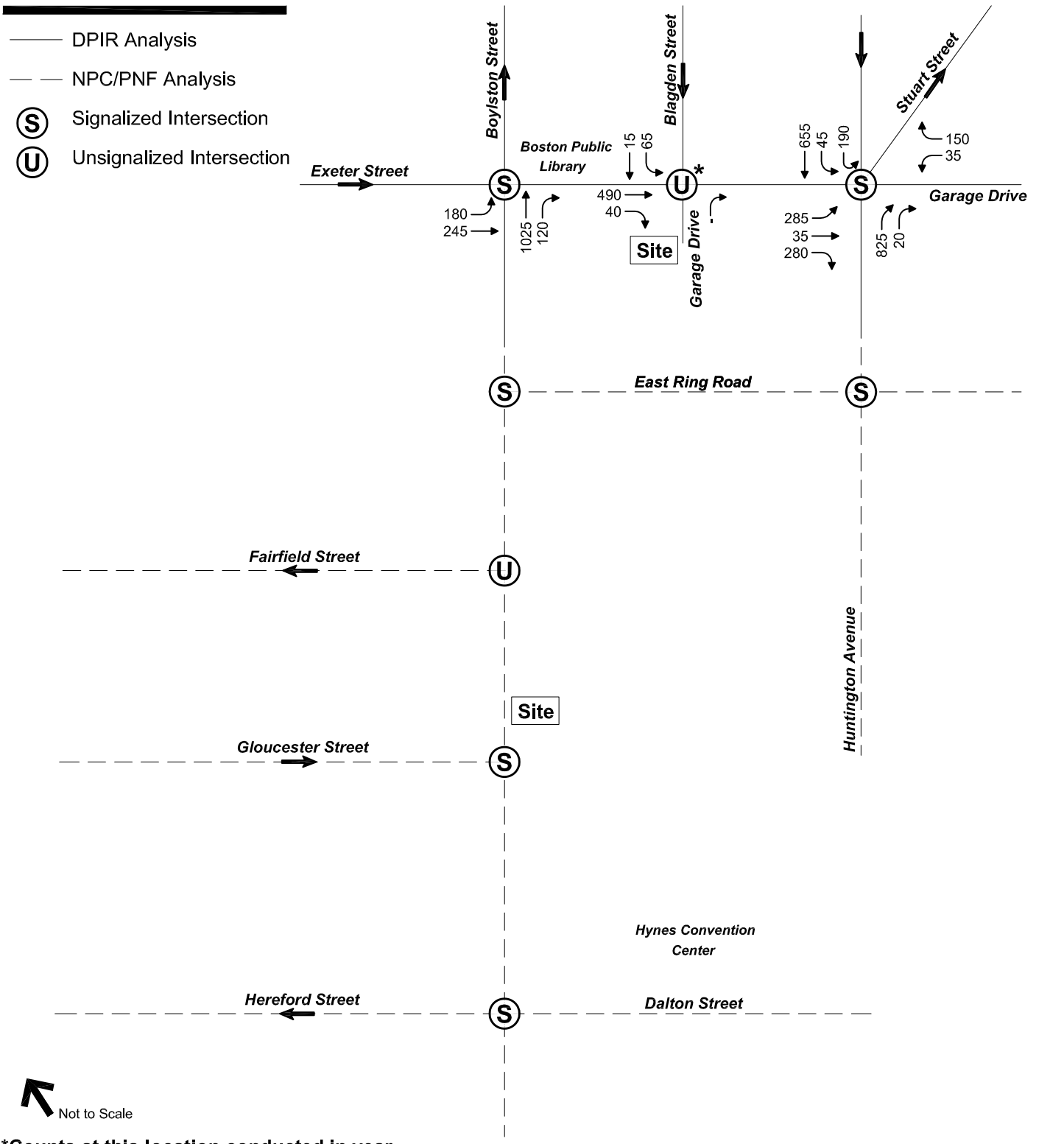
Supplemental Traffic Count Locations



***Counts at this location conducted in year 2008 and reduced 1% per year for 2 years to correspond to 2006 numbers**

Figure 4-5

2006 Existing Condition
Weekday Morning (8am - 9am) and Evening (5pm-6pm)
Peak Hour Traffic Volumes



***Counts at this location conducted in year 2008 and reduced 1% per year for 2 years to correspond to 2006 numbers**

Figure 4-6

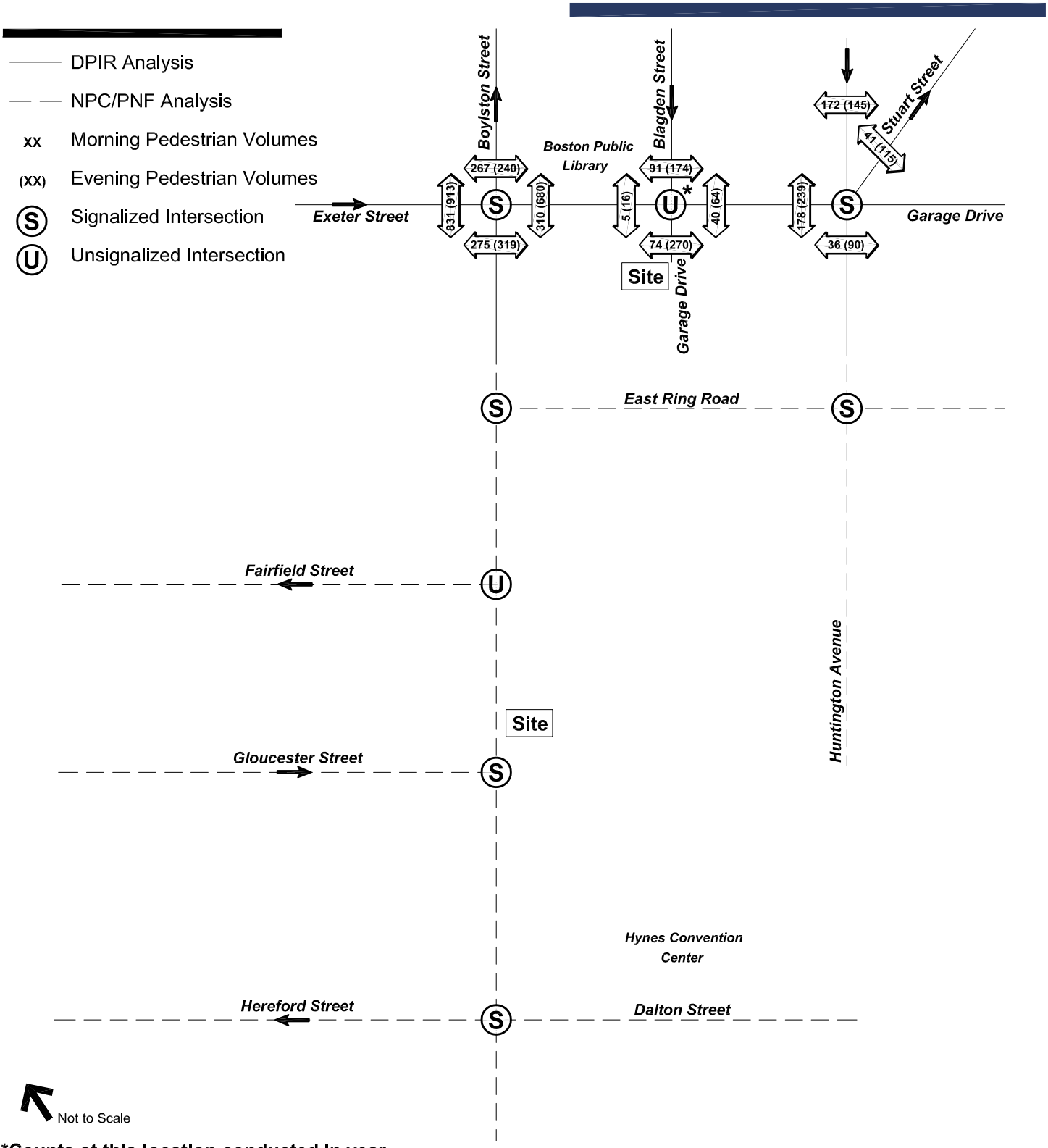
2006 Existing Condition
Saturday (4pm - 5pm)
Peak Hour Traffic Volumes

Source: MBTA

Not to Scale

Figure 4-9

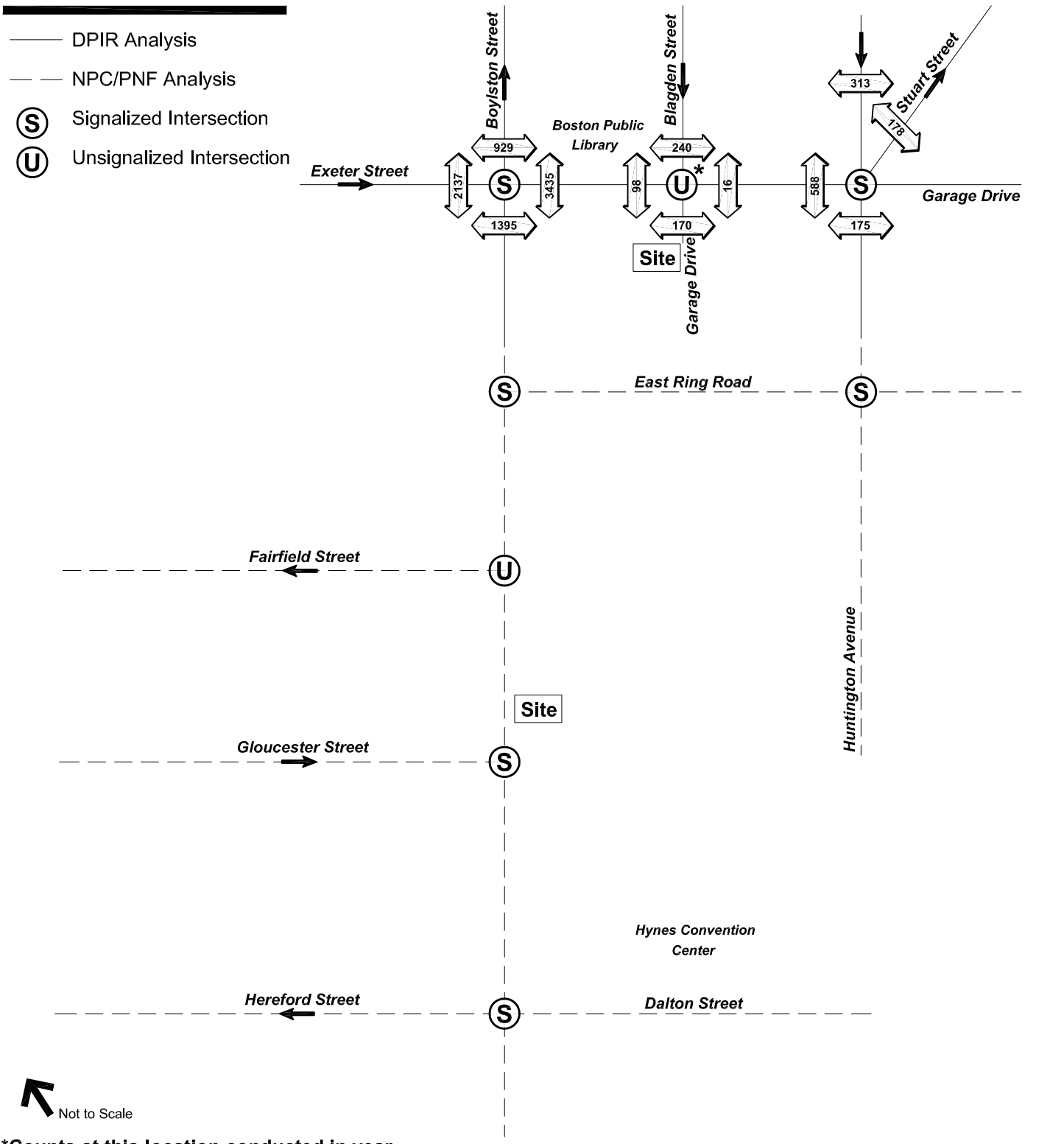
MBTA Bus and Transit Routes



***Counts at this location conducted in year 2008 and reduced 1% per year for 2 years to correspond to 2006 numbers**

Figure 4-10

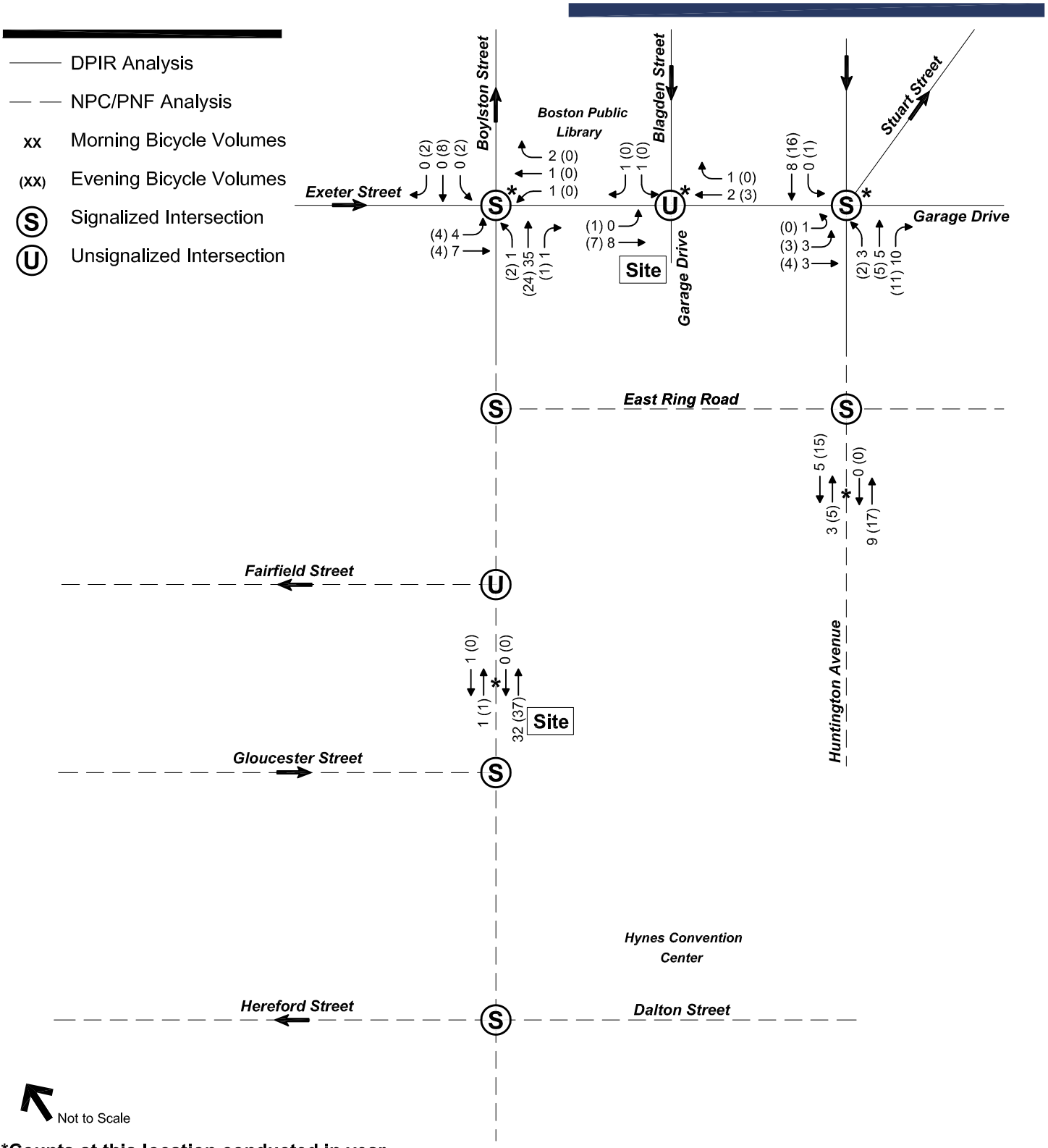
2006 Existing Condition
Weekday Morning (8am - 9am) and Evening (5pm - 6pm)
Peak Hour Pedestrian Volumes



***Counts at this location conducted in year 2008 and reduced 1% per year for 2 years to correspond to 2006 numbers**

Figure 4-11

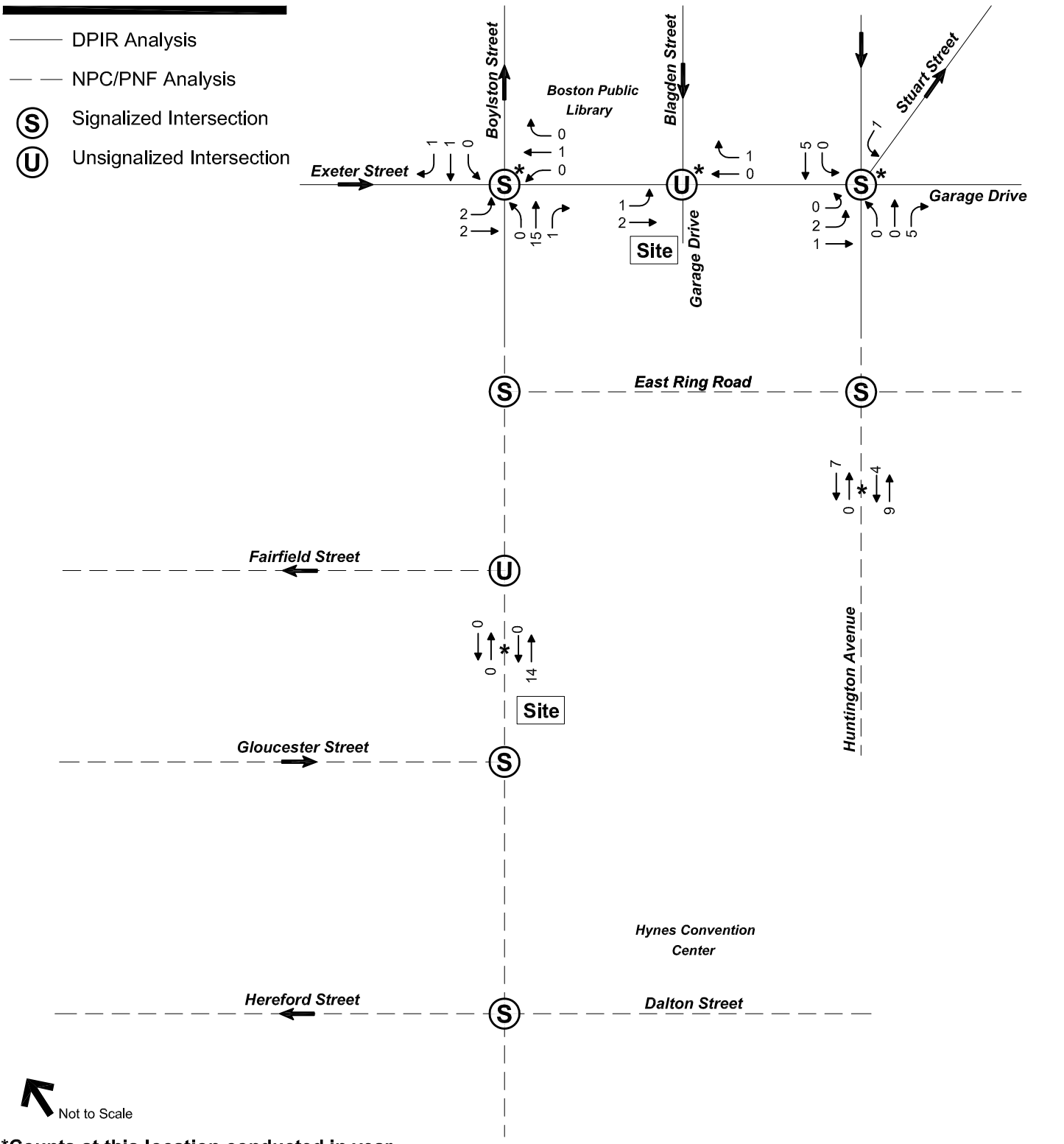
2006 Existing Condition
Saturday (4pm - 5pm)
Peak Hour Pedestrian Volumes



***Counts at this location conducted in year 2008 and reduced 1% per year for 2 years to correspond to 2006 numbers**

Figure 4-12

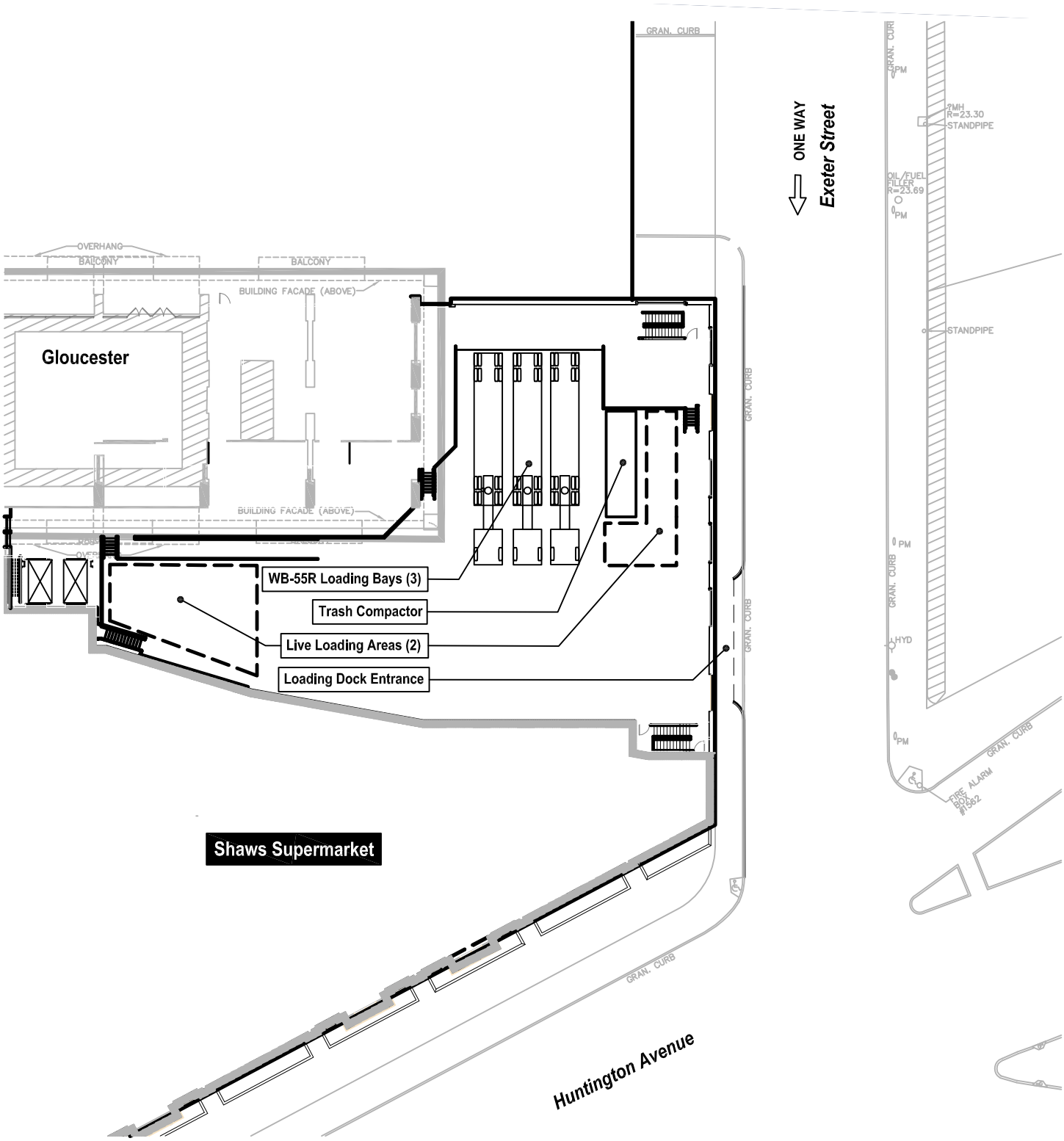
2006 Existing Condition
Weekday Morning (8am - 9am) and Evening (5pm - 6pm)
Peak Hour Bicycle Volumes

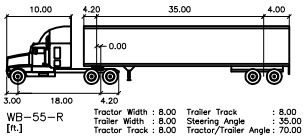


***Counts at this location conducted in year 2008 and reduced 1% per year for 2 years to correspond to 2006 numbers**

Figure 4-13

2006 Existing Condition
Saturday (4pm - 5pm)
Peak Hour Bicycle Volumes

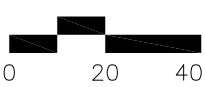




NOTE: MAX TRUCK STANDARD - AASHTO WB-55

Figure 4-14

Shaws Supermarket
Existing Loading Area



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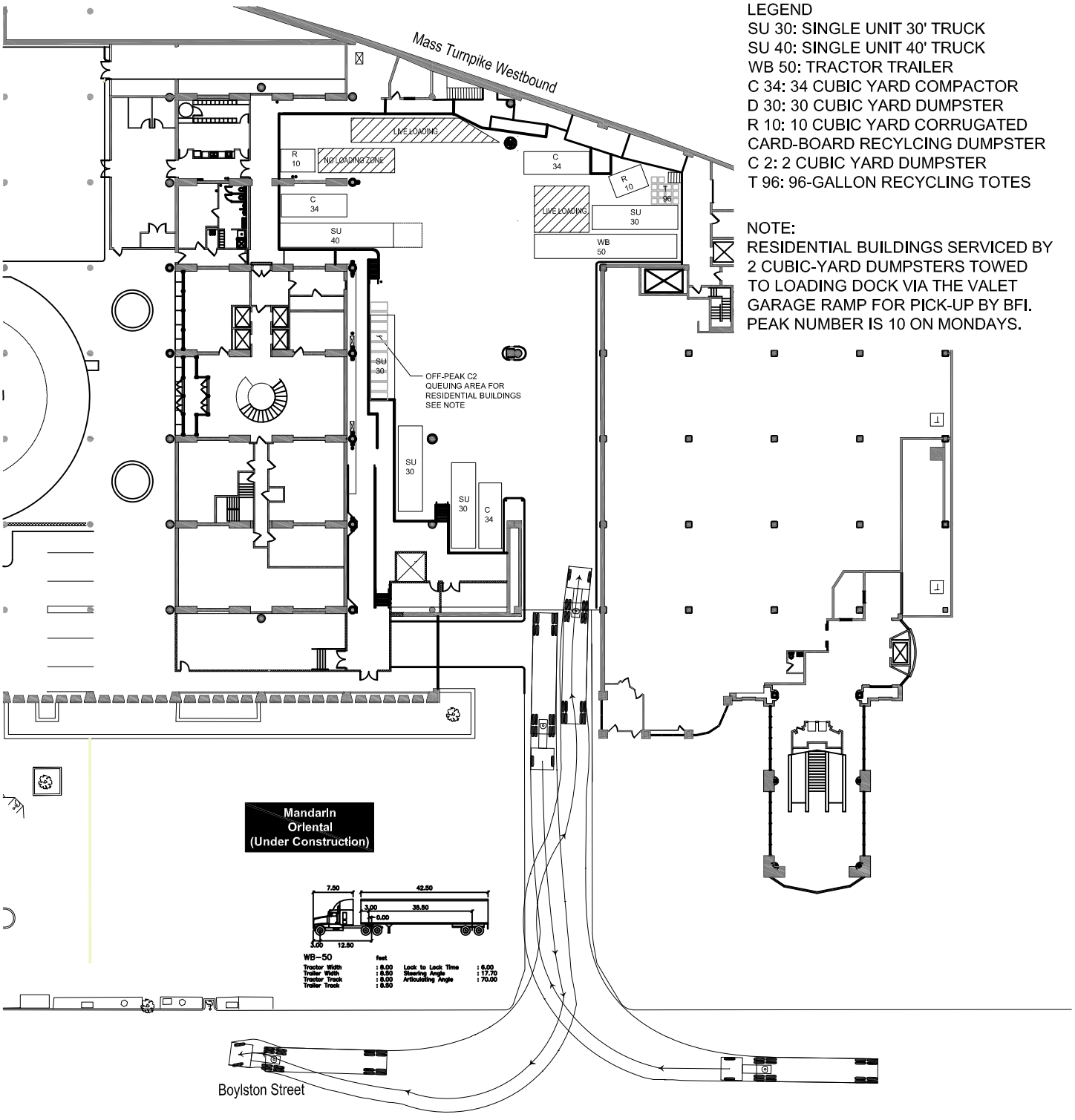


LEGEND
SU 30: SINGLE UNIT 30' TRUCK
SU 40: SINGLE UNIT 40' TRUCK
WB 50: TRACTOR TRAILER
C 34: 34 CUBIC YARD COMPACTOR
D 30: 30 CUBIC YARD DUMPSTER
R 10: 10 CUBIC YARD CORRUGATED CARD-BOARD RECYLCING DUMPSTER
C 2: 2 CUBIC YARD DUMPSTER
T 96: 96-GALLON RECYCLING TOTES

NOTE:
RESIDENTIAL BUILDINGS SERVICED BY 2 CUBIC-YARD DUMPSTERS TOWED TO LOADING DOCK VIA THE VALET GARAGE RAMP FOR PICK-UP BY BFI. PEAK NUMBER IS 10 ON MONDAYS.

Figure 4-15

Prudential Center
North Loading Dock

0 20 40 Feet

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

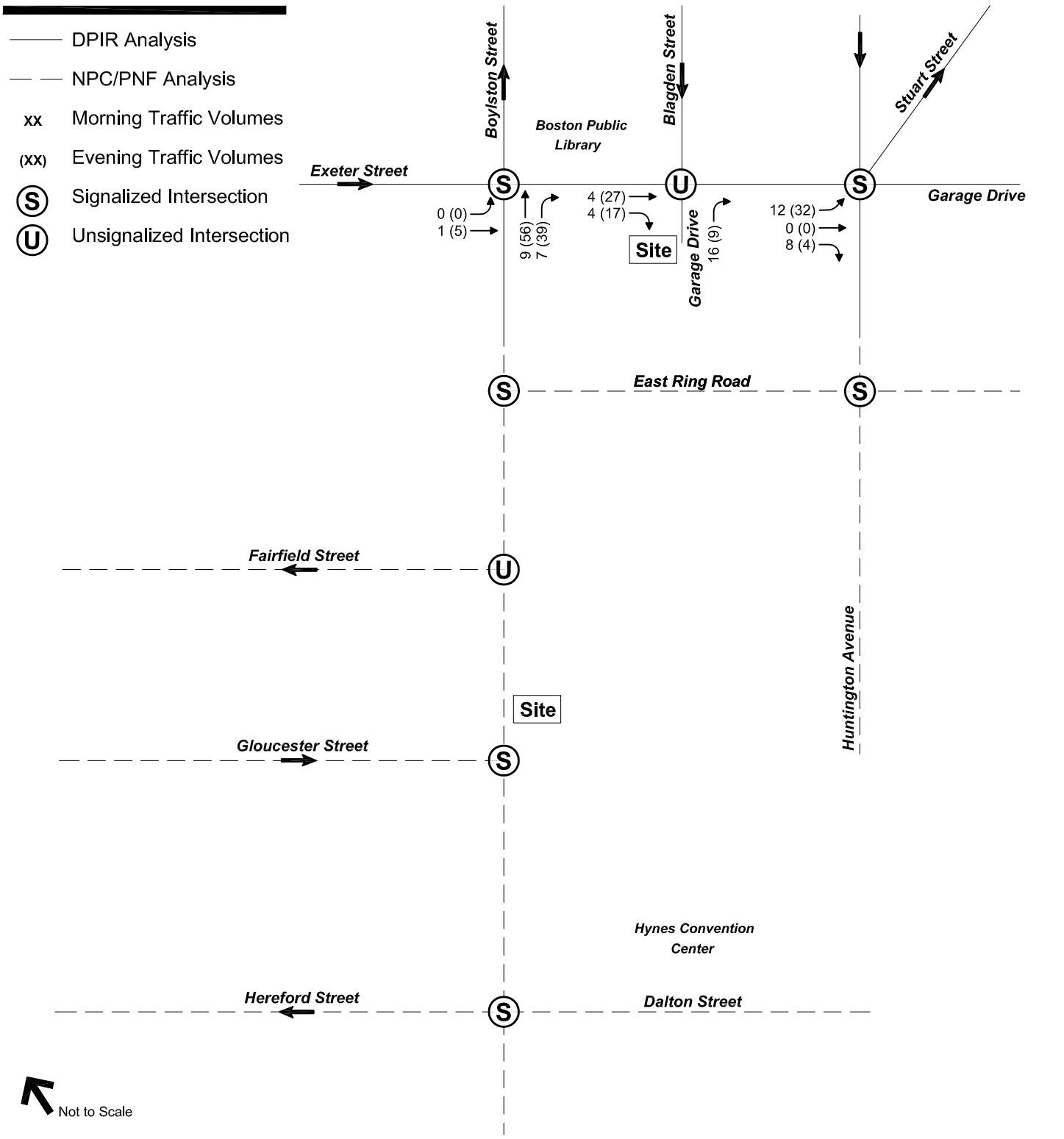


Figure 4-16

Project Generated Trips
Weekday Morning and Evening

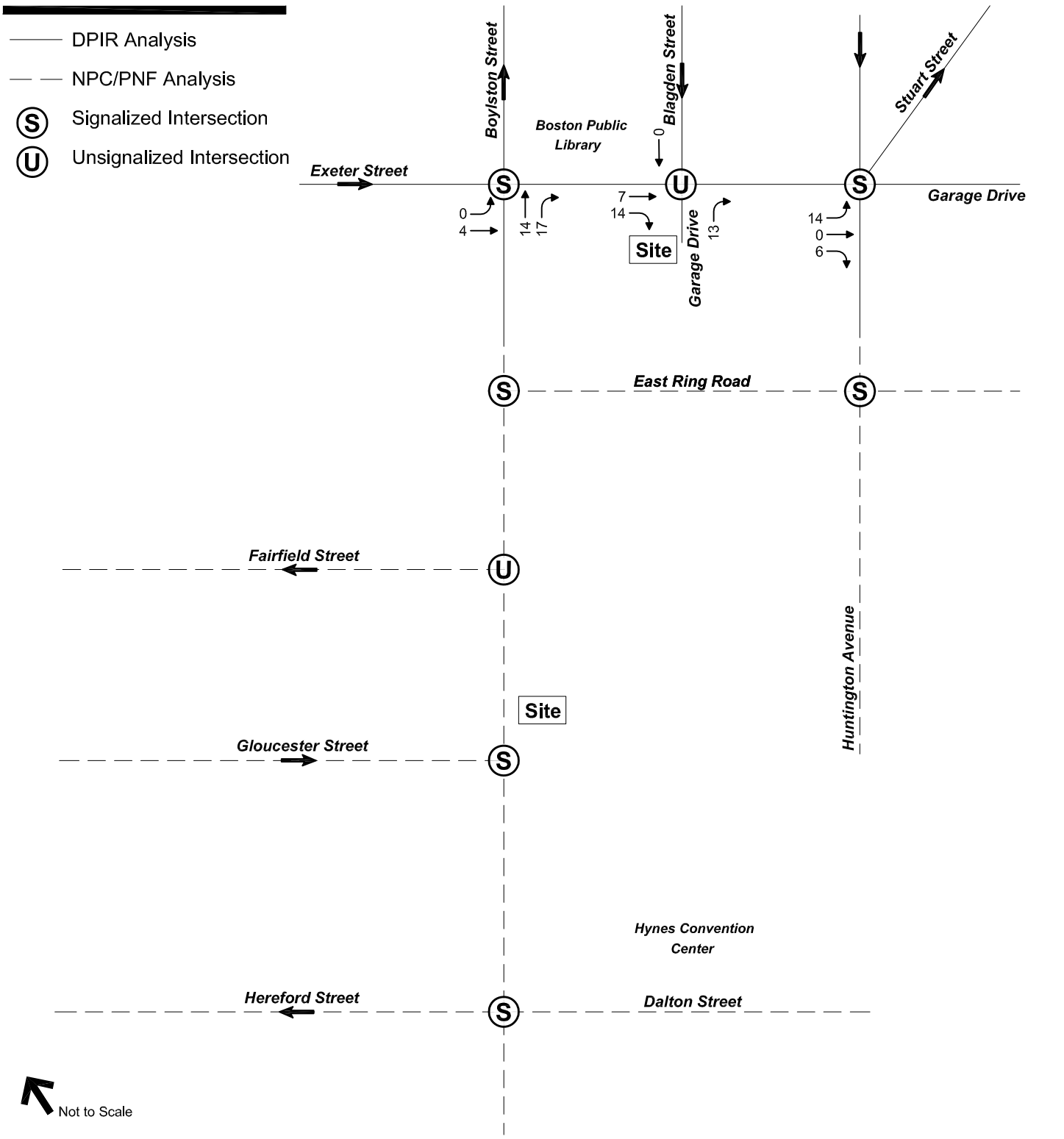


Figure 4-17

Project Generated Trips
Saturday

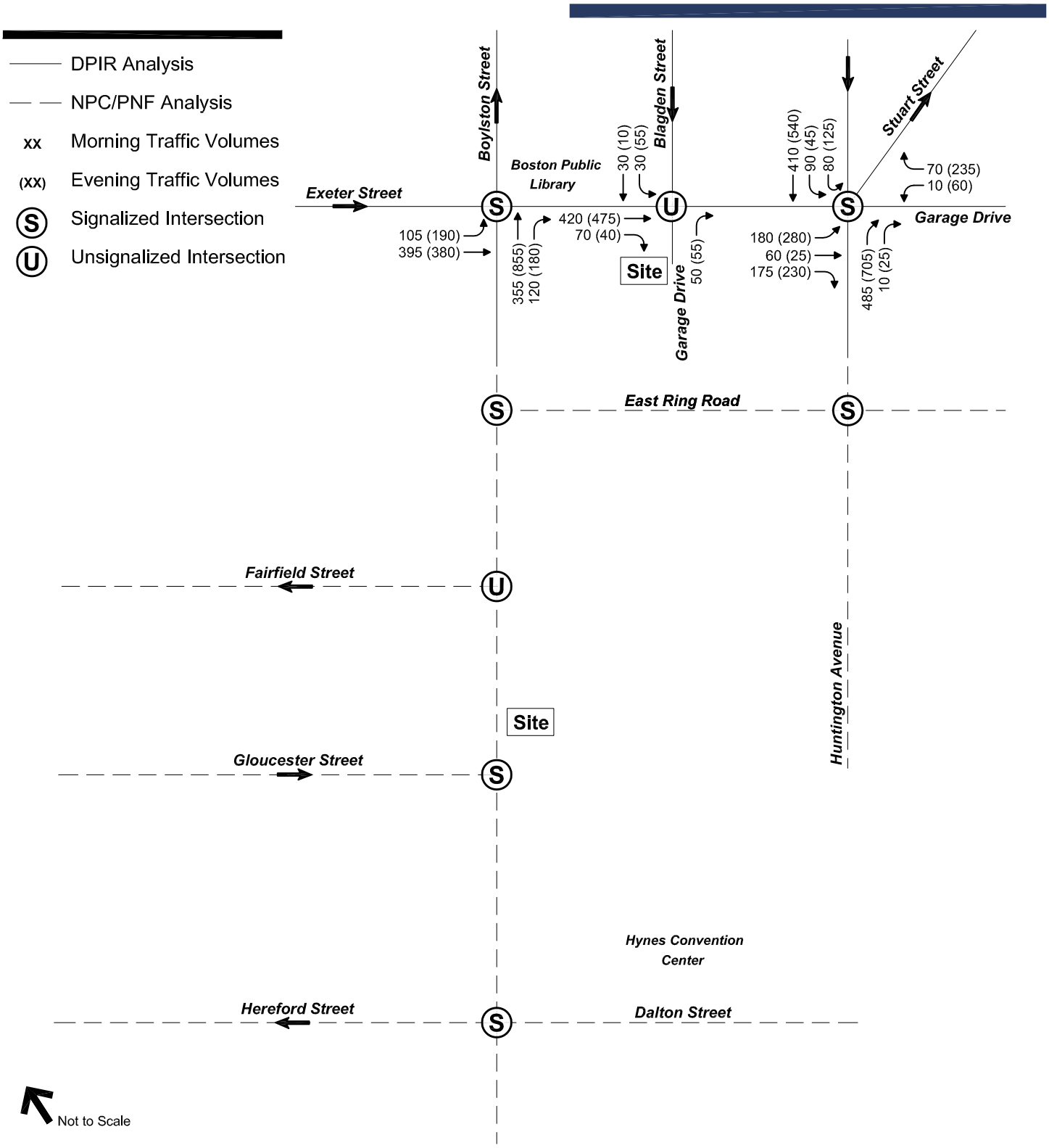


Figure 4-18

2011 Full Build Condition
Weekday Morning (8am - 9am) and Evening (5pm - 6pm)
Peak Hour Traffic Volumes

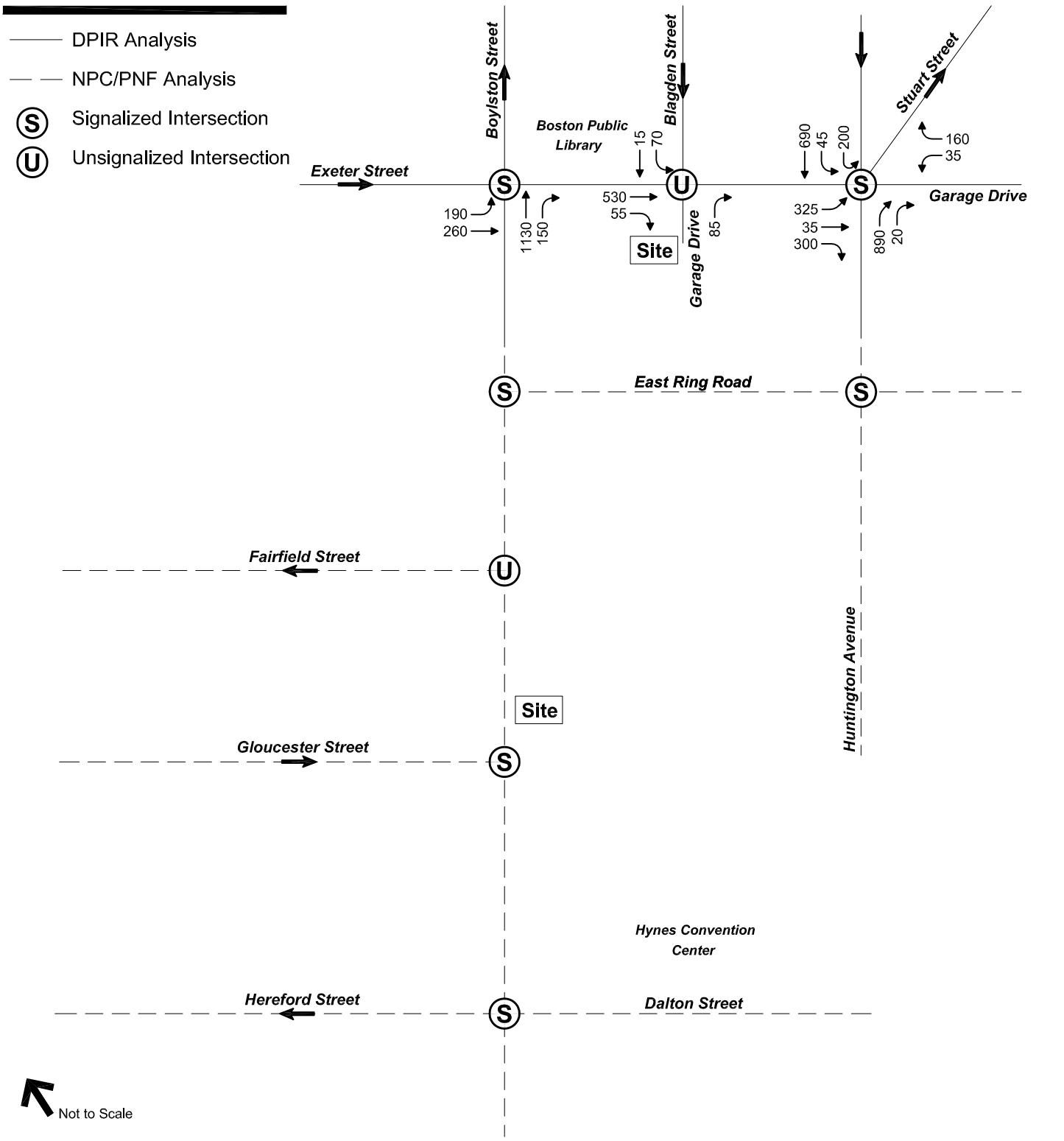
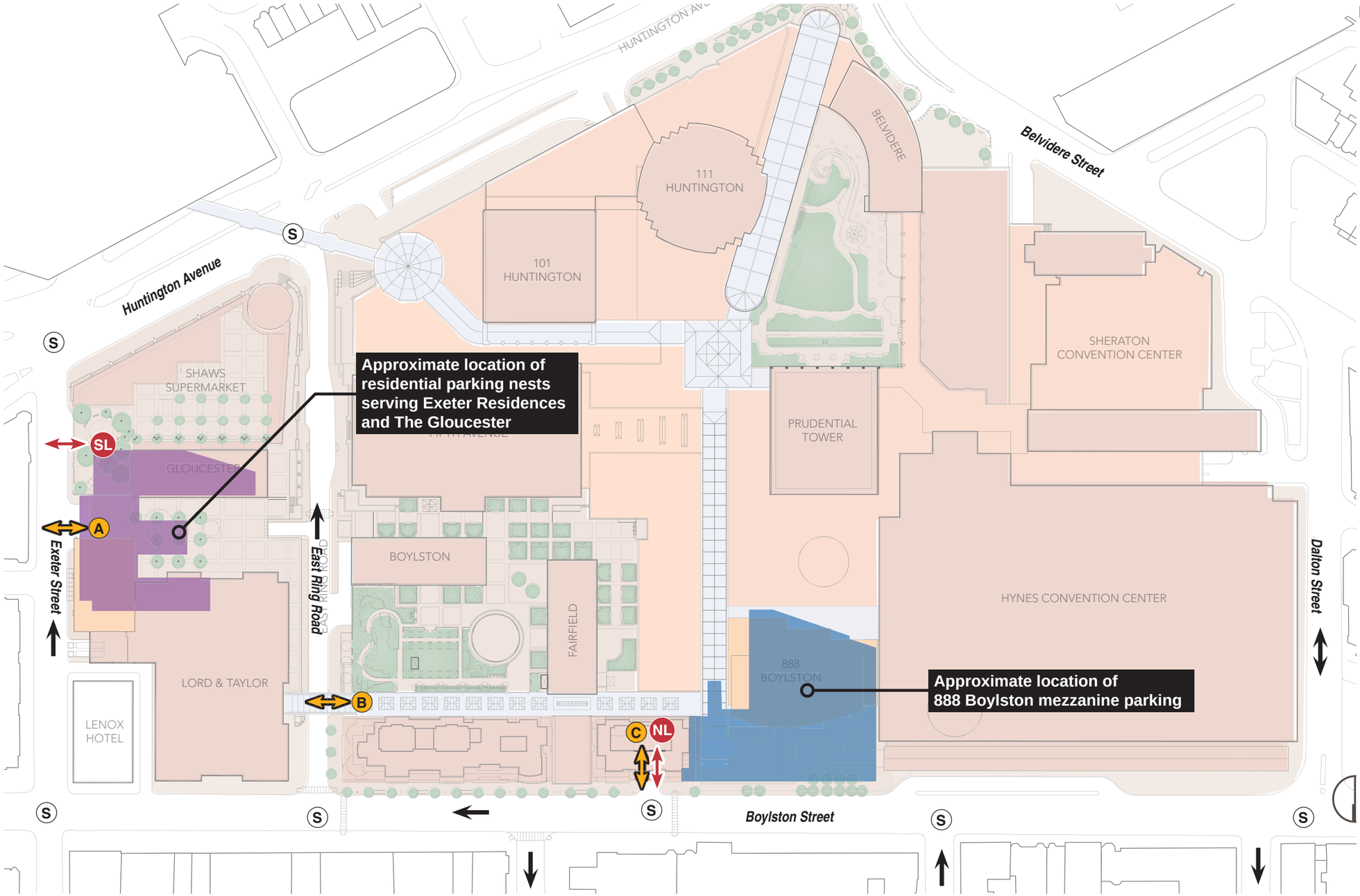


Figure 4-19

2011 Full Build Condition
Saturday (4pm - 5pm)
Peak Hour Traffic Volumes



Loading/Service Areas

SL Shaw's Loading Dock

Forward-In/Forward-Out for trucks up to WB-50 (semi-trucks with 1 42.5' trailer). This Dock is shared between Shaw's Supermarket, Gloucester Apartments and Avalon Exeter.

NL North Loading Dock

Forward-In/Forward-Out access for trucks up to WB-50. Serves the North Arcade retail, The Fairfield, Mandarin Oriental Boston and 888 Boylston.

Prudential North Garage - Entrys and Exits

A Access in and out to Blue, Green and Platinum Levels. Key card and ticket cashier for cash spaces access. Primary entry/exit for Avalon Exeter.

B Key card and ticket access into Green and Platinum Leves. Valet-only access to Blue Level (Mandarin Oriental Nest). Only key card access out. Primary entry/exit for 888 Boylston reserved parking.

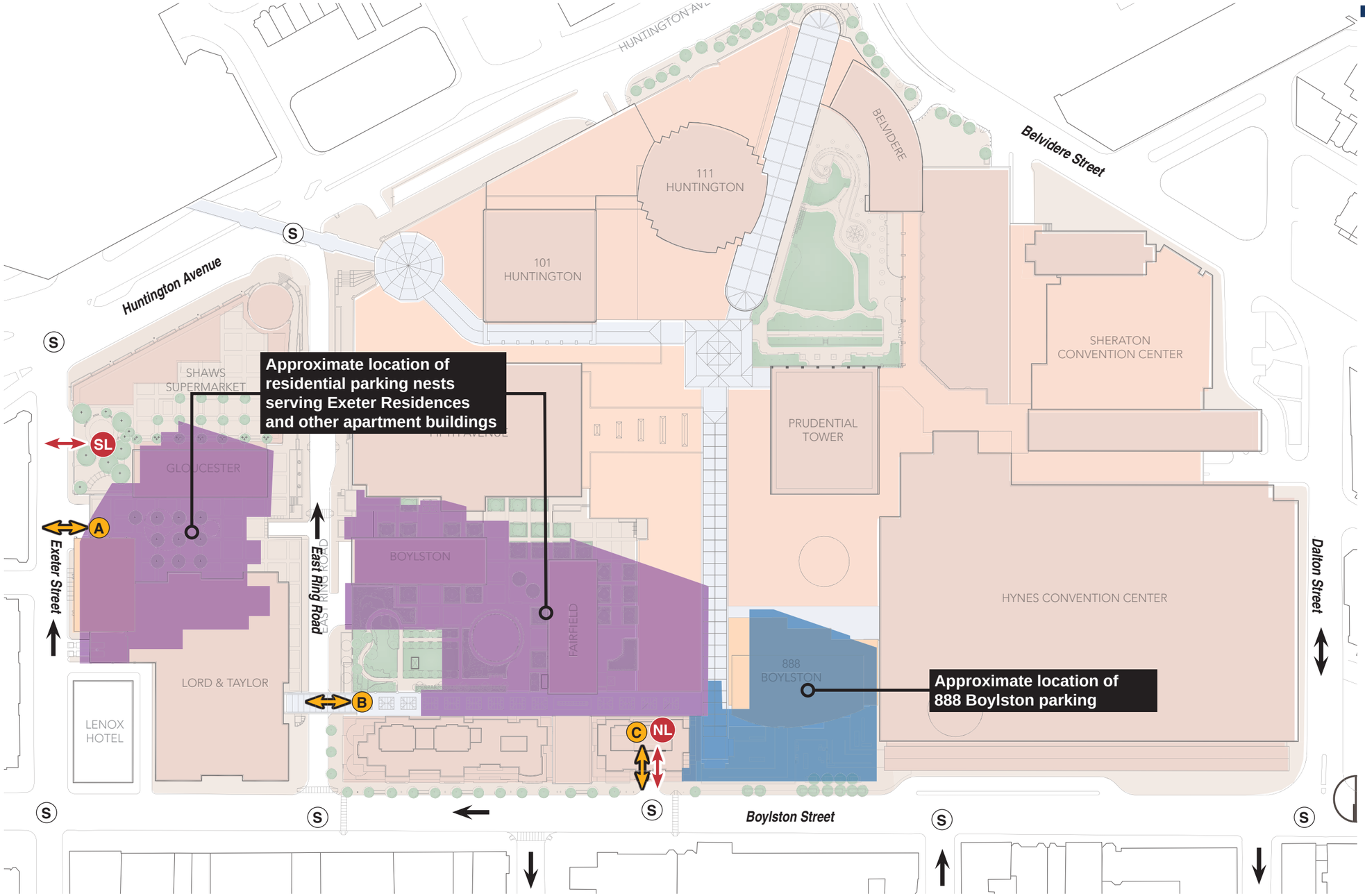
C Exit only for Mandarin Oriental Valet Nest. Valet Key card only.

Figure 4-20

Exeter Residences and 888 Boylston
Vehicular Access Plan
Blue Parking Level

Not to Scale

AvalonBay COMMUNITIES, INC. Boston Properties



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A Access in and out to Blue, Green and Platinum Levels. Key card and ticket cashier for cash spaces access. Primary entry/exit for Avalon Exeter.

B Key card and ticket access into Green and Platinum Leves. Valet-only access to Blue Level (Mandarin Oriental Nest). Only key card access out. Primary entry/exit for 888 Boylston reserved parking.

C Exit only for Mandarin Oriental Valet Nest. Valet Key card only.

Figure 4-21

Exeter Residences and 888 Boylston
Vehicular Access Plan
Green Parking Level

Not to Scale

AvalonBay COMMUNITIES, INC. Boston Properties

5 Environmental Protection

This chapter was prepared for the DPIR to supplement the Environmental Protection chapter documented in the NPC/PNF. Specifically, this section updates the NPC/PNF and provides detail regarding wind, shadow, daylight, solar glare and geotechnical components. The remaining environmental analyses studied pursuant to Article 80 Large Project review guidelines are contained in Chapter 6 of the original NPC/PNF document.

5.1 Introduction

Pursuant to the BRA Scoping Determination issued on February 15, 2008, the environmental studies presented in the NPC/PNF were revised and/or updated. A complete list of environmental studies evaluated for the Project throughout the NPC/PNF and DPIR processes is identified below in **Table 5-1**. In addition to the studies continued in this DPIR, original documentation can be found within the NPC/PNF Volumes I and II as stated in **Table 5-1**.

With the exception of wind, the updated environmental studies in this DPIR are based on the Proposed Program of 27 stories or 311' in height for the Exeter Residences and of 17 stories or 242' in height for 888 Boylston. The "P**roposed Program**" on which the analysis of wind is based is a slightly more intensive program of 19 stories or 265' in height for 888 Boylston and 28 stories or 320' in height for Exeter Residences. Although the Proposed Program as presented in this DPIR has been reduced from those parameters, the impacts of the more intensive Proposed Program were satisfactory as to wind. Since the impacts of the modified Proposed Program discussed in this DPIR will be less than the impacts of the taller and denser proposal, the wind analysis has not been further redone to reflect the currently reduced program.

The environmental studies in the NPC/PNF were based on a program of 30 stories and 340' in height for the Exeter Residences and of 19 stories and 265' in height for 888 Boylston, which is more intensive than the Proposed Program as presented in this DPIR.

Table 5-1
Environmental Study Documentation

Environmental Study	NPC/PNF (August 2007)	Draft Project Impact Report (DPIR)
Wind	Volume I, Section 6.1 Volume II, Appendix E	Volume I, Section 5.2 Technical Appendix G
Shadow	Volume I, Section 6.2	Volume I, Section 5.3
Daylight	Volume I, Section 6.3	Volume I, Section 5.4
Solar Glare	Volume I, Section 6.4	Volume I, Section 5.5
Noise	Volume I, Section 6.5 Volume II, Appendix F	Refer to original study in NPC/PNF
Air Quality	Volume I, Section 6.6	Refer to original study in NPC/PNF
Solid & Hazardous Materials	Volume I, Section 6.7	Refer to original study in NPC/PNF
Geotechnical & Groundwater	Volume I, Section 6.8	Volume I, Section 5.6
Water Quality	Volume I, Section 6.9	Refer to original study in NPC/PNF
Flood Hazards/Wetlands	Volume I, Section 6.10	Refer to original study in NPC/PNF
Construction Impacts	Volume I, Section 6.11	Refer to original study in NPC/PNF
Rodent Control	Volume I, Section 6.12	Refer to original study in NPC/PNF
Sustainable Design & Practices	Volume I, Section 6.13 Volume II, Appendix G	Volume I, Chapter 7 Sustainable Design
Cultural Resources	Volume I, Section 6.14	Refer to original study in NPC/PNF

5.2 Wind

■

Introduction

Pedestrian level winds conditions were evaluated as part of a quantitative study as required by Section 80B(2)(a) of the Boston Zoning Code. The objective of the wind study was to assess the potential effect of the proposed development on pedestrian level wind conditions in the Project area and provide recommendations for minimizing adverse effects, if any.

The pedestrian level wind study involved wind simulation on a 1:400 scale model of the Project area. The simulations were conducted by Rowan, Williams Davies and Irwin (RWDI) in a boundary-layer wind tunnel for the purpose of estimating local wind speed conditions under three conditions; Existing Conditions, 155-feet Zoning Height and the Proposed Program as directed by the BRA Scoping Determination. The Proposed Program was analyzed with Exeter Residences at 28 stories (320 feet) and 888 Boylston at 19 stories (265 feet), although the current program proposes Exeter Residences at 27 stories (311 feet) and 888 Boylston at 17 stories (242 feet). The potential impacts resulting from the Project based upon the current program are anticipated to be less than those of the modeled buildings. The study identifies estimated changes in pedestrian level wind conditions from the Project and potential mitigation, required to address such impacts.

The study modeled the ground level wind conditions at 92 locations including pedestrian routes and surrounding public streets from Dalton Street to the Boston Public Library and from Huntington Avenue to Newbury Street. The study locations were reviewed by the BRA prior to conducting the study.

The results of the wind tunnel study were compared to the criteria in the BRA"s Development Review Guidelines and the guidelines contained in Article 41 of the Boston Zoning Code.

■

Regulatory Context

As required by Section 80B(2)(a) of the City of Boston Zoning Code for Large Project review and Article 41-16, the General Design Guidelines and Environmental Impact Standards for the Huntington Avenue Prudential Center District, the Proponent completed a quantitative pedestrian level wind analysis to ascertain the potential pedestrian level wind impacts resulting from the Project adjacent to and in the vicinity of the Project Site. This study has particular emphasis on building entrances, sidewalks, parks and other public open spaces in the Project area. As contemplated by Section 80B(2)(a) of the Code, the wind analysis for the Project compares the pedestrian level wind conditions with and without the Proposed Project. The study evaluated (1) Existing Conditions, (2) the 155-feet zoning height for each building and (3) the Proposed Program, as required by the BRA Scoping Determination. The Existing Conditions are presented below for context only. The more applicable quantitative analysis compares the modeled pedestrian level wind conditions under the existing zoning height of 155-feet and the Proposed Program.

Overview

Major buildings, especially those that extend above their surrounding, often cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface. Taller buildings intercept these faster winds and deflect them down to the pedestrian environment. The funneling of wind through gaps between buildings and the acceleration of wind around corners of buildings may also cause a localized increase in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from prevailing upper-level winds, resulting in no substantial changes to the local pedestrian-level wind environment. The most effective way to assess potential pedestrian-level wind impacts around a proposed new building is to conduct scale model tests in a boundary layer wind tunnel. For that reason, RWDI has conducted the wind tunnel tests which are reported in this section.

The consideration of wind in planning outdoor activity areas is important since high winds in an area tend to deter pedestrian use. For example, winds should be light or relatively light in areas where people would be sitting, such as outdoor cafés or playgrounds. For bus stops and other locations where people would be standing, somewhat higher winds can be tolerated. For frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. For infrequently used areas, the wind comfort criteria can be relaxed even further. The actual effects of wind can range from pedestrian inconvenience, due to the blowing of dust or other loose materials in a moderate breeze, to severe difficulty with walking due to the wind forces on the pedestrian.

Methodology

Information concerning the site and surroundings was derived from site photographs, the BRA's 3D model of the area, information on surrounding buildings supplied by the architects and site plans and elevations of the proposed development provided by the design team.

The following configurations were simulated in the wind tunnel:

- Existing Conditions – includes existing buildings on and around the site;
- 155-Feet Zoning Height – includes Exeter Residences and 888 Boylston at 155 feet zoning height on and around the existing site surroundings.
- Proposed Program – includes the design of 28 stories and 320' in height for the Exeter Residences and 19 stories and 265' in height for 888 Boylston in and around the existing site surroundings.

The scale model including the entire Prudential Center and surrounding Back Bay area, was equipped with specifically designed wind speed sensors that were connected to the wind tunnel's data acquisition system to record the mean and fluctuating components of wind speed at a full-scale height of five feet above grade in pedestrian areas throughout the study site. Study locations were selected by RWDI based on their extensive experience in modeling pedestrian level wind conditions in Boston. Specific study locations were selected to adequately model conditions at potentially windy or high pedestrian traffic locations. The horizontal extent of the study area was selected to capture any locations likely to be affected by the Proposed Program. This methodology was confirmed by comparing the modeled conditions at the perimeter of the study area under the approved Development Plan and the Proposed Program. As shown on **Figures 5-1** thru **5-3,** twenty-five of the twenty-seven perimeter sensor locations studied remain within the same comfort category when comparing the approved Development Plan and the Proposed Program. The two perimeter locations that changed when comparing these conditions (Nos. 49 and 36) changed by only 1 mph and remained comfortable for standing on an annualized basis.

Wind speeds were measured for 36 wind directions, in 10 degree increments, starting from true north (see Technical Appendix G). The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model. The results were then combined with long-term meteorological data, recorded at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

This study involved state-of-the-art measurements and analysis techniques to predict wind conditions at the study site. However, some uncertainty remains in predicting wind comfort, and this must be kept in mind. The comfort limits used in this report represent an average for the total population. Also, unforeseen changes in the Project area, such as the construction or removal of buildings, can affect the conditions experiences at the site. Finally, the predictions of wind speeds are necessarily a statistical procedure. The wind speeds reported are for the frequency or occurrence stated (based on percent of the year). Lower and higher wind speeds will occur but on a less frequent basis.

■

Pedestrian Wind Comfort Criteria

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed + 1.5 times the root-mean-square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second set of criteria used by the BRA to determine the acceptability of a specific location is based on the work of Melbourne. This set of criteria is used to determine

the relative level of pedestrian wind comfort for activities such as sitting, standing or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed). They are as follows in **Table 5-2**.

Table 5-2
BRA Mean Wind Criteria*

Melbourne Category	Description	Criteria*
1. Comfortable for Sitting	Recommended for outdoor cafes and amenities that promote sitting.	≤12 miles per hour
2. Comfortable for Standing	Appropriate at major building entrances, bus stops or other areas where people may want to linger but not necessarily sit for extended periods of time.	>12 and ≤15 miles per hour
3. Comfortable for Walking	Appropriate from sidewalks, plazas, parks where people are more likely to be active and receptive to some wind activity.	>15 and ≤19 miles per hour
4. Uncomfortable for Walking	Considered a nuisance for some activities, but can be acceptable, depending upon the season and use of an area.	>19 and ≤27 miles per hour
5. Dangerous	Wind speeds can adversely affect a pedestrian's balance and footing.	> 27 miles per hour

* Applicable to the hourly mean wind speed exceeded 1 percent of the time.
Source: Boston Redevelopment Authority

The wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BRA effective gust velocity criterion of 31 mph. However, without any mitigation measures; the general wind climate in Boston is likely to be frequently uncomfortable for more passive activities such as sitting.

■

Huntington Avenue / Prudential Center District
General Design and Environmental Impact Standards

City of Boston Article 41-16(2) establishes additional environmental impact standards for work within the existing Planned Development Area including Pedestrian Safety Standards related to wind velocity. The Code requires that buildings be designed to avoid excessive and uncomfortable downdrafts on pedestrians and shall be shaped or include other wind-baffling measures so that the Project will not cause ground-level ambient wind speeds to exceed the standards established by Table A of this section of the Code. The referenced Table A is repeated in **Table 5-3** below.

Table 5-3
Article 41 Pedestrian Safety/Comfort Wind Standards

Activity Area	Effective Gust Velocity*	Permitted Annual Occurrence Frequency
Limit for All Pedestrian Areas	13.8 m/sec (31 mph)	1%
Major Walkways – Especially Principal Egress Path for High-Rise Buildings	13.8 m/sec (31 mph)	1%
Other Pedestrian Walkways – Including Street and Arcade Shopping Areas	11.2 m/sec (25 mph)	5%
Open Plazas and Park Areas, Walking and Strolling Areas	6.3 m/sec (14.1 mph)	15%
Open Plaza and Park Areas, Open-Air Restaurants	4.0 m/sec (9 mph)	20%

* The effective gust velocity (egv) is defined as egv = U + 1.5 fvc , where U is the mean windspeed at a particular location and fvc is the root mean square of the fluctuating velocity component measured at the same location over the same time interval.

Source: Boston Redevelopment Authority

Prior to construction of the Project, nine of the locations measured exceed the standards in Table A of Section 41-16(2), also shown above in **Table 5-3**. After the construction of Exeter Residences and 888 Boylston, only five of the locations measured exceed the standards in Table A of Section 41-16(2) and, in each case, the wind conditions have a lesser velocity and/or occur less frequently than under the No-Build Conditions. Therefore, to the extent the ground-level ambient wind speeds exceed the standards of Table A of Section 41-16(20), such exceedances are not caused by the Project.

Test Results

The following sections describe the expected pedestrian level wind conditions in the Existing, 155-feet Zoning Height and Proposed Program conditions. Sensor location plans depicting pedestrian wind comfort and safety categories are provided in **Figure 5-1** through **5-3.** A complete tabulation of modeled pedestrian wind speeds is provided in Appendix G of the Technical Appendices.

Existing Conditions

Under existing conditions, the majority of the Project area is comfortable for sitting, standing or walking. With the exception of three individual sensor locations (Nos. 40, 52 and 53) all of the studied locations within public pedestrian areas and street corridors are estimated to comply with the BRA criteria for annual wind speed. Locations 40 and 52 located on sidewalks along Huntington Avenue and Belvidere Street both exceed the BRA's effective wind gust criteria by 3 mph with an effective wind gust speed of 34 mph. In addition, six private courtyard locations (80, 81, 84, 86, 87, 88) surrounding the Fairfield residential building have elevated wind speeds that fall within the uncomfortable category. Location 87 has an annualized wind speed of 28 mph and an effective wind gust speed of 39 mph. Locations 81 and 86 have unacceptable effective wind gust speeds of 33 and 32 mph respectively.

Overall, six locations were estimated to exceed the BRA's effective wind gust criteria. These are locations 40, 52, 81, 84, 86, 88 and 89.

Despite the urban conditions and scale of the Project area, the majority of studied locations (54 percent) experienced conditions generally suitable for walking or standing, consistent with long-standing uses of these public and private pedestrian spaces. An additional 35 percent of the locations were expected to have even lower wind speeds and were estimated to be comfortable for sitting. Ten of the 92 locations studied under existing conditions were expected to have uncomfortable conditions at least 1 percent of the year.

155-Feet Zoning Height

The zoning height of 155 feet was modeled for both 888 Boylston and the Exeter Residences. Overall, this development scenario is slightly improved when compared to the existing conditions. Pedestrian level wind conditions were simulated at ninety-two locations in this development program. Approximately 52 percent (48 sensors) were estimated to be comfortable for standing or walking and an additional 40 percent (37 sensors) are expected to experience even lower wind

speeds falling within the comfortable for sitting category. Nine percent (8 sensors) were found to be uncomfortable within the BRA review criteria, two fewer than under existing conditions.

Similar to the existing conditions, the majority of studied locations within public pedestrian corridors meet the BRA comfort criteria. Only 4 locations within public sidewalks (40, 52, 53, and 75) are estimated to be uncomfortable more than 1 percent of the time. Three additional locations (79, 80 and 88) within the residential or commercial courtyards fall into the uncomfortable category.

All 92 locations modeled in the Project area under this development scenario comply with the BRA effective wind gust criteria on an annual basis and the 31 mph limit for all pedestrian areas, major walkways and egress paths from high-rise buildings established by Article 41-16(2).

Proposed Program

The design of the proposed Project was further developed since the submission of the NPC/PNF and was updated to include revisions to the building massing and inclusion of mitigation features to improve the proposed wind conditions. In the Proposed Program, the pedestrian level wind conditions remained essentially unchanged over the Project area when compared with the 155 foot zoning height. As expected, the majority of the Project area 93 percent (86 locations) remains comfortable for sitting standing or walking. Six modeled locations (40, 52, 53, 87, 88) were found to be uncomfortable when compared to the BRA criteria for mean annual wind speed, an improvement over both the existing conditions (10 uncomfortable) and the 155 foot development program (8 uncomfortable locations). Four of the uncomfortable locations (40, 52, 53 and 75) are on public sidewalks and are estimated to be uncomfortable under all studied building scenarios.

The remaining locations estimated to be uncomfortable under the proposed condition are 87 and 88 located within interior courtyards. While these locations are uncomfortable under existing conditions, a 1 to 2 mph reduction in mean annual wind speed is predicted. These three locations also exceed the BRA's effective wind gust criteria for pedestrian areas by 1 to 3 mph with effective wind gusts or 32 to 34 mph.

In comparing the 155 foot buildings and the Proposed Program, greater than 68 percent of the locations studied are expected to experience a modeled change in wind speed of less than 2 mph. It is unlikely that most individuals could perceive a change of less than 2 mph, whether an increase or decrease. Accordingly, for the purposes of this study, we treat these locations as unchanged.

When comparing the 155 foot buildings with the Proposed Program, 62 locations (67 percent) are unchanged, 9 locations (10 percent) are expected to have an increase in pedestrian level winds and 19 locations (21 percent) are expected to experience a decrease in annual winds. Pedestrian level winds within the public and private pedestrian spaces within the Prudential Center remain the same or are improved slightly. The dangerous condition predicted at location 87 under the 155 foot zoning height is expected to experience a 7 mph decrease in annual wind speed and an 8 mph decrease in the effective gust speed thereby eliminating the dangerous condition at this location. Overall, the Proposed Program will improve wind conditions, resulting in an average reduction of effective wind gust velocity of 1 mph annually.

Other locations within Prudential Center which are expected to improve include a group of 5 locations near the base on the Fairfield and Boylston residential buildings. These locations (80, 81, 82, 83 and 87) are expected to experience an average decrease of approximately 4 mph annual wind speed and a decrease of 5 mph effective gust speed, substantially improving the pedestrian wind speed conditions in this area.

Five studied locations (8, 16, 20, 25 and 41) are expected to experience an increase in mean annual wind speed of up to 2 mph but these locations will remain comfortable for sitting, standing or walking. No individual location within the Project area is expected to experience an increase in annual wind speed greater than 3 mph.

Article 41 includes additional criteria relating to the allowable wind speed for "Other Pedestrian Ways" and "Open Plaza and Park Areas" as noted in Table 5-3 above. For Other Pedestrian Ways these criteria state that anticipated wind gusts not exceed 25 miles per hour with an annual occurrence frequency of greater than 5%. For Open Plaza and Park Areas these criteria state that anticipated wind gusts not exceed 14.1 miles per hour with an annual occurrence frequency of greater than 15%. The Proposed Project meets these criteria for all of the studied locations with the exception of three locations (87, 88 and 89) which were non-compliant in the No-Build Condition.

As expected in an urbanized area with numerous high-rise buildings, there are some locations in the study area that will experience increased modeled wind speeds. Other areas are predicted to have reduced wind speeds and generally improved conditions. Overall, the Proposed Project will result in a modest improvement in pedestrian level wind conditions across the Project area.

■

Mitigation

The Proposed Project will have a minor influence on pedestrian level winds in the public and private spaces near the site. The urban nature of the site and the presence of numerous tall buildings contribute to a moderately windy pedestrian

environment, an environment that would be present even under the No- Build condition if the Project were not constructed. As described above, the Project will result in a moderate improvement in mean annual wind speed in the Project area.

To achieve this condition, the Project design includes the installation of 10-foot tall trees at selected locations along Exeter Street, at the corner of Exeter and Blagden Streets. The type of trees may be either coniferous or have a branch density that will be adequate to have the desired wind mitigation effect. The design team will identify the appropriate choice with the final streetscape design and will work with the BRA to ensure that the proposed trees provide the designed effect. No additional wind mitigation is anticipated to be required. **Figure 5-3** depicts the locations of the proposed mitigation measures related to the Project.

5.3 Shadow Analysis

This shadow analysis updates the analysis included in the NPC/PNF by adding additional evaluation dates and providing a separate study of shadow on the Boston Public Library courtyard east wall. This additional data is beyond the requirements of Article 80 Large Project Review and are provided to respond to comments raised during the NPC/PNF public review. The shadow studies included herein utilize the updated massing for the Exeter Residences and 888 Boylston. The following study dates were evaluated:

1. 2/5 and 11/5
2. 3/21 and 9/21 (Spring and Fall Equinox)
3. 5/5 and 8/5
4. 6/21 (Summer Solstice)
5. 10/21
6. 12/21 (Winter Solstice)

Several interim study dates (2/5 and 11/5, 3/21 and 9/21, and 5/5 and 8/5) represent similar sun azimuth and altitude data, therefore the shadow impacts for these dates coincide and are presented as a single study date. Furthermore, the October 21st date was included as a study timeframe since this is the City's date after which use of public open space diminishes and therefore potential impacts are less relevant. Lastly, a discussion of the potential impacts on the pedestrian plaza spaces around the existing Prudential Center AvalonBay buildings is included in this section.

Pursuant to the BRA Scoping Determination the following three study scenarios were analyzed for each study date:

1. Existing Conditions
2. 155-feet Zoning Height, and
3. Proposed Program.

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Regulatory Context

As required by Section 80B(2)(b) of the City of Boston Zoning Code for Large Project review, the Proponent completed a shadow study to ascertain the potential new shadow impacts resulting from the Project. This study has particular emphasis on sidewalks, parks and other public open spaces as well as the existing pedestrian plaza and courtyard areas around the existing Prudential Center AvalonBay buildings and the Boston Public Library courtyard east wall. As contemplated by Section 80B(2)(b) of the Code, the shadow study for the Project compares the Proposed Program and Existing Conditions. Furthermore, the 155-feet Zoning Height condition was also analyzed for this DPIR.

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Methodology

The following shadow study has been prepared using methodologies consistent with accepted practices for such studies completed under Article 80 review. The analysis provides a comparison of the Existing Conditions, 155-feet Zoning Height and Proposed Program conditions. This is accomplished by using a three-dimensional CAD model of the Project area using data provided by the BRA, updated as necessary to include recently completed projects and in the case of the 155-feet Zoning Height and Proposed Program conditions, to include any approved projects within the study area. The study was completed using standard sun altitude and azimuth data for each study date estimated to occur at latitude and longitude 42.36°N, 71.06°W (Table 5-4) according to Appendix 6 of BRA Development Guidelines.

Table 5-4 Azimuth and Altitude Data

Date	Local Time	Solar Position	
		Altitude	Azimuth
February 5 / November 5	9:00 AM	33.0	125.7
(Eastern Standard Time)	12:00 PM	48.0	-176.9
	3:00 PM	30.5	-121.8
March 21 / September 21	9:00 AM	33.0	125.7
(Daylight Savings Time)	12:00 PM	48.0	-176.9
	3:00 PM	30.5	-121.8
	6:00 PM	23.9	-79.3
May 5 / August 5	9:00 AM	39.9	93.5
(Daylight Savings Time)	12:00 PM	68.8	149.4
	3:00 PM	56.5	-113.7
	6:00 PM	23.9	-79.3
June 21	9:00 AM	39.9	93.5
(Daylight Savings Time)	12:00 PM	68.8	149.4
	3:00 PM	56.5	-113.7
	6:00 PM	23.9	-79.3
October 21	9:00 AM	25.9	115.3
(Daylight Savings Time)	12:00 PM	47.4	166.0
	3:00 PM	37.4	-132.9
	6:00 PM	7.3	-96.0
December 21	9:00 AM	14.2	141.9
(Eastern Standard Time)	12:00 PM	24.1	-175.6
	3:00 PM	10.0	-135.1

Times were adjusted for daylight savings time as appropriate. Shadows were estimated for each study date at 9 AM, 12 Noon, 3 PM and 6PM.

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Existing Conditions

The following section describes the estimated shadows under the Existing Conditions depicted on **Figures 5-4** thru **5-9**. Following this description is a summary of the estimated changes in the Project area shadows caused by each element of the Project.

February 5 / November 5

On February 5 and November 15, the sun rises between 6:36 and 6:54 AM in the southeastern sky. At 9 AM nearly all of the sidewalks in the Project area are still within shadows cast by adjacent buildings. The only sidewalks in sunlight at this

hour within several blocks of the Project area are at the corner of Boylston and Dartmouth Streets and along the western sidewalks along Commonwealth Avenue.

At 12 noon, the sun is in the southern sky and shadows are cast due north. The majority of sidewalks and pedestrian areas in the Project area are still within shadows cast by mid and high-rise buildings east of Boylston Street. The western sidewalks along Commonwealth Avenue remain fully sunlit.

At 3 PM the sun is in the southwestern sky and shadows are cast towards the northeast. Both Boylston Street sidewalks are in nearly complete shadow. The western sidewalks on Newbury and Boylston Streets are almost entirely sunlit at this hour.

March 21 / September 21

March 21 and September 21 are the vernal and autumnal equinox when the length of daytime and nighttime are equal. Daylight Savings Time is in effect. The sun rises between 6:31 and 6:45 AM. At 9 AM, most north and west-facing sidewalks remain in shadow along with most of Boylston Street. The only consistent exceptions are several small gaps along the south facing sidewalks on Boylston Street. These conditions create a variable experience for pedestrians in the study area. Pedestrians walking along Boylston Street have the opportunity to seek out small sun-lit areas but the dominant condition is walking in shadows cast by low and high-rise buildings to the south and east of the Boylston Street corridor. Pedestrians on Newbury, Exeter, Fairfield and Gloucester Streets have the choice of seeking the sunny side of the street along these corridors. These conditions are typical of an urban environment in the early spring and are to some degree standard across the Back Bay due to the common street pattern.

At noon on these dates, the sun has shifted to the south and a more consistent pattern of shadows in the study area emerges. With the exception of shadows cast by existing high-rise buildings in the Project area, all of the south and east sidewalks are in shadow and all of the north and west sidewalks are in full sunlight.

At 3 PM, the sun has shifted to the southwest more in line with the geometry of the Back Bay street network minimizing shadows cast on sidewalks and other public spaces within the study area. The existing high-rise buildings in the area continue to cast shadows on nearby sidewalks but overall this is the sunniest part of the day in the Project area on March 21 and September 21.

The sun sets on these dates between 6:43 and 6:54 PM.

May 5 / August 5

On May 5 and August 5, the sun rises between 5:34 and 5:42 AM in the eastern sky. By 9 AM the sun is high enough in the sky that many sidewalks and pedestrian areas in the Project vicinity are in partial sun at this time. The Boylston Street sidewalks have the greatest area of shadow due to their close proximity to the mid and high-rise buildings east of Boylston Street.

At noon the sun is nearly at its annual zenith and shadows are limited to the sidewalks immediately adjacent to mid and high-rise buildings such as the Hynes Building, the Prudential Center and the Lenox Hotel. At this hour shade is expected to be as desirable as sun, particularly in August. The presence of existing shadows at this hour is not likely to influence pedestrian behavior.

At 3 PM on May and August 5, the sun is still high in the western sky. Shadows cast on sidewalks or other pedestrian areas are very limited in the Project area. All of Boylston Street, Newbury Street and all of the west-facing sidewalks on cross streets are in full sunlight. Shadows cast by the existing buildings at the Prudential Center fall mainly within the Project site. The only exception is a small section of sidewalk on Exeter Street immediately west of the site.

A 6 PM the sun is due west of the site and is still 2 hours from setting at 7:58 PM. Shadows are cast on all east-facing sidewalks and greater than 50 percent of the west-facing sidewalks. All cross-streets are nearly completely shaded as are most of the pedestrian areas within the site interior.

June 21

June 21 is the vernal equinox, the first day of summer and has the longest day of the year. The sun rises at 5:08 AM and sets at 8:25 PM; Eastern Daylight Savings Time is in effect.

At 9 AM, the sun is in the eastern sky and has been up for almost four (4) hours. As expected, all south-facing sidewalks in the study area are in full sun and only rarely do even the high-rise buildings cast shadows that extend beyond their immediate vicinity.

At 12 Noon, the sun is at its annual zenith. North-facing sidewalks are still partially within existing shadows cast by adjacent buildings throughout the neighborhood. At this time of year, some pedestrians will be seeking shade from the sun while others will actively seek the full sun.

At 3 PM, the sun has moved to the southwest and shadows in the Back Bay are at their annual minimum due to the high sun angle and the orientation of the street

network. Even the high-rise buildings in the vicinity of the Project Site cast relatively small shadows the generally remain on-site.

At 6 PM, the sun has moved lower in the western sky and south-facing sidewalks are uniformly shaded. Pedestrians continue to have the choice of walking in shade or on the sunny side of the street.

October 21

The sun rises at 7:05 AM on October 21. At 9 AM the sun is still low in the sky and nearly all of the pedestrian areas in the vicinity of the Project site are fully shaded. The limited exceptions are the intersection of Boylston and Exeter Streets and the east facing sidewalks on Commonwealth Avenue. Except for these areas, only slivers of sunlit sidewalks are present in the vicinity of the site.

At noon, the sun in almost due south. East facing sidewalks in the Back Bay are uniformly sunlit with the exception of Boylston Street which is nearly in complete shadow. The existing mid and high-rise building east of Boylston Street extend across Newbury Street but do not extend as far west as Commonwealth Avenue.

By 3 PM on October 21, the sun is low in the southwestern sky and only limited sections of Boylston Street are sunlit. West-facing sidewalks along Commonwealth Avenue and Newbury Street remain in nearly full sunlight. Due to the extensive existing shadows in the Boylston Street corridor pedestrians generally do not have a choice of sunlit or shaded sidewalks.

The sun sets at 5:52 PM on October 21.

December 21

On December 21st, the sun is relatively low in the southern sky throughout the day and even at noon, most public spaces and sidewalks within the study area are in full shadow including almost all of the Commonwealth Avenue green space. The only consistent exception throughout the day is the south-facing sidewalk on Commonwealth Avenue where approximately 50 percent of the sidewalk is in full sun at 12 Noon.

At noon, and 3 PM, most of the south-facing sidewalk of Commonwealth Avenue is in full sun but as stated above, the remainder of the study area sidewalk is in shadow. By 6 PM on December 21, the sun has set.

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Potential Effects – Exeter Residences

The following sections describe the anticipated net new shadows cast by the proposed Exeter Residences building for the 155-feet Zoning Height and Proposed Program scenarios as shown on **Figures 5-10** thru **5-27** found at the end of this chapter.

February 5 / November 5

155-feet Zoning Height

On February 5 and November 5, the 155 foot Exeter Residences building will cast small new shadows on Exeter Street at noon and 3 PM. These shadows are extensions of existing shadows cast by the Gloucester residential building and are limited to the sidewalk and western façade of a small section of the Boston Public Library. As described below, these new shadows do not extend to the interior courtyard of the library. Shadows on the plaza to the west of the Exeter Residences are limited to a small triangle of shadow at 9 AM extending toward Lord & Taylor.

Proposed Program

The proposed Exeter Residences building will not cast any new shadow beyond that cast by the 155 foot as-of-right building on public ways. Accordingly, no new impacts to the pedestrian environment are expected. Shadow impacts on the plaza to the west of the Exeter Residences is equivalent to the 155 foot condition.

March 21 / September 21

155-feet Zoning Height

On March 21 and September 21, the 155 foot Exeter Residences will cast new shadows on Exeter Street at noon and 3 PM. The noon shadow is a sliver along the sidewalk adjacent to the Lenox Hotel. The 3 PM shadows cast on the sidewalk and façade of the Boston Public Library will add to the existing shadows along this sidewalk but will not extend to the roof of the library.

This minor change in the extent of existing shadows will not have a discernable effect on public use of this sidewalk and, as demonstrated below, no new shadow will be cast within the open-air courtyard at the library at this time. At 9 AM a small area of shadow extends onto the pedestrian plaza west of the 155 foot Exeter Residences, and the remaining evaluation times show no new shadow on the plaza.

Proposed Program

On March 21 and September 21, the proposed Exeter Residences is expected to result in a small increase in shadows cast towards Boylston Street at 9 AM filling in a small gap in existing shadows opposite the Mandarin Hotel. The noon shadows are not expected to increase beyond the sliver described above for the 155 foot building. Any new shadows caused by the increased height will not reach the sidewalk or other pedestrian areas. Similarly, at 3 PM and 6 PM the additional height of the proposed Exeter Residences building will not increase the shadows cast on sidewalks or other pedestrian areas, including the plaza to the west of the Exeter Residences.

As described above, these minor changes are not expected to have any discernable effect on pedestrian use of these spaces.

May 5 / August 5

155-feet Zoning Height

The 155 foot Exeter Residences will cast new shadows within pedestrian areas at 3 PM and 6 PM on May 5 and August 5. The new shadows at 3 PM will fall on the west-facing sidewalks of Exeter Street at Blagden Street and on the sidewalk adjacent to the Copley Square Hotel. At 6 PM the new shadows cast by this building are limited to the south west corner of the intersection of Blagden and Exeter Streets and the Blagden Street sidewalk at the rear of 25 Huntington Avenue.

Impacts to the plaza to the west of the 155 foot Exeter Residences are limited to the 9AM analysis period.

Proposed Program

The proposed Exeter Residences will cast a longer shadow down Blagden Street at 3 PM on May 5 and August 5 than under the 155 foot development program. However, these shadows cast towards the rear of the Boston Public Library and will not reach the library's open air courtyard. The additional height proposed by this scenario will not increase the shadows cast on sidewalks of other public areas at 9 AM, noon and 6 PM.

June 21

155-feet Zoning Height

On June 21 at 9 AM, the 155 foot Exeter Residences will cast a new shadow towards the roof and rear wall of Lord & Taylor and some of the adjacent plaza space, but that shadow will not reach Boylston Street or the East Ring Road. At noon, the new

shadow cast will be limited to the raised pedestrian areas directly north of the Exeter Residences and the adjacent roof of Lord & Taylor.

At 3 PM, a small new shadow will cross Exeter Street and shade the north and south corners of the intersection of Exeter and Blagden Streets. At 6 PM this shadow will have shifted slightly to the south shading the north-facing sidewalk of Blagden Street and the west facing sidewalks of Exeter Street.

Proposed Program

At 9 AM, the morning shadows of the Exeter Residences building extend across East Ring Road creating new shadows on a section of these sidewalks. At 12 Noon, the proposed Exeter Residences will have extended further east down Blagden Street shading additional sidewalks on both sides of the street. However, the shadows still fall short of the open-air courtyard of the library. At 6 PM, the new shadows cast by the building extend further across the Copley Square Hotel block and fill in a very small gap in the existing shadows near the Westin Hotel. The increase of shadows is minor in nature and is unlikely to be noticed by the public or result in any change in use of these spaces.

October 21

155-feet Zoning Height

On October 21, the 155 foot Exeter Residences will cast new shadows on public sidewalks at noon and 3 PM. At these hours, new shadows will be cast on Exeter Street. At noon, the shadow creates new shade along the east face of the Lenox Hotel, leaving the west-facing sidewalk at the rear of the Boston Public Library in full sunlight. At 3 PM, the building's shadow will fill part of the remaining gap adjacent to the library. As described below, these shadows will not reach the open-air courtyard at the library.

Impacts on the plaza to the west of the Exeter Residences are limited to the 9 AM period filling in a gap in the existing shadow.

At 6 PM the sun has set.

Proposed Program

At 9 AM shadows cast by the proposed Exeter Residences do not land on public streets of sidewalks, but similar to the 155 foot condition, create shadow on the plaza immediately to the west of the Exeter Residences. At noon the north-south shadow on Exeter Street extends across Boylston Street but still leaves the eastern sidewalk along the library in full sun. At 3 PM the shadows from the proposed Exeter

Residences extend in a northeast direction adding a small section of shadow on Exeter Street and the roof of the Boston Public Library. Despite shadows being long in the afternoon on this date the proposed building shadows do not reach the library courtyard.

December 21

155-feet Zoning Height

December 21 generally represents the longest shadows of the year. On this date the 155 foot Exeter Residences does not cast new shadow on public streets and sidewalks at any time of the day.

A very minor triangle of shadow is cast on the plaza to the west of the Exeter Residences but is limited to the 9 AM period.

The sun sets on this date at 4:15.

Proposed Program

On December 21, similar to the 155 foot condition, the Exeter Residences do not cast shadows on the public way in the immediate vicinity of the site because the existing shadows already shade Exeter Street and Boylston Street given that this date typically represents the longest shadows of the year. However, at 9 AM the Exeter Residences do cast a shadow on the sidewalk on the north side on Commonwealth Avenue. This shadow does not land on the Commonwealth Avenue Mall space in the middle of the avenue which is shaded by existing buildings.

The shadow on this date does not extend to the Boston Public Library Courtyard as seen on the figures. In response to public comments the Proponent has also studied shadows that may land on the courtyard wall. This analysis in included in the next section.

Boston Public Library Interior Courtyard and Courtyard Wall

In response to comments on the NPC/PNF the Proponent has prepared a specialized shadow study to evaluate the shadow impacts that the Proposed Project may have on the west facing wall of the inner courtyard of the original Boston Public Library ("BPL") building on Dartmouth Street.

The BRA requirements for shadow studies are limited to the impact of shadows on the ground plane, specifically in public spaces such as roadway and sidewalk areas and public parks. The BPL analysis however, goes beyond the requirements of

Article 80 Large Project Review. Of the two buildings proposed, only the Exeter Residences contributes any shadow to the west facing wall of the BPL. Only the Proposed Project was evaluated as the worst-case condition. The proposed building casts no shadow on the BPL courtyard level itself at any time of the year.

The time scale for this evaluation was more extensive for this evaluation than the ground plane studies to better show the nuances of the shadow conditions on the wall. Each evaluation date included eleven evaluation times set in one hour increments from 8:00 AM to 6:00 PM.

This analysis is based on the same evaluation dates that were used in the ground level shadow analysis included above. A slight difference of shadow between two dates, such as the Spring and Fall Equinox, is more evident in such a small area. Therefore the date that had the greater shadow impact is included on the figures. The BPL wall shadow study graphics can be found on **Figures 5-22** to **5-27**.

This detailed analysis included ninety-nine (99) separate evaluation times. Of these 99, four displayed shadow on the BPL east courtyard wall that was a result of the Proposed Project. They are detailed below.

February 5 / November 5, 3:00 PM – At this time the Exeter Residences casts shadow on one-and-a-half windows on the third floor of the courtyard. The remainder of the west-facing courtyard wall is in complete shade from the southern and western walls of the courtyard and the BPL roof. There are no new shadows on this wall from the Exeter Residences at 2:00 PM or 4:00 PM on the same date.

March 21 / September 21, 4:00 PM – During this period the Exeter Residences casts a shadow on approximately two-thirds of the third level wall. This includes approximately six windows. There is no new shadow from the Exeter Residences on this wall at 3:00 PM or 5:00 PM on the same date.

Conclusion – Exeter Residences

The proposed Exeter Residences building results in some additional shadow, as would be expected, but the impacts to public ways are minimal. New shadow on the north side of the Commonwealth Avenue only occurs in one time period of one evaluation date and the shadows move quickly due to the distance between the building and the sidewalk area. For the most part the new shadows expected to be cast by the Exeter Residences building will generally fill gaps in existing area shadows or expand existing shadows created in this dense urban area.

This analysis also depicts the shadows that would be expected on the plaza area to the west of the proposed Exeter Residences building which is part of the privately

owned Prudential Center pedestrian areas. Generally the Exeter Residences cast shadow in the early morning hours and then have no further impact through the rest of the day.

Impacts on the Boston Public Library western-facing courtyard wall were extensively studied and found to be minimal. The Project will not cast any shadows on the courtyard level itself, and in four of the ninety-nine periods studied, casts shadow on the highest level on the western-facing courtyard wall.

Boston's Back Bay neighborhood, dominated by mid-rise buildings and adjacent to the "City's Spine" of high-rise buildings is an area of constantly changing sun and shadow shifting on an hourly, daily and seasonal basis. The minor changes predicted by this analysis are unlikely to be noticed by the typical pedestrian or casual observer.

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Potential Effects – 888 Boylston

The following section describes the estimated shadows under the 155-feet Zoning Height and Proposed Program conditions for the 888 Boylston development and are shown on **Figures 5-10** thru **5-21**.

February 5 / November 5

155-feet Zoning Height

On February 5 and November 5, the 155 foot 888 Boylston building will cast new shadow on Boylston Street and the adjacent street side plaza space, beginning with a thin column of shadow at 9 AM to a wider shadow as the sun moves west. At approximately 10:30, 888 Boylston's shadow is coincident with the Prudential Center behind it where it has very little new shadow. By 3 PM the 155 foot 888 Boylston casts no new shadow.

Due to the sun angle there are no impacts on the internal pedestrian plaza spaces in and around the existing AvalonBay residential buildings.

The sun has set prior to the 6 PM period.

Proposed Program

The proposed 888 Boylston does not have any additional impacts on roadway or sidewalk areas except at the 9 AM period where the Proposed Program fills in some gaps on Gloucester Street north of Boylston Street.

Similar to the 155 foot condition, the proposed 888 Boylston building does not cast shadow on the existing internal pedestrian plaza spaces.

March 21 / September 21

155-feet Zoning Height

On March 21 and September 21, the 155 foot 888 Boylston will create minor new shadows on the eastern and western sidewalks of Gloucester Street near Boylston Street at 9 AM. By 12 PM the building contributes only slivers of new shadow as this area is overlaid by the shadow from the Prudential tower with shadows directed nearly perpendicular to Boylston Street. By 3 PM new shadows are off the public sidewalk. At this time the building introduces some very minor shadow to the Boylston Street plaza area adjacent the building and on to the upper plaza behind the western-most portion of the newly constructed Mandarin Oriental Boston.

At 3 PM and 6 PM on March 21 and September 21, the sun has shifted to the southwest and most existing shadows coincide with the Back Bay street network. Any shadows cast by the proposed 888 Boylston building will fall within the Prudential Center property and will not cast any new shadows on any publicly owned space or sidewalk.

Proposed Program

While the proposed 888 Boylston results in additional shadow length in comparison to the 155 foot version, the proposed building does not result in additional shadow on public streets, sidewalks or Prudential Center pedestrian plaza areas. Additional shadow is extended on adjacent roof areas and fills some gaps in Public Alley 443.

It is important to note that in both the 155 foot and proposed 888 Boylston conditions nearly the entire Boylston Street corridor from Hereford Street to Exeter Street is within the shadows of the existing low, mid and high-rise structures that dominate the vicinity.

May 5 / August 5

155-feet Zoning Height

On May 5 and August 5 the 155 foot 888 Boylston building has very limited shadow impacts. At 9 AM the building's shadow extends toward the Boylston/Gloucester intersection shading a portion of the plaza along Boylston Street. A small section of

the southerly side of Boylston Street is shaded as well. The majority of the Boylston corridor in the vicinity of the site is in shade from existing buildings at this time.

At noon, 3 PM and 6 PM the shadows are limited to within the Prudential Center site. At noon the shadow fills in a portion of the Boylston plaza that is not already shaded by the Prudential tower. At 3 PM and 6 PM the shadows extend to the east and southeast respectively shading a portion of the existing pedestrian plaza areas around the existing AvalonBay buildings.

Proposed Program

Under the proposed 888 Boylston program, the 9 AM shadows extend down Boylston Street in front of the Hynes Convention Center past the Boylston/Gloucester intersection shading the northern side of Boylston Street. The southern side of Boylston Street is already shaded by the Hynes.

At 12 PM the 888 Boylston shadow reaches into Boylston Street, but falls short of the far sidewalk. Portions of the roadway and the southern sidewalk along the building frontage are in shade at this time.

At 3 PM and 6 PM the effects are similar to the 155 foot condition as shadows are limited to pedestrian plaza spaces within the Prudential Center as shown on Figures 5-13 and 5-19. At 6 PM the overwhelming majority of internal pedestrian spaces are in shade.

June 21

155-feet Zoning Height

On June 21, the sun traces its highest arc across the sky and results in the fewest shadows of the year in the Project area. At 9 AM, 888 Boylston will cast a small shadow to the west near the Hynes Convention Center not reaching Boylston Street. At this time these shadows do not impact the sidewalks along Boylston Street.

At 12 noon, the sun is almost due south of the site and the building's new shadow extends to the plaza immediately to the north of the building and does not reach Boylston Street.

At 3 PM, the 155 foot 888 Boylston will cast a small new shadow to the east, striking the existing Prudential Center arcade. However, this narrow shadow will be limited to the Project Site and will not shade any public space or sidewalk.

At 6 PM, the sun is low in the western sky and any shadows cast by the proposed building fall within the Prudential Center property and are subsumed by existing

shadows. This time period does include shadows on the pedestrian plaza areas directly to the east of the 155 foot 888 Boylston.

Proposed Program

At 9 AM the proposed 888 Boylston Street building's shadow extends to the northwest past the corner of the Hynes Convention Center and into Boylston Street. At this time the south facing side of Boylston Street is already shaded. The proposed 888 Boylston building shades a portion of the northerly facing sidewalk adjacent to the Hynes entry.

At noon the shadow of the proposed building is limited to the sidewalk immediately in front of the side due to the high sun angle. At 3 PM and 6 PM shadow impacts are to pedestrian plaza spaces within the Prudential Center, similar to the condition under the 155 foot condition. No impacts to public streets or open spaces occur at his time.

October 21

155-feet Zoning Height

On October 21 at 9 AM the Boylston Street sidewalks are generally in shade, a small sliver of Boylston Street is shaded by the 155 foot 888 Boylston. The results at noon are similar as 888 Boylston fills in a gap of shade along the western edge of the building extending across Boylston Street. At 3 PM the only new shadow from the 155 foot 888 Boylston is a small triangle area on the Boylston Street plaza.

On this date, there are no impacts on the internal pedestrian plaza areas during the evaluation period.

Prior to the 6 PM period the sun has set.

Proposed Program

At 9 AM and 12 PM the Proposed Program does not result in any additional shadow on the public streets and sidewalk beyond the 155 foot program effects. At 3 PM the Proposed Program extends a thin column of shadow across Boylston Street shading a small portion of the north and south sidewalks. The Proposed Program, similar to the 155 foot building, does not shade the in internal Prudential Center pedestrian plaza areas.

December 21

155-feet Zoning Height

December 21 generally represents the longest shadows of the year. Boylston Street is generally in shadow for most of the day. On this date the 155 foot 888 Boylston fills in gaps with new shadow at 9 AM and 12 PM. At 3 PM the proposed 888 Boylston building casts no new shadow, as the street is fully in shade under the existing condition.

On this date the 155 foot 888 Boylston building contributes no new shadow to the internal pedestrian plaza areas around the existing AvalonBay residential buildings.

The sun sets on this date at 4:15.

Proposed Program

On December 21 the proposed 888 Boylston building has equivalent shadow on Boylston Street in the immediate vicinity of the site when compared to the 155 foot Boylston building. The Proposed Program also fills in a gap between existing shadows at the Commonwealth Avenue and Gloucester Street intersection. This shadow only occurs for a short period of time and is subsumed by the existing shadows due to the low sun angle.

Similarly to the 155 foot condition, the proposed building does not cast any shadow on the Prudential Center internal pedestrian plaza areas compared to the existing condition.

Conclusions – 888 Boylston

The proposed 888 Boylston building will create minor new shadows during each day modeled. In all cases the shadow impacts do not violate any of the design criteria relevant to the building.

When compared to the 155 foot 888 Boylston building the Proposed Program results in minor changes in shadow impacts to public ways and the internal Prudential Center Pedestrian plaza in and around the existing AvalonBay residential buildings. The shadows will fill in existing small gaps in the shadows created by the existing built environment or marginally expand on existing shadows.

Additionally, the Proposed Program only includes a short period of shadow on the Commonwealth Avenue Mall under only one time period analyzed. This shadow occurs for about an hour and a half and if generally a thin shaft of shadow between existing shadow from existing buildings.

These minor and brief instances of new shadows created by the proposed building are not expected to have any measurable effect on the public use of these spaces. The Back Bay is a densely-developed urban neighborhood with a mixture of low, mid and high-rise buildings. The shadows created by this architectural mixture presently create a mosaic of sun and shade from Arlington Street to Massachusetts Avenue that change by the hour, day and season. The addition of the proposed building at 888 Boylston is consistent with the mixture of building sizes within the Boylston Street corridor and will only add to the existing shaded conditions at the margin in a very minor way. The minor changes are well below those that might be expected to result in a change in public use of open space or other pedestrian areas.

5.4 Daylight Analysis

The following section describes the Project's anticipated effect on daylight obstruction at the site. The analysis was prepared using the BRA's Daylight Analysis Program and has been completed in accordance with the requirements of Article 80 of the City of Boston Zoning Code. The results of the analysis are presented in **Figure 5-28 through 5-34**.

Regulatory Context

Article 80, Section B(2)(c), Large Project Review – Environmental Component anticipates the potential need for a Proponent to describe the percentage of sky plane obstructed in the Existing and Proposed Conditions. Furthermore, the 155-feet Zoning Height condition was also analyzed for this DPIR.

Methodology

The proposed Project was analyzed using the Boston Redevelopment Authority's Daylight Analysis Program (BRADA) comparing the existing and proposed conditions. This section provides a description of the methodology used for the analysis.

BRADA Software

The BRADA[1] program was developed in 1985 by the Massachusetts Institute of Technology to estimate the pedestrian's view of the sky plane taking into account the massing and building materials used. The software approximates a pedestrian's view of a site based on input parameters such as: location of viewpoint, length and height of buildings and the relative reflectivity of the building facades. The model typically uses the midpoint of an adjacent right-of-way or sidewalk as the analysis viewpoint. Based on these data, the model calculates the perceived sky plane obstruction and provides a simple graphic depicting the analysis conditions.

The model inputs used for the study presented in this PNF are based on site observations and an existing conditions survey prepared by Vanasse Hangen Brustlin, VHB and schematic design plans prepared by CBT and Elkus/Manfredi Architects, project architects. As described above, the BRADA software considers the relative reflectivity of building facades when calculating perceived daylight obstruction. Highly reflective materials are thought to reduce the perceived sky plane obstruction when compared to non-reflective materials. For the purposes of this study, the building facades are considered non-reflective, resulting in a conservative estimate of daylight obstruction.

Viewpoints and Study Scenarios

In response to comments received from the NPC/PNF filing, four viewpoints were selected for the daylight analysis. Additional interior courtyard locations were requested but due to program limitations they were analyzed as perspectives and can be found in Chapter 3, Urban Design.

The four viewpoints used for this daylight analysis are depicted on **Figure 5-28**:

- Viewpoint #1: Exeter Street - located on the centerline of Exeter Street, centered on the façade of the proposed Exeter Residences.
- Viewpoint #2: Gloucester plaza – located between the Gloucester and Lord & Taylor buildings, focused on the western façade of the proposed Exeter Residences from a point equally spaced between the existing buildings.
- Viewpoint #3: Boylston Street - located on the centerline of Boylston Street, centered on the façade of the proposed 888 Boylston.
- Viewpoint #4: Fairfield plaza – located between the Fairfield and Prudential Mall buildings, centered on the eastern façade of the proposed 888 Boylston.

Each viewpoint was analyzed for three study scenarios:

[1] Boston Redevelopment Authority Daylighting Analysis (BRADA) Software: Harvey Brian and Susan Stuebing, Massachusetts Institute of Technology, Cambridge, Massachusetts (1985).

- Existing conditions;
- 155-feet Zoning Height; and
- Proposed Program.

■

Exeter Residences

Existing Conditions

Viewpoint #1
The sky plane from the centerline of Exeter Street under current conditions is dominated by the existing massing of a portion of the Lord & Taylor building as well as the entrance to the existing Prudential Center parking garage. This view takes up approximately 29.0 percent of the sky plane when calculated by the BRADA program. **Figure 5-29** provides the percentage of sky plane obstructed for Viewpoint #1 under existing conditions.

Viewpoint #2
Under current conditions the sky plane from the Gloucester plaza study point is impacted peripherally by the abutting Lord & Taylor and Gloucester buildings. This view takes up approximately 0.6 percent of the sky plane when calculated by the BRADA program. **Figure 5-29** provides the percentage of sky plane obstructed for Viewpoint #2 under existing conditions.

155-Feet Zoning Height

Viewpoint #1
The sky plane obstruction for the Exeter Residences site under existing conditions occupies approximately 29.0 percent as viewed from the centerline of Exeter Street. The establishment of a 155-foot building at this location will increase the building's massing and appearance from the centerline of Exeter Street by an additional 56.3 percent of the sky plane resulting in a total obstruction of 85.3 percent as calculated by the BRADA model. **Figure 5-30** summarizes the 155-feet zoning height scenario for the Exeter Residences from Viewpoint #1.

Viewpoint #2
The sky plane obstruction for the Exeter Residences site as viewed from the Gloucester plaza study point is currently occupied by 0.6 percent of the sky plane. The establishment of a 155-foot building at this location will increase the building's massing and appearance from the centerline of Exeter Street by an additional 18.1 percent of the sky plane resulting in a total obstruction of 18.7 percent as calculated

by the BRADA model. **Figure 5-30** summarizes the 155-feet zoning height scenario for the Exeter Residences from Viewpoint #2.

Proposed Program

Viewpoint #1
The sky plane obstruction for the Exeter Residences site under existing conditions occupies approximately 29.0 percent as viewed from the centerline of Exeter Street. The establishment of the proposed 27-story building at this location will increase the building's massing and appearance from the centerline of Exeter Street by an additional 58.0 percent of the sky plane resulting in a total obstruction of 87.0 percent as calculated by the BRADA model. **Figure 5-31** summarizes the proposed daylight conditions for the Exeter Residences from Viewpoint #1.

Viewpoint #2
The sky plane obstruction for the Exeter Residences site as viewed from the Gloucester plaza study point is currently occupied by 0.6 percent of the sky plane. The establishment of the proposed 27-story building at this location will increase the building's massing and appearance from the centerline of Exeter Street by an additional 46.6 percent of the sky plane resulting in a total obstruction of 47.2 percent as calculated by the BRADA model. **Figure 5-31** summarizes the proposed daylight conditions for the Exeter Residences from Viewpoint #2.

■

888 Boylston

Existing Conditions

Viewpoint #3
The sky plane from the centerline of Boylston Street under current conditions is impacted by the existing entrance to the Prudential Arcade and North terrace. This view takes up approximately 5.8 percent of the sky plane when calculated by the BRADA program. **Figure 5-32** provides the percentage of sky plane obstructed for Viewpoint #3 under existing conditions.

Viewpoint #4
Under current conditions the sky plane from the Fairfield plaza study point is impacted by the abutting Mandarin Oriental Boston and Prudential Arcade. This view takes up approximately 58.5 percent of the sky plane when calculated by the BRADA program. **Figure 5-32** provides the percentage of sky plane obstructed for Viewpoint #4 under existing conditions.

155-Feet Zoning Height

Viewpoint #3
The sky plane obstruction for the 888 Boylston site under existing conditions occupies approximately 5.8 percent as viewed from the centerline of Boylston Street. The establishment of a 155-foot building at this location will increase the building's massing and appearance from the centerline of Boylston Street by an additional 21.9 percent of the sky plane resulting in a total obstruction of 27.7 percent as calculated by the BRADA model. **Figure 5-33** summarizes the 155-feet zoning height scenario for 888 Boylston from Viewpoint #3.

Viewpoint #4
The sky plane obstruction for the 888 Boylston site as viewed from the Fairfield plaza study point is currently occupied by 58.5 percent of the sky plane. The establishment of a 155-foot building at this location will have no effect on the percentage of sky plane obstructed resulting in no change to the total obstruction of 58.5 percent as calculated by the BRADA model for existing conditions. **Figure 5-33** summarizes the 155-feet zoning height scenario daylight conditions for 888 Boylston from Viewpoint #4.

Proposed Program

Viewpoint #3
The sky plane obstruction for the 888 Boylston site under existing conditions occupies approximately 5.8 percent as viewed from the centerline of Boylston Street. The establishment of the proposed 17-story building at this location will increase the building's massing and appearance from the centerline of Boylston Street by an additional 30.3 percent of the sky plane resulting in a total obstruction of 36.1 percent as calculated by the BRADA model. **Figure 5-34** summarizes the proposed daylight conditions for 888 Boylston from Viewpoint #3.

Viewpoint #4
The sky plane obstruction for the 888 Boylston site as viewed from the Fairfield plaza study point is currently occupied by 58.5 percent of the sky plane. The establishment of the proposed 17-story building at this location will have no effect on the percentage of sky plane obstructed resulting in no change to the total obstruction of 58.5 percent as calculated by the BRADA model for existing conditions. **Figure 5-34** summarizes the proposed daylight conditions for 888 Boylston from Viewpoint #4.

■

Conclusions

The proposed developments will alter the view of the sky plane from the adjacent streets and sidewalks. The effect from Exeter Residences cannot be avoided because

the Project includes the addition of a 27 story building to an existing low-rise structure. The effect from the increased height of 888 Boylston from the previously approved plan is minimal. These changes will, of necessity, require a change in the view of the site and sky plane when viewed from the adjacent public streets and sidewalks.

5.5 Solar Glare Analysis

Introduction

This section includes an assessment of the potential solar glare impacts from new program and mitigation strategies, if necessary, to offset potential heat gain and glare impacts. Although the Prudential Center Redevelopment FPIR/FEIR did not include a solar glare analysis, the discussion presented in the NPC/PNF and this DPIR demonstrates conformance with the Article 80 Review guidelines and responds to agency comments generated from the NPC/PNF filing.

The Exeter Residences building is a predominantly masonry building with residential scale fenestration that is expected to have a limited solar glare and heat gain effect on the surrounding buildings. The masonry shaft will have cantilevered glass bays that rise up the entirety of the north façade.

888 Boylston is proposed to be a fully glazed building set back 92-feet from the Boylston Street curb (77-feet from the property line), and buffered from the street by street trees and plaza plantings. As a fully glazed building, there is a potential for glare and heat gain effects on neighboring streets and buildings as discussed below.

There are two general types of solar glare and they are commonly referred to as "spot glare" and "scattered glare." The first originates as a reflection from smooth façade buildings which creates a glare with an equal level of intensity as the source object. The second originates as porous surfaced buildings diffuse the light as it's reflected thereby decreasing the intensity of the glare and making it appear scattered. Reduced intensity alleviates squinting and general discomfort for pedestrians and drivers.

Since the normal human viewing range is commonly defined as an angle 30 degrees above to 45 degrees below the horizontal, and 65 degrees to the left or right of the forward line of sight, solar glare angles located outside of these parameters have little to no effect. In addition, glare angles that run perpendicular to the observer (e.g. pedestrian, automobile driver) have no adverse impacts. In some cases lower solar altitude angles produce glare (distant glare) within the discussed viewing range, however the solar intensity is decreased due to the greater expanse of atmosphere

the light traveled to reach the observer. As stated previously, reduced intensity offsets the impacts of solar glare. Since distant glare has less effect on the eye, the solar glare impacts for this study outside of 400-feet from the reflective surface were considered to be insignificant due to the low solar intensity.

Regulatory Context

As required by Section 80B(2)(d) of the City of Boston Zoning Code for Large Project review, the Proponent has completed a solar glare study to ascertain the potential new impacts resulting from the Project.

Methodology

Utilizing a computer model of the Prudential Center and Back Bay downloaded from the BRA website and a three dimensional computer model of the proposed buildings, the study team simulated sun angles for specific times of year and day then projected reflections off the proposed buildings. For the purposes of this study a conservative approach was used to analyze the potential solar glare impacts; as such the proposed buildings were modeled as 100% reflective and having smooth surface facades. In reality, the reflectivity of glass and varying materials for Exeter Residences and 888 Boylston will be of a smaller percentage. Therefore, impacts depicted in the corresponding figures would naturally decrease. In an effort to conform to the other environmental studies found throughout this chapter the solar glare study for the Project evaluates the 155-feet Zoning Height and Proposed Program scenarios as depicted in **Figures 5-35** thru **5-40**.

Study dates were as follows:

- Winter Solstice - December 21
- Spring Equinox - March 21
- Summer Solstice - June 21

Spring and Autumnal (September 21) equinoxes were considered identical for the purposes of this study.

Study times for each date were as follows:

- 9am
- 12 noon
- 3pm
- 6pm (for Daylight Savings Time dates)

It is important to note that Daylight Savings Time plays a part in this analysis. This study uses 2008 Daylight Savings Time hours and sun angles, when in effect. Legislation signed into law in 2005 moves the start of Daylight Savings Time in 2007

from the beginning of April to the beginning of March. Thus the Spring Equinox will move from Standard Time to Daylight Savings Time and the sun will be somewhat lower at 9am and noon and somewhat higher at 3pm then what this study portrays.

The study scenarios include:

- 155-feet Zoning Height; and
- Proposed Program.

■

155-Feet Zoning Height – Exeter Residences & 888 Boylston

March 21, 9am EST: Figure 5-35 shows effects are restricted to the Prudential Center Arcade roof, the south face of the Mandarin Oriental Boston, a small number of north facing offices of the Prudential Tower, the northwest corner of Saks Fifth Avenue roof, and a minor width of the Gloucester building. The range of glare varies from a minor to average level of intensity.

March 21, 12 noon EST: Figure 5-35 identifies a small area of glare striking the Prudential Center Arcade roof, the Shaw's Supermarket loading dock roof and a portion of the southern Exeter Street sidewalk. The glare experienced by pedestrians and/or cyclists on the sidewalk will be of minor intensity and shifting simultaneously with time. It is important to note that the Prudential Center Arcade roof provides glazing on the windows to minimize or alleviate any discomfort received by pedestrians from rooftop glare.

March 21, 3pm EST: As indicated by **Figure 5-35**, shafts of reflected sunlight strike the Hynes Convention Center roof, the Prudential Center Arcade roof, the Lord & Taylor roof, and a small section of the southwest façade of the Fairfield building. Furthermore, a thin shaft of glare will affect the eastern sidewalk of Exeter Street at this date and hour. The level of intensity during this study time varies from minor to average with the majority being on average.

March 21, 6pm EST: Figure 5-35 depicts sunlight reflected onto the Hynes Convention Center roof and the Lord & Taylor roof with a minor level of intensity. Several thin shafts of glare will affect building rooftops on the northern side of Boylston Street and the southern portion of Newbury Street, ranging from minor to moderately intense levels of glare. Furthermore, a small collection of moderately intense glare will hit the western façade of the Mandarin Oriental Boston during this time and date.

June 21, 9am EST: Figure 5-36 shows the morning sun at a relatively low angle sending narrow bands of light onto the rooftops and streets. Sunlight reflecting off the facetted curve of the north elevation of 888 Boylston strikes Boylston Street on the northern portion of the roadway, sidewalk and building front with a small panel of light. However, the glare will not be a factor to east-bound one-way traffic, cyclists or pedestrians on Boylston Street since it is perpendicular to pedestrian and vehicular movement. At this hour, the thin shaft of glare depicted on Exeter Street may be a factor to south-bound traffic. Other glare effects during this date and time are to rooftops, the south-west façade and service entrance of the Mandarin Oriental Boston, the south-west façade of the Fairfield building, and the south-west façade of the Boston Public Library to which there are no entrances.

June 21, 12 noon EST: The high angle of the sun at this date and time, as indicated in **Figure 5-36**, almost completely eliminates glare effects at this date and time. Minor intensity glare is expected on the roof of the Prudential Center Arcade and the roof covering the entrance to the Prudential Center Garage off of Exeter Street.

June 21, 3pm EST: Shafts of reflected sunlight of average to moderate intensity are shown in **Figure 5-36** striking the Hynes Convention Center and Lord & Taylor rooftops. At this time, the plaza located in front of 888 Boylston will receive moderate to intense levels of glare in several locations. This scenario highlights the importance of the plaza tree plantings to eliminating glare. Trees will be in full leaf well before June 21, and should help to address this issue.

June 21, 6pm EST: Figure 5-36 identifies low sun reflecting off the northwest facades of Exeter Residences and 888 Boylston which creates far reaching shafts of glare with minor to average level intensities. Glare is expected on rooftops of the Hynes Convention Center, buildings on Boylston Street, Lord & Taylor, Lenox Hotel and the Boston Public Library. Reflected sunlight of minor level intensity will reach the front façade of Saks Fifth Avenue, the north-west façade of the Gloucester building and the storefront of several buildings on Boylston Street. Lastly, the southeast portion of the Boylston Street arcade will be cast with scattered glare of average intensity to which plaza tree plantings will help to alleviate.

December 21, 9am EST: The morning sun at this date and time, as shown on **Figure 5-37,** distributes thin and low intensity bands of light onto the proposed building facades producing minimal glare effects. Minor intensity glare is cast onto the Prudential Center arcade roof extending onto the northern façade of the Prudential tower and elevated walkway. Reflected sunlight also strikes the north-east façade of the Gloucester building and continues past onto the Shaw's Supermarket rooftop and Huntington Avenue sidewalk. Also during this time, a small flash of glare with minor intensity strikes the west-bound lane of traffic on Huntington Avenue. This may be a factor for drivers, however, unlikely since the glare would be behind and to the side of vehicles thereby causing less of a distraction. Furthermore, a substantial shaft of reflected sunlight with average level intensity is anticipated to strike the

building front of the northern side of Boylston Street opposite from the Boston Public Library including a portion of the sidewalks along Boylston and Exeter Streets at this location. Since temperatures at this time of year are low, any heat gain on neighboring buildings or pedestrian pathways are likely to have a salutary in December.

December 21, 12 noon EST: Figure 5-37 indicates a thin channel of reflected sunlight striking the rooftops of several buildings located on the corner of Gloucester and Boylston Streets, the Hynes Convention Center, and the Prudential Center Arcade. A small number of north facing offices of the Prudential Tower, will be impacted at this date and time with minor intensity glare.

December 21, 3pm EST: Figure 5-37 shows a number of narrow shafts of reflected sunlight which affects the southern façade of the Mandarin Oriental Boston most substantially. The glare is expected to be of minor intensity and as discussed previously, heat gain during this cold season is likely to be a positive impact. The Hynes Convention Center, Saks Fifth Avenue and Lord & Taylor rooftops also receive several shafts of reflected sunlight.

■

Proposed Program – Exeter Residences & 888 Boylston

March 21, 9am EST: As shown in **Figure 5-38**, the solar glare effects during this day and time are similar to those anticipated under the 155-feet scenario, however the intensity level is lessened during the proposed condition. Thin shafts of light are reflected onto rooftops of the Hynes Convention Center, the Prudential Center Arcade, the Mandarin Oriental Boston, and the Boston Public Library. The south façade of the Mandarin Oriental Boston and a small portion of the north facing offices of the Prudential Tower will receive minor to average level intensity glare. Although, compared to the 155-feet condition, impacts to the Saks Fifth Avenue and Gloucester building are minimized, if not removed.

March 21, 12 noon EST: Figure 5-38 identifies a fluid panel of reflected sunlight which affects the rooftop of the Prudential Center Arcade. Furthermore, three variegated panels strike the rooftop of Shaw's Supermarket and a small patch of sidewalk along Huntington Avenue. In comparison to the 155-feet scenario, the impacts expected during this day and time within the public way are reduced thereby decreasing the glare experienced by pedestrians and/or cyclists.

March 21, 3pm EST: Figure 5-38 indicates shafts of reflected sunlight will strike the rooftop of the Hynes Convention Center, the Prudential Center Arcade, Lord & Taylor, and the Lenox Hotel. In several locations, the reflected sunlight is interrupted or dotted, rather than a continuous panel of light which breaks up the intensity and impact of the solar glare. Impacts are also expected along a small section of the southwest façade of the Fairfield building with minor to average level

intensity. Compared to the 155-feet condition results, impacts along the Exeter Street sidewalk disappeared. Several small areas of minor glare are anticipated along Boylston Street which may affect pedestrians and/or motorists. However, the angle of the sunlight along Boylston Street is not perpendicular to the object therefore the discomfort will be minimal.

March 21, 6pm EST: Figure 5-38 depicts sunlight reflected onto the rooftop of the Hynes Convention Center, Lord & Taylor, and the Boston Public Library with a minor level of intensity. Very thin and long shafts of glare will strike building rooftops on the northern side of Boylston Street extending to the southern portion of Newbury Street, ranging from minor to moderately intense levels of glare. A small collection of average to moderately intense scattered glare will hit the western façade and rooftop of the Mandarin Oriental Boston during this time and date. Furthermore, the western portion of the Boylston Arcade in front of 888 Boylston will experience a panel of reflected sunlight that will be diminished by plaza tree plantings.

June 21, 9am EST: Consistent with the 155-feet scenario results for this day and time, sunlight is reflected onto the rooftops and streets with thin tracks of light due to the low angle of the morning sun. Glare effects are expected on rooftops such as the Hynes Convention Center, Prudential Center Arcade, Mandarin Oriental Boston, and the Boston Public Library. As shown in **Figure 5-39** thin panels of reflected sunlight will strike the north façade of the Gloucester building with minor intensity. A small panel of solar glare is expected on the northern portion of Boylston Street, the sidewalk and adjacent building front. The glare will not be a factor to east-bound one-way traffic, cyclists or pedestrians on Boylston Street since it is perpendicular to pedestrian and vehicular movement. At this hour, a thin shaft of glare depicted on Exeter and Blagden Streets may be a factor to south-bound and west-bound traffic and pedestrians.

June 21, 12 noon EST: The high angle of the sun at this date and time, as indicated in **Figure 5-39**, almost completely eliminate glare effects. The Prudential Center Arcade rooftop and the entrance to the Prudential Center Garage will receive several small areas of minor intensity glare.

June 21, 3pm EST: Large shafts of reflected sunlight are shown in **Figure 5-39** striking the rooftop of the Hynes Convention Center and Lord & Taylor. Variegated panels of minor to intense levels of solar glare are dispersed along the Boylston Arcade and extending into Boylston Street. At this hour and angle of sunlight, these effects would not be expected to affect one-way traffic on Boylston Street, and plaza trees would be expected to noticeably diminish the glare.

June 21, 6pm EST: Figure 5-39 identifies low sun reflecting off the northwest facades of Exeter Residences and 888 Boylston which creates far reaching shafts of glare in northerly, easterly and westerly directions. The largest panel of glare is expected on

the Hynes Convention Center rooftop, although of minor intensity. Other rooftops affected include Lord & Taylor, Saks Fifth Avenue, Mandarin Oriental Boston and the Boston Public Library. Thin rays of minor level intensity glare will impact the roadway, sidewalk and rooftops of buildings on Boylston Street extending to Newbury Street. As discussed previously, the glare will be perpendicular to pedestrian and vehicular movement therefore reducing the potential impacts. Reflected sunlight of minor level intensity will also reach the front façade and rooftop of Saks Fifth Avenue, the north-west façade and plaza north of the Gloucester building and the plaza south of Mandarin Oriental Boston. Lastly, the southeast portion of the Boylston Arcade will be cast with scattered glare of average intensity which plaza tree plantings will help to alleviate.

December 21, 9am EST: **Figure 5-40** shows low sun reflecting off the south face of 888 Boylston onto the roof of the Prudential Center Arcade and the north wall of the Prudential Tower. There is no impact on Boylston Street at this date and time. On Exeter Street the impacts to the building at the northwest corner of Boylston Street and Exeter street are greatly diminished when compared to the 155 foot condition due to changes in building and façade geometry. Solar glare to the south toward the Gloucester and Shaws Supermarket are eliminated through the design and façade changes.

December 21, 12 noon EST: Figure 5-40 At this time the proposed 888 Boylston Street produces a thin ray of reflected sunlight onto the eastern Gloucester Street sidewalk with moderate intensity. Given the offset from parked vehicles this reflected light is not expected to have a significant impact on drivers at this intersection but pedestrians on the east sidewalk may notice it. The proposed Exeter Residences casts minor reflected light that is broken up by the window pattern into the Huntington Avenue and Exeter Street intersection. Exeter Street is one-way southbound here. Given this and the relatively minor intensity of the reflected light, impacts on divers are not expected.

December 21, 3pm EST: Figure 5-40 shows a very limited amount of reflected light from the 888 Boylston building, most of which lands on the Hynes Convention Center roof. Reflected light from the Exeter Residences is greatly diminished and more widely distributed as a result of the proposed building geometry and façade design. Segmented patches of glare are spread over the south face of the Mandarin Oriental Boston and pedestrian plaza areas to the west of the building.

■

Conclusions

The proposed Exeter Residences utilizes a number of design aspects to mitigate glare:

- The south elevation and portion of the east and west elevations are a combination of masonry and windows that reduce the potential impact of solar glare.
- The curved east façade of the building will disperse the reflected sun instead of concentrating it.
- The Solar Glare analysis is based on a fully reflective glass condition. The actual building glass will have a reduced reflectivity which will substantially mitigate solar glare effects.
- Potential glare impacts to vehicles on Boylston Street in December will be behind and to the right of the direction of travel and shouldn't impair drivers. These effects are greatly improved over the 155 foot condition.

888 Boylston is a fully glazed building that will reflect sunlight onto neighboring buildings and streets. The proposed Project design has been updated with changes in building geometry and façade treatments to reduce solar glare while maintaining the building's design vernacular. The potential for negative consequences are noticeably mitigated by a number of factors:

- The building is substantially set back from Boylston Street and surrounded by buildings that shade the street from a significant portion of the reflected sunlight.
- Street trees on the plaza protect Boylston Street from early morning glare in the summer months.
- Boylston Street is one-way, so that traffic has its back to some of the afternoon glare effects.
- The stepped configuration of the south elevation puts some of it in shadow in the morning.
- The existing Prudential Arcade glazing is tinted which will greatly reduce glare effects
- The Solar Glare analysis is based on a fully reflective glass condition. The actual building glass will have a reduced reflectivity which will substantially mitigate solar glare effects.

Likely effects from the proposed Project on the surrounding public spaces, despite these mitigating features, include the following:

- Heat gain through the glazed roof of the Prudential Center atrium, especially in the summer.
- Potential glare from 888 Boylston on Boylston Street in June, addressed with plaza tree plantings.
- Some potential heat gain in pedestrian areas west of the Exeter Residences in the afternoon in late June.

The Proponent will continue to evaluate the design of the west and east façades of the building to the extent possible. In particular, glass treatments including special

coatings, color and reflectivity of the glazing, and mullion depth and orientation will be carefully selected with an eye to decreasing reflected sunlight.

5.6 Geotechnical and Groundwater Analysis

Subsurface Soil Conditions

Subsurface soil conditions at the Project Site consist of the following based on data from test borings completed at the site:

Table 5-5 Subsurface Soil Conditions

General Description	Typical Thickness of Strata (ft)	Depth (ft)[1]
Granular Fill	5 to 9.5	0
Organic Silt	0 to 10	5 to 10
Marine Sand	10 to 15	10 to 20
Marine Clay	100 to 125	25 to 30
Glacial Till	5 to 10	125 to 130
Bedrock	-	125 to 150

1. Refers to depth below lowest level of Prudential Garage slab (existing).

Groundwater

Groundwater levels at and near the Project Site are measured within a large network of groundwater observation wells monitored periodically by the Proponent. Measured groundwater levels at wells located within the lowest level Prudential Center garage slab range from approximately El. 1 to 2 BCB, and are directly below the slab. The existing lowest level garage is at about El. 2.5 to 3. Groundwater levels measured at existing monitoring wells in city streets located outside of the Project range from about El. 3 to 7 depending on location. The locations of the wells surrounding the Project are indicated on **Figure 5-41**.

Groundwater Conservation Overlay District

The Prudential Center is located within the Groundwater Conservation Overlay District (GCOD) and will need to comply with the associated requirements relating to infiltration of rainwater and no negative impacts to groundwater levels within the

subject area on surrounding lots. Specifically, the Project must capture into a suitably designed system a volume of rainfall equivalent to not less than 1-inch across the portions of the lot occupied by the Project. A system to capture and infiltrate rainwater will be installed. Considering site constraints the infiltration system will be installed along Exeter Street outside of the existing below grade garage at the Prudential Center as described in Chapter 6, Infrastructure Systems. The Project will not result in any negative impacts to groundwater levels.

Extensive groundwater monitoring programs have been undertaken during previous construction activities within the Prudential Center. Analysis of the data collected indicates that groundwater levels outside the Prudential Center are not impacted by temporary, localized dewatering within the garage. Furthermore, groundwater levels recharged rapidly (within 24 hours) once temporary dewatering was terminated in specific work areas.

■

Foundation Construction Methodology

The new buildings will be supported on deep foundations extending through the soft compressible marine clay soils to bedrock at depths of 125 to 150 ft. Drilled, high capacity foundation elements are planned. Either large diameter (approximately 3 to 6 ft) drilled shafts /caissons or small diameter (less than 12 inches) will be used. The construction methodology used for foundation installation provides continuous support of the drilled hole at all times either by use of a steel casing as the drilling is advanced, or by use of bentonite slurry to prevent caving and loss of ground until concrete is placed to construct the foundation element. No temporary or permanent dewatering is needed for the drilled shaft or drilled pile installation. However, some localized temporary construction dewatering may be required for other construction activity at the site due to the shallow groundwater levels described above.

The non-displacement, drilled-in deep foundations have been selected to result in negligible ground movement and vibration during installation. These types of foundations have been installed successfully at other locations within the Prudential Center, including for support of 111 Huntington tower and the Mandarin Oriental Boston, without impact to abutting structures. In addition, a preconstruction survey of existing surrounding buildings will be prepared. Furthermore, this type of installation creates less noise than traditional pile driving.

The foundations will consist of discrete concrete elements that do not require dewatering for installation and do not create a barrier to groundwater flow. Therefore there is no impact to groundwater levels from the foundation construction activity. No basement levels below the current garage are planned. Therefore, there is no potential for impacts or change to the current groundwater conditions from the planned permanent construction.

The drilled shafts will be cored through the existing concrete floor slab of the garage. No permanent construction is planned below the garage slab level. However, isolated excavations below the slab may be required for pile cap construction, grade beams and structural connections. These shallow excavations will likely require localized temporary construction dewatering. Temporary shoring or earth support that may be required at these locations will be within the footprint of the new structure and not in the public way.

■

Geotechnical Impacts Monitoring Program

With the exception of the Prudential Center Garage, existing buildings within the Prudential Center are supported on deep foundations which bear below the level that may potentially be impacted by the planned construction activity. The Boylston, Fairfield and Gloucester Apartments, the portion of the Mandarin Oriental Boston closest to the construction work, and the Hynes Convention Center are all supported on deep foundations extending to bedrock at depths of greater than 100 ft below site grades. The Lord & Taylor building is supported on pressure injected footing foundations extending to the about 20 ft below garage level. The Prudential Center Garage is founded on wood piles or a concrete mat depending on the location. The garage adjacent to the proposed construction is wood pile supported. Existing foundation plans for the adjacent portion of the garage, supported on wood piles, indicate the tops of piles (cut-off elevations) range from about El. -1 to -4 BCB. Pile lengths vary but extend to average depths of 15 to 20 ft below the garage level into the marine sand or clay layers. The tops of the piles are well below area groundwater levels so are not at risk of exposure, which would result in pile deterioration and loss of capacity.

The Lenox Hotel is located beyond the Prudential Center Garage, north of the proposed construction and is also supported on wood pile foundations extending into the underlying marine sand or clay at depths of about 25 ft below the basement level of the hotel. The Lenox Hotel has one basement level with a basement floor slab at about El. 9.5 to 10. The tops of the wood piles supporting the Lenox Hotel are cut off at about El. 2.3 and are below area groundwater levels based on available nearby groundwater level data.

Other structures are located at a distance that would not be impacted by the planned foundation installation. In addition, no significant excavation, no pile driving or permanent dewatering is planned or needed for the construction.

The objective of the design and construction of the foundation system will be to avoid adverse impacts to adjacent buildings and other structures in close proximity to the buildings. This will be accomplished through requirements of the design criteria developed and selection of appropriate construction methodology. A

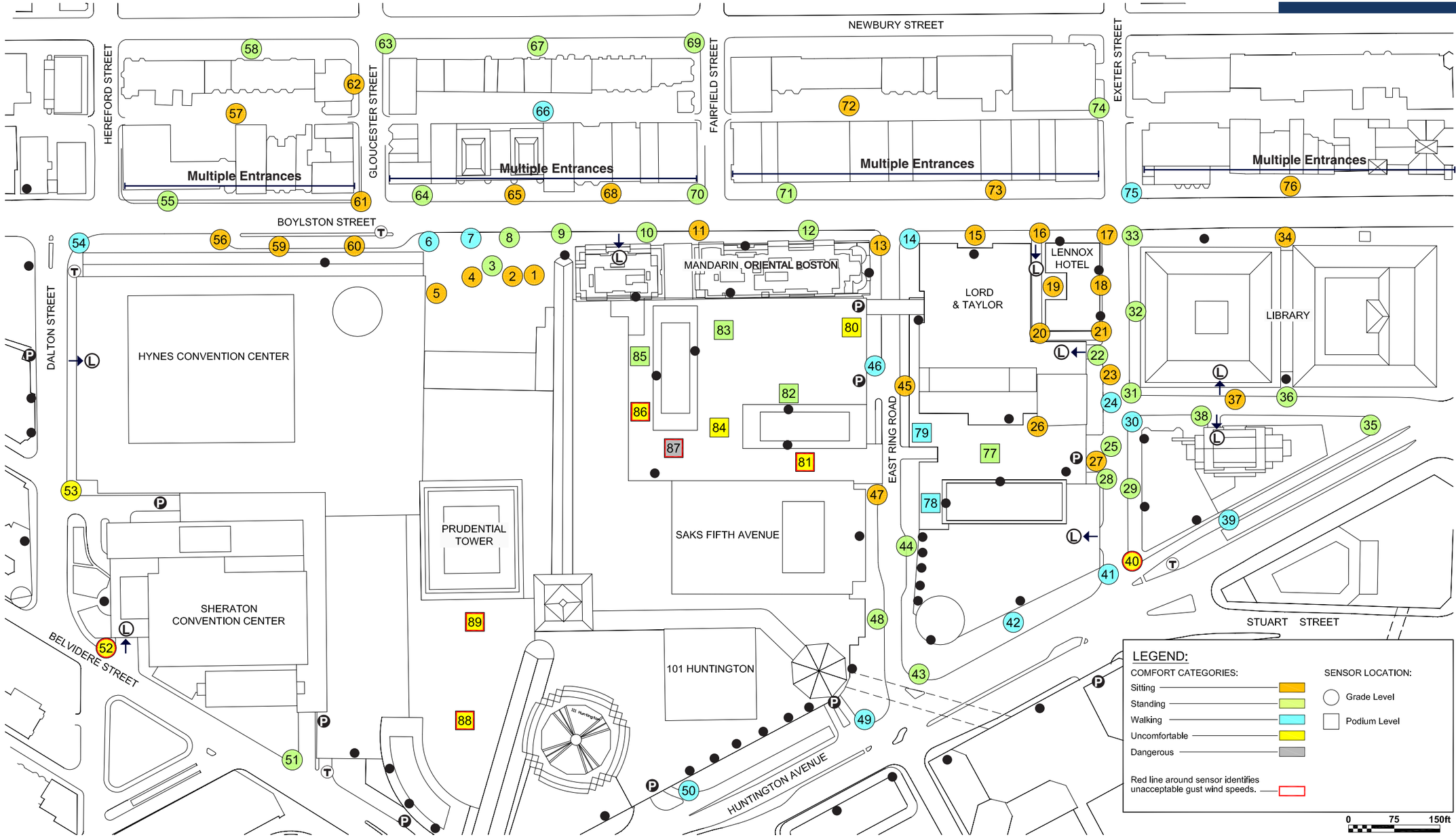
geotechnical instrumentation and monitoring program will be developed and implemented prior to the start of construction to monitor contractor performance and off site impacts. The program will include preconstruction surveys, and settlement, groundwater and vibration monitoring during foundation construction. The performance criteria developed will be incorporated into the Contract Documents for the Project and adherence to the performance criteria will be monitored during construction. Specific mitigation measures proposed are as follows:

- Contractor designs and procedures will be reviewed and accepted by the Project design team prior to implementation.
- The instrumentation monitoring program will be undertaken and data evaluated to determine modifications construction procedures to mitigate impacts.
- Groundwater levels outside the Project will be monitored using the large network of offsite groundwater observation wells.

■

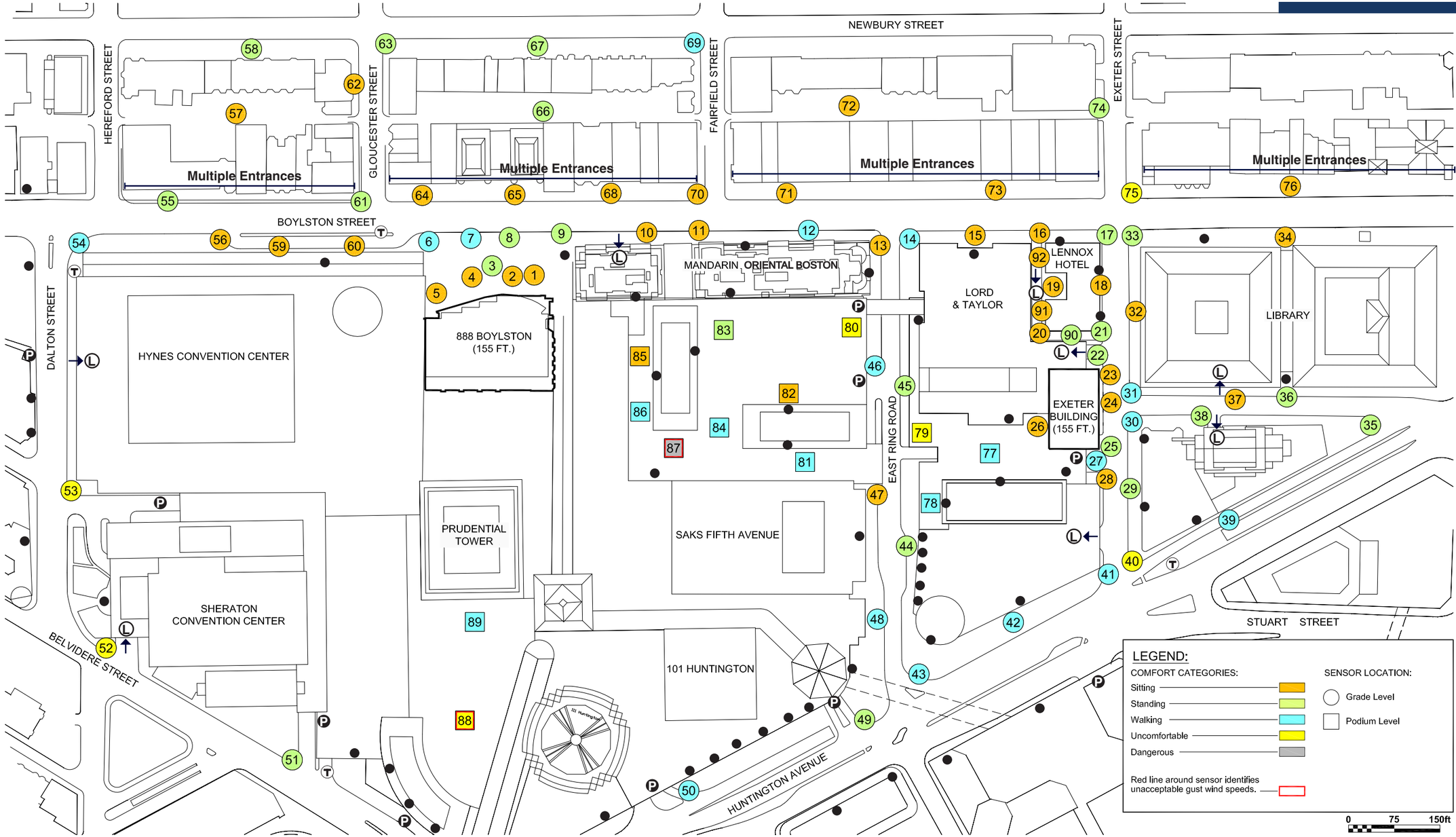
Oil and Hazardous Materials in Soil and Groundwater

The Project Site is not a listed disposal site. Previous soil and groundwater testing completed at the Prudential Center have not revealed elevated levels of oil or hazardous materials in soil or groundwater. Localized dewatering, as described above, required during construction will be conducted in accordance with temporary construction dewatering permits to be applied for and obtained from the BWSC and MWRA. Soil generated during foundation installation will consist primarily of naturally deposited clay which will be removed from the site in accordance with applicable regulations.



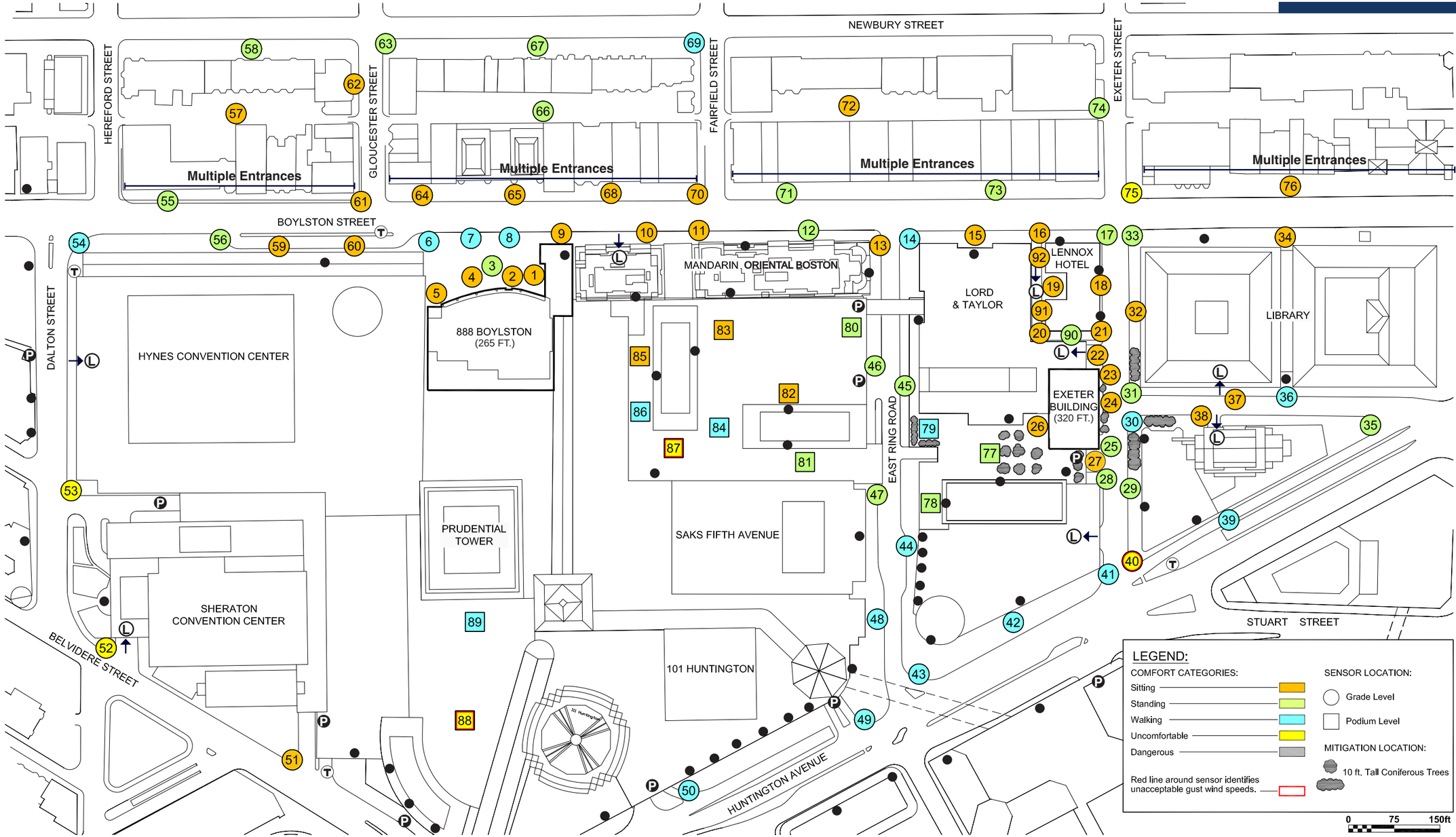
Parking Garage
MBTA Bus Stops
Building Entrances
Loading Areas

Figure 5-1
Wind - No-Build Conditions



Parking Garage
MBTA Bus Stops
Building Entrances
Loading Areas

Figure 5-2
Wind - 155-feet Condtitions



Parking Garage

MBTA Bus Stops

Building Entrances

Loading Areas

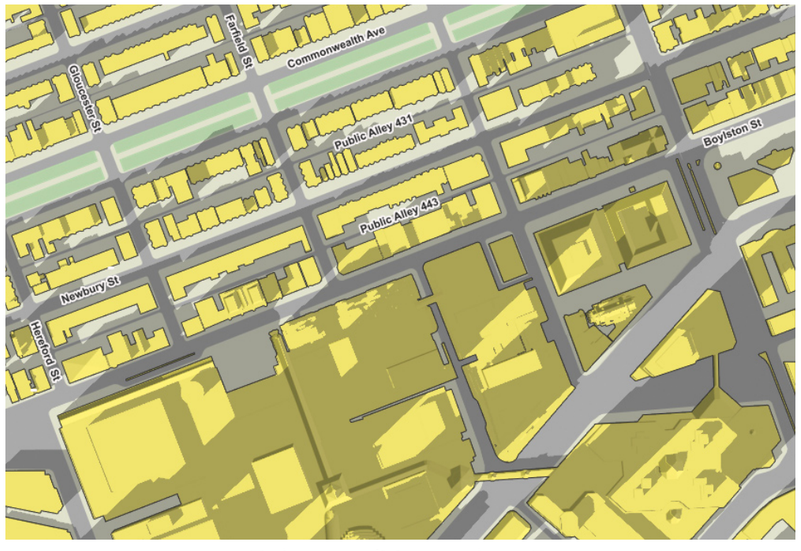
Figure 5-3
Wind - Proposed Conditions

Legend

Public Green Spaces

February/November 5
9am

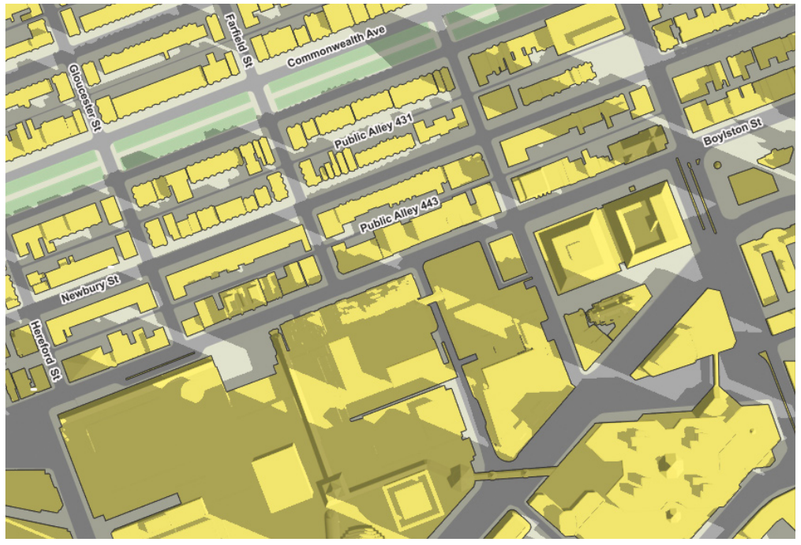
February/November 5
12pm



February/November 5
3pm

February/November 5
6pm

Figure 5-4
February/November 5
Shadow Analysis
No-Build Condition



March/September 21
9am

March/September 21
12pm

March/September 21
3pm

March/September 21
6pm

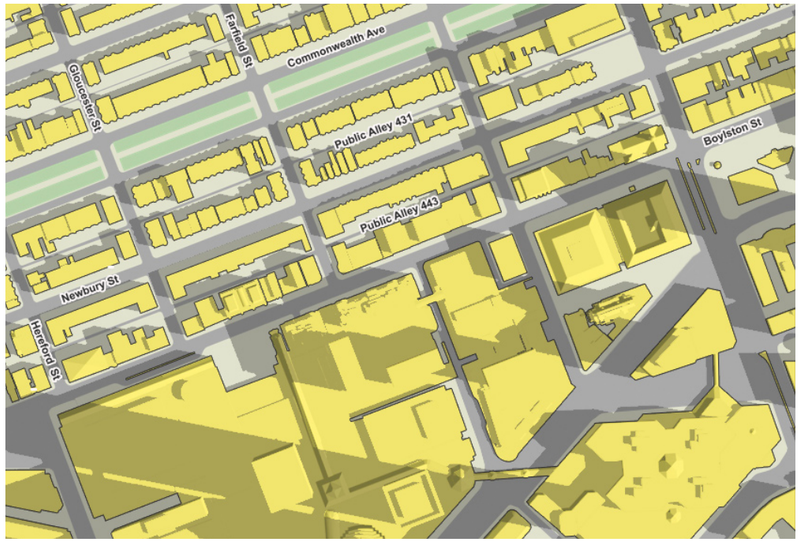
Legend

Public Green Spaces

Figure 5-5
March/September 21
Shadow Analysis
No Build Condition

Legend

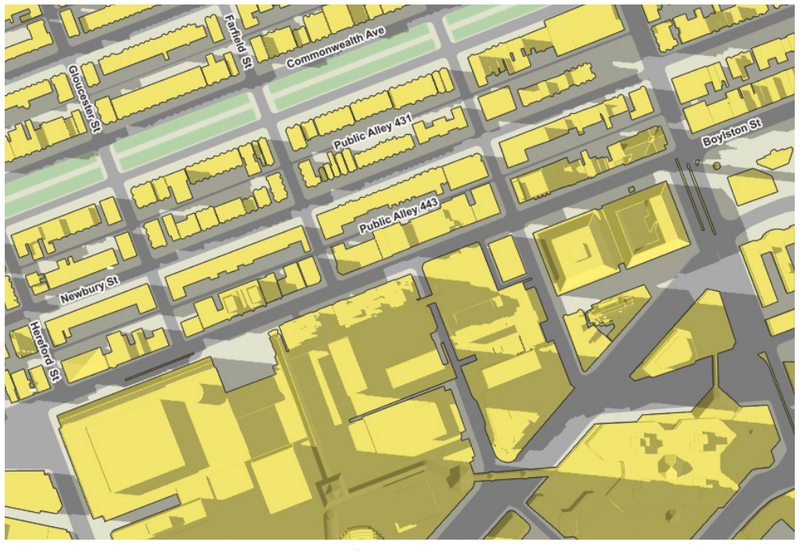
Public Green Spaces



May/August 5
9am

May/August 5
12pm

May/August 5
3pm



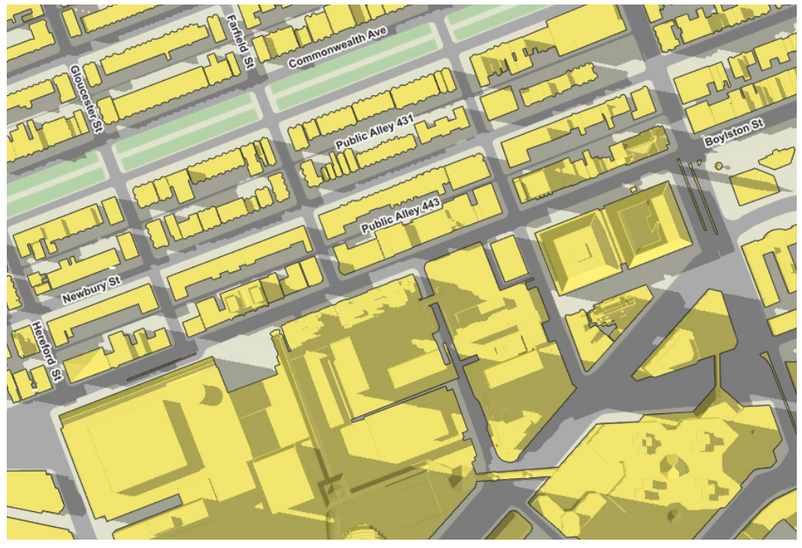
May/August 5
6pm

Figure 5-6
May/August 5
Shadow Analysis
No-Build Condition

June 21
9am

June 21
12pm

June 21
3pm



June 21
6pm

Legend

Public Green Spaces

Figure 5-7

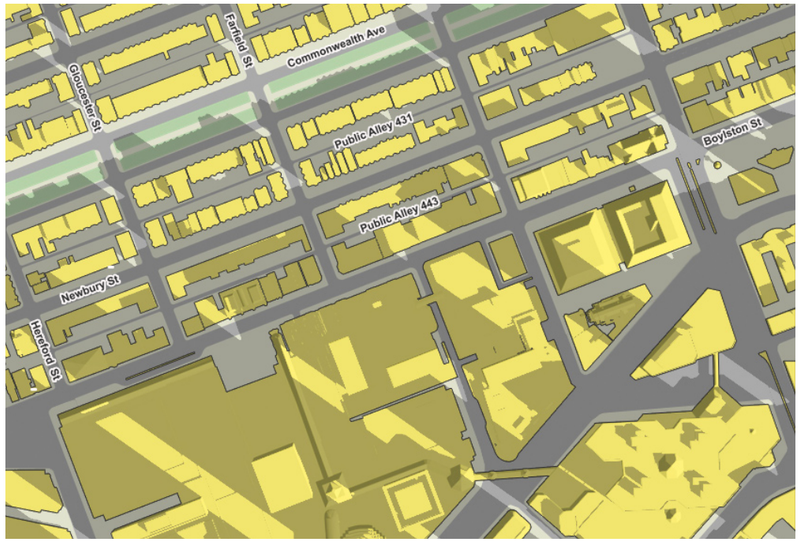
June 21
Shadow Analysis
No-Build Condition

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

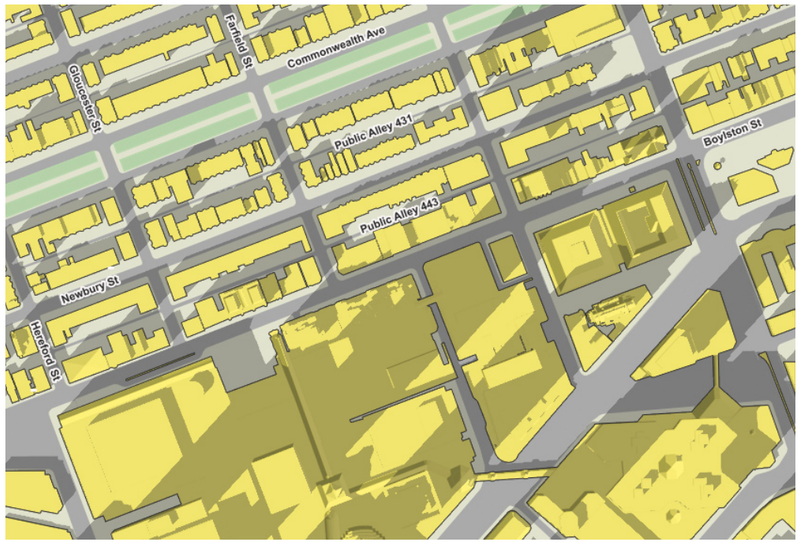
Legend

Public Green Spaces



October 21
9am

October 21
12pm



October 21
3pm

October 21
6pm

Figure 5-8

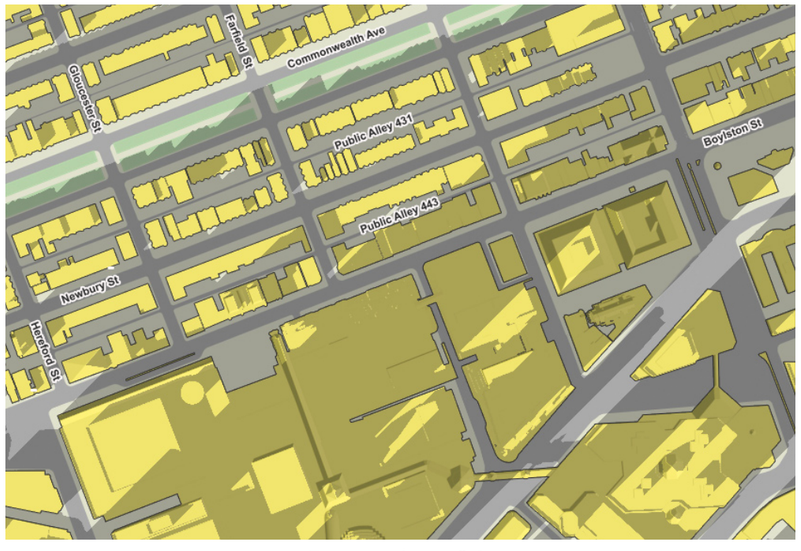
October 21
Shadow Analysis
No-Build Condition

Legend

Public Green Spaces

December 21
9am

December 21
12pm



December 21
3pm

December 21
6pm

Figure 5-9

December 21
Shadow Analysis
No-Build Condition

February/November 5
9am

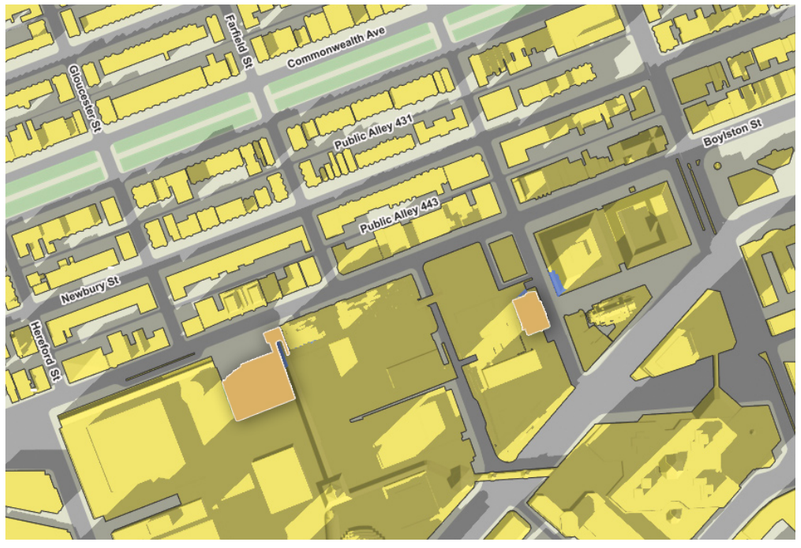
February/November 5
12pm

Legend

888 Boylston and
Exeter Residences Buildings

New Shadow created by
155'- 888 Boylston and
Exeter Residences buildings

Public Green Spaces

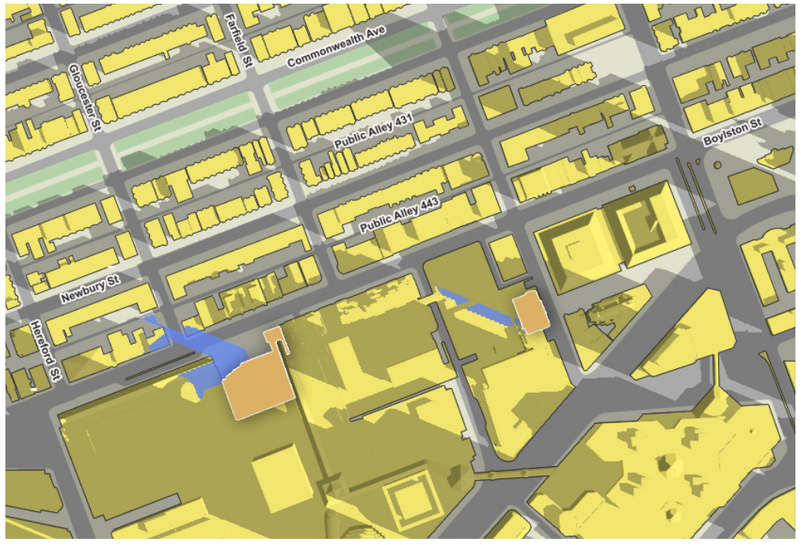


February/November 5
3pm

February/November 5
6pm

Figure 5-10

February/November 5
Shadow Analysis
155- Building Height



March/September 21
9am

March/September 21
12pm

March/September 21
3pm

March/September 21
6pm

Legend

888 Boylston and
Exeter Residences Buildings

New Shadow created by
155'- 888 Boylston and
Exeter Residences buildings

Public Green Spaces

Figure 5-11

March/August 21
Shadow Analysis
155- Building Height

May/August 5
9am

May/August 5
12pm

Legend

888 Boylston and Exeter Residences Buildings

New Shadow created by 155'- 888 Boylston and Exeter Residences buildings

Public Green Spaces

May/August 5
3pm

May/August 5
6pm

Figure 5-12
May/August 5
Shadow Analysis
155'- Building Height

June 21
9am

June 21
12pm

June 21
3pm

June 21
6pm

Legend

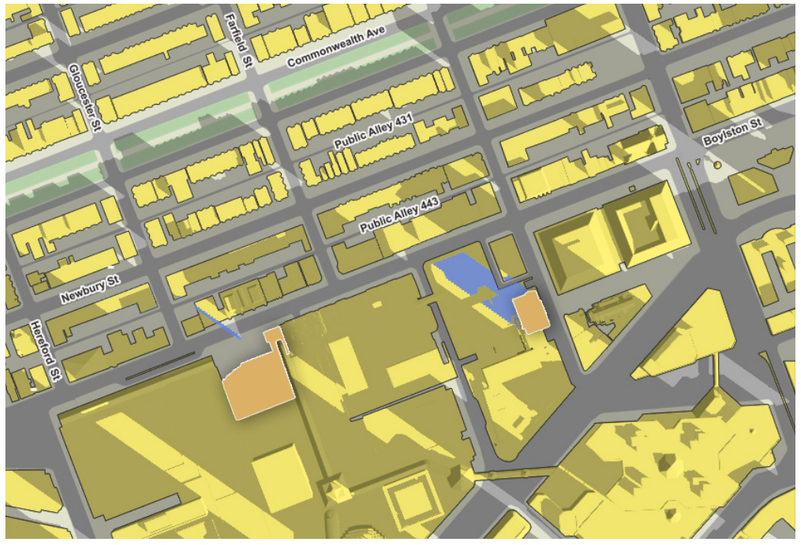
888 Boylston and
Exeter Residences Buildings

New Shadow created by
155'- 888 Boylston and
Exeter Residences buildings

Public Green Spaces

Figure 5-13

June 21
Shadow Analysis
155'- Building Height



October 21
9am

October 21
12pm

October 21
3pm

October 21
6pm

Legend

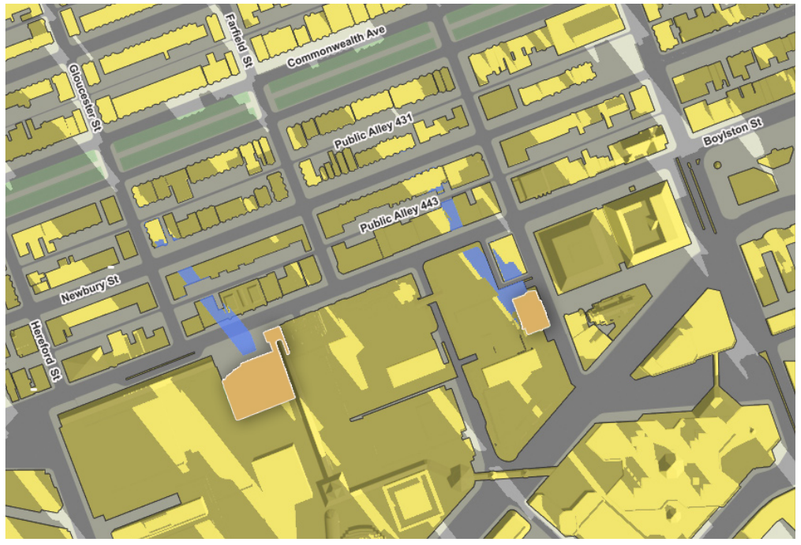
888 Boylston and Exeter Residences Buildings

New Shadow created by 155'- 888 Boylston and Exeter Residences buildings

Public Green Spaces

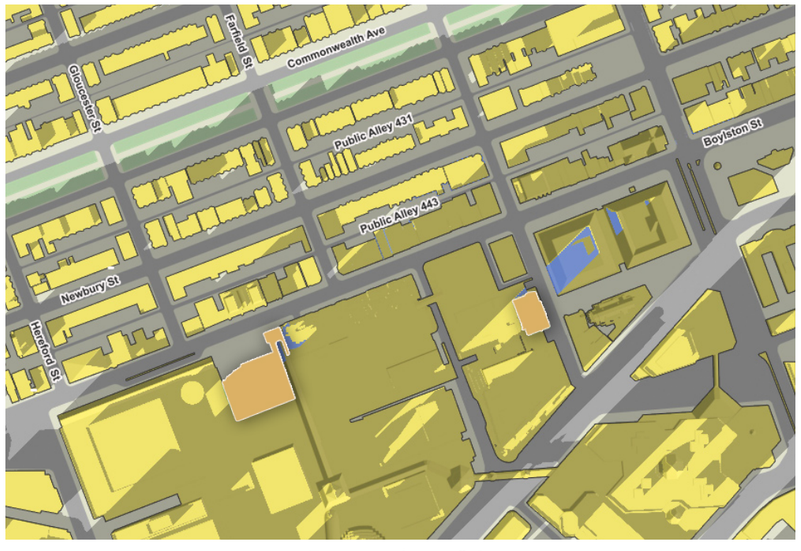
Figure 5-14

October 21
Shadow Analysis
155'- Building Height



December 21
9am

December 21
12pm



December 21
3pm

December 21
6pm

Legend

888 Boylston and
Exeter Residences Buildings

New Shadow created by
155'- 888 Boylston and
Exeter Residences buildings

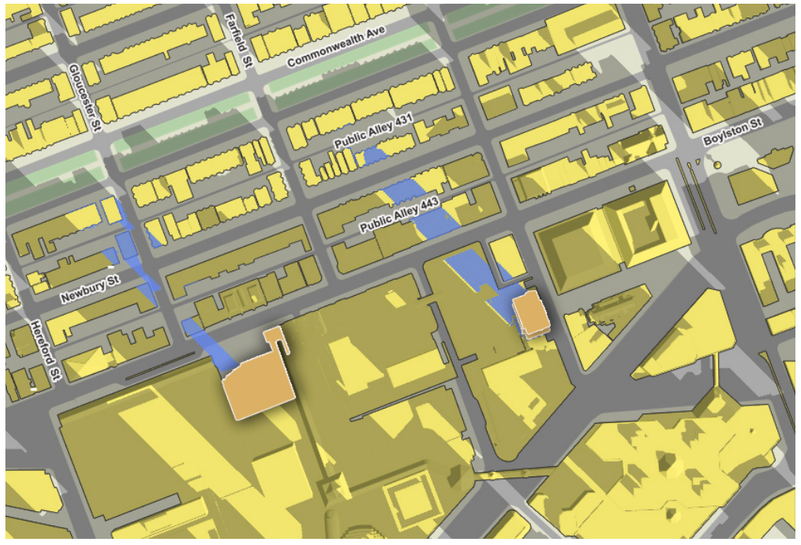
Public Green Spaces

Figure 5-15

December 21
Shadow Analysis
155'- Building Height

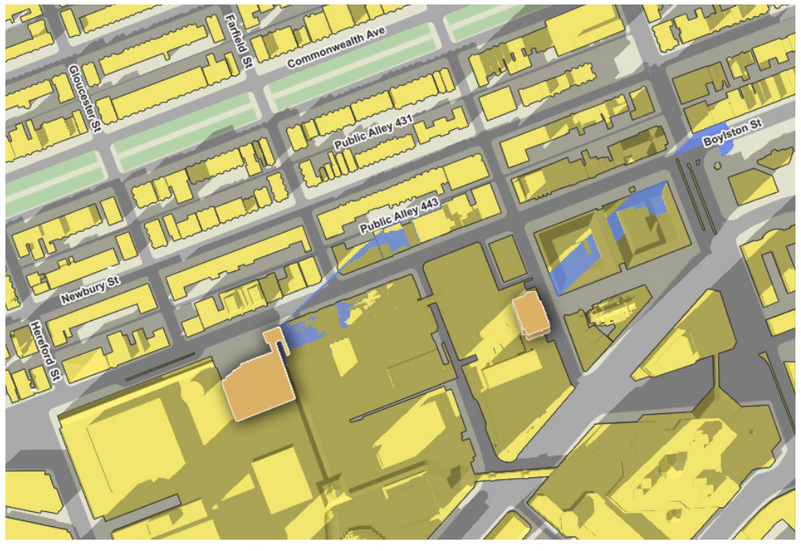
Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties



February/November 5
9am

February/November 5
12pm



February/November 5
3pm

February/November 5
6pm

Legend

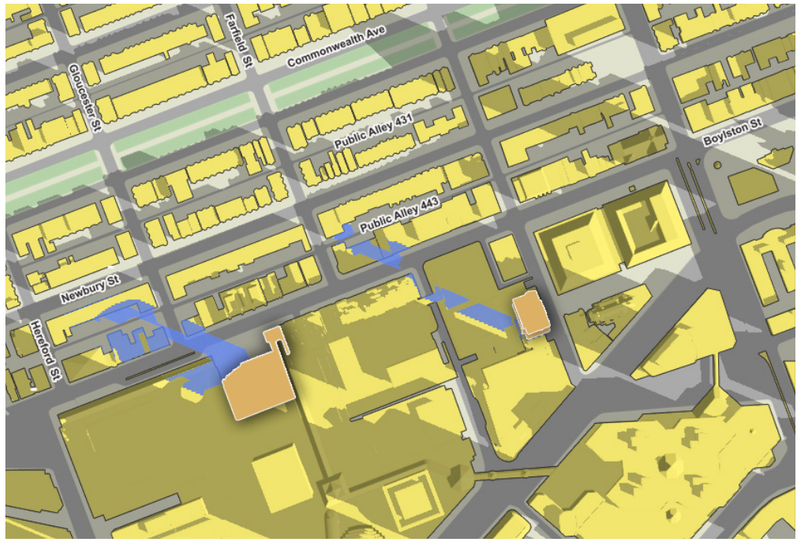
Proposed 888 Boylston and Exeter Residences Buildings

