Notice of Project Change

Submitted Pursuant to Article 80A-6 of the Boston Zoning Code

PARCEL P-7A
240 Tremont Street, Boston

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

Submitted By:
Tremont Stuart Development LLC
Amherst Media Investors Boston, LLC

In Association With:
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GZA GeoEnvironmental, Inc.

April 6, 2012

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1.0 PROJECT OVERVIEW

1.1 Introduction

This Notice of Project Change ("NPC") is being submitted in accordance with Article 80A-6 of the Boston Zoning Code ("the Code") for the proposed development of Parcel P-7A at 240 Tremont Street, in Boston's Theatre District. This approximately 5,787 square foot parcel, at the corner of Tremont and Stuart Streets, is presently owned by the City of Boston, and for many years was occupied by a ticket sales trailer and more recently by an advertising pylon sign.

On August 14, 2007, Tremont Stuart Development LLC (the "Original Proponent"), a partnership of Abbott Real Estate Development LLC and Amherst Media Investors Boston, LLC ("Amherst Media"), (as subsequently amended on January 12, 2010 by the Boston Redevelopment Authority from Tremont Stuart Development, LLC alone as the redeveloper to Tremont Stuart Development, LLC and Amherst Media Investors Boston, LLC as co-redevelopers (the "Current Proponent") received approval from the Boston Redevelopment Authority ("BRA") to construct a 14-story structure, which was to contain approximately 74,458 square feet of gross floor area, and include 72 studio and one-bedroom dwelling units, restaurant space, and prominent exterior signage ("PNF Project"). Since the date of that approval, the market for residential condominium uses has slowed dramatically while the hotel market in Boston has rebounded.

The NPC development program, which is being proposed by the Original Proponent in conjunction with hotel developer HotelWorks Developer, LLC, is for a 19-story, 240-room Micro Hotel that will include lower-level restaurant and retail uses, and general common areas for meeting/flex space. The building's exterior will feature state of the art signage and vibrant lighting elements to promote the location as the anchor of Boston's Theatre District ("NPC Project").

The Original Proponent has conducted outreach to City agencies, neighborhood representatives, elected officials, and other interested parties on this modified proposal, and will continue to do so throughout the NPC review process.

This NPC presents both an overview of the modified NPC Project and specific analyses of changes relative to transportation, environmental protection, infrastructure, and other categories of potential project impacts that are evaluated through the Code Article 80B Large Project Review process. As detailed below, most Article 80B review components will see no measurable changes due to the proposed revisions to the Project. The slight increase in traffic resulting from the proposed Project changes will have a negligible effect on area roadways.

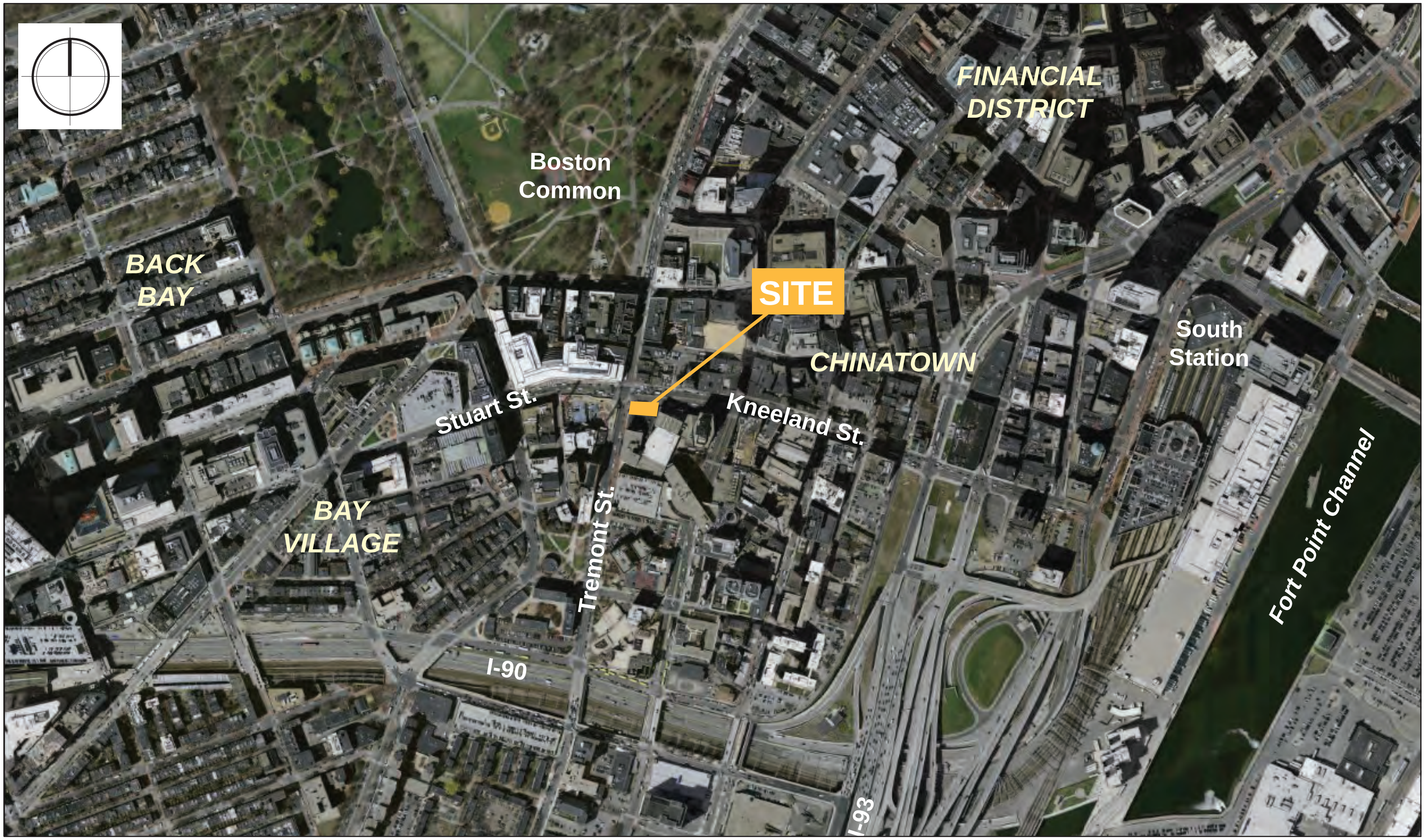
Section 80A-6 of the Code provides that "[i]n the event of a material change in a Proposed Project . . . the [BRA] Director . . . shall determine whether the . . . change . . . significantly review, and whether such increased impacts warrant resubmission of the PNF." The information included in this NPC submission indicates that the NPC Project will result in no "significant increases" to any studied impacts. We, therefore, respectfully request a determination waiving further review of the Project.

1.2 Project Site and Context

Located at the corner of Stuart and Tremont Streets (see **Figure 1-1: Project Locus** and **Figure 1-2: Project Aerial)**, 240 Tremont Street presently contains temporary pylon signage.

Parcel P-7A is encumbered by easements for access, egress and other purposes for the Wilbur Theatre, which abuts the property. Parcel P-7A is in the South Cove Urban Renewal Area, and for zoning purposes is located within the Midtown Cultural District, as established by Article 38 of the Boston Zoning Code (the "Code").

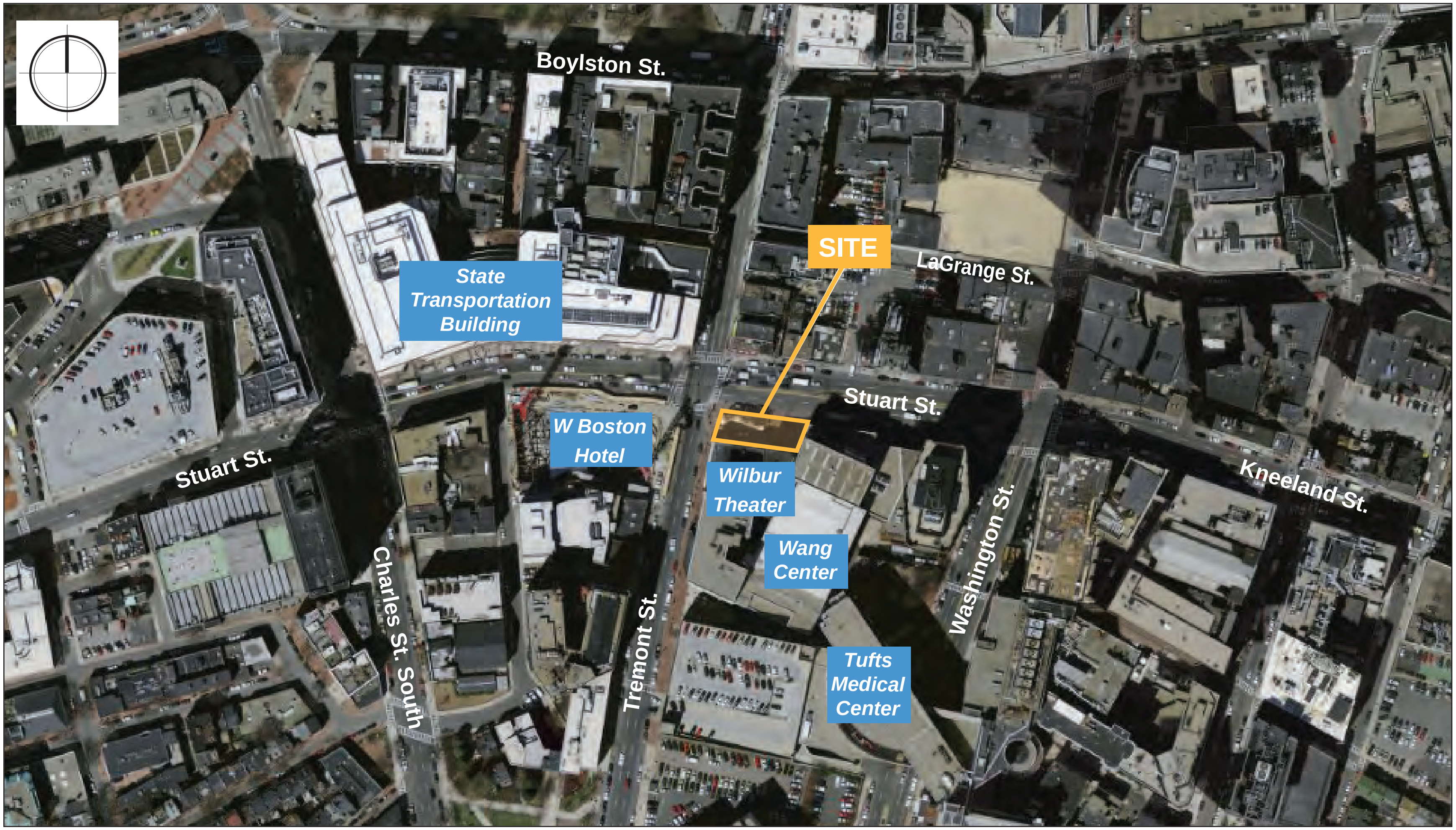
Parcel P-7A, which currently contains a temporary advertisement structure, is in the vicinity of over a dozen theaters. Parcel P-7A is within walking distance to 14 public transit stations and more than 5,000 off-street parking spaces.



Not to scale.

Source: MassGIS

Figure 1-1.
Project Locus



Not to scale.

Source: MassGIS

Figure 1-2.
Project Aerial

1.3 Detailed Project History and Permitting Review

On February 24, 2004, the BRA authorized its Secretary to advertise a Request for Proposals ("RFP") for the long-term lease and development of Parcel P-7A. The BRA made Parcel P-7A available for lease to create a commercial development that lends further impetus to the City's ongoing effort to reinvigorate the Theater District and to provide programmatically and technologically innovative enhancements to the area's current vitality. Due to unsatisfactory submissions, on September 9, 2004, the BRA rejected both of the proposals it had received.

On September 29, 2004, the BRA again issued an RFP for the long-term lease and development of Parcel P-7A. On August 11, 2005, the BRA granted a Tentative Designation authorizing Amherst Media Investors Boston, LLC to redevelop Parcel P-7A with a new, three-story structure containing commercial, retail, community, and cultural space, and featuring a spectacular signage component (the "Original Proposal").

On January 26, 2006, the BRA Board was advised that Amherst's Original Proposal would be revised to include a residential component, which component was to be undertaken in a venture with Abbott Real Estate Development LLC ("Abbott"), in a substantially larger structure. This revision would eliminate commercial, community, and cultural space, while retaining a signage component substantially in accordance with that of the Original Proposal.

On July 20, 2006 the BRA extended the Tentative Designation of Amherst to November 2006.

On November 16, 2006 the BRA amended the Tentative Designation of the Redeveloper for Parcel P-7A from Amherst alone to a venture between Amherst Media and Tremont-Stuart Development, LLC, which is a single-purpose entity formed by Amherst Media and Abbott (collectively, the "Partnership"), and extended the Tentative Designation of the designee to November 3, 2007.

The Partnership submitted a Project Notification Form, or PNF, proposing a fourteen-story structure containing approximately 74,458 square feet of gross floor area, and including approximately 72 studio and one-bedroom dwelling units, restaurant space, and a signage component the ("PNF Project"). The centerpiece of the signage was proposed to be an electronic video board (the "Video Display") that will play full motion video, subject to obtaining applicable approvals, and can be used to provide news as well as arts and cultural information.

On August 14, 2007, the PNF Project received Article 80 Large Project review approval from the BRA. At the same hearing, the BRA also authorized staff to petition the City of Boston Zoning Commission ("Zoning Commission") to designate Parcel P-7A an Urban Renewal Area or "U" Overlay District, adopt a minor modification to the South Cove Urban Renewal Plan, and petition the Public Improvement Commission ("PIC") for the discontinuance of certain surface, subsurface, and air rights portions of Tremont and Stuart Streets.

On October 31, 2007, the Zoning Commission designated Parcel P-7A an Urban Renewal Area ("U") Overlay District. The BRA has extended this Tentative Designation annually since 2006 and most recently on January 12, 2012 until May 3, 2012.

Since the date of the Tentative Designation, the Partnership has diligently proceeded to obtain permits and approvals necessary for the development of a 14-story residential condominium on Parcel P-7A. The Partnership received all necessary approvals (with the exception of Boston Water & Sewer Commission approval and the final building permits) by the fall of 2008. Unfortunately, by this time, the economic climate for the development of residential condominiums, as well as most commercial real estate development in general, had severely deteriorated. This challenging investment climate continued throughout 2009, and it was not until 2010 that the Partnership was able to explore new options for redevelopment. At this point, although the residential condominium market still had not recovered, viable redevelopment options for the Site included rental residential, student housing, and hotel, all uses allowed under the South Cove Urban Renewal Plan and the zoning for the Midtown Cultural District. During 2011, the Partnership was successful in securing a health care Real Estate Investment Trust as a prospective co-developer of Parcel P-7A to construct and operate an assisted living facility. The BRA, however, deemed this proposed use to be inconsistent with, and inappropriate for, the surrounding Theatre District and the Midtown Cultural District, and in the Fall 2011 notified the Partnership of its need to explore other development options.

In the January 12, 2012 Authority Memorandum, it was stated that the Authority staff views hotel use as an appropriate use of the Site. The Authority continued in the Memorandum by requiring the Partnership to file a Notice of Project Change. This NPC is being submitted pursuant to the Authority's January 12, 2012 Memorandum and vote.

1.4 Detailed NPC Project Description

Parcel P-7A at 240 Tremont Street is a dynamic location and presents a superb opportunity for a creative redevelopment that will reinvigorate the Theatre District with innovative uses and signage to promote the importance of the district. The proposed development concept is a 19-story, 240-room Micro Hotel, which will include several floors of common space on the lower levels for restaurant and retail uses, general hotel common areas for meeting/flex space, and a rooftop deck.

The building will feature stimulating signage, bolstering the potential of creating a landmark building at this important corner of the Theatre District. The Project Proponent believes that the proposed mix of hospitality and restaurant space, and light emitting diode ("LED") advertising billboards, is responsive to the BRA's and the City's goal of re-invigorating the Theatre District and establishing the corner of Tremont and Stuart Streets as the center of the Theatre District. The NPC Project will contribute to the continued revitalization of the Theatre District by The NPC Project will contribute to the continued revitalization of the Theatre District by providing active ground floor and lower-level uses.

1.5 NPC Building Program and Comparison to Previously Approved PNF Project

Table 1-1 below lists the Approximate Dimensions and Building program of the NPC Project and **Table 1-2** that follows compares the dimensional aspects of the NPC and PNF Projects.

Table 1-1: Approximate Dimensions

Lot Area (square feet)[1]:	6,079± s.f.
Number of Residential Units:	240 Hotel Guest Rooms (15-per floor)
FAR Floor Area (approximate)[2] :	100,885± s.f.
Building Height[3]:	Approximately196 feet/19 stories
Floor Area Ratio:	16.6

Building Program

Level	Gross Retail s.f.	Gross Residential s.f.	Total Gross s.f.	FAR Floor Area s.f.
Basement:	0	0	3,875±	0
First Floor:	3,875±	0	3,875±	3,875±
Second Floor:	5,345±	0	5,345±	5,345±
Third Floor:	5,345±	0	5,345±	5,345±
Fourth through Nineteenth Floor:	0	85,520± (15 levels)	85,520±	85,520±
Enclosed Roof Penthouse	0	800±	800±	800±
Mechanical PH	0	0	2075±	0
Total	14,565±	86,320±	106,835±	100,885±

[1]Lot area will consist of the 5,787 s.f. BRA parcel and approximately 292 square feet in the existing Stuart Street right-of-way that is proposed as part of the discontinuance of Stuart Street. Please see discussion in Section 2.4.4.

[2]FAR Floor Area as defined by the Boston Zoning Code.

[3]As measured by the Boston Zoning Code, and not including the mechanical penthouse on the roof which will extend approximately eighteen feet higher on a portion of the rooftop.

Table 1-2: Comparison of Building Programs - PNF and NPC Projects		
	Approved PNF Wilbur Place 72 Residential Units	**Proposed NPC Theater District Hotel 240 Hotel Rooms**
Lot Area (square feet)	6079± s.f.	6079± s.f.
Building Height [1]	Approximately 154 feet / 14 stories	Approximately 196 feet/ 19 stories
Residential Gross s.f.	64,337 sf	0 sf
Retail/Restaurant/Other Gross s.f.	6,360 sf	14,565 sf
Hotel Gross s.f.	0 sf	86,320 sf
Total Gross s.f.	74,458 sf	106,835 sf
Total Gross Floor Area (F.A.R.) [2]	68,621 sf	100,885 sf
Floor Area Ratio (F.A.R.) [2]	11.3	16.6

[1] As measured to the top of the highest proposed occupied floor.

[2] F.A.R. Floor Area as defined by Boston Zoning Code.

1.6 Summary of Changes in Project Impacts and Mitigation

1.6.1 Urban Design

PNF Project

The PNF building was designed as a long and slender fourteen-story structure, rising approximately 154'-9" to the top of roof pavers, as measured by the Boston Zoning Code, and not including the mechanical penthouse on the roof which would have extended approximately ten feet higher on a portion of the rooftop. The mechanical penthouse was located along the south edge of the roof. An electronic video board – the first of its kind in Boston – was proposed to be affixed to the exterior skin of the structure extending from the second to fourth floor levels, serving as a major attraction to residents and visitors alike, both during the day and evening hours.

NPC Project

The design goal, similar to the PNF Project, is to significantly enhance the character of the existing site and neighborhood with the design of a contemporary focal point that serves as a gateway to Boston's Theatre District. The proposed building continues to be designed as a long and slender structure. The proposed design is for a nineteen-story structure, rising approximately 196' to the top of roof pavers (approximately 41 feet higher than the PNF project), as measured by the Boston Zoning Code, and not including the mechanical penthouse on the roof which will extend approximately 18 feet higher on a portion of the rooftop, which is approximately 8 feet higher than the PNF project). The mechanical penthouse is located along the south edge of the roof, as far from the street facades as possible. The proposed building height and massing appropriately fit within the surrounding neighborhood.

The exterior lighting continues to be a vital component of the overall design concept. Designed to harmonize with the sleek architecture, the building's lighting and signage accents will distinguish this structure prominently on the Stuart/Tremont Streets corner. The primary lighting type used will be linear strips of Light Emitting Diode ("LED") fixtures. To integrate with the building architecture, specific horizontal and vertical architectural features will be outlined with the LED fixtures. The LED fixtures will be programmed for a variety of colors and effects which further reinforce ideas related to the building signaling a gateway to the Theatre District. The electronic video boards are proposed to be inlaid and affixed to the exterior skin of the structure extending from the second to fourth floor levels on the corner and eastern ends of the structure. This feature will serve as a major attraction to residents and visitors alike, both during the day and evening hours.

1.6.2 Transportation Impacts

PNF Project

The PNF Project would have added up to 242 vehicle trips on a daily basis, including 121 vehicles entering and 121 vehicles exiting; 2 entering and 8 exiting during the a.m. peak hour, and 15 entering and 7 exiting during the p.m. peak hour. The existing, No-Build, and Build conditions were analyzed at two study area intersection locations (Stuart Street/Tremont Street and Stuart Street/Kneeland Street/Washington Street) during the PNF review. Due to the negligible volume of traffic generated by the Project, the LOS was not expected to change at any of the study area intersections. The existing transit service and sidewalks adequately served the demand of the new transit and pedestrian trips generated by the PNF Project.

A Transportation Access Plan Agreement (TAPA) between the Proponent and the City of Boston was executed on September 23, 2008.

NPC Project

Section 5.0 of this NPC details the transportation impacts associated with the proposed 240-room Micro Hotel use, including trip generation, vehicular access, pedestrian access, parking, loading and service, travel demand management, changes to the TAPA, the Construction Management Plan (CMP), and Public Improvements Commission (PIC) coordination.

When compared to the PNF Project, the NPC Hotel Project would result in only 37 more vehicle trips (26 additional entering and 11 additional exiting) during the weekday morning peak hour and 29 more vehicle trips (9 additional entering and 20 additional exiting) during the evening peak hour. This increase corresponds to less than one additional new vehicle trip per minute on area roadways during morning peak hour and approximately one additional new vehicle trip every two minutes during the evening peak hour.

As with the PNF Project, no parking will be provided for proposed Project. Hotel guest parking will be self-park and will occur at one of the several off-site public parking garage and lots in the area. Given the convenient location of the Project Site to MBTA rapid transit, MBTA bus, downtown, and transit-oriented marketing by the Proponent, transit and walk trips to and from the Project Site account for between approximately 65% and 80% of hotel peak-hour trips. In addition, the availability of Zipcar and Hubway bicycle share stations will help reduce the need for guest parking.

Subject to approval by the Boston Transportation Department (BTD) and the Boston Department of Public Works (DPW), the NPC Project proposes to remove three metered parking spaces and relocate one existing fire hydrant along Stuart Street. The Stuart Street curb would be used for three short-term (10 minute) pick-up/drop-off spaces for hotel guest registration and one space to be used as a taxi stand. The Proponent will work with BTD to identify the most appropriate solution for pick-up/drop-off activities adjacent to the Project Site.

All loading and service activity associated with the Project will be accommodated on-site within the existing driveway as approved in the PNF Project. Access to the loading/service area is provided via Stuart Street and is currently shared with the adjacent Wilbur Theater. The NPC Project will continue to share the loading/service area with the Wilbur Theater and will coordinate all loading/service activity to ensure that the loading area sufficiently meets the needs of both uses.

The Proponent is committed to implementing a Transportation Demand Management ("TDM") program that supports the City's efforts to reduce dependency on the automobile by encouraging alternatives to driving alone, especially during peak travel periods. The TDM will be facilitated by the Project's proximity to the downtown area and transit.

Due to the low volume of new traffic associated with the proposed NPC Hotel Project (37 additional vehicle trips during the a.m. peak hour and 29 additional vehicle trips during the p.m. peak hour), the NPC Project is expected to have a negligible impact on vehicular conditions in the area. Such a small increase in traffic would be imperceptible, given that weekday peak-hour traffic volumes typically fluctuate as much as 10% from day to day.

1.6.3 Wind

PNF Project

The PNF Project's qualitative wind assessment showed that none of the 28 locations considered for either existing or build conditions had annual PLWs that exceeded the BRA guideline wind speed (i.e. where the effective gust velocity exceeds 31 mph more often than once in one hundred hours.) In addition, no location had an annual estimated PLW Category higher than 3 (Comfortable for Walking) for either existing or build conditions. For annual PLWs, 24 of the 28 locations evaluated remained in the same PLW category. Overall, the PNF building tended to reduce PLWs slightly in the Project vicinity. (See **Appendix A** for a copy of the completed Wind Analysis contained in the PNF.)

NPC Project

Mr. Frank Durgin, P.E., the wind engineer that completed the PNF wind evaluation, has concluded that a full qualitative or quantitative study of pedestrian level winds (PLWs) for the NPC Project is not needed. Mr. Durgin's analysis is presented in **Section 4.1** of this NPC.

1.6.4 Shadow

PNF Project

The PNF provided a shadow analysis describing and graphically depicting the anticipated shadow impacts from the Project for the No Build and Build conditions.

The PNF Project replaced an undeveloped paved lot that largely casts no shadow with a new building approximately 155-feet in height. Any construction on the Project Site will result in new shadows compared to the No Build condition. In the morning, new shadows from the Project were cast across the roadway intersection of Tremont Street and Stuart Street towards the State Transportation Building and the abutting sidewalk on the north side of Stuart Street, adjacent to shadow cast by existing buildings. By 12:00 Noon and in the mid-day hours, new shadows extended northward and reach a small portion of buildings north of the Project Site, and portions of the Tremont and Stuart Street sidewalks. In the late afternoon, new shadows were cast along Stuart Street. There was a limited period of new shadow on Jacob Wirth’s in the spring and fall only at 3:00 p.m., however, in the fall, the front of the Jacob Wirth’s façade remained in the sun at 3:00 p.m. No new shadows extended to Boston Common, Wilbur Theatre, Wang Theatre, or Shubert Theatre.

NPC Project

The NPC project has completed the shadow analysis that graphically depicts the anticipated shadows in the same manner and graphics as the PNF submission. As noted, the NPC Project has a building height of 197’-0” to the roof structure, approx. 40’-0” taller than the previous PNF Project resulting in a proportional shadow increase. The dimensional footprint, massing and volume of the NPC Project are similar to the previous PNF Project. As portrayed in the graphics presented in **Section 4.2** of this NPC, the anticipated shadows are generally similar to those of the Previous Project.

1.6.5 Daylight

PNF Project

The PNF presented the findings of a daylight study performed to determine the extent to which the Project restricts the amount of daylight reaching streets or pedestrian ways in the immediate vicinity of the Project Site. The study evaluated daylight obstruction for the existing (No Build) and proposed (Build) configurations, for the area context, and for As-of-Right Build conditions along Stuart and Tremont Streets. (See **Appendix B** for a copy of the completed Daylight Analysis contained in the PNF.)

Daylight obstruction increased at the Project Site over the existing conditions, as the present Project Site is undeveloped. The PNF Project resulted in daylight obstruction from 68.4% to 81.2%, which is similar and in the same range as context values for the area and the as-of-right daylight obstruction.

NPC Project

It is expected that with the same footprint, representing a slender building with the similar massing to the PNF Project, that daylight obstruction for the additional height proposed may add 5% to 10% to the obstruction values contained in the PNF analysis.

1.6.6 Solar Glare

PNF Project

The PNF analysis demonstrated that the potential for reflected sunlight from the PNF Project to impact drivers and pedestrians along nearby streets was minor. For a majority of the cases considered in the PNF, no ground-level impact was predicted, due to the presence of surrounding (and proposed) buildings (i.e. including the W Hotel that was not constructed as yet) that blocked incoming sunlight and intercepted reflected glare. The most significant predicted glare impact was for drivers on Stuart Street during summer mornings and evenings, who were expected to experience only several brief moments of glare as they pass the Project Site. Because the PNF Project's design does not include highly reflective glass, the intensity of the solar glare was felt to be sufficiently mitigated. (See **Appendix C** for a copy of the completed Solar Glare Analysis contained in the PNF.)

NPC Project

The NPC Project will have an exterior façade and massing similar to the PNF project and the additional height would not be expected to significantly alter the findings of the PNF.

1.6.7 Air Quality

PNF Project

The PNF provided the results of the air quality analyses to evaluate the existing air quality in the Project area, predict the worst-case air quality impacts from the Project's fuel combustion equipment, and evaluate the potential impacts of Project-generated traffic on the air quality at the most congested local intersection. In addition, representative air quality measurements from Massachusetts Department of Environmental Protection monitors at the time revealed that the existing air quality in the Project area was in compliance with Massachusetts and National Ambient Air Quality Standards (NAAQS) for all of the criteria air pollutants.

The worst-case air quality impacts from the PNF Project's fuel combustion equipment (heating units and emergency generator) were deemed not to have an adverse impact on air quality. The maximum one-hour and eight-hour ambient carbon monoxide ("CO") impacts, at all locations around the Project Site from the Project's fuel combustion equipment, including conservative background CO concentrations, were predicted to be safely in compliance with the NAAQS for CO.

A microscale air quality analysis was not performed for the PNF Project due to its extremely small motor vehicle trip generation. The small number of motor vehicle trips generated by the PNF Project was determined not have a significant impact on the delays or the level of service at the local intersections. Therefore, the motor vehicle traffic generated by the PNF Project would not have a significant impact on air quality at any intersection in the Project area. Consequently, a microscale air quality analysis was not necessary for the PNF Project with the air quality in the Project area remaining safely in compliance with the NAAQS for CO after the PNF Project was built.

NPC Project

The MassDEP air monitoring data considered to be representative of the project area was updated for the most recent available, complete, three-year period (2008-2010). The existing air quality in the project area is generally much better than the National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare in ambient air, with a margin for safety.

On April 11, 2011, U.S. EPA replaced the SCREEN3 model with AERSCREEN as the recommended air dispersion screening model. AERSCREEN is a screening-level air quality model based on the EPA-approved AERMOD. Tech Environmental updated the air quality modeling analysis using AERMOD model in screening mode. Worst-case concentrations of CO from the Project's fuel combustion equipment were predicted for locations around the building. The maximum predicted total CO concentrations (fuel combustion exhaust impacts plus background) are lower than those presented in the PNF and are safely in compliance with the NAAQS. This analysis demonstrates that the operation of the fuel combustion equipment will not have an adverse impact on air quality.

Similar to the PNF Project, a microscale air quality analysis was not performed for the NPC Project due to its extremely small motor vehicle trip generation which will not have a significant impact on the delays or the level of service at the local intersections. Therefore, the air quality in the Project area will remain safely in compliance with the NAAQS for CO after the NPC Project is completed.

See **Section 4.3** of this NPC for the completed NPC air quality analysis.

1.6.8 Noise Impacts

PNF Project

The PNF presented the results of a noise study designed to determine whether the operation of the PNF Project will comply with the Massachusetts DEP Noise Policy, City of Boston Noise Regulations, and Housing and Urban Development (HUD) Residential Site Acceptability Standards.

Nighttime ambient baseline sound level (L_{90}) monitoring was conducted at locations deemed to be representative of the nearby residential areas, during the time period when human activity is at a minimum and any future noise would be most noticeable. At the time of the PNF, the nighttime L_{90} values measured in the Project area ranged from 56 to 62 dBA.

A sound level measurement was also taken in front of the Project Site for the PNF during the morning peak traffic period to estimate the existing day-night average sound level (Ldn) in the Project area. The estimate of the Ldn demonstrated that the existing sound level at the project site complied with HUD Site Acceptability Standards for residential projects, to maintain acceptable indoor sound levels.

The potential significant sources of exterior sound from the PNF Project were identified and their impacts modeled at five sensitive locations surrounding the PNF Project. The modeling showed that the Project, with a minimal amount of mitigation, would not have an adverse impact on noise levels and would be designed to comply with City of Boston and Massachusetts DEP noise regulations and Standards.

NPC Project

There will be no major changes in rooftop mechanical equipment that was assumed in the noise analysis prepared for the PNF. Since the hotel proposed in this NPC will be a taller building than the one proposed in the PNF, the mechanical roof top equipment will be further away from noise-sensitive receptors. Therefore, the proposed hotel mechanical equipment will generate noise levels equal to or less than those presented in the PNF. (See **Section 4.4** of this NPC for the completed NPC noise analysis.)

The Project Proponent is committed to implementing certain sound level mitigation measures (i.e. specification of low-noise mechanical equipment and silencers, acoustical shielding, and operational restrictions for the emergency generator), for the Project, as necessary, to comply with the applicable sound level limits, as defined in this report. With the mitigation outlined in **Section 4.4.4**, the NPC Project is not expected to create a noise nuisance condition and will be designed to fully comply with the most stringent sound level limits set by the Massachusetts DEP Noise Policy, City of Boston Noise Regulations, and the HUD Residential Site Acceptability Standards.

1.6.9 Wetlands/Flood Hazard Zones

PNF and NPC Projects

Federal Emergency Management Agency's ("FEMA") Flood Insurance Rate Maps ("FIRM") for the City of Boston (Community Panel 250-286-0010C, effective date April 1, 1982) were reviewed to determine if the Project Site lies within the 100-year flood plain). It is noted that no portion of the Project Site lies below the 100-year flood elevation as shown on the FIRM map. There are no wetlands as defined by the Massachusetts Wetlands Protection Act, or tidelands subject to Chapter 91 licensing, located on the Project Site.

1.6.10 Water Quality/Stormwater Management

PNF and NPC Projects

No negative impacts to water quality were anticipated from the development of the PNF Project. The existing site is paved and therefore the construction of the PNF building and associated paved surfaces was not anticipated to result in substantial changes in site permeability or the amount of stormwater runoff. The same result is expected with the NPC Project

As a redevelopment project, the NPC Project design will meet the applicable Massachusetts Department of Environmental Protections' October 2011 Stormwater Management Standards to the maximum extent practicable.

1.6.11 Geotechnical and Groundwater Impacts

PNF Project

Preliminary subsurface investigations were performed at the Project Site as part of a PNF geotechnical engineering analysis, which included the completion of two deep borings to depths of approximately 100 feet. About 12 feet of fill over deep natural silty clay, glacial till and bedrock, was identified in each of the borings. An observation well was installed in one boring and depth to groundwater was measured at approximately 17 feet below ground surface.

The PNF building was expected to have one basement level that would likely extend close to the property lines, except to the south where a 12-foot setback from the property line with the Wilbur Theatre is proposed. Based on knowledge of the subsurface soil conditions, it was anticipated the foundations were likely to be supported on a mat foundation bearing on the natural silty clay crust, with basement areas waterproofed.

The temporary earth support wall would likely consist of soldier piles and wood lagging as groundwater is at about the proposed excavation grade and therefore a groundwater cutoff was not be required. Construction dewatering would be limited and designed to control limited seepage and precipitation. As the stormwater system in the street adjacent to the Project Site flows to a combined stormwater/sewer system, a dewatering discharge permit application would be submitted to the Massachusetts Water Resources Authority and the Boston Water and Sewer Commission.

No adverse impacts on adjacent buildings, the unused MBTA subway tunnel under Tremont Street or on utilities were anticipated during the construction phase of the Project. Provisions would be incorporated into the design and construction specifications to limit potential impacts to adjacent structures and utilities, and the PNF Project was designed in accordance with BWSC requirements for projects within the Groundwater Conservation Overlay District, NPC Project

No major changes are anticipated between the PNF project and NPC project relating to geotechnical or groundwater issues. The Proponent will reengage discussion with the appropriate agencies and personnel relating to the Groundwater Conservation Overlay District.

1.6.12 Solid and Hazardous Materials

PNF and NPC Projects

The Proponent will implement measures to handle the anticipated generation, storage, and disposal of solid waste generated by the Project. Operational measures have been considered that will be employed to promote waste reduction and recycling. The NPC Project like the PNF Project will accommodate recycling measures meeting or exceeding the City's recycling guidelines. In addition, the disposal and construction contracts for the NPC Project will include specific language to ensure the contractor's compliance with City and State regulations. Demolition and construction debris will be recycled to the maximum extent possible.

During the PNF preparation, GZA GeoEnvironmental, Inc. ("GZA") performed a Phase I Environmental Site Assessment ("Phase 1 Report") on the subject property. On the basis of the observations made and the information reviewed during the course of the site assessment, it was GZA's opinion that the available historical, surficial and analytical evidence did not identify any Recognized Environmental Conditions.

On March 28, 2012, Lake Shore Environmental ("Lake Shore") completed a review of the Phase I Environmental Report completed by GZA including an electronic file search of available data at MA DEP. Based on this review, Lake Shore extended reliance on the conclusions reached in the 2006 GZA Report. (The reliance letter from Lake Shore Environmental is available on request).

Soil to be excavated at the Project Site to accommodate the proposed basement will be chemically characterized so that a suitable disposal destination can be selected as required by the Massachusetts environmental regulations.

1.6.13 Construction Analysis

PNF and NPC Projects

The Proponent will comply with all applicable state and local regulations governing construction of the proposed Project. The Proponent will require that the general contractor comply with the Construction Management Plan ("CMP"), developed in consultation with and approved by the Boston Transportation Department ("BTD"), prior to the commencement of construction.

The Proponent will employ a construction manager that will be responsible for developing a construction phasing and staging plan and for coordinating construction activities with all appropriate regulatory agencies. The Project's geotechnical consultant will provide consulting services associated with foundation design recommendations, prepare geotechnical specifications, and review the construction contractor's proposed procedures. In addition the geotechnical consultant will monitor vibration during construction as added protection for abutting structures.

The NPC construction period is estimated to extend approximately 20 months. Construction management and scheduling will aim to minimize impacts on the surrounding environment. Construction methodologies that ensure public safety throughout the Project Site will be employed.

1.6.14 Historic Resources Component

PNF and NPC Projects

The NPC Project like the PNF Project will not require any demolition of any historic structures and will have beneficial impacts contributing to the viability and street life of the surrounding area. By locating a building at this prominent Stuart and Tremont Streets corner, the Project will reestablish the street wall and anchor one corner of this significant downtown intersection. The design and use of the proposed space is intended to create a dynamic and exciting interaction with pedestrians and visitors to the Theatre District. Minimal shadow impacts onto the Jacob Wirth façade were anticipated for the PNF Project and the NPC Project shadow impacts are detailed in **Section 4.2** of this NPC.

The Proponent will consult with the Boston Landmarks Commission and the Massachusetts Historical Commission staff regarding review of the NPC Project. In addition, a Massachusetts Historical Commission NPC Form may be filed in accordance with M.G.L. Chapter 9, Sec. 26-27c, as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00).

(See **Appendix D** for a copy of the completed Historic Resources Component contained in the PNF.)

1.6.15 Infrastructure Systems Component

PNF and NPC Projects

During the PNF review, the Proponent and its consultants initiated contact with the Boston Water and Sewer Commission ("BWSC") to understand and evaluate the water, storm drain, and sanitary sewer systems, and to design the Project to prevent disruption of utility services. Further meetings and discussions will be scheduled as building design and permitting progress.

The proposed connections to the water, storm drain, and sanitary sewer systems will be designed in conformance with the BWSC's design standards, Water Distribution System and Sewer Use Regulations, Requirements for Site Plans and Groundwater District Requirements. Separate sanitary sewer and storm drain connections will be provided. The Proponent will submit a site plan to the BWSC's Engineering Services Division for review and approval when the design of the Project is 50% complete. A General Service Application will be obtained prior to construction. The site plan will show the location of water, storm drain, and sanitary sewer systems which serve the site and the location of existing and proposed water, storm drain, sanitary sewer connections and groundwater recharge/stormwater infiltration facilities.

It is expected that a Massachusetts Department of Environmental Protection (DEP) sewer connection permit (Compliance Certification BRP WP 73 for sanitary connection greater than 15,000 gpd but less than or equal to 50,000 gpd will be required, based on the anticipated sewage flow.

In addition, the Proponent will coordinate with the Boston Public Works Department regarding Theatre District design standards and street configurations.

See **Section 6.0** of this NPC for the completed NPC Infrastructure Systems Component.

2.0 GENERAL INFORMATION

2.1 Development Impact Project ("DIP") Exactions

The Micro Hotel ("NPC Project") at 240 Tremont Street constitutes a Development Impact Project ("DIP") under Article 80B-7 of the Boston Zoning Code. Based on the present NPC plans, the Project Proponent will provide the Neighborhood Housing Trust with a payment contribution of approximately **$6,964.95**, and the Neighborhood Jobs Trust with a payment of approximately **$1,389.45**, as detailed below.

These estimated linkage payments have been calculated as follows:

Housing Linkage:

DIP Uses:	100,885SF
Exclusion:	-100,000 SF
	885 SF
	X $7.87/SF
	$6,964.95

Jobs Linkage:

DIP Uses:	100,885 SF
Exclusion:	-100,000 SF
	885 SF
	X $1.57/ SF
	$1,389.45

2.2 Proponent Information

2.2.1 Project Proponent

The Proponent is a venture between Amherst Media Investors Boston, LLC ("Amherst Media") , Tremont Stuart Development LLC ("TSD") and HotelWorks Developers, LLC. Amherst Media recently, by mutual agreement with Abbott (the "Agreement"), took management control and a majority ownership position in TSD. As such, Amherst Media is now in a position as the controlling member of both co-designees (Amherst Media and TSD) to seek a transfer of the Tentative Designation to the Proponent. It is anticipated that TSD will not participate in the project and Amherst Media and HotelWorks Developers, LLC will form a new entity (HotelWorks, LLC) to be tentatively designated as the redeveloper by the Authority. As part of the Agreement; TSD, Abbott and its affiliates have given consent to the transfer of the Tentative Designation and agreed to release and indemnify Amherst Media and all related parties from the actions taken heretofore by Abbott, its affiliates or TSD.

HotelWorks Developers, LLC, is a venture owned by two real estate development professionals who have been active in the Boston area for over 30 years. The managing members of this venture are Robert Gatnik, who has been involved in various aspects of hotel construction and development in the Boston market for over 12 years and Christopher Kelly who has developed in excess of 2 million square feet of real estate in the market, including two recent successful residential developments in the City of Boston (CVs to be provided under separate cover). Both managing partners have extensive experience in all phases of real estate development and real estate portfolio management, as well as extensive experience with institutional investors and lenders.

2.2.2 Project and Team Information

Table 2- 1: Project and Team Information	
Project Name:	**Parcel P-7A**
Project Location:	240 Tremont Street, Boston, MA
Property Owner:	Boston Redevelopment Authority One City Hall Plaza, 9^{th} Floor Boston MA 02201
Project Proponent:	Tremont/Stuart Development LLC Amherst Media Investors Boston, LLC 67 Summit Avenue Summit NJ 07901 Tel: 908-608-0110 Fax: 908-608-0112 *Mark Van Fossan* , *smvf@aol.com* *Greg Silvershein* HotelWorks Developer, LLC c/o Insight Partners, Inc Riverside Center 275 Grove Street, Suite 2-400 Newton, MA 02466 *Robert Gatnik*, rgatnik@comcast.net Tel: 617-308-4889 *Chris Kelly*, cjkelly@insight-partners.com Tel: 617-663-4884
Architect:	Group One Architects 21 West Third Street South Boston, MA 02127 Tel: 617-268-7000 *Harry Wheeler* *harry@grouponeinc.com* *Rob Festa* *rob@grouponeince.com*

Permitting Consultant:	Mitchell L. Fischman Consulting LLC 41 Brush Hill Road Newton, MA 02461 Tel: 781-760-1726 (Cell) *Mitchell L. Fischman, AICP* mitch.*fischman@tetratech.com*
Transportation Consultant:	Howard/Stein-Hudson Associates, Inc. 38 Chauncy Street, 9th Floor Boston MA 02111 Tel: 617-482-7080 Fax: 617-482-7417 *Guy Busa* gbusa@hshassoc.com
Legal:	Brennan, Dain, LeRay, Weist, Torpy, Garner, PC 129 South Street Boston MA 02110 Tel: 617-542-4874 *Don Weist dweist@bdlwtg.com* Shadrawy & Rabinovitz 31 State Street 5th Floor Boston, MA 02109 Tel: 617-523-3333 *Bud Shadrawy BudShadrawy@ShadRabLaw.com*
Air Quality/Noise Consultant:	Tech Environmental, Inc. 16011 Trapelo Road Waltham MA 02451 Tel: 781-890-2220 Fax: 781-890-9451 *Marc Wallace* *mwallace@techenv.com*
Civil Engineer:	Bryant Associates, Inc. 98 North Washington Street Boston MA 02114-2127 Tel: 617-248-0300 Fax: 617-248-0212 *George L. Earle, III, P.E.* *gearle@bryant-engrs.com* *Philip M. Marvel, Jr., P.E.* *pmarvel@bryant-engrs.com*

Geotechnical Consultant:	GZA GeoEnvironmental, Inc. 133 Federal Street, 10th Floor Boston MA 02110 Tel: 617-482-1000 Fax: 617-482-6868 *Bruce W. Fairless, P.E.* *Tel: 617-482-1000 bfairless@gza.com*
Wind Consultant:	Frank Durgin, P.E. 19 Payson Road Belmont MA 02178 Tel/Fax: 617-216-4719 *fhdurgin@gmailcom*
Construction Manager:	Tishman Construction Corp. of Massachusetts 84 State Street Boston, MA 02109 Tel: 617-723-2314 ext 241 Fax: 617-227-3451 *Thomas A. Erickson, EVP & Regional Manager* *erickson@tishman.com*
Surveyor:	Harry R. Feldman, Inc. 112 Shawmut Avenue Boston MA 02118 Tel: 617-357-9740 Fax: 617-357-1829 *Karl McCarthy* *kam@harryrfeldman.com*
Estimated Construction Commencement:	1st Quarter 2013
Estimated Construction Completion:	4th Quarter 2014
Approximate Construction Cost:	$66 million
Status of Project Design:	Schematic

2.3 Public Benefits

The NPC Project will result in a number public benefits for the Theatre District and overall for the City of Boston. These benefits include:

- Creating approximately 240 moderately priced Micro Hotel Rooms in a city that has a documented need for additional hotel rooms as well as economical options for business travelers, tourists and conventioneers;
- Transforming an underutilized site to enhance a “24/7” urban neighborhood;
- Creating approximately 300 new construction jobs and 150 permanent jobs;
- Contributing to the continued revitalization of the Theatre District by providing an active ground level use which supports the area’s theatre-related economic activity during both daytime and nighttime hours;
- Reinvigorating the streetscape, anchoring the corner of the Theatre District, providing street level activity that enhances the public realm, and providing high quality urban design that reinforces the fundamental character of the Theatre District;
- Generating new property tax revenues as a result of converting an undeveloped parcel into a 19-story modern hotel facility with advertising signage and a restaurant use;
- Creating a vibrant and architecturally distinct gateway building at the entrance to the Theater District;
- Introducing iconic and dramatic video displays integrated throughout the facade of the building that will provide a interesting dynamic interaction with ongoing theater productions; and
- Contributing free video display time for city groups, civic organizations and neighborhood groups.

2.4 Regulatory Controls and Permits

This NPC filing details the proposed change in use from residential condominium to hotel, as well as the increases proposed to the Project's height and massing. Because the Project Site is owned by the BRA, it will be made available for development pursuant to a land disposition agreement. The Site is a portion of Parcel P-7A, as shown in the South Cove Urban Renewal Plan (the "Plan"), and has been designated as an Urban Renewal Overlay District, or "U," District. In such a district, the terms of the applicable urban renewal plan, in combination with the pertinent land disposition agreement, supply the operative use and dimensional restrictions for a project. Specifically, Section 3-1C of the Code provides that "the provisions of this code establishing use, dimensional, parking, and loading requirements for the downtown districts shall not apply to urban renewal areas established under Section 3-1A." Hence, redevelopment of the Project Site will be governed by the Plan.

Zoning relief for the NPC Project will be obtained via the "U" District overlay. Proposed project changes will further require a minor modification to the relevant provisions of the Plan.

The Project is subject to Large Project Review process set out by Article 80B of the Code. The Project will additionally comply to the extent feasible with the requirements of Code Articles 32 (Groundwater Conservation Overlay District) and 37 (Green Buildings).

Table 2-2: NPC Anticipated Permits and Approvals

Agency Name	Required Permit or Action
Federal	
U.S. Environmental Protection Agency	NPDES Notice of Intent for Construction
Federal Aviation Administration	Determination of No Hazard to Air Navigation (if required)
State	
Massachusetts Department of Environmental Protection, Division of Air Quality Control	Notice of Commencement of Construction
Massachusetts Department of Environmental Protection	Sewer Extension/Connection (BRP WP 72 and BRP WP 73)
Massachusetts Water Resources Authority	Construction Dewatering Discharge Permit
Massachusetts Historical Commission	Historic Review
Massachusetts Outdoor Advertising Board	Sign Permit (if required)
Local	
Boston Redevelopment Authority	Article 80 Review and Execution of Related Agreements; Recommendation of Amendment to U District; Lease Commencement Agreement and Ground Lease
Boston Zoning Commission	Amendment to U District
Boston Civic Design Commission	Schematic Design Review (if required)
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan
Boston Department of Public Works/ Public Improvements Commission	Amend discontinuance of a part of Stuart Street and vertical discontinuances for projecting building elements; Curb Cut Permit; Street Opening Permit; Street/Sidewalk Occupancy Permit; Subsurface Groundwater Recharge
Boston Water and Sewer Commission	Construction Dewatering Discharge Permit; Water and Sewer Connection Permit
Boston Department of Inspectional Services	Building Permits; Certificates of Occupancy; Other Construction Related Permits

*This is a preliminary list based on Project information currently available. It is possible that not all of these permits or actions will be required, or that additional permits may be needed.

2.5 Legal Information

2.5.1 Legal Judgments or Actions Pending Concerning the Proposed Project

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

2.5.2 History of Tax Arrears on Property Owned in Boston by the Applicant

The Project Proponent owns no real estate in Boston on which real estate tax payments are in arrears.

2.5.3 Evidence of Site Control over the Project Area

The Project Site is owned by the BRA. The BRA designated Amherst Media, LLC as redeveloper of the Project Site by vote of its Board on August 11, 2005, and acknowledged the partnership between Amherst Media, LLC and the Project Proponent for the undertaking of the Project by vote of its Board on January 26, 2006.

2.5.4 Nature and Extent of Any and All Public Easements

The Project Site is subject to those easements in favor of The New Wilbur Theatre, Inc. granted by the BRA by Grant of Easements dated May 4, 1989, recorded with the Suffolk Registry of Deeds in Book 15586, Page 155.

A portion of the footprint of the Project lies within the current layout of Stuart Street. Above and below surface discontinuances by vote of the Public Improvement Commission (PIC) of portions of Stuart Street in their entirety (by narrowing the sidewalk and/or by narrowing the traveled right of way), and certain additional above grade portions of the Stuart Street and Tremont Street sidewalks for projecting architectural elements were approved and recorded for the PNF Project. The NPC Project will require amendments to these approvals from the PIC both vertically, based on the proposed height increase, and horizontally for one portion of the footprint that extends beyond the existing discontinuance. The overall cubic area of the discontinuance has decreased with the new design.

Please refer to **Figure 2-1** for the site plan superimposed on the ALTA/ACSM Land Title Survey.

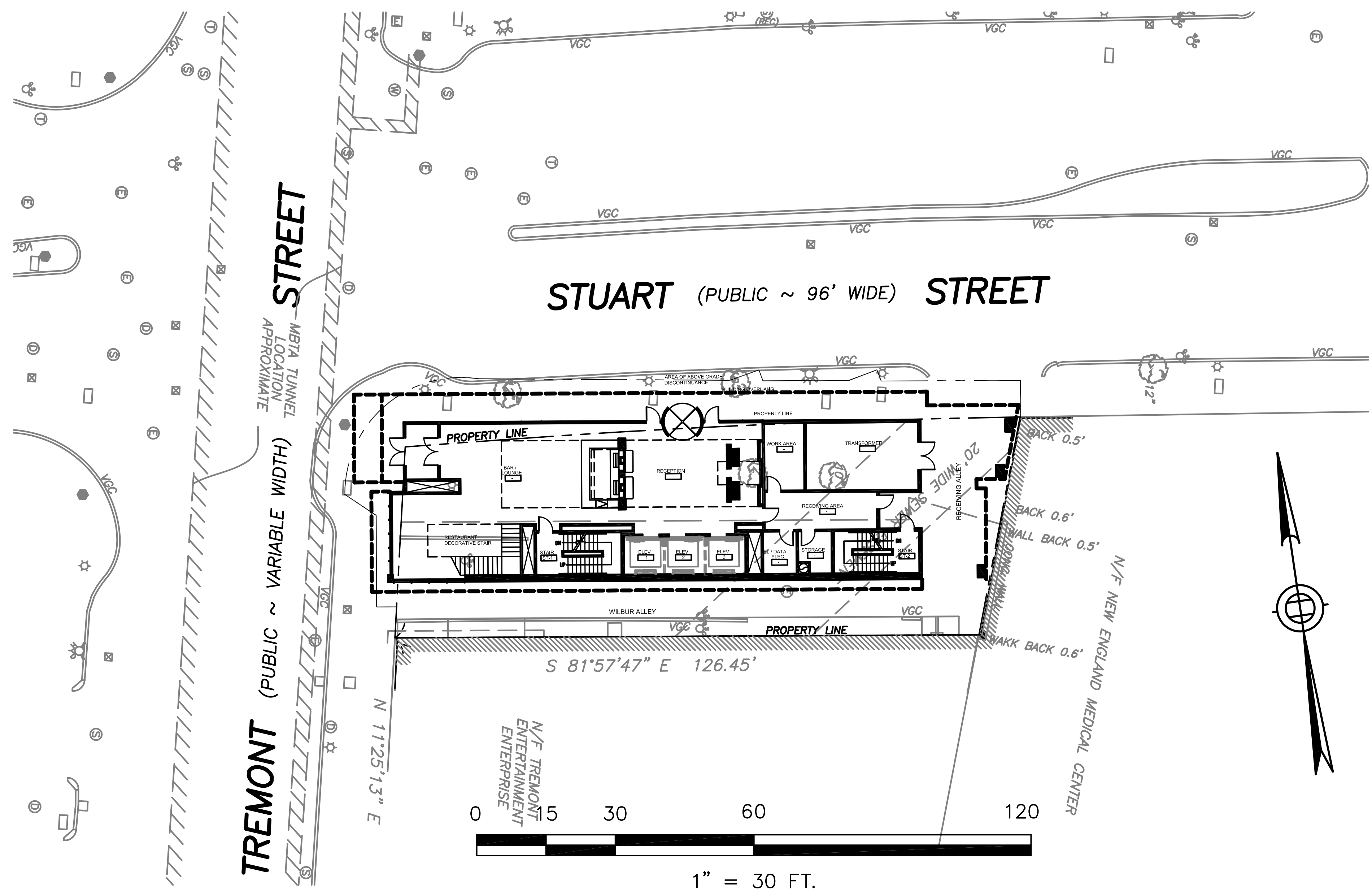


Figure 2–1

MARCH 2012

SITE PLAN

240 TREMONT ST

SCALE: 1"=30'

BRYANT ASSOCIATES
Engineers Surveyors Construction Managers
90 Canal Street, Suite 301
Boston, Massachusetts 02114
Tel: (617) 248-0300
Fax: (617) 248-0212
www.bryant-engrs.com

2.6 NPC Public Review Process

The development team will outreach and attended meetings with neighborhood, community and business leaders regarding the NPC Project during the Article 80 review process, including review with the following agencies.

Elected Officials

- Office of City Council President Stephen J. Murphy
- Office of City Councilor William Linehan

Community Organizations

- Chinatown Neighborhood Association
- Asian Community Development Corporation
- Park Plaza CAC
- Bay Village

Abutters

- Wilbur Theatre
- Wang Center
- Emerson College
- Pebblebrook Hotel Trust (W Boston Hotel)
- Condominium Association (Residences at the W)
- Owner, 75 Stuart Street Restaurant
- Tufts-New England Medical Center

City Agencies/Commissions

- Boston Transportation Department
- Boston Civic Design Commission
- Boston Environment Department
- Boston Landmarks Commission
- Boston Water and Sewer Commission
- Mayor’s Office of Neighborhood Services

3.0 URBAN DESIGN COMPONENT

3.1 Introduction

The NPC hotel development, located at 240 Tremont Street on BRA Parcel P-7A, will be comprised of approximately 240 hotel rooms, and approximately 14,565 square feet of common/retail space. Discussion of urban design and sustainability elements for the proposed new building is provided in the sections below, and is illustrated on the plans, perspectives, and photographs that are included at the end of the Urban Design Component (see **Figures 3.1** through **3.22).**

3.2 Site Context

The Wilbur Theatre borders the Project Site to the south on Tremont Street. The Wilbur Theatre's facades are predominantly brick with traditional stone detailing. The street façade of the Wilbur Theatre is approximately four stories tall, with the stage house rising to approximately seven stories at the rear of the property. To the south of the Wilbur Theatre on Tremont Street is the 14-story Biewend Building. The Wang Center stage house borders the Project Site to the east along Stuart Street. This structure is approximately 9 stories tall, and is clad in masonry and metal panels with no windows or other detail. On the opposite side of Tremont Street is the W Boston Hotel and Residences, a 28-story luxury hotel and condominium building. The opposite side of Stuart Street features predominantly three- and four-story commercial buildings, including the Jacob Wirth's building. Adjacent to Jacob Wirth's, the proposed 45 Stuart Residences has now been approved, and will be starting construction in the near future. As approved, the project is a 29-story, 384,000 square feet residential building that will house 404 units along with 198 parking spaces.

In the NPC Project's vicinity are several existing high-rise structures, consisting of the approximately 175-foot Jean Mayer USDA Human Nutrition Research Center on Aging ("HNRCA") building (Stuart/Washington Streets), the approximately 106-foot State Transportation Building (Stuart & Charles Street), and, further along Stuart Street to the west, the approximately 180-foot One Charles (Residences) and the approximately 256-foot former Radisson Hotel that is undergoing an extensive renovation and rebranding effort. Several theatres in the site vicinity are in the 60-foot to 80-foot range. Neighboring buildings are a mix of brick, stone and pre-cast concrete panels.

3.3 Building Program

The development program will include retail/restaurant use and hotel common/flex space (approximately 14,465 square feet in total) on the first three floors of the building and hotel rooms on floors four through nineteen. A total of approximately 240 hotel rooms are proposed. The total FAR gross floor area is approximately 100,885± square feet.

At the Stuart/Tremont Street corner, a building advertising and sign component will be integrated into the exterior skin of the structure from Levels 2 through 4 in various sizes and dimensions. The two corner building signs will be approximately 21'-0"W x 30'-0"H on both Stuart and Tremont, with similar signs on the opposite end of the Stuart Street façade. Within the field of the façade, there will be smaller signs of approximately 9'-0" W x 22'-0"H placed along Stuart and Tremont Streets, with additional smaller, fragmented panels in a random pattern that will extend up to the 6th story of the building.

Mechanical and storage spaces are planned in the one-level basement and on the roof in a mechanical penthouse.

3.4 Building Design

3.4.1 Design Concept

The design goal is to significantly enhance the character of the existing site and neighborhood with the design of a contemporary focal point that serves as a gateway to Boston's Theatre District. The NPC Project will transform the Stuart/Tremont Streets intersection by creating a dynamic and exciting interaction with pedestrians and visitors to the Theatre District. The energetic and lively façade skin, enhanced through the integration of a unique and dramatic array of electronic imagery, will provide a theatrical coordination of lighting effects across the entire building, and will signal to visitors their arrival at an exciting and energetic location.

3.4.2 Design Overview

The NPC Project's main entrance will be located on Stuart Street at the north side of the building. The highly visible restaurant space will feature floor to ceiling glass along the Project's sidewalk frontage.

Access to the loading area off Stuart Street at the east end of the Project Site will be provided for this Project while maintaining a loading and staging area for the Wilbur Theatre. Along the entire south edge of the Project Site, a 12'-0" access easement will be maintained for egress of the Wilbur Theatre as well as the Project. This alley will be designed to provide high levels of light with interactive lighting and theatre poster display cases to engage passersby, similar to Shubert Alley in New York's Theatre District.

The building is split into two distinct facades: 1) along Tremont Street and 2) facing the Wilbur Theatre. Both facades create a very dynamic and rhythmic pattern of light, color, and texture. Sunshades located within the façade pattern also create a very playful pattern of light and shadow. In addition the corner of the building also cantilevers out over the main building corner to further emphasize the building's movement and energy. The building façade and material pattern embody the same movement and energy that the theater district and the shows it contains have become known for.

3.4.3 Height and Massing

The building is designed as a tall and slender nineteen-story structure, rising approximately 197'-0", as measured by the Boston Zoning Code, i.e., to the top of the roof structure, and not including the mechanical penthouse on the roof, which will extend approximately 20 feet higher on a portion of the rooftop. The mechanical penthouse will be located along the south edge of the roof, as far from the street facades as possible. Also not included in the overall height is a 42" glass extension of the facade at the perimeter of the roof, which will serve as a guard rail for occupants of the roof patios, as well as to screen mechanical fans and vent piping on the roof.

The building height and massing of the immediate neighborhood is a somewhat inconsistent mix of high-rise and mid-rise structures. The proposed building height and massing will fit appropriately into the surrounding neighborhood, and, compared to other nearby existing and proposed buildings, will have a reduced impact on the neighborhood.

3.4.4 Façade Design, Fenestration, and Building Materials

On Stuart and Tremont Streets, the exterior of the proposed building will be broken into three vertical divisions. Level 1 will have a very transparent glass band allowing maximum visibility of the restaurant space from the street. This street front façade will have operable glass panels along the entire length of the restaurant to further enliven the street experience. Levels 2 through 4 are proposed to be a mixture of glazing and sign panels using a combination of electronic and static signage. Levels 5 through 19 will have a thin aluminum curtain wall framework with large expanses of glass, metal panel and spandrel panel all glazed within the same curtain wall framing. The rhythm of these materials will be representative of and highly influenced by the Theatre District and the playfulness of the music and dance that the district embodies.

Facing the Wilbur Theatre, the façade will be predominantly metal panel, again with randomized pattern of color and projections. Although included within a more solid façade, these materials will speak the same architectural language as the Tremont Street façade, but represent it in a different way.

Colors for the façade as proposed are shades of blue and metal. Glazing will be only slightly reflective, in order to maintain a high percentage of natural light allowed to the interior, while taking advantage of the energy savings afforded by the latest glazing technologies. Lighting and signage will be colorful and animated and will integrate with the building form and concept.

3.5 Exterior Lighting Program and Lighting Animation

The exterior lighting will be a vital component of the overall design concept. The goal of the lighting is to respond to the Project Site, culture and history of the Theatre District (see also discussion of historic signage in the City in **Appendix D**, the PNF's Historic Resources Component), and to respond to the people that live, work, and enjoy the area.

The primary lighting type used will be linear strips of Light Emitting Diode ("LED") fixtures. To integrate with the building architecture, specific horizontal and vertical architectural features will be outlined with the LED fixtures. The LED fixtures will be programmed to produce a variety of colors and effects to further reinforce the building's role as a gateway to the Theatre District.

This proposed development on the primary corner of the Boston's Theatre District is intended to create an iconic structure that will serve as a landmark to welcome and draw visitors into the area. The electronic video board, the first of its kind in Boston, will serve as a major attraction to theater goers, hotel guests, and city visitors alike, both during the day and evening hours. Also, the sleek architecture of this mainly glass building, rising above the bustling street, will feature lighting and signage accents that will distinguish the building within the city.

The goal of the lights wrapping the building, in conjunction with the architecture and signage, is to further mark the building in an innovative way, as a hallmark location and the entrance to the Theatre District. The objective of the proposed lighting scheme is to imitate the lights and movement of a theatre premiere to excite Theatre District attendees and captivate passersby. In a tribute to theatre days of old, before the dawn of movies and television, this lighting scheme has been developed to alert the City that this location is a destination. The building and lights will draw attention directly before the start of the theatre productions, responding to the heart of the entertainment district and in celebration of the people enjoying the area.

3.6 Site Design

3.6.1 Open Space and Landscaped Areas

The NPC building extends over the current property line[1] into the existing sidewalk on the north and west edge, where improvements will be limited in order to provide the widest possible clear width for pedestrians. The restaurant windows at Level 1 may be operable, in order to facilitate interaction between the interior and exterior at street level. A 12'-0" access easement will be maintained along the south edge of the Project Site in the form of an alley. This alley, which also serves as access to the nightclub inside the Wilbur Theatre, is proposed to be designed with decorative paving, high levels of light and interactive theatre poster display cases to encourage pedestrian activity. The hotel will have a common roof deck that may also have limited food and

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[1] Construction of the Project will require the discontinuance by vote of the Public Improvement Commission of portions of Stuart Street (by narrowing the sidewalk and/or by narrowing the traveled right of way).

beverage services. Access to the roof deck will be through an extension of the south portion of the building to allow for elevator and stair access, as well as other support functions for the use and enjoyment of the roof space.

3.6.2 Pedestrian Circulation

New sidewalks, curbing, and lighting are proposed along the street. The building lighting, combined with the signage and restaurant component, will serve to engage the pedestrian and enliven the property, signaling an arrival to Boston's Theatre District. The Project's lighting program, together with the new restaurant use, will revitalize the corner and enhance the pedestrian experience. Proposed lighting will also help to illuminate the sidewalk enhancing security and public safety in this area.

Guests will access the building from the Stuart Street entrance and lobby, which will also provide access to the restaurant and retail areas. Emergency egress from the building will be provided to the alley along the south side of the building.

The proposed curb extension along Stuart Street will be constructed to accommodate the footprint of the new building without compromising sidewalk width along Stuart Street. In addition, the extension will provide improved access to pedestrians walking adjacent to the Project Site, increase the pedestrian waiting area at the intersection of Stuart Street/Tremont Street, and help accommodate both passing pedestrians and ground-level activity at the new building.

An existing curb cut on Stuart Street accessing the Wilbur Theatre loading zone will remain, and is proposed to be shared by the Project and the Wilbur Theatre.

3.6.3 Parking and Vehicular Circulation

The loading area for the NPC Project, along with the Wilbur Theatre loading zone, is at the east edge of the property as discussed above. Service and loading activity will be coordinated with the Wilbur Theatre. Trash for the NPC Project will be compacted and remain inside the building's trash room until pick-up and removal, via the loading zone, at regular intervals. Restaurant delivery vehicles may also pull off-street via the loading zone, as coordinated with the Wilbur Theatre. A 26'-0" wide loading zone will occupy the east edge of the Project Site at Level 1.

No hotel guest parking is proposed on the Project Site. There are several parking garages in the immediate area available to guests and patrons. The Proponent is currently in discussions with valet services and parking facilities, within close walking distance of the Project Site, to secure parking options for use by hotel guests. In addition, Zipcars™ has several nearby locations, which will help reduce the need for guest parking.

3.7 Sustainable Design

The Proponent and the Project design team (including a *LEED* Accredited Professional) are considering many sustainable design and energy conservation measures for the Project. The design team will include an assigned LEED Accredited Professional.

A preliminary **LEED 2009 for New Construction and Major Renovations (Checklist)** is presented in accompanying **Figure 3.22**. The team anticipates including evaluating and including as many of the Boston Green Building Credits as possible. At this early stage of design, the project design and construction team is still investigating and developing appropriate strategies to pursue credits through both LEED and the Boston Green Building programs. During the design process, the Proponent will evaluate incorporating green-building features into the NPC Project, including the following:

- Increasing the energy performance of the building with building envelope materials;
- Green or cool roofing materials;
- Increasing the energy performance of the building with energy efficient appliances;
- Utilization of energy efficient lighting;
- Reducing water use in the building with water efficient plumbing fixtures;
- Facilitating the reduction of waste generated by building occupants and providing increased opportunity for recycling;
- Recycling and/or salvaging construction and demolition debris;
- Incorporating recycled content materials into the building and finishes;
- Incorporating rapidly renewable building materials;
- Establishing minimum indoor air quality (IAQ) performance;
- Reducing the quantity of indoor air contaminants with low-emitting materials such as paints, carpets, sealants and woods;
- Providing a high level of thermal comfort system control for individuals;
- Incorporating operable windows with insulating glass; and
- Introducing natural lighting and views of the outdoors.

