DRAFT PROJECT IMPACT REPORT

One Kenmore Square

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

Submitted by:
Mark Kenmore, LLC
57 River Street, Suite 106
Wellesley, MA 02481

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

In Association with:
Speck & Associates LLC
Studio Gang
Reed Hilderbrand LLC
Reuben, Junius & Rose, LLP
Sanborn, Head & Associates, Inc
Stantec
Bohler Engineering
Vanderweil Engineers

April 22, 2019

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Table of Contents

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

List of Appendices

List of Figures

List of Figures (Continued)

List of Figures (Continued)

List of Figures (Continued)

List of Tables

List of Tables (Continued)

List of Tables (Continued)

Chapter 1.0

Introduction/Project Description

1.0 INTRODUCTION/ PROJECT DESCRIPTION

1.1 Introduction

Mark Kenmore, LLC (the Proponent), proposes to construct a new, 27-story, approximately 389-room hotel surrounded by a new, approximately half-acre public plaza (the Project), as shown in Figure 1-1. The Project also includes the demolition of the existing building at 560-574 Commonwealth Avenue, and shifting the building site east, amid the new public plaza. The shift allows construction of a new public street to connect Commonwealth Avenue and Beacon Street, in between the new plaza and the former building site. The Proponent will be responsible for construction of the new public plaza and roadway improvements, which will significantly improve the pedestrian experience in Kenmore Square, without negatively impacting traffic patterns. The area in which the proposed roadway reconfiguration, hotel, and public plaza will occur (the Project Area) is shown in Figure 1-2.

The resulting Project serves as a unique opportunity to redefine the heart of Kenmore Square. It will activate a critical flashpoint for the city's cultural life and will form a more distinctive gateway to the Back Bay and downtown from Greater Boston's western reaches. By reorganizing the street system, pedestrian and bicyclist safety will be improved without worsening traffic congestion. The new public plaza will provide a new public gathering space in Kenmore Square and accommodate the crowds that pass through the square on Red Sox game days. In addition to these public realm improvements, undertaken at the Proponent's cost, the Project will also create new construction and permanent jobs, and increased tax revenues to the City of Boston.

This Draft Project Impact Report (DPIR) is being submitted to the Boston Planning and Development Agency (BPDA) in response to the Scoping Determination issued on June 20, 2018. The DPIR offers a description of the revised Project, its minimal impacts and proposed mitigation strategies, and its substantial benefits to the City of Boston.

One Kenmore Square   Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Figure 1-1
Project Axonometric

One Kenmore Square **Boston, Massachusetts**

Figure 1-2
Aerial Locus Map

1.2 Project Identification

The Proponent has enlisted a team of professional, Boston-based planners, engineers, attorneys, architects and consultants to assist with the development of the proposed Project. The Project and the Project Team are identified below.

Address/Location:	560-574 Commonwealth Avenue
Proponent	Mark Kenmore, LLC 57 River Street, Suite 106 Wellesley, MA 02481 (617) 614-9149 Robert Korff Damien Chaviano David Roache, PE
Planning and Urban Design	Speck & Associates LLC 1561 Beacon Street, #3 Brookline, MA 02446 (617) 614-9149 Jeff Speck, AICP, CNU-A, LEED AP, Hon. ASLA
Architect	Studio Gang 50 Broad Street, Suite 1003 New York, NY 10004 (212) 579-1514 Jeanne Gang Weston Walker Bryan Scheib
Landscape Architect	Reed Hilderbrand LLC 130 Bishop Allen Drive Cambridge, MA 02139 (671) 923-2422 Gary Hilderbrand John Kett Wendy Wang
Legal Counsel	Reuben, Junius & Rose, LLP 171 High Street Newburyport, MA 01950 Jared Eigerman, Esq.

Permitting Consultant:	Epsilon Associates, Inc. 3 Mill & Main Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Cindy Schlessinger Talya Moked, LEED AP BD+C
Transportation and Parking Consultant:	Stantec 226 Causeway Street, 6th Floor Boston, MA 02114 (617) 523-8103 Ralph DeNisco Jason Schrieber
Civil Engineer:	Bohler Engineering 75 Federal Street, Suite 620 Boston, MA 02110 (617) 849-8040 Steve Martorano, PE Zachary Richards, PE
Mechanical, Electrical, and Plumbing Engineer	R. G. Vanderweil Engineers, LLP 274 Summer Street Boston, MA 02210 (617) 574-8132 Alex Vanderweil Paul Van Kauwenberg
Geotechnical and Environmental Engineer	Sanborn, Head & Associates, Inc. 1 Technology Park Drive Westford, MA 01886 (978) 577-1000 Matthew Heil Kevin Stetson

1.3 Project Description

1.3.1 Changes to the Project Since the PNF

On March 12, 2018, the Proponent, along with the Buckminster Annex Corporation, submitted a Project Notification Form (PNF) to the Boston Planning and Development Agency (BPDA), outlining a proposal to construct two hotels directly across Beacon Street from one another at 560-574 Commonwealth Avenue and 645, 651, and 655-665 Beacon Street. After submitting the PNF, the Project team met with the Impact Advisory Group (IAG) and community, as well as with the BPDA, City agencies, and elected officials. Following these meetings, the Proponent evaluated the comments and concerns expressed by the community, resulting in a significant redesign of the proposal. The Project no longer contains the Beacon Street parcels controlled by Buckminster, and Buckminster is no longer involved in the Project.

Since the filing of the PNF, the Proponent has continued to meet with interested parties, and studied written comments. This has resulted in numerous improvements to the Project in response to public input. Most noticeably, the Project Area has been shifted easterly into Kenmore Square, and the Project will result in construction of a single hotel building set within an approximately half-acre public plaza.

The proposed Planned Development Area comprises approximately 47,160 square feet (1.1 acres), including land owned in fee by the Proponent, and public ways owned in fee by the City of Boston, which will be reconfigured and improved through the Project, at the Proponent's expense. The proposed PDA is the same as the Project Area, shown in Figure 1-2.

As described above and in more detail below, the revised Project consists of a new, 27-story, approximately 389-room hotel and a new approximately 0.5-acre public plaza. The new Project program is similar to the Commonwealth Avenue Component proposed in the PNF and contains four additional stories and seven additional hotel rooms compared to the previous proposal. By shifting the location of the new hotel east, the distance between that building and the existing residential building at 566 Commonwealth Avenue has increased by approximately 88 feet.

1.3.2 Area Context

Kenmore Square is the confluence of four major streets at a busy intersection. To the west, Boston University borders the Project Area; to the east, the Back Bay neighborhood; to the north, Boston University/Storrow Drive and the Charles River; and to the south, Brookline Avenue, the Massachusetts Turnpike and Fenway Park. As it stands today, there is no actual "square" in Kenmore Square, no place to gather other than sidewalks and no vibrant street-level retail that can capture crowds and energize the neighborhood coherently.

The high concentration of nearby restaurants, bars, and stores, combined with the number of pedestrians, makes Kenmore Square one of the most highly visited and dense parts of the city of Boston. This vibrancy, as well as the Square's proximity to the Longwood Medical and Academic Area, local universities, sports and cultural options and downtown Boston, make the Project Area an ideal location for a hotel. Hotels are inherently semi-public spaces.

Kenmore Square is also benefitted by a wealth of multi-modal options at its front door. Steps away is Kenmore Station, which provides access to five bus routes, as well as the B, C, and D trains of the MBTA's Green Line.

Across Brookline Avenue is a 20-dock Hubway station, and 800-feet up Beacon Street are steps to the MBTA's Worcester Line commuter rail at Lansdowne Station. Within a five-minute walk there are six additional MBTA bus routes.

1.3.3 Proposed Project

The Project consists of demolishing the existing commercial building at 560-574 Commonwealth Avenue, constructing a new, 27-story, approximately 389-room hotel, reconfiguring public ways in and around the Project Area, and creating an approximately 21,000 sf (half acre), tree-lined public plaza to be owned by the City, and as described below. The Proponent will design, build, and maintain the public plaza as part of the Project.

Some of the roadway and public plaza work will take place outside of the Planned Development Area, as off-site, public realm improvements. All work in the public realm will be reviewed and approved by the BPDA, and all work in public ways will be subject to the jurisdiction of the City's Public Improvements Commission.

1.3.3.1 Proposed Roadway Configuration and Public Plaza

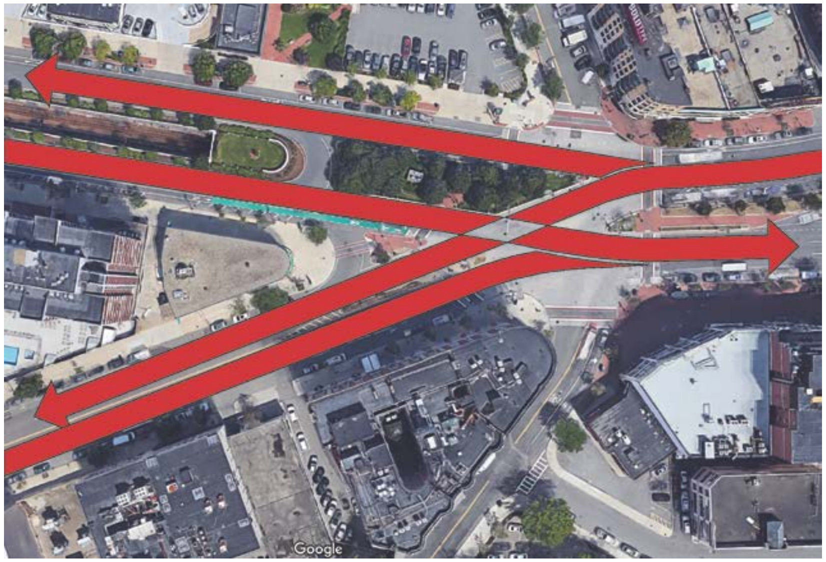
Despite some recent streetscape improvements, Kenmore Square is still an unwelcoming place for people walking. Public space is tight—there's no real "square" in the square—and pedestrians must wait a long time to cross some very wide streets. Due to the complicated main intersection, a full signal cycle takes almost two minutes and then rushes pedestrians across seven lanes of fast-moving traffic. Cyclists, too, face dangerous challenges as they try to negotiate this key commuter route.

As has been learned in other cities, simplifying the intersection by cutting redundant roadway can vastly improve the pedestrian experience without worsening traffic congestion. Such changes can also make new public spaces for people walking and biking.

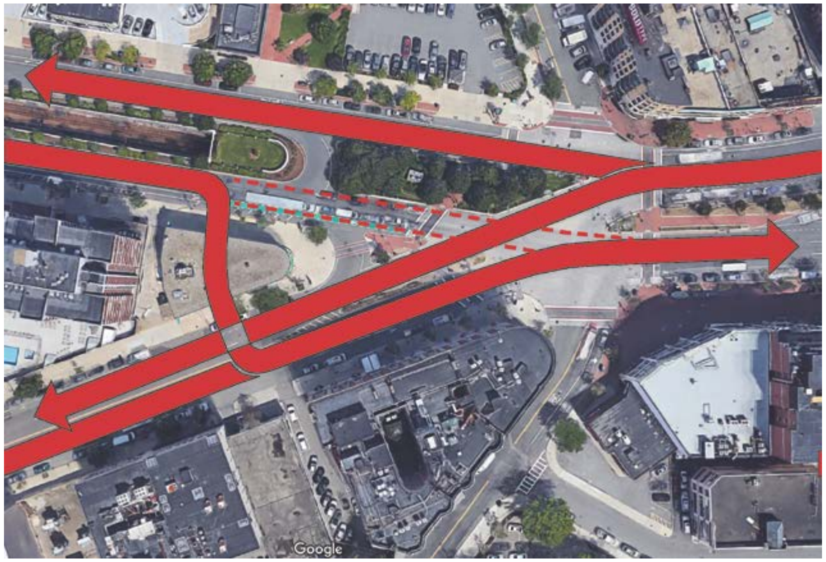
In Kenmore Square, these changes are made possible by the redevelopment of the current "flatiron" site owned by the Proponent. Moving this building footprint sets the stage for a simpler and slimmer street configuration, and an urban design that responds to community concerns about the impacts of growth.

The four-step diagram presented in Figure 1-3 illustrates the proposed reconfiguration. The new cross-street through the subject site (New Road) shifts eastbound Commonwealth Avenue traffic onto Beacon Street, allowing the removal of approximately 300 linear feet of Commonwealth Avenue's southerly half.

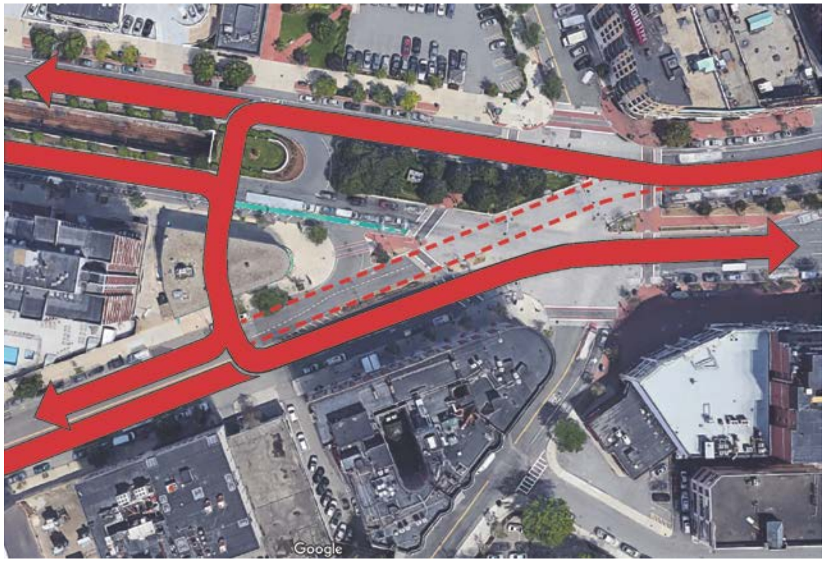
The creation of New Road also allows westbound Beacon Street traffic—which now must cross Commonwealth Avenue—to instead join Commonwealth Avenue and shift southerly to Beacon Street once through the square. This change allows the westbound flank of Beacon Street to be removed, also for approximately 300 feet.



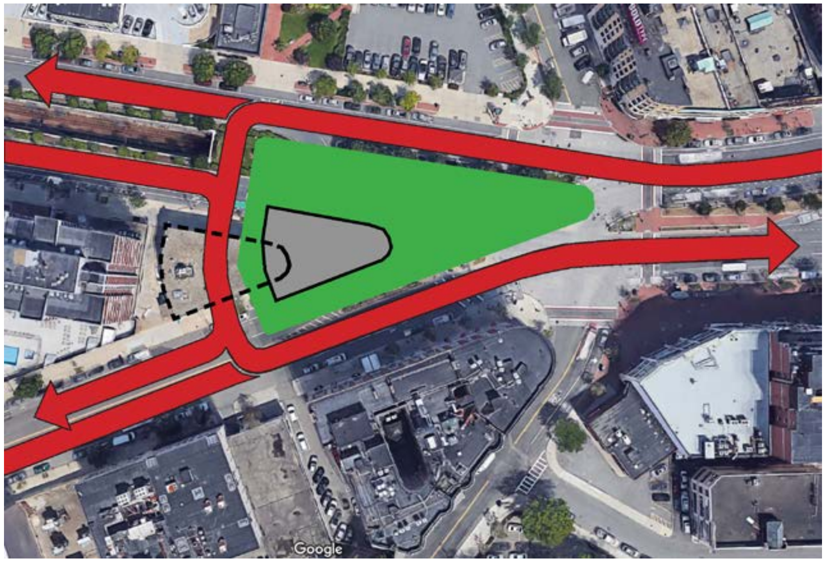
1: Existing Flow



2: New street diverts eastbound Comm. Avenue traffic



3: And diverts westbound Beacon Street traffic



4: The result is a large public space with room for the displaced building and a half-acre square

Altogether, the reconfiguration creates one-way flow around a central public plaza, like a signalized roundabout. Unlike a "island", the new public plaza is big enough for the proposed new hotel building amidst an approximately half-acre of space for public gathering and mobility.

The result is a Kenmore Square whose heart is a public space rather than a busy roadway.

This redesign much improves some key pedestrian trajectories across the Project Area. For example, people walking from Boston University to Brookline Street will no longer need to meander west and then east as they make their way across Commonwealth Avenue and Beacon Street. Instead, they can enjoy a direct walk across a public plaza (see Figure 1-4).

Bike lanes in Kenmore Square are currently situated between fast-moving traffic and the threat of car doors. With the revised Project, these facilities will be moved between the parking lane and the curb, where they will be protected by parked cars. Perhaps more importantly, several incomplete and inconvenient bike routes can be remedied.

This proposed street reconfiguration will transform roadway into walkable public spaces. The new public plaza is designed for dining and lingering, active programming, and accommodation of the large crowds that pass through Kenmore Square on Red Sox game days.

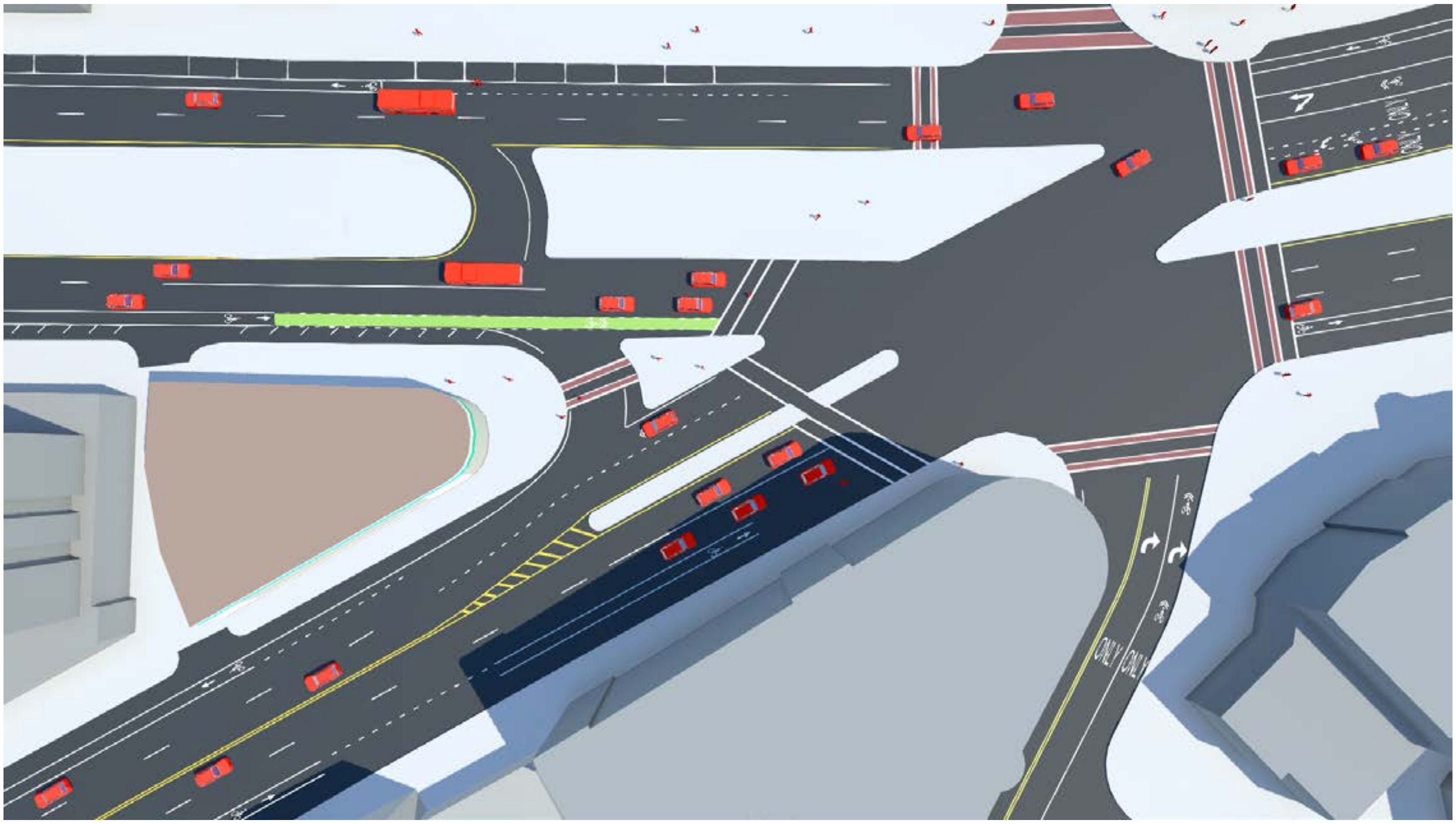
The changes will create a new public gathering space in Kenmore Square, and vastly improve the safety and the experience of one of Boston's most important public spaces. The Plaza will include, for the first time in Kenmore Square, consistently shaded sidewalks, a strong canopy of well-adapted tree species recalling the plantings of Commonwealth Avenue.

1.3.3.2 Building Program

The ground floor of the new hotel building will contain an approximately 1,500 sf space, perhaps for Citizen's Bank to relocate its branch from 560-574 Commonwealth Avenue, the hotel lobby, a café and lounge space, and back-of-house space. Of this ground-level interior space, only the back-of-house space will be closed to the public and the café and lounge space on the ground-floor of the hotel will spill out onto the plaza in good weather, further activating the public realm.

On the second floor will be an approximately 7,000 sf restaurant/bar, also open to the public. The third and fourth floors will contain amenities for hotel guests, such as meeting rooms, a library, and a gym and fitness studios. The rest of the building will contain guest rooms and other back-of-house spaces.

No parking will be provided on site. Instead, the relatively small number of guests at a hotel of this type and at this location who are expected to require parking nearby will be accommodated by off-site valet parking.



Current Layout

Proposed Reconfiguration

One Kenmore Square **Boston, Massachusetts**

Speck & Associates LLC

Figure 1-4
Roadway Reconfiguration

Loading, deliveries, and drop-off/pick-up will occur on Beacon Street, and service loading will occur on New Road. No loading, deliveries, or drop-off/pick-up will be permitted on Commonwealth Avenue.

The site plan is presented in Figure 1-5, and floor plans and elevations are presented in Appendix A. Table 1-1 presents the Project program.

Table 1-1 Project Program

Project Element	Approximate Dimension
Hotel	389 rooms
Retail/Services/Restaurant	1,500 sf
Restaurant/Bar	7,000 sf
Total Gross Floor Area (GFA)*	**231,000 sf**
New Public Plaza	21,000 sf
Parking	Valet to off-site
Height	27 stories/299 feet*

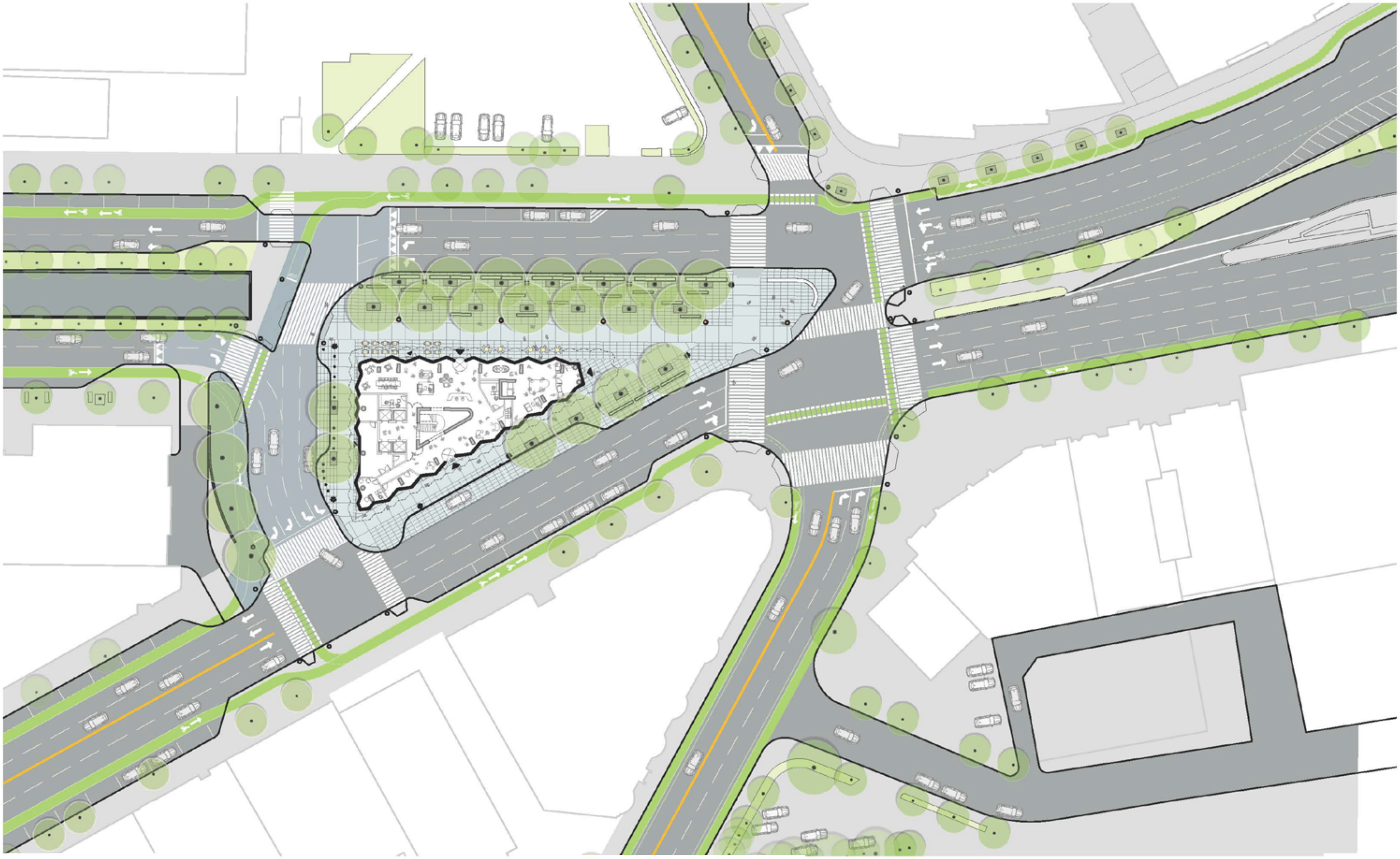
*299 feet to top of last occupiable space. With an approximately 15-foot mechanical penthouse, building height would be approximately 314 feet.

At ground level, the building is carved back from the upper-story massing, and uses a glass exterior, providing additional plaza space while ensuring full transparency to the public realm. Programmatically, the hotel lobby with its adjacent restaurant, retail, and services space on the ground and second levels, are intended to serve all visitors to Kenmore Square. The lower floors include an atrium space that is naturally lit via a rooftop skylight, to bring daylight into the hotel's corridor spaces and amenity levels.

The new public plaza and hotel tower are designed in concert to become a Boston destination. There will be plenty of gathering space for crowds of baseball fans before and after games at Fenway Park, Marathon watchers cheering the final mile, and Boston University students and others mingling under the trees. The amenity levels for hotel guests will overlook the plaza and out over the cityscape.

1.3.4 Alternatives

In the PNF, a hotel building of a similar scale was proposed on the 560-574 Commonwealth Avenue parcel currently owned by the Proponent. Although the Commonwealth Avenue portion of the PNF Project would have provided similar economic benefits as the Project proposed in this DPIR, the public realm improvements associated with the roadway reconfiguration as well as the creation of the plaza would not be realized. The transportation analysis presented in Chapter 2.0 shows that the proposed roadway reconfiguration will result in a new approximately half-acre public plaza in Kenmore Square, while improving operations for the pedestrians, bicyclists, transit users and vehicles that travel to, through, and within the larger area. Other environmental impacts of the PNF Project and DPIR Project are expected to be generally similar.



0' 50'

One Kenmore Square **Boston, Massachusetts**

REED HILDERBRAND

Figure 1-5
Site Plan

1.4 Public Benefits

The Project will provide substantial public benefits for the surrounding neighborhood and the City of Boston as a whole, both during construction and on an ongoing basis upon its completion.

Improved Street and Pedestrian Environment

The Project will create a Kenmore Square whose heart is a public space, rather than a busy roadway. As described above, the reconfigured roadways will improve safety and the experience of traveling to Kenmore Square for people walking, biking, or driving. The Project includes the creation of a new approximately half-acre public plaza.

In the barest terms, the Proponent will undertake, at its private cost, an approximately $15 million public works project to transform Kenmore Square. The development of the new hotel amid the new public plaza makes this investment feasible.

Smart Growth/Transit-oriented Development

The Project is consistent with both smart-growth and transit-oriented development principles. The Project Area is currently served intensively by public transportation, including Boston's MBTA Green Line, the recently completed, regional rapid transit Lansdowne Commuter Rail Station. and bus lines that provide easy access to the Project Area from the Greater Boston region. The addition of hotel, and restaurant/retail/service uses adjacent to other active uses will support the expansion of the vibrant live, work, and play area existing today and further contemplated by other development projects nearby.

Sustainable Design

The Proponent is committed to building a LEED-certifiable Project with a target of the Silver level, incorporating sustainable design features into the Project to preserve and protect the environment.

Increased Employment

Overall, the Project will create approximately 500 construction-period jobs and approximately 190 permanent jobs once it is occupied.

Increasing Property Tax Revenues

The Project will create new property tax revenues to the City of Boston through significantly increased property values.

1.5 Regulatory Controls and Permits

1.5.1 B-4 Zoning District / Restricted Parking Overlay District

The entire Project Area is located within an underlying B-4 zoning district, and the overlaying Restricted Parking Overlay District. No portion of the Project Area is located within the Groundwater Conservation Overlay District (GCOD).

PDA Development Plan

The Project Area contains an area of more than one acre and is therefore eligible for designation as a Planned Development Area (PDA), a type of special purpose zoning overlay district. Moreover, the Project complies with the *Planned Development Area Policy Guidance for Developers*, adopted by the BPDA Board on August 14, 2015. Specifically, the Project is large-scale, complex, incorporates uses appropriate to its setting, and provides significant mitigation and public benefits to the immediate area and the Kenmore Square neighborhood.

Pursuant to Section 80C-3.1. of the Code, a PDA Development Plan for the Project will set forth the proposed location and appearance of structures, open spaces and landscaping, proposed uses of the area, densities, proposed traffic circulation, parking and loading facilities, access to public transportation, and proposed dimensions of structures.

The proposed Planned Development Area comprises approximately 47,160 square feet (1.1 acres), including land owned in fee by the Proponent and public ways owned in fee by the City of Boston, which will be reconfigured and improved through the Project. The proposed PDA is the same as the Project Area, shown in Figure 1-2.

Use Regulations

The uses proposed for the Project include hotel, retail, restaurant, and services, all of which are permitted by right within the underlying B-4 zoning district. All uses at the Project will be described in the PDA Development Plan.

Dimensional Requirements

The Project will demolish the existing building at 560-574 Commonwealth Avenue. After a land exchange with the City of Boston,[1] the Proponent will construct for the City both the reconfigured streets, and a new public plaza measuring approximately 21,000 sf (0.5 acres).

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1 The Proponent will grant to the City its current fee holdings of approximately 9,501 sf, and acquire from the City a new parcel of approximately 7,547 sf and additional air rights, at which to build its new building. Fair market values will be calculated for all land transactions.

The public plaza will surround a new hotel building with approximately 231,000 sf of Gross Floor Area to be designed, built and owned by the Proponent. In contrast to the Project as proposed under the PNF filed in 2018, and in response to the Scoping Determination issued by the BPDA, this new building will be located approximately 88 feet away from the existing residential building at 566 Commonwealth Avenue.

The total footprint of the new building will be approximately 6,948 sf. It is anticipated that the new parcel will be approximately 7,547 sf, with air rights over another approximately 2,929 sf of the new plaza. For purposes of zoning, the public plaza will serve as the "lot," such that the Project results in a Floor Area Ratio (FAR) of approximately 8.5. No buildings other than the new hotel will be permitted at the approximately 0.5-acre lot. Zoning relief to allow the proposed FAR will be approved through the PDA Development Plan.

There is no maximum building height established within the B-4 district. The new hotel will have a building height of approximately 299 feet and include 27 stories. These building heights will be set forth in the PDA Development Plan.

There is no requirement to include usable open space for non-dwelling uses within the underlying B-4 district. However, as noted above, the new public plaza created by the Project, within which the new building will be constructed, will provide approximately 21,000 sf of public open space, in addition to extensive other public realm improvements within Kenmore Square, both in and around the Project Area. This will be set forth in the PDA Development Plan. The Development Plan will also provide for relief for certain parapet setbacks.

Off-Street Parking

As noted above, the Project Area is located within a Restricted Parking Overlay District, which restricts off-street parking facilities dedicated to any use other than residential and hotel uses. The Project will not include any on-site parking, as will be described and approved through the PDA Development Plan.

Loading Facilities

Loading for the Project is discussed in Section 2.2.2.8. It will be set forth in the PDA Development Plan. (Code sec. 80C-3.1.)

1.5.2 BCDC Schematic Design Review (Article 28)

The Boston Civic Design Commission (BCDC) must review any project exceeding 100,000 sf of gross floor area, or any project determined by BCDC to be of "special urban design significance." (*Id*. sec. 28-5.) The Proponent is subject to schematic design review by BCDC. The Proponent looks forward to continuing to work with the BCDC regarding the design of the Project.

1.5.3 Barrier-Free Access (Article 30)

The purposes of Article 30 of the Boston Zoning Code (Barrier-Free Access) are to ensure that physically handicapped persons have full access to buildings open to the public; to afford such persons the educational, employment, and recreational opportunities necessary to all citizens; and to preserve and increase the supply of living space accessible to physically handicapped persons. (*Id.* sec. 30-1.) The hotel and other uses proposed by the Project are subject to the provisions Article 30 (*id.* sec. 30-3), and the Project is designed to comply.

1.5.4 Groundwater Conservation Overlay District (Article 32)

As noted above, the Project Area is not located within the GCOD. However, the Project will be required to provide stormwater recharge in keeping with current Boston Water and Sewer Commission (BWSC) water-quality policies. Any groundwater monitoring wells that may be installed during construction will be turned over to the Boston Groundwater Trust if possible.

1.5.5 Green Buildings (Article 37)

The purposes of Article 37 (Green Buildings) are: to ensure that major building projects are planned, designed, constructed, and managed to minimize adverse environmental impacts; to conserve natural resources; to promote sustainable development; and to enhance the quality of life in Boston. The Project is subject to the requirements of Article 37 because it is subject to Large Project Review and is designed to comply with Article 37. As noted above, the Proponent is committed to developing a LEED-certifiable building with a target of the Silver level, incorporating sustainable design features into the building to preserve and protect the environment.

1.5.6 Development Impact Project (Article 80)

Under Section 80B-7 of the Boston Zoning Code, a Development Impact Project (DIP) is required to make mitigation payments, or provide equivalent in-kind contributions, to create affordable housing and job-training programs. The Project constitutes a DIP for purposes of Section 80B-7. As required under Article 80, the obligations of the Proponent regarding DIP payments will be memorialized in a written agreement with the BPDA.

1.5.7 Demolition Delay (Article 85)

Any proposal to demolish a substantial portion of a "significant building" is subject to a delay of up to 90 days imposed by the Boston Landmarks Commission. (Code sec. 85.) The Project entails demolition of the existing building at 560-574 Commonwealth Avenue, which was constructed in approximately 1954. The building is not listed or recommended for listing on any registers of historic places, but demolition of the building will be subject to review under Article 85 of the Boston Zoning Code.

The Article 85 Review for the demolition of buildings in the Project site will be initiated through the filing of an Article 85 application for the building to the Boston Landmarks Commission (BLC).

1.5.8 Inclusionary Affordable Housing

Because the Project includes hotel and commercial uses, it is not subject to the Mayor's Executive Order regarding inclusionary affordable housing, nor to the BPDA's Inclusionary Development Policy (IDP). The Project will include approximately 389 new guest rooms, but no dwelling units per the IDP.

1.5.9 Boston Water and Sewer Commission

The Boston Water and Sewer Commission (BWSC) approval of the Project is required due to the proposed improvements. The Project will be reviewed and approved by the BWSC through the BWSC's Site Plan Approval process. Once the Project is approved, the general contractor will coordinate obtaining and executing the General Service Application (GSA) with the BWSC for any proposed improvements.

1.6 Legal Information

1.6.1 Legal Judgments Adverse to the Proposed Project

The Proponent is not aware of any legal judgments in effect or legal actions pending that would prevent the Proponent from undertaking the Project.

1.6.2 History of Tax Arrears on Property

No properties owned in the City of Boston by the Proponent are in tax arrears to the City of Boston.

1.6.3 Site Control/ Public Easements

The Proponent holds fee title to 560-574 Commonwealth Avenue, as well as the abutting portion of Commonwealth Avenue, for a depth of 30 feet. The remainder of the Project Area is owned in fee by the City of Boston. A complete title examination is on file with the BPDA.

A survey is provided in Appendix B.

1.7 Anticipated Permits

Table 1-2 presents a preliminary list of permits and approvals from governmental agencies that are expected to be required for the Project, based on currently available information. It is possible that only some of these permits or actions will be required, or that additional permits or actions will be required.

Table 1-2 Anticipated Permits and Approvals

Agency	Permit, Review or Approval
Federal Agencies	
Federal Aviation Authority	Determination of No Hazard
State Agencies	
Massachusetts Water Resources Authority	Construction Dewatering Permit
Department of Environmental Protection, Division of Air Quality Control	Notification prior to construction
City Agencies	
Boston Civic Design Commission	Schematic Design Review
Boston Committee on Licenses/Public Safety Commission	Flammable Storage License (emergency power generation)
Boston Fire Department	Approval of Fire Safety Equipment
Boston Inspectional Services Department	Building and Occupancy Permits
Boston Interagency Green Building Committee	Zoning Article 37 Green Buildings
Boston Landmarks Commission	Article 85 Demolition Delay Review
Boston Planning & Development Agency	Large Project Review (Section 80B) Cooperation Agreement Boston Residents Construction Employment Plan Development Impact Project (DIP) Agreement PDA Development Plan MGL c. 121B Demonstration Project
Boston Public Improvement Commission	Vertical Discontinuances (cantilevered levels) Grant of Location (utility equipment) Projection License (canopies) Specific Repairs (streets and sidewalks) License, Maintenance, and Indemnification Agreement
Boston Transportation Department	Transportation Access Plan Agreement Construction Management Plan Street and Sidewalk Occupant Permits
Boston Water and Sewer Commission	Water and Sewer Connection Permits General Service Application Site Plan Review Infiltration and Inflow (I&I) Fee
Boston Zoning Commission	Zoning Map Amendment PDA Development Plan

1.8 Public Participation

Even before filing the PNF, the Proponent and members of the Project team met with City and State agencies, elected officials, members of the IAG, abutting owners, neighborhood groups, community leaders, business owners, area residents, and other stakeholders to seek input and feedback on the development plan as proposed. The Proponent participated in a series of meetings including public meetings, IAG meetings and meetings with individuals and small groups representative of the neighborhood. Through this engagement process, the Proponent received many recommendations from the community expressing their ideas regarding the overall development.

The following meetings were held during the public comment period after the PNF filing:

- IAG Meeting, March 28, 2018
- Public Meeting, April 23, 2018
- IAG Meeting #2, January 29, 2019

During the time between the first and second IAG meeting, the Proponent and Project team carefully reviewed the input received from the elected and appointed officials and the community members and stakeholders. The result is the updated Project, detailed in this DPIR. Based on community feedback, the Project has been altered to move away from the closest residential neighbor, Kenmore Tower, to create a new public plaza and improve the pedestrian, bicycle and traffic flow in Kenmore Square. In advance of the official filing of the DPIR, the Proponent and Project team met with City and State agencies and elected officials to present the significant changes to the Project since original filing. Additionally, the team has conducted outreach to numerous organizations and individuals.

The Project team will continue to meet with area residents and other stakeholders regarding this DPIR during its review period, and will continue to communicate with elected and appointed officials, members of the IAG, abutters and stakeholders throughout the permitting and construction project.

1.9 Construction Phasing

The Proponent, along with its design and construction team, understand the critical importance of maintaining safe operations of the public streets in and around the Project Area for all users, especially pedestrians and cyclists. Kenmore Square is a vital transportation hub, and with the adjacency of Fenway Park, it sees significant increases in activity over 100 days per year. Prior to the start of construction, the Proponent and its team will work with City agencies including BTD and the Public Works Department to develop a comprehensive construction/traffic management plan.

The following are the expected project phases and the protective and traffic management measures that will be employed during those phases:

- Phase 1 (2 Months): Demolition – During this phase the various site control and management measures will be installed and the existing building will be removed. The following measures will be implemented:
  - Police details
  - Temporary pedestrian routing with fence, jersey barriers and overhead protection
  - Elimination of on-street parking adjacent to the existing site
  - Maintain existing vehicular operations
- Phase 2 (5 Months): Utility relocations – During this phase the various public and private utilities within the footprint of the proposed building will be relocated either within sections of the existing public streets to remain or through the new proposed street. The following measures will be implemented:
  - Police details
  - Temporary pedestrian routing with fence, jersey barriers and overhead protection
  - Elimination of on street parking adjacent to the existing site
  - Maintain existing vehicular operations
- Phase 3 (2 Months): Construction of "New Road" – During this phase the new connector road will be constructed and opened. The following measures will be implemented:
  - Police details
  - Re-routing of bicycles and pedestrians via temporary crossings of Commonwealth Avenue and Beacon Street
- Phase 4 (3 Months): Site Preparation – During this phase, New Road is open with the traffic signal operating in a temporary configuration. The new, approximately half-acre public plaza and building footprint will be stripped and demolished, and some utilities will still be relocated. The following measures will be implemented:
  - Police details
  - Fence/Jersey barrier around new plaza area

- o Pedestrians routed around plaza on opposite sidewalks

- ♦ Phase 5 (24 Months): Vertical Construction – The remainder of the construction of the proposed building and plaza will be completed during this stage. The following measures will be implemented:

  - o Police details
  - o Fence/Jersey barrier around new plaza area
  - o Pedestrians routed around plaza on opposite sidewalks

Chapter 2.0

Transportation

2.0 TRANSPORTATION

2.1 Introduction

This Chapter provides an evaluation and summary of existing transportation infrastructure in Kenmore Square and the proposed changes to the roadway network, infrastructure and operations as a result of the Project. The new hotel will sit amidst a new public plaza in the heart of Kenmore Square. The existing central intersection will be reduced significantly in size and simplified; as a result of the reconfiguration of the roadways made possible by a new street connecting Commonwealth Avenue and Beacon Street on the west side of the proposed plaza. The Project allows the heart of Kenmore Square to become a place for people to gather, rather than a place for cars.

Kenmore Square has always been an important social hub in Boston, serving as a gateway to the Back Bay, a front door for Boston University, and the prime entry to Fenway Park. It is western terminus of the Commonwealth Avenue Mall, connecting to Frederick Law Olmsted's Emerald Necklace. Boston University's campus borders the northern edge of Kenmore Square. The iconic Citgo sign welcomes visitors, Red Sox fans, and marathon runners alike to Boston. The B, C, and D Branches of the MBTA Green Line meet in Kenmore Square, as do six MBTA bus routes, the Worcester commuter rail line, Boston University's shuttles, and the Medical Academic and Scientific Community Organization (MASCO) shuttles.

Kenmore Square is both a hub of transportation and a destination for residents, employees, and tourists. However, it has no defined gathering place for these people to arrive, be welcomed, meet, and take in all that Kenmore Square has to offer. Dominated by a large intersection and wide streets, Kenmore Square is a place to move out of rather than to linger in. The proposed Project changes the nature of Kenmore Square, increasing public space, adding significant accommodations for walking and biking, and removing the dominance of vehicular traffic.

The transportation study in this Chapter adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and the BPDA Article 80 Large Project Review process. The study methodology and assumptions were coordinated with BTD and other City agency staff. The study includes an evaluation of existing and future conditions with and without the Project, including an analysis of impacts on the current and proposed roadway networks, loading operations, transit services, and pedestrian and bicyclist activity.

The sections below provide an overview of the Project, and a summary of findings of the transportation analyses, including anticipated impacts, proposed mitigation, a description of the study area, and a discussion of the study methodology. Further sections provide a detailed summary of the transportation mitigation that the Proponent is committed to implementing as part of the Project and the proposed roadway network reconfigurations.

2.1.1 Summary of Project

As described in Section 1.3, the Project includes the construction of an approximately 231,000 square foot hotel in the heart of Kenmore Square, amid a new, approximately half-acre public plaza. This is a fitting location for guest accommodations thanks to its proximity to Fenway Park, Boston University, the Back Bay, Copley Square, and Downtown Boston, but it may be most valuable on a regular basis for business travelers visiting both Boston and the Hynes Convention Center or Longwood Medical and Academic Area (LMA), as well as for families of patients at the LMA.

Rather than developing the hotel where the current Citizen's Bank sits as previously proposed, the 389-room hotel will be moved eastward to allow for the creation of a new public roadway ("New Road") connecting Commonwealth Avenue south to Beacon Street. This "New Road" will become the western edge of a new one-way vehicular circulation through Kenmore Square, eliminating the need for the eastbound half of Commonwealth Avenue and the westbound half of Beacon Street, east of New Road.

By removing surplus portions of these two streets, a new public plaza in the heart of Kenmore Square can form, surrounding the hotel. Vehicles will flow one-way—much like they do in the eastern half of Kenmore Square around the MBTA station—effectively forming a one-way "square-about." This design greatly reduces crossing distances for pedestrians (up to 40 percent for some crossings), creates new protected routes for bicyclists, and helps remove vehicle conflicts that cause delays today, such that all modes of transportation will experience more efficient and safe operations—while creating significant public realm.

Table 2-1 outlines a summary of the Project.

Table 2-1 Project Program

Project Element	Approximate Dimension
Hotel	389 rooms
Retail	1,500 sf
Restaurant*	7,000 sf
Total Gross Floor Area (GFA)*	**231,000 sf**
New Public Plaza	21,000 sf
Parking	Valet to Off-site

* Although the hotel has a restaurant, the analysis does not account for the restaurant as a separate entity because ITE accounts for in-hotel restaurants when projecting trip generation.

The Project does not include the construction of any new parking spaces, and all public space is reserved for pedestrians and place-making rather than surface parking. Public transportation, walking, and biking will be encouraged. Valet parking at a local garage or surface lot will be available for any guests requiring parking, and an approximately 110-foot loading zone on Beacon Street will accommodate taxi and roadway network Company (TNC – Uber/Lyft), and general public pick-up and drop-off.

2.1.2 Summary of Findings and Transportation Mitigation

The Project will create a new pedestrian plaza in Kenmore Square, while improving operations and the environment for the pedestrians, bicyclists, transit users and vehicles that travel to, through and within the larger area.

The Proponent is undertaking the expense to construct not only the hotel, but the creation of the public plaza, construction of New Road, and the bike lanes and signals along Commonwealth Avenue westbound, New Road, and Beacon Street. The development of these public realm improvements has been and will continue to be coordinated with the plans for Kenmore Square put forth by the BTD and the BPDA.

In summary, the proposed improvements include:

- Across all modes of transportation, the Project's transportation networks reduce conflicts and improve operations and safety at most approaches;
- Key vehicular delays drop from LOS E and F to D and E with the proposed roadway network, resulting from crossing flows of two major arterials in Kenmore Square;
- Increase the amount of public space dedicated to pedestrians;
- Increase the number and quality of pedestrian crossings, while also improving the time available for each, simplifying the pedestrian experience and creating shorter, direct and efficient crossing patterns;
- Simplify signal operations and conflicts at the central Kenmore Square intersection (Brookline Avenue / Deerfield Street / Commonwealth Avenue / Beacon Street);
- Introduce a new roadway (New Road) and two new coordinated signalized intersections;
- Install new traffic signals at the central Kenmore Square intersection and at the intersections of New Road consistent with the latest BTD standards and guidelines and connected with the rest of the area signal system;
- Several existing crosswalks that remain have been shortened, and all new or replacement crosswalks create significantly shorter crossings than exist today;
- Extend the range of convenient last-mile access to the MBTA Kenmore Station with easier walk access to transit;

- Connect the new public plaza with Commonwealth Avenue Mall to the west and Kenmore Square to the east with new east-west crosswalks, opening up a new activated walking route through the Square;

- Increase the number of available walking routes between the northern and southern sides of Kenmore Square from two to nine routes;

- Increase overall safety in the Square by reducing vehicular exposure, increasing compliance with pedestrian signal indications, and increasing driver awareness of pedestrians;

- Improve and complete the bicycle network through Kenmore Square on all approaches consistent with BTD plans and other area investments including new protected bicycle lanes, resulting in a more cohesive and safe bicycling experience;

- Accommodate all loading and service activity adjacent to the hotel;

- Commit to actively manage the curbside adjacent to the hotel to minimize impacts on the surrounding network; and

- Implement a robust Transportation Demand Management (TDM) program that includes ongoing coordination with the City and area stakeholders to minimize demand for parking and vehicle travel.

In addition, the hotel's impact on transportation operations in the Build Condition as compared to the No-Build Condition are minimal with all intersections operating at an acceptable Level of Service (LOS).

2.1.3 Study Area

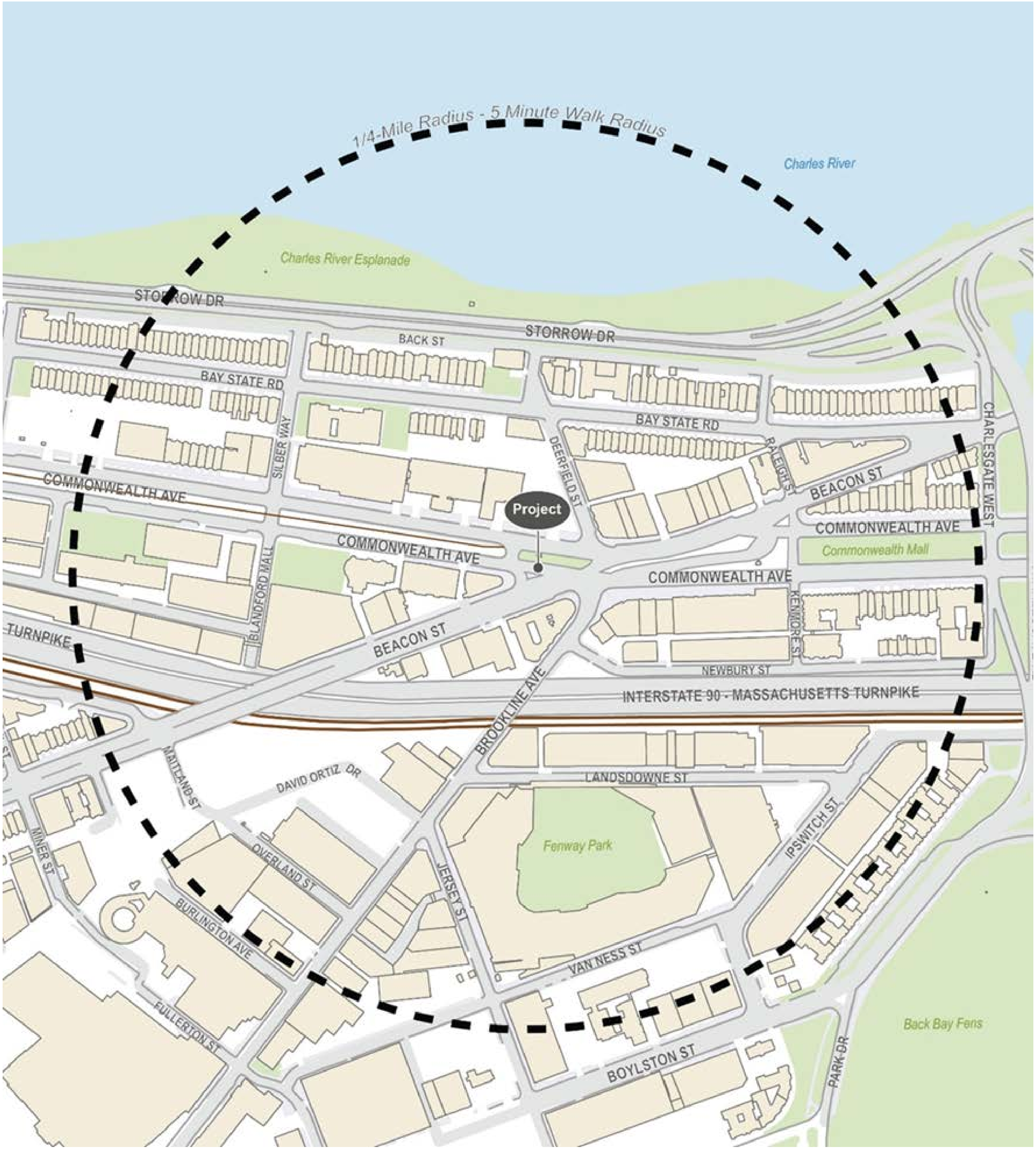
The transportation study area is centered in Kenmore Square at the Commonwealth Avenue / Brookline Avenue / Beacon Street / Deerfield Street intersection. It includes three new intersections west of the proposed plaza and hotel, extends east to Kenmore Street and Raleigh Street, north to Bay State Road, and south to Newbury Street. The study area was confirmed with BTD on February 21, 2019 and is consistent with the study areas scoped for other nearby developments, including the Commonwealth Hotel, Related Beal's Kenmore Square Redevelopment, and Boston University's Data Sciences Center. Figure 2-1 shows the study area.

2.1.3.1 Study Area Intersections

Eight intersections were selected for vehicle, bicyclist, and pedestrian analysis.

1. Deerfield Street and Bay State Road (unsignalized)

2. Raleigh Street and Bay State Road (unsignalized)



One Kenmore Square Boston, Massachusetts

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Figure 2-1
Study Area

3. Brookline Avenue and Newbury Street (unsignalized)

4. The U-turn at Commonwealth Avenue eastbound (unsignalized)

5. Kenmore Square Intersection – Commonwealth Avenue / Beacon Street / Brookline Avenue / Deerfield Street (signalized)

6. Beacon Street and Raleigh Street (signalized)

7. Commonwealth Avenue (eastbound) and Kenmore Street (signalized)

8. Commonwealth Avenue (westbound) and Kenmore Street (signalized)

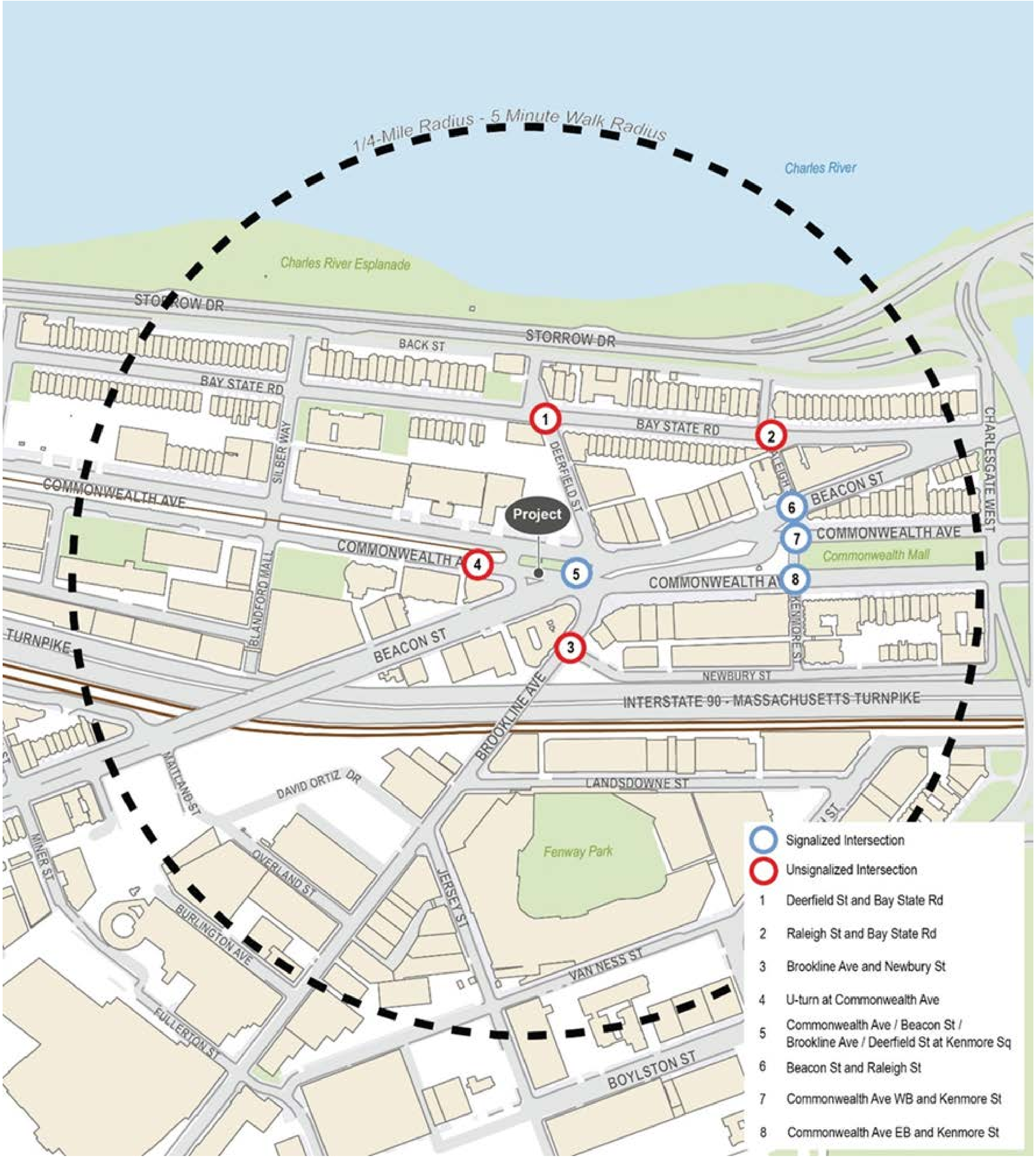
Figure 2-2 shows the intersections included in the analysis, which define the Study Area.

2.1.4 Study Methodology

The transportation analysis follows the BTD's "Transportation Access Plan Guidelines" and uses standard methodologies, including: the Institute of Transportation Engineers' (ITE's) trip generation handbook and parking generation manual for the estimation and forecasting of trips and parking associated with the Project; and the Transportation Research Board's Highway Capacity Manual, Sixth Edition, for the estimation of vehicular delays and queues at intersections. The transportation system within the study area was reviewed according to standard engineering practices to document and understand the presence and use of vehicular travel lanes, transit stations and bus stops, sidewalks and crosswalks, and bicycle facilities.

The study includes a survey and compilation of existing transportation conditions within the study area, including descriptions and analysis of the operations and modifications, for vehicles, pedestrians, bicyclists, transit, and the overall transportation environment.

The study also includes an operations analysis of current and future conditions on the existing and proposed roadway networks. For clarity, a nomenclature was developed for the analysis. The roadway networks are referred to as Current (as is) and Proposed. Three scenarios were used for analysis: Existing (current volumes), No-Build (future volumes including background growth and vehicle volumes from other approved projects but no Project-generated trips), and Build (No-Build volumes with the addition of Project-generated trips). The current roadway network was only analyzed under Existing and No-Build conditions. The Build Condition only includes the proposed roadway network because these transportation improvements to Kenmore Square are integral to the Project.



One Kenmore Square Boston, Massachusetts

Figure 2-2
Intersections for Analysis

Each condition was evaluated on the current and/or proposed networks in the morning and afternoon peak hours according to the five scenarios shown in Table 2-2 below.

Table 2-2 Scenarios Analyzed

	Existing Condition	2024 No-Build Condition	2024 Build Condition
Current Network	AM Peak Hour PM Peak Hour	AM Peak Hour PM Peak Hour	
Proposed Network	AM Peak Hour PM Peak Hour	AM Peak Hour PM Peak Hour	AM Peak Hour PM Peak Hour

Synchro software was used to analyze the performance of the roadway network as agreed to with the Boston Transportation Department. It provides a reasonable estimation of operating characteristics that are easily comparable between different scenarios.

At the request of BTD, VISSIM analysis is also being prepared as part of the design submission process for the proposed roadway network and was used to help calibrate the analysis herein. The proposed roadway network design process is ongoing concurrently with the DPIR process. VISSIM provides a more nuanced assessment of overall interactions in complex networks and will be used to ensure a high-quality final design of the proposed roadway networks. Ongoing coordination will ensure that the final design will be consistent with the results of the DPIR analysis.

Existing volumes for vehicles, pedestrians, and bicyclists during the morning and evening peak hours were obtained from the Kenmore Square Redevelopment Project Notification Form submitted by Related Beal, which conducted counts at study area intersections in 2017. To ensure a conservative analysis, these counts were compared to counts provided by BTD in its own Synchro model, and other recent efforts, which confirmed the conservative nature of these as coordinated with BTD.

2.1.4.1 Red Sox Game Volumes

The Project Area is located approximately 850 feet from Fenway Park and 500 feet from Kenmore Station, the MBTA station most used by Red Sox fans on the way to and from games. Red Sox games and other events at Fenway Park bring a high volume of people to Kenmore Square who are not part of the typical everyday environment but are there only to attend an event at Fenway Park. The impact of these periodic events is frequent enough to warrant consideration.

To determine the typical change in environment, counts of vehicles, bicycles, and pedestrians were conducted during a Red Sox game on Friday, September 14, 2018.

A comparison of the 2018 Red Sox counts to the Existing Volumes shows that vehicular volumes entering the Kenmore Square intersection during a Red Sox game were about four-percent (4%) higher than when there is no event at Fenway Park. However, the increases are isolated, with only six turning movements primarily impacted and the rest remaining fairly consistent. We note that these movements are among the lowest volume movements in Kenmore Square:

- Right turn from Commonwealth Avenue westbound to Deerfield Street
- U-turn at Commonwealth Avenue eastbound
- Right turn from Beacon Street onto Brookline Avenue
- Left turn from Commonwealth Avenue westbound to Brookline Avenue
- Right turn from Commonwealth Avenue eastbound to Beacon Street
- Right turn from Commonwealth Avenue eastbound to Brookline Avenue

Increases at these locations are suggestive of visitors searching for local parking options as opposed to normal travel patterns. All other intersection turning movements see volumes that are equal to or less than the Existing Vehicle Count. *In fact, the highest-volume eastbound and westbound movements between Commonwealth Avenue and Beacon Street decreased somewhat*, which likely reveals the added delay caused by many more pedestrians crossing and occasionally blocking traffic flow. Therefore, in coordination with BTD, it was determined to use the Existing Volumes as the analytical baseline.

Meanwhile, during a Red Sox game there are 18% fewer bicyclists than on a typical day. Increased volumes are seen continuing straight on Commonwealth Avenue westbound and eastbound, turning right from Brookline Avenue to Commonwealth Avenue eastbound, and turning right from Deerfield Street to Commonwealth Avenue westbound. Reduced bike volumes were observed at all other locations. Since the bike movements of greatest conflict with cars or pedestrians involve connections between Commonwealth Avenue westbound and Beacon Street or Brookline Avenue, the Existing Volumes represent a more conservative set of bicycle volumes.

Pedestrian volumes increase substantially on a Red Sox game day, with 47% more pedestrians. The crosswalks across Deerfield Street, Beacon Street, and Brookline Avenue see the greatest increases in pedestrian volumes from typical conditions. One of the primary benefits of the Project's reconfiguration of Kenmore Square is both added pedestrian space and the addition of several new, shorter pedestrian crossings. These crossings provide new route options for these surges of pedestrians. Meanwhile, many of the existing crossings that remain are shortened, and all crossings experience more walk time as a percentage of the signal cycle length, resulting in substantially reduced delays to better-handle peak walking volumes.

While it is important for the overall design to understand the nature of increased pedestrian activity in Kenmore Square on game days, the Existing pedestrian volumes, rather than Red Sox game day pedestrian volumes, were used for the scenario analyses as directed by BTD and other City agencies.

Vehicle, pedestrian, and bicycle volumes are included in Appendix C.

2.2 Physical Conditions

This section describes existing and proposed transportation infrastructure for all road users. A discussion of existing on-street and off-street public parking supply is also provided.

2.2.1 Current Roadway Network

Figure 2-3 shows the current roadway network in Kenmore Square, which is also described below.

Commonwealth Avenue

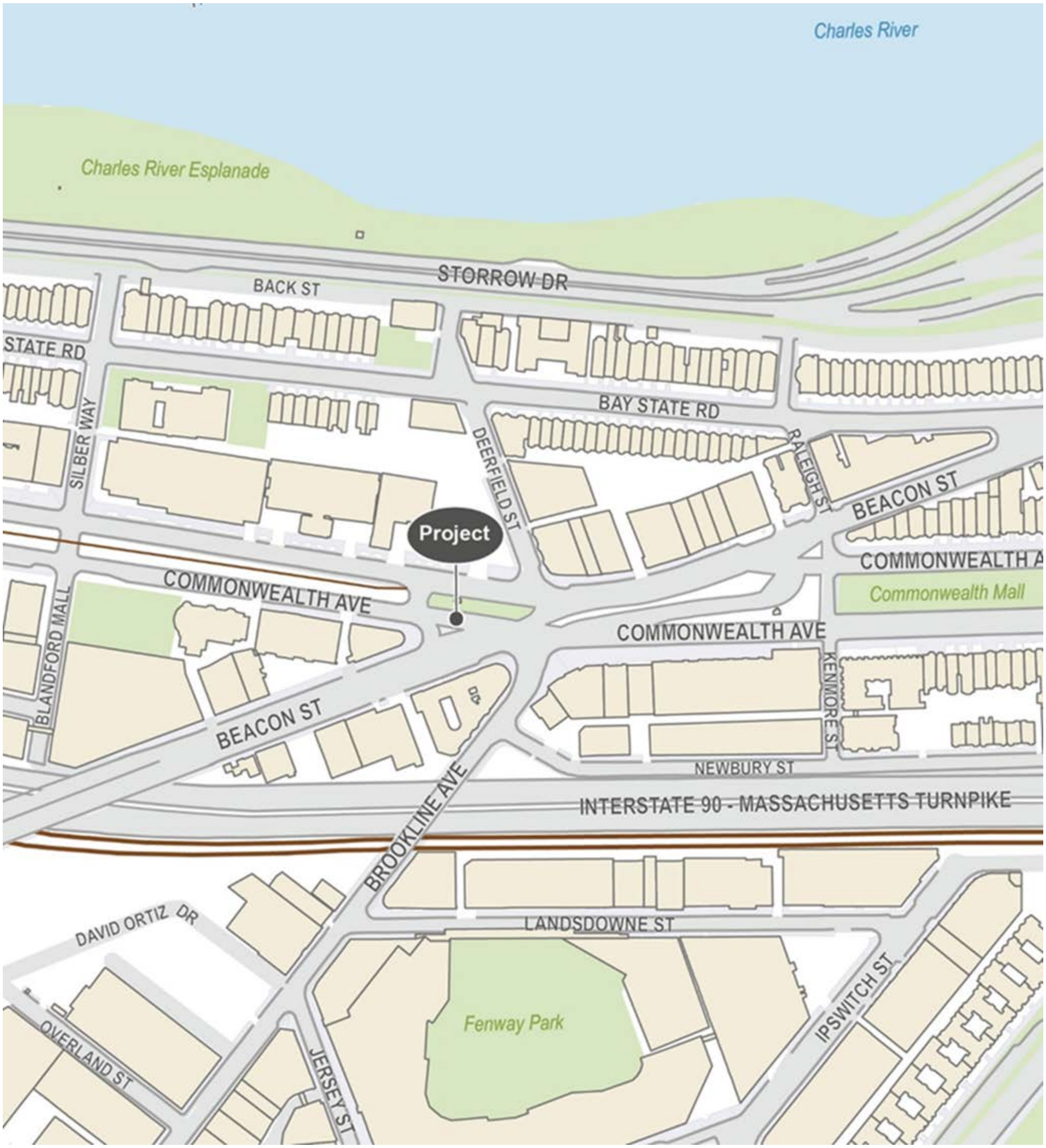
Commonwealth Avenue is an east/west roadway that today, runs through the heart of the Project Area. The roadway extends from its eastern end-point, the Boston Public Garden at Arlington Street, to Packard's Corner in Allston, where it turns and continues southwest.

The roadway accommodates four lanes of two-way vehicular traffic (two-lanes in each direction) separated by a median of varying widths and median uses for most of its length. On the northern portion of the Project Area, Commonwealth Avenue is separated by small green spaces which include an Air Quality Monitoring Station that will be relocated as part of this Project, to the east it is separated by the central headhouse and bus bays of Kenmore Station; and to the west it is separated by the MBTA's Green Line B Branch. In Kenmore Square, Commonwealth Avenue widens to three lanes in each direction between Raleigh and Deerfield Streets. On-street parking is provided on both sides of Commonwealth Avenue near the Project Area and along most of its entire length.

Sidewalks are provided along the northern edge of Commonwealth Avenue westbound and along the southern edge of Commonwealth Avenue eastbound. Signalized crosswalks are available at all signalized intersections within the Study Area.

Beacon Street

Beacon Street is a two to four lane east/west roadway which begins at Tremont Street in Downtown Boston to the east, continues through Back Bay, turns southwesterly in Kenmore Square, then travels into and through Brookline and Newton, before terminating at I-95.



One Kenmore Square Boston, Massachusetts

Figure 2-3
Current Roadway Network

West of Arlington Street, the roadway is three-lanes of one-way vehicular traffic westbound to Raleigh Street. After merging with Commonwealth Avenue westbound through the Kenmore Square intersection, Beacon Street becomes a two-way road of four lanes (two lanes per direction) separated by a median with the MBTA Green Line C Branch running below-grade until surfacing in a widened median in Brookline. On-street parking is provided on both sides of Beacon Street in the Project Area.

Brookline Avenue

Brookline Avenue is a northeast/southwest roadway to the south of the Project Area which begins at the Kenmore Square intersection and extends to the southwest to Washington Street in Brookline. North of Boylston Street it is a two-lane two-way roadway. South of Boylston Street it widens to four lanes and passes through the Longwood Medical and Academic area. There is no on-street parking closest to Kenmore Square.

Sidewalks are provided along both sides of Brookline Avenue, and signalized crosswalks are available at all signalized intersections.

Deerfield Street

Deerfield Street is a north/south roadway to the north of the Project Area that extends barely 500-feet between the Kenmore Square intersection and Back Street along Storrow Drive to the north. The roadway allows two-way vehicular traffic and some on-street parallel parking, with a segment of angled parking on its eastern curb in front of the United States Postal Service building, closest to Kenmore Square.

Sidewalks are provided along both sides of Deerfield Street, and unsignalized crosswalks are available at the Kenmore Square and Bay State Road intersections.

Bay State Road

Bay State Road is a one-lane, one-way westbound roadway north of the Project Area that extends west from Charlesgate West into Boston University west of Granby Street, where it becomes a two-way dead-end access into the campus. The roadway passes through a residential area that runs parallel to Commonwealth Avenue to its north.

Parking is allowed on both sides of the street with a mix of metered and residential parking. Sidewalks are provided along both sides of Bay State Road, and unsignalized crosswalks are available at all intersections except Raleigh Street.

Raleigh Street/Kenmore Street

Raleigh Street is a north/south roadway that extends between Newbury Street to the south and Back Street along Storrow Drive to the north. It is predominately a narrow two-lane, two-way roadway with segments of on-street parking. South of the Beacon Street intersection, Raleigh Street becomes Kenmore Street. Between eastbound Commonwealth Avenue and westbound Beacon Street, Raleigh/Kenmore Street is one-way northbound Sidewalks are provided along both sides of Raleigh Street and Kenmore Street, and crosswalks are available at all intersections, with signalization at its three intersections with Commonwealth Avenue eastbound, westbound, and Beacon Street.

Newbury Street

Newbury Street is a one-way westbound roadway running south of the Project Area between Charlesgate West and Brookline Avenue. The street is a continuation of Newbury Street, a one-way westbound roadway that runs through Back Bay and ends at Charlesgate East. The street runs parallel to and between Commonwealth Avenue and the Massachusetts Turnpike.

Metered parking is provided along the Massachusetts Turnpike side and residential parking occupies the north side of the street. Sidewalks are provided along both sides of the street except for a 500-foot stretch of the southern side between Kenmore Street and a bend that is about 150-feet from Brookline Avenue. There is only one crosswalk located at Newbury Street's Brookline Avenue intersection.

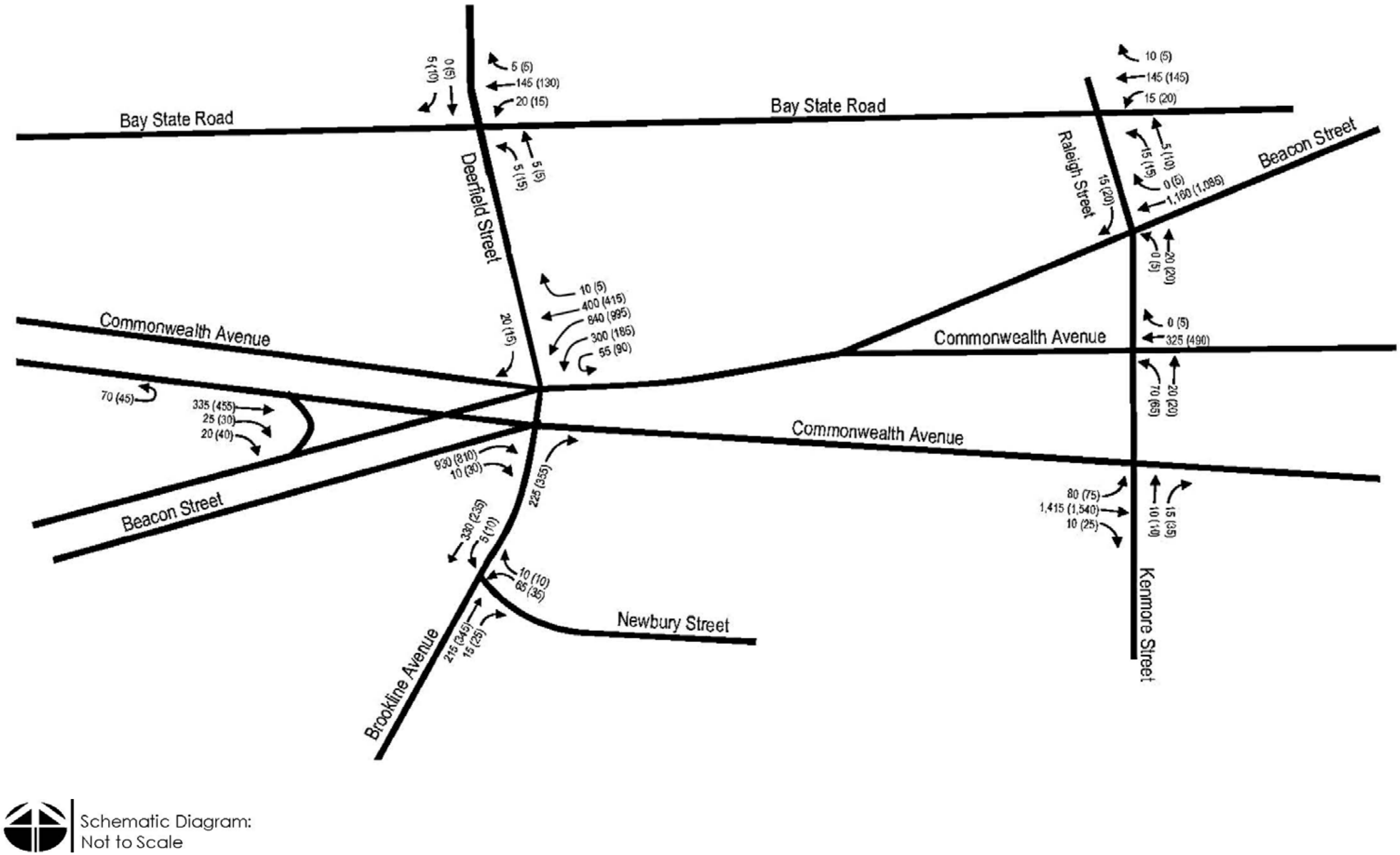
2.2.1.1 Existing Vehicle Volumes on the Current Network

Figure 2-4 shows the Existing peak hour vehicle volumes for the a.m. and p.m. peaks on the current roadway network.

2.2.1.2 Crash Analysis

A review of crash records was conducted to identify existing safety concerns in the Study Area. Crash data for the Study Area intersections was obtained from the Massachusetts Department of Transportation – Highway Division (MassDOT) through the online MassDOT Crash Portal. Generally, the Crash Portal contains crash data compiled by the Massachusetts Registry of Motor Vehicles (RMV) from crash reports submitted by State and local police. Crash data was researched for the most recent five years on record (2012-2016).

Of the Study Area intersections evaluated, crashes were identified at only two locations. Although the raw number of crashes alone is important, the actual exposure or potential for an individual to be involved in a crash is reflected by calculating the crash rate. Crash rates were calculated for the two study area intersections with data shown in Table 2-3. These crash rates represent the number of crashes per million vehicles entering the intersection. MassDOT has determined the average crash rate in District 6 (which includes the City of Boston) to be 0.71 crashes per every million vehicles entering the intersection (MEV) for signalized intersections, and 0.52 crashes per MEV for unsignalized intersections. MassDOT has determined the Statewide average crash rate to be 0.78 crashes per MEV for signalized intersections, and 0.57 crashes per MEV for unsignalized intersections.



One Kenmore Square Boston, Massachusetts

These average rates are based upon crash information queried on June 26, 2018. The rates represent "average" crash experience and serve as a basis for comparing reported crash rates for study area intersections. Crash rates that far exceed the MassDOT averages warrant closer evaluation to identify potential safety-related improvements.

The MassDOT Crash Portal revealed five total crashes over the most recently documented five-year period (2012-2016) the intersection of Commonwealth Avenue / Beacon Street / Deerfield Street / Brookline Avenue for a crash rate of 0.07 crashes per million entering vehicles. The Crash Portal also revealed two total crashes over this same five-year period at the Bay State Road / Raleigh Street intersection, for a crash rate of 0.51 crashes per million entering vehicles. The calculated crash rates at each intersection are below the District 6 and Statewide average rates. The crash data also revealed that there was a fatal injury crash identified at the intersection of Bay State Road and Raleigh Street in 2013.

Classifications of crashes at study area intersections are summarized in Table 2-3. Crash rate calculation worksheets are contained in Appendix C.

Table 2-3 Summary of Crash Data at Intersections

	Kenmore Square					Bay State Road at Raleigh Street				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Severity										
Property Damage	0	0	0	0	0	0	0	0	0	0
Injury	1	1	0	0	1	1	0	0	0	0
Fatality	0	0	0	0	0	0	1	0	0	0
Not Reported	2	0	0	0	0	0	0	0	0	0
Collision Type										
Rear-end	0	1	0	0	0	0	0	0	0	0
Angle	0	0	0	0	0	0	0	0	0	0
Sideswipe	1	0	0	0	0	0	0	0	0	0
Single Vehicle	0	0	0	0	0	0	0	0	0	0
Head On	1	0	0	0	1	0	0	0	0	0
Not Reported	1	0	0	0	0	1	1	0	0	0
Time										
6am-10am	1	0	0	0	1	0	0	0	0	0
10am-4pm	1	1	0	0	0	1	0	0	0	0
4pm-7pm	0	0	0	0	0	0	1	0	0	0
7pm-6am	1	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0
Road Condition										
Dry	2	1	0	0	1	1	0	0	0	0
Wet	0	0	0	0	0	0	0	0	0	0
Snow/Ice	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Not Reported	1	0	0	0	0	0	1	0	0	0
Season										
Dec-Feb	0	0	0	0	0	0	0	0	0	0
Mar-May	1	0	0	0	1	1	1	0	0	0
Jun-Aug	1	1	0	0	0	0	0	0	0	0
Sep-Nov	1	0	0	0	0	0	0	0	0	0
Light										
Daylight	1	1	0	0	1	1	0	0	0	0
Dawn/Dusk	0	0	0	0	0	0	0	0	0	0
Dark (Unlit)	0	0	0	0	0	0	0	0	0	0
Dark (Lit)	1	0	0	0	0	0	0	0	0	0
Unknown	1	0	0	0	0	0	1	0	0	0
Total	*3*	*1*	*0*	*0*	*1*	*1*	*1*	*0*	*0*	*0*
Total										
Count	3	1	0	0	1	1	1	0	0	0
Average per year			1.00					0.40		
Crash Rate[a]			**0.07**					**0.51**		

2.2.1.3 Pedestrian Conditions

The current roadway configuration at the Kenmore Square intersection has seven crosswalks that surround the center of the intersection, with one unsignalized crosswalk connecting the current Citizen Bank site at 560-574 Commonwealth Avenue to a small pedestrian median at the apex of Commonwealth Avenue eastbound and Beacon Street. All signalized crosswalks are longer than 30-feet and three are longer than 50-feet. Table 2-4 lists the crosswalk lengths at the central Kenmore Square intersection.

Table 2-4 Crosswalk Lengths on Current Roadway Network

Crosswalk	Length
Brookline Avenue	67′
Commonwealth Avenue eastbound (MBTA busway)	45′
Commonwealth Avenue westbound (MBTA busway)	52′
Deerfield Street	48′
Commonwealth Avenue westbound (Green Space)	33′
Commonwealth Avenue eastbound (Green Space)	35′
Beacon Street	74′
Commonwealth Avenue eastbound – Beacon Street (Pedestrian Median to Citizen Bank Site)	29′

Figure 2-5 shows the crosswalks and their respective lengths on the current roadway network. There are only two routes north-south across Kenmore Square on either side of the existing signal. In the current signal phasing as shown later in Section 2.3.1, pedestrians must navigate multi-phase crossing of Commonwealth Avenue which don't always operate sequentially, adding significant pedestrian delays.

The next crossings are one long block away, 500-feet to the east at Raleigh/Kenmore or 750-feet to the west at Silber Way, resulting in primary demand for the crossings in Kenmore Square to meet the pedestrian desire lines of this active neighborhood.

2.2.1.4 Existing Pedestrian Volumes

Figure 2-6 shows the Existing peak hour pedestrian volumes for the a.m. and p.m. peaks on the current roadway network. Significant pedestrian volumes can be found in Kenmore Square—often exceeding vehicle volumes on several approaches in Kenmore Square.

2.2.1.5 Bicycle Conditions

There are bicycle accommodations in and around Kenmore Square, with a combination of bicycle lanes and shared lane markings. However, the current network lacks cohesiveness and is not laid out in a manner intuitive to any but the most aggressive bicyclists, creating safety perceptions.

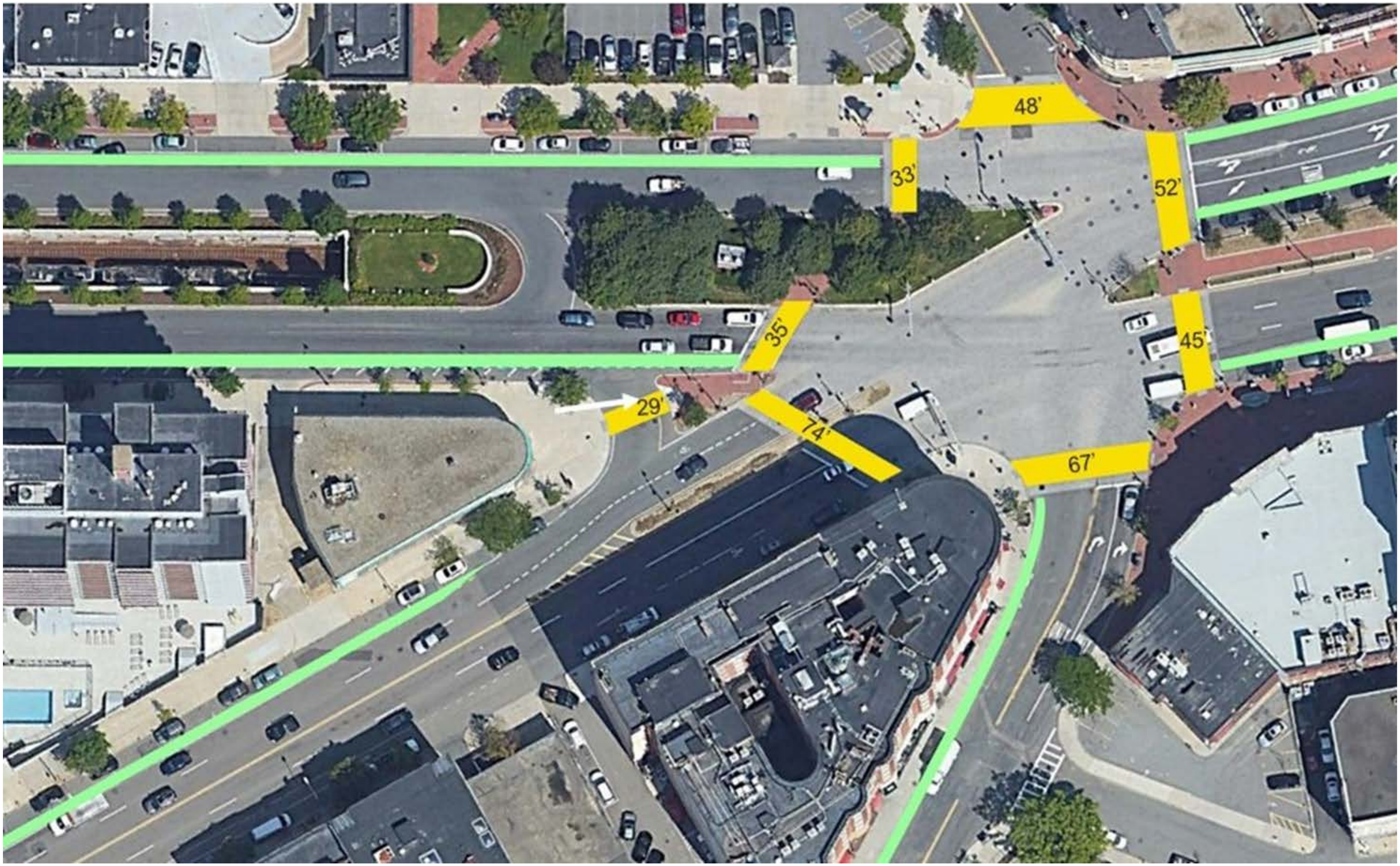
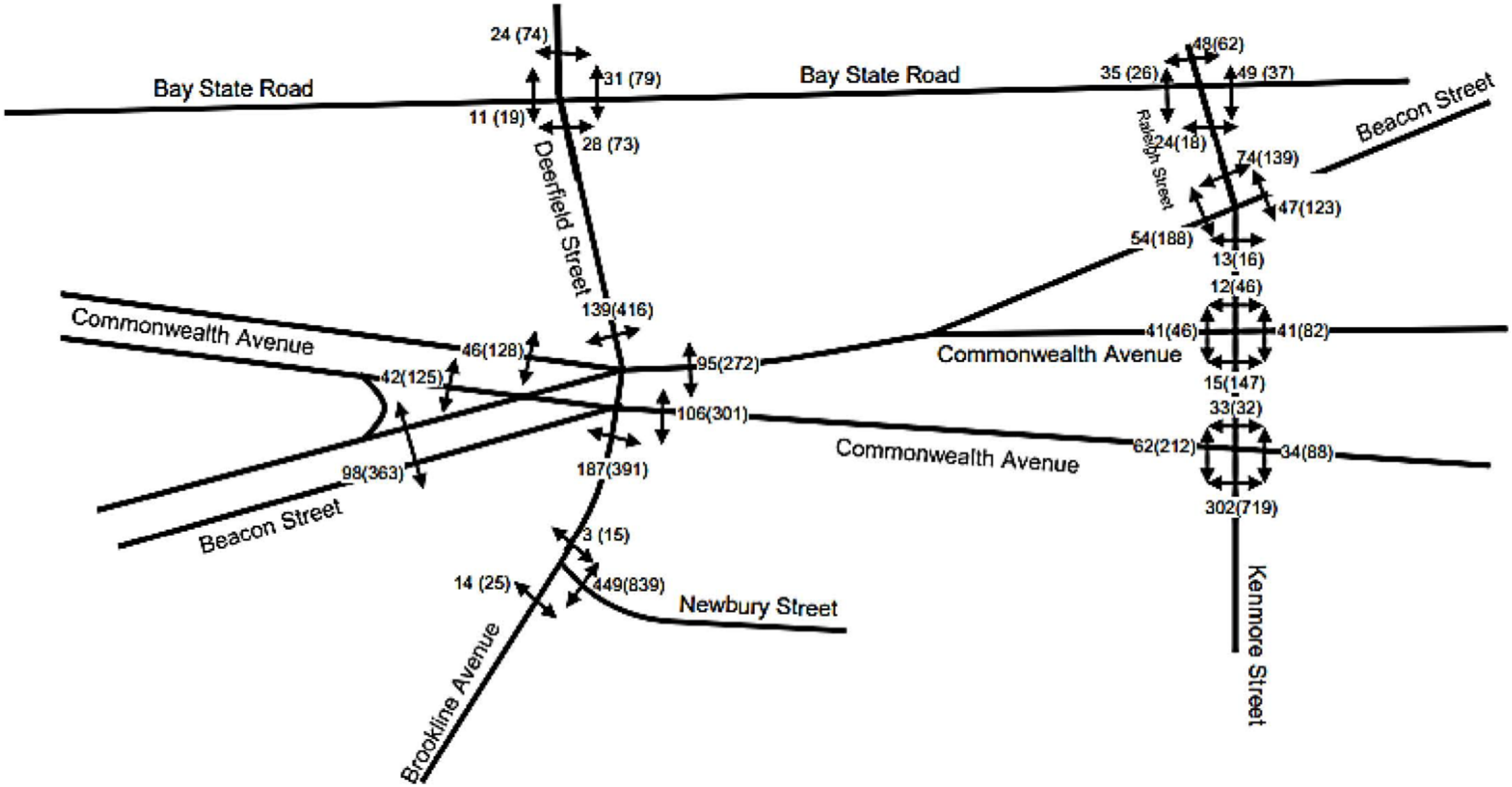


Figure 2-5

Crosswalks on the Current Roadway Network



Schematic Diagram: Not to Scale

One Kenmore Square   Boston, Massachusetts

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Figure 2-6

Existing Peak Hour AM (PM) Pedestrian Volumes on Current Roadway Network

Most major roadways have bike lanes and shared lane markings, but their confluence within the heart of Kenmore Square is not well-accommodated and very exposed to vehicle traffic.

Beacon Street west of Kenmore Square provides unbuffered bicycle lanes in both directions, with the exception of the first 150-feet of westbound Beacon Street closest to the Square where only sharrows are provided. Westbound Beacon Street east of Kenmore Square has an unbuffered bike lane paralleling the one-way westbound bike traffic, with plans for this to become a protected lane against the curb as part of the Related-Beale Project. Unbuffered bike lanes are also present in both directions along Commonwealth Avenue on both sides of the Kenmore Square intersection. Brookline Avenue has an unbuffered bike lane heading south out of Kenmore Square.

Intersection accommodations for through or turning bicycles are non-existent in the current configuration of Kenmore Square, with the exception of a single dashed guideline for westbound bikes on Commonwealth Avenue merging across westbound Beacon Street. Neither left-turn lanes nor bike boxes for left-turning bicyclists are present. The lack of a left-turn facility from westbound Commonwealth Avenue onto Beacon Street or Brookline Avenue is a notable missing link in the regional bike network. There are bicycle racks supporting parking for more than 100 bikes within a ¼ mile of the Project Area. Inverted "U" bicycle racks are the most prevalent, although post and ring racks are also present.

Three Blue Bike stations are located within a quarter-mile of the Project Area providing a very high density of shared bike access. The closest station is located to the north of the Kenmore Square intersection (on the corner of Deerfield Street and Commonwealth Avenue westbound), which provides 19 bicycle docks. The second station is located southeast of the Kenmore Square intersection at the corner of Brookline Avenue and Commonwealth Avenue. This station has 26 docks. A third station sits at the corner of Silber Way and Commonwealth Avenue and has 19 bicycle docks (this station is currently closed during winter months).

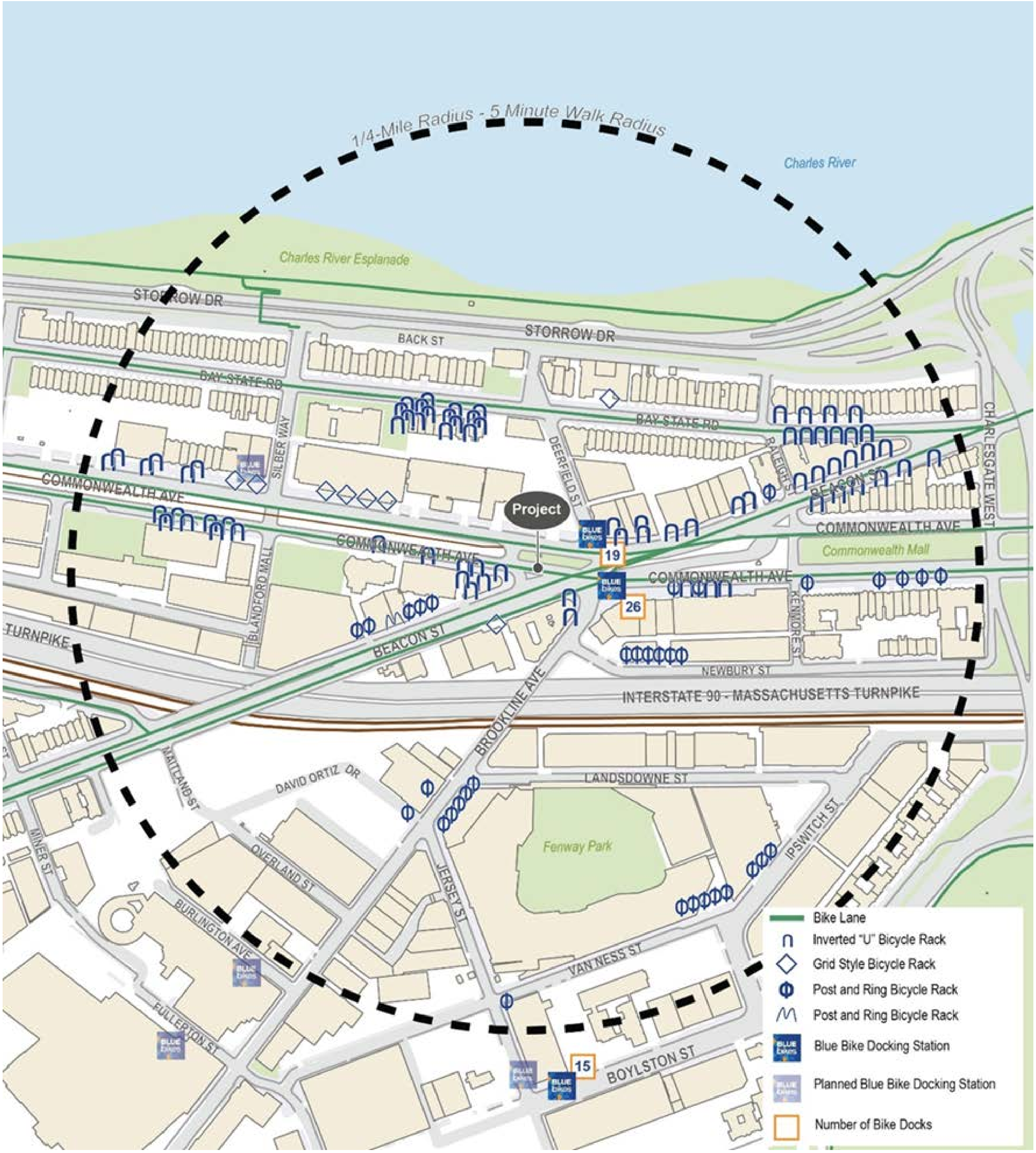
Figure 2-7 shows the current bicycle network within the study area, including bike lanes, bike parking facilities, and bike-share docking stations.

2.2.1.6 Existing Bicycle Volumes

Figure 2-8 shows the Existing peak-hour bicycle volumes for the a.m. and p.m. peaks on the current roadway network. The highest peak hour movements are generally consistent with the highest vehicular movements, with 191 bikes heading eastbound in the a.m. on Commonwealth Avenue and Beacon Street. In the p.m. there are 185 bikes heading westbound on these streets.

2.2.1.7 Transit Conditions

The Project Area is well-served by public transportation. The MBTA Green Line, the Worcester branch of the MBTA's commuter rail, the MBTA bus system, and multiple institutional shuttles all provide access service to Kenmore Square.



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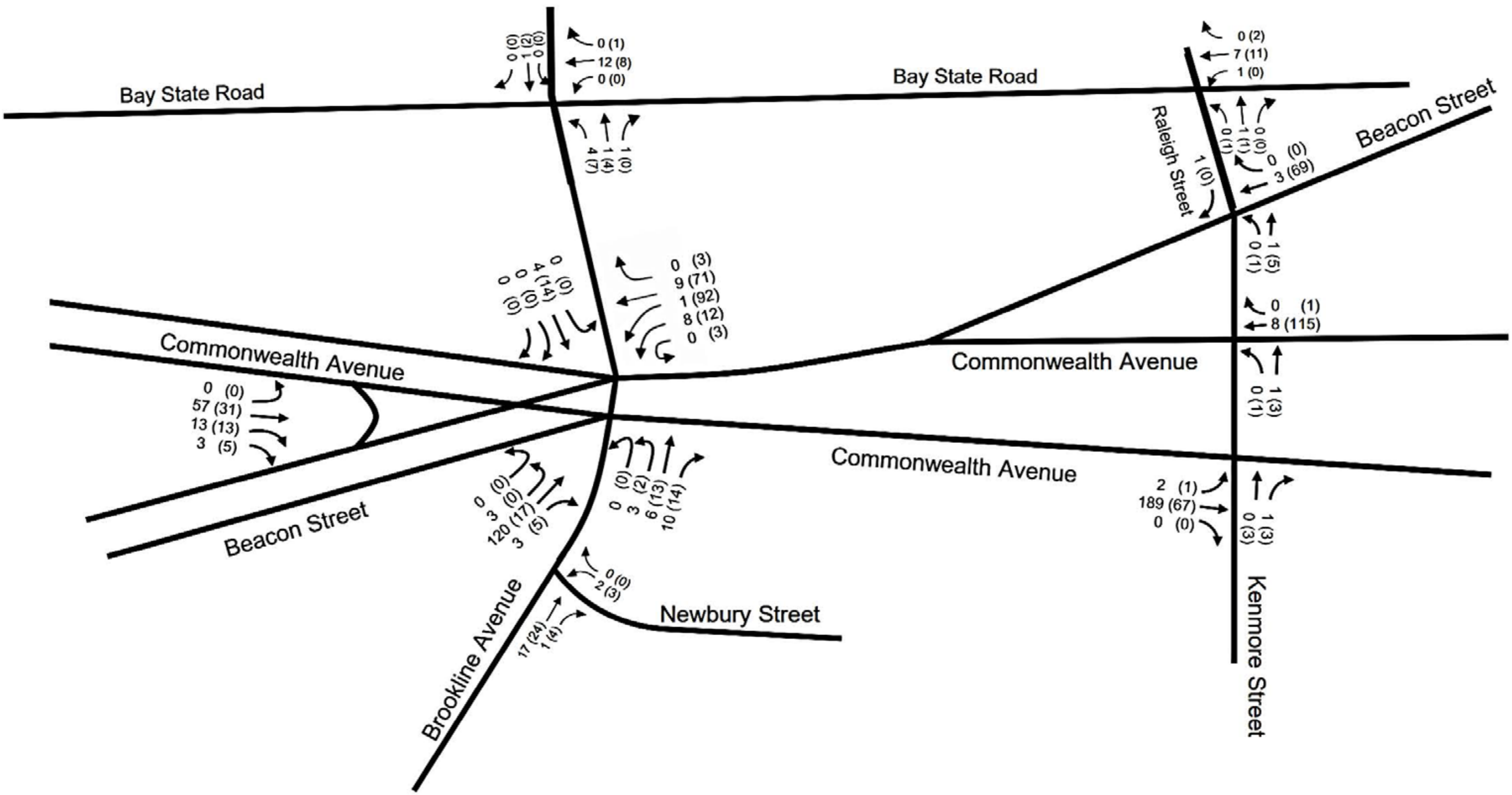

Schematic Diagram:
Not to Scale

One Kenmore Square Boston, Massachusetts

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Figure 2-8
Existing Peak Hour AM (PM) Bicycle Volumes on the Current Roadway Network

The Green Line's Kenmore station serves the B, C and D branches of the Green Line, with over 9,500 passengers boarding these trains at the station on a typical weekday. Green Line service connects Kenmore Square to Brighton, Brookline and Newton to the west, as well as to the Back Bay, Downtown Boston, and North Station to the east. This includes a one-seat ride to all other MBTA subways at either Park Street or Government Center, as well as the North Shore commuter rail lines at North Station via the C branch. An in-line transfer to the Green Line's D branch provides service into Cambridge and will be extended to Somerville and Medford upon the completion of the Green Line Extension project, which is slated to open in 2022.

MBTA Bus Routes 8, 9, 19, 57, 57A, 60, and 65 can be accessed at the Kenmore Station busway in Kenmore Square and provide one-seat service to Harvard Square, Watertown Square, and Chestnut Hill among other desired locations around the region. Route 57 is one of the higher ridership bus routes in the MBTA's system, connecting Watertown and Brighton with Kenmore Square. Once a day, it is the only bus to pass through Kenmore Square along Commonwealth Avenue without stopping in the busway to serve Downtown Boston. All other buses enter and exit via Brookline Avenue, terminating at the Kenmore busway. Meanwhile, MBTA Bus Route 55 is within walking distance of the Project Area, with multiple stops along Ipswich Street providing service between the Fenway neighborhood, Copley Square, and Downtown Boston. Route 9 operates one inbound route to Kenmore Square a day, providing transport from South Boston to Boston Latin School in the Fenway neighborhood.

The Worcester branch of the MBTA's commuter rail stops at Lansdowne Station a short walk away from the Project Area on Beacon Street. Twenty-eight inbound and twenty-six outbound trains connect Kenmore Square with Back Bay Station and South Station to the east, as well as Brighton Landing, several stops in Newton, and multiple stops on the way to Worcester to the west. The single seat ride to South Station provides access to all south shore commuter rail services and Providence, as well as Amtrak intercity service to Washington D.C. and points in between.

Boston University has two shuttle routes that operate in the Study Area: one providing service from the Charles River Campus along Commonwealth Avenue to the Boston University Medical Campus in the South End; and the Fenway shuttle providing service to the Boston University Fenway Campus in the Longwood Medical and Academic Area. Each shuttle serves several stops along Commonwealth Avenue and either turns around in Kenmore Square or passes through *en route* to the Boston University Medical or Fenway campuses.

The Medical Academic and Scientific Community Organization (MASCO), operates several shuttles in the LMA which provide connections for commuters. The Fenway AM, Fenway Mid Express, and Fenway PM routes provide service between the LMA, the Fenway neighborhood, and several parking lots between Beacon Street and Brookline Avenue where there are MASCO affiliates. The Harvard School of Public Health Shuttle (HSPH) provides service from the Harvard School of Public Health in the LMA to the Landmark Center at

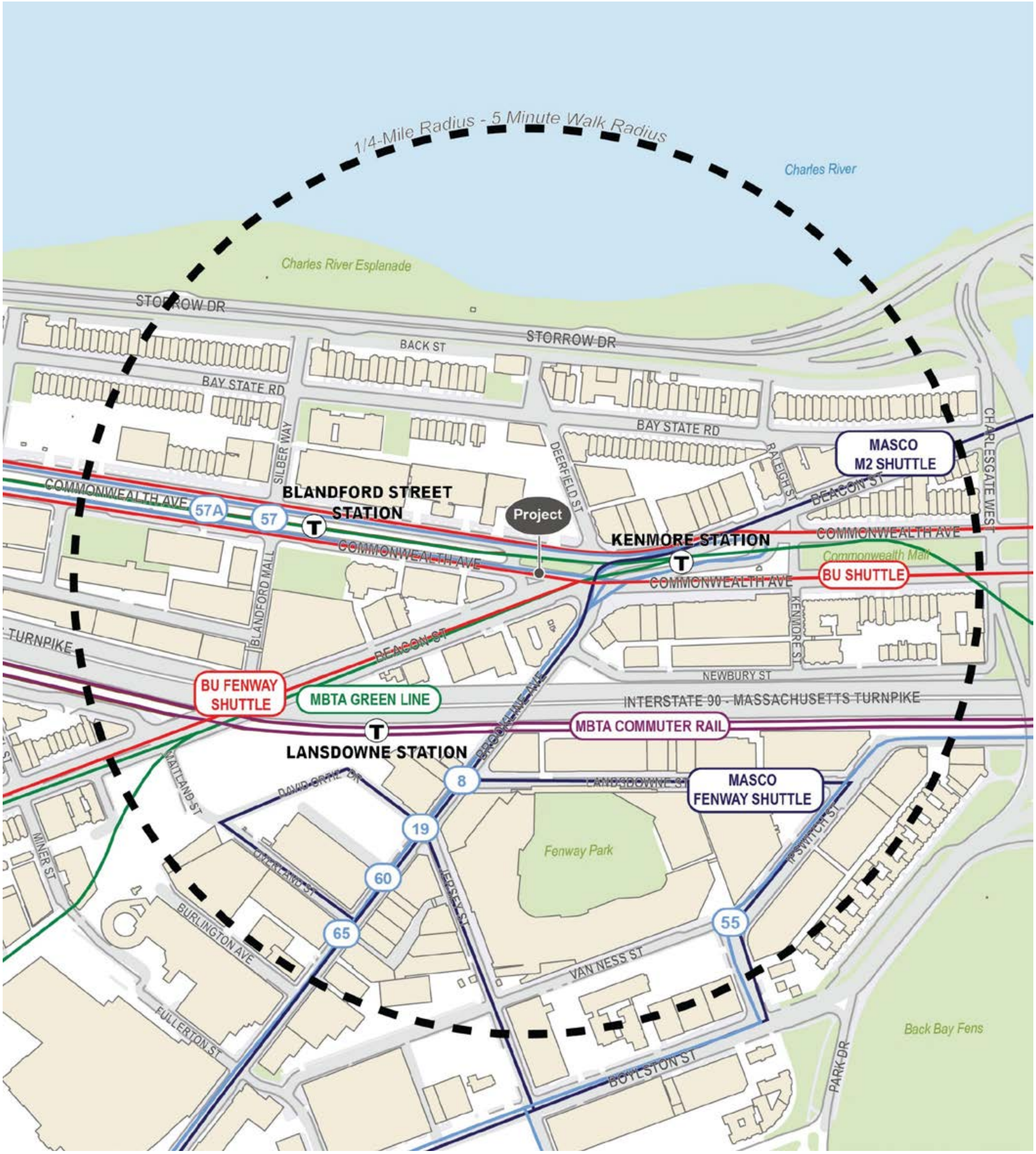
Brookline Avenue and Park Drive in the Fenway neighborhood. The M2 shuttle provides service from the Harvard Medical School campus in the LMA to Harvard Square in Cambridge.

All routes are shown in Figure 2-9 (current roadway network) and are described in more detail in Table 2-5.

2.2.1.8 Parking on the Current Roadway Network

On-street parking and curb regulations in the Study Area are shown in Figure 2-10. The majority of curbside use consists of metered on-street parking with a two-hour time limit with varying additional regulations. Metered parking is available for four-hour intervals closer to Boston University's campus.

The Project will not provide any off-street parking on-site. There are seven off-street parking options available within a quarter-mile radius of the Project. Figure 2-11 shows the location of indoor garages and outdoor surface lots. Any hotel guests or other visitors will be valeted to one of these locations where there will be a contractual relationship with the hotel operator—otherwise driving guests will self-park at a nearby commercial facility of their choosing. Valet operations are described under the loading and servicing section below.



One Kenmore Square **Boston, Massachusetts**

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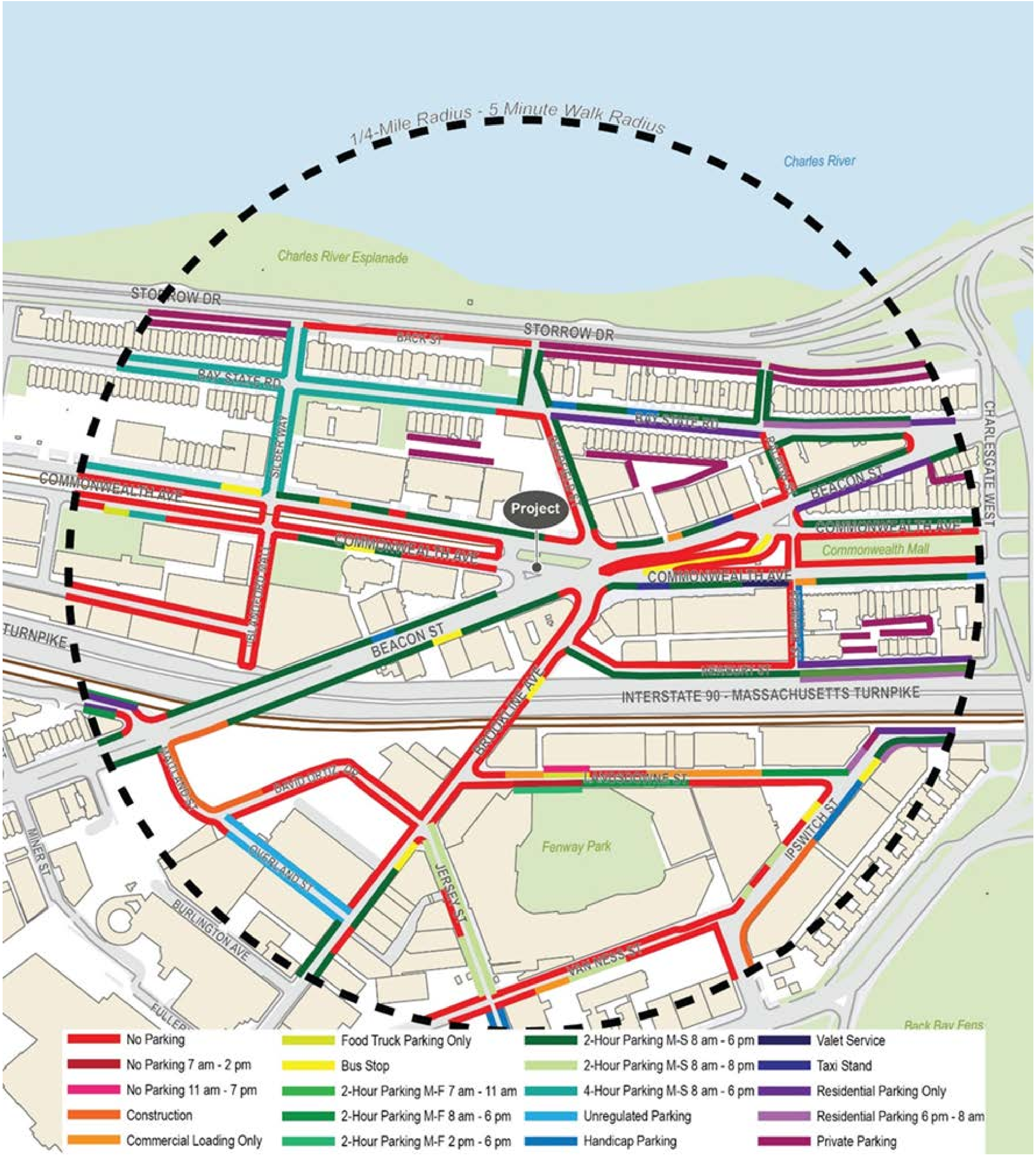
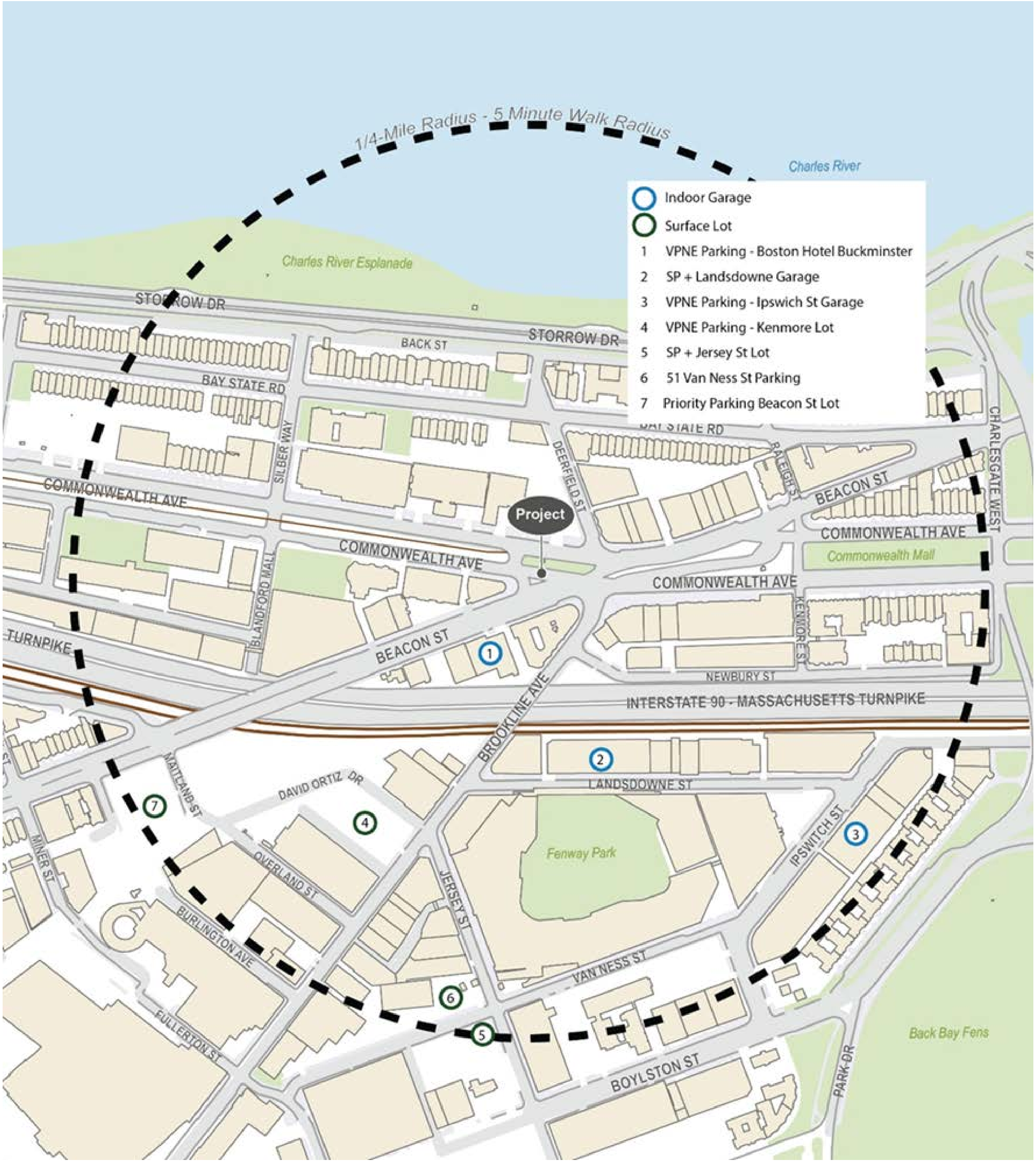
Figure 2-9
Transit Network on the Current Roadway Network



One Kenmore Square Boston, Massachusetts

Figure 2-10
On-Street Parking Regulations in Study Area



One Kenmore Square   Boston, Massachusetts

Figure 2-11
Off-Street Parking Facilities in Study Area

Table 2-5 Transit Service in Kenmore Square

Transit Route	Transit Operator	Origin/ Destination	Major Stops	Weekday Operating Hours	Peak Hour Frequency (minutes)	Daily Boardings (2018)
Green Line B Branch	MBTA	Park Street – Boston College	BU Packards Corner Chestnut Hill Boston College	5:01 am – 1:29 am	Inbound 1-5 Outbound 5-11	159,902 (all branches)
Green Line C Branch	MBTA	North Station – Cleveland Circle	Coolidge Corner Washington Square Cleveland Circle	5:01 am – 1:20 am	Inbound 1-5 Outbound 6-12	159,902 ((all branches)
Green Line D Branch	MBTA	Government Center – Riverside (Newton)	Longwood Newtown Centre Riverside	4:56 am – 1:49 am	Inbound 1-5 Outbound 5-11	159,902 (all branches)
Worcester Commuter Rail	MBTA	South Station – Union Station (Worcester)	Back Bay Boston Landing Framingham	4:40 am – 1:51 am	Inbound (AM) 15-20 Outbound (PM) 10-30	1,023
8	MBTA	Harbor Point/ Umass – Kenmore Station via B.U. Medical Center and Dudley Square	South Bay Center Wentworth Institute Longwood	5:15 am – 12:56 am	30	3,048
9	MBTA	City Point – Kenmore Station via Boston Latin	City Point Broadway Copley Square	5:13 am – 1:13 am	5-10	6,430
19	MBTA	Fields Corner – Kenmore Station	Fields Corner Uphams Corner Fenway	5:50 am – 7:45 pm	15-20	3,125

Table 2-5 Transit Service in Kenmore Square (Continued)

Transit Route	Transit Operator	Origin/ Destination	Major Stops	Weekday Operating Hours	Peak Hour Frequency (minutes)	Daily Boardings (2018)
55	MBTA	Queensbury Street – Park Street via Copley	Boylston Street (Fenway) Hynes Convention Center Copley Square Beacon Hill	5:48 am – 11:10 pm	15	634
57	MBTA	Watertown Yard – Kenmore Station	Watertown Yard Newton Corner Brighton Center Union Square (Allston)	4:33 am – 1:30 am	10	8,782
57 A	MBTA	Oak Square – Kenmore Station	Oak Square Brighton Center Union Square (Allston)	5:42 – 9:30 am 4:30 – 7:06 pm	10	1,773
60	MBTA	Chestnut Hill – Kenmore Station	Chestnut Hill Brookline Village Longwood Medical Area	4:55 am – 12:18 am	25-30	1,319
65	MBTA	Brighton – Kenmore Station	Brighton Center Washington Square Longwood Medical Area	5:58 am – 8:58 pm	20	2,418
Medical Campus Shuttle	Boston University	Charles River Campus (Comm Ave) – Medical Campus (South End)		7 am – 11:55 pm	10	Not Available

Table 2-5 Transit Service in Kenmore Square (Continued)

Transit Route	Transit Operator	Origin/ Destination	Major Stops	Weekday Operating Hours	Peak Hour Frequency (minutes)	Daily Boardings (2018)
Fenway Campus Shuttle	Boston University	Charles River Campus (Comm Ave) – Fenway T Station	Comm Ave at Blandford St Brookline Avenue at Pilgrim Road	7 am – 10 pm	20	Not Available
Fenway AM/Mid Express/PM Shuttle	MASCO	Landsdowne MBTA Station – Longwood	Fenway Satellite Parking Lots	5:05 am – 9:49 pm	6	Not Available
HSPH Shuttle	MASCO	Harvard School of Public Health (Longwood) – Landmark Center (Fenway)		7 am – 6:25 pm	35	Not Available
M2 Shuttle	MASCO	Harvard Medical School (Longwood) – Harvard Square (Cambridge)	Kenmore Square	6:40 am – 11:52 pm	10	Not Available

Table 2-6 shows parking supply of parking garages and surface lots in the study area that can be considered for a parking agreement with the hotel operator.

Table 2-6 Off-Street Parking Capacity

Lot	Number of Spaces
Priority Parking Beacon Street Lot	249
VPNE Parking – Ipswich St Garage	239
VPNE Parking – Kenmore Lot	207
SP+ Jersey Street Lot	95
51 Van Ness St Parking	75
VPNE Parking – Boston Hotel Buckminster	56
SP+ Lansdowne Garage	50
Total	971

2.2.1.9 Freight Network

Local freight delivery occurs on all streets in the Study Area, with regular deliveries observed curbside and into alleys and side streets throughout Kenmore Square. No dedicated truck routes exist in Kenmore Square. According to an interactive map of the trucking network within Massachusetts (per MassDOT website), there is a 24-hour freight restriction for all vehicles 2.5 tons and over along Bay State Road between Charlesgate West to the east and Granby Street to the west. No other roadways in the Study Area have commercial vehicle exclusions.

2.2.2 Proposed Roadway Network

The proposed roadway configuration will decompress the complex, expansive, but single-point intersection of Commonwealth Avenue, Beacon Street, Brookline Avenue, and Deerfield Street located at the heart of Kenmore Square. The proposed configuration simplifies the major crossing movements and creates two new, smaller intersections along the new connector road (New Road) at the western edge of the Project Area. This proposed reconfiguration will reduce the size and complexity of the primary intersection, significantly reducing overall delays and dispersing conflict points that are currently aggregated at the main intersection. The two new smaller intersections to the west each have simple operations, resulting in fewer delays and conflicts. The resulting integrated system at the three corners of the new public plaza will be built as part of the Project formed will operate as a coordinated system not dissimilar from how the eastern half of Kenmore Square operates today. Collectively, Kenmore Square will operate with signals progressed to minimize delays while maximizing pedestrian throughput.

A key part of dispersing Kenmore's conflicts is removing the crossing movements of westbound Beacon/Commonwealth to Beacon Street and eastbound Commonwealth to Commonwealth Avenue. Both the westbound lanes of Beacon Street and the eastbound lanes of Commonwealth Avenue to the east of New Road are removed and replaced by the new public plaza. This increases public realm space in Kenmore Square and results in an active pedestrian plaza in the heart of Kenmore Square.

Not only is the plaza a large public space, but it is now connected to the rest of Kenmore Square by several new signalized crosswalks—each significantly shorter than any existing crosswalk. In addition, the new street configuration provides space for protected and raised bike lanes, which include dedicated left-turn bike signals that allow for the safe movement of bicycles.

The specific changes to vehicle movements are described below:

- The most significant physical change is the creation of "New Road," a new southbound public street through the existing 560-574 Commonwealth Avenue site from Commonwealth Avenue westbound to Beacon Street.

- Beacon Street transitions to a three-lane, one-way eastbound road between New Road and the Brookline Avenue / Commonwealth Avenue / Beacon Street intersection. Cross vehicular traffic that once took a slight left turn from Commonwealth Avenue westbound to Beacon Street now continues straight around the north side of the new public plaza on Commonwealth Avenue westbound, turning left at New Road and making a right turn onto Beacon Street in one signal phase.

- Continuing eastbound vehicular traffic on Commonwealth Avenue turns left at New Road and right onto Beacon Street. From Beacon Street, vehicles make a slight right turn onto Commonwealth Avenue. Eastbound Commonwealth Avenue vehicular traffic uses the same maneuver to turn right onto Brookline Avenue.

- Vehicles that once made a U-turn from Commonwealth Avenue westbound to Commonwealth Avenue eastbound at the Kenmore Square intersection will continue onto Commonwealth Avenue westbound, turn left at New Road, turn right onto Beacon Street, and make a slight right turn onto Commonwealth Avenue eastbound.

- Vehicles that once made a U-turn from Commonwealth Avenue eastbound to Commonwealth Avenue westbound just before the Kenmore Square intersection will turn right onto New Road, right on Beacon Street, and take a slight right onto Commonwealth Avenue eastbound. After the Brookline Avenue / Commonwealth Avenue / Beacon Street intersection, the vehicular traffic will turn left onto Kenmore Street at the Commonwealth Avenue eastbound / Kenmore Square intersection and left again at the Commonwealth Avenue westbound / Kenmore Street intersection. From there, vehicles can continue straight on Commonwealth Avenue westbound.

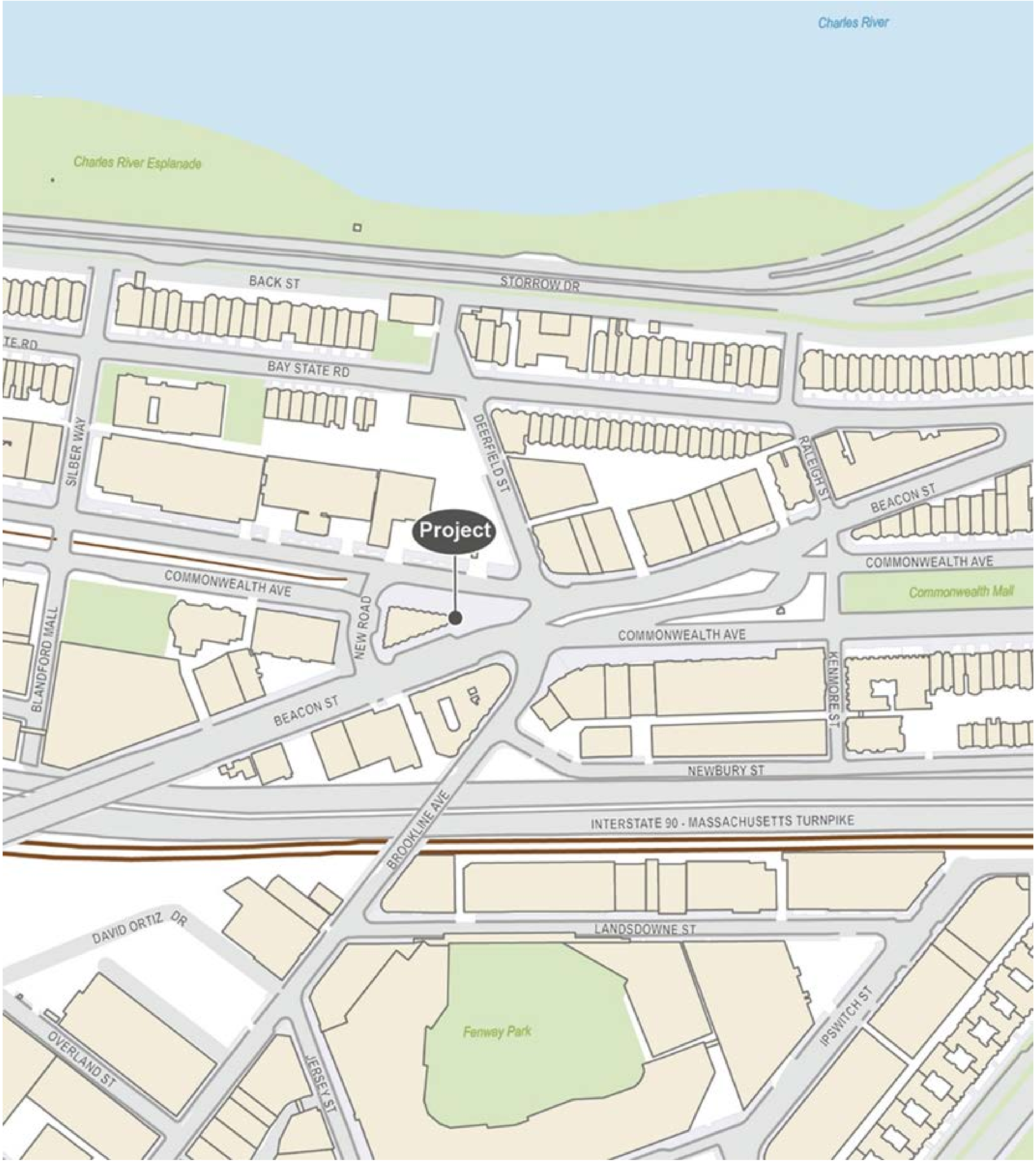
- Vehicles turning from Commonwealth Avenue westbound onto Brookline Avenue can still make the left turn at the Brookline Avenue / Commonwealth Avenue / Beacon Street intersection. No changes are made to vehicle moves on Brookline Avenue to Deerfield Street.

In addition to the new public plaza in the center of the intersection, the proposed configuration allows for more crosswalks and shorter crossing distances where crosswalks exist today, significantly improved and connected bicycle facilities and biking routes, and integrated, coordinated signal timings that reduce wait times for pedestrians, cyclists and motorists.

Figure 2-12 shows the proposed roadway network.

2.2.1.2 Existing Vehicle Volumes on the Proposed Network

Figure 2-13 shows the Existing peak hour vehicle volumes for the a.m. and p.m. peaks loaded onto the proposed roadway network, accounting for turning movements which have been dispersed from Kenmore Square.



One Kenmore Square Boston, Massachusetts

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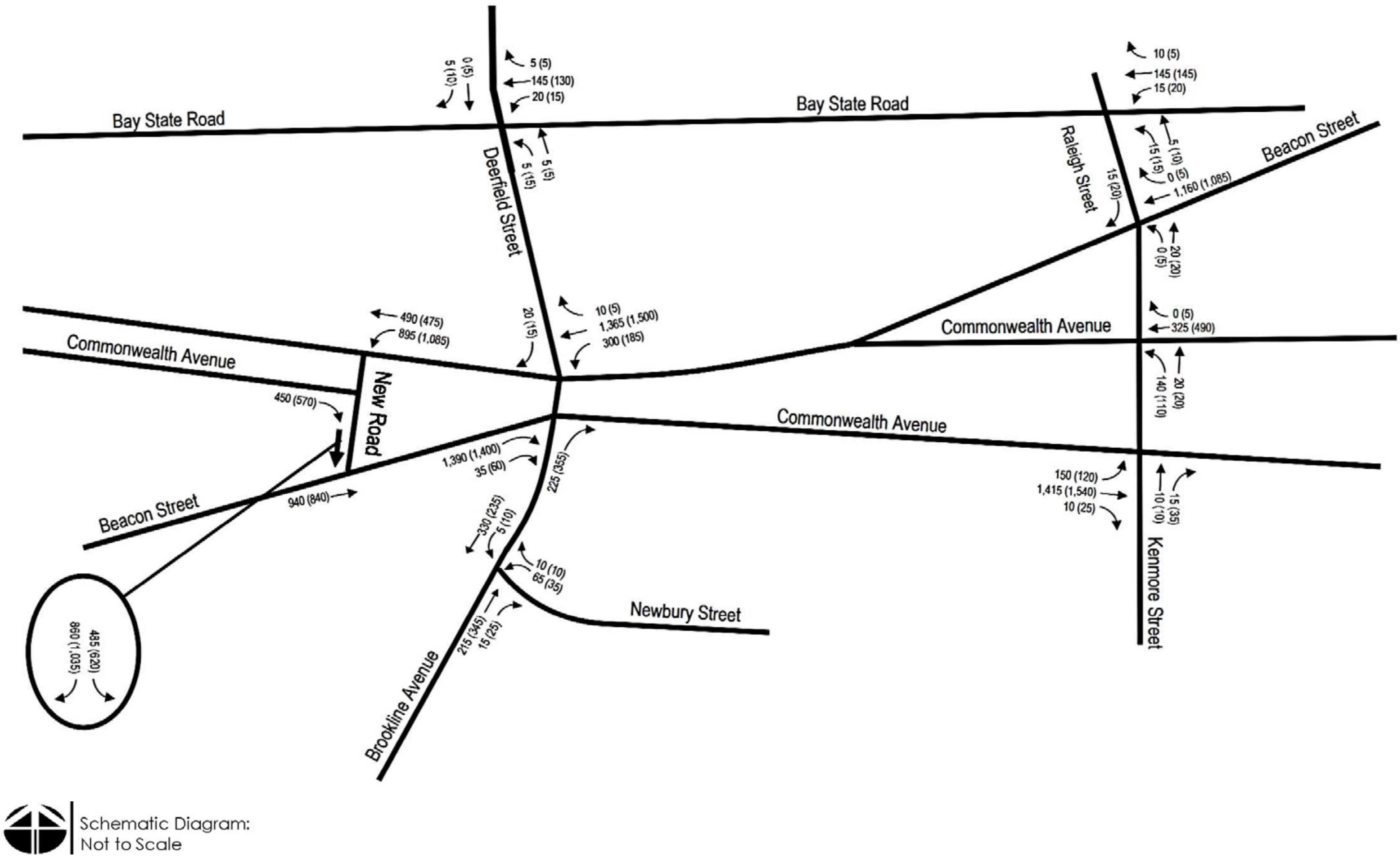
Figure 2-12
Proposed Roadway Network



One Kenmore Square **Boston, Massachusetts**

Figure 2-13

Existing Peak Hour AM (PM) Vehicle Volumes on the Proposed Roadway Network

2.2.2.2 Proposed Pedestrian Conditions

The proposed roadway configuration at the Kenmore Square intersection has thirteen signalized crosswalks connecting across Kenmore Square, to the MBTA station, or to the new public plaza. This nearly doubles the quantity of crossings in Kenmore Square from seven today. Several existing crosswalks that remain have been shortened, and all new or replacement crosswalks create significantly shorter crossings than exist today. The longest proposed crosswalk is 60-feet—19% shorter than the longest crosswalk today. See Table 2-7 below.

There are several new crossings proposed for Kenmore Square. In the heart of Kenmore Square, a new short crosswalk with low crossing delay has been added between the central MBTA station access and the new plaza, which opens several new points of access between the station and points in Kenmore Square to the north, west, and south. Coupled with lower delays on the eastern crossings of Commonwealth Avenue and new access to much shorter crossings of Beacon Street and Commonwealth Avenue to the west of Brookline Street and Deerfield Street, the analysis suggests that walk access to transit at Kenmore Station will become much easier, extending the range of convenient last-mile access to the MBTA.

Meanwhile, the addition of New Road and its associated crosswalks across Commonwealth Avenue and Beacon Street adds a new north-south connection in the heart of Kenmore Square along the western edge of the new plaza, helping add more routes for pedestrians across Kenmore Square. Similarly, the new east-west crosswalks, which connect the new public plaza directly with the Commonwealth Avenue Mall to the west and Kenmore Station to the east, open up a new activated walking route through Kenmore Square, in much the same way that Harvard Station's headhouse is activated in between Massachusetts Avenue and JFK Street in Cambridge.

In total, the number of available walking routes between the northern and southern sides of Kenmore Square increases from two to nine. Figure 2-14 shows the crosswalks and their respective lengths per the proposed roadway network. As supplemental detailed analysis and design is conducted in coordination with BTD, it is expected that overall pedestrian capacity in Kenmore Square will increase significantly and walking delays will drop dramatically.

While walking comfort and convenience will help the Square and transit access, the safety benefits of the proposed crosswalk changes should be noted. Exposure to potential vehicular conflicts increases when crosswalks are long, or signal delay is lengthy. The proposed design shortens crosswalks or adds significantly shorter new crosswalks while reducing crossing delays. These changes are expected to reduce vehicular exposure, increase compliance with pedestrian signal indications, and increase driver awareness of pedestrians in Kenmore Square—all of which are expected to improve overall safety.

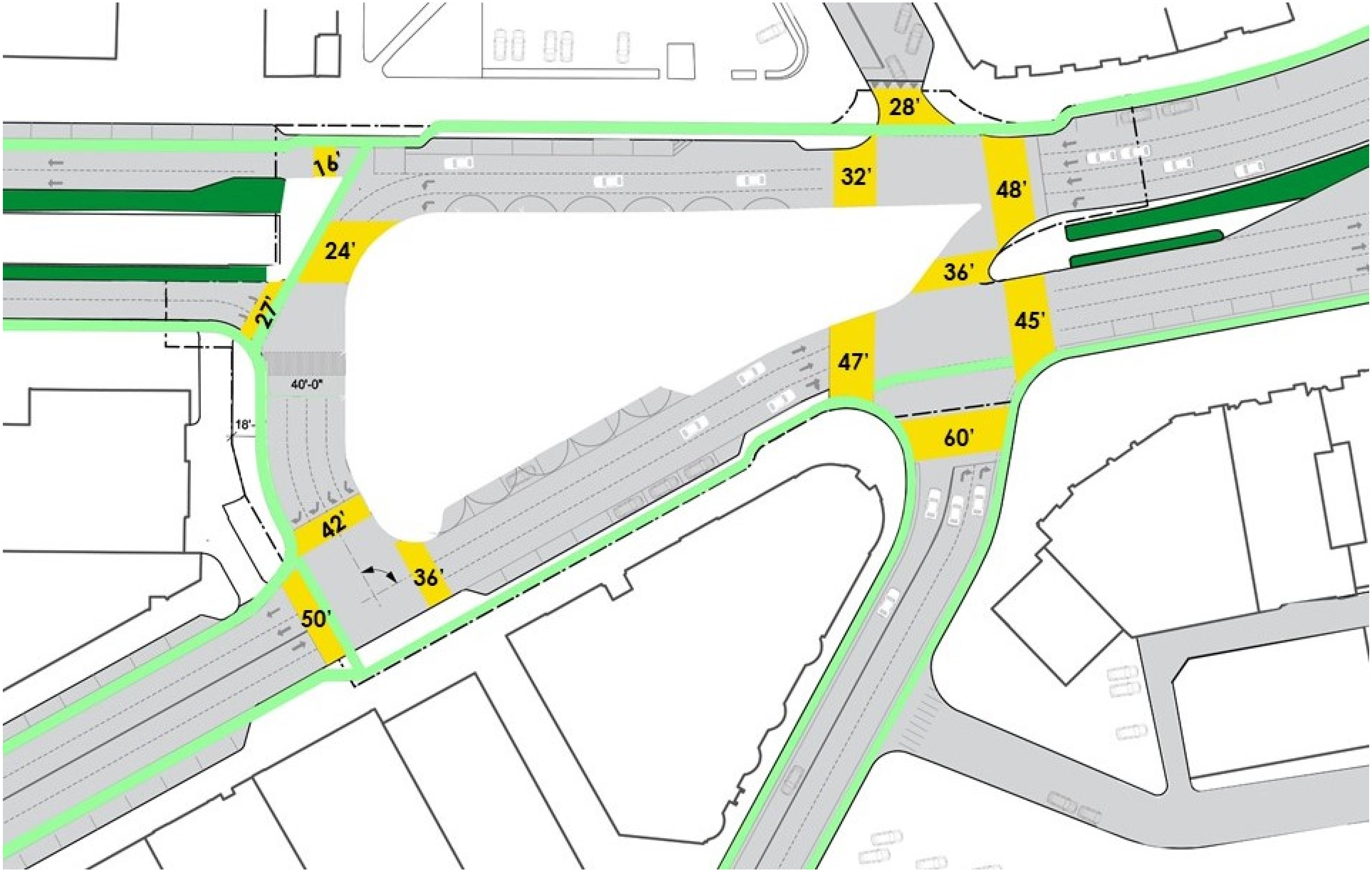


Figure 2-14
Proposed Roadway Network Crosswalks

Table 2-7 Crosswalk Changes on Proposed Roadway Network

Crosswalk	Length	Changes
Brookline Street	60′	7′ / 10% Shorter
Commonwealth Avenue eastbound (@ busway)	45′	No Change
Commonwealth Avenue westbound (@ MBTA busway)	48′	4′ / 8% Shorter
MBTA busway to public plaza	36′	NEW
Deerfield Street	28′	20′ / 42% Shorter
Commonwealth Avenue eastbound (@ public plaza)	32′	1′ / 3% Shorter
Beacon Street eastbound westbound (@ public plaza)	47′	1′ / 2% Shorter
Commonwealth Avenue westbound (@ MBTA portal)	16′	NEW
Commonwealth Avenue eastbound (@MBTA portal)	27′	NEW
MBTA portal to public plaza	24′	NEW
New Road	42′	NEW
Beacon Street (west of New Road)	50′	NEW
Beacon Street (east of New Road)	36′	NEW

2.2.2.3 Existing Pedestrian Volumes

Figure 2-15 shows the Existing peak hour pedestrian volumes for the a.m. and p.m. peaks assigned to the proposed roadway network. No future pedestrian volumes were analyzed on the current or proposed roadway networks, but pedestrians will have many more options available where existing and future volumes could be assigned.

2.2.2.4 Proposed Bicycle Conditions

The Project has been coordinating its bicycle design concepts with Related Beal's proposed improvements and made refinements with appropriate City staff for consistency with ongoing City efforts in the area. Specific meetings on area bicycle plans and City guidelines were held with the Active Transportation Director at BTD. Based on ongoing discussions, the proposed configuration has been adapted to be consistent with improvements proposed by the City and others while retaining improved bicycle connectivity throughout the Kenmore Square area. The result is a cohesive plan that provides a safe environment for all bicyclists in Kenmore Square.

The proposed roadway network includes robust changes to the existing bicycle network in Kenmore Square, including the incorporation of bicycle accommodations in the proposed signal system. Infrastructure changes to accommodate the new roadway pattern creates space to install protected bicycle lanes on all approaches, with some rebuilt at sidewalk level, depending on coordination with ongoing City plans.

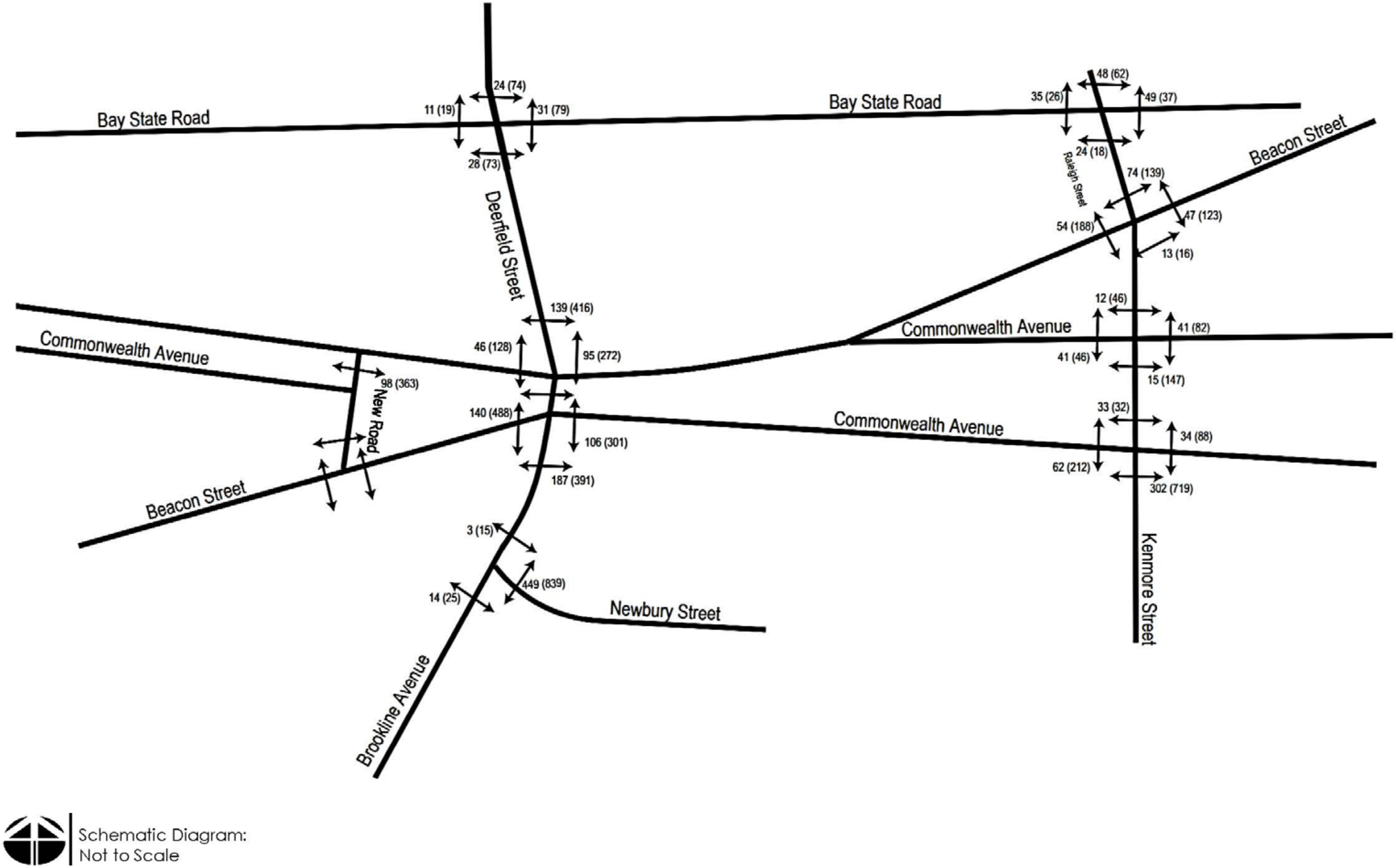


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Figure 2-15

Existing Peak Hour AM (PM) Pedestrian Volumes on the Proposed Roadway Network

Proposed bicycle improvements are consistent with the City's latest guidelines which prioritize protection of vulnerable pedestrian populations, including children, seniors, and the disabled. The new southbound cycle track between westbound Commonwealth Avenue and Beacon Street enables cyclists to have a more direct route of travel across Kenmore Square safely instead of navigating the current unsafe left from Commonwealth Avenue to Beacon Street. Details of the proposed biking system follow:

- The Commonwealth Avenue westbound bike lane is converted to a parking-protected bike lane with buffer per Boston Complete Streets Guidelines (BCSG).
- Bikes turning left from Commonwealth Avenue westbound to Beacon Street will have a dedicated signal to proceed across Commonwealth Avenue and south on New Road to Beacon Street.
- Bike signals, turn boxes, ramp grades and transitions will be integrated into intersection designs.

Figure 2-16 shows the proposed bicycle network. The dotted line indicates the Project construction limits.

2.2.2.5 Proposed Bicycle Circulation

Figure 2-17 shows the Existing peak hour bicycle volumes for the a.m. and p.m. peaks assigned to the proposed roadway network.

2.2.2.6 Proposed Transit Conditions

Most bus routes serving the Kenmore busway are unaffected by the proposed physical reconstruction of Kenmore Square. Outbound service on MBTA Bus Routes 8, 19, 60, and 65 turns left out of the busway, proceeds westbound on Commonwealth Avenue, and turns left at the signal onto to Brookline Avenue. Inbound services turn right from Brookline Avenue to Commonwealth Avenue eastbound and enter the busway across Commonwealth Avenue. Neither of these movements will be physically impacted by the roadway network redesign, and both are expected to have significantly reduced signal delays due to improved signal operations.

MBTA Routes 57 and 57A will see a modification in their path on the inbound (eastbound) approach as a result of the network redesign. Outbound service will remain the same with busses continuing straight on Commonwealth Avenue westbound towards Allston / Brighton after leaving the busway. Inbound buses will turn right onto New Road from Commonwealth Avenue eastbound, then turn left onto Beacon Street eastbound during a single signal phase. From Beacon Street, they will continue onto Commonwealth Avenue eastbound as they do

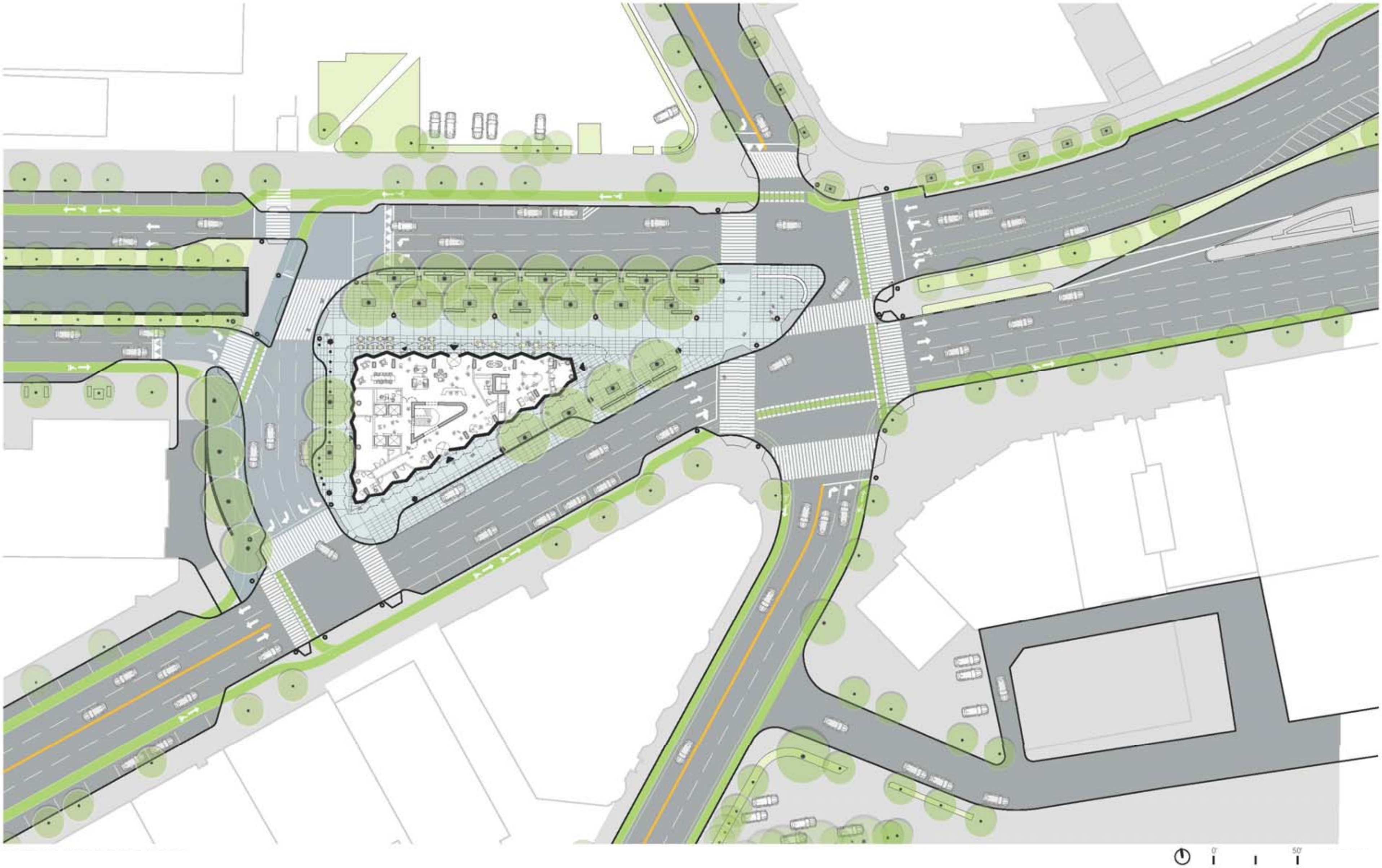

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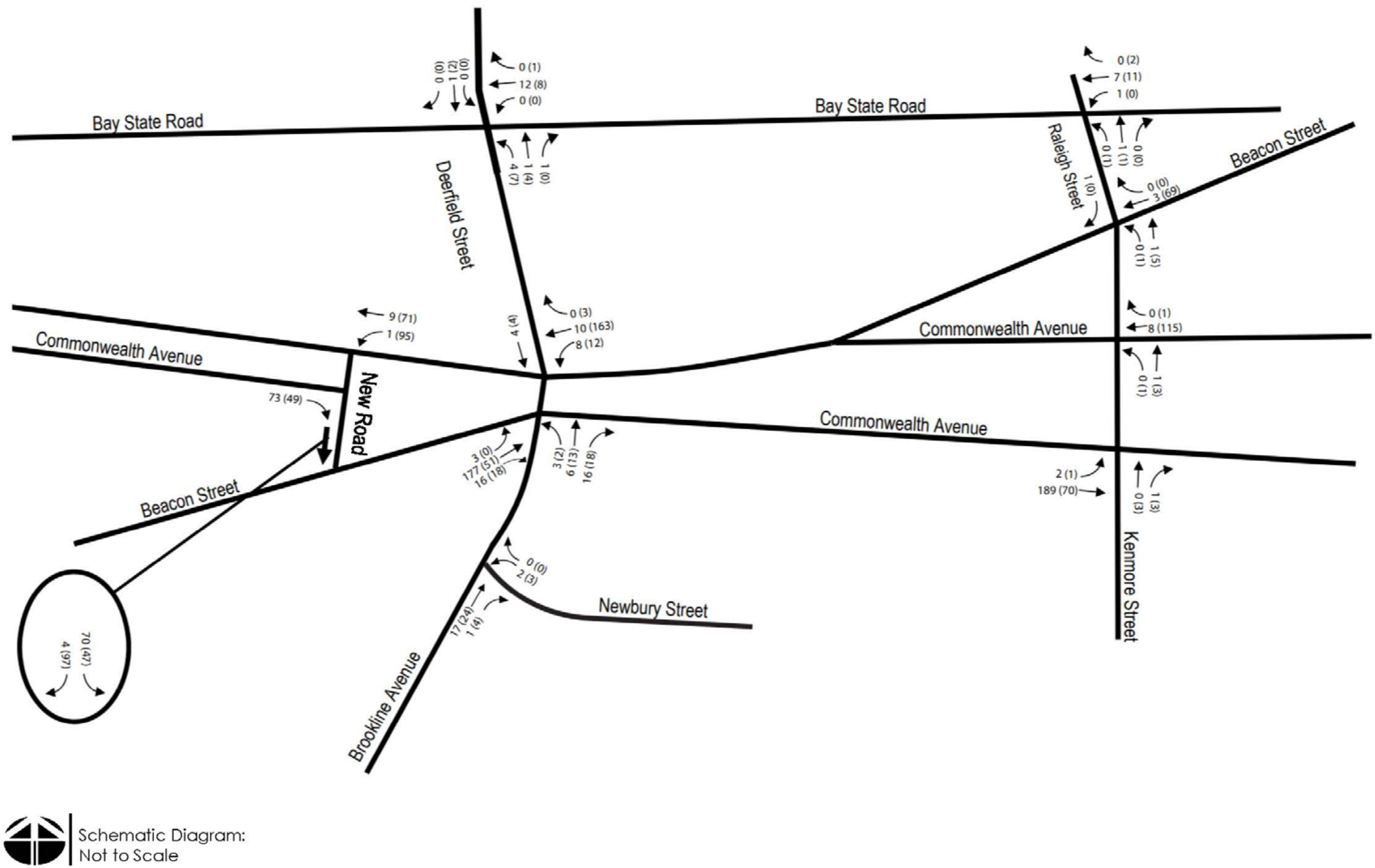
Figure 2-16
Pedestrian and Bicycle Network



One Kenmore Square   Boston, Massachusetts

Figure 2-17

Existing Peak Hour AM (PM) Bicycle Volumes on Proposed Roadway Network today and enter the busway on Commonwealth Avenue. All of these changes have been discussed in meetings with MBTA bus operations personnel, and future meetings will be held to ensure that final designs accommodate existing and planned bus operations in Kenmore Square.

The MBTA recently published a set of findings and recommendations for bus service as a result of the Better Bus Project. Of the eight bus routes in the study area, only five were recommended for change and only two saw recommendations that will impact Kenmore Square directly. The Better Bus Project recommended Route 19 provide all day service to Kenmore Square, as it currently only operates during a.m. peak hours. The Better Bus Project also recommended Route 65 terminate at Ruggles Station and no longer serve Kenmore Square. Neither of these recommendations would drastically change the transit conditions in Kenmore Square.

Both Boston University shuttles pass through the Kenmore Square intersection proposed to be redesigned and will be impacted by the roadway network redesign. The Medical Campus shuttle's route will turn right onto New Road, left onto Beacon Street, and then continue on Commonwealth Avenue. The Fenway Campus shuttle will turn right onto New Road and right onto Beacon Street before continuing its existing route. These minor impacts have been discussed with and are understood by Boston University transportation services personnel.

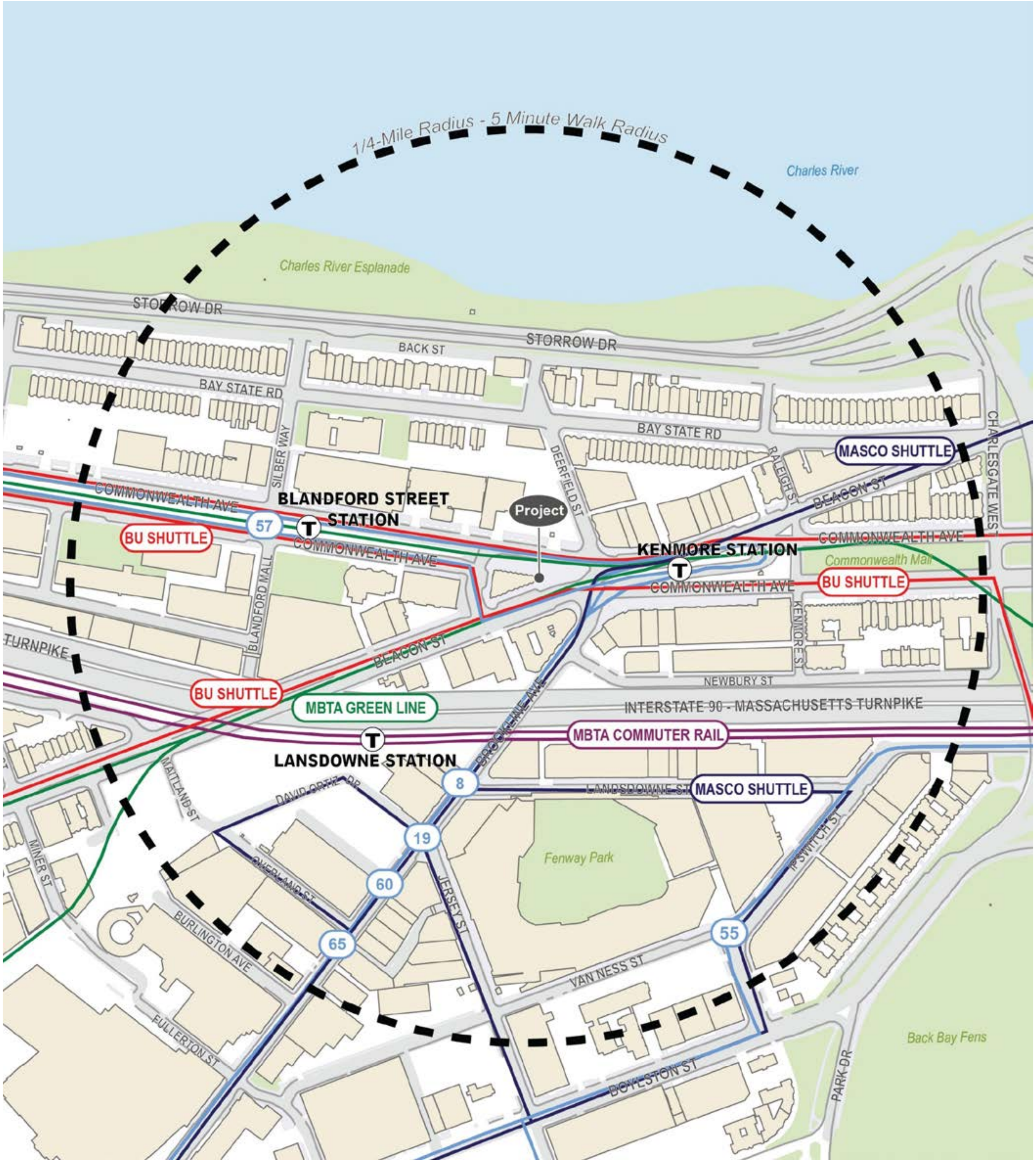
MASCO's M2 Shuttle passes through Kenmore Square, turning left from Commonwealth Avenue westbound to Brookline Avenue inbound and right from Brookline Avenue to Commonwealth Avenue eastbound outbound. Neither of these turning movements will be impacted by the roadway network redesign.

Figure 2-18 shows the transit routes on the proposed roadway network.

2.2.2.7 Proposed Parking

The proposed roadway network is expected to reduce the number of on-street metered parking spaces by one and increase the number of on-street loading and drop-off spaces by seven. to overall curbside use include the following as currently designed.

- ♦ On-street spaces on the north side of Commonwealth Avenue westbound in front of Boston University's parking lot will be moved southward to accommodate the protected bike lane, and the curb extension for a new crossing might result in a one-space loss;
- ♦ New Road will include a two-space commercial loading zone;
- ♦ Beacon Street westbound will not lose any parking but its location may be modified through the City's proposed bicycle improvements;



One Kenmore Square Boston, Massachusetts

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Figure 2-18
Bus Network on Proposed Roadway Network

- The southern edge of Beacon Street eastbound retains all current spaces and curb cuts, potentially with safety improvements as part of the new signalized intersection with New Road; and
- The northern curb of Beacon Street eastbound will have five new loading and drop-off spaces along the public plaza.

The hotel building will accommodate 10 to 15 bicycles with indoor long-term parking for staff who choose to bike to work. The indoor parking will be located on the second floor and will be accessible by the service elevator. Additionally, the Project will accommodate short-term parking outdoors for approximately 20 bicycles.

The Project is located within the Restricted Parking Overlay District and will not provide any on-site off-street vehicle parking. Arrangements for off-street parking will be available at a nearby off-site garage or surface parking lot. A description and figure of existing area parking facilities was described in the previous Section 2.2.1.8 and shown in Figure 2-10 and Figure 2-11.

2.2.2.8 Loading and Service

The Project and reconfigured Kenmore Square include two areas dedicated to loading and access. The first will be located on New Road and will be long and wide enough to accommodate a 30-foot box truck, and the second loading curb will be located on Beacon Street and will be long and wide enough to accommodate five passenger vehicles, as shown in Figure 2-19. All curbside activity will be actively managed by the hotel operator, including the engagement of a professionally licensed valet parking operator holding all appropriate City of Boston permits and licenses.

Passenger and hotel guest loading will occur on the Beacon Street curb, which will be managed as described above. This drop-off area is shown on Figure 2-20, with space for at least five vehicles, and is located close to the main hotel lobby entrance.

The final allocation and operation of this approximately 100-foot space will be determined on an ongoing basis in coordination with BTD during their valet permitting process. However, preliminary analysis and examination with hotel and valet operators suggests that this space will be divided between valet operations and drop-off/pick-up operations for general vehicles, taxis and TNCs.

Using the ITE Trip Generation's table for daily hotel trip generation by hour of day, the percentage of trips arriving at the hotel at any time of the day was calculated. Between 3 p.m. and 9 p.m., over one-third of all trips are expected to arrive at the Project. Besides this evening peak, vehicles arrive on a regular basis throughout the day. Table 2-8 shows the result.

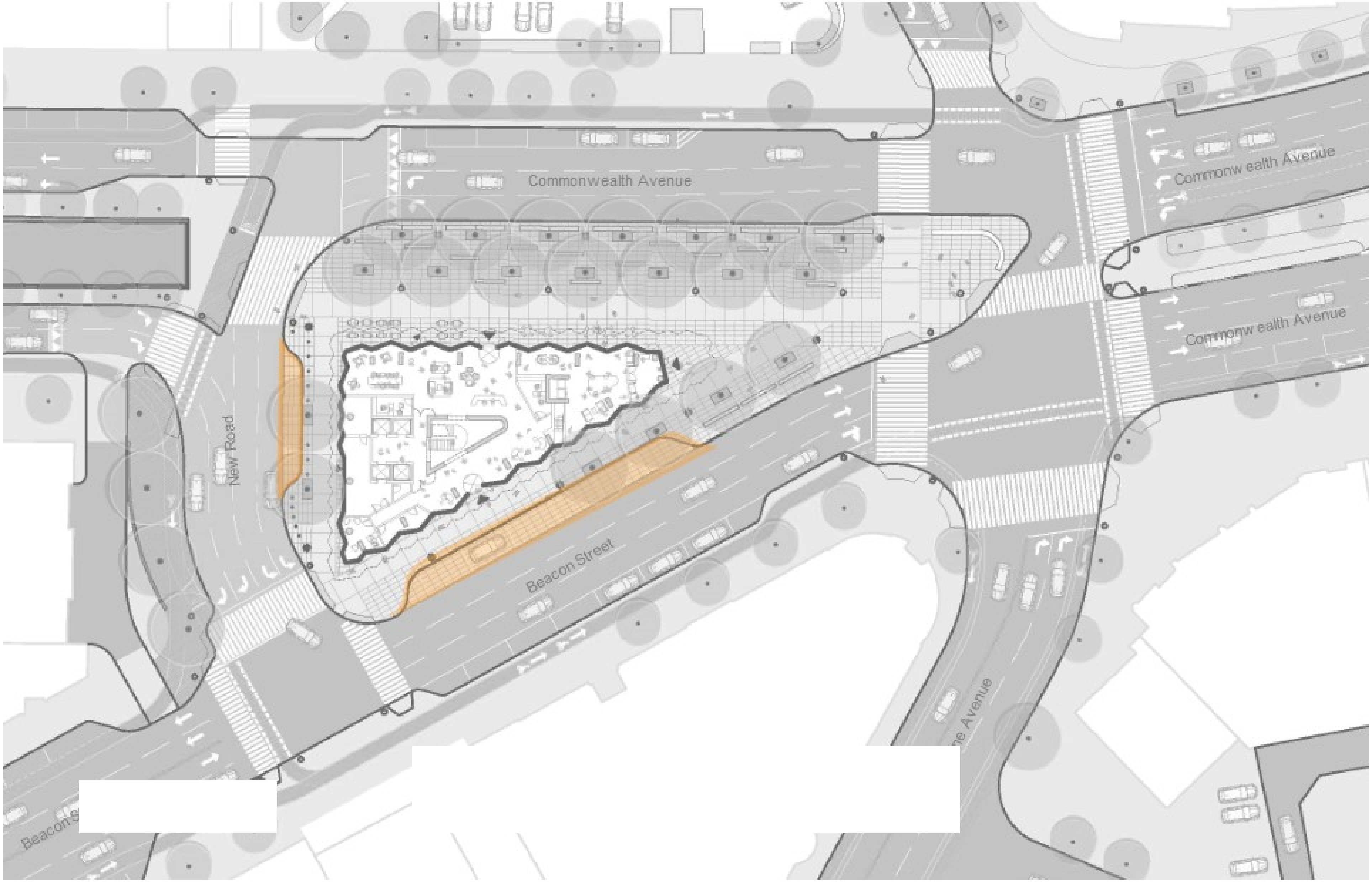

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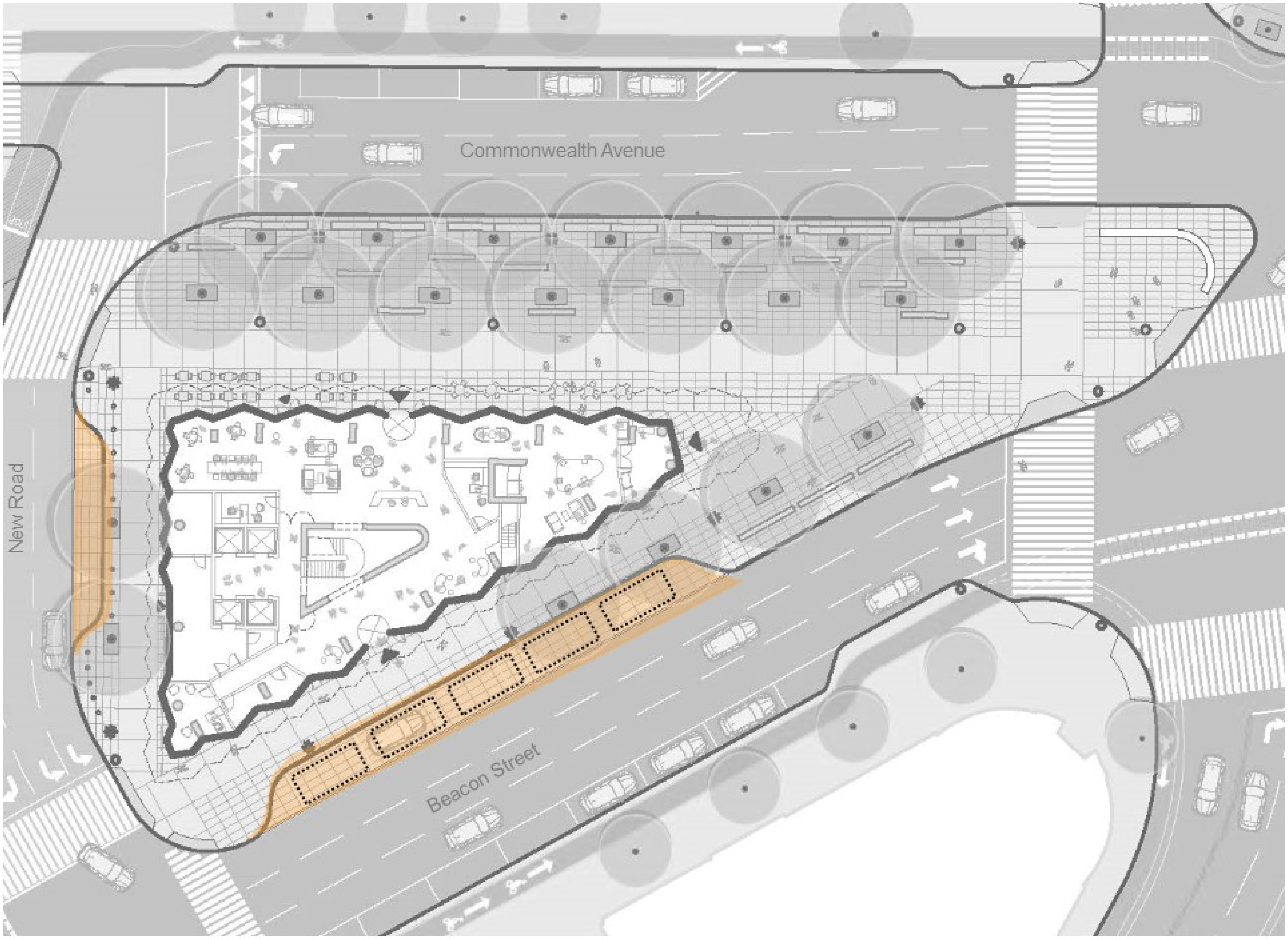
Figure 2-19
Dedicated Loading Areas



One Kenmore Square Boston, Massachusetts

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Figure 2-20
Passenger Loading Curb Capacity

Table 2-8 Expected Vehicle Arrival by Time of Day

Period of Day	Hours	Percent of Expected Vehicles
Early Morning	12 to 6 am	7%
Peak Morning	6 to 9 am	11%
Mid-Morning	9 to 11 am	10%
Mid-Day	11 am to 3 pm	22%
Afternoon	3 to 4 pm	9%
Peak PM	4 to 9 pm	27%
Night	9 to 12 pm	13%

Service and delivery activity for Project operations will be handled primarily on the New Road curbside, adjacent to the service area of the Project. The Proponent has consulted with potential operators of similar hotel facilities in design preparation and identified expected levels of service and loading activity. On a daily basis, the hotel is expected to have receive three to five box trucks (SU-30's) to provide laundry, trash, and other delivery services. These trucks will be directed to use the loading zone on New Road, and their arrivals and operations will be actively managed by the Transportation Coordinator. At this stage, the loading zone is designed to allow trucks to enter and exit the loading space on New Road with minimal impacts to adjacent traffic. Turning templates demonstrating these maneuvers are included in Appendix C.

Table 2-9 shows the expected type, frequency, and purpose of service loading vehicles

Table 2-9 Expected Loading Vehicles

Type of Vehicle	Number of Vehicles Expected	Frequency
Box Truck (laundry/trash)	5	Daily
Tractor Trailer (food/beverage)	1	Daily

Larger vehicles are often used by food/beverage providers, and typically do not happen more than once a day. These deliveries will be actively managed and scheduled to occur during off-peak hours with lower vehicle volumes on the adjacent roadways. Larger deliveries will be actively discouraged from occurring during area events. The occasional deliveries by larger vehicles (WB-50) will use the Beacon Street curb and be coordinated with the valet operator and transportation coordinator to minimize conflicts with hotel guest operations.

2.3 Signal Operations

In this section, a visual representation of the current and proposed signal phasing in Kenmore Square is included to compare traffic signal operations and overall movements between the networks. The proposed network simplifies conflicts at the central Kenmore Square intersection, and improves pedestrian circulation, while adding two other integrated intersections. In the current network, the main Kenmore Square intersection includes a number of conflicting and complex operations to balance the interaction between all modes.

The current operations reflect the signal phasing typically run by BTD as provided to the Project team. The proposed network reflects the operating plan used for analysis in this DPIR. Final design and operating plans will be determined through the ongoing and subsequent design process with BTD and other city agencies.

Please note that for all scenarios, BTD has the capability to actively manage signal timing through its Traffic Management Center. Nevertheless, BTD typically operates using a 100 second cycle in the PM peak and a 90 second cycle in the AM peak. These are consistent with other area signals which BTD operates in an interconnected and coordinated fashion. Proposed plans retain those cycle lengths to remain consistent with area operations.

The figures below show an illustrative representation of the signal phasing sequence. Final proposed phasing will be completed as part of the signal design process following BTD standards and guidelines. The order of the phases shown is important as it demonstrates the sequence of moves in these interconnected locations. These then repeat so that once the last phase operates, the signal returns to Phase A. *Please note that the graphics are meant to represent the pedestrian and vehicle moves allowed in each phase. The vehicle volumes, queues, and other visuals are NOT meant to be representative of the capacity analysis summarized in Tables 2-16 through Table 2-25.*

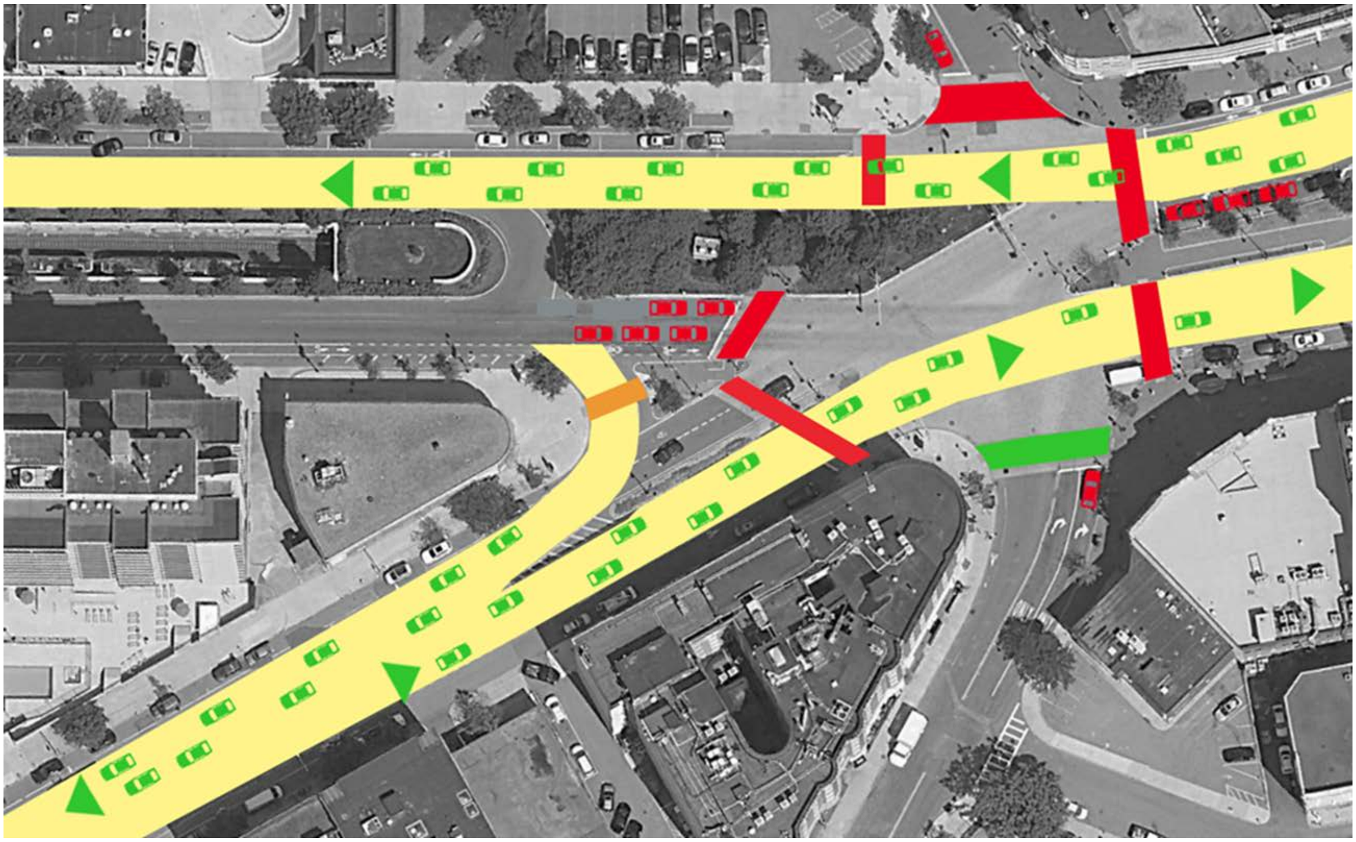
2.3.1 Current Signal Phasing

Phase A

Westbound Commonwealth Avenue and eastbound Beacon Street receive a green indication. During this phase (as well as all phases), vehicles also can turn right from Commonwealth Avenue eastbound to Beacon Street westbound through the unsignalized slip lane located between the existing Citizens Bank building and a pedestrian island.

Pedestrians can cross Brookline Avenue at the southern edge of the intersection concurrent with cars turning right from Beacon Street to Brookline Avenue.

Figure 2-21 shows Phase A.



Phase B

Eastbound vehicular traffic on Commonwealth Avenue is released and vehicular traffic can still turn right onto Beacon Street at the unsignalized intersection in front of the existing Citizen's Bank building. Deerfield Street vehicular traffic receives a right turn signal.

Pedestrians can cross Beacon Street as well as the westbound half of Commonwealth Avenue to the east of Deerfield Street, between the busway and the northern sidewalk of Commonwealth Avenue.

Figure 2-22 shows Phase B.

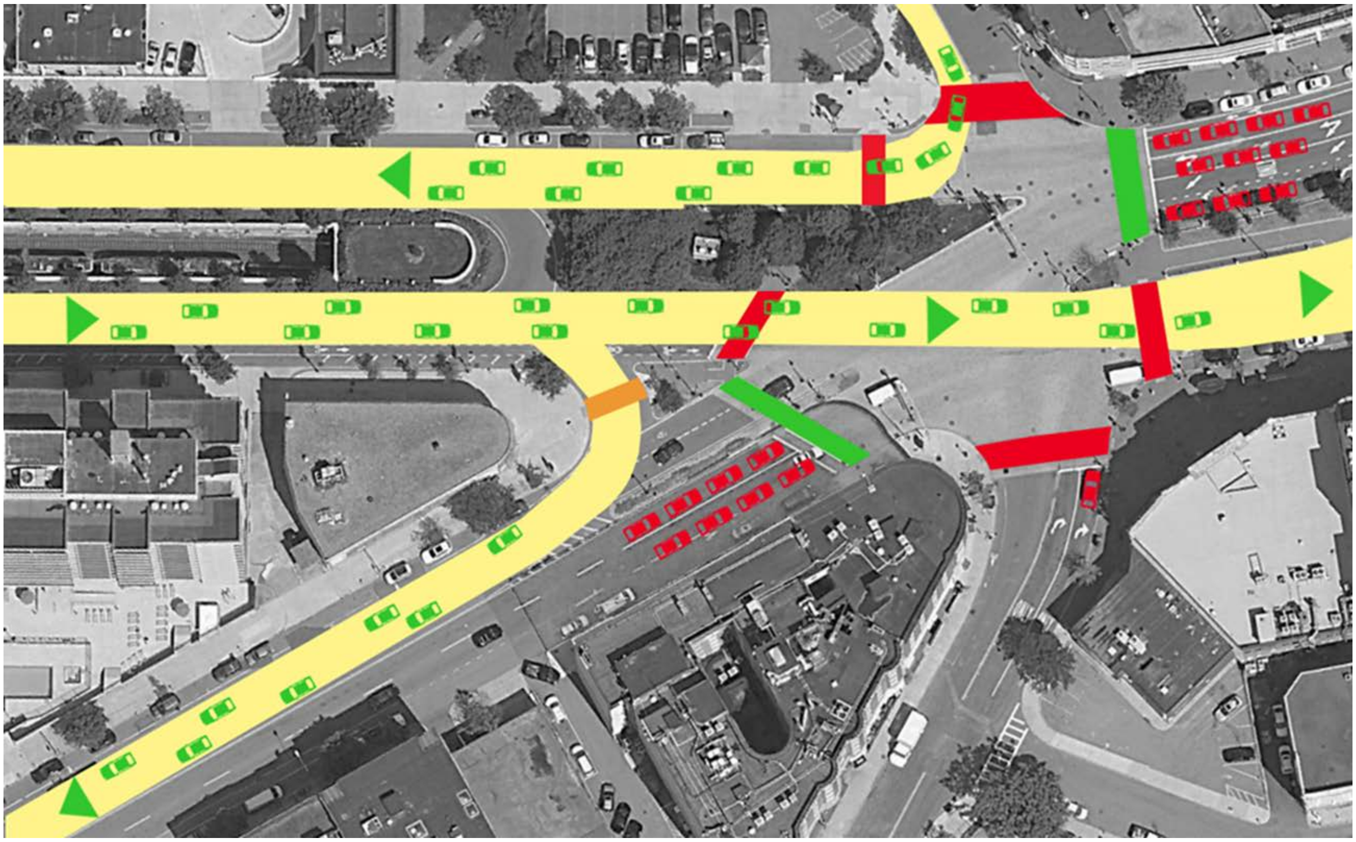


Figure 2-22
Current Signal Phasing – Phase B

Phase C

The only moving vehicular traffic during this phase are vehicles turning left from Commonwealth Avenue westbound onto Brookline Avenue. Vehicles can still turn right onto Beacon Street at the unsignalized intersection in front of the existing Citizen's Bank building.

Pedestrians can cross Deerfield Street, westbound Commonwealth Avenue to the west of Deerfield Street, Beacon Street, and Commonwealth Avenue eastbound—both on the western and eastern sides of the intersection.

Figure 2-23 shows Phase C.

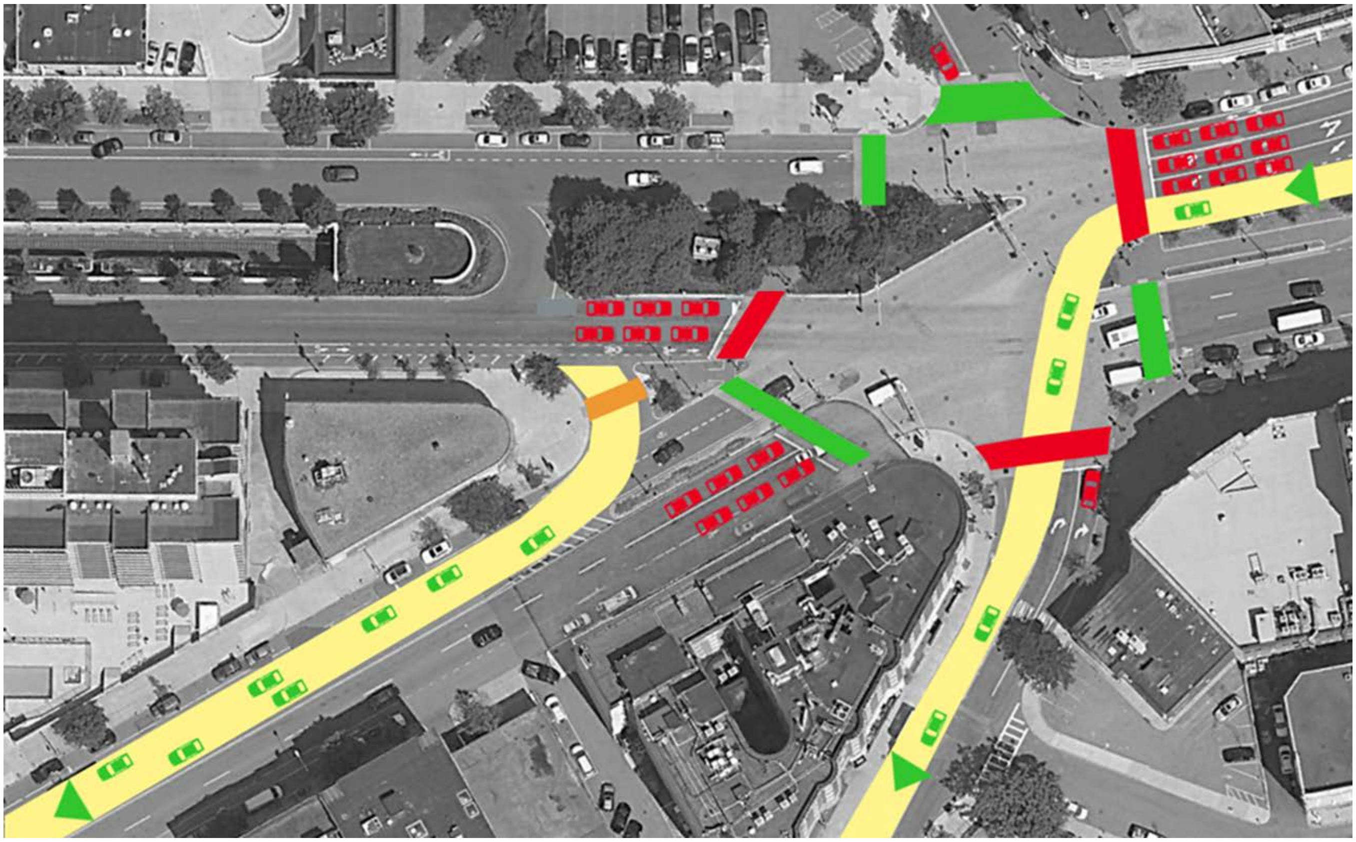


Figure 2-23

Current Signal Phasing – Phase C

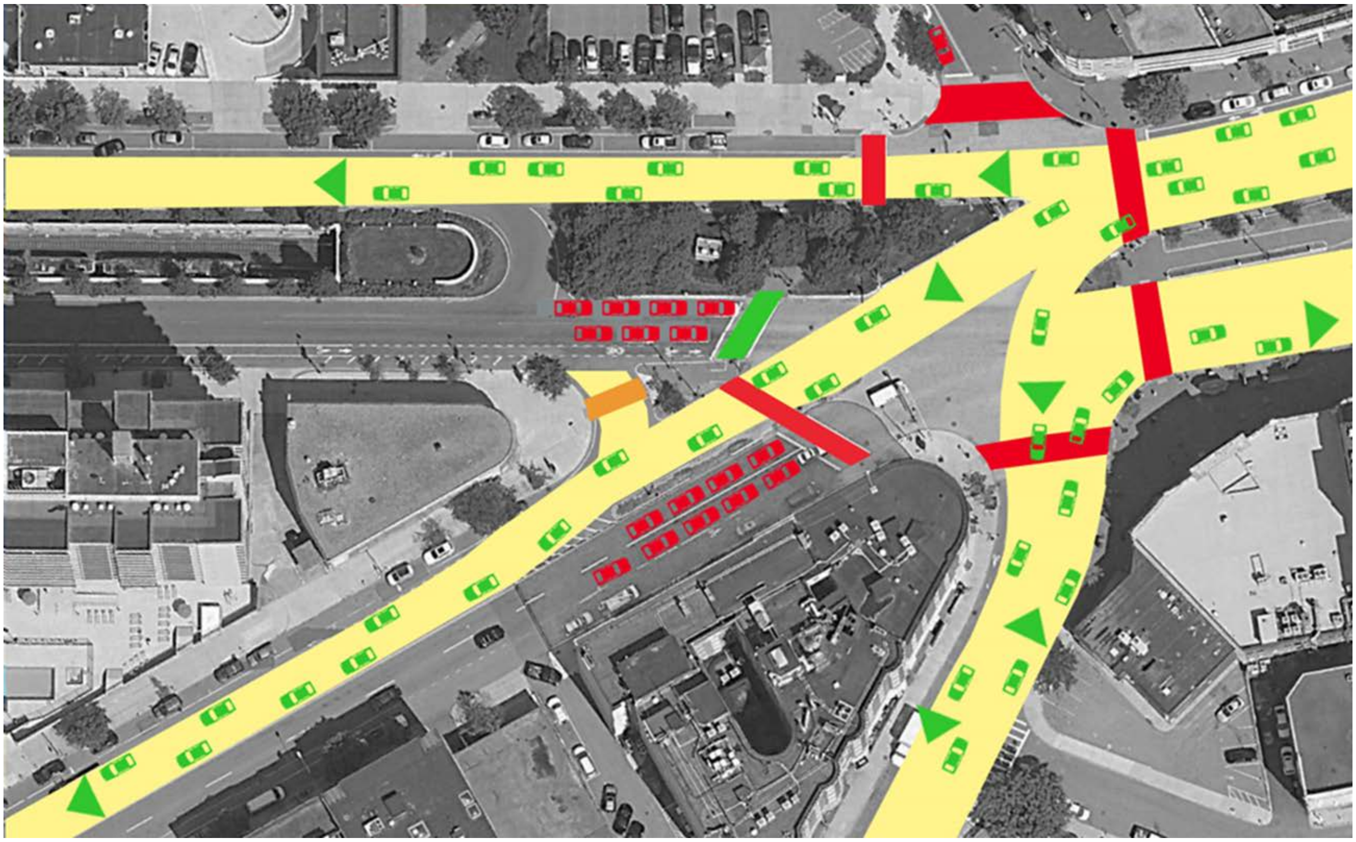
Phase D

Phase D has the most vehicular traffic movements and the fewest pedestrian crossings.

All westbound vehicular movements on Commonwealth Avenue receive a green indication. In addition, vehicles on Brookline Avenue have a right turn signal a right turn onto Commonwealth Avenue eastbound. As always, vehicles can still turn right onto Beacon Street at the unsignalized intersection in front of the existing Citizen's Bank building.

Pedestrians only have a crossing signal at Commonwealth Avenue eastbound to the west of Deerfield Street between the pedestrian median and the green space to the west of the intersection.

Figure 2-24 shows Phase D.



2.3.2 Proposed Signal Phasing

Under the proposed roadway network, the intersection of Commonwealth Avenue westbound / Beacon Street / Brookline Avenue / Deerfield Street is simplified. The new intersections at New Road and Commonwealth Avenue eastbound and New Road and Beacon Street relocate some of the movements from the existing intersection in order to provide for the simpler and more pedestrian-friendly operation at the central Kenmore Square intersection. Please note for the proposed cycle phases, the figures show the primary phasing, though slight leads and lags may exist to facilitate sequential movement.

Phase A

Phase A provides for continuous movement of eastbound Beacon Street and westbound Commonwealth Avenue through the study area. At the New Road intersections, eastbound Commonwealth Avenue traffic is stopped while westbound Commonwealth Avenue traffic continues through or left onto New Road. Traffic on New Road can turn right onto Beacon Street, but the left turn lanes are stopped while Beacon Street eastbound traffic flows.

Pedestrians have walk indications across Deerfield Street, Deerfield Street/Brookline Avenue between the public plaza and the MBTA busway, Brookline Avenue, and Commonwealth Avenue eastbound at New Road.

Bicyclists have signals concurrent with vehicle traffic on Commonwealth Avenue westbound, New Road southbound, and Beacon Street eastbound. Bicyclists are not allowed to ride on the public plaza.

Figure 2-25 shows Phase A.

Figure 2-25

Proposed Network Signal Phasing – Phase A

Phase B

Westbound traffic on Commonwealth Avenue continues through the central Kenmore Square intersection but can only go straight at the New Road intersection. Commonwealth Avenue eastbound traffic turns right onto New Road and can turn left or right on Beacon Street. Westbound traffic on Commonwealth Avenue has a left turn signal to turn left onto Brookline Avenue.

Pedestrians have a walk indication across Deerfield Street, Beacon Street / Commonwealth Avenue eastbound at the central Kenmore Square intersection (both sides of the intersection), and New Road between the MBTA Green Line bridge and the public plaza.

Bicyclists continue to have signals concurrent with the associated vehicle phases.

Figure 2-26 shows Phase B.

One Kenmore Square Boston, Massachusetts

Figure 2-26
Proposed Network Signal Phasing – Phase B

Phase C

Phase C is the third phase and provides the most pedestrian crossing movements. Pedestrians can cross at every crosswalk except Deerfield Street, Brookline Avenue, and Commonwealth Avenue eastbound at the central Kenmore Square intersection.

Vehicle traffic can make a right turn from Deerfield Street to Commonwealth Avenue westbound and a right turn from Brookline Avenue to Commonwealth Avenue eastbound.

Figure 2-27 shows Phase C.

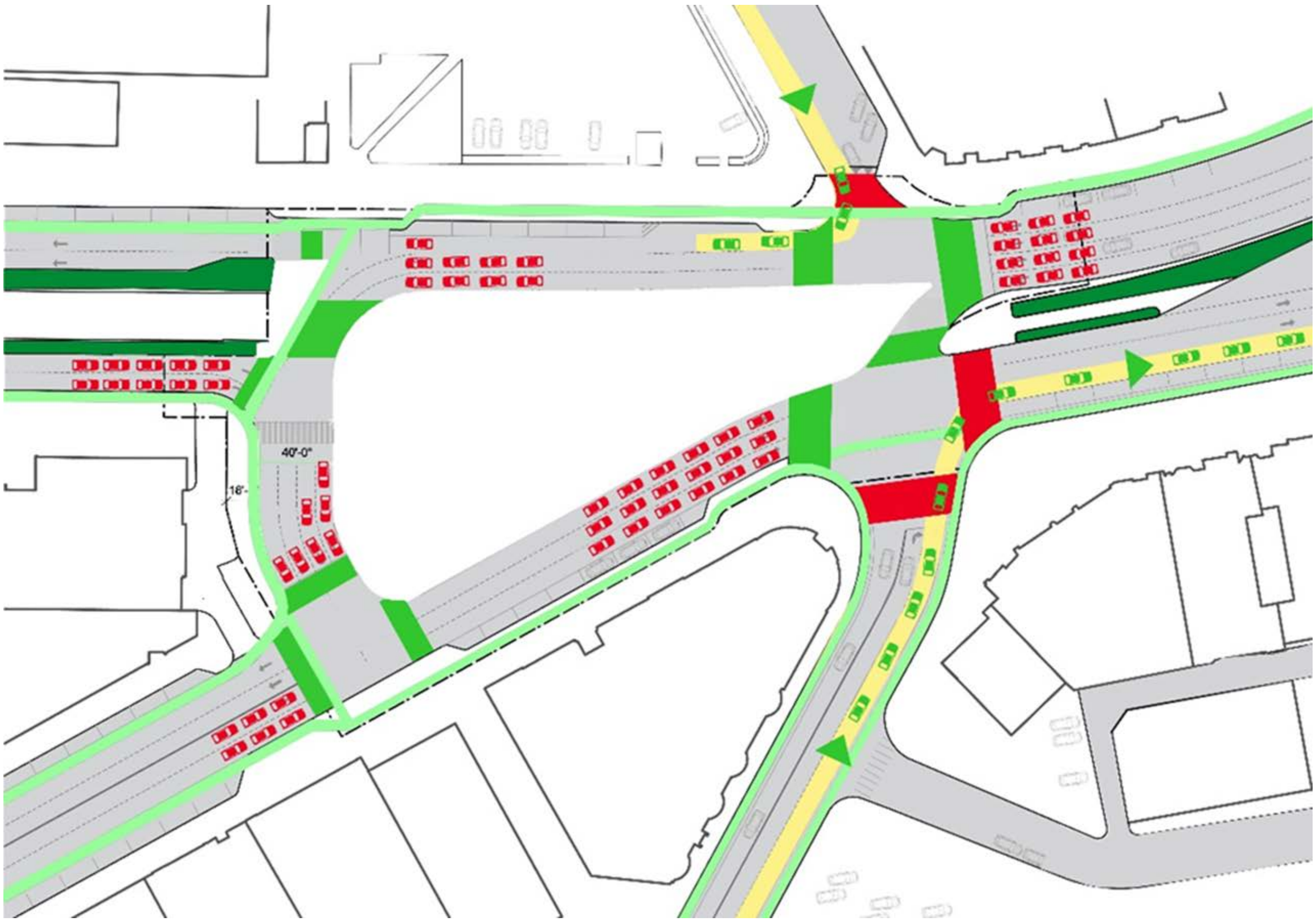


Figure 2-27

Proposed Network Signal Phasing – Phase C

2.4 2024 No-Build Analysis

2.4.1 Area Growth

The Fenway-Kenmore-Audubon Circle neighborhood of Boston continues to evolve as a vibrant activity center in Boston. The Project has worked with BTD and the BPDA to identify recent proposed developments and other changes to area infrastructure to incorporate into the Future 2024 No-Build analysis for the Project. Below are listed the relevant projects agreed upon for inclusion in this analysis. These are proposed and / or under review by the BPDA, Board approved, or under construction are expected to influence the 2024 peak hour vehicle volumes within the study area. Except where specifically noted, the anticipated vehicular traffic impacts have been included within the analyses of the 2024 No-Build Condition as agreed upon in coordination with the BTD and is consistent with recent area filings. A description of each project is provided below, and their locations are shown in Figure 2-28.

- Kenmore Square Redevelopment

  On November 15, 2018, the BPDA Board approved Related Beal, LLC's proposal to redevelop the parcels at 533-541 Commonwealth Avenue and 650-660 Beacon Street, a site located across the Kenmore Square intersection from the Project. That project involves rebuilding six existing buildings, renovating a seventh, and creating 280,500 square feet of office and retail space, as well as 60 parking spaces.

- Boston University Data Sciences Center

  Boston University is proposing to build a 19-story, 305,000 square foot Data Sciences Center to be built on an existing surface parking lot on Commonwealth Avenue, ¼ mile from the Project. The center will house classrooms, computer labs, and office and research space. No parking will be provided on-site. This project is currently under review by the BPDA.

- Fenway Center

  On December 6, 2019, MK Parcel 7 Development LLC received a building permit to construct Phase 1 of the Fenway Center, a new mixed-use development along Brookline Avenue, just across the Massachusetts Turnpike from Kenmore Square. Phase 1 includes constructing Building 1 and Building 2 of the four-building and parking garage development. Building 1 is a seven-story residential building with ground floor retail along Beacon Street, Maitland Street, and David Ortiz Way. Building 2 is a 13-story building with ground floor retail along Beacon Street and David Ortiz Way. It also has a community center on the ground floor. A 590-space parking garage is located below the two buildings. The cumulative area of the two buildings is 346,000 square feet.

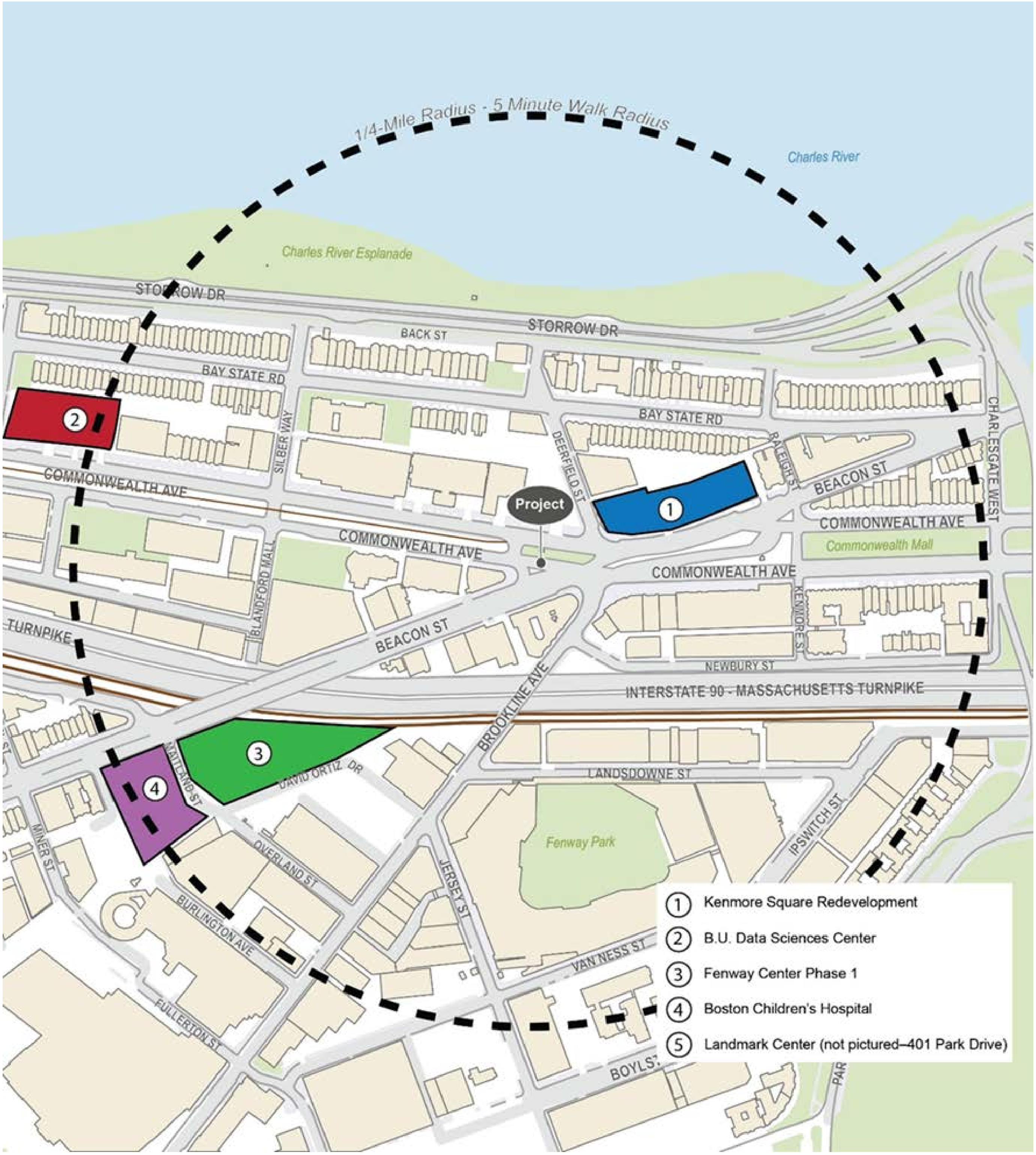


Figure 2-28
Background Growth Projects

Although only Phase 1 of Fenway Center is under construction, this analysis considers full-build out of the Fenway Center, including Buildings 3 and 4 and the shared parking garage, in its analysis. Total project development equates to approximately 1 million square feet and 1,390 parking spaces.

- Boston Children's Hospital

  On November 14, 2013, the BPDA Board approved Boston Children's Hospital's proposal to construct a new office building at 819 Beacon Street to support their practices. The office building site is ¼ mile down Beacon Street from the Project with 202,950 square feet of office space, 9,480 square feet of ground floor retail, and a parking garage for over 400 vehicles[1].

- Landmark Center

  In January 2014, Samuels and Associates' proposal to enhance the Landmark Center was approved. The project created open space in front of the former Sears Roebuck Building at the corner of Park Drive and Brookline Avenue, and improved pedestrian connections to the MBTA Fenway Station; no structures were proposed. The project is under construction.

  Phase 2 of this project proposes the demolition of the retail building at the corner of Brookline Avenue and Fullerton Street and constructing a 14-story building with ground floor retail and office/lab space above. This phase was approved by the BPDA in November 2017 through a notice of project change filing. No trip generation figures were included with the filing; therefore, the project was not included in the No-Build and Build projections. This is consistent with transportation studies done for other area developments.

2.4.2 2024 No-Build Volumes

The 2024 No-Build Condition was developed and analyzed to evaluate expected future transportation conditions in the study area, such as background vehicular traffic growth without taking into consideration the growth resulting from the Project. The future analysis year represents a five-year horizon from the existing conditions.

The 2024 No-Build includes anticipated increases in vehicle traffic activity on study area roadways resulting from projects proposed and under review by the BPDA, BPDA Board approved, or under construction as noted above.

[1] The BPDA website says the development will include 432 parking spaces while the Boston Children's Hospital's DPIR says 496 parking spaces (page 28).

The 2024 No-Build volumes were calculated for the morning and evening peak hours by adding the project generated trips for the five projects described above. The 2024 No-Build volumes were tested on the current roadway network and the proposed roadway network.

2.4.2.1 2024 No-Build Volumes on Current Network

Figure 2-29 shows the 2024 No-Build peak hour vehicle traffic volumes for the a.m. and p.m. peaks on the current roadway network in the five-year horizon. The heavy crossing movements of westbound Commonwealth Avenue to Beacon Street and eastbound Commonwealth Avenue can easily be seen.

2.4.2.2 2024 No-Build Volumes on Proposed Network

Figure 2-30 shows the 2024 No-Build peak hour vehicle volumes for the a.m. and p.m. peaks on the proposed roadway network in the five-year horizon. The heavy crossing volume is now relocated to New Road, decompressing the movements of one intersection into three intersections.

2.5 2024 Build Conditions

The 2024 Build Conditions volumes were developed to evaluate the transportation impact of the Project and proposed roadway network for Kenmore Square. The 2024 Build volumes are calculated by estimating Project-generated traffic volumes and distributing the volumes in the Study Area according to the Boston Transportation Department's Development Review Guidelines. The traffic volumes expected to be generated by the Project were added to the 2024 No-Build volumes to create the 2024 Build volume on the Proposed network.

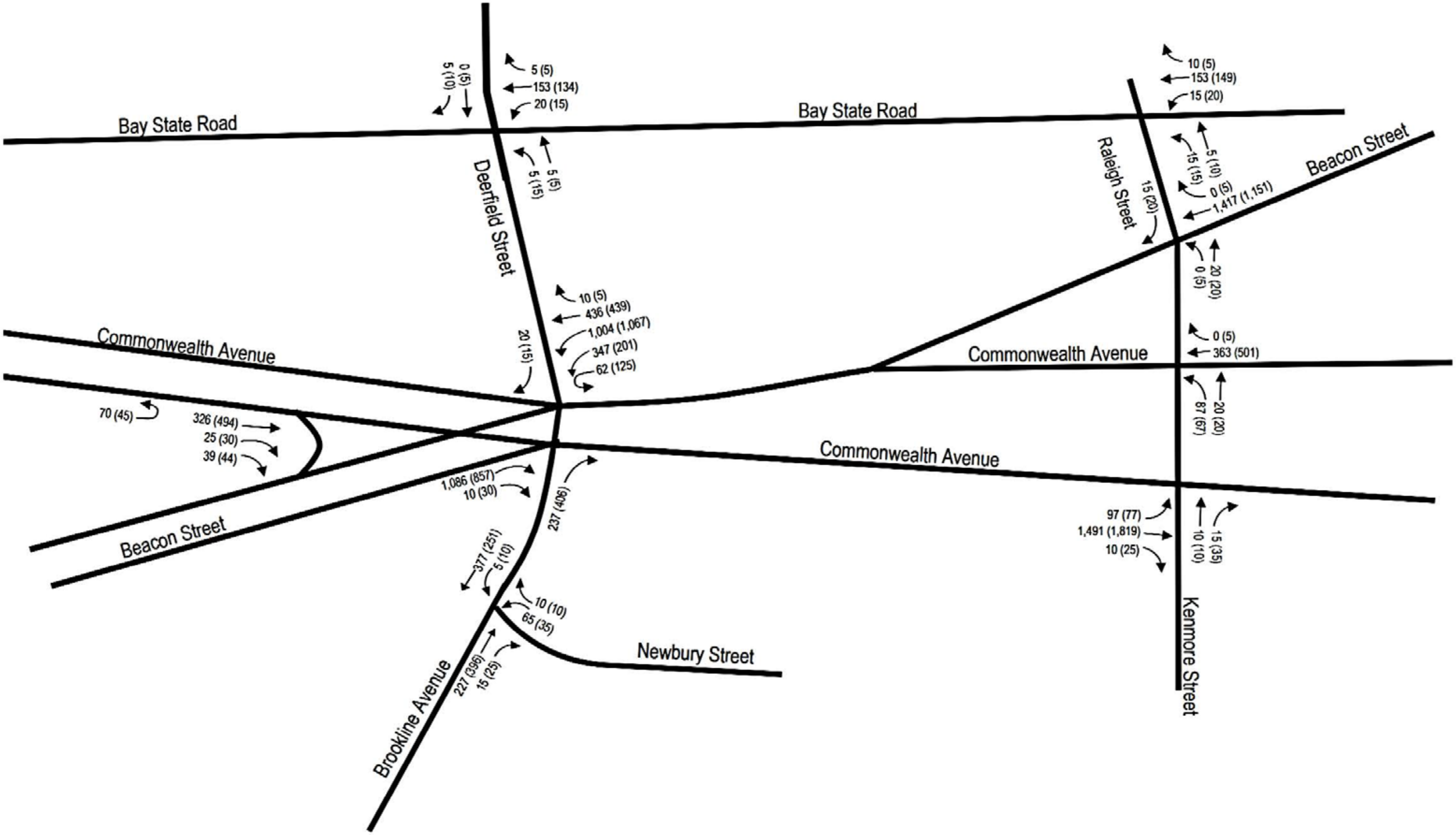
2.5.1 Project Generated Trips

The overall program for the Project was described in Table 2-1. The Project primarily consists of the 389-room hotel, and associated facilities. The existing Citizens Bank branch is anticipated to be incorporated as part of the overall Project, and the trips associated with it were included in existing counts, so it was not evaluated as part of the Project generated trips.

The ITE Trip Generation Manual, 10th edition, describes hotels as "places of lodging that provide sleeping accommodations and supporting facilities such as restaurants; cocktail lounges; meeting and banquet rooms or convention facilities; limited recreational facilities (pool, fitness room); and/or other retail and service shops."[2]

To estimate overall Project generated trips, the analysis followed BTD's methodology of converting unadjusted ITE Trips to person trips and then assigning those by mode and geography to determine the expected volumes to be generated by the Project.

[2] ITE Trip Generation Manual – 10th Edition – Volume 2: Data Part 1 – Land Uses (000-399)

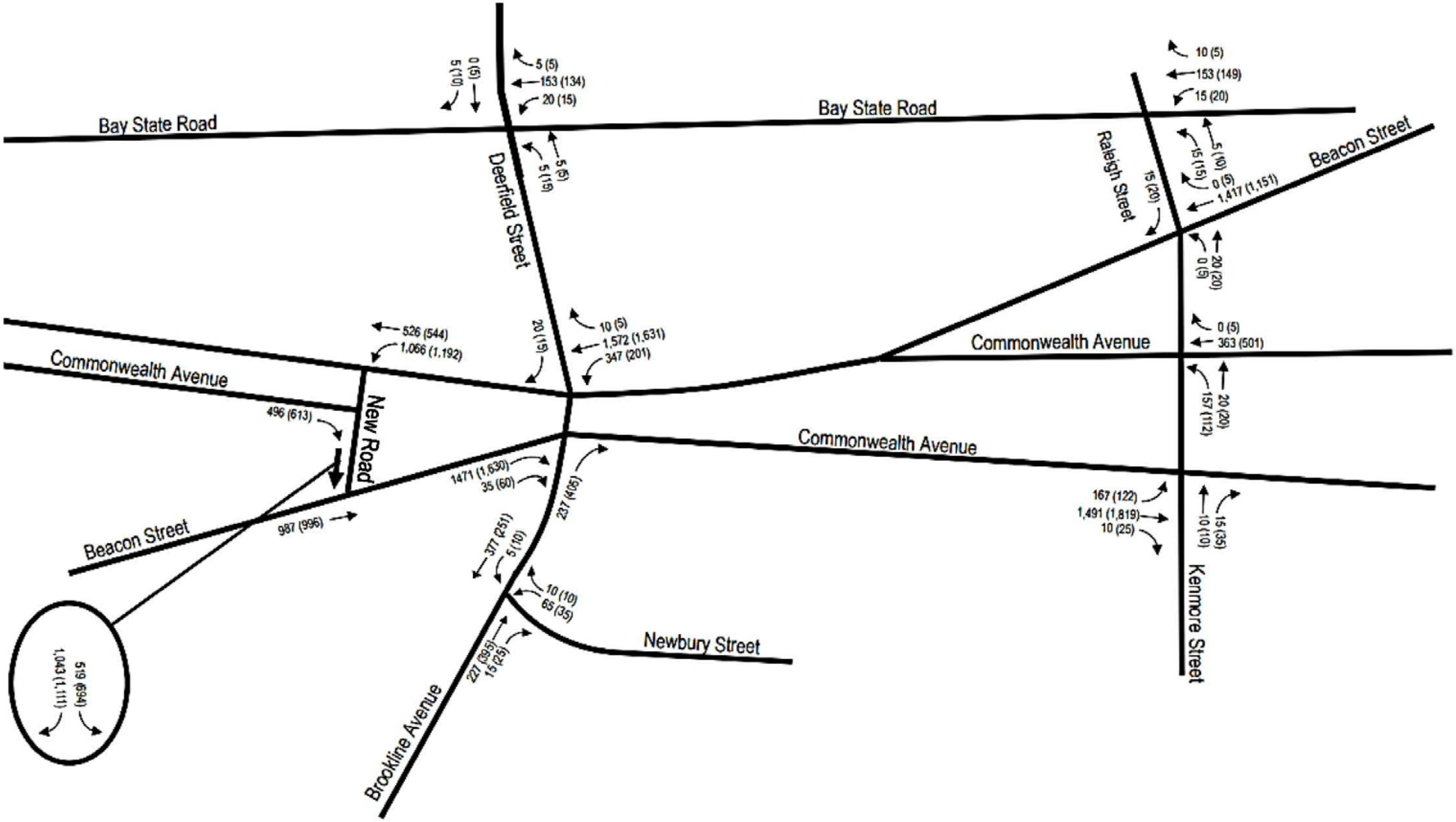


Schematic Diagram:
Not to Scale

One Kenmore Square **Boston, Massachusetts**

Figure 2-29

2024 No-Build Peak Hour AM (PM) Vehicle Volumes on the Current Roadway Network



Schematic Diagram:
Not to Scale

One Kenmore Square **Boston, Massachusetts**

Figure 2-30

2024 No-Build Peak Hour AM (PM) Vehicle Volumes on the Proposed Roadway Network

2.5.1.1 Unadjusted ITE Vehicle Trips

The Institute for Transportation Engineers provides trip generation values for hotels based on their key market and hotel operations. The ITE manual includes multiple hotel types including Hotel, All-Suites Hotel, Business Hotel, Motel, and Resort Hotel and was used to estimate the unadjusted daily and peak hour trip rates for the Project's 389 hotel rooms. ITE distinguishes hotels based on their location, with the default location being a general urban/suburban setting. Given that Kenmore Square is in a highly urbanized area of Boston and adjacent to the MBTA Kenmore Station, the Project's location is more akin to the Center City Core or Dense Mixed-Use Urban setting. The Center City Core hotel table was used to calculate daily trips, but to be conservative during peak hours, the general urban/suburban hotel tables were used for peak hour trip generation. The trip generation based on these rates is listed in Table 2-10.

Table 2-10 Unadjusted Trip Generation

	Daily	AM Peak	PM Peak
Total	2,136	189	266
In	1,068	112	136
Out	1,068	78	130

2.5.1.2 Person Trips

The unadjusted vehicular trips were converted to person trips by applying an average vehicle occupancy factor of 1.67 persons per vehicle to the unadjusted trip rates. The factor was obtained from the 2016 National household survey for all purpose trips for the Fenway neighborhood which includes Kenmore Square. Table 2-11 below summarizes the calculations. The person trips were then distributed to different modes according to the mode shares.

Table 2-11 Person Trip Calculation

	Daily	Person Trips (AM)	Person Trips (PM)
TOTAL	3,566	316	444
IN	1,783	186	226
OUT	1,783	130	217

2.5.1.3 Mode Share

Person trips were then separated into modes. The mode share was obtained from the BTD Development Review Guidelines (Zone 4). Using all-purpose trips Table 2-12 summarizes the mode share for person trips.

Table 2-12 Mode Share for Person Trips

	All purposes				
	Daily	AM Peak		PM Peak	
		IN	OUT	IN	OUT
Auto	33%	33%	22%	22%	33%
Transit	21%	31%	15%	15%	31%
Walk/Bike/Other	46%	36%	63%	63%	36%
Total	100%	100%	100%	100%	100%

2.5.1.4 Project-Generated Trips

Vehicle trips were then adjusted by dividing the auto mode by the vehicle occupancy factor. Table 2-13 summarizes the adjusted pedestrian trips generated by the Project.

Table 2-13 Project Generated Person Trips

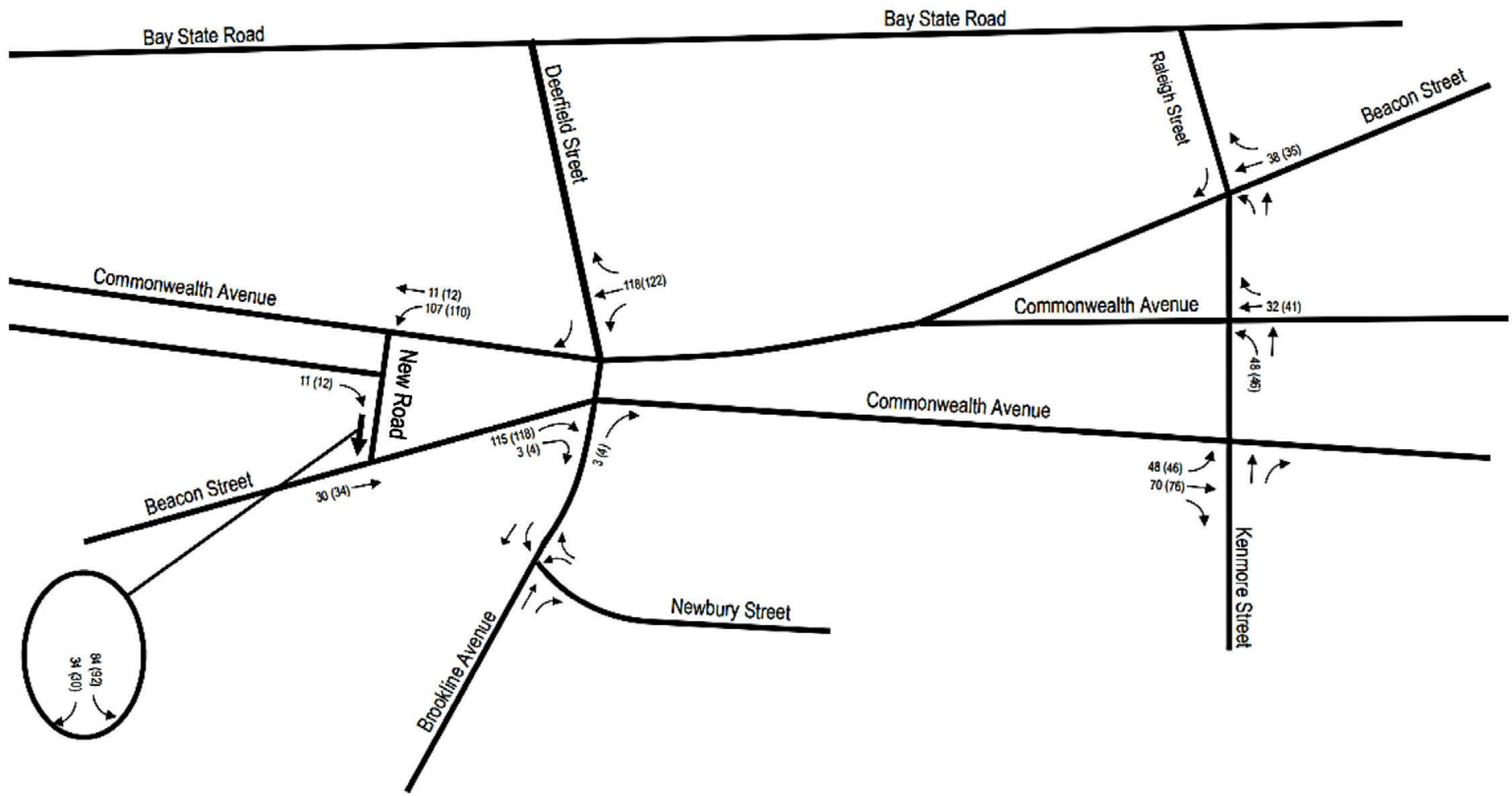
	Project Generated Persons Trips				
	Daily	AM Peak		PM Peak	
		IN	OUT	IN	OUT
Auto	1,177	62	28	50	72
Transit	749	58	19	34	67
Walk/Bike/Other	1,641	67	82	143	78
Total	3,566	186	130	226	217

The adjusted auto trips were calculated by taking the Project-generated person trips for the auto mode share in Table 2-13 and dividing it by average vehicle occupancy factor of 1.67 person per vehicle. The adjusted vehicle trips are in Table 2-14.

Table 2-14 AVO Adjusted Auto Trips

AM Peak		PM Peak	
IN	OUT	IN	OUT
37	17	30	43

Adjusted vehicle trips were then assigned to the street network using the trip distribution tables provided by BTD in their Development Review Guidelines for Zone 4 as described above. Figure 2-31 shows the Project generated trips on the proposed roadway network.



Schematic Diagram:
Not to Scale

One Kenmore Square   Boston, Massachusetts

Stantec

Figure 2-31

Project-Generated Trips - Peak Hour AM (PM) Vehicle Volumes on the Proposed Roadway Network

2.5.1.5 2024 Build Volumes on Proposed Network

The Project-generated vehicle trips were added to the 2024 No-Build a.m. and p.m. peak traffic volumes to obtain the 2024 Build peak a.m. and p.m. traffic volumes, as shown in Figure 2-32.

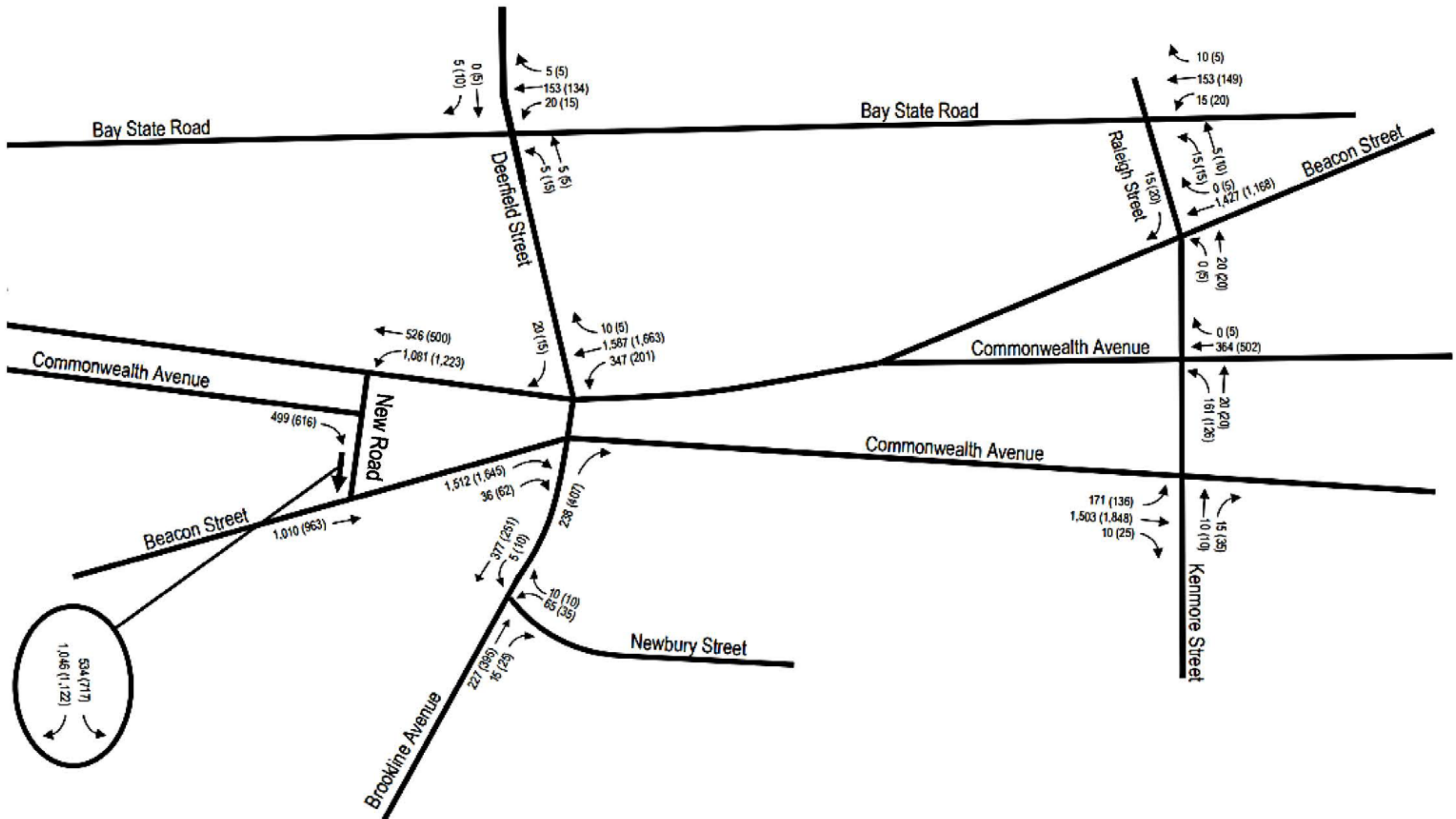
2.6 Operations Analysis

This section presents the transportation operations analysis for vehicular operations at the Study Area intersections identified earlier in this Chapter. The operations analysis provides a summary of overall operations by intersection and individual movement as they relate to BTD reporting requirements. The analysis was conducted for the Existing, 2024 No-Build and 2024 Build Conditions (a.m. and p.m. peak hours) on the current and proposed network as described previously.

Intersection operating conditions are classified by a quantified level-of-service (LOS). Signal timings used for the current network analyses were provided by BTD. Signal timings for the proposed network were developed for this Project to balance LOS across modes and will be refined through the subsequent design process.

LOS is a qualitative measure of control delay at an intersection providing an index to the operational qualities of a roadway or intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS D is typically considered acceptable in a downtown, urban environment. LOS E indicates that vehicles experience significant delay and queuing, while LOS F suggests unacceptable delays for the average vehicle. LOS designation is reported differently for signalized and unsignalized intersections. Longer delays at signalized intersections than at unsignalized intersections are perceived as acceptable.

For signalized intersections, the analysis considers the operations of each lane or lane group entering the intersection and the LOS designation is for the overall conditions at the intersection. For unsignalized intersections, however, this analysis assumes the traffic on the main street is not affected by traffic on the side streets. The LOS is only determined for left turns from the main street and all movements from the minor street. Synchro 10.0 software was used to evaluate the LOS operations at the Study Area intersections. This analysis is based on the 2010 Highway Capacity Manual (HCM). Table 2-15 below presents the LOS delay threshold criteria as defined in the HCM.



Schematic Diagram:
Not to Scale

One Kenmore Square **Boston, Massachusetts**

Figure 2-32
2024 Build Peak Hour AM (PM) Vehicle Volumes on the Proposed Roadway Network

Table 2-15 Level of Service Criteria at Signalized Intersections

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio	
	≤1.0	>1.0
≤10	A	F
>10-20	B	F
>20-35	C	F
>35-55	D	F
>55-80	E	F
>80	F	F

Please note that the operations of the Current Network were calibrated in coordination with BTD to reflect typical observed conditions. For the Proposed Network, the design was programmed to include the characteristics of each intersection, such as geometry, signal timings, heavy vehicles, bus operations, bicycle conflicts, and pedestrian crossings. Proposed network evaluation further includes minor adjustments to phase lengths and offset optimization at adjacent intersections for coordination with the proposed network.

As described earlier, a VISSIM model is further being developed in coordination with BTD and will be used to inform ongoing design efforts. The capacity analysis results are summarized in the following sections.

All Synchro outputs can be found in Appendix C.

2.6.1 Signalized Intersection Capacity Analysis

2.6.1.1 Existing Conditions on Current Roadway Network

The current operations at the Study Area intersections are generally acceptable in an urbanized environment. Most intersections operate at LOS D or better with a few exceptions. The Kenmore Street / Raleigh Street and Beacon Street intersection operates at LOS F in both the a.m. and p.m. peaks. Additionally, the Brookline Avenue northbound approach to Kenmore Square's central intersection operates at LOS F. Table 2-16 reports all metrics for each intersection and individual movement for the Existing Conditions on the Current Roadway Network scenario.

Table 2-16 Existing Conditions on Current Roadway Network Analysis – Signalized Intersections

	AM Peak Hour					PM Peak Hour				
	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	95th	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	95th
Beacon Street and Brookline Avenue / Deerfield Street and Commonwealth Avenue										
Commonwealth Ave EB-T	D	41.2	0.68	95	143	E	77.0	0.97	156	260
Commonwealth Ave EB-R	A	1.1	0.16	0	0	A	2.5	0.27	0	0
Brookline Ave NB-R	F	103.5	1.00	76	159	F	389.4	1.76	196	297
Deerfield St SB-R	C	30.1	0.07	9	29	C	34.0	0.06	8	26
Beacon St NE-R	F	81.2	1.08	293	424	C	32.5	0.83	226	313
Commonwealth Ave SW-L	D	45.0	0.91	162	157	D	45.9	0.78	193	198
Commonwealth Ave SW-TR	B	13.4	0.69	158	135	C	28.0	0.73	255	233
Commonwealth Ave SW-R	C	30.4	0.91	196	139	D	41.5	0.85	241	236
OVERALL	**D**	**48.3**				**E**	**75.5**			
Kenmore Street and Commonwealth Avenue EB										
Commonwealth Ave EB-LTR	A	3.6	0.52	0	261	B	14.9	0.62	270	417
Kenmore St NB-TR	D	41.7	0.21	14	39	D	51.3	0.39	28	62
OVERALL	**A**	**4.3**				**B**	**15.9**			
Kenmore Street and Commonwealth Avenue WB										
Commonwealth Ave WB-TR	C	30.3	0.44	90	134	D	51.0	0.85	168	247
Kenmore St NB-L	B	11.2	0.29	1	35	A	6.6	0.21	1	8
Kenmore St NB-T	D	50.1	0.13	12	29	D	38.0	0.07	12	20
OVERALL	**C**	**27.9**				**D**	**45.3**			
Kenmore Street / Raleigh Street and Beacon Street										
Beacon St WB-TR	F	127.4	1.20	463	593	F	106.2	1.15	458	589
Kenmore St NB-LT	A	3.4	0.14	0	1	B	14.6	0.08	3	8
Raleigh St SB-R	D	40.3	0.13	9	28	D	39.0	0.10	12	34
Overall	**F**	**124.2**				**F**	**103.1**			

2.6.1.2 Existing Conditions on Proposed Roadway Network

The proposed network introduces two additional signalized intersections at Commonwealth Avenue and New Road, and at Beacon Street and New Road while simplifying the operations at the central Kenmore Square intersection (Brookline Avenue / Deerfield Street / Commonwealth Avenue / Beacon Street). The proposed network shows an improvement in operations at the central Kenmore Square intersection compared to the current configuration. In the a.m., the intersection operates at LOS B and in the p.m. peak the intersection operates at LOS C. Most individual improvements see an operational improvement as well. The two new signalized intersections operate at LOS C or better in both the a.m. and p.m. peaks.

Some minor changes in the signalized intersections of Kenmore Street / Raleigh Street and Beacon and Kenmore Street and Commonwealth Avenue are seen as a result of the minor adjustments in phase lengths and offsets described above. For the Kenmore Street / Raleigh Street and Beacon Street intersection, this scenario shows a potential substantive improvement.

Table 2-17 reports all metrics for each intersection and individual movement in the Existing Conditions on the Proposed Roadway Network scenario.

Table 2-17 Existing Conditions on Proposed Roadway Network Analysis – Signalized Intersections

	AM Peak Hour					PM Peak Hour				
	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	Queue (ft) 95th	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	Queue (ft) 95th
Brookline Avenue / Deerfield Street and Commonwealth Avenue and Beacon Street										
Beacon St EB-T	C	22.6	0.91	69	233	C	32.1	0.89	148	223
Commonwealth Ave WB-L	D	40.0	0.73	208	273	C	34.1	0.54	118	141
Commonwealth Ave WB-TR	A	5.1	0.47	99	119	A	5.7	0.54	120	135
Brookline Ave NB-R	C	34.4	0.34	77	117	C	33.9	0.51	110	160
Deerfield St SB-R	C	30.8	0.05	11	31	C	27.3	0.03	7	23
OVERALL	**B**	**17.8**				**C**	**20.9**			
New Road and Commonwealth Avenue										
Commonwealth Ave EB-R	B	18.4	0.39	101	175	C	23.9	0.56	140	247
Commonwealth Ave WB-L	C	30.0	0.80	156	162	B	16.0	0.81	119	101
Commonwealth Ave WB-T	A	3.5	0.41	30	61	A	1.2	0.41	2	3
OVERALL	**C**	**20.1**				**B**	**14.8**			
Beacon Street and New Road										
Beacon St EB-T	D	41.1	0.82	322	406	C	34.0	0.74	251	325
New Rd SB-L	A	5.8	0.34	49	82	A	7.1	0.44	88	25
New Rd SB-R	A	1.6	0.42	0	1	A	2.0	0.50	1	21
OVERALL	**B**	**18.7**				**B**	**14.0**			
Kenmore Street and Commonwealth Avenue EB										
Commonwealth Ave EB-LTR	A	6.9	0.65	72	79	A	8.2	0.74	100	492
Kenmore St NB-TR	D	39.8	0.11	16	41	D	36.6	0.20	25	58
OVERALL	**A**	**7.4**				**A**	**9.0**			
Kenmore Street and Commonwealth Avenue WB										
Commonwealth Ave WB-TR	D	53.3	0.73	117	163	D	48.8	0.83	159	216
Kenmore St NB-L	C	26.2	0.55	55	109	C	30.4	0.36	26	39
Kenmore St NB-T	D	36.1	0.13	17	26	C	32.1	0.08	11	16
OVERALL	**D**	**44.5**				**D**	**44.9**			
Kenmore Street / Raleigh Street and Beacon Street										
Beacon St WB-TR	C	22.5	0.78	323	477	D	46.2	0.96	375	543
Kenmore St NB-LT	A	1.9	0.13	0	0	A	0.4	0.07	1	0
Raleigh St SB-R	D	47.7	0.12	11	32	D	37.9	0.09	12	34
OVERALL	**C**	**22.5**				**D**	**45.1**			

2.6.1.3 2024 No-Build Conditions on Current Roadway Network

With the inclusion of background area growth, some changes in comparison to the Existing Conditions on the Current Roadway Network are seen on the 2024 No-Build Conditions on the Current Roadway Network. These are primarily seen at the central Kenmore Square intersection (Brookline Avenue / Deerfield Street / Commonwealth Avenue / Beacon Street) where both delay and LOS worsen at many of the approaches in both the a.m. and p.m. peak hours.

Table 2-18 reports all metric for each intersection and individual movement in the 2024 No-Build Conditions on the Current Roadway Network scenario.

Table 2-18 2024 No-Build Conditions on Current Roadway Network Analysis – Signalized Intersections

	AM Peak Hour					PM Peak Hour				
	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	Queue (ft) 95th	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	Queue (ft) 95th
Beacon Street and Brookline Avenue / Deerfield Street and Commonwealth Avenue										
Commonwealth Ave EB-T	D	40.6	0.66	92	140	F	97.8	1.06	186	291
Commonwealth Ave EB-R	A	1.7	0.22	0	0	A	2.9	0.30	0	0
Brookline Ave NB-R	F	116.5	1.06	86	169	F	497.4	2.01	235	341
Deerfield St SB-R	C	30.1	0.07	9	29	C	34.0	0.06	8	26
Beacon St NE-R	F	151.9	1.26	400	535	D	36.1	0.87	248	373
Commonwealth Ave SW-L	F	64.7	1.05	253	157	D	47.8	0.93	230	224
Commonwealth Ave SW-TR	B	14.8	0.82	233	141	C	28.8	0.78	301	250
Commonwealth Ave SW-R	C	33.4	0.99	232	124	D	40.0	0.90	259	239
OVERALL	**E**	**77.4**				**F**	**93.2**			
Kenmore Street and Commonwealth Avenue EB										
Commonwealth Ave EB-LTR	A	4.1	0.55	0	256	B	16.8	0.73	330	469
Kenmore St NB-TR	D	41.7	0.21	14	39	D	51.3	0.39	28	62
OVERALL	**A**	**4.6**				**B**	**17.6**			
Kenmore Street and Commonwealth Avenue WB										
Commonwealth Ave WB-TR	C	31.1	0.49	102	150	D	51.8	0.86	173	256
Kenmore St NB-L	B	15.4	0.36	5	49	A	7.2	0.21	0	6
Kenmore St NB-T	D	50.9	0.13	12	27	D	39.5	0.08	12	18
OVERALL	**C**	**28.9**				**D**	**46.2**			
Kenmore Street / Raleigh Street and Beacon Street										
Beacon St WB-TR	F	242.0	1.47	639	773	F	134.1	1.21	507	640
Kenmore St NB-LT	A	3.5	0.14	1	0	B	14.6	0.08	3	8
Raleigh St SB-R	D	40.3	0.13	9	28	D	39.0	0.10	12	34
Overall	**F**	**236.6**				**F**	**130.1**			

2.6.1.4 2024 No-Build Conditions on Proposed Roadway Network

The same background growth was applied to the proposed Kenmore Square network for the 2024 No-Build Conditions on the Proposed Roadway Network scenario. As with the Existing Conditions on the Proposed Roadway Network scenario, the 2024 No-Build Conditions on the Proposed Roadway Network scenario shows that the simplified operations continue to show operational benefits at the central Kenmore Square intersection (Brookline Avenue / Deerfield Street / Commonwealth Avenue / Beacon Street) and its individual approaches.

Note that the Beacon Street and New Road intersection shows minor changes from the Existing Conditions on the Proposed Roadway Network scenario analysis but still operates within acceptable parameters.

As with the Existing Conditions on the Proposed Roadway Network scenario analysis, some minor changes in the signalized intersections of Kenmore Street / Raleigh Street and Beacon and Kenmore Street and Commonwealth Avenue are seen as a result of the minor adjustments in phase lengths and offsets described above. For the Kenmore Street / Raleigh Street and Beacon Street intersection, this scenario shows a potential substantive improvement.

Table 2-19 reports all metrics for each intersection and individual movement in the 2024 No-Build Conditions on the Proposed Roadway Network scenario.

Table 2-19 2024 No-Build Conditions on Proposed Roadway Network Analysis – Signalized Intersections

	AM Peak Hour					PM Peak Hour				
	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	Queue (ft) 95th	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	Queue (ft) 95th
Brookline Avenue / Deerfield Street and Commonwealth Avenue and Beacon Street										
Beacon St EB-T	C	26.6	0.94	78	406	D	35.9	0.98	189	439
Commonwealth Ave WB-L	D	45.6	0.88	242	281	D	37.0	0.61	137	155
Commonwealth Ave WB-TR	A	4.6	0.54	106	109	A	5.7	0.58	129	134
Brookline Ave NB-R	C	34.7	0.36	81	122	D	36.8	0.60	131	187
Deerfield St SB-R	C	30.8	0.05	11	31	C	28.1	0.04	7	23
OVERALL	**B**	**19.5**				**C**	**23.3**			
New Road and Commonwealth Avenue										
Commonwealth Ave EB-R	C	20.4	0.45	118	207	C	28.3	0.64	168	319
Commonwealth Ave WB-L	C	26.8	0.82	161	164	C	27.1	0.83	209	181
Commonwealth Ave WB-T	A	3.8	0.44	38	58	A	2.1	0.43	13	20
OVERALL	**B**	**19.5**				**C**	**22.0**			
Beacon Street and New Road										
Beacon St EB-T	D	49.3	0.88	351	468	D	52.7	0.84	295	379
New Rd SB-L	A	5.5	0.36	62	38	A	8.0	0.50	117	0
New Rd SB-R	A	1.7	0.49	0	1	A	1.9	0.53	0	14
OVERALL	**C**	**20.9**				**C**	**20.9**			
Kenmore Street and Commonwealth Avenue EB										
Commonwealth Ave EB-LTR	A	8.4	0.68	54	68	A	3.7	0.70	28	36
Kenmore St NB-TR	D	39.8	0.11	16	41	D	36.6	0.21	25	58
OVERALL	**A**	**8.8**				**A**	**4.4**			
Kenmore Street and Commonwealth Avenue WB										
Commonwealth Ave WB-TR	D	53.5	0.76	131	183	D	49.1	0.83	162	222
Kenmore St NB-L	C	25.1	0.58	57	109	B	19.7	0.36	14	36
Kenmore St NB-T	C	32.5	0.13	16	22	D	39.5	0.08	10	18
OVERALL	**D**	**44.4**				**D**	**43.5**			
Kenmore Street / Raleigh Street and Beacon Street										
Beacon St WB-TR	D	40.9	0.97	507	736	F	62.0	1.03	457	591
Kenmore St NB-LT	A	1.9	0.13	0	0	A	0.4	0.07	1	0
Raleigh St SB-R	D	47.4	0.12	11	32	D	37.9	0.09	12	34
OVERALL	**D**	**40.4**				**E**	**60.3**			

2.6.1.5 2024 Build Conditions on Proposed Roadway Network

This scenario includes Project generated volumes added to the 2024 No-Build Conditions on the Proposed Roadway Network scenario. The 2024 Build scenario was only analyzed with the proposed roadway network as it is integral to the realization of the Project.

The comparison of the 2024 Build Conditions on the Proposed Roadway Network scenario to the 2024 No-Build Conditions on the Proposed Roadway Network scenario shows only minimal change. The central Kenmore Square intersection (Brookline Avenue / Deerfield Street / Commonwealth Avenue / Beacon Street) shows a small increase in delay in the a.m. peak of just over three seconds. These additional seconds change the LOS from B to C, but the intersection continues to operate well within acceptable parameters.

Otherwise, the 2024 Build Conditions on the Proposed Roadway Network scenario appears to have similar conditions as compared to the 2024 No-Build Conditions on the Proposed Roadway Network. In addition, as mentioned above, the 2024 Build Conditions on the Proposed Roadway Network scenario greatly improves the number and quality of pedestrian crossings in Kenmore Square in comparison to the existing roadway scenarios.

Table 2-20 reports all metrics for each intersection and individual movement in the 2024 Build Conditions on the Proposed Roadway Network scenario.

Table 2-20 2024 Build Conditions on Proposed Roadway Network Analysis – Signalized Intersections

	AM Peak Hour					PM Peak Hour				
	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	Queue (ft) 95th	LOS	Delay (s/veh)	v/c	Queue (ft) 50th	Queue (ft) 95th
Brookline Avenue / Deerfield Street and Commonwealth Avenue and Beacon Street										
Beacon St EB-T	C	34.3	0.97	86	428	D	39.0	0.99	215	447
Commonwealth Ave WB-L	D	45.3	0.88	240	277	D	36.6	0.61	137	153
Commonwealth Ave WB-TR	A	4.6	0.54	107	109	A	5.7	0.59	131	135
Brookline Ave NB-R	C	34.8	0.36	82	123	D	36.9	0.60	131	188
Deerfield St SB-R	C	30.8	0.05	11	31	C	28.1	0.04	7	23
OVERALL	**C**	**22.7**				**C**	**24.5**			
New Road and Commonwealth Avenue										
Commonwealth Ave EB-R	C	20.9	0.45	121	211	C	29.1	0.65	171	329
Commonwealth Ave WB-L	C	27.1	0.83	164	165	C	26.9	0.84	213	182
Commonwealth Ave WB-T	A	3.8	0.44	39	58	A	2.2	0.44	13	20
OVERALL	**B**	**19.8**				**C**	**22.2**			
Beacon Street and New Road										
Beacon St EB-T	D	51.3	0.88	357	476	D	51.9	0.83	298	382
New Rd SB-L	A	5.9	0.38	68	43	A	9.2	0.52	123	0
New Rd SB-R	A	1.8	0.49	0	1	A	1.9	0.53	0	15
OVERALL	**C**	**21.9**				**C**	**21.0**			
Kenmore Street and Commonwealth Avenue EB										
Commonwealth Ave EB-LTR	A	8.3	0.69	75	505	A	4.3	0.71	34	42
Kenmore St NB-TR	D	39.8	0.11	16	41	D	36.6	0.20	25	58
OVERALL	**A**	**8.8**				**A**	**5.0**			
Kenmore Street and Commonwealth Avenue WB										
Commonwealth Ave WB-TR	D	53.7	0.77	131	184	D	49.2	0.84	163	222
Kenmore St NB-L	C	25.6	0.59	61	110	C	21.5	0.39	16	40
Kenmore St NB-T	C	32.6	0.13	16	22	D	39.4	0.08	11	18
OVERALL	**D**	**44.5**				**D**	**43.4**			
Kenmore Street / Raleigh Street and Beacon Street										
Beacon St WB-TR	D	42.3	0.98	515	744	F	66.7	1.04	471	604
Kenmore St NB-LT	A	1.9	0.12	1	0	A	0.4	0.07	1	0
Raleigh St SB-R	D	47.3	0.12	11	32	D	37.9	0.09	12	34
OVERALL	**D**	**41.8**				**E**	**64.9**			

2.6.2 Unsignalized Intersection Capacity Analysis

There are three unsignalized intersection in the Project Study Area. Each intersection was reviewed for all scenarios and networks as described above. Results are summarized below by scenario.

2.6.2.1 Existing Conditions on Current Roadway Network

In the current Existing Conditions on the Current Roadway Network scenario, all approaches operate with minimal delay and acceptable metrics, especially for an urban environment. Operations and analysis by intersection and movement are shown in Table 2-21.

Table 2-21 Existing Conditions on Current Roadway Network Analysis – Unsignalized Intersections

	AM Peak Hour				PM Peak Hour			
	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)
Brookline Avenue and Newbury Street (unsignalized)								
Newbury Street WB-LR	C	15.9	0.19	0.7	C	23.1	0.19	0.6
Brookline Ave SW-LT	A	8.2	0.01	0.0	B	10.2	0.02	0.0
OVERALL	**A**	**1.9**			**A**	**1.7**		
Raleigh Street and Bay State Road (unsignalized)								
Raleigh St NB-LT	A	9.6	0.03	0.1	A	9.7	0.03	0.1
OVERALL	**A**	**1.0**			**A**	**1.2**		
Deerfield Street and Bay State Road (unsignalized)								
Bay State Rd WB-LTR	A	7.9	0.19	0.7	A	7.8	0.17	0.6
Deerfield St NB-LT	A	7.4	0.01	0	A	7.5	0.02	0.1
Deerfield St SB-TR	A	6.7	0.01	0	A	6.9	0.02	0
OVERALL	**A**	**7.8**			**A**	**7.7**		

2.6.2.2 Existing Conditions on Proposed Roadway Network

The Existing Conditions on the Proposed Roadway Network analysis shows virtually no change in operations at the unsignalized intersections as shown in Table 2-22.

Table 2-22 Existing Conditions on Proposed Roadway Network Analysis – Unsignalized Intersections

	AM Peak Hour				PM Peak Hour			
	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)
Brookline Avenue and Newbury Street								
Newbury Street WB-LR	C	15.9	0.19	0.7	C	23.1	0.19	0.7
Brookline Ave SW-LT	A	8.2	0.01	0.0	B	10.2	0.02	0.0
OVERALL	**A**	**1.9**			**A**	**1.7**		
Raleigh Street and Bay State Road								
Raleigh St NB-LT	A	9.6	0.03	0.1	A	9.7	0.03	0.1
OVERALL	**A**	**1.0**			**A**	**1.2**		
Deerfield Street and Bay State Road								
Bay State Rd WB-LTR	A	7.9	0.19	0.7	A	7.8	0.17	0.6
Deerfield St NB-LT	A	7.4	0.01	0.0	A	7.5	0.02	0.1
Deerfield St SB-TR	A	6.7	0.01	0.0	A	6.9	0.02	0
OVERALL	**A**	**7.8**			**A**	**7.7**		

2.6.2.3 2024 No-Build Conditions on Current Roadway Network

The 2024 No-Build Conditions on the Current Roadway Network analysis includes changes in vehicle volumes resulting from the background projects described above. The analysis of the 2024 No-Build Conditions on the Current Roadway Network scenario shows minimal change from the Existing Conditions on the Current Roadway Network, except for the Newbury Street approach to Brookline Avenue. That approach experiences a small change in delay (just over one second with no change in LOS as shown in Table 2-23.

Table 2-23 2024 No-Build Conditions on Current Roadway Network Analysis – Unsignalized Intersections

	AM Peak Hour				PM Peak Hour			
	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)
Brookline Avenue and Newbury Street								
Newbury Street WB-LR	C	17.0	0.20	0.8	D	25.2	0.21	0.7
Brookline Ave SW-LT	A	8.2	0.01	0.0	B	10.4	0.02	0.0
OVERALL	**A**	**1.9**			**A**	**1.7**		
Raleigh Street and Bay State Road (unsignalized)								
Raleigh St NB-LT	A	9.7	0.03	0.1	A	9.7	0.03	0.1
OVERALL	**A**	**1.0**			**A**	**1.2**		
Deerfield Street and Bay State Road (unsignalized)								
Bay State Rd WB-LTR	A	8.0	0.2	0.7	A	7.9	0.18	0.6
Deerfield St NB-LT	A	7.5	0.01	0	A	7.5	0.02	0.1
Deerfield St SB-TR	A	6.7	0.01	0	A	6.9	0.02	0
OVERALL	**A**	**7.9**			**A**	**7.8**		

2.6.2.4 2024 No-Build Conditions on Proposed Roadway Network

The 2024 No-Build Conditions on the Proposed Roadway Network analysis shows similar results to the 2024 No-Build Conditions on the Current Network analysis. It also shows the slight change in delay for the Newbury Street approach as seen in the 2024 No-Build Conditions on the Current Roadway Network analysis. The results from this analysis are shown in Table 2-24.

Table 2-24 2024 No-Build Conditions on Proposed Roadway Network Analysis – Unsignalized Intersections

	AM Peak Hour				PM Peak Hour			
	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)
Brookline Avenue and Newbury Street								
Newbury Street WB-LR	C	17.0	0.20	0.8	D	25.2	0.21	0.7
Brookline Ave SW-LT	A	8.2	0.0	0	B	10.4	0.02	0.0
OVERALL	**A**	**1.9**			**A**	**1.7**		
Raleigh Street and Bay State Road								
Raleigh St NB-LT	A	9.7	0.03	0.1	A	9.7	0.03	0.1
OVERALL	**A**	**1.0**			**A**	**1.2**		
Deerfield Street and Bay State Road								
Bay State Rd WB-LTR	A	8.0	0.2	0.7	A	7.9	0.18	0.6
Deerfield St NB-LT	A	7.5	0.01	0	A	7.5	0.02	0.1
Deerfield St SB-TR	A	6.7	0.01	0	A	6.9	0.02	0
OVERALL	**A**	**7.9**			**A**	**7.8**		

2.6.2.5 2024 Build Conditions on Proposed Roadway Network

Project volumes are applied in the 2024 Build Conditions on the Proposed Roadway Network scenario. No further changes in operations are evidenced, as seen in Table 2-25.

Table 2-25 2024 Build Conditions on Proposed Roadway Network Analysis – Unsignalized Intersections

	AM Peak Hour				PM Peak Hour			
	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)	LOS	Delay (s/veh)	v/c	95th Queue (# of veh)
Brookline Avenue and Newbury Street								
Newbury Street WB-LR	C	17.0	0.20	0.8	D	25.2	0.21	0.7
Brookline Ave SW-LT	A	8.2	0.01	0.0	B	10.4	0.02	0.0
OVERALL	**A**	**1.9**			**A**	**1.7**		
Raleigh Street and Bay State Road								
Raleigh St NB-LT	A	9.7	0.03	0.1	A	9.7	0.03	0.1
OVERALL	**A**	**1.0**			**A**	**1.2**		
Deerfield Street and Bay State Road								
Bay State Rd WB-LTR	A	8.0	0.2	0.7	A	7.9	0.18	0.6
Deerfield St NB-LT	A	7.5	0.01	0	A	7.5	0.02	0.1
Deerfield St SB-TR	A	6.7	0.01	0	A	6.9	0.02	0
OVERALL	**A**	**7.9**			**A**	**7.8**		

2.7 Transportation Mitigation

The Proponent is undertaking the expense to construct not only the hotel, but the creation of the public plaza, construction of New Road, and the bike lanes and signals along Commonwealth Avenue westbound, New Road, and Beacon Street. The development of these public realm improvements has been and will continue to be coordinated with the plans for Kenmore Square put forth by BTD and the BPDA.

As detailed above, the Project analysis predicts significant improvements to the operations, delay, and safety of all modes of transportation in Kenmore Square

Operations Improvements

Across all modes of transportation, the Project's roadway networks reduce conflicts and improve operations and safety at most approaches. Key vehicular delays drop from LOS E and F to D and E with the proposed roadway network, resulting from crossing flows of two major arterials in Kenmore Square. The time-saving benefits of the simpler signal operations which result from circulating cars around the new plaza balance the slightly-increased driving distance around the plaza and the addition of small delays at the new signals on New Road and result in decongesting Beacon / Commonwealth / Brookline / Deerfield. Delays for vehicles waiting at the central signal today are replaced with an integrated and safer signal phasing that sequences the time it takes to travel through Kenmore Square.

The proposed roadway network changes in Kenmore Square also benefit the volume of transit buses serving Kenmore Station, with less delay heading in and out of Commonwealth Avenue as well as Brookline Avenue. However, of potentially greater value to transit is the reduced walking delay crossing to the busway from longer pedestrian signal cycles. Most importantly, the new crossing between the busway—which will include direct vertical access to the Green Line station below—and the new plaza will create many new safe walking routes to buses and trains, helping to decongest the two subterranean access tunnels by providing an entirely new approach to the station from the plaza. This, in turn, will shorten crossings and add new crosswalks to Commonwealth Avenue and Beacon Street.

For those walking, the addition of a new public plaza with various spaces for active and passive enjoyment and improved crossing opportunities will be a vast improvement for Kenmore Square, which is dominated by vehicular traffic today. With multiple new north-south and east-west walking opportunities created, Kenmore Square becomes more permeable and better-connected, minimizing the barrier that Commonwealth Avenue, Beacon Street and their combined traffic represent today and reducing walk times across Kenmore Square. Crosswalks are increased in quantity with dozens of combinations of new walking routes across Kenmore Square—each with less crossing delay, at no apparent penalty to drivers.

The Project creates new space for protected bicycling throughout Kenmore Square, with three roadway changes: Beacon Street moves northward by one lane, allowing a buffered and parking-protected bike lane to run along its southern curb; Commonwealth Avenue westbound moves southward enough to enable a bike lane to run behind parked cars at sidewalk level; and the proposed hotel moves eastward enough to create bike lanes and a one-way mixing zone at sidewalk level to the west of New Road.

The combined system of protected bike lanes is a leap forward for the bike-ability of Kenmore Square, which today does not have continuous nor protected bike lanes for many common moves. In particular, the missing westbound move along Beacon Street through Kenmore Square will be created along New Road, resulting from a bike signal across both halves of Commonwealth Avenue. Cyclists who currently navigate with the same delays as a car through vehicular traffic—or take the much longer but safer option of waiting for crosswalks through Kenmore Square—will instead be able to proceed directly through Kenmore Square with minimal delay on a dedicated facility. This same New Road connection will allow eastbound cyclists to quickly flow with protection to the eastbound Beacon Street to Commonwealth Avenue lane, avoiding the delays and exposure of riding alongside eastbound vehicular traffic.

Finally, the Project's new signalization enables a crucial missing movement from Brookline Avenue to Commonwealth Avenue westbound to occur alongside the main north-south crosswalk that exists today. Rather than dismounting or finding longer routes to the southwest, those biking from Fenway and the LMA can head westbound and across the River much more quickly with the creation of this new move.

Safety

The proposed roadway network eliminates crossing flows and creates a one-way, unconflicted circulation, greatly reducing conflict points. The approaches to the central intersection (Brookline Avenue/Deerfield Street/Commonwealth Avenue/ Beacon Street) become intuitive to understand with less westbound lane grouping confusion. The primary conflicting left turns are replaced by alternating flow down New Road, nearly eliminating angle crash threats.

With substantial reductions in crosswalk lengths, potential pedestrian exposure to moving vehicles conflicts will be greatly reduced, and with notably shorter crossing signal delays, the temptation to cross without signal protection is expected to decrease. More and safer crossing opportunities means more people on foot, which in turn forces drivers to be more aware of those walking. Finally, the exposure to nearby moving vehicles becomes greatly reduced along many existing and new sidewalks resulting from buffering bike lanes with parking and the addition of landscaping in the new plaza, helping to reduce walk stress in Kenmore.

For those biking through Kenmore Square, protecting existing bike lanes and adding new protected connections is a dramatic improvement in biking safety. Direct exposure to vehicle traffic is all but eliminated, with most bicyclists moving in dedicated facilities and directly accommodated in the signal. These new roadway improvements also reduce the desire of bicyclists to use sidewalks, which may feel safer than biking on roads in Kenmore Square today but present safety conflicts with pedestrians. Clear markings, landscape buffers and/or curbs entirely separate pedestrians and bicyclists in most parts of the new roadway network, and the application of Boston's mixing zone treatments along a portion of New Road improves separation and safety.

2.8 Transportation Demand Management

The Proponent is committed to implementing a robust set of Transportation Demand Management (TDM) measures to minimize vehicle usage and Project related traffic impacts for hotel employers and guests. The Project is vastly improving multimodal connectivity in Kenmore Square. The increase in Kenmore Square pedestrian space and added and upgraded crossings will encourage pedestrian activity while making access to public transportation faster and more seamless. Furthermore, as an urban, high-amenity hotel, it is expected that relatively few guests will drive or park during their stay.

Nevertheless, the TDM program will include active on-site management of transportation activities and programs with an emphasis on promoting and supporting non-auto travel for all users.

The Proponent will work with the City to formalize a TDM program for inclusion in the Transportation Access Plan Agreement (TAPA) appropriate to the Project and consistent with its level of impact. The TDM measures are likely to include, but may not be limited to the following:

- Designating an on-site Transportation Coordinator. The transportation coordinator will oversee all transportation and curbside management;
- Retaining a fully licensed Valet Operator to manage the curbside in accordance with all BTD permits and requirements as appropriate;
- Actively managing loading and service activity to minimize impacts on the surrounding roadway network, including scheduling off-peak loading as possible;
- Providing no dedicated on-site parking for staff or guests;
- Completing arrangements with off-site parking facilities, available at market rates, to accommodate but not encourage guest parking demand;
- Exploring participation in area Transportation Management Association;

- Providing maintenance for the adjacent pedestrian areas as determined through final agreements to be reached with the City;
- Ensuring that the hotel website include information on non-auto travel alternatives to the Project;
- Providing on-site materials directing and promoting area transportation alternatives, including MBTA services, bike share, and connections to car-sharing services;
- Providing information about bike-share for guests;
- Encouraging the hotel operator to provide access to pre-tax, payroll deducted MBTA passes or Bike share memberships for all employees;
- Encouraging the hotel operator to provide access to a Guaranteed Ride Home program for employees;
- Providing information on bicycle parking, and access to shower/changing facilities for employees.

2.9 Construction Management

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. A Construction Management Plan (CMP) will be developed and submitted to the BTD for their approval. These plans will detail construction vehicle routing and staging.

Construction vehicles will be necessary to move construction materials to and from the Project. Every effort will be made to reduce noise, control fugitive dust, and minimize other disturbances associated with construction traffic. Truck staging and laydown areas for the Project will be carefully planned. The need for street occupancy (lane closures) along roadways adjacent to the Project is not known at this time.

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 because no new parking will be provided for them. Because of the construction workers early arrival/departure schedule (typically 7:00 a.m. – 3:00 p.m.), conflict for on street parking is not anticipated.

During the construction period, pedestrian activity adjacent to the 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.

Chapter 3.0

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

3.1.1 Introduction

RWDI was retained to conduct a pedestrian wind assessment for One Kenmore Square in Boston. The objective of the study is to assess the effect of the Project on local conditions in pedestrian areas on and around the study site and provide recommendations for minimizing adverse effects, if needed. The quantitative assessment will be based on wind speed measurements on a scale model of the Project and its surroundings in one of RWDI's boundary-layer wind tunnels. These measurements will be combined with the local wind records and compared to appropriate criteria for gauging wind comfort and safety in pedestrian areas. The assessment focusses on critical pedestrian areas, including the building entrances and sidewalks along adjacent and nearby streets. Figure 1-2 in Chapter 1 indicates the Project Area. The wind tunnel analysis will identify specific mitigation that will help to ensure that the Project including the public plaza and surrounding area has acceptable wind conditions for the proposed uses. The complete wind study including proposed mitigation will be submitted on or before May 22, 2019.

3.1.2 Background and Approach

3.1.2.1 Wind Tunnel Study Model

To assess the wind environment around the Project, a 1:300 scale model of the Project Area and surroundings is constructed for the wind tunnel tests of the following configurations:

A. No-Build: Existing site with BPDA approved projects and projects under construction.

B. Build A: No-Build conditions with Project included.

C. Build B: No-Build conditions with the hotel moved to the original PNF location.

The wind tunnel model includes all relevant surrounding buildings and topography within an approximately 1200-foot radius of the study site. The wind and turbulence profiles in the atmospheric boundary layer beyond the modelled area will also be simulated in RWDI's wind tunnel. The wind tunnel model will be instrumented with 112 specially designed wind speed sensors to measure mean and gust speeds at a full-scale height of approximately five feet above local grade in pedestrian areas throughout the study area.

Wind speeds will be measured for 36 directions in a 10-degree increment. The measurements at each sensor location are recorded in the form of ratios of local mean and gust speeds to the mean wind speed at a reference height above the model.

The placement of wind measurement locations is based on RWDI's experience and understanding of the pedestrian usage for this site and reviewed by the BPDA. See Figure 3.1-1.

3.1.2.2 Meteorological Data

The data from the wind tunnel test will be combined with long term meteorological data, recorded during the years 1995 through 2018 at Boston Logan International Airport to predict full scale wind conditions. The analysis is performed separately for each of the four seasons and for the entire year. Figures 3.1-2 and 3.1-3 present "wind roses", summarizing the annual and seasonal wind climates in the Boston area, respectively, based on the data from Logan Airport.

For example, the wind rose in Figure 3.1-2, summarizes the annual wind data which in general, indicates the most common wind directions are those between north-northwest and south-southwest. Winds from the east-northeast to the east-southeast are also relatively common. In the case of strong winds, northeast, west-northwest, northwest and west are the dominant wind directions.

3.1.3 BPDA Wind Criteria

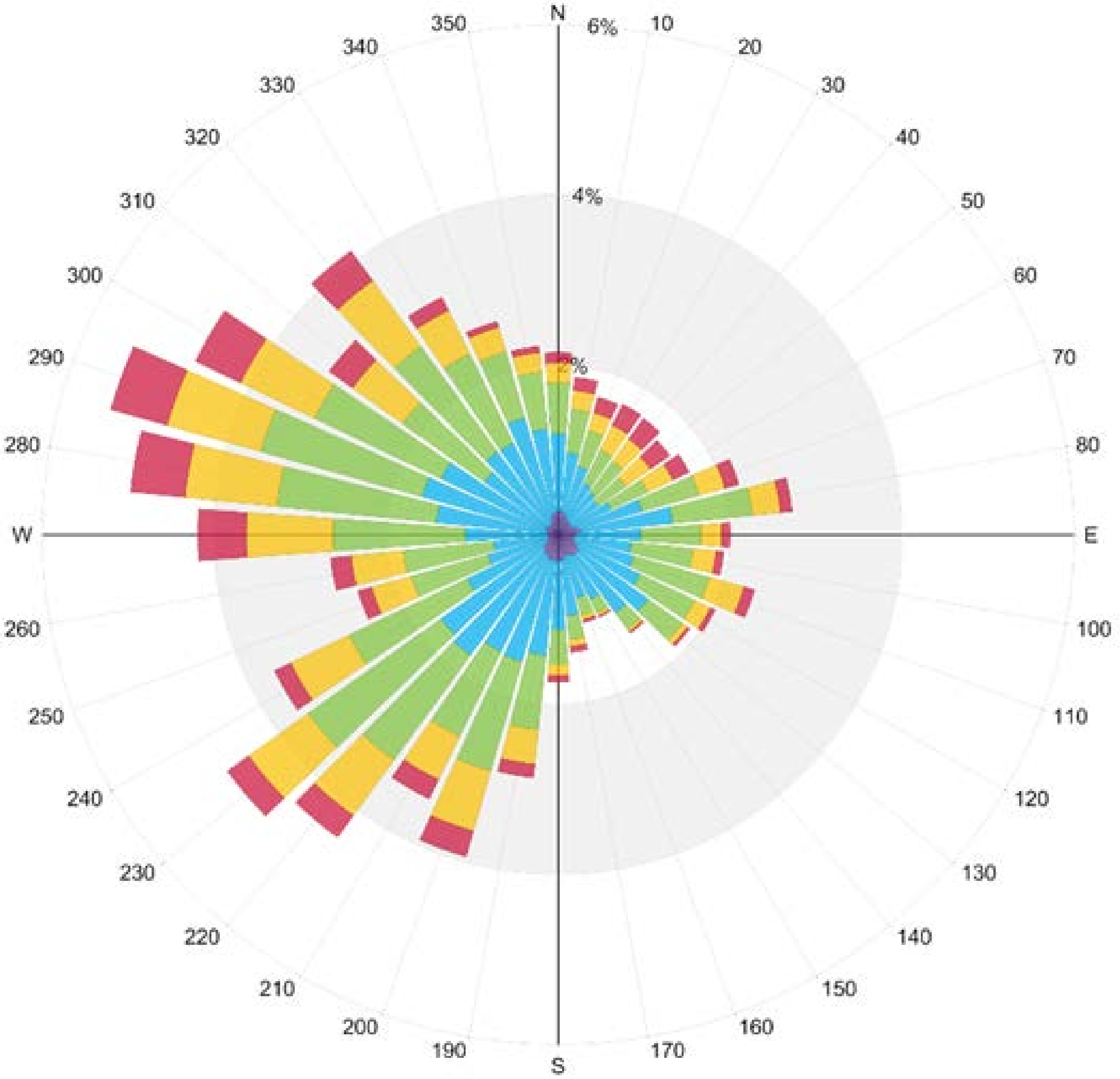
The Boston Planning and Development Agency has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BPDA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root mean square wind speed) of 31 mph should not be exceeded more than one percent of the time. See Table 3.1-1 below for the BPDA Mean Wind Criteria.

Table 3.1-1 BPDA Mean Wind Criteria

Comfort Category	*Mean Wind Speed (mph)*
Dangerous	> 27
Uncomfortable for Walking	> 19 and ≤ 27
Comfortable for Walking	> 15 and ≤ 19
Comfortable for Standing	> 12 and ≤ 15
Comfortable for Sitting	< 12

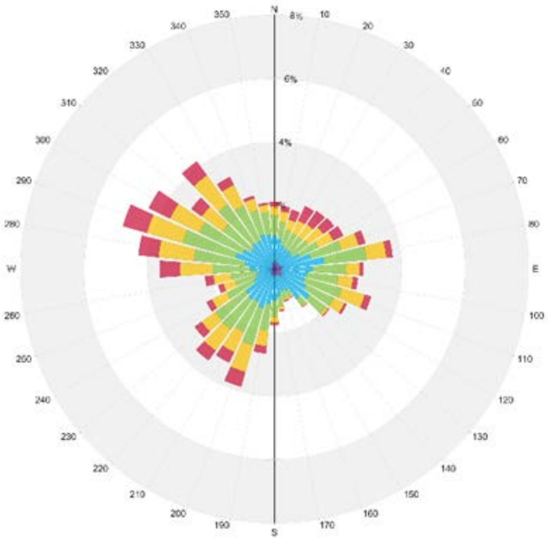
Figure 3.1-1

Preliminary Sensor Plan

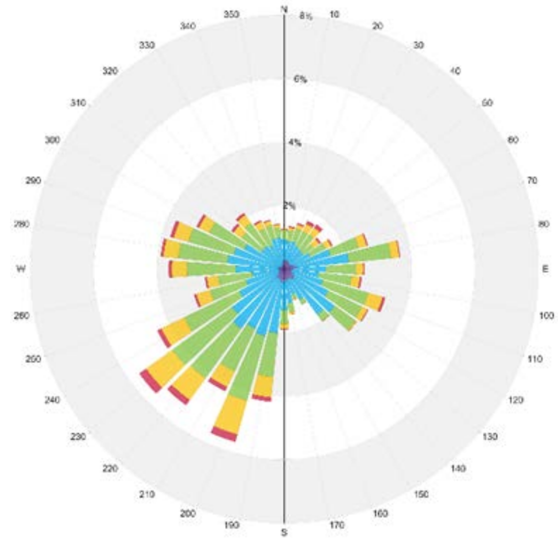


Wind Speed (mph)	Annual Probability (%)
Calm	3.0
1-5	7.9
6-10	32.5
11-15	32.4
16-20	16.3
>20	7.9

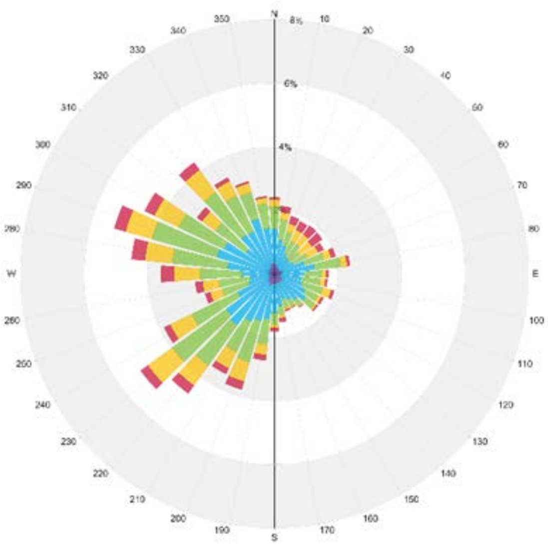
Figure 3.1-2
Annual Directional Distribution of Winds Approaching Boston Logan International Airport from 1995 to 2018



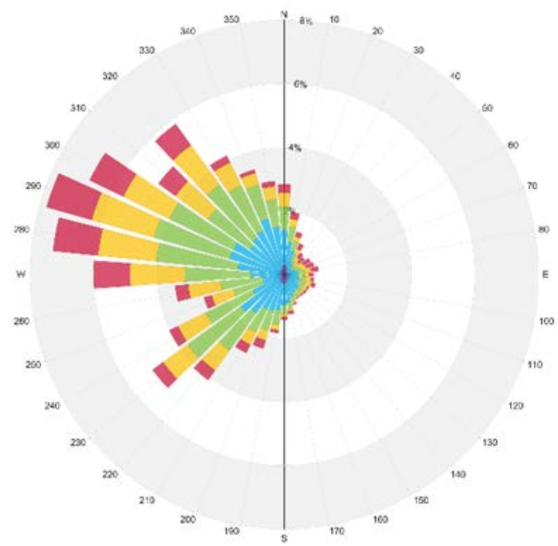
Spring (March – May)



Summer (June – August)



Fall (September – November)



Winter (December – February)

Wind Speed (mph)	Seasonal Probability (%)			
	Spring	Summer	Fall	Winter
Calm	2.8	3.0	3.4	2.6
1-5	6.8	9.4	8.7	6.5
6-10	28.9	38.8	34.6	27.9
11-15	32.3	34.4	32.0	30.9
16-20	19.2	11.8	14.5	19.7
>20	10.1	2.6	6.8	12.4

Figure 3.1-3

Seasonal Directional Distribution of Winds Approaching Boston Logan International Airport from 1995 to 2018

The second set of criteria used by the BPDA to determine the acceptability of specific locations is based on the work of Melbourne. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time. They are as included in Table 3.1-2.

Table 3.1-2 Wind Acceptability – Effective Gust Speed

Wind Acceptability	*Effective Gust Speed (mph)*
Acceptable	$\leq$ 31
Unacceptable	> 31

*Applicable to hourly mean speed exceeded 1% of the time.

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

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

The study involves state of the art measurement and analysis techniques to predict wind conditions. Nevertheless, some uncertainty remains in predicting wind comfort, and this must be kept in mind. For example, the sensation of comfort among individuals can be quite variable. Variations in age, individual health, clothing, and other human factors can change a particular response of an individual. The comfort limits to be used represent an average for the total population. Also, unforeseen changes in the project area, such as the construction or removal of buildings, can affect the conditions experienced at the site. Finally, the prediction of wind speeds is necessarily a statistical procedure. The wind speeds to be reported are for the frequency of occurrence stated (1% of the time). Higher wind speeds will occur but on a less frequent basis.

3.1.4 *Generalized Wind Flows*

General wind flows that could occur when in contact with tall buildings are shown in Figure 3.1-4 and described below.

Downwashing

Tall buildings tend to intercept the stronger winds at higher elevations and redirect them to the ground level. This is often the main cause for wind accelerations around large buildings at the pedestrian level.

Corner Acceleration

When winds approach at an oblique angle to a tall façade and are deflected down, a localized increase in the wind activity or corner acceleration can be expected around the exposed building corners at pedestrian level.

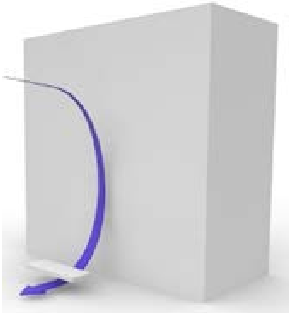
Channeling Effect

When two buildings are situated side by side, wind flow tends to accelerate through the space between the buildings due to channeling effect caused by the narrow gap.

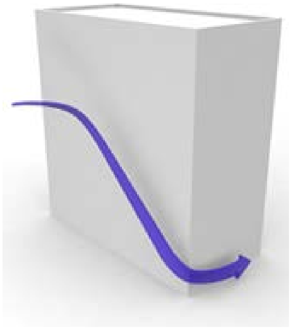
If these building/wind combinations occur for prevailing winds, there is a greater potential for increased wind activity. Design details such as; setting back a tall tower from the edges of a podium, deep canopies close to ground level, wind screens, tall trees with dense landscaping, rounded building corners etc. (Figure 3.1-5) can help reduce wind speeds. The choice and effectiveness of these measures would depend on the exposure and orientation of the site with respect to the prevailing wind directions and the size and massing of the proposed buildings.

3.1.5 *Potential Wind Conditions at One Kenmore Square*

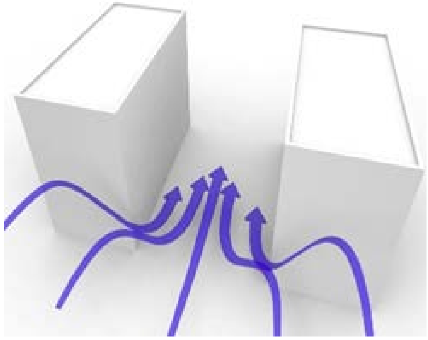
Adverse conditions, as per the generalized wind flows descried above, are expected when the existing single-story development is replaced by the 27-story tower. These challenges would be less prevalent if the existing surrounds, particularly to the north and west were of similar height to the Project, however, due to the exposed nature of the site, some areas will be expected to have higher than desired wind conditions without a proper assessment and the incorporation of wind control features. Generally, locations immediately adjacent to the building are most likely to be impacted by the new building, with impacts anticipated to be reduced further from the building.



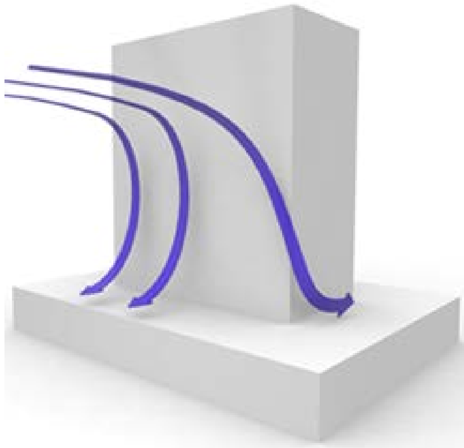
Downwashing: Tall buildings tend to intercept the stronger winds at higher elevations and redirect them to the ground level. This is often the main cause for wind accelerations around large buildings at the pedestrian level.



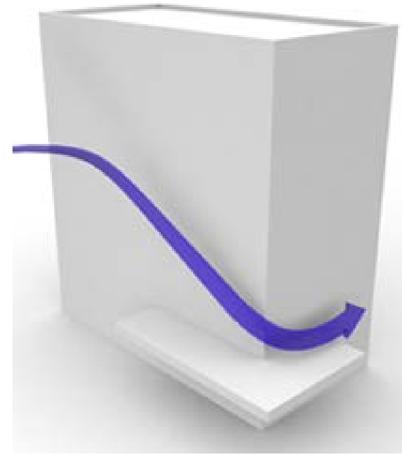
Corner Acceleration: When winds approach at an oblique angle to a tall façade and are deflected down, a localized increase in the wind activity or corner acceleration can be expected around the exposed building corners at pedestrian level.



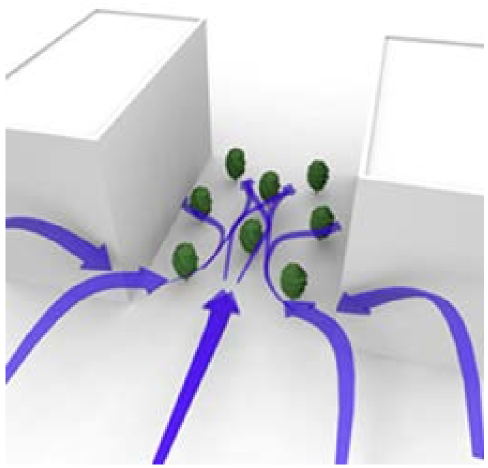
Channeling Effect: When two buildings are situated side by side, wind flow tends to accelerate through the space between the buildings due to channeling effect caused by the narrow gap.



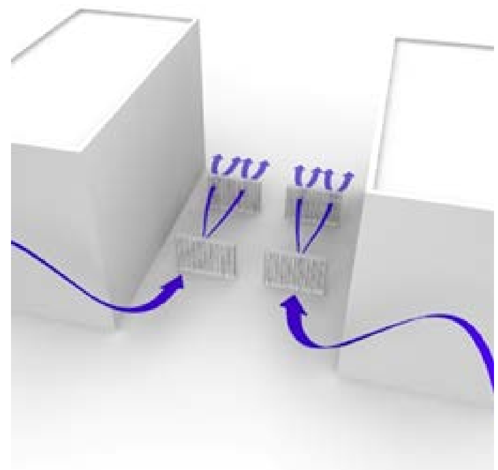
Podium/tower setback



Canopy



Landscaping



Wind Screens

Figure 3.1-5

Common Wind Control Measures

3.1.6 Potential Wind Control Measures for One Kenmore Square

Given the flat iron shape of the building the building, mitigation such as canopies will be designed to confirm that the corners of the building do not have adverse effects on the public experience. Potential wind mitigation could include extending the north canopy of the Project outward and around the northwest corner of the building, as well as adding an additional canopy at the southwest corner of the building. Examples of canopies are shown on Figure 3.1-6. Canopies can help to reduce downwashing and accelerating winds from reaching pedestrian level.

Vertical wind screen elements can also be positioned at various upwind locations around the site as well. Examples of wind screens are shown in Figure 3.1-7.

Planting tall, dense landscaping around the site will also assist with minimizing wind speeds.

Localized hard and/or soft landscaping features placed on both sides of the entrance (Figure 3.1-8) will also be considered as well as recessing the entrance (Figure 3.1-9), if feasible.

3.1.7 Ongoing Design Review

The Project will continue through the BPDA design review process as well as Boston Civic Design Commission review, both of which will focus, in part, on pedestrian level winds.

One Kenmore Square   Boston, Massachusetts

Figure 3.1-6
Examples of Canopies

Figure 3.1-7

Examples of Vertical Wind Screens

Figure 3.1-8

Examples of Wind Control for Entrances

Figure 3.1-9

Examples of Recessed Entrances

3.2 Shadow

3.2.1 Introduction and Methodology

As typically required by the BPDA, a shadow impact analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 a.m., 12:00 noon, and 3:00 p.m.) during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox.

The shadow analysis presents the existing shadow and new shadow that would be created by the proposed Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, sidewalks and bus stops adjacent to and in the vicinity of the Project site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 to 3.2-14 at the end of this section. In addition, shadow animations are provided in Appendix D.

The analysis shows that the Project's impacts will generally be limited to the immediately surrounding streets and sidewalks. New shadow will be cast onto the Charles River Esplanade during two of the fourteen time periods studied (December 21 at 9:00 a.m. and 3:00 p.m.). No new shadow will be cast onto nearby bus stops.

3.2.2 Vernal Equinox (March 21)

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

At 12:00 p.m., shadow from the Project will be cast to the north onto Commonwealth Avenue and its sidewalks, and onto New Road and its eastern sidewalk. No new shadow will be cast onto nearby bus stops or existing open spaces.

At 3:00 p.m., shadow from the Project will be cast to the northeast onto Commonwealth Avenue and its sidewalks and onto a portion of Deerfield Street and its sidewalks. No new shadow will be cast onto nearby bus stops or existing open spaces.

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, shadow from the Project will be cast to the west onto New Road and its sidewalks. No new shadow will be cast onto nearby bus stops or existing public open space.

At 12:00 p.m., shadow from the Project will be cast to the north onto Commonwealth Avenue and its sidewalks and onto New Road and its eastern sidewalk. No new shadow will be cast onto nearby bus stops or existing public open space.

At 3:00 p.m., shadow from the Project will be cast to the northeast onto Commonwealth Avenue and its sidewalks and Deerfield Street and its sidewalks. No new shadow will be cast onto nearby bus stops or existing public open space.

At 6:00 p.m., shadow from the Project will be cast to the southeast onto Commonwealth Avenue and its southern sidewalk. No new shadow will be cast onto nearby bus stops or existing public open space.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m., during the autumnal equinox, shadow from the Project will be cast to the northwest onto Commonwealth Avenue and its sidewalks, and onto New Road and its sidewalks. No new shadow will be cast onto nearby bus stops or existing open spaces.

At 12:00 p.m., shadow from the Project will be cast to the north onto Commonwealth Avenue and its sidewalks, and onto a small portion of New Road and its eastern sidewalk. No new shadow will be cast onto nearby bus stops or existing open spaces.

At 3:00 p.m., shadow from the Project will be cast to the northeast and over Commonwealth Avenue and its sidewalks and Deerfield Street and its sidewalks. No new shadow will be cast onto nearby bus stops or existing open spaces.

At 6:00 p.m., shadow from the Project will be cast to the east and over Commonwealth Avenue and its sidewalks, Charlesgate West and its sidewalks, Charlesgate and its sidewalks, and Charlesgate East and its sidewalks. No new shadow will be cast onto nearby bus stops or open spaces.

3.2.5 Winter Solstice (December 21)

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

At 9:00 a.m., shadow from the Project will be cast to the northwest. New shadow will be cast onto a portion of the Charles River Esplanade. No new shadow will be cast onto nearby bus stops or other open spaces.

At 12:00 p.m., shadow from the Project will be cast to the north onto Commonwealth Avenue and its sidewalks, and onto a portion of Storrow Drive. No new shadow will be cast onto nearby bus stops or existing open spaces.

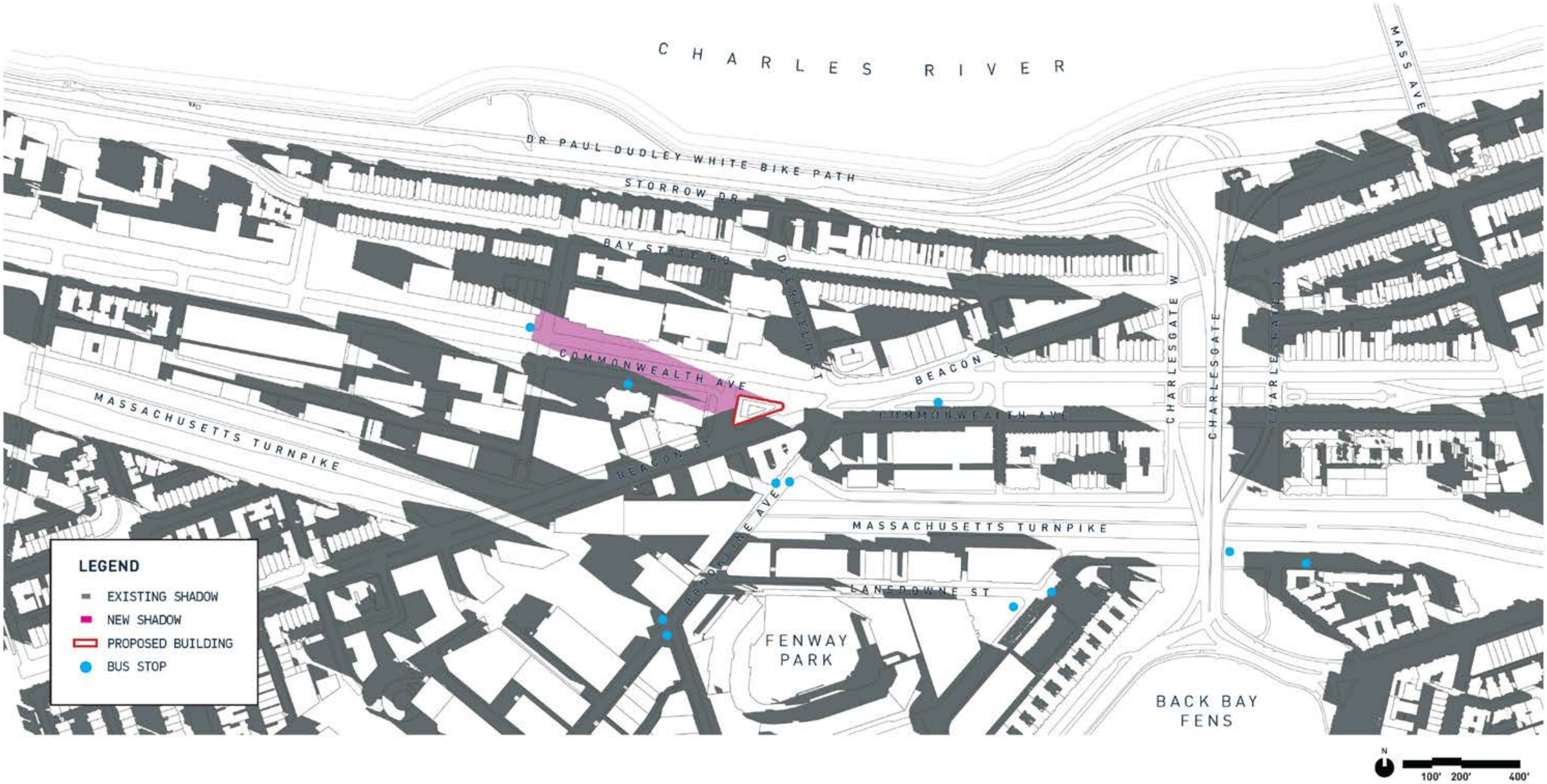
At 3:00 p.m., most of the surrounding area is covered by existing shadow. Shadow from the Project will be cast to the northeast and onto a small portion of Commonwealth Avenue and its sidewalks and Deerfield Street and its sidewalks. New shadow will extend onto a portion of the Charles River Esplanade and onto the Charles River. No new shadow will be cast onto nearby bus stops or other open spaces.

3.2.6 Alternative Build Scenario

A shadow analysis of an alternative build scenario was requested. As illustrated on Figures 3.2-15 to 3.2-28, the net new shadow cast from the alternative build scenario is similar to the net new shadow that will be cast from the Project during the time periods studied. In fact, during some of the time periods studied, shadow from the alternative build scenario will be cast farther than the shadow cast from the Project. For example, shadow from the alternative build scenario will be cast onto the Commonwealth Avenue bus stop during the vernal equinox at 9:00 a.m., while shadow cast from the Project will not. An animation indicating the net new shadow is included in Appendix D.

3.2.7 Conclusions

Fourteen time periods were studied to determine the extent of new shadow cast by the Project. The shadow study shows that new shadow will mainly be cast across nearby streets and sidewalks. New shadow will be cast onto the Charles River Esplanade during only two of the fourteen time periods studied (December 21 at 9:00 a.m. and 3:00 p.m.). As the shadow moves west to east around the building, there will be some new shadow on portions of the proposed plaza that will move as the day progresses. No new shadow will fall on bus stops. Shadow cast from the alternative build scenario is similar to that of the Project.



One Kenmore Square Boston, Massachusetts

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Figure 3.2-1

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

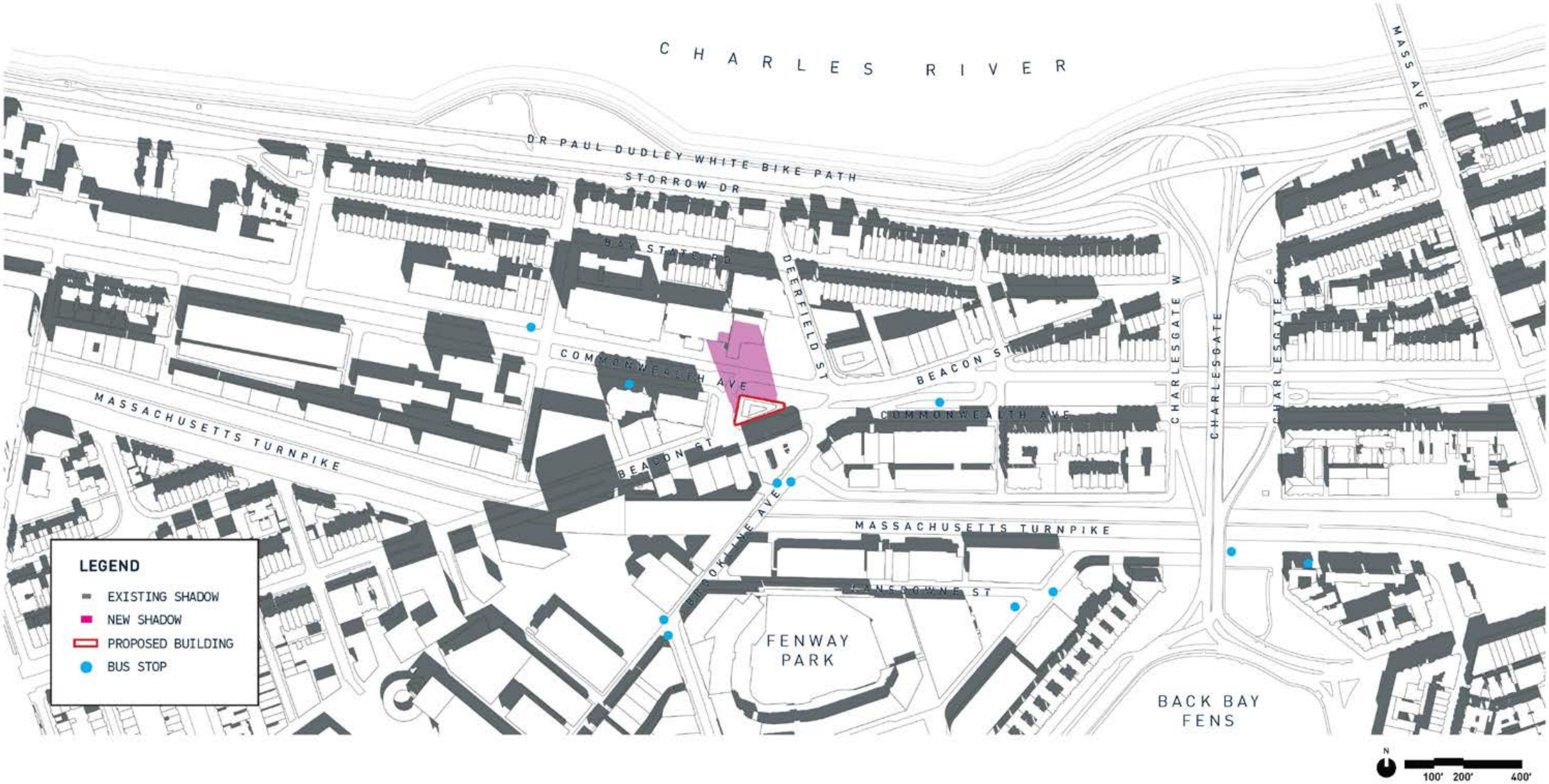

Figure 3.2-2

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

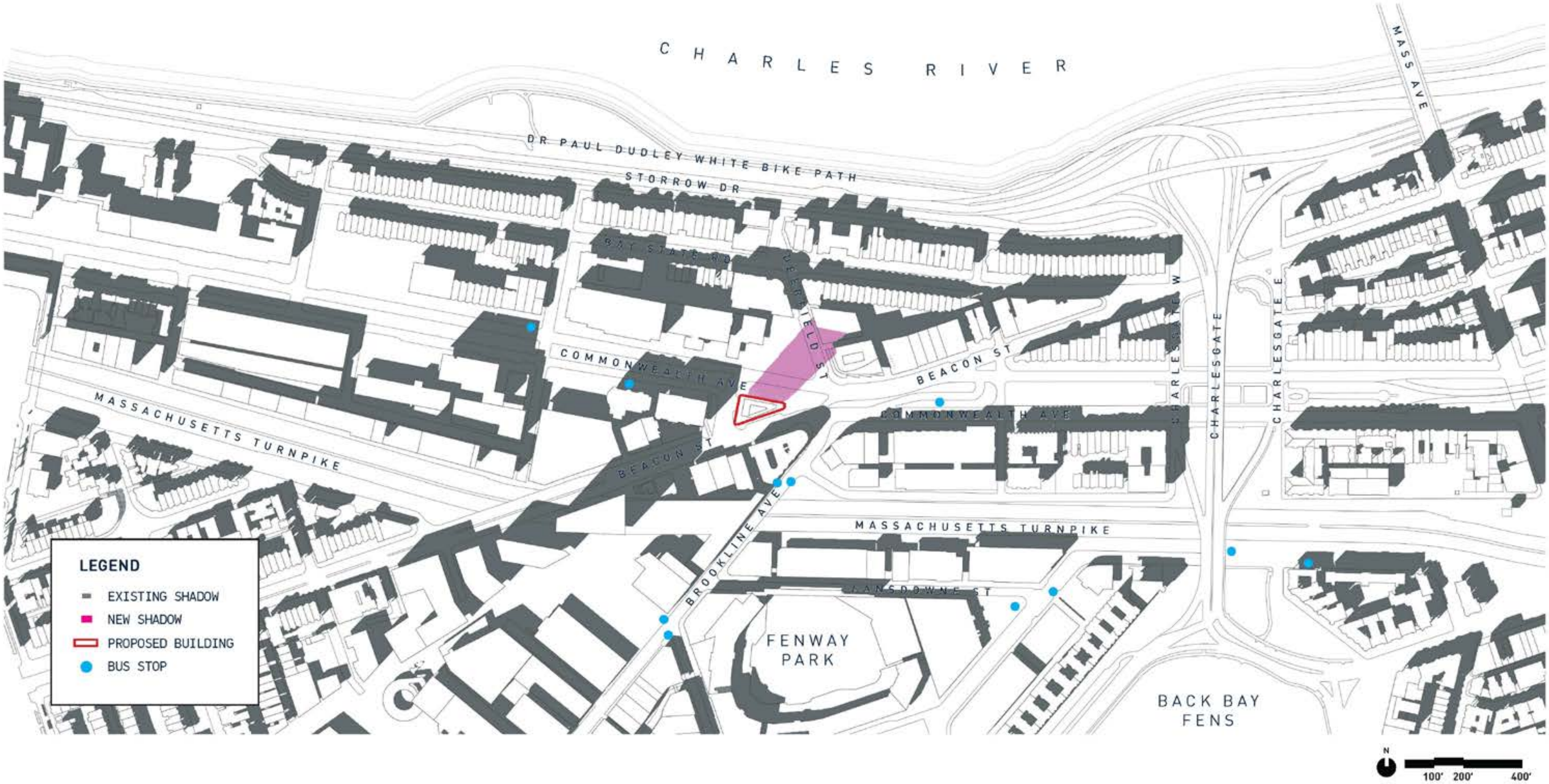

Figure 3.2-3

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

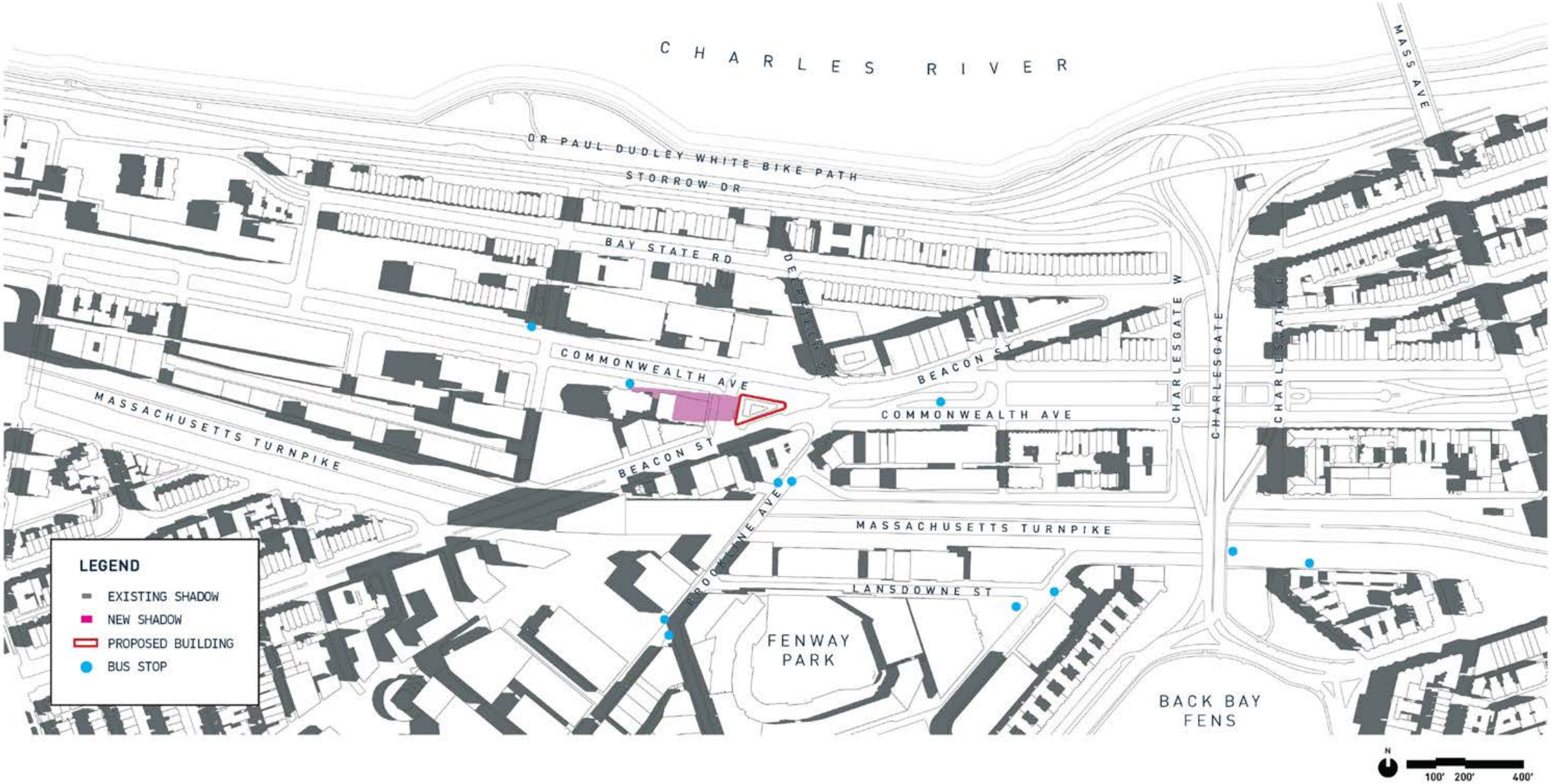

Figure 3.2-4

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

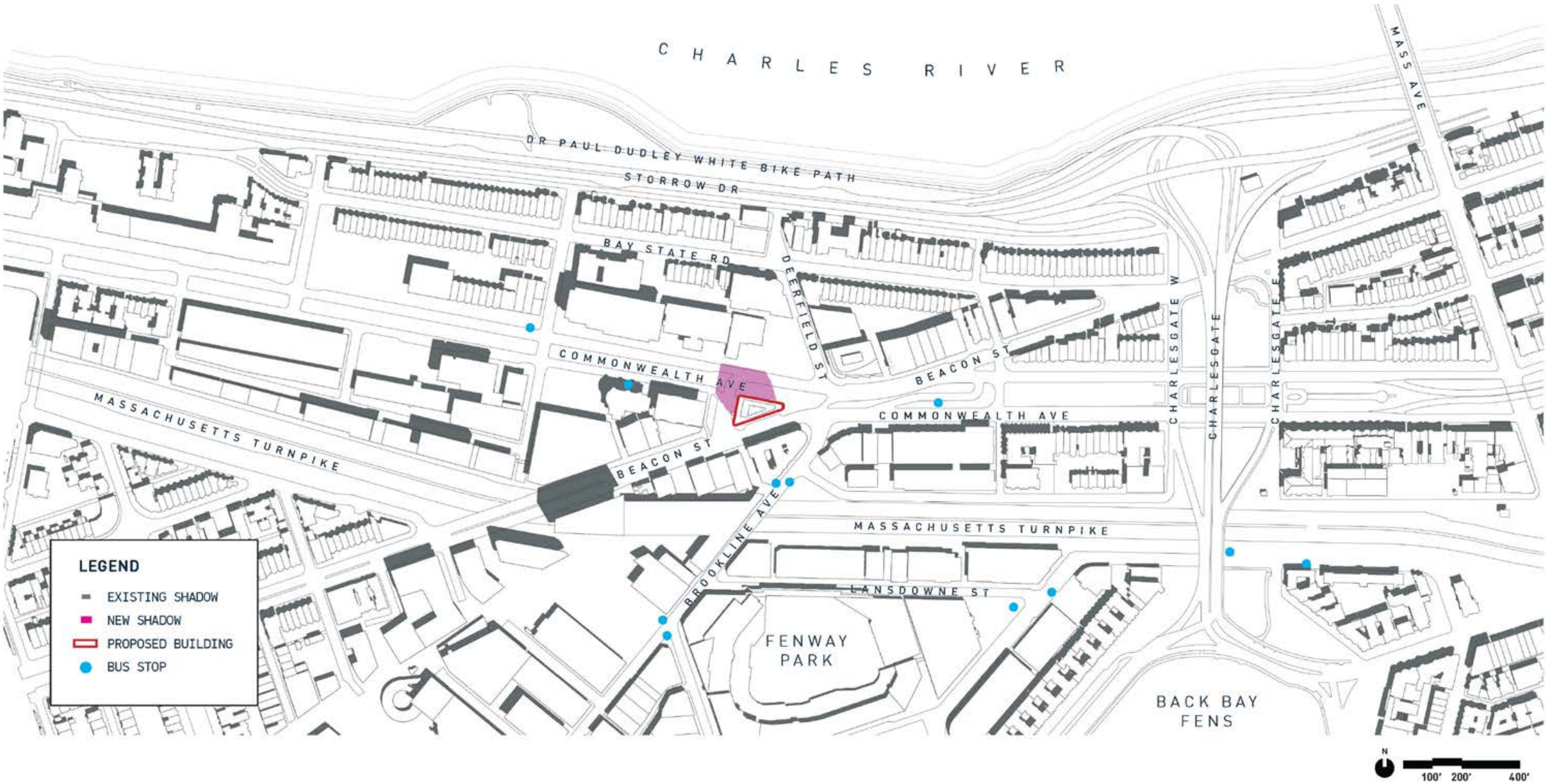

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Figure 3.2-5

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

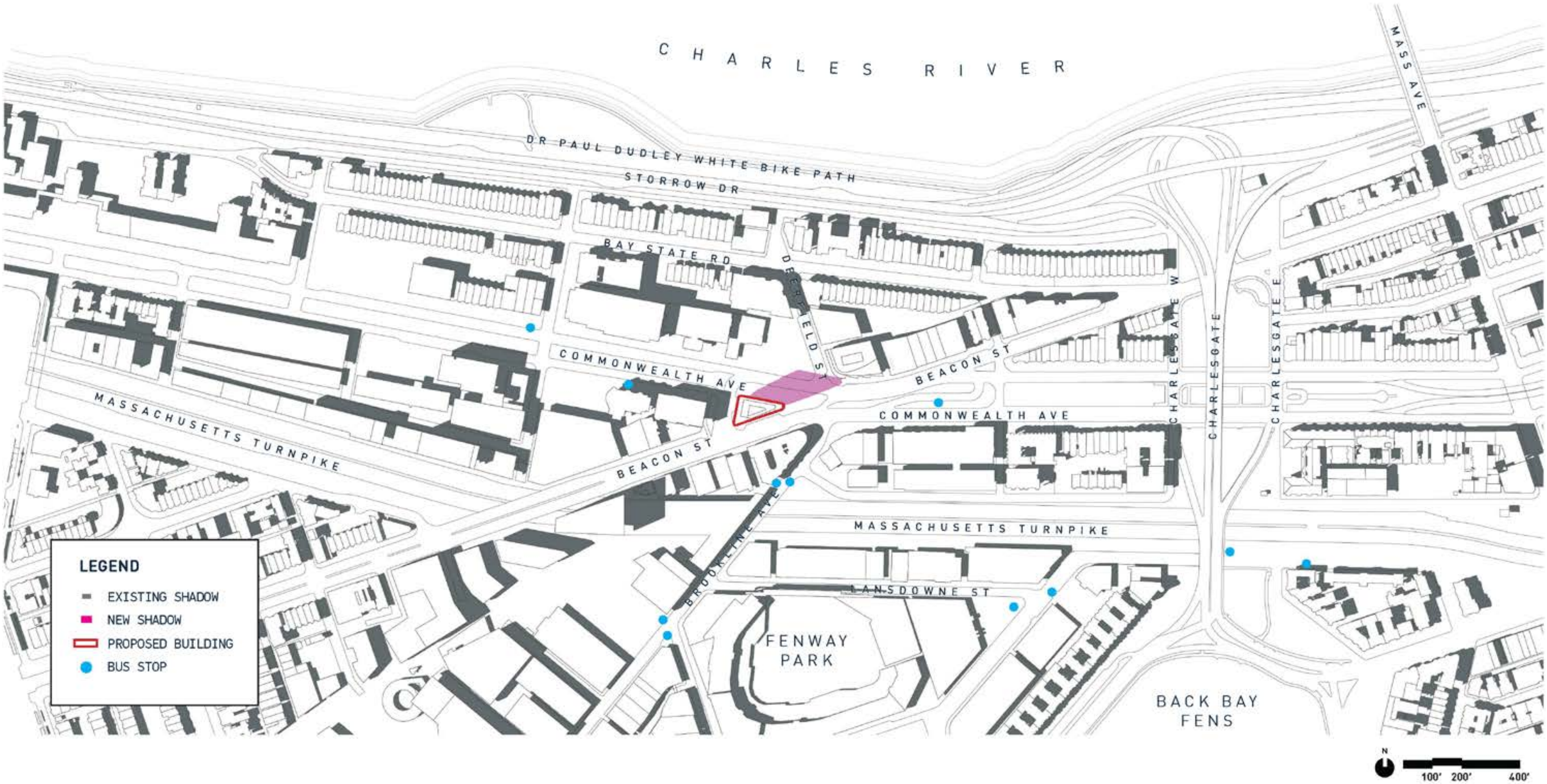

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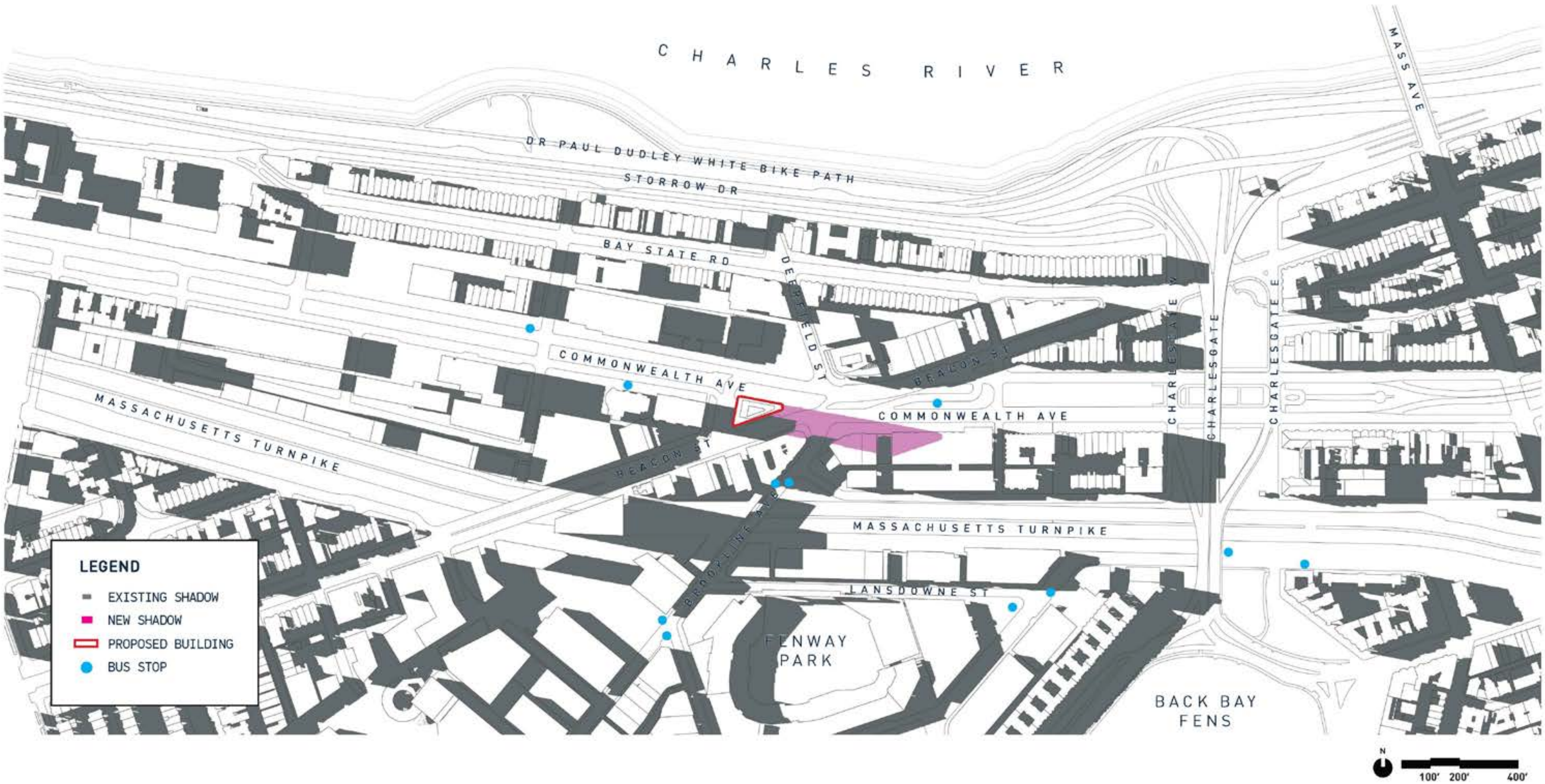
Figure 3.2-6

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



One Kenmore Square Boston, Massachusetts

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Figure 3.2-7

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

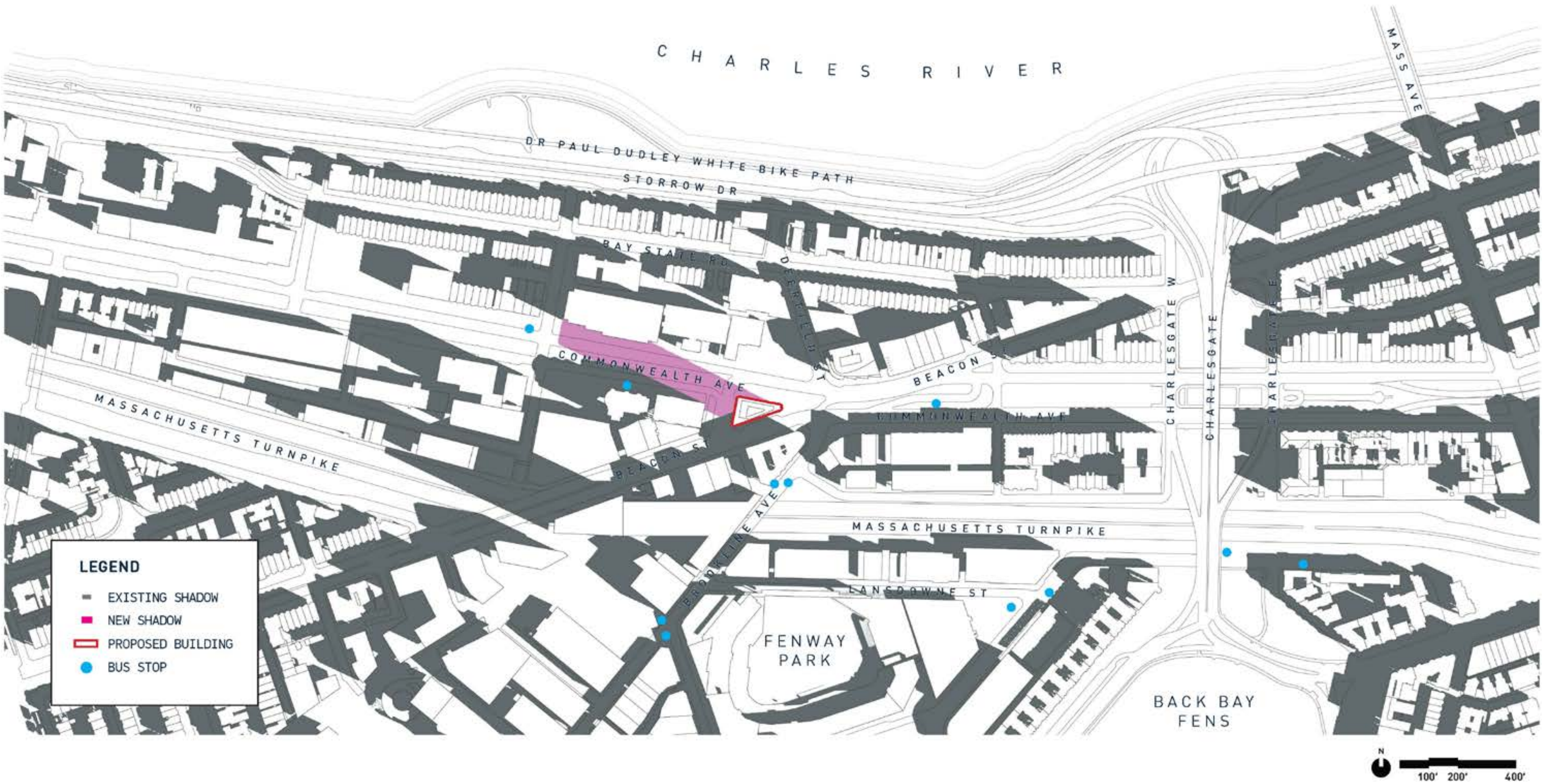


Figure 3.2-8

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

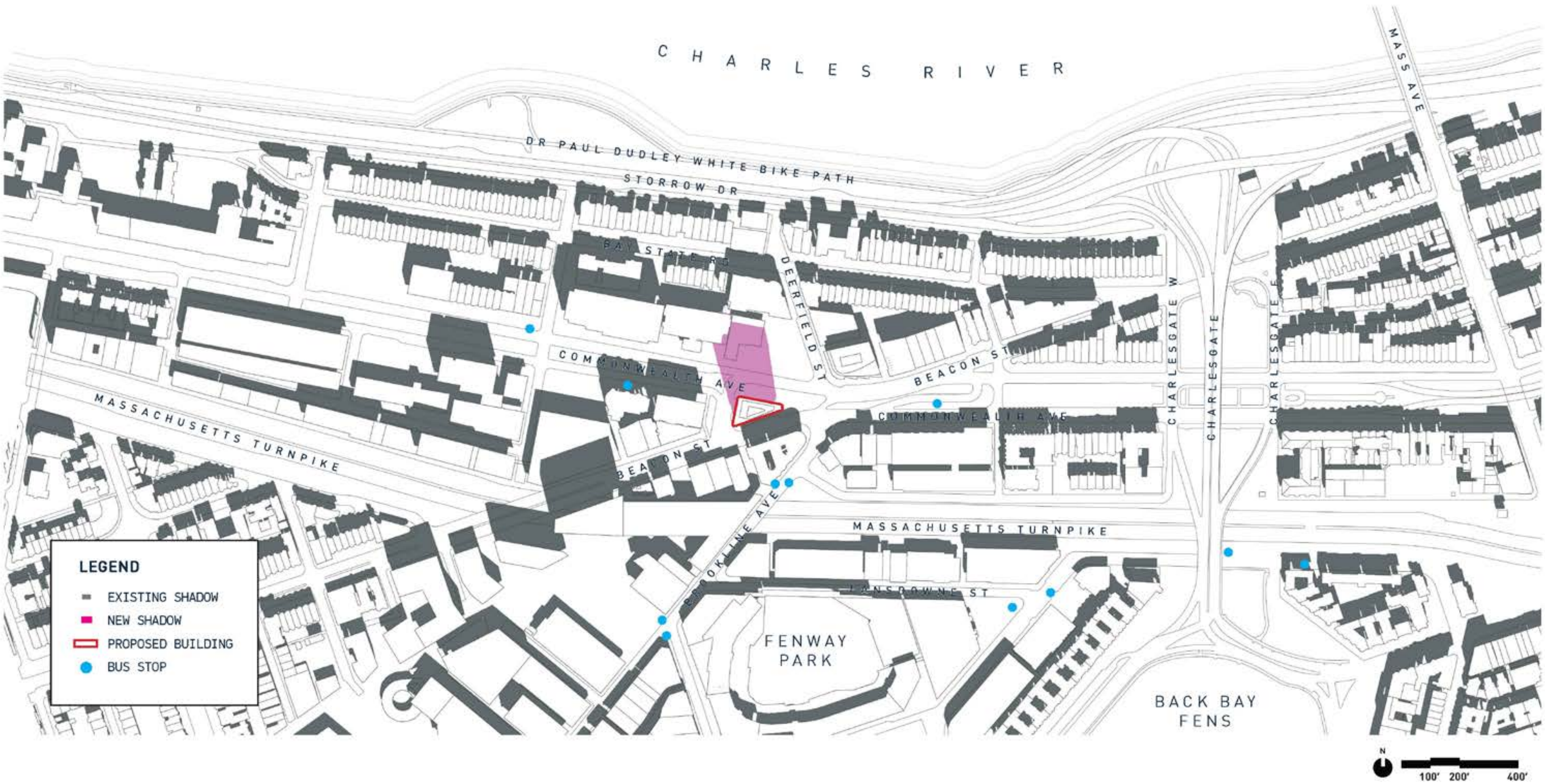
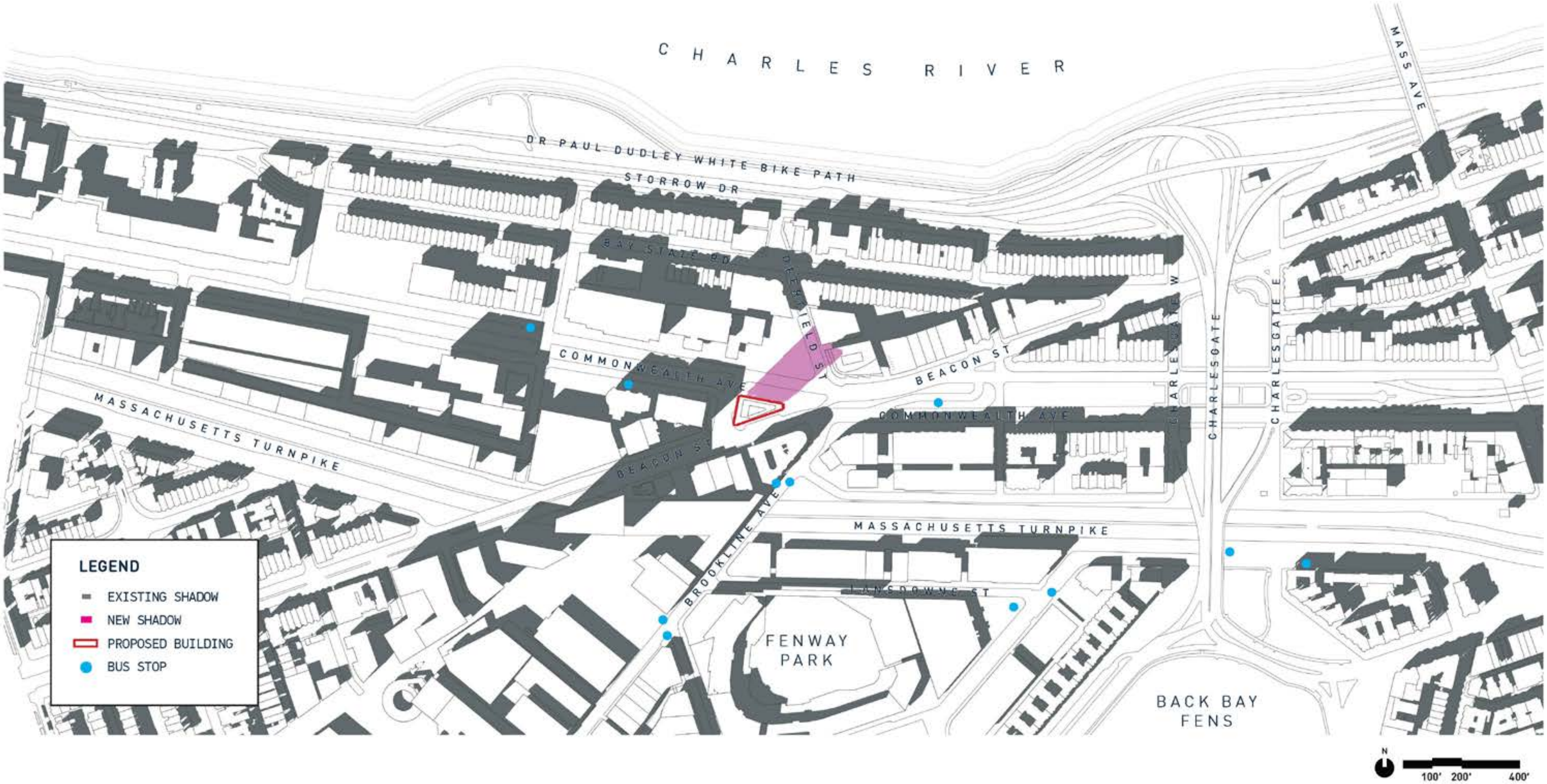


Figure 3.2-9

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



One Kenmore Square Boston, Massachusetts

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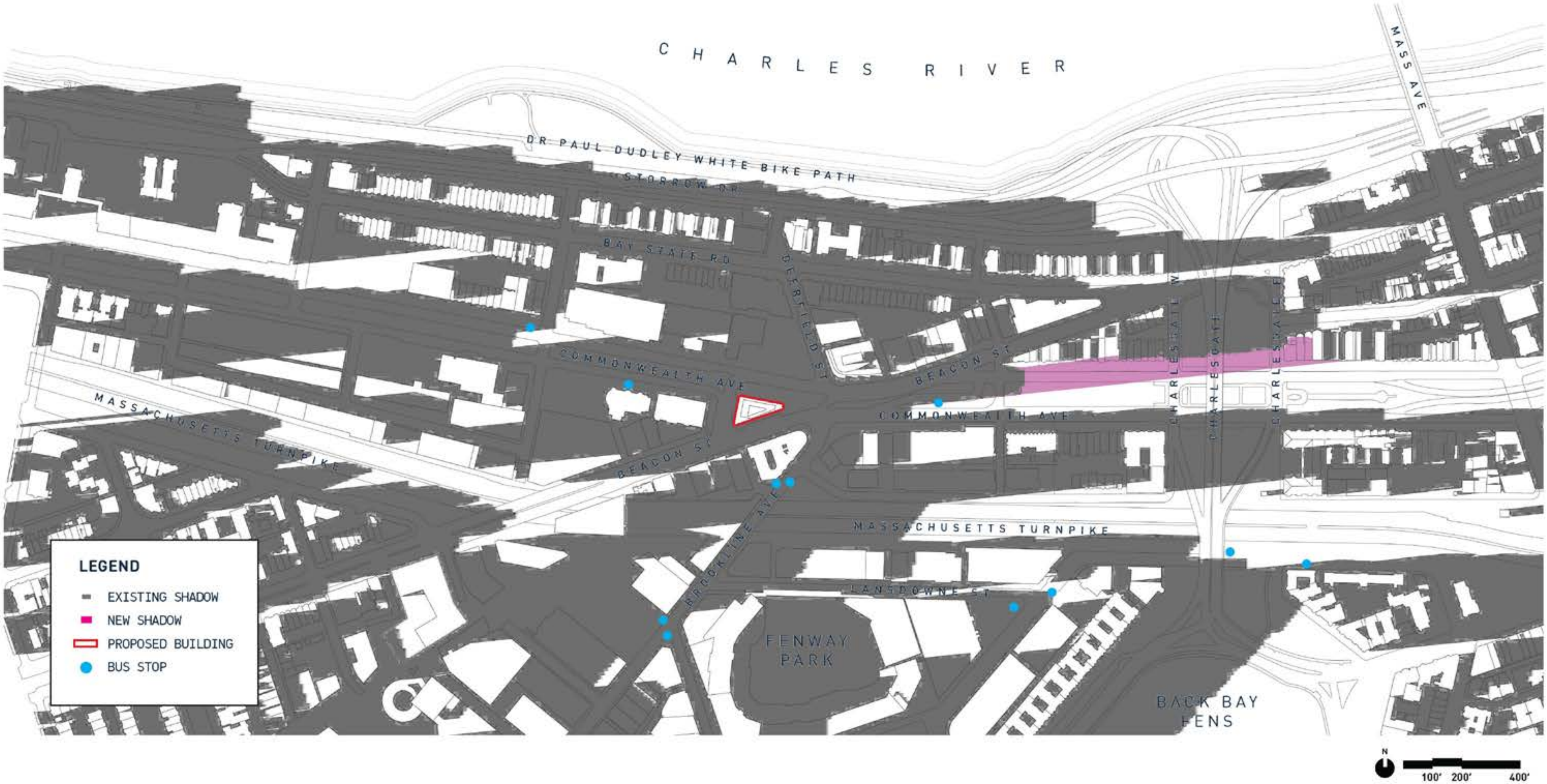
Figure 3.2-10
Shadow Study, September 21 3:00 p.m.



One Kenmore Square Boston, Massachusetts

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Figure 3.2-11

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

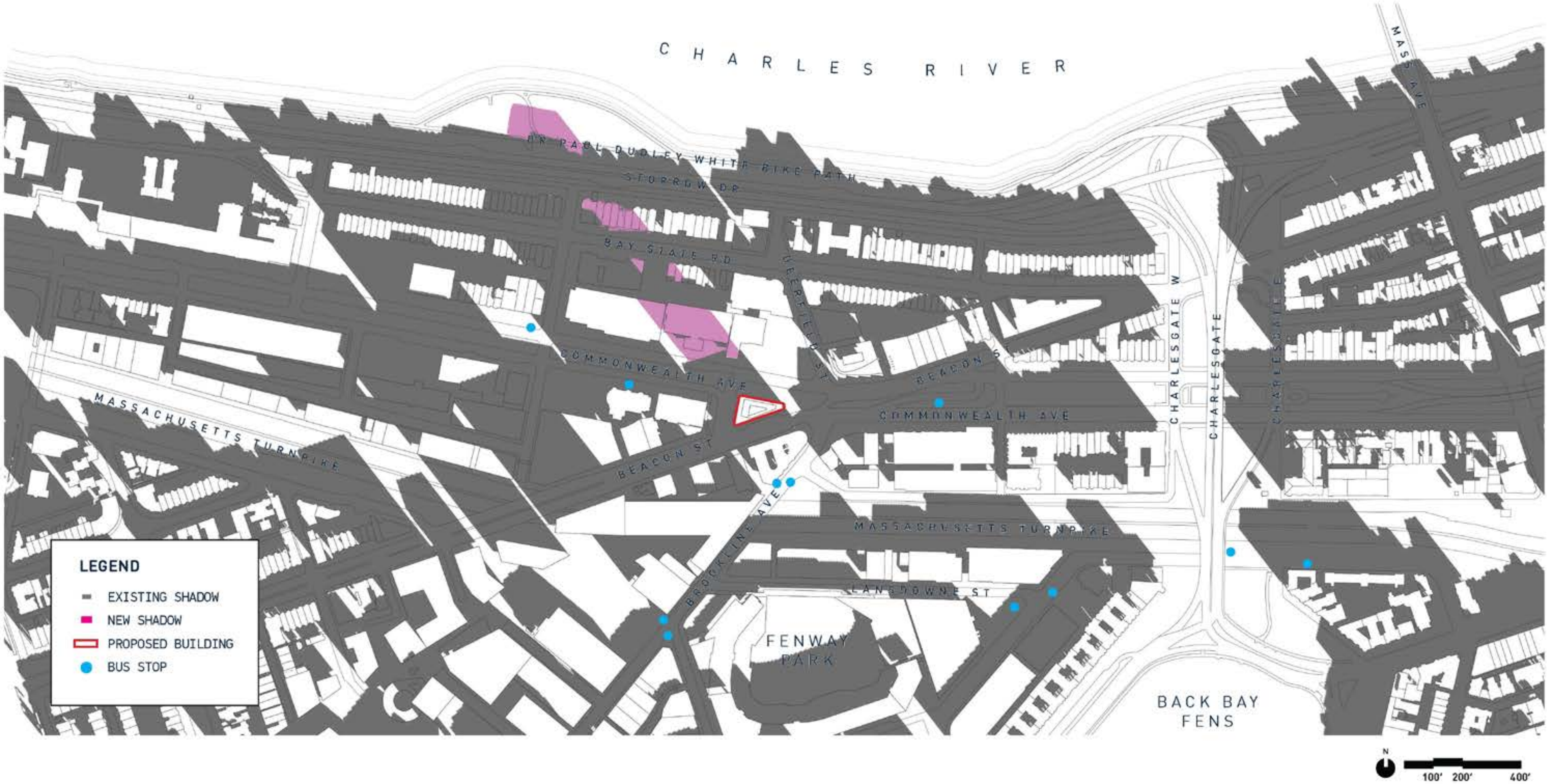

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Figure 3.2-12

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

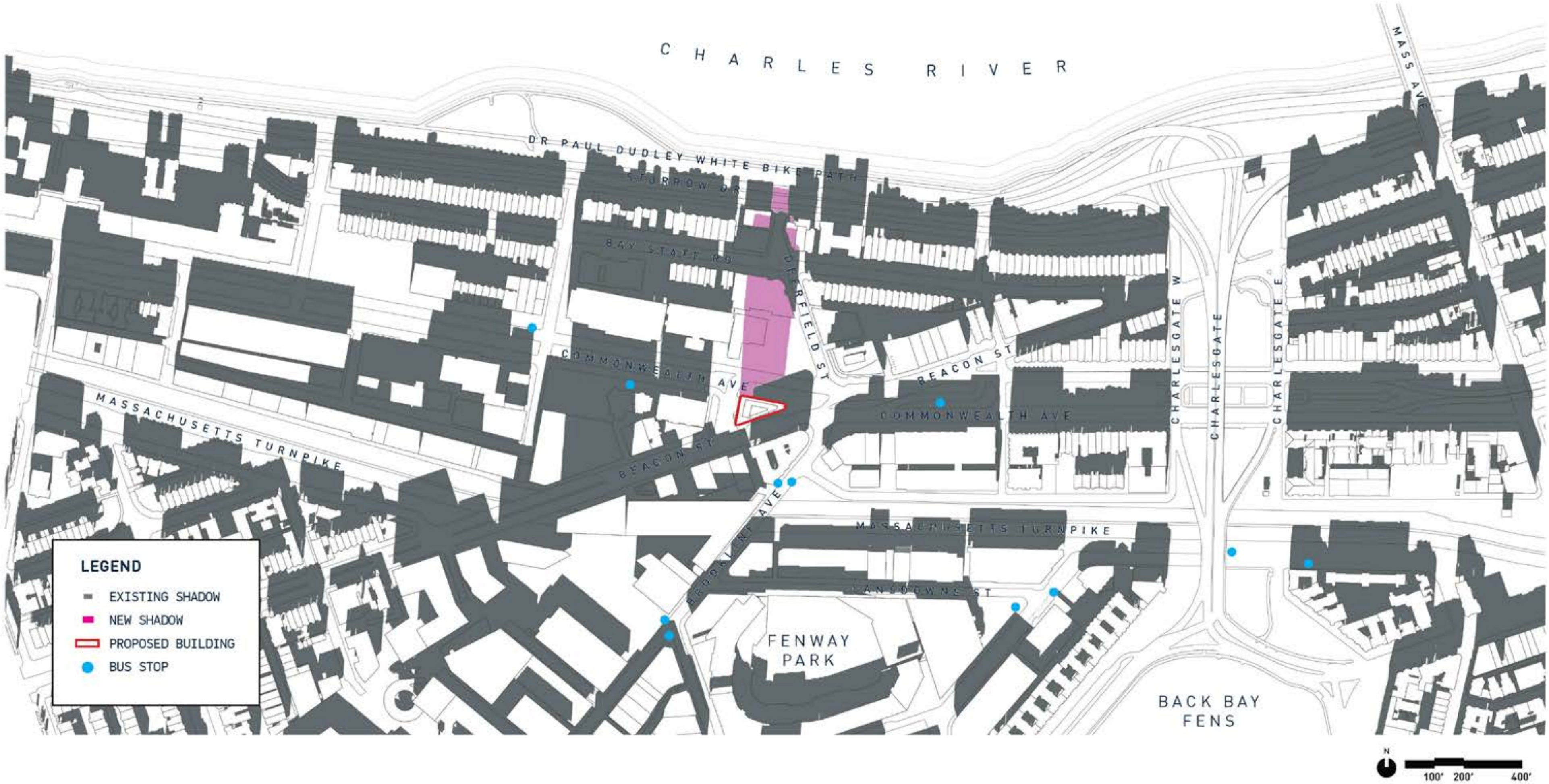

Figure 3.2-13

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

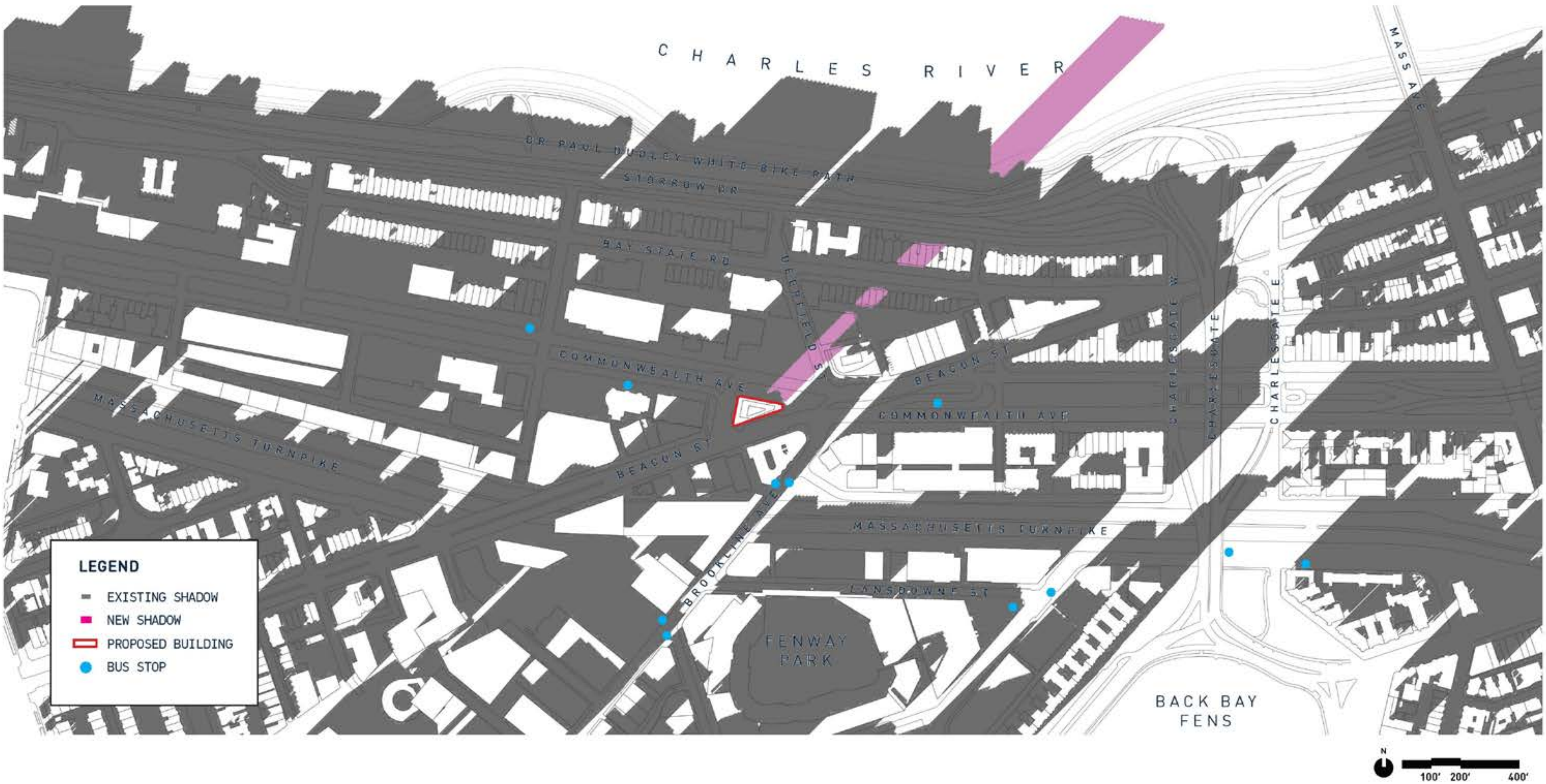

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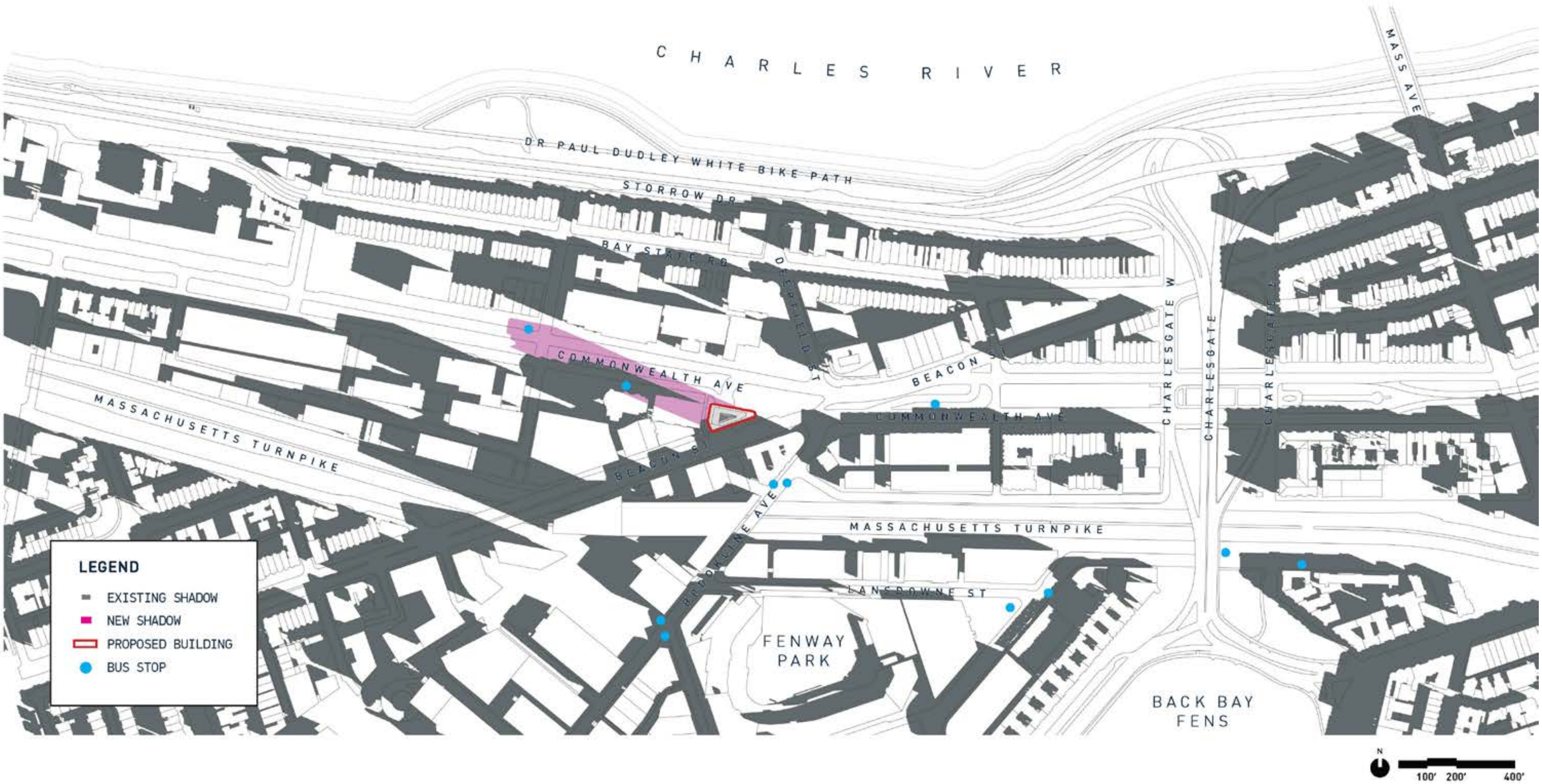
Figure 3.2-14

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



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/ARCHITECTS

Figure 3.2-15

Shadow Study, Alternative Build Scenario, March 21 9:00 a.m.

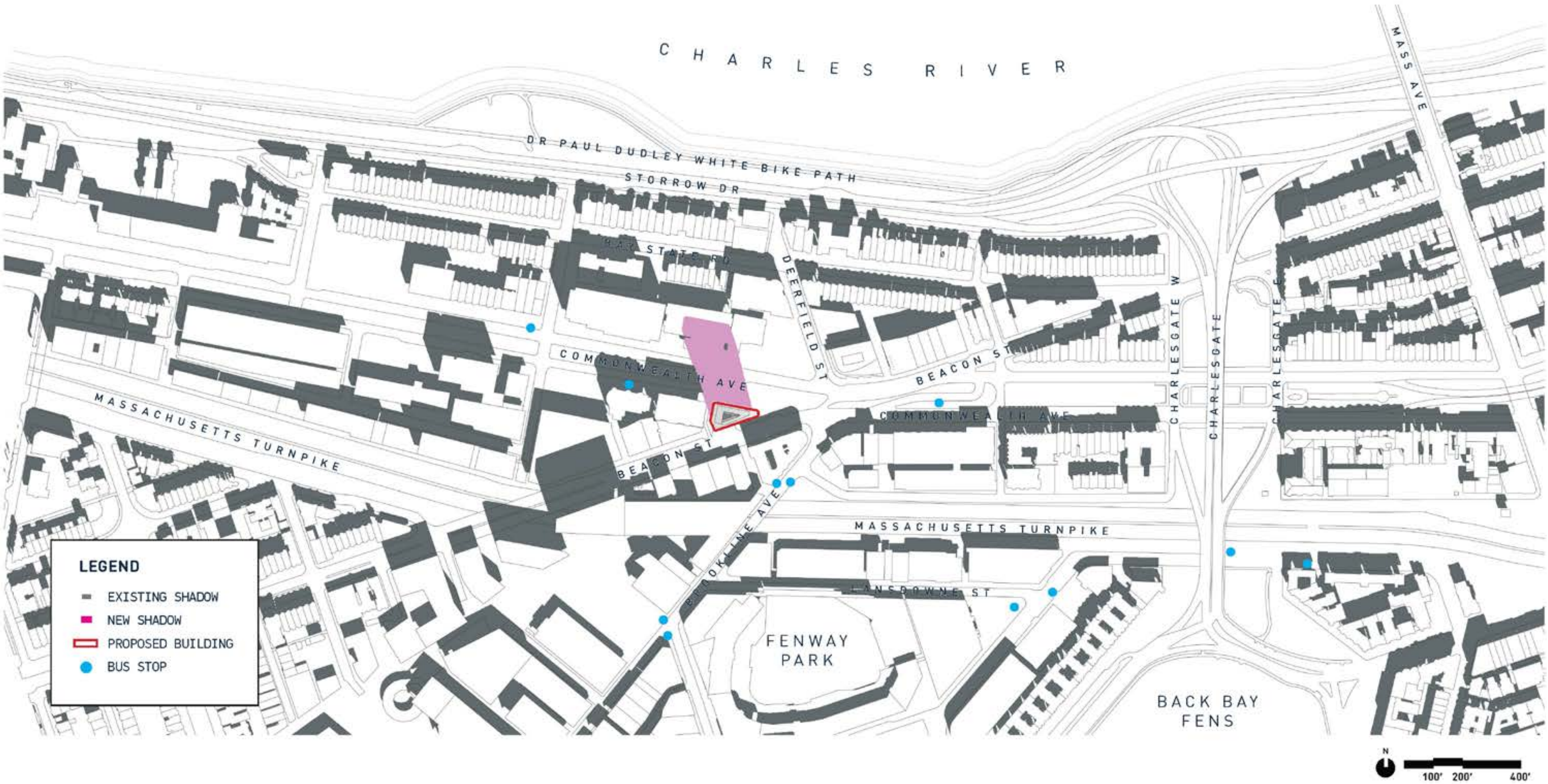

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Figure 3.2-16

Shadow Study, Alternative Build Scenario, March 21 12:00 p.m.

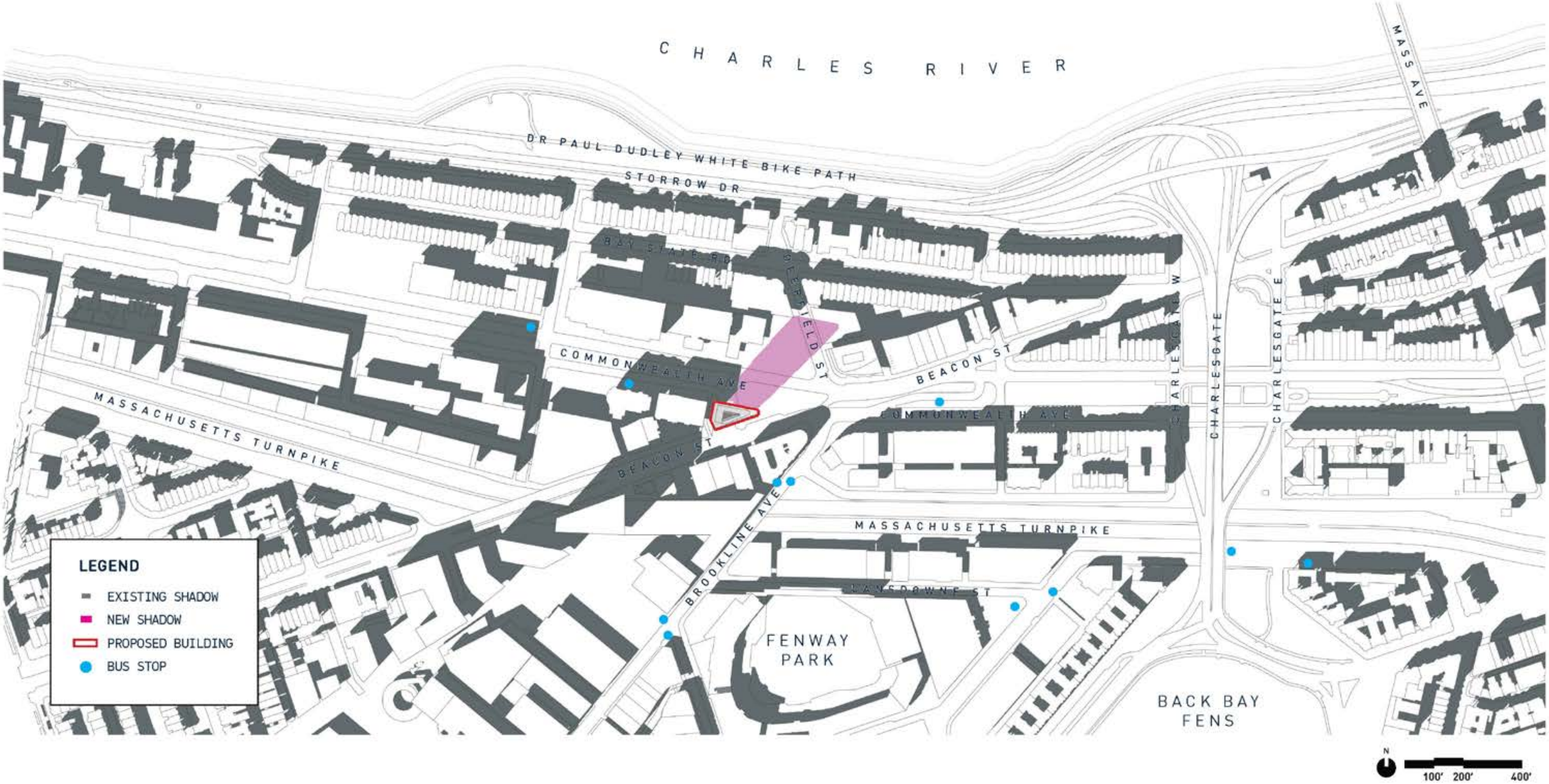

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Figure 3.2-17

Shadow Study, Alternative Build Scenario, March 21 3:00 p.m.

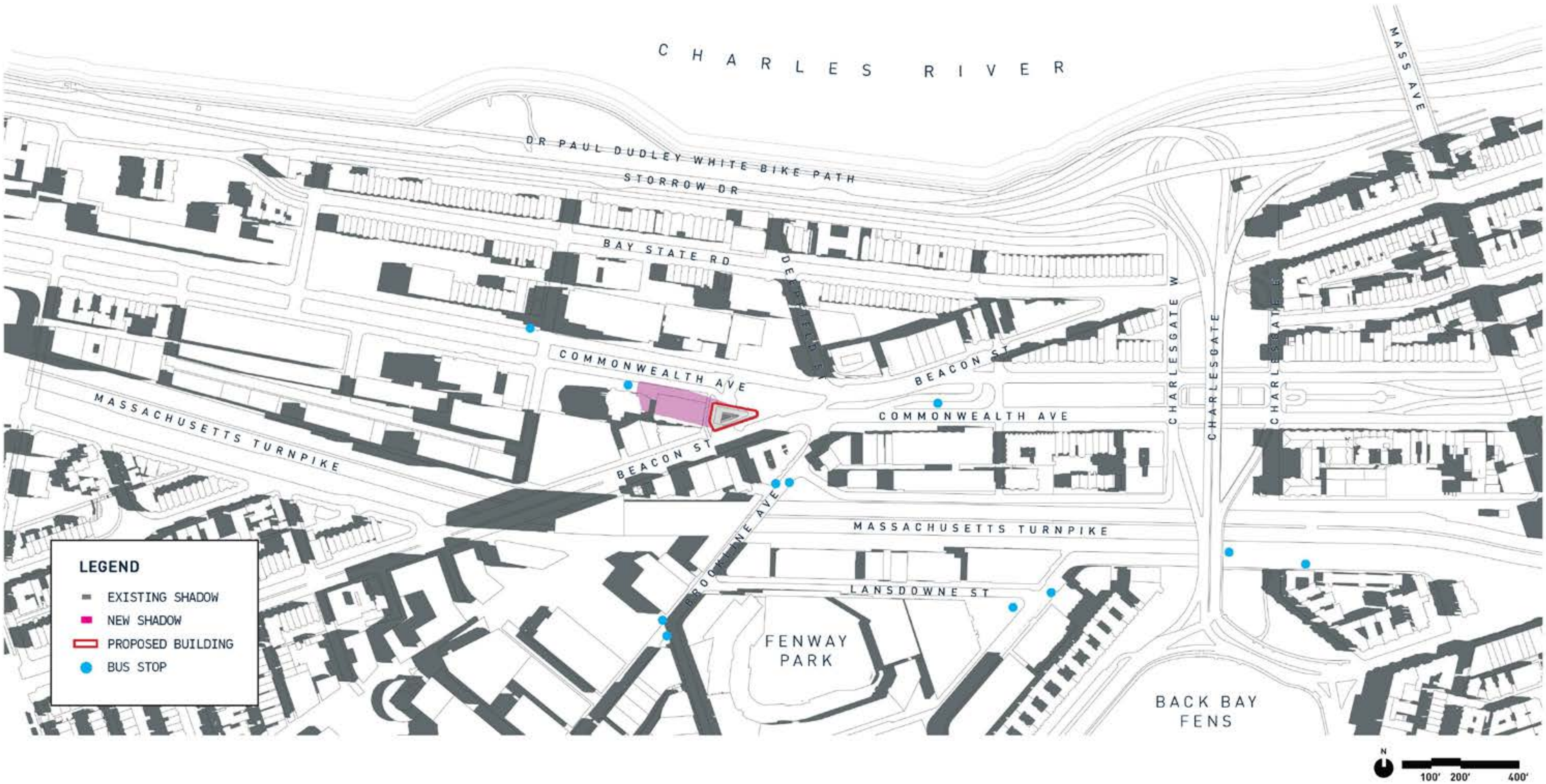

Figure 3.2-18

Shadow Study, Alternative Build Scenario, June 21 9:00 a.m.

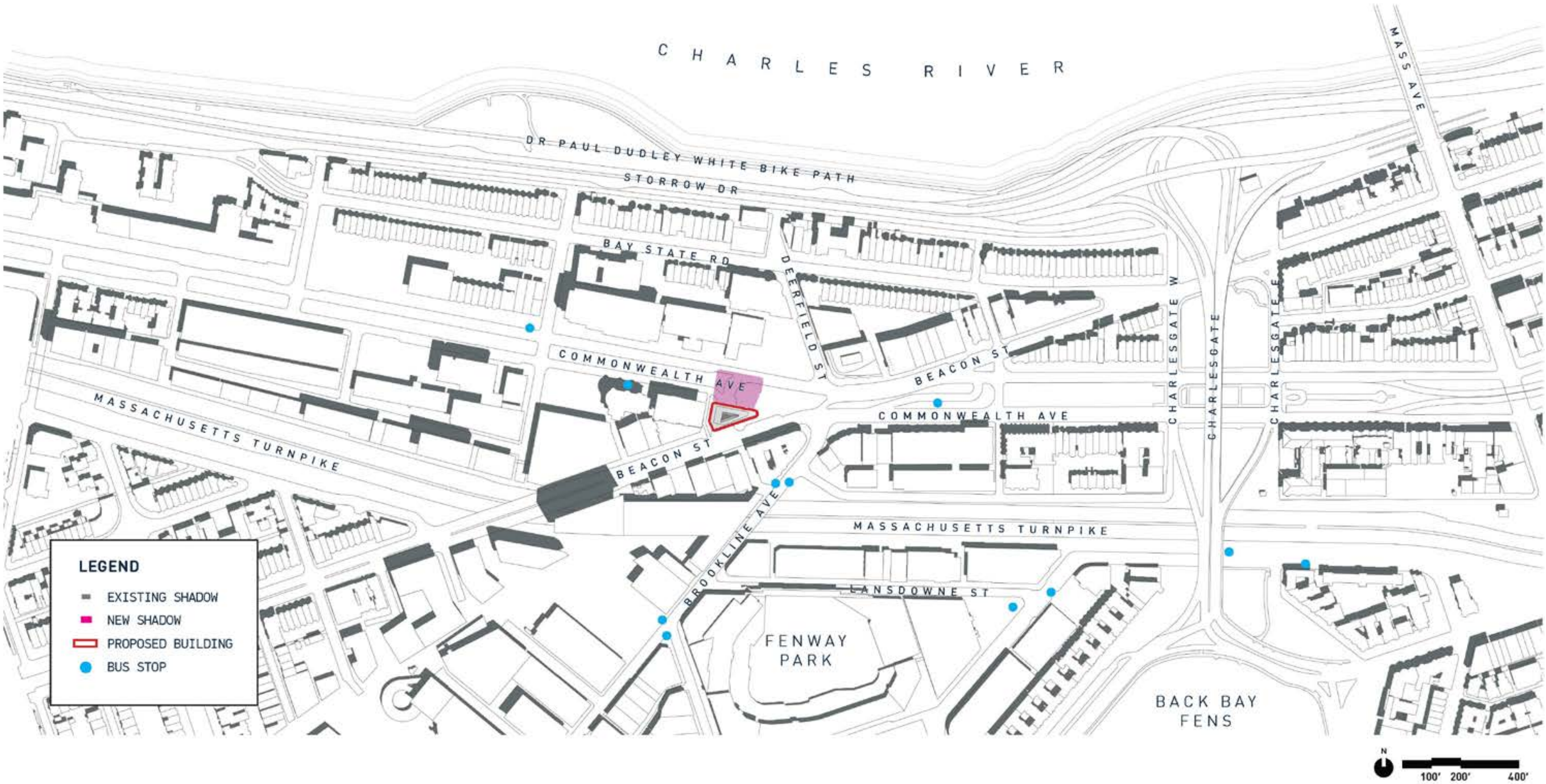

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Figure 3.2-19

Shadow Study, Alternative Build Scenario, June 21 12:00 p.m.

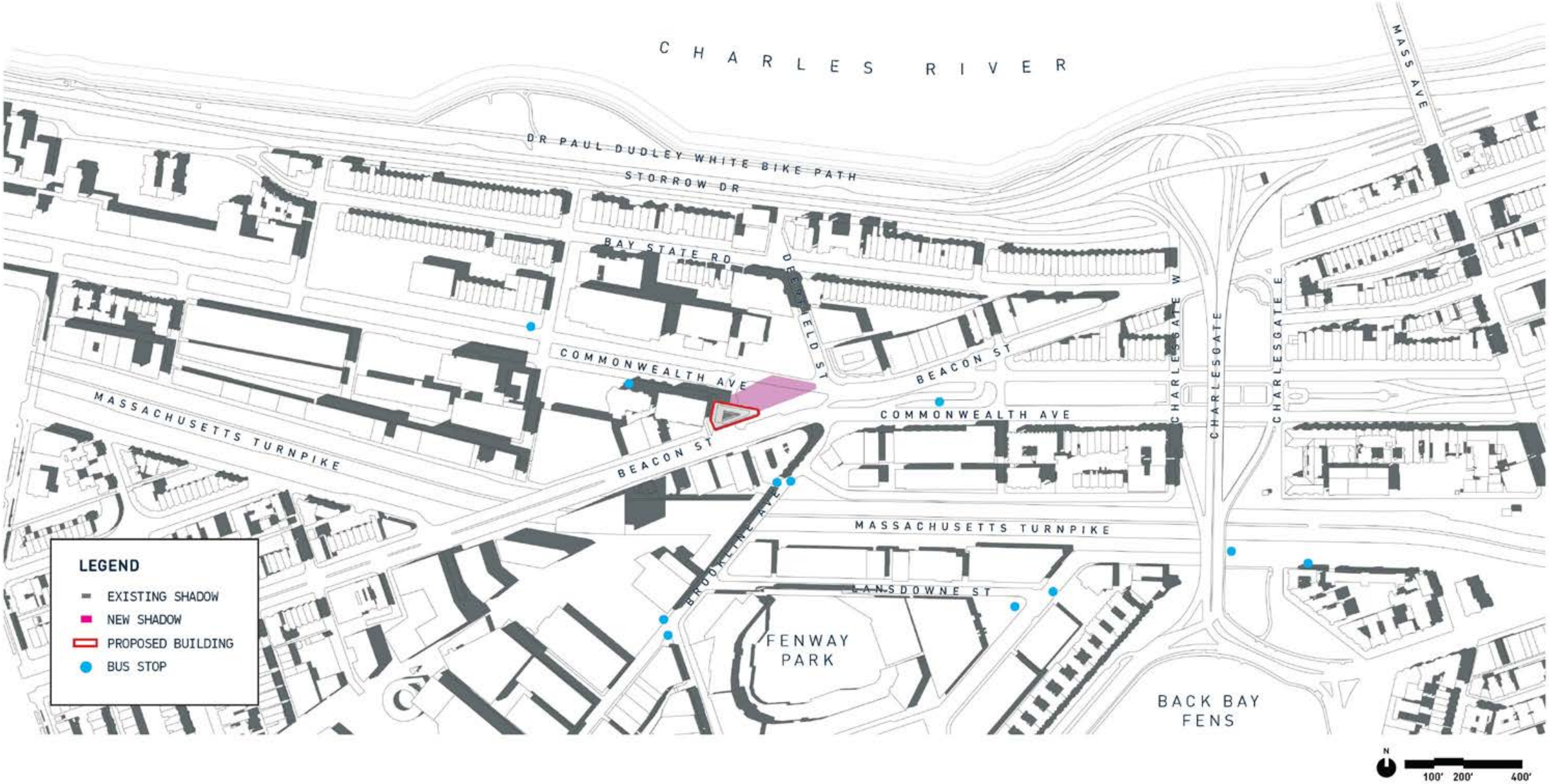

Figure 3.2-20

Shadow Study, Alternative Build Scenario, June 21 3:00 p.m.

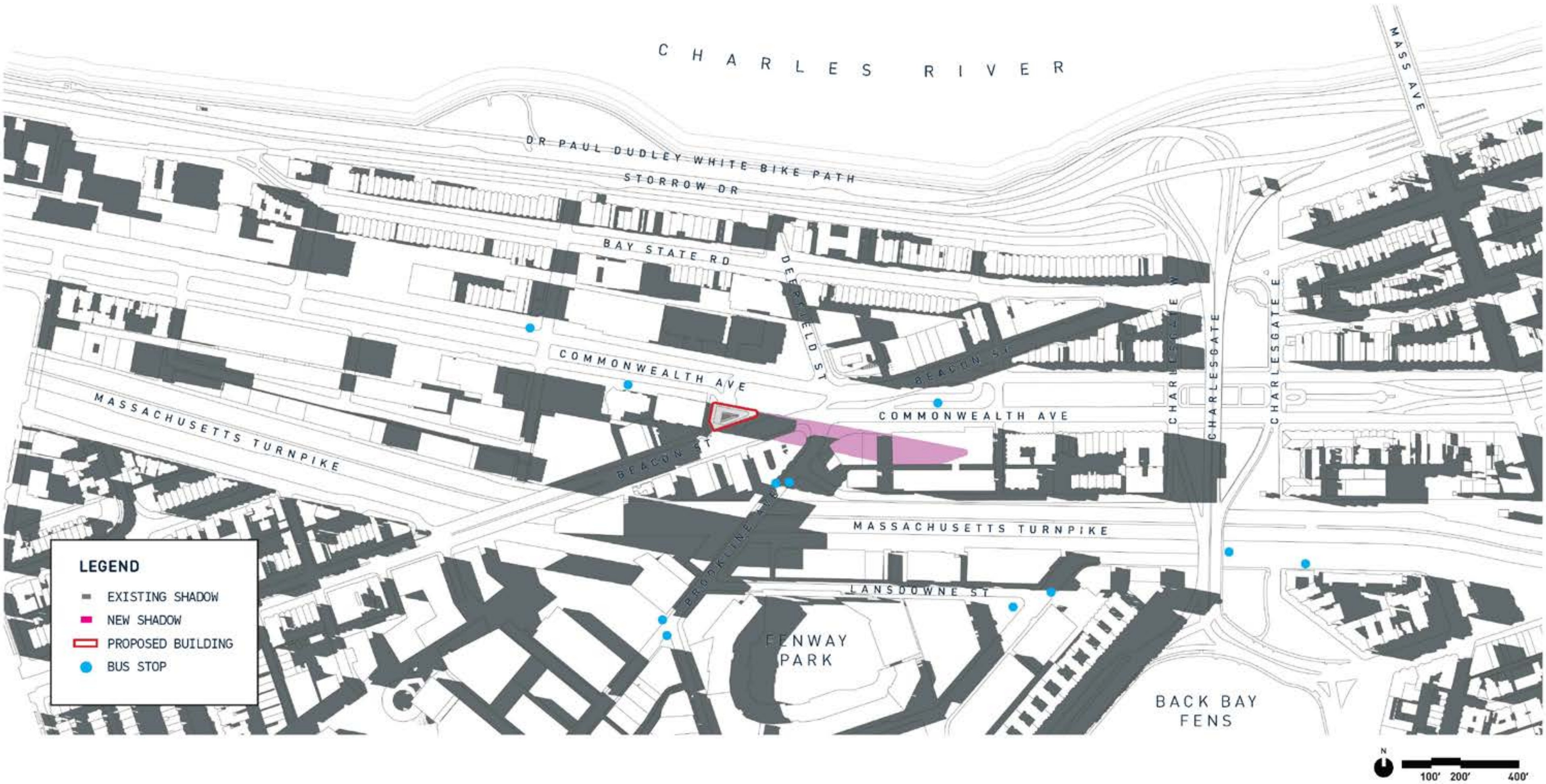

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Figure 3.2-21

Shadow Study, Alternative Build Scenario, June 21 6:00 p.m.

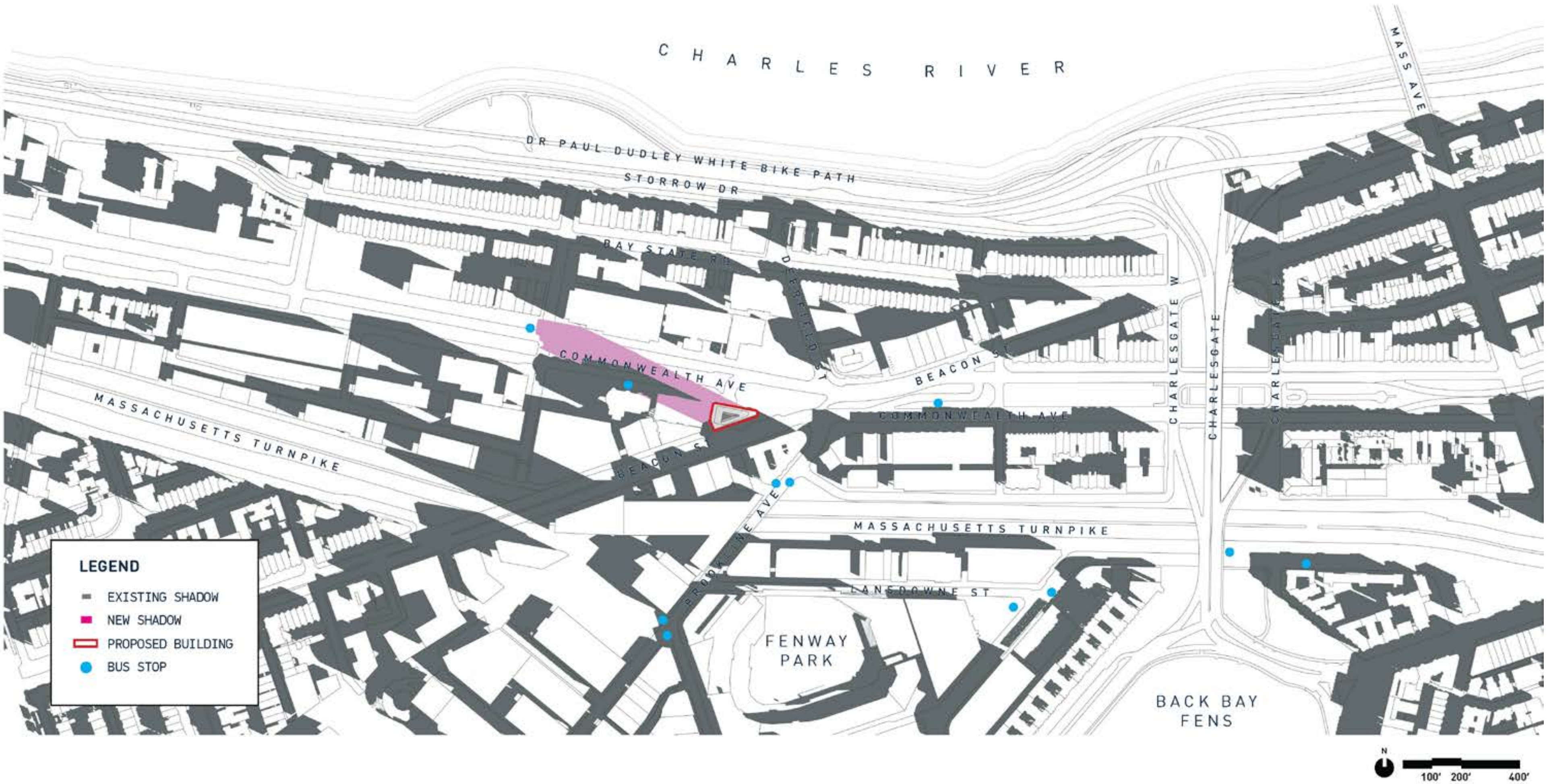

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Figure 3.2-22

Shadow Study, Alternative Build Scenario, September 21 9:00 a.m.

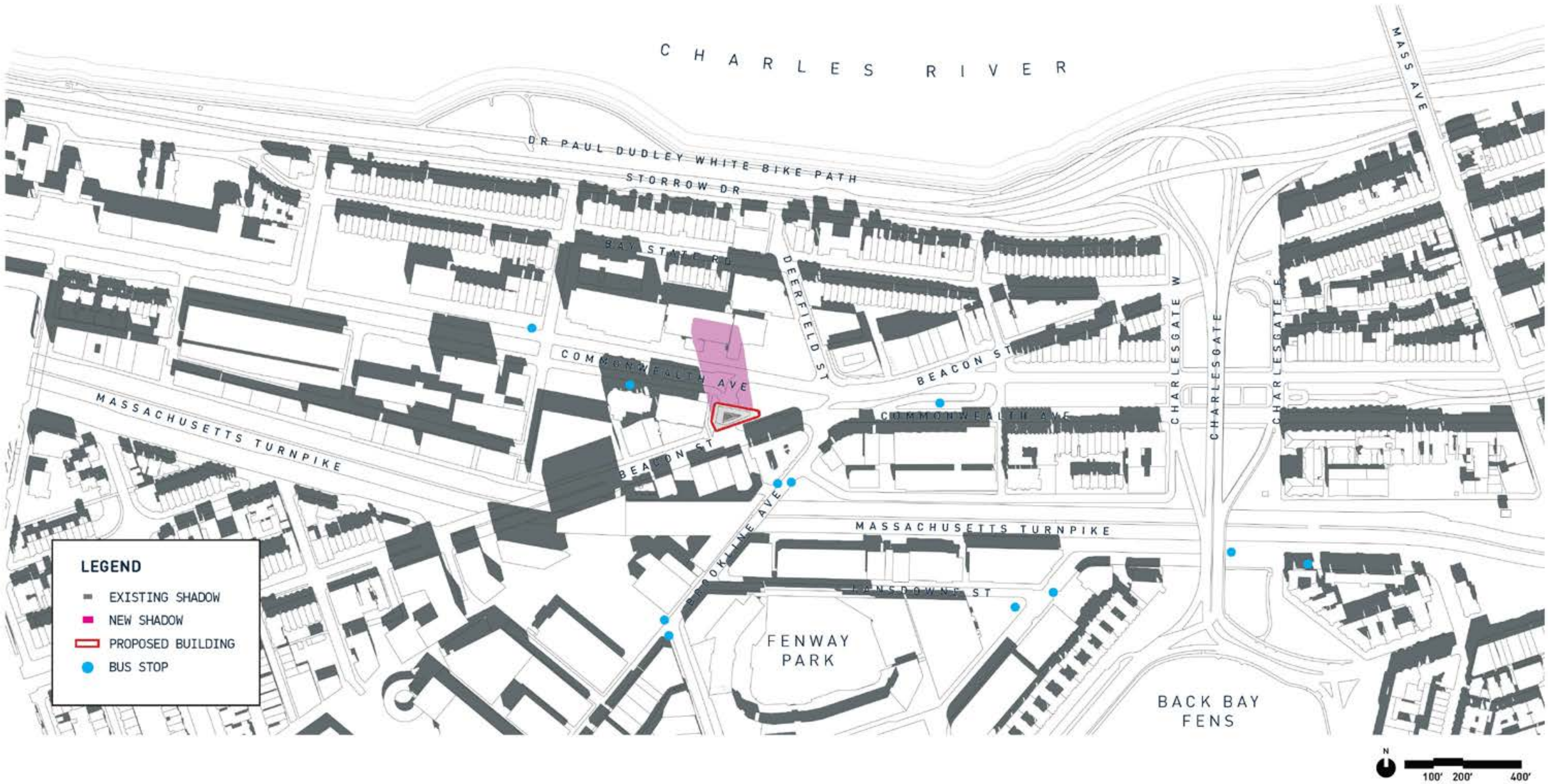

Figure 3.2-23

Shadow Study, Alternative Build Scenario, September 21 12:00 p.m.

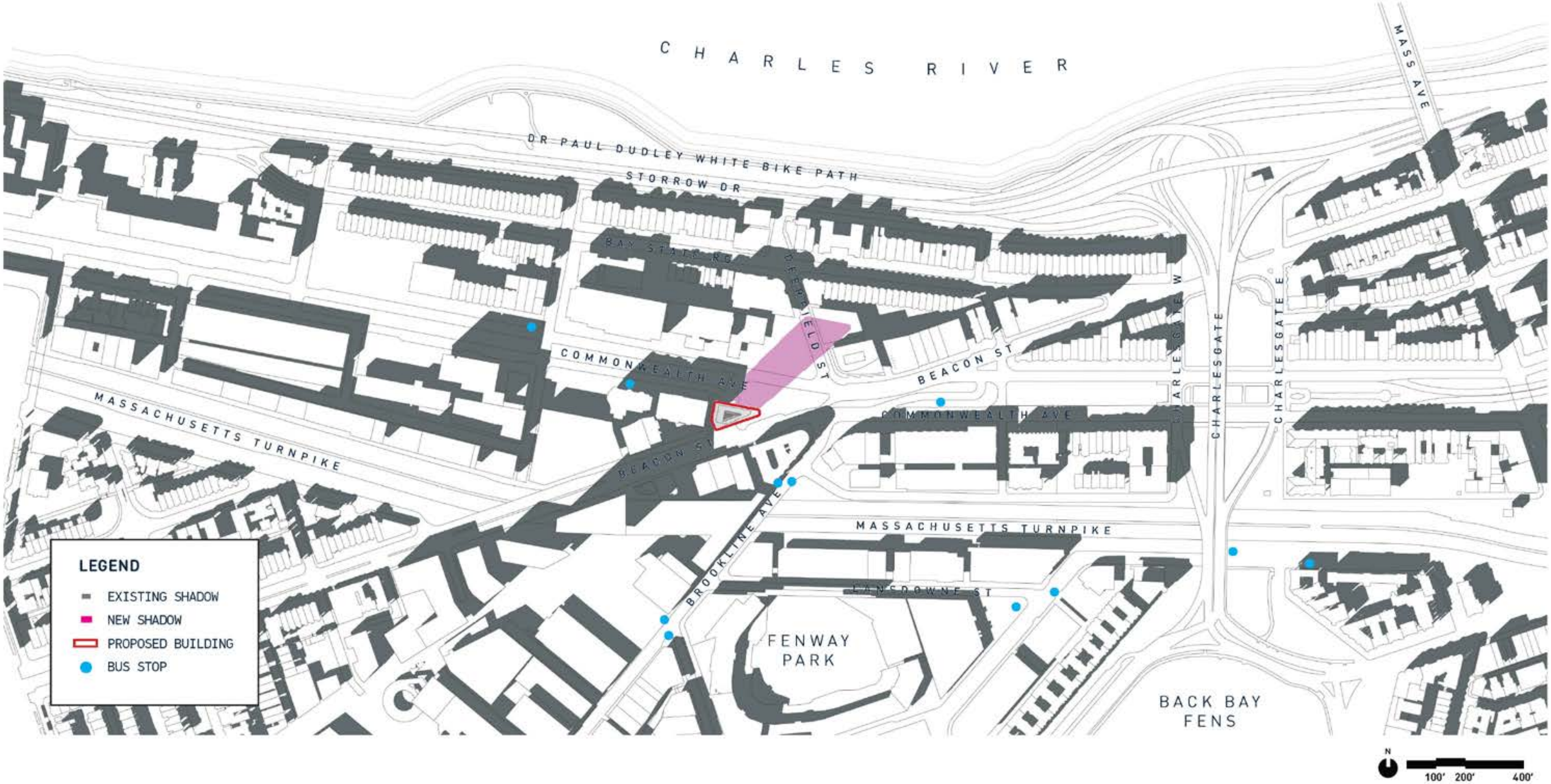

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Figure 3.2-24

Shadow Study, Alternative Build Scenario, September 21 3:00 p.m.

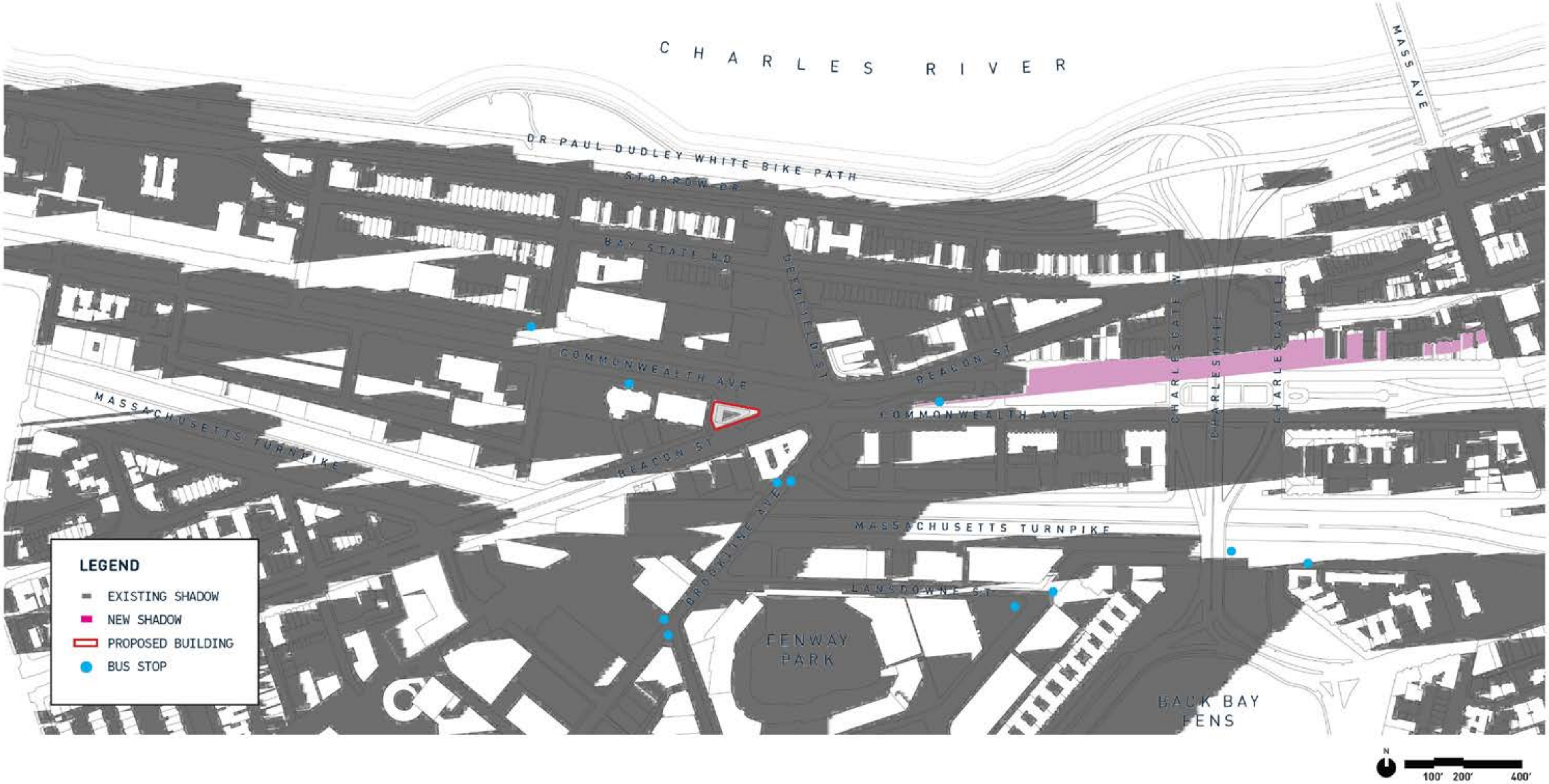

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Figure 3.2-25

Shadow Study, Alternative Build Scenario, September 21 6:00 p.m.

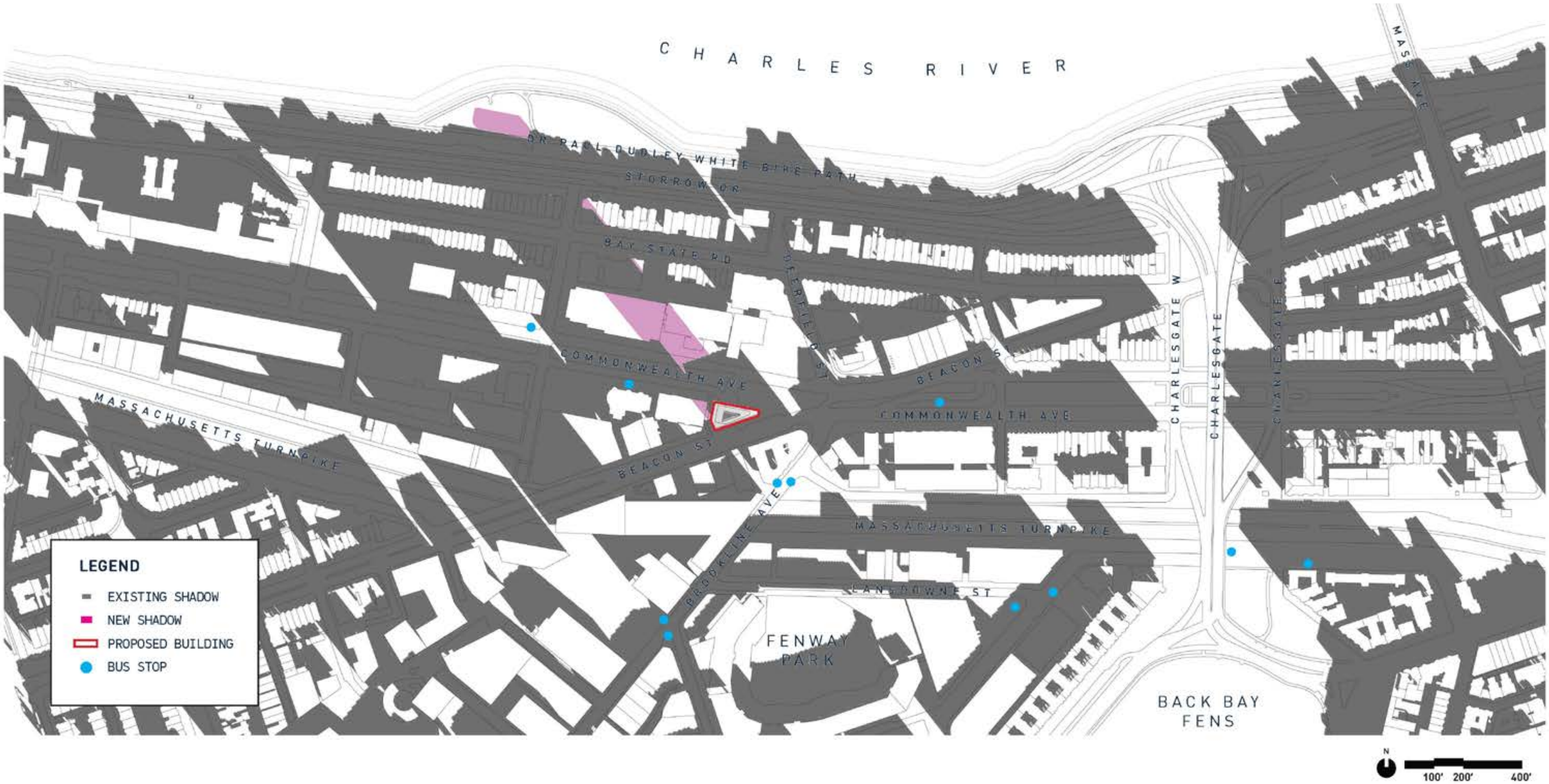

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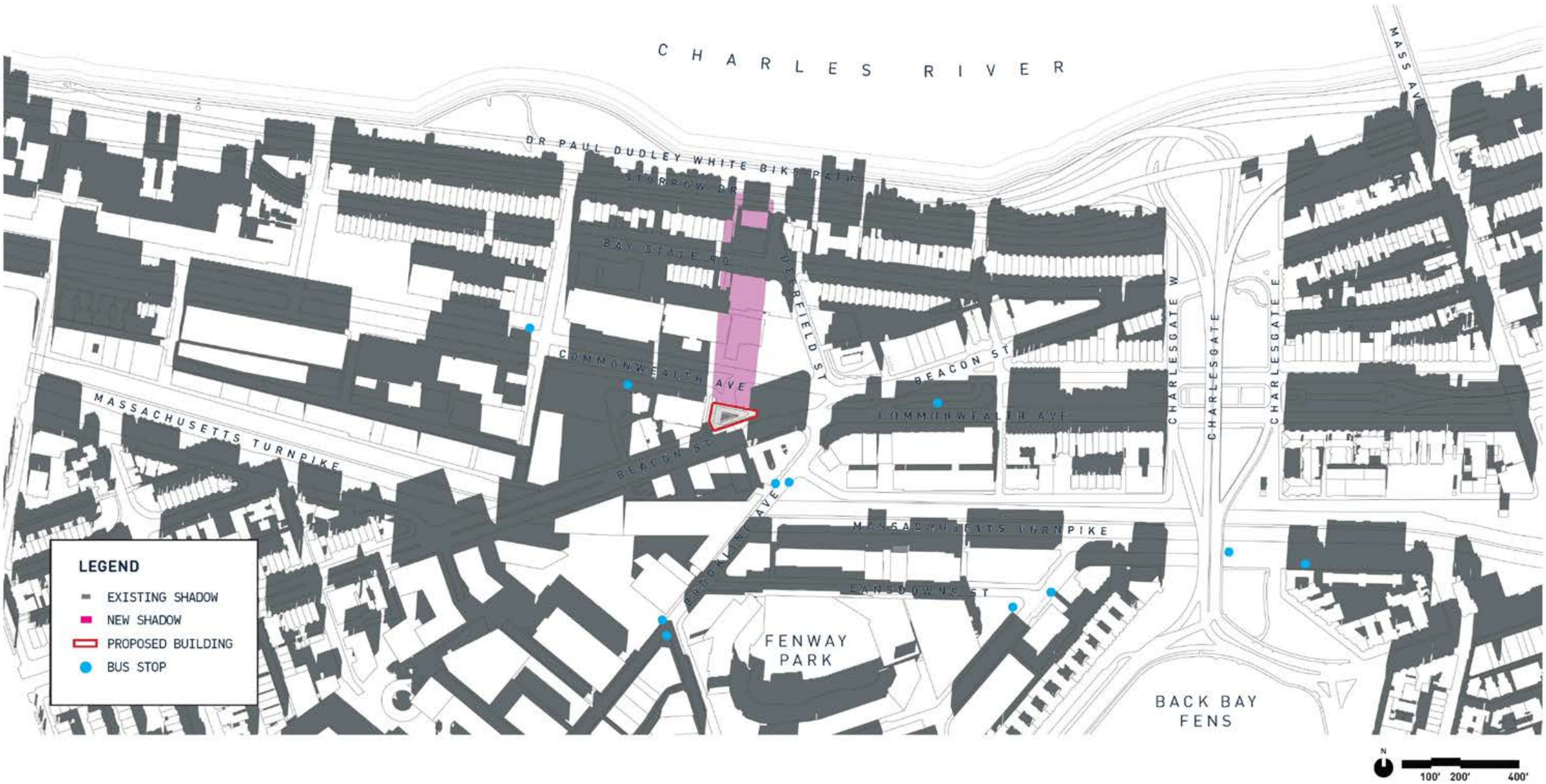
Figure 3.2-26

Shadow Study, Alternative Build Scenario, December 21 9:00 a.m.



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/ARCHITECTS

Figure 3.2-27

Shadow Study, Alternative Build Scenario, December 21 12:00 p.m.

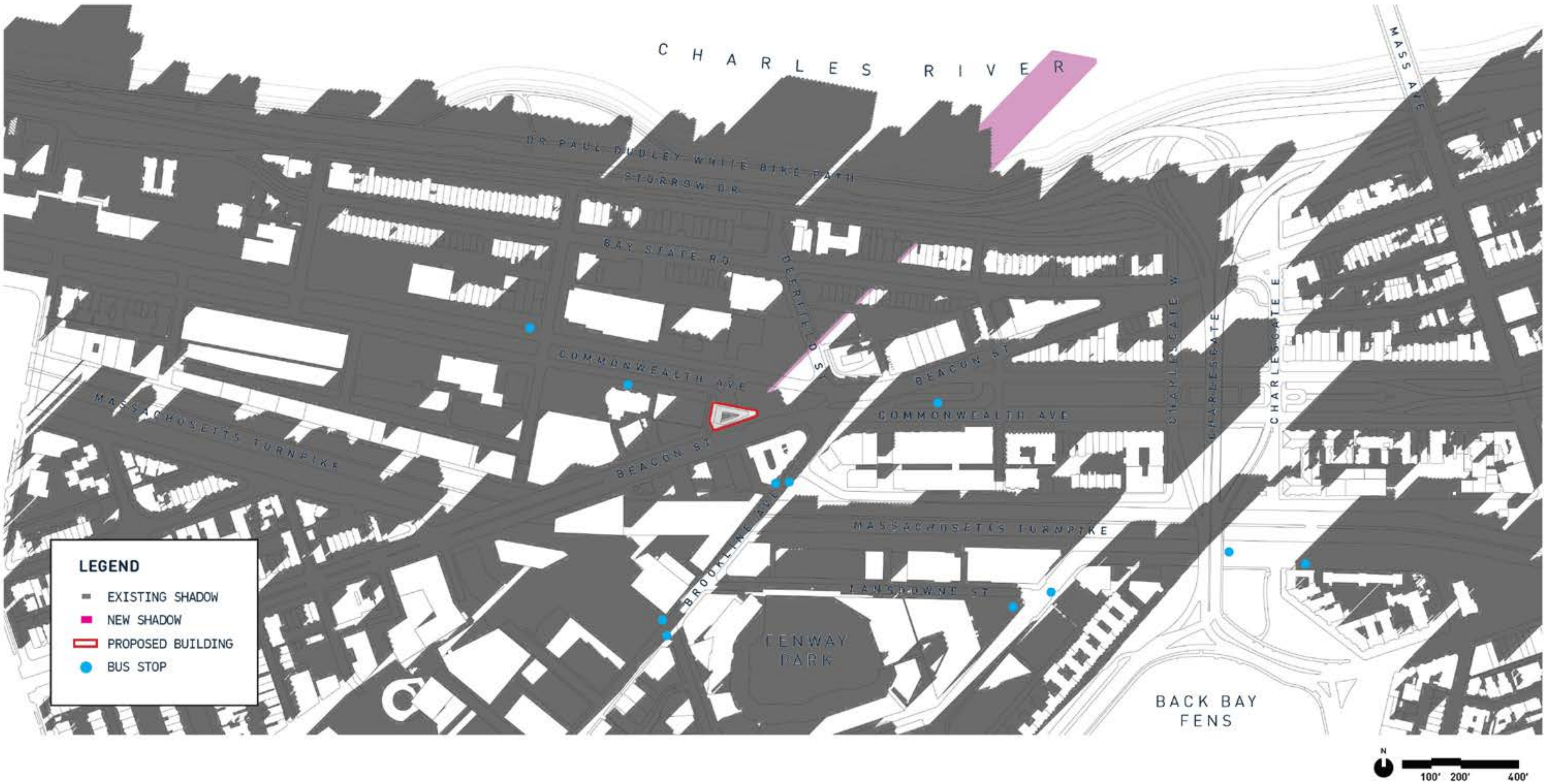

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Figure 3.2-28

Shadow Study, Alternative Build Scenario, December 21 3:00 p.m.

3.3 Daylight Analysis

3.3.1 Introduction

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

Because the Project Area currently consists of a one-story building and roadways, the proposed Project will increase daylight obstruction from the existing condition; however, the proposed building will be surrounded by a new public plaza on both sides, allowing for additional views to the sky.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis (BRADA) computer program[1]. This program measures the percentage of sky-dome that is obstructed by a project and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways centered on the proposed building. The façade of the building facing the viewpoint, including heights, setbacks, corners and other features, is plotted onto a base map using lateral and elevation angles. The two-dimensional base map generated by BRADA represents a figure of the building in the "sky dome" from the viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 to 100-percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

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

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

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

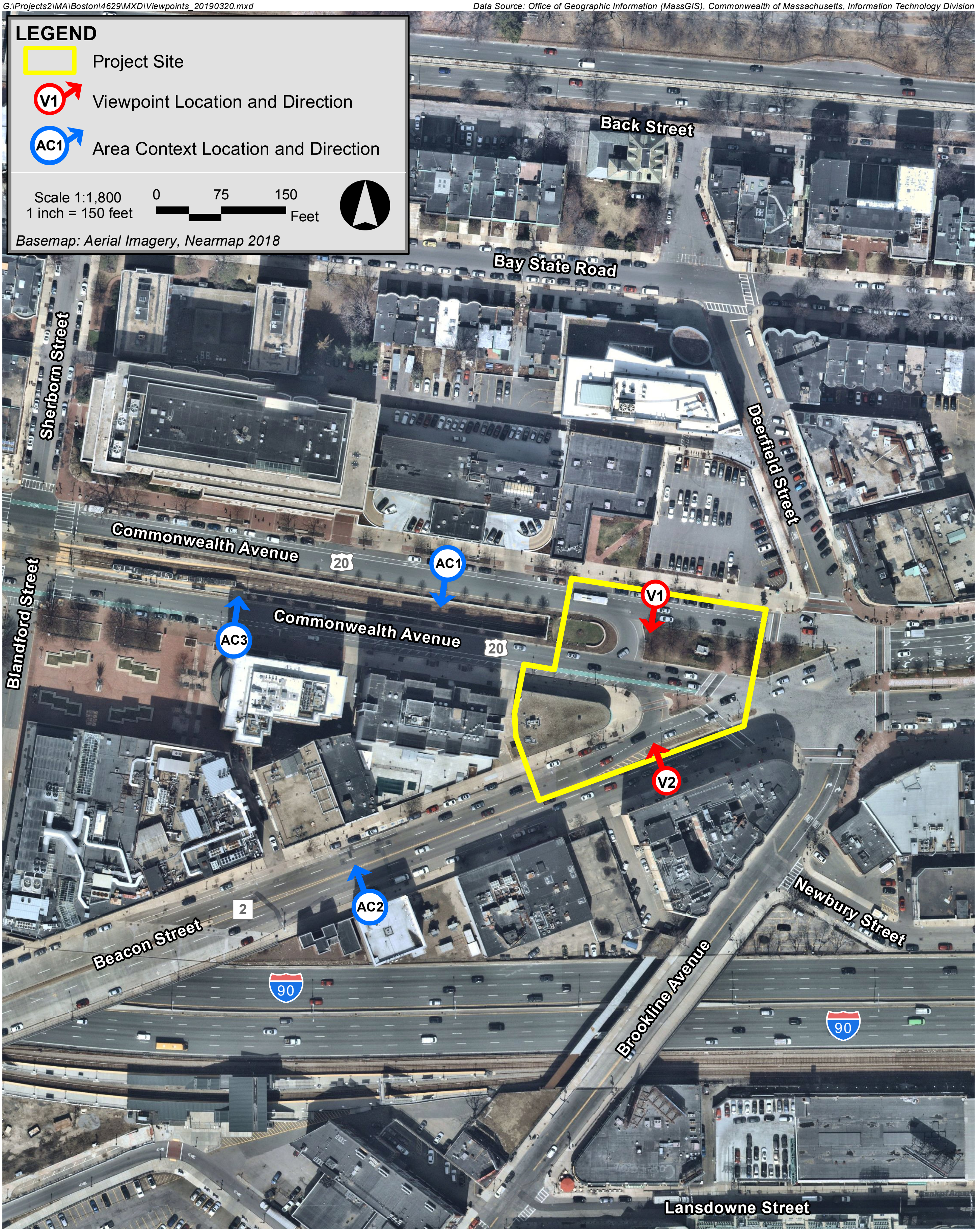

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Figure 3.3-1
Viewpoint and Area Context Locations

- **Viewpoint 1:** View from the center of Commonwealth Avenue facing southwest toward the Project Area.
- **Viewpoint 2:** View from the center of Beacon Street facing northwest toward the Project Area.
- **Area Context Viewpoint AC1:** View from Commonwealth Avenue facing southwest toward 566 Commonwealth Avenue.
- **Area Context Viewpoint AC2:** View from Beacon Street facing northeast toward 700 Beacon Street.
- **Area Context Viewpoint AC3:** View from Commonwealth Avenue facing northeast toward 595 Commonwealth Avenue.

3.3.3 Results

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

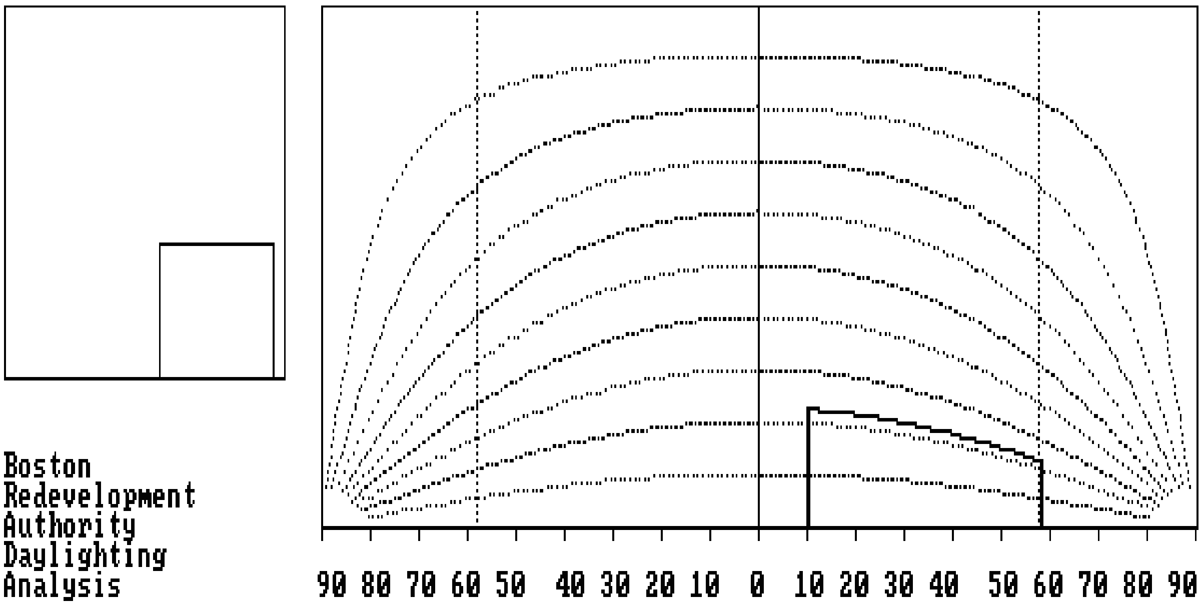
Table 3.3-1 Daylight Analysis Results

Viewpoint Locations		Existing Conditions	Proposed Conditions
Viewpoint 1	View from the center of Commonwealth Avenue facing southwest toward the Project Area	9.3%	73.0%
Viewpoint 2	View from the center of Beacon Street facing northwest toward the Project Area	13.5%	86.7%
Area Context Points			
AC1	View from Commonwealth Avenue facing southwest toward 566 Commonwealth Avenue	63.6%	N/A
AC2	View from Beacon Street facing northeast toward 700 Beacon Street	53.0%	N/A
AC3	View from Commonwealth Avenue facing northeast toward 595 Commonwealth Avenue	68.9%	N/A

Commonwealth Avenue – Viewpoint 1

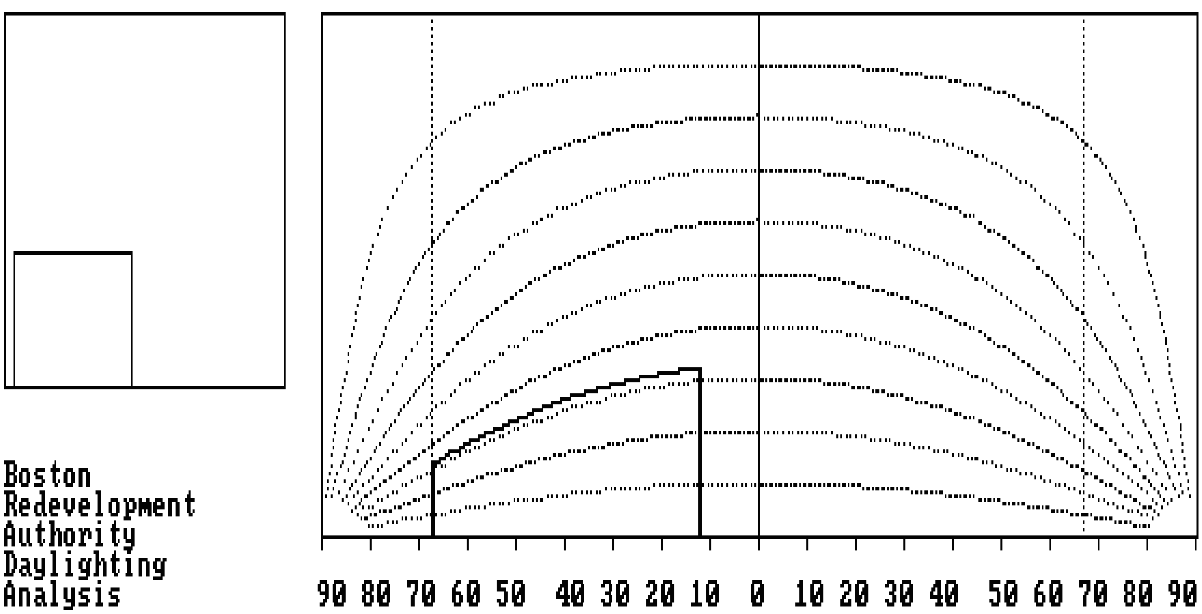
Commonwealth Avenue runs through the northern portion of the Project Area. Viewpoint 1 was taken from the center of the westbound portion of Commonwealth Avenue facing southwest toward the existing building. Viewpoint 1 begins at the edge of the 560-574 Commonwealth Avenue parcel and ends at the eastern edge of the Project Area.

Viewpoint 1: View from the center of Commonwealth Avenue facing southwest toward the Project Area



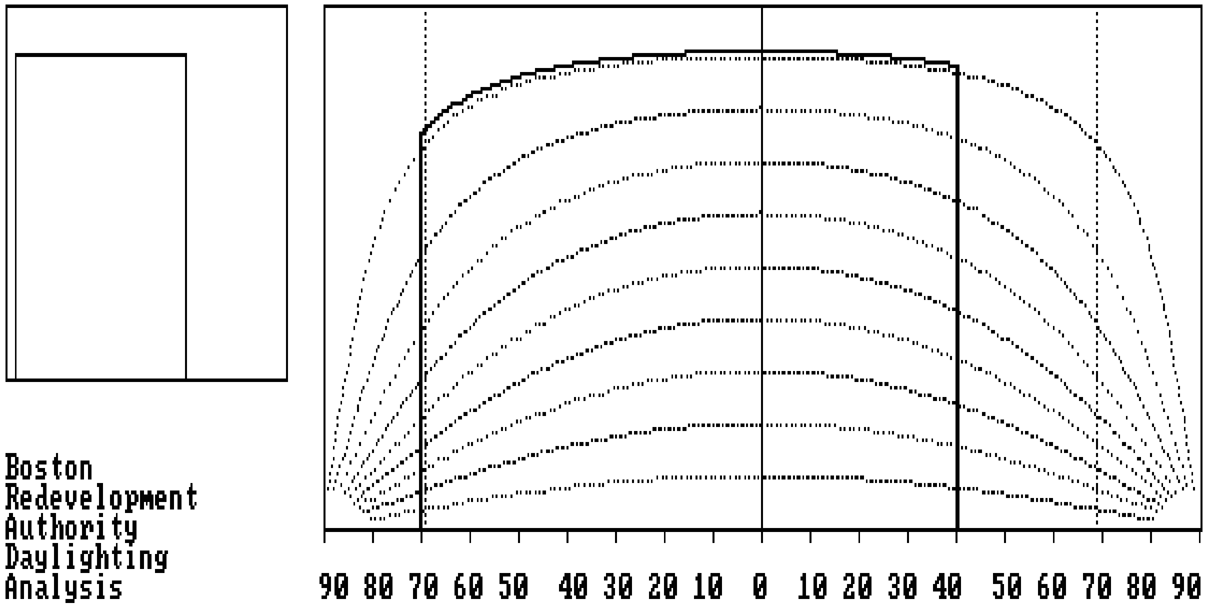
Obstruction of daylight by the building is 9.3 %

Viewpoint 2: View from the center of Beacon Street facing northwest toward the Project Area



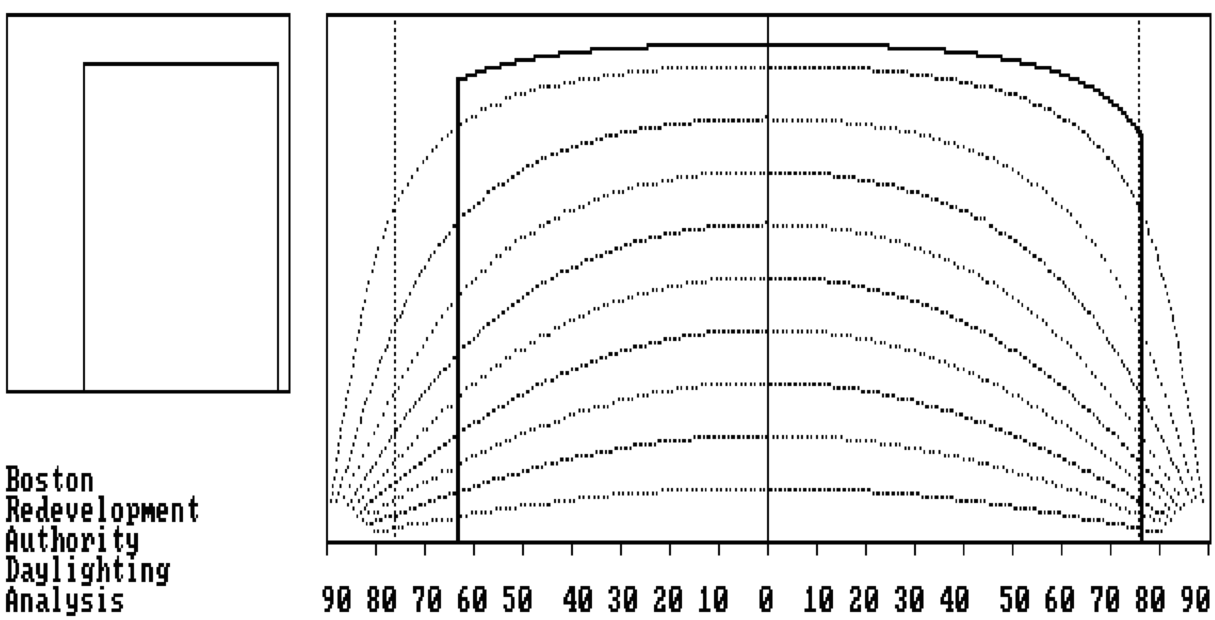
Obstruction of daylight by the building is 13.5 %

Viewpoint 1: View from the center of Commonwealth Avenue facing southwest toward the Project Area



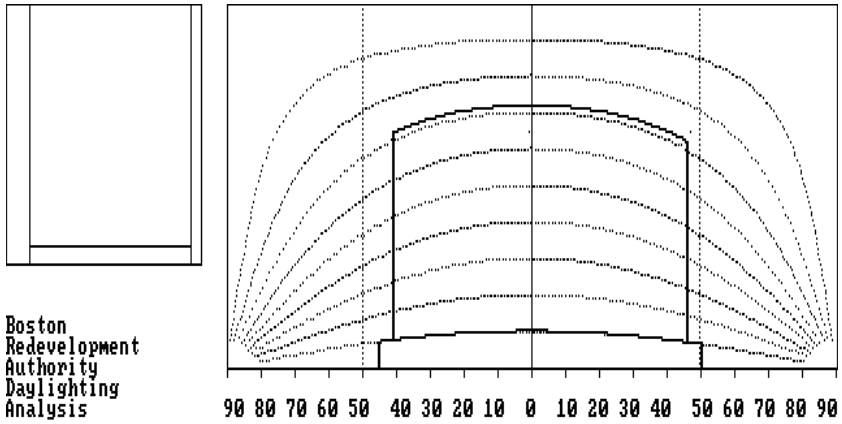
Obstruction of daylight by the building is 73.0 %

Viewpoint 2: View from the center of Beacon Street facing northwest toward the Project Area



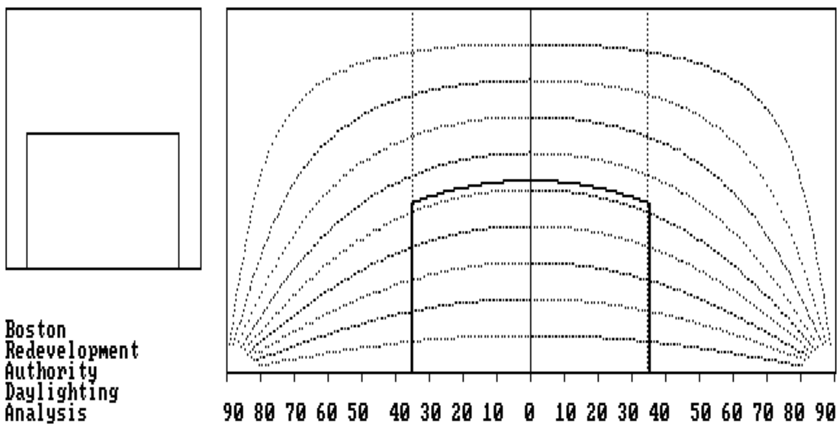
Obstruction of daylight by the building is 86.7 %

Area Context Viewpoint AC1: View from Commonwealth Avenue facing southwest toward 566 Commonwealth Avenue



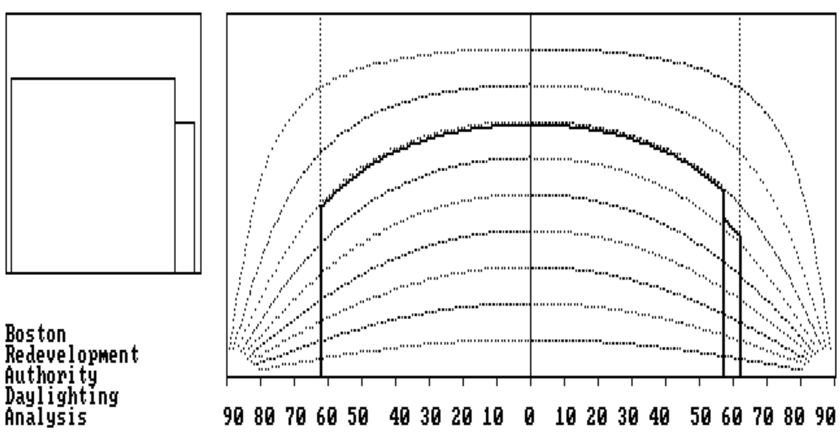
Obstruction of daylight by the building is 63.6 %

Area Context Viewpoint AC2: View from Beacon Street facing northeast toward 700 Beacon Street



Obstruction of daylight by the building is 53.0 %

Area Context Viewpoint AC3: View from Commonwealth Avenue facing northeast toward 595 Commonwealth Avenue



Obstruction of daylight by the building is 68.9 %

Since the Project Area currently contains a one-story building, sidewalks, and roadways, the existing daylight obstruction is only 9.3%. The Project will increase the daylight obstruction to 73.0%. Although this is slightly higher than the Area Context buildings, the Project will be surrounded by a new public plaza on both sides, allowing for additional views to the sky.

Beacon Street – View 2

Beacon Street runs through the southern edge of the Project Area. Viewpoint 2 was taken from the center of the eastbound portion of Beacon Street facing northwest toward the existing building. Viewpoint 2 begins at the edge of the 560-574 Commonwealth Avenue parcel and ends at the eastern edge of the Project Area.

Since the Project Area currently contains a one-story building, sidewalks, and roadways, the existing daylight obstruction is only 13.5%. The Project will increase the daylight obstruction to 86.7%. Although this is higher than the Area Context buildings, the Project will be surrounded by a new public plaza on both sides, allowing for additional views to the sky.

Area Context Viewpoints

The Project Area is in an area that consists of low to mis-rise buildings containing residential, institutional, and commercial uses. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for the three Area Context Viewpoints described above and shown on Figure 3.3-1. The daylight obstruction values ranged from 53.0% for AC2 to 68.9% for AC3. Although the daylight obstruction values for the Project are higher than the Area Context values, the Project will be surrounded by a new public plaza on both sides, allowing for additional views to the sky.

3.3.4 Conclusions

The daylight analysis conducted for the Project describes existing and proposed daylight obstruction conditions at the Project Area and in the surrounding area. The results of the BRADA analysis indicate that the Project will result in increased daylight obstruction over existing conditions. However, the Project will be surrounded by a new public plaza on both sides, allowing for additional views to the sky.

3.4 Solar Glare

RWDI was retained to investigate the impact that solar reflections emanating from the proposed Project will have on the surrounding urban realm. As with any modern building, the Project naturally creates reflections within its surroundings, the majority of which are minor in nature and are considered typical of any new construction. No significant impacts due to reflections from the Project are anticipated on the Massachusetts Turnpike Extension or at Fenway Park.

A preliminary set of simulations was conducted to determine peak reflection intensities and the frequency of occurrence of reflections for a broad area around the Project. Based on the preliminary simulations, 32 receptor points were chosen to understand in detail how reflections from the building may impact drivers, pedestrians, and building facades.

The results of the solar glare analysis are summarized below, and the detailed results are included as Appendix E.

Thermal Impacts on Pedestrians, Drivers, and Facades

The nature of the proposed facades ensure that reflected sunlight will not focus (multiply) in any particular area. No significant thermal impacts (i.e. risks to human safety or property damage) on-site or in the surrounding neighborhood are predicted.

Visual Glare Impacts for Drivers, Pedestrians, and Facades

Visual impact categories are described as low, moderate, high or damaging. Low impact suggests that either no significant reflections occur or the reflections will have a minimal effect on a viewer, even when looking directly at the source. Moderate impact suggests the reflections can cause some visual nuisance only to viewers looking directly at the source. High impact suggests the reflections can reduce visual acuity for viewers operating vehicles or performing other high-risk tasks who are unable to look away from the source, posing a significant risk of distraction.

Reflection impacts are generally predicted to be low to moderate for drivers in the area. Occasional high impact reflections are anticipated to occur along Commonwealth Avenue travelling west approaching Deerfield Street and travelling east on Commonwealth Avenue approaching the new passthrough from Commonwealth Avenue to Beacon Street. These impacts, however, are possible in less than 0.24 and 0.7% of the daytime annually and occur for very short durations, respectively. It is important to note that RWDI assumed a glazing typical of those used in the Boston area in its study. The design team, however, anticipates using a glass with a substantially lower reflectivity than what was modelled, further minimizing the impacts. Potential mitigation options are being explored.

Visual impacts on pedestrians and facades in the immediate vicinity of the Project site are anticipated to be typical of any glazed building on the site, do not pose a safety risk, and represent a visual nuisance at worst, as viewers can easily look away. For many buildings, these impacts have the potential to occur in a very small fraction of the year (less than 1.5% of the daytime annually).

Thermal Impacts on Facades

At all studied façade locations, reflections are of low intensity and short duration and therefore, reflections are not anticipated to lead to significant additional cooling load for a building.

3.5 Air Quality Analysis

3.5.1 Introduction

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

3.5.2 BPDA Air Quality Analysis Requirements

BPDA guidelines state:

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

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

BPDA guidelines also state:

> *A microscale analysis predicting localized carbon monoxide concentrations should be performed, including identification of any locations projected to exceed the National or Massachusetts Ambient Air Quality Standards, for projects in which: 1) project traffic would impact intersections or roadway links currently operating at Level of Service ("LOS") D, E, or F or would cause LOS to decline to D, E, or F; 2)*

project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, 3) the project will generate 3,000 or more new average daily trips on roadways providing access to a single location.

The Project does not include the construction of a parking garage or any new parking spaces, and all public space is reserved for pedestrians and place-making rather than surface parking. However, for this Project, there will be a new one-way roadway connecting Commonwealth Avenue south to Beacon Street, improving flow around Kenmore Square.

Since the Project will generate new vehicle trips, and a number of area intersections operate at LOS D or worse, a microscale analysis is required.

With respect to stationary sources of air pollution, BPDA guidelines state:

Emissions from any parking facility constructed as part of the project and from the project's heating and mechanical systems must be estimated. In addition, carbon monoxide monitors shall be installed in all enclosed parking facilities and a description of the proposed ventilation system must be provided.

And,

Building/garage air intake and exhaust systems and specifications and an analysis of the impact of exhausts on pedestrians and any sensitive receptors must be identified and described.

Any new stationary sources will be reviewed by the Massachusetts Department of Environmental Protection during permitting under the Environmental Results Program, as required. It is expected that all stationary sources will be small, and any impacts from stationary sources would be insignificant. However, the BPDA Scoping Determination specifically requests an analysis of impacts resulting from emissions from the Project's heating and mechanical systems.[2] As noted above, there is no parking facility planned for the Project.

3.5.3 National Ambient Air Quality

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

[2] Boston Planning & Development Agency (BPDA). Scoping Determination 560-574 Commonwealth Avenue / 645-665 Beacon Street (Kenmore Hotels). June 20, 2018

The modeling methodologies were developed in accordance with the latest Massachusetts Department of Environmental Protection (MassDEP) modeling policies and Federal modeling guidelines.[3] The following sections outline the NAAQS standards and detail the sources of background air quality data.

3.5.3.1 National Ambient Air Quality Standards

The 1970 Clean Air Act was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the Clean Air Act, EPA promulgated NAAQS for the following criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) (PM10 and PM2.5), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table 3.5-1. Massachusetts Ambient Air Quality Standards (MAAQS) are typically identical to NAAQS (differences are highlighted in **bold** in Table 3.5-1).

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

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

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

		NAAQS ($\mu g/m^3$)		MAAQS ($\mu g/m^3$)	
Pollutant	Averaging Period	Primary	Secondary	Primary	Secondary
NO_2	Annual (1)	100	Same	100	Same
	1-hour (2)	**188**	None	**None**	None
SO_2	Annual (1)(9)	80	None	80	None
	24-hour (3)(9)	365	None	365	None
	3-hour (3)	None	1300	None	1300
	1-hour (4)	**196**	None	**None**	None
PM2.5	Annual (1)	**12**	**15**	**None**	**None**
	24-hour (5)	**35**	**Same**	**None**	**None**

[3] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

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

		NAAQS ($\mu g/m^3$)		MAAQS ($\mu g/m^3$)	
Pollutant	Averaging Period	Primary	Secondary	Primary	Secondary
PM10	Annual (1)(6)	**None**	None	**50**	Same
	24-hour (3)(7)	150	Same	150	Same
CO	8-hour (3)	10,000	Same	10,000	Same
	1-hour (3)	40,000	Same	40,000	Same
Ozone	8-hour (8)	**147**	Same	**235**	Same
Pb	3-month (1)	1.5	Same	1.5	Same

Source: http://www.epa.gov/ttn/naaqs/criteria.html and 310 CMR 6.04
(1) Not to be exceeded.
(2) 98th percentile of one-hour daily maximum concentrations, averaged over three years.
(3) Not to be exceeded more than once per year.
(4) 99th percentile of one-hour daily maximum concentrations, averaged over three years.
(5) 98th percentile, averaged over three years.
(6) EPA revoked the annual PM10 NAAQS in 2006.
(7) Not to be exceeded more than once per year on average over three years.
(8) Annual fourth-highest daily maximum eight-hour concentration, averaged over three years.
(9) EPA revoked the annual and 24-hour SO_2 NAAQS in 2010. However, they remain in effect until one year after the area's initial attainment designation, unless designated as "nonattainment".

3.5.3.2 Background Concentrations

To estimate background pollutant levels representative of the area, the most recent air quality monitor data reported by the MassDEP in their Annual Air Quality Reports was obtained for 2015 to 2017. The three-hour and 24-hour SO_2 values are no longer reported in the annual reports. Data for these pollutant and averaging time combinations were obtained from the EPA's AirData website.

The Clean Air Act allows for one exceedance per year of the CO and SO_2 short-term NAAQS per year. The highest second-high accounts for the one exceedance. Annual NAAQS are never to be exceeded. The 24-hour PM10 standard is not to be exceeded more than once per year on average over three years. To attain the 24-hour PM2.5 standard, the three-year average of the 98th percentile of 24-hour concentrations must not exceed 35 $\mu g/m^3$. For annual PM2.5 averages, the average of the highest yearly observations was used as the background concentration. To attain the one-hour NO_2 standard, the three-year average of the 98th percentile of the maximum daily one-hour concentrations must not exceed 188 $\mu g/m^3$.

Background concentrations were determined from the closest available monitoring stations to the proposed development. All pollutants are not monitored at every station, so data from multiple locations are necessary. The closest monitor is at Kenmore Square (130 yards east), but this site only samples for SO_2, PM10, PM2.5, and NO_2.

A site on Harrison Avenue is roughly 1.6 miles southeast of the Project. This site samples for the remaining pollutants. A summary of the background air quality concentrations are presented in Table 3.5-2.

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

POLLUTANT	AVERAGING TIME	2015	2016	2017	Background Concentration ($\mu g/m^3$)	NAAQS	Percent of NAAQS
SO_2 (1)(6)(7)	1-Hour (5)	14.4	10.7	7.3	10.8	196.0	6%
	3-Hour	11.5	10.0	0.0	11.5	1300.0	1%
	24-Hour	7.6	5.2	3.9	7.6	365.0	2%
	Annual	1.4	1.1	1.3	1.4	80.0	2%
PM10 (7)	24-Hour	30.0	30.0	27.0	30.0	150.0	20%
	Annual	14.2	14.1	11.2	14.2	50.0	28%
PM2.5	24-Hour (5)	14.5	13.0	12.2	13.2	35.0	38%
	Annual (5)	6.5	6.2	6.1	6.3	12.0	52%
NO_2 (3)	1-Hour (5)	105.3	88.4	86.5	93.4	188.0	50%
	Annual	32.6	28.3	24.9	32.6	100.0	33%
CO (2)	1-Hour	1560.9	2750.4	1512.7	2750.4	40000.0	7%
	8-Hour	1031.4	1375.2	1439.4	1439.4	10000.0	14%
Ozone (4)	8-Hour	14.4	10.7	7.3	10.8	196.0	6%
Lead (8)	Rolling 3-Month	11.5	10.0	N/A	11.5	1300.0	1%

Notes:
From 2015-2017 MassDEP's Annual Ambient Air Quality Reports and EPA's AirData Website
(1) SO_2 reported ppb. Converted to μg/m3 using factor of 1 ppm = 2.62 μg/m3.
(2) CO reported in ppm. Converted to μg/m3 using factor of 1 ppm = 1146 μg/m3.
(3) NO_2 reported in ppb. Converted to μg/m3 using factor of 1 ppm = 1.88 μg/m3.
(4) O_3 reported in ppm. Converted to μg/m3 using factor of 1 ppm = 1963 μg/m3.
(5) Background level is the average concentration of the three years.
(6) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.
(7) PM10 monitor at Kenmore Square was deactivated in 2016. Harrison Avenue monitor used for 2016 and 2017.
(8) Lead is not reported at any site in Massachusetts in 2017.

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

3.5.4 Mobile Sources

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

3.5.4.1 Methodology

As described above, a "microscale" analysis is required for any intersection where (1) Project traffic would impact intersections or roadway links currently operating at LOS D, E, or F, or would cause LOS to decline to D, E, or F; (2) Project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or, (3) the Project will generate 3,000 or more new average daily trips on roadways providing access to a single location. The microscale analysis involves modeling of CO emissions from vehicles idling at and traveling through signaled intersections. Predicted ambient concentrations of CO for the Build and No-Build cases are compared with federal (and state) ambient air quality standards for CO.

The microscale analysis typically examines ground-level CO impacts due to traffic queues in the immediate vicinity of a project. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million (ppm) for a one-hour averaging period, and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots. Air quality modeling techniques (computer simulation programs) are typically used to predict CO levels for both existing and future conditions to evaluate compliance of the roadways with the standards. The microscale analysis has been conducted using the latest versions of EPA's MOVES and CAL3QHC programs to estimate CO concentrations at sidewalk receptor locations. Future year (2024) emission factor data calculated from the MOVES model, along with traffic data, were input into the CAL3QHC program to determine CO concentrations due to traffic flowing through the selected intersections. The modeling methodology was developed in accordance with the latest MassDEP modeling policies and Federal modeling guidelines.[4]

Existing background values of CO at the nearest monitor location at Harrison Avenue were obtained from MassDEP. CAL3QHC results were then added to background CO values of 2.4 ppm (one-hour) and 1.3 ppm (eight-hour), as provided by MassDEP, to determine total air quality impacts due to the Project. These values were compared to the NAAQS for CO of 35 ppm (one-hour) and 9 ppm (eight-hour).

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

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[4] 40 CFR 51 Appendix W, Guideline on Air Quality Models, 70 FR 68228, Nov. 9, 2005

Intersection Selection

Two signalized intersections included in the traffic study meet the conditions described at the beginning of this section. The traffic volumes and LOS calculations provided in Chapter 2 form the basis of evaluating the traffic data versus the microscale thresholds. The following intersections were analyzed:

- The intersection of Kenmore Street, Raleigh Street, and Beacon Street, and;
- The intersection of Kenmore Street and Commonwealth Avenue Westbound.

Microscale modeling was performed for these intersections based on the aforementioned methodology. The 2024 No-Build and Build conditions were each evaluated for both morning (a.m.) and afternoon (p.m.) peak. Both cases reflect the conditions with the proposed roadway configuration.

Although the intersection of Brookline Avenue, Deerfield Street, Commonwealth Avenue, and Beacon Street is shown to operate at LOS D or worse with the current roadway configuration, the Project's roadway reconfiguration improves conditions to LOS C or better, excluding them from the analysis. It can be reasonably concluded that if the worst performing intersections (with respect to LOS) do not cause a condition of air pollution, then better performing intersections also do not cause a condition of air pollution.

Emissions Calculations (MOVES)

The EPA MOVES computer program was used to estimate motor vehicle emission factors on the roadway network. Emission factors calculated by the MOVES model are based on motor vehicle operations typical of daily periods. The Commonwealth's statewide annual Inspection and Maintenance (I&M) program was included, as well as the county specific vehicle age registration distribution, fleet mix, meteorology, and other inputs. The inputs for MOVES for the future year (2024) are provided by MassDEP.

All link types for the modeled intersections were input into MOVES. Idle emission factors are obtained from factors for a link average speed of 0 miles per hour (mph). Moving emissions are calculated based on speeds at which free-flowing vehicles travel through the intersection as stated in traffic modeling (Synchro) reports.

A speed of 25 mph is used for all free-flow traffic, consistent with the City of Boston speed limit. Speeds of 10 and 15 mph were used for right (and U-turns, if necessary), and left turns, respectively. Roadway emissions factors were obtained from MOVES using EPA guidance.[5]

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

Winter CO emission factors are typically higher than summer. Therefore, January weekday emission factors were conservatively used in the microscale analysis. The emission factors are presented in Table 3.5-3.

Table 3.5-3 Observed Ambient Air Quality Concentrations and Selected Background Levels

Carbon Monoxide Only		2024
Free Flow	25 mph	1.658
Right Turns	10 mph	2.541
Left Turns	15 mph	2.237
Queues	Idle	3.039

Notes: Winter CO emission factors are higher than Summer and are conservatively used

Urban Unrestricted Roadway type used

Receptors & Meteorology Inputs

Sets of up to 110 receptors were placed in the vicinity of the modeled intersections. Receptors extended approximately 300 feet on the sidewalks along the roadways approaching the intersections. The roadway links and receptor locations of the modeled intersection are presented in Figures 3.5-1 and 3.5-2.

For the CAL3QHC model, limited meteorological inputs are required. Following EPA guidance[6], a wind speed of one meter per second, stability class D(4), and a mixing height of 1,000 meters were used.

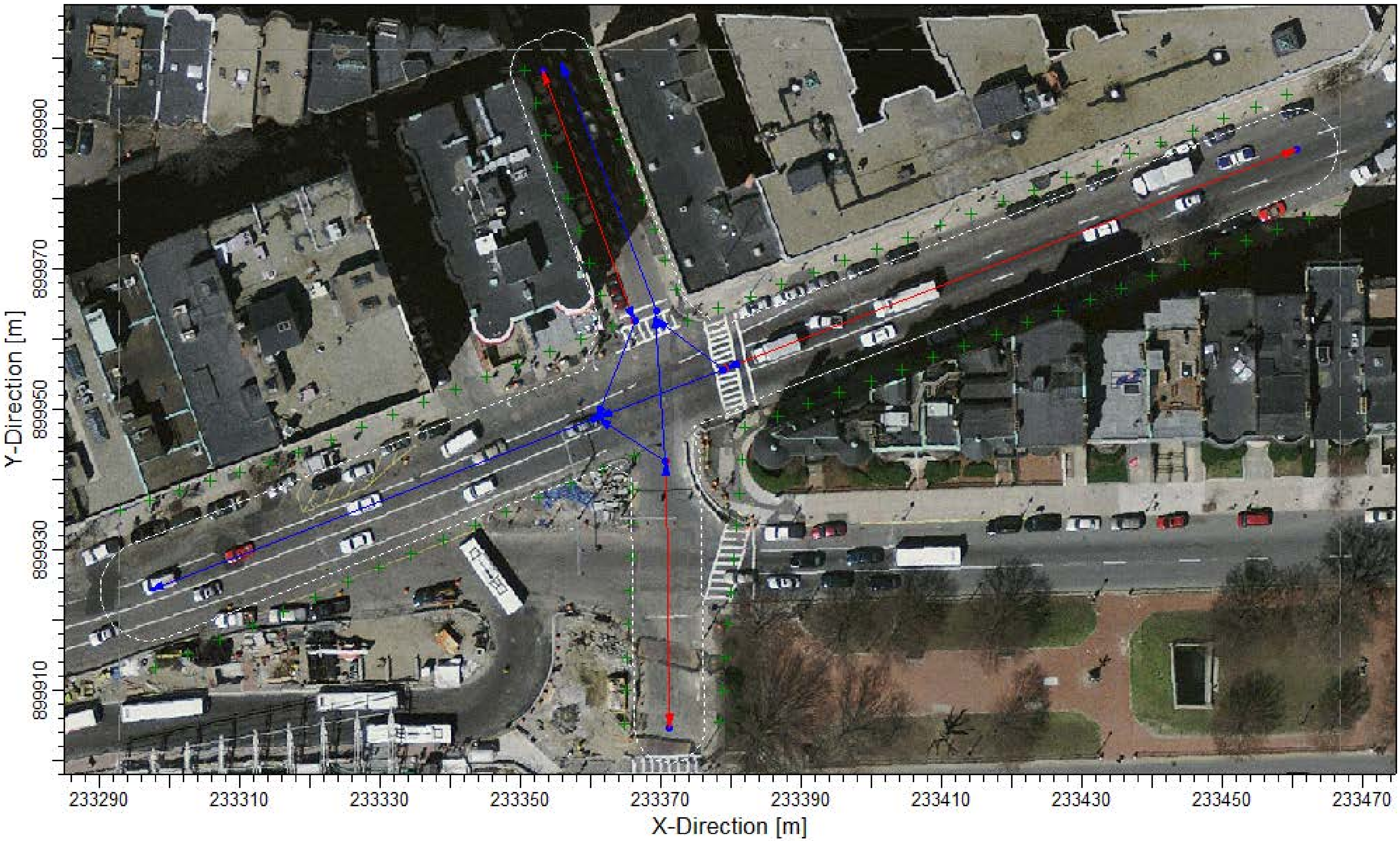
To account for the intersection geometry, wind directions from 0° to 350°, at every 10° were selected. A surface roughness length of 321 centimeters was selected and is consistent with the urban environment.[7]

Impact Calculations (CAL3QHC)

The CAL3QHC model predicts one-hour concentrations using queue-links at signalized intersections, worst-case meteorological conditions, and traffic input data. The CAL3QHC methodology was based on EPA CO modeling guidance. Signal timings were provided directly from the traffic modeling outputs.

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

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



One Kenmore Square Boston, Massachusetts

Figure 3.5-1

Intersection of Kenmore Street, Raleigh Street, and Beacon Street

One Kenmore Square **Boston, Massachusetts**

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Figure 3.5-2

Intersection of Commonwealth Avenue WB and Kenmore Street

For use in the microscale analysis, background concentrations of CO in ppm were required. The corresponding maximum background concentrations in ppm were 2.4 ppm (2,750 $\mu g/m^3$) for one-hour and 1.3 ppm (1,439 $\mu g/m^3$) for eight-hour CO.

3.5.4.2 Air Quality Results

The results of the maximum one-hour predicted CO concentrations from CAL3QHC are provided in Tables 3.5-4 and 3.5-5 for the 2024 No-Build and Build scenarios. Eight-hour average concentrations are calculated by multiplying the maximum one-hour concentrations by a factor of 0.9.[8]

The results of the one-hour and eight-hour maximum modeled CO ground-level concentrations from CAL3QHC were added to EPA supplied background levels for comparison to the NAAQS. These values represent the highest potential concentrations at the intersection as they are predicted during the simultaneous occurrence of "defined" worst case meteorology. The highest one-hour traffic-related concentration predicted in the area of the Project for the future modeled conditions (0.2 ppm) plus background (2.4 ppm) is 2.6 ppm. The highest eight-hour traffic-related concentration predicted in the area of the Project for the future modeled conditions (0.2 ppm) plus background (1.3 ppm) is 1.5 ppm. All concentrations are well below the one-hour NAAQS of 35 ppm and the eight-hour NAAQS of 9 ppm.

3.5.4.3 Conclusions

Results of the microscale analysis show that all predicted CO concentrations are well below one-hour and eight-hour NAAQS. There is no discernable change to the modeled concentrations from the No-Build to Build cases. Therefore, it can be concluded that there are no anticipated adverse air quality impacts resulting from increased traffic from the Project.

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

Table 3.5-4 Summary of Microscale Modeling Analysis (No-Build 2024)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Kenmore Street, Raleigh Street, and Beacon Street	AM	0.2	2.4	2.6	35
	PM	0.1	2.4	2.5	35
Kenmore Street and Commonwealth Avenue WB	AM	0.1	2.4	2.5	35
	PM	0.2	2.4	2.6	35
8-Hour					
Kenmore Street, Raleigh Street, and Beacon Street	AM	0.2	1.3	1.5	9
	PM	0.1	1.3	1.4	9
Kenmore Street and Commonwealth Avenue WB	AM	0.1	1.3	1.4	9
	PM	0.2	1.3	1.5	9

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.

Table 3.5-5 Summary of Microscale Modeling Analysis (Build 2024)

Intersection	Peak	CAL3QHC Modeled CO Impacts (ppm)	Monitored Background Concentration (ppm)	Total CO Impacts (ppm)	NAAQS (ppm)
1-Hour					
Kenmore Street, Raleigh Street, and Beacon Street	AM	0.2	2.4	2.6	35
	PM	0.2	2.4	2.6	35
Kenmore Street and Commonwealth Avenue WB	AM	0.1	2.4	2.5	35
	PM	0.2	2.4	2.6	35
8-Hour					
Kenmore Street, Raleigh Street, and Beacon Street	AM	0.2	1.3	1.5	9
	PM	0.2	1.3	1.5	9
Kenmore Street and Commonwealth Avenue WB	AM	0.1	1.3	1.4	9
	PM	0.2	1.3	1.5	9

Notes: CAL3QHC eight-hour impacts were conservatively obtained by multiplying one-hour impacts by a screening factor of 0.9.

3.5.5 Stationary Sources

The BPDA Scoping Determination required a stationary source analysis to ensure that the proposed Project will not adversely impact air quality in the area.

Stationary sources of air pollution are typically units that combust fuel. In this case, these sources consist of heating and hot water units and emergency electrical generators. Cooling towers, although not a combustion source, are a source of particulate emissions. There is no underground garage and therefore no associated exhaust vents.

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

3.5.5.1 AERMOD Modeling Methodology

The most recent version of the U.S. EPA AERMOD refined dispersion model (Version 18081) was selected to predict concentrations from the stationary sources related to the Project. AERMOD is the U.S. EPA's preferred model for regulatory applications. The use of AERMOD provides the benefits of using the most current algorithms available for steady state dispersion modeling.

The ISC-AERMOD View graphical user interface (GUI) Version 9.6.5, created by Lakes Environmental, was used to facilitate model setup and post-processing of data. The AERMOD model was selected for this analysis because it:

- is the required U.S. EPA model for all refined regulatory analyses for receptors within 50 km of a source;
- is a refined model for facilities with multiple sources, source types, and building-induced downwash;
- uses actual representative hourly meteorological data;
- incorporates direction-specific building parameters which can be used to predict impacts within the wake region of nearby structures;
- allows the modeling of multiple sources together to predict cumulative downwind impacts;
- provides for variable emission rates;
- provides options to select multiple averaging periods between one-hour and one year (scaling factors can be applied to adjust the one-hour impact to a peak impact less than one-hour); and
- allows the use of large Cartesian and polar receptor grids, as well as discrete receptor locations.

Regulatory default options adopted for the model include:

- *Use stack-tip downwash (except for building downwash)*. Stack-tip downwash is an adjustment of the actual stack release height for conditions when the gas exit velocity is less than 1.5 times the wind speed. For these conditions, the effective release height is reduced a bit, based on the diameter of the stack and the wind and gas exit velocity. This option applies to point sources only, such as emergency generators, cooling towers, boiler units and garage vents.
- *Use the missing data and calms processing routines*. The model treats missing meteorological data in the same way as the calms processing routine (i.e., it sets the concentration values to zero for that hour, and calculates the short term averages according to U.S. EPA's calms policy), as set forth in the Guideline. Since only 1-hour averages are being used, concentrations predicted with calm or missing data would not affect model results.

The AERMOD model is able to assign sources to a rural or urban category to allow specified urban sources to use the effects of increased surface heating under stable atmospheric conditions. The urban dispersion classification was selected based on a visual inspection of the area within a three-kilometer radius of the Project site. A population estimate of 1,118,961 was obtained from the MassDEP and is used in the AERMOD model to estimate the urban boundary layer height.

The regional meteorology in Boston is best approximated with meteorological data collected by the nearby Boston Logan International Airport in East Boston, MA. The station is located approximately 4.6 miles (7.5 km) to the east of the Project at an elevation of 19.7 feet (6 m) above mean sea level. This station is the closest site for which extensive meteorological data are available which are representative of similar topographic influences that affect the Project. Five years (2013-2017) of hourly surface data collected at the station include wind speed and direction, temperature, cloud cover and ceiling height. Upper air data from Gray, Maine was processed along with the surface data using version 18081 of the AERMET meteorological data preprocessor. These files have been used on other AERMOD applications in the area for review by MassDEP and are presumed to be of sufficient quality for regulatory applications. Figure 3.5-3 presents a wind rose showing the frequency of wind direction and speed of the modeled meteorological data.

The AERMOD model is able to assign sources to a rural or urban category to allow specified urban sources to use the effects of increased surface heating under stable atmospheric conditions. The urban dispersion classification was selected based on a visual inspection of the area within a three-kilometer radius of the Project. The area is shown in Figure 3.5-4.

A network of 2,104 receptors with increasing spacing was used for the refined AERMOD modeling analysis. A nested grid of Cartesian receptors centered on the project was used. The entire modeling domain encompassed 100 square kilometers.

Terrain data were obtained from the U.S.G.S National Map Seamless Server (www.seamless.usgs.gov) according to guidance set forth by EPA.[9] Source, building, and receptor elevations were processed using the AERMAP processor by way of the Lakes AERMOD View interface. Figures 3.5-5 and 3.5-6 present the source and receptor locations, as well as the buildings used in the GEP stack height/downwash analysis described below.

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9 U.S. EPA, AERMOD Implementation Guide, March 19, 2009.

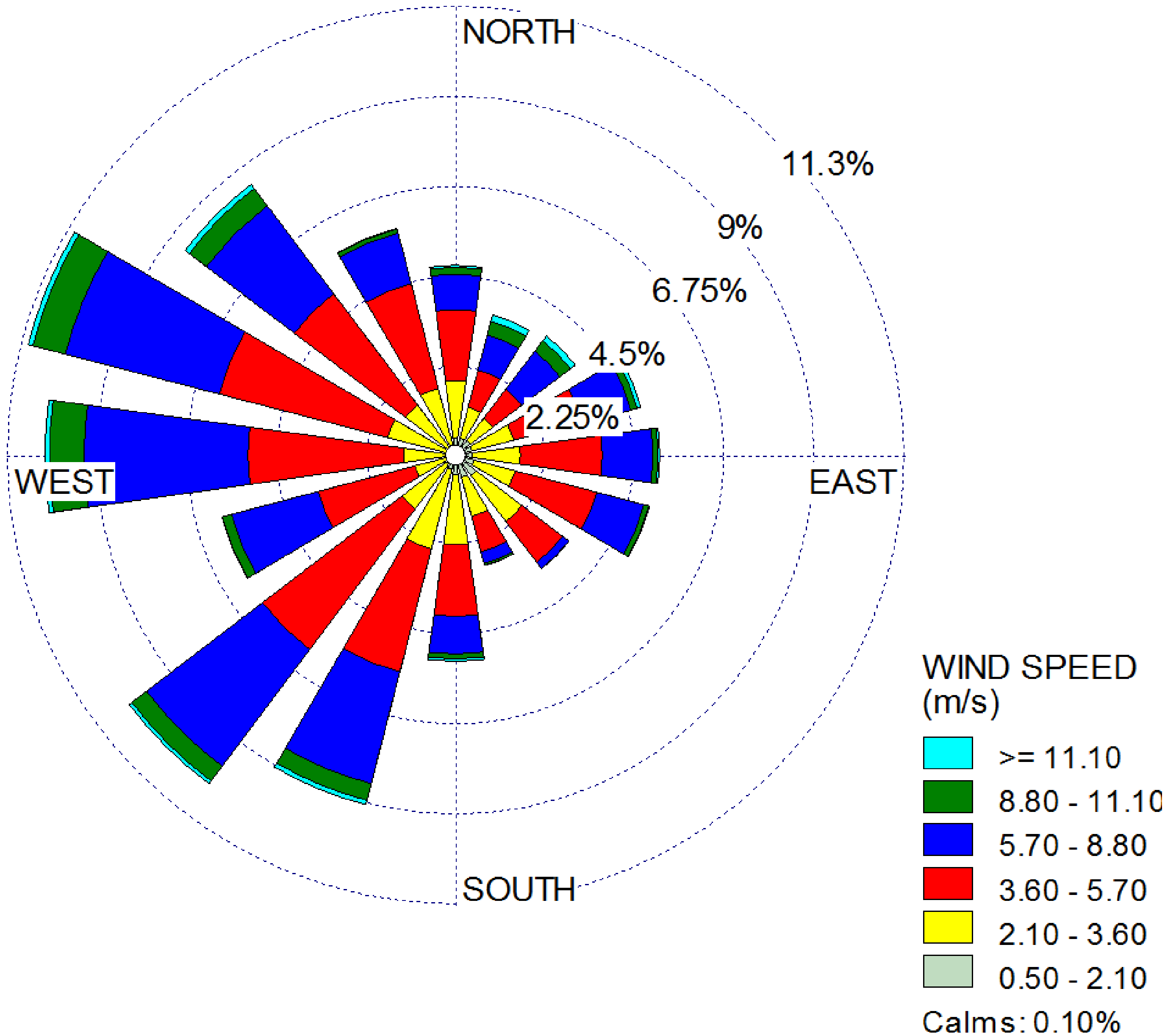
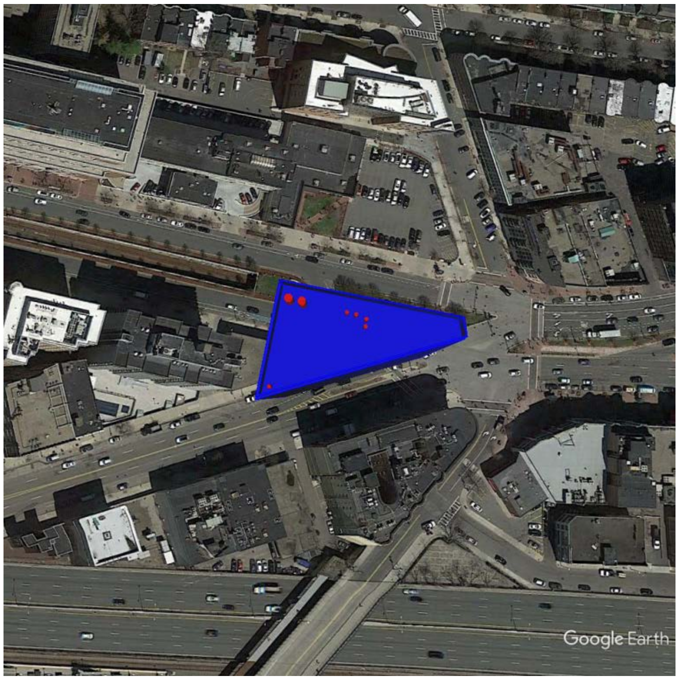


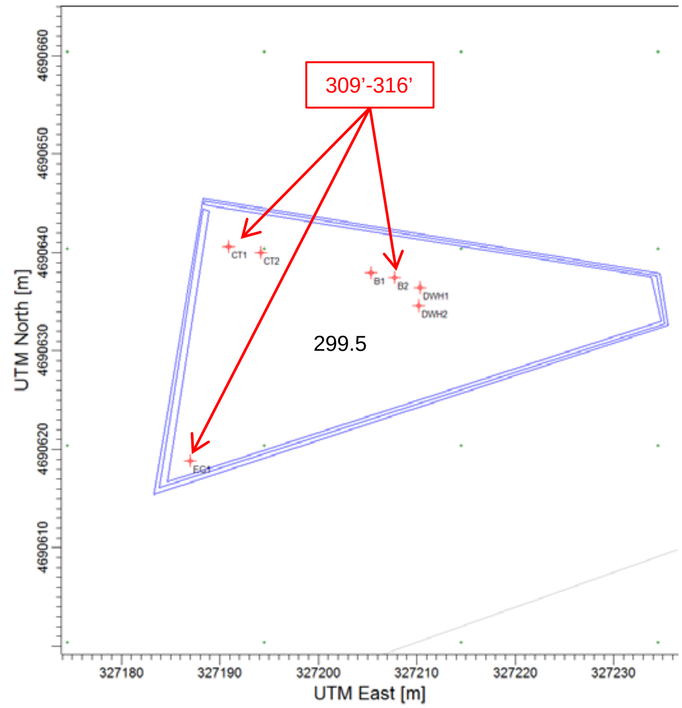
Figure 3.5-3

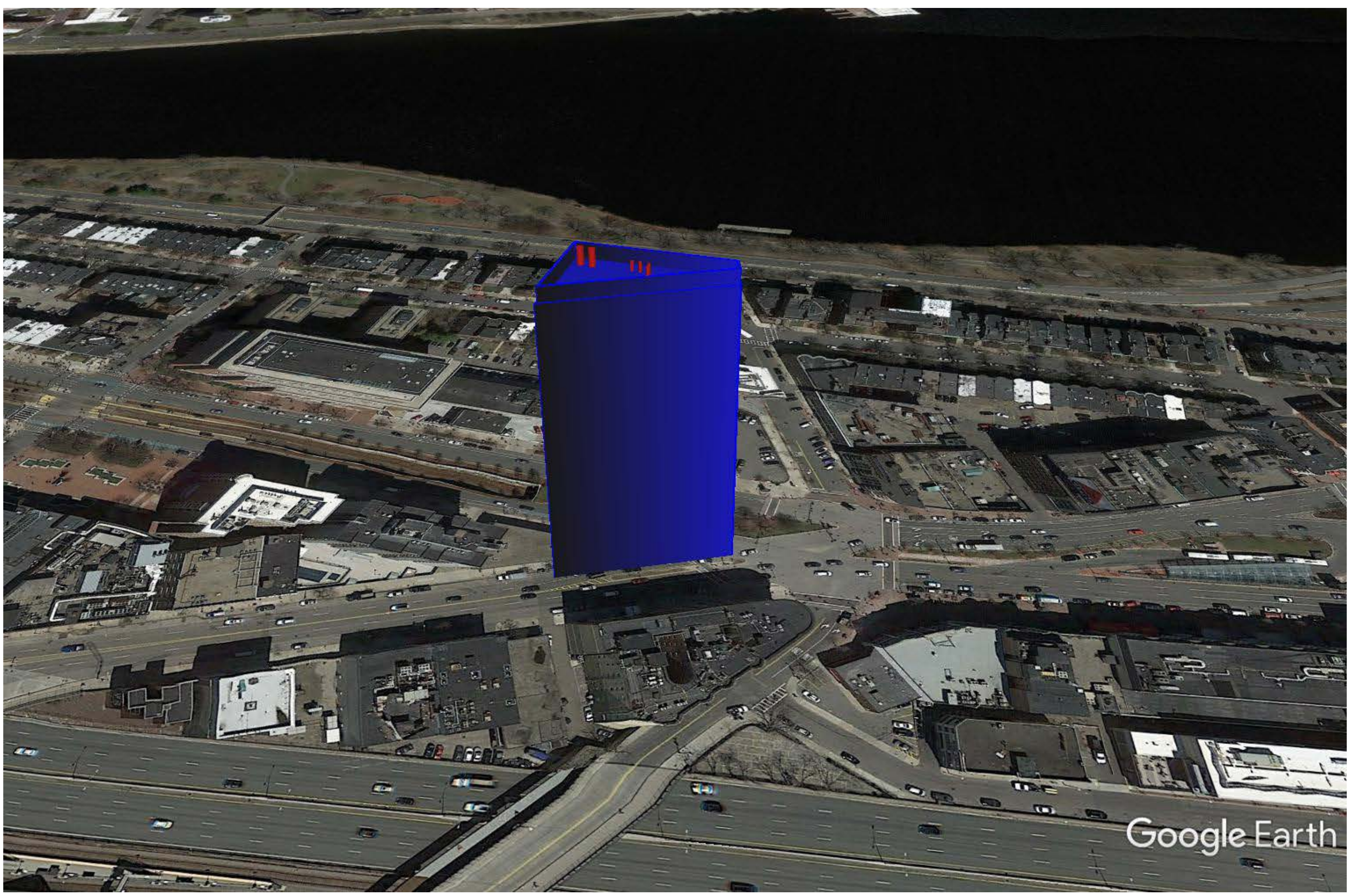
2013-2017 Boston Logan Airport Wind Rose

One Kenmore Square **Boston, Massachusetts**

Figure 3.5-4
Urban/Rural 3km Radius



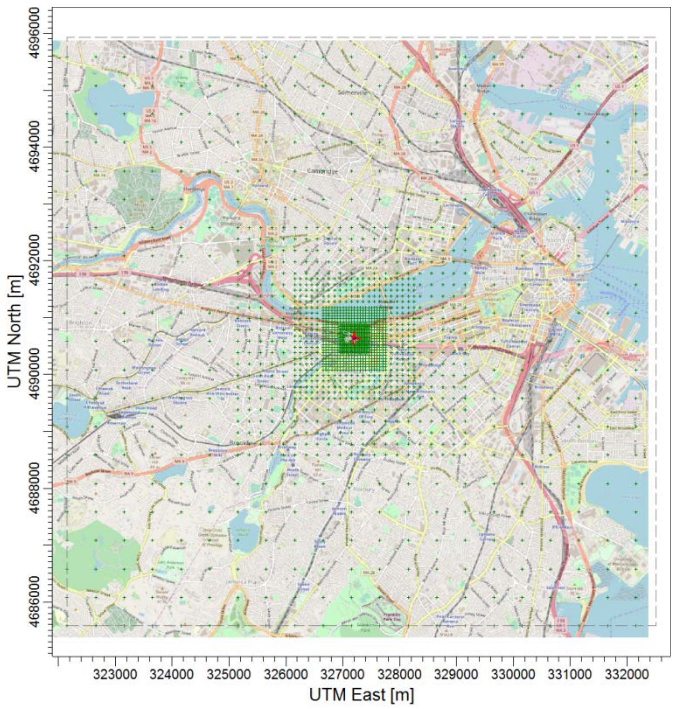


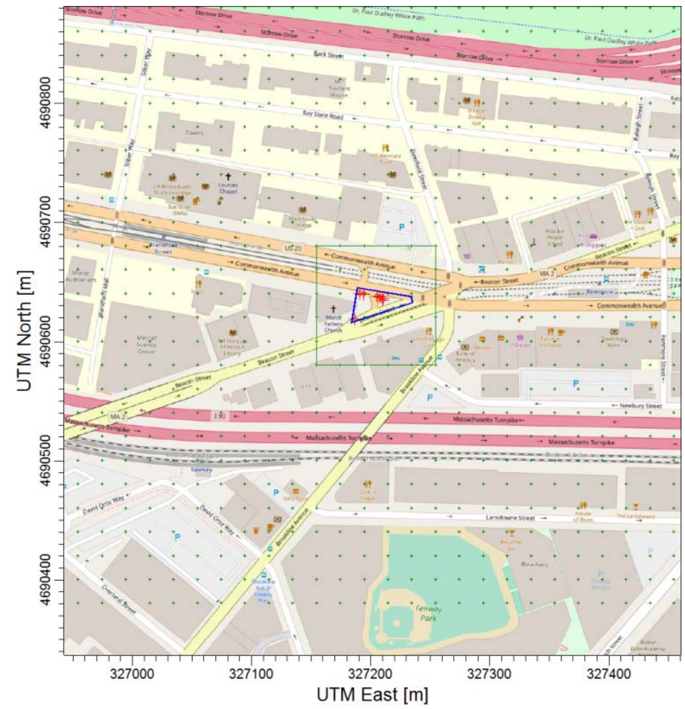


One Kenmore Square Boston, Massachusetts

Figure 3.5-5

Source and Building Locations





One Kenmore Square Boston, Massachusetts

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Figure 3.5-6
Receptor Locations

3.5.5.2 Sources

Stationary sources of air pollution are typically units that combust fuel. In this case, these sources consist of heating units, electrical generating units, and cooling towers.

The design is anticipated to include four heating and hot water boilers totaling 11.6 mmBTU/hr heat input. The units are anticipated to be exhausted through four stacks. All units are anticipated to be natural gas-fired and located in mechanical penthouse areas on the building's roof.

The boilers will be within the requirements of the MassDEP's Environmental Results Program (ERP) since individual estimated heat inputs are below the 10 to 40 mmBtu/hour ERP range. However, emissions were conservatively estimated for each boiler based on the MassDEP Boiler ERP program emission limits. Dispersion modeled impacts from the heating units were estimated from exhaust stacks 10 feet above the building roof heights above ground level. For all impacts, the heating equipment is assumed to be in operation 24 hours per day, seven days per week.

All boilers are expected to be below the ERP limits of 10 MMBTU/hour. Therefore, registration with MassDEP would not be required.

Current design plans are for one 500-kilowatt emergency generator to be installed. The unit will provide life safety and standby emergency power. The unit will be diesel-fired and located in a mechanical area on the roof of the building. The generator is assumed to be designed such that its exhaust stack extends at least 10 feet above the building roof height above ground level.

Typically, the generator will operate for approximately one hour each month for testing and general maintenance. The ERP regulation applies to new emergency generators greater than 37 kW. The regulation is similar to the boiler ERP in that new engines are subject to emission standards, recordkeeping, certification, and compliance with the MassDEP noise policy. Since the generators' maximum rating capacities are greater than the ERP limit of 37 kW, all three will be subject to the ERP program. Per the ERP, the generators' owner will submit a certification form to MassDEP within 60 days of installation. Emergency engines are limited to 100 hours per year for testing, with up to 50 of those hours for non-emergency use, while they are allowed unlimited operation for emergencies as defined in 310 CMR 7.02(8)(i)(2).

Emissions were estimated for the emergency generators based on vendor supplied data. Comparable equipment was assumed where not provided by the architects. The generator is assumed to operate 500 of 8,760 hours per year in the modeling for annual averaging times.[10]

The design is for two dual-cell cooling towers, capable of providing approximately 625 tons of cooling each, to be installed on the tower. These units will remove the excess heat generated by the building's mechanical equipment. All units will be located on the roof of the building.

Only emissions of particulate matter are assumed to be produced by the cooling tower cells. The cooling towers are assumed to operate at 100% capacity for 8,760 hours per year. Emissions of all other pollutants from the cooling towers are expected to be negligible.

Emissions and exhaust parameters were based on vendor supplied data and/or engineering judgment. The modeled ID corresponding to the source is shown in Table 3.5-6. Physical stack heights and diameters were obtained via discussions with the client and are presented in Table 3.5-7. The modeled emission rates are presented in Table 3.5-8.

Table 3.5-6 Modeled Source Descriptions

ID	Description	Make/Model
EG1	Emergency Generator	500 kW Caterpillar C15
CT1	Cooling Tower	625 ton Marley NC840NLS2
CT2	Cooling Tower	625 ton Marley NC840NLS2
B1	Heating Boiler	4.0 mmBtu/hr Fulton EDR+4000
B2	Heating Boiler	4.0 mmBtu/hr Fulton EDR+4000
DWH1	Domestic Water Heater	1.8 mmBtu/hr Power VT Plus 180LX 300A-PVIF
DWH2	Domestic Water Heater	1.8 mmBtu/hr Power VT Plus 180LX 300A-PVIF

[10] Although MassDEP currently limits operation of emergency generators to 100 hours per year for testing, for modeling purposes, MassDEP accepts a limit of 500 hours to be used to account for the intermittent operation of these units. A factor of 0.0571 (500/8760) is used in the calculation of an annual average emission rate to account for this limitation. U.S. EPA also allows the use of this factor in the calculation of the 1-hour NO_2 concentration, considering the probabilistic form of the 1-hour NO_2 standard, and the intermittent nature of emergency generator operation. probabilistic form of the 1-hour NO_2 standard, and the intermittent nature of emergency generator operation.

Table 3.5-7 Source Stack Physical Data

Source ID	UTME [m]	UTMN [m]	Base Elevation [m]	Release Height [m]	Gas Exit Temperature [K]	Gas Exit Velocity [m/s]	Inside Diameter [m]
EG1	327187.0	4690618.8	4.57	94.34	804.3	52.47	0.203
CT1	327190.9	4690640.6	4.57	96.31	305.5	21.22	2.130
CT2	327194.2	4690640.0	4.57	96.31	305.5	21.22	2.130
B1	327205.4	4690637.9	4.57	94.34	349.8	15.58	0.254
B2	327207.7	4690637.5	4.57	94.34	349.8	15.58	0.254
DWH1	327210.3	4690636.4	4.57	94.34	349.8	19.48	0.152
DWH2	327210.2	4690634.6	4.57	94.34	349.8	19.48	0.152

Table 3.5-8 Modeled Emission Rates

Source ID	EG1		CT1/C2		B1/B2		DWH1/DWH2	
Pollutant	Short Term (g/s)	Annual (g/s)	Short Term (g/s)	Annual (g/s)	Short Term (g/s)	Annual (g/s)	Short Term (g/s)	Annual (g/s)
NOx (as NO_2)	0.0721	0.0721	0.0000	0.0000	0.0176	0.0176	0.0079	0.0079
CO	0.6900	N/A	0.0000	N/A	0.0403	N/A	0.0181	N/A
PM10/PM2.5	0.0402	0.0023	0.0085	0.0085	0.0050	0.0050	0.0023	0.0023
SO_2	9.70E-4	5.53E-5	0.0000	0.0000	0.0003	0.0003	0.0001	0.0001
Source: Manufacturer's data. See Appendix F.								

Detailed calculations, assumptions, and exhaust parameters for all stationary sources are presented in the Appendix F.

3.5.5.3 GEP Stack Height Analysis

The Good Engineering Practice (GEP) stack height evaluation of the facility has been conducted in accordance with EPA guidelines.[11] A GEP stack is sufficiently high to avoid aerodynamic downwash effects from nearby buildings or structures. As defined by the EPA guidelines, the formula for computing GEP stack height is the greater of:

- 65 meters, or
- for stacks constructed after January 12, 1979,

$$H_{GEP} = H_b + 1.5L$$

[11] U.S. EPA, Guideline for Determination of Good Engineering Practice Stack Height, EPA-450-/4-80-023R, June 1985.

Where,

H_{GEP} = GEP stack height,

H_b = Height of adjacent or nearby structures,

L = Lesser of height or maximum projected width of adjacent or nearby building (*i.e.*, the critical dimension), and nearby is within 5L of the stack from downwind (trailing edge) of the building.

The GEP formula was applied to each input building. The EPA's Building Profile Input Program Prime Version (BPIP-Prime) was run to confirm the GEP height and to calculate direction-specific building dimensions for use in AERMOD.

The point sources subject to building influences are the boiler stacks, cooling towers, and emergency generator stack.

The proposed boiler stacks, cooling towers, and emergency generator stack are all below GEP height; therefore, building downwash effects were considered in the air quality modeling. The AERMOD model determines when and if to include downwash in its calculations. In addition, if downwash applies, the AERMOD downwash algorithm will be used to estimate concentrations in the building cavity areas.

3.5.5.4 Results

A cumulative impact analysis of Project-related stationary sources was also conducted for comparison to the NAAQS for CO, SO_2, NO_2, PM10, and PM2.5. This analysis addresses emissions from the Project's heating boilers, emergency generators, and cooling towers.

Worst-case maximum predicted impacts from these source groups were added to monitored background values obtained from MassDEP and compared to the NAAQS.

Table 3.5-8 presents the cumulative modeling results for the stationary sources plus monitored background values. Total impacts, when combined with background, are below the NAAQS for all pollutants and averaging periods. The concentration closest to its applicable standard is 1-hour NO_2 (106.4 $\mu g/m^3$ and 57% of NAAQS). However, of the total, background comprises 93.4 $\mu g/m^3$ or nearly 50% of the NAAQS. The Project impact is extremely minor, totaling less than 10% of ambient background NO_2.

3.5.5.5 Conclusions

Using conservative estimates, all predicted concentrations at the nearest receptors for impacts from the stationary sources (including heating boilers, cooling towers, and emergency generator), plus monitored background values, are well under the NAAQS thresholds. Results are shown in Table 3.5-9.

Table 3.5-9 Summary of NAAQS Stationary Source Modeling Analysis

POLLUTANT	AVERAGING TIME	MAXIMUM MODELED CONC. ($\mu g/m^3$)	BACKGROUND CONCENTRATION ($\mu g/m^3$)	TOTAL CONCENTRATION [8] ($\mu g/m^3$)	STANDARD ($\mu g/m^3$)	% of Standard
SO_2	1 HOUR [1]	0.24	10.8	11.1	195	6%
	3 HOUR [2]	0.20	11.5	11.7	1300	1%
	24 HOUR [2]	0.10	7.6	7.7	365	2%
	ANNUAL [3]	0.02	1.4	1.4	80	2%
PM_{10}	24 HOUR [4]	3.24	30.0	33.2	150	22%
	ANNUAL [3]	0.58	14.2	14.8	50	30%
$PM_{2.5}$	24 HOUR [5]	2.79	13.2	16.0	35	46%
	ANNUAL [6]	0.56	6.3	6.8	15	45%
NO_2	1 HOUR [7]	13.07	93.4	106.4	188	57%
	ANNUAL [3]	2.49	32.6	35.1	100	35%
CO	1 HOUR [2]	121.22	2750.4	2871.6	40000	7%
	8 HOUR [2]	57.10	1439.4	1496.5	10000	15%

Notes:

[1] Maximum 4th-Highest Maximum Daily 1-Hour Concentration Averaged Over 5 Years
[2] Highest 2nd-High Concentration Over 5 Years
[3] Highest Annual Concentration Over 5 Years
[4] Highest 6th-High Concentration Over 5 Years
[5] Maximum 8th-Highest 24-Hour Concentration Averaged Over 5 Years
[6] Maximum Annual Concentration Averaged Over 5 Years
[7] Maximum 8th-Highest Maximum Daily 1-Hour Concentration Averaged Over 5 Years
[8] Discrepancies in sums may occur due to rounding.

3.5.5.6 Permitting

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

It is expected that the majority of stationary sources (boilers, engines, etc.) may be subject to MassDEP's Environmental Results Program (ERP). The Proponent will complete the required applications and submittals for the equipment, as necessary. No sources are expected to meet or exceed the thresholds for a Non-Major Comprehensive Plan Approval.

3.6 Stormwater/Water Quality

See Section 7.3.

3.7 Flood Hazard Zones/ Wetlands

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the site located in the City of Boston - Community Panel Number 25025C0076G, dated September 25, 2009, indicates the FEMA Flood Zone Designations for the site area. The FIRMs show that the Project Area is located entirely outside of the 500-year flood zone.

The Project Area is developed and does not contain wetlands.

3.8 Geotechnical Impacts

This section describes existing conditions, subsurface soil and groundwater conditions, and planned below-grade construction for the Project.

3.8.1 Historical Conditions

Up until the mid-19th century, the Project Area was on the edge of tidal flat that was filled during the late 1880s. From the 1880s through the early 1900s, the area was generally vacant except for the public streets. By 1914, the first building had been constructed at the 560 Commonwealth Avenue parcel, and in 1954 the existing structure was built.

3.8.2 Subsurface Conditions

Based on Sanborn Head's experience working in the area and review of the available geotechnical information, subsurface conditions are anticipated to consist of approximately 10 to 20 feet of granular, urban fill. The fill is underlain by approximately 4 to 6 feet of organic deposits, 10 to 20 feet of marine sand/silt, and about 160 feet of marine clay (Boston Blue Clay). Beneath the marine clay is a thin layer of glacial till over bedrock which is on the order 200 feet below the ground surface. It is anticipated that the top of the marine clay will be encountered between approximately 40 and 45 feet below the ground surface.

3.8.3 Groundwater

Groundwater levels in the vicinity of the Project Area are monitored by the Boston Groundwater Trust (BGwT). Groundwater levels at BGwT observation wells near the site indicate water levels typically range from El. 6 to 8 feet BCB or approximately 10 to 15 feet below the ground surface. It should be noted that groundwater levels can be influenced by below grade utilities or other structures and will fluctuate depending on seasonal variations in temperature and precipitation.

3.8.4 Project Impacts and Foundation Considerations

The proposed building is anticipated to be supported on deep foundations bearing in the glacial till or bedrock with a slab-on-grade floor system. The deep foundation system will be selected based on the building loads and will consider potential impacts to the adjacent MBTA tunnels and below grade utilities in terms of ground movement, vibrations and groundwater.

3.9 Solid and Hazardous Waste

3.9.1 Hazardous Waste

Based on a 2018 Phase I Environmental Site Assessment (ESA) completed for 560 Commonwealth Avenue, no current Recognized Environmental Conditions (RECs) were identified in connection with this property, nor are any other RECs anticipated for the remaining portion of the Project Area currently comprised of public streets. As defined by ASTM E1527-13 a REC is the presence or likely presence of hazardous substances or petroleum products in, on, or at a site: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. The 560 Commonwealth Avenue parcel was included within the boundaries of a Massachusetts Department of Environmental Protection (DEP) Massachusetts Contingency Plan (MCP) release site identified by Release Tracking Number (RTN) 3-27604. RTN 3-27604 was related to a release of #2 fuel oil that achieved regulatory closure with a "Permanent Solution" Class A-1 Response Action Outcome (RAO) in 2008. No other RTNs have been identified on parcel. Based on a Hazardous Building Materials (HBM) survey, asbestos-containing materials (ACM) were identified within the existing building at 560 Commonwealth Avenue. Abatement will be completed prior to demolition in accordance with local, state and federal regulations. Soil and groundwater encountered during construction related earthwork will be managed in accordance with applicable regulations.

3.9.2 Operation Solid and Hazardous Waste Generation

The Project will generate solid waste typical of hotel uses. Solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by building management. The Project will generate approximately 331 tons of solid waste per year.

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

3.9.3 Recycling

A dedicated recyclables storage and collection program will facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills. The recycling program will be fully developed in accordance with LEED standards as described in Chapter 4.

3.10 Noise Impacts

3.10.1 Introduction

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

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

3.10.2 Noise Terminology

There are several ways in which sound (noise) levels are measured and quantified. All of them use the logarithmic decibel (dB) scale. The following information defines the sound level measurement terminology used in this analysis.

The decibel scale is logarithmic to accommodate the wide range of sound intensities observed in the environment. A property of the decibel scale is that the sound pressure levels of two or more separate sounds are not directly additive. For example, if a sound of 50 dB is added to another sound of 50 dB, the total is only a three-dB increase (53 dB), which is equal to doubling in sound energy but not equal to a doubling in quantity (100 dB).

Thus, every three-dB change in sound level represents a doubling or halving of sound energy. Relative to this characteristic, a change in sound levels of less than three dB is imperceptible to the human ear.

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

A sound level meter (SLM) that is used to measure noise is a standardized instrument.[12] It contains "weighting networks" to adjust the frequency response of the instrument to approximate that of the human ear under various circumstances. The most commonly used weighting network is the A-weighting (there are also C-, and Z-weighting networks) because it most closely approximates how the human ear responds to sound at various frequencies, described in Hertz (Hz). The A-weighting network is the accepted scale used for community sound level measurements, and sounds are frequently reported as detected with a sound level meter with this weighting. A-weighted sound levels emphasize middle frequency sounds (i.e., middle pitched – around 1,000 Hz), and de-emphasize low and high frequency sounds. A-weighted sound levels are reported in decibels designated as "dBA".

Because the sounds in the environment vary with time, many different sound metrics may be used to quantify them. There are two typical methods used for describing variable sounds. These are exceedance levels and equivalent levels, both of which are derived from a large number of moment-to-moment A-weighted sound pressure level measurements. Exceedance levels are values from the cumulative amplitude distribution of all of the sound levels observed during a measurement period. Exceedance levels are designated L_n, where "n" can have a value between 0 and 100 in terms of percentage. Equivalent levels are designated L_{eq} and quantify a hypothetical steady sound that would have the same energy as the actual fluctuating sound observed. The several sound level metrics that are commonly reported in community noise monitoring and are presented in this report are described below.

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

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

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

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

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

- L_{eq} is a sound pressure level commonly A-weighted and presented in dBA. The equivalent level represents the time average of the fluctuating sound pressure, but because sound is represented on a logarithmic scale and the averaging is done with time-averaged mean square sound pressure values, the L_{eq} is primarily controlled by loud noises if there are fluctuating sound levels.

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

3.10.3 Noise Regulations and Criteria

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

Table 3.10-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the BAPCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. These maximum allowable sound pressure levels apply at the property line of the receiving property. The "Residential Zoning District" limits apply to any lot located within a residential zoning district or to any residential use located in another zone except an Industrial Zoning District, according to Regulation 2.2. Similarly, per Regulation 2.3, business limits apply to any lot located within a business zoning district not in residential or institutional use.

Table 3.10-1 City Noise Standards, Maximum Allowable Sound Pressure Levels

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

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

3.10.4 Existing Conditions

A background noise level survey was conducted to characterize the existing "baseline" acoustical environment in the vicinity of the Project. Existing noise sources around the Project include: vehicular and truck traffic along local streets, pedestrian traffic, mechanical and ventilation noise from surrounding structures, construction noise from nearby projects, an alarm from a surrounding building, overhead planes and helicopters, nearby and passing sirens, wind, birds, and the general city soundscape.

3.10.5 Noise Monitoring Methodology

Since noise impacts from the Project on the community will be highest when background noise levels are the lowest, the study was designed to measure community noise levels under conditions typical of a "quiet period" for the area. Therefore, daytime measurements were scheduled to avoid peak traffic conditions. Sound level measurements were made on Monday, March 11, 2019 during the daytime (11:30 a.m. to 1:00 p.m.) and on Tuesday, March 12, 2019 during nighttime hours (12:00 a.m. to 2:00 a.m.). All measurements were 20 minutes in duration.

Sound levels were measured at publicly accessible locations at a height of five feet (1.5 meters) above ground level, under low wind conditions, and with dry roadway surfaces. Wind speed, temperature, and humidity measurements were made with a Kestrel 3000 Pocket Wind Meter which is equipped with an electronic wind speed indicator, temperature thermistor, and humidity sensor. Unofficial observations about meteorology or land use in the community were made solely to characterize the existing sound levels in the area and to estimate the noise sensitivity at properties near the Project.

3.10.6 Noise Monitoring Locations

The selection of the noise monitoring locations was based upon a review of zoning and land use in the Project Area. Five noise monitoring locations were selected as representative sites to obtain a sampling of the ambient baseline noise environment. These measurement locations are depicted on Figure 3.10-1 and described below.

- **Location 1** is located on the northern sidewalk of Commonwealth Avenue, in front of 575 Commonwealth Avenue at a large Boston University dormitory, northwest of the Project. This location is representative of the closest institutional/residential receptors northwest of the Project.

- **Location 2** is located on the sidewalk at the intersection of Deerfield Street and Bay State Road adjacent to 96 Bay State Road, north of the Project. This location is representative of the closest residential receptors north of the Project.

- **Location 3** is located on the northern sidewalk of Commonwealth Avenue, in front of 541 Commonwealth Avenue, northeast of the Project. This location represents the closest mixed use with commercial/residential receptors northeast of the Project.

- **Location 4** is located on the southeastern sidewalk of Beacon Street, in front of 645 Beacon Street at the Boston Hotel Buckminster, south of the Project. This location is representative of the closest commercial/residential receptors south of the Project.

- **Location 5** is located on the northwestern sidewalk of Beacon Street, near the southeast corner of 566 Commonwealth Avenue, southwest of the Project. This location is representative of the closest mixed use with commercial/residential receptors west of the Project.

3.10.7 Noise Monitoring Equipment

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

G:\Projects2\MA\Boston\4629\MXD\Sound_Monitoring_20190404.mxd

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

One Kenmore Square Boston, Massachusetts

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Figure 3.10-1

Sound Monitoring Locations

3.10.8 Measured Background Sound Levels

Baseline noise monitoring results are presented in Table 3.10-2 and summarized below:

- The daytime residual background (L_{90}) measurements ranged from 57 to 68 dBA;
- The nighttime residual background (L_{90}) measurements ranged from 49 to 66 dBA;
- The daytime equivalent level (L_{eq}) measurements ranged from 60 to 73 dBA;
- The nighttime equivalent level (L_{eq}) measurements ranged from 55 to 67 dBA.

Table 3.10-2 Summary of Measured Background Noise Levels – March 11, 2019 (Daytime) & March 12, 2019 (Nighttime)

Location	Period	Start Time	L_{eq}	L_{max}	L_{10}	L_{50}	L_{90}	L_{90} Sound Pressure Level by Octave-Band Center Frequency (Hz)									
								31.5	63	125	250	500	1000	2000	4000	8000	16000
			dBA	dBA	dBA	dBA	dBA	dB	dB	dB	dB	dB	dB	dB	dB	dB	dB
1	Day	11:25 AM	67	79	71	62	58	64	62	59	56	54	54	47	39	27	24
2	Day	11:50 AM	60	72	61	59	57	63	62	59	53	52	54	48	37	26	24
3	Day	1:23 PM	73	97	74	69	63	70	68	64	60	59	60	53	43	33	26
4	Day	12:29 PM	67	80	70	66	61	67	65	60	58	56	57	52	42	33	26
5	Day	12:56 PM	71	79	74	70	68	67	66	65	69	64	63	58	47	33	24
1	Night	12:20 AM	60	74	63	55	53	62	59	57	54	52	48	40	28	20	23
2	Night	12:48 AM	55	72	55	51	49	56	57	53	49	47	44	37	24	19	23
3	Night	1:10 AM	65	79	69	60	55	62	61	58	54	52	50	44	31	22	23
4	Night	1:32 AM	60	74	64	58	55	59	60	56	56	53	50	43	31	22	23
5	Night	1:54 AM	67	77	69	66	66	61	62	66	68	63	59	54	44	30	23

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

Weather Conditions:

	Date	Temp	RH	Sky	Wind
Daytime	Monday, March 11, 2019	53 °F	39%	Mostly Cloudy	W 4-6 mph
Nighttime	Tuesday, March 12, 2019	35 °F	63%	Clear	W 0-2 mph

Monitoring Equipment Used:

	Manufacturer	Model	S/N
Sound Level Meter	Larson Davis	LD831	4374
Microphone	Larson Davis	377C20	165110
Preamp	Larson Davis	PRM831	46515
Calibrator	Larson Davis	CAL200	13675

3.10.9 Future Conditions – Overview of Potential Project Noise Sources

The primary sources of continuous sound exterior to the Project are expected to consist of ventilation, cooling, and emergency power noise sources. Multiple noise sources are anticipated to be located on the rooftop and ventilation apertures associated with noise sources will discharge sound at various heights and at various facades of the Project.

Table 3.10-3 provides an anticipated list of the major sources of sound. Sound power levels used in the acoustical modeling of each piece of equipment are presented in Table 3.10-4. Sound power level data was provided from the manufacturer for most pieces of equipment. If sound power levels were not provided, they were assumed by Epsilon. The fan sizes and corresponding sound power levels for the intake and exhaust ventilation fans relating to the proposed vault and kitchen areas were not provided for the Project and were assumed based on their anticipated uses.

The Project includes select noise-control measures in order to achieve compliance with the applicable noise regulations. As the design progresses, specifications for mechanical equipment may change; however, appropriate measures will be taken to ensure compliance with the City Noise Standards. Acoustical louvers were applied to the ventilation fans that will be used for intake and exhaust ventilation with regards to the proposed vault and kitchen areas on the northern and western façades. It is expected that the emergency generator sound levels will be controlled using a Level 2 sound attenuated enclosure. To further limit impacts from the standby generator, required periodic, routine testing will be conducted during daytime hours, when background sound levels are highest. A summary of potential noise mitigation considered for the Project is presented in Table 3.10-5.

Table 3.10-3 Modeled Noise Sources

Noise Source	Quantity	Approximate Location & Elevation	Size/Capacity
Cooling Tower (Air cooled)	2	Northwest corner of Rooftop Level	625 tons
Emergency Generator	1	Southwest corner of Rooftop Level	500 kW
Energy Recovery Unit	2	Center of Rooftop Level on each side of Skylight	12,500 CFM
Roof Exhaust Fan	2	Northeast corner of Rooftop Level on each side of Stair Bulkhead	11,250 CFM
Upblast Roof Exhaust Fan	1	Northeast corner of Rooftop Level	8,500 CFM
Vault Intake Fan[1]	1	Northern façade of Level 1	1,000 CFM
Vault Exhaust Fan[1]	1	Western façade of Level 1	1,000 CFM
Kitchen Exhaust Fan[1]	1	Northern façade of Level 2	5,000 CFM
Kitchen Intake Fan[1]	1	Western façade of Level 2	5,000 CFM

Notes:
1. Assumed fan based on proposed use, specific fan not provided.

Table 3.10-4 Modeled Sound Power Levels per Noise Source

Noise Source	Broad-band (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Cooling Tower (Air cooled)[2]	87	92[1]	92	90	87	85	81	78	74	67
Emergency Generator[3]	97	113[1]	113	103	101	94	90	88	84	80
Energy Recovery Unit[4]	90	93[1]	93	91	89	86	86	80	76	72
Roof Exhaust Fan[5]	85	83[1]	83	92	85	80	79	77	74	70
Upblast Roof Exhaust Fan[6]	93	86[1]	86	87	94	93	84	82	80	76
Vault Exhaust/Intake Fan[7]	66	63[1]	63	65	62	64	63	57	50	43
Kitchen Exhaust/Intake Fan[8]	86	98[1]	98	92	90	83	80	75	68	63

Notes: Sound power levels do not include mitigation identified in Table 3.10-5.

1. No data provided by manufacturer. Octave-band sound level assumed to be equal to the 63 Hz band level.
2. SPX Cooling Technologies Marley NC8403NLS2.
3. Caterpillar (C15) Sound Attenuated Level 2 Enclosure; Sound power levels calculated from sound pressure level data measured at a distance of 49.2 feet.
4. Greenheck ERU RVE-120-74-30H-35D-N; Sound power levels based on radiated sound levels.
5. Greenheck GB-360HP.
6. Greenheck CUE-300HP-B-VGD.
7. EF SWD-10-VG (Assumed fan based on proposed use, specific fan was not provided).
8. EF CSW-22-BI-41-4-100-II-30 (Assumed fan based on proposed use, specific fan was not provided).

Table 3.10-5 Attenuation Values Applied to Mitigate Each Noise Source

Noise Source	Form of Mitigation	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
Vault Exhaust/Intake Fan	Louver[1]	2[2]	5	4	5	6	9	13	14	13
Kitchen Exhaust/Intake Fan	Louver[1]	2[2]	5	4	5	6	9	13	14	13

Notes:

1. Slimshield Model SL-4 Acoustical Louver.
2. No data provided by manufacturer. Octave-band sound level assumed.

3.10.10 Noise Modeling Methodology

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

3.10.11 *Future Sound Levels – Nighttime*

The analysis of sound levels at night included all the mechanical equipment operating at maximum loads, except the emergency generator, to simulate worst-case nighttime operation conditions at nearby receptors. Seven modeling locations were included in the analysis. All seven of the modeling receptors (A-G) represented nearby residentially or institutionally zoned locations. Modeling location A represents monitoring location 1 on the northern sidewalk of Commonwealth Avenue, in front of 575 Commonwealth Avenue, a large Boston University dormitory northwest of the Project. Modeling location B represents monitoring location 2 on the sidewalk at the intersection of Deerfield Street and Bay State Street, in front of 96 Bay State Road, north of the Project. Modeling location C represents monitoring location 3 on the northern sidewalk of Commonwealth Avenue, in front of 541 Commonwealth Avenue, northeast of the Project. Modeling location D represents monitoring location 4 on the southeastern sidewalk of Beacon Street, in front of 645 Beacon Street at the Boston Hotel Buckminster, south of the Project. Modeling location E represents monitoring location 5 on the northwestern sidewalk of Beacon Street, near the southeast corner of 566 Commonwealth Avenue, southwest of the Project. Modeling location F represents the same residences as location E, but now towards the northeastern corner of the property. Modeling location G represents the front of 565 Commonwealth Avenue at the Kenmore Classroom Building for Boston University, directly across the street to the north of the Project. The modeling receptors, which correspond to residential/institutional uses in the community, are depicted in Figure 3.10-2. The predicted exterior Project-only sound levels range from 29 to 47 dBA at nearby receptors. The City of Boston Residential limits have been applied to the appropriate locations. Predicted sound levels from Project-related equipment are within the broadband and octave-band nighttime limits under the City Noise Standards at the modeling locations. The evaluation results are presented in Table 3.10-6.

Table 3.10-6 Comparison of Future Predicted Project-Only Nighttime Sound Levels to the City of Boston Limits

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	44	57	55	51	48	40	35	26	16	8
B	Residential	35	47	44	42	39	32	26	18	8	0
C	Residential	34	50	46	41	38	31	25	17	8	0
D	Residential	29	44	39	35	31	27	23	19	14	2
E	Residential	39	55	52	47	44	36	30	21	13	7
F	Residential	42	59	55	50	47	39	33	24	15	8
G	Institutional	47	58	58	53	50	45	39	29	21	13
City of Boston Limits	**Residential/Institutional**	**50**	**68**	**67**	**61**	**52**	**46**	**40**	**33**	**28**	**26**
	Business	**65**	**79**	**78**	**73**	**68**	**62**	**56**	**51**	**47**	**44**

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

One Kenmore Square **Boston, Massachusetts**

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Figure 3.10-2

Sound Modeling Locations

3.10.12 Future Sound Levels – Daytime

As previously noted, the emergency generator will only operate during the day for brief, routine testing when the background sound levels are high, or during an interruption of power from the electrical grid. A second analysis combined noise from the Project's anticipated mechanical equipment and its emergency generator to reflect worst-case conditions during a period of equipment testing. The sound levels were calculated at the same receptors as in the nighttime analysis and then evaluated against daytime limits. The predicted exterior Project-only daytime sound levels range from 34 to 50 dBA at nearby receptors. Predicted sound levels from Project-related equipment are within the daytime broadband and octave-band limits under the City Noise Standards at each of the modeled locations. This evaluation is presented in Table 3.10-7.

Table 3.10-7 Comparison of Future Predicted Project-Only Daytime Sound Levels to City Noise Standards

Modeling Location ID	Zoning / Land Use	Broadband (dBA)	Sound Level (dB) per Octave-Band Center Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
A	Residential	47	61	59	55	51	43	38	29	20	11
B	Residential	38	53	49	45	42	35	29	20	10	0
C	Residential	36	55	51	44	41	33	27	19	10	0
D	Residential	34	55	52	41	36	30	25	23	17	5
E	Residential	42	60	57	50	47	39	33	24	16	10
F	Residential	45	62	59	53	50	42	36	27	19	11
G	Institutional	50	62	62	56	53	48	42	32	24	16
City of Boston Limits	Residential/Institutional	60	76	75	69	62	56	50	45	40	38
	Business	65	79	78	73	68	62	56	51	47	44

3.10.13 Conclusions

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

Predicted mechanical equipment noise levels from the Project at each receptor location, taking into account attenuation due to distance, structures, and noise-control measures, will be at or below the octave-band requirements of the City Noise Standards. The predicted sound levels from Project-related equipment, as modeled, are expected to remain well below 50 dBA at residences; therefore, within the nighttime and daytime residential zoning limits for the City of Boston at the nearest residential receptors. The results indicate that the Project can operate without substantial impact on the existing acoustical environment.

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

3.11 Construction Impacts

3.11.1 Introduction

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

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

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

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

3.11.2 Construction Methodology/Public Safety

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

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

3.11.3 Construction Schedule

The Proponent anticipates that the Project will commence construction in the 2nd quarter of 2020 and last for approximately 36 months.

Typical construction hours will be from 7:00 am to 6:00 pm, Monday through Friday, with most shifts ordinarily ending at 3:30 pm. No substantial sound-generating activity will occur before 7:00 am. If longer hours, additional shifts, or Saturday work is required, the construction manager will place a work permit request to the Boston Air Pollution Control Commission and BTD in advance. Notification should occur during normal business hours, Monday through Friday. It is noted that some activities such as finishing activities could run beyond 6:00 pm to ensure the structural integrity of the finished product; certain components must be completed in a single pour, and placement of concrete cannot be interrupted.

Section 1.9 includes more detailed information on phasing.

3.11.4 Construction Staging/Access

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

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

3.11.5 Construction Mitigation

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

A CMP will be submitted to BTD for review and approval prior to issuance of a Building Permit. The CMP will include detailed information on specific construction mitigation measures and construction methodologies to minimize impacts to abutters and the local community.

The CMP will also define truck routes which will help in minimizing the impact of trucks on City and neighborhood streets.

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

3.11.6 Construction Employment and Worker Transportation

The number of workers required during the construction period will vary. It is anticipated that approximately 500 construction jobs will be created over the length of construction. The Proponent will make reasonable good-faith efforts to have at least 51% of the total employee work hours be for Boston residents, at least 40% of total employee work hours be for minorities and at least 12% of the total employee work hours be for women. The Proponent will enter into jobs agreements with the City of Boston.

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

3.11.7 Construction Truck Routes and Deliveries

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

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

3.11.8 Construction Air Quality

Short-term air quality impacts from fugitive dust may be expected during demolition, excavation and the early phases of construction. Plans for controlling fugitive dust during demolition, excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks.

The construction contract will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts, pursuant to this Article 80 approval. These measures are expected to include:

- Using wetting agents on areas of exposed soil on a scheduled basis;
- Using covered trucks;
- Minimizing spoils on the construction site;
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

3.11.9 Construction Noise

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

Mitigation measures are expected to include:

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

- Turning off idling equipment; and

- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

3.11.10 Construction Vibration

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

3.11.11 Construction Waste

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

3.11.12 Protection of Utilities

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

3.11.13 Rodent Control

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

3.11.14 Wildlife Habitat

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

Chapter 4.0

Sustainable Design and Climate Change Preparedness

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE PREPAREDNESS

4.1 Sustainable Design

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

A LEED checklist for the Project is included at the end of this section and details the credits the Project anticipates achieving. This is a preliminary evaluation of the LEED checklist, and applicable credits may change as the building design advances. For purposes of the LEED checklist, the LEED project boundary is defined as the footprint on which the new hotel building will be located, excluding the approximately one half -acre public plaza around it.

The following is a detailed credit-by-credit analysis of the Project team's approach to achieving LEED certifiability at the Silver level. Points that are still being studied and marked as "maybe" on the LEED checklist are italicized below.

Integrative Process

<u>IP Integrative Process:</u> In compliance with credit requirements, the Project team will complete the following tasks:

1. A preliminary "Box" Energy Model: the Project team has modeled the building's design and assessed potential strategies associated with the site conditions, the extensive massing and building orientation, the basic envelope design, lighting levels within the regularly occupied spaces, the thermal comfort ranges of the occupants, the plug and process load needs, and the programmatic and operational parameters of the building. Results of the preliminary energy model are provided in Appendix G.

2. A preliminary Water-Use Systems Analysis: during the schematic design phase, the team will also explore methods of reducing potable water loads within the building as well as any potable water required for irrigation of the building site and process water necessary for equipment within the building.

Location and Transportation

LT Sensitive Land Protection: The Project Area is located on previously developed, urban land, located in downtown Boston, satisfying the credit conditions.

LT High Priority Site: The Project Area is in a documented HUD qualified census tract.

LT Surrounding Density and Diverse Uses: The Project will meet the criteria for both Option 1 and Option 2. The proposed new building is a hotel development located in downtown Boston, and the surrounding ¼-mile radius will meet, and exceed, the credit thresholds for Option 1 – Surrounding Density. The building is located in the Kenmore Square area of Boston, and has significant access to community resources. The building easily meets the credit requirement of eight uses within a ½-mile walking distance of the main entrance. These resources include, but are not limited to:

- Santander Bank ATM – 0.5 mile;
- Eastern Standard Restaurant – 0.2 mile;
- United States Postal Service – 0.1 mile;
- Fenway Park – 0.3 mile;
- Barnes and Noble – 0.1 mile;
- The Boston Language Institute – 0.2 mile;
- T-Mobile – 200 feet; and
- City Convenience – 174 feet.

LT Access to Quality Transit: The Project Area is located within a short walk (0.2 miles) of the Kenmore MBTA underground subway and bus station. This station provides at least 360 weekday trips and 216 weekend trips.

LT Bicycle Facilities: Due to the small footprint of the building, the design may not provide enough space for locked and protected storage of bicycles. The team will explore options for meeting the credit requirements.

LT Reduced Parking Footprint: The Project will not include on-site parking, inherently meeting the LEED requirements for reduction in parking footprint.

Sustainable Sites

SS Prerequisite – Construction Activity Pollution Prevention: The construction documents will include a Soil Erosion and Sedimentation Control Plan to be developed in accordance with the EPA Construction General Permit of the NPDES. A Stormwater Pollution Prevention Plan (SWPPP) will also be developed for the building in accordance with the requirements for the US EPA's National Pollutant Discharge Elimination System Construction General Permit. These documents will be used to document compliance with this prerequisite.

SS Site Assessment: The Project team will complete and document an assessment of the following information:

1. Topography – contours and sloping,
2. Hydrology – flood hazards and existing water bodies,
3. Climate – solar exposure and sun angles,
4. Vegetation – vegetation types and greenfield spaces,
5. Soils – soils delineation, prime farmland, and disturbed soils,
6. Human Use – enhanced views, availability of transportation, and future building potential, and
7. Human Health Effects – population assessment, physical fitness, and existing air pollution sources.

SS Rainwater Management: The Project will provide an extensive network of stormwater storage and infiltration equipment below the ground surface. This system will hold up to 1.25-inch of rainfall, which is equivalent to a 90% rainfall event. Since this building is a high-density development, it meets all three available points.

SS Heat Island Reduction: The building will utilize high albedo materials for all hardscapes, including both nonroof and roof installations. All installed materials will meet LEED requirements for either initial or three-year Solar Reflectance Index values.

Water Efficiency

WE Prerequisite – Outdoor Water Use Reduction: Due to the small building area, the building design will not include a permanent irrigation system, thereby satisfying the requirements of this credit.

WE Prerequisite – Indoor Water Use Reduction: The building will reduce demand for potable water through high efficiency fixtures within the hotel rooms – this design will surpass the prerequisite requirement for 20% reduction with a goal of 35% reduction. The design will specify WaterSense labeled fixtures and the following flow rates:

- Shower: 1.75 GPM;
- Bath Lavatory: 1.0 GPM;
- Toilet: 1.28 GPF; and
- Energy Star Certified clothes washers.

WE Prerequisite – Building Level Water Metering: A water meter will be installed for the building.

WE Indoor Water Use: The building will reduce demand for potable water through high efficiency fixtures within the hotel rooms – this design will surpass the prerequisite requirement for 20% reduction with a goal of 30% reduction. The design will specify WaterSense labeled fixtures and the following flow rates:

- Shower: 1.75 GPM;
- Bath Lavatory: 1.0 GPM;
- Toilet: 1.28 GPF; and
- Energy Star Certified clothes washers.

WE Cooling Tower Water Use: The building will include a cooling tower. The design will maximize the number of water cycles through filtration and strict concentration control of calcium, alkalinity, silica, chlorine, and the overall conductivity.

WE Water Metering: The Project team will include additional water meters for two of the following systems: indoor plumbing, domestic hot water, and boiler use.

Energy and Atmosphere

EA Prerequisite – Fundamental Commissioning and Verification: The Project team will include an experienced Commissioning (Cx) Agent - this person will be hired before the end of the design development phase and will provide review services for the project Basis of Design and Owner's Project Requirements as well as a thorough review of both the Design Development and Construction Documents plan and specification set, observation of all start-up testing and balancing procedures, and confirmation of installation and operation according to the design parameters.

EA Prerequisite – Minimum Energy Performance: The building will meet this prerequisite, as well as the Massachusetts Stretch Energy Code, through the following design approaches, resulting in an ASHRAE 90.1 Appendix G model demonstrating a minimum Energy Use Reduction of at least 16% by cost, below ASHRAE 90.1-2010 (LEED) and at least 10% by energy use, below ASHRAE 90.1-2013 (Stretch Code):

1. Above code levels of insulation within the cavity as well as continuous exterior of the sheathing;
2. Very high efficiency equipment mechanical systems;
3. LED lighting and sophisticated, automated controls;
4. Energy Star appliances; and
5. Energy Recovery for all ventilation.

EA Prerequisite – Building Level Energy Metering: The building will include a building-level energy meter for all energy consumption including electricity and natural gas.

EA Prerequisite – Fundamental Refrigerant Management: The building's HVAC systems will not include any chlorofluorocarbon (CFC)-based refrigerants.

EA Enhanced Commissioning: The Project team will include an experienced Commissioning (Cx) Agent. This person will be hired before the end of the design development phase and will provide review services for the project Basis of Design and Owner's Project Requirements as well as a thorough review of both the Design Development and Construction Documents plan and specification set, observation of all start-up testing and balancing procedures, and confirmation of installation and operation according to the design parameters.

EA Optimize Energy Use: The building will meet this credit, as well as the Massachusetts Stretch Energy Code, through the following design approaches, resulting in an ASHRAE 90.1 Appendix G model demonstrating a minimum Energy Use Reduction of at least 16% by cost, below ASHRAE 90.1-2010 (LEED) and at least 10% by energy use, below ASHRAE 90.1-2013 (Stretch Code):

1. Above code levels of insulation within the cavity as well as continuous exterior of the sheathing;
2. Very high efficiency equipment mechanical systems;
3. LED lighting and sophisticated, automated controls;
4. Energy Star appliances; and
5. Energy Recovery for all ventilation.

EA Green Power: The Project team will explore options for Green Power and Carbon Offset purchasing to counteract the environmental toll of fossil fuel production for creation of building energy.

Materials and Resources

MR Prerequisite – Storage and Collection of Recyclables: The building will provide a designated storage point for recyclable materials; management will then move all refuse to the street for city collection. Collected materials will include the following:

- Mixed paper;
- Corrugated cardboard;
- Glass;
- Plastics;
- Metals;
- Batteries; and
- Mercury Containing Lamps.

MR Prerequisite – Construction and Demolition Waste Management Planning: The Project team will implement a construction waste management plan with a diversion goal of 75% of the site-generated waste from the landfill. The construction team will provide monthly reports of waste diversion.

MR Building Product Disclosure and Optimization – Environmental Product Declarations: The Project team will document the use of at least 20 different, permanently installed products, sourced from at least five different manufacturers, that include confirmed environmental product declaration documents.

MR Building Product Disclosure and Optimization – Sourcing of Raw Materials: The Project team will document the use of at least 20 different, permanently installed products, sourced from at least five different manufacturers, that include third-party corporate sustainability reports with information on extraction operations.

MR Building Product Disclosure and Optimization – Material Ingredients: The Project team will document the use of at least 20 different, permanently installed products, sourced from at least five different manufacturers, that include manufacturer's inventory of all contents, Health Product Declarations, and/or Cradle-to-Cradle certification.

MR Construction and Demolition Waste Management: The Project team is committed to reducing construction waste through at least 75% diversion of four material streams.

Indoor Environmental Quality

IEQ Prerequisite – Minimum Indoor Air Quality Performance: The Project team will ensure that all ventilation systems meet the minimum requirements of Sections 4 through 7 of the ASHRAE 62.1-2010 standard for Acceptable Indoor Air Quality. Each unit will have kitchen and bath exhaust as required by the Standard. In addition, fresh air will be mechanically supplied directly to each unit.

IEQ Prerequisite – Environmental Tobacco Smoke Control: Smoking will be prohibited inside the building and within 25-feet of all entries, outdoor air intakes, and operable windows; these prohibitions will be incited in all leasing agreements and will be displayed via on-site signage.

IEQ Enhanced Indoor Air Quality Strategies: The Project team will include the following:

- A permanent entryway system at least 10-feet long in the primary direction of travel;
- Direct exhaust of all housekeeping and laundry areas to prevent cross-contamination; and
- MERV 13 filtration on all ventilation systems.

IEQ Low Emitting Materials: The Project team will specify paints, coatings, flooring, adhesives, and sealants that comply with this credit criteria.

IEQ Construction Indoor Air Quality Management Plan: The general contractor will ensure that all installed ductwork is adequately protected throughout the construction phase. This protection will be verified by site inspections.

IEQ Thermal Comfort: The building will provide individual thermal controls for all hotel rooms. Additionally, all shared spaces will include controls for adjustment per group needs.

EQ Interior Lighting: The building will meet the criteria for both Option 1 and Option 2:

Option 1 - Lighting Control. The building will provide individual lighting controls for all building occupants within all hotel rooms. Additionally, all shared spaces will include controls for adjustment per group needs.

Option 2 - Lighting Quality. The building will include the following lighting strategies:

1. All light sources will have a CRI of 80, or higher,
2. At least 75% of the total connected lighting load will use lights with a rated light of at least 24,000 hours,
3. All regularly occupied spaces will use light fixtures with a luminance of less than 2,500 cd/m2, and
4. 90% of the regularly occupied floor area will meet the thresholds for LEED requirements for area-weighted average surface reflectance.

EQ Daylight: The Project team will complete a computer simulation demonstrating that at least 55% daylight autonomy is achieved throughout the building. Additionally, the simulation will confirm an annual sunlight exposure of no more than 10%.

EQ Quality Views: The Project team will seek to maximize the views available to occupants in all regularly occupied spaces. At least 75% of the applicable floor area will achieve a direct line of sight to the outdoors.

EQ Acoustic Performance: The Project team will strive to reduce transfer of HVAC background noise, isolate sounds according to their sound transmission class, and meet the LEED required reverberation time for all applicable room times within the building.

Innovation in Design

The Project team will seek to achieve five Innovation points; potential credits include: Integrated Pest Management, Green Cleaning, Green Building Education, Reduction of Mercury in Lighting, and Local Purchasing.

ID LEED Accredited Professional: At least one accredited professional is part of the Project team.

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

Project Checklist

Project Name: One Kenmore Square

Date: 1-Apr-19

Y	?	N			
1			Credit	Integrative Process	1

Y	?	N		Location and Transportation	16
13	1	2		**Location and Transportation**	**16**
			Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
1		1	Credit	High Priority Site	2
5			Credit	Surrounding Density and Diverse Uses	5
5			Credit	Access to Quality Transit	5
	1		Credit	Bicycle Facilities	1
1			Credit	Reduced Parking Footprint	1
		1	Credit	Green Vehicles	1

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

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

Y	?	N			
9	4	20		**Energy and Atmosphere**	**33**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
3		3	Credit	Enhanced Commissioning	6
6	2	10	Credit	Optimize Energy Performance	18
		1	Credit	Advanced Energy Metering	1
		2	Credit	Demand Response	2
		3	Credit	Renewable Energy Production	3
		1	Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2

Y	?	N			
5	0	8		**Materials and Resources**	**13**
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
		5	Credit	Building Life-Cycle Impact Reduction	5
1		1	Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
1		1	Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
1		1	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

Y	?	N			
10	3	3		**Indoor Environmental Quality**	**16**
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
1	1		Credit	Enhanced Indoor Air Quality Strategies	2
2		1	Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
1		1	Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
2			Credit	Interior Lighting	2
2		1	Credit	Daylight	3
	1		Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

Y	?	N			
6	0	0		**Innovation**	**6**
5			Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

Y	?	N			
1	2	1		**Regional Priority**	**4**
	1		Credit	EA Optimize Energy Performance; Threshold = 8 pts	1
1			Credit	SS Rainwater Management; Threshold = 2 pts	1
	1		Credit	WE Indoor Water Use Reduction; Threshold = 4 pts	1
		1	Credit	LT High Priority Site; Threshold = 2 points	1

Y	?	N			
54	12	44	**TOTALS**	Possible Points:	**110**

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

Regional Priority

Regional Priority Credits (RPCs) are established LEED credits designated by the USGBC to have priority for a particular area of the country. When a Project team achieves one of the designated RPCs, an additional credit is awarded to the Project. RPCs applicable to the site include: SS Rainwater Management, WE Indoor Water Use Reduction, and EA Optimize Energy Performance.

4.2 Climate Change Preparedness

4.2.1 Introduction

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

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

4.2.2 Extreme Heat Events

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

4.2.3 Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate this, the Proponent will take measures to minimize stormwater runoff and protect the Project's mechanical equipment, as necessary. The Project will be designed to reduce the existing peak rates and volumes of stormwater runoff from the site, and promote runoff recharge to the greatest extent practicable.

4.2.4 Drought Conditions

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

Chapter 5.0

Urban Design

5.0 URBAN DESIGN

5.1 Introduction

While the extension of Beacon Street and Commonwealth Avenue beyond Charlesgate in the latter part of the 19th century predicted a new growth pattern for Boston and Brookline, their awkward intersection at Kenmore Square acquired neither the spatial quality nor the cultural identity of a great urban square. Fast, moving lanes of commuter traffic have dominated the space for more than 100 years. The Project redefines the heart of the neighborhood. It will activate a critical flashpoint for the city's cultural life, and will form a more distinctive gateway to the Back Bay and downtown from Greater Boston's western reaches.

Analysis of the area revealed an unseen development opportunity: reorganizing the street system could vastly increase the supply of public space in the square while reprioritizing highly active pedestrian and bicycle realms in ways consistent with important national trends that favor walkability and sidewalk activation. The introduction of a short new block to manage vehicle traffic sets the stage for a new public plaza of approximately half an acre at the middle of the square. From the plaza, the iconic 300-foot "flatiron" hotel tower, which tapers towards a narrow footprint to produce more usable public right-of-way, will announce a renewed civic landscape amid increasingly vibrant institutional, commercial, retail, entertainment, and cultural uses (see Figure 5-1 and 5-2).

5.2 A Square for Everyone

Despite some recent streetscape improvements, Kenmore Square is still an unwelcoming place for people walking. Public space is tight—there's no real "square" in the square—and pedestrians wait a long time to cross some very wide streets. By simplifying the intersection with the proposed roadway configuration described in Section 1.3.3.1, the pedestrian experience will be improved without worsening traffic congestion.

The roadway reconfiguration, made possible by the redevelopment of the Proponent's site, will transform roadway dominated by cars into walkable public spaces. They will create a new public gathering space in Kenmore Square, and will vastly improve the safety and the experience of one of Boston's most important public spaces.

5.3 Plaza Character

The proposal includes a broad, shaded public plaza organized for dining and lingering, active programming, and the accommodation of large crowds passing through on close to 100 Fenway Park events annually. The hotel will include ground and second-floor food and beverage venues that spill onto the plaza in good weather, continuing and expanding a grand Kenmore neighborhood tradition.

One Kenmore Square **Boston, Massachusetts**

STUDIO/
GANG
/ARCHITECTS

Figure 5-1
Aerial View

One Kenmore Square Boston, Massachusetts

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GANG
/ARCHITECTS

Figure 5-2
View Facing West on Commonwealth Avenue

Public realm commitments include the provision of adequate volumes of high-performance soils to eventually support a fully-mature hardwood tree canopy on the plaza. This is transformative for Kenmore Square.

The proposed plaza achieves, for the first time in Kenmore Square, consistently shaded sidewalks and a strong canopy of well-adapted tree species on the plaza that recalls the plantings of Commonwealth Avenue to the east and the west. Paving and seating arise from the detailed geometries of the site while bringing a high level of logic and clarity to safe pedestrian and protected bicycle navigation. Custom-designed, 30-foot tall light towers will bring a unique character of nighttime liveliness to the scene, marking the square with a monumental, tunable light display that can enunciate seasonal and special programmed events for the entire Kenmore area (see Figure 5-3).

5.4 Building Design

To help the new Kenmore Square plaza become a well-used and well-loved public space, the proposed hotel is shaped to maximize the area of the plaza and minimize the building's footprint, and its interior spaces are programmed to complement existing amenities and activities in the surrounding neighborhood. The unique character of the site not only produces a flatiron building but one that tapers to increase the public plaza.

The plaza and tower have been integrally designed to establish a new Boston destination at Kenmore Square. Through both its architecture and its programming, the proposed hotel is designed to enhance the public space that surrounds it. Architecturally, the building's form tapers inward and becomes more transparent towards its base, maximizing space available for the public realm and infusing the plaza with light and activity. At ground level, the building is carved away, providing additional plaza space while becoming fully transparent to reinforce connections with the public realm. Programmatically, the hotel lobby with its adjacent ground-floor and second-level restaurant/retail/services space are situated on the ground level to activate the site and will be available to serve all people coming to Kenmore Square and encourage visitors to dwell and enjoy Kenmore Square through daytime and nighttime hours. The lower floors provide generous amenity programs, and the atrium space is naturally lit via a rooftop skylight that brings daylight into the hotel's corridor spaces and amenity levels.

The new public plaza and hotel tower are designed in concert to become a Boston destination. There will be plenty of space for crowds of baseball fans before and after games at Fenway Park, Marathon watchers cheering the final mile, and Boston University students and others mingling under the trees. The amenity levels will provide elevated spaces for hotel guests to overlook the plaza and out over the cityscape.

One Kenmore Square **Boston, Massachusetts**

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Figure 5-3
Plaza View Facing West

The key to the tower's striking yet harmonious urban presence is the unit of the bay window. A typical feature of traditional Boston buildings, bay windows give the tower's interior spaces added area, interest, daylight, visual interest and expanded views. They also allow the building to "step out" as it rises in a gradual way that blends large steps into a continuous gradient of bays—giving the tower a dynamic appearance that still feels welcoming and at the human scale (see Figure 5-4). The façade design integrates a carefully calibrated ratio of glazed areas and solid insulated areas that optimize energy performance while reinforcing the dramatic vertical expression of the architecture.

The tower's articulated bays of brick and glass bundle together as they step up the building (see Figure 5-1 referenced above). The building facade gives a unique experience to all users. The tower's stepping bays minimize its footprint in the public plaza and will contribute to an active, engaging pedestrian environment. This functionally rich form allows the tower to both serve as an entrance to the historic Back Bay neighborhood and take its place on the growing Boston skyline. In its sensitively tapered form, its innovative reinterpretation of bay window geometry, and its balance of transparency and opacity, the tower's design is sensitive to both the human scale and the urban scale. From up close it, and from afar it will serve as an appropriately dynamic entrance to the Kenmore and Back Bay neighborhoods.

One Kenmore Square **Boston, Massachusetts**

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Figure 5-4
View Facing East on Commonwealth Avenue

Chapter 6.0

Historic and Archaeological Resources

6.0 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This section describes the historic and archaeological resources within and in the vicinity of the Project site.

6.1 Historic Resources in the Project Area

The Project Area contains a single-story commercial building at 560-574 Commonwealth Avenue that was built in 1954 as the Kenmore Square branch of the First National Bank of Boston. The simple, undistinguished design is the work of the Boston architectural firm of Perry, Shaw & Hepburn. Although the building has been leased to a succession of financial institutions since its construction, it remains in use as a retail banking facility.

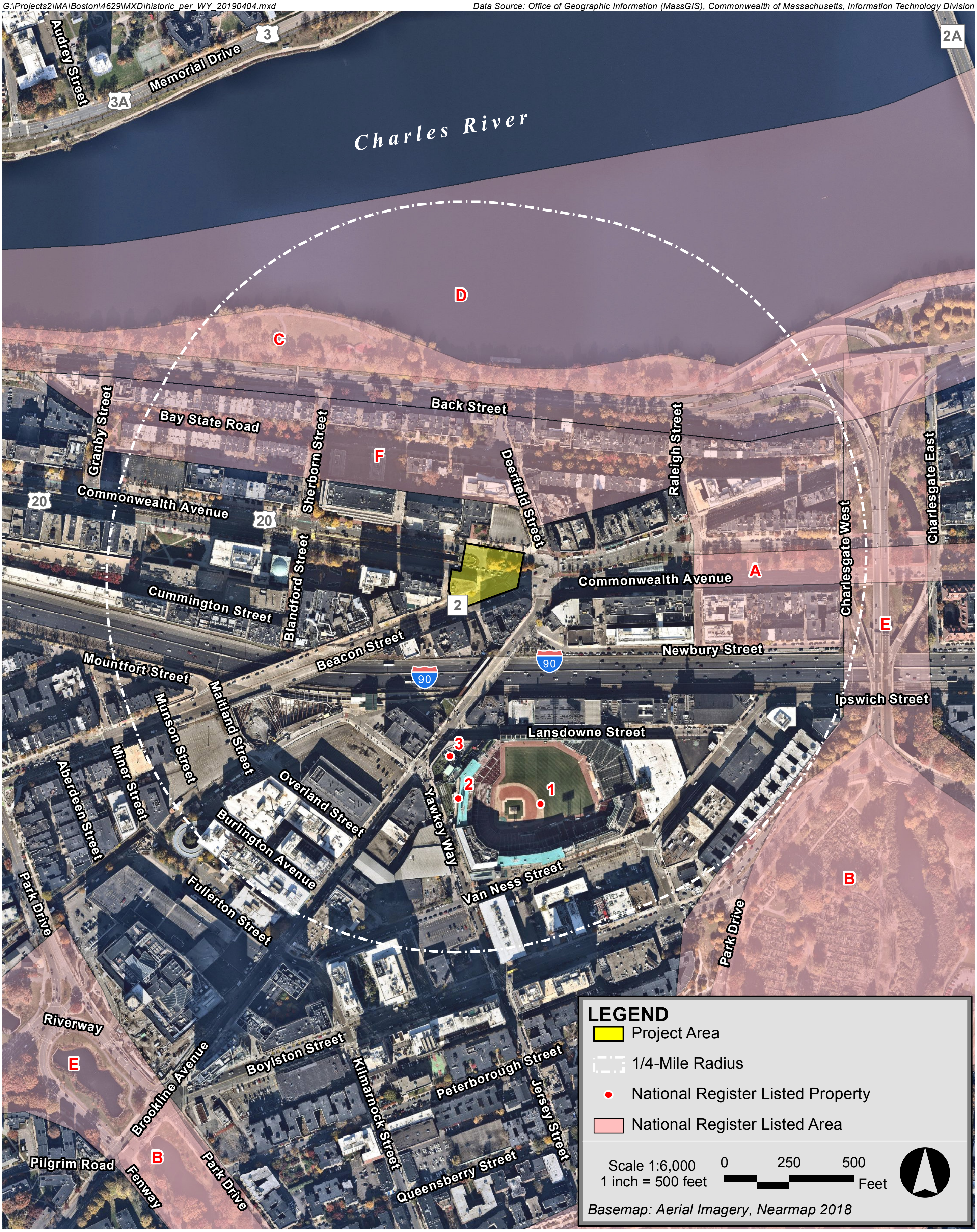
Its flatiron footprint filling the point of land defined by the crossing of Commonwealth Avenue and Beacon Street at Kenmore Square, the building is organized as a single-story structure veneered in buff limestone on a slightly darker polished granite base. Both the Commonwