



171 Tremont Street

Project Notification Form

SUBMITTED TO
Boston Redevelopment Authority
One City Hall, 9th Floor
Boston, MA 02201

PROONENT
171 Tremont Street, LLC
171-172 Tremont Street
Boston, MA 02111

David L. Raftery

IN ASSOCIATION WITH
Elkus Manfredi Architects
GRADE Architecture + Interior Design
Sean T. O'Donovan, Esq.
Dennis E. McKenna, Esq.
Mikyong Kim Design
Haley & Aldrich
Feldman Land Surveyors

PREPARED BY



99 High Street
Boston, MA 02110

July 14, 2015

July 14, 2015

Brian Golden, Director
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Re: Project Notification Form
171 Tremont Street
Boston, MA

Dear Director Golden:

171 Tremont Street, a company owned by the Dabbah Family of Switzerland, is pleased to submit the Project Notification Form for a residential condominium project known as 171 Tremont Street (the "Project") to be located in the Midtown Cultural District at 171-172 Tremont Street on an approximately 0.1 acre parcel.

The Project will provide a harmonious, iconic structure at the foot of Boston Common. The luxury condominium building will contribute to the long term revitalization of Downtown Boston by building on the momentum generated by the recently constructed larger-scale mixed-use developments in the area. It will create new residential activity and accompanying public realm improvements including a tranquil pocket park.

The Project involves the demolition of an existing four-story building and construction of a new 20-story residential building with 19 residential units, a grand lobby, two amenities floors, and dedicated below-grade parking. We believe that the architectural character and the residential opportunities offered by the Project will contribute to the on-going revitalization of the Midtown Cultural District.

We look forward to working with you and your staff in your on-going review of the Project. If you have any questions or would like any additional information, please do not hesitate to contact me.

Sincerely,



Maurice Dabbah
171 Tremont Street, LLC

Cc: Mr. David Raftery, David Raftery LLC
Mr. Sean O'Donovan, O'Donovan Law Office PC
Mr. Dennis E. McKenna, Riemer & Braunstein, LLP
Ms. Elizabeth Grob, VHB

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Boston, Massachusetts

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Project Overview

1.1 Introduction

This Project Notification Form (the “PNF”) is submitted pursuant to the Large Project Review requirements of Article 80 of the Boston Zoning Code and Enabling Act. This PNF presents details about the 171 Tremont Street development (the “Project” or “171 Tremont”) located at 171-172 Tremont Street (the “Project Site”) within the Midtown Cultural District of Downtown Boston (the “MCD”). Refer to Figure 1-1 for the site location map.

This PNF is submitted by VHB, on behalf of 171 Tremont Street, LLC (“the owner”) which is being developed jointly by the Dabbah family of Switzerland and David Raftery (collectively, the “Proponent” or “Developer”).

This PNF provides a description of the Project as well as an analysis of transportation and shadow impacts. The Proponent will prepare a Draft Project Impact Report (“DPIR”) subsequent to the PNF which will include detailed environmental analysis including but not limited to wind, shadow, daylight, air quality, water quality, flood hazards, wetlands, geotechnical/groundwater, solid waste, noise, infrastructure, and construction period impacts.

This chapter provides an overview of existing site conditions and describes the Project. It also discusses Project zoning compliance and requested relief, provides a description of ongoing public participation and outreach, identifies anticipated permits and approvals, provides applicant information, and includes Development Impact Project (“DIP”) information.

1.2 Project Context and Existing Site Conditions

The Project is centrally located in the Midtown Cultural District of Boston, Massachusetts near Downtown Crossing (see Figure 1-1). It fronts on Boston Common, with open views to the Boston Public Garden beyond. The Project Site comprises approximately 50 linear feet of frontage on Tremont Street and 74 linear feet of frontage on Avery Street with the rear of the property bounded by Mason Street. The 4,438 square foot Project Site includes a 993 SF utility easement area and a 3,445 SF building lot containing the former Millennium Place sales office, a five-story glass-and-steel building

(see Figures 1-2, 1-3 and 1-4). This structure will be razed to allow for construction of the proposed luxury condominium building.

The Project Site is surrounded by a mix of uses. The Parkside, Grandview Boston Apartments and Tremont on the Common residences are located to the north; 80 Mason, The Ritz-Carlton Hotel and residential towers along with the recently completed Millennium Place are located to the east; and Loews Cinema is located to the south. Over the last decade, new development in the vicinity has helped the area to finally erase the “combat zone” moniker prevalent for so many years. Millennium Partners’ new developments at Hayward Place, Emerson College’s relocation to Boylston Street and Tremont Street, the redevelopment of Lafayette City Center and major improvements within Boston Common such as the restoration of the Parkman Bandstand have all contributed to this change. The Proponent’s proposed development will support this continued transformation.

1.3 Project Description

The Proponent proposes to construct a new 19 unit luxury residential condominium building consisting of one residence per floor¹ (see Figures 1-5 through 1-15). In addition to the residential component of the Project, the program will include amenity space and two floors of below grade parking with off-street loading. The total building height off 237 feet is measured from grade to the top of the last occupiable floor. The building massing at the uppermost floors steps down to the west to minimize shadow impacts on Boston Common from the early morning eastern sun (see Figure 3-1).

171 Tremont will utilize an elegant composition of natural stone, glass and bronze metal components on the exterior façade while the interiors will be focused on the highest quality finishes and amenities. The building height and massing have been carefully considered in context with its neighbors to “book end” the Ladder District block defined by Avery Street and West Street. Tremont on the Common stands at a height of approximately 250’ above grade and the proposed Project seeks to harmonize with this datum to create a cohesive corner element to the block. From an urban design sense the corner building is key in defining precinct boundaries and typically more prominent than its immediate neighbors. On the east elevation contemporary bay windows continue the rhythm of the current residential properties backing onto Mason Street. This element is repeated in one elegant vertical expression on the Avery Street side to provide visual interest to the vista looking west from Washington Street.

Floor plans are depicted in Figures 1-16 through 1-22. Figure 1-23 shows the proposed building sections. Table 1.1 details the proposed development program.



¹ With the exception of Residential Level 2, which contains two residential units, and the Penthouse, which occupies two floors.

Table 1.1 *Proposed Development Program*

Height	237' (255' with mechanicals)
Stories	20 (not including mechanicals)
Building Gross Square Footage	85,385 GSF
Units	19
Lot Area	4,438 SF
FAR	15.8
Parking	2 Levels of below-grade parking 28 Parking Spaces 19 Indoor Bicycle Parking Spaces 4 Outside Bicycle Parking Spaces

The overall goal of the Project architecture is to create a harmonious iconic structure at the foot of Boston Common. The luxury building will contribute to the long term revitalization of downtown Boston by building on the momentum generated by the recently developed neighboring larger-scale mixed-use developments. It will create new residential activity and provide accompanying public realm improvements.

The urban pocket park at 171 Tremont Street offers a sanctuary space for small-scale gathering and lunchtime activities (Figure 1-24). Nestled within a grove of trees, this urban destination will provide a refuge for pedestrians with the sound of water, night lighting and color. Along the building edge, a water wall will create a fountain experience along with outdoor seating along a wood deck. Shaded by canopy trees, this outdoor space will invite engagement that complements Boston Common with seating within the pocket park. Specialty lighting in the evening and during the holidays will offer outdoor seating for nighttime engagement.

1.4 Sustainability

The Project is a Transit Oriented Development (“TOD”) proximate to mass transit as well as vehicular access to highways. The Project supports the objectives of smart growth by providing new development at existing nodes of excellent transportation facilities.

Energy conservation and other sustainable design measures will be integral parts of the proposed Project. The building will employ, where possible, energy and water efficient features for mechanical, electrical, architectural, and structural systems and assemblies. Sustainable design elements relating to building energy management systems, lighting, recycling, conservation measures, regional building materials, and clean construction vehicles will be included wherever practicable.

The City of Boston requires sustainable design in new development projects. Article 37 of the Boston Zoning Code requires that projects be designed as certifiable under the U.S. Green Building Council’s (“USBC”) Leadership in Energy and Environmental Design (“LEED”) program based on the most appropriate LEED building rating system. The Project will comply with Article 37 requirements for

“LEED certifiable” status. The Proponent along with the development team is currently designing a building that will be a model of sustainability and design.

The Proponent is striving to design and construct a LEED certifiable project at LEED Silver or higher. A preliminary LEED Project Checklist is provided in Appendix A of this report. The Proponent is committed to continued exploration of practical ideas for creating a sustainable development that contributes to urban resilience in Boston. The forthcoming Draft Project Impact Report (“DPIR”) will include a final LEED Project Checklist, as well as a more detailed approach to sustainability and design.

1.5 Zoning Compliance

The Project is located within the MCD and is subject to Article 38 of the City of Boston Zoning Code. Within the MCD, it is located in the “Boston Common and Public Garden Protection Area” (Section 38-5.1). In addition to as-of-right maximums, the code allows as-of-right dimensions subject to Large Project Review and receipt of a Certification of Compliance pursuant to Section 80B-6. Table 1.2 provides the dimensional regulations to which the Project is subject. Zoning relief will be sought from the Zoning Board of Appeals for building height and floor area ratio at the appropriate time.

Table 1.2 Zoning Code Dimensional Regulations and Proposed Project Dimensions

Dimensional Regulation	As-of-Right (Maximum)	As-of-Right (<i>Large Project Review</i>)	Proposed Project Dimensions
Building Height	125 Feet	155 Feet	237 Feet (255 feet with mechanicals)
Floor Area Ratio (“FAR”)	8	10	15.8

The proposed Project is in compliance with the use regulations in Article 38 as follows:

- 38-18, 5. (a) Residential Uses: multifamily dwelling
- 38-18, 5. (p) Accessory Uses: subject to the restrictions of Article 10 (i) a garage or parking space for occupants and visitors provided that such use is accessory to a residential use.
- 38-38, 1. Residences (only lobby space is permitted at grade on streets bounding blocks)

The Project is also subject to Section 38-19 Specific Design Requirements. These requirements will be incorporated into the Project’s final design. The design requirements include specifications for the following (subject to zoning relief pursuant to Article 6A):

- Street Wall Continuity
- Street Wall Height
- Display Window Area Regulations
- Setback Requirements
- Sky Plane Setbacks
- Maximum Floor Plates
- Principal façade may require relief from setback requirements
- Corner Conditions for Corner Lot Buildings

Necessary approvals will be sought at the appropriate time from the City of Boston Public Improvement Committee for any projection of the Project over the public right-of-way.

1.6 Summary of Community Outreach

The Proponent and its development team have met with the following city and elected officials, representatives of the local community, local neighborhood associations, property owners and other interested parties throughout the project planning phase. The Proponent will continue to meet with such individuals and groups during the Article 80 review period.

- **Neighborhood Groups-** The development team has met with representatives of the Midtown Cultural District Residents Association (MCDRA) on multiple occasions and made presentations to the MCDRA on March 9 and June 8, 2015. Members of the development team also met with representatives of the condominium associations for the Millennium North and South towers on May 26, 2015. The development team met with the Friends of the Public Garden in June, 2015. The development team plans to continue to meet with various neighbors and neighborhood groups during the upcoming months.
- **Business Groups-** A meeting was held with the Downtown Boston Business Improvement District ("BID") in December, 2014.
- **City Councilors-** The development team has met with City Council President Bill Linehan in January 2015 and At-Large City Councilors Michael Flaherty, Stephen Murphy (December, 2014) and Michelle Wu's Chief of Staff (December, 2014).
- **Elected Officials-** In December, 2014 members of the development team met with State Senator Anthony W. Petrucci. In May, 2015 members of the development team met with State Representative Aaron Michlewitz.

1.7 Regulatory Controls, Approvals, and Permits

Table 1.3 lists the anticipated permits and approvals from federal, state, and local governmental agencies, which are anticipated to be required for the Project. This permit table will be updated with the next BRA filing as necessary.

The proponent will sign an Affordable Housing Agreement with the BRA to create off-site affordable housing opportunities for families in the City of Boston consistent with the City's Inclusionary Development Policy.

Table 1.3 Anticipated Permits and Approvals

Agency/Department	Permit/Approval/Action
Federal	
Federal Aviation Administration ("FAA")	Notices of Proposed Construction or Alteration (Building & Cranes)
Commonwealth of Massachusetts	
Department of Environmental Protection, Division of Air Quality Control	Air Quality Self-Certification (if required)
City of Boston	
Boston Redevelopment Authority ("BRA")	Article 80 Large Project Review (PNF & DPIR) Affordable Housing Agreement
Boston Zoning Board of Appeal ("ZBA")	Dimensional Variances, Conditional Use Permits
Boston Parks and Recreation Department	Approval of Demolition and Construction within 100 feet of Park or Parkway
Boston Transportation Department ("BTD")	Transportation Access Plan Agreement ("TAPA") Construction Management Plan
Public Improvement Commission ("PIC")	Review of Specific Repair Plan for Proposed Streetscape Improvements & Curb Modifications, Projection License
Boston Water and Sewer Commission ("BWSC")	Site Plan Approval Cut & Cap Plan Approval
Boston Committee on Licenses	Permit to Erect and Maintain a Garage Flammable Storage Permit
Boston Department of Inspectional Services ("ISD")	Building Permits and other Construction-Related Permits Certificate of Occupancy
Boston Landmarks Commission	Article 85 Demolition Delay
Boston Air Pollution Control Commission ("BAPCC")	Parking Freeze Review

1.8 Development Team

171 Tremont, LLC owns the property located at 171-172 Tremont Street, which is being developed by the Dabbah family of Switzerland in conjunction with David L. Raftery (collectively the "Proponent" or "Developer"). The Developer has over 25 years of international and domestic real estate development and investment experience.

Developer	171 Tremont Street, LLC 171 -172 Tremont Street Boston, MA 02111 914-522-0759 Contact: David L. Raftery
Architect	Elkus Manfredi Architects 25 Drydock Ave Boston, MA 02210 617-426-1300 Contact: Howard Elkus, FAIA, RIBA, LEED AP, Principal Ross Cameron, RIBA, Senior Associate Ross Cromarty, Designer GRADE Architecture + Interior Design 180 Varick Street #916 New York City, 10014 212-645-9113 Contact: Thomas Hickey, AIA, Partner Edward Yedid, Partner
Landscape Architect	Mikyoung Kim Design 119 Braintree Street, No. 103 Boston, MA 02134 617-782-9130 Contact: Bryan Chou Ian Downing Samantha Partington
Legal Counsel	Sean T. O'Donovan, Esq. 10 Tremont Street, Suite 200 Boston, MA 02108 617-629-8888 Riemer & Braunstein, LLP Three Center Plaza, Suite 600 Boston, MA 02108 617-523-9000 Contact: Dennis E. McKenna, Esquire Robert C. Buckley, Esquire
Planning and Permitting/Transportation Engineering /Civil Engineering	VHB 99 High Street, 10 th Floor Boston, MA 02210 617-728-7777 Contact: Mark Junghans, Principal, Civil Engineering Elizabeth Grob, Director of Urban Permitting Services/ Project Manager

David Black, Associate, Transportation Planner
Stephanie Krueel, ENV SP, Senior Environmental Planner
Selma Mandzo-Predzic, PE, LEED AP, Traffic Engineer

Geotechnical Services

Haley & Aldrich
465 Medford Street #2200
Charlestown, MA 02129
617-886-7400
Contact: Joel Mooney, P.E., LSP, Senior Vice President

Survey

Feldman Land Surveyors
112 Shawmut Avenue
Boston, MA 02118
617-357-9740
Contact: Paul Foley, Project Surveyor

1.9 Prior Development Experience

The project is being developed by Switzerland's Dabbah family jointly with David Raftery who together bring international, national and local real estate development and investment expertise that will benefit the Project and the surrounding neighborhood.

The Dabbah family established itself in Switzerland in the early 1960's focusing in various commodity businesses. In the early 1980's they diversified their capital in real estate throughout Europe and the United States, acquiring and developing several significant residential and commercial projects throughout the last thirty years. Maurice Dabbah is presently a member, and co-investor, of a development team that has been selected as the exclusive party to negotiate with the State of Monaco to build a platform and sea wall that would enable the development of a 600,000 SF ultra-high end residential project. Maurice Dabbah through Manhattan Development Corporation was also a partner in the assemblage and development of 1177 Avenue of the Americas, a one million square foot art deco postmodern office building completed in the 1990. Americas Tower remains an iconic New York City skyscraper. In Paris, French Development Corporation successfully refurbished the 600,000 square foot twin tower office complex "Les Mercuriales" which was subsequently leased to various major European corporations.

David Raftery brings over 25 years of local development experience to the Project. Mr Raftery has been involved in the acquisition, permitting and construction of hundreds of housing units in Boston, including affordable, workforce, and market rate units throughout the city. He has extensive experience with Boston's ZBA, the BRA's Small and Large Project Review process, the Parks Department, Boston Water & Sewer, DCR, PIC, and Inspectional Services Department.

The development team has deep family roots in Boston. Several of the principals and their family members have attended the local universities, including Boston University and Boston College. The

Development team's attention to detail and commitment to excellence has been recognized by receipt of a Prism Award in 2005 from the Builders Association of Greater Boston, for the "Best Urban Residential Multi-unit Project".

1.10 Legal Information

Legal Judgments or Actions Pending Concerning the Proposed Project: The Proponent is not aware of any legal judgments or pending action which concerns the Project.

History of Tax Arrears on Property Owned in Boston by the Proponent: The Proponent owns no real estate in Boston for which real estate tax payments are in arrears.

Site Control: The Proponent owns the entire Project Site by virtue of the deed recorded in the Suffolk County Registry of Deeds in Book 53174, Page 290.

1.11 Preliminary Development Impact Project ("DIP") Information

The Project will not contain more than 100,000 square feet of gross floor area of Development Impact Uses which include retail and commercial uses, and therefore is not subject to Section 80B-7 of the Code.

2

Transportation Analysis

2.1 Project Overview

171 Tremont Street enjoys an outstanding transit-oriented location, and benefits from the robust public transportation services in Downtown Boston. As described in this section of the PNF, the transportation analysis concludes that there will be no significant traffic impact, or other negative transportation impact, in the vicinity of the Site or beyond. Indeed, the Project is expected to enhance pedestrian accessibility in the area and enliven the pedestrian realm.

Based on the trip generation analysis presented below, it is clear that the proposed Project is a relatively limited trip generator, expected to generate fewer than 30 vehicle trips on a daily basis, with approximately 10 percent of those trips (3 vehicle trips) occurring during the morning and evening peak hours. The minimal transportation impact is largely due to the small number of residential units proposed and the fact that the residential use will replace an approximately 13,800 SF office use on the Site. Further, the Site benefits from excellent availability of alternative modes for residents and visitors at this downtown location.

A total of 19 condominium units are proposed, supported by approximately 28 below-grade parking spaces. The parking spaces will be for the private use of the residences, not commercial spaces, and therefore are exempt from the Parking Freeze.

The building lobby and pedestrian entrance will be located on the Tremont Street frontage. The parking will be accessed via a curb-cut and automatic garage door on Mason Street, facilitated by a mechanical lift to the below-grade levels. In addition, an off-street loading dock will be incorporated at approximately the same location as the existing office building curb-cut and loading dock. A minimum of 19 secure bicycle parking spaces will be provided in the building, and 4 short-term/visitor bicycle spaces will be provided in the vicinity of the lobby entrance.

The following sections describe existing traffic, parking, transit and pedestrian/bicycle conditions, and what changes are expected as a result of the Project.

2.2 Study Area/Roadway Network

The location of the Project in relation to the local and regional roadway network is presented in Figure 2-1. The Project Site is bounded by Tremont Street to the west, Avery Street to the south, Mason Street to the east, and a pedestrian easement on the north side connecting Tremont Street to Mason Street. Tremont Street is one-way southbound with multiple vehicle travel lanes, paralleled by Washington Street to the east which is one-way northbound. Mason Street is a public rear service road running between Avery Street and West Street, which is two-way between Avery Street, at roughly its mid-point at the rear of the Opera House and Modern Theater fronting Washington Street. Mason Street continues as a service alley one-way northbound from that point to West Street.

Avery Street is two-way in the vicinity of the Site with one eastbound and one westbound vehicle travel lane, but is one-way eastbound at the intersection with Washington Street to the east. This section of Avery Street requires all vehicles to arrive at the Project Site from the Tremont Street end of Avery Street. As a result, most Project Site vehicle trips from the south, west and east must use West Street or Temple Place to arrive via Tremont Street at the western end of Avery Street. Trips departing to the east can exit Avery Street at its eastern end, but all other departing Project Site trips can depart via Tremont Street to access other directions at its intersection with Boylston Street/Essex Street. Access to the Interstate Highway System (1-90 and 1-93) is provided at the Kneeland Street/Surface Street interchange, and by various ramps along the Rose Kennedy Greenway, and Storrow Drive can be accessed via Charles Street and Arlington Street.

Although Avery Street is a relatively low-volume roadway, it is controlled by traffic signals at both ends. The primary function of the traffic signals on Avery Street at both Tremont Street and Washington Street is to facilitate and protect pedestrian movements rather than accommodate traffic demand. At Tremont Street, the two-phase signal facilitates a protected crosswalk across Tremont Street on the north side of the intersection concurrently with the left-turn vehicle exit movements from Avery Street. Similarly, at Washington Street, the two-phase signal facilitates a protected crosswalk across Washington Street on the south side of the intersection concurrently with the left-turn vehicle exit movements from Avery Street.

Avery Street also provides access to parking and drop-off/pick-up for both the Ritz Carlton Hotel and Residences on both sides of Avery Street east of Mason Street. Observations at the traffic signals at both ends of Avery Street indicate that there is very limited delay or queuing even during peak periods, and capacity for traffic turning movements is more than adequate. In addition to commuter peak periods, there is a noticeable increase in activity in the evenings, particularly on weekends, when the nearby Theater District is active. There is also some drop-off activity associated with the multiplex cinema at the corner of Avery Street and Tremont Street opposite the Project Site.

Traffic circulation in the study area incorporates a significant number of one-way streets, as shown in Figure 2-1. The circulation pattern protects the Downtown retail/commercial area from through traffic by interrupting the continuity of major north-south and east-west roadways or one-way pairs. Tremont Street and Washington Street provide the primary one-way pair serving the study area, with Tremont

Street as a major north-to-south corridor, but with limited connections to the Downtown area. Washington Street is an important south to north corridor passing through the study area, but general traffic circulation is interrupted by a pedestrian-only zone on Summer Street and Winter Street at Downtown Crossing, again as shown in Figure 2-1. Northbound general traffic is forced to travel westbound to Tremont Street southbound via Temple Place or West Street. The Boylston Street/Essex Street corridor is one-way eastbound east of Washington Street, and through westbound traffic is accommodated a block further to the south on the Kneeland Street corridor.

The traffic circulation pattern has specific implications for vehicular access for the Project Site itself. Specifically, the short one-way eastbound section of Avery Street at Washington Street requires all vehicles to arrive at the Project Site from the Tremont Street end of Avery Street. As a result, most Project Site vehicle trips from the south, west and east must use West Street or Temple Place to arrive via Tremont Street at the western end of Avery Street. Trips departing to the east can exit Avery Street at its eastern end, but all other departing Project Site trips can depart via Tremont Street to access other directions at its intersection with Boylston Street/Essex Street. Access to the Interstate Highway System (1-90 and 1-93) is provided at the Kneeland Street/Surface Street interchange, and by various ramps along the Rose Kennedy Greenway, and Storrow Drive can be accessed via Charles Street and Arlington Street.

2.3 Existing Transportation Conditions

2.3.1 Pedestrian Environment

The Project Site enjoys an outstanding location in terms of pedestrian accessibility. Not only is it proximate to the Downtown Crossing retail/commercial district area, the Theater District and Chinatown, it is also within reasonable walking distance of several other Boston neighborhoods, including Back Bay, Beacon Hill, Bay Village, the South End and the Leather District. Furthermore, immediate access to Boston Common across Tremont Street provides an un-paralleled walking advantage for a city center location. The extensive off-road pathway system, extending through the Public Garden and connecting to the Esplanade, yields both recreational opportunities and enhanced pedestrian accessibility.

The more immediate context of the Project Site is shown in Figure 2-2, and the existing site plan is shown in Figure 2-3. Pedestrian access to the existing office building on the Project Site is located on the Tremont Street frontage. The Site benefits from continuous sidewalks on both the Tremont Street and Avery Street frontages, and pedestrian crossing facilities are provided at the immediately adjacent Tremont Street/Avery Street intersection. As noted previously, the two-phase signal at the Tremont Street/Avery Street intersection facilitates a protected crosswalk across the multiple travel lanes on Tremont Street on the north side of the intersection concurrently with the left-turn vehicle exit movements from Avery Street. The narrower sidewalks on Mason Street reflect the fact that it is a service roadway rather than a pedestrian corridor, and experiences limited pedestrian activity. There is,

however, a mid-block crosswalk on Mason Street at the end of the wide pedestrian way between the Project Site and the adjacent residential building (The Parkside).

2.3.2 Bicycle Access

The widely varying cross-sections of downtown streets render many of them unsuitable for dedicated bicycle lanes. However, the Boston Transportation Department (“BTD”) has continued to introduce bike lanes, where possible, and shared-lane (“sharrow”) striping and signage on Downtown streets to accommodate bicycles as safely as possible and reinforce awareness of their presence to other road users, including both pedestrians and vehicle drivers. There are no dedicated bike lanes in the immediate vicinity of the Project Site, but the City of Boston is planning to provide a cycle track on Boylston Street under its 5-year plan.

The existing office building does not have provisions for interior secure bike parking or shower/changing facilities, but there are short-term outdoor bike racks providing parking for 4 bikes on the Avery Street sidewalk adjacent to the Site. Short-term parking for 6 bikes is also provided on the opposite sidewalk adjacent to the Cinema. Furthermore, Hubway bike share stations are available only a short walk from the Site, as shown in Figure 2-2 Public Transportation.

The Project Site enjoys great public transportation accessibility, well supported by subway and local bus service. The public transportation system within a 5-minute walk, or 0.25 mile radius, is illustrated in Figure 2-4, and the individual transit services and frequencies are summarized in Table 2.1.

Table 2.1 Study Area Public Transit Services

Route	Destination	Closest Stop	Peak Headway (minutes)	Off-Peak Headway (minutes)
Red Line	Alewife-Ashmont/Braintree	Downtown Crossing	9	12-13
Orange Line	Oak Grove-Forest Hills	Chinatown	5	8-13
Green Line	Lechmere- BC, Cleveland Cir, Riverside, Brigham Cir	Downtown Crossing	5-7	9-14
Silver Line	SL4: Dudley Station - South Station via Essex Street	Chinatown	8	11-15
	SL5: Dudley Station – Downtown via Washington Street	Boylston	7	11
Local # 11	City Point – Downtown	Washington Street @ Essex Street	6	25
Local # 43	Ruggles Station – Park & Tremont Streets	Tremont Street Opp Winter Street	18	20-35
Local # 55	Jersey & Queensberry Streets – Park & Tremont Streets	Tremont Opp Avery Street	15-17	30-40

As shown in Figure 2-4, the Project Site is located immediately across Tremont Street from Boylston Station (Green Line), approximately a 2-minute walk from Chinatown Station (Orange Line) and within a 5-minute walk of Downtown Crossing (Orange and Red Lines). SL4 and SL5 Silver Line service stop outside Chinatown Station on Washington Street, and the SLS terminates on Temple Place before returning to Dudley Station via Tremont Street where it also stops immediately opposite the Project Site. Local bus routes 11, 43 and 53 also stop within a short walk from the Project Site. Commuter Rail, Amtrak and private bus carriers are available at South Station, approximately 0.5 miles to the east of the Project Site.

The density of public transportation service within easy reach of the Project Site is a primary factor for the occupants of the 171 Tremont Street (existing or proposed) to choose transit as their day-to-day mode of travel.

2.3.3 Parking/Vehicular Access

Currently, there are no parking accommodations on the Project Site, and vehicular access is limited to an off-street loading dock accessed via a 9-foot wide curb-cut on the west side of Mason Street, as shown in Figure 2-3. As an office building, existing service and loading operations are relatively limited. On-street parking in the area is very limited, and the curbside regulations in the vicinity (see Figure 2-3) generally prohibit stopping at all times, with the exception of valet parking for the Ritz Carlton hotel on the southern side of Avery Street. The absence of on-site and on-street parking again reflect the excellent non-auto mobility of the Project Site.

Zipcar car-sharing vehicles are located within a short walk from the Project Site, as shown in Figure 2-3.

2.4 Proposed Site Plan – Transportation

The proposed site plan related to transportation is shown in Figure 2-5.

2.4.1 Pedestrian Access

Pedestrian access to the residential lobby will be located on the Tremont Street frontage where the sidewalk is approximately 11 feet wide, and there will be a supplementary access for residents on Mason Street. In addition, there will be an internal connection for residents between the internal car arrival/departure bay and the building lobby, as well as between the below-grade parking floors and the lobby.

Sidewalks abutting the new building will be reconstructed in conformance with ADA requirements, and a landscape plan will be developed and implemented in the easement area on the north side of the building between Tremont Street and Mason Street.

2.4.2 Bicycle Accommodations

The proposed Project will fully comply with the Boston Transportation Department guidelines for bicycle parking for multi-unit residential buildings with four or more units, and provide one secure/covered bicycle parking spaces per unit and one outdoor/open bicycle parking spaces per five units. A minimum of 19 secure bicycle parking spaces will be provided in the building, and four short-term/visitor bicycle spaces will be provided in the vicinity of the lobby entrance. The bicycle room will be located inside the parking garage, accessible via the passenger elevator. The BTM requirement for shower and changing facilities will be satisfied by the accommodations in each residential unit.

2.4.3 Parking

An attended parking system with a total of approximately 28 below-grade parking spaces are proposed to support the 19 residential units. As shown in Figure 2-3, the below-grade parking garage will be accessed via a curb-cut and automatic garage door on Mason Street. The attended parking system will provide a mechanical elevator to the two below-grade parking levels. The parking spaces will be for the private use of the residences, and, as they will not be commercial spaces, they are exempt from the Parking Freeze.

2.4.4 Loading

Loading and servicing for the Project will be provided in an internal loading bay on Mason Street accessed via the existing curb-cut for the current office loading bay at that location. As a residential project, the proposed Project is expected to have limited loading needs other than regular mail, trash collection and recycling. It is expected that the loading and servicing needs of the proposed residential building will be no greater, or less, than the existing office building.

2.5 Trip Generation

A trip generation analysis for the proposed Project has been performed in accordance with standard BTM methodology for Transportation Access Plans ("TAP"). The analysis is based on Institution of Transportation Engineers ("ITE") Manual, 9th edition, vehicle trip generation rates for Residential Condominium/Townhouse land use (Land Use Code, LUC 230), adjusted by a National average vehicle occupancy ("AVO") to derive person trips. Mode share is based on BTM data for Area 2, within which the Project is located, to yield trips by auto, transit, walk and bicycle. Auto trips were adjusted by a conservative AVO of 1.2 persons per vehicle for ride-sharing to derive vehicle trips. The results of the trip generation analysis are presented in Tables 2.2 through 2.4.

Table 2.2 Project Person Trip Generation Summary

	ITE-Based Trips	AVO	Person Trips
Morning Peak Hour			
In	2	1.13	2
Out	7	1.13	8
Total	9		10
Evening Peak Hour			
In	7	1.13	8
Out	4	1.13	5
Total	11		13
Weekday Daily			
In	56	1.13	63
Out	56	1.13	63
Total	112		126

Source: Institute of Transportation Engineers Trip Generation 9th Edition, LUC 230

Table 2.3 Project Mode Split

Mode	
Automobile	28%
Transit	30%
Walk/Bike/Other	42%

Source: BTDA Area 2 Daily Mode Share Data

Table 2.4 Project Trip Generation by Mode

	Person Trips	Transit Trips	Walk/Bicycle Trips	Trips by Vehicle	AVO	Vehicle Trips
Morning Peak Hour						
In	2	1	1	1	1.2	1
Out	8	2	3	2	1.2	2
Total	10	3	4	3		3
Evening Peak Hour						
In	8	2	3	2	1.2	2
Out	5	1	2	1	1.2	1
Total	13	3	5	3		3
Weekday Daily						
In	63	19	27	18	1.2	15
Out	63	19	27	18	1.2	15
Total	126	38	54	36		30

2.5.1 Potential Project Impacts

Based on the trip generation analysis presented above, it is clear that the proposed Project is a relatively limited trip generator, expected to generate less than 126 person trips on a daily basis. Less than 10% of those trips, approximately 10 person trips, are projected to occur during the weekday AM

peak hour, and approximately 13 person trips are projected to occur during the weekday PM peak hour.

While the parking ratio of 1.47 spaces per residential unit provides more than the BTZ Zoning limit of one parking space per unit, this ratio is not expected to encourage additional vehicle trip generation over-and-above typical rates for downtown residences. Further, in light of the excellent non-auto mobility of the Site, the Project is expected to generate only approximately 3 vehicle trips during each of the weekday AM and PM peak hours. This magnitude of vehicle trip generation is expected to have negligible impact to the roadway network, even though the majority of vehicle trips will pass through the Tremont Street/Avery Street intersection. In practice, there will likely be no noticeable degradation in level of service, queuing or delays. It is important to also note that the residential Project will eliminate office use on the Site, albeit the office space is currently vacant. Indeed, a trip generation analysis for the approximately 13,800 SF office building shows that while the trip generation for office use would be less over the course of the 24-hour weekday, it would be slightly greater during the AM and PM hours compared to the 19 residential units proposed. Therefore, the Proposed Project in fact represents a net reduction in trip generation during the critical weekday peak periods compared to the existing office land use.

2.6 Transportation Demand Management

The Proponent will designate a Transportation Coordinator, and will become a member of the ABC (A Better City) Transportation Management Association (TMA). In addition, the Proponent will coordinate with the neighboring buildings in the area, and will implement a package of TDM strategies for building residents to include the following:

- Marketing information including MBTA services
- Transit pass sales
- Secure, indoor bicycle storage
- Provide group membership for the Hubway bike-share program to all building residents
- Provide group membership for the Zipcar car-share program to all building residents

2.7 Construction Management

In coordination with the BTZ, the proponent will develop a detailed evaluation of potential short-term construction-related transportation impacts including construction vehicle traffic, parking supply and demand, and pedestrian access. Detailed Construction Management Plans will be developed and submitted to the BTZ for their approval. These plans will detail construction vehicle routing and staging.

2.7.1 Construction Vehicle Traffic

Construction vehicles will be necessary to move construction materials to and from the Project Site. In coordination with the BTD, every effort will be made to reduce the noise, control fugitive dust, and minimize other disturbances associated with construction traffic. Truck staging and lay-down areas for the Project will be carefully planned.

2.7.2 Construction Workers Traffic and Parking Issues

In coordination with the BTD, contractors will be encouraged to devise access plans for their personnel that de-emphasize auto use (such as seeking off-site parking, provide transit subsidies, on-site lockers, etc.) Construction workers will also be encouraged to use public transportation to access the Project Site because no new parking will be provided for them.

2.7.3 Pedestrian Access during Construction

In coordination with the BTD, during the construction period, pedestrian activity adjacent to the Project Site may be impacted by sidewalk closures. A variety of measures will be considered and implemented to protect the safety of pedestrians. Temporary walkways, appropriate lighting, and new directional and informational signage to direct pedestrians around the construction sites will be provided. After construction is complete, finished pedestrian sidewalks will be permanently reconstructed to meet ADA standards around the new facilities. Any damage as a result of construction vehicles or otherwise will be repaired per City standards.

2.7.4 Transportation Access Plan Agreement

As required under the Article 80 process, the proponent will prepare and submit a Transportation Access Plan Agreement (TAPA) for execution by the proponent and the BTD. In addition, a Construction Management Plan (CMP) will be prepared for review by the BTD and other City of Boston agencies.



3

Shadow Analysis

3.1 BRA Shadow Impact Analysis

Two shadow study analyses were undertaken. The first shadow study examined three times of day for four seasons as stipulated by the BRA review process. The second study examined the impact of any new shadow specifically on the Boston Common to verify the proposed Project's compliance with the Public Common Shadow Act (1990).

The shadow study impact analysis in Appendix B was conducted in accordance with the BRA protocol to investigate shadow impacts from the Project at (9:00 a.m., 12:00 noon, and 3:00 p.m.) during the summer solstice (June 21), autumnal equinox (September 21), vernal equinox (March 21), and the winter solstice (December 21). Shadow studies were also conducted for 6:00 p.m. during the summer solstice and autumnal equinox.

Shadow impacts from the Proposed Project are minor. Due to the slim massing form and diminutive floor plate, the resulting new shadows cast are slight and narrow. The impact is limited to 6 out of the 14 periods studied, with the largest impacts occurring in the morning. These impacts are reduced due to the siting of the building in the path of shadow cast by the Ritz Carlton Hotel and Ritz Carlton Residences at 10 Avery Street. During the remaining periods, new shadows either fall on the roofs of existing buildings, or within shadows cast by existing buildings. During these periods, no new shadow is cast on sidewalks or public open space.

Vernal Equinox (March 21): During the first time period (9:00 a.m.), a small portion of new shadow from the Project is cast onto Boston Common. Due to the shadow cast by the existing Ritz Carlton tower to the east, the new shadow cast by the Project is greatly reduced. During the second period (noon), there is a small portion of new shadow that falls on Boston Common, Tremont Street, and the adjacent sidewalk. During the third period (3:00pm) no new shadow is cast onto any other open space. New shadow is confined to the roof tops of adjacent buildings.

Summer Solstice (June 21): During the first time period (9:00am), new shadow from the Project is cast onto a small portion of Boston Common. At 12:00 p.m., there is a slight portion of new shadow cast on Tremont Street and the adjacent sidewalk with no new shadow falling on Boston Common. During the remaining periods (3:00 p.m., 6:00 p.m.), no new shadow is cast onto any other open space. New shadow is confined to the roof tops of adjacent buildings.