3.8 Urban Design Submission and Project Drawings

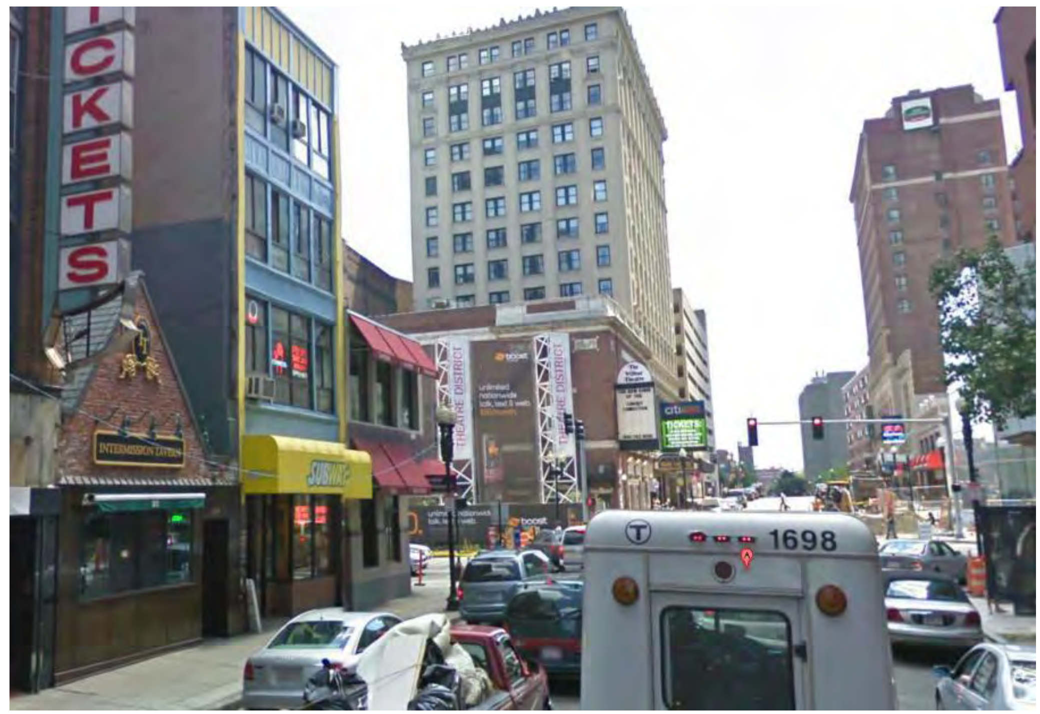
Figures 3-1 through **3-22**, more fully illustrate the Urban Design and sustainability narrative and include the following figures and photographs:

Figure 3.1 Site Aerial
Figure 3.2 Site Context Images
Figure 3.3 Proposed Floor Plan - Ground
Figure 3.4 Proposed Floor Plan - Second
Figure 3.5 Proposed Floor Plan - Third
Figure 3.6 Proposed Floor Plan - Typical
Figure 3.7 Proposed Floor Plan - Public Roof
Figure 3.8 Proposed Floor Plan - Roof Mechanical
Figure 3.9 Building Section
Figure 3.10 Elevation - Stuart Street
Figure 3.11 Elevation - Tremont Street
Figure 3.12 Elevation - Wilbur Alley
Figure 3.13 Aerial View - Stuart Street
Figure 3.14 Aerial View - Tremont Street
Figure 3.15 Aerial View - Stuart Street Façade
Figure 3.16 Street Views - Stuart Street
Figure 3.17 Street Views - Tremont Street
Figure 3.18 Context Aerial #1 With Future Build Out
Figure 3.19 Context Aerial #2 With Future Build Out
Figure 3.20 Street Views
Figure 3.21 Street Views
Figure 3.22 LEED 2009 for New Construction and Major Renovations

Group One Partners, In
21 West Third Street Boston, MA 021
T: 617.268.7000 F: 617.268.0209

FIGURE 3.1
SITE AERIAL

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA



Group One Partners, In
21 West Third Street Boston, MA 021
T: 617.268.7000 F: 617.268.0209

FIGURE 3.2
SITE CONTEXT IMAGES

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

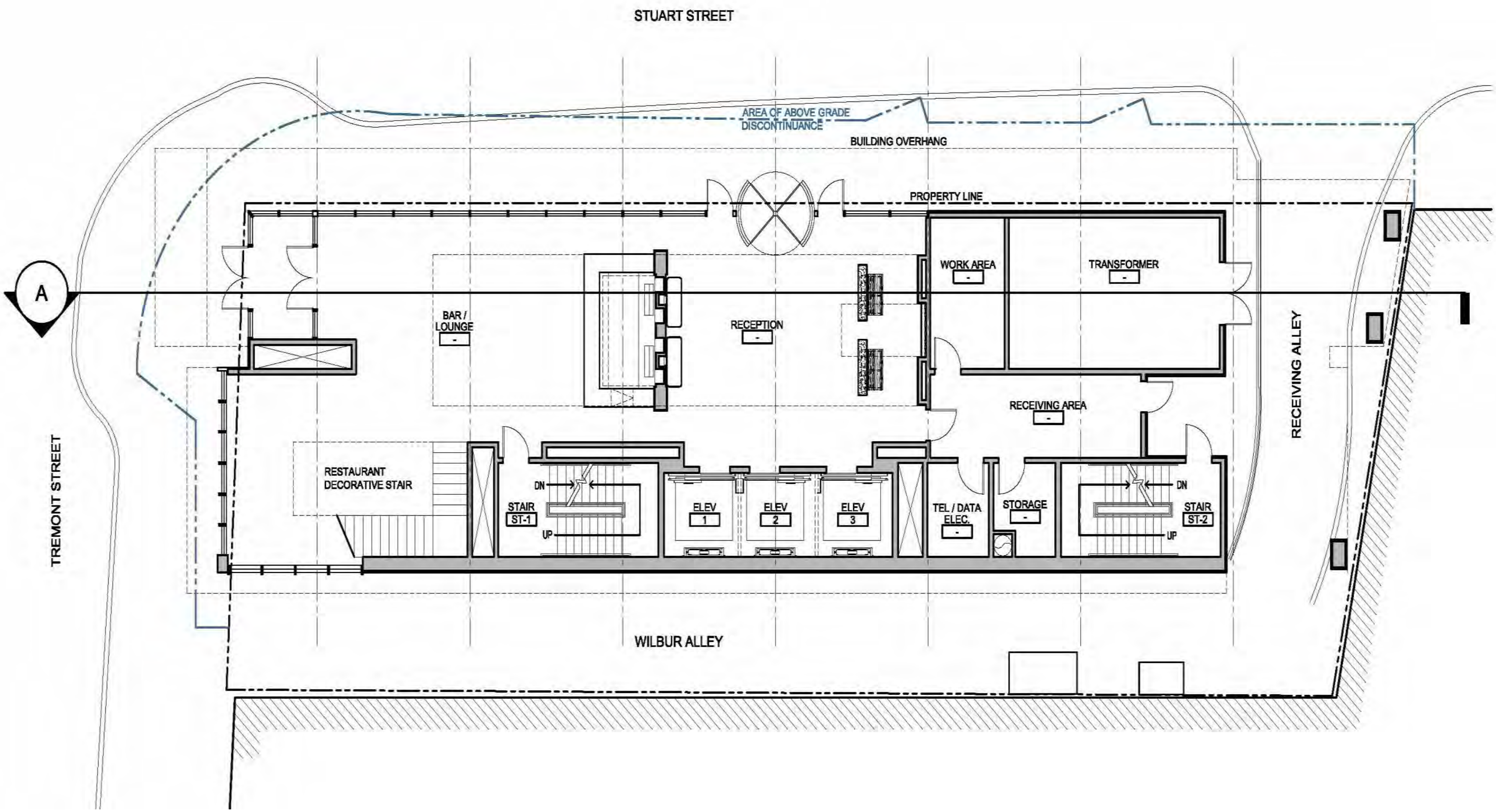


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FIGURE 3.3
PROPOSED FLOOR PLAN - GROUND

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

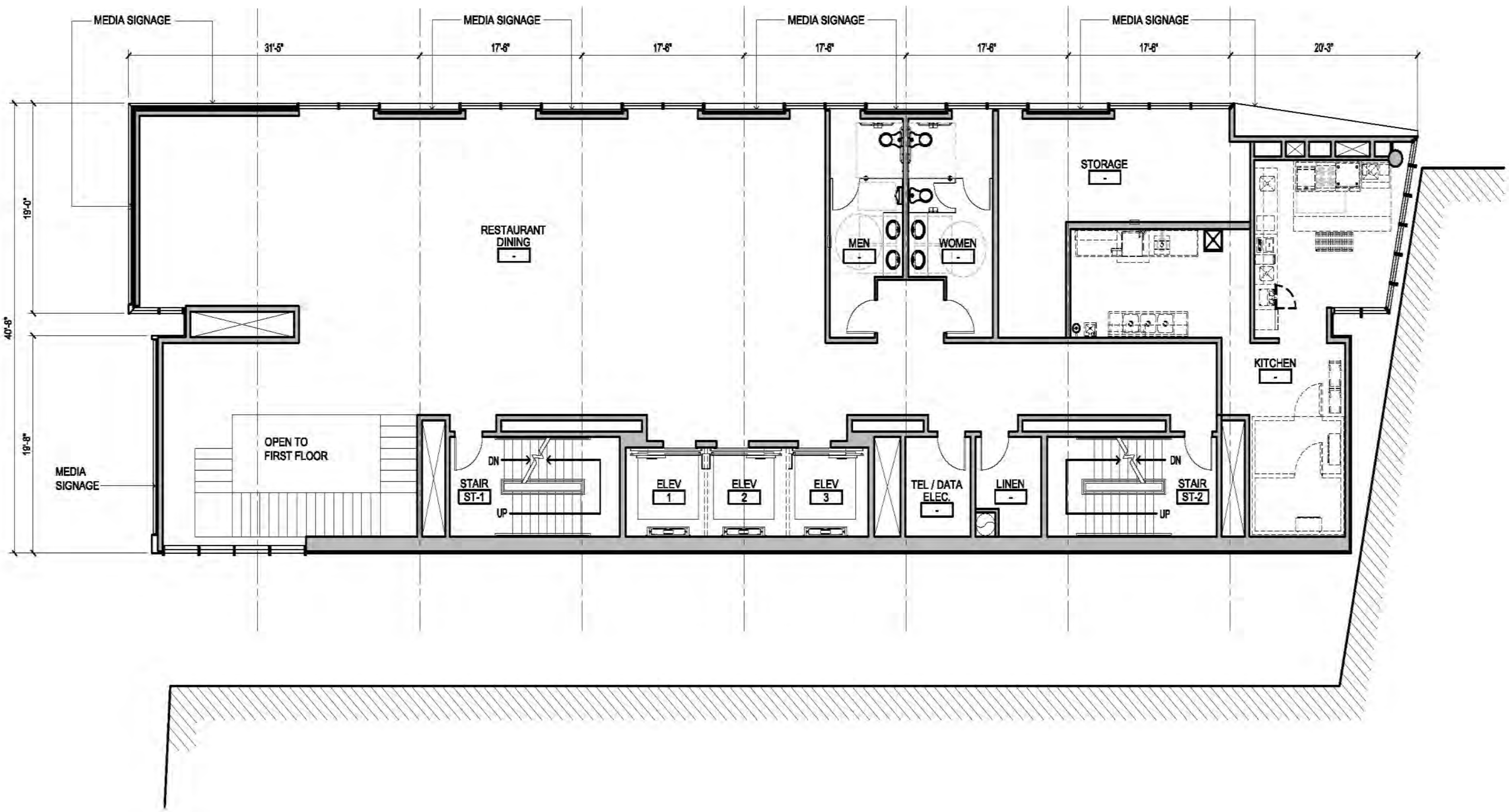

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FIGURE 3.4
PROPOSED FLOOR PLAN - SECOND

PARCEL 7A
STUART / TREMONT STREET
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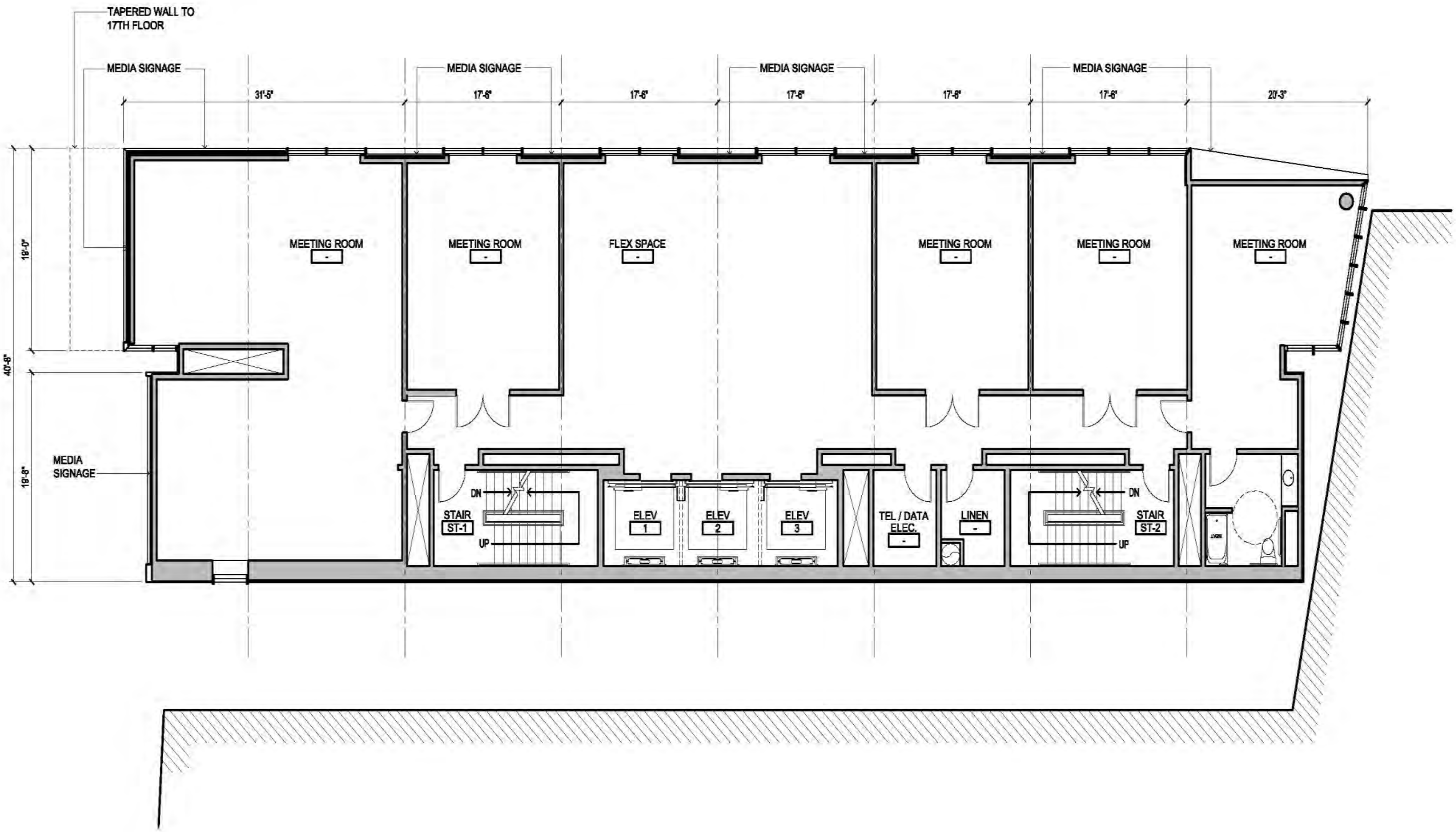

FIGURE 3.5
PROPOSED FLOOR PLAN - THIRD

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PARCEL 7A
STUART / TREMONT STREET
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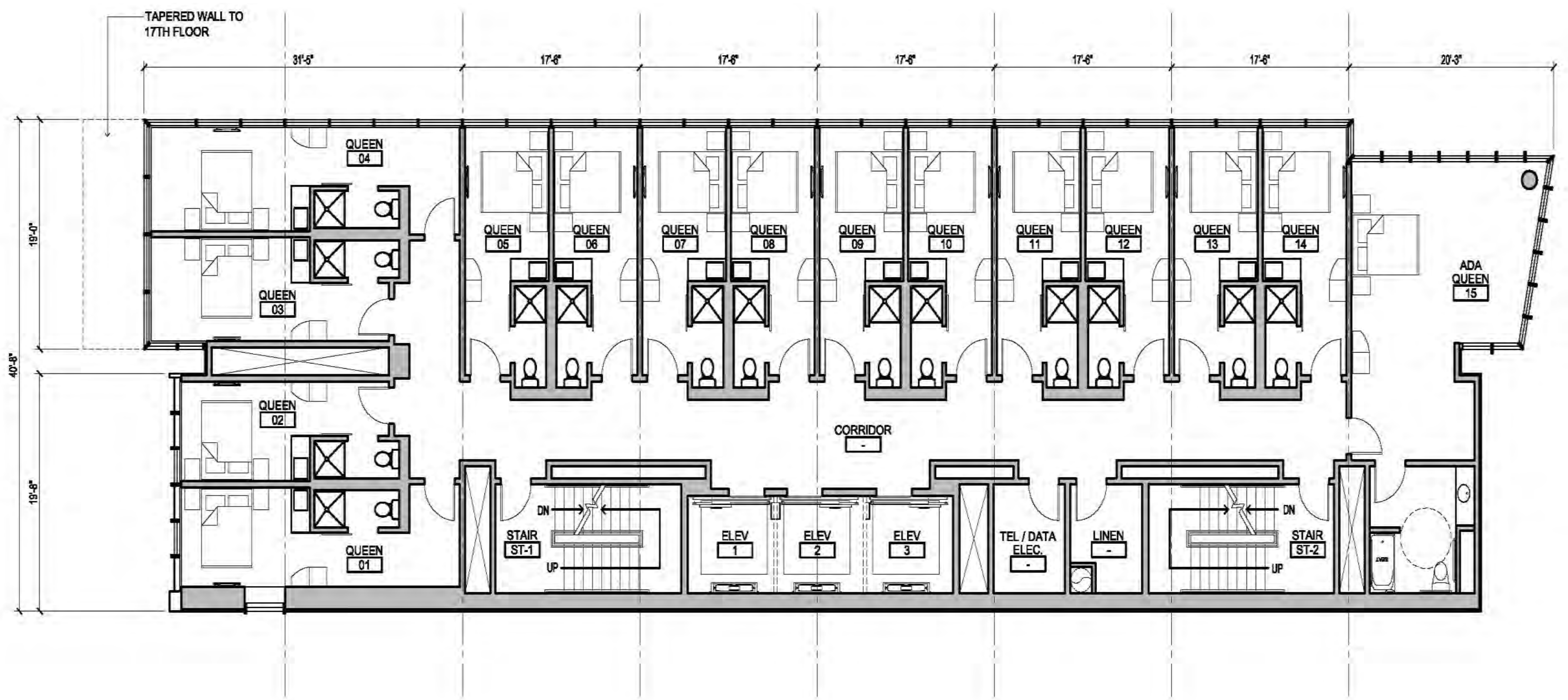

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FIGURE 3.6
PROPOSED FLOOR PLAN - TYPICAL

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

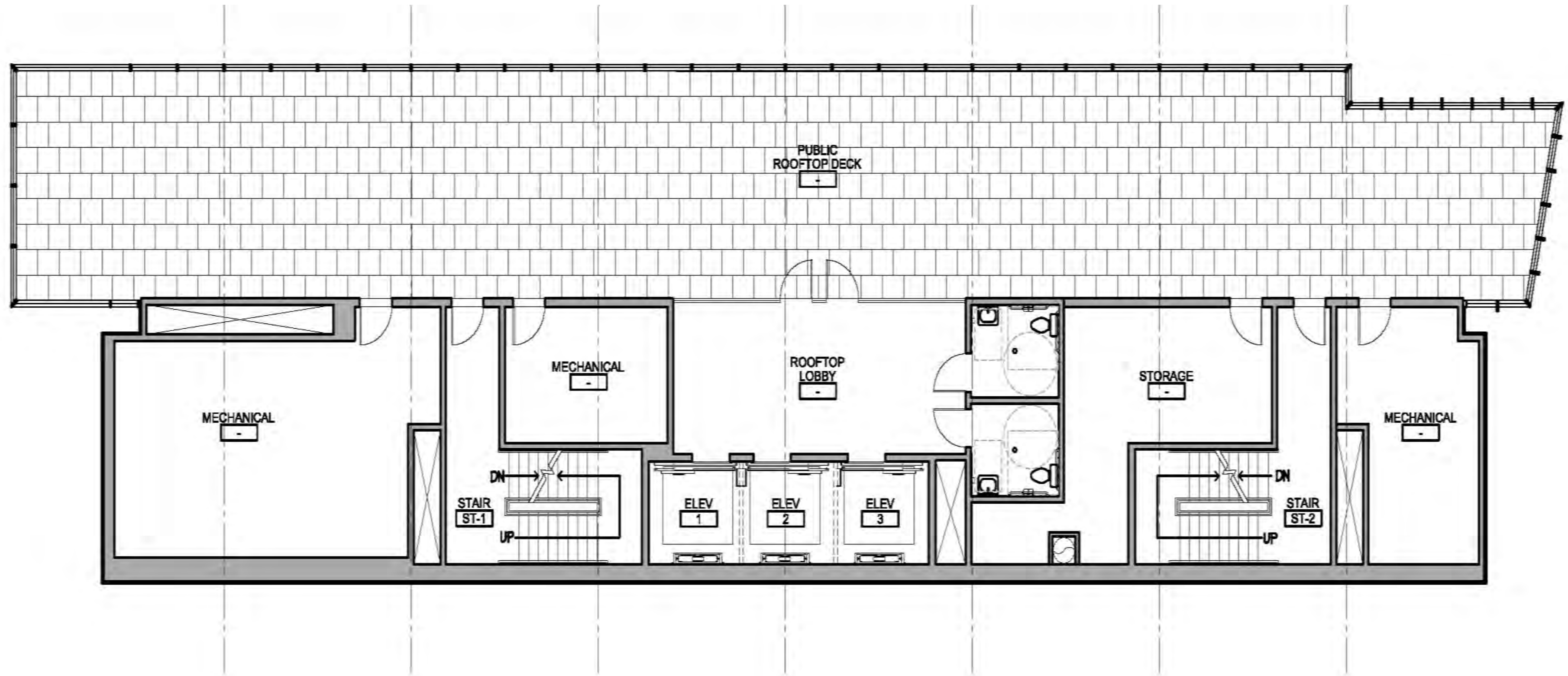

FIGURE 3.7
PROPOSED FLOOR PLAN – PUBLIC ROOF

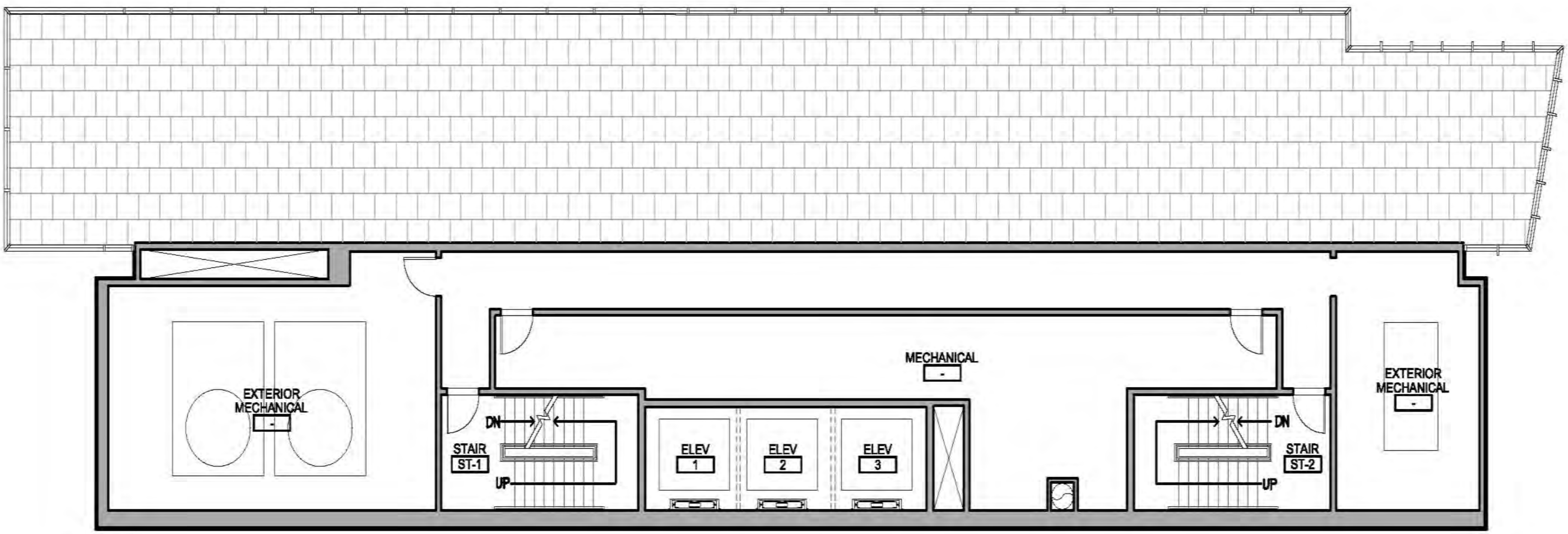

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FIGURE 3.8
PROPOSED FLOOR PLAN – ROOF MECHANICAL

PARCEL 7A
STUART / TREMONT STREET
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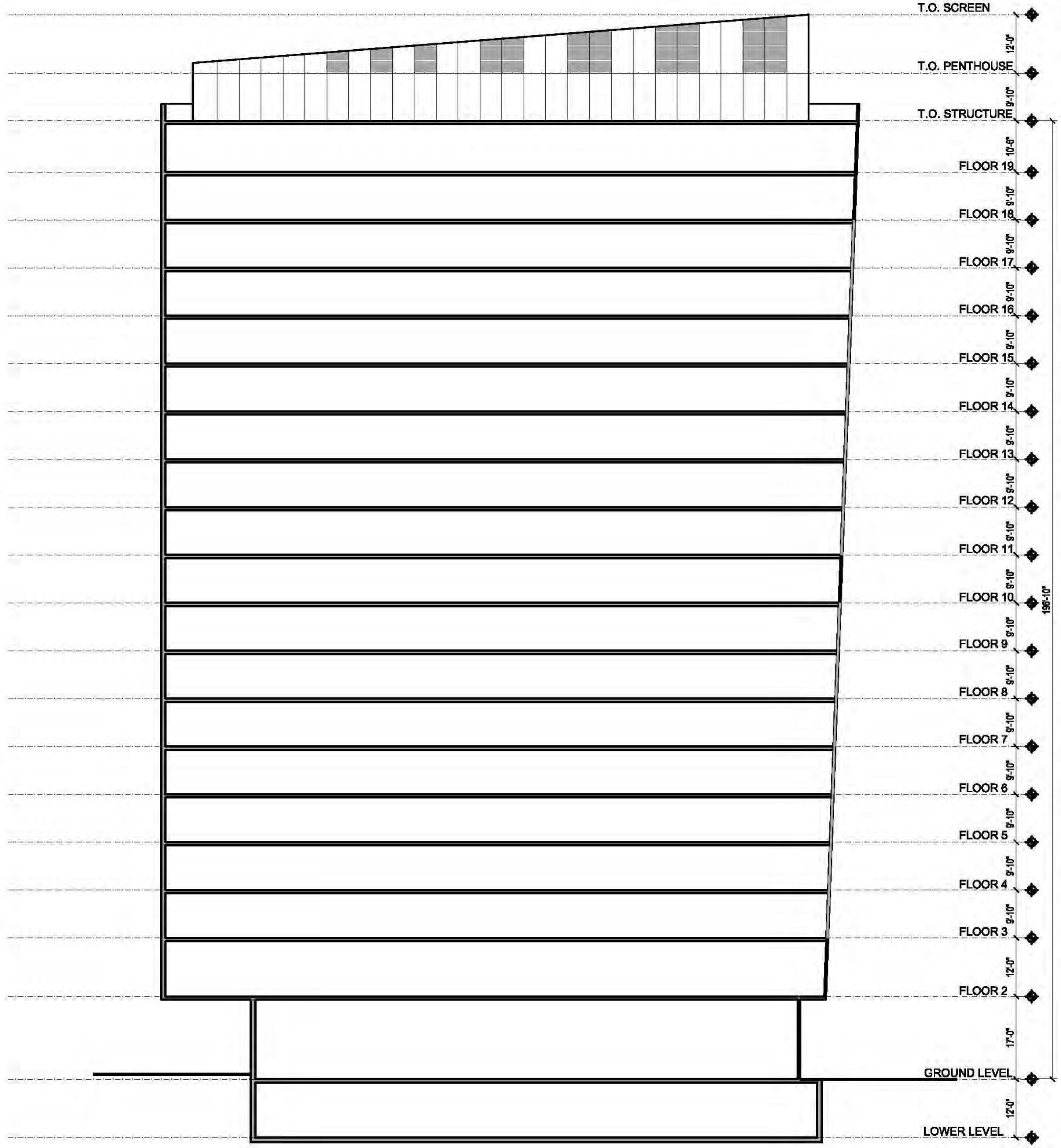

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FIGURE 3.9
BUILDING SECTION

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FIGURE 3.10
ELEVATION – STUART STREET

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

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FIGURE 3.11
ELEVATION – TREMONT STREET

PARCEL 7A
STUART / TREMONT STREET
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FIGURE 3.12
ELEVATION – WILBUR ALLEY

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

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FIGURE 3.13
AERIAL VIEW – STUART STREET

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

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FIGURE 3.14
AERIAL VIEW – TREMONT STREET

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

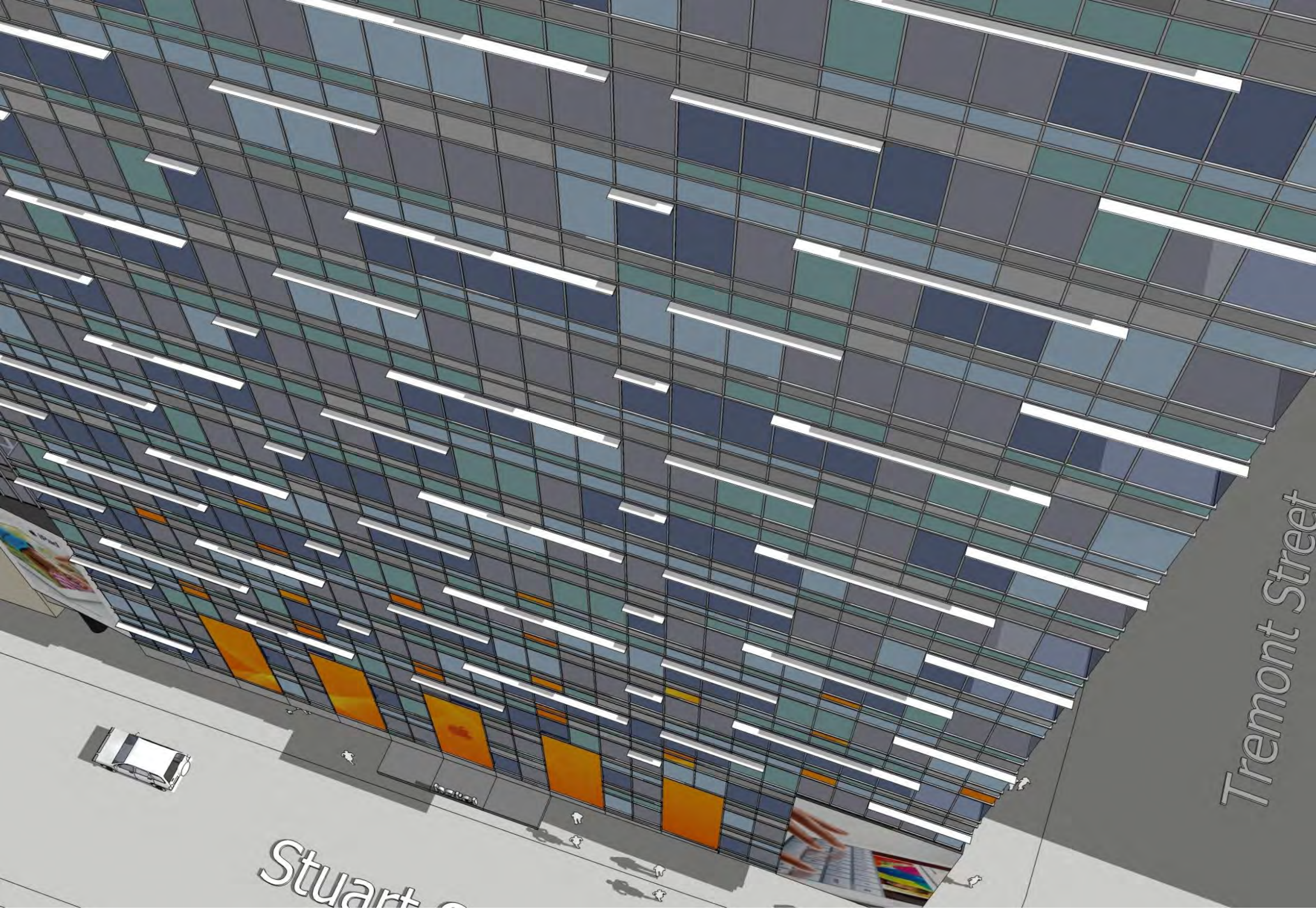

FIGURE 3.15
AERIAL VIEW – STUART STREET FACADE

EAST VIEW

WEST VIEW

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FIGURE 3.16
STREET VIEWS – STUART STREET

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

NORTH VIEW

SOUTH VIEW

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FIGURE 3.17
STREET VIEWS – TREMONT STREET

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

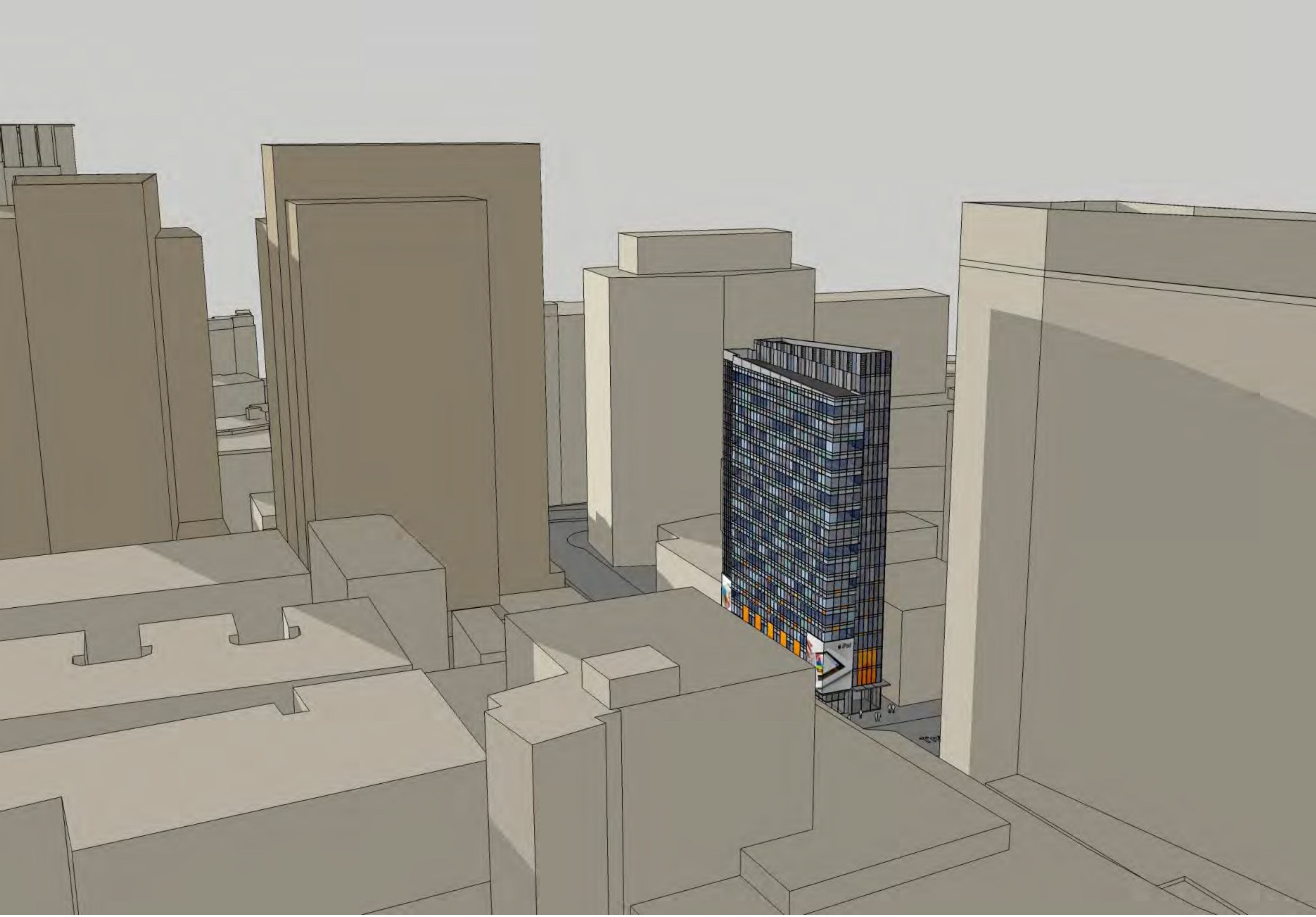

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FIGURE 3.18
CONTEXT AERIAL #1 WITH FUTURE BUILD OUT

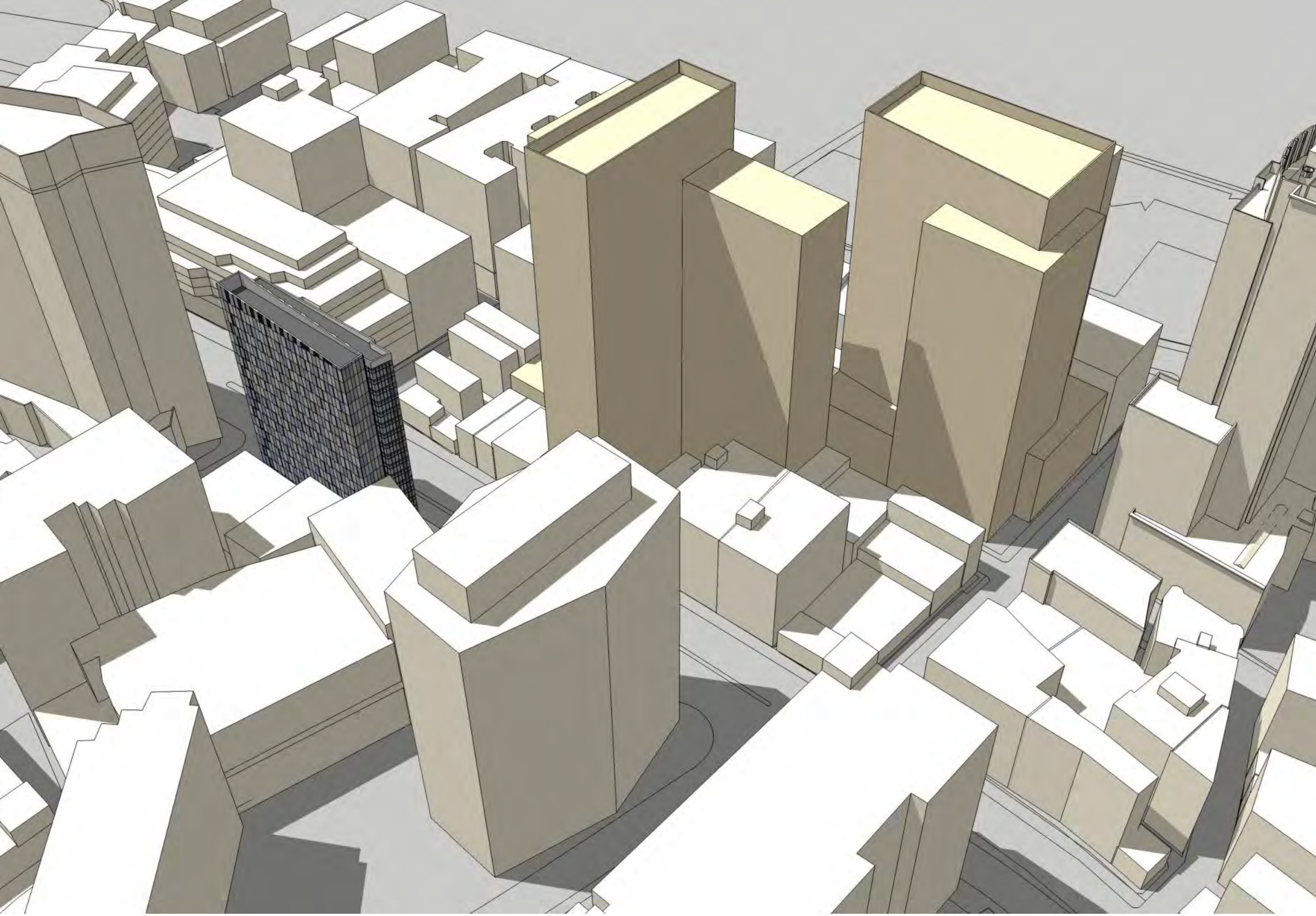

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FIGURE 3.19
CONTEXT AERIAL #2 WITH FUTURE BUILD OUT

PARCEL 7A
STUART / TREMONT STREET
BOSTON, MA

FIGURE 3.20
STREET VIEWS

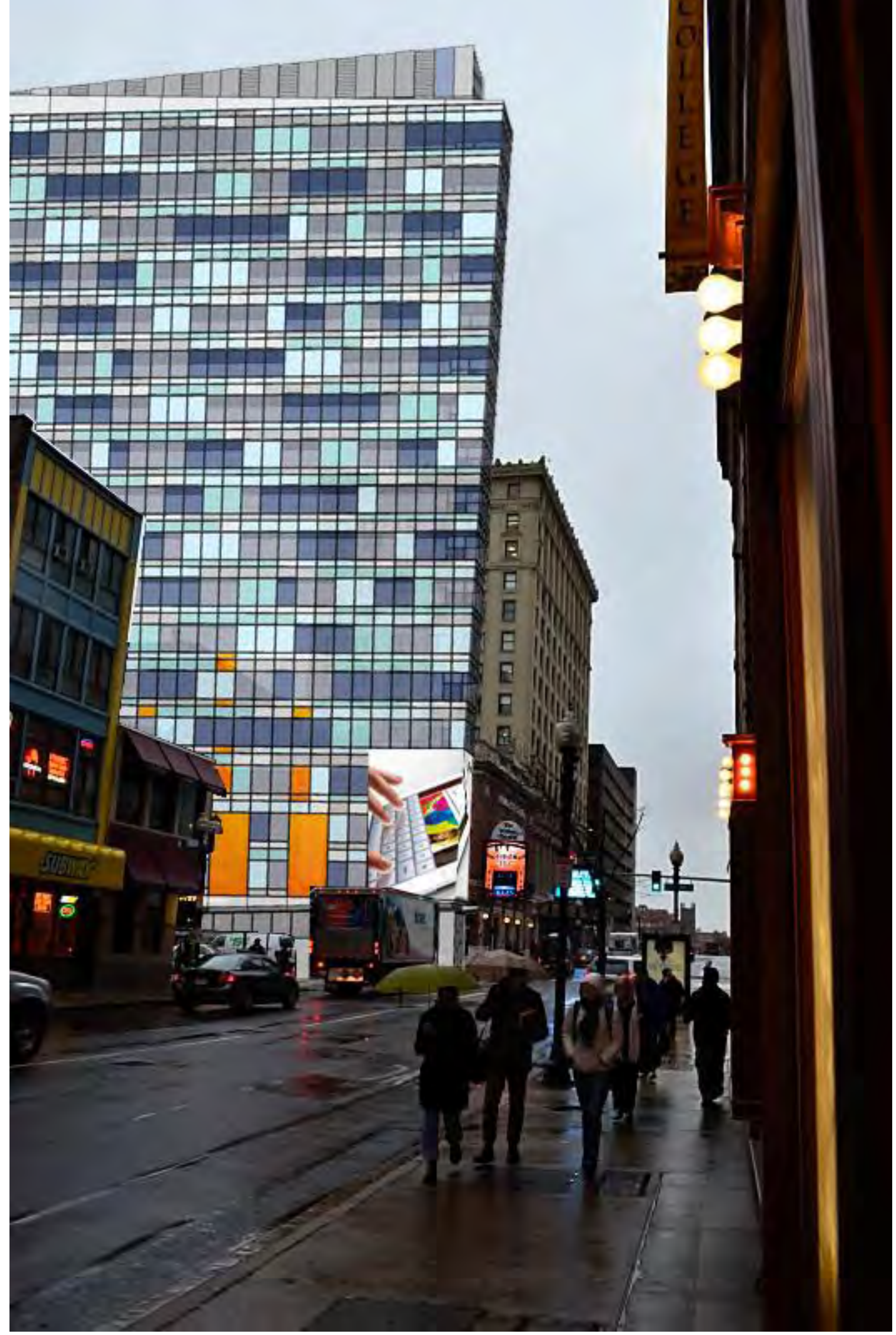


FIGURE 3.21
STREET VIEWS

4.0 ENVIRONMENTAL PROTECTION COMPONENT

4.1 Wind Analysis

A qualitative wind assessment was performed to determine the effect of the PNF Project on pedestrian-level winds ("PLWs") in the Project vicinity. Results are obtained for both existing and build[2] conditions. PLWs were considered at twenty-eight (28) locations in and near the Project Site. (See **Appendix A** for a copy of the PNF Wind Analysis).

The PLW categories described in **Table 4.1-1** are: (1) Comfortable for Long Periods of Standing or Sitting; (2) Comfortable for Short Periods of Standing or Sitting; (3) Comfortable for Walking; (4) Uncomfortable for Walking; and (5) Dangerous and Unacceptable. None of the 28 locations considered for either existing or build conditions will have annual PLWs that exceed the BRA guideline wind speed (i.e. where the effective gust velocity exceeds 31 mph more often than once in one hundred hours.)

The detailed results of the PNF Wind Analysis are presented in **Appendix A** in **Figures 4.1-13** through **4.1-20** as well as in **Table 4.1-1** at the end of the PNF narrative section, which also provides a summary of the winds by PLW categories.

With regard to the NPC project, Mr. Frank Durgin, P.E., the wind engineer that completed the PNF wind evaluation, has concluded that a full qualitative or quantitative study of pedestrian level winds (PLWs) for the NPC Project is not needed. Mr. Durgin's analysis is provided in the paragraphs below and is based on the accompanying figures in this section of the NPC.

Figure 4.1-1 is a map of the area surrounding the site of the proposed NPC Project. **Figure 4.1-2** is a drawing of the first floor of the PNF (Wilbur Place) **[1]** building showing the exits and the locations near the exits (10,11,12,13,15,16,17,18,19, and 20) studied in the 2006 NPC PLWs investigation. **Figure 4.1-3** is a similar figure of the first floor of the NPC proposed building. It should first be noted that the locations of the exits for the NPC building are quite different from those in the PNF (2006) building. Also, the dashed line in **Figure 4.1- 3** depicts the second floor overhang of the NPC building. As a result of these differences, and the fact that Mr. Durgin did not think the added height of the building would have any but a small effect on PLWs further away from the building, he made new estimates of the PLWs at the four new locations (29, 30, 31 and 32) shown in **Figure 4.1-3.**

---

1 Though not yet constructed at the time of the PNF, the 25-story W Boston Hotel at 100 Stuart Street at the corner of Stuart and Tremont Streets, was permitted and approved by the BRA Board in 2001, and was assumed to be in place in the build condition in the prior PNF analysis.

Figure 4.1-4 shows schematically how an isolated building interacts with the wind. Because the wind speed increases with height, as the wind is forced to a stop at the upwind façade, the pressure recovered on that façade is higher near the top than at the bottom of the façade. As a result, the wind flows down the windward façade and forms the vortex upwind of the building shown in **Figure 4.1-4**. This vortex is stretched and accelerated as it goes around the two upwind lower corners, causing the accelerated flow areas **(A)** shown on the left hand side of **Figure 4.1-4**. Similar accelerated areas also occur for winds blowing at the corners of the building (**B** in **Figure 4.1-4**). Because the NPC building is surrounded by other tall buildings, it did not seem likely to Mr. Durgin that it will interact with the wind in this way for winds from any direction. Further, if it did, Mr. Durgin felt that the highest winds caused by the vortex would be in the middle of the Stuart or Tremont Street because of the significant building overhang of the NPC building along both Stuart and Tremont Streets. There is a more detailed discussion of that flow pattern below.

Monolithic buildings (*i.e.*, those that do not change shape with height), if they are significantly taller than most of the surrounding buildings, almost invariably will be windy at their bases. However, when there are many buildings of similar height in an area, they tend to shelter one another. This is the case for the NPC proposed building.

4.1.1 A Discussion of Criteria

Since the early 1980s, the Boston Redevelopment Authority (BRA) has used a guideline criterion for acceptable winds of not exceeding a 31 mph effective gust more often than once in one hundred hours. The effective gust is defined as the average wind speed plus 1.5 times the root mean square variation about the average. The effective gust can be shown to be about the fastest one-minute gust in an hour. When many locations are considered, the effective gust averages about 1.4 times the average hourly wind speed **.** However, that ratio can vary widely from 1.4 for individual locations.

In 1978, Melbourne developed probabilistic criteria for average and peak PLWs, which accounted for different types of pedestrian activity as well as the safety aspects of such winds. Durgin has suggested the use of an Equivalent Average, which combines the effects of average, gusting, and peak winds. Later Mr. Durgin reinterpreted Melbourne’s criteria to apply to Equivalent Average winds. The Equivalent Average is similar to an hourly average, but combines the effects of steady and gusting winds. Five categories of PLWs are defined below:

Table 4.1-1: Wind Comfort Criteria

Category	Wind Comfort Criteria Definitions	PLWs occurring 1% of time[3]
1	Comfortable for Long Periods of Standing or Sitting;	>10.0 mph
2	Comfortable for Short Periods of Standing and Sitting;	10.0>14.2 mph
3	Comfortable for Walking;	14.2>18.3 mph
4	Uncomfortable for Walking;	18.3>24.6 mph
BRA	Acceptable by BRA guideline	<21.6 mph
5	Dangerous and Unacceptable.	>24.6 mph

These criteria are not absolute (any location can have dangerous winds in a major storm or hurricane). Rather, they imply that the location would have wind speeds such that the activity suggested could be undertaken comfortably most of the time, and would be perceived[4] as such, by most people who frequent the location. For example, the PLWs at Logan Airfield are in Category 4 (uncomfortable for walking) but near the dividing line between Category 4 and Category 3 (comfortable for walking) (see **Table 4.1- 1** above). But they are well under the BRA 31 mph effective gust wind speed guideline (converted to an equivalent average wind), which is high in Category 4. Therefore, most people would probably perceive conditions in the open at Logan Airfield as marginally comfortable for walking.

4.1.2 Detailed Discussion of Results

In the prior section, Mr. Durgin indicated that the results of the PNF (2006) study, for most locations other than those near the doors of the PNF building, would probably be essentially unchanged, but that he had made new estimations for the four new locations (29, 30, 31, & 32) at the entrances to the 2012 building. **Table 4.1-2** below leaves out the PNF (2006) results for the locations at every entrance of the PNF proposed building. It does, however, include the PNF (2006) PLW estimates away from the building and for the four new locations (29, 30, 31, and 32) at the 2012 building's first floor entrances and at locations 9 and 22 for existing conditions.

---

[2] The choice of 1% is based on the fact that the wind speeds set as upper limits for each PLW Category at 1% are roughly at the limit of PLWS for which the activity in each Category would become uncomfortable for the activity described [8].
[3] On a somewhat windy day, a person familiar with the location would choose not to go there for the specified activity.

Table 4.1-2
ESTIMATED CATEGORIES FOR NW, SW, EASTERLY STORM, AND ANNUAL WINDS FOR EXISTING (Ex) AND THE 2012 BUILD (Bld) CONDITIONS

Loc	NW		SW		STORM		ANNUAL		Loc
No.	Ex[1]	Bld	Ex	Bld	Ex	Bld	Ex	Bld	No.
1	3	3	2	2	2	2	3	3	**1**
2	2	2	2	2	1	1	2	2	**2**
3	3	3	3	3	3	2	3	3	**3**
4	3	3	2	2	2	2	3	3	**4**
5	3	3	2	2	2	2	3	3	**5**
6	2	2	1	1	2	2	2	2	**6**
7	3	3	2	2	2	2	3	3	**7**
8	2	2	2	2	2	2	2	2	**8**
9	4	4	2	2	2	3	3	3	**9**
14	2	3	1	1	2	2	2	3	**14**
21	3	3	2	2	2	2	3	3	**21**
22	4	4	2	3	2	2	3	3	**22**
23	3	3	2	2	3	3	3	3	**23**
24	3	3	2	2	2	2	2	2	**24**
25	3	3	2	2	2	2	3	3	**25**
26	3	3	3	3	2	2	3	3	**26**
27	3	3	3	3	2	2	3	3	**27**
28	2	2	3	3	2	2	3	3	**28**
29	3	3	1	2	2	2	3	3	**29**
30	3	3	2	1	2	2	2	3	**30**
31	2	1	1	1	1	1	2	1	**31**
32	2	1	1	1	1	1	2	1	**32**

1 Existing conditions did not include the Loews Hotel (now W Hotel) as that area was a Parking lot.

In most cases, as was the case for the PNF (2006) Wilbur building, the Categories are in comfortable conditions. There are two exceptions: location 9 at the SW corner of the W Hotel, and location 22 directly in front of the Wilbur Theater. Both are predicted to be in low Category 4 (uncomfortable for walking) for NW winds, but otherwise are predicted to be in categories 2 and 3 (comfortable conditions).

The W (former proposed Loews Hotel) faces Stuart Street (see **Figure 4.1- 1**) and NW winds blow almost directly at that façade. Across Stuart Street, the 135 ft. State Transportation Building blocks winds below 135 ft., but the W Hotel is 300 feet tall, so that the upper 165 ft. of it is somewhat exposed to NW winds. As a result, there will probably be a down flow in front of the W Hotel façade facing Stuart Street and a vortex as shown in **Figure 4.1-4** in the middle of Stuart Street. The predicted Category 4 PLWs at location 9 are probably due to this vortex being stretched and accelerated around that corner of the W Hotel for NW winds. The predicted Category 4 PLWs at location 22 in front the Wilbur Theater are due to the accelerated flow caused by that same vortex shown in **A** in **Figure 4.1- 4**. These two locations would have PLWs in Category 4 for existing conditions, but the Loews building lot was a parking lot at the time and was assumed as such for existing conditions.

There is a somewhat similar situation for the NPC building. There the N wind will blow directly at the Stuart Street façade and there are lower buildings immediately upstream of the Wilbur Place building. The tallest one at about 125 ft. is on the north side of La Grange Street, but there is a 115 ft. building on the South side of La Grange Street. With the proposed NPC building being about 196 ft. tall, it is less than twice as tall as either of these two upwind buildings, so that any vortex formed in front of Wilbur Place along Stuart Street will be much less strong than that in front of the W Hotel. The second story overhang will push the high-speed wind at the bottom of the vortex away from the building along Stuart Street and will act to diffuse the accelerated wind at the corner of the building at the intersection of Stuart and Tremont Streets.

Based on placing the NPC Building into the BRA Model (as illustrated in **Figures 3.18** and **3.19** in the Urban Design Component of this NPC) that also includes proposed buildings in the parking lot across Stuart Street just E of the site of the NPC Project, it appears that these proposed buildings are approximately the same height as the W Hotel. With these buildings in place, according to Mr. Durgin, they would have little or no effect on PLWs near the NPC building for southerly and westerly winds, but would change the effects of N, NE, and E winds. For N winds, winds flowing around the NW vertical corner of the proposed buildings, would speed up the N winds impinging on the N façade of the NPC building. As a result, the strength of the vortex along Stuart Street would be increased and the accelerated flow around the NW corner of the NPC building made stronger. For NE winds the proposed buildings would provide additional sheltering for the NPC building. For E winds, winds flowing around the vertical SE of corner of the proposed buildings, would tend to speed up PLWs flowing along Stuart Street toward Tremont Street. Since the magnitude of these effects would depend on the details of these proposed buildings, Mr. Durgin would hesitate to guess the total effect on PLWs along Stuart Street and at the corner at Tremont Street.

4.1.3 Other Comments

The revolving door at the entrance on Stuart Street juts out about four feet and will cause any wind blowing either up or down Stuart Street to speed up to get around the revolving door. To prevent this speedup, the revolving door would need to be set back into the building so that there is no bump in the building wall at this point (see **Figure 4.1-3**).

At the Tremont Street entrance, the flow around that corner will be defused and slowed due to the overhang at that corner of the NPC building. PLWs there could be fast enough to get into Category 4 at times. To make sure people entering or exiting out of the NPC building have a place out of the wind, these doors could also be setback into the building by 4 or 5 feet (see **Figure 4.1-3**)

REFERENCES

1) Durgin, F.H., “A Qualitative Assessment of Pedestrian Level Winds for the Proposed Wilbur Place (PNF) Building at 140 Tremont Street in Boston, Massachusetts June 23, 2006.

2) Cochran, L., Peterka, J, Cermak, J. ”Pedestrian Wind Report.- Wind Tunnel Tests- The Loews Hotel, Boston, Massachusetts”, Cermak, Peterka, Petersen, Inc. Report CPP Project 99-1929, December, 2000.

3) Davenport, A.G., and Isyumov, N., “The Application of the Boundary Layer Wind Tunnel to the Prediction of Wind Loading”, Proceedings of Intl. Seminar on Wind Effects on Buildings and Structures, Ottawa, Canada, September, 1967.

4) Durgin, F.H., “Use of the Equivalent Average for Evaluating Pedestrian Level Winds”, Presented at the Sixth U.S National Conf. On Wind Engineering, University of Houston, Houston, Texas, March 7-10, 1989, *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 36, pp. 817-828, 1990.

5) Melbourne, W.H., “Criteria for Environmental Wind Conditions”, *Journal of Industrial Aerodynamics*, Vol.3, 1978, pp. 241-249.

6) Durgin, F.H., "Pedestrian Level Wind Studies at the Wright Brothers Facility", Progress in Wind Engineering (Proc. of the 8th International Conference on Wind Engineering), New York, Elsevier, Part 4, 1992, pp. 2253-2264.

7) Durgin, F.H., “Pedestrian Level Wind Criteria Using the Equivalent Average”, *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 66 (1997), pp. 215-226.

8) Durgin, F.H., “Evaluating Pedestrian Level Winds” Presented at the Eleventh International Conference on Wind Engineering in 2005.

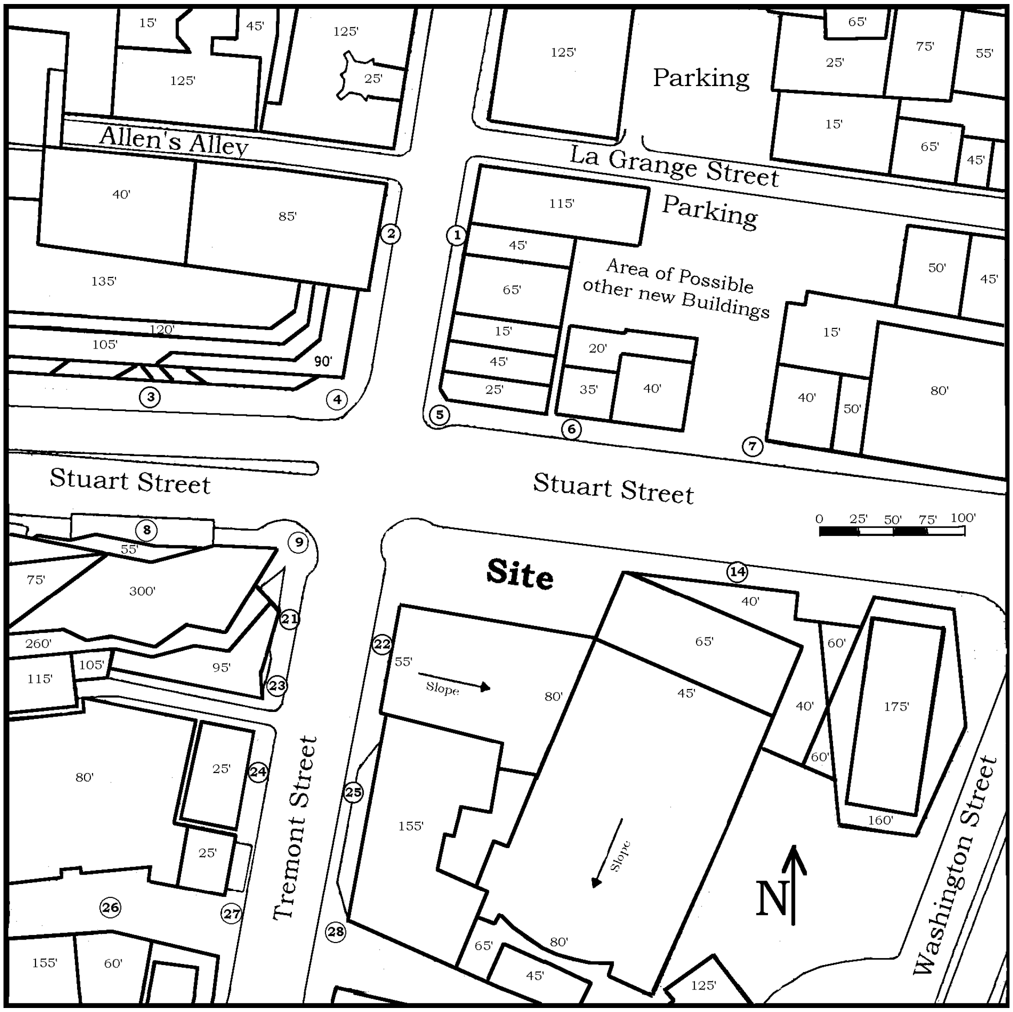


Figure 4.1-1 Area Map of Existing Conditions for the NPC Project With Pedestrian Level Wind Study Locations Numbered

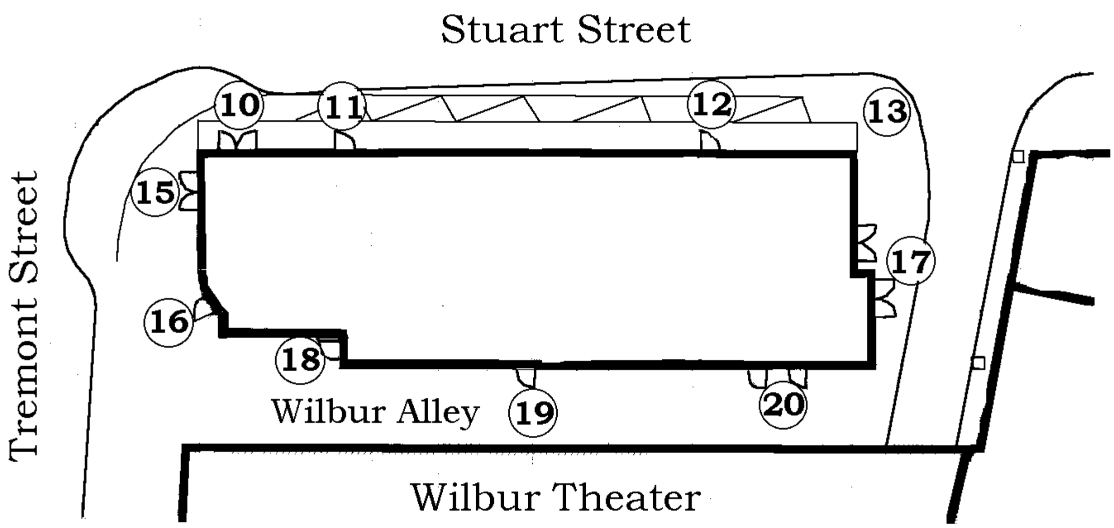


Figure 4.1-2 First Floor of PNF (2006) Building Indicating Doors and Pedestrian Level Wind Study Locations

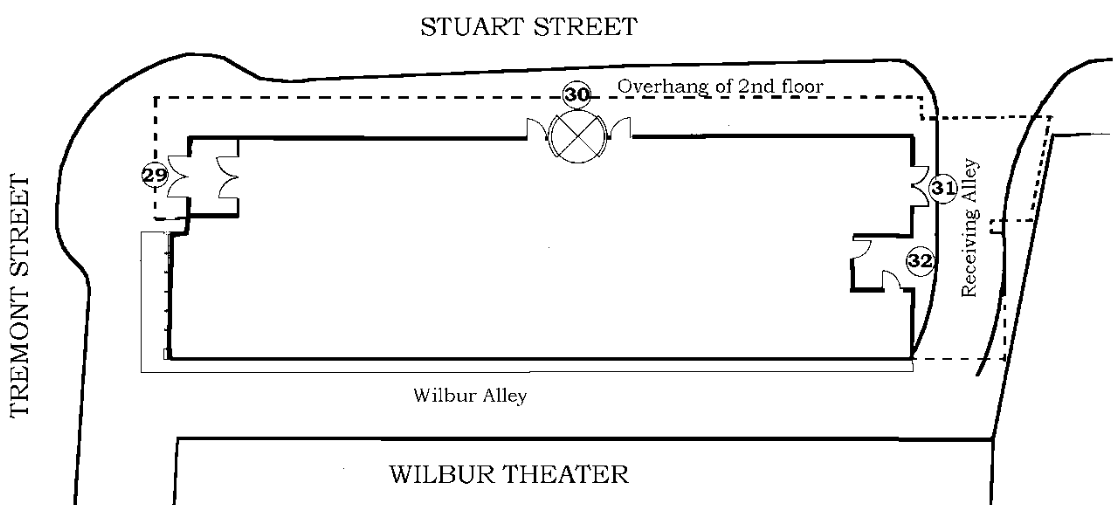


Figure 4.1-3 First Floor of NPC Building Indicating Entrances and Pedestrian Level Wind Study Locations and Numbers

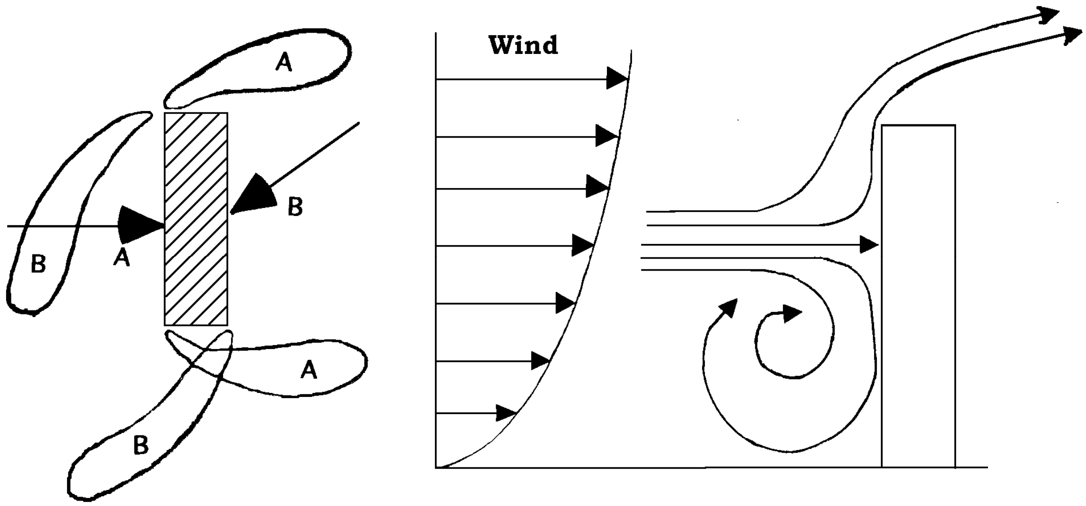


Figure 4.1-4 Interaction of an Isolated Building with the Approaching Wind Direction Perpendicular to the Façade of the Building

4.2 Shadow

4.2.1 Introduction

The following analysis describes and depicts graphically the anticipated shadow impacts from both the NPC Projects during the morning (9:00 a.m.), midday (12:00 Noon), and mid-afternoon (3:00 p.m.) time periods during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21). The early evening time period (6:00 p.m.) is shown for June 21 and September 21. All times refer to local time. For each time of day, shadows are depicted for the No Build and Build conditions. Shadow diagrams are included as **Figures 4.2-1** through **4.2-14** at the end of the shadow analysis.

Particular attention is given to pedestrian sidewalks in the vicinity of the NPC Project. It is noted that new shadows do not extend to the Boston Common or park areas. The shadow diagrams also show the W Boston Hotel and Residences (originally approved as a Loews Hotel) in both the existing and build condition. In addition, the shadow study addresses impacts to historic resources, in the vicinity of the Project Site (see Figure 5-1 in **Appendix D** which identifies historic resources and buildings in the vicinity).

4.2.2 Vernal Equinox (March 21)

Figures 4.2-1 through **4.2-3** depict shadows on March 21.

At 9:00 a.m., shadows are cast in a northwesterly direction. In the morning, existing shadows cover a portion of the intersection of Tremont Street and Stuart Street, falling on sidewalk areas along both Stuart and Tremont Streets. New shadows from the Project extend across the roadway intersection of Tremont Street and Stuart Street to a portion of the sidewalk directly in front of the State Transportation Building and to the façade of that building, adjacent to existing shadow from existing buildings and the W Hotel.

At 12:00 Noon, new shadows will fall on the Stuart Street buildings directly across from the Project Site, and on the sidewalks on the north side of Stuart Street. Shadows do not fall on Jacob Wirth's at this time period.

At 3:00 p.m., the existing shadows extend in a northeast direction across the intersection of Tremont Street and Stuart Street and onto the Project Site, including the intersection. New shadows from the NPC building will extend in a northeast direction across Stuart Street to the middle of the Jacob Wirth's block and to portions of the Stuart Street sidewalks adjacent to other areas that are already in shadow from existing buildings.

4.2.3 Summer Solstice (June 21)

Figures 4.2-4 through **4.2-7** depict shadows on June 21.

At 9:00 a.m., shadows extend in a westerly direction. New shadows fall on the portion of Tremont Street sidewalks closest to the Stuart/Tremont intersection. Portions of the east side of Tremont Street's sidewalks are already in shadow from the Wilbur Theatre and Wang Theatre.

By 12:00 Noon, new shadows are limited to the sidewalk directly adjacent to the Project Site and extend almost across the roadway to the sidewalk on the opposite side of Stuart Street.

At 3:00 p.m., new shadows remain on the sidewalks adjacent to the Project Site on Stuart Street, and extend approximately to the midpoint of the street.

At 6:00 p.m., shadows fall easterly, and new shadows are limited to the back of the Wang Theatre to the east of the Project adjacent to Stuart Street. The Stuart Street sidewalk adjacent to the property remains mostly in the sun at this time period.

No new Project shadows are cast on Jacob Wirth's in the summer solstice.

4.2.4 Autumnal Equinox (September 21)

Figures 4.2-8 through **4.2-11** depict shadows on September 21.

In the morning, at 9:00 a.m., new shadows are cast on a portion of façade of the State Transportation Building and on a portion of the sidewalks in front of the building on the north side of the street.

At 12:00 Noon, new shadows fall on a portion of Stuart Street and its sidewalks across from the Project Site. The majority of the Stuart Street sidewalk, on the south side, are already in shadow from other buildings

At 3:00 p.m., new shadows from the Project cross Stuart Street and extend to the front of the Jacob Wirth building.

At 6:00 p.m., shadow from existing buildings extend onto most sidewalks in the Project vicinity, and new shadow from the NPC building casts a narrow band on the Stuart Street sidewalk in front of the Wang Center loading area and to the other side of Washington Street in front of the Tufts dental building.

4.2.5 Winter Solstice (December 21)

Figures 4.2-12 through **4.2-14** depict shadows on December 21. Winter sun casts the longest shadows of the year.

At 9:00 a.m., existing shadows extend throughout most of the Project vicinity. New shadows are found on a portion of the roof of State Transportation Building and the Majestic Theatre, but do not fall for the most part on the Majestic Theatre buildings' façade.

By 12:00 Noon, existing shadows extend northward across Stuart Street on both sides of Tremont Street. New shadows are cast onto the roof of buildings across Stuart Street.

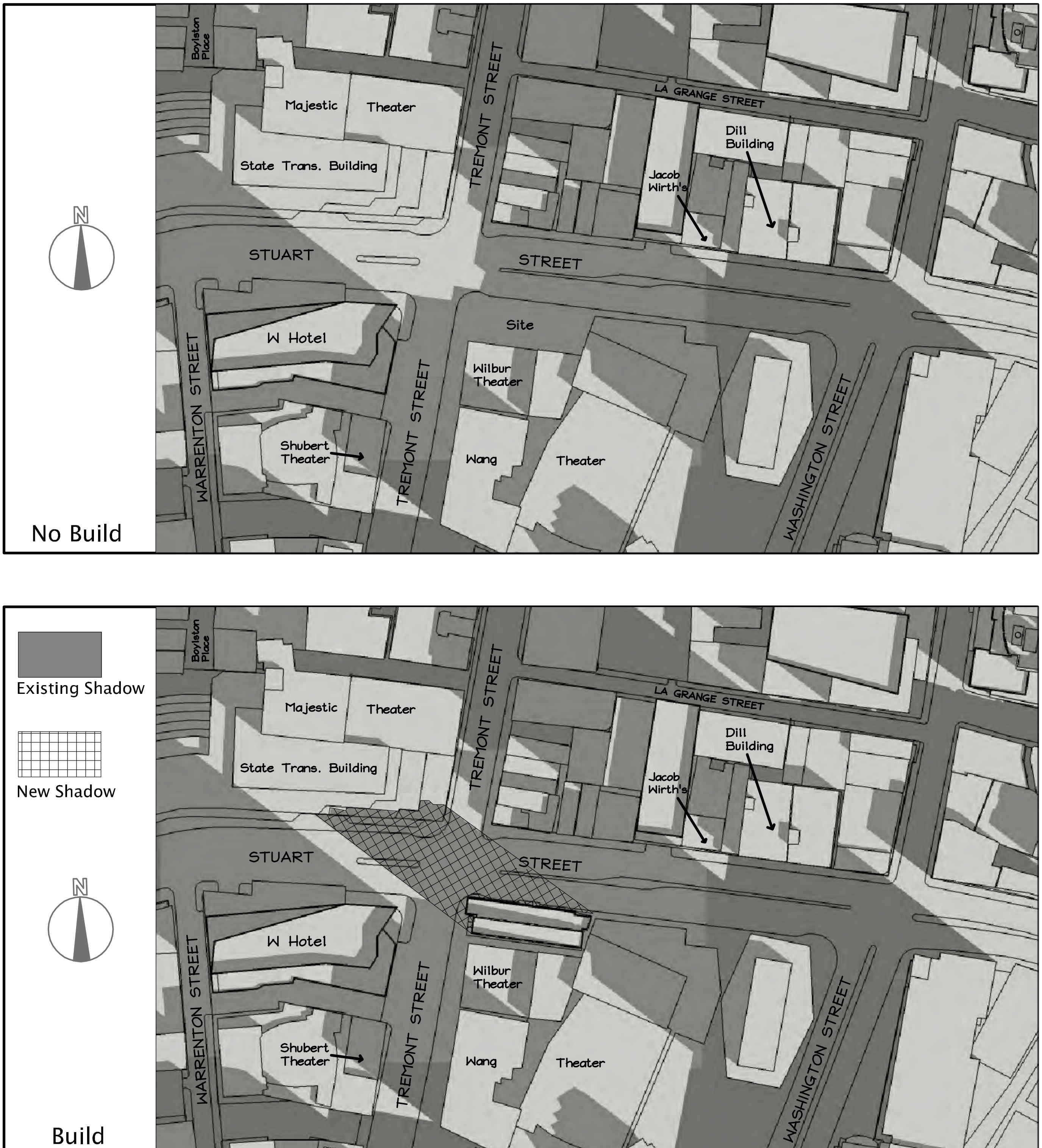
At 3:00 p.m., most of the site vicinity is covered by existing shadow, including the Project Site. There are no new shadows cast during this time period associated with the NPC building.

4.2.6 Conclusions

The NPC shadow analysis graphically depicts the anticipated shadows in the same manner and graphics as for the PNF Project. As noted in the Project Description, the NPC Project has a building height of 197'-0" to the roof structure, approx. 40'-0" taller than the previous PNF Project, with resulting shadows that are also proportionately increased. The dimensional footprint, massing and volume of the NPC Project are similar to the previous PNF Project. As portrayed in the NPC graphics, the anticipated shadows are similar to the previous Project, but somewhat longer as discussed above during the times of year where there are shadow impacts.

Any construction on the Project Site would result in new shadows compared to the No Build condition. In the morning, new shadows from the NPC Project will be cast across the roadway intersection of Tremont Street and Stuart Street towards the State Transportation Building and the abutting sidewalk on the north side of Stuart Street, adjacent to shadow cast by existing buildings. By 12:00 Noon and in the mid-day hours, new shadows extend northward and reach a small portion of buildings north of the Project Site, and portions of the Tremont and Stuart Street sidewalks. In the late afternoon, new shadows are cast along Stuart Street. There is a limited period of new shadow on Jacob Wirth's in the spring and fall only at 3:00 p.m., however, in the fall, the front of the Jacob Wirth's façade remains in the sun at 3:00 p.m.

No new shadows extend to Boston Common, Wilbur Theatre, Wang Theatre, or Shubert Theatre.



Azimuth 125.7 - Altitude 33.0

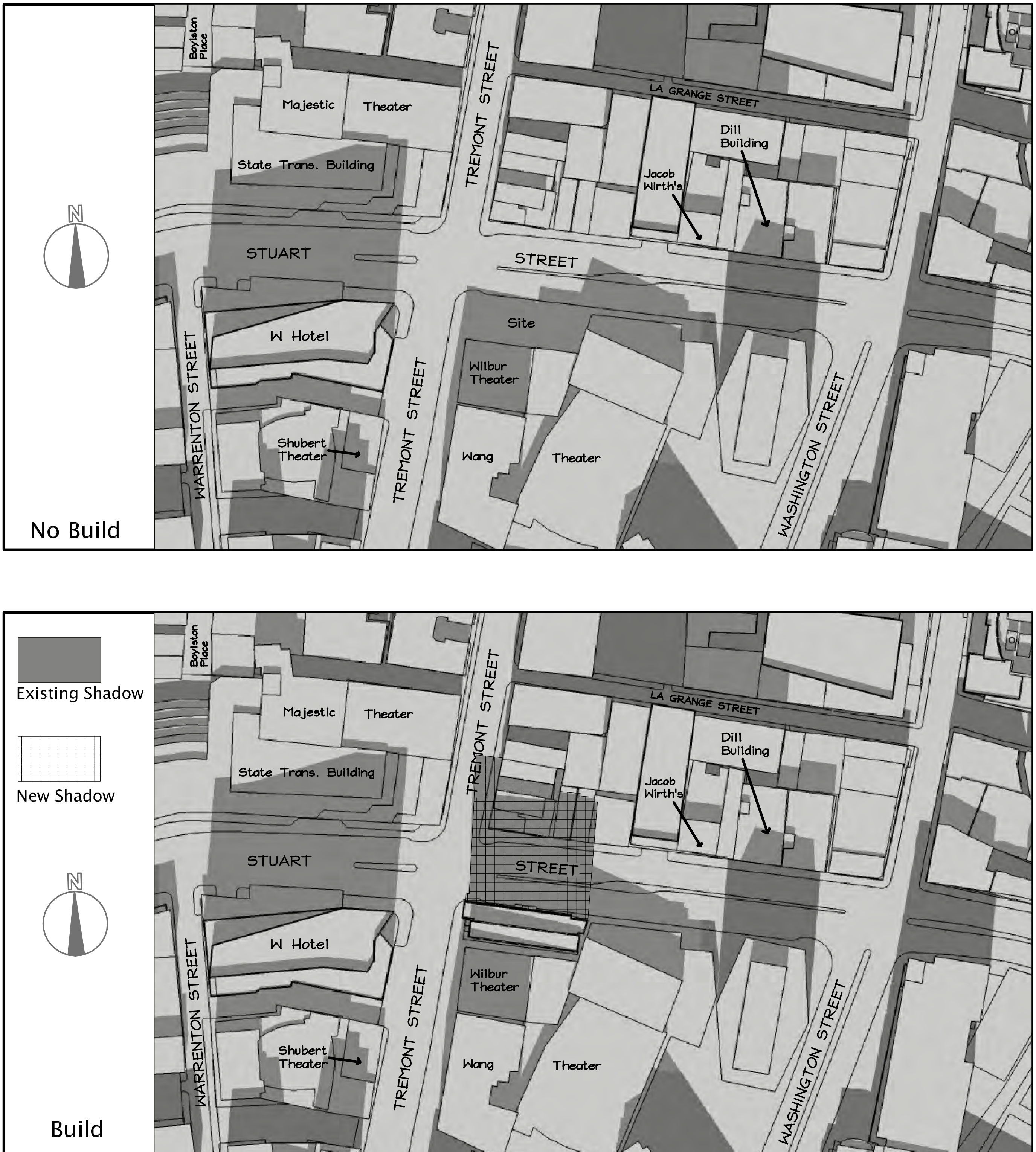
March 21 - 9AM

Figure 4.2-1

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
617.268.7000 ph
617.268.0209 f
www.grouponeinc.com



Azimuth -176.9 - Altitude 48.0

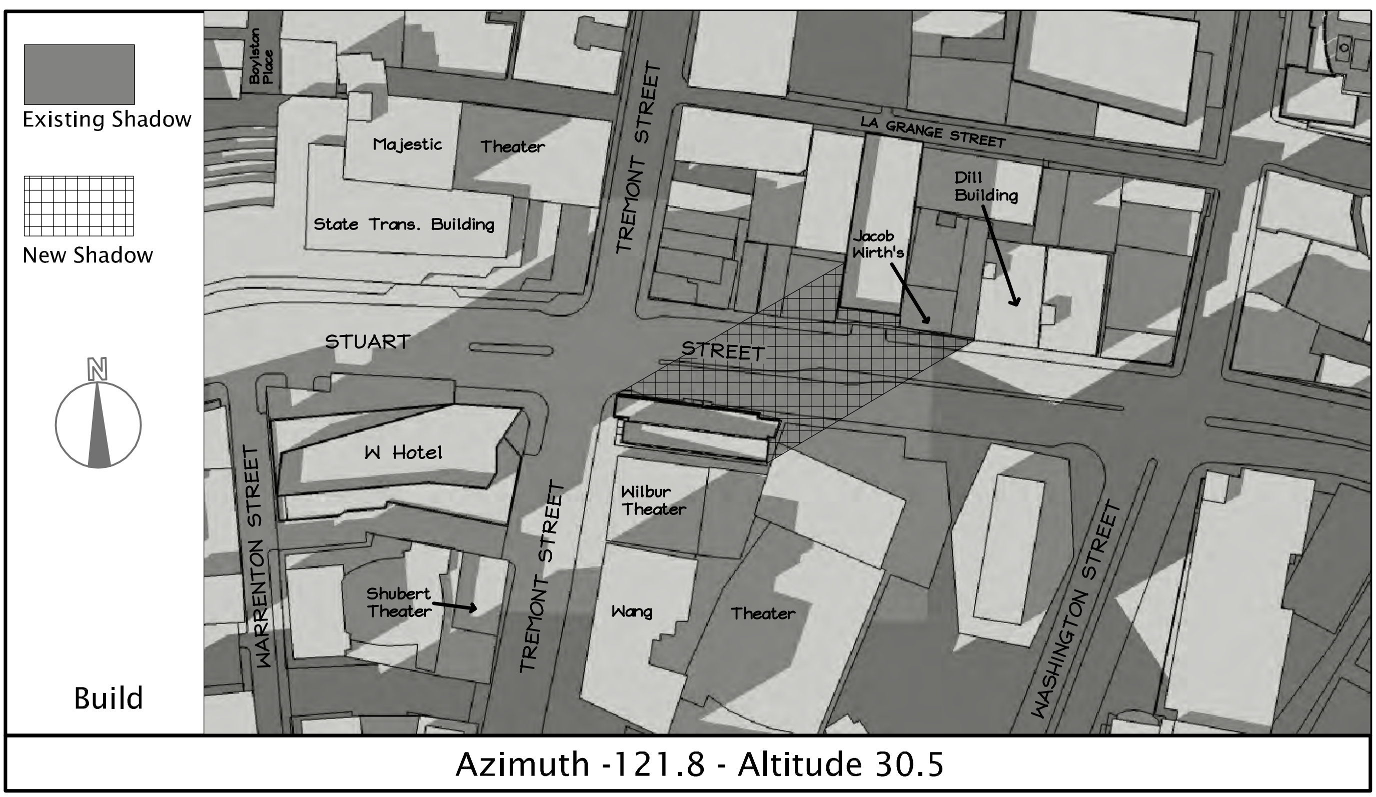
March 21 - 12 Noon

Figure 4.2-2

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
617.268.7000 ph
617.268.0209 f
www.grouponeinc.com



March 21 - 3PM

Figure 4.2-3

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
617.268.7000 ph
617.268.0209 f
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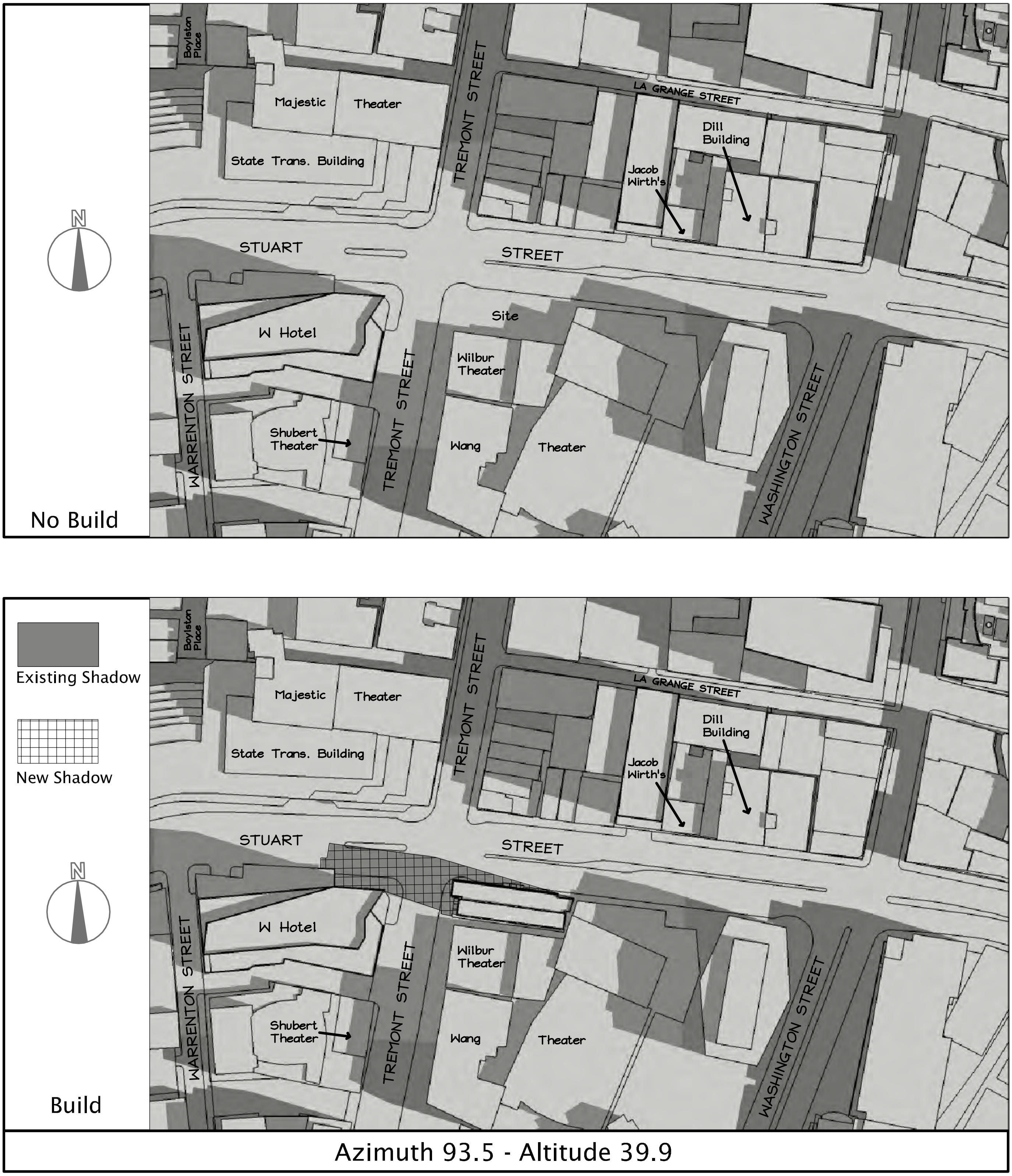


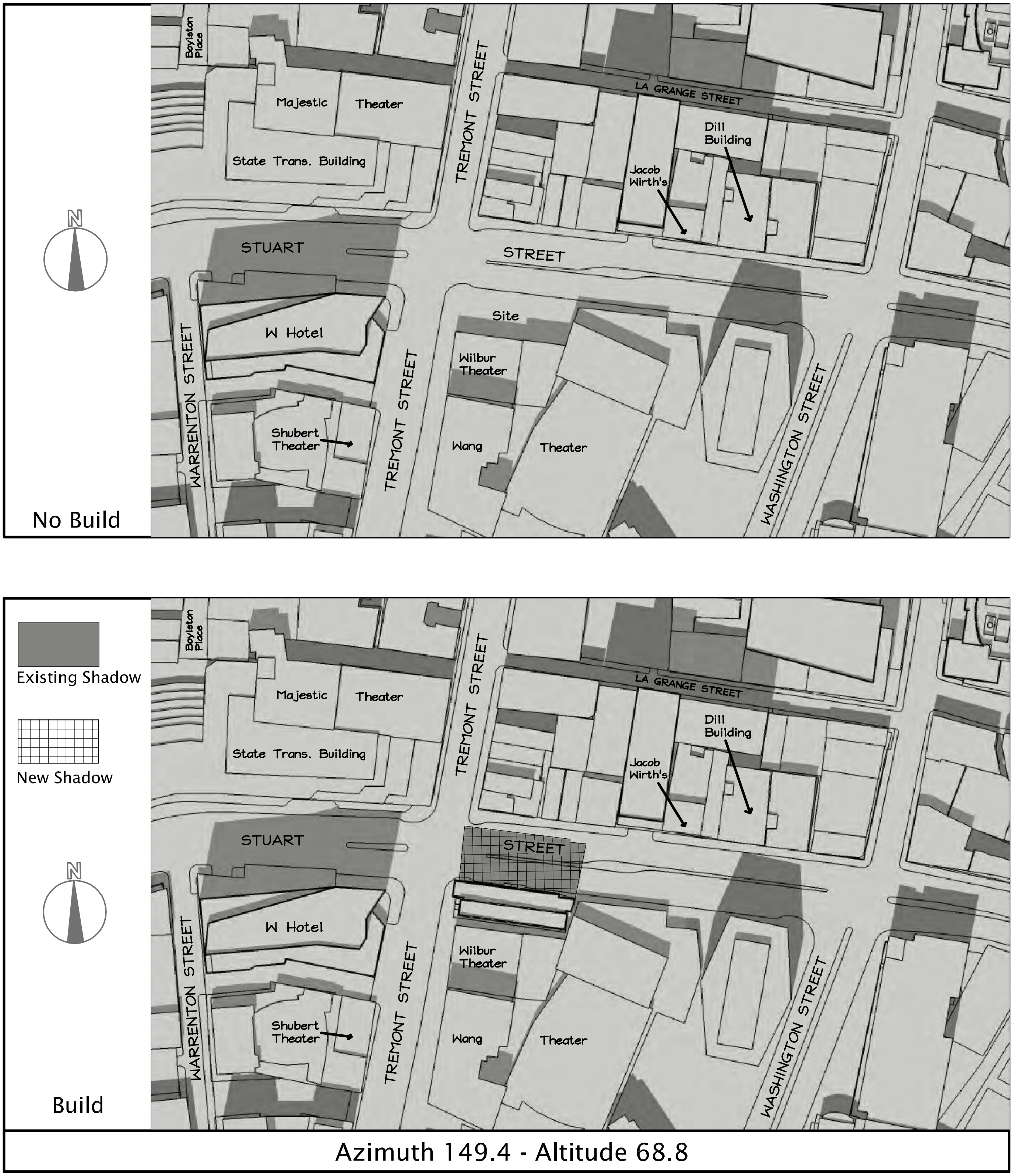
June 21 - 9AM

Figure 4.2-4

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
617.268.7000 ph
617.268.0209 f
www.grouponeinc.com



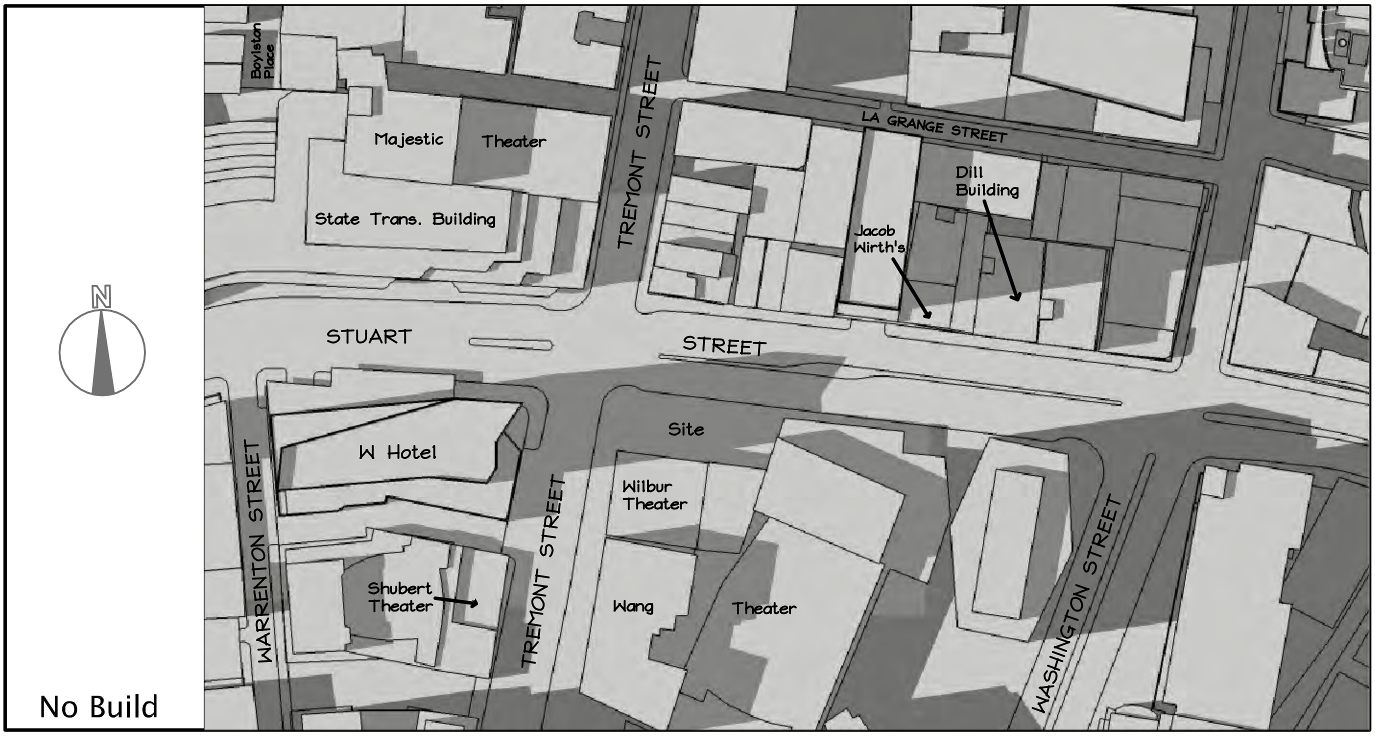
June 21 - 12PM

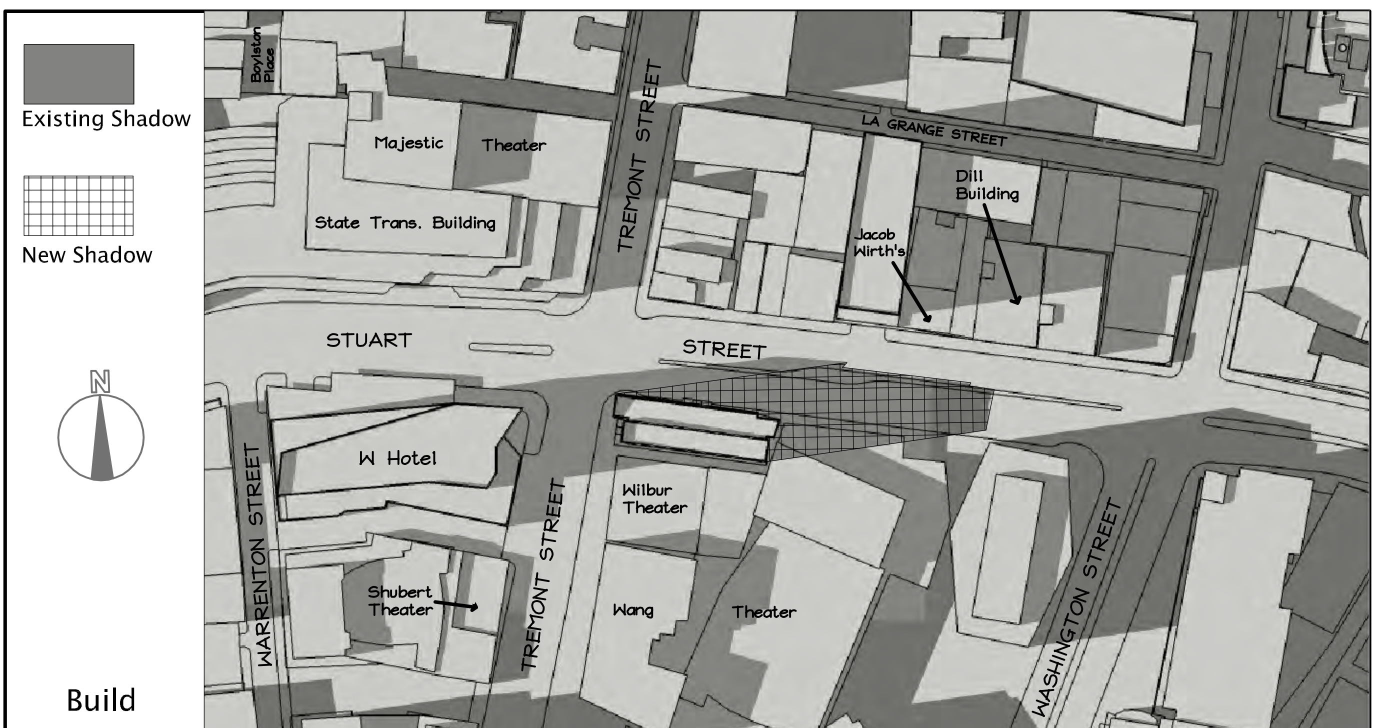
Figure 4.2-5

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
617.268.7000 ph
617.268.0209 f
www.grouponeinc.com





Azimuth -113.7 - Altitude 56.5

June 21 - 3PM

Figure 4.2-6

Parcel P7A Shadow Study

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Azimuth -79.3 - Altitude 23.9

June 21 - 6PM

Figure 4.2-7

Parcel P7A Shadow Study

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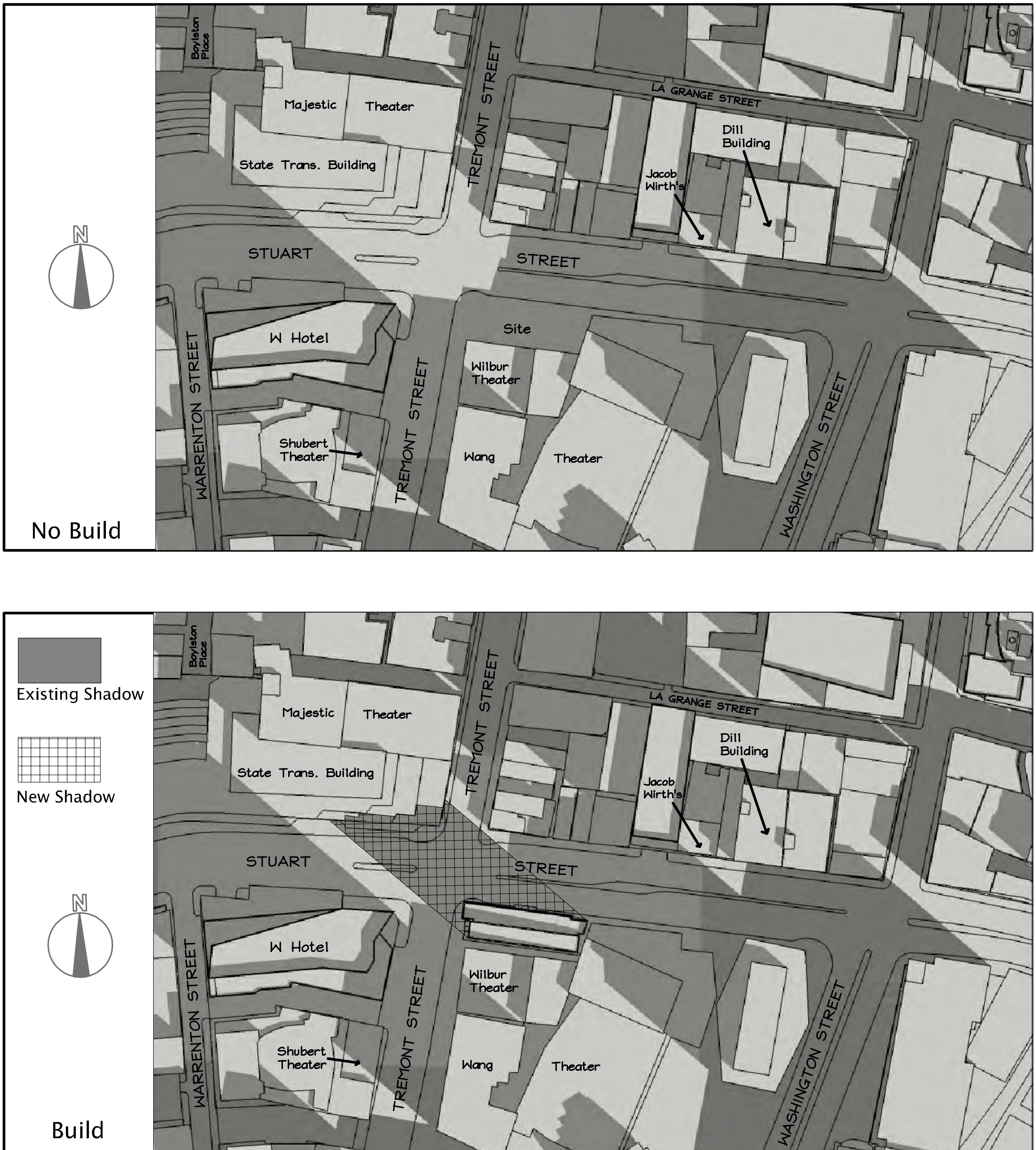

Azimuth 115.3 - Altitude 25.9

September 21 - 9AM

Figure 4.2-8

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
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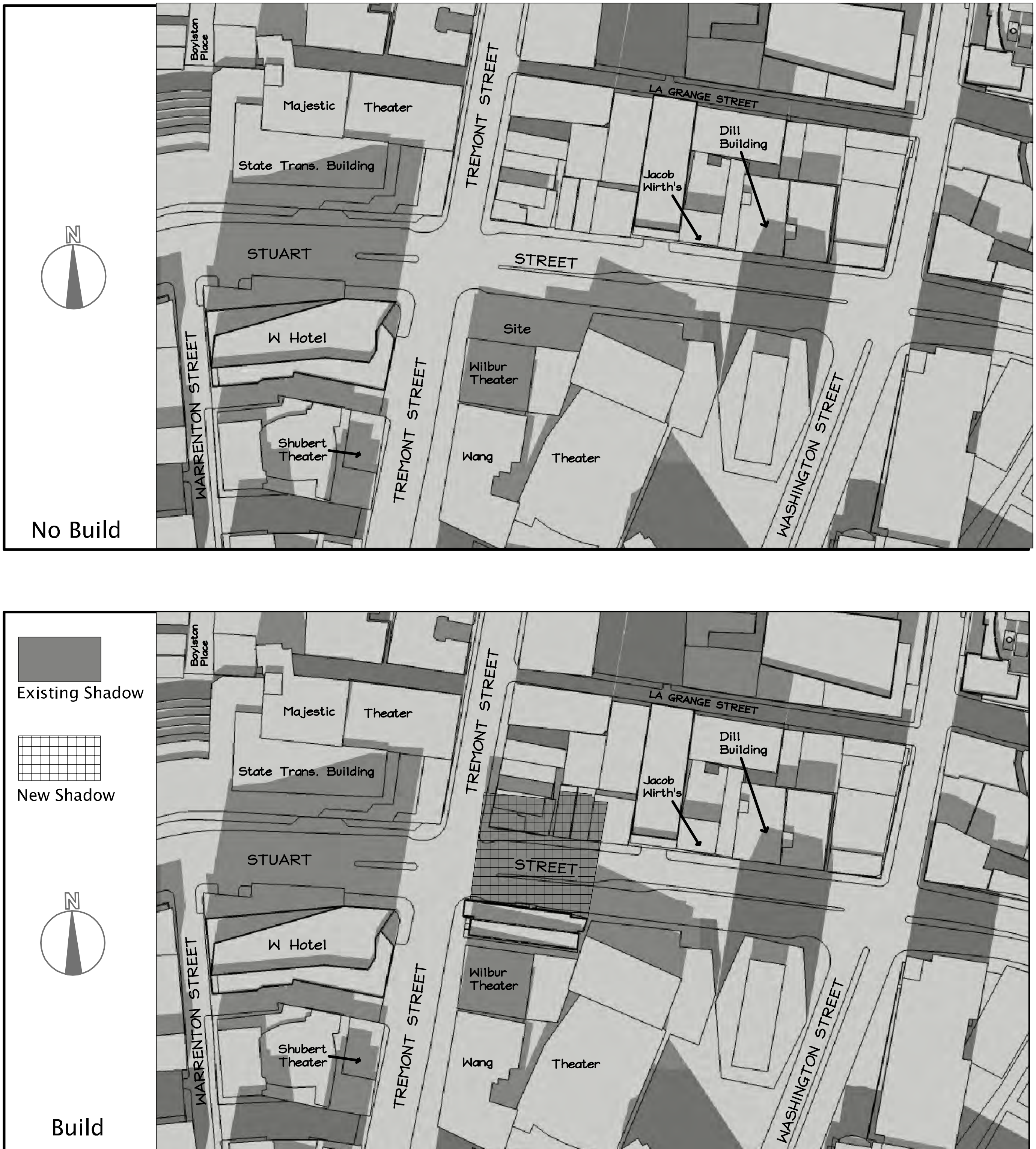

Azimuth 166.0 - Altitude 47.4

September 21 - 12PM

Figure 4.2-9

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
617.268.7000 ph
617.268.0209 f
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Azimuth -132.9 - Altitude 37.4

September 21 - 3PM

Figure 4.2-10

Parcel P7A Shadow Study

Boston, MA

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Boston, MA 02127
617.268.7000 ph
617.268.0209 f
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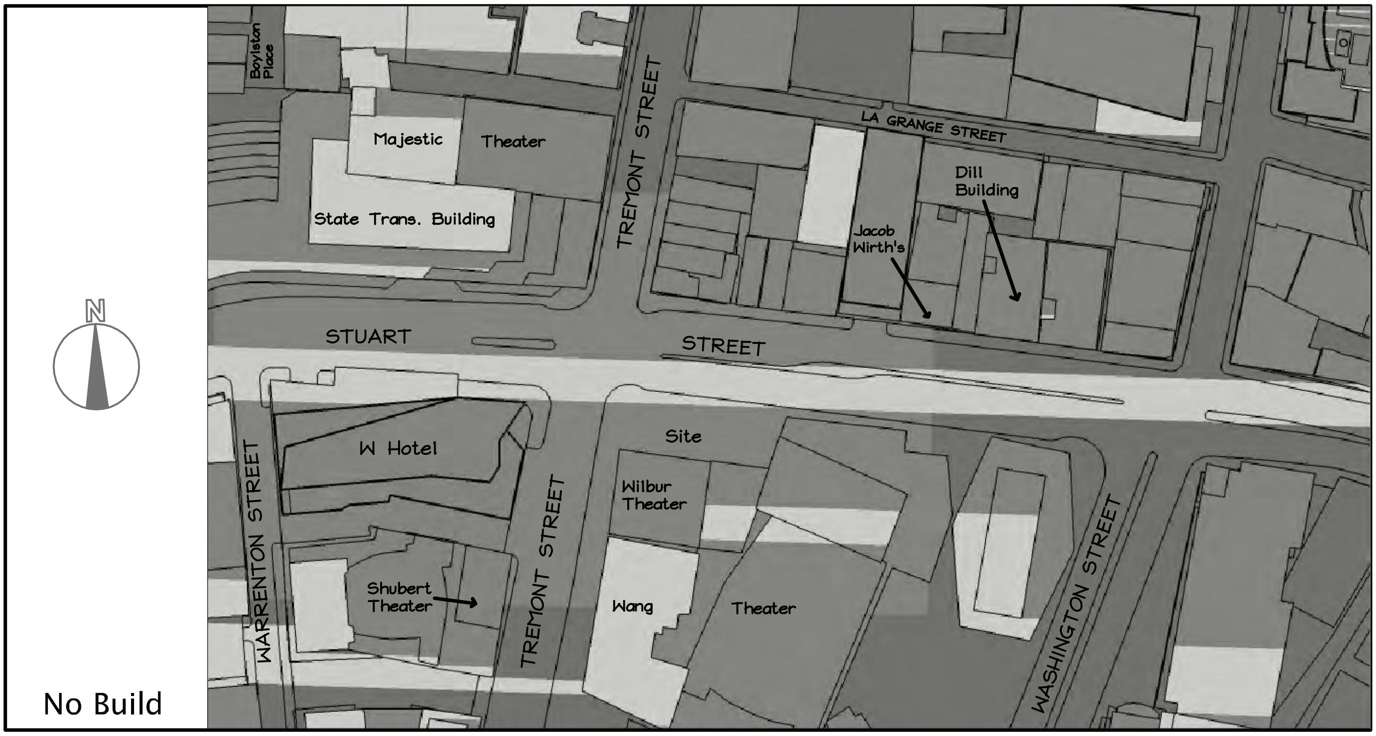

Azimuth -96.0 - Altitude 7.3

September 21 - 6PM

Figure 4.2-11

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
617.268.7000 ph
617.268.0209 f
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Azimuth 141.9 - Altitude 14.2

December 21 - 9AM

Figure 4.2-12

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
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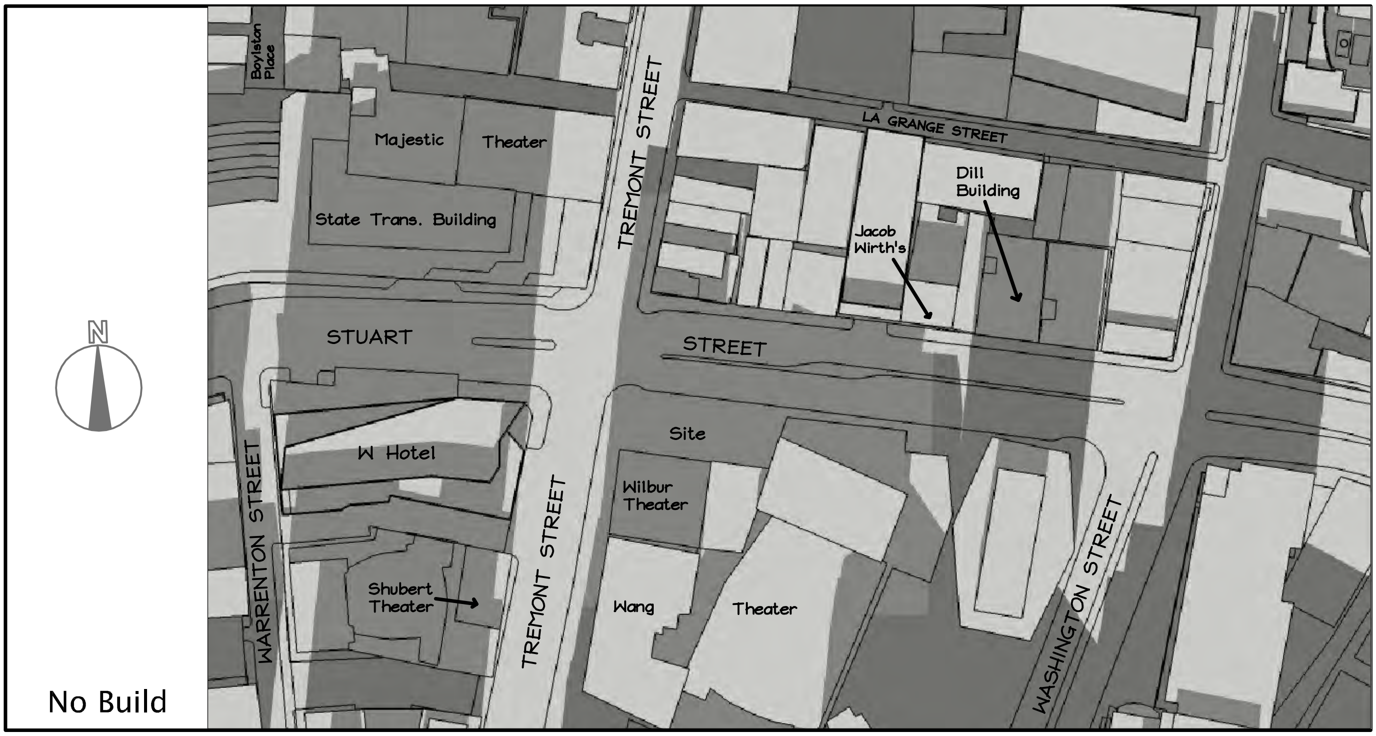
617.268.7000 ph
617.268.0209 f
www.grouponeinc.com



Azimuth -175.6 - Altitude 24.1

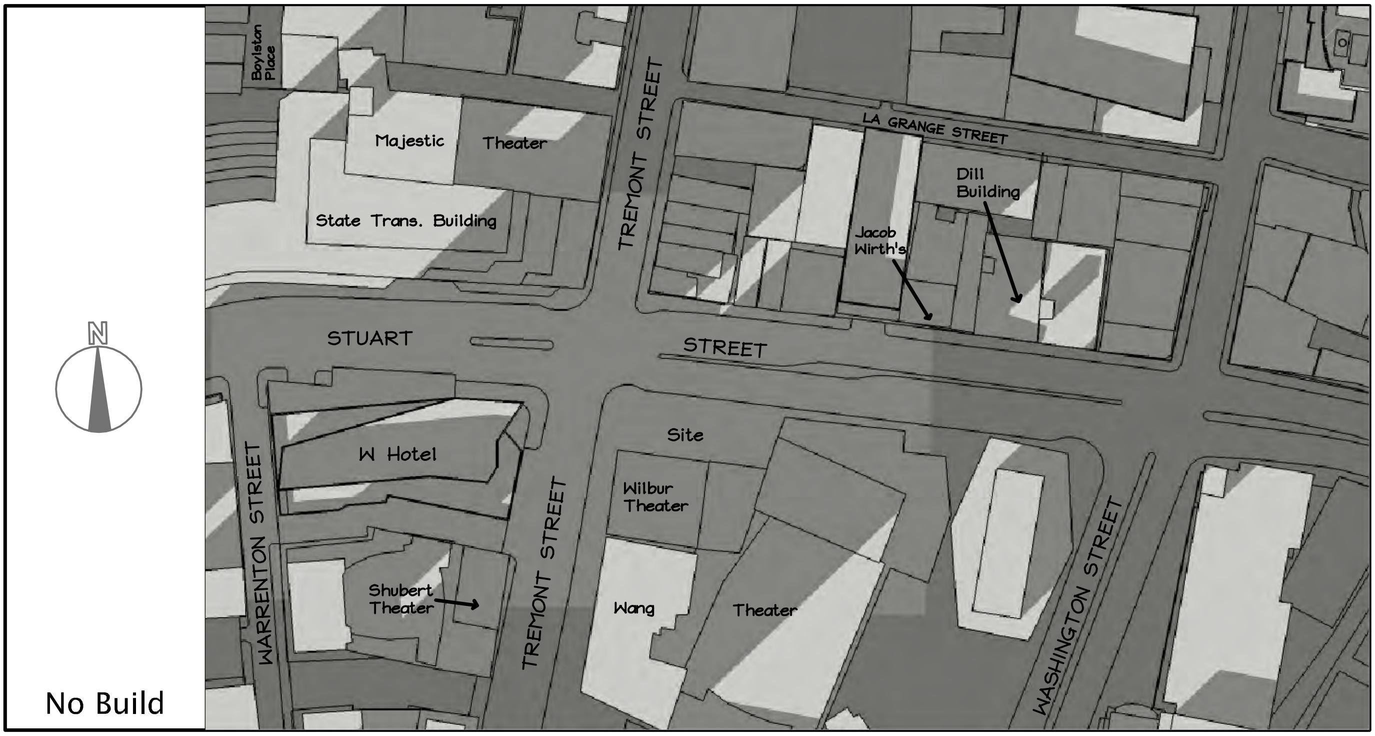
December 21 - 12PM

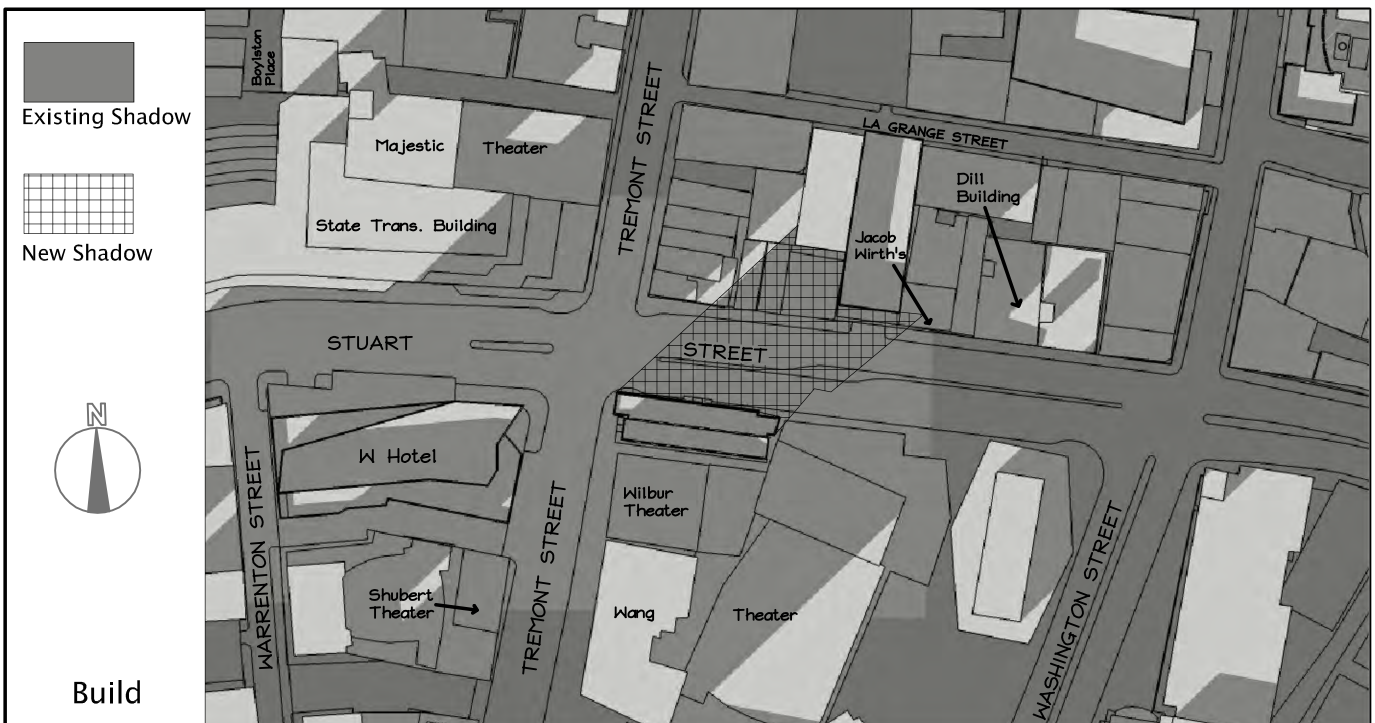
Figure 4.2-13

Parcel P7A Shadow Study

Boston, MA

Group One Partners, Incorporated
21 West Third Street
Boston, MA 02127
617.268.7000 ph
617.268.0209 f
www.grouponeinc.com





Azimuth -135.1 - Altitude 10.0

December 21 - 3PM

Figure 4.2-14

Parcel P7A Shadow Study

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617.268.0209 f
www.grouponeinc.com

4.3 Air Quality Impacts

Tech Environmental, Inc. performed air quality analyses for the NPC Project. These analyses consisted of: 1) an evaluation of existing air quality; 2) an evaluation of potential carbon monoxide (CO) impacts from the operation of the Project's fuel combustion equipment; and 3) a microscale CO analysis for the intersections in the Project area that meet the BRA criteria for requiring such an analysis.

4.3.1 Existing Air Quality

The City of Boston is currently classified as being in attainment of the Massachusetts and National Ambient Air Quality Standards (NAAQS) for all of the criteria air pollutants except ozone (see Error! Reference source not found. **4.3-1**). These air quality standards have been established to protect the public health and welfare in ambient air, with a margin for safety.

Table 4.3-1. Massachusetts and National Ambient Air Quality Standards (NAAQS)

Pollutant	Averaging Time	NAAQS (μg/m^3)
SO_2	1-hour[P] 24-hour[P] Annual[P] (Arithmetic Mean)	196[a] 365[b] 80
CO	1-hour[P] 8-hour[P]	40,000[b] 10,000[b]
NO_2	1-hour[P] Annual[P/S] (Arithmetic Mean)	188[c] 100
PM_{10}	24-hour[P/S]	150
$PM_{2.5}$	24-hour[P/S] Annual[P/S] (Arithmetic Mean)	35[d] 15[e]
O_3	8-hour[P/S]	147[f]
Pb	Rolling 3-Month Avg.[P/S] Calendar Quarter[P/S] (Arithmetic Mean)	0.15 1.5

P = primary standard; S = secondary standard.
[a] 99th percentile 1-hour concentrations in a year (average over three years).
[b] One exceedance per year is allowed.
[c] 98th percentile 1-hour concentrations in a year (average over three years).
[d] 98th percentile 24-hour concentrations in a year (average over three years).
[e] Three-year average of annual arithmetic means.
[f] Three-year average of the annual 4th-highest daily maximum 8-hour ozone concentration must not exceed 0.075 ppm (147 ug/m^3) (effective May 27, 2008) and the annual PM_{10} standard was revoked in 2006.

The MassDEP currently operates air monitors in various locations throughout the city. The closest, most representative, MassDEP monitors for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), fine particulate matter ($PM_{2.5}$), coarse particulate matter (PM_{10}), and lead are located at Kenmore Square. The closest, most representative, MassDEP monitor for ozone is located at Dudley Square (Harrison Avenue).

Table 4.3-2 summarizes the MassDEP air monitoring data, for the most recent available, complete, three-year period (2008-2010), that are considered to be representative of the project area. **Table 4.3-2** shows that the existing air quality in the project area is generally much better than the NAAQS. The highest impacts relative to a NAAQS are for eight-hour ozone and annual $PM_{2.5}$. Ozone is a regional air pollutant on which the small amount of additional traffic generated by this Project will have an insignificant impact. The project's operations will not have a significant impact on local $PM_{2.5}$ concentrations.

Table 4.3-2. Representative Existing Air Quality in the Project Area				
Pollutant, Averaging Period	**Monitor Location**	**Value (μg/m^3)**	**NAAQS (μg/m^3)**	**Percent of NAAQS**
CO, 1-hour	Kenmore Square, Boston	2,061	40,000	5%
CO, 8-hour	Kenmore Square, Boston	1,718	10,000	17%
NO_2, 1-hour	Kenmore Square, Boston	103.1	188	55%
NO_2, Annual	Kenmore Square, Boston	41.4	100	41%
Ozone, 8-hour	Harrison Avenue, Boston	123	147	84%
PM_{10}, 24-hour	Kenmore Square, Boston	43	150	29%
$PM_{2.5}$, 24-hour	Kenmore Square, Boston	22.3	35	64%
$PM_{2.5}$, Annual	Kenmore Square, Boston	9.8	15	65%
Lead, Quarterly	Kenmore Square, Boston	0.015	1.5	1%
$SO_{2,}$ 1-hour	Kenmore Square, Boston	56.7	196	29%
$SO_{2,}$ 24-hour	Kenmore Square, Boston	36.7	365	10%
$SO_{2,}$ Annual	Kenmore Square, Boston	10.5	80	13%

Source: MassDEP, http://www.mass.gov/dep/air/priorities/aqreports.htm and email from Ann, Sorenson, MassDEP, September, 2010.

Notes:

(1) Annual averages are highest measured during the most recent three-year period for which data are available (2008 - 2010). Values for periods of 24-hours or less are highest, second-highest over the three-year period unless otherwise noted.

(2) The eight-hour ozone value is the 3-year average of the annual fourth-highest values, the 24-hour $PM_{2.5}$ value is the 3-year average of the 98th percentile values, the annual $PM_{2.5}$ value is the 3-year average of the annual values – these are the values used to determine compliance with the NAAQS for these air pollutants.

(3) The one-hour NO_2 value is the -year average of the 98th percentile values and the one-hour SO_2 value is the -year average of the 99th percentile values

(4) The one-hour ozone standard was revoked by the US EPA in 2005; the annual PM_{10} standard was revoked in 2006 and the 3-hour SO_2 standard was revoked by the US EPA in 2010.

4.3.2 Impacts from Heating, Mechanical, and Exhaust Systems

Peak CO Emission Rates from Fuel Combustion Equipment

The NPC Project will include fuel combustion equipment that will emit air pollutants to the atmosphere when operating. Fuel combustion equipment for the Project will include gas-fired heating equipment and a diesel-fired emergency generator (350 kW). Heating will be accomplished with gas-fired hot-water boilers, and domestic hot water will be created with a central gas-fired system.

EPA's AP-42 document was used to determine the uncontrolled CO emission rate for the gas-firing heating equipment. The total equipment heat input capacity for the Project will be 8.8 million Btu per hour (MMBtu/hour). Assuming a heating value of 1,000 Btu/cubic foot of natural gas this translates to approximately 8,800 cubic feet of natural gas burned per hour. Using a CO emission factor of 84 lb/million cubic feet of gas burned[5], the maximum total CO emissions from the Project's heating equipment will be 0.74 lb/hour (0.09 gram/sec). This calculation conservatively assumes that all of the equipment is operating simultaneously at its full design capacity.

Emissions from the emergency generator building may occur for brief periods during periodic testing (maximum 20 – 30 minutes per week) and whenever a break in electrical power necessitates their use. EPA's AP-42 document was used to determine the uncontrolled CO emission rate for the emergency generator. The AP-42 emission factor for CO is 4.06 gram/kWatt/hour.[6] Therefore, the maximum CO emission rate for the 350-kWatt generator will be 0.39 gram/sec. Therefore the total CO emissions from the Project's gas-fired equipment and the emergency generator will be 0.48 grams/sec.

Peak Ambient CO Concentration

On April 11, 2011, U.S. EPA replaced the SCREEN3 model with AERSCREEN as the recommended air dispersion screening model. AERSCREEN is a screening-level air quality model based on AERMOD. Worst-case concentrations of CO from the Project's fuel combustion equipment were predicted for locations around the building with the U.S. AERMOD model in screening mode (Version 11353). The results of the air quality analysis for locations outside and around the building are summarized in **Table 4.3-3**. The results in **Table 4.3-3** represent all outside locations on and near the Project Site, including building air intakes, nearby residences, and pedestrians/sidewalks. The Air Quality Appendix (**Appendix E**) contains the AERSCREEN model output.

The AERSCREEN model was used to predict the maximum concentration of CO by modeling the air pollutant emissions both as a point source with aerodynamic building downwash and as a volume source, and using the largest predicted impact to be conservative. The largest air quality impact was predicted to occur when the emissions were modeled as a volume source. Therefore, the AERSCREEN model was used to predict the total maximum concentration of CO by modeling the fuel combustion equipment as one volume source with the total peak CO emissions (0.48 grams/sec). The dimensions of the Project building were used to calculate the initial lateral

[5] US EPA, "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition Volume I: Stationary Point and Area Sources", Table 1.4-1, January 1995 (revised July 1998).
[6] US EPA, "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition Volume I: Stationary Point and Area Sources", Table 3.3-1, January 1995 (revised October 1996).

and vertical dispersion parameters for the AERSCREEN analysis. The predicted concentrations presented here represent the worst-case air quality impacts from the fuel combustion equipment at all locations on and around the Project. The analysis of the ambient impacts from the fuel combustion CO emissions as a volume source is not dependent on the exact location of the emissions. The AERSCREEN model predicts one-hour average concentrations of air pollutants.

The AERSCREEN model predicts that the maximum one-hour CO concentration from the fuel combustion equipment will be 0.16 ppm (193.81 $\mu g/m^3$). This concentration represents the maximum CO concentration at any location surrounding the Project.

The maximum predicted eight-hour CO concentration at any ambient (outside) location will be significantly smaller than the one-hour prediction. This is because the worst-case meteorological conditions used to predict the peak one-hour impact will not persist for eight consecutive hours. MassDEP guidance allows the maximum eight-hour CO impact to be conservatively estimated by multiplying the maximum one-hour impact by a factor of 0.9 (i.e. the eight-hour impact is 90% of the one-hour impact). The maximum predicted eight-hour CO concentration was determined to be approximately 0.14 ppm (0.16 ppm x 0.9).

The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare in ambient air, with a margin for safety. The NAAQS for CO are 35 ppm for a one-hour average and 9 ppm for an eight-hour average. The Commonwealth of Massachusetts has established the same standards for CO. The CO background values of 1.8 ppm for a one-hour period and 1.5 ppm for an eight-hour period were added to the maximum predicted fuel combustion equipment ambient impacts to represent the CO contribution from other, more distant, sources. With the conservative background concentration added, the peak, total, one-hour and eight-hour CO impacts from the fuel combustion equipment, at any location around the buildings, will be no larger than 2.0 ppm and 1.6 ppm, respectively. These maximum predicted total CO concentrations (fuel combustion exhaust impacts plus background) are safely in compliance with the NAAQS. This analysis demonstrates that the operation of the fuel combustion equipment will not have an adverse impact on air quality.

Conclusions

The conservative air quality analysis for the NPC Project demonstrates that there will be no adverse air quality impacts from the operation of the NPC Project's fuel combustion equipment.

Table 4.3-3: Peak Predicted Fuel Combustion Air Quality Impacts				
Location	**Peak Predicted One-Hour Impact (ppm)**	**One-Hour Indoor Guideline or NAAQS (ppm)**	**Peak Predicted Eight-Hour Impact (ppm)**	**Eight-hour Indoor Guideline or NAAQS (ppm)**
Outside – Surrounding the Building* (Fuel Combustion Emissions)	2.0**	35 (NAAQS)	1.6**	9 (NAAQS)

NAAQS = Massachusetts and National Ambient Air Quality Standards for CO (ppm = parts per million)

* Representative of maximum CO impact at all nearby residences, buildings, and sidewalks.

** Includes background concentrations of 1.8 ppm for the one-hour period and 1.5 ppm for the eight-hour period.

4.3.3 Microscale CO Analysis for Selected Intersections

The Boston Redevelopment Authority (BRA) requires a microscale air quality analysis for any intersection in the Project study area where the level of service (LOS) is expected to deteriorate to D and the Project causes a 10% increase in traffic or where the level of service is E or F and the Project contributes to a reduction in LOS. For such intersections, a microscale air quality analysis is required to examine the CO concentrations at sensitive receptors near the intersection.

A microscale air quality analysis was not performed for the NPC Project due to its extremely small motor vehicle trip generation. The NPC Project generates only 47 motor vehicle trips during the morning peak traffic hour and only 51 motor vehicle trips during the afternoon traffic hour. The NPC Project will add no more than 10 motor vehicle trips to either of the intersections included in the transportation impact analysis during either the morning or afternoon peak traffic period.

Table 4.3-4 shows that the NPC Project will not deteriorate the LOS of either analyzed intersections and will increase the traffic at either intersection by no more than 0.4%. The small motor vehicle trip generation from the NPC Project will not have a significant impact on motor vehicle delays and air pollutant emissions at the analyzed intersections. Therefore, the motor vehicle traffic generated by the NPC Project will not have a significant impact on air quality at any intersection in the Project area and a microscale air quality analysis is not necessary for this Project.

Table 4.3-4: Summary of No-Build and Build Case Level of Service (LOS)

Intersection	Worst-Case No-Build LOS (a.m./p.m.)	Worst-Case Build LOS (a.m./p.m.)	% Increase in Traffic from the Project	Requires Analysis?
Stuart Street/Tremont Street – Signalized	D/D	D/D	+0.3%/+0.4%	NO
Stuart Street/Kneeland Street/Washington Street – Signalized	C/C	C/C	+0.3%/+0.4%	NO

Data Source: Howard/Stein-Hudson Associates, Inc.

Notes:

The LOS shown for the signalized intersection represents the overall delay for the intersection.

None of the intersections experience a reduction in LOS from the Project's traffic. The Stuart Street/Tremont Street intersection operates at LOS D for the No-Build and Build cases and the Project increases the traffic at these intersections by 0.3% or less. The Stuart Street/Kneeland Street/Washington Street intersection operates at an acceptable level of service for the Build case.

Conclusions

The traffic generated by the NPC Project will have an insignificant impact on the peak-hour traffic volumes at local intersections. Therefore, the NPC Project will have an insignificant impact on the local air quality. The air quality in the Project area will remain safely in compliance with the NAAQS for CO after the NPC Project is completed.

4.4 Noise Impacts

There will be no major changes in rooftop mechanical equipment that was assumed in the noise analysis prepared for the PNF Project. Since the hotel proposed in this NPC is a taller building than one proposed in the PNF, the mechanical roof top equipment will be further away from noise-sensitive receptors. Therefore, the proposed hotel mechanical equipment will generate noise levels equal to or less than those presented in the PNF. Presented below is the noise analysis prepared for the PNF.

Tech Environmental, Inc. performed a noise analysis for the PNF Project. The goal of the noise impact analysis was to determine whether the operation of the proposed Project will comply with the City of Boston Noise Regulations, the Massachusetts Department of Environmental Protection (MassDEP) Noise Policy, and US Department of Housing and Urban Development (HUD) Residential Site Acceptability Standards.

4.4.1 Common Measures of Community Noise

The unit of sound pressure is the decibel (dB). The decibel scale is logarithmic to accommodate the wide range of sound intensities to which the human ear is subjected. A property of the decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 70 dB is added to another sound of 70 dB, the total is only a 3-decibel increase (or 73 dB), not a doubling to 140 dB. Thus, every 3 dB increase represents a doubling of sound energy. For broadband sounds, a 3 dB change is the minimum change perceptible to the human ear. **Table 4.4-1** gives the perceived change in loudness of different changes in sound pressure levels.[7]

Table 4.4-1: Subjective Effects of Changes in Sound Pressure Levels

Change in Sound Level	Apparent Change in Loudness
3 dB	Just perceptible
5 dB	Noticeable
10 dB	Twice (or half) as loud

Non-steady noise exposure in a community is commonly expressed in terms of the A-weighted sound level (dBA); A-weighting approximates the frequency response of the human ear. Levels of many sounds change from moment to moment. Some are sharp impulses lasting 1 second or less, while others rise and fall over much longer periods of time. There are various measures of

[7] American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1989 ASHRAE Handbook--Fundamentals (I-P) Edition, Atlanta, GA, 1989.

sound pressure designed for different purposes. To establish the background ambient sound level in an area, the L_{90} metric, which is the sound level exceeded 90 percent of the time, is typically used. The L_{90} can also be thought of as the level representing the quietest 10 percent of any time period. Similarly, the L_{10} can also be thought of as the level representing the quietest 90 percent of any time period. The L_{10} and L_{90} are broadband sound pressure measures, i.e., they include sounds at all frequencies.

The L_{eq}, or equivalent sound level, is the steady-state sound level over a period of time that has the same acoustic energy as the fluctuating sounds that actually occurred during that same period. It is commonly referred to as the average sound level. The L_{dn} is the 24-hour average sound level, in dBA, obtained by adding 10 decibels to night-time sound levels between 10 p.m. and 7 a.m.

Sound level measurements typically include an analysis of the sound spectrum into its various frequency components to determine tonal characteristics. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis examines nine octave bands from 32 Hz to 8,000 Hz. A source is said to create a pure tone if acoustic energy is concentrated in a narrow frequency range and one octave band has a sound level 3 dB greater than both adjacent octave bands.

The acoustic environment in an urban area such as the Project area results from numerous sources. Observations show that major contributors to the background sound level in the Project area include motor vehicle traffic on local and distant roadways, and mechanical equipment on nearby buildings. Typical sound levels associated with various activities and environments are presented in **Table 4.4-2**.

Table 4.4-2: Common Indoor and Outdoor Sound Levels			
Outdoor Sound Levels	**Sound Pressure (μPa)**	**Sound Level (dBA)**	**Indoor Sound Levels**
	6,324,555	110	Rock Band at 5 m
Jet Over-Flight at 300 m		105	
	2,000,000	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		95	
	632,456	90	Food Blender at 1 m
Diesel Truck at 15 m		85	
Noisy Urban Area—Daytime	200,000	80	Garbage Disposal at 1 m
		75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		65	Normal Speech at 1 m
	20,000	60	
Quiet Urban Area—Daytime		55	Quiet Conversation at 1m
	6,325	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		45	
	2,000	40	Empty Theatre or Library
Quiet Suburb—Nighttime		35	
	632	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		25	Empty Concert Hall
Rustling Leaves	200	20	Average Whisper
		15	Broadcast and Recording Studios
	63	10	
		5	Human Breathing
Reference Pressure Level	20	0	Threshold of Hearing

Notes: μPa, or micro-Pascals, describes sound pressure levels (force/area). DBA, or A-weighted decibels, describes sound pressure on a logarithmic scale with respect to 20 μPa (reference pressure level).

4.4.2 Noise Regulations

Commonwealth Noise Policy

The MassDEP regulates noise through 310 CMR 7.00, "Air Pollution Control." In these regulations "air contaminant" is defined to include sound and a condition of "air pollution" includes the presence of an air contaminant in such concentration and duration as to "cause a nuisance" or "unreasonably interfere with the comfortable enjoyment of life and property."

Regulation 7.10 prohibits "unnecessary emissions" of noise. The MassDEP DAQC Policy Statement 90-001 (February 1, 1990) interprets a violation of this noise regulation to have occurred if the noise source causes either:

1. An increase in the broadband sound pressure level of more than 10 dBA above the ambient level; or
2. A "pure tone" condition.

The ambient background level is defined as the L_{90} level as measured during equipment operating hours. A "pure tone" condition occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by 3 dB or more.

The MassDEP does not regulate noise from motor vehicles accessing a site or the equipment backup notification alarms. Therefore, the provisions described above only apply to a portion of the sources that may generate sound following construction of the Project.

Local Regulations

The City of Boston Environment Department regulates noise through the Regulations for the Control of Noise as administered by the Air Pollution Control Commission. The Project will be located in an area consisting primarily of commercial and residential uses. The closest residential uses are the existing Marriott Courtyard Hotel on Tremont Street and residential buildings at 62 Boylston Street and 90 Warrenton Street. One Charles Residences is further from the Project Site than these closer structures. The proposed W Boston Hotel & Residences (formerly Loews Boston Hotel) at 100 Stuart Street, across Tremont Street from the Project, will also be a residential use (either hotel or residences). The Project must comply with Regulation 2.2 for noise levels in Residential Zoning Districts at these and any other residential locations. **Table 4.4-3** lists the maximum allowable octave band and broadband sound pressure levels for residential and business districts. Daytime is defined by the City of Boston Noise Regulations as occurring between the hours of 7:00 a.m. and 6:00 p.m. daily except Sunday. Compliance with the most restrictive nighttime residential limits will ensure compliance for other land uses with equal or higher noise limits.

Table 4.4-3: Maximum Allowable Sound Pressure Levels (dB) City Of Boston			
	Zoning District		
Octave Band (Hz)	Residential (Daytime)	Residential (All Other Times)	Business (anytime)
32 Hz	76	68	79
63 Hz	75	67	78
125 Hz	69	61	73
250 Hz	62	52	68
500 Hz	56	46	62
1000 Hz	50	40	56
2000 Hz	45	33	51
4000 Hz	40	28	47
8000 Hz	38	26	44
Broadband (dBA)	**60**	**50**	**65**

4.4.3 Pre-Construction Sound Level Measurements

Existing baseline sound levels in the Project area were measured during the quietest overnight period when human activity and roadway traffic were at a minimum, and when the Project's mechanical equipment (the principal sound sources) could be operating. Since the Project's mechanical equipment may operate at any time during a 24-hour day, a weekday between 1 a.m. and 5 a.m. was selected as the worst-case time period, i.e., the time period when Project-related sounds may be most noticeable due to the quieter background sound levels. Establishing an existing background (L_{90}) during the quietest hours of the facility operation is a conservative approach for noise impact assessment and is required by the MassDEP Noise Policy. The nighttime noise measurement locations are as follows (see the Figure in the **Appendix F**):

Property Line with Wilbur Theatre (Monitoring Location #1): Near the rear of the Project.

Tremont Street (Monitoring Location #2): Near the corner of Stuart and Tremont Streets and near the W Boston Hotel and Residences at 100 Stuart Street project. This location is also representative of the 90 Warrenton Street residential building.

62 Boylston Street (Monitoring Location #3): On Tremont Street in front of 62 Boylston Street.

Marriott Courtyard Hotel (Monitoring Location #4): On Tremont Street in front of the hotel.

Broadband (dBA) and octave band sound level measurements were made with the CEL Model 593 environmental sound level analyzer, at each monitoring location, for a duration of approximately one-half hour. The full octave band frequency analysis was performed on the frequencies spanning 16 to 16,000 Hertz. A time-integrated statistical analysis of the data used to quantify the sound variation was also performed, including the calculation of the L_{90}, which is used to set the ambient background sound level.

The CEL 593 model is equipped with a model CEL 250 ½" precision condenser microphone and has an operating range of 5 dB to 140 dB and an overall frequency range of 3.5 Hz to 20,000 Hz. This meter meets or exceeds all requirements set forth in the ANSI S1.4-1983 Standards for Type 1 quality and accuracy and the State and City requirements for sound level instrumentation. Prior to any measurements, this sound analyzer was calibrated with an ANSI Type 1 calibrator that has an accuracy traceable to the National Institute of Standards and Technology (NIST). During all measurements, the CEL 593 was tripod mounted at approximately five feet above the ground in open areas away from vertical reflecting surfaces.

The sound level monitoring was conducted on Friday, September 1, 2006. Weather conditions during the sound survey were conducive to accurate sound level monitoring: the temperature was approximately 50 ^{o}F, the skies were mostly clear, and the winds were calm. The microphone of the sound level analyzer was fitted with a 3-inch windscreen to negate any effects of wind-generated noise.

The nighttime sound level measurements taken in the vicinity of the Project Site reveal sound levels that are typical for an urban area. A significant source of existing sound at all locations was motor vehicle traffic on local roadways and mechanical equipment on nearby buildings.

The results of the nighttime baseline sound level measurements are presented in **Table 4.4-4**, and the complete measurement printouts are provided in the Noise Appendix (**Appendix F**). The nighttime background L_{90} level ranged from 56 dBA to 62 dBA. The octave band data in Table 4.4-4 show that a pure tone was detected in one of the nighttime noise measurements at 63 Hz. This was likely due to noise from motor vehicle traffic.

Table 4.4-4: Nighttime Baseline Sound Level Measurements September 1, 2006				
Sound Level Measurement	**(Location #1) Property Line 2:26 - 2:56 a.m.**	**(Location #2) Tremont St. & Stuart St. 3:07 - 3:33 a.m.**	**(Location #3) 62 Boylston St. 3:39 - 4:09 a.m.**	**(Location #4) Marriott Hotel 4:21 - 4:52 a.m.**
Broadband (dBA)				
Background (L_{90})	56	58	62	57
Octave Band L_{90} (dB)				
16 Hz	57	57	59	59
32 Hz	62	62	62	59
63 Hz	64	61	66	61
125 Hz	58	59	63	61
250 Hz	56	57	63	58
500 Hz	55	54	58	54
1000 Hz	51	55	57	52
2000 Hz	47	49	53	47
4000 Hz	40	41	47	40
8000 Hz	32	32	39	31
16000 Hz	<25	<25	25	<25
Pure Tone?	No	No	Yes (63 Hz)	No

Noise monitoring at the Project Site during the morning peak traffic period was used to evaluate the existing ambient sound levels and to evaluate conformance with the Site Acceptability Standards established by HUD for residential development. The purpose of the HUD guidelines is to provide standards for determining the acceptability of residential project locations with regards to existing sound levels. The HUD criteria regarding the day-night average sound level (L_{dn}) are listed below. These standards apply to L_{dn} measurements taken several feet from the building in the direction of the predominant source of noise.

Normally Acceptable - L_{dn} not exceeding 65 dBA

Normally Unacceptable - L_{dn} above 65 dBA but not exceeding 75 dBA

Unacceptable - L_{dn} above 75 dBA.

These HUD standards do not apply to this Project, but are used as guidance regarding the suitability of the Project area with regard to background sound levels.

A sound level measurement was taken to help estimate the L_{dn} for the Project Site. A 30-minute sound level measurement was taken during the morning peak-traffic period, on Friday, September 1, 2006 between 7:35 a.m. and 8:07 a.m., in front of the Project Site on the corner of Stuart and

Tremont Streets (Monitoring Location #5). This measurement was also taken with a CEL Model 593 environmental sound level analyzer. The Figure in the Noise Appendix (**Appendix F**) shows where this measurement was taken.

The main source of noise during the peak morning traffic period sound level measurement was motor vehicle traffic on local streets. The A-weighted L_{eq} and L_{10} measured during the morning peak traffic period were 62 dBA and 69 dBA, respectively. A pure tone was measured at 63 Hz due to motor vehicle noise. **Table 4.4-5** summarizes the sound level measurements taken during the morning peak traffic period. The Noise Appendix (**Appendix F**) contains a complete listing of this noise measurement data.

Table 4.4-5: Peak Morning Traffic Period Sound Level Measurement - September 1, 2006

Sound Level Measurement	**(Location #5) Project Site Corner of Tremont and Stuart Streets Peak Morning Traffic Period 7:35 to 8:07 a.m.**
Broadband (dBA)	
Background (L_{90})	61
Average (L_{eq})	62
Background (L_{10})	69
Octave Band L_{90} (dB)	
16 Hz	57
32 Hz	60
63 Hz	72
125 Hz	62
250 Hz	61
500 Hz	57
1000 Hz	56
2000 Hz	52
4000 Hz	45
8000 Hz	36
16000 Hz	<25
Pure Tone?	Yes (63 Hz)

The HUD regulations allow the estimation of the L_{dn} from noise measurements near roadways by using either the L_{eq} value taken during the peak traffic hour or the L_{10} value taken during the peak traffic hour minus 3 dB. Using the L_{10} approach provides the largest estimate for the L_{dn} of 66 dBA. This noise level represents the sound level at ground level near the street curb. The first and second levels of the Project will not contain residential uses; therefore, the sound level was adjusted to represent the closest residential units to the street. Adjusting the L_{dn} estimate to the third floor of the building provides an estimate for the L_{dn} of approximately 61 dBA. This sound level complies with the HUD residential noise level criteria without having to include additional sound attenuation in the building design.

4.4.4 Reference Data and Candidate Mitigation Measures

The mechanical systems for the Project are in the early design stage. Sound power data for the equipment of the expected size and type for the Project have been obtained to represent the Project's mechanical equipment. The sound levels from all potential significant Project noise sources are discussed in this section.

The design for the PNF Project and now the NPC Project are expected to include the following significant mechanical equipment (see the Figure in the Noise Appendix (**Appendix F)** for the approximate locations of the equipment):

- One 160-ton cooling tower unit located on the building roof within a penthouse screen that is open to the sky.
- Exhaust fans (toilet, dryer, and a commercial kitchen fan) located on the building roof.
- One 25-ton package air conditioning and ventilation units on the building rooftop, to provide heating, air conditioning, and ventilation for the building common areas.
- A 350-kWatt, diesel-powered, emergency generator to provide electricity for safety in the event of a loss of electrical power to the Project. This unit would be located on the building roof within an acoustical enclosure, within the penthouse screen.

All of the equipment listed above was included in the noise impact analysis. Loading and unloading will occur from a loading zone located along the east side of the building. Loading and unloading operations will consist mostly of residents moving in and out of the building, with a small amount associated with the proposed restaurant and retail space located on the building's first two levels. Trash and recycling collection will occur inside the ground floor of the building near the loading area, with loaded trash/recycling receptacles manually rolled to curbside for pickup. Trash/recycling pickup and loading/service activities will not produce a significant amount of noise and these activities were not included in the analysis. The Project's traffic was not included in the noise analysis because motor vehicles are exempt under both the City of Boston and MassDEP noise regulations.

The Project will use an emergency generator to provide power for life safety in the event of a temporary break in electrical service to the building. The noise impact analysis assumes that the Project will have one 350-kWatt emergency power generator. This unit will include a critical silencer (muffler) to mitigate exhaust noise, and would be located on the building roof. The emergency generator will be operated only when electrical service to the building is interrupted and periodically for brief periods for testing purposes. The emergency generator will be tested for the minimum acceptable amount designated by the manufacturer; and will only be tested during daytime periods. The residents will be notified of the emergency generator testing schedule. Emergency generator equipment will be selected and designed to assure compliance with all applicable noise regulations.

The sound generation profiles for the mechanical equipment noise sources operating concurrently under full-load conditions were used to determine the maximum possible resultant sound levels from the Project Site as a whole, to define a worst-case scenario. To be in compliance with City and MassDEP regulations, the resultant sound level must not exceed the allowable octave band limits in the City of Boston noise regulation and must be below the allowable incremental noise increase, relative to existing noise levels, as required in the MassDEP Noise Policy.

This sound level impact analysis was performed using sound generation data for representative equipment with any necessary mitigation measures to demonstrate compliance with noise regulations. As the building design evolves, the sound generation for the actual equipment selected may differ from the values that were utilized for the analysis. If equipment with smaller noise generation profiles is selected, less noise mitigation may be required. Conversely, if equipment with larger noise generation profiles is selected, more noise mitigation may be required. A range of mitigation options are available, even if the sound generation characteristics of the final equipment selected differ from that which were included in the sound level impact analysis. The Project will incorporate mitigation measures, as necessary, to achieve compliance with the noise regulations. Mitigation measures may include:

- **Specification of low-noise mechanical equipment and silencers:** The cooling tower, exhaust fans, and package heating, air conditioning, and ventilation (HVAC) unit will be of a low-noise design. The emergency generator exhaust stack will be equipped with a critical exhaust silencer for sound reduction.

- **Acoustical shielding:** The emergency generator will be located within an acoustical enclosure. The cooling tower will be located within a mechanical penthouse.

- **Operational restrictions:** The emergency generator will only be operated when electrical service to the building is interrupted and for occasional brief daytime periods for the minimum acceptable amount of testing designated by the manufacturer. Residents would be notified of the emergency generator testing schedule.

4.4.5 Calculated Future Sound Levels

Methodology

Reference sound level data were used to predict future worst-case noise levels at the modeled noise locations (receptors). These levels were calculated according to the equations:

$$L_p = L_w - 10 \log (2 \pi R^2) - \text{Atmospheric Absorption} - \text{Sound Mitigation}$$
$$L_p = L_{pr} - 10 \log ((D/R)^2) - \text{Atmospheric Absorption} - \text{Sound Mitigation}$$

where:

L_p	=	predicted sound pressure level (dB)
L_w	=	reference sound power level (dB)
L_{pr}	=	reference sound pressure level (dB)
R	=	distance of L_p from source (meters)
D	=	reference sound pressure distance.

In the equations above, the terms $[-10 \log(2 \pi R^2)]$ and $[-10\log((R/D)^2)]$ represent the decrease of sound levels due to distance from the source by hemispherical spreading. Atmospheric absorption is the process by which sound energy is absorbed by the air, and it is significant at large distances and at high frequencies. To be conservative, sound attenuation due to ground absorption and wave scattering was ignored. Sound level calculations are documented in the Noise Appendix (**Appendix F**).

Receptors

The Project is surrounded by residential and commercial properties. The sound level impacts from the building's mechanical equipment were predicted at the worst-case property line and at the four closest/worst-case sensitive (residential) locations. These sensitive locations were selected based on the proximity of the equipment (smaller distances correspond to larger noise impacts) and the amount of shielding by the Project building (taller nearby residential locations will experience less shielding from the Project's rooftop mechanical equipment, which may result in larger potential noise impacts from the Project). For locations below the building roof line on which the equipment is to be located, the higher the elevation of the receptor, the less shielding it will experience from the roofline. The Figure in the Noise Appendix (**Appendix F**) shows the locations of the modeled noise sources and receptors. Noise impacts at other nearby noise-sensitive locations (residences, parks, etc.) farther from the site will be less than those predicted for these receptors.

Worst-Case Property Line

The property line location that is expected to receive the largest sound level impact from the Project's mechanical equipment was determined to be along the south side of building abutting the Wilbur Theatre, at sidewalk level. This location is expected to receive the largest sound level impacts from the Project's rooftop mechanical equipment. This location can be classified as a residential zone.

Worst-Case Residences

The four closest and tallest residential buildings surrounding the Project were chosen as receptors for the noise impact analysis. The modeled residential receptors are: 1) What was then a future residences or hotel (now W Hotel) at 100 Stuart Street, 2) an existing Marriott Courtyard Hotel at 275 Tremont Street, 3) existing residences at 62 Boylston Street, and 4) existing residences at 90 Warrenton Street. The highest residences at each of the four residential building locations were modeled to represent the worst potential noise impacts.

4.4.6 Compliance with State and Local Noise Standards

The City of Boston and MassDEP noise standards apply to the operation of the mechanical equipment at the proposed Project. The details of the noise predictions are included in the Noise Appendix (**Appendix F**) and the results are presented in **Table 4.4-6** through **Table 4.6-8.** The sound impact analysis includes the simultaneous operation of the Project's cooling tower, building exhausts, package heating, air conditioning, and ventilation equipment, and an emergency generator. The predicted sound levels are worst-case predictions that represent all hours of the day, as the analysis assumes full operation of the mechanical equipment 24-hours a day. The typical sound level impacts from the mechanical equipment will likely be lower than what is presented here, since the mechanical equipment will operate at full-load only during certain times of the day and during the colder and warmer months of the year, it is not likely that all of the mechanical equipment will operate at the same time, and any emergency generator will operate very infrequently and only for very short periods of time. Sound level impacts at locations farther from the Project (e.g. other residences, etc.) will be lower than those presented in this report.

<u>City of Boston Noise Standards</u>

The noise impact analysis results, presented in **Table 4.4-6** through **Table 4.4.-8**, show that the sound level impact at the worst-case property line and the closest residences will be between 29 and 45 dBA. The smallest sound level impact is predicted to occur at the 90 Warrenton Street residential building. This result occurs because this building is much shorter than the Project and will be significantly shielded from any noise generated by the Project's rooftop equipment. The largest sound level impact is predicted to occur at what is now the W Boston Hotel and Residences at 100 Stuart Street building, due to its closeness and height. Noise impacts predicted at all five locations are easily in compliance with the City of Boston's nighttime noise limit (50 dBA) for a residential area. The results also demonstrate compliance with the City of Boston, residential, non-daytime, octave band noise limits at all five locations.

The City of Boston noise limits for business areas are significantly higher than the nighttime noise limits for residential areas (see **Table 4.4-3**). The Project will also easily comply with the City of Boston business area noise limits at all surrounding commercial properties.

MassDEP Noise Regulations

The predicted sound level impacts at the worst-case property line and the worst-case residential locations were added to the measured L_{90} value of the quietest daily hour to test compliance with MassDEP's noise criteria. Assuming the Project's mechanical noise is constant throughout the day, the Project will cause the largest increase in sound levels during the period when the lowest background noise occurs. Minimum background sound levels (diurnal) typically occur between 1:00 a.m. and 5:00 a.m.

The predicted sound level impacts at the worst-case property line and the closest residences were added to the L_{90} values measured during the period with the least amount of background noise to test compliance with MassDEP's noise criteria. The predicted noise impacts at the property line and the closest residences were added to the most-representative measured L_{90} values to determine the largest possible increase in the sound level at each location during the quietest hour at the site.

As shown in **Table 4.4-5** and **Table 4.5-8**, the Project is predicted to result in no change in sound level at any of the five locations modeled. The results demonstrate that the Project will not have a perceptible impact on sound levels at the five modeled locations. The Project’s worst-case sound level impacts during the quietest nighttime periods will be easily in compliance with the MassDEP allowed noise increase of 10 dBA. The noise predictions for each octave band show that the mechanical equipment will not create a pure tone condition at any location. The mechanical equipment for the Project will not result in a violation of the MassDEP noise regulations.

HUD Site Acceptability Standards

The maximum predicted sound level impacts from the Project are well below 65 dBA and will not increase the existing L_{dn} in the Project area. Therefore, the Project area will still comply with HUD’s Site Acceptability Standards after the Project is constructed.

Table 4.4-6: Estimated Future Sound Level Impacts - Anytime Property Line (South Side – Wilbur Theatre)

Octave Bands	Residential Nighttime Noise Standards	Maximum Predicted Sound Levels*
32 Hz	68	55
63 Hz	67	54
125 Hz	61	47
250 Hz	52	43
500 Hz	46	35
1000 Hz	40	29
2000 Hz	33	19
4000 Hz	28	12
8000 Hz	26	4
Broadband (dBA)	**50**	**38**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Site #1)	56
Wilbur Place (Now Parcel P-7) Project*	38
Calculated Combined Future Sound Level	56
Calculated Incremental Increase	No Change
Compliance with MassDEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.

Note: MassDEP Policy allows a sound level increase of up to 10 dBA.

Table 4.4-7: Estimated Future Sound Level Impacts - Anytime Now the W Hotel, 100 Stuart Street Project		
Octave Bands	**Residential Nighttime Noise Standards**	**Maximum Predicted Sound Levels***
32 Hz	68	56
63 Hz	67	57
125 Hz	61	52
250 Hz	52	48
500 Hz	46	43
1000 Hz	40	39
2000 Hz	33	33
4000 Hz	28	28
8000 Hz	26	20
Broadband (dBA)	**50**	**45**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Site #2)	58
Wilbur Place (Now Parcel P-7) Project *	45
Calculated Combined Future Sound Level	58
Calculated Incremental Increase	No Change
Compliance with MassDEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.

Note: MassDEP Policy allows a sound level increase of up to 10 dBA.

Table 4.4-8: Estimated Future Sound Level Impacts - Anytime Marriott Courtyard Hotel		
Octave Bands	**Residential Nighttime Noise Standards**	**Maximum Predicted Sound Levels***
32 Hz	68	50
63 Hz	67	50
125 Hz	61	46
250 Hz	52	43
500 Hz	46	38
1000 Hz	40	33
2000 Hz	33	23
4000 Hz	28	13
8000 Hz	26	0
Broadband (dBA)	**50**	**40**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	**Maximum Sound Levels* (dBA)**
Existing Nighttime Background, L_{90} (Site #4)	57
Wilbur Place (Now Parcel P-7) Project*	40
Calculated Combined Future Sound Level	57
Calculated Incremental Increase	No Change
Compliance with MassDEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.

Notes: MassDEP Policy allows a sound level increase of up to 10 dBA.

4.4.7 Conclusions

With the mitigation outlined in this report, sound levels at all nearby sensitive locations and at all property lines will fully comply with the most stringent City of Boston and MassDEP daytime and nighttime sound level limits, and the HUD design Noise Levels. The Project will not create a noise nuisance condition and will comply with all applicable noise regulations.

The final design process for the PNF and NPC Projects, will incorporate low noise equipment and noise control measures, as necessary, to ensure full compliance with the City of Boston and MassDEP noise regulation at all nearby sensitive receptors. This acoustic analysis demonstrates that the Project's design will meet the applicable acoustic criteria with careful design and the use of the mitigation measures outlined in this report.

4.5 Water Quality/Stormwater Management

4.5.1 Introduction

No negative impacts to water quality are anticipated from the development of the NPC Project. The existing Project Site is paved, and therefore the construction of the proposed building and associated paved surfaces is not anticipated to result in substantial changes in site permeability or the amount of stormwater runoff.

The Project Site is located within the City's Groundwater Conservation Overlay District. BWSC requires that the site design includes specific provisions for the recharge of groundwater via temporary storage and infiltration of stormwater runoff from the site.

The site drainage system will be separated from the sewer system as required by the Boston Water and Sewer Commission ("BWSC"). As proposed, stormwater will be discharged off-site to BWSC's storm drain system, which then connects to the BWSC combined system in Tremont Street, and which ultimately discharges into the Deer Island treatment plant.

Catch basins installed within the Project Site will have plaques that state: "Don't Dump – Drains to Boston Harbor". The Project design will meet the applicable Standards Massachusetts Department of Environmental Protections' 2011 Stormwater Management Standards, as described below, to the extent practicable.

4.5.2 Existing Storm Drainage System

The stormwater drainage lines adjacent to the Project Site are owned and operated by BWSC. The drainage from the Project area ultimately discharges into Boston Harbor.

A preliminary capacity analysis was performed on the BWSC drains the Project may utilize. The flow capacity for the segments abutting the site on Tremont Street was analyzed using the Manning equation, BWSC wastewater system maps and field survey information. The results are summarized in **Table 4.5-1.**

Table 4.5-1: Drain Hydraulic Capacity Analysis								
BWSC Manhole Numbers	Location	Distance (ft.)	Invert Elevation		Slope	Diameter (inches)	Manning's n	Flow Capacity (cfs)
			Inlet (ft.)	Outlet (ft.)				
89-90	Tremont	92	18.1	17.7	0.0043	12	.015	2.03
90-91	Tremont	28	17.7	17.4	0.0107	12	.015	3.19

Notes:
1. Manhole numbers and invert elevations from BWSC Wastewater System Maps23J and 23K and from a Land Title Survey drawing by Harry R. Feldman, Inc., dated February 21, 2006.
2. Flow calculations based on Manning's Equation.
3. Manning's "n" value assumed.

4.5.3 Proposed Storm Drainage

The DEP's Stormwater Management Policy requires that previously developed sites improve stormwater runoff over existing conditions. Stormwater runoff rates can be reduced by reducing impervious area and/or creating stormwater storage capacity. Stormwater quality can be improved by retrofitting the drainage network with devices and technologies to treat stormwater runoff. The Project will include improvements to the stormwater management system and will improve the discharge quality. Site and roof runoff will be directed to a storage/infiltration system designed specifically for the Project Site, in accordance with BWSC requirements for projects within the Groundwater Conservation Overlay District. It is anticipated that this system will be located on site, with an overflow connection to the BWSC drainage system at the intersection of Tremont and Stuart Streets.

The peak runoff rates have been estimated for several design storm events. Please note that impervious area on the Project Site will not change, as the Project Site is currently entirely impervious. It is assumed that the proposed site will be entirely impervious as well. Runoff rates were calculated based on the Rational Method to estimate the peak rate of stormwater discharge from the site. **Table 4.5-2** shows the rate of runoff in cubic feet per second (CFS) resulting from several design storms expected for the Boston metropolitan area.

Table 4.5-2: Estimated Peak Rate of Runoff							
Scenario	**Impervious Site Area (sf)**	**2-Year Storm (cfs)**	**5-Year Storm (cfs)**	**10-Year Storm (cfs)**	**25-Year Storm (cfs)**	**50-Year Storm (cfs)**	**100-Year Storm (cfs)**
Pre-Development	7,280	0.630	0.722	0.800	0.910	0.994	1.083
Post-Development	7,280	0.630	0.722	0.800	0.910	0.994	1.083

The water quality of the stormwater discharge will be improved over existing conditions. The drainage system on the Project Site will be separated from the sewer system as required by the BWSC. As Proposed, treated stormwater will be discharged off-site to BWSC's storm sewer system, which ultimately discharges into Boston Harbor.

The quality of the stormwater runoff will improve when compared to existing conditions. Existing runoff from the surface parking lot introduces sediment and contaminants into the public stormwater system. Under build conditions, the runoff will be primarily building roof drains that discharge directly to the BWSC system. Any catch basins installed on the Project Site will be equipped with traps and hoods. The final specifications of the stormwater drainage facilities will be determined during the design.

4.5.4 Stormwater Management Standards

In November of 1996, DEP issued a Stormwater Management Policy for use under multiple statutory and regulatory authorities of the DEP, including the Massachusetts Wetlands Protection Act (as amended by the Rivers Protection Act) and the federal Clean Waters Act. The *Storm Water Management Standards*, in three volumes, were re-issued in October 2011.

Although the Project is not subject to the Wetlands Protection Act, the Stormwater Management Standards offer a method to assess the impacts of the Project. The Project meets the definition of a redevelopment project (development, rehabilitation, expansion and/or phased projects in previously developed sites resulting in no net increase in impervious area) under the Policy. No portion of this Project proposes to develop previously undeveloped land. Redevelopment projects, or portions of projects qualifying as redevelopment, are governed by Performance Standard #7. Standard #7 requires that the Stormwater Management Standards be met to the maximum extent practicable.

Below is a summary of the Project's anticipated compliance with the Stormwater Management Standards.

Standard #1 Untreated Direct Discharge of Stormwater

The Project is not expected to result in the discharge of untreated stormwater directly to or cause erosion in wetlands or water of the Commonwealth. Roof runoff is considered uncontaminated. Catch basins will be fitted with hoods to prevent the introduction of oil and floating debris into the drainage system.

Standard #2 No Increase in Peak Discharge Rates

The stormwater management systems for the Project will be designed to ensure that post-development peak discharge rates do not exceed predevelopment peak discharge rates.

Standard #3 Groundwater Recharge

The groundwater recharge/stormwater storage and infiltration system will be designed in accordance with BWSC's requirements for development within the Groundwater Conservation Overlay District.

Standard #4 80% Total Suspended Solids Removal

As a redevelopment project, the Project is governed by Standard #7. Both the roof and surface runoff will be directed into an infiltration system. Catch basins will be equipped with sumps and hoods.

Standard #5 Higher Potential Pollutant Loads

Standard #5 is not applicable to this Project because it does not contain land uses defined by DEP to have higher potential pollutant loads.

Standard #6 Protection of Critical Areas

Since the Project Site lies within the Groundwater Conservation Overlay District, the drainage and infiltration system design, as required by BWSC, will provide for the storage/infiltration of one inch of rainfall over the impervious area of the post-development Project.

Standard #7 Redevelopment Projects

As a redevelopment project, the Project is governed by Standard #7. The standard states that the project must meet the Stormwater Management Standards to the maximum extent practicable. It is intended that the Project will achieve this standard.

Standard #8 Erosion and Sediment Control

Erosion and sediment controls will be implemented to prevent impacts during construction. Water from construction dewatering efforts will be collected in siltation tanks prior to discharge into the drainage system. If required, controls may also include siltation fences or staked hay bales positioned around the perimeter of the construction site.

Standard #9 Operation and Maintenance Plan

The Proponent will develop an operation and maintenance plan to ensure that the stormwater systems function as designed.

4.6 Geotechnical/Groundwater Impacts

4.6.1 Introduction

This section addresses the below-grade construction activities anticipated for the NPC Project. It discusses existing soil and groundwater conditions, anticipated foundation construction methods, and excavation work anticipated for the NPC Project. Additional test borings and geotechnical study will be completed to further assess the subsurface conditions at the Project Site. This section also addresses potential NPC Project impacts and proposed mitigation measures.

4.6.2 Project Site and Subsurface Conditions

Based on data collected from two soil borings on the parcel, subsurface conditions at the Project Site generally consist of the following materials listed in order of increasing depth.

- Fill: Approximately 12 feet of granular fill was encountered in the borings and generally consisted of loose to dense, brown, fine to coarse sand with up to 35 percent gravel and/or up to 35 percent silt, with trace amounts of brick and other debris.

- Silty Clay: The typical Boston Blue Clay stratum was encountered below the fill, with samples from the upper 5 to 10 feet ranging from stiff to very stiff in consistency and containing up to 10 percent fine to coarse sand and/or up to 10 percent gravel. Below this stiff clay crust was medium stiff to stiff, silty clay with some layers of medium to very dense fine to medium sand with up to 35 percent silty clay.

- Glacial Soils: Below the silty clay at depths of 75 and 85 feet was hard silty clay, with up to 20 percent fine to coarse sand and up to 20 percent gravel or very dense fine to coarse sand with up to 20 percent sand. This stratum was up to approximately 20 feet thick.

- Argillite Bedrock: Below the granular glacial soils was a fractured argillite bedrock beginning at depths of about 95 to 100 feet.

4.6.3 Groundwater Conditions

Stabilized groundwater was recently measured at about 17.4 feet below ground surface, corresponding to an elevation of about elevation +7 feet, Boston City Base Datum.

There are no Boston Groundwater Trust wells within about a block of the Project Site. Wells 23J-2896 and 23K-1788 are about 500 feet from the Project Site and indicate a groundwater elevations of about +7 to +14 feet and elevation +6 feet, respectively. Groundwater data at the surface parking lot across Tremont Street and within 100 feet of the Project Site, indicates groundwater elevations of about +3 to +5 feet.

As the Project is within the BRA's Groundwater Conservation Overlay District (Midtown subdistrict), the Proponent will reinitiate contact with Elliott Laffer, Executive Director, of the Boston Groundwater Trust regarding the NPC Project.

4.6.4 Excavation and Foundation Construction

<u>Excavation</u>

The proposed building will have one basement level that will likely extend close to the eastern, northern and western property lines, but have a 12 foot setback from the adjacent Wilbur Theatre to create an alley. The basement level will accommodate tenant storage and utility rooms. The proposed building will be nineteen stories above street grade. The basement slab will be approximately 14 feet below street grade.

<u>Foundation Support/Groundwater Control During Construction</u>

Based on knowledge of the subsurface soil conditions, it is anticipated that the foundations are likely to be supported on a mat foundation bearing on the natural silty clay crust. Excavation to construct the mat foundation will extend to depths of about 17 feet below existing ground surface. As the groundwater is generally at the anticipated bottom of excavation, construction dewatering will be limited to control of seepage and precipitation that enters the excavation. Basement areas will be waterproofed to control groundwater seepage for the permanent building.

As the stormwater system in the street adjacent to the Project Site flows to a combined stormwater/sewer system, a dewatering discharge permit application will be submitted to the MWRA and BWSC.

A temporary earth support wall will be required to protect adjacent streets, structures and utilities from movement during construction. This wall will likely consist of soldier piles and wood lagging. With groundwater levels near the anticipated bottom of excavation, a groundwater cutoff wall is not required.

<u>Vibration and Settlement Monitoring During Construction</u>

During construction, vibrations will be monitored at adjacent structures to verify the vibration magnitude is within specified limits. Settlement points will be established on adjacent structures before construction and monitored for settlement periodically during construction. If settlement is observed greater than specified limits, submitted remedial action plans will be enacted to limit the settlement.

<u>Wilbur Theatre Foundation</u>

Preliminary data indicates buildings in the vicinity are supported on spread footings. The adjacent Wilbur Theatre is supported on shallow foundations with one basement level. The proposed NPC building will be 12 feet from the Wilbur Theatre such that the proposed excavation will not extend into the bearing zone of the Theatre’s footings.

4.6.5 Probable Project Impact and Mitigation Measures

No adverse impacts on adjacent buildings, the unused Tremont Street MBTA subway tunnel and utilities are anticipated during the construction phase of the NPC Project. Provisions will be incorporated into the design and construction specifications to limit potential impacts to adjacent structures and utilities. Specific mitigation measures are as follows:

- The design team will conduct studies, prepare designs and specifications, and will review contractor's submittals for conformance to the Project contract documents with specific attention to protection of nearby structures and facilities.
- Contractor designs and procedures will be reviewed and accepted by the Project design team prior to implementation.
- Performance criteria will be established for the lateral earth support systems with respect to movements, and the construction sequence of the below-grade portion of the work will be controlled by specific requirements in the Project specifications as necessary. The contractor will be required to modify construction methods and take all necessary steps during the work to protect nearby buildings, the MBTA tunnel, and adjacent utilities.
- As part of the contractor's submittal, the contractor will be required to submit contingency plans for remedial measures in the event that unacceptable excavation support system performance occurs. The design team will review these measures prior to construction.
- Before construction, video surveys will be performed of adjacent roadways and buildings to document existing conditions.
- Vibration and settlement monitoring will be performed during construction at adjacent structures. If settlement is observed, submitted remedial action plans will be enacted to limit the settlement. If vibration levels are exceeded, the contractor will be required to change construction procedures to mitigate the vibration levels.
- Groundwater levels outside the Project Site will be monitored by offsite groundwater observation wells. If groundwater levels drop below specified limits, contingency measures will be implemented to better control groundwater leakage into the excavation and/or restore groundwater levels outside the excavation to required levels.

4.6.6 Summary

Preliminary subsurface investigations have been performed at the Project Site. The proposed NPC building will have one basement level that will likely extend close to the property lines, except to the south where a 12-foot setback from the property line with the Wilbur Theatre is proposed.

Based on knowledge of the subsurface soil conditions, it is anticipated the foundations for the proposed 19-story building are likely to be supported on a mat foundation bearing on the natural silty clay crust. Basement areas will be waterproofed.

A temporary earth support wall will likely consist of soldier piles and wood lagging as groundwater is at about the proposed excavation grade and therefore a groundwater cutoff is not required. Construction dewatering will be limited and designed to control limited seepage and precipitation. As the stormwater system in the street adjacent to the Project Site flows to a combined stormwater/sewer system, a dewatering discharge permit application may be required.

No adverse impacts on adjacent buildings, the unused MBTA subway tunnel and utilities are anticipated during the construction phase of the Project. Provisions will be incorporated into the design and construction specifications to limit potential impacts to adjacent structures and utilities.

4.7 Solid and Hazardous Materials

4.7.1 Solid Waste

Operational Solid Waste

It is preliminarily estimated that the NPC Project will generate approximately 255 tons of solid waste per year, based on the assumption that each hotel room will generate approximately 4 lbs. per day, and each 1,000 square feet of commercial or retail space will generate approximately 5.5 tons per year of waste. Trash is proposed to be collected in small carts inside the building and transported to the loading area for removal. Waste generated from the new building will be typical of hotel and commercial uses and is not expected to be hazardous.

The building's interior design will encourage the recycling of solid waste by providing storage areas for recyclable materials in appropriate areas. As typically requested by the Boston Environment Department, the building will provide the appropriate spaces required to institute a recycling program that meets or exceeds the City's recycling guidelines, and that provides recycling areas for waste paper and newspaper, metal, glass, and plastics (#1 through #7, co-mingled).

Construction Period Waste

Solid waste generated by construction is likely to include concrete and asphalt debris from the exterior construction process. These materials will be reused/disposed of off-site in accordance with applicable regulations.

The disposal and construction contracts will include specific language to ensure the contractor's compliance with City and State regulations. In the interest of reducing disposal costs and minimizing the Project's impact on the environment, the Proponent is committed to reusing and recycling construction debris wherever possible. Materials that cannot be recycled or reused will be transported in covered trucks to an approved landfill or other approved off-site areas. Standard precautionary measures such as dust control agents, covered trucks, and minimal on-site storage will be implemented. The commitments regarding demolition and construction practices and waste disposal issues will be included in the Construction Management Plan.

If during the course of construction, visual or olfactory evidence of contamination is observed that is inconsistent with previous assessments of the property, these materials will be stockpiled and characterized for the presence of contamination prior to their on-site reuse or off-site disposal. If hazardous waste is encountered during construction operations, this material will be managed in accordance with applicable DEP and EPA regulations by licensed contractors.

4.7.2 Hazardous Materials

GZA GeoEnvironmental, Inc. ("GZA") completed a preliminary environmental study (ASTM Phase I Environmental Site Assessment) at the Project Site during the PNF review. The study reported that a three-story building with a basement level was constructed on the site in 1914. The building had several commercial and retail occupants, including a bowling alley, Walton Lunch Company, Beef and Ale House, a cocktail lounge and various restaurants and stores. This building was demolished in 1974. The Hub Ticket Agency temporary trailer, used for ticket sales, has occupied the Project Site since 1975. A metal tower, used as a billboard, is situated on the northeast corner of the Project Site.

The adjoining properties have had a similar history of mixed commercial and residential use. No manufacturing was identified at the Project Site or adjoining properties.

GZA completed a subsurface exploration program at the Project Site as part of a Geotechnical Engineering Study, which included the completion of two deep borings to depths of approximately 100 feet. About 12 feet of fill over deep natural silty clay, glacial till and bedrock, was identified in each of the borings. An observation well was installed in one boring and depth to groundwater was measured at approximately 17 feet below ground surface. No physical evidence of petroleum contamination was observed during GZA's field effort. No soil or groundwater samples were submitted for laboratory analysis.

On the basis of the observations made and the information reviewed during the course of the site assessment, it is GZA's opinion that the available historical, surficial and analytical evidence did not identify any Recognized Environmental Conditions.

On March 28, 2012, Lake Shore Environmental ("Lake Shore") completed a review of the Phase I Report completed by GZA including an electronic file search of available data at MA DEP. Based on this evaluation, Lake Shore extended reliance on the conclusions reached in the 2006 GZA Report. (A copy of the reliance letter from Lake Shore Environmental is available on request).

Soils to be excavated at the Project Site to accommodate the proposed basement will be chemically characterized so that a suitable disposal destination can be selected as required by the Massachusetts environmental regulations.

If work is proposed outside established hours, the Boston Air Pollution Control Commission ("APCC") will be notified at the time a permit is sought from the Commissioner of the Inspectional Services Department.

Table 4.8-1 outlines the proposed construction schedule for the NPC Project. Construction is expected to commence in the 1st quarter of 2013, and will be completed in the 4th Quarter of 2014.

Table 4.8-1: Proposed Construction Schedule

Activities[1]	Timetable Duration[1]
Foundation/Substructure	4 months
Concrete Structure	5 months
Building Façade and Exterior Envelope	6 months
Interior Finishes	5 months
Building Completion	20 months

[1] Note: Some overlap of activities are expected to occur.

4.8.4 Construction Practices

Construction procedures will be designed to meet all OSHA safety standards for specific site construction activities. Specific construction and staging details for each phase of construction will be finalized with BTD following BRA and other City approvals.

Perimeter Protection/Public Safety

The CMP will describe any necessary sidewalk closures, pedestrian re-routings, and barrier placements and/or fencing deemed necessary to ensure safety around the site perimeter. The abutting sidewalks are expected to be closed to pedestrian traffic during the construction period. Plans for redirection of pedestrian traffic will be coordinated with and approved by BTD. In addition, access to the Wilbur Theatre emergency egress will be maintained at all times. Barricades and secure fencing will be used to isolate construction areas from pedestrian traffic.

Construction Staging Areas

The construction manager and/or general contractor will maintain a safe environment for both pedestrians and passing vehicles. The initial site mobilization will include the installation of a chain link fence to isolate the construction area. Gates are expected to be located at the existing curb cuts on Stuart Street and Tremont Street.

Staging is expected to occur on the Project Site within the fencing. If additional offsite staging is required, the contractor will secure an additional site. Any off-site staging will be included in the

4.8 Construction Impacts

4.8.1 Introduction

The following section describes the proposed NPC Project's construction activities and steps that will be taken to avoid or minimize environmental and transportation-related construction impacts. The Project Proponent will employ a construction manager that will be responsible for developing a construction phasing and staging plan and for coordinating construction activities with all appropriate regulatory agencies. The NPC Project's geotechnical consultant will provide consulting services associated with foundation design recommendations, prepare geotechnical specifications, and review the construction contractor's proposed procedures. In addition the geotechnical consultant will monitor vibration during construction as added protection for abutting structures.

Construction management and scheduling will aim to minimize impacts on the surrounding environment. Construction methodologies that ensure public safety throughout the Project Site will be employed.

4.8.2 Construction Management Plan

The Project Proponent will comply with all applicable state and local regulations governing construction of the proposed Project. The Project Proponent will require that the general contractor comply with the Construction Management Plan ("CMP"), developed in consultation with and approved by the Boston Transportation Department ("BTD"), prior to the commencement of construction. The construction manager and/or general contractor will be bound by the CMP, which will establish the guidelines for the duration of the Project and will include specific mitigation measures and staging plans to minimize impacts on abutters.

Construction methodologies will ensure that safety measures will be employed and signage will include construction manager contact information with emergency contact numbers. Construction management and scheduling measures will also be taken to minimize impacts on the surrounding environment. Such measures will include the creation of construction worker commuting and parking plans, the development of routing plans for trucking and deliveries, and efforts to minimize noise and dust.

The Project Proponent also anticipates the CMP will incorporate coordination with nearby theatres, including the Wilbur Theatre, during the construction period.

4.8.3 Construction Activity Schedule

The construction period for the Project is expected to last approximately 20 months. Typical construction hours will be from 7:00 a.m. to 6:00 p.m., Monday through Friday.

CMP. All construction activity will be kept within the designated areas approved by the Construction Management Plan. There will be no stockpiling of fill, equipment or materials, overnight or on weekends on public property or public ways unless prior approval is granted through permitting for utility upgrades and repairs.

Signage will direct pedestrians around the Project Site as well as direct truck traffic and deliveries.

A proposed construction staging plan for the Project will be provided as a part of the CMP.

Construction Vibration Monitoring

Significant vibration from construction activity is not anticipated. Foundation systems do not involve pile-driving or pressure-injected footings. Vibration monitoring will be in place and performed by the geotechnical engineer. Existing condition surveys of the abutting buildings will be performed (see also **Section 4.6**, Geotechnical and Groundwater Impacts, of this NPC).

Best Management Practices

During construction, Best Management Practices for the control of erosion and the discharge of sediment will be followed. Typically this will include the use of filter fabrics around slopes and catch basins, stabilization of all slopes, the use of wheel washes on construction vehicles, and mechanical street sweeping at the Project Site.

Recycling of Construction and Demolition Debris

The Proponent will take an active role with regard to the reprocessing and recycling of construction waste. To the extent possible, asphalt paving will be sent to an asphalt batching plant for recycling. Construction procedures will allow for the segregation, reprocessing, reuse, and recycling of materials or donation to the Building Materials Resource Center, where feasible, though demolition of existing structures is not part of this Project. In addition, consideration will be given to construction lay down areas having sufficient space for segregation of construction wastes. For those materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility, per DEP's Regulations for Solid Waste Facilities, 310 CMR 19.00. This requirement will be specified in the disposal contract.

4.8.5 Transportation Impacts During Construction

Construction Vehicle Volumes

Trucks will be required to deliver supplies to the Project Site. It is expected that truck traffic will range from an average of 8 to 10 trucks per day during typical periods to as many as possibly 10 to 15 per day during peak construction periods.

Construction Vehicle Routes

Specific truck routes will be established with BTD through the CMP. Construction contracts will include clauses restricting truck travel to BTD requirements. Maps showing approved truck routes will be provided to all suppliers, contractors, and sub-contractors.

Construction Worker Parking

The number of workers required for construction of the Project will vary during the construction period, ranging from approximately 18 to 50 workers to as many as 100 workers during peak construction periods. However, it is anticipated that all construction workers will arrive and depart prior to peak traffic periods.

Parking will be discouraged in the immediate neighborhood side streets. Public transit use will be encouraged with the Proponent and construction manager working aggressively to ensure the construction workers are informed of the public transportation options serving the area. Space will be made available for workers' supplies and tools to be securely stored on-site so that workers will not have to transport them on a daily basis, further allowing workers to commute via public transit. Workers will be encouraged to park in private off-site facilities within the area. The construction contractor will be directed away from parking on residential streets. The construction contractor will encourage the use of public transportation, and prohibit parking for its subcontractors. The proponent will meet with designated representatives of neighborhood organizations during the construction process.

4.8.6 Construction Air Quality

The generation of dust is likely from construction activities. The following measures will be employed to reduce potential generation of dust and airborne particles:

- Wetting agents will be used regularly to control and suppress dust that may come from the construction materials and from demolition;
- All trucks for transportation of construction debris will be fully covered;
- Storage of construction debris on site will be kept to a minimum;
- Actual construction practices will be monitored to ensure those unnecessary transfers and mechanical disturbances of loose materials are minimized and to ensure that any emissions of dust are negligible; and
- A wheel wash area will be established to minimize dust and mud accumulations in city streets, or periodic street sweeping may be utilized to maintain an acceptable street / sidewalk condition.

4.8.7 Construction Noise

Every reasonable effort will be made to minimize the noise impact of construction activities. Mitigation measures will include:

- Scheduling of work during daytime hours;
- Using appropriate mufflers on all equipment and providing ongoing maintenance of intake and exhaust mufflers;
- Maintaining muffling enclosures on continuously operating equipment, such as air compressors and welding generators;
- Replacing specific construction operations and techniques by less noisy ones where feasible - e.g. using vibration pile driving instead of impact driving if practical;
- Selecting the quietest practical items of equipment -e.g., electric instead of diesel powered equipment;
- Selecting equipment operations to keep average levels low, to synchronize noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Turning off idle equipment; and
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

4.8.8 Rodent Control

The City of Boston has declared that the infestation of rodents is a serious problem in the community. In order to control this infestation, the city enforces requirements established under the Massachusetts State Sanitary Code, Chapter 11, 105 CMA 410.550 and the State Building Code, Section 108.6 Policy number 87-4 established that extermination of rodents shall be required for issuance of permits of demolition, excavation, foundation, and basement rehabilitation.

Prior to excavation, the ground will be tested for rodent activity. A formal rodent control program will be established prior to the start of construction, and all areas of the Project Site will be treated to comply with regulatory requirements.

4.8.9 Utilities and Coordination with Other Projects

See **Section 6.9,** Infrastructure Systems Component, for more discussion of utility protection during construction. The Proponent will also coordinate with other construction projects in the immediate area.

5.0 TRANSPORTATION COMPONENT

5.1 Prior Project Notification Form (PNF) Project

The October 2006, a Project Notification Form (“PNF”) for 240 Tremont Street contained a comprehensive transportation analysis prepared by Howard/Stein-Hudson Associates, Inc. (“HSH”). At that time, the PNF Project included the construction of a new, 14-story building with approximately 72 residential units and approximately 6,300 square feet (sf) of restaurant space. The existing transportation conditions were documented in terms of traffic and pedestrian volumes, transit service and ridership, and on-street and off-street parking availability.

For the transportation section of the PNF, HSH used Institute of Transportation Engineers (ITE) rates, along with local survey data and other sources, to develop trip generation, trip distribution, vehicle occupancy, and mode use estimates for the proposed development program.

A traffic analysis was conducted for the PNF in accordance with the Boston Transportation department (BTD) *Transportation Access Plan Guidelines (2001)*. The study included an evaluation of traffic operations for the Existing Conditions; long-term No-Build conditions, including new traffic resulting from general background growth and any identified development projects; and a Build scenario, including specific travel demand forecasts for the Project. Due to the negligible increase in traffic generated by the Project, the level of service (LOS) was not expected to change at either of the study area intersections analyzed in the PNF (Stuart Street/Tremont Street and Stuart Street/Kneeland Street/Washington Street). A Transportation Access Plan Agreement (TAPA) between the Proponent and the City of Boston was executed on September 23, 2008.

The PNF program is herein referred to as the BRA Approved PNF Project, consisting of 72 residential units and 6,300 sf of restaurant space.

5.2 Notice of Project Change (NPC) Project

The Proponent is currently proposing to construct a new approximately 19-story Micro-Hotel with 240 rooms and ancillary uses including approximately 5,345 sf of space for restaurant/lounge/dining use. A micro-hotel is a full-service facility, but is different than a typical hotel in that they generally have smaller and more moderately priced rooms – attractive to the budget-conscious traveler. The NPC site plan is shown on **Figure 5-1**. This chapter addresses transportation issues related to changes under the Proposed NPC Hotel Project including trip generation, vehicular access, pedestrian access, parking, loading and service, travel demand management (TDM), the Transportation Access Plan Agreement (TAPA), the Construction Management Plan (CMP), and Public Improvements Commission (PIC) coordination.

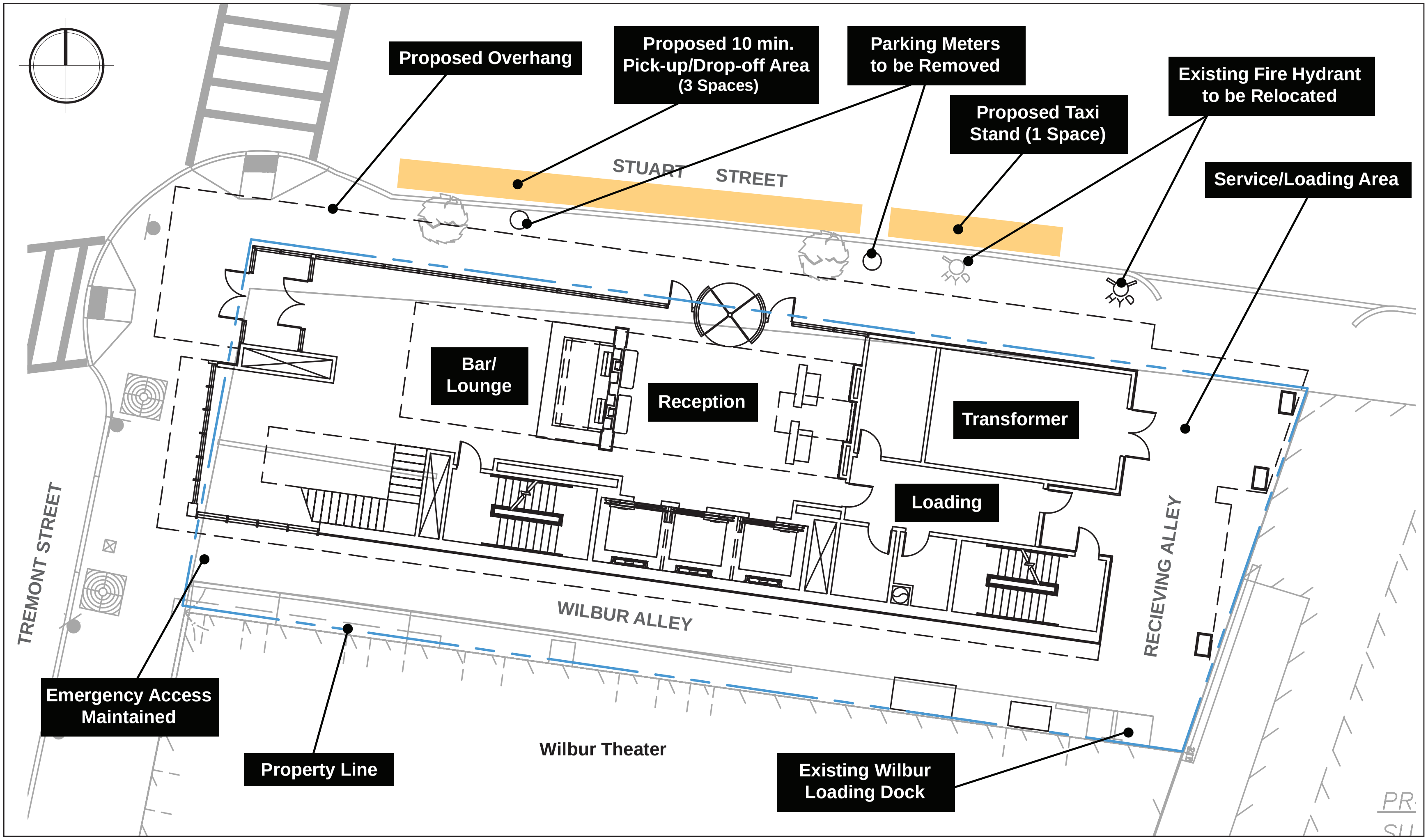


Figure 5-1.
Site Plan

The alternate building programs for 240 Tremont Street are shown and compared in **Table 5-1**, which outlines the BRA Approved PNF Project and the Proposed NPC Hotel Project.

Table 5-1: Building Program Comparisons at Parcel 7A

Program Description	A	B	C = B minus A
	PNF: BRA Approved Project	**NPC: Proposed Hotel Project**	**Change: NPC compared to PNF**
Residential	72 units	0	**- 72 units**
Hotel	0	240 rooms	**+ 240 rooms**
Restaurant	6,300 sf	5,345 sf	**- 955 sf**

5.3 Trip Generation

Trip generation estimates for the BRA Approved Project were based on rates derived from ITE's *Trip Generation* (7^{th} edition, 2004) fitted curve equations and average trip rates for land use codes *LUC 230 – Residential Condominium/Townhouse* and *LUC 931 – Quality Restaurant*. The ITE rates produce vehicle trip estimates, which are then converted to person trips using vehicle occupancy rates (VOR) based on 2009 National Household Travel Survey data and other local data. Using appropriate mode split information for this area, the total person trips are then allocated to vehicle, transit, and walk trips.

Since the time of the PNF filing, an updated version (8^{th} edition, 2009) of the *Trip Generation* manual has become the industry standard for estimating trips. For the NPC, the updated version was used to estimate trips for the Project using *LUC 310 – Hotel*, which was identified as the closest match to a "Micro Hotel". According to ITE, hotels are places of lodging that provide sleeping accommodations and other supporting uses including restaurants, lounges, and other uses. Therefore, the trip generation associated with the restaurant use is included within *LUC 310.* Specific trip generation rates for micro hotel uses have not been established by ITE; however, it is expected that LUC 310 provides a conservative estimate of trip generation for these uses. A detailed summary of the trip generation calculations is provided in **Appendix G.**

The resulting vehicle trip generation for the BRA Approved PNF Project and the Proposed NPC Hotel Project are compared in **Table 5-2.**

Table 5-2: Vehicle (Auto and Taxi) Trip Generation Comparison				
		A	**B**	**C = B minus A**
Period	**Direction**	**PNF: BRA Approved Project**	**NPC: Proposed Hotel Project**	**Change: NPC compared to PNF**
Daily	In	121	413	**292**
	Out	121	413	**292**
	Total	**242**	**826**	**584**
a.m. Peak Hour	In	2	28	**26**
	Out	8	19	**11**
	Total	**10**	**47**	**37**
p.m. Peak Hour	In	15	24	**9**
	Out	7	27	**20**
	Total	**22**	**51**	**29**

As shown in Column C of **Table 5-2**, when compared to the BRA Approved PNF Project, the NPC Hotel Project would result in 37 more vehicle trips (26 additional entering and 11 additional exiting) during the weekday morning peak hour and 29 more vehicle trips (9 additional entering and 20 additional exiting) during the evening peak hour. This increase corresponds to less than one additional new vehicle trip per minute on area roadways during morning peak hour and approximately one additional new vehicle trip every two minutes during the evening peak hour.

Table 5-3 shows a similar comparison of transit trip generation for the existing building, the BRA Approved PNF Project and Proposed NPC Hotel Project. As shown in Column C (the difference between the PNF Project and the NPC Hotel Project), transit trips would increase by 53 more transit trips (47 additional entering and 6 additional exiting) during the weekday morning peak hour and 47 more transit trips (8 additional entering and 39 additional exiting) during the evening peak hour.

Table 5-3: Transit Trip Generation Comparison				
		A	B	C = B minus A
Period	Direction	PNF: BRA Approved Project	NPC: Proposed Hotel Project	Change: NPC compared to PNF
Daily	In	79	529	**450**
	Out	79	529	**450**
	Total	**158**	**1,058**	**900**
a.m. Peak Hour	In	2	49	**47**
	Out	5	11	**6**
	Total	**7**	**60**	**53**
p.m. Peak Hour	In	9	17	**8**
	Out	5	44	**39**
	Total	**14**	**61**	**47**

Table 5-4 similarly shows the walk/bicycle trip generation for alternative programs. As shown in Column C, walk trips would increase by 69 more pedestrian trips (25 additional entering and 44 additional exiting) during the weekday morning peak hour and 67 more pedestrian trips (59 additional entering and 8 additional exiting) during the evening peak hour.

Table 5-4: Walk/Bike Trip Generation Comparison				
		A	B	C = B minus A
Period	Direction	PNF: BRA Approved Project	NPC: Proposed Hotel Project	Change: NPC compared to PNF
Daily	In	380	688	**308**
	Out	379	688	**309**
	Total	**759**	**1,376**	**617**
a.m. Peak Hour	In	8	33	**25**
	Out	26	70	**44**
	Total	**34**	**103**	**69**
p.m. Peak Hour	In	46	105	**59**
	Out	22	30	**8**
	Total	**68**	**135**	**67**

5.4 Vehicular Access and Circulation

Hotel guest parking will be self-park and will occur at one of the several off-site public parking garages and lots in the area. There are over 8,000 public parking spaces within convenient walking distance. Also due to the inherent nature of a micro-hotel, it is anticipated that many of the guests will not have vehicles and will take advantage of the site's convenient location with respect to the downtown and availability of numerous non-auto alternatives (e.g. MBTA public transportation, Zipcar, Hubway, etc.).

As shown in the NPC site plan (**Figure 5-1**), the NPC Project proposes to remove three metered parking spaces and relocate one existing fire hydrant along Stuart Street. Three short-term (10 minute) pick-up/drop-off spaces for hotel guest registration and one space to be used as a taxi stand is proposed along the Stuart Street curb. A taxi stand for two vehicles is also provided at the W Boston Hotel located adjacent to the site at 100 Stuart Street. The Proponent will work with BTD to identify the most appropriate solution for pick-up/drop-off activities adjacent to the Project Site.

Based on trip generation data and anticipated dwell times for guests and taxicabs, as shown in **Table 5-5,** it is forecast that the 4 spaces are sufficient to service the vehicle activity.

Table 5-5: Vehicle Activity at Hotel Entrance

	Number of Spaces	Uses	Average Dwell Time per Vehicle	Hourly Capacity	p.m. Peak Hour Demand
Drop-off curb/live parking at the entry	1	Primarily taxi-cab pick-up/drop-off	5 minutes	1 x 12 = 12 vehicles per hour	During the p.m. peak hour, 12 taxicabs will arrive at the same 12 will depart. The hourly capacity of 12 vehicles will be sufficient to meet demand.
	3	Short-term for guest registration	10 minutes	3 x 6 = 18 vehicles per hour	During the p.m. peak hour, 12 autos will arrive and 15 will depart. The hourly capacity of 18 vehicles will be sufficient to meet demand.

5.5 Pedestrian Access

Pedestrian entrances to the hotel lobby will be located on Stuart Street and Tremont Street. Guests will use the front entry for registration, for taxicab calls, and when they short-term park for registration. When walking to nearby destinations in the Theatre District or Downtown Boston, guests will likely use the Tremont Street side entrance and Stuart Street main entrance, respectively. Two interior stairways will provide emergency egress from the upper hotel floors onto Tremont Street and the Receiving Alley.

5.6 Parking Management

All long-term and overnight guest parking will occur off-site. It is anticipated that guest self-parking activity would generally occur at the Tufts Medical Center garage (937 public spaces), the City Place Garage (333 public spaces), the Motormart Garage (900 public spaces), and the Radisson Boston Hotel (900 public spaces), which are among the largest and closest facilities. Hotel guests can also choose to self-park at one of the several other parking lots and garages in the area; there are over 8,000 public spaces within convenient walking distance (quarter-mile or 5-minute walk) to the site.

The Boston Transportation Department (BTD) has established parking space guidelines throughout the City to ensure that the proper parking capacity is provided with new buildings. The Project site, however, cannot accommodate new parking. The recommended BTD parking ratio for hotels is 0.40 parking spaces per room. With 240 rooms, the guidelines indicate that the Project should provide 96 parking spaces for guests. Many downtown Boston hotels only provide off-site parking. Current trends in downtown Boston show that actual parking demand is lower than the BTD ratio, which is a maximum guideline. It should be noted the parking demand is associated with 100% hotel occupancy rates, which rarely occur. Also, given the inherent nature of the proposed micro-hotel, it is expected that many of the guests will not have vehicles. The site is conveniently located within walking distance (quarter-mile or 5-minute walk) to downtown Boston, and the Theatre District and. Several non-auto alternatives include MBTA public transportation, Zipcar (17 cars within a quarter mile); and Hubway bicycle share (2 stations within a quarter mile).

Sufficient capacity exists at the parking garages in the area to meet the parking demand of this Project.

5.7 Loading and Service Access

The existing site is currently vacant and does not generate any loading activity today; however, the site is served with an existing driveway located along the eastern portion of the site with access on Stuart Street. This driveway serves as the loading area for the Wilbur Theatre loading dock. Loading and service activity at the Wilbur Theater typically consists of an occasional tractor trailer to deliver and/or pick up supplies/equipment associated with performances. Theater loading activity is typically limited to approximately three deliveries per month. These deliveries typically require the use of a WB-40 tractor trailer, which is backed into the site from Stuart Street. With the proposed NPC Hotel Project, all recycling, trash collection, and loading activities will occur on-site from this existing driveway located along the eastern side of the building (see **Figure 5-1**). The Project will share the loading area with the adjacent Wilbur Theatre as defined in the TAPA for the BRA Approved PNF Project. The Proponent is committed to coordinating all service and loading activity with that of the Wilbur Theatre to ensure that the driveway meets the needs of both uses.

Based on research of the National Cooperative Highway Research Program (NCHRP)[8] and on Boston specific data, the proposed hotel is expected to generate about 4 deliveries per day. Building management will encourage all loading and service activities to occur during off-peak times of traffic with most deliveries anticipated between 7:00 a.m. and 1:00 p.m., or, on average, less than 1 delivery per hour during this period.

The designated loading area will be sufficient to handle the loading demands of the Project as well as that of the Wilbur Theatre. Permanent "No Idling" signs will be posted in the loading and parking areas.

5.8 Travel Demand Management

The Proponent will work with the City to develop a Travel Demand Management (TDM) program appropriate for the Project and consistent with its level of impact. TDM measures for the Project may include, but are not limited to, the following:

5.8.1 Transportation Coordinator

The Proponent will require the Hotel Operator to designate a full-time, on-site employee as the development's transportation coordinator. The transportation coordinator will oversee all transportation issues, including the management of vehicular operations, service and loading, parking, and TDM programs. The transportation coordinator will also be responsible for coordinating deliveries with the Wilbur Theatre, which will have shared building access with the Project.

5.8.2 Ridesharing/Carpooling

The Proponent will encourage the Hotel Operator to facilitate ridesharing for employees through geographic matching and parking fee discounts.

5.8.3 Guaranteed Ride Home Program

The Proponent will encourage the Hotel Operator to offer a "guaranteed ride home" for employees in order to remove an obstacle to transit use and ridesharing.

5.8.4 Transit Pass Programs

The Proponent will encourage the Hotel Operator to encourage employees to use transit through the following measures:

- Offering on-site transit pass sales or participation in the MBTA Corporate T-pass Program.
- Offering T-pass subsidies to full-time employees and, on a pro rata basis, to part-time employees.
- Investigating the potential of offering federal "Commuter Choice" programs, including pre-tax deductions for transit passes and subsidized transit passes.

[8] *Truck Trip Generation Data*—Synthesis 298. National Cooperative Highway Research Program (NCHRP) and Transportation Research Board. 2001.

5.8.5 Information and Promotion of Travel Alternatives

The Proponent will encourage the Hotel Operator to:

- Provide employees and visitors with public transit system maps, schedules, and other information on transit services in the area and provide such information in a prominent location within the Hotel, as well as on the Hotel's Web site.
- Provide an annual (or more frequent) newsletter or bulletin summarizing transit, ridesharing, bicycling, alternative work schedules, and other travel options.
- Provide information on travel alternatives (e.g. Hubway bicycle share, MBTA, etc.) for employees and visitors via the Internet and in the building lobby.

5.9 Transportation Access Plan Agreement

For the BRA Approved PNF (Residential Project), a TAPA was signed by the Proponent and the City of Boston on September 23, 2008. For the NPC Hotel Project, the Proponent will provide a new TAPA to the Boston Transportation Department (BTD) for review and approval due to the change in use. The new TAPA will codify the specific measures, mitigation, and agreements between the Proponent and BTD. The Proponent is committed to complete any mitigation and commitments identified in the prior TAPA as deemed appropriate for the NPC Project.

5.10 Construction Management Plan

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

5.11 Public Improvement Commission

Certain streetscape improvements and modifications to the previously approved discontinuances along Stuart Street and Tremont Street may require Public Improvement Commission (PIC) review and approval. The Proponent will work with the PIC as appropriate.

6.0 INFRASTRUCTURE SYSTEMS COMPONENT

6.1 Introduction

This section addresses the NPC Project's impact on the capacity and adequacy of existing water, sewage, stormwater, energy, and electrical communications utility systems. The analysis also discusses likely Project-related impacts on the utilities, and identifies mitigation measures to address these potential impacts. Please refer to **Section 4.5**, Water Quality/Stormwater Management, of this NPC for a discussion of stormwater management and provisions for the recharge of groundwater.

6.2 Agency Coordination

The Proponent and its consultants will re-initiate contact with the Boston Water and Sewer Commission ("BWSC") to gather information and evaluate the water, storm drain, and sanitary sewer systems, and to design the Project to prevent disruption of utility services. Meetings and discussions will be scheduled as building design and permitting progress.

The proposed connections to the water, storm drain, and sanitary sewer systems will be designed in conformance with the BWSC's design standards, Water Distribution System and Sewer Use Regulations, Requirements for Site Plans and Groundwater Conservation Overlay Protection District Requirements. Separate sanitary sewer and storm drain connections will be provided. The Proponent will submit a site plan to the BWSC's Engineering Services Division for review and approval when the design of the Project is 50% complete. A General Service Application will be obtained prior to construction. The site plan will show the location of water, storm drain, and sanitary sewer systems which serve the Project Site and the location of existing and proposed water, storm drain, sanitary sewer connections and groundwater recharge/stormwater infiltration facilities.

At this time, a Massachusetts Department of Environmental Protection ("DEP") sewer extension /connection permit may be required in accordance with BRP WP 72 and BRP WP 73.

In addition, the Proponent will coordinate with the Boston Public Works Department regarding Theatre District design standards and street configurations.

6.3 Sanitary Sewer System

6.3.1 Existing Sanitary Sewer System

The sewer system within Tremont and Stuart Streets, abutting the Project Site, is owned and operated by the BWSC (see **Figure 6-1**). Separated 12-inch sanitary and 12-inch drains exist in the easterly side of Tremont Street, to the east of the existing MBTA tunnel. These pipes discharge to a 20-inch by 30-inch combined sewer in Stuart Street. The system ultimately discharges to the Deer Island Treatment facility.

6.3.2 NPC Project-Generated Sewage Flow

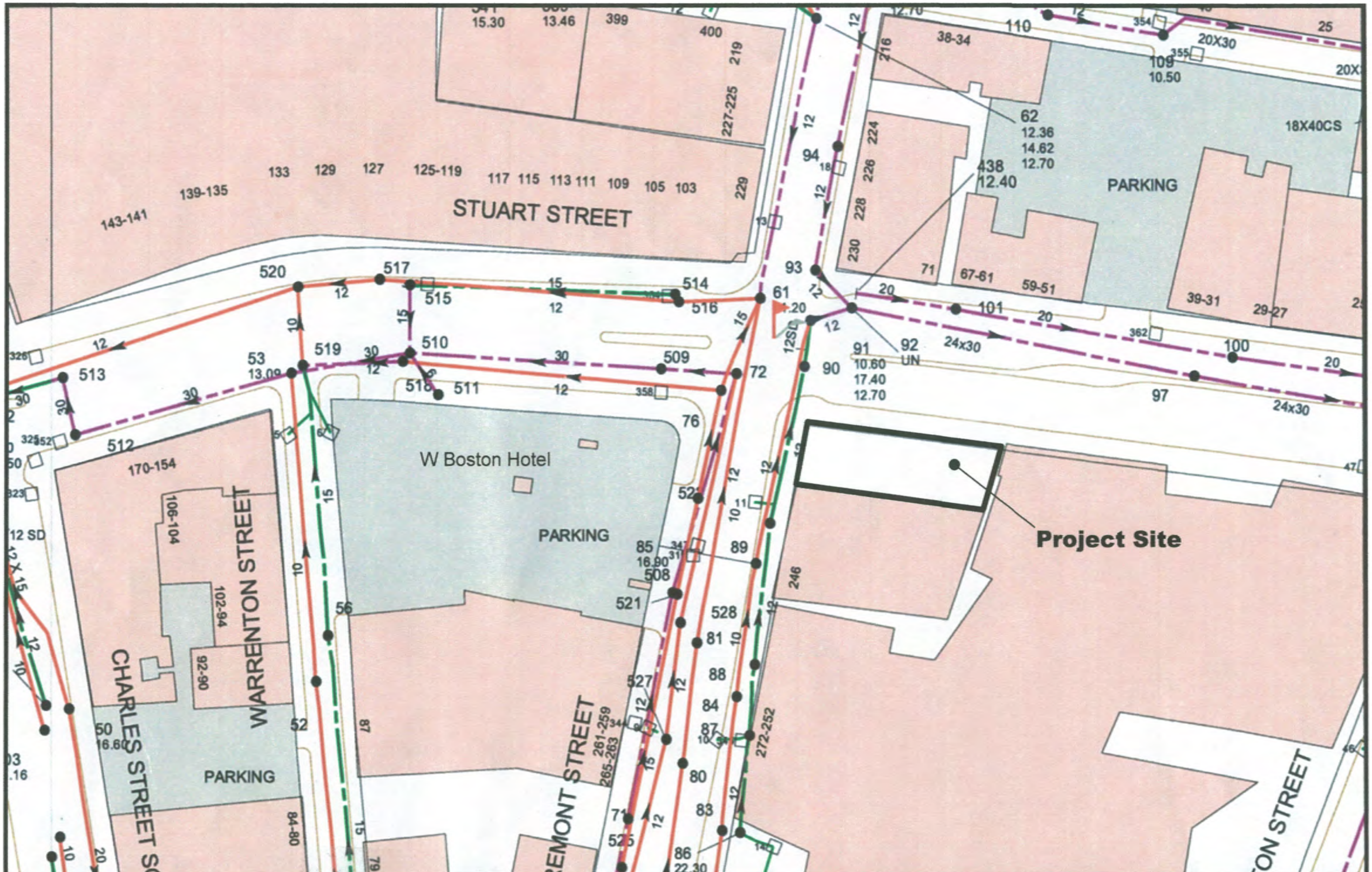
The NPC Project sewage generation is calculated from sewage flow estimates as stipulated in the Title V State Environmental Code regulations (310 CMR 15.00). Based on these assumptions, the proposed Project is estimated to generate an average of 29,900 gallons per day (gpd) of sanitary sewage per day as calculated in **Table 6-1** below.

Table 6- 1: Estimated Average Daily Sewage Flow

Use	Rate	Amount
Hotel	240 Rooms @ 110 gpd per bedroom	26,400 gpd
Restaurant	100 seats @ 35 gpd per seat	3,500 gpd
Total:		**29,900 gpd**

In addition, during the hottest periods of summer, cooling tower blowdown represents an additional contribution to the sewer system. Assuming three percent of the circulating water is lost and must be replenished with makeup water, then one-third of this loss is blowdown and will enter the sewer system (with the reminder evaporating to the atmosphere). As such, the daily blowdown during the hottest days of summer will be 4.8 gpd. This will result in an estimated total of approximately 29,900 gpd of sanitary sewage during the summer months.

BWSC may suggest that the NPC building connect to the 12-inch sanitary sewer line in Tremont Street. The NPC building will utilize separate sanitary and drain (stormwater runoff) connections to the City's systems. A backwater valve will be provided within the building for each connection as requested by the BWSC. This valve will prevent effluent from a surcharged sanitary sewer or storm drain system from entering and flooding the building. The sanitary sewer system ultimately connects to the MWRA Deer Island Treatment facility, where it is treated and discharged to Boston Harbor.



NORTH Scale: 1" = 100'	**Figure 6-1** Existing Sewers and Drains Parcel P-7a, Boston, MA *Source: BWSC System Mapping*	**Legend** = drain = sanitary sewer = combined sewer = manhole = catch basin	BRYANT ASSOCIATES 90 Canal Street Suite 301 Boston, MA 02114

The construction of all connections will be performed to minimize any effects on adjacent streets and ensure that adequate facilities are available to service the Project Site and surrounding areas during construction. Appropriate permits and approvals will be obtained.

6.3.3 Sewer System Capacity

Previously, a preliminary capacity analysis was performed on the BWSC sewer lines that the NPC Project may utilize. The flow capacity for the segment of sanitary sewer abutting the site on Tremont Street was analyzed using the Manning equation and BWSC wastewater sewer maps. The results are summarized in **Table 6-2** below.

Table 6-2: Sewer Hydraulic Capacity Analysis

BWSC Manhole Numbers	Location	Distance (ft.)	Invert Elevation		Slope	Diameter (inches)	Manning's n	Flow Capacity	
			Inlet (ft)	Outlet (ft)				(mgd)	(gpm)
85-91	Tremont	149	16.9	12.6	.0288	12	.015	3.384	2,350

Notes: 1. Manhole numbers and invert elevations from BWSC Wastewater System Maps 23J and 23K.
2. Flow calculations based on Manning's Equation.
3. Manning's "n" value assumed.

According to the calculated flow capacity, the BWSC 12-inch sewer line in Tremont Street will have adequate capacity to meet the needs of the Project. The NPC Project is expected to produce and average flow of 21 gpm and a peak flow (calculated as five times the average flow) of approximately 105 gallons per minute (gpm) of wastewater. The sewer reach abutting the Project site has a capacity of 2,350 gpm. Based on this no capacity problems are expected in the immediate vicinity of the Project Site.

6.3.4 Sewer System Mitigation

NPC Project-related mitigation to help conserve water and reduce the amount of wastewater generated by the NPC Project will include a number of water conservation measures to be used throughout the NPC Project. These measures, as described in **Section 6.4.6**, will include grease traps to be provided in the restaurant in accordance with the BWSC's Grease Trap guidelines. The Proponent will consult with the supervisor for the BWSC's Grease Trap Program, prior to preparing plans for the restaurants.

A discussion of existing and proposed storm drainage in the Project area, as well as the NPC Project's impacts on the storm drain system, is included in **Section 4.5** of this NPC.

6.4 Water System

6.4.1 Existing Water System

The existing water system in the immediate area of the Project Site includes three 12-inch mains in Tremont Street, two 12-inch and one 16-inch main in Stuart Street, and an 8-inch line from Tremont Street which dead ends at the property line, according to BWSC record information (see **Figure 6-2**). Due to the age of these pipes, any proposed taps to service the Project will be closely coordinated with the BWSC.

6.4.2 Anticipated Water Consumption

Water consumption is based on sewage generation with an added factor for system losses plus requirements for the building's cooling system. Based on the projected average daily wastewater generation of approximately 29,900 gpd, it is estimated that the NPC Project will require approximately 32,890 gpd of water. This estimate is based on DEP's recommendation that the water consumption estimates be 10% greater than estimated sewage generation.

As stated previously, a maximum of three percent of the cooling tower's circulating water will be lost to the atmosphere. This rate represents a maximum makeup water demand during the hottest periods of summer. A maximum daily demand for one summer day by the Project is approximately 9.6 gpd. This estimate is calculated assuming a daily demand will be equal to the maximum demand rate (3% of circulating water) for ten hours of the day.

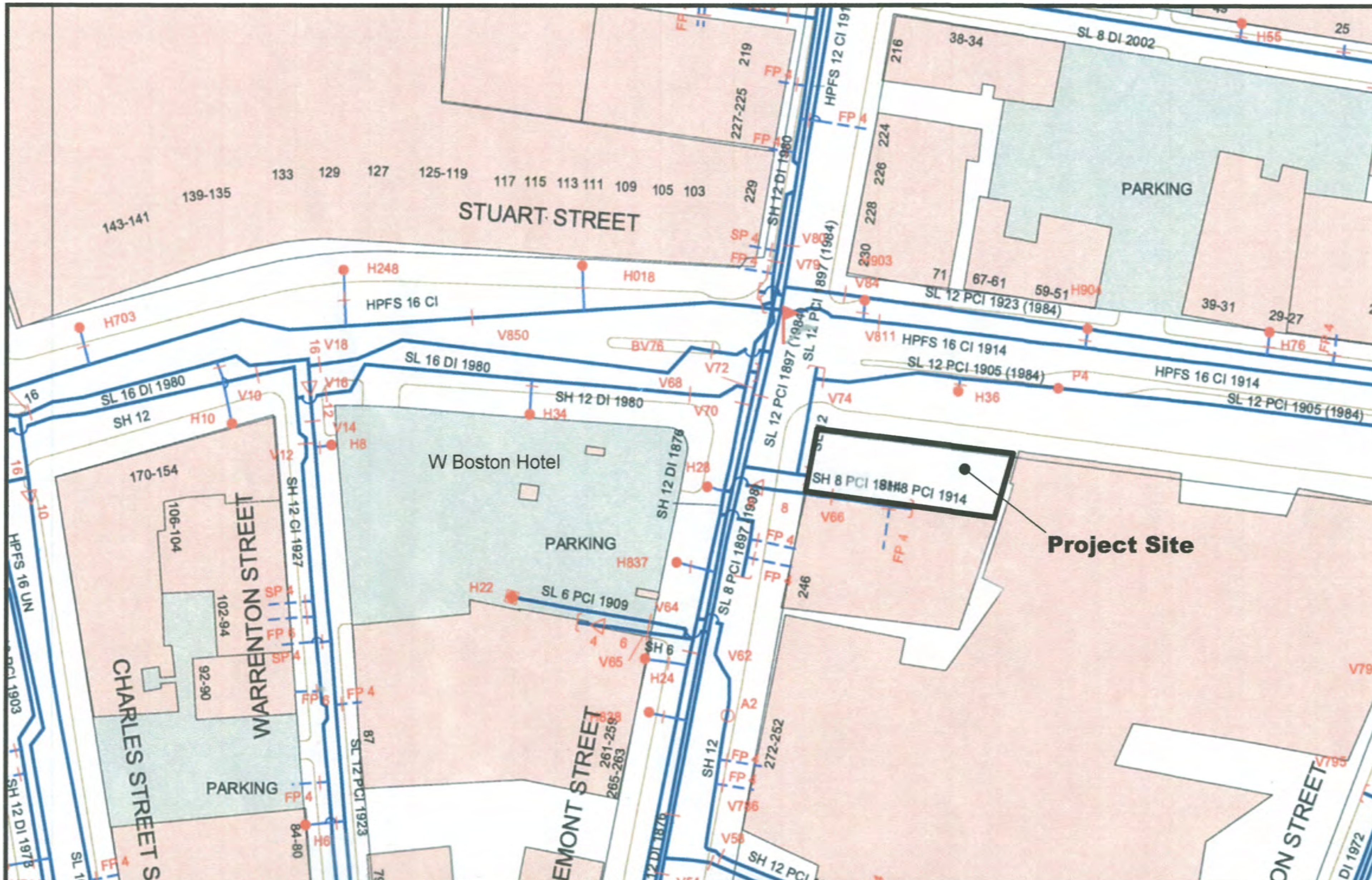
Previous discussions with BWSC have indicated that there appears to be adequate capacity in the water supply system to provide the projected flows. Flow tests were conducted by BWSC in July 2008, in response to request in connection with this project. The connections for both the domestic and fire services will run from the existing pipes in Tremont and/or Stuart Street into the building. Their exact sizes and locations will be included in the BWSC Site Plan.

6.4.3 Proposed Water Service

Water services for domestic use and fire protection to the Project Site will be supplied from BWSC water mains in Tremont Street. It is proposed, in response to a request by BWSC, to relocate a portion of a 12-inch Southern Low system main in Tremont Street, to avoid conflict with the proposed building foundation. Both the domestic and fire protection water services to the proposed building can be fed from this new/relocated main.

6.4.4 Hydrant Flow Tests

Flow testing was done by BWSC in July 2008. BWSC will be consulted regarding the applicability of these test results to the NPC project, or whether updated testing should be conducted.



Scale: 1" = 100'

Figure 6-2
Existing Water System
Parcel P-7a, Boston, MA
Source: BWSC System Mapping

Legend

= water main

= hydrant

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6.4.5 Fire Protection Systems

The NPC Project will be equipped with adequate fire suppression systems, as required. Fire suppression systems will connect to the BWSC high pressure main via separate fire pipes, and will meet all applicable standards set by the Boston Fire Department. A backflow preventer will be installed on the fire suppression systems as required by the BWSC. Fire protection connections for the Project will be approved by the Fire Chief, and the Proponent will seek input from the Boston Fire Department as the Project progresses.

6.4.6 Water Supply Conservation and Mitigation Measures

The State Building Code requires the use of water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand on the existing distribution system. The Proponent will investigate the installation of sensor-operated sinks with water conserving aerators and sensor operated toilets in public restrooms. Recycling and reuse of water will be investigated to the fullest extent possible.

In addition, the Proponent will provide for the connection of the water meter to the BWSC's automatic meter reading system. At the Proponent's expense, a meter interface unit ("MIU") approved by the BWSC will be mounted near the meter, along with a telephone line and jack near the meter, and an outside meter reading device. The BWSC will connect the telephone line and MIU to the meter and program the MIU, at the BWSC's expense.

Water supply systems servicing the NPC Project will be looped so as to minimize public hazard or inconvenience in the event of a water main break.

BWSC has indicated that the building's water supply should be metered by one master meter. Any internal metering of individual units will be done "downstream" of the master meter.

6.5 Electric Systems

NSTAR provides electrical service to this area. The electrical service will consist of an NSTAR Network Transformer vault located within the building.

The Proponent will coordinate with the Public Works Department, Street Lighting Division, if improvements are proposed in the street lighting and to determine if the Public Works Department has any improvement projects planned for this area.

6.6 Steam Systems

Record information provided by Trigen indicates that an 8-inch steam main, originating at a manhole on Stuart Street, enters the Project Site from the Tremont Street side. It is unclear at this time whether this line services the Wilbur Theatre. The possible utilization of this steam line for this NPC Project will be explored as the design advances.

6.7 Telephone and Cable Systems

The design team will contact Verizon and Comcast to determine their requirements necessary to provide the Project with telephone, cable and high-speed internet service.

6.8 Gas Systems

It is expected that natural gas will be used for the NPC Project's heating needs. Keyspan provides natural gas service to the City of Boston and maintains a 4-inch water column gas pressure to the discharge side of meter. The Proponent will meet with Keyspan to discuss the Project when the design of the NPC Project progresses and estimated loads are determined.

6.9 Utility Protection During Construction

As described previously, protection of BWSC water, sewer, and drain lines will begin before commencement of site work. The Proponent (or its construction contractor) will require that the locations of all existing water, sewer and drainage lines be marked by BWSC. Excavation in the area of existing water, sewer, and drain lines will proceed with caution. Hand excavation will take place when excavation in the immediate area of pipe walls is required. BWSC will require additional protection measures if new pipes are to cross existing pipes.

The BWSC will require the construction contractor to submit a General Service Application for review prior to construction.

7.0 Coordination with Government Agencies

7.1 Architectural Access Board Requirements

This NPC Project will comply with the requirements of the Architectural Access Board. The Project will also be designed to comply with the Standards of the Americans with Disabilities Act.

7.2 Massachusetts Environmental Policy Act

Based on information currently available, development of the NPC Project is not anticipated to exceed a review threshold that would require MEPA review.

7.3 Boston Civic Design Commission

The NPC Project exceeds the 100,000 gross square foot size threshold requiring automatic referral to the Boston Civic Design Commission for schematic review. An initial design presentation to the BCDC was scheduled for April 3, 2012.

7.4 Massachusetts Historical Commission

The NPC Project is subject to review by the Massachusetts Historical Commission ("MHC") under M.G.L. Chapter 9, Section 26-27C, as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00).

8.0 PROJECT CERTIFICATION

This form has been circulated to the Boston Redevelopment Authority as required by Article 80A-6 of the Boston Zoning Code.

4.2.12

Signature of Proponent
Mark Van Fossan

Date

4/6/12

Signature of Proponent's Representative

Date

Mitchell L. Fischman Consulting LLC

APPENDIX A – PNF WIND ANALYSIS

4.0 ENVIRONMENTAL PROTECTION COMPONENT

4.1 Wind Analysis

4.1.1 Introduction

A qualitative wind assessment was performed to determine the effect of the proposed Project on pedestrian-level winds ("PLWs") in the Project vicinity. Results are obtained for both existing and build[2] conditions. PLWs were considered at twenty-eight (28) locations in and near the Project Site.

The PLW categories are: (1) Comfortable for Long Periods of Standing or Sitting; (2) Comfortable for Short Periods of Standing or Sitting; (3) Comfortable for Walking; (4) Uncomfortable for Walking; and (5) Dangerous and Unacceptable. None of the 28 locations considered for either existing or build conditions will have annual PLWs that exceed the BRA guideline wind speed (i.e. where the effective gust velocity exceeds 31 mph more often than once in one hundred hours.)

The detailed results are presented in **Figures 4.1-13** through **4.1-20** as well as **Table 4.1-1** at the end of this section, which also provides a summary of the PLW categories.

4.1.2 Methodology

This assessment is based on:

- Topographic and planimetric survey maps of the area obtained from the BRA;
- The results of a 1999 wind tunnel assessment of PLWs done for the proposed Loews Hotel proposed across Tremont Street from Wilbur Place [1];
- Architectural plans for the Wilbur Place building obtained from Sheskey Architects;
- One site visit to the area during which 15 photographs were taken;
- An evaluation of the urban context of the proposed Project Site;
- A review of the Boston wind climate; and
- Frank Durgin's 35 years of experience dealing with PLWs.

[2] Though not yet constructed, the 25-story Loews Boston Hotel, 100 Stuart Street at the corner of Stuart and Tremont Streets, was permitted and approved by the BRA Board in 2001, and it is assumed to be in place in both the existing and build conditions.

The interaction of the wind with buildings and structures is very complicated and, at times, difficult to predict, especially for an urban area with a mixture of low-rise, mid-rise, and high-rise buildings. It is especially difficult for roof terraces. Thus this evaluation provides a qualitative assessment of PLWs.

4.1.3 Location and Description of the Project and the Surrounding Area

Description of Existing Condition **(Figure 4.1-1 and Figure 4.1-2)**

The Project Site is on the east (E) side of Tremont Street at the corner of Tremont and Stuart Streets. Currently, the Project Site contains a trailer and signage. An area map with building heights in feet is included as **Figure 4.1-1**. The PLW locations at which estimates are made are indicated in **Figure 4.1-2**.

Description of the Build Condition **(Figure 4.1-3)**

The proposed building will occupy nearly the entire site. It will be 155 feet tall. Doorways will be at locations 10, 11, 12 15, 16, 17, 18, 19 and 20 as shown in **Figure 4.1-3**.

There will be a 12-foot wide access way (alley) between the Wilbur Theatre and Wilbur Place. The entrances along Tremont and Stuart Street will be set back under the building. Signage is proposed on the building's exterior (the second, third, and fourth floors) along Stuart and Tremont Streets.

The Surrounding Area

To the west (W) of the Project Site across Tremont Street will be the proposed approximately 300-foot W Boston Hotel and Residences. To the south (S) is a 155 foot building and to the E is a 175 foot building. To the northwest is the approximately 130-foot State Transportation Building.

To the NE beyond is Millennium Center at 430 feet, Kensington Place at 290 feet and Liberty Place at 310 feet. Further to the NE is the Boston Financial District with its many 300- to 500-foot buildings. Thus, except for winds blowing up or down Tremont, Stuart, and Kneeland Streets, the Project Site is quite sheltered by these many tall buildings.

4.1.4 The Wind Climate

The Variation of Wind Speed With Height

In general, the natural wind is unsteady (i.e., it is gusty) and its average speed increases with height above the ground [2]. **Figure 4.1-4** depicts how the average wind speed varies with height for different types of terrain. While generally it does not happen, when one puts up any building, the possibility exists that the building will bring the higher speed winds at the top of the building down to ground level.

Figure 4.1-5 shows schematically how an isolated building interacts with the wind. Because the wind speed increases with height, as the wind is forced to a stop at the upwind façade, the pressure recovered on that façade is higher near the top than at the bottom of the façade. As a result, the wind flows down the windward façade and forms the vortex upwind of the building shown in the figure. This vortex is stretched and accelerated as it goes around the two upwind lower corners, causing the accelerated flow areas (A) shown on the left hand side of **Figure 4.1-5**. Similar accelerated areas also occur for winds blowing at the corners of the building (B in **Figure 4.1-5**). Because the proposed building is surrounded by other tall buildings, it does not interact with the wind in this way for winds from any direction.

Monolithic buildings (i.e., those that do not change shape with height), if they are significantly taller than most of the surrounding buildings, almost invariably will be windy at their bases. However, when there are many buildings of similar height in an area, they tend to shelter one another. This is the case for the proposed building.

Statistical Description of the Boston Wind Climate

The Project Site is located about 3 miles SW of Logan Airfield. Thus, the wind data from Logan Airfield usually used to define the winds for the Boston area is applicable. **Figure 4.1-6** depicts a wind rose for Boston. The wind speeds are estimated at pedestrian level at the airport. The length of each line radiating from the center of the figure to the outermost crossing line is proportional to the total time the wind comes from that direction. The other lines crossing the radial lines indicate the frequency of winds less than 7, 10, and 15 mph. As noted in the figure, the wind rose is based on surface wind data from Logan Airfield taken from 1945 to 1965. Data from 1965 to 2005 is also available, but it is not believed to be as representative of the true winds in Boston. Many 25- to 40-story buildings have been built in the financial district of Boston since 1965. The financial district is just one mile SSW of Logan Airfield.

Figure 4.1-6 shows that the winds in Boston come primarily from the NW, W, and SW. **Figures 4.1-7** through **4.1-10** show pedestrian level wind roses for Boston for winter (Dec., Jan., and Feb.), spring (Mar., Apr., and May), summer (Jun., Jul., and Aug.), and fall (Sept., Oct., and Nov.). These figures show that NW winds tend to occur during the colder months and SW winds during the warmer months. Spring and fall are transitional, but winds are stronger in the spring than in the fall. Strong easterly winds usually occur during storms when there is precipitation.

The average wind speed at Logan Airfield at 58 feet (the average height at which the data was taken) is 12.9 mph. At pedestrian height (i.e., at chest height, 4.5 feet) it is about 8.6 mph. The average wind speeds at 58 and 4.5 feet at Logan Airfield for each month are shown in **Figure 4.1-11**. Seasonally, the average wind speed at pedestrian level is 9.4 mph in the winter, 9.2 mph in the spring, 7.4 mph in the summer, and 8.2 mph in the fall.

4.1.5 Pedestrian Wind Criteria

Since the early 1980s, the BRA has used a guideline criterion for acceptable winds of not exceeding a 31mph effective gust more often than once in one hundred hours. The effective gust is defined as the average wind speed plus 1.5 times the root mean square variation about the average. The effective gust can be shown to be about the fastest one-minute gust in an hour. When many locations are considered, the effective gust averages about 1.4 times the average hourly wind speed [3]. However, that ratio can vary widely from 1.4 for individual locations.

In 1978, Melbourne [4] developed probabilistic criteria for average and peak PLWs, which accounted for different types of pedestrian activity as well as the safety aspects of such winds. Durgin [3] suggested the use of an Equivalent Average which combines the effects of average, gusting, and peak winds and later [5 and 6] reinterpreted Melbourne's criteria to apply to Equivalent Average winds (**Figure 4.1-12**). The Equivalent Average used in this figure is similar to an hourly average, but combines the effects of steady and gusting winds. Five categories of PLWs are defined:

1) Comfortable for Long Periods of Standing or Sitting;[3]
2) Comfortable for Short Periods of Standing or Sitting;
3) Comfortable for Walking;
4) Uncomfortable for Walking;
5) Dangerous and Unacceptable.

These criteria are not absolute (any location can have dangerous winds in a major storm or hurricane). Rather, they imply that the location would have wind speeds such that the activity suggested could be undertaken comfortably most of the time, and would be perceived[4] as such, by most people who frequent the location. For example, the PLWs at Logan Airfield are in Category 4 (uncomfortable for walking) but near the dividing line between Category 4 and Category 3 (comfortable for walking) (see **Figure 4.1-12**). But they are well under the BRA 31 mph effective gust wind speed guideline (converted to an equivalent average wind), which is high in Category 4. Therefore, most people would perceive conditions in the open at Logan Airfield as marginally comfortable for walking.

[3] The numbering system for the Categories was reversed in December, 1999. Before December, 1999, the slowest winds were in Category 5 and the fastest in Category 1. Since the December, 1999, the slowest are in Category 1 and the fastest in Category 5.
[4] On a somewhat windy day, a person familiar with the location would choose not to go there for the specified activity.

4.1.6 Pedestrian-Level Winds at the Project Site

Introduction

The objective of this study was to examine the effects of the proposed Wilbur Place building on PLWs about the Project Site and at nearby buildings. In the following sections, the effects of NW winter winds, SW summer winds, and easterly storm winds will be discussed for existing and build conditions. The results from NW, SW, and storm directions will be summarized by an estimated prediction of the annual PLW category at each location considered. When a PLW Category does not change, it does not mean the PLWs did not increase or decrease, but only that they did not change sufficiently for the PLW Category to change.

The estimated categories for all locations, wind directions, and annual winds for both existing and the build conditions are shown in **Figures 4.1-13** to **4.1-20**. The results for all locations, wind directions, and annual winds, as well as a summary, are tabulated in **Table 4.1-1**. The summary indicates both the number of locations that will not change category and those that will change up or down one or two categories. Reference [1], a wind tunnel investigation of PLWs for the proposed Loews Boston Hotel across Tremont Street from the Project Site, was used extensively in determining the PLW Categories reported herein.

For the most part, the weather in New England is dominated by either large coastal storms (fall, winter, and spring) or the Bermuda High (summer). Typically, when a coastal storm occurs, it rains or snows for 4 to 12 hours, then it clears, and, as the storm moves to the NE, the winds blow from the NW for three or four days until the next weather system arrives. These storms and the NW winds following them occur mostly in the fall, winter, and spring. NW winds are particularly uncomfortable in the winter, when typically they occur on cold days. The Bermuda High is generally responsible for the SW winds that occur in the summer.

Northwest (Winter) Winds **(Figures 4.1-13 and 4.1-14)**

NW winds blow diagonally across the intersection of Tremont and Stuart Streets from the Transportation Center toward the Project Site (see **Figure 4.1-13**). The results for NW winds include the effects of all winds blowing from W to N. The estimated categories for all locations for existing and build conditions for NW winds are shown in **Figures 4.1-13** and **4.1-14** (also see **Table 4.1-1**).

For NW winds, the PLW Category at eighteen of the twenty-eight locations considered do not change. The PLW Category did not increase by two at any location. The PLW Category increased by one at locations 9, 14, and 22. It decreased by one at 7 locations (11, 12, 13, 16, 17, 19, and 20). All these locations are in the immediate vicinity of the proposed Project. Although locations 9 and 22 both increased from Category 3 to 4, the actual increase in wind speed was estimated to be quite small (about 1mph).

Southwest (Summer) Winds **(Figures 4.1-15 and 4.1-16)**

The prevailing winds in the summer are from the SW. SW winds blow diagonally across the intersection of Tremont and Stuart Streets from the proposed W Boston Hotel and Residences toward the NE (**Figure 4.1-15**). The results for SW winds include effects of all winds blowing from S to W. The estimated categories for all locations for existing and build conditions are shown in **Figures 4.1-15** and **4.1-16** (also see **Table 4.1-1**).

For SW winds, the PLW Category does not change at twenty-one of the twenty-eight locations considered. Of the other seven locations, the PLW category increased by one at Locations 15, 16, and 22; and decreased by one at Locations 10, 11, 12, and 13. Again, all the locations that changed are near or in the Project Site.

Easterly Storm Winds **(Figures 4.1-17 and 4.1-18)**

Easterly winds occur about one third of the time. Light easterly winds occur as a storm starts or in the summer as a sea breeze. During the first four to twelve hours of a typical coastal storm, it rains or snows depending on the temperature. The wind is from the NE or SE depending on whether the center of the storm passes to the east or west of the city. The results for easterly storm winds includes the effects of all winds blowing from N to E to S (i.e., from the eastern side of the compass).

Since for strong easterly winds, it will generally be raining or snowing, and people expect it to be windy, the emphasis in evaluating the effect of the proposed buildings should be on entering or exiting buildings. The Categories for all easterly wind directions from N-E-S were estimated and have been combined to obtain a single result for easterly winds. Bear in mind that the total time the winds come from all of these easterly directions is about the same as the time the wind comes from either the NW or SW quadrants.

The estimated Categories for all locations for existing and build conditions are shown in **Figures 4.1-17** and **4.1-18** (See **Table 4.1-1**).

For easterly winds, PLW Categories at twenty-four of the twenty-eight locations considered are estimated to remain unchanged. Only at location 9 was there an estimated increase in PLW Category, and that was from category 2 to 3. At Locations 3, 16, and 18, the PLW Category decreased by one. Thus again the locations that change are near or in the Project Site and net effect of the Proposed Project will be to reduce PLWs.

Annual Winds **(Figures 4.1-19 and 4.1-20)**

In the above discussion, only winds from three general wind directions are discussed. While those are important directions related to seasons and storms, one cannot infer the overall annual windiness at any location from those results. PLW Categories were estimated for the eight major wind directions (i.e., from the NE, E, SE, S, SW, W, NW, and N). Those estimated categories were then used with an eight compass point statistical description of the Boston wind climate to estimate the overall annual category for each of the twenty-eight locations considered. The resulting estimated categories for each location for existing and build conditions are listed in the last column in **Table 4.1-1**. In comparing these annual estimates with those for the five specific directions, one must remember that the total occurrence of winds from the easterly directions is roughly equal to that for either NW or SW. These annual estimates are qualitative and must be treated as such.

For annual winds, twenty-four of the twenty-eight locations considered are estimated not to change PLW Category. Of the other locations, the PLW Category is estimated to rise one category at Location 14. At Locations 16, 19, and 20, the PLW Category decreases by one. Thus overall, the Proposed Project will have little effect on PLWs and the net effect is expected to be a slight decrease in PLWs.

4.1.7 Summary

A qualitative assessment was performed to determine the effect of the proposed new building on pedestrian-level winds ("PLWs") in the Project vicinity. Results were obtained for both existing and build configurations. PLWs were considered at twenty-eight (28) locations in and near the Project Site. None of the 28 locations considered for either existing or build conditions will have annual PLWs that exceed the BRA guideline wind speed (i.e. where the effective gust velocity exceeds 31 mph more often than once in one hundred hours.)

The PLW categories are: (1) Comfortable for Long Periods of Standing or Sitting, (2) Comfortable for Short Periods of Standing or Sitting, (3) Comfortable for Walking, (4) Uncomfortable for Walking, and (5) Dangerous and Unacceptable. No location has an annual estimated PLW Category higher than 3 (Comfortable for Walking) for either existing or build conditions.

For annual PLWs, 24 of the 28 locations remain the same PLW category. Overall, PLWs in and near the proposed new building are modest and the addition of the new building will tend to reduce PLWs slightly in the Project vicinity.

4.1.8 References

[1] Cochran, L., Peterka, J, Cermak, J. ,"Pedestrian Wind Report.- Wind Tunnel Tests- The Loews Hotel, Boston Massachusetts", Cermak, Peterka, Petersen, Inc. Report CPP Project 99-1929, December, 2000.

[2] Davenport, A.G., and Isyumov, N., "The Application of the Boundary Layer Wind Tunnel to the Prediction of Wind Loading", Proceedings of Intl. Seminar on Wind Effects on Buildings and Structures, Ottawa, Canada, September, 1967.

[3] Durgin, F.H., "Use of the Equivalent Average for Evaluating Pedestrian Level Winds", Presented at the Sixth U.S National Conf. On Wind Engineering, University of Houston, Houston, Texas, March 7-10, 1989, *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 36, pp. 817-828, 1990.

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

[5] Durgin, F.H., "Pedestrian Level Wind Studies at the Wright Brothers Facility", Progress in Wind Engineering (Proc. of the 8th International Conference on Wind Engineering), New York, Elsevier, Part 4, 1992, pp. 2253-2264.

[6] Durgin, F.H., "Pedestrian Level Wind Criteria Using the Equivalent Average", Journal of Wind Engineering and Industrial Aerodynamics, Vol. 66 (1997), pp. 215-226.

Loc No.	NW Ex	NW Bld	SW Ex	SW Bld	STORM Ex	STORM Bld	ANNUAL Ex	ANNUAL Bld	Loc No.
1	3	3	2	2	2	2	3	3	1
2	2	2	2	2	1	1	2	2	2
3	3	3	3	3	3	2	3	3	3
4	3	3	2	2	2	2	3	3	4
5	3	3	2	2	2	2	3	3	5
6	2	2	1	1	2	2	2	2	6
7	3	3	2	2	2	2	3	3	7
8	2	2	2	2	2	2	2	2	8
9	3	4	2	2	2	3	3	3	9
10	3	3	2	1	2	2	3	3	10
11	3	2	2	1	2	2	2	2	11
12	3	2	2	1	2	2	2	2	12
13	3	2	2	1	2	2	2	2	13
14	2	3	1	1	2	2	2	3	14
15	3	3	1	2	2	2	3	3	15
16	3	2	1	2	2	1	3	2	16
17	2	1	1	1	1	1	2	2	17
18	2	2	1	1	2	1	2	2	18
19	2	1	1	1	1	1	2	1	19
20	2	1	1	1	1	1	2	1	20
21	3	3	2	2	2	2	3	3	21
22	3	4	2	3	2	2	3	3	22
23	3	3	2	2	3	3	3	3	23
24	3	3	2	2	2	2	2	2	24
25	3	3	2	2	2	2	3	3	25
26	3	3	3	3	2	2	3	3	26
27	3	3	3	3	2	2	3	3	27
28	2	2	3	3	2	2	3	3	28

Estimated Categories for NW, SW, Easterly Storm, and Annual Winds for Existing (Ex), And (Bld) Build Conditions

Direction	NW	SW	Storm	Annual
Up 2 Cat.	0	0	0	0
Up 1 Cat	3	3	1	1
No Change.	18	21	24	24
Down 1 Cat.	7	4	3	3
Down 2 Cat.	0	0	0	0

Summary of Locations that Changed Category Between Existing and Build Conditions

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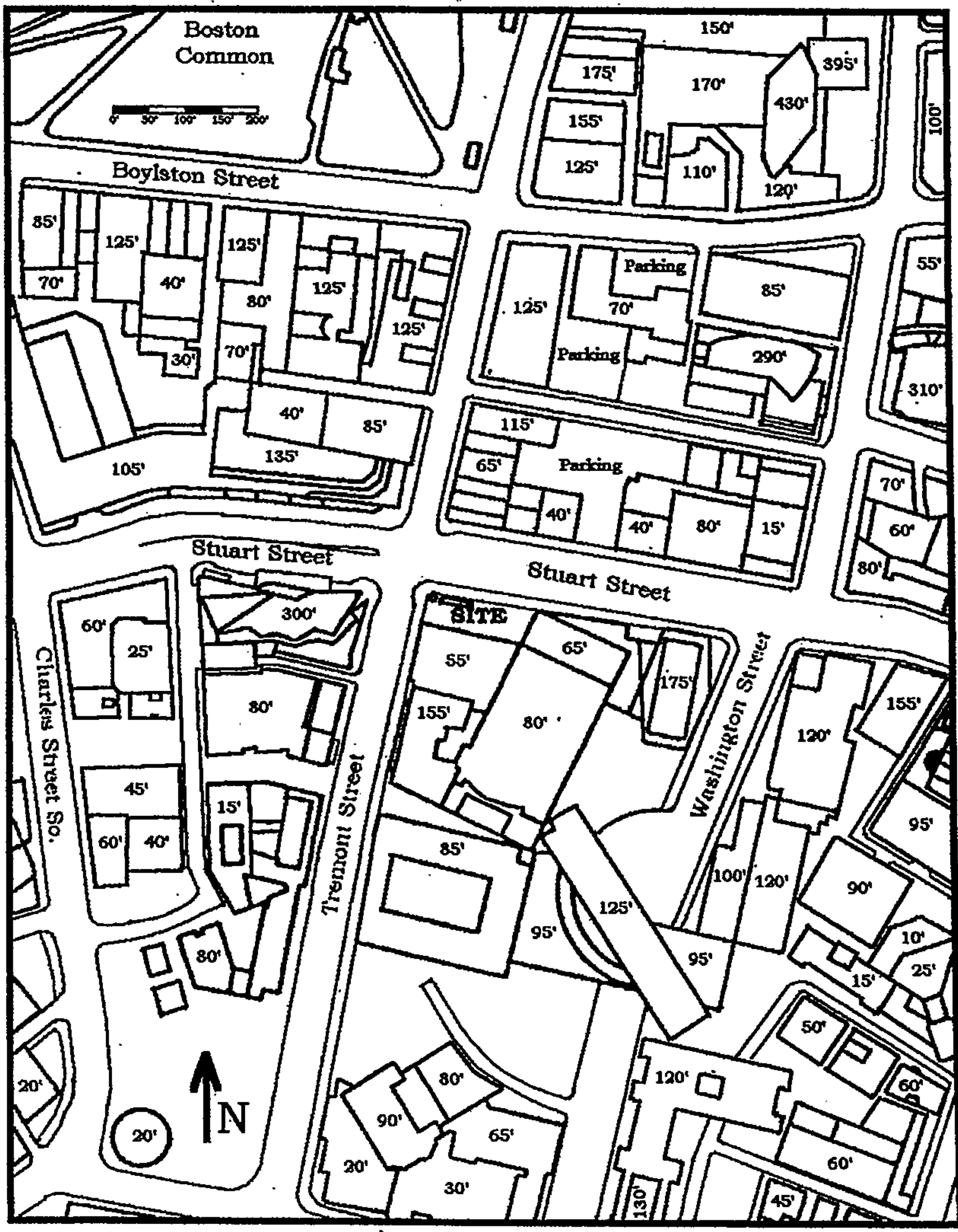
Pedestrian Level Winds Summary Table

Source: Frank H. Durgin, P.E.

Table 4.1-1

2616Wind.dwg



Area Map, Including Building Heights in Feet

Source: Frank H. Durgin, P.E.

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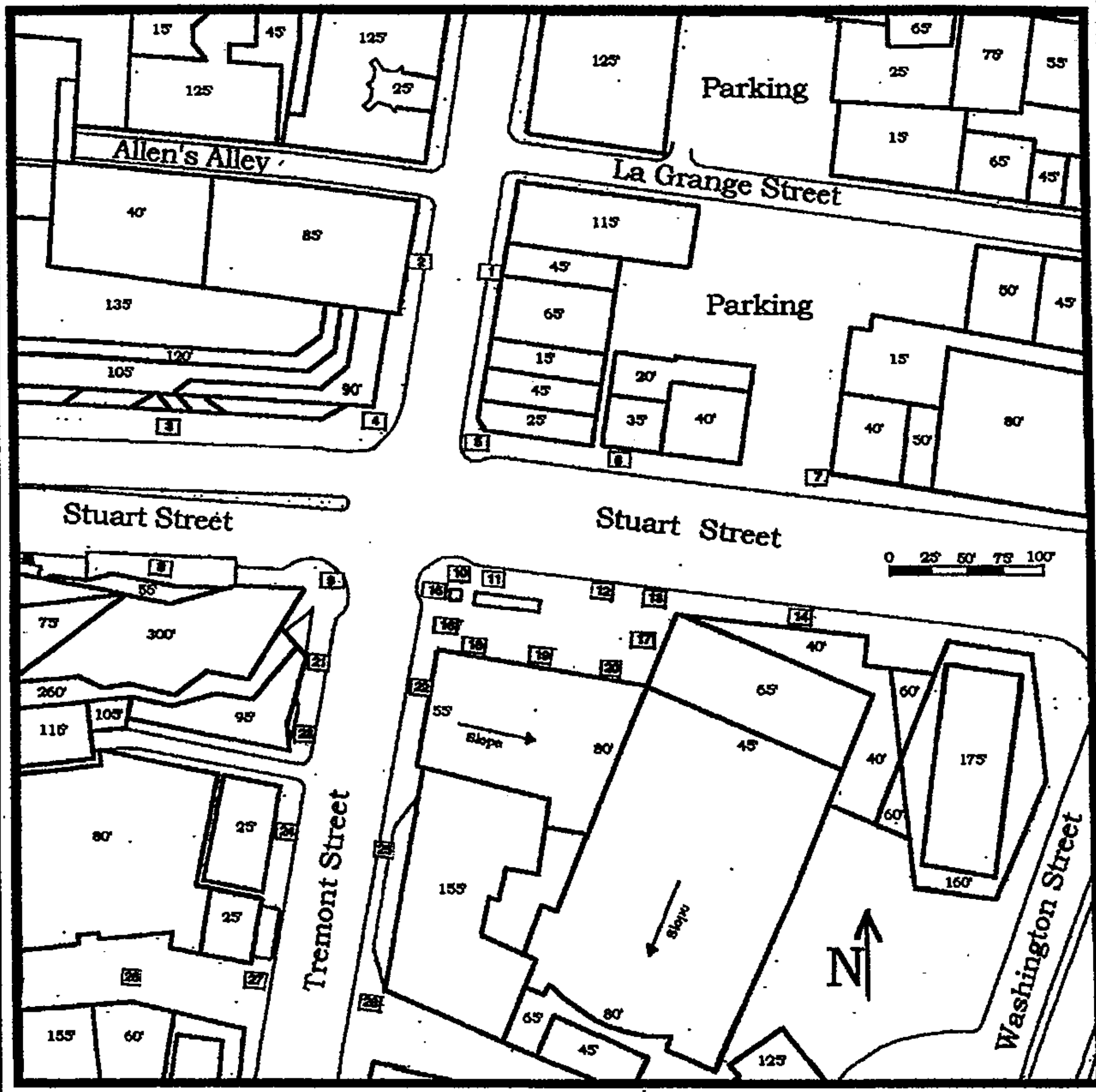
Figure
4.1-1

2616Wind.dwg



Map of Existing Conditions, Giving Building Heights in Feet, and PLW Location Numbers

Source: Frank H. Durgin, P.E.

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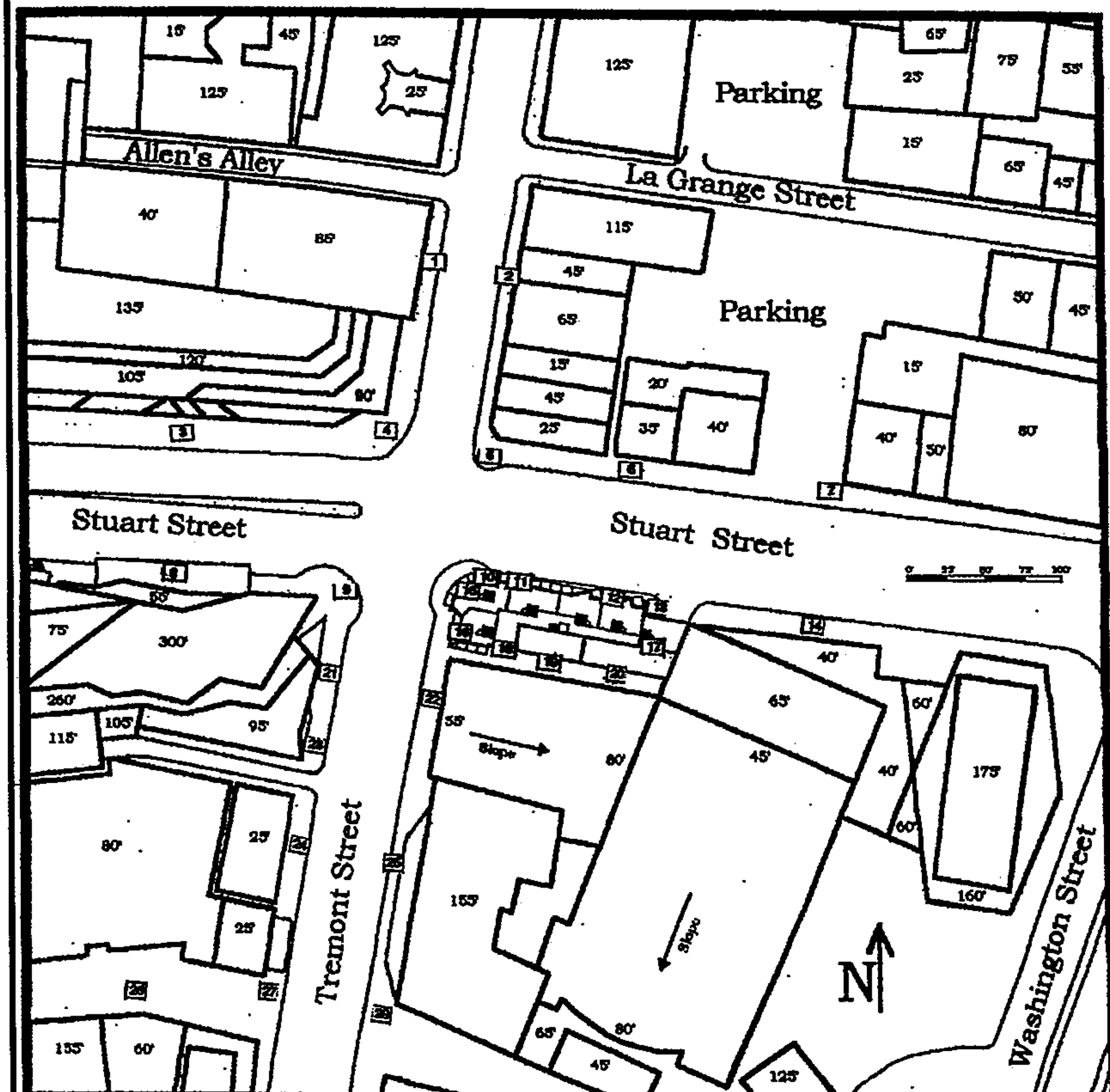
Figure 4.1-2

2616Wind.dwg



Map of Build Conditions, Giving Building Heights in Feet, and PLW Location Numbers

Source: Frank H. Durgin, P.E.

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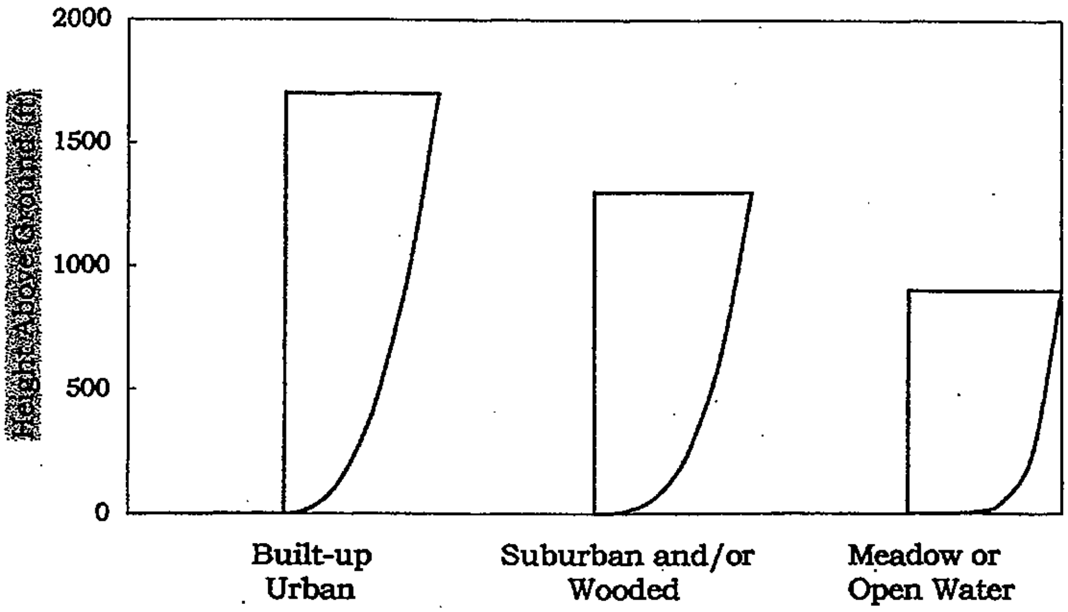
Figure 4.1-3

2616Wind.dwg



Types of Earth's Boundary Layers After Davenport (2)

Source: Frank H. Durgin, P.E.

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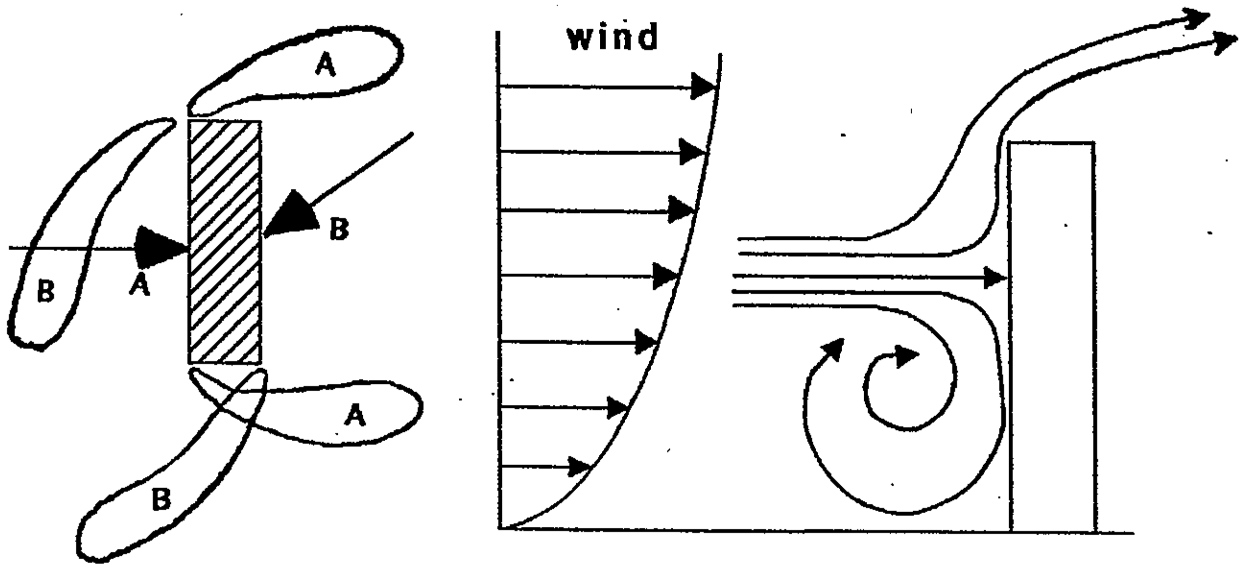
Figure 4.1-4

2616Wind.dwg



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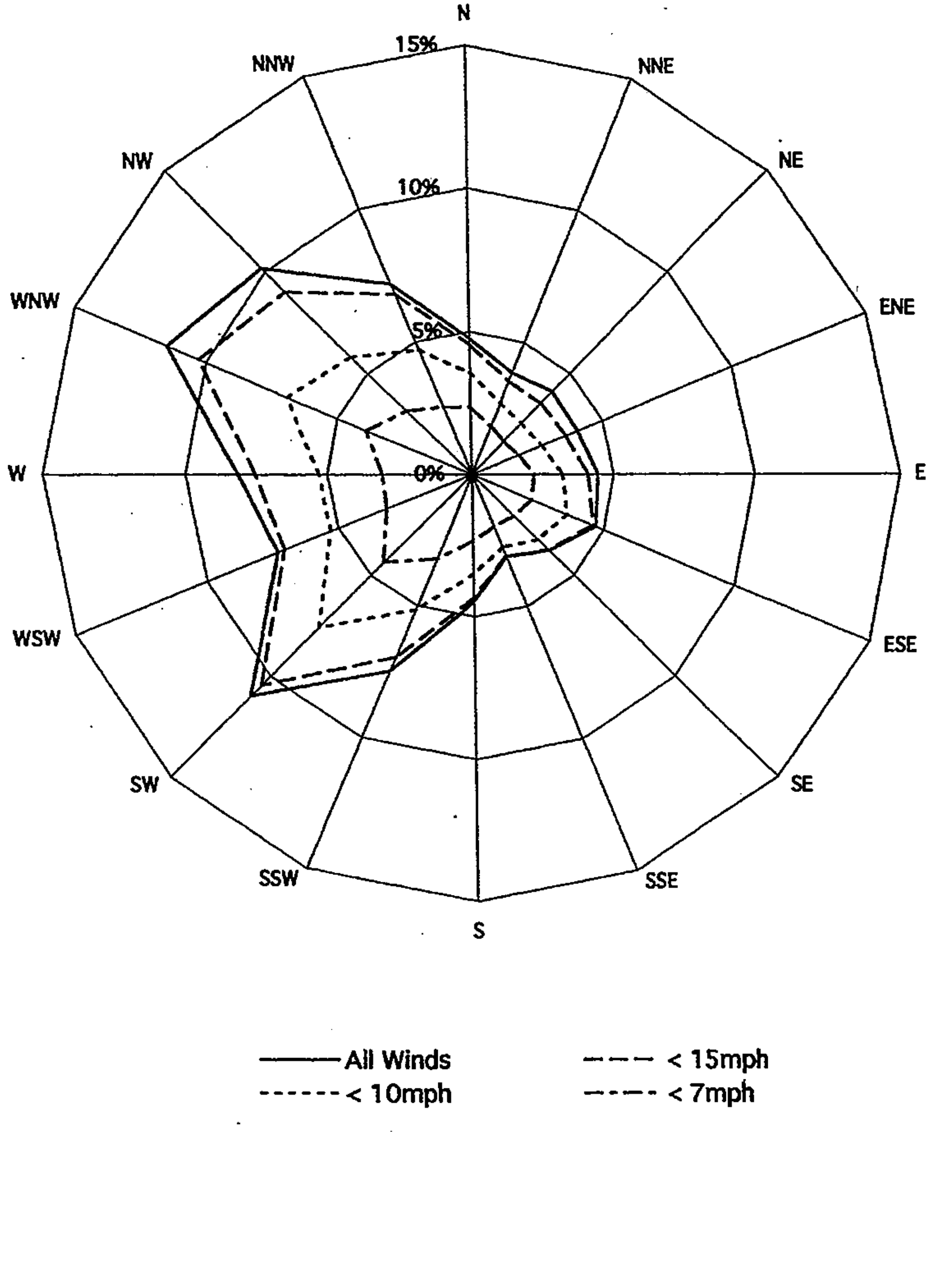
Schematic of How the Wind Interacts with an Isolated Building

Source: Frank H. Durgin, P.E.

Figure 4.1-5

2616Wind.dwg



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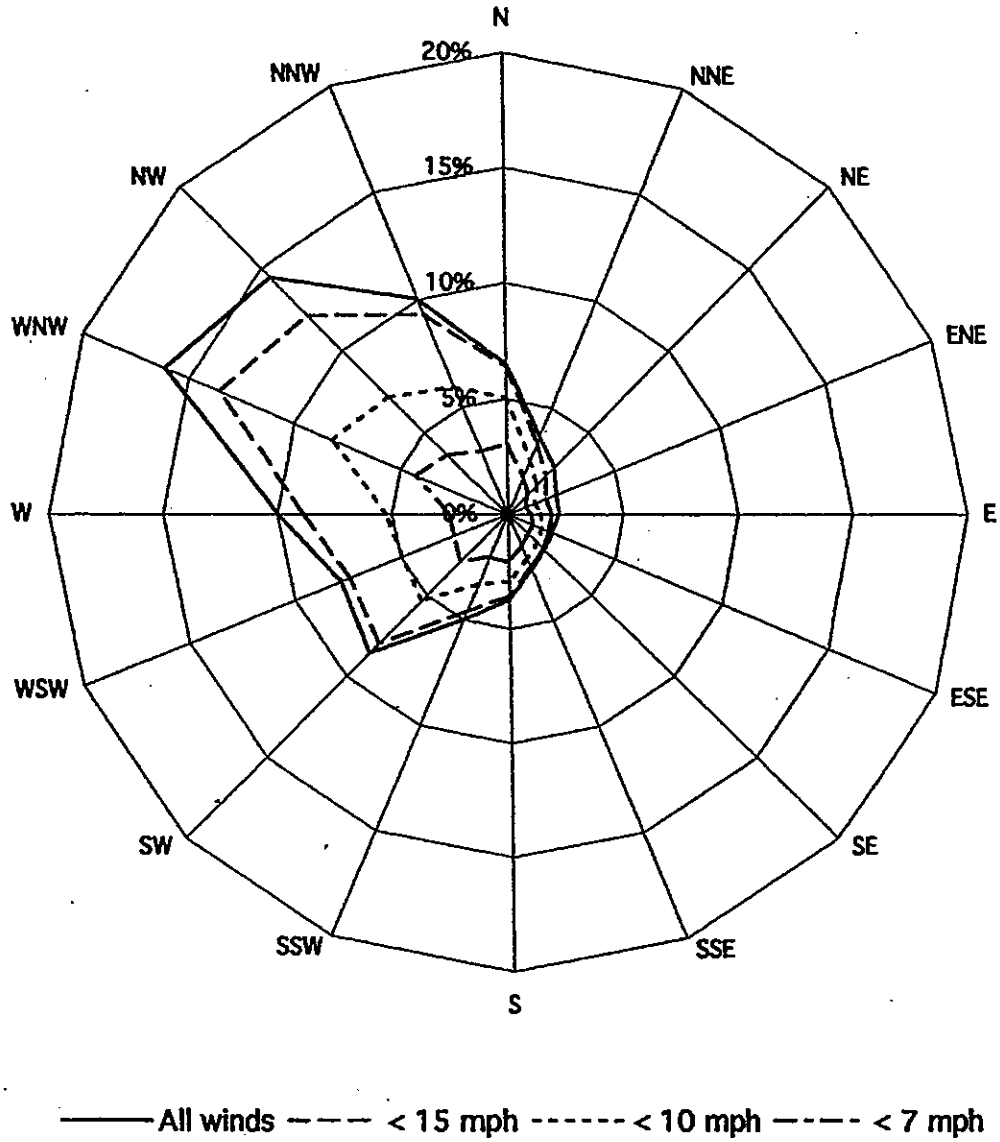
Annual Pedestrian Level Wind Rose For Boston Based on Surface Data From Logan Airfield 1945-1965

Source: Frank H. Durgin, P.E.

Figure 4.1-6

2616Wind.dwg



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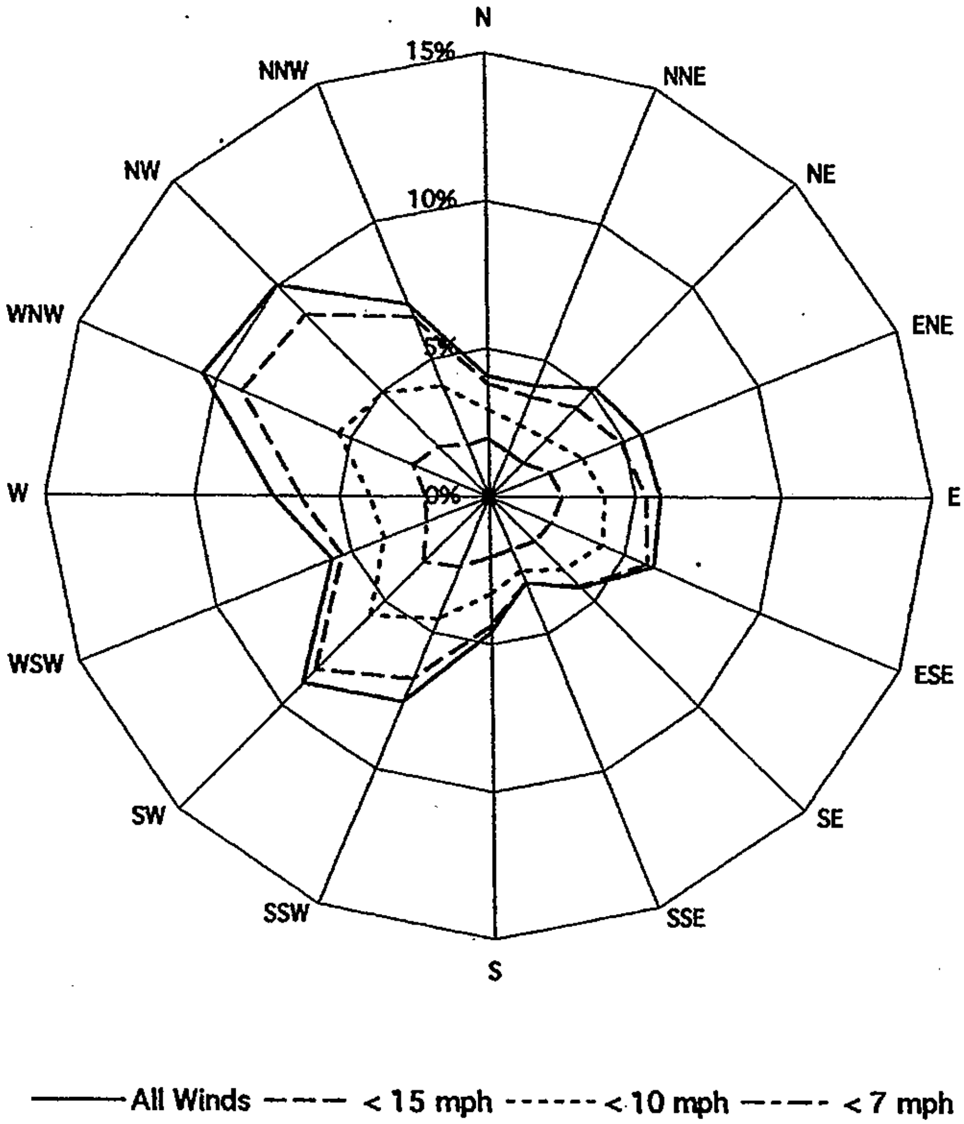
Winter (Dec., Jan., Feb.) Pedestrian Level Wind Rose for Boston Based on Surface Data from Logan Airfield 1945–1965

Source: Frank H. Durgin, P.E.

Figure 4.1-7

2616Wind.dwg



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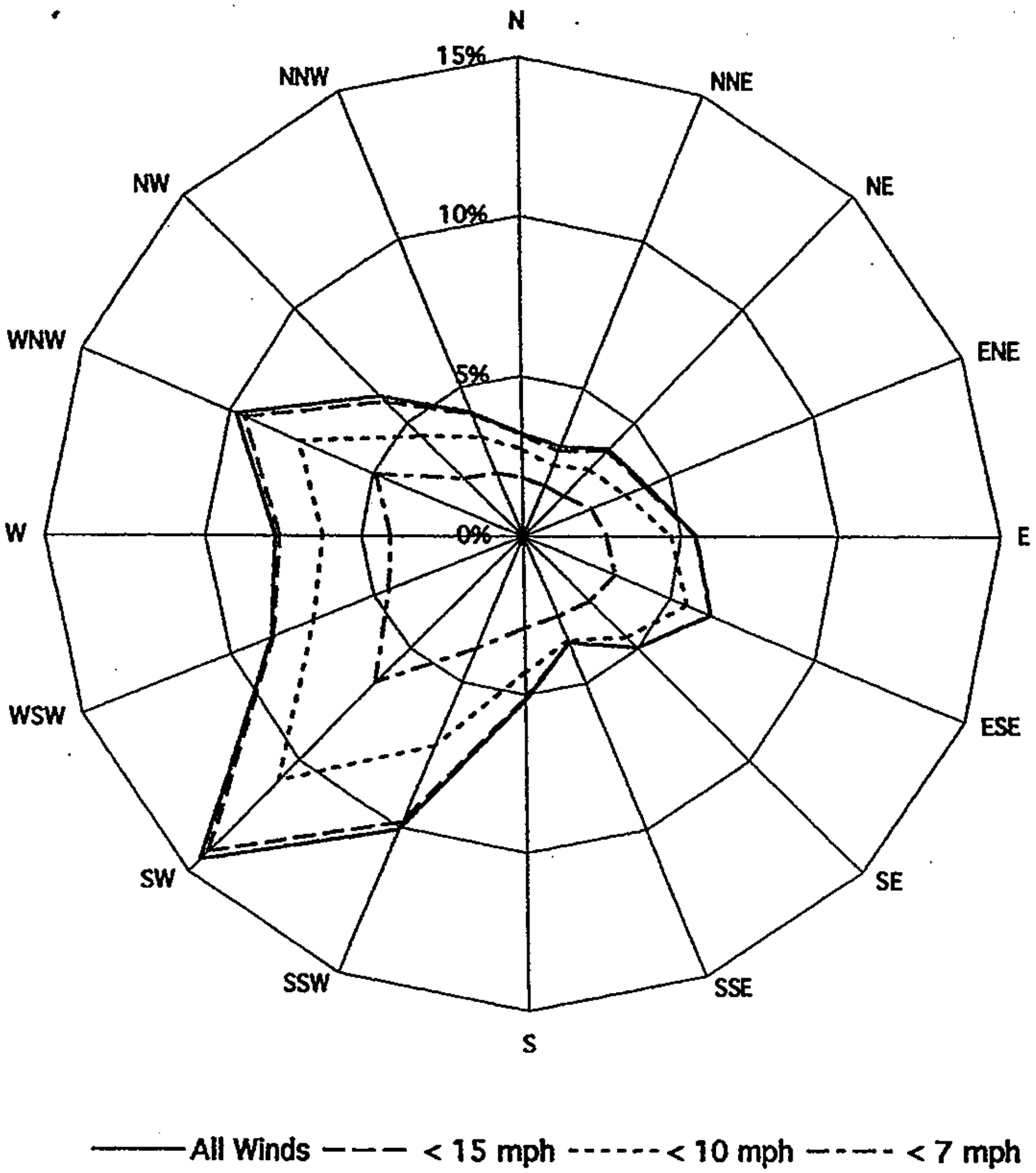
Spring (Mar., Apr., May) Pedestrian Level Wind Rose for Boston Based on Surface Data from Logan Airfield 1945–1965

Source: Frank H. Durgin, P.E.

Figure 4.1-8

2616Wind.dwg



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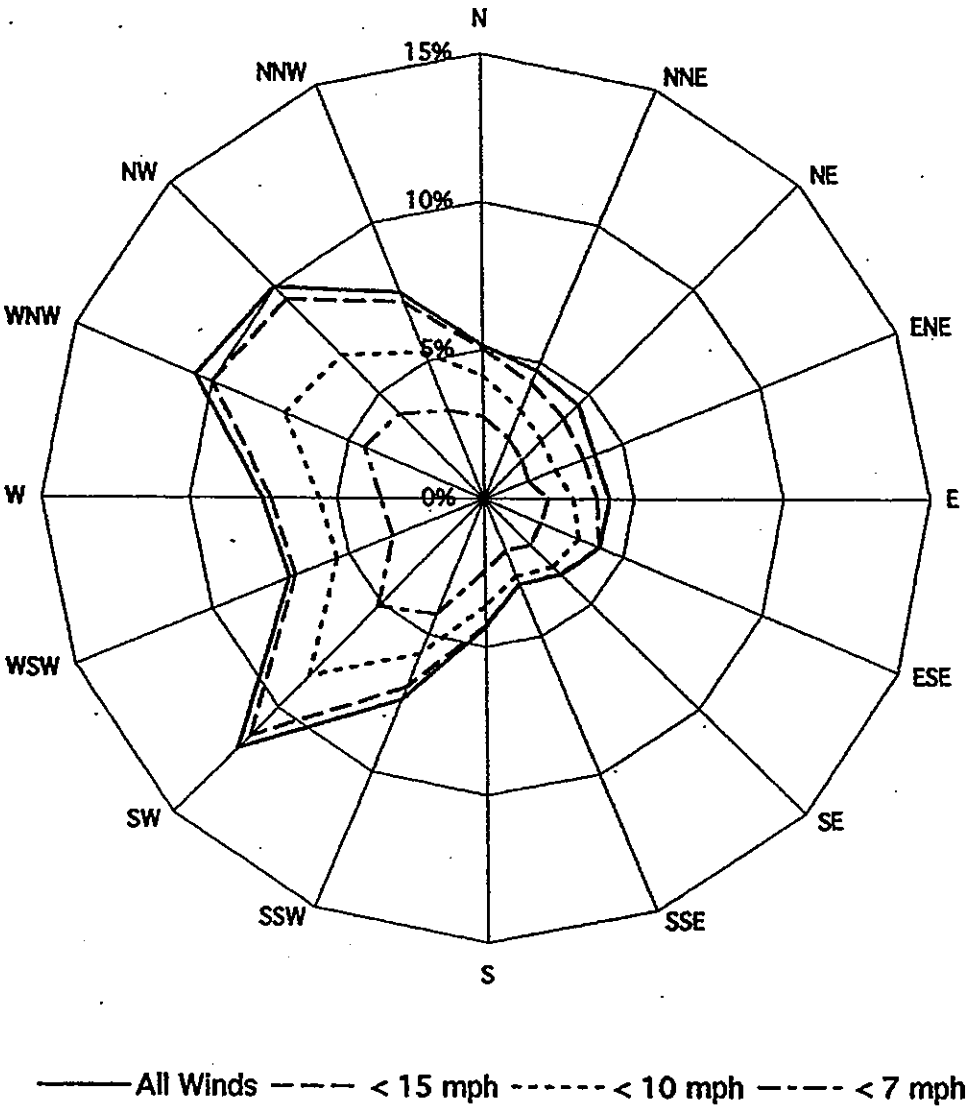
Summer (June, July, Aug.) Pedestrian Level Wind Rose for Boston Based on Surface Data from Logan Airfield 1945–1965

Source: Frank H. Durgin, P.E.

Figure 4.1-9

2616Wind.dwg



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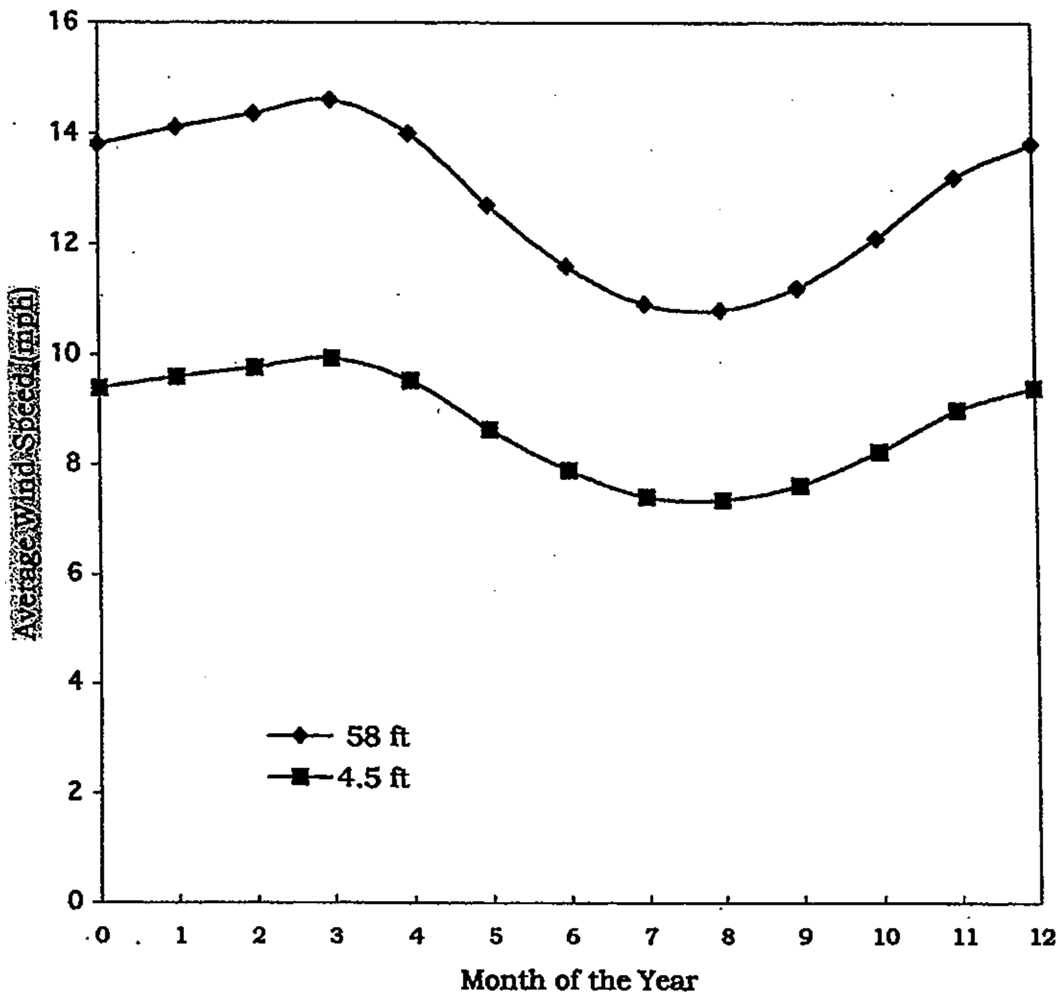
Fall (Sept., Oct., Nov.) Pedestrian Level Wind Rose for Boston Based on Surface Data from Logan Airfield 1945-1965

Source: Frank H. Durgin, P.E.

Figure 4.1-10

2616Wind.dwg



Yearly Average is 12.9 mph at 58 feet

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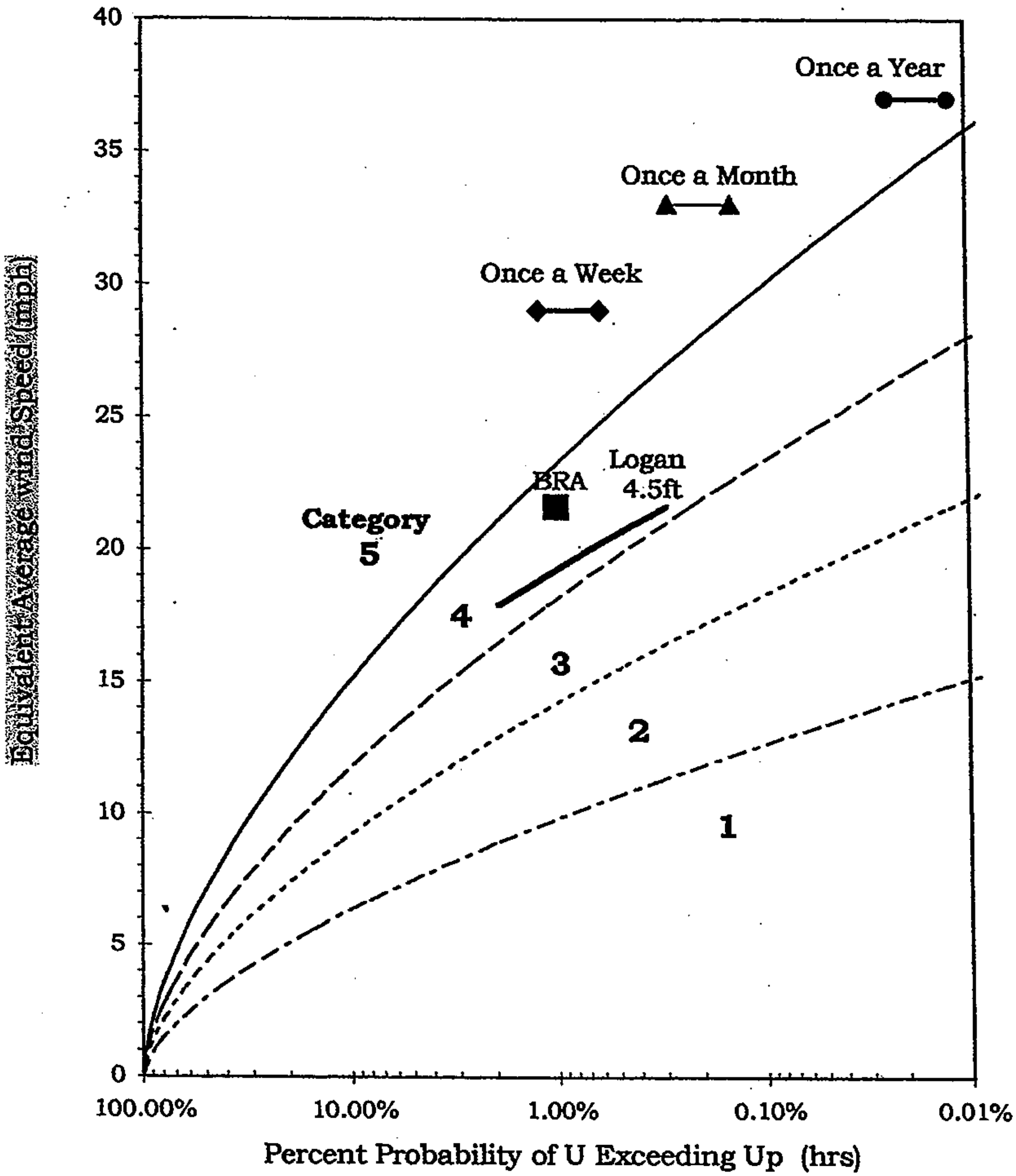
Average Wind Speed at Logan Airfield Based on Surface Data from 1945-1965

Source: Frank H. Durgin, P.E.

Figure 4.1-11

2616Wind.dwg



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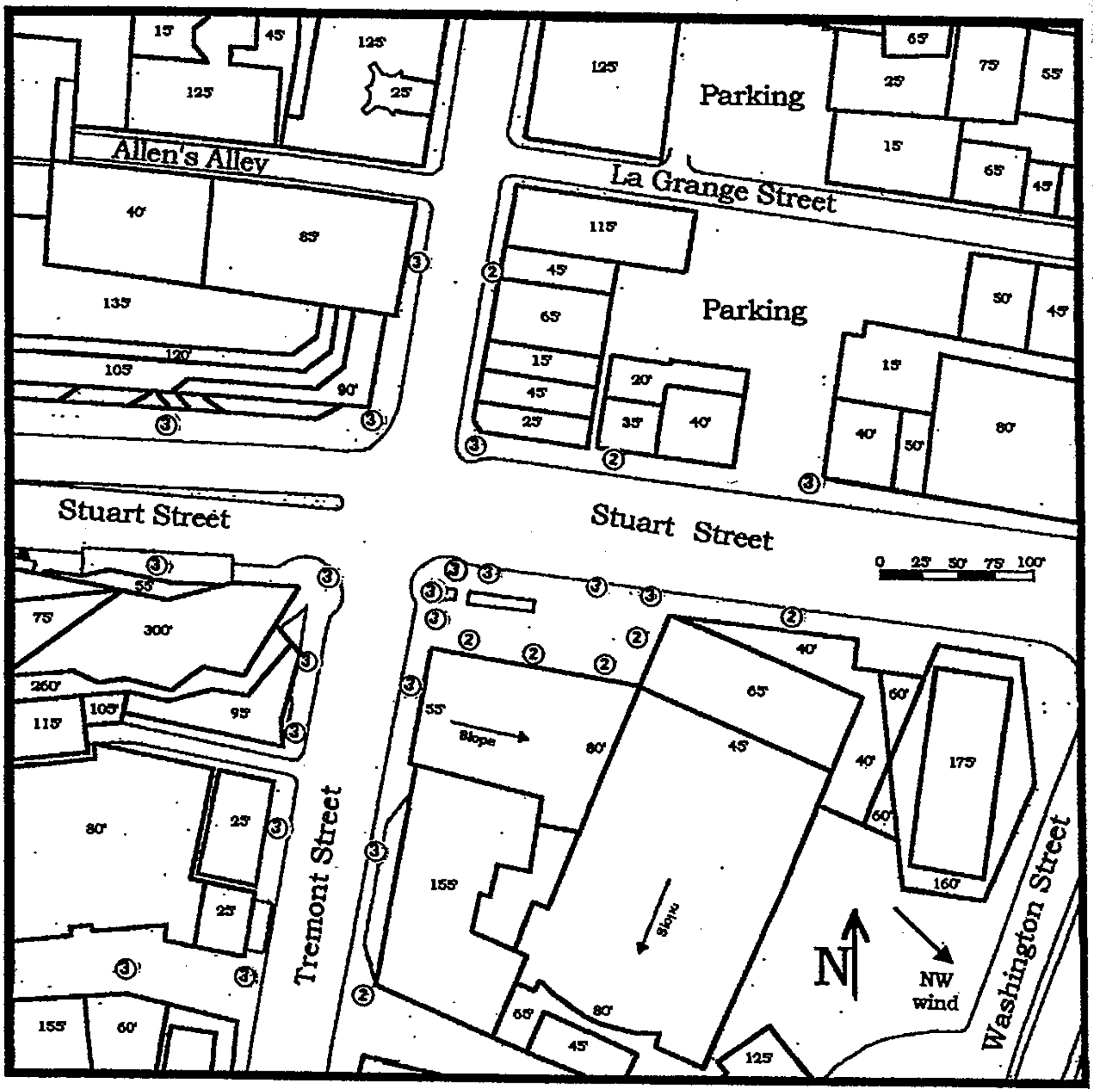
Pedestrian Level Wind Criteria For Equivalent Average Winds

Source: Frank H. Durgin, P.E.

Figure 4.1-12

2616Wind.dwg



Categories for Existing Conditions for NW Winds

Source: Frank H. Durgin, P.E.

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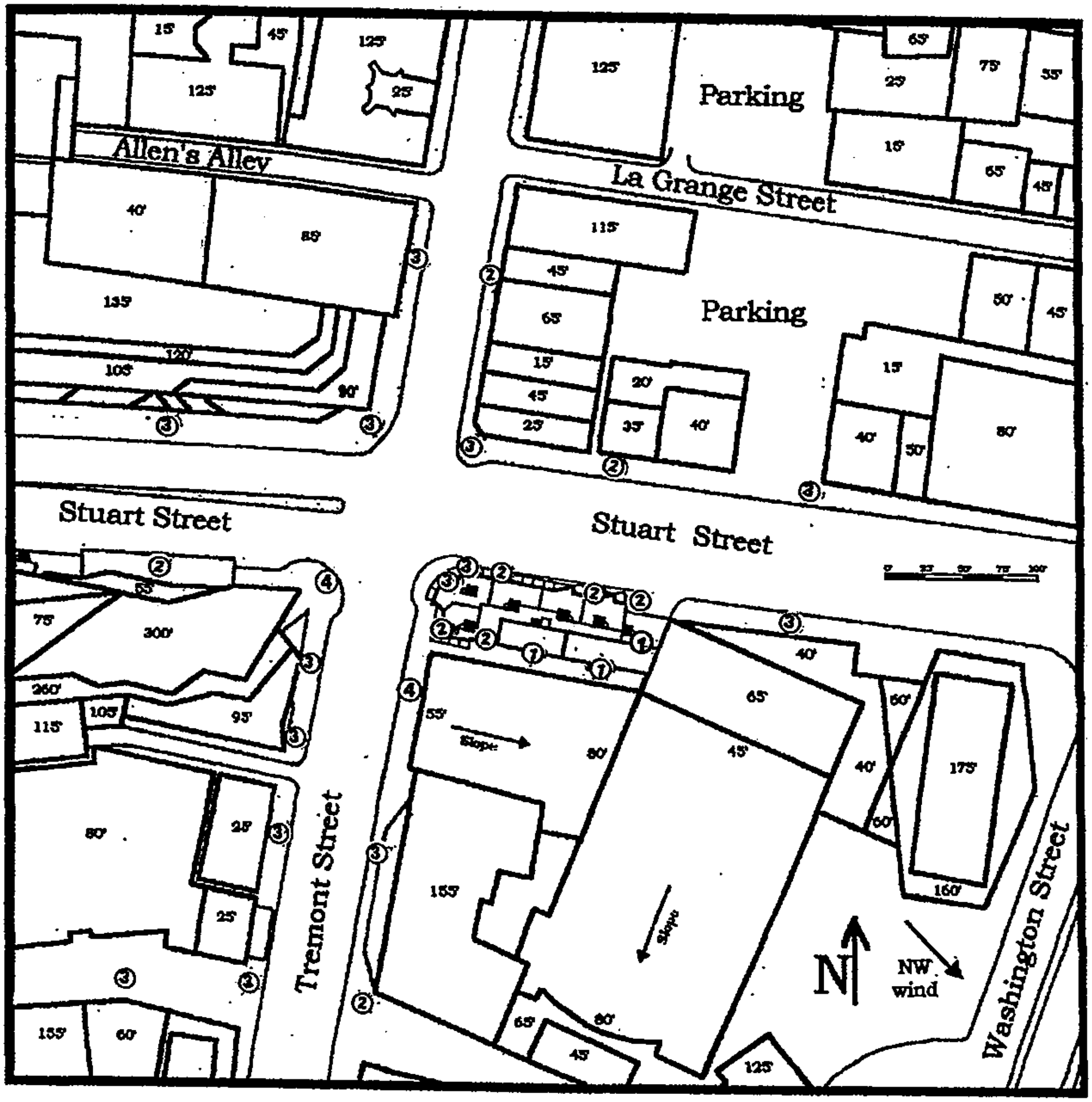
Figure 4.1-13

2616Wind.dwg



Categories for Build Conditions for NW Winds

Source: Frank H. Durgin, P.E.

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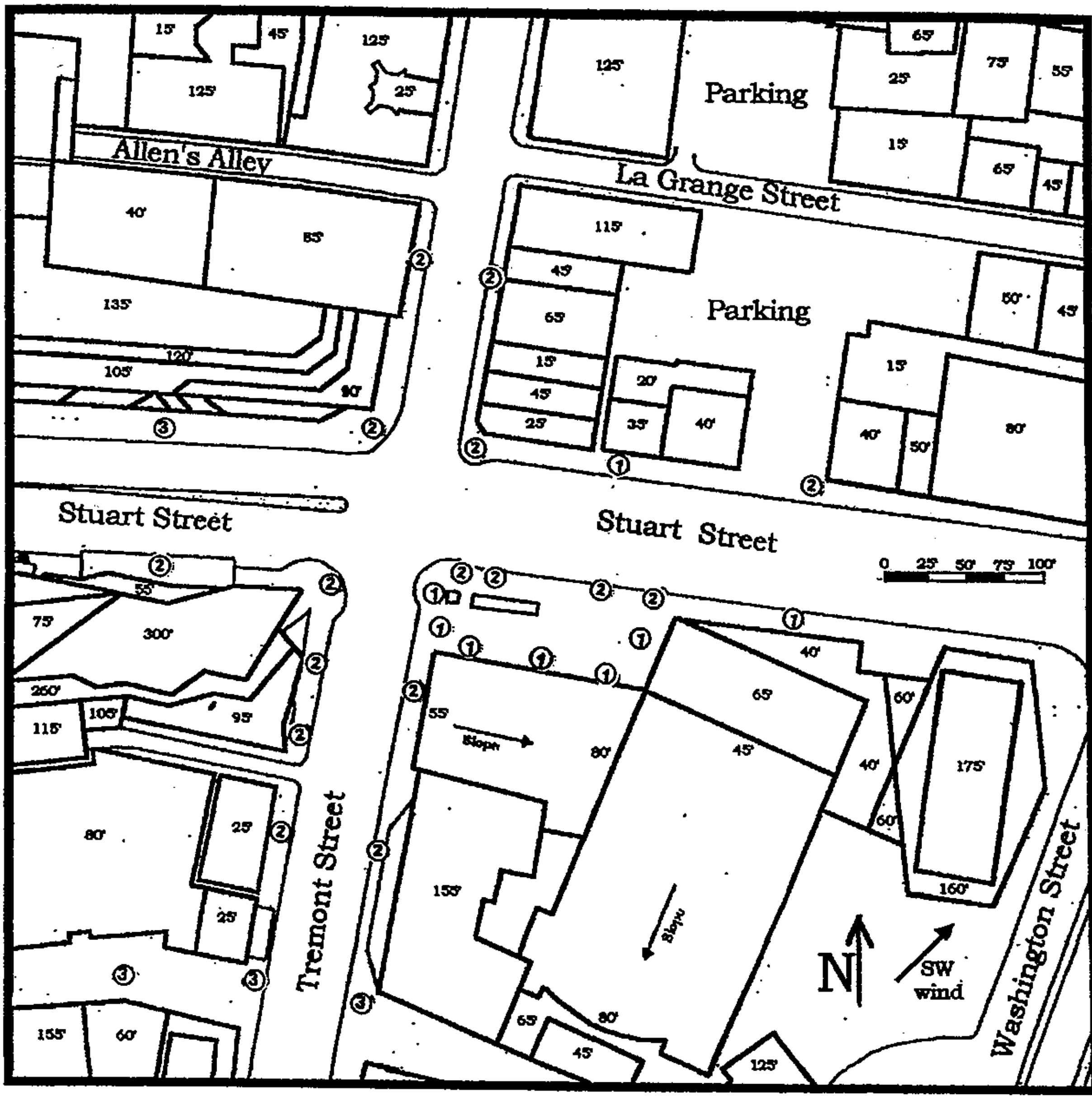
Figure 4.1-14

2616Wind.dwg



Categories for Existing Conditions for SW Winds

Source: Frank H. Durgin, P.E.

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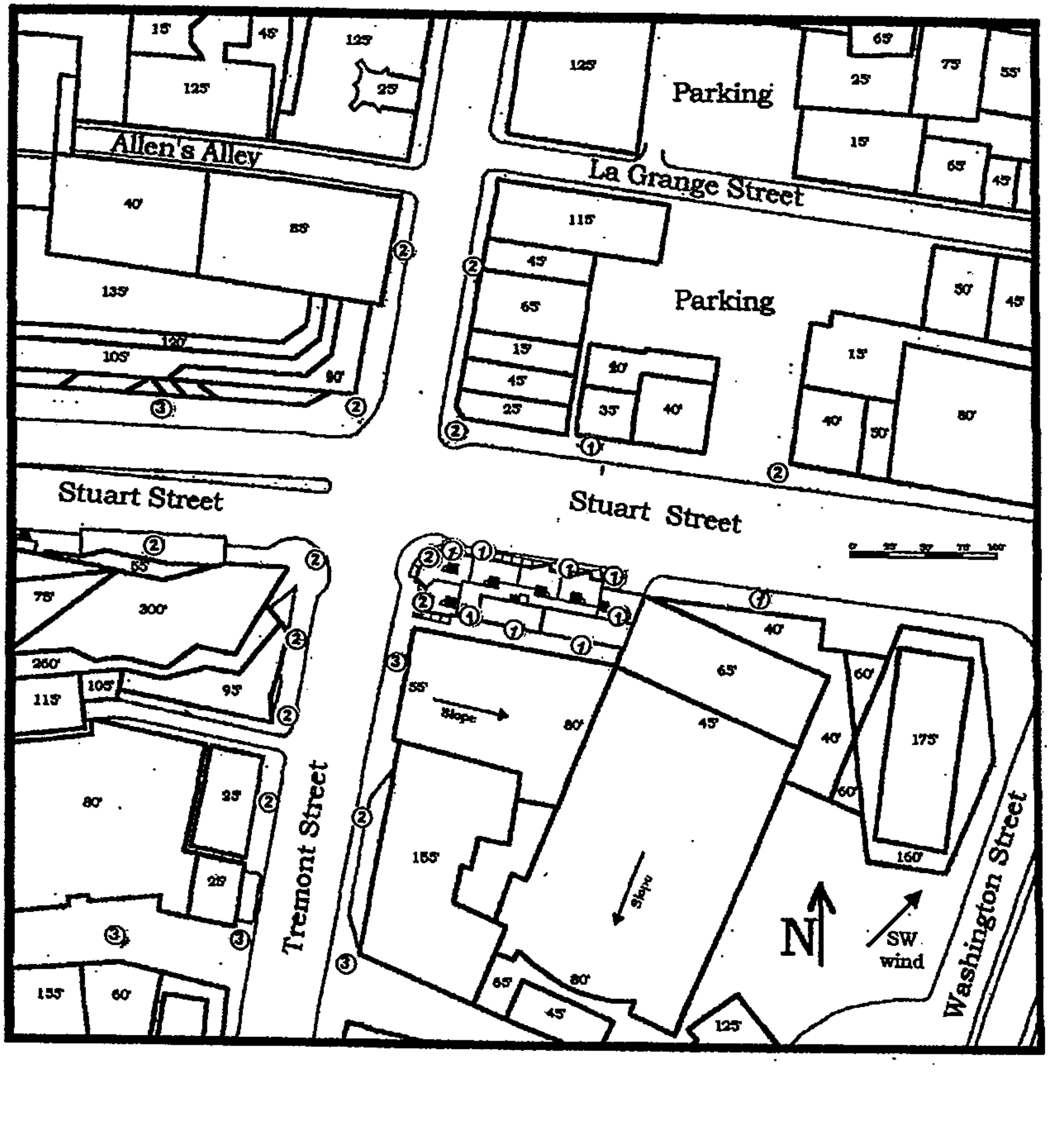
Figure 4.1-15

2616Wind.dwg



Categories for Build Conditions for SW Winds

Source: Frank H. Durgin, P.E.

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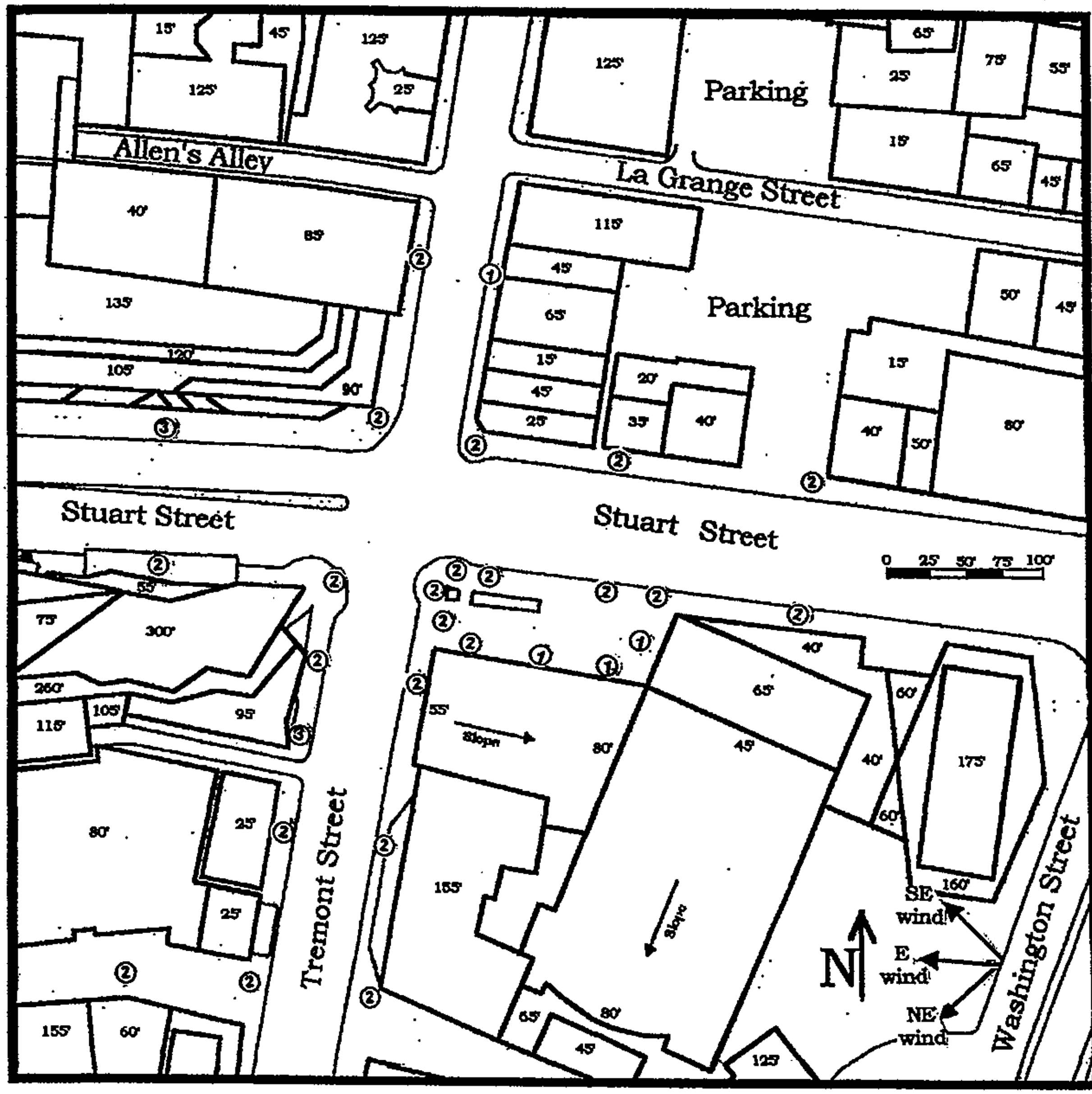
Figure 4.1-16

2616Wind.dwg



Categories for Existing Conditions and Easterly Storm Winds

Source: Frank H. Durgin, P.E.

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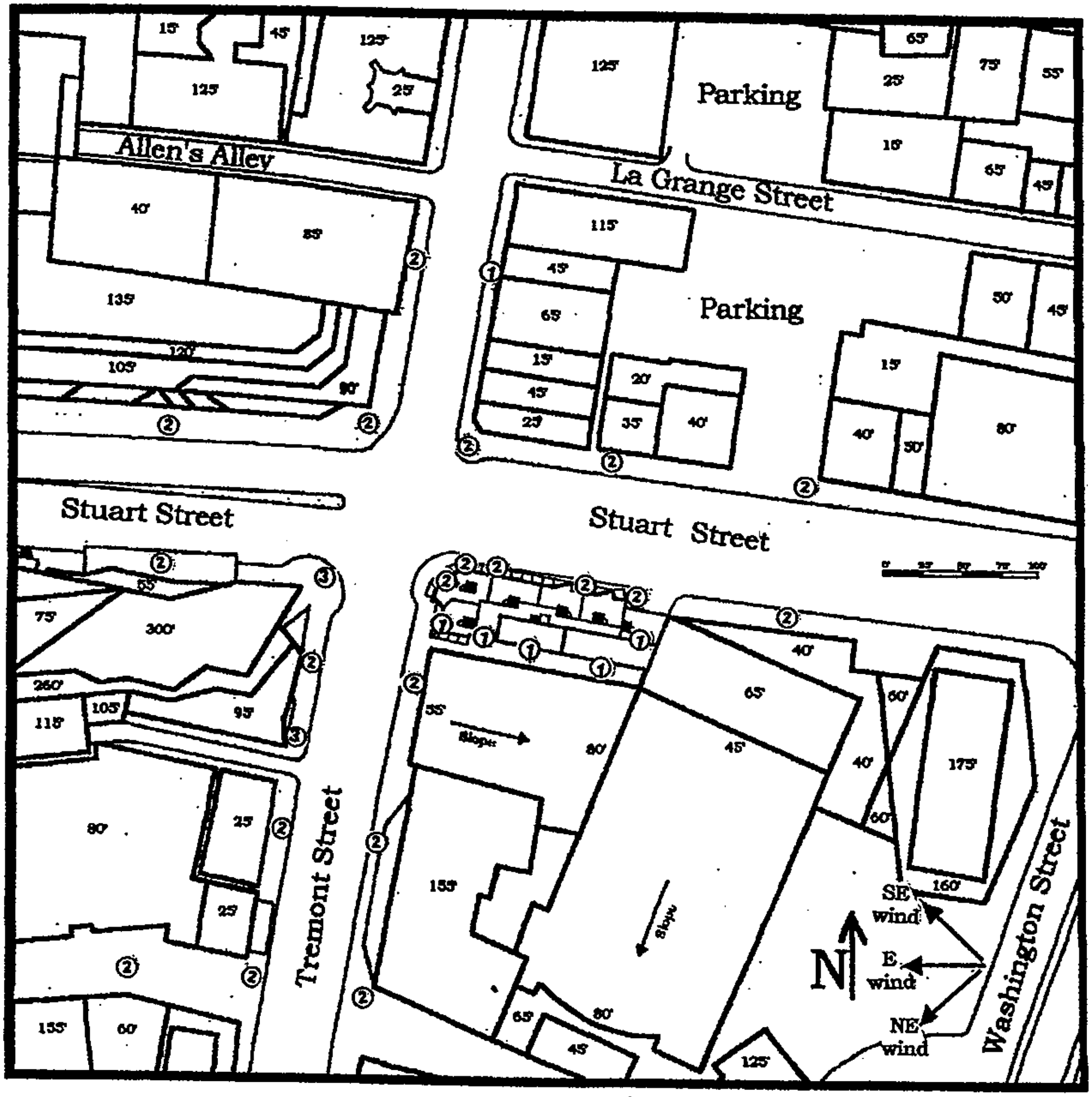
Figure 4.1-17

2616Wind.dwg



Categories for Build Conditions and Easterly Storm Winds

Source: Frank H. Durgin, P.E.

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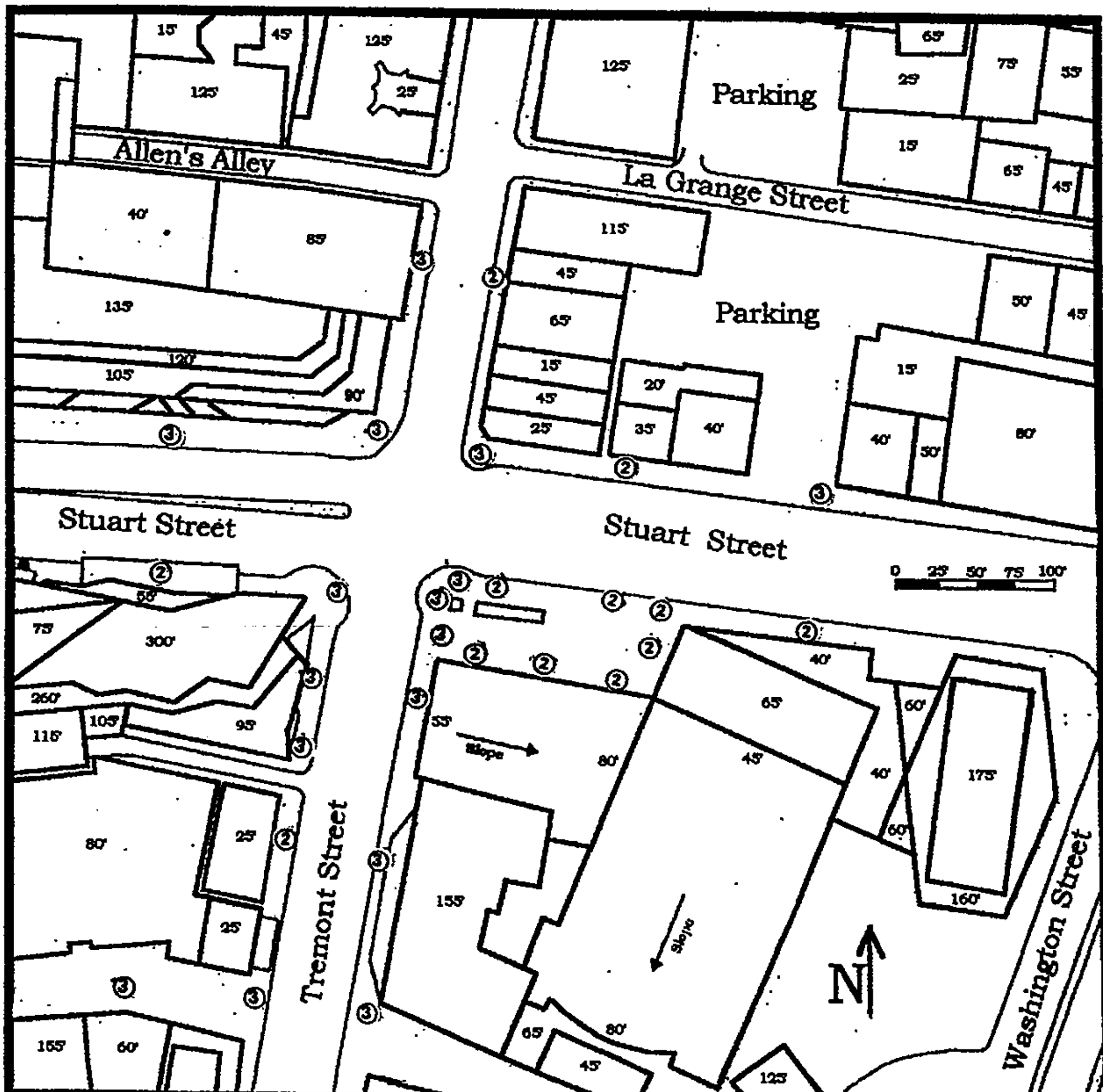
Figure 4.1-18

2616Wind.dwg



Annual Categories for Existing Conditions

Source: Frank H. Durgin, P.E.

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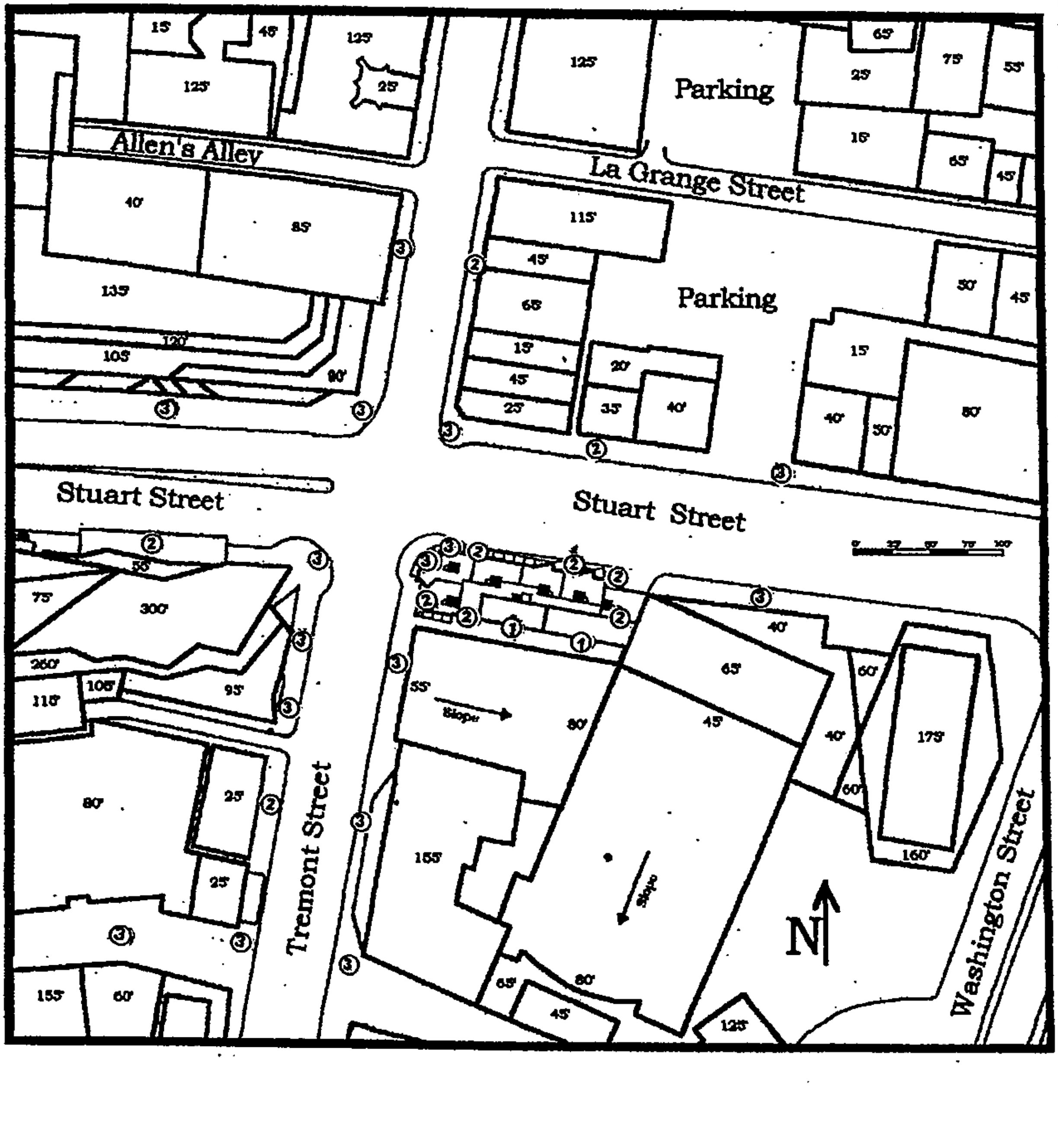
Figure 4.1-19

2616Wind.dwg



Annual Categories for Build Conditions

Source: Frank H. Durgin, P.E.

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Figure 4.1-20

2616Wnd.dwg

APPENDIX B – PNF DAYLIGHT ANALYSIS

4.3 Daylight

Daylor Consulting Group performed a daylight study to determine the extent to which the Project restricts the amount of daylight reaching streets or pedestrian ways in the immediate vicinity of the Project Site. The study evaluates daylight obstruction for the existing (No Build) and proposed (Build) configurations along Stuart Street and Tremont Street. The study also evaluates: (1) a theoretical building meeting existing zoning requirements (as-of-right) conditions, and (2) an area context.

4.3.1 Methodology

The daylight study was performed utilizing the Boston Redevelopment Authority Daylight Analysis ("BRADA") computer program. Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways centered on the building(s) in question. The façade of the building facing the viewpoint, including heights, setbacks, corners, and other features is plotted onto a base map using lateral and elevation angles. The two-dimensional base map produced by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen. The percent obstruction of daylight from the viewpoint is calculated by BRADA based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building.

The study also refers to the area context values, as calculated in the Loews Boston Hotel, Draft Project Impact Report for the Loews Boston Hotel, completed by Epsilon Associates, in March 2001.

4.3.2 Observation Points

The daylight analysis considered four observation points around the Project Site including:

1. Stuart Street (Observation Point 1): No Build, Build, As-of-Right
2. Tremont Street (Observation Point 2): No Build, Build, As-of-Right
3. Stuart Street (Observation Point 3): Area Context
4. Tremont Street (Observation Point 4): Area Context

Plot plans of the Project Site and the observation points surrounding the Project Site for existing configuration (No Build); the proposed configuration (Build); and context buildings are shown on **Figures 4.3-1** through **4.3-7** at the end of this section.

4.3.3 Results

A daylight analysis was conducted to evaluate the daylight obstruction of the Project. **Figures 4.3-1** through **4.3-4** identify observation point locations. **Figures 4.3-5** through **4.3-7** graphically illustrate the analysis results. Daylight obstruction will increase at the Project Site along both Stuart Street and Tremont Streets as a result of the proposed approximately 155-foot building on the Project Site. The results of the daylight analysis are summarized in **Table 4-2.**

Table 4-2: Summary of Daylight Obstruction

Observation Point	Street/Elevation	Existing (No Build) Configuration	Proposed (Build) Configuration	Context	As-of-Right Configuration
1	Stuart Street	0.0%	81.2%	–	81.4%
2	Tremont Street	0.0%	68.4%	–	65.7%
3	Loews Boston Hotel, Stuart Street	–	–	72.6%[1]	–
4	Loews Boston Hotel, Tremont Street	–	–	72.6%[1]	–
–	State Transportation Building, Stuart Street	–	–	72.3%[1]	–
–	Tremont Street, East Side	–	–	77.3%[1]	

[1] Source: Loews Boston Hotel, Draft Project Impact Report, March 2001, prepared by Epsilon Associates, Inc.

Stuart Street – Observation Point 1

Observation Point 1 is located on Stuart Street, centered halfway along the proposed façade. **Figure 4.3-5** shows perspectives of the No Build configuration and **Figure 4.3-6** shows perspectives for the Build configuration. Under the existing configuration, 0.0% of the daylight is obstructed. The proposed (Build) Project obstructs 81.2% of daylight. The theoretical as-of-right Build configuration along Stuart Street obstructs 81.4% of daylight (see **Figure 4.3-7**).

Tremont Street – Observation Point 2

Observation Point 2 is located on Tremont Street, centered halfway along the proposed façade. **Figure 4.3-5** shows perspectives of the No Build configuration and **Figure 4.3-6** shows perspectives for the Build configuration. Under the existing case, 0.0% of the daylight is obstructed. The proposed (Build) Project obstructs 68.4% of daylight. The theoretical as-of-right Build configuration along Tremont Street obstructs 65.7% of daylight (see **Figure 4.3-7**).

Loews Boston Hotel (Stuart Street) Context – Observation Point 3

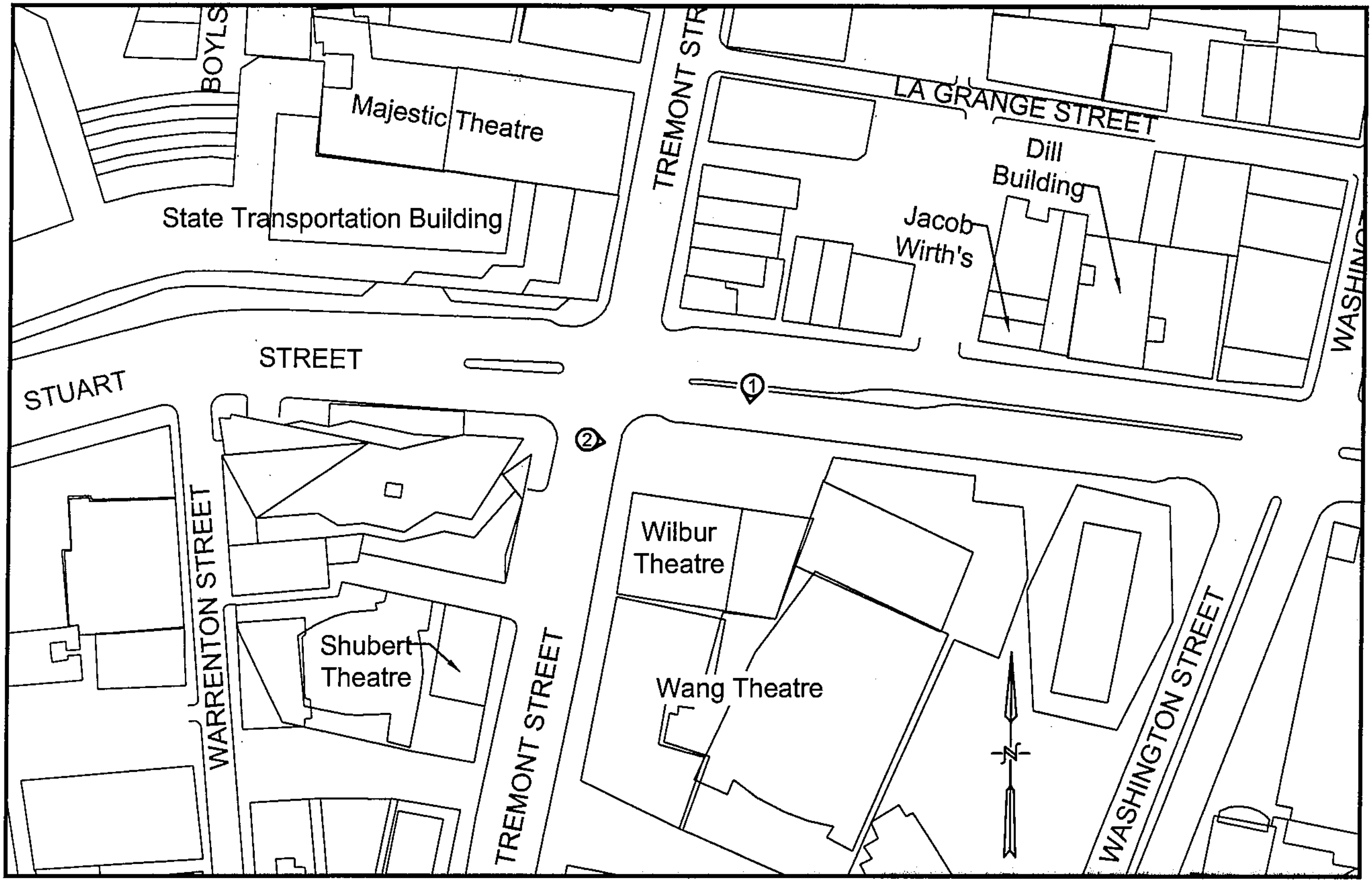
Observation Point 3 represents a context daylight obstruction value for the proposed Loews Boston Hotel along Stuart Street as presented in the Draft Project Impact Report, dated March 2001. Daylight obstruction is 72.6%.

Loews Boston Hotel (Tremont Street) Context – Observation Point 4

Observation Point 4 represents a context daylight obstruction value for the proposed Loews Boston Hotel along Tremont Street as presented in the Draft Project Impact Report, dated March 2001. This building will obstruct 72.6% of daylight.

4.3.4 Summary

Daylight obstruction will increase at the Project Site over the existing conditions, as the present Project Site is undeveloped. The proposed Project results in daylight obstruction of 68.4% to 81.2%. This is in the same range as context values for the area (72.6% to 77.3%), and similar to or slightly higher than the as-of-right daylight obstruction (65.7% to 81.4%). In general, although the Project may increase daylight obstruction, daylight obstruction values are within the range of other existing and proposed buildings in the vicinity of the Project.



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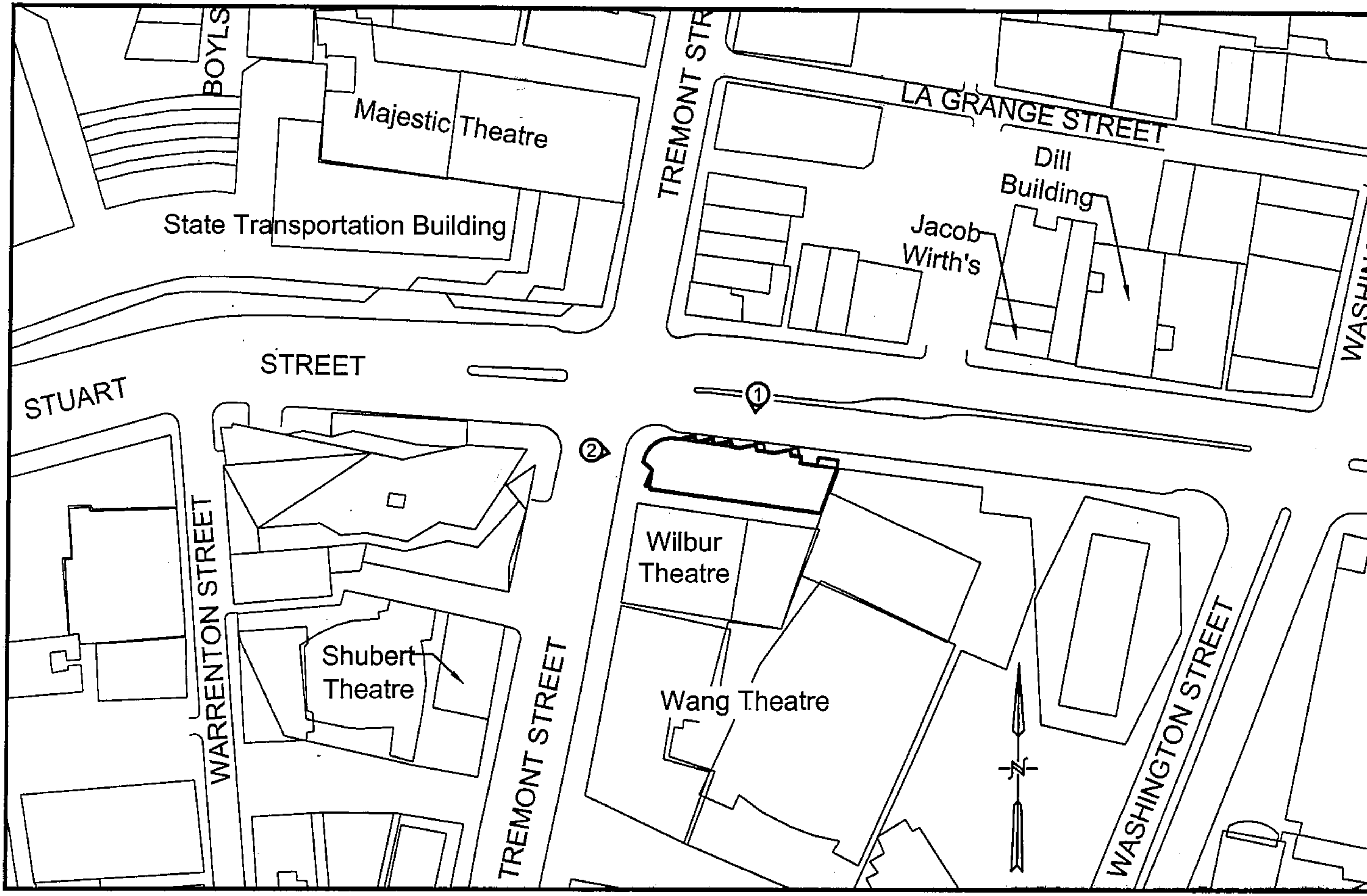
Existing Configuration: Observation Points

Figure 4.3-1

2616BRADA.DWG



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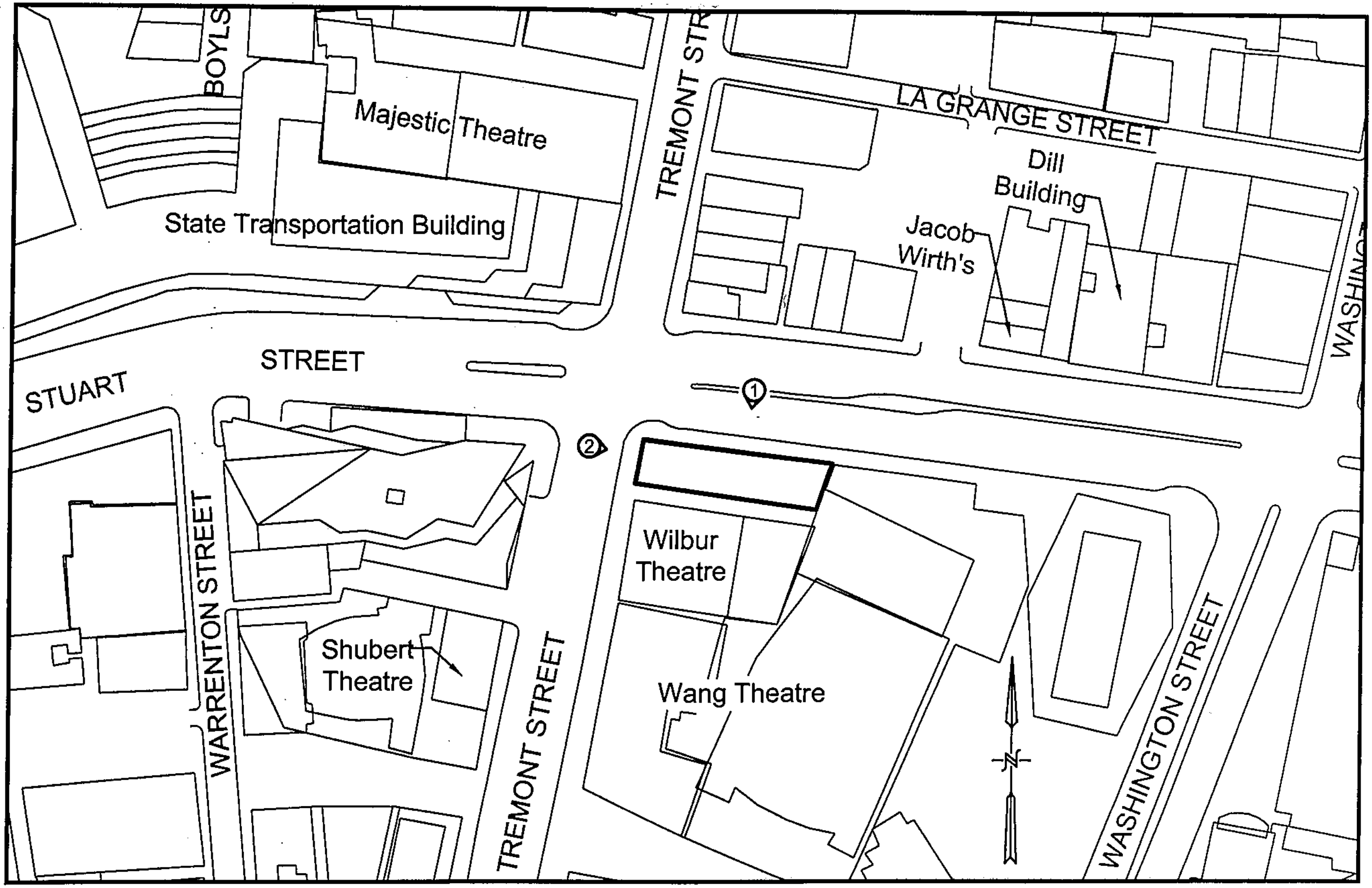
Proposed Configuration:
Observation Points

Figure
4.3-2
2616BRADA.DWG



As-Of-Right Zoning Observation Points

Figure 4.3-3

2616BRADA.DWG

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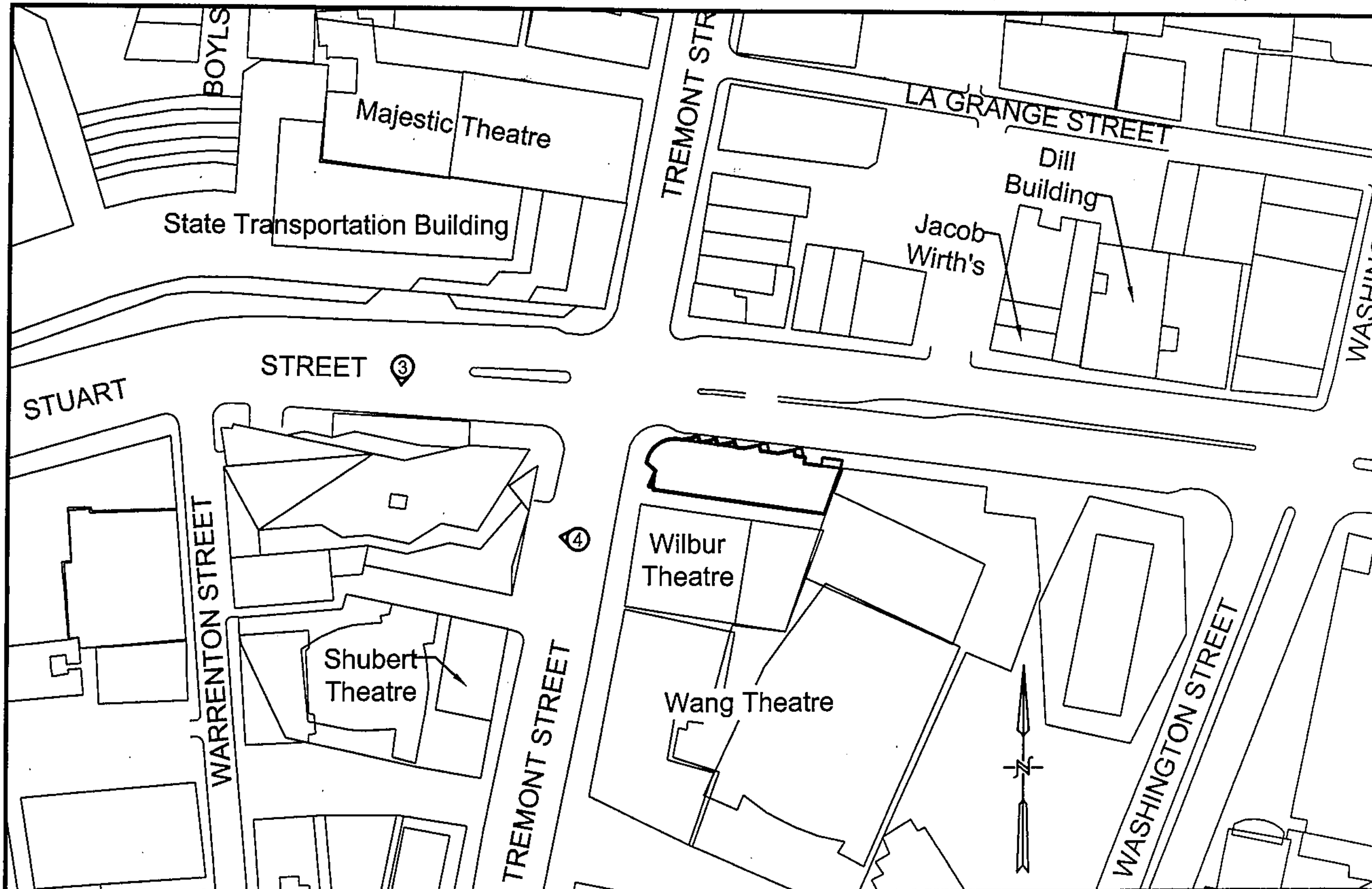

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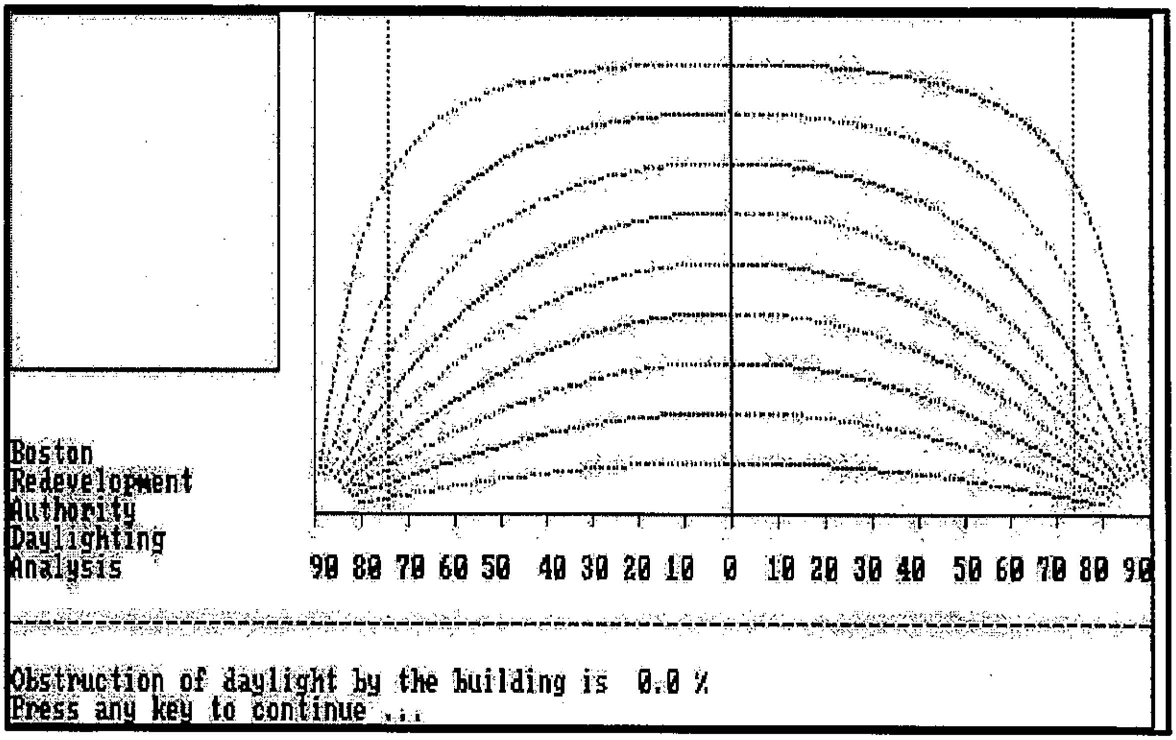
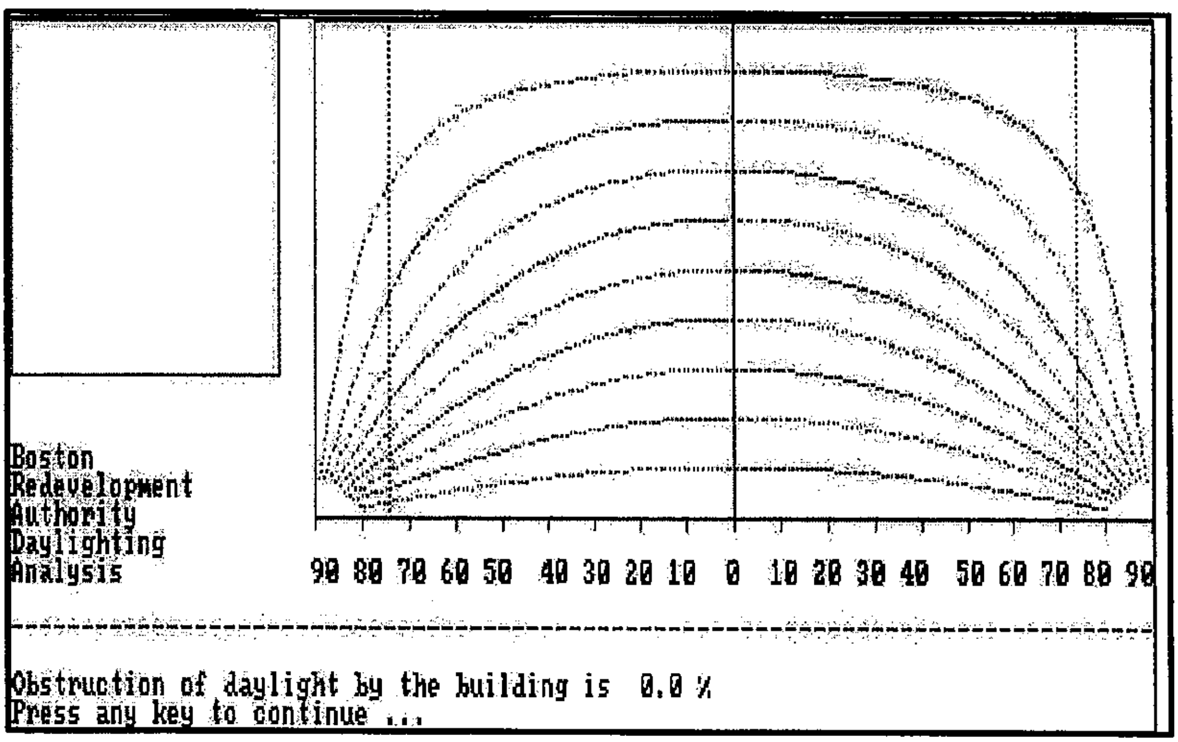
Context Building: Observation Points

Figure 4.3-4

2616BRADA.DWG



No Build - 0.0% Stuart Street (Observation Pt. 1)



No Build - 0.0% Tremont Street (Observation Pt. 2)

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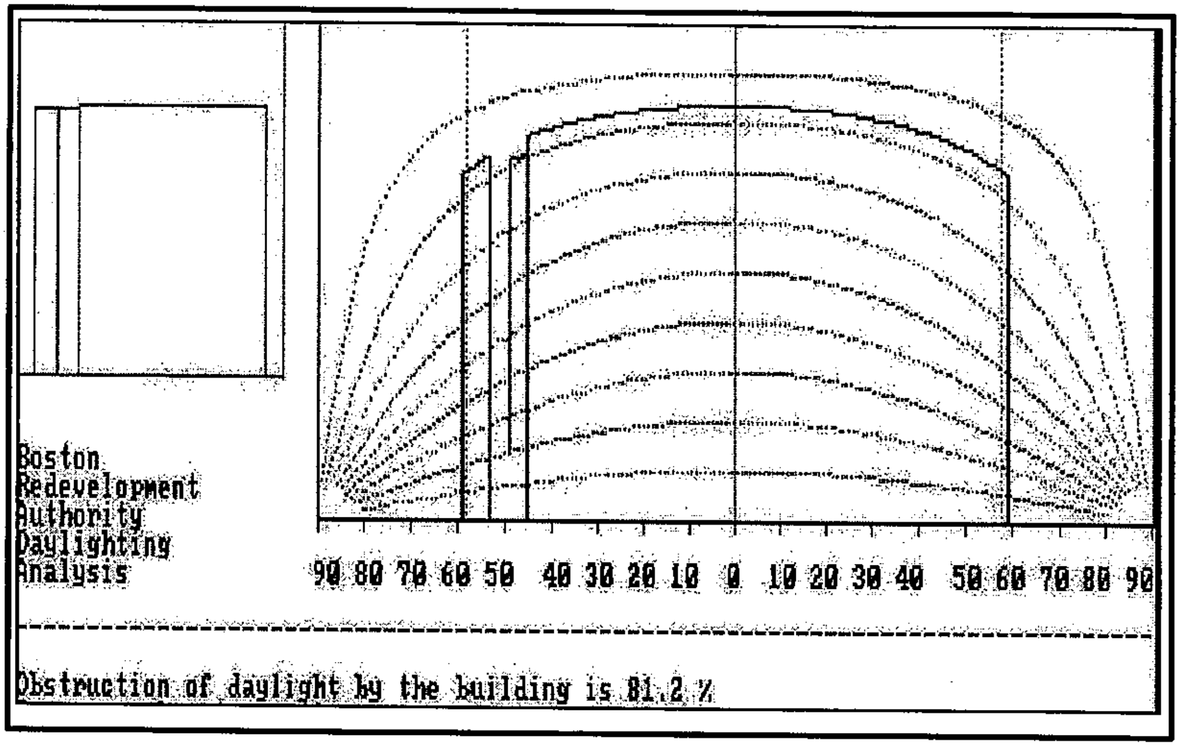
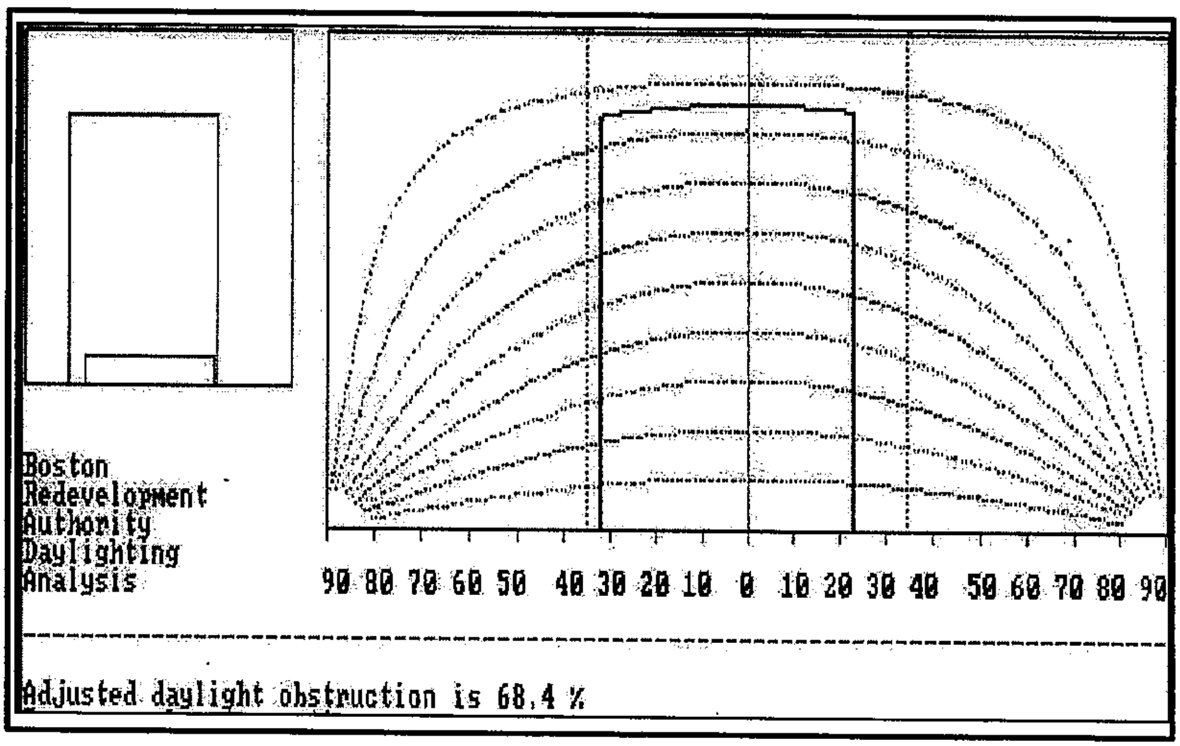
Wilbur Place
Daylight Study
No Build Configuration

Figure
4.3-5

2616BRADA.DWG



Build - 81.2% Stuart Street (Observation Pt. 1)



Build - 68.4% Tremont Street (Observation Pt. 2)

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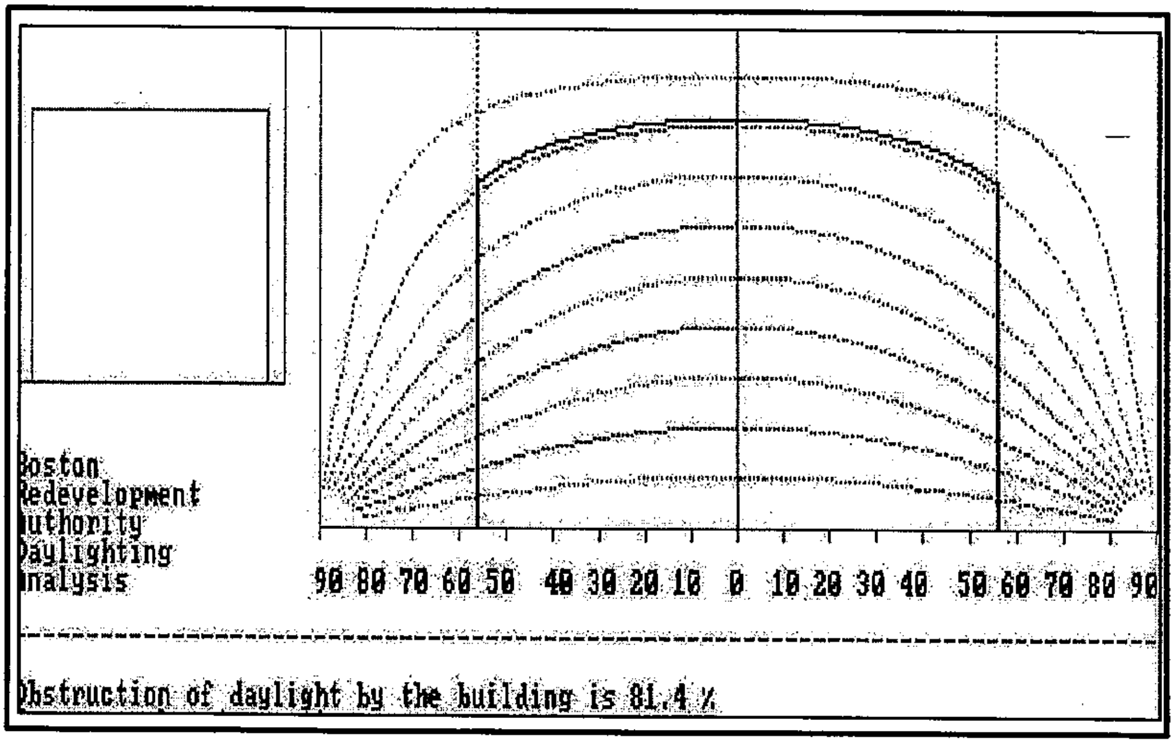
Wilbur Place
Daylight Study
Build Configuration

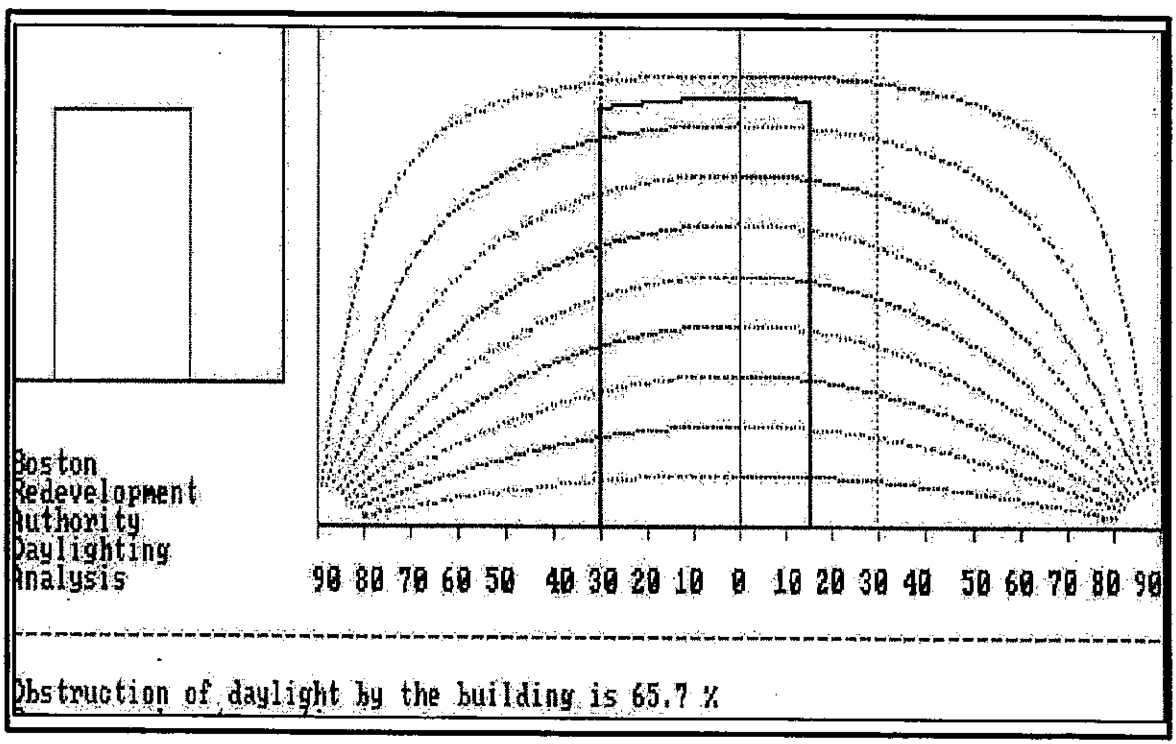
Figure

4.3-6

2616BRADA.DWG



As-of-Right - 81.4% Stuart Street (Observation Pt. 1)



As-of-Right - 65.7% Tremont Street (Observation Pt. 2)

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Wilbur Place
Daylight Study
As-of-Right Configuration

Figure 4.3-7

2616BRADA.DWG

APPENDIX C – PNF SOLAR GLARE ANALYSIS

4.4 Solar Glare

4.4.1 Introduction

This section of the PNF presents the results of the solar glare analysis. The Project will include a single 14-story tower clad in a combination of glass and metal. Most exterior surfaces of the tower will be faced with glass windows, framed by metal window casings. Metal trellises will also extend out from the face of the building to support signs and lighting. The first story will be comprised of retail storefronts, while most of the second, third and fourth stories facing Stuart and Tremont streets will display large advertising billboards The building has a long and narrow footprint, with its long axis oriented roughly east-to-west along Stuart Street.

While the Project will not use highly reflective glass such as that used in some types of buildings, there is some potential that the building surfaces will reflect sunlight onto portions of Stuart and Tremont Streets. Experience shows that reflected sunlight, or solar glare, as it is generally called, may be a nuisance, and can produce visual impairment at times or even discomfort if the source is very intense. Because the Project's design does not include highly reflective glass, the intensity of the solar glare will be mitigated. An analysis of the potential glare impacts is provided here.

The sun's intensity or brightness, the ability of a surface to reflect light, and the sun's position in the sky are the factors affecting potential visual impairment from solar glare. Two general types of surfaces can be distinguished: (1) those which are "smooth specular (flat) surfaces which reflect the sun's rays in a parallel fashion"; and (2) those which scatter or diffuse the sun's rays in various directions, such as porous or curved surfaces.[5] Smooth specular surfaces, which reflect the sun's rays in parallel fashion, produce an image of the source (spot glare) at an intensity of that equal to that of the sun times the surface's reflectivity. Other surfaces which are porous will scatter or diffuse the sun's rays (scattered glare). These surfaces will appear brighter, but they will actually have a lower intensity than if the surface were non-porous. For the Project, most of the visible exterior will consist of specular surfaces. However, the streetward-facing sides of the building are broken into a number of vertical faces at varying angles to one another, so that reflected glare will fan out into a number of narrow beams. The billboards covering the lower stories of the building will tend to scatter sunlight rather than produce specular images, thus minimizing the production of spot glare at observation points nearest to the building.

Studies indicate that solar glare should be evaluated for the events when reflective light is visible within the normal human viewing range. The normal human viewing range is defined as an angle 30 degrees above the horizontal, 45 degrees below the horizontal, and 65 degrees to the right or left of the forward line of sight. Therefore, reflected sunlight could be found to occur within the normal human viewing range when the sun's altitude angle is 30 degrees or less above the horizon and the reflected sunlight is 65 degrees to the right or left from a forward line of sight.

[5] Erickson, Donald K., "Seattle – Coping with Visual Impacts, Evaluation of Light and Glare", EC, July, 1980.

Though lower solar altitude angles produce glare that is within the normal viewing range, the sun's rays will also pass through more atmosphere than at higher angles thus scattering incoming rays more and reducing sunlight intensity.

The study presented below provides an evaluation of reflected sunlight onto local street and pedestrian levels from the proposed development's glass surfaces.

4.4.2 Methodology

Potential for solar glare from the Project's glass façades were evaluated using solar altitude and azimuth angles and simple geometry. This was done by considering the location of reflected light during four times of the year. The four periods were the spring and autumnal equinox and winter and summer solstice. Initially, three hours for each of these four cases were selected; 8:00 a.m., noon, and 4:00 p.m. These times were chosen because both pedestrians during lunch (noon) and commuters (8:00 a.m. and 4:00 p.m.) are affected by solar glare. For each of these times, solar angle data was calculated. Altitude and azimuth angles are presented in **Table 4-3** for each of the time periods evaluated.

Table 4-3: Altitude and Azimuth Angles

Time	Altitude Angle (Degrees) Above Horizon	Azimuth Angle (Degrees) Clockwise from North
Spring Equinox – March 21		
8:00 a.m. EST*	24	114
Noon EST	48+	186
4:00 p.m. EST	19	252
Summer Solstice – June 21		
8:00 a.m. EDT**	29	84
Noon EDT	69+	151
4:00 p.m. EDT	46+	261
6:00 p.m. EDT	23	281
Autumnal Equinox – September 21		
8:00 a.m. EDT	14	103
Noon EDT	47+	164
4:00 p.m. EDT	29	240
Winter Solstice – December 21		
8:00 a.m. EST	6	130
Noon EST	24	184
4:00 p.m. EST	2	236

* Eastern Standard Time

** Eastern Daylight Time

+ Reflected sunlight will be outside normal viewing range

Because reflected sunlight is only in the normal viewing range when the sun's altitude angle is below 30 degrees, cases with larger angles were not included in this study. The summer afternoon case, 4:00 p.m. EDT, was therefore not considered. The first afternoon hour that the sun altitude angle was below 30 degrees was calculated (6:00 p.m. EDT – 23 degrees) and evaluated in this study.

Since light is reflected from a specular surface at the same angle the light strikes the surface (measured from an imaginary line perpendicular to the surface), the light's angle of reflectance can be determined if its angle of incidence is known. In the horizontal plane, the angle of incidence was determined by knowing the sun's azimuth angle and the orientation of the reflective surface. By projecting the sun's rays from the corners of the building facing the sunlight, the area potentially affected by solar glare was determined. The distance that reflected sunlight would extend was determined by projecting a ray, using the appropriate altitude angle, from the top of the reflective surface. The reflected ray was then extended until it intersected ground level.

In many cases, reflected light will be intercepted by adjacent buildings. The reflected light can be completely blocked by a building or partially intercepted. In the case where reflected light is intercepted by a lower nearby building, only the upper portion of reflected light remains unopposed. This results in a shaded area just beyond the adjacent building followed by a resumption of the glare sector further away. Adjacent buildings will also act to block out incoming rays and thus reduce the amount of sunlight actually striking the reflective surface. The results presented in this study account for reflected light intercepted by existing adjacent buildings, and also by the proposed 25-story Loews Boston Hotel[6], which was planned replace an existing ground-level parking lot on the southwest corner of Stuart and Tremont Streets, opposite the *Wilbur Place* Project Site, and is now slated to become the W Boston Hotel and Residences. This study also accounts for incoming sunlight that would be blocked by the immediately-adjacent Wilbur Theatre and New England Medical Center complex, as well as the proposed Loews building as shown in the 2001 Draft Project Impact Report.

Using sun position data, diagrams of reflected sunlight from the Project were developed for each study case that the reflected light was predicted to be in the normal viewing range. The solar glare diagrams are shown in **Figures 4.4-1** through **4.4-9**.

4.4.3 Results

The most significant potential solar glare impacts from the Project will be caused by light reflected from the north and west sides of the building. The glass surfaces on these sides have potential solar glare impacts along Stuart Street and along small portions of Tremont Street. As discussed earlier, several factors mitigate these impacts. The use of low-reflectivity glass will reduce the intensity of any ground-level glare, while the angled vertical faces of the building will fan reflected light out into a number of narrow beams. The billboards covering the lower stories

[6] Loews Boston Hotel was permitted by the Boston Redevelopment Authority in 2001.

will significantly reduce the potential for solar glare immediately adjacent to the building, thus protecting the traffic intersection of Stuart and Tremont Streets. Finally, the nearby buildings of the New England Medical Center and the Loews Boston Hotel (now the proposed W Boston Hotel and Residences), which is included in the figures, either block incoming sunlight or intercept reflected glare, such that the south and east sides of the building will have virtually no potential ground-level impacts.

Winter Solstice

The winter period is generally of concern for solar glare because the winter sun altitude angle is continuously below 30 degrees. However, as a result of the densely built-up urban surroundings, nearby buildings block a significant fraction of the incoming sunlight from reaching the Project Site. On the winter solstice (December 21) at 8:00 a.m. EST, the sun is very low and is positioned in the southeast portion of the sky. As shown in **Figure 4.4-1**, there are no predicted ground-level impacts, as incoming sunlight is completely blocked by neighboring buildings to the southeast of the Project.

At 12:00 noon on the same day (**Figure 4.4-2**), the sun's rays will come from the south at a higher altitude angle. During this period, sunlight will be reflected from both the south and east sides of the Project building, though the buildings of the New England Medical Center will shade much of the south face and will intercept what light is reflected. Solar glare impacts are minimal, limited to small slivers of Stuart and Lagrange streets, and extending across the ground-level parking lot between the two streets. This glare will be just at the edge of the normal range of view for drivers traveling west and outside the normal range of view for drivers traveling east.

Finally, at 4:00 p.m. EST (**Figure** 4.4-3), incoming solar rays will be blocked by the Loews (proposed W Boston Hotel and Residences) and neighboring buildings along Tremont Street. Because the sun's angle of incidence is so low during this period, any incoming light not blocked will strike only the very top of the Project building and reflected sunlight will only be visible from the ground at a distance of several thousand feet. In the vicinity of the Project no ground-level impacts are predicted.

Spring Equinox

On the spring equinox (March 21) at 8:00 a.m. EST, **Figure 4.4-4** indicates that reflected light from the south face of the Project building will produce a small area of glare on the sidewalk along Tremont Street, adjacent to the Loews (proposed W Boston Hotel and Residences). Most of the sunlight reflected from the Project building will be intercepted by the lower stories of the proposed hotel itself.

At 12:00 noon EST, reflected light is outside of the normal viewing range because the solar altitude angle is too high.

At 4:00 p.m. EST most of the incoming sunlight will be blocked by the proposed Loews (proposed W Boston Hotel and Residences), and any light not blocked will be reflected from the south side of the Project building and be intercepted by neighboring buildings of the New England Medical Center, as shown in **Figure 4.4-5**. No ground-level impacts are predicted.

Summer Solstice

During the summer solstice (June 21), **Figure 4.4-6** indicates that at 8:00 a.m. EDT, solar rays will strike the north and east sides of the Project building. Due to the angled vertical faces of the building, reflected glare will fan out into several narrow beams affecting small portions of Stuart Street. Drivers traveling along Stuart Street should only experience several brief moments of glare in their normal field of vision as they pass through each of the beams. Because the normal range of vision extends only 65 degrees to the left or right of center, reflected beams extending to the northeast from the Project will only affect westbound drivers, while beams extending to the northwest will only affect eastbound drivers.

At 12:00 noon EDT, reflected light is beyond the normal viewing range because of the high solar altitude angle.

At 6:00 p.m. EDT (the first afternoon hour with an altitude angle below 30 degrees), the incoming solar rays from the west will strike the north and west sides of the project building (see **Figure 4.4-7**). In a similar fashion to the 8:00 a.m. case, the angled faces of the building will cause reflected glare to fan out into several narrow beams striking portions of Stuart and Tremont streets at various angles. Most of the reflected beams will extend northwestward or northeastward from the project building, and drivers should experience only brief moments of glare as these narrow beams pass through their field of vision. Reflected glare from the west side of the building has the potential to extend due west, parallel to Stuart Street, for several hundred feet. This glare could affect drivers and pedestrians moving east along Stuart Street for a somewhat longer duration. For example, drivers moving east along Stuart Street at 30 miles per hour could experience up to six or seven seconds of glare during the brief period of the evening when the rays are aligned parallel to the street.

In contrast, for the other seasons and times of day that indicated a potential for ground-level glare, drivers would typically be affected for one second or less while passing through each spot of glare. Importantly, however, the use of billboards on the lower stories of the project building will prevent summer evening glare from occurring in the traffic intersection of Stuart and Tremont streets, where clear visibility will be most critical to drivers. And as noted above, the intensity of the glare will be reduced by the use of low-reflective glass.

Autumnal Equinox

For the autumnal equinox (September 21), **Figure 4.4-8** indicates that at 8:00 a.m. EDT the solar rays will come from an east-southeasterly direction. Neighboring buildings east of the Project building will shade all but the upper stories of the east and south sides of the building, which will reflect narrow beams of sunlight to the west and the northeast. These reflected beams will be intercepted by the proposed Loews (W Boston Hotel and Residences) and by buildings along Lagrange Street. No ground-level impacts are predicted.

At 12:00 Noon EDT, reflected light is outside the normal viewing range because the solar altitude angle is too high.

At 4:00 p.m. EDT (**Figure 4.4-9**), the solar rays will come from the southwest and strike the south side of the Project building. The Loews (proposed W Boston Hotel and Residences) will block the east side of the building from incoming light. All of the reflected glare from the south side of the Project building will be intercepted by buildings in the New England Medical Center complex immediately to the southeast. No ground-level impacts are predicted.

4.4.4 Mitigation

As discussed above, several features of the Project design and location are expected to mitigate solar glare impacts. First, the use of low-reflective glass will reduce the intensity of sunlight reflected from the building's windows. Second, the faces of the building are broken into a number of vertical planes at various angles, causing any reflected glare to be spread out into narrow beams and minimizing the amount of time required for drivers or pedestrians to traverse any ground-level glare that does occur. Finally, the Project building will be very near to a number of existing buildings of similar height, which will block a significant portion of incoming sunlight and prevent much of the reflected glare from reaching the ground.

4.4.5 Conclusion

The analyses demonstrate that the potential for reflected sunlight from the Project to impact drivers and pedestrians along nearby streets is minor. For a majority of the cases considered, no ground-level impact was predicted, due to the presence of surrounding buildings that block incoming sunlight and intercept reflected glare. The most significant predicted glare impacts affect drivers on Stuart Street during summer mornings and evenings, who mainly experience only several brief moments of glare as they pass the Project Site.

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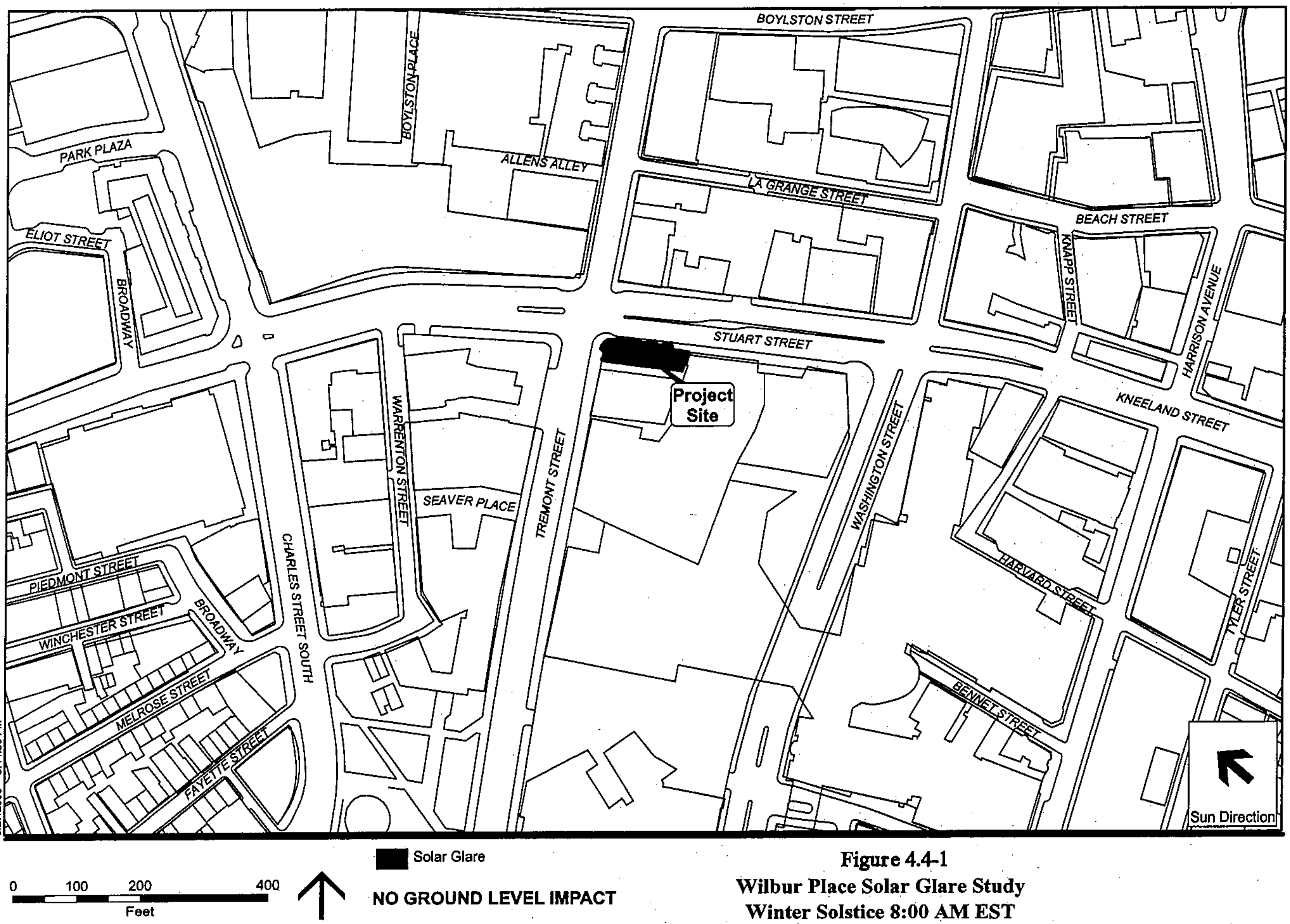

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Figure 4.4-1
Wilbur Place Solar Glare Study
Winter Solstice 8:00 AM EST

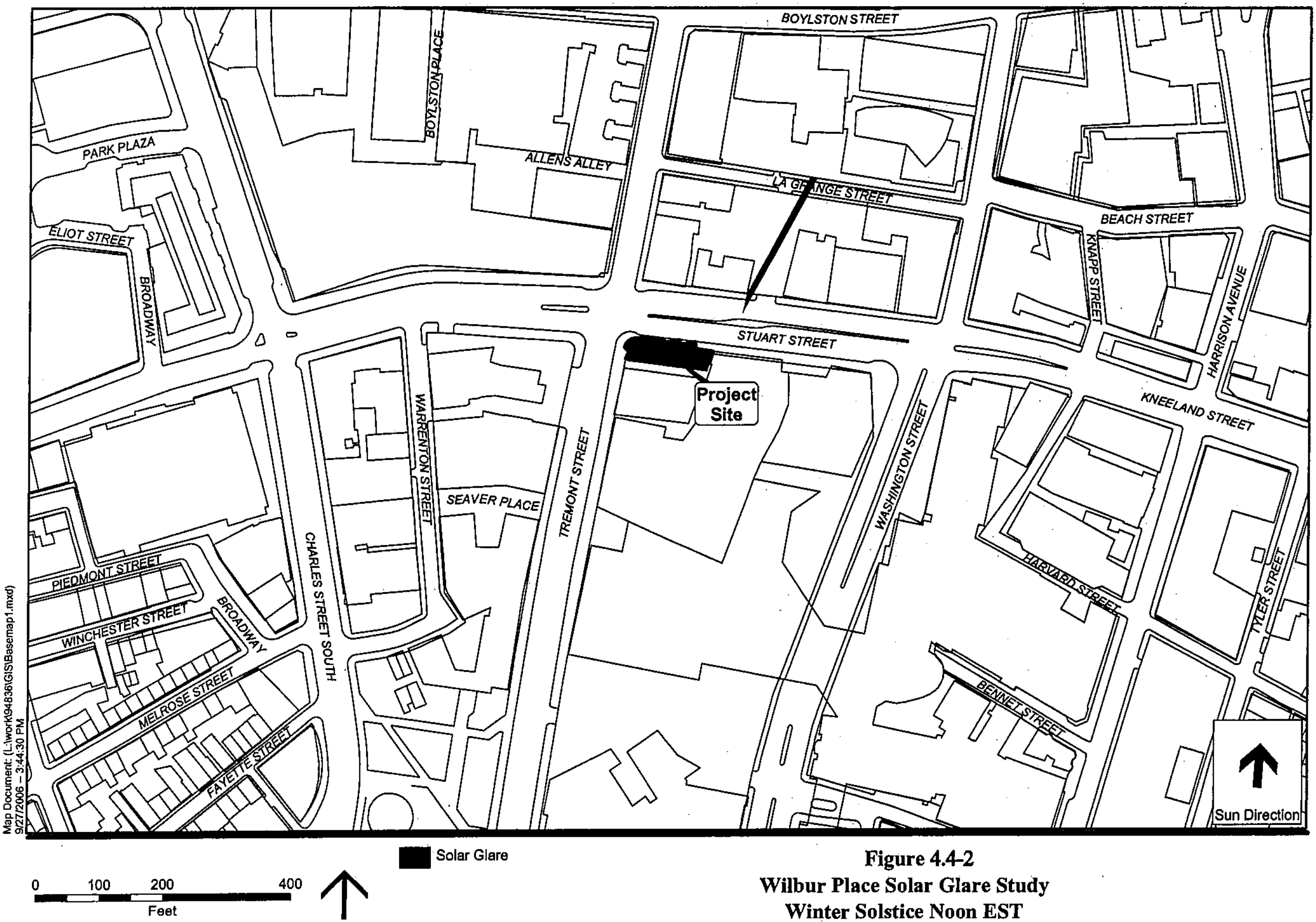

Figure 4.4-2
Wilbur Place Solar Glare Study
Winter Solstice Noon EST

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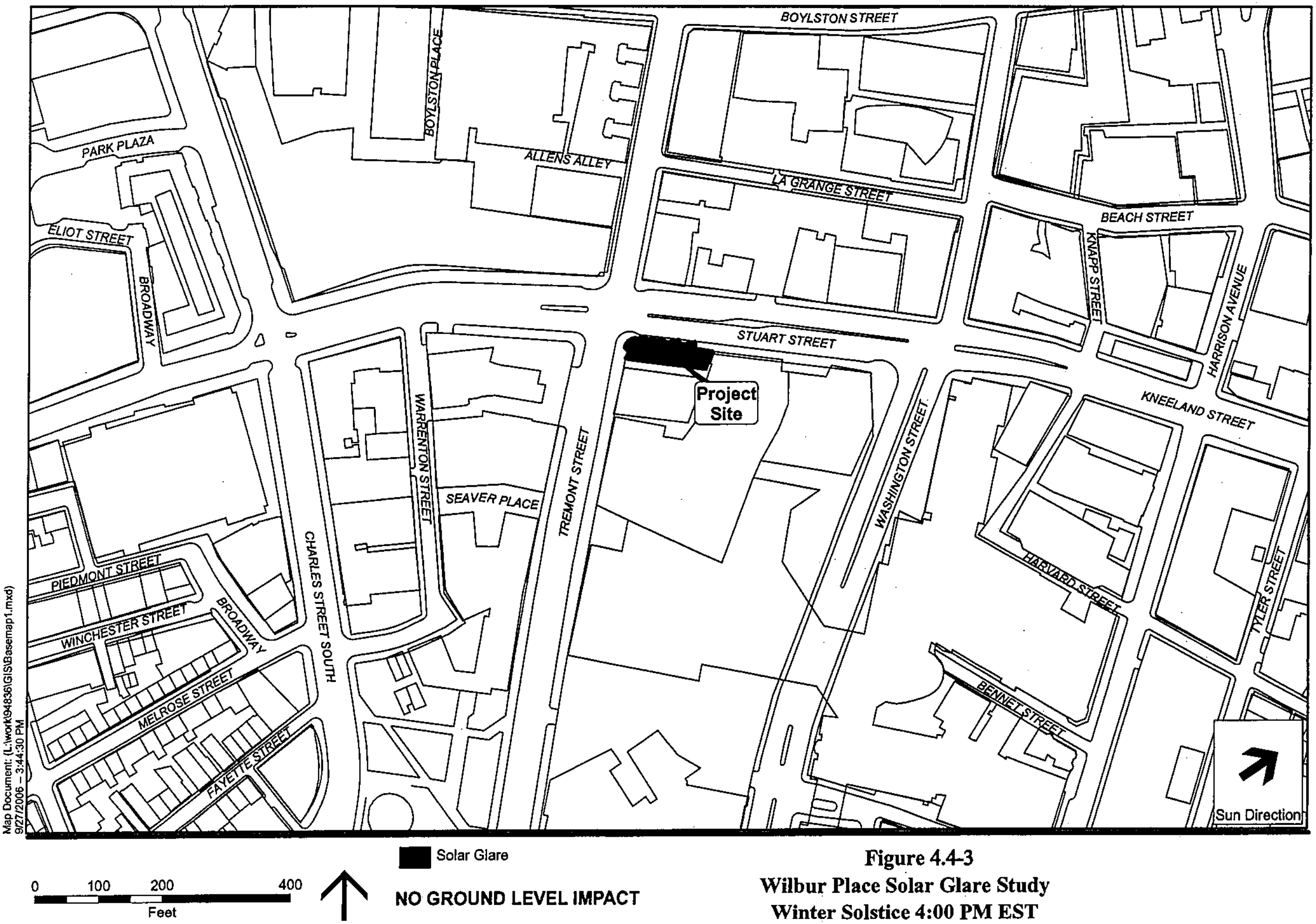

Figure 4.4-3
Wilbur Place Solar Glare Study
Winter Solstice 4:00 PM EST

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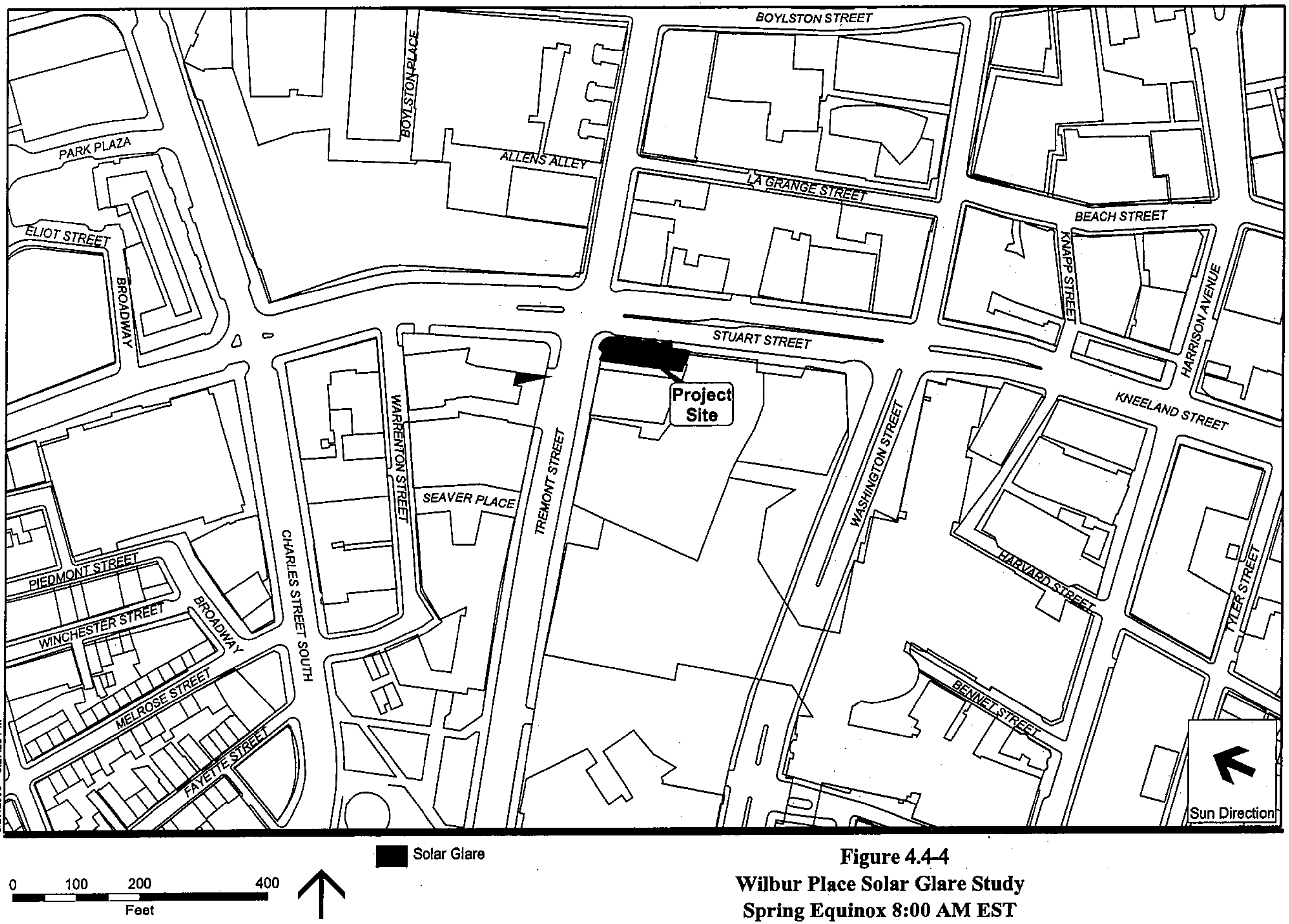

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Figure 4.4-4
Wilbur Place Solar Glare Study
Spring Equinox 8:00 AM EST

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Solar Glare

0 100 200 400
Feet

NO GROUND LEVEL IMPACT

Figure 4.4-5
Wilbur Place Solar Glare Study
Spring Equinox 4:00 PM EST

EarthTech

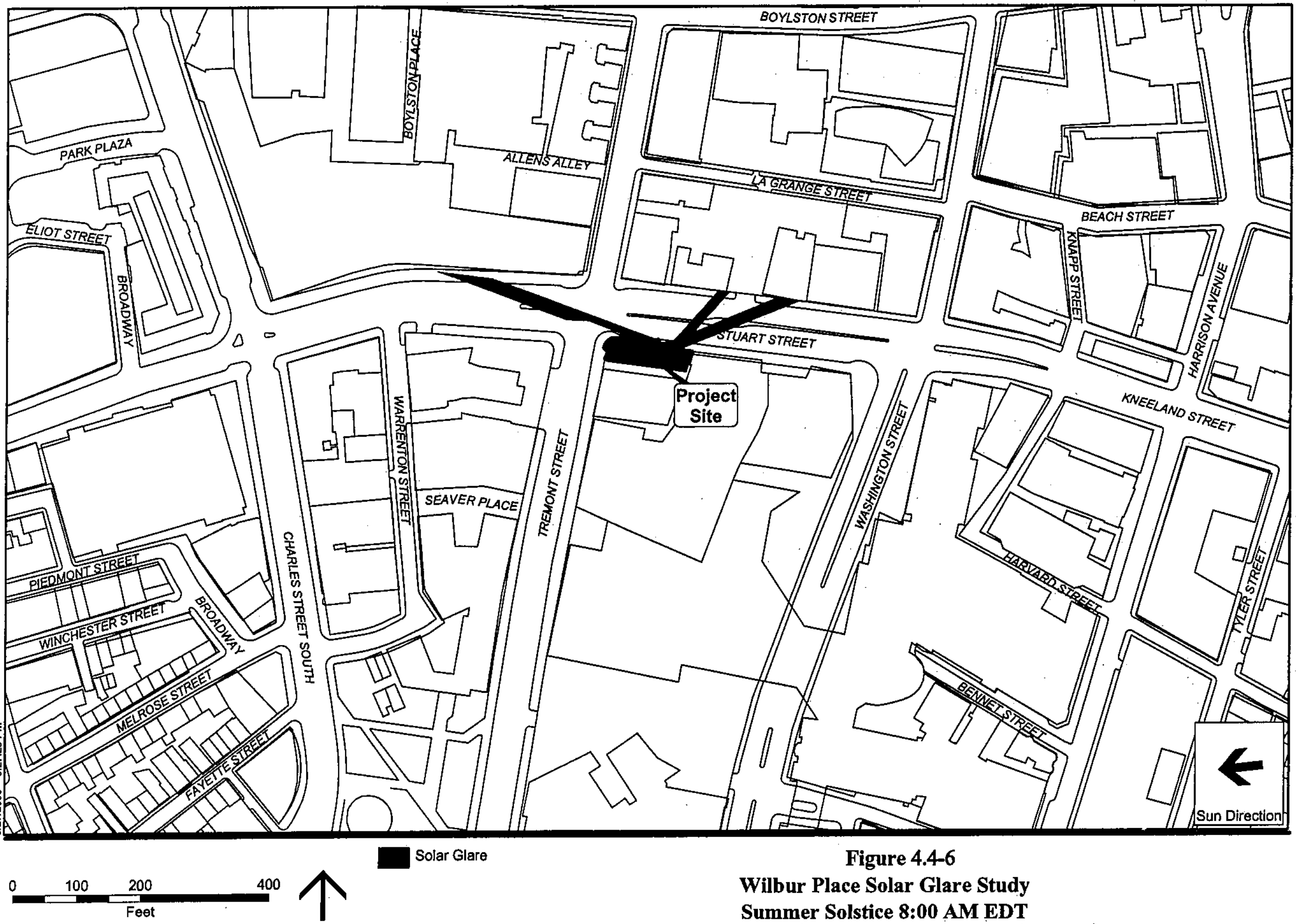

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Figure 4.4-6
Wilbur Place Solar Glare Study
Summer Solstice 8:00 AM EDT

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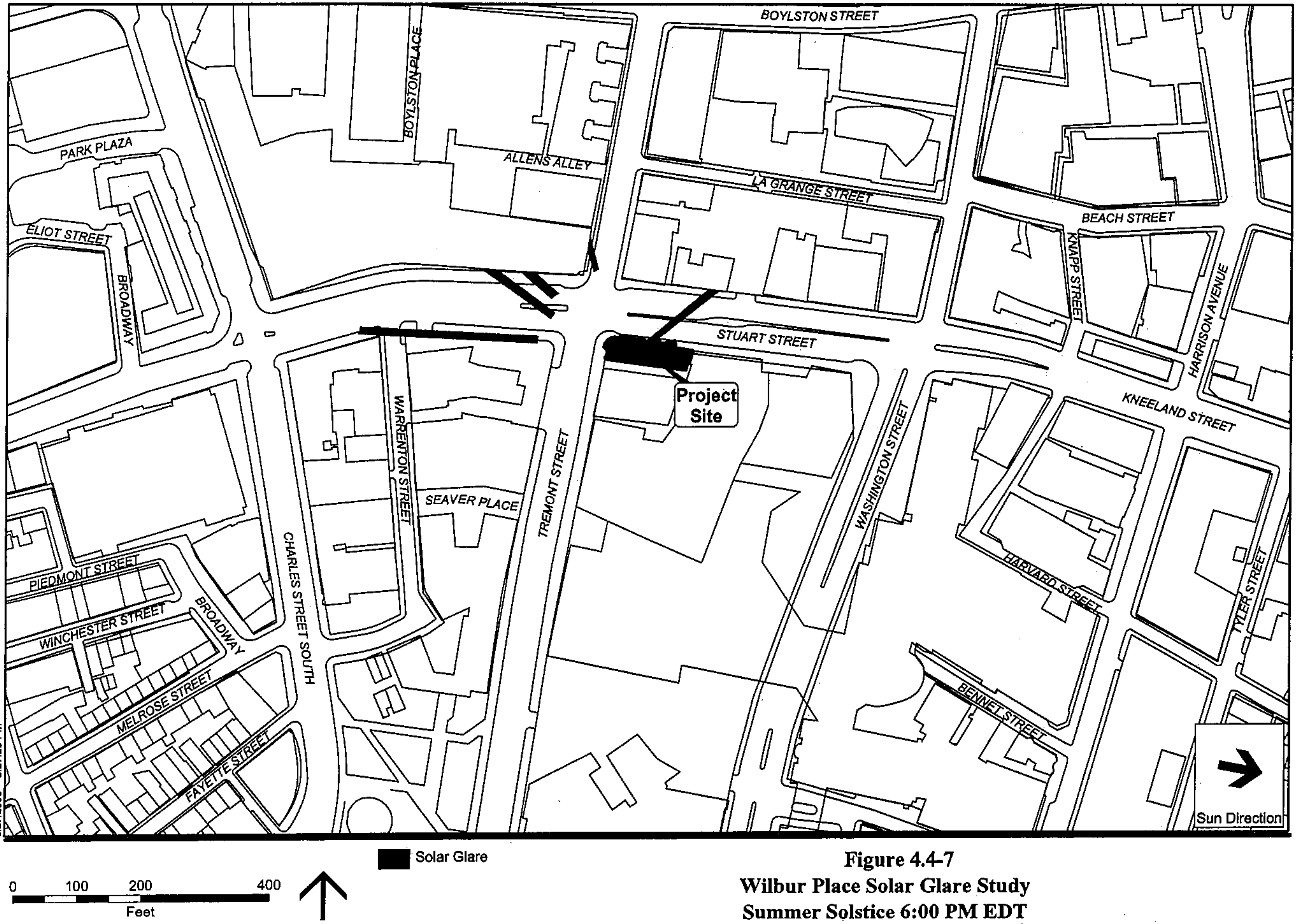

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Figure 4.4-7
Wilbur Place Solar Glare Study
Summer Solstice 6:00 PM EDT

EarthTech

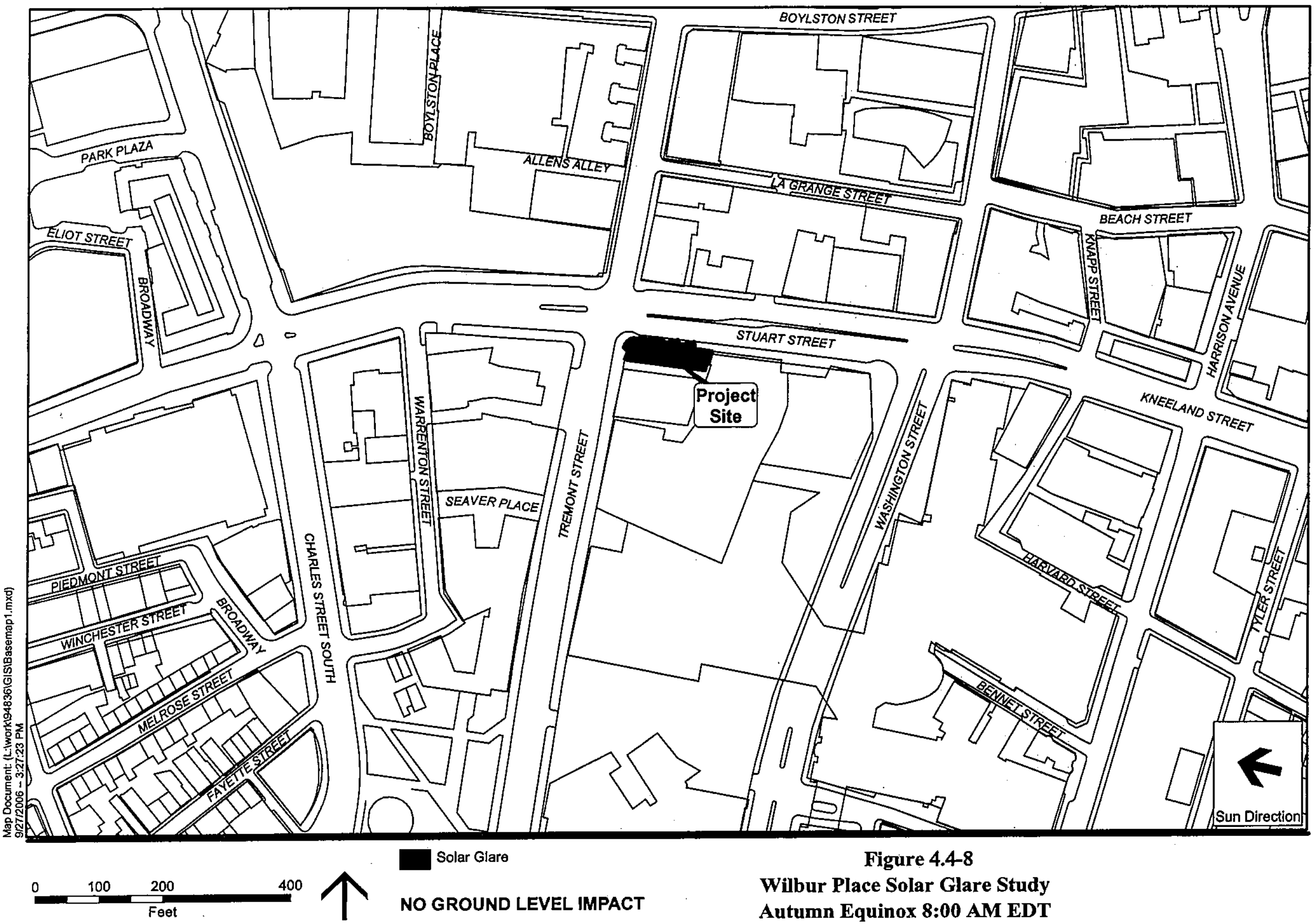

Figure 4.4-8
Wilbur Place Solar Glare Study
Autumn Equinox 8:00 AM EDT

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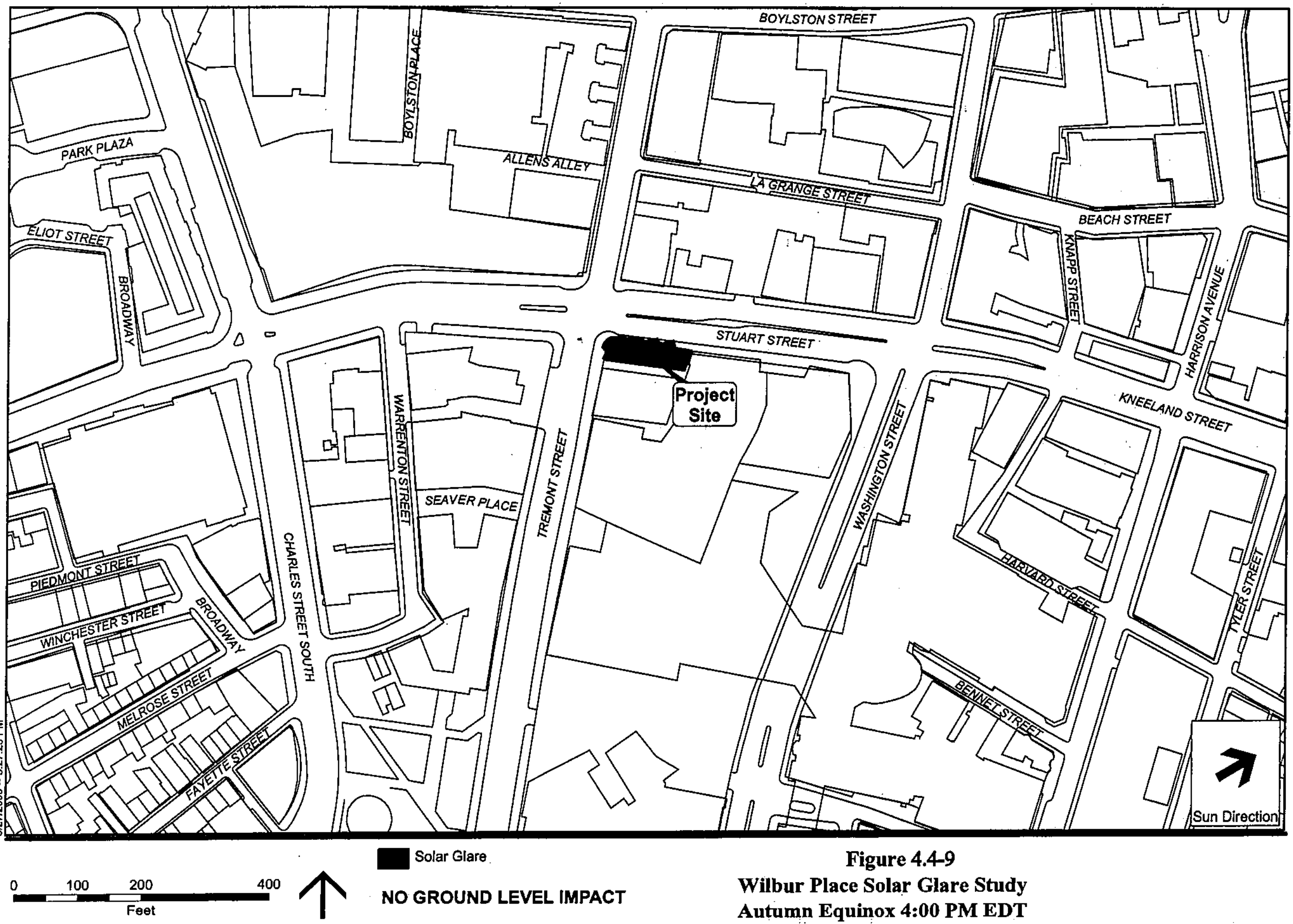

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Figure 4.4-9
Wilbur Place Solar Glare Study
Autumn Equinox 4:00 PM EDT

APPENDIX D – PNF HISTORIC RESOURCES COMPONENT

5.0 HISTORIC RESOURCES COMPONENT

5.1 Introduction

This section of the PNF identifies and describes historic resources in the vicinity of the Project and evaluates the impacts of the Project on these resources.

The Project Site does not contain any structures on the National or State Register of Historic Places. The property is owned by the Boston Redevelopment Authority, and it has been occupied by the Hub Ticket Trailer and an existing sign pylon for a number of years.

The Project Site itself is located in the Boston Theatre Multiple Resource area. The closest historic buildings to the property are the Wilbur Theatre at 244-250 Tremont Street, the Wang (Metropolitan) Theatre at 252-272 Tremont Street, the Shubert Theatre at 263-265 Tremont Street, the Jacob Wirth building at 31-39 Stuart Street, and the Dill Building at 11-25 Stuart Street. These resources and other properties on the National and State Registers of Historic Places identified within a ¼-mile radius of the Project Site are shown on **Figure 5-1** with each resource identified by name. A list of these historic resources, including information on the status of the property's historic designation is shown in **Table 5-1**.

Following the description of resources in **Section 5.2** below, **Section 5.3**, which follows, addresses the Project's construction, design, and signage in relation to nearby historic resources.

5.2 Historic Districts and Properties

A description of the historic districts and of properties nearest the Project Site included below has been compiled from individual building survey forms, National Register of Historic Places Registration Forms for the districts and the Theatre District Multiple Resource Area Registration Form.

5.2.1 Historic Districts

Bay Village Historic District, Piedmont Winchester, Melrose, Fayette and Tremont Streets

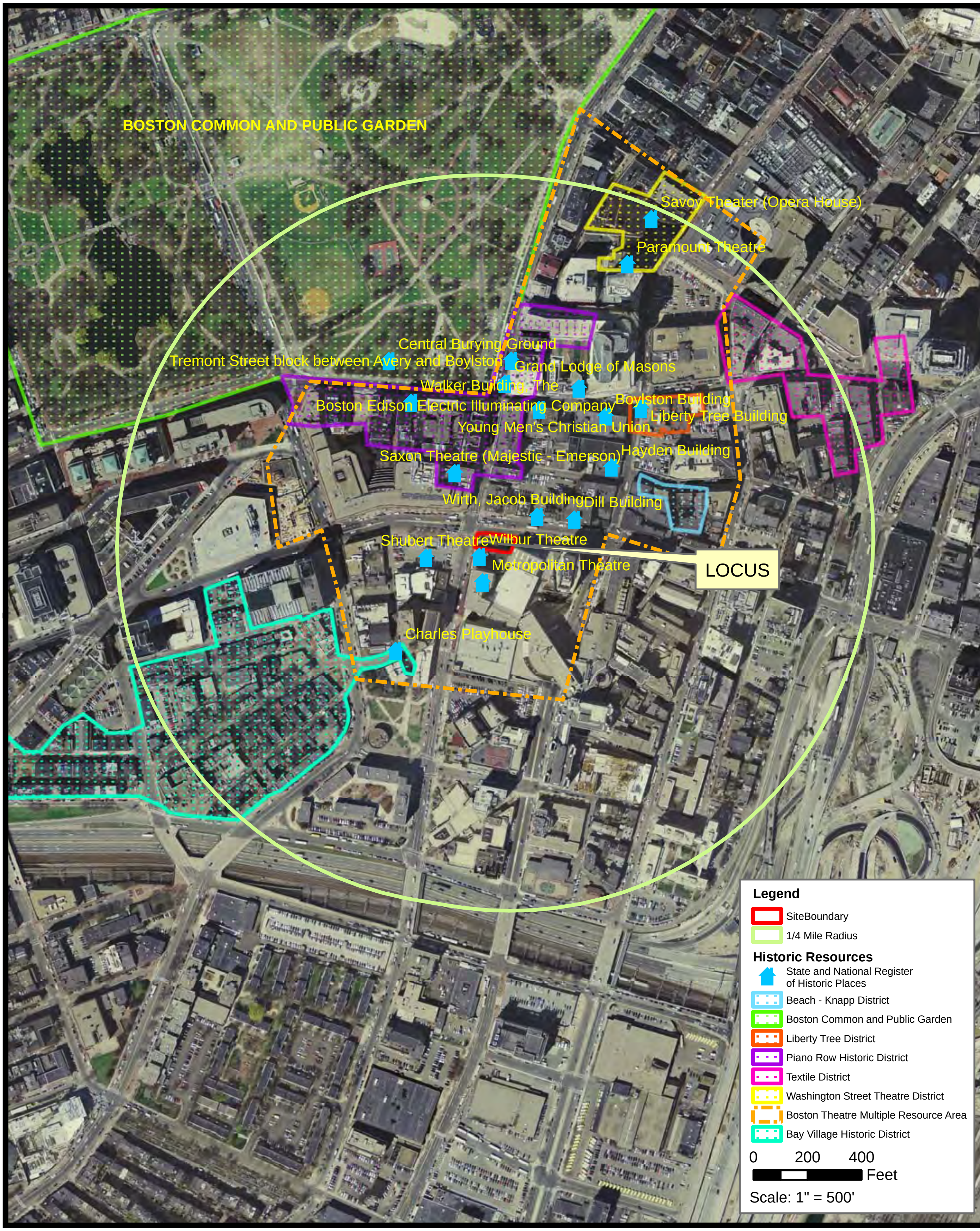
One of the smallest neighborhoods in the City of Boston, Bay Village was created by a landfill in the 1820's by developer Ephraim Marsh. Bay Village has been known as the Church Street District, South Cove and Kerry Village. The craftspeople who built the Beacon Hill residences settled in this area and constructed local residences for their own use.

Boston Common

Boston Common is bounded by Park, Beacon, Charles, Boylston, and Tremont Streets in downtown Boston. This early example of land conservation covers 50 acres and is a city park. The Common is an irregular pentagon of grass, trees, and man made features with four sides facing streets lined with buildings forming a strong street edge and the fifth facing the Public Garden. Boston Common includes paths, walkways and malls. It contains a variety of sculptures, including fountains and memorials, and the Frog Pond is the only body of water remaining. Boston Common's main significance is its status as the first public park in the United States, and as a military training ground. It was set aside in 1634 as common land for the citizens, as pasturage for cattle owned by Bostonians, and for public events. The Boston Common defines the boundary of the theatre district on two sides and enhances the visual importance of the buildings along its edge.

Boston Public Garden

This 24-acre property is nearly regular in shape, and the land undulates gently. The irregularly shaped pond or lagoon is the most prominent feature, well known for its swan boats. The elegant ornamental iron footbridge set on granite abutments and piers spans the narrows of the lagoon, and marks the central axis of the Garden, connecting Commonwealth Avenue Mall with Boston Common. The pathway system and the layout of trees are "naturalistic" in the English garden tradition. Minor shrubs and garden beds are more formally arranged. Numerous fountains and statuary complement the bucolic landscape.Originally marshland, an Act of the Legislature in 1859 protected the Boston Public Garden for horticultural purposes in perpetuity. The late 1850s design was overseen by architect George Meachan, an admirer of 19^{th}-century landscape writer and theorist Alexander Jackson Downing, whose ideas profoundly influenced development of landscape and architecture in the United States.



It is the end user's responsibility to verify the accuracy and appropriateness of the data contained herein. Use of this map constitutes agreement with the terms of Daylor GIS Disclaimer.

Daylor Consulting Group Inc.

Ten Forbes Road Braintree, MA 02184 781 / 849-7070

Historic Resources

Wilbur Place
Boston, Massachusetts

09/27/06

Source: MassGIS, BWSC

Figure 5-1

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Table 5-1: Historic Districts and Properties	
Name	**Status**
Districts	
Bay Village Historic District	Local Historic District*, State Register
Boston Common and Public Garden	National Register District; State Register; National Historic Landmark; Local Landmark*
Boston Theatre Multiple Resource Area	National Register Multiple Resource Area – Four districts and 10 individual properties within an area roughly bounded by Boylston, Charles, Warrenton and Washington Streets, Park Square, Harrison Avenue, West and Tremont Streets; State Register
Beach-Knapp District	National Register District; National Register MRA; State Register
Central Burying Ground Boston Common	National Historic Landmark; National Register District; State Register, Local Landmark
Liberty Tree District	National Register District; National Register MRA; State Register
Park Street Historic District	National Register District, State Register District
Piano Row Historic District	National Register District; National Register MRA; State Register
Textile District	National Register District; State Register
Tremont Street Block between Avery and Boylston Streets	National Register District; National Register MRA; National Register Determination of Eligibility; State Register
Washington Street Theatre District 511-559 Washington Street	National Register District; State Register
West Street Historic District	National Register District; National Register MRA; State Register
Individual Properties	
Boston Edison Electric Illuminating Company, 25-39 Boylston Street	National Register; National Register MRA; State Register; National Register Determination of Eligibility
Boylston Building 2-22 Boylston Street and 651-657 Washington Street	National Register; National Register MRA; State Register; Local Landmark (Exterior only)
Charles Playhouse 74-78 Warrenton Street	National Register; National Register MRA; State Register
Dill Building 11-25 Stuart Street	National Register; National Register MRA; State Register
Grand Lodge of Masons 186 Tremont Street	National Register District; National Register MRA; State Register
Hayden Building 681-683 Washington Street	National Register; National Register MRA; State Register; Local Landmark (Exterior only); Preservation Restriction
Liberty Tree Building 628-636 Washington Street	National Register District; National Register MRA; State Register; Local Landmark (Exterior only)
Metropolitan Theatre (Wang Center) 252-272 Tremont Street	National Register; National Register MRA; State Register; Local Landmark

Table 5-1: Historic Districts and Properties (continued)	
Paramount Theatre 549-563 Washington Street	National Register District; State Register; Local Landmark
Savoy Theatre (Opera House) 537-541 Washington Street	National Register District; State Register; Local Landmark
Saxon Theatre (Emerson Majestic Theatre) 219-221 Tremont Street	National Register District; National Register MRA; State Register; Boston Landmark
Shubert Theatre 263-265 Tremont Street	National Register; National Register MRA; State Register
Tremont Street Subway Tremont Street	National Register; National Register District; National Historic Landmark; State Register; Local Landmark
Joseph W. Walker Building 120 Boylston Street	National Register District; National Register MRA; State Register; Preservation Restriction
Wilbur Theatre 244-250 Tremont Street	National Register; National Register MRA; State Register; Local Landmark
Jacob Wirth Building 31-39 Stuart Street	National Register; National Register MRA; State Register; Local Landmark
Young Men's Christian Union 48 Boylston Street	National Register; National Register MRA; State Register; Local Landmark (Exterior only)

*Local Historic Districts and Local Landmarks are listed in the State Register of Historic Places

Boston Theatre District Multiple Resources Area (MRA)

Comprising 4 districts and 10 individual buildings, the Boston Theatre MRA is a dense, predominantly commercial area toward the southern edge of the downtown business district. It is characterized by an irregular street pattern and heterogeneity of building styles and types generally of masonry, and low or moderate in scale. The network of street corridors are broken only occasionally by open space. Buildings less than three stories and greater than twelve tend to break the street rhythm of the area. The area is located south of the major downtown retail and financial districts. It is marked as a cultural and entertainment district due to the concentration of theatres built for stage plays, vaudeville, burlesque and movies.

Currently, the district contains the city's finest examples of early 20th century theatre types. The area achieved it greatest significance from 1890-1930. Building styles range from Federal residences, and continues into 19th and 20th century commercial architecture. By the mid-19th century, the area was increasingly commercial; and a huge variety of styles was characteristic of the second half of the 19th century. A number of flamboyant Gothic Revival buildings were located on the corner of Tremont and Boylston, for example the Young Men's Christian Union (1875), a fellowship and service organization. Early skyscrapers were mostly clothed in Renaissance or Beaux Arts garb. The Masonic Temple of 1899 and the Colonial Building (1900) are examples of steel frame 'palazzo skyscrapers,' generally 10 to 11 stories in height. In the 20th century, technology brought a change in scale, although the city height restriction of 125 feet controlled development. New materials like glazed terra cotta became popular for decorative architectural details including the well-known Steinert Building (1896). In the case of the Majestic Theatre (1903) and the Savoy Theatre (1928), the whole façade was composed of terra cotta. The Paramount (1930-32) is a landmark Art Deco building that created a spectacular display of electric light that was a trademark of the theatre district.

Beach / Knapp District, (Boston Theatre MRA) Beach and Knapp Streets

The Beach / Knapp District is composed of six buildings located on Beach and Knapp Streets between lower Washington Street and the Harrison Avenue edge of Chinatown, and the Garment District. The buildings reflect the historical development from residential to mixed commercial and light industrial/warehouse uses, and are architecturally significant as fine examples of particular building types. During the 1830s and 1840s the Beach/ Knapp area was predominantly residential and the modest Greek Revival row-houses at 5 and 7 Knapp Street survive from this earlier period. The nearby Boston to Albany and Old Colony railroad terminals made the area a popular location for hotels, including the "Shakespearian Inn" which remains at 7-15 Beach Street. The Inn has been remodeled, but retains three 4-story metal oriel windows, elaborate cast iron capitals and a cast iron plaque dedicated to William Shakespeare. Three 'loft' buildings, 17-23 and 25-29 Beach Street and 9-23 Knapp Street are representative of the light manufacturing that moved into the area. The buildings at 17-23 Beach and 9-23 Knapp were designed by the nationally known firm Shepley, Rutan and Coolidge, the successor firm to H. H. Richardson. 9-23 Knapp Street is indebted to the Richardsonian tradition in its simple massing and multi-story arcades.

The Central Burying Ground, Boston Common

A section of the Common along the north side of Boylston Street between Park Square and Tremont Street was privately-owned land. Later purchased by the town for a fourth burial ground; the Central Burying Ground near the Boylston Street boundary was established in 1756. Soldiers who died at the Battle of Bunker Hill (1775) and during the British occupation were buried there, as well as peacetime citizens of Boston. The 1722 map of Capt. John Bonner shows a few other present day streets: West Street; Beach Street, so-named because it ran along the water; Essex Street, which also followed the curve of the shoreline; and Rainford Lane, later the section of Harrison Street between Essex and Beach Streets.

Liberty Tree District, (Boston Theatre MRA) Essex and Washington Streets

The Liberty Tree Historic District consists of six buildings clustered around the corner of Washington and Essex Streets. The area is significant historically as the location of the famous Liberty Tree, and architecturally as a small-scale ensemble of mid-to-late 19^{th} century commercial buildings. The corner of Washington and Essex Streets was the site of the Liberty Tree Tavern and the American elm known as the Liberty Tree, a gathering place for patriots protesting the Stamp Act. The 4-story brick Liberty Street Block (1850), 628-636 Washington Street was built on this historic corner site by wealthy Bostonian David Sears. This Greek Revival/Italianate commercial building housed small shops on the ground floor and elegant public halls above. Adjacent buildings reflect the commercial development in the mid-to-late 19th century. Shops were still small and the upper floors of commercial buildings at 11-13 and 15-17 Essex Street were used as residences. 15-17 and 25-31 Essex Street are among the district's best surviving examples of High Victorian Gothic commercial buildings.

Piano Row Historic District (Boston Theatre MRA) Park Square to Avery Street along Boylston and Tremont Streets

"Piano Row" covers 4.28 acres and is composed of 29 buildings, generally dating to the late-19th and early-20th century. In the early 19th century the neighborhood was mainly residential, but after 1850 became more commercial. Between 1890 and 1930 it was the favored location for piano dealers and music-related businesses, as well as major hotels, institutions and theatres. The area includes distinctive structures by prominent architects, grouped in an ensemble that frames the Boston Common. Major firms represented were Winslow & Wetherell (later Winslow and Bigelow), Clarence A. Blackall of Blackall, Clapp and Whittemore. The two most significant buildings constructed for music companies were the Beaux Arts Steinert Building (1896), which included a fine concert hall, and the Oliver Ditson Building (1917), headquarters for one of the nation's oldest and largest music publishing firms. Many other buildings housed one or more piano or organ dealers including the Tremont Theatre (1889) at 176 Tremont Street, the Masonic Temple (1899) at 183-186 Tremont Street, and the Colonial Building (1900) at 96-106 Boylston Street. The ornate Jacobethan style Touraine Hotel (1898) was originally a luxury hotel. The three most important theatres were the Tremont (1889), the Colonial (1900) and the Majestic (1903). A new building occupying three parcels at the center of the district on Boylston Street was just completed.

Textile District, Roughly Essex Street from Phillips Square to Columbia Street and Chauncy Street from Phillips Square to Rowe Place

The Textile District is located at the northeast corner of Chinatown created when the South Cove Corporation began filling 56 acres of marsh in 1833. The neighborhood was substantially residential, some portions occupied by the middle class and predominantly Irish immigrants in the mid-19th century joined later by a large influx of immigrants including Chinese, Italian, Jewish and Syrian, who converted the area's single family homes to multiple unit tenements.

The Textile District encompasses a densely spaced group of large and moderate-sized warehouse-type structures built at the end of the 19th century and the early 20th century and associated with Boston's textile industry. Typically built of brick, brownstone and granite, some with cast iron storefronts, some of the structures are still occupied by clothing-related businesses. The buildings are relatively heterogeneous in height and represent a core of manufacturing buildings that employed workers who lived in Chinatown's residential areas.

Tremont Street Subway, Tremont Street at Boston Common

Opened in 1897, the Boylston and Park Street Stations are the oldest subway stations in the United States. Although Park Street's interior has been completely altered, Boylston Street's retains much of its original character, with the exception of wooden wainscoting, telephone, and fire hoses removed in 1985. The kiosks were designed in Beaux-Arts style by Edmund March Wheelwright, who served as city architect from 1891 to 1895. They were constructed of Deer Island granite with metal and glass roofs. There are now two kiosks at Boylston Street, although the 1938 Bromley Atlas shows four. The atlas also shows an underground passage to the 12-story Little Building (1917) on the corner of Tremont and Boylston Streets. Apparently built as a service to theatre patrons, the entrances can be seen at the Boylston Street Station, the Emerson/ Majestic and Colonial Theatres. Used as bomb shelters during World War II, the tunnels are no longer accessible.

West Street Historic District, (Boston Theatre MRA) West and Tremont Streets

The district covers three-fifths of an acre, and comprises four early-20th century commercial buildings on the northern edge of the theatre district. Two are located on Tremont Street, and two on the south side of West Street. The four buildings are of high architectural quality and illustrate important trends in the history of Boston's retail trade. In the first three decades of the 20th century, Tremont and West Street were part of the fashionable ladies shopping area. The large department store was emerging as the dominant retail type. The 11-story and 10-story Lawrence Buildings at 148-149 and 150 Tremont Street were once part of Chandler and Company, an exclusive department store. The Schraffts Building, a 5-story limestone Renaissance Revival commercial building built in 1922 at 16-24 West Street, was occupied for 50 years by Schraffts candy store and restaurant. The Fabyan Building (1926), a 5-story limestone office building designed by Coolidge, Shepley, Bulfinch and Abbott, was occupied by small personal service businesses.

5.2.2 Individual Properties

Charles Playhouse, 74-78 Warrenton Street

This Greek Revival building, now the Charles Playhouse, was built as the Fifth Universalist Church in 1838-39, by renowned architect Asher Benjamin (1771-1845). Later the building was used by the Hebrew Temple Ohabei Shalom from 1863 -87, and the Scotch Presbyterian Church from 1889 to 1925. The monumental temple-front church was constructed in brick and has a 12-foot high raised granite basement designed to accommodate two stores that provided rental income to the church. The pediment is supported on brick pilasters and paired central two-story fluted Greek Ionic columns. Finely carved detailing includes floral window panels. In 1957 the building was converted for use as the Charles Playhouse. At street level, the façade has three portal entrances. The interior is by and large a "black box," which effectively hides any surviving details, and most of the original ornament has been replaced with modern architectural detailing. The building is the most prominent example of Greek Revival style that survives in the district.

Dill Building,11-25 Stuart Street

The two identical, symmetrical sections of this six-story, brick, loft building were constructed in two stages from 1886 to 1887. The Dill Building has a 2-story metal storefront with engaged columns. A wide band course separates the storefront from the upper four stories, and a second belt course extends under the sixth-story windows. The rectangular and segmental-arched window openings are arranged in groups across the building, separated by brick pilasters. The owner of this commercial building was Charles H. Dill. The building permits, only available for the second section, indicate that the architect was A. S. Drisko, who also built the Emerson Piano Factory (1890-91) in the South End. Drisko also designed residential properties on Commonwealth Avenue, Marlborough and Newbury Streets in the Back Bay. He also built multi-family houses. The interior plans for the second section (#11-17) show the floor plan was open, indicating that the building was probably used for light manufacturing. During the 20th century the Full and Sullivan Co., makers of leather coats, occupied the building, as well as other clothing companies. The Dill Building complements its neighbor (west) the Jacob Wirth Building. It is a fine example of the well-proportioned brick loft buildings being constructed in the Beach/Knapp Street.

Grand Lodge of Masons, 183-186 Tremont Street

The Masonic Temple is located on Tremont in the heart of the central business district opposite Boston Common. The almost rectangular skyscraper has two principal facades, five bays along Tremont Street, and six bays along Boylston Street. The building is constructed with a steel frame with a granite façade; nine stories capped by flat roof. The Renaissance Revival palazzo style used was popular at the turn of the century. The first three floors have rusticated stone, separated from each other by band courses. The ground floor has large shop windows, separated from each other by piers capped with cartouche. On the main body of the elevation, the windows are decorated with molded architraves and shields. Above, the cornice is composed of dentils, egg and dart, foliated brackets, and a fascia adorned with a lion's head. The Grand Lodge is sited on an important city corner at Tremont and Boylston Streets and the Boston Common. It is the third Masonic Temple on the site, and serves as headquarters for the first Masonic Lodge in America, and the highest Masonic authority in New England. The present building by Loring and Phipps was built 1897-99. Architects George F. Loring (1851-1918) and Stanford Phipps were for some years a leading firm who designed buildings for businesses, schools, and other public buildings and residences in New England.

Hayden Building, 681-683 Washington Street

Constructed in 1875, on the corner of Washington and LaGrange Streets, this five-story office building is the only surviving example of a commercial building in Boston designed by H. H. Richardson. The Hayden Building exhibits the architect's characteristic Romanesque Revival style with heavily rusticated masonry construction. Richardson used vertical arches topped by small repeating attic windows. The Hayden is a rectangular structure with simple but strong massing and articulation of the façade, defined by large scale stone detailing, and variation in stone. The building's design represented a shift away from the more ornate High Victorian style that Richardson was using at Trinity Church (1872-77) in Copley Square. It is said to foreshadow Richardson's 1886 Marshall Field Wholesale Store in Chicago. The Hayden design became the inspiration for many early skyscrapers of the late 19^{th} century. The building was commissioned by the family of Richardson's wife.

Metropolitan Theatre, 252-272 Tremont Street

The Wang Center, originally the Metropolitan Theatre, was built in 1925, and combines a 14-story Renaissance Revival office building of granite and cast stone, with a Baroque auditorium seating 4,225 people. Clarence H. Blackall was the architect. The Louis XIV baroque interior features a series of vestibules and three lobbies including a Grand Lobby, all extravagantly decorated in marble, bronze, ornate gilding and painted friezes. The initial developer of the Metropolitan was movie mogul Nathan Gordon. The theatre employed a corps de ballet, a 100-voice chorus, and a 55-piece orchestra. There was also a 3,100-pipe organ. Apart from the stage shows, musician and dancers performed tableaux, ballet and operatic moments. People waiting could arrange bridge parties, or play ping pong and billiards downstairs. After the show, couples danced in the Grand Lounge. In 1932 an art-deco restaurant opened in the lounge area. Big bands including Duke Ellington and Tommy Dorsey played there during the 1940s. After World War II, attendance declined. Renamed the Music Hall in 1962, it hosted large productions including the Bolshoi Ballet and the Metropolitan Opera.

Paramount Theatre, 549-563 Washington Street

Built in 1930-1932, the Paramount Theatre on Washington Street was designed by Arthur H. Bowditch and builder George B. H. Macomber. The 3-bay art deco theatre was articulated with flat, vertical design elements. Side bays were built with single elongated windows covered with metal grillwork in geometric patterns. A spectacular feature of the façade is the original Art Deco marquee and upright sign. By the 1930s, marquees lit from inside became a dazzling incandescent feature of the district. The Paramount is distinguished as one of the first theatres designed specifically for showing moving pictures. When it opened in 1932 it was billed as "the first intimate deluxe picture house Boston has seen." The thoroughly modern theatre seated about 1,500, and had polished oriental walnut and African ebony walls and Art Deco wall murals. A lounge was located under the theatre as space where friends could meet. The first feature was "Shanghai Express" with Marlene Dietrich. The Paramount was erected on the site of hostelries that served early theatre enterprises. The first was the Lamb Tavern (1745) and later the Greek Revival Adams House, which was demolished to make way for the Paramount.

Saxon / Majestic Theatre, 219-221 Tremont Street

Built in 1903, the free-standing flamboyant Majestic Theatre is an outstanding example of Beaux Arts classicism, both inside and out, and originally seated 1700. It was designed by John Galen Howard and J. M. Wood, for merchant and patron of the arts Eben D. Jordan, Jr., son of the founder of Jordan Marsh. John Galen Howard was a nationally prominent architect. The grey terracotta façade in high relief dominates Tremont Street. Architect Henry. B Pennell designed the opulent interior in collaboration with skilled Boston decorators L. Haberstroth & Sons. The lobby, though small, is highly decorated with murals by William Dodge, stained glass windows, mirrored walls and a heavily gilded frieze. Dodge's best known work is in the Library of Congress. It was the first theatre to integrate electrical fixtures into the architectural fabric, and the first to have a fully cantilevered gallery. The acoustics are remarkable. For over 50 years the Majestic featured theatrical events that included Ethel Merman, Harry Houdini, Lena Horne and the Marx Brothers. In 1956, it was sold and became a cinema called the Saxon. After suffering a gradual decline, the theatre fell into neglect. In 1983, Emerson College bought the Majestic and began an expert restoration, which included the marquee and canopy reflecting the 1903 originals.

Shubert Theatre, 265 Tremont Street

The 1908-10 building has a cast stone façade, which replaced the original marble, following the widening of Tremont Street in 1925. It is dominated by a large Palladian window that rises from a segmental-arched entrance canopy to a modillion cornice with balustrade. This classically-inspired façade is highlighted by a 1910 wrought iron and glass marquee. Named after Sam S. Shubert, from the well-known family of theatre owners, it was designed by Thomas M. James (1875-1942) and opened on January 24, 1910 with seats for 1,500 patrons. The Shubert was built for drama, and some notable actors and actresses have performed here, including Sir Laurence Olivier, Sir John Gielgud and John Barrymore. The Adamesque interior is moderately scaled and decorated in ivory with blue accents provided by carpets and draperies. The interior decoration was in part inspired by the palace at Versailles. Lobby paintings after Boucher are painted by William Dodge, whose murals adorn the Library of Congress. H. B. Pennell designed the interior helped by a group of talented artists. He was also responsible for work at the Wilbur and the Majestic. The Shubert is a well-preserved example of an early 20th century theatre.

Wilbur Theatre, 246-248 Tremont Street

Located in the heart of the Boston Theatre District, the Wilbur faces Tremont Street. The handsome Wilbur Theatre is freestanding, except along the rear stage wall, which abuts the Wang Center, formerly the Music Hall or Metropolitan Center. Built in 1914, the elegant Wilbur Theatre's style incorporates Georgian and Federal Revival motifs. The two-story theatre was designed by renowned architect Clarence H. Blackall, who was also responsible for the Colonial, the Metropolitan, and the Modern Theatre on Washington Street. The building is faced with brick (laid in English bond pattern) and trimmed with marble. The principal façade is composed of five bays; but the design emphasis is on the three center bays, which project slightly. At street level, three well-proportioned portals are surrounded freestanding Greek Ionic marble fluted columns set in antis within marble frames capped with triangular-pediments. On the second story, the three center bays are emphasized by three large semi-circular arches. The arches have marble surrounds, a large marble console bracket at the keystone, and marble tympanums carved with theatre masks. Above the arched windows, there is a long horizontal marble panel inscribed with the name of the theatre. The building is capped by a marble modillion cornice. A prominent marquee is attached at the second floor. The interior is in Federal Revival Style, characterized by simplicity, refinement and intimacy. Public spaces are modest in number and the scale is restrained rather than opulent. The deep balcony makes the theatre seem smaller than its 1,200 seats would suggest. The auditorium has no visible support columns. The Wilbur has premiered many famous productions, including 'Our Town" and "A Streetcar Named Desire." The Theatre is virtually intact and in excellent condition.

Jacob Wirth Building, 31-39 Stuart Street

This pair of Greek Revival bowfront row houses was built in 1844 by housewright Greenleaf C. Sanborn. The two-story buildings have four dormers projecting from the shallow pitched roof. The later 19th century cast iron storefront unites the pair. The building is important as a reminder of the 19th century architectural context, but now largely gone from the district. German immigrant and originally a baker, Jacob Wirth opened his restaurant here in 1868, and the restaurant and bar have continued to offer the same German-style fare ever since. There have been relatively few changes inside or out, and the interior displays handsome 19th-century woodwork.

5.3 Potential Impacts to Historic Resources

5.3.1 Construction Impacts

Removal of the existing ticket trailer on the Project Site will not impact any historic structures. The proposed new building will be fourteen stories tall and will have a basement of one story. Excavation is expected to reach a depth of approximately 17 feet below grade. A discussion of the potential construction impacts and mitigation for dewatering, vibration, settlement and angular distortion are discussed in **Section 4.9,** Geotechnical and Groundwater Impacts, of this PNF. The proposed design will incorporate a geotechnical monitoring program to avoid adverse impacts to adjacent historic buildings.

5.3.2 Project Design

Contemporary in design, the proposed building will be seen in the context of historic properties and contemporary buildings and features. Other nearby contemporary structures, such as the Ritz Carlton Hotel & Towers, Loews Theatre, and the proposed W Boston Hotel & Residences (formerly Loews Boston Hotel, originally proposed and permitted in 2001) along with the proposed building at *Wilbur Place* integrate new construction and design with the district's several magnificent historic theatres. The new Emerson Majestic marquee interprets a historic feature using modern technology. Similarly, Wilbur Place will serve as the gateway to Boston's Theatre District using contemporary design and state-of-the-art technology.

Historically, this corner at the intersection of Stuart and Tremont Streets contained two narrow, three-story brick buildings, which each occupied their entire lot and were separated from the Wilbur Theatre by a narrow alley. Owned in the 1920s by the Trustees of Tufts College (238) and the Walton Lunch Co. (240 –242), the buildings dated prior to 1874. Before 1900, this block was characterized by three- to five-story buildings containing stores, flats, residences and a large lot for the Winthrop School. The twentieth century brought the city's larger and most elaborate theatres. The scale of the block changed and a continuous street wall was established with the construction of the Wilbur (1914) and Metropolitan (1924, Wang) Theatres. More substantial massing and great variations in building heights emphasized the dramatic evolution of the block. This section of Tremont Street was widened in 1925, also contributing to the sense of a monumental scale. Subsequently, the corner buildings at 238–242 Tremont Street were demolished with no replacement to respond to the new scale, massing and more opulent theatre architecture. The proposed building will once again serve as an anchor at the north end of the block and will re-establish the street plane, which suffers from the lack of architectural massing.

A complete discussion of the *Wilbur Place* design is provided in **Section 3.0**, Urban Design section of this PNF.

5.3.3 Proposed Signage

As described in **Section 3.5** of this PNF, signage is an integral feature of this development. Evoking the historic condition, the proposed building will offer a different visual experience between day and night. Historic photographs of the theatre district along Tremont Street during the day exhibit the massing, fenestration, architecture and ornamentation of the various buildings. At night, however, the buildings on both sides of the street served as a dark backdrop framing lighted signs, which projected over the sidewalk and above the buildings creating a sparkling collage of signs and lights on multiple planes within the street corridor (see **Figure 5-2**).

The Metropolitan Theatre (Wang) displayed a seven-story lit blade sign on Tremont Street (see **Figure 5-3**), a lit sign for the Hotel Eliot was on the top of the building, the Schubert had two large internally lit horizontal blade signs, the Wilbur had a large marquee and the Emerson had an internally lit sign as part of its marquee. Externally lit billboards and smaller lit signs for adjacent hotels, restaurants and other businesses were interspersed among the theatres.

The Theatre District on Washington Street had similar characteristics (see **Figure 5-4** and **5-5**). Historic night time views of the Washington Street theatre district also illustrate the cacophony of dazzling lights and signs the most stunning being the multi-colored, blazing marquee and tall vertical sign on the façade of the Paramount Theatre (recently restored) that creates a spectacular display of electric light that was a trademark of the theatre district (see **Figure 5-6**). The visual expression of the proposed building will be most dramatic at night serving as sign and focal point attracting patrons to the theatre district. The lighting will contribute to the district's increased sense of vitality. During the day, the massing will be more prominent, completing this corner and contributing to pedestrian activity during the day and at night.

5.3.4 Shadow and Wind Impacts

Results of the wind study conclude that the proposed structure will reduce the overall wind impacts to pedestrians in the vicinity of the Project Site. The shadow study indicates that minimal impact will occur to the façade of the Jacob Wirth restaurant. Both items are addressed in detail separately in **Section 4.1** and **4.2**, respectively, of this PNF.

5.4 Archaeological Resources

According to the USGS archaeological map on file at the Massachusetts Historical Commission, there are no known or designated archaeological properties on the Project Site. Given the previous development at this location, consisting of two masonry structures each with a basement, and the projected depth of the excavation at 17 feet, there is little potential for the presence of undisturbed archaeological resources that might be disturbed by the Project.

Night view of Tremont Street Theatre District

Source: Bostonian Society

Daylor Consulting Group, Inc.

Ten Forbes Road, Braintree, MA 02184 781-849-7070

Wilbur Place
Historical Photographs

Figure 5-2

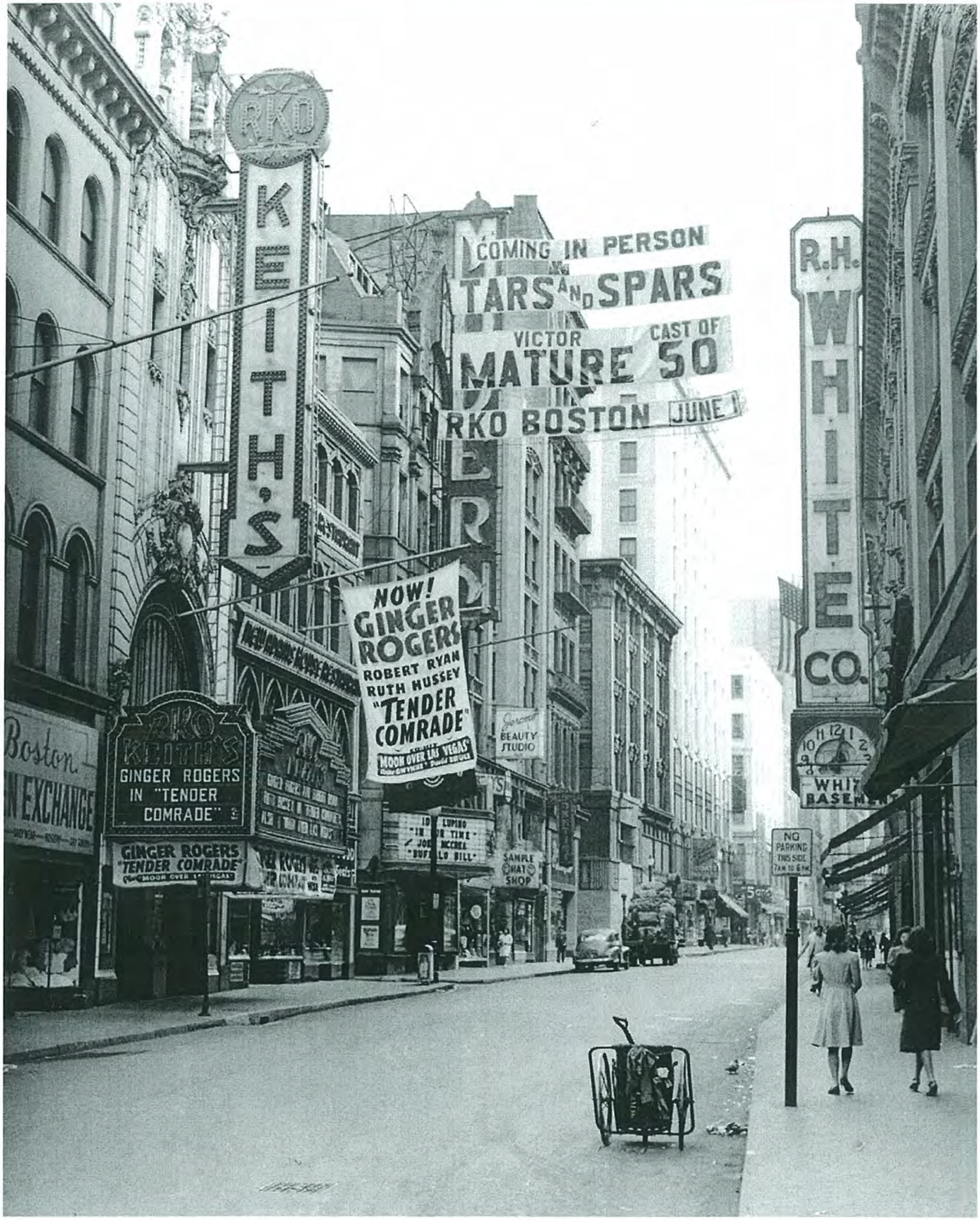
View of Metropolitan Theatre (Wang)

Source: Bostonian Society

Daylor Consulting Group, Inc.
Ten Forbes Road, Braintree, MA 02184 781-849-7070

Wilbur Place
Historical Photographs

Figure 5-3



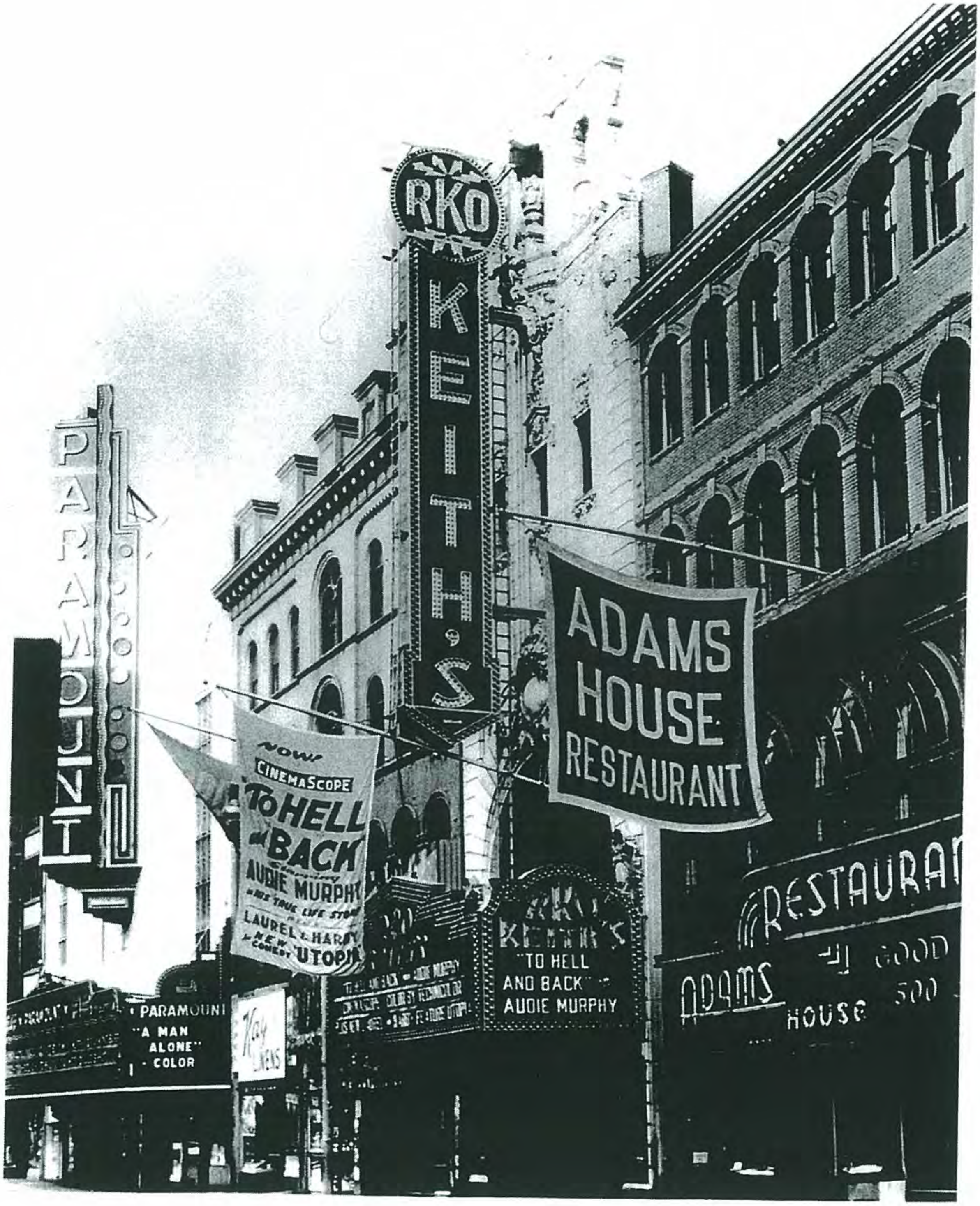
View of Washington Street Theatre District — Source: Bostonian Society

Daylor Consulting Group, Inc.

Ten Forbes Road, Braintree, MA 02184 781-849-7070

Wilbur Place
Historical Photographs

Figure 5-4



View of Washington Street Theatre District

Source: Theatre Historical Society

Daylor Consulting Group, Inc.

Ten Forbes Road, Braintree, MA 02184 781-849-7070

Wilbur Place
Historical Photographs

Figure 5-5

Connector

Night view of Washington Street Theatre District

Source: Bostonian Society

Daylor Consulting Group, Inc.

Ten Forbes Road, Braintree, MA 02184 781-849-7070

Wilbur Place
Historical Photographs

Figure 5-6

5.5 Conclusion

The Project will not demolish any historic structures and will have beneficial impacts in that it will contribute to the viability and street life of the surrounding area. It will reestablish the street wall and anchor one corner of a significant downtown intersection. The design and use of spaces is intended to create a dynamic and exciting interaction with pedestrians and visitors to the Theatre District. A desirable urban design effect from the Project will be to enhance the viability of the surrounding area and revitalize the Theatre District.

Minimal shadow impacts to the Jacob Wirth façade are anticipated, only in the late afternoon in the spring and fall. The wind impacts are expected to improve once the building is constructed.

The Proponent will consult with the Boston Landmarks Commission and the Massachusetts Historical Commission. A Massachusetts Historical Commission PNF will be filed in accordance with M.G.L. Chapter 9, Sec. 26-27c as amended by Chapter 254 of the Acts of 1988 (950 CMR 71.00). As part of this review, the staff of the Massachusetts Historical Commission will be consulted to identify measures to avoid or minimize adverse impacts to State Register properties.

APPENDIX E – NPC AIR QUALITY APPENDIX

APPENDIX E
AIR QUALITY

240 TREMONT STREET
NOTICE OF PROJECT CHANGE

Pages   Contents

```
**MODELOPTs:  NonDFAULT CONC                              FLAT
              NOCHKD           SCREEN

                                      ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  -- DEPOSITION LOGIC --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses URBAN Dispersion Algorithm for the SBL for     1 Source(s),
  for Total of    1 Urban Area(s):
  Urban Population =      50000.0 ;  Urban Roughness Length =  1.000 m

**Model Allows User-Specified Options:
        1. Stack-tip Downwash.
        2. Model Assumes Receptors on FLAT Terrain.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Urban Roughness Length of 1.0 Meter Used.

**Other Options Specified:
        NOCHKD   - Suppresses checking of date sequence in meteorology files
        SCREEN   - Use screening option
which forces calculation of centerline values

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR

**This Run Includes:       1 Source(s);        1 Source Group(s); and      100 Receptor(s)

**The Model Assumes A Pollutant Type of:  OTHER

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                 m for Missing Hours
                                                                 b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =     6.20 ;  Decay Coef. =     0.000     ;  Rot. Angle =      0.0
                 Emission Units = GRAMS/SEC                                 ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      3.5 MB of RAM.

**Input Runstream File:          CO_SCREEN.DTA
**Output Print File:             CO_SCREEN.LST

**File for Summary of Results:   W:\Apps\aermod\2723\CO_SCREEN.SUM
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PAGE 2

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NOCHKD SCREEN

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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

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(METERS/SEC)

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*** One Hour CO Modeling *** 16:42:41
PAGE 3

**MODELOPTs: NonDFAULT CONC FLAT
NOCHKD SCREEN

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Profile file: Urban.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 11111 Upper air station no.: 22222
Name: UNKNOWN Name: UNKNOWN
Year: 2010 Year: 2010

First 24 hours of scalar data

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10 01 04 4 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	40.	10.0	255.2	2.0
10 01 05 5 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	50.	10.0	255.2	2.0
10 01 06 6 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	60.	10.0	255.2	2.0
10 01 07 7 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	70.	10.0	255.2	2.0
10 01 08 8 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	80.	10.0	255.2	2.0
10 01 09 9 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	90.	10.0	255.2	2.0
10 01 10 10 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	100.	10.0	255.2	2.0
10 01 11 11 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	110.	10.0	255.2	2.0
10 01 12 12 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	120.	10.0	255.2	2.0
10 01 13 13 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	130.	10.0	255.2	2.0
10 01 14 14 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	140.	10.0	255.2	2.0
10 01 15 15 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	150.	10.0	255.2	2.0
10 01 16 16 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	160.	10.0	255.2	2.0
10 01 17 17 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	170.	10.0	255.2	2.0
10 01 18 18 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	180.	10.0	255.2	2.0
10 01 19 19 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	190.	10.0	255.2	2.0
10 01 20 20 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	200.	10.0	255.2	2.0
10 01 21 21 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	210.	10.0	255.2	2.0
10 01 22 22 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	220.	10.0	255.2	2.0
10 01 23 23 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	230.	10.0	255.2	2.0
10 01 24 24 01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	240.	10.0	255.2	2.0

First hour of profile data

```
YR MO DY HR HEIGHT F  WDIR   WSPD AMB_TMP sigmaA  sigmaW  sigmaV
10 01 01 01   10.0 1   10.    0.50   255.3   99.0  -99.00  -99.00

F indicates top of profile (=1) or below (=0)

*** AERMOD - VERSION  11353 ***   *** 240 Tremont Street Project                                    ***        03/14/12
                                  *** One Hour CO Modeling                                          ***        16:42:41
                                                                                                               PAGE   4
**MODELOPTs:  NonDFAULT CONC                                        FLAT
              NOCHKD            SCREEN

                                          *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***

                                  ** CONC OF OTHER    IN MICROGRAMS/M**3                         **

                                                    DATE                                                              NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS     193.81832  ON 10083103: AT (   -130.21,     276.04,     6.20,     6.20,    0.00)  GC  GRID_1

*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR

*** AERMOD - VERSION  11353 ***   *** 240 Tremont Street Project                                    ***        03/14/12
                                  *** One Hour CO Modeling                                          ***        16:42:41
                                                                                                               PAGE   5
**MODELOPTs:  NonDFAULT CONC                                        FLAT
              NOCHKD            SCREEN

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of          0 Fatal Error Message(s)
A Total of          0 Warning Message(s)
A Total of          0 Informational Message(s)

A Total of      18504 Hours Were Processed

A Total of          0 Calm Hours Identified

A Total of          0 Missing Hours Identified (  0.00 Percent)

   ******** FATAL ERROR MESSAGES ********
            ***  NONE  ***

   ********   WARNING MESSAGES   ********
            ***  NONE  ***
```

APPENDIX F – NPC NOISE APPENDIX

APPENDIX F
NOISE

240 TREMONT STREET
NOTICE OF PROJECT CHANGE

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3	Table 2: Estimate of Total Sound Level Impacts at the Worst-Case Residences (Marriott Courtyard Hotel)
4	Table 3: Estimate of Total Sound Level Impacts at the Worst-Case Residences (62 Boylston Street Residences)
4	Table 4: Estimate of Total Sound Level Impacts at the Worst-Case Residences (90 Warrenton Street Residences)
5	Table 5: Estimate of Total Sound Level Impacts at the Worst-Case Property Line (South Side/Wilbur Theater)
6	Table 6: Estimate of Noise from the Rooftop Exhaust Fans at all Receptors
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14	Nighttime Baseline Sound Level Measurement Summary – (Location #4) Tremont Street Marriott Courtyard Hotel
15	Morning Peak Traffic Period Sound Level Measurement Summary – (Location #5) Project Site: Tremont & Stuart Streets

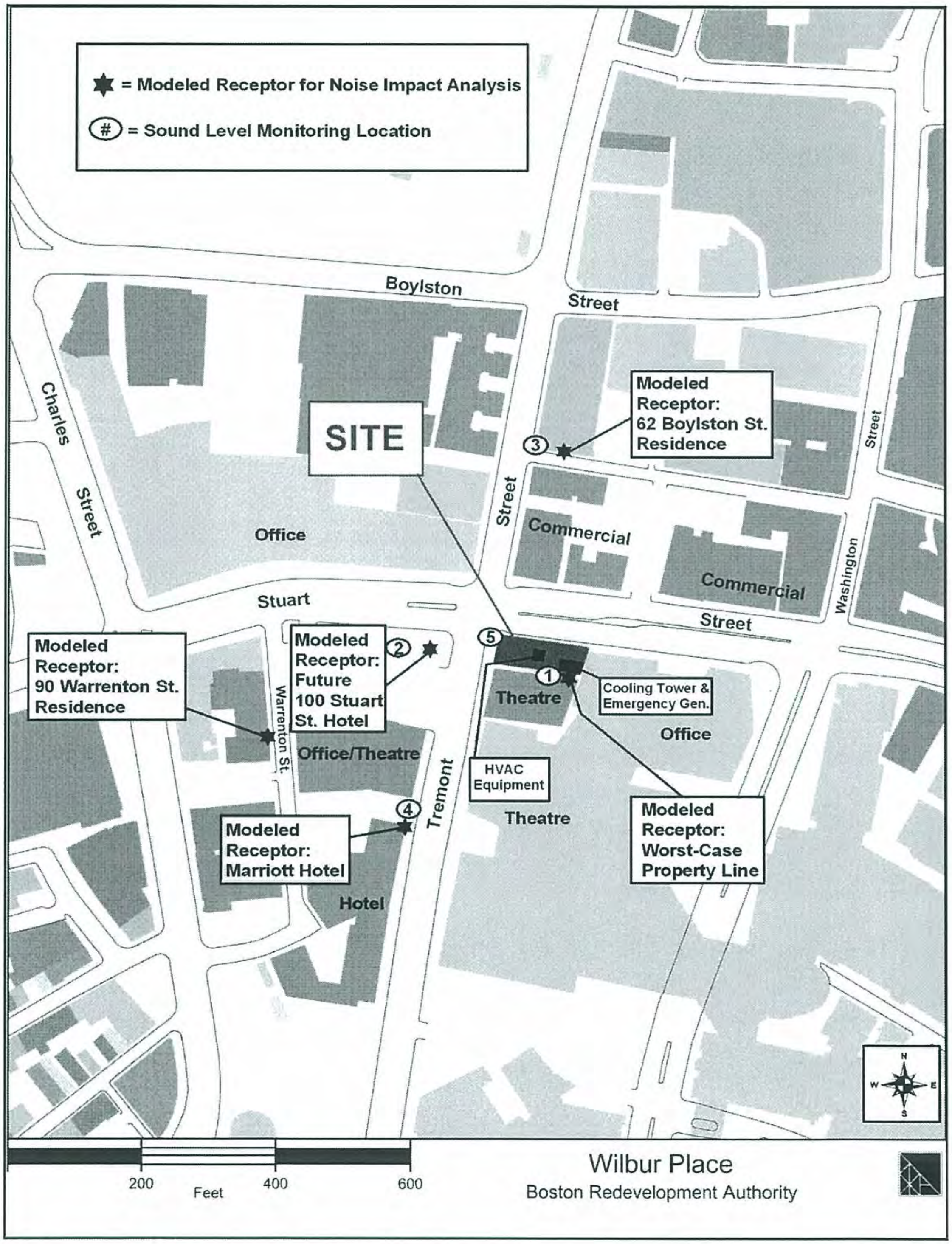

Figure: Location of Noise Monitoring and Modeled Noise Sources and Receptors

TABLE 1

ESTIMATE OF TOTAL SOUND LEVELS IMPACTS AT WORST-CASE RESIDENCES (100 STUART STREET FUTURE PROJECT)

(SEE TABLES 6 - 9 FOR DETAILS ON EACH SOUND SOURCE)

(ANYTIME)

Modeled Receptor - Worst-Case Residences: 100 Stuart St. Proposed Hotel											
	Octave Band Center Frequency (Hz)										Calculated
Sound Source	**31**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**		**dB(A)**
Rooftop Exhaust Fans	42	38	33	21	15	11	5	-2	-13		21
Rooftop HVAC Unit	38	38	37	38	35	32	27	24	19		37
Rooftop Emergency Generator	52	54	50	37	35	33	30	26	14		40
Rooftop Cooling Tower	52	52	47	47	41	37	26	14	1		43
Total Sound Pressure Level (L_p), (dB)	**56**	**57**	**52**	**48**	**43**	**39**	**33**	**28**	**20**		**45**
Boston Residential (non-daytime) Noise Limits (dB)	68	67	61	52	46	40	33	28	26		50
Compliance with City of Boston Regulations?	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES

TABLE 2

ESTIMATE OF TOTAL SOUND LEVELS IMPACTS AT WORST-CASE RESIDENCES (MARRIOTT COURTYARD HOTEL)

(SEE TABLES 6 - 9 FOR DETAILS ON EACH SOUND SOURCE)

(ANYTIME)

Modeled Receptor -- Worst-Case Residences: Marriott Courtyard Hotel											
	Octave Band Center Frequency (Hz)										Calculated
Sound Source	**31**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**		**dB(A)**
Rooftop Exhaust Fans	33	29	23	10	4	-2	-10	-21	-37		10
Rooftop HVAC Unit	29	29	27	27	24	19	13	6	-5		25
Rooftop Emergency Generator	44	46	41	27	24	21	16	8	-9		29
Rooftop Cooling Tower	49	49	43	43	38	33	22	9	-7		39
Total Sound Pressure Level (L_p), (dB)	**50**	**50**	**46**	**43**	**38**	**33**	**23**	**13**	**-2**		**40**
Boston Residential (non-daytime) Noise Limits (dB)	68	67	61	52	46	40	33	28	26		50
Compliance with City of Boston Regulations?	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES

TABLE 3

ESTIMATE OF TOTAL SOUND LEVELS IMPACTS AT WORST-CASE RESIDENCES (62 BOYLSTON STREET RESIDENCES)

(SEE TABLES 6 - 9 FOR DETAILS ON EACH SOUND SOURCE)

(ANYTIME)

Modeled Receptor -- Worst-Case Residences: 62 Boylston Street Street Residences											
	Octave Band Center Frequency (Hz)										Calculated
Sound Source	**31**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**		**dB(A)**
Rooftop Exhaust Fans	33	29	24	10	3	-3	-11	-22	-38		10
Rooftop HVAC Unit	29	29	28	27	23	18	12	5	-6		24
Rooftop Emergency Generator	45	47	42	28	25	21	16	8	-8		30
Rooftop Cooling Tower	50	50	44	44	38	33	22	9	-6		40
Total Sound Pressure Level (L_p), (dB)	**51**	**51**	**46**	**44**	**38**	**33**	**23**	**13**	**-2**		**40**
Boston Residential (non-daytime) Noise Limits (dB)	68	67	61	52	46	40	33	28	26		50
Compliance with City of Boston Regulations?	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES

TABLE 4

ESTIMATE OF TOTAL SOUND LEVELS IMPACTS AT WORST-CASE RESIDENCES (90 WARRENTON STREET RESIDENCES)

(SEE TABLES 6 - 9 FOR DETAILS ON EACH SOUND SOURCE)

(ANYTIME)

Modeled Receptor -- Worst-Case Residences: 90 Warrenton Street Residences											
	Octave Band Center Frequency (Hz)										Calculated
Sound Source	**31**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**		**dB(A)**
Rooftop Exhaust Fans	28	23	15	0	-9	-16	-25	-35	-50		2
Rooftop HVAC Unit	24	23	19	17	11	5	-2	-8	-18		13
Rooftop Emergency Generator	40	40	34	17	13	7	2	-5	-21		20
Rooftop Cooling Tower	45	43	36	33	26	19	8	-4	-18		28
Total Sound Pressure Level (L_p), (dB)	**46**	**45**	**38**	**34**	**26**	**20**	**9**	**0**	**-14**		**29**
Boston Residential (non-daytime) Noise Limits (dB)	68	67	61	52	46	40	33	28	26		50
Compliance with City of Boston Regulations?	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES

TABLE 5

ESTIMATE OF TOTAL SOUND LEVELS IMPACTS AT WORST-CASE PROPERTY LINE (SOUTH SIDE - WILBUR THEATER)

(SEE TABLES 6 - 9 FOR DETAILS ON EACH SOUND SOURCE)

(ANYTIME)

Modeled Receptor - Worst-Case Property-Line: South Side - Wilbur Theater											
	Octave Band Center Frequency (Hz)										Calculated
Sound Source	**31**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**		**dB(A)**
Rooftop Exhaust Fans	37	31	24	9	0	-7	-16	-23	-33		11
Rooftop HVAC Unit	33	31	28	26	20	14	7	4	-1		22
Rooftop Emergency Generator	49	49	43	27	22	17	12	8	-3		30
Rooftop Cooling Tower	54	52	45	43	35	29	18	9	0		38
Total Sound Pressure Level (L_p), (dB)	**55**	**54**	**47**	**43**	**35**	**29**	**19**	**12**	**4**		**38**
Boston Residential (non-daytime) Noise Limits (dB)	68	67	61	52	46	40	33	28	26		50
Compliance with City of Boston Regulations?	YES	YES	YES	YES	YES	YES	YES	YES	YES		YES

TABLE 6

ESTIMATE OF SOUND LEVEL IMPACTS FROM THE ROOFTOP EXHAUST FANS AT ALL RECEPTORS (ANYTIME)

Rooftop Exhaust Fans
(toilet/kitchen/dryer on Roof)

	Octave Band Center Frequency (Hz) 31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Sound power level (Lw), dB[1]	86	82	78	68	64	61	57	51	45	68
Directivity of Sound dB[2]	0	0	-1	-3	-5	-6	-7	-8	-8	
Net L_W, dB	86	82	77	65	59	55	50	43	37	65

Modeled Receptor - Worst-Case Residences: 100 Stuart St. Proposed Hotel

Distance in feet = 200 feet
Distance in meters = 61 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-44	-44	-44	-44	-44	-44	-44	-44	-44	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-5	
No Shielding by Project Roof[4]	0	0	0	0	0	0	0	0	0	
Sound Pressure Level (L_p), (dB)	42	38	33	21	15	11	5	-2	-13	**21**

Modeled Receptor -- Worst-Case Residences: Marriott Courtyard Hotel

Distance in feet = 325 feet
Distance in meters = 99 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-48	-48	-48	-48	-48	-48	-48	-48	-48	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-9	
Shielding by Project Roof[4]	-5	-5	-6	-6	-7	-9	-11	-14	-17	
Sound Pressure Level (L_p), (dB)	33	29	23	10	4	-2	-10	-21	-37	**10**

Modeled Receptor -- Worst-Case Residences: 62 Boylston Street Street Residences

Distance in feet = 310 feet No Impact
Distance in meters = 94 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-47	-47	-47	-47	-47	-47	-47	-47	-47	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-8	
Shielding by Project Roof[4]	-5	-5	-6	-7	-8	-10	-12	-15	-18	
Sound Pressure Level (L_p), (dB)	33	29	24	10	3	-3	-11	-22	-38	**10**

Modeled Receptor -- Worst-Case Residences: 90 Warrenton Street Residences

Distance in feet = 435 feet No Impact
Distance in meters = 133 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-50	-50	-50	-50	-50	-50	-50	-50	-50	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	-1	-1	-3	-12	
Shielding by Building Roof[4]	-7	-9	-11	-14	-17	-20	-23	-24	-24	
Sound Pressure Level (L_p), (dB)	28	23	15	0	-9	-16	-25	-35	-50	**2**

Modeled Receptor - Worst-Case Property-Line: South Side - Wilbur Theater

Distance in feet = 150 feet
Distance in meters = 46 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-41	-41	-41	-41	-41	-41	-41	-41	-41	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	0	-1	-4	
Shielding by Project Roof[4]	-8	-10	-12	-15	-18	-21	-24	-24	-24	
Sound Pressure Level (L_p), (dB)	37	31	24	9	0	-7	-16	-23	-33	**11**

Footnotes: [1] Greenheck Model LB-54-15 Exhaust Fan Total (20,000 cfm) (Used for purpose of determining typical specs)
[2] Directivity from "Electric Power Plant Environmental Noise Guide" -Edison Electric Institute Table 4.22 and monitoring data
[3] Air Absorption Sound Attenuation Rates from "Electric Power Plant Environmental Noise Guide" -EEI Table 5.1

Sound Attenuation Rates (dB per 100 m)

31.5	63	125	250	500	1000	2000	4000	8000
0.00	-0.01	-0.03	-0.10	-0.24	-0.44	-0.88	-2.51	-8.77

[4] Z.Maekawa, APPLIED ACOUSTICS, 1(1968), 157-173.

TABLE 7

ESTIMATE OF SOUND LEVEL IMPACTS FROM THE ROOFTOP PACKAGE HVAC UNIT AT ALL RECEPTORS (ANYTIME)

Rooftop HVAC Unit										
	Octave Band Center Frequency (Hz)									Calculated
	31	63	125	250	500	1000	2000	4000	8000	dB(A)
Sound power level (Lw), dB[1]	82	82	82	85	84	82	80	78	76	88
Directivity of Sound dB[2]	0	0	-1	-3	-5	-6	-7	-8	-8	
Net L_W, dB	82	82	81	82	79	76	73	70	68	82

Modeled Receptor - Worst-Case Residences: 100 Stuart St. Proposed Hotel										
Distance in feet =	200 feet									
Distance in meters =	61 meters									
	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-44	-44	-44	-44	-44	-44	-44	-44	-44	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-5	
No Shielding by Project Roof[4]	0	0	0	0	0	0	0	0	0	
Sound Pressure Level (L_p), (dB)	38	38	37	38	35	32	27	24	19	37

Modeled Receptor -- Worst-Case Residences: Marriott Courtyard Hotel										
Distance in feet =	325 feet									
Distance in meters =	99 meters									
	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-48	-48	-48	-48	-48	-48	-48	-48	-48	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-9	
Shielding by Project Roof[4]	-5	-5	-6	-6	-7	-9	-11	-14	-17	
Sound Pressure Level (L_p), (dB)	29	29	27	27	24	19	13	6	-5	25

Modeled Receptor -- Worst-Case Residences: 62 Boylston Street Street Residences										
Distance in feet =	310 feet									
Distance in meters =	94 meters									
	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-47	-47	-47	-47	-47	-47	-47	-47	-47	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-8	
Shielding by Project Roof[4]	-5	-5	-6	-7	-8	-10	-12	-15	-18	
Sound Pressure Level (L_p), (dB)	29	29	28	27	23	18	12	5	-6	24

Modeled Receptor -- Worst-Case Residences: 90 Warrenton Street Residences										
Distance in feet =	435 feet									
Distance in meters =	133 meters									
	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-50	-50	-50	-50	-50	-50	-50	-50	-50	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	-1	-1	-3	-12	
Shielding by Building Roof[4]	-7	-9	-11	-14	-17	-20	-23	-24	-24	
Sound Pressure Level (L_p), (dB)	24	23	19	17	11	5	-2	-8	-18	13

Modeled Receptor - Worst-Case Property-Line: South Side - Wilbur Theater										
Distance in feet =	150 feet									
Distance in meters =	46 meters									
	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-41	-41	-41	-41	-41	-41	-41	-41	-41	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	0	-1	-4	
Shielding by Project Roof[4]	-8	-10	-12	-15	-18	-21	-24	-24	-24	
Sound Pressure Level (L_p), (dB)	33	31	28	26	20	14	7	4	-1	22

Footnotes: [1] AAON Model 270D Package HVAC Unit (Used for purpose of determining typical specs)

[2] Directivity from "Electric Power Plant Environmental Noise Guide" -Edison Electric Institute Table 4.22 and monitoring data

[3] Air Absorption Sound Attenuation Rates from "Electric Power Plant Environmental Noise Guide" -EEI Table 5.1

Sound Attenuation Rates (dB per 100 m)

31.5	63	125	250	500	1000	2000	4000	8000
0.00	-0.01	-0.03	-0.10	-0.24	-0.44	-0.88	-2.51	-8.77

[4] Z Maekawa, APPLIED ACOUSTICS, 1(1968), 157-173.

TABLE 8

ESTIMATE OF SOUND LEVEL IMPACTS FROM THE ROOFTOP COOLING TOWER AT ALL RECEPTORS (ANYTIME)

Rooftop Cooling Tower
(On roof - surrounded by screen)

	Octave Band Center Frequency (Hz)									Calculated
	31	63	125	250	500	1000	2000	4000	8000	dB(A)
Sound power level (Lw), dB[1]	103	103	99	102	99	97	90	83	77	101
Screening Directivity of Sound dB[2]	0	0	-1	-3	-5	-6	-7	-8	-8	
Net L_W, dB	103	103	98	99	94	91	83	75	69	96

Modeled Receptor - Worst-Case Residences: 100 Stuart St. Proposed Hotel
Distance in feet = 245 feet
Distance in meters = 75 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-45	-45	-45	-45	-45	-45	-45	-45	-45	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-7	
Shielding by Penthouse Wall[4]	-5	-5	-6	-6	-7	-9	-11	-14	-16	
Sound Pressure Level (L_p), (dB)	52	52	47	47	41	37	26	14	1	**43**

Modeled Receptor -- Worst-Case Residences: Marriott Courtyard Hotel
Distance in feet = 370 feet
Distance in meters = 113 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-49	-49	-49	-49	-49	-49	-49	-49	-49	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-3	-10	
Shielding by Project Roof[4]	-5	-5	-6	-6	-7	-9	-11	-14	-17	
Sound Pressure Level (L_p), (dB)	49	49	43	43	38	33	22	9	-7	**39**

Modeled Receptor -- Worst-Case Residences: 62 Boylston Street Street Residences
Distance in feet = 325 feet
Distance in meters = 99 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-48	-48	-48	-48	-48	-48	-48	-48	-48	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-9	
Shielding by Project Roof[4]	-5	-5	-6	-7	-8	-10	-12	-15	-18	
Sound Pressure Level (L_p), (dB)	50	50	44	44	38	33	22	9	-6	**40**

Modeled Receptor -- Worst-Case Residences: 90 Warrenton Street Residences
Distance in feet = 465 feet
Distance in meters = 142 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-51	-51	-51	-51	-51	-51	-51	-51	-51	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	-1	-1	-4	-12	
Shielding by Surrounding Wall[4]	-7	-9	-11	-14	-17	-20	-23	-24	-24	
Sound Pressure Level (L_p), (dB)	45	43	36	33	26	19	8	-4	-18	**28**

Modeled Receptor - Worst-Case Property-Line: South Side - Wilbur Theater
Distance in feet = 150 feet
Distance in meters = 46 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-41	-41	-41	-41	-41	-41	-41	-41	-41	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	0	-1	-4	
Shielding by Project Roof[4]	-8	-10	-12	-15	-18	-21	-24	-24	-24	
Sound Pressure Level (L_p), (dB)	54	52	45	43	35	29	18	9	0	**38**

Footnotes: [1] Baltimore Air Coil Co. Model 15146 Cooling Tower (Used for purpose of determining typical specs)
[2] Directivity from "Electric Power Plant Environmental Noise Guide" -Edison Electric Institute Table 4.22 and monitoring data
[3] Air Absorption Sound Attenuation Rates from "Electric Power Plant Environmental Noise Guide" -EEI Table 5.1

Sound Attenuation Rates (dB per 100 m)

31.5	63	125	250	500	1000	2000	4000	8000
0.00	-0.01	-0.03	-0.10	-0.24	-0.44	-0.88	-2.51	-8.77

[4] Z.Maekawa, APPLIED ACOUSTICS, 1(1968), 157-173.

TABLE 9

ESTIMATE OF SOUND LEVEL IMPACTS FROM THE ROOFTOP EMERGENCY GENERATOR AT ALL RECEPTORS (ANYTIME)

Rooftop Emergency Generator
(350 kW with critical silencer and acoustical enclosure, on the roof)

	Octave Band Center Frequency (Hz)									Calculated
	31	63	125	250	500	1000	2000	4000	8000	dB(A)
Sound pressure level @1-m (L_p), dB[1]	90	92	88	75	73	71	70	66	59	78
No Addit.Sound Transmission Loss dB[2]	0	0	0	0	0	0	0	0	0	
Net Lp, dB	90	92	88	75	73	71	70	66	59	78

Modeled Receptor - Worst-Case Residences: 100 Stuart St. Proposed Hotel

Distance in feet = 250 feet
Distance in meters = 76 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-38	-38	-38	-38	-38	-38	-38	-38	-38	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-7	
No Shielding by Project Roof[4]	0	0	0	0	0	0	0	0	0	
Sound Pressure Level (L_p), (dB)	52	54	50	37	35	33	30	26	14	**40**

Modeled Receptor -- Worst-Case Residences: Marriott Courtyard Hotel

Distance in feet = 370 feet
Distance in meters = 113 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-41	-41	-41	-41	-41	-41	-41	-41	-41	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-3	-10	
Shielding by Project Roof[4]	-5	-5	-6	-6	-7	-9	-11	-14	-17	
Sound Pressure Level (L_p), (dB)	44	46	41	27	24	21	16	8	-9	**29**

Modeled Receptor -- Worst-Case Residences: 62 Boylston Street Street Residences

Distance in feet = 325 feet
Distance in meters = 99 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-40	-40	-40	-40	-40	-40	-40	-40	-40	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	-1	-2	-9	
Shielding by Project Roof[4]	-5	-5	-6	-7	-8	-10	-12	-15	-18	
Sound Pressure Level (L_p), (dB)	45	47	42	28	25	21	16	8	-8	**30**

Modeled Receptor -- Worst-Case Residences: 90 Warrenton Street Residences

Distance in feet = 465 feet
Distance in meters = 142 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-43	-43	-43	-43	-43	-43	-43	-43	-43	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	-1	-1	-4	-12	
Shielding by Building Roof[4]	-7	-9	-11	-14	-17	-20	-23	-24	-24	
Sound Pressure Level (L_p), (dB)	40	40	34	17	13	7	2	-5	-21	**20**

Modeled Receptor - Worst-Case Property-Line: South Side - Wilbur Theater

Distance in feet = 150 feet
Distance in meters = 46 meters

	31	63	125	250	500	1000	2000	4000	8000	Calculated dB(A)
Drop-off with distance (dB)	-33	-33	-33	-33	-33	-33	-33	-33	-33	
Loss from Air Absorption[3] (dB)	0	0	0	0	0	0	0	-1	-4	
Shielding by Project Roof[4]	-8	-10	-12	-15	-18	-21	-24	-24	-24	
Sound Pressure Level (L_p), (dB)	49	49	43	27	22	17	12	8	-3	**30**

Footnotes: [1] Caterpillar 350-kW diesel generator exhaust with critical grade silencer and acoustical enclosure, behind penthouse wall.

[2] No Additional Sound Transmission Loss

[3] Air Absorption Sound Attenuation Rates from "Electric Power Plant Environmental Noise Guide" -EEI Table 5.1

Sound Attenuation Rates (dB per 100 m)

31.5	63	125	250	500	1000	2000	4000	8000
0.00	-0.01	-0.03	-0.10	-0.24	-0.44	-0.88	-2.51	-8.77

[4] Z Maekawa, APPLIED ACOUSTICS, 1(1968), 157-173.

Summary of Sound Level Measurements

Broadband (dBA) and octave band sound level measurements were made with a CEL Model 593 environmental sound level analyzer, at each monitoring location, for a duration of approximately one-half hour. The full octave band frequency analysis was performed on the frequencies spanning 16 to 16,000 Hertz. A time-integrated statistical analysis of the data used to quantify the sound variation was also performed, including the calculation of the L_{90}, which is used to set the ambient background sound level.

The CEL 593 model is equipped with a model CEL 250 ½" precision condenser microphone and has an operating range of 5 dB to 140 dB and an overall frequency range of 3.5 Hz to 20,000 Hz. This meter meets or exceeds all requirements set forth in the ANSI S1.4-1983 Standards for Type 1 quality and accuracy and the State and City requirements for sound level instrumentation. Prior to any measurements, this sound analyzer was calibrated with an ANSI Type 1 calibrator that has an accuracy traceable to the National Institute of Standards and Technology (NIST). During all measurements, the CEL 593 was tripod mounted at approximately five feet above the ground in open areas away from vertical reflecting surfaces.

Wilbur Place, 240 Tremont Street – Boston, MA

Nighttime Sound Level Measurement - Project Site Property Line (Back PL) (Site #1)

Casella CEL SoundTrack - dB1 4.01 © Casella CEL Ltd 1998 - 2001

- Run Summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run Mode	Octave band Environmental
Run start	09/01/2006 02:26:51
Run end	09/01/2006 02:56:51
Run duration	000 00:30:00.41
Last calibration	09/01/2006 02:18:30
Measurement range	25 - 100 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Period results -

Record number	1 : 1
Record start	09/01/2006 02:26:51.0
Period time	30 min
Periods too short for LNs	No
Overload occurred	No
Overload %time	0.00
Low battery occurred	No
Pause was used	No
Paused all the time	No

Band (Hz)	Fw	L_{eq} (dB)	MAX (dB)	L_{10} (dB)	L_{50} (dB)	L_{90} (dB)
Broadband	L	71.2	77.2	76.0	73.0	69.0
Broadband	A	60.8	70.5	69.0	63.0	56.0
16	L	61.6	70.5	68.0	64.0	57.0
32	L	64.3	69.9	68.0	66.0	62.0
63	L	66.9	76.0	74.0	69.0	64.0
125	L	61.3	71.0	69.0	64.0	58.0
250	L	58.6	64.7	63.0	61.0	56.0
500	L	58.0	66.6	65.0	60.0	55.0
1k	L	57.4	68.2	67.0	60.0	51.0
2k	L	52.1	62.4	62.0	55.0	47.0
4k	L	45.5	55.3	53.0	49.0	40.0
8k	L	38.3	48.9	46.0	42.0	32.0
16k	L	26.0	36.0	34.0	29.0	---.-

Wilbur Place, 240 Tremont Street – Boston, MA

Nighttime Sound Level Measurement – Tremont Street at Site of Future Residential Development (Site #2)

Casella CEL SoundTrack - dB1 4.01

- Run Summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run Mode	Octave band Environmental
Run start	09/01/2006 03:07:52
Run end	09/01/2006 03:33:48
Run duration	000 00:25:56.52
Last calibration	09/01/2006 02:18:30
Measurement range	25 - 100 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Period results -

Record number	1 : 1
Record start	09/01/2006 03:07:52.0
Period time	1 min
Periods too short for LNs	No
Overload occurred	No
Overload %time	0.00
Low battery occurred	No
Pause was used	No
Paused all the time	No

Band (Hz)	Fw	L_{eq} (dB)	MAX (dB)	L_{10} (dB)	L_{50} (dB)	L_{90} (dB)
Broadband	L	71.4	78.0	76.0	73.0	69.0
Broadband	A	61.0	65.7	65.0	63.0	58.0
16	L	61.2	72.4	69.0	63.0	57.0
32	L	65.7	74.6	71.0	68.0	62.0
63	L	64.1	70.2	69.0	66.0	61.0
125	L	62.1	68.9	67.0	64.0	59.0
250	L	61.1	67.0	66.0	64.0	57.0
500	L	56.9	61.0	60.0	59.0	54.0
1k	L	57.6	64.2	62.0	60.0	55.0
2k	L	52.7	58.6	57.0	55.0	49.0
4k	L	44.8	50.2	50.0	48.0	41.0
8k	L	35.9	41.5	41.0	39.0	32.0
16k	L	---.-	34.3	33.0	27.0	---.-

Wilbur Place, 240 Tremont Street – Boston, MA

Nighttime Sound Level Measurement – 62 Boylston Street Mixed Use retail/Residential (Site #3)

Casella CEL SoundTrack - dB1 4.01 © Casella CEL Ltd 1998 - 2001

- Run Summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run Mode	Octave band Environmental
Run start	09/01/2006 03:39:43
Run end	09/01/2006 04:09:45
Run duration	000 00:30:02.40
Last calibration	09/01/2006 02:18:30
Measurement range	25 - 100 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Period results -

Record number	1 : 1
Record start	09/01/2006 03:39:43.0
Period time	30 min
Periods too short for LNs	No
Overload occurred	No
Overload %time	0.00
Low battery occurred	No
Pause was used	No
Paused all the time	No

Band (Hz)	Fw	L_{eq} (dB)	MAX (dB)	L_{10} (dB)	L_{50} (dB)	L_{90} (dB)
Broadband	L	76.8	83.8	83.0	80.0	72.0
Broadband	A	65.5	72.6	72.0	69.0	62.0
16	L	63.1	72.8	69.0	65.0	59.0
32	L	69.1	81.4	79.0	73.0	62.0
63	L	72.7	82.7	81.0	76.0	66.0
125	L	69.7	78.9	76.0	73.0	63.0
250	L	68.2	76.2	74.0	72.0	63.0
500	L	60.8	67.6	67.0	64.0	58.0
1k	L	60.2	66.5	66.0	63.0	57.0
2k	L	57.4	66.1	65.0	60.0	53.0
4k	L	53.6	64.9	64.0	57.0	47.0
8k	L	45.9	57.6	57.0	49.0	39.0
16k	L	31.4	45.0	43.0	34.0	25.0

Wilbur Place, 240 Tremont Street – Boston, MA

Nighttime Sound Level Measurement – Tremont Street Courtyard Marriott Hotel (Site #4)

Casella CEL SoundTrack - dB1 4.01 © Casella CEL Ltd 1998 - 2001

- Run Summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run Mode	Octave band Environmental
Run start	09/01/2006 04:21:17
Run end	09/01/2006 04:52:34
Run duration	000 00:31:17.40
Last calibration	09/01/2006 02:18:30
Measurement range	25 - 100 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Period results -

Record number	1 : 1
Record start	09/01/2006 04:21:17.0
Period time	30 min
Periods too short for LNs	No
Overload occurred	No
Overload %time	0.00
Low battery occurred	No
Pause was used	No
Paused all the time	No

Band (Hz)	Fw	L_{eq} (dB)	MAX (dB)	L_{10} (dB)	L_{50} (dB)	L_{90} (dB)
Broadband	L	73.0	85.2	81.0	75.0	69.0
Broadband	A	60.8	69.1	68.0	64.0	57.0
16	L	63.8	72.9	71.0	67.0	59.0
32	L	62.7	73.0	69.0	65.0	59.0
63	L	63.8	70.2	69.0	66.0	61.0
125	L	63.3	69.0	68.0	66.0	61.0
250	L	61.2	70.3	69.0	64.0	58.0
500	L	57.3	64.4	63.0	60.0	54.0
1k	L	56.4	65.8	64.0	60.0	52.0
2k	L	52.8	63.1	62.0	56.0	47.0
4k	L	48.7	64.3	61.0	51.0	40.0
8k	L	38.7	55.2	50.0	42.0	31.0
16k	L	---.-	36.2	34.0	27.0	---.-

Wilbur Place, 240 Tremont Street – Boston, MA

Peak Hour Sound Level Measurement – Project Site at Intersection of Tremont and Stuart Streets (Site #5)

Casella CEL SoundTrack - dB1 4.01 © Casella CEL Ltd 1998 - 2001

- Run Summary -

Instrument	CEL-593.C1T Version 7.21 Type 1
Instrument ID (DPB)	112240
Run Mode	Octave band Environmental
Run start	09/01/2006 07:35:08
Run end	09/01/2006 08:07:27
Run duration	000 00:32:19.16
Last calibration	09/01/2006 07:28:22
Measurement range	25 - 100 dB
Microphone response	Random Incidence
Polarizing voltage	Off
Time weighting	F
Frequency weighting	L, A
Exchange rate (Q)	3
Period time	30 min
Periods too short for LNs	No
Profiles recorded	No
Profile sample interval	1 s
Number of records	1
Events enabled	No
Overload occurred	No
Low battery occurred	No
Pause was used	No

- Period results -

Record number	1 : 1
Record start	09/01/2006 07:35:08.0
Period time	30 min
Periods too short for LNs	No
Overload occurred	No
Overload %time	0.00
Low battery occurred	No
Pause was used	No
Paused all the time	No

Band (Hz)	Fw	L_{eq} (dB)	MAX (dB)	L_{10} (dB)	L_{50} (dB)	L_{90} (dB)
Broadband	L	75.0	84.2	79.0	76.0	74.0
Broadband	A	62.1	74.0	69.0	63.0	61.0
16	L	60.8	74.1	68.0	63.0	57.0
32	L	64.1	78.0	72.0	66.0	60.0
63	L	73.0	81.8	76.0	74.0	72.0
125	L	64.0	74.2	68.0	66.0	62.0
250	L	63.7	72.2	68.0	66.0	61.0
500	L	58.4	69.1	64.0	60.0	57.0
1k	L	58.4	70.3	65.0	58.0	56.0
2k	L	54.5	69.1	63.0	56.0	52.0
4k	L	48.0	62.9	57.0	50.0	45.0
8k	L	38.7	49.6	45.0	42.0	36.0
16k	L	---.-	40.7	32.0	27.0	---.-

APPENDIX G – NPC TRANSPORTATION APPENDIX

240 Tremont Street

Trip Generation - Micro-Hotel

HOWARD/STEIN-HUDSON ASSOCIATES

March 23, 2012

HOTEL OPTION																			
Land Use	Units/SF	Category	Trip Rates (Trips/ksf or unit)	Unadjusted Vehicle Trips	Assumed national vehicle occupancy rate[1]	Converted to Person trips	Transit Share[2]	Transit Trips	Walk/Bike/ Other Share[2]	Walk/ Bike/ Other Trips	Vehicle Share[2]	Vehicle Person Trips	Auto Person Trips[3]	Taxi Person Trips[3]	Assumed local auto occupancy rate for autos[4]	Assumed local auto occupancy rate for taxis[5]	Total Adjusted Auto Trips	Total Adjusted Taxi Trips	Total Adjusted Auto + Taxi Trips
WEEKDAY DAILY																			
Hotel[6]	240	Total	8.17	1,961	1.8	3,529	30%	1,059	39%	1,376	31%	1,094	766	328	1.8	1.1	425	400	825
	Rooms	In	4.09	980	1.8	1,765	30%	529	39%	688	31%	547	383	164	1.8	1.1	213	200	413
		Out	4.09	980	1.8	1,765	30%	529	39%	688	31%	547	383	164	1.8	1.1	213	200	413
WEEKDAY AM PEAK																			
Hotel[6]	240	Total	0.52	125	1.8	225		61		103		62	44	19	1.8	1.1	24	23	47
	Rooms	In	0.29	69	1.8	124	40%	49	27%	33	34%	42	29	13	1.8	1.1	16	11	28
		Out	0.23	56	1.8	101	11%	11	69%	70	20%	20	14	6	1.8	1.1	8	11	19
WEEKDAY PM PEAK																			
Hotel[6]	240	Total	0.61	146	1.8	264		61		135		68	48	20	1.8	1.1	27	25	51
	Rooms	In	0.35	85	1.8	153	11%	17	69%	105	20%	31	21	9	1.8	1.1	12	12	24
		Out	0.26	61	1.8	111	40%	44	27%	30	34%	38	26	11	1.8	1.1	15	12	27

1. 2001 National vehicle occupancy rates - 1.2:home to work; 1.8: family/personal business; 1.8: shopping; 2.1 social/recreational
2. Mode shares based on BTD data for Area 3.
3. Vehicle Person Trips are allocated to 70% private auto and 30% taxi. Taxi trip rate based on CTPS Taxi activity rates for Hotel lane use, as adopted by Central Artery/Tunnel Project.
4. Local vehicle occupancy rates based on 2000 Census data and 2001 National VOR.
5. For taxi cabs, assume 1.1 passengers per cab. Taxi cab occupancy does not include driver.
6. ITE Trip Generation, 8th Edition, LUC 310 (Hotel), average rate.