New Shadow created by Proposed 888 Boylston and Exeter Residences buildings

Public Green Spaces

Figure 5-16

February/November 5
Shadow Analysis
Proposed Condition



March/September 21
9am

March/September 21
12pm

March/September 21
3pm

March/September 21
6pm

Legend

Proposed 888 Boylston and Exeter Residences Buildings

New Shadow created by Proposed 888 Boylston and Exeter Residences buildings

Public Green Spaces

Figure 5-17

March/September 21
Shadow Analysis
Proposed Condition

May/August 5
9am

May/August 5
12pm

May/August 5
3pm

May/August 5
6pm

Legend

Proposed 888 Boylston and Exeter Residences Buildings

New Shadow created by Proposed 888 Boylston and Exeter Residences buildings

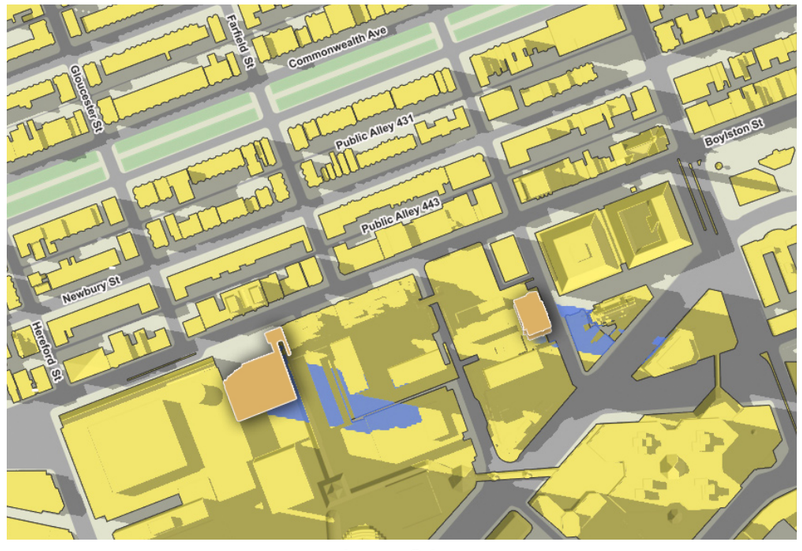
Public Green Spaces

Figure 5-18
May/August 5
Shadow Analysis
Proposed Condition

June 21
9am

June 21
12pm

June 21
3pm



June 21
6pm

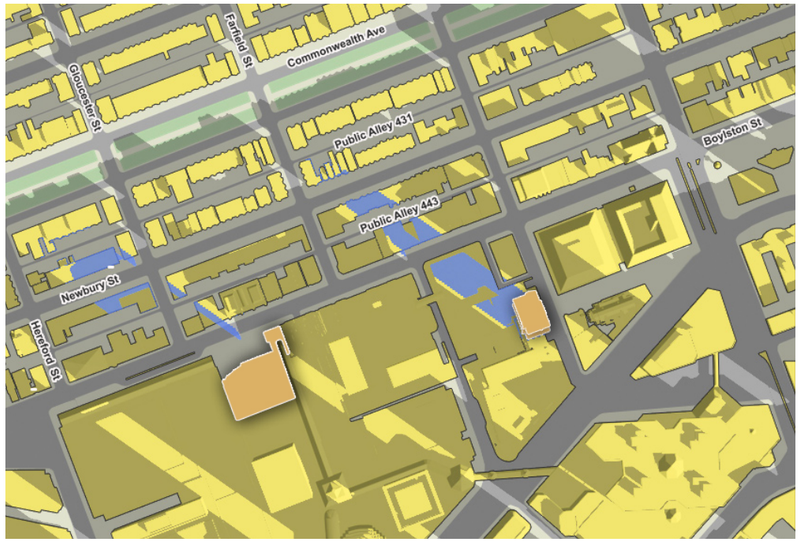
Legend

Proposed 888 Boylston and Exeter Residences Buildings

New Shadow created by Proposed 888 Boylston and Exeter Residences buildings

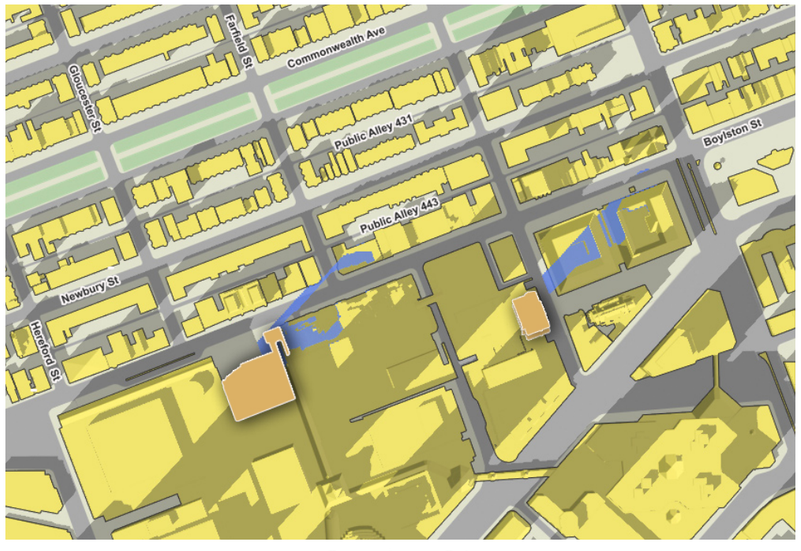
Public Green Spaces

Figure 5-19
June 21
Shadow Analysis
Proposed Condition



October 21
9am

October 21
12pm



October 21
3pm

October 21
6pm

Legend

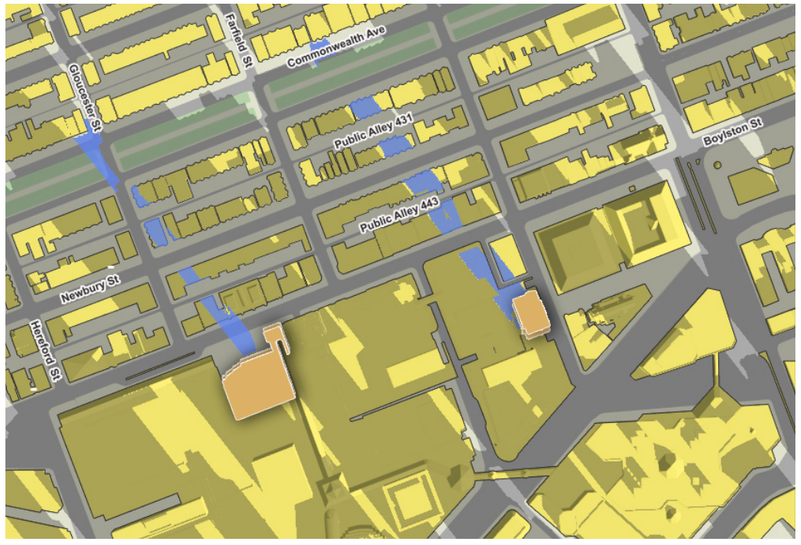
Proposed 888 Boylston and Exeter Residences Buildings

New Shadow created by Proposed 888 Boylston and Exeter Residences buildings

Public Green Spaces

Figure 5-20

October 21, 2008
Shadow Analysis
Proposed Condition



December 21
9am

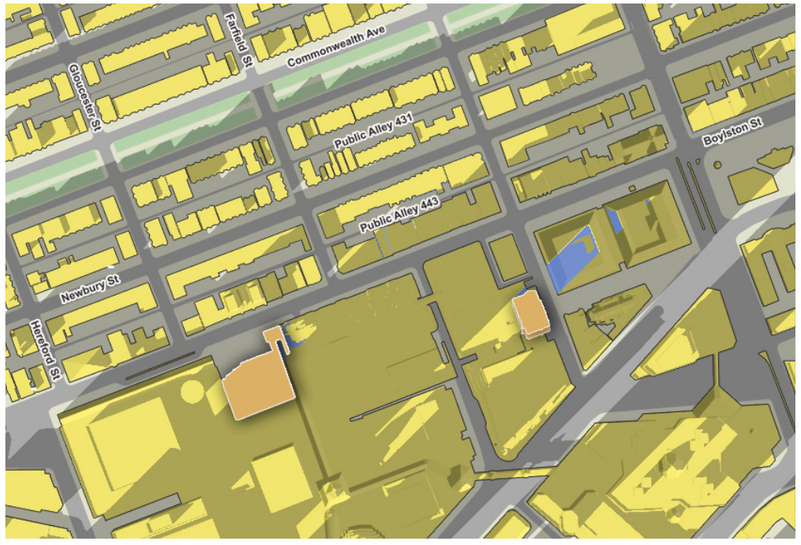
December 21
12pm

Legend

Proposed 888 Boylston and Exeter Residences Buildings

New Shadow created by Proposed 888 Boylston and Exeter Residences buildings

Public Green Spaces



December 21
3pm

December 21
6pm

Figure 5-21

December 21
Shadow Analysis
Proposed Condition

8:00 AM

9:00 AM

10:00 AM

11:00 AM

12:00 PM

1:00 PM

2:00 PM

3:00 PM

4:00 PM

5:00 PM

6:00 PM

LEGEND

Exeter Residences Shadow

Figure 5-22

February 5 / November 5
Boston Public Library
East Courtyard Facade

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC.

Boston Properties

8:00 AM

9:00 AM

10:00 AM

11:00 AM

12:00 PM

1:00 PM

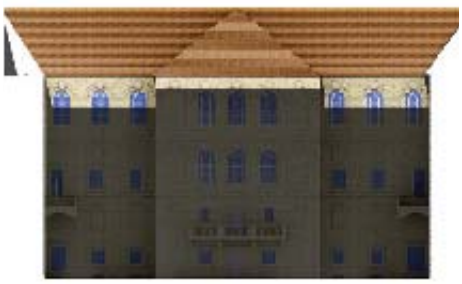
2:00 PM

3:00 PM

4:00 PM

LEGEND

Exeter Residences Shadow



5:00 PM

6:00 PM

Figure 5-23

March 21 / September 21
Boston Public Library
East Courtyard Facade

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC.

Boston Properties

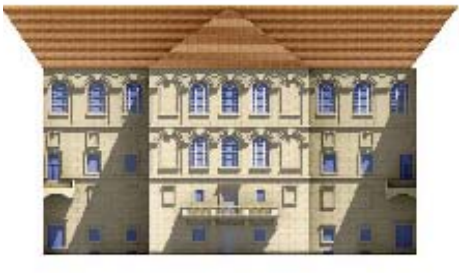
8:00 AM

9:00 AM

10:00 AM

11:00 AM

12:00 PM

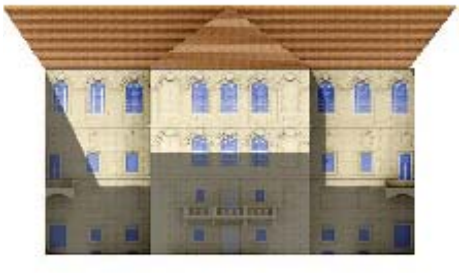


1:00 PM

2:00 PM

3:00 PM

4:00 PM



5:00 PM

6:00 PM

LEGEND

Exeter Residences Shadow

Figure 5-24

May 5 / August 5
Boston Public Library
East Courtyard Facade

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC.

Boston Properties

8:00 AM

9:00 AM

10:00 AM

11:00 AM

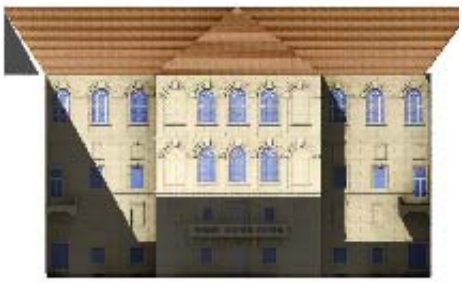
12:00 PM

1:00 PM

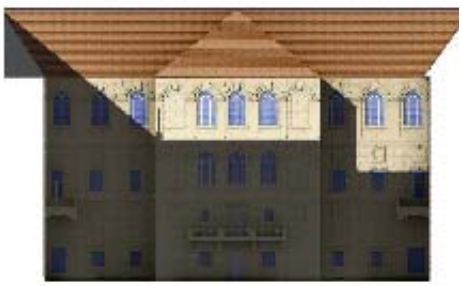
2:00 PM

3:00 PM

4:00 PM



5:00 PM



6:00 PM

LEGEND

Exeter Residences Shadow

Figure 5-25

June 21
Boston Public Library
East Courtyard Facade

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC.

Boston Properties

8:00 AM

9:00 AM

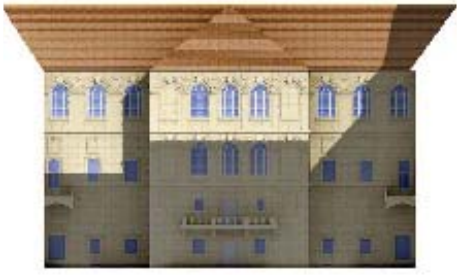
10:00 AM

11:00 AM

12:00 PM

1:00 PM

2:00 PM



3:00 PM

4:00 PM

5:00 PM

6:00 PM

LEGEND

Exeter Residences Shadow

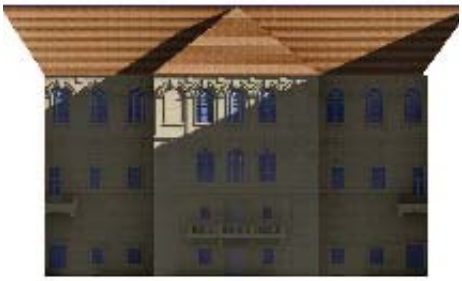
Figure 5-26

October 21
Boston Public Library
East Courtyard Facade

8:00 AM

9:00 AM

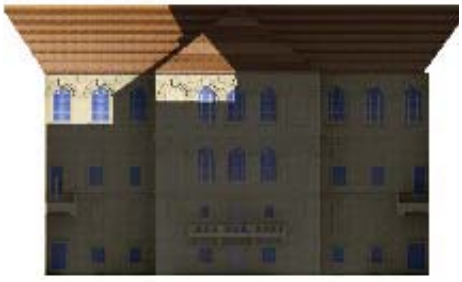
10:00 AM



11:00 AM

12:00 PM

1:00 PM



2:00 PM

3:00 PM

4:00 PM

5:00 PM

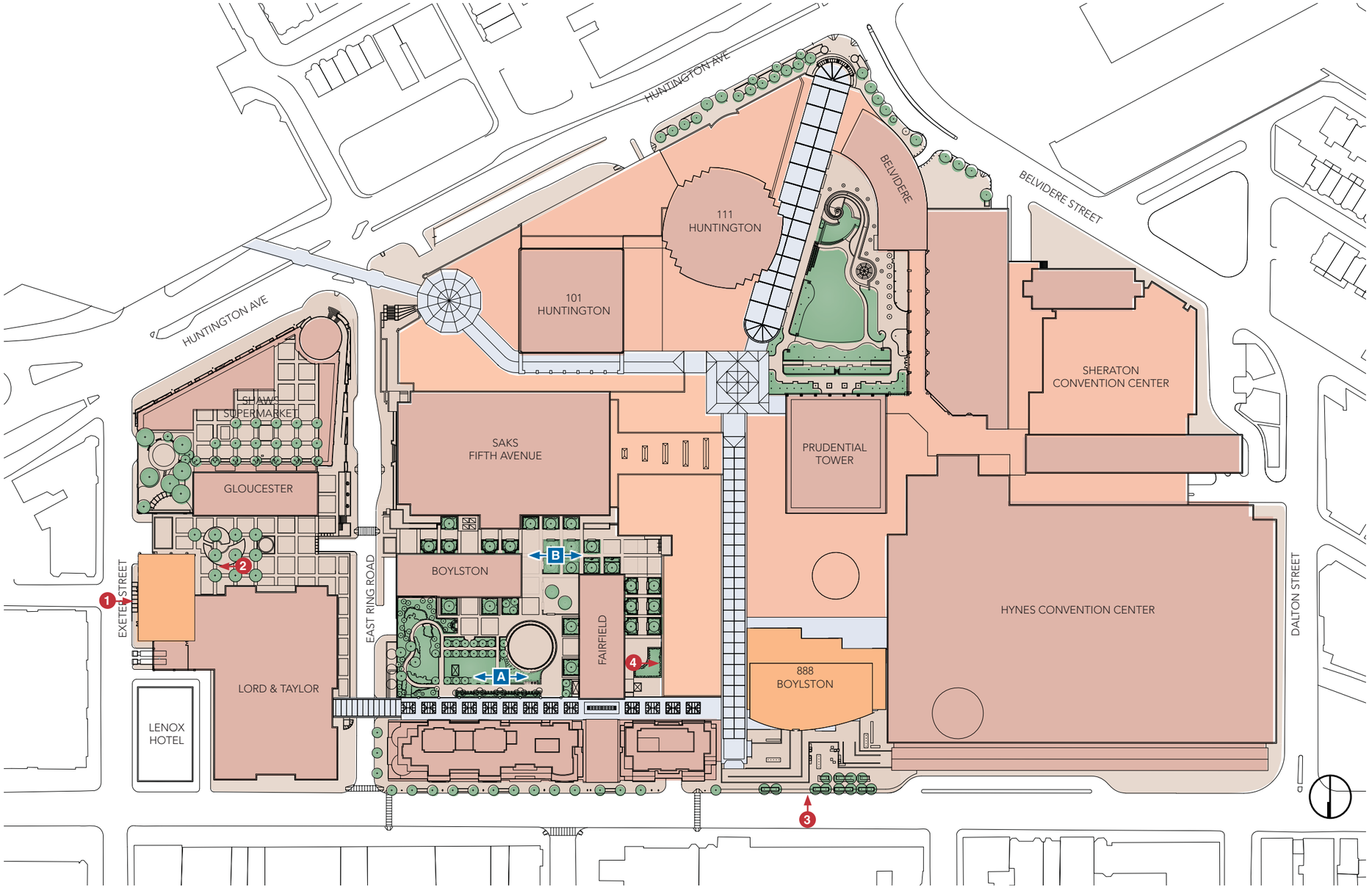
6:00 PM

LEGEND

Exeter Residences Shadow

Figure 5-27

December 21
Boston Public Library
East Courtyard Facade

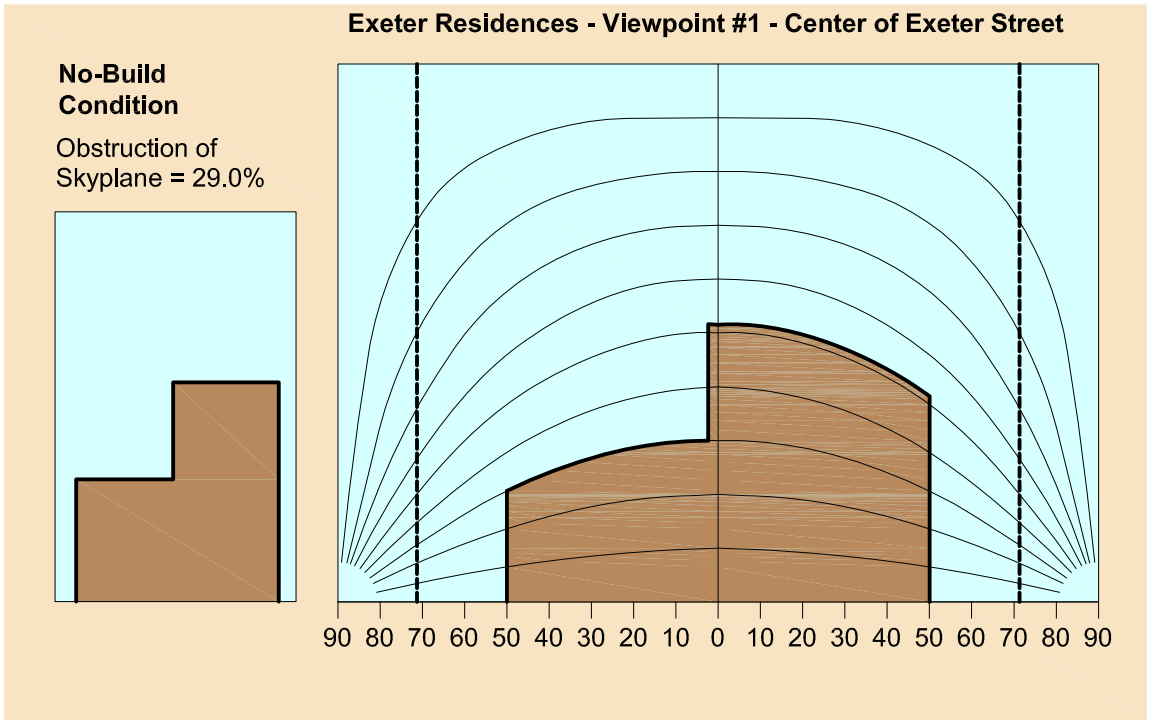


Daylighting Analysis Point

Perspective Viewpoint

0 80 160 Feet

Figure 5-28
Daylighting Study Points



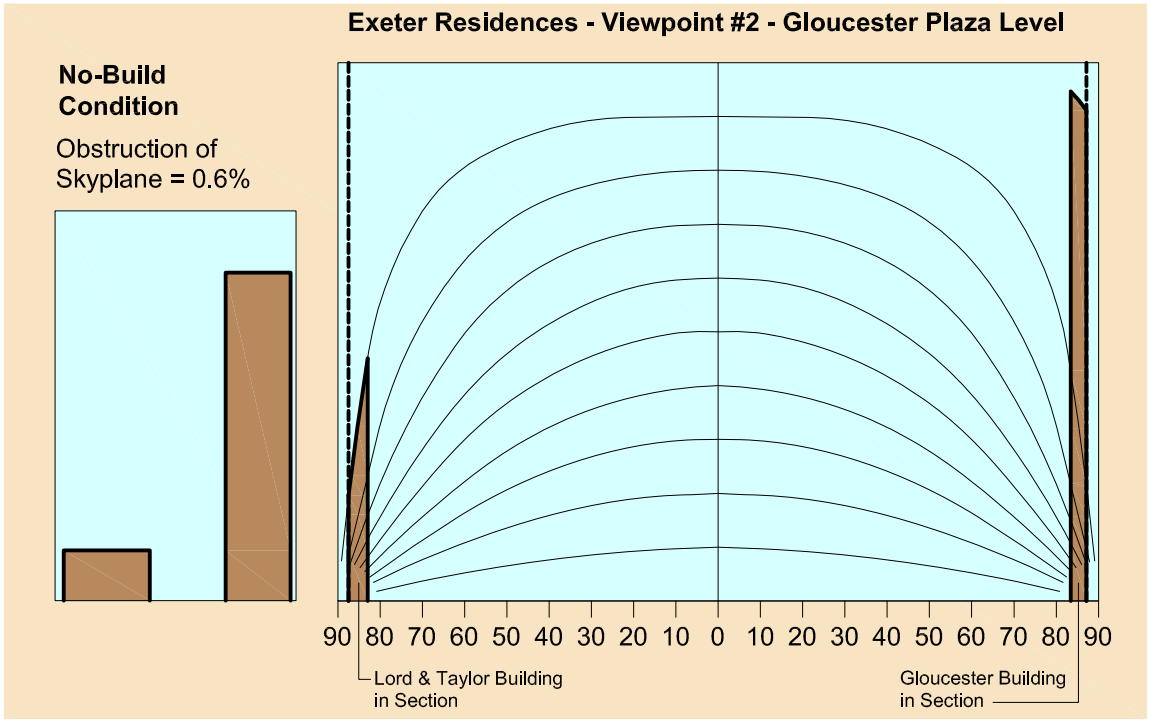
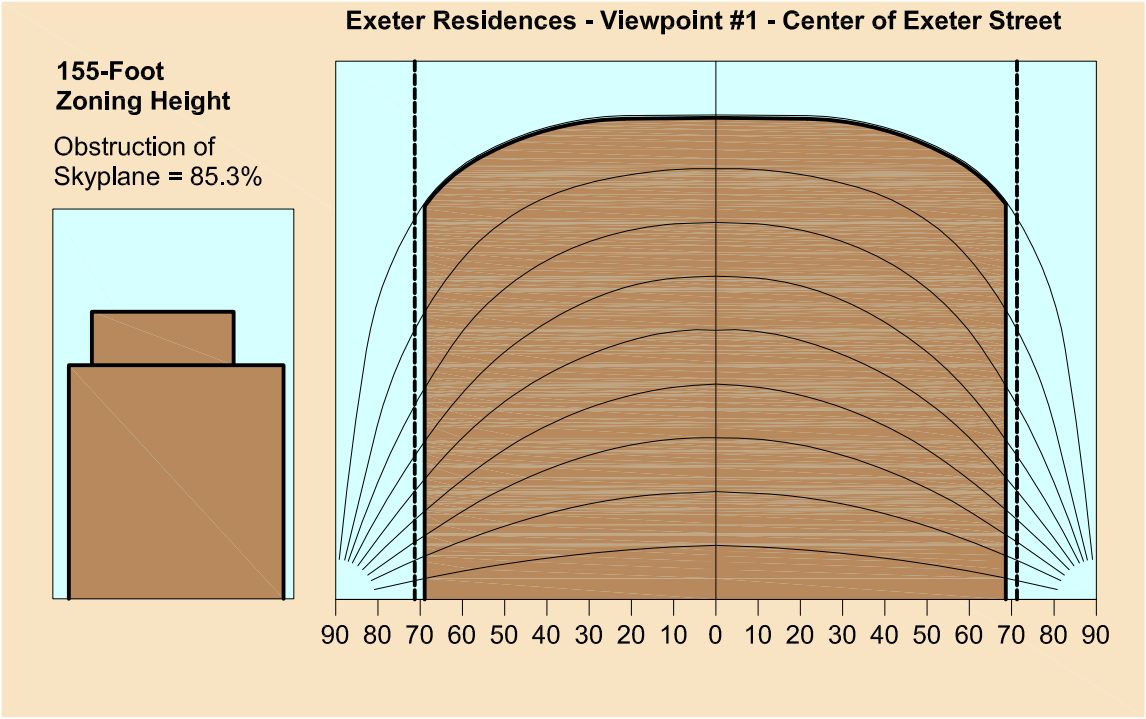


Figure 5-29

Daylight - Exeter Residences @ No-Build Condition



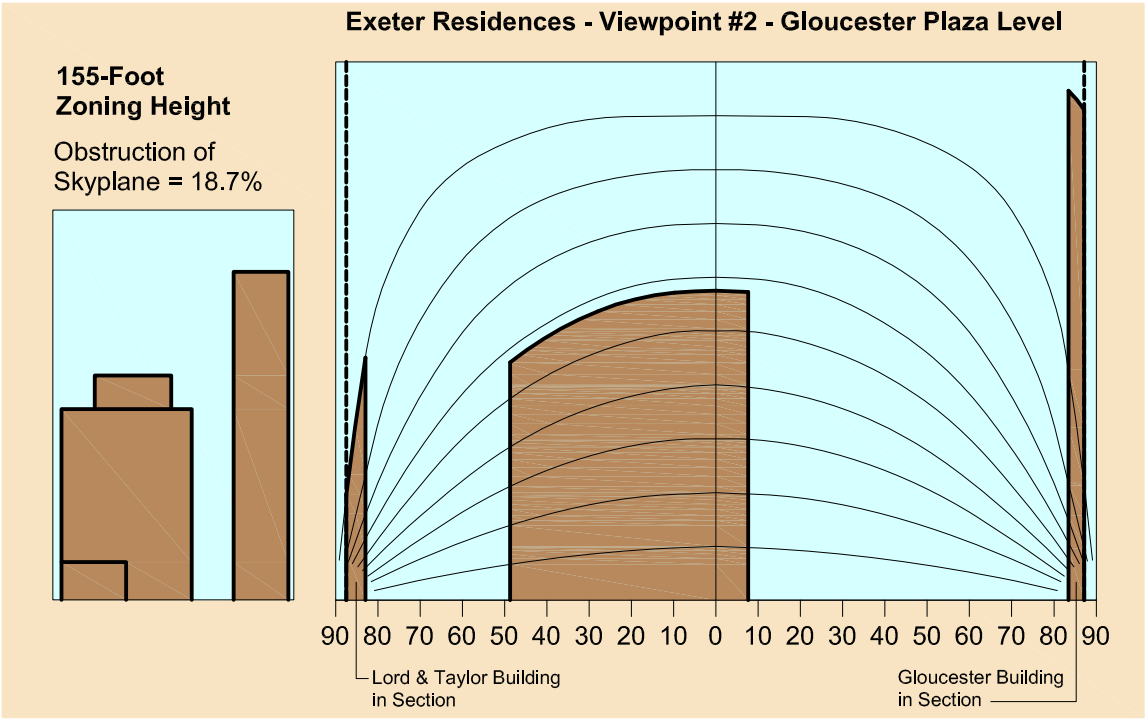
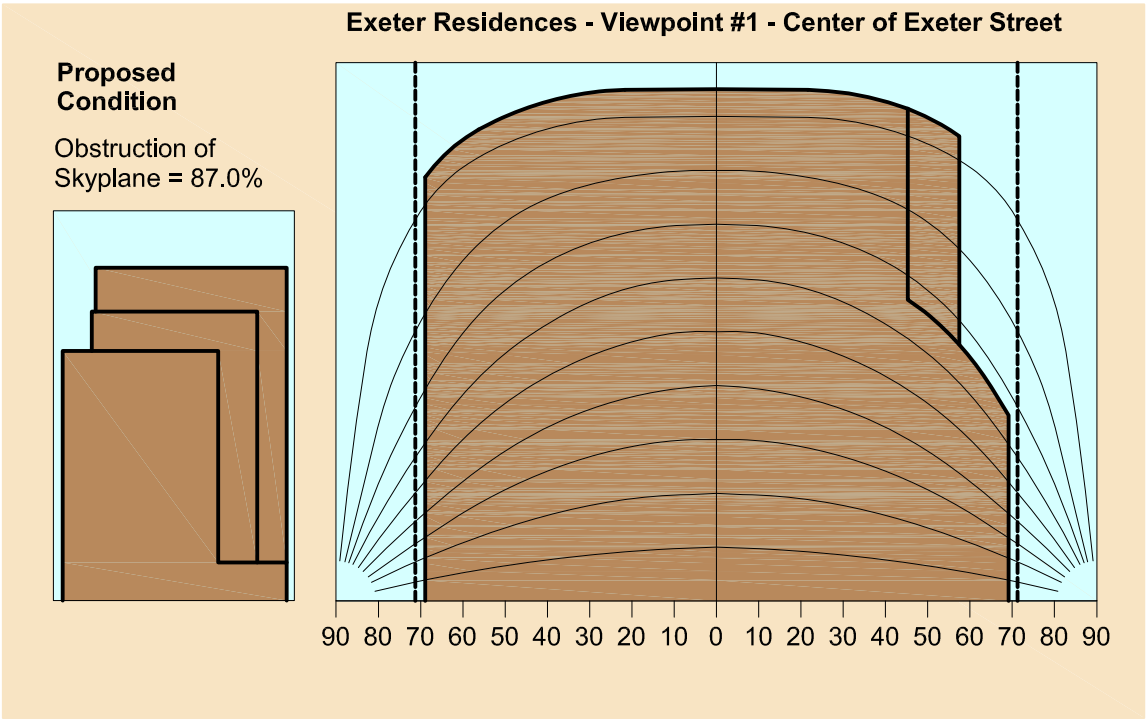


Figure 5-30

Daylight - Exeter Residences @155-feet Condition



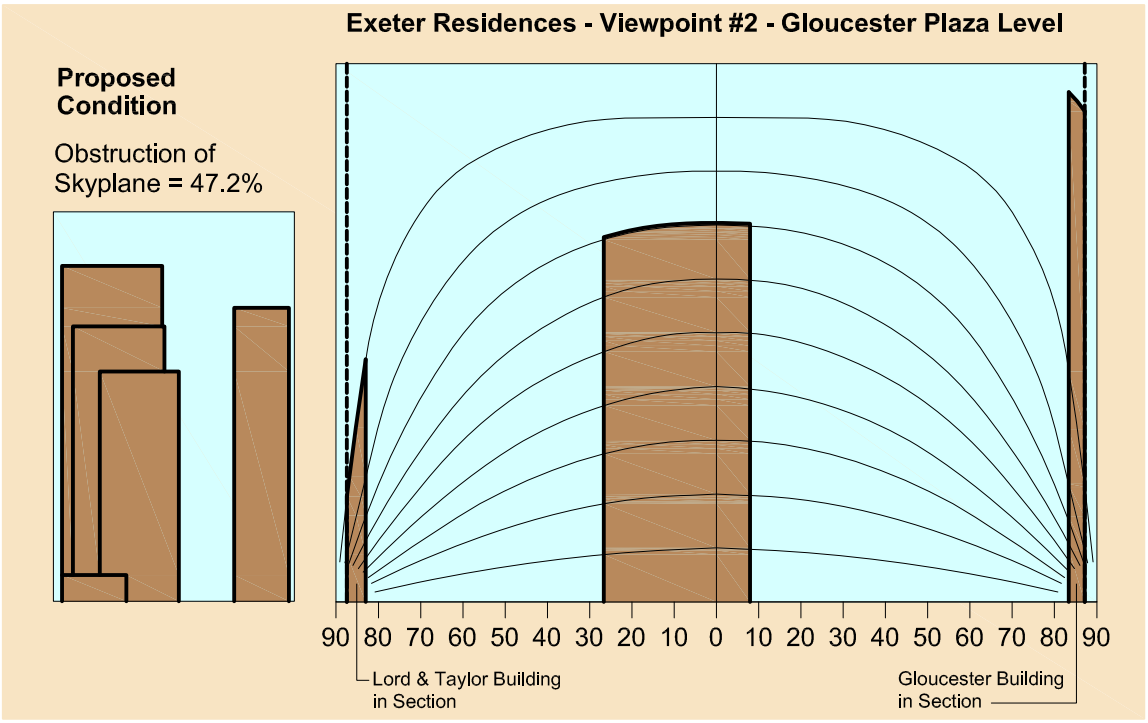
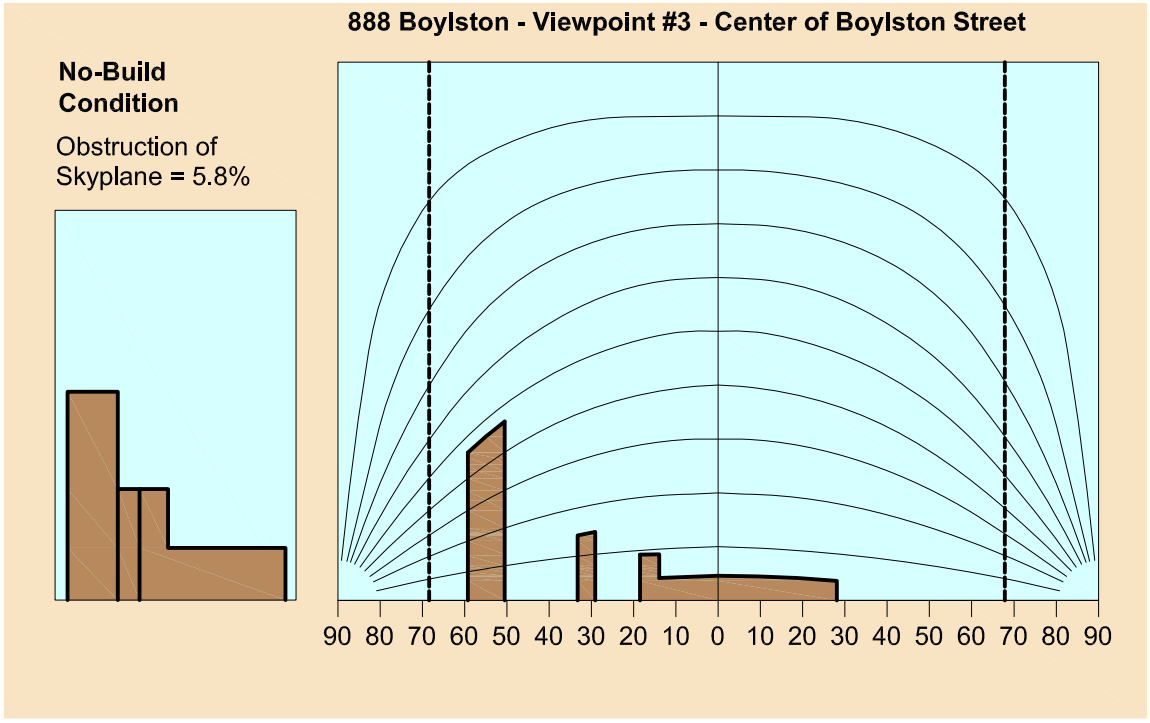


Figure 5-31

Daylight - Exeter Residences @ Proposed Condition



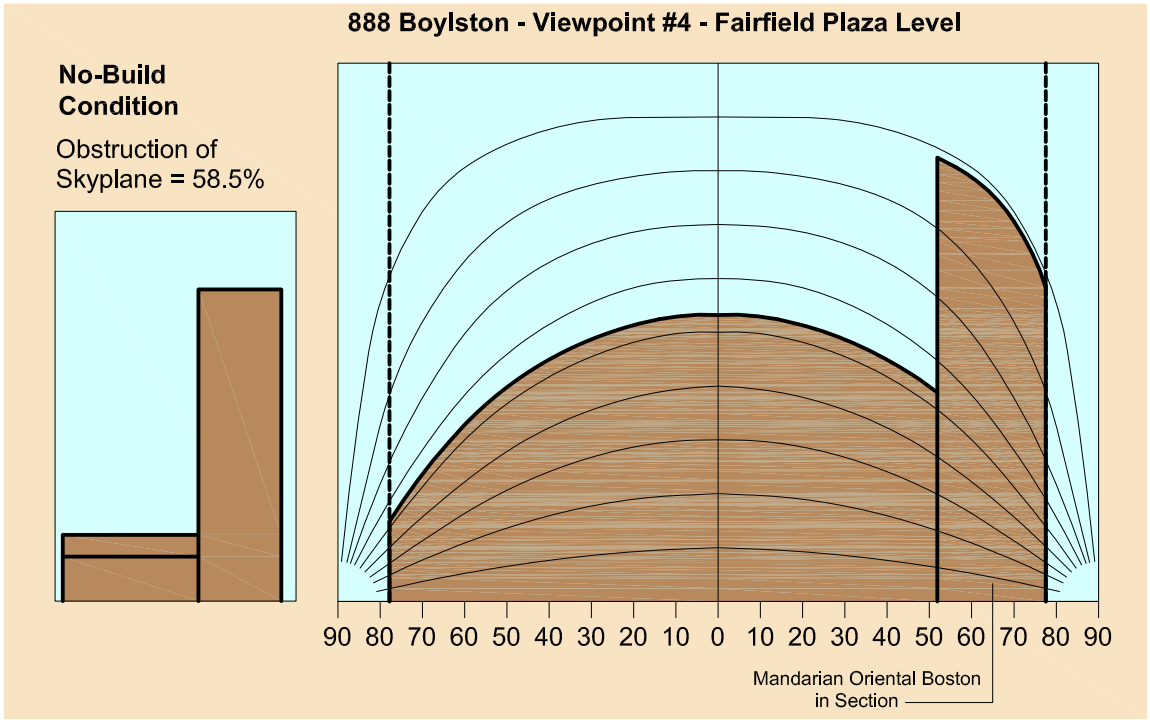
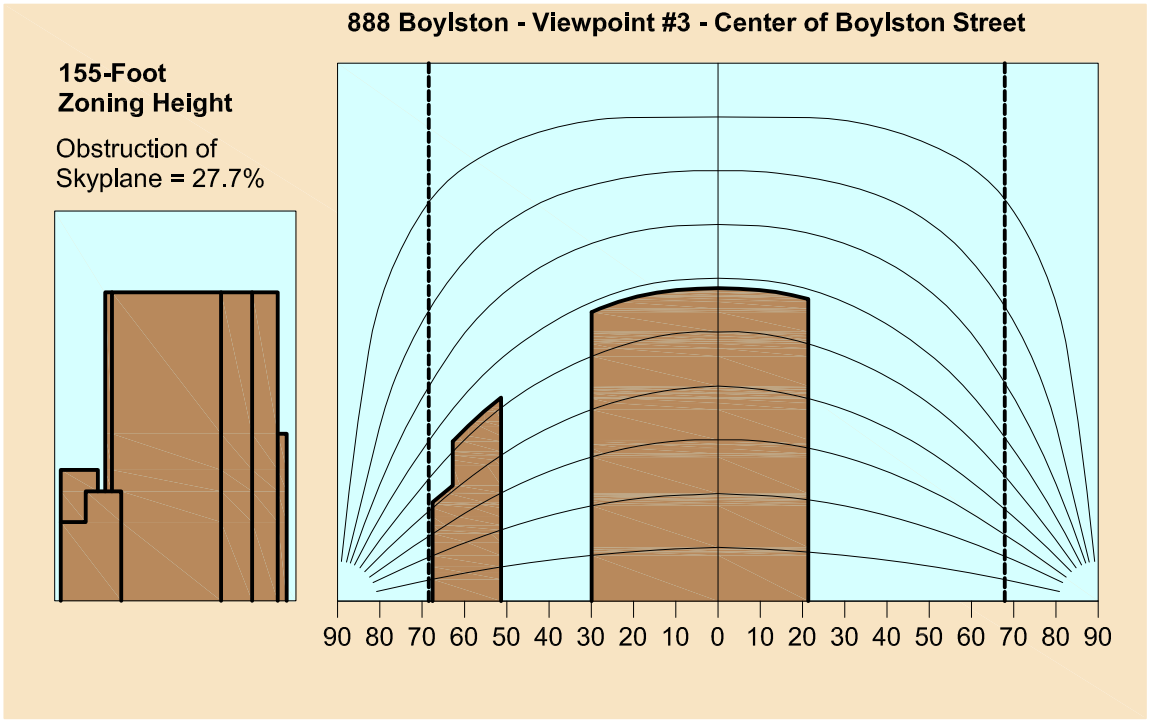


Figure 5-32

Daylight - 888 Boylston @ No-Build Condition



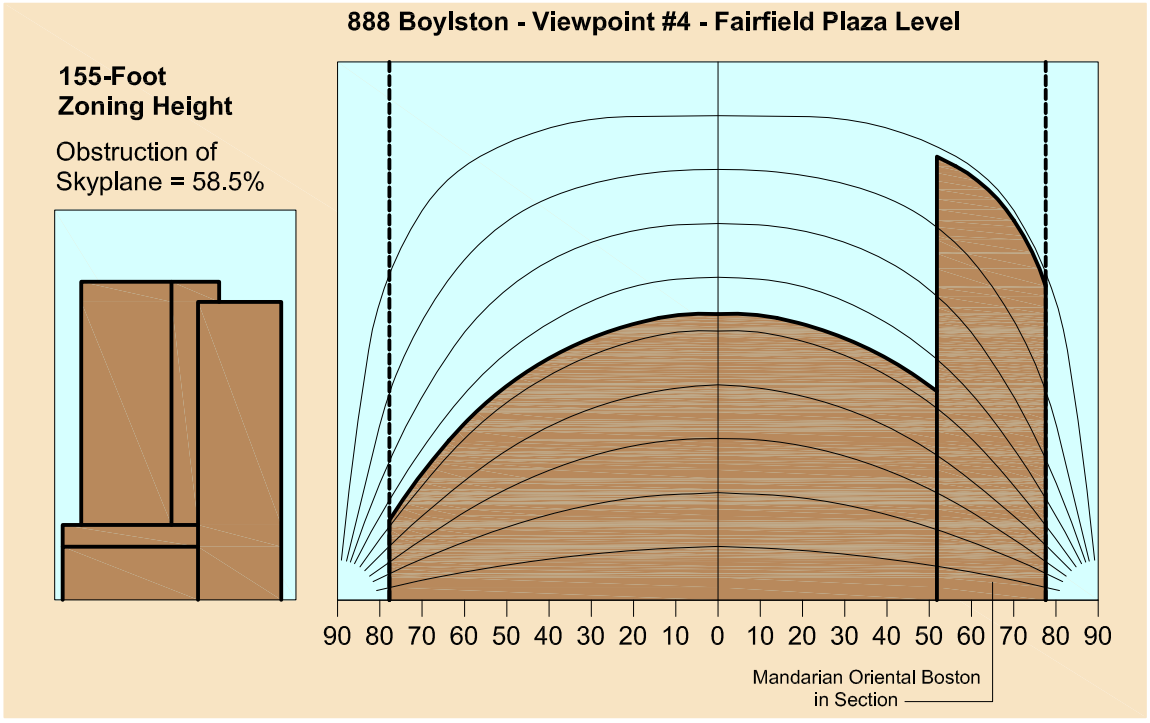
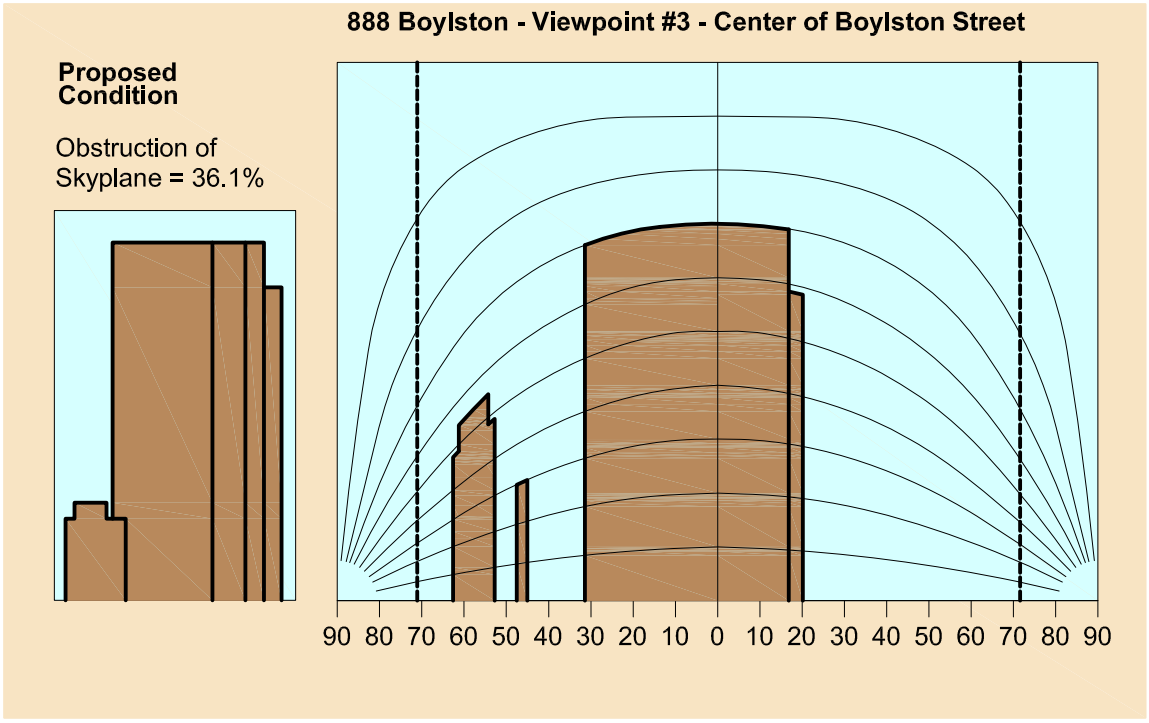


Figure 5-33

Daylight - 888 Boylston @ 155-feet Condition



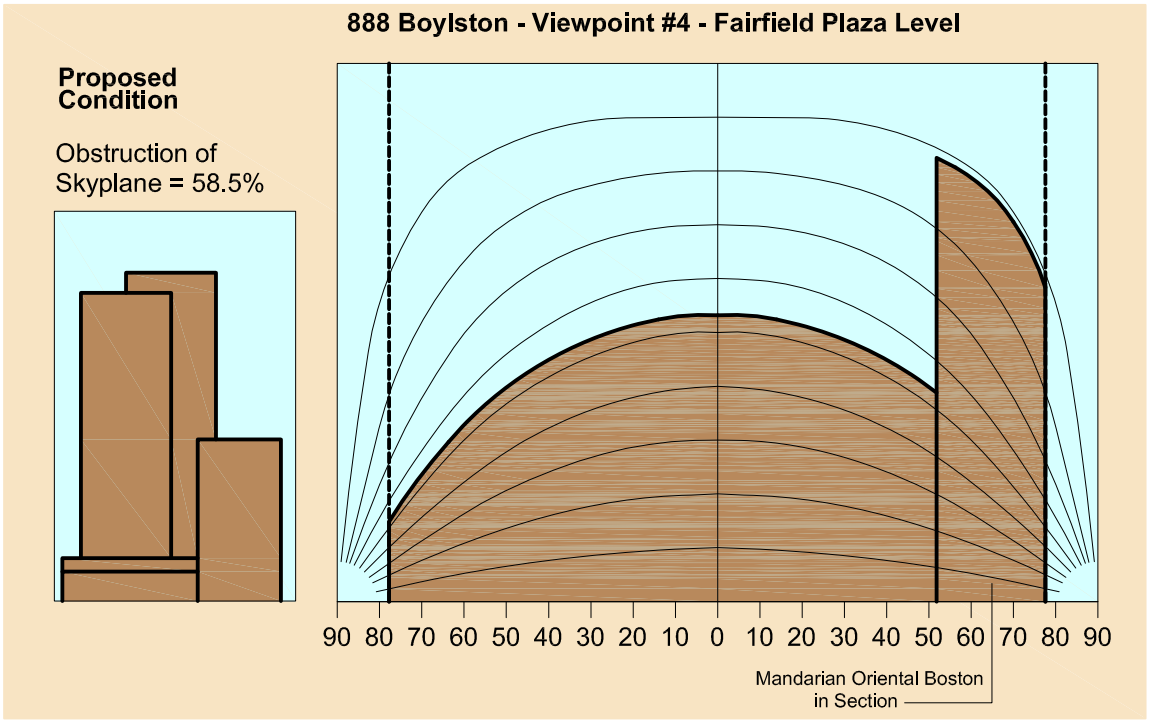


Figure 5-34

Daylight - 888 Boylston @ Proposed Condition

9 AM

12 PM

3 PM

6 PM

Legend

155-feet 888 Boylston and Exeter Residences Buildings

Reflection Intensity Scale

intense

minor

N

Figure 5-35

March 21
155-feet Building Height Condition
Solar Glare Analysis
Eastern Standard Time

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

9 AM

12 PM

3 PM

6 PM

Legend

155-feet 888 Boylston and Exeter Residences Buildings

Reflection Intensity Scale

intense

minor

N

Figure 5-36

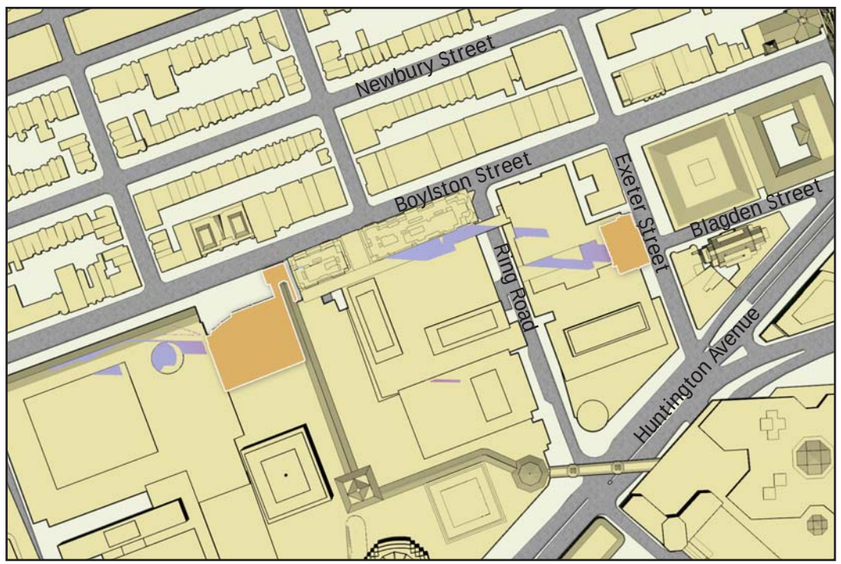
June 21
155-feet Building Height Condition
Solar Glare Analysis
Eastern Standard Time

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

9 AM

12 PM



3 PM

N

Legend

155-feet 888 Boylston and Exeter Residences Buildings

Reflection Intensity Scale

intense

minor

Figure 5-37

December 21
155-feet Building Height Condition
Solar Glare Analysis
Eastern Standard Time

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

9 AM

12 PM

3 PM

6 PM

Legend

Proposed 888 Boylston and Exeter Residences Buildings

Reflection Intensity Scale

intense

minor

Figure 5-38

March 21
Proposed Program
Solar Glare Analysis
Eastern Standard Time

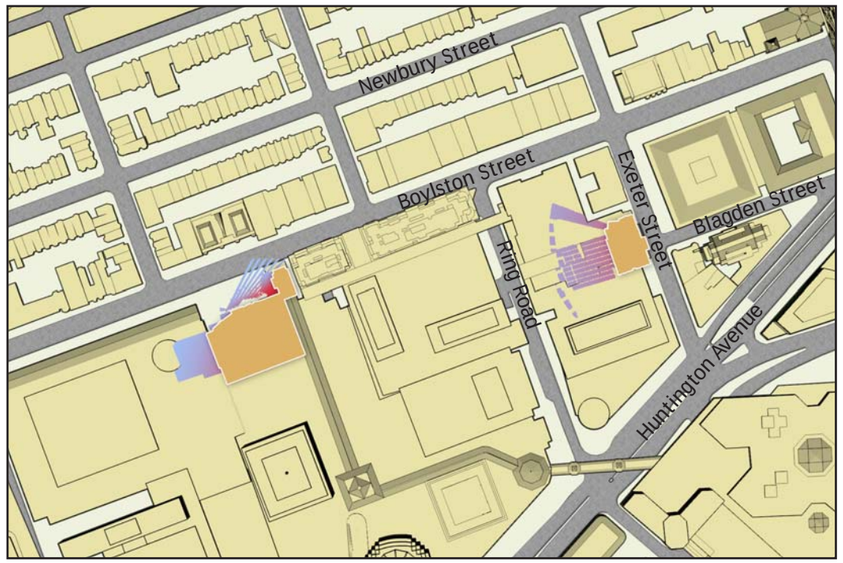
N

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

9 AM

12 PM



3 PM

6 PM

Legend

Proposed 888 Boylston and Exeter Residences Buildings

Reflection Intensity Scale

intense

minor

Figure 5-39

June 21
Proposed Program
Solar Glare Analysis
Eastern Standard Time

N

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

9 AM

12 PM

3 PM

Legend

Proposed 888 Boylston and Exeter Residences Buildings

Reflection Intensity Scale

intense

minor

N

Figure 5-40
December 21
Proposed Program
Solar Glare Analysis
Eastern Standard Time

Exeter Residences\888 Boylston | DPIR

AvalonBay COMMUNITIES, INC. | Boston Properties

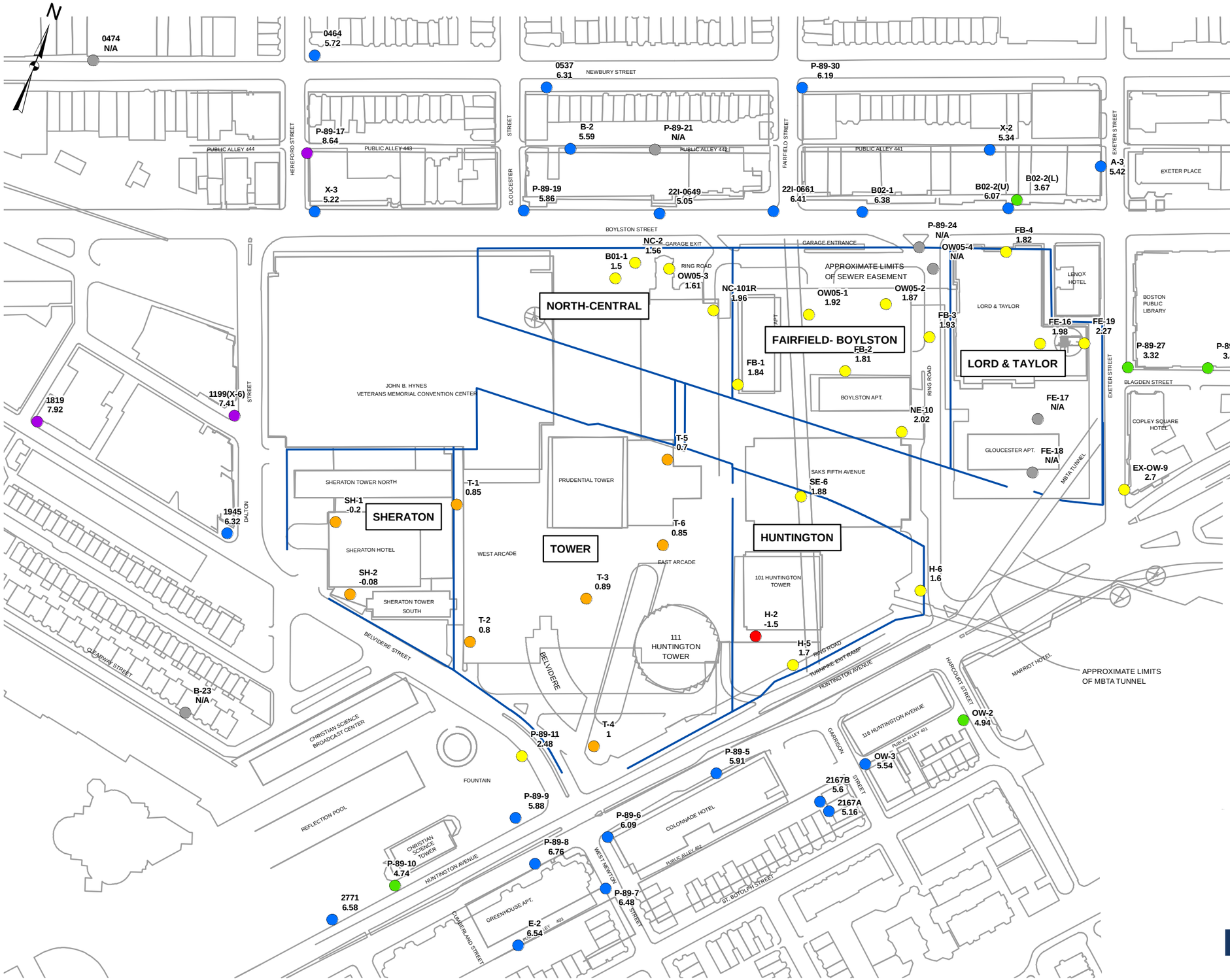


Figure 5-41

Well Locations

6 Infrastructure Systems

This chapter was prepared for the DPIR to supplement the Infrastructure Systems chapter documented in the NPC/PNF. Specifically, this section provides detail regarding the groundwater mitigation/management, monitoring and recharge. The remaining infrastructure systems studied pursuant to Article 80 Large Project review guidelines are contained in Chapter 7 of the original NPC/PNF document.

6.1 Stormwater Management

Regulatory Context

The Exeter Residences and 888 Boylston Project Sites are located within the limits of the Groundwater Conservation Overlay District (GCOD), pursuant to Article 32 of the Boston Zoning Code. The proposed building sites are located over below-grade parking garages and neighboring tunnels which serve local transit and state roadways. Based on the existing site constraints, few opportunities for recharge of stormwater are available. However, the Proponent will work with the Boston Water Sewer Commission (BWSC), Boston Redevelopment Authority (BRA) and Boston Groundwater Trust in order to respond to the Article 32 requirements. Through a series of coordination meetings, potential recharge areas have already been identified to provide groundwater recharge opportunities, as discussed below.

Stormwater Recharge System

Stormwater management controls will be established in compliance with BWSC standards. The Proponent is committed to controlling peak flows, pollutants and sediments entering into the receiving waters of the local BWSC stormwater drainage system to the extent practical. The drainage design will be reviewed and approved by the BWSC as part of the BWSC Site Plan Approval process following the Article 80 Large Project Review process.

Existing Conditions

In Exeter Street, the stormwater drainage system is owned and managed by the BWSC. A 12-inch northwestern flowing stormwater main combines with a 20-inch southeastern flowing stormwater main at the intersection of Blagden Street at Exeter Street. The resulting 18-inch drain pipe is routed to a collector drain in Dartmouth Street and is eventually directed to an outfall at the Charles River.

A 12-inch stormwater drain is located in Boylston Street and flows northeasterly. This drain line increases to a 33x39-inch stormwater main before the intersection of Boylston and Fairfield Streets where it discharges to a 60x72-inch combined sewer. From here the flow gets carried northward until it discharges dry weather and lower intensity flows to the West Side Interceptor (WSI). During high wet weather flow events, this line overflows to a 36x48-inch combined sewer line that continues to carry flow northward to the Boston Marginal Conduit (BMC) located beneath Storrow Drive.

A 48x100-inch stormwater drain, which flows southwesterly in Boylston Street, combines with the 33x39-inch sanitary line at the siphon chamber at the intersection of Boylston and Hereford Streets where it discharges dry weather and lower intensity flows to the WSI. During high wet weather flow events, this line overflows to an 84-inch combined sewer line that continues to carry flow northward to the BMC located beneath Storrow Drive.

Proposed Conditions

Due to existing on-site constraints a below grade stormwater recharge system will be located in Exeter Street within the public way. Approximately 65 precast concrete galleys will be constructed to provide a total stormwater recharge volume of approximately 3,500 cubic feet. In an effort to address the goals of the Groundwater Conservation Overlay District, the recharge system will be located on Exeter Street where it can supplement groundwater elevations in the proximity of the Lenox Hotel and Boston Public Library. The recharge system is sized for the equivalent 1-inch roof runoff from both Exeter Residences and 888 Boylston, although Exeter Residences will physically supply the runoff to this system. Specifically, the roof runoff from Exeter Residences will discharge directly to the below grade system which will also include overflow connections to the existing 12-inch and 20-inch stormwater mains in Exeter Street to accommodate for high flow conditions. **Figure 6-1** depicts the schematic design of the recharge system along Exeter Street.

As discussed previously in the NPC/PNF, roof runoff from 888 Boylston will be discharged to the existing 12-inch main in Boylston Street since there is no physical connection to the proposed recharge system in Exeter Street. **Figure 7-2** contained in the NPC/PNF depicts the conceptual utility plan along Boylston Street.

All improvements and connections to BWSC infrastructure will be reviewed by the BWSC as part of the designated BWSC Site Plan review process. This process includes a comprehensive design review of the proposed service connections, assessment of system demands and capacity as well as the establishment of service accounts. Furthermore, a detailed groundwater monitoring plan, which is an on-going program for the Prudential Center, will be continued during and after construction to ensure groundwater levels will be maintained. **Figure 5-41** depicts the location of existing monitoring wells that will be monitored.

Article 32 - Groundwater Conservation Overlay District

Section 32-6 of the Boston Zoning Code requires that any Proposed Project promote infiltration into the ground of a volume of rainwater equivalent to 1-inch across the area to be occupied by the Project by capturing and infiltrating runoff from building roof areas within a suitably-designed system for recharge to the groundwater table. This requirement may be reduced if a Proponent demonstrates that this amount of recharge cannot feasibly be achieved using techniques and materials appropriate to the Proposed Project and the lot upon which it is located. In addition, a Proposed Project cannot result in negative impact on groundwater levels within a lot or adjacent lots.

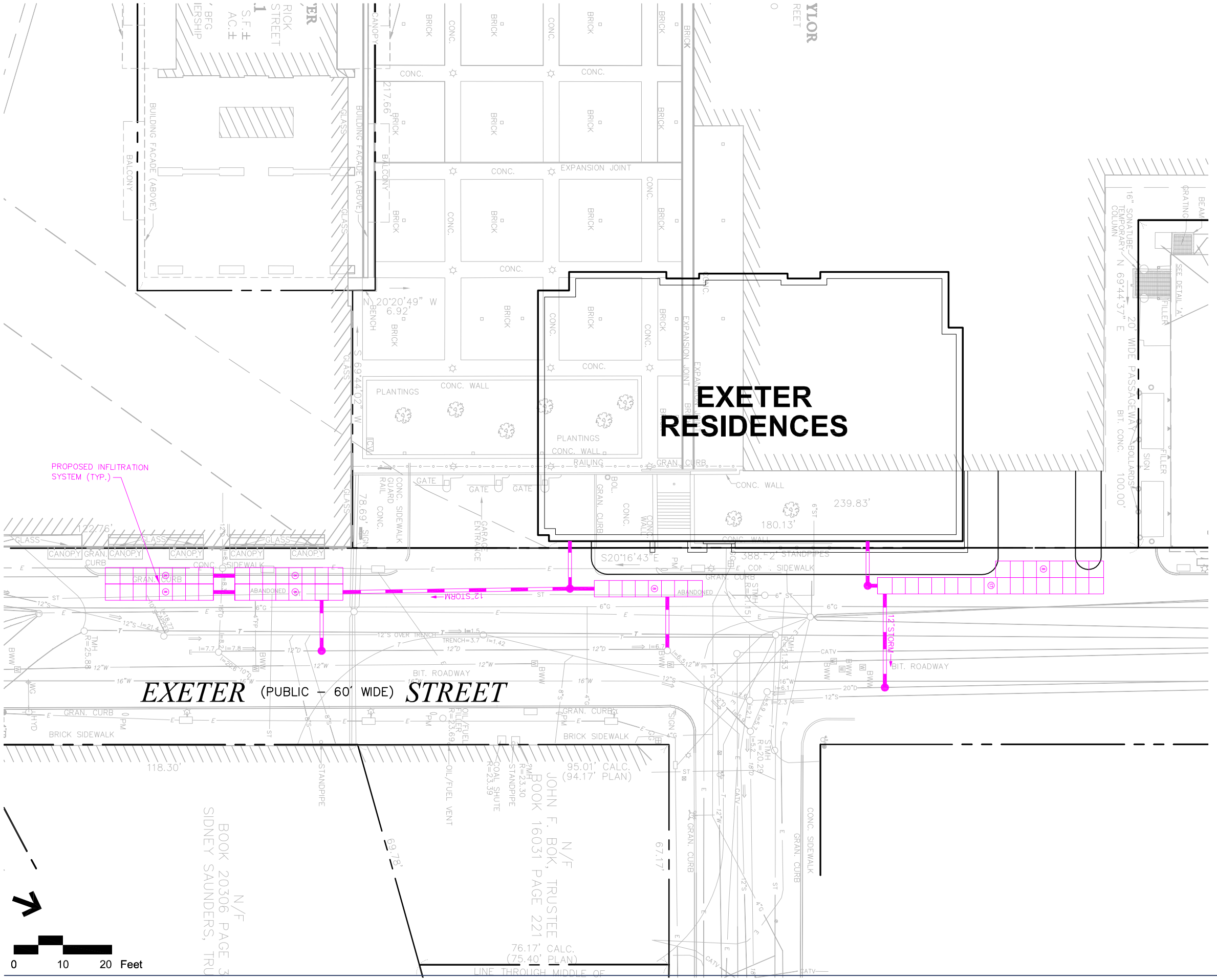
The Proponent has coordinated with Boston Groundwater Trust and City agencies to identify a proposed location in Exeter Street to provide a recharge system which will positively benefit the groundwater table and locate the recharge toward the Lenox Hotel and Boston Public Library. Roof runoff from the proposed Exeter Residences will be directed to this system. Location of a similar system adjacent the 888 Boylston site is not feasible due to the Prudential Center Garage limits and the Green Line tunnel located in Boylston Street. However, the volume of rainwater to be recharged to the Exeter Street location will be equivalent to not less than 1-inch across the area to be occupied by both the Exeter Residences and 888 Boylston.

The use of subsurface area under the public way is subject to Public Improvement Commission (PIC) approval, with whom the Proponent will coordinate directly following the Article 80 process.

Summary

The final design process for these Project components will include required engineering analyses and will adhere to applicable protocols and design standards, ensuring that the proposed buildings are properly supported by the City's infrastructure. Detailed design of the utility systems will proceed in conjunction with the design of the buildings and interior mechanical systems. Furthermore, the Proponent will meet the recharge requirements of Article 32 and will continue to

coordinate with BWSC, the BRA and Boston Groundwater Trust regarding the requirements of Article 32.



Legend

Storm Sewer Lines and Structures

Figure 6-1

Conceptual Infiltration Facility Location Plan
Exeter Residences

7

Sustainable Design and Practices

This chapter was prepared for the DPIR to supplement the discussion of sustainable design and practices documented throughout the NPC/PNF. Specifically, this section updates the NPC/PNF and provides detail regarding the sustainable approach to be followed by Exeter Residences and 888 Boylston including a detailed description of Leadership in Energy and Environmental Design (LEED®) endeavors. The prior discussions of sustainable design and practices pursuant to Article 80 Large Project review guidelines are contained in Chapters 3, 4, 5, 6 and 7 of the original NPC/PNF document.

7.1 Introduction

Both Boston Properties and AvalonBay highly value sustainability and both firms are committed to environmental stewardship responsibility and sustainability as it relates to the building development. One of the fastest growing sectors in the sustainability movement has been within architecture and building systems. The Exeter Residences and 888 Boylston will incorporate sustainability features in their design, construction, and operation. The Project design team is actively involved in investigating and implementing environmentally responsible initiatives and, as such, these sustainable design elements and construction strategies will be integrated into the planning, design, and operation of the both buildings Furthermore, Boston Properties and AvalonBay both look forward to working with the BRA regarding the City's Article 37 Green Buildings design process to which this chapter directly relates. Article 37 provides a framework for on-going project coordination after completion of the Article 80 process through final design.

To comply with Article 37 both Boston Properties and AvalonBay plan to measure their success through the framework of LEED® (Leadership in Energy and Environmental Design), using indicators such as reduced energy consumption, improved stormwater management, reduction in water usage, improved indoor air quality, and use of sustainable materials where possible, to evaluate performance. Exeter Residences and 888 Boylston will both meet the requirements of Article 37 by attaining a LEED® certifiable status under the appropriate LEED® building rating

system. In addition, Boston Properties anticipates submitting 888 Boylston for LEED® Silver certification or above.

As a new construction residential apartment building, the Exeter Residences is categorized as a LEED® - NC (New Construction) project. As an office building which will be fit-out by tenants, 888 Boylston is categorized as a LEED® - CS (Core/Shell) project. Both buildings have been pre-registered with the United States Green Building Council (USGBC) which oversees and administers LEED® certifications. Each building is pursuing credit points from categories that include: Sustainable Sites; Water Efficiency; Energy & Atmosphere; Materials & Resources; Indoor Environmental Quality; and potential for receiving Innovation and Design Process points. Additionally, Boston Properties will design and construct 888 Boylston with the intent to achieve a minimum of a LEED® Silver certification.

7.2 Sustainable Design and Practices

As stated previously, Exeter Residences and 888 Boylston will comply with the City of Boston's Article 37 requirements. Sustainable design and practices can be defined by three main categories: construction, operations and transportation. Where applicable and feasible, the following categories' guidelines will be practiced:

- Construction — noise and working hours, air quality, stormwater quality, geotechnical impact, groundwater impact, recycling and reuse, construction worker transportation.
- Operations — air quality, noise, water quality, water conservation, energy, conservation, pollution prevention, solid and hazardous waste, and recycling.
- Transportation — Transportation Demand Management (TDM), flextime.

The Proponent and architects of the Exeter Residences and 888 Boylston are continuing to develop the design detail and systems design of the buildings and will follow this sustainable framework moving forward. Responsible and sustainable development features will be refined in further evolutions of the design. A construction plan will be developed with the BRA, Boston Transportation Department and appropriate jurisdictional agencies and constituencies to address the specifics of each of these issues; this plan will include programs and protections that will fulfill the requirements of construction methodology in relation to evolving site circumstances. The construction manager or general contractor will be a part of the plan development and will be responsible to ensure that each contractor will be apprised fully of these provisions and guidelines prior to construction, and will be required to bid the contract on this basis.

Comprehensive design and construction guidelines shall be drafted to educate and assist future tenants in implementing sustainable design and construction strategies for tenant improvements.

■

Construction

A building-specific Construction Management Plan (CMP) will be developed for each of the Exeter Residences and 888 Boylston taking the unique site context and circumstances into account for each development. During construction, the particular owner will work with the contractor to:

- Maximize re-use and recycling of materials salvaged during site demolition. This includes creating a process for segregation and transfer of construction waste and recyclables, and includes participation with the Building Materials Resource Center, donating suitable excess materials or non-recyclable materials where possible.
- Adhere to city construction standards and noise ordinance requirements of 7:00 AM to 6:00 PM for construction work hours.
- Establish with the City and adjacent neighborhoods efficient truck routes that minimize use of residential streets, and provide maps indicating truck routes to all suppliers, contractors and sub-contractors.
- Schedule deliveries for off-peak hours where feasible.
- Post no-idling signs and enforce the no-idling law during the construction period.
- Work toward minimizing fugitive dust impacts by: requiring materials- and debris-removal trucks to undergo wheel wash; spraying all aggregate piling and excavated material at day's and week's end; and, scheduling regular mechanical street sweeping (working with the City to provide appropriate definitions of required thoroughfare proximity and standards).
- Connect stationary noise-producing equipment (pumps, generators) to the NSTAR grid, where feasible.
- Offer incentives for workers who carpool or use public transit to work through the Artery Business Committee's Transportation Management Association (ABC TMA).
- Evaluate employing measures such as: securing decking on roadways; adjusting backup alarms on vehicles and equipment; keeping engine housing panels closed; and, shutting off equipment that is not in use.
- Provide for the proper storage and disposal of hazardous materials during operations.
- Build screening through the construction process to provide light shielding which will improve the aesthetic environment for surrounding area users and residents, where feasible.

Operations

During the operation of the Exeter Residences and 888 Boylston, the particular owner will examine the possibility of implementing the following measures to protect air quality and water quality, promote water and energy conservation, reduce solid and hazardous waste and encourage recycling. Tenants of 888 Boylston also will be encouraged to follow sustainable practices through a Tenant Operation Manual. These measures may feature:

- Including trash disposal and recycling areas.
- Installing sensor-operated sinks and toilets in public restrooms.
- Exploring opportunities to conserve energy and resources during design development.
- Examining whether unoccupied spaces are consuming only the energy necessary to maintain operational safety and building security.
- Directing exterior lighting downward and providing shields to reduce glare, where applicable.

Transportation

The Exeter Residences and 888 Boylston transportation study is discussed in detail in the NPC/PNF Chapter 5 with updates to that discussion found in this DPIR Chapter 4. Relevant to matters of responsible and sustainable development, the following areas will be included, where feasible in building operations.

Exeter Residences will join the Prudential Center's Transportation Management Organization (TMO), of which Boston Properties is already a member. The TMO has a transportation coordinator and sponsors the following programs:

- Transportation Day events which educate tenants on transportation opportunities to the Center and provides information on MBTA, carpool and vanpool programs, walk and bike to work programs, etc.;
- A segment in the quarterly CenterScene newsletter that provides detailed information on the TMO's programs;
- Program recruitment for the Artery Business Committee's Transportation Management Association (ABC TMA), whose programs focus on decreasing single-drivers and getting people to commute via other methods of transportation;
- Bike rack areas located throughout the Prudential Center, both outside (Boylston and Bridge Court entrances) and inside (Orange level of the south garage).

AvalonBay and Boston Properties will implement the following Transportation Demand Management (TDM) measures, where feasible:

- Encourage flextime scheduling for office and retail tenants (flextime is inherent in apartment operations; thus this measure of traffic congestion reduction will naturally occur);
- Continuing to support and potential expansion of the on-site ZipCar® or similar vehicles;
- Implement Ride Home program for non-drivers and HOV users;
- Provide secure bicycle storage in an area protected from the elements (for commuters), additional bicycle storage for short-term users, and for approximately 15% of residents of the Exeter Residences within the building or garage limits;
- Offer MBTA fare subsidization for employees, through pre-tax payroll deduction for MBTA pass or other methods.

7.3 Leadership in Energy and Environmental Design (LEED®)

In addition to meeting the City of Boston Article 37 requirements, Exeter Residences and 888 Boylston will incorporate many "life-cycle" sustainable measures, as established by the LEED® Council discussed below. The Proponent and architects will make the buildings LEED® certifiable in accordance with Article 37 of the City of Boston Zoning Code. Both Project teams will research additional sustainable and energy-efficient measures as the building designs develop. Preliminary LEED® Checklists used in attaining certification are provided at the end of this chapter for both the Exeter Residences and 888 Boylston.

Exeter Residences will meet the certifiable level of LEED® points as discussed below. In addition, Boston Properties intends to submit 888 Boylston for LEED® Silver certification. The following LEED® categories, as defined in the LEED® credit checklists found at the end of this chapter, are discussed for each building below.

Exeter Residences

AvalonBay Communities is committed to the environmentally responsible design, construction and operation of rental homes. The proposed Exeter Residences will comply with the Boston Green Building Regulations as required by Article 80B and Article 37 of the Boston Zoning Code and Enabling Act.

The Boston Green Building Regulations require that major projects, being those subject to Article 80B review, are planned, designed, constructed, and managed to minimize adverse environmental impacts. Article 37 further requires that the proposed project employ the USGBC's Leadership in Energy and Environmental Design (LEED®) rating system for the tracking of LEED® credits to demonstrate that the proposed project is LEED® Certifiable.

As a new construction residential apartment building, the Exeter Residences is categorized as a LEED® - NC (New Construction) project and is pre-registered with the USGBC. The LEED® - NC rating system is composed of six categories that include: Sustainable Sites; Water Efficiency; Energy & Atmosphere; Materials & Resources; Indoor Environmental Quality; and Innovation and Design Process.

Sustainable Sites

At the core of the LEED® rating system, is the category of Sustainable Sites. The objective of this category is steer development toward building sites that minimize impact on the natural environment.

The Exeter Residences building site is created through the partial demolition of two buildings (Lord & Taylor and the existing garage). The previously developed site features exemplary connectivity to basic services in the community and is located in an urban setting with an existing density that exceeds the 60,000 square feet per acre. The Project achieves both criteria that qualify for Sustainable Sites Credit 2.

The Project achieves all of the Alternative Transportation credits (1) through its proximity to several modes of mass transit, including bus, subway and commuter rail connections; (2) by providing covered bicycle storage facilities for 15% of the building occupants; (3) by providing preferred parking for low-emitting and fuel efficient vehicles; (4) by providing the number of parking spaces that meets, but does not exceed, the local zoning requirement.

The Project also includes an innovative groundwater recharging system that captures storm water runoff and returns it to the ground water table, thereby safeguarding the foundations of nearby wood-pile-supported buildings. The storage component of the groundwater recharging system meets the criteria established in Credit 6.1.

High-albedo roofing membrane will be utilized to maximize solar reflectance and minimize heat gain, thereby reducing urban heat island effects.

Water Efficiency

Conservation of fresh water preserves a natural resource while reducing the amount of energy and chemicals used for sewage treatment.

The Exeter Residences will utilize high efficiency irrigation and drought tolerant plant species. Low flow plumbing fixtures will be used throughout the building.

Energy & Atmosphere

High efficiency heating and cooling systems will be utilized throughout the Exeter Residences. A number of energy conservation technologies, along with enhanced commissioning services, will be implemented. On-going measurement and verification of the building systems will be employed to optimize building performance. No chlorofluorocarbon (CFC) based refrigerants will be used to reduce ozone depletion in the atmosphere.

Materials & Resources

The materials employed in the construction of buildings have a significant impact on the amount of virgin materials that are harvested and the amount of waste products that are generated. Recycling diverts material waste products from landfills and reduces the demand for raw materials. In addition, the extraction, processing and transportation of materials to project sites consumes energy and contributes to carbon dioxide emissions while the use of locally extracted and processed materials stimulate the local economy.

AvalonBay supports the storage and collection of recyclables. The Project includes recycling facilities within the building. A demolition and construction waste management plan will be implemented during construction of the Project to divert at least 50% of the construction waste material from landfills. Construction materials with recycled content will be specified and materials will be procured from regional sources whenever possible.

Indoor Environmental Quality

The comfort and well-being of the occupants is a paramount concern. The quality of indoor air, and specifically the reduction of airborne pollutants, is known to minimize occurrences of asthma, allergies, and other health ailments. Irritating off-gassing, caused by the presence of volatile organic compounds (VOCs) in interior finishes, can be avoided by using products that release fewer and less harmful chemical compounds. In addition, access to daylight and views while enabling

occupants to control their thermal environment, is fundamental in achieving occupant comfort.

A construction indoor air quality management plan will be implemented to prevent contamination mechanical systems and absorptive materials, and to safeguard the comfort of construction workers. Low-emitting adhesives and sealants, paints, and carpet systems will be specified to reduce the presence of VOCs. Occupants will have control over lighting and their thermal environment. Generous expanses of vision glass will provide occupants with access to daylight and views.

A preliminary LEED® scorecard indicates that the Project will achieve a certifiable number of points and thereby comply with the City of Boston Article 37 Green Building Design. The scorecard will be updated regularly as the design develops and engineering assumptions are substantiated.

■

888 Boylston

Boston Properties' commitment to sustainability and the location of 888 Boylston within the City makes this Project well positioned for a Silver LEED® – CS (Core/Shell) rating. Following the Article 80 process, Boston Properties will initiate the LEED certification process in connection with the design development of the building. Boston Properties has already pre-registered 888 Boylston Street with the USGBC for LEED.

Sustainable Sites

As a redevelopment site in an urban area, the building earns points for site selection, development density, and alternative transportation options. A storm water management plan will be developed to collect storm water for recharging groundwater in the neighborhood. A light-colored, high-albedo roof shall be included to reduce the heat island effect within urban areas. Comprehensive design and construction guidelines shall be drafted to educate and assist future tenants in implementing sustainable design and construction strategies for tenant improvements.

Water Efficiency

Low-flow plumbing fixtures shall be selected for the core and shell to reduce the overall domestic water use. Landscape design, the appropriate use of indigenous plants and a high-efficiency irrigation system shall reduce water use for irrigation.

Energy & Atmosphere

Overall energy use of the core and shell shall be reduced below ASHRAE 90.1-2004 standards which are also a betterment to the standard of the Massachusetts Energy Code reductions. A number of energy conservation technologies along with enhanced commissioning services and ongoing measurement and verification of both the base building and future tenant systems shall be implemented to optimize building performance when occupied. No CFC (chlorofluorocarbon) based refrigerants will be used to reduce ozone depletion in the atmosphere. To support the generation of grid-source renewable energy, renewable trading certificates may be purchased for the core and shell electricity supply.

Materials & Resources

A demolition and construction waste management plan shall be implemented during construction of the Project to divert the majority of waste material from landfills. Recycling shall be strongly encouraged by the tenants with convenient areas for collection and storage. Construction materials for the core and shell shall contain significant percentages of recycled content. Every effort shall be used to use local materials or materials manufactured regionally.

Indoor Environmental Quality

The comfort and well-being of the occupants shall be paramount in regard to air-quality and access to day-light and outside views. Finishes, adhesives, and sealants for the core and shell shall be selected for low VOC (volatile organic compounds) content to minimize the environmental impacts of off-gassing. The HVAC system will be designed and constructed to deliver an increased mix of fresh air to support the core and tenant spaces. During construction, an IAQ (indoor air quality) Management Plan will be implemented to protect mechanical systems from contamination.

LEED-NC Version 2.2 Registered Project Checklist

Exeter Residences
Boston, Massachusetts

Yes	?	No			
10	1	3	**Sustainable Sites**		14 Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
1			Credit 1	**Site Selection**	1
1			Credit 2	**Development Density & Community Connectivity**	1
1			Credit 3	**Brownfield Redevelopment**	1
1			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
1			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
1			Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1
1			Credit 4.4	**Alternative Transportation**, Parking Capacity	1
		1	Credit 5.1	**Site Development,** Protect of Restore Habitat	1
		1	Credit 5.2	**Site Development,** Maximize Open Space	1
1			Credit 6.1	**Stormwater Design,** Quantity Control	1
		1	Credit 6.2	**Stormwater Design,** Quality Control	1
1			Credit 7.1	**Heat Island Effect,** Non-Roof	1
1			Credit 7.2	**Heat Island Effect,** Roof	1
	1		Credit 8	**Light Pollution Reduction**	1

Yes	?	No			
2	1	2	**Water Efficiency**		5 Points
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
		1	Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
		1	Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
	1		Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Yes	?	No			
4	3	1	**Energy & Atmosphere**		17 Points
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
2	1		Credit 1	**Optimize Energy Performance**	1 to 10
		1	Credit 2	**On-Site Renewable Energy**	1 to 3
1			Credit 3	**Enhanced Commissioning**	1
1			Credit 4	**Enhanced Refrigerant Management**	1
	1		Credit 5	**Measurement & Verification**	1
	1		Credit 6	**Green Power**	1

continued…

Yes	?	No			
5	2	6	**Materials & Resources**		**13** Points
Y			Prereq 1	**Storage & Collection of Recyclables**	Required
		1	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
		1	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1
		1	Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1
1			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
	1		Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
		1	Credit 3.1	**Materials Reuse**, 5%	1
		1	Credit 3.2	**Materials Reuse**,10%	1
1			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
1			Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
1			Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regic	1
1			Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regic	1
		1	Credit 6	**Rapidly Renewable Materials**	1
	1		Credit 7	**Certified Wood**	1
Yes	?	No			
8	5	2	**Indoor Environmental Quality**		**15** Points
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
		1	Credit 1	**Outdoor Air Delivery Monitoring**	1
	1		Credit 2	**Increased Ventilation**	1
1			Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
	1		Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
1			Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1
	1		Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
		1	Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1			Credit 6.1	**Controllability of Systems**, Lighting	1
1			Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
1			Credit 7.1	**Thermal Comfort**, Design	1
	1		Credit 7.2	**Thermal Comfort**, Verification	1
	1		Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
1			Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1
Yes	?	No			
5			**Innovation & Design Process**		**5** Points
1			Credit 1.1	**Innovation in Design**: Avalon Tenant Education Plan	1
1			Credit 1.2	**Innovation in Design**: Green Maintenance Plan	1
1			Credit 1.3	**Innovation in Design**: SS 7.1 Exemplary: 100% parking under ground	1
1			Credit 1.4	**Innovation in Design**: Provide Specific Title	1
1			Credit 2	**LEED® Accredited Professional**	1
Yes	?	No			
34	12		**Project Totals** (pre-certification estimates)		**69** Points

Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points

LEED-CS Version 2.0 Registered Project Checklist

888 Boylston Street
Boston MA

Yes	?	No			
7	**5**	**3**	**Sustainable Sites**		**15** Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
1			Credit 1	**Site Selection**	1
1			Credit 2	**Development Density & Community Connectivity**	1
	1		Credit 3	**Brownfield Redevelopment**	1
1			Credit 4.1	**Alternative Transportation**, Public Transportation Access	1
	1		Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1
	1		Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1
		1	Credit 4.4	**Alternative Transportation**, Parking Capacity	1
		1	Credit 5.1	**Site Development,** Protect of Restore Habitat	1
	1		Credit 5.2	**Site Development,** Maximize Open Space	1
		1	Credit 6.1	**Stormwater Design,** Quantity Control	1
1			Credit 6.2	**Stormwater Design,** Quality Control	1
1			Credit 7.1	**Heat Island Effect,** Non-Roof	1
1			Credit 7.2	**Heat Island Effect,** Roof	1
	1		Credit 8	**Light Pollution Reduction**	1
1			Credit 9	**Tenant Design and Construction Guidelines**	1

Yes	?	No			
2	**1**	**2**	**Water Efficiency**		**5** Points
1			Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1
	1		Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1
		1	Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction**, 20% Reduction	1
		1	Credit 3.2	**Water Use Reduction**, 30% Reduction	1

Yes	?	No			
7		**7**	**Energy & Atmosphere**		**14** Points
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required
3		5	Credit 1	**Optimize Energy Performance**	1 to 8
		1	Credit 2	**On-Site Renewable Energy**	1
1			Credit 3	**Enhanced Commissioning**	1
1			Credit 4	**Enhanced Refrigerant Management**	1
1			Credit 5.1	**Measurement & Verification - Base Building**	1
1			Credit 5.2	**Measurement & Verification - Tenant Sub-metering**	1
		1	Credit 6	**Green Power**	1

continued…

Yes	?	No			
4	3	4	**Materials & Resources**		**11** Points
Y			Prereq 1	**Storage & Collection of Recyclables**	Required
		1	Credit 1.1	**Building Reuse**, Maintain 25% of Existing Walls, Floors & Roof	1
		1	Credit 1.2	**Building Reuse**, Maintain 50% of Existing Walls, Floors & Roof	1
		1	Credit 1.3	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1
1			Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1
	1		Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1
		1	Credit 3	**Materials Reuse**, 1%	1
1			Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1
	1		Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1
1			Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regic	1
1			Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regic	1
	1		Credit 6	**Certified Wood**	1

Yes	?	No			
5	4	2	**Indoor Environmental Quality**		**11** Points
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
1			Credit 1	**Outdoor Air Delivery Monitoring**	1
	1		Credit 2	**Increased Ventilation**	1
1			Credit 3	**Construction IAQ Management Plan**, During Construction	1
1			Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1 pt for 2
1			Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	2 pts for 3
1			Credit 4.3	**Low-Emitting Materials**, Carpet Systems	3 pts for 4
			Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	
		1	Credit 5	**Indoor Chemical & Pollutant Source Control**	1
		1	Credit 6	**Controllability of Systems**, Thermal Comfort	1
	1		Credit 7	**Thermal Comfort**, Design	1
	1		Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
	1		Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

Yes	?	No			
1	4		**Innovation & Design Process**		**5** Points
	1		Credit 1.1	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.2	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.3	**Innovation in Design**: Provide Specific Title	1
	1		Credit 1.4	**Innovation in Design**: Provide Specific Title	1
1			Credit 2	**LEED® Accredited Professional**	1

Yes	?	No		
26	17	18	**Project Totals** (pre-certification estimates)	**61** Points

Certified 23-27 points **Silver** 28-33 points **Gold** 34-44 points **Platinum** 45-61 points

8

Public Benefits and Mitigation

This chapter was prepared for the DPIR to supplement the Public Benefits and Mitigation text documented in the NPC/PNF. Specifically, this section updates the NPC/PNF and provides detail regarding the affordable housing commitments for Exeter Residences, updated Development Impact Project components, and Boylston and Exeter Street improvements. The remaining Public Benefits and Mitigation elements studied pursuant to Article 80 Large Project review guidelines are contained in Chapters 3, 5, and 8 of the original NPC/PNF document.

8.1 Introduction

The Exeter Residences and 888 Boylston will provide substantial public benefits to the City of Boston and its neighborhoods, including monetary contributions and public realm improvements. Chapters 3 and 8 of the NPC/PNF discussed the various public benefits that will be provided by the Exeter Residences and 888 Boylston. This section provides an overall description of public benefits as well as any changes since the filing of the NPC/PNF. These public benefits are also summarized in **Table 8-1** below. In particular, this chapter provides information on the affordable housing program, including location and size of new/additional units, affordable rent levels, market rents, waiting lists and marketing/advertising.

8.2 Table of Public Benefits

Table 8-1
Summary of Public Benefits – Exeter Residences and 888 Boylston

Benefit	Description	Incremental Amount*	Total Amount
Housing Linkage	Exeter Residences has 1,330 SF dedicated to Development Impact Uses ^	$10,468	$10,468
	888 Boylston and the remaining area of Phase 4a has 134,559 SF dedicated to Development Impact Uses ^	$1,058,979	$2,496,444
	The additional common area in Phase 4b has 1,000 SF dedicated to Development Impact Uses ^	$7,870	$7,870
Jobs Linkage	Exeter Residences has 1,330 SF dedicated to Development Impact Uses ^	$2,089	$2,089
	888 Boylston and the remaining area in Phase 4a has 134,559 SF dedicated to Development Impact Uses	$211,258	$498,751
	The additional common area in Phase 4b has 1,000 SF dedicated to Development Impact Uses	$1,570	$1,570
Affordable Housing	Create the number of units equivalent to 25 percent of the number of Total Number of Units (Exeter Residences)	Up to 47 units	Up to 47 units
Communities Benefits Fund	Under the Development Plan and Cooperation Agreement – Exeter Residences	$302,500	$302,500
	Under the Development Plan and Cooperation Agreement – 888 Boylston	$168,199	$364,030
	Under the Development Plan and Cooperation Agreement – Additional common area in Phase 4b	$1,250	$1,250
Job Creation	In the office component (in addition to construction jobs)	600 permanent jobs	1600 permanent jobs
Fiscal Benefits	Annual real estate tax revenue to the City – Exeter Residences	$470,000	$470,000
	Annual real estate tax revenue to the City – 888 Boylston	$1,340,000	$4,025,000
Neighborhood	Boylston Street Improvements	$400,000	$400,000
	Total (excluding real estate tax revenue)	$2,164,183 plus other benefits	$4,084,972 plus other benefits

*Development Impact Use square footages based on the incremental development from the previously approved Project.

^ In connection with 888 Boylston, approximately 13,773 SF of retail area that was in existence prior to 1990 will be demolished and rebuilt. Also, in connection with the Exeter Residences, approximately 9,251 SF of area, currently part of Lord & Taylor, that was in existence prior to 1990 will be demolished and rebuilt. Although these areas were in existence prior to 1990, the Proponent has agreed to pay linkage on this demolished and reconstructed area, which amounts are included for 888 Boylston and the Exeter Residences, respectively, in the table above.

8.3 Housing and Jobs Linkage

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Housing Linkage

Development Impact Uses as defined in Article 80B-7 excludes residential uses but includes commercial uses, such as office and retail, and common space uses. Exeter Residences is estimated to have 1,330 SF of retail and common space dedicated to Development Impact Uses. 888 Boylston and the remainder of Phase 4a are estimated to have 134,559 SF of office, retail and common space dedicated to Development Impact Uses, which is in addition to the 287,493 SF dedicated under the previously approved Development Plan. The additional common area to be constructed in a portion of Phase 4b has 1,000 SF dedicated to Development Impact Uses. At the rate of $5.00/SF for the areas included in the Development Plan Project approved for 888 Boylston in 1990 and at the rate of $7.87/SF for the additional area proposed, Exeter Residences will contribute $10,468 and 888 Boylston will contribute $2,496,444 and the Phase 4b area will contribute $7,870, for a combined contribution of $2,514,782 in housing linkage payments. This is an increase of $1,077,317 over the housing linkage payment of $1,437,465 which would have been due for 888 Boylston as originally approved.

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Jobs Linkage

Job linkage payments are calculated at the rate of $1.00/SF for the areas included in the Development Plan Project approved for 888 Boylston in 1990 and at the rate of $1.57/SF for the additional area proposed. Exeter Residences will contribute $2,089 and 888 Boylston will contribute $498,751 and the Phase 4b are will contribute $1,570, for a combined contribution of $502,410 in job linkage payments. This is an increase of $214,917 over the job linkage payment of $287,493 which would have been due for 888 Boylston as originally approved.

8.4 Affordable Housing

Under the Mayor's Executive Order on Affordable Housing dated February 29, 2000, as amended by An Order Relative to the Affordable Housing Cost Factor dated February 3, 2005 and as further modified by An Order Relative to the Inclusionary Development Policy dated May 16, 2006 (the Executive Order), not less than 15% of market rate units (if on-site) or 15% of all units (if off-site or based on a "cash-out") are subject to the Inclusionary Development Policy. The developer may include such units on-site within Prudential Center or could make a grant for the construction, preservation or rehabilitation of housing units, which may be off-site, equivalent to 15 percent of the market rate housing units in the amount of $200,000 per unit for rental housing. If the cash-out option is selected, these funds are to be paid in seven (7) equal installments with the first payment required prior to the issuance by the Inspectional Services Department of a building permit for a project.

To meet the objectives of creating Affordable Units, AvalonBay proposes to create as Affordable Units the number of units equivalent to 25% percent of the number of total units, which exceeds the requirements under the Executive Order. The Exeter Residences will contain up to 188 units. If 188 new units are developed, this would result in 47 units being affordable.

AvalonBay recognizes that the development of Exeter Residences as an additional component of its existing Avalon at the Prudential Center community (781 apartment homes located in the three adjacent apartment buildings) provides a unique opportunity to increase the available affordable housing within the City of Boston.

Affordable Housing Program

All affordable housing units will be located on-site at the Prudential Center within (i) the proposed Exeter Residences, and (ii) the existing Avalon at Prudential Center - 781 apartment homes located within the three towers referred to as the Fairfield, the Gloucester, and the Boylston. The affordable housing units will be distributed as follows:

Exeter Residences

Assuming 188 units are developed at the Exeter Residences:

- Total affordable Units - 9 units (or 4.8% of the total units constructed at Exeter Residences)
- Affordability - Units will be rented to households earning between 80% and 120% of the Boston Metropolitan Statistical Area - Average Mean Income

("BMSA/AMI") median income as determined by the U.S. Department of Housing and Urban Development, with an average of 100% BMSA/AMI.
- Term - 50 year term (30 year restriction with an option of 20 year extension).
- Location - Units to be located on floors 12 and below.
- Distribution - Units to be distributed evenly between studio (5 apartments) and one-bedrooms (4 apartments).

Avalon at Prudential Center – Protected Units

- Protected Units: 28 units (or 14.9% of the total units constructed at Exeter Residences)
- Description - Pursuant to the existing 1998 agreement with the BRA relating to the existing Avalon at Prudential Center, 28 units are designated as affordable. These units shall remain affordable for an extended period of time as outlined below.
- Affordability - There are currently 6 original affordable tenants (the Current Protected Tenants). These tenants will continue to be protected at the current rent levels and AvalonBay will limit rental increases for these tenants to 5% per year. These rental increase limitations will remain in place for the 6 remaining Current Protected Tenants for so long as they continue as residents of Avalon at Prudential Center. As each of the 6 remaining Current Protected Tenants vacate their units at Avalon at Prudential Center, these units will be rented to households earning between 80-120% of BMSA/AMI with an average of 100% of the BMSA/AMI. The remaining 22 units will be rented to households earning between 80-120%, with an average of 100% of the BMSA/AMI.
- Term - Affordability term will be 50 years (30 year restriction with an option of 20 year extension). The 50 year term for all Protected Units will begin upon receipt of the building permit for Exeter Residences.
- Location - All Existing Protected Unit will remain in their current locations. As current units are vacated, they may be moved to units located on floors 12 and below.
- Distribution - Units to be distributed within 12 studios, 13 one-bedrooms, and 3 two-bedrooms.

Avalon at Prudential Center - Additional Units

- 10 units (or 5.3% of the total units constructed at Exeter Residences)
- Affordability - Units will be rented to households earning between 80% and 120% of the BMSA/AMI median income, with an average of 100% BMSA/AMI.
- Term - 50 year term (30 year restriction with an option of 20 year extension). 50 year term will begin upon receipt of the building permit for Exeter Residences.

- Location - Units to be located on floors 12 and below.
- Distribution - Units to be distributed between studio and one-bedroom apartments as follows: (6) studios and (4) one-bedroom. The overall distribution on the existing Avalon at the Prudential Center will be 18 studios, 17 one-bedroom and 3 two-bedroom apartments.

The Proponent will work with the BRA to adopt a Tenant Marketing Plan for the affordable units, which will establish waiting lists and a marketing/advertising program. The affordable rents are established by a formula determined by the US Department of Housing and Urban Development that assumes 30% of the average 100% AMI less a utility allowance determined by the Boston Housing Authority. The rents are adjusted for apartment size based on the average family size for that apartment type.

8.5 Community Benefits Fund

Under the Development Plan and the Cooperation Agreement, $195,831 was to be paid by the Proponent of Phase 4a to fulfill obligations made to previously designated recipients. This contribution is for projects intended to maintain the vitality of the impacted neighborhoods and to improve the quality of life in the City. To date, the specific projects proposed to be funded were indicated in the Cooperation Agreement based on a recommendation by PruPAC. The payment of $195,831 was to be made on the issuance of the building permit for the Phase 4a. However, at the request of the BRA, in 2003 Boston Properties pre-paid the amount of $104,036 attributable to Phase 4a, so that the community would have use of these funds at an earlier point in time, with the balance of $91,795 payable on the issuance of a building permit for Phase 4a. The incremental development for 888 Boylston of 134,559 SF and the additional 1,000 SF to be added to Phase 4b, at a rate of $1.25/SF, will result in an additional contribution of $169,449, for a total contribution of $365,280.

Exeter Residences is estimated to have 242,000 SF, which, at the rate of $1.25/SF, will result in a contribution of $302,500. Together, the buildings and additional area of Phase 4b will contribute $667,780 towards the Community Benefits Fund. Allocation of these funds will be determined by the BRA, with the advice of PruPAC.

8.6 Job Creation & Fiscal Benefits

In addition to construction jobs, when completed the office building will add 1640 permanent office jobs to the Prudential Center site.

The Exeter Residences is expected to increase annual tax revenue to the City by approximately $470,000 in real estate taxes. 888 Boylston is anticipated to generate an additional $1,340,000 dollars in annual tax revenue, for a total of $4,025,000 annually. The developments combined will total $4,495,000 in annual real estate taxes.

8.7 Boylston Street Improvements

Both Exeter Residences and 888 Boylston incorporate pedestrian and streetscape improvements and will be vital contributors to their respective street frontages. Each Proponent has committed a donation of $200,000, for a total of $400,000, dedicated purely to future or on-going Boylston Street Improvement projects in recognition of the importance that Boylston Street has for the Back Bay. Furthermore, by establishing a continuous façade along Boylston Street, 888 Boylston will knit together a portion of the street that has long been characterized by disparate fragments, and will fulfill several important goals set by the Boylston Street Improvements Master Plan.

8.8 Boylston Street Plaza and Boylston Arcade Improvements

As part of the development of 888 Boylston, the existing streetscape between the Mandarin Oriental Boston and the Hynes Convention Center will be completely upgraded. This work will consist of: 1) a pedestrian plaza that is designed for a multitude of uses, and 2) an arcade entrance to the Prudential Center that is more fitting of its pedestrian connection role.

The existing plaza is the last remaining section of streetscape of the original 1960's Prudential Center. It is of no surprise that the existing plaza is not very inviting to pedestrians and has limited utility due to the varying grade changes, stairs, and high planters. The new plaza will serve the following multitude of uses:

- It will serve as an extension to the activity on Boylston Street, where pedestrians can pause during the course of their travels along Boylston Street including public seating and benches;
- It will serve as a meeting location for those who are dining or shopping in the neighborhood;
- It will provide curb side drop-off and lobby entrance for customers and tenants of the office portion of the building;

- It will provide direct access to the street level retail that is being added at the base of the building;
- It will have patio seating for the restaurant spaces that may be located in the street level of 888 Boylston and the Hynes Convention Center; and,
- It will be programmed for certain events related to office and retail tenants at the Prudential Center, community events, as well as citywide events like the Boston Marathon.

The new plaza has been designed through the use of public amenities such as movable seating, fountains, planting and lighting, to ensure that the space will not feel empty when unoccupied. The plaza will integrate seamlessly with the Boylston Street Improvements, which provide continuity to the City's vision of Boylston Street as a grand boulevard.

The new arcade entrance is important for the Back Bay neighborhood and will serve as a major entry point to the covered system of arcades connecting the Prudential Center, Hynes Convention Center, Copley Place, and Back Bay Station, while also presenting a new front door for the Prudential Center. Furthermore, the arcades connect the Back Bay to the South End, similar to the way retail lined streets would connect two neighborhoods. This connectivity is the main reason that the Back Bay has become a 24/7 live, work and play neighborhood. As such, the new arcade entrance will be a more appropriate for such an important role and will be a grander entrance than the current entrance.

8.9 Exeter Street Improvements

The Exeter Residences will help to continue the transformation of Exeter Street from a service roadway for the Prudential Center to a vital pedestrian friendly street connecting the Back Bay to the South End and Copley Square to the Prudential Center. The design of the building and the proposed physical improvements to the Exeter Street corridor will help to create a more neighborhood feel to the street and replaces the current utilitarian aesthetic. The current white masonry planters and concrete sidewalks will be replaced with a modern glass lobby at the base of the building and inviting brick sidewalks.

In contrast to the other residential apartment towers at the Prudential Center which sit on top of the plaza, the Exeter Residences will have a front door directly on Exeter Street. The two-story residential lobby will be clad in glass and visible from Copley Square as one looks down Blagden Street. Additionally, the retail space will also have direct frontage on Exeter Street, which will create further visual interest with the extension of the two-story glass façade. The monumental public stair and elevator will provide an efficient and direct pedestrian connection from Exeter Street

to the plaza, to Shaw's supermarket and beyond to the core of the Prudential Center. People will be able to navigate to and from the Prudential Center via Exeter Street without having to walk around to entrances on Huntington Avenue, East Ring Road or Boylston Street.

A combination of street trees, cross walks and new lighting will create a street that is reminiscent of the Back Bay. The concrete sidewalk will be replaced with brick, which will extend from the property line adjacent to the Lord and Taylor loading dock to the entrance to the Prudential Center North Garage. Rather than using curb cuts, the pedestrian crossing at the garage entrance/exit will remain at the same height as the sidewalk; this will highlight the importance of the pedestrian in the hierarchy of movement in the area. Additionally, a series of street trees will be planted in front of the building and adjacent to the Lord & Taylor loading dock. The Proponent also proposes upgrading the existing street lamps with the City standard fixture for the Back Bay, the double-headed acorn fixture.

At the intersection of Blagden Street and Exeter Street, the Proponent is proposing to plant street trees, consistent with the trees proposed to be planted across the street. Two new crosswalks are proposed to ease pedestrian movement: one across the proposed narrow Blagden Street/Exeter Street intersection and second across Exeter Street to the south of Blagden Street at a location which will terminate in between the front entrance to the Exeter Residences and the monumental stair.

9 Review List

9.1 Introduction

This *Draft Project Impact Report* (DPIR) for Exeter Residences and 888 Boylston is being distributed to public agencies, city and community groups concerned with the development of the Prudential Center area, and to the interested parties listed below. This list includes those entities that Article 80 requires as part of the review of the document. Additional copies of this report are available from Mark Junghans, Vanasse Hangen Brustlin, Inc. (VHB), 99 High Street, Boston, MA 02110 telephone (617) 728-7777.

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City of Boston Mayor's Office
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Boston Assessing Department

Mr. Ronald Rakow, Commissioner
Boston Assessing Department
One City Hall Square, Room 301
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Boston Transportation Department

Mr. Thomas Tinlin, Commissioner
Boston Transportation Department
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Boston Transportation Department
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Mr. David A. Carlson, Executive Director
Boston Civic Design Commission
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Antonia Pollack, Commissioner
Boston Parks and Recreation Department
1010 Massachusetts Avenue
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PO Box 199177
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Department of Neighborhood
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26 Court Street
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Inspectional Services Department

Commissioner William Good
Inspectional Services Department
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Mayor's Office of Neighborhood Services

Jay Walsh, Director
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Department of Environmental Protection

Division of Wetlands and
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One Winter Street
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Boston Public Library
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Prudential Planning Adivsory Committee (PruPAC)

Ms. Betsy Johnson
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11½ Greenwich Park
Boston, MA 02118

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Signatures

This Draft Project Impact Report has been circulated to agencies and persons in accordance with the provisions of the Boston Zoning Code, Section 80A-3.

Proponent
Boston Properties

8-15-08

Michael A. Cantalupa — Date
Senior Vice President of Development

Preparer
Vanasse Hangen Brustlin, Inc.

8/15/08

Mark Junghans, P.E. — Date
Principal