Autumnal Equinox (September 21): During the first and second time periods, a small amount of new shadow is cast onto Boston Common. Due to the sun's angle during these periods, the Project falls in the path of existing shadow cast by the Ritz Carlton Hotel & Ritz Carlton Residences. Due to these conditions, the new shadow is greatly reduced to a narrow slice. During the remaining two periods no new shadow is cast onto any other open space. New shadow is confined to the roof tops of adjacent buildings.

Winter Solstice (December 21): During the first time period, no new shadow is cast. During the second period, there is a very small sliver of new shadow that falls on Boston Common. No new shadow is cast onto any other open space during the third period. New shadow is confined to the roof tops of adjacent buildings.

3.2 Public Commons Shadow Act

The Public Commons Shadow Act prohibits a permit-granting authority such as the BRA from authorizing a structure within the Midtown Cultural District which would cast "new shadow" on the Public Commons for more than two hours from 8:00 am through 2:30 pm on any day from March 21 through October 21, inclusive, with certain exceptions set forth in Section 2 of the Act. "New Shadow" is defined as shadow additional to shadow which would be created by structures conforming to as-of-right height limits allowed by the Boston Zoning Code as in effect on May 1, 1990.

The largest amount of new shadow cast by the Project on Boston Common occurs on August 21st at 10:00 a.m., illustrated in Figure 3-1. Under the Public Commons Shadow Act, the BRA, as the permit-granting authority, may approve such additional shadow as long as the total area shaded for more than a two hour period does not exceed one acre (43,560 square feet), to be calculated as the sum of the areas of new shadow cast beyond the two hour limit by all structures in the Midtown Cultural District approved after March 20, 1989, including PDAs. Implementation of the Project will require approval by the BRA of 0.12 acres (5,135 square feet) of shadow beyond the two hour limit from the "shadow bank."

Figures

-
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 - 2-1 Roadway Network
 - 2-2 Transportation Context
 - 2-3 Existing Transportation Conditions
 - 2-4 Public Transportation
 - 2-5 Proposed Site Plan – Transportation
 - 3-1 Shadow Study – Most Impactful Analysis Period

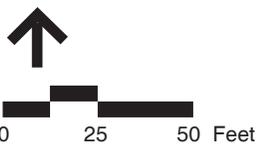


Figure 1-2
Existing Site Conditions Plan

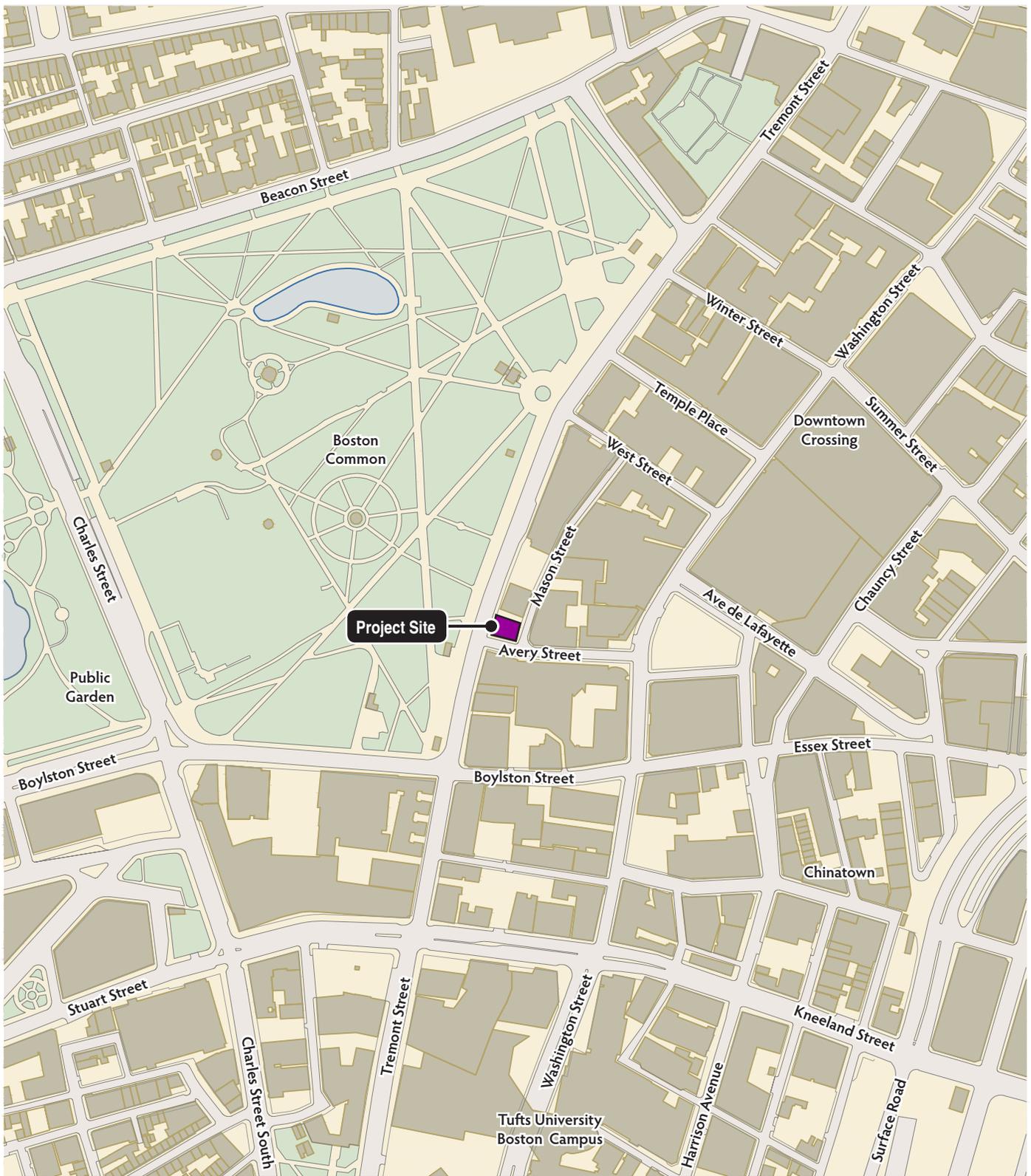


Figure 1-1
Site Location Map



WEST ELEVATION - FROM TREMONT ST.



SOUTH + EAST ELEVATIONS - FROM AVERY STREET

FIGURE 1-3
AREA PHOTOGRAPHS A



WEST + SOUTH ELEVATIONS



NORTH + WEST ELEVATIONS

FIGURE 1-4
AREA PHOTOGRAPHS B

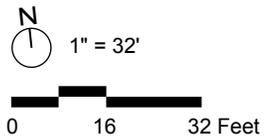
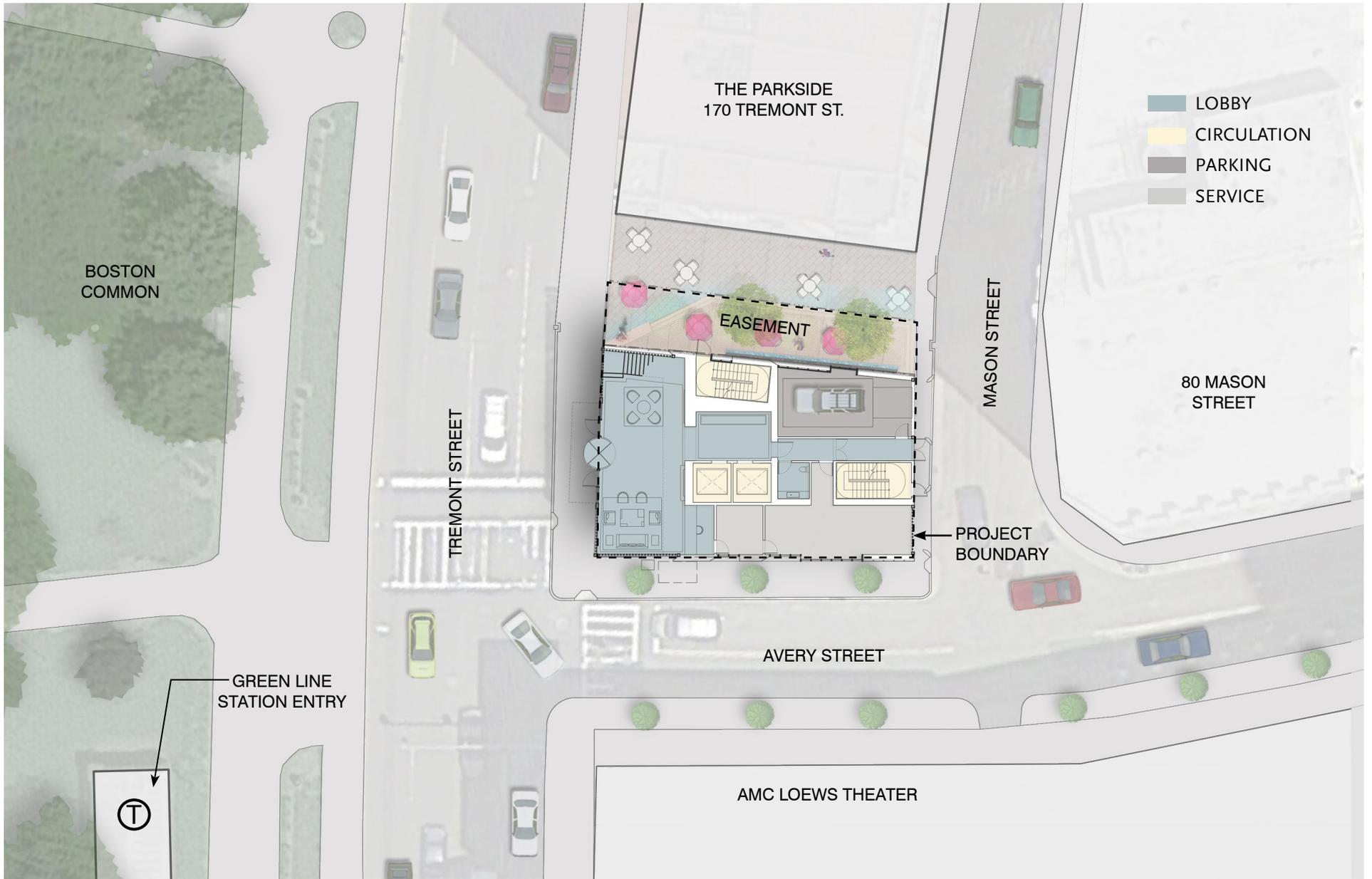


FIGURE 1-5
PROPOSED SITE PLAN



FIGURE 1-6
PROPOSED PROJECT RENDERING - AERIAL VIEW FROM BOSTON COMMON

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FIGURE 1-7
PROPOSED PROJECT RENDERING - GROUND LEVEL VIEW FROM BOSTON COMMON

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FIGURE 1-8
PROPOSED PROJECT RENDERING - AERIAL VIEW OF SOUTH FACADE



FIGURE 1-9
PROPOSED PROJECT RENDERING - AERIAL VIEW OF WEST FACADE

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FIGURE 1-10
PROPOSED PROJECT RENDERING - AERIAL VIEW OF EAST FACADE



FIGURE 1-11
MASSING DIAGRAM - VIEW TO NORTH



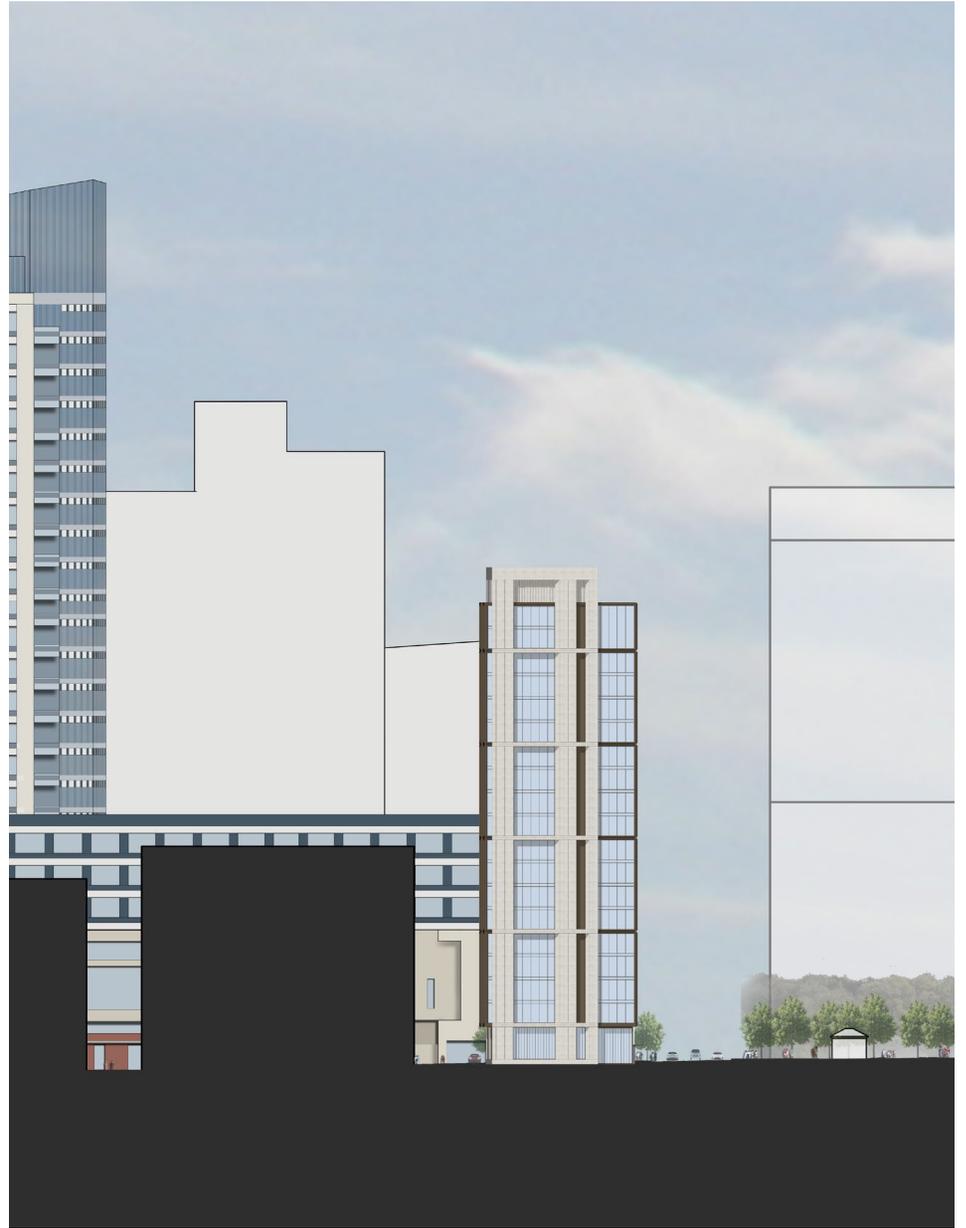
FIGURE 1-12
MASSING DIAGRAM - VIEW TO EAST

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EAST ELEVATION



NORTH ELEVATION

FIGURE 1-13
ELEVATION DIAGRAM - EAST AND NORTH



FIGURE 1-14
ELEVATION DIAGRAM - WEST

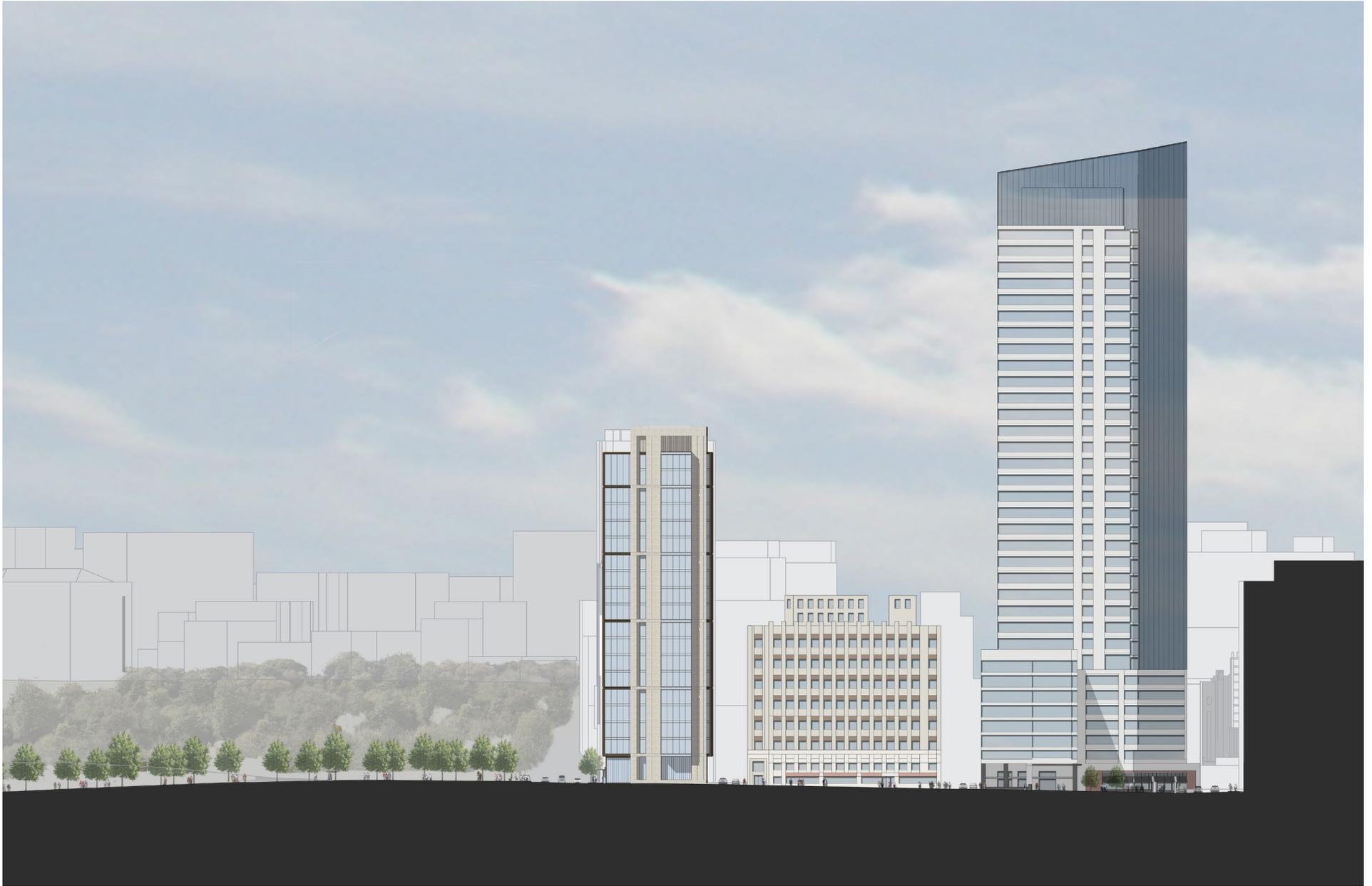


FIGURE 1-15
ELEVATION DIAGRAM - SOUTH

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- RESIDENTIAL
- LOBBY
- AMENITY
- CIRCULATION
- PARKING
- SERVICE
- ROOF

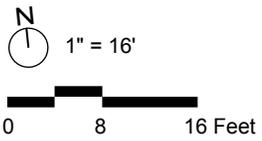
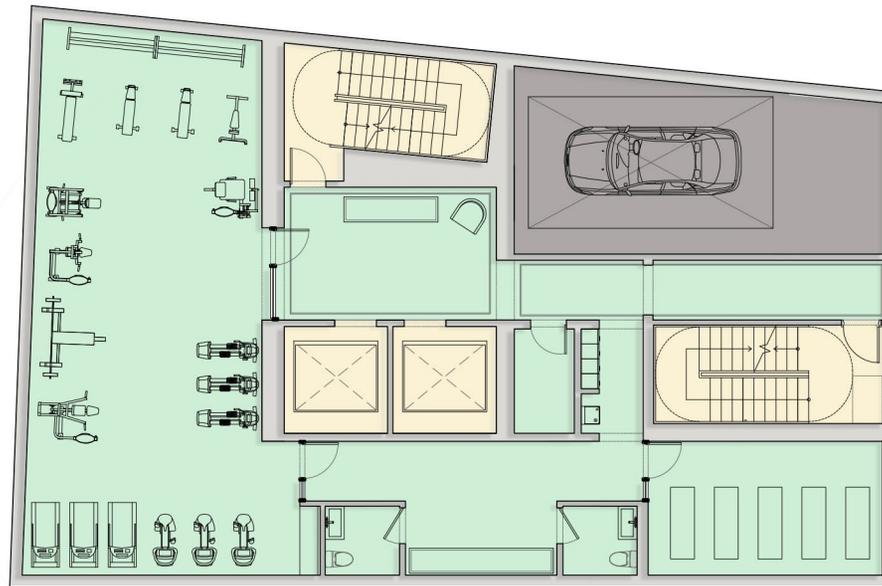


FIGURE 1-16
LEVEL B1 - GYM

- RESIDENTIAL
- LOBBY
- AMENITY
- CIRCULATION
- PARKING
- SERVICE
- ROOF

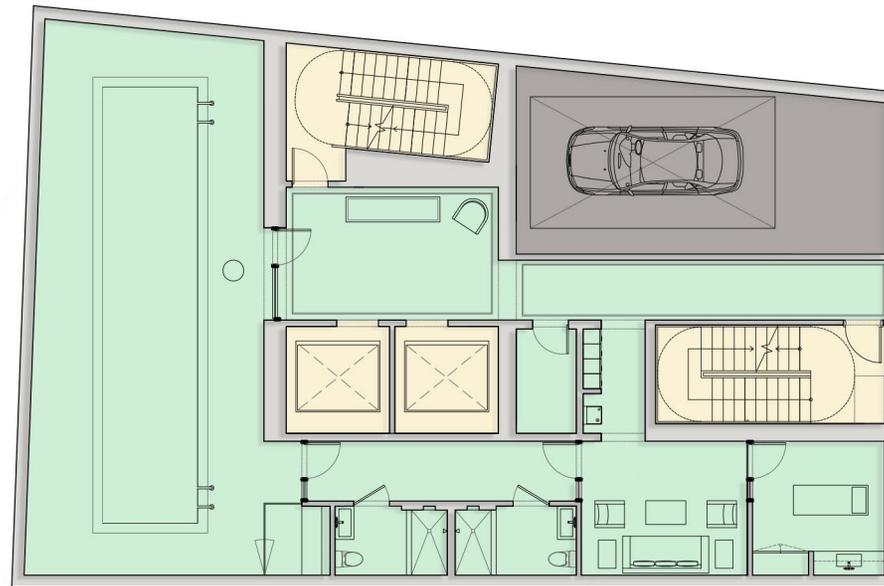
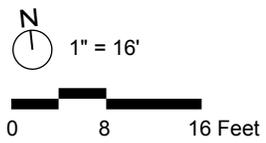


FIGURE 1-17
LEVEL B2 - POOL



- RESIDENTIAL
- LOBBY
- AMENITY
- CIRCULATION
- PARKING
- SERVICE
- ROOF

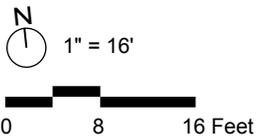
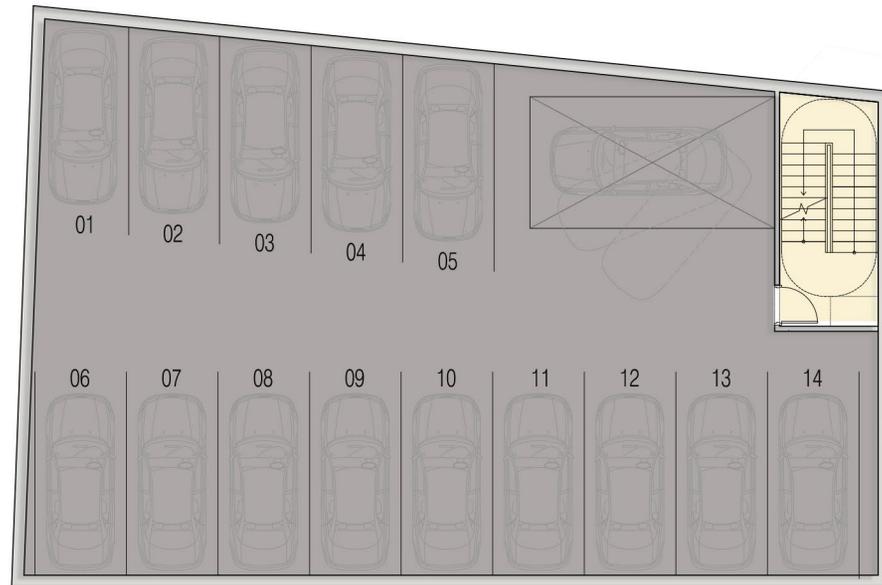


FIGURE 1-18
LEVEL P1/P2 PARKING

- RESIDENTIAL
- LOBBY
- AMENITY
- CIRCULATION
- PARKING
- SERVICE
- ROOF

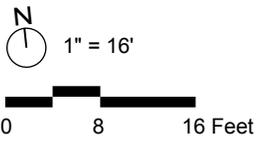
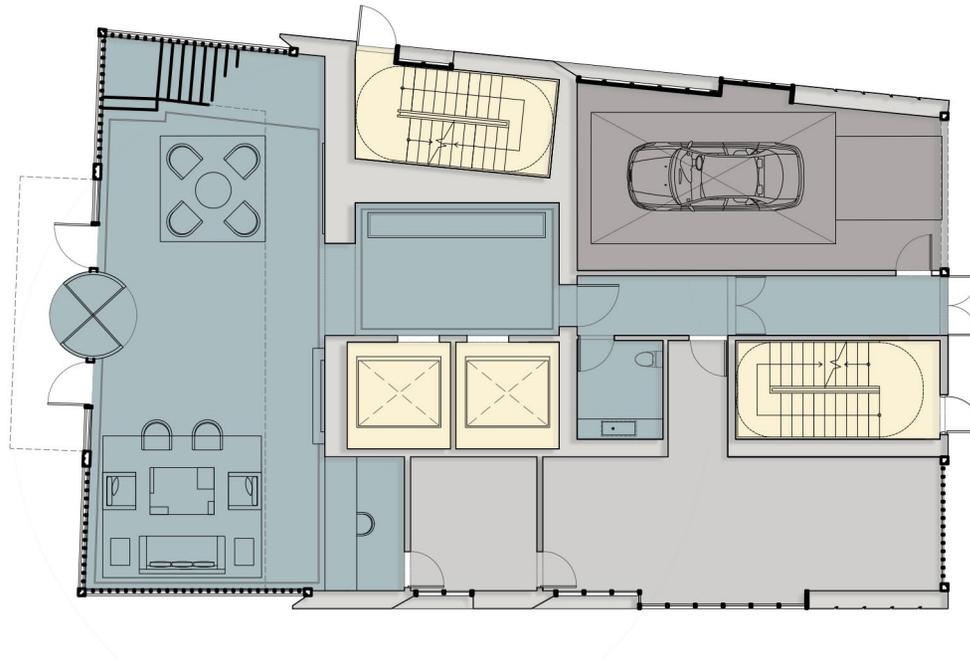


FIGURE 1-19
LEVEL 01 - LOBBY

- RESIDENTIAL
- LOBBY
- AMENITY
- CIRCULATION
- PARKING
- SERVICE
- ROOF

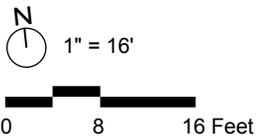
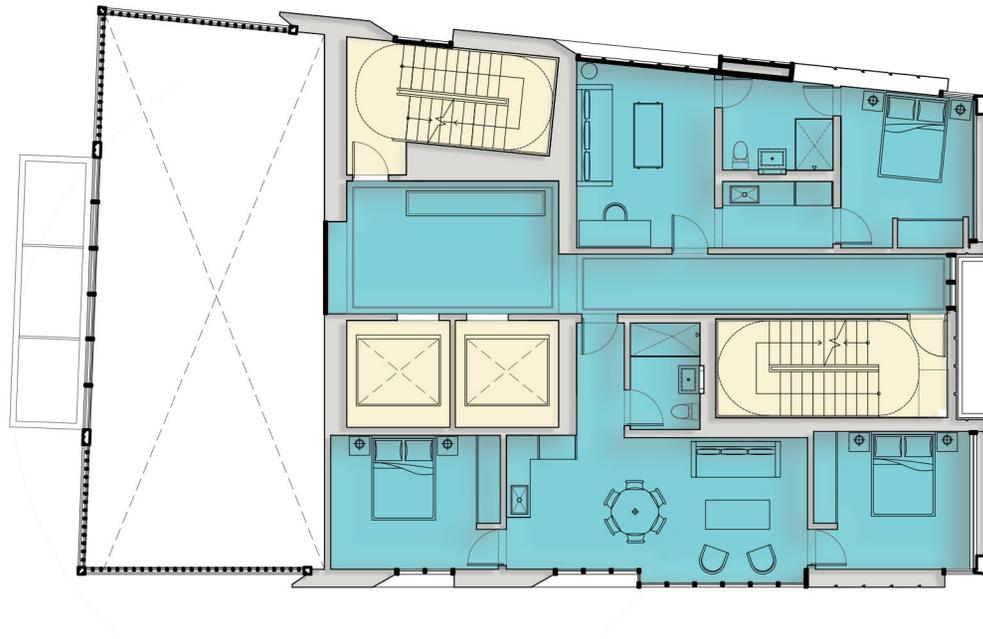


FIGURE 1-20
LEVEL 02 - PIED A TERRE

- RESIDENTIAL
- LOBBY
- AMENITY
- CIRCULATION
- PARKING
- SERVICE
- ROOF

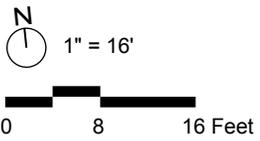
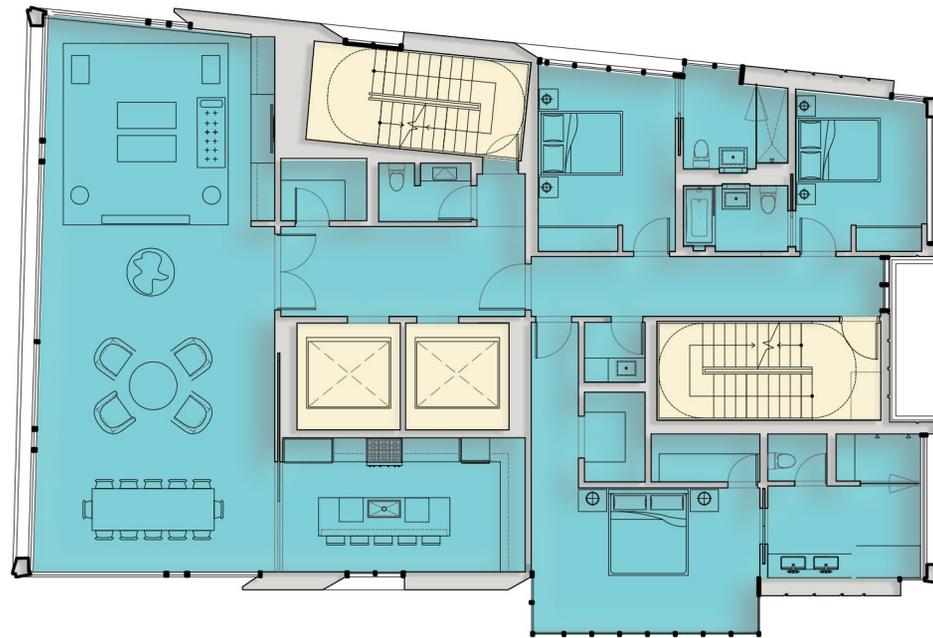


FIGURE 1-21
TYPICAL FLOOR PLAN LEVEL 03-18

- RESIDENTIAL
- LOBBY
- AMENITY
- CIRCULATION
- PARKING
- SERVICE
- ROOF

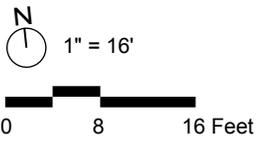
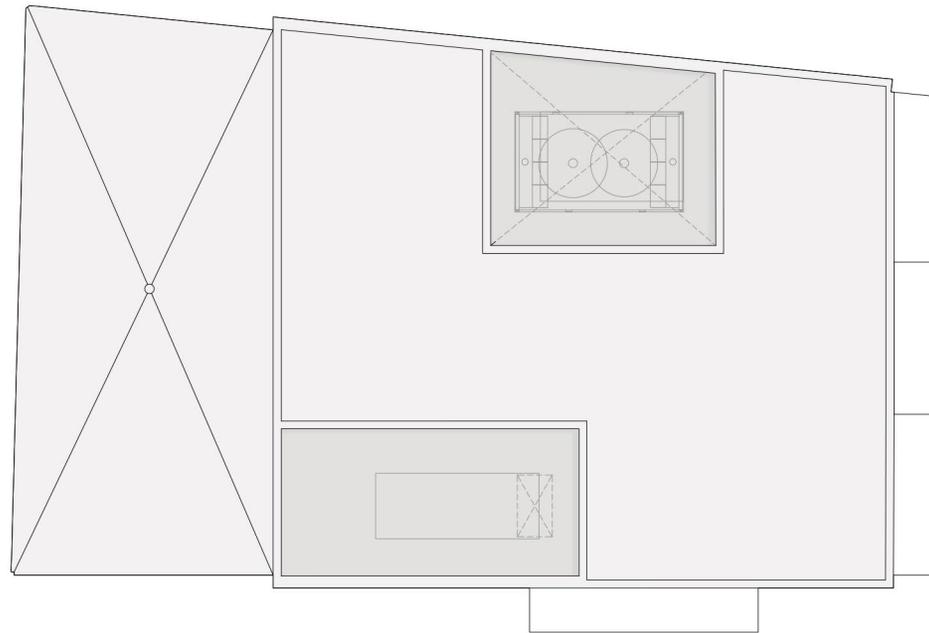


FIGURE 1-22
ROOF PLAN

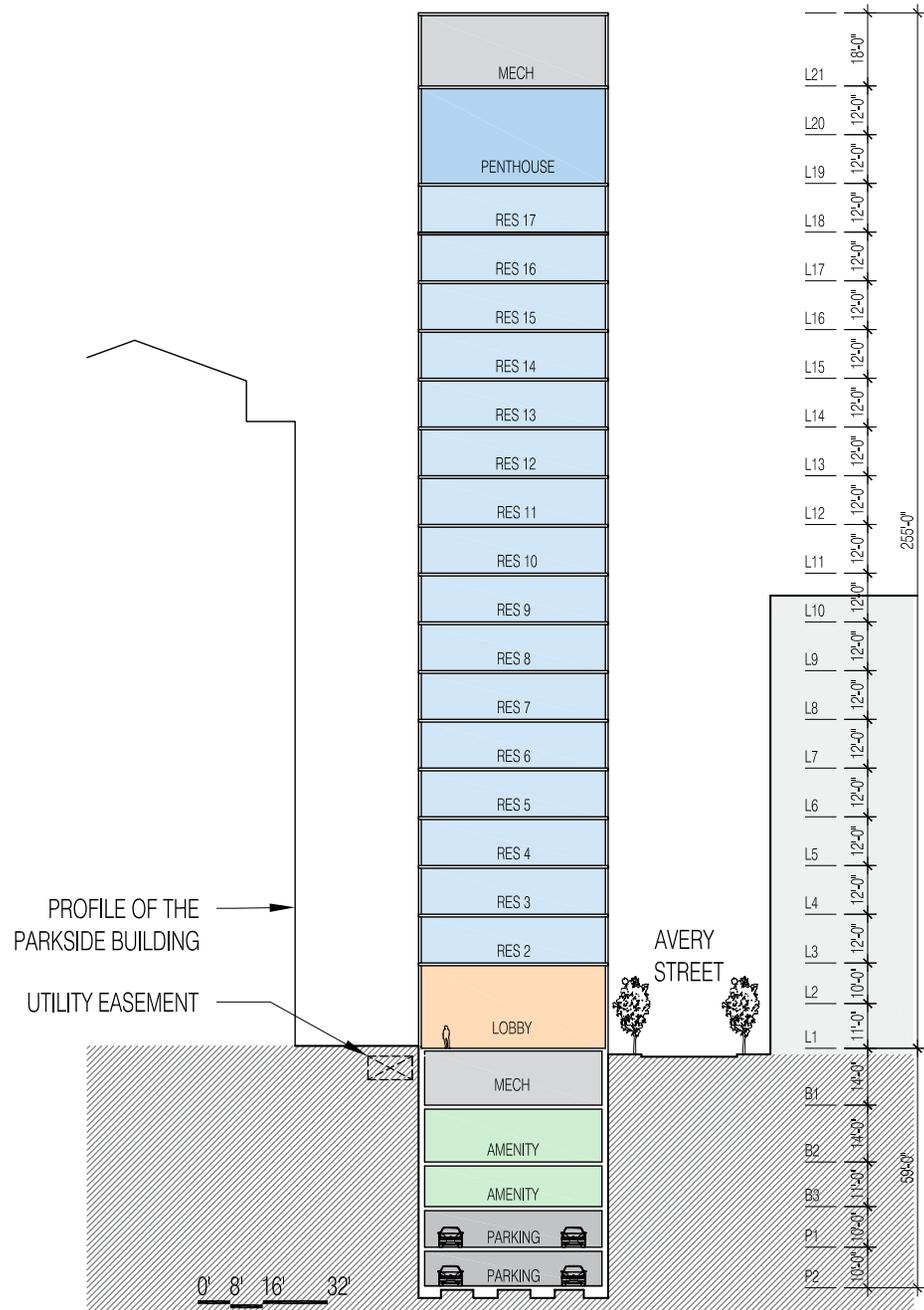
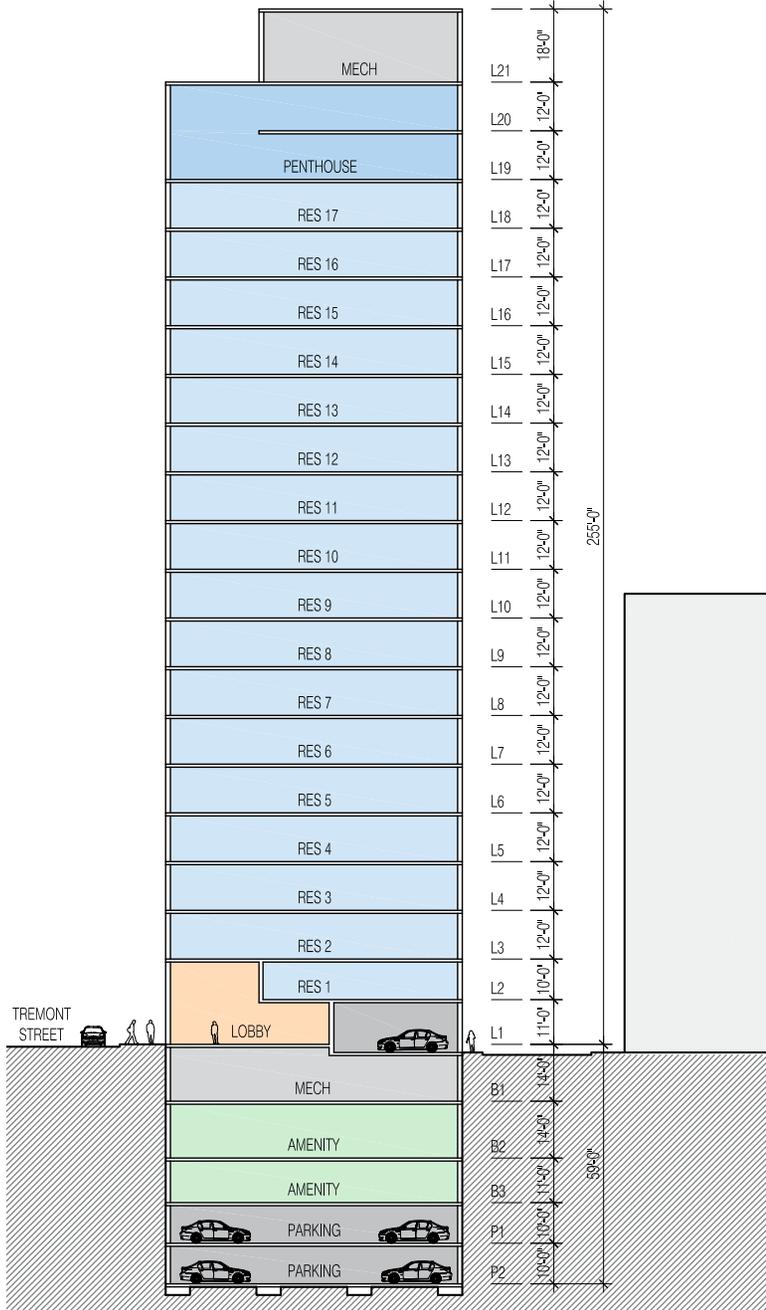


FIGURE 1-23
BUILDING SECTIONS



Raised Platform

Movable Furniture

Wood Deck

Water Wall

FIGURE 1-24
LANDSCAPE PLAN

mikyoung kim design

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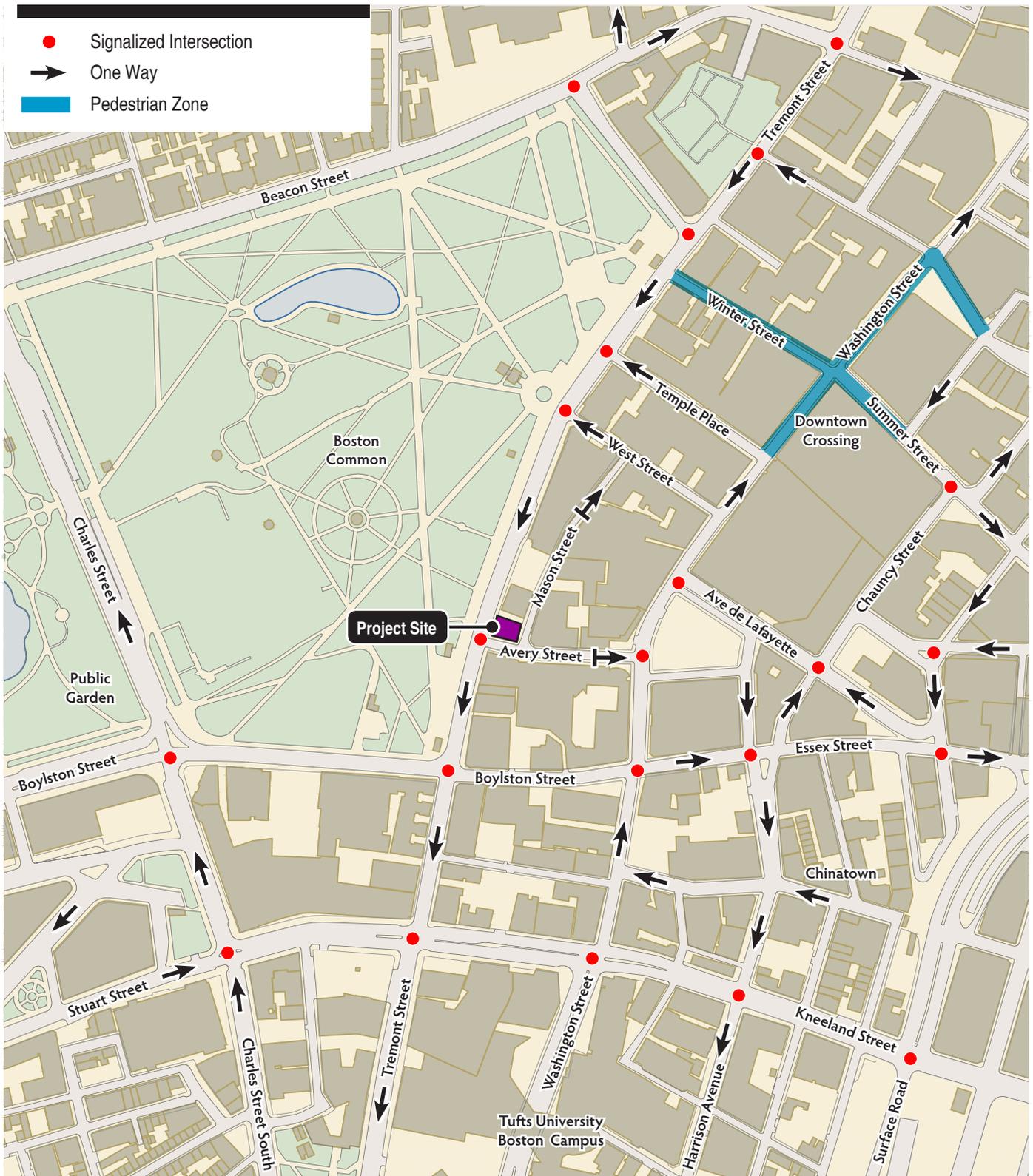


Figure 2-1
Roadway Network

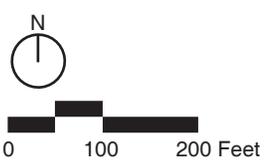
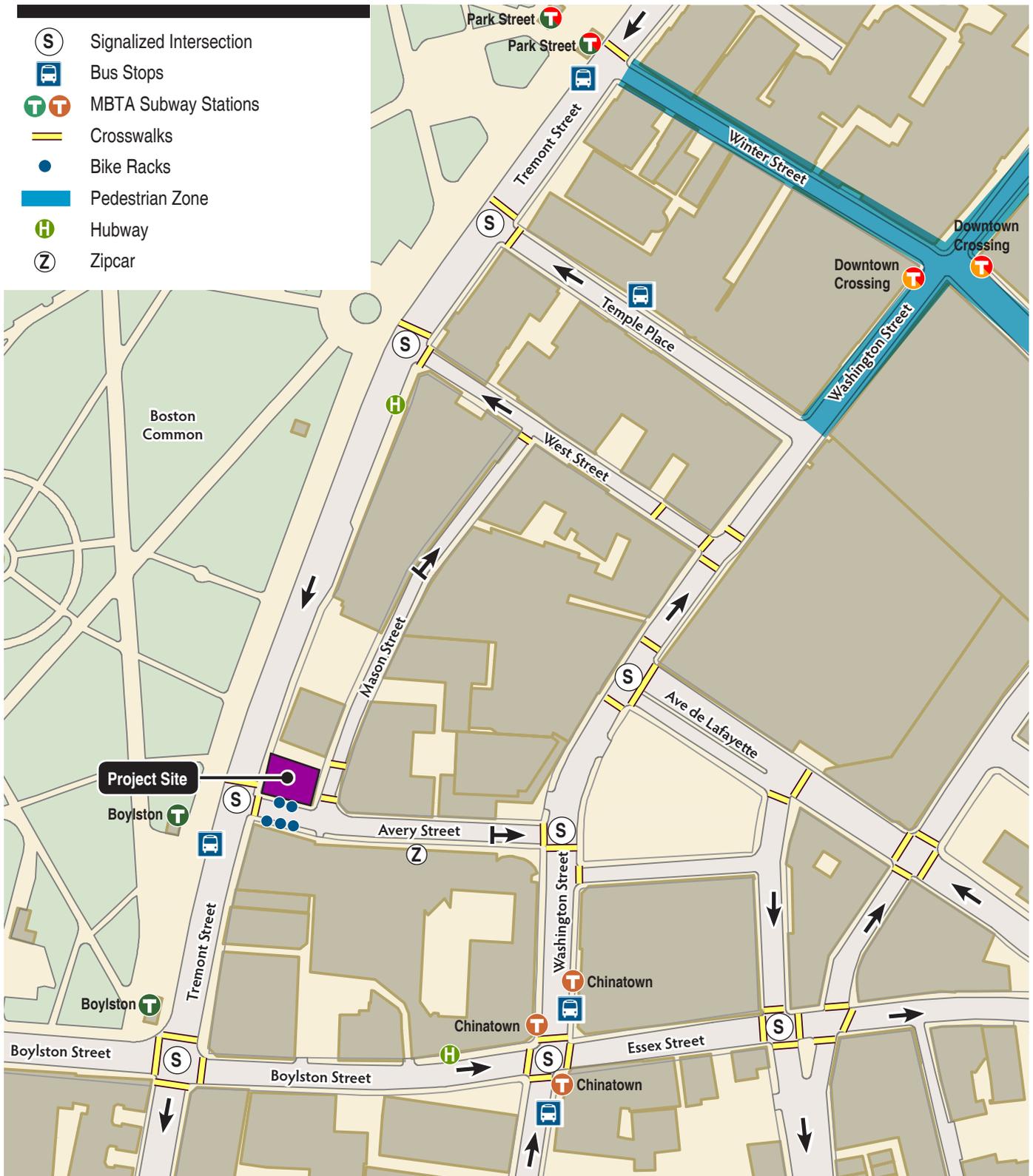


Figure 2-2
Existing Site Transportation Context

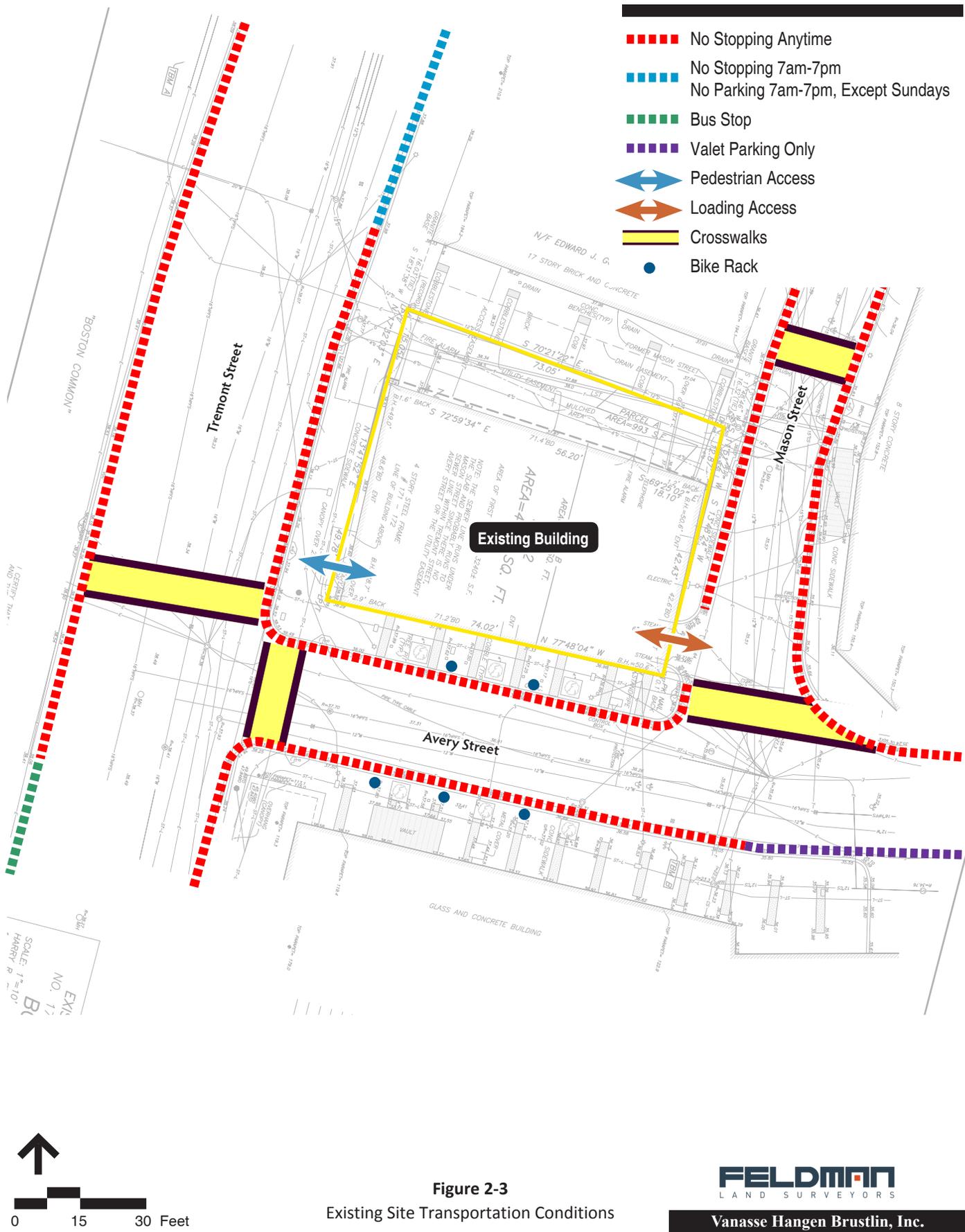




Figure 2-4
Public Transportation

-  Pedestrian Access
-  Loading Access
-  Garage Access
-  Project Site



SCALE: 1" = 10'
 HARRY P. B.
 NO. 17
 EXH. B

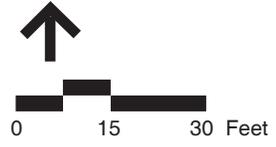


Figure 2-5
 Proposed Site Plan - Transportation

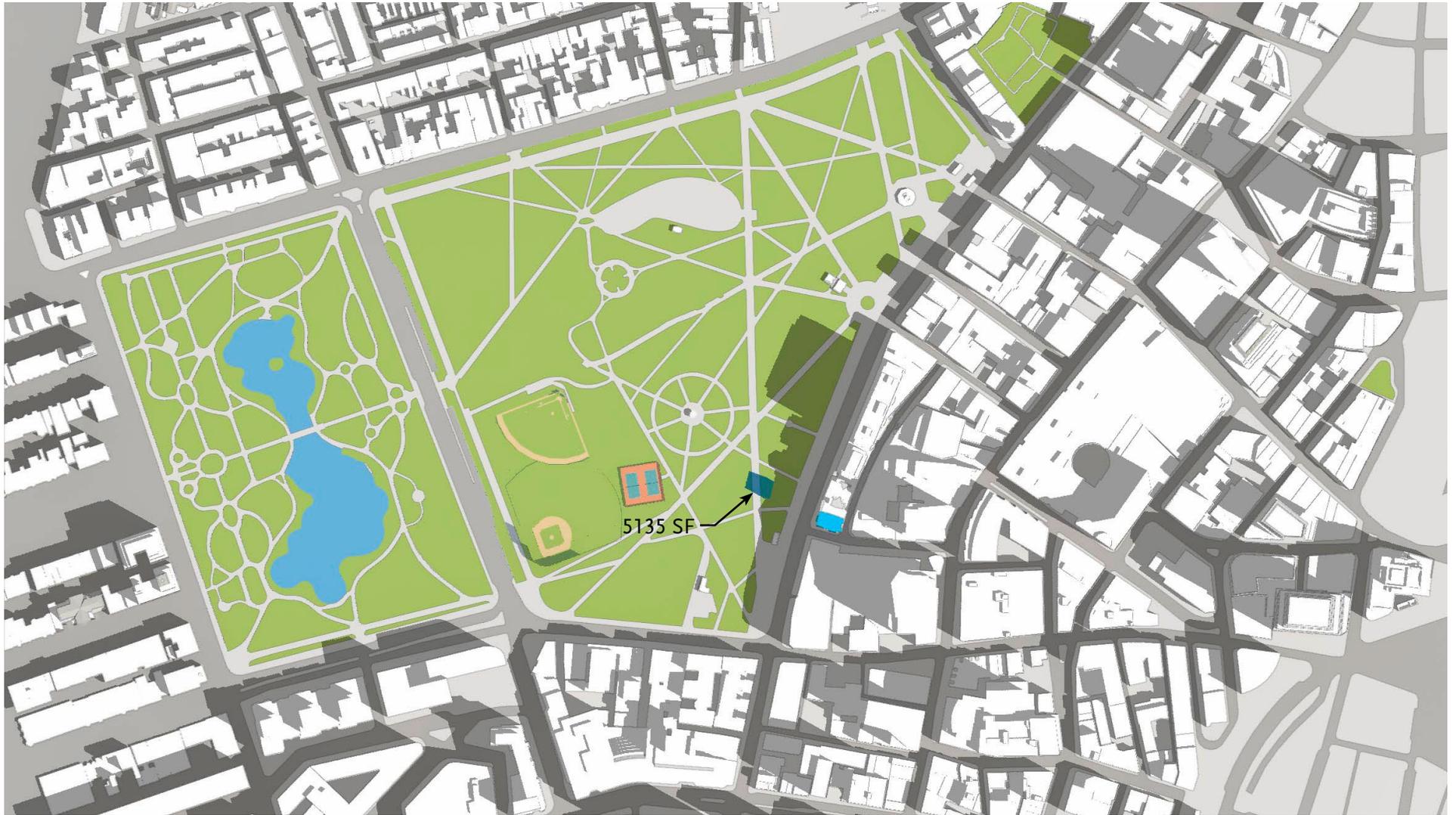


FIGURE 3-1

SHADOW STUDY - MOST IMPACTFUL ANALYSIS PERIOD - AUGUST 21, 10:00 AM

ELKUS | MANFREDI
ARCHITECTS

Vanasse Hangen Brustlin, Inc.

Appendix A

Leed Score Card

BRA Preparedness and Resiliency Checklist

BRA Accessibility Checklist



LEED 2009 for New Construction and Major Renovations

Project Checklist

Project Name: 171 Tremont Street

Date: July 14, 2015

16 2 8 Sustainable Sites Possible Points: 26

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

5 3 2 Water Efficiency Possible Points: 10

Y	?	N			
Y			Prereq 1	Water Use Reduction—20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
3	1		Credit 3	Water Use Reduction	2 to 4

4 21 10 Energy and Atmosphere Possible Points: 35

Y	?	N			
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
4	15		Credit 1	Optimize Energy Performance	1 to 19
		7	Credit 2	On-Site Renewable Energy	1 to 7
	2		Credit 3	Enhanced Commissioning	2
	2		Credit 4	Enhanced Refrigerant Management	2
		3	Credit 5	Measurement and Verification	3
	2		Credit 6	Green Power	2

4 4 7 Materials and Resources Possible Points: 14

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

Materials and Resources, Continued

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

10 4 1 Indoor Environmental Quality Possible Points: 15

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

2 4 Innovation and Design Process Possible Points: 6

Y	?	N			
	1		Credit 1.1	Innovation in Design: Exemplary Performance	1
1			Credit 1.2	Innovation in Design: Tenant Guidelines	1
	1		Credit 1.3	Innovation in Design: Green Education	1
	1		Credit 1.4	Innovation in Design: TBD	1
	1		Credit 1.5	Innovation in Design: TBD	1
1			Credit 2	LEED Accredited Professional	1

1 3 Regional Priority Credits Possible Points: 4

Y	?	N			
	1		Credit 1.1	Regional Priority: SSc7.1	1
	1		Credit 1.2	Regional Priority: SSc3	1
1			Credit 1.3	Regional Priority: SSc7.2	1
	1		Credit 1.4	Regional Priority: SSc6.1	1

42 41 28 Total Possible Points: 110

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

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at <http://www.cityofboston.gov/climate>

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (<http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/>)
3. Army Corps of Engineers guidance on sea level rise (<http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf>)
4. Proceeding of the National Academy of Science, "Global sea level rise linked to global temperature", Vermeer and Rahmstorf, 2009 (<http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf>)
5. "Hotspot of accelerated sea-level rise on the Atlantic coast of North America", Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 ([http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf](http://www.bostonredevelopmentauthority.org/planning/Hotspot%20of%20Accelerated%20Sea-level%20Rise%202012.pdf))
6. "Building Resilience in Boston": Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 (http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf)

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond "Yes" to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current [Climate Change Preparedness & Resiliency Checklist](#).

Climate Change Resiliency and Preparedness Checklist

A.1 - Project Information

Project Name:	171 Tremont Street
Project Address Primary:	171 Tremont Street, Boston, MA 02111
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	David Raftery/Developer/ David Raftery Inc./ davidraftery@comcast.net/ 781-708-9556

A.2 - Team Description

Owner / Developer:	171 Tremont Street, LLC
Architect:	Elkus Manfredi Architects
Engineer (building systems):	TBD
Sustainability / LEED:	TBD
Permitting:	VHB
Construction Management:	TBD
Climate Change Expert:	TBD

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

PNF / Expanded PNF Submission	Draft / Final Project Impact Report Submission	BRA Board Approved	Notice of Project Change
Planned Development Area	BRA Final Design Approved	Under Construction	Construction just completed:

A.4 - Building Classification and Description

List the principal Building Uses:	Residential
List the First Floor Uses:	Lobby, Garage Entry, Loading

What is the principal Construction Type – select most appropriate type?

Wood Frame	Masonry	Steel Frame	Concrete
------------	---------	-------------	----------

Describe the building?

Site Area:	4,438 SF	Building Area:	85,385 SF
Building Height:	237 Ft.	Number of Stories:	20 Flrs.
First Floor Elevation (reference Boston City Base):	39 Elev.	Are there below grade spaces/levels, if yes how many:	5 Levels

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:	New Construction	Core & Shell	Healthcare	Schools
	Retail	Homes Midrise	Homes	Other
Select LEED Outcome:	Certified	Silver	Gold	Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	Yes / No	Certified:	Yes / No
	TBD		TBD

A.6 - Building Energy

What are the base and peak operating energy loads for the building?

Electric:	TBD (kW)	Heating:	TBD (MMBtu/hr)
What is the planned building Energy Use Intensity:	TBD (kbut/SF or kWh/SF)	Cooling:	TBD (Tons/hr)

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	TBD (kW)	Heating:	TBD (MMBtu/hr)
		Cooling:	TBD (Tons/hr)

What is nature and source of your back-up / emergency generators?

Electrical Generation:	TBD (kW)	Fuel Source:	TBD
System Type and Number of Units:	Combustion Engine	Gas Turbine	Combine Heat and Power
			TBD (Units)

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 - Analysis

What is the full expected life of the project?

Select most appropriate:	10 Years	25 Years	50 Years	75 Years
--------------------------	----------	----------	-----------------	----------

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:	10 Years	25 Years	50 Years	75 Years
--------------------------	----------	----------	-----------------	----------

What time span of future Climate Conditions was considered?

Select most appropriate:	10 Years	25 Years	50 Years	75 Years
--------------------------	----------	----------	-----------------	----------

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

0/95 Deg.

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

100 Deg.	5 Days	5 Events / yr.
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What Drought characteristics will be used for project planning – Duration and Frequency?

30 Days	1 Events / yr.
---------	----------------

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

44 Inches / yr.	TBD Inches	TBD Events / yr.
-----------------	------------	------------------

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

TBD Peak Wind	TBD Hours	TBD Events / yr.
---------------	-----------	------------------

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:

TBD %

How is performance determined:

TBD

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

Select all appropriate:

High performance building envelop	High performance lighting & controls	Building day lighting	EnergyStar equip. / appliances
High performance HVAC equipment	Energy recovery ventilation	No active cooling	No active heating

Describe any added measures:

TBD

What are the insulation (R) values for building envelop elements?

Roof:	R = TBD	Walls / Curtain Wall Assembly:	R = TBD
Foundation:	R = TBD	Basement / Slab:	R = TBD
Windows:	R = TBD / U =	Doors:	R = TBD / U =

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

On-site clean energy / CHP system(s)	Building-wide power dimming	Thermal energy storage systems	Ground source heat pump
On-site Solar PV	On-site Solar Thermal	Wind power	None

Describe any added measures:

TBD

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems? **TBD**

Select all appropriate:

Connected to local distributed electrical	Building will be Smart Grid ready	Connected to distributed steam, hot, chilled water	Distributed thermal energy ready
---	-----------------------------------	--	----------------------------------

Will the building remain operable without utility power for an extended period?

	<i>Yes / No</i>		If yes, for how long:	3 Days
If Yes, is building "Islandable?"	<i>TBD</i>			
If Yes, describe strategies:				

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

Select all appropriate:

Solar oriented – longer south walls	Prevailing winds oriented	External shading devices	Tuned glazing,
Building cool zones	Operable windows	Natural ventilation	Building shading
Potable water for drinking / food preparation	Potable water for sinks / sanitary systems	Waste water storage capacity	High Performance Building Envelop
Describe any added measures: <i>TBD</i>			

What measures will the project employ to reduce urban heat-island effect?

Select all appropriate:

High reflective paving materials	Shade trees & shrubs	High reflective roof materials	Vegetated roofs
Describe other strategies: <i>TBD</i>			

What measures will the project employ to accommodate rain events and more rain fall?

Select all appropriate:

On-site retention systems & ponds	Infiltration galleries & areas	vegetated water capture systems	Vegetated roofs
Describe other strategies: <i>TBD</i>			

What measures will the project employ to accommodate extreme storm events and high winds?

Select all appropriate:

Hardened building structure & elements	Buried utilities & hardened infrastructure	Hazard removal & protective landscapes	Soft & permeable surfaces (water infiltration)
Describe other strategies: <i>TBD</i>			

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

<i>Yes / No</i>

Describe site conditions?

Site Elevation – Low/High Points:

<i>Boston City Base 39 Elev.(Ft.)</i>
--

Building Proximity to Water:

Is the site or building located in any of the following?

Coastal Zone:

Velocity Zone:

Flood Zone:

Area Prone to Flooding:

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs:

Future floodplain delineation updates:

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. Otherwise you have completed the questionnaire; thank you!

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise:

Frequency of storms:

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:

First Floor Elevation:

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

If Yes, to what elevation

If Yes, describe:

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

Systems located above 1 st Floor.	Water tight utility conduits	Waste water back flow prevention	Storm water back flow prevention
--	------------------------------	----------------------------------	----------------------------------

Were the differing effects of fresh water and salt water flooding considered:

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

If yes, to what height above 100 Year Floodplain:

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

Yes / No

If Yes, describe:

--

Will the building remain occupiable without utility power during an extended period of inundation:

Yes / No

If Yes, for how long:

days

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

--

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:

Yes / No	Hardened / Resilient Ground Floor Construction	Temporary shutters and or barricades	Resilient site design, materials and construction
----------	--	--------------------------------------	---

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:

Yes / No	Surrounding site elevation can be raised	Building ground floor can be raised	Construction been engineered
----------	--	-------------------------------------	------------------------------

Describe additional strategies:

--

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:

Yes / No	Solar PV	Solar Thermal	Clean Energy / CHP System(s)
	Potable water storage	Wastewater storage	Back up energy systems & fuel

Describe any specific or additional strategies:

--

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

Accessibility Checklist

(to be added to the BRA Development Review Guidelines)

In 2009, a nine-member Advisory Board was appointed to the Commission for Persons with Disabilities in an effort to reduce architectural, procedural, attitudinal, and communication barriers affecting persons with disabilities in the City of Boston. These efforts were instituted to work toward creating universal access in the built environment.

In line with these priorities, the Accessibility Checklist aims to support the inclusion of people with disabilities. In order to complete the Checklist, you must provide specific detail, including descriptions, diagrams and data, of the universal access elements that will ensure all individuals have an equal experience that includes full participation in the built environment throughout the proposed buildings and open space.

In conformance with this directive, all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding the following:

- improvements for pedestrian and vehicular circulation and access;
- encourage new buildings and public spaces to be designed to enhance and preserve Boston's system of parks, squares, walkways, and active shopping streets;
- ensure that persons with disabilities have full access to buildings open to the public;
- afford such persons the educational, employment, and recreational opportunities available to all citizens; and
- preserve and increase the supply of living space accessible to persons with disabilities.

We would like to thank you in advance for your time and effort in advancing best practices and progressive approaches to expand accessibility throughout Boston's built environment.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
 - a. http://www.ada.gov/2010ADASTandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
 - a. <http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html>
3. Boston Complete Street Guidelines
 - a. <http://bostoncompletestreets.org/>
4. City of Boston Mayors Commission for Persons with Disabilities Advisory Board
 - a. <http://www.cityofboston.gov/Disability>
5. City of Boston – Public Works Sidewalk Reconstruction Policy
 - a. http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
6. Massachusetts Office On Disability Accessible Parking Requirements
 - a. www.mass.gov/anf/docs/mod/hp-parking-regulations-mod.doc
7. MBTA Fixed Route Accessible Transit Stations
 - a. http://www.mbta.com/about_the_mbta/accessibility/

Article 80 | ACCESSIBILITY CHECKLIST

Project Information

Project Name:	171 Tremont Street
Project Address Primary:	171-172 Tremont Street, Boston, MA
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Elizabeth Grob/Director of Urban Permitting Services/VHB/egrob@vhb.com/617-607-2942

Team Description

Owner / Developer:	171 Tremont Street, LLC
Architect:	Elkus Manfredi Architects
Engineer (building systems):	TBD
Sustainability / LEED:	TBD
Permitting:	VHB
Construction Management:	TBD

Project Permitting and Phase

At what phase is the project – at time of this questionnaire?

PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BRA Board Approved
BRA Design Approved	Under Construction	Construction just completed:

Article 80 | ACCESSIBILITY CHECKLIST

Building Classification and Description

What are the principal Building Uses - select all appropriate uses?

Residential – One to Three Unit	Residential - Multi-unit, Four +	Institutional	Education
Commercial	Office	Retail	Assembly
Laboratory / Medical	Manufacturing / Industrial	Mercantile	Storage, Utility and Other
Lobby, Garage Entry, Loading			

First Floor Uses (List)

What is the Construction Type – select most appropriate type?

Wood Frame	Masonry	Steel Frame	Concrete
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Describe the building?

Site Area:	4,438 SF	Building Area:	85,385 SF
Building Height:	237 Ft.	Number of Stories:	20 Flrs.
First Floor Elevation:	39 Elev.	Are there below grade spaces:	Yes / No

Assessment of Existing Infrastructure for Accessibility:

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

Provide a description of the development neighborhood and identifying characteristics.

The project is located in the Midtown Cultural District adjacent to the Boston Common. The project site is surrounded by a mix of uses including residential, hotel, retail, education, and entertainment.

List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.

The project site is located across the street from the Boylston Green Line Station, a 2-minute walk from the Chinatown Orange Line Station, and a 5-minute walk from the Downtown Crossing Orange/Red Line station. Local bus routes 11, 43, and 53 are within a short walk from the site. The project is located approximately 0.5 miles from South Station, where commuter rail, Amtrak, and private bus carriers are available.

Article 80 | ACCESSIBILITY CHECKLIST

List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.

The project site is located approximately 0.2 miles from the Tufts Medical Center, and one block from Emerson College.

Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.

The project site is located within a half mile of the Emerson College Library, the State transportation Library, the Suffolk Law Library, the Hirsch Health Sciences Library, the Boston Athenaeum, the Congregation Library, the Boston Chinatown Neighborhood Center, and the Government Center complex.

Surrounding Site Conditions – Existing:

This section identifies the current condition of the sidewalks and pedestrian ramps around the development site.

Are there sidewalks and pedestrian ramps existing at the development site?

Yes.

If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.

There are continuous 12-foot sidewalks on both Tremont and Avery Streets fronting the project site. On the Mason Street frontage there are narrower sidewalks due to the street’s use as a service roadway. There is a wide pedestrian way between the project site and The Parkside residential building to the north.

Are the sidewalks and pedestrian ramps existing-to-remain? **If yes**, have the sidewalks and pedestrian ramps been verified as compliant? **If yes**, please provide surveyors report.

The existing sidewalks and pedestrian ramps are to be reconstructed to meet current code.

Is the development site within a historic district? **If yes**, please identify.

No.

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Typically, a five foot wide Pedestrian Zone supports two people walking

Article 80 | ACCESSIBILTY CHECKLIST

side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org

Yes.

If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.

Downtown Mixed-Use.

What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.

11 feet total. Frontage: 3 feet. Pedestrian: 6 feet. Furnishing: 2 feet.

List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way?

Concrete for all zones, consistent with current conditions.

If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?

N/A

Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?

No.

If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?

N/A

Article 80 | ACCESSIBILITY CHECKLIST

Proposed Accessible Parking:

See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability Handicap Parking Regulations.

What is the total number of parking spaces provided at the development site parking lot or garage?

28

What is the total number of accessible spaces provided at the development site?

An attended parking system is proposed. A mechanical elevator will be used to access the below-grade parking. All parking will be functionally accessible.

Will any on street accessible parking spaces be required? **If yes,** has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?

No

Where is accessible visitor parking located?

No visitor parking will be provided on-site.

Has a drop-off area been identified? **If yes,** will it be accessible?

There is no drop-off area.

Include a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations. Please include route distances.

N/A

Article 80 | ACCESSIBILITY CHECKLIST

Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to accommodate persons of all abilities that allow for universal access to entryways, common spaces and the visit-ability* of neighbors.

**Visit-ability – Neighbors ability to access and visit with neighbors without architectural barrier limitations*

Provide a diagram of the accessible route connections through the site.

N/A

Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.

All site access will be via the ground floor lobby. All units will be accessible by passenger elevator.

Are the accessible entrance and the standard entrance integrated?

Yes.

If no above, what is the reason?

Will there be a roof deck or outdoor courtyard space? **If yes**, include diagram of the accessible route.

Yes, there will be an at-grade public outdoor courtyard accessible via Tremont Street and Mason Street.

Has an accessible routes way-finding and signage package been developed? **If yes**, please describe.

N/A

Accessible Units: (If applicable)

In order to facilitate access to housing opportunities this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing choice.

What is the total number of proposed units for the development?

19

How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?

19 for-sale market rate.

How many accessible units are being proposed?

TBD

Article 80 | ACCESSIBILITY CHECKLIST

Please provide plan and diagram of the accessible units.

TBD

How many accessible units will also be affordable? If none, please describe reason.

None. The proponent will sign an Affordable Housing Agreement with the BRA to create off-site affordable housing opportunities for families in the City of Boston consistent with the City's Inclusionary Development Policy.

Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. **If yes,** please provide reason.

No

Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?

No

Did the Advisory Board vote to support this project? **If no,** what recommendations did the Advisory Board give to make this project more accessible?

N/A

Thank you for completing the Accessibility Checklist!

For questions or comments about this checklist or accessibility practices, please contact:

kathryn.quigley@boston.gov | Mayors Commission for Persons with Disabilities



Appendix B

Shadow Study

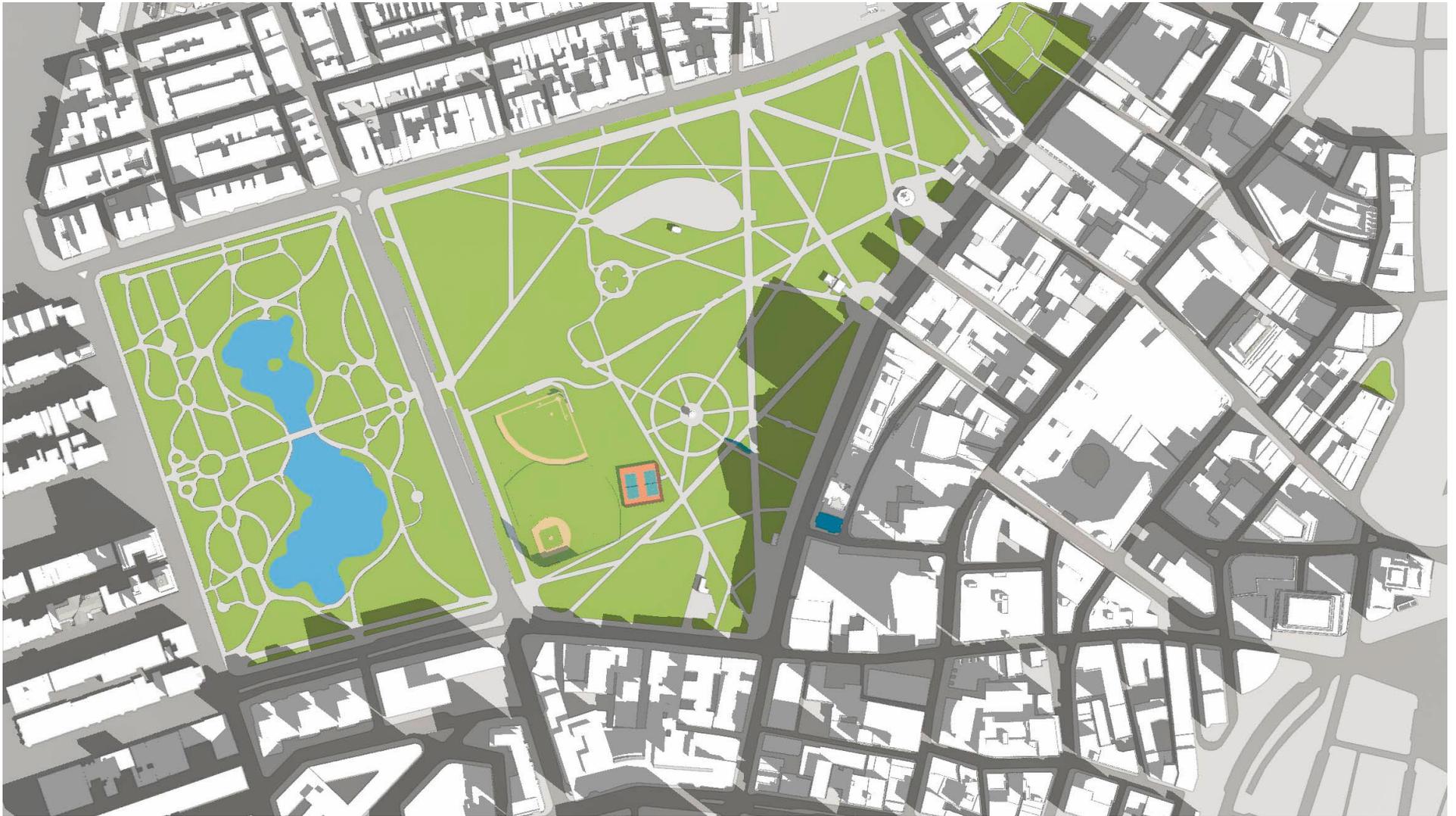


FIGURE B-1
SHADOW STUDY - MARCH 21, 9:00 AM

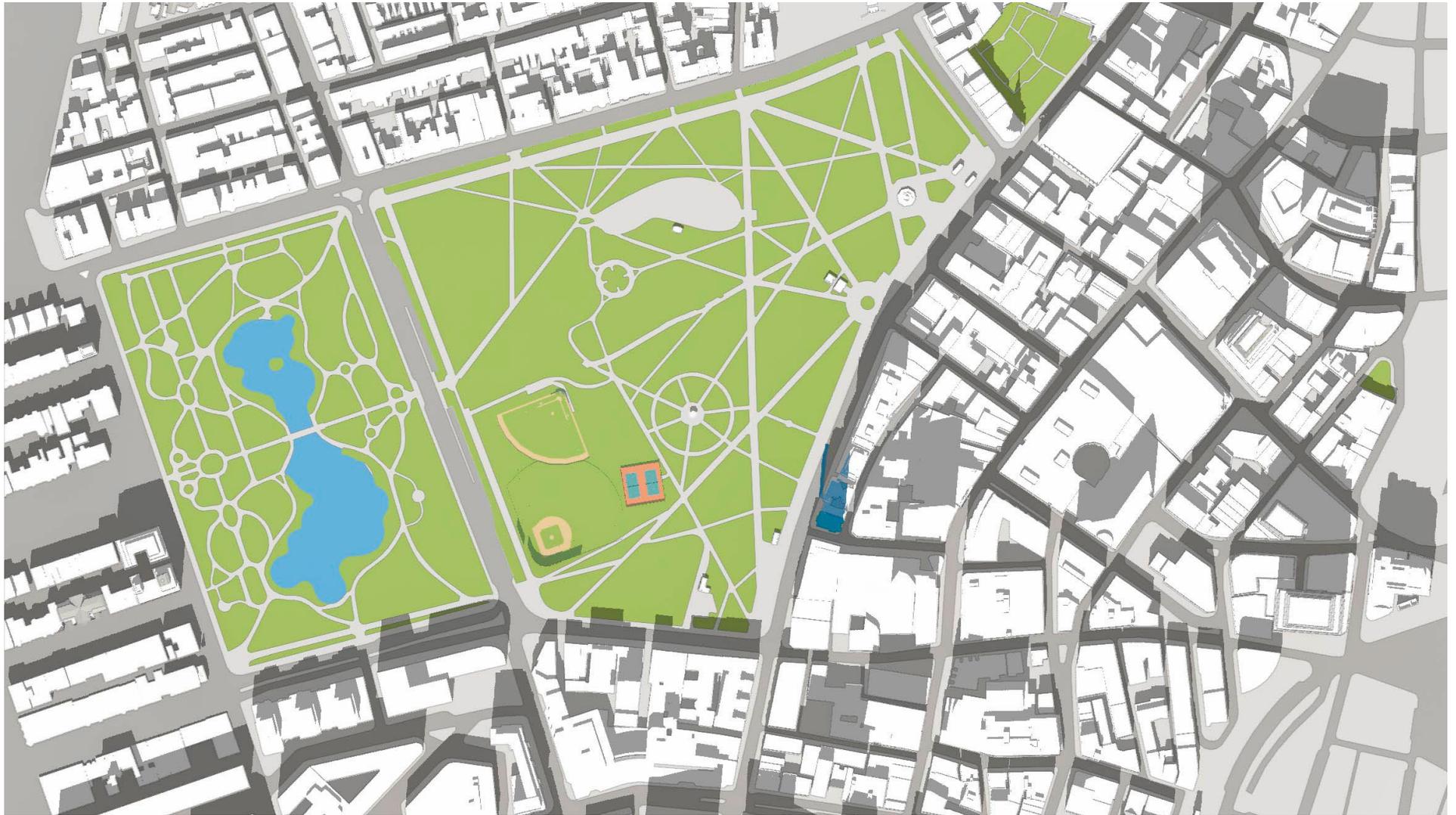


FIGURE B-2
SHADOW STUDY - MARCH 21, 12:00 PM

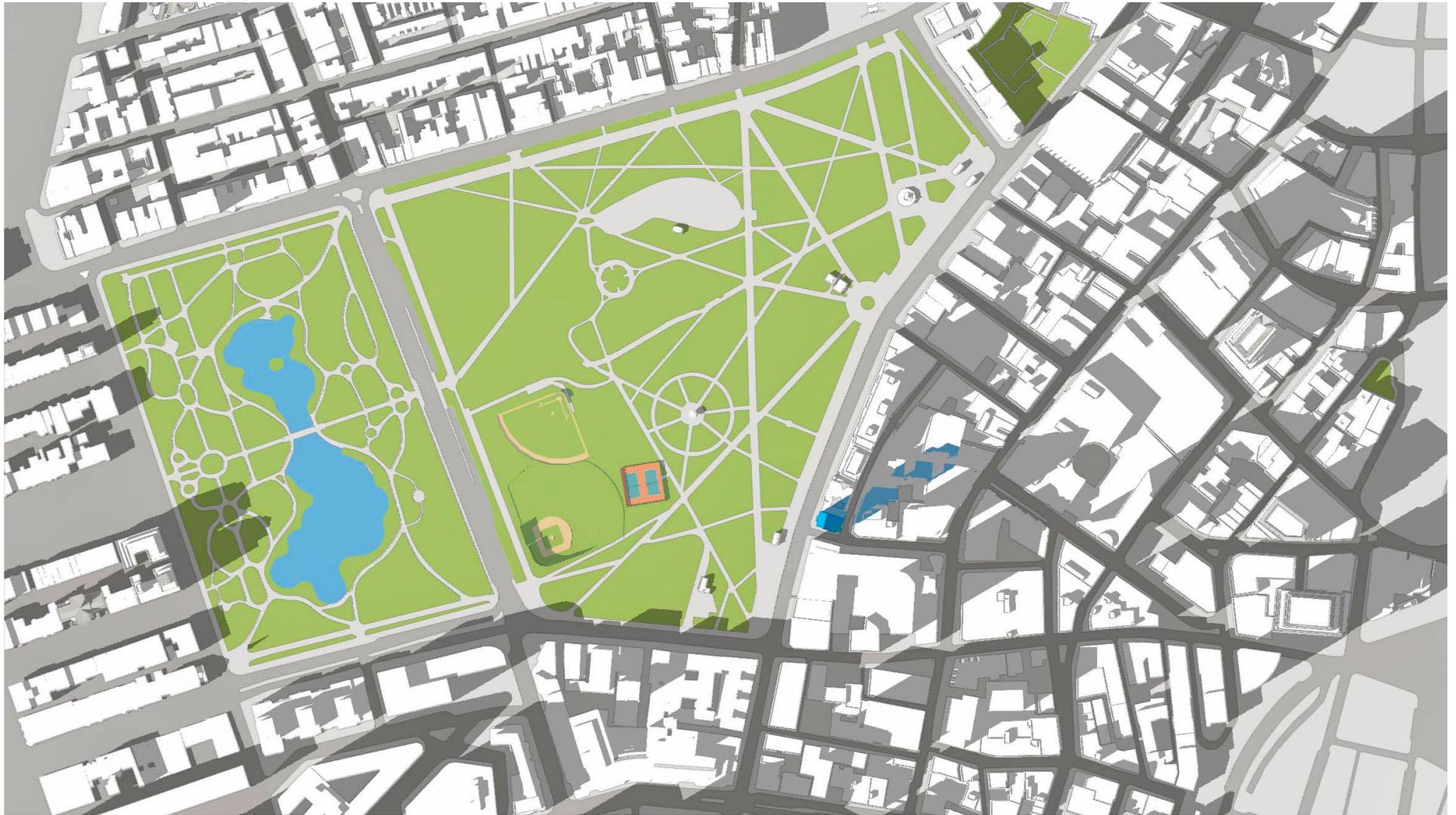


FIGURE B-3
SHADOW STUDY - MARCH 21, 3:00 PM

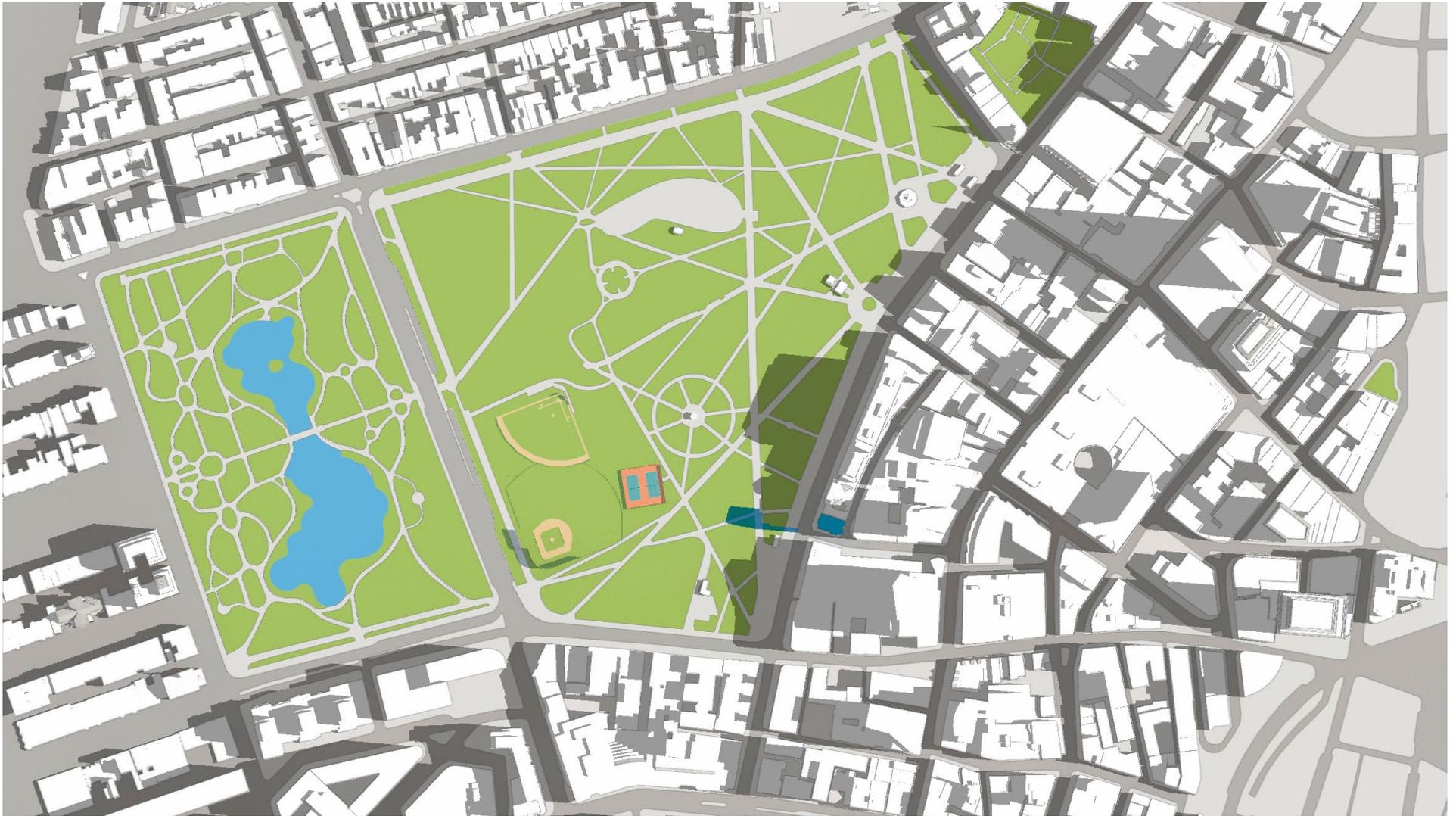


FIGURE B-4
SHADOW STUDY - JUNE 21, 9:00 AM

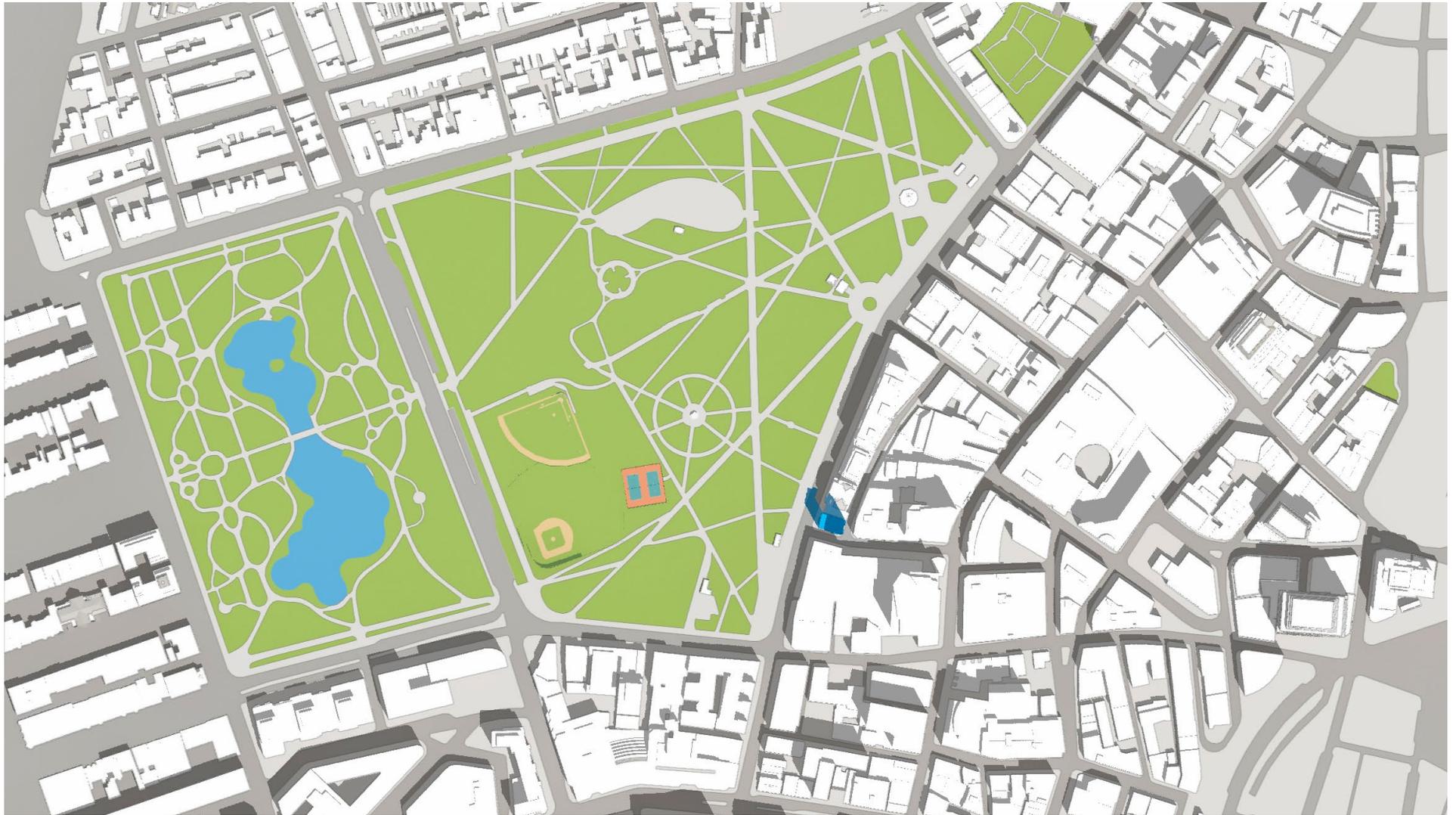


FIGURE B-5
SHADOW STUDY - JUNE 21, 12:00 PM

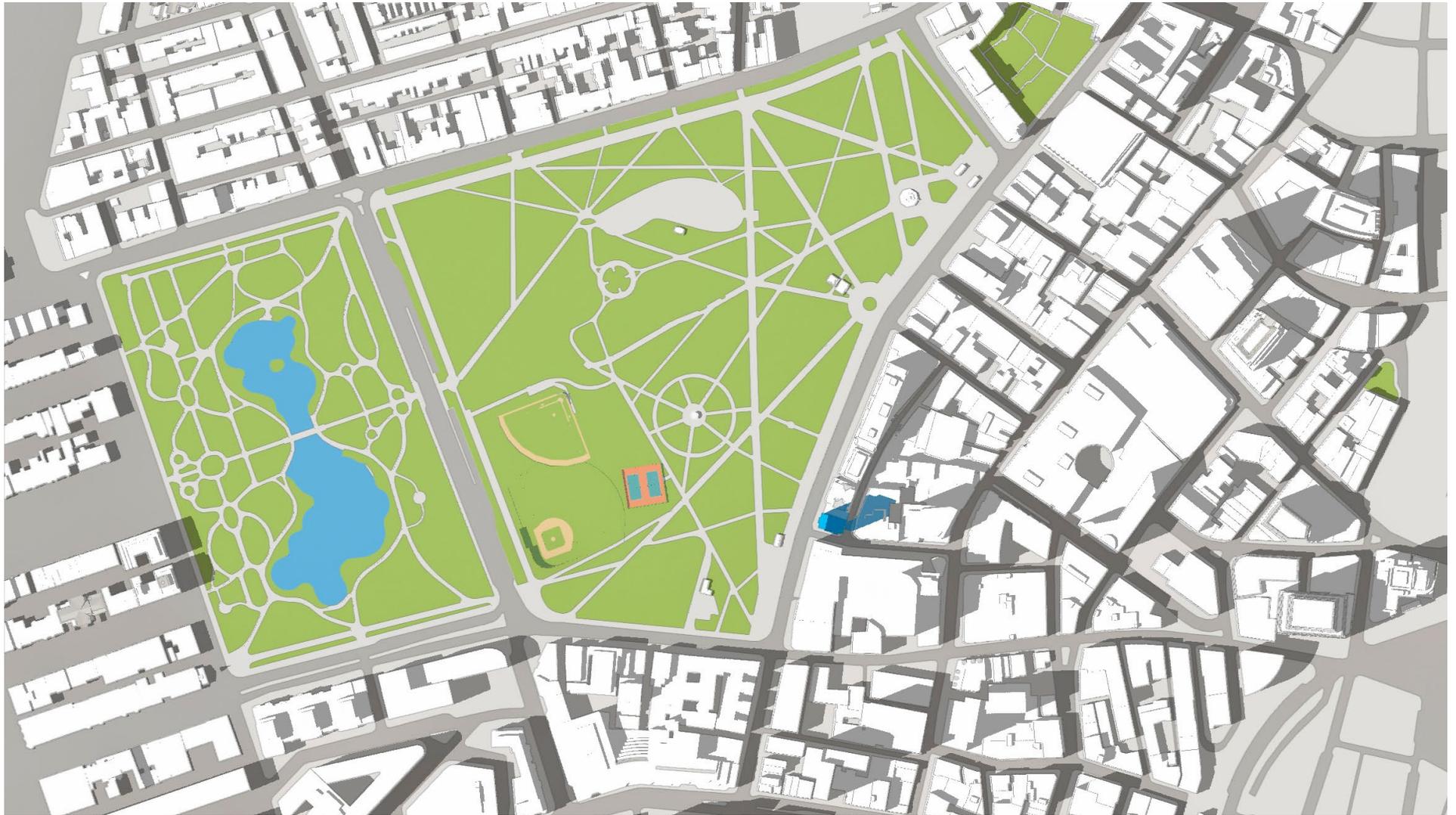


FIGURE B-6
SHADOW STUDY - JUNE 21, 3:00 PM



FIGURE B-7
SHADOW STUDY - JUNE 21, 6:00 PM



FIGURE B-8
SHADOW STUDY - SEPTEMBER 21, 9:00 AM

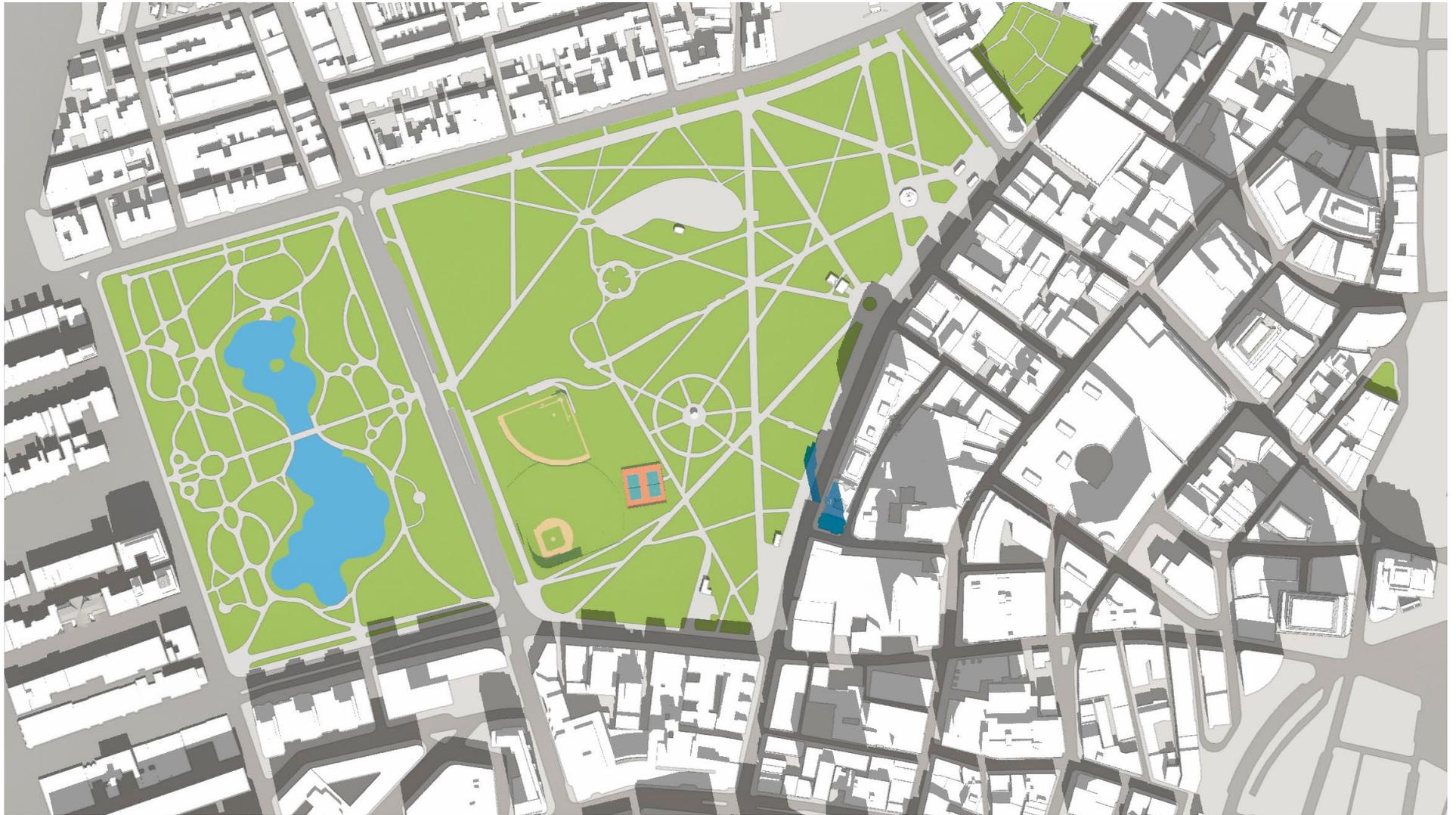


FIGURE B-9
SHADOW STUDY - SEPTEMBER 21, 12:00 PM

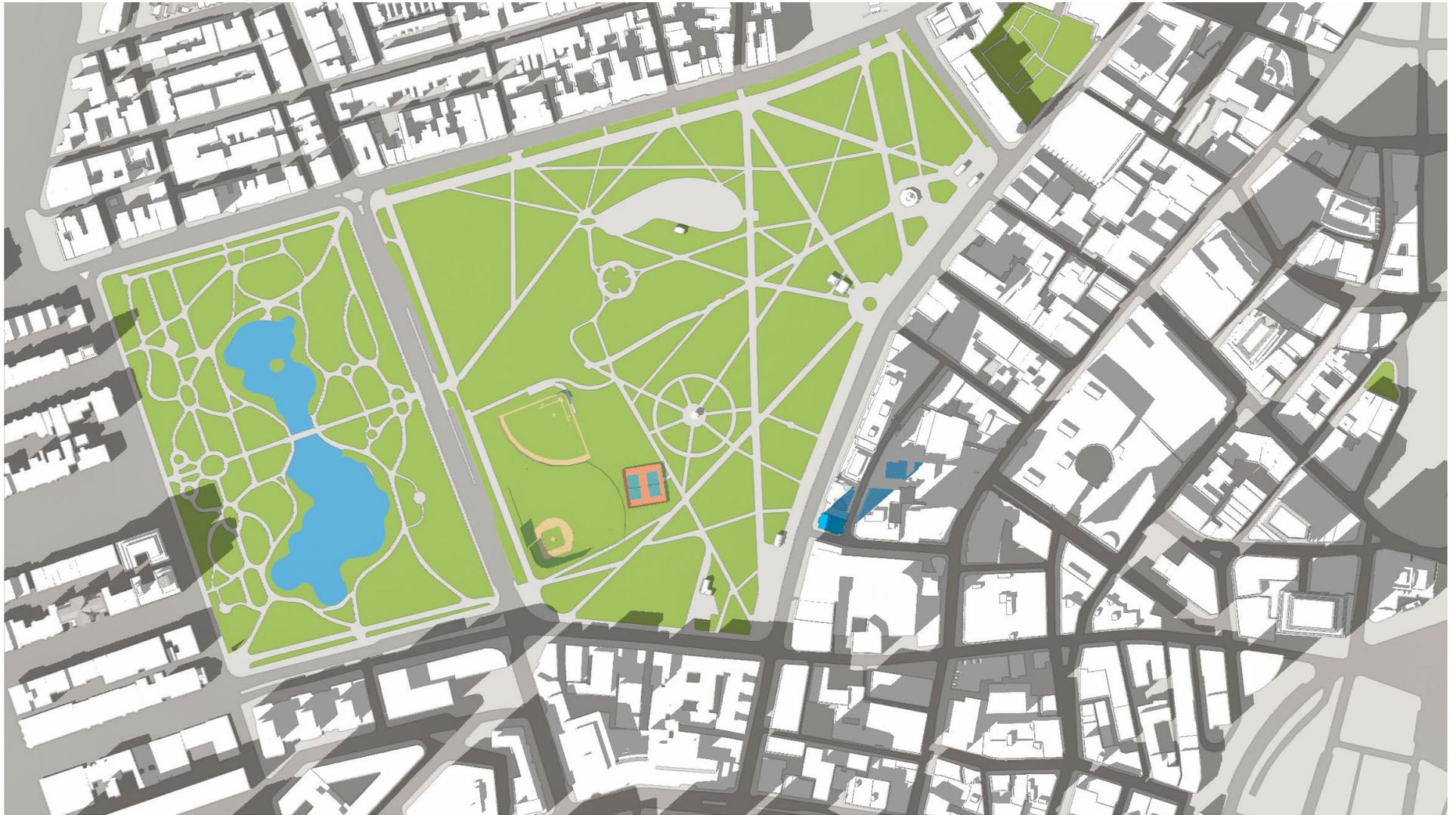


FIGURE B-10
SHADOW STUDY - SEPTEMBER 21, 3:00 PM



FIGURE B-11
SHADOW STUDY - SEPTEMBER 21, 6:00 PM

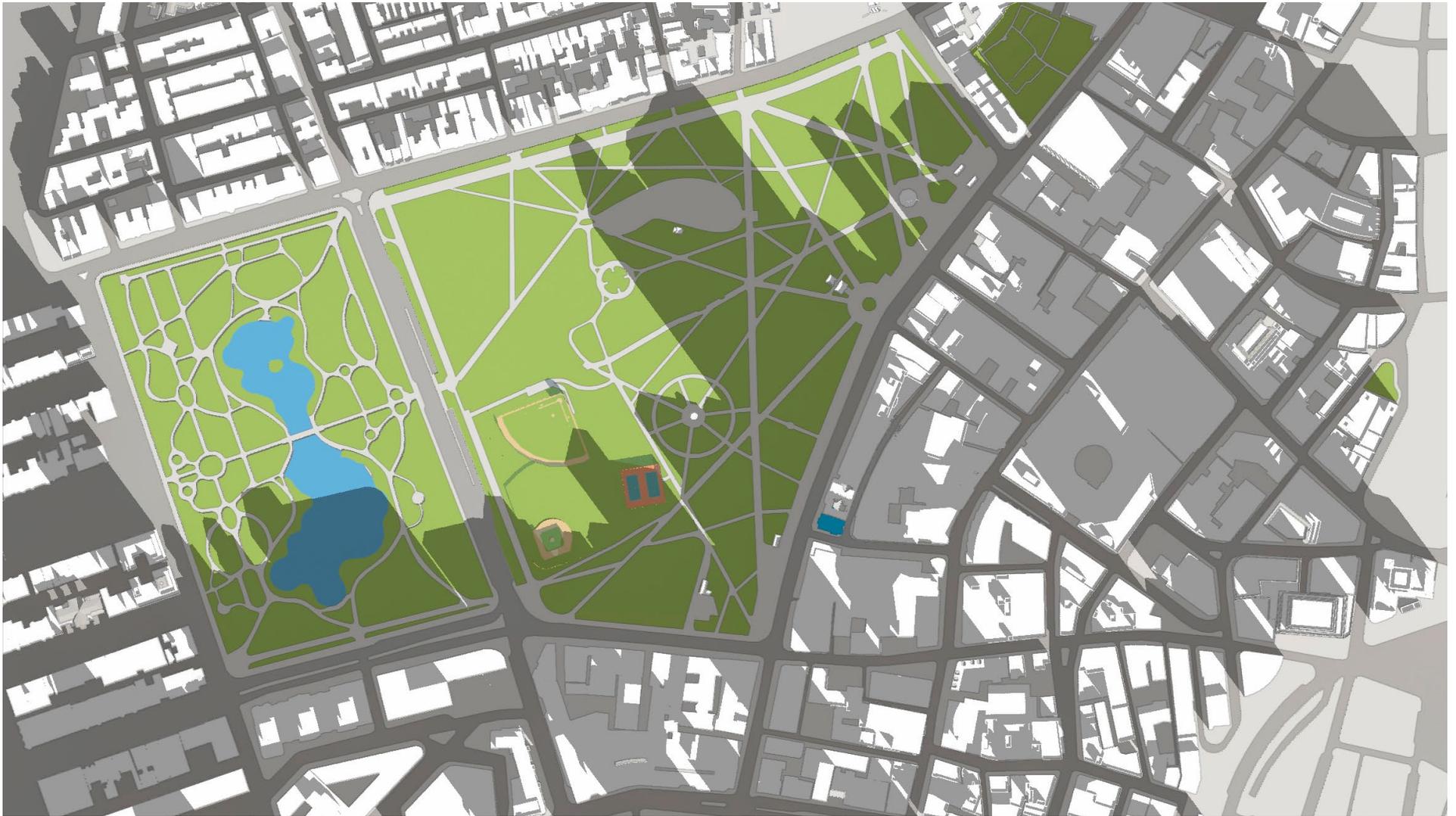


FIGURE B-12
SHADOW STUDY - DECEMBER 21, 9:00 AM

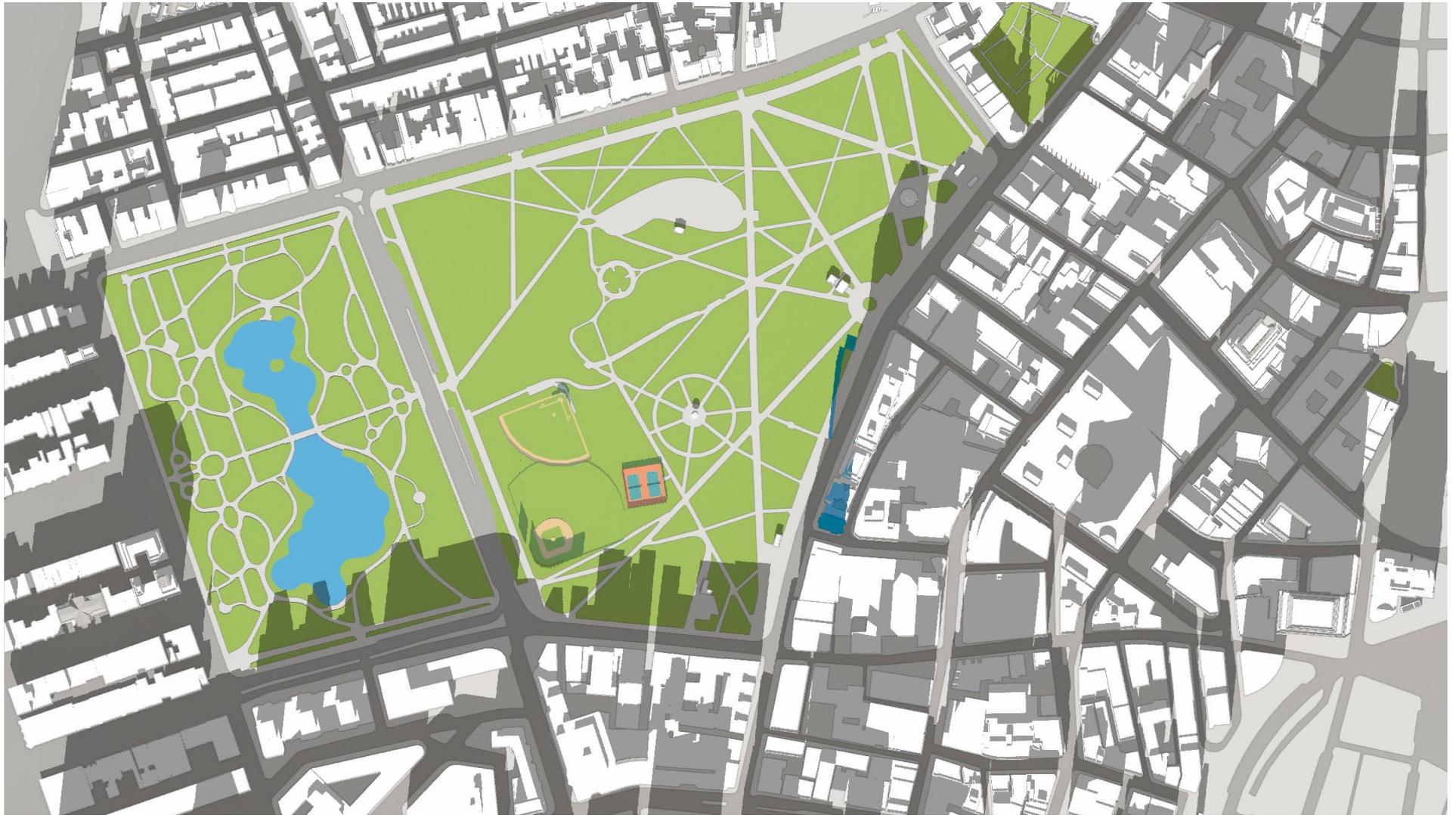


FIGURE B-13
SHADOW STUDY - DECEMBER 21, 12:00 PM



FIGURE B-14
SHADOW STUDY - DECEMBER 21, 3:00 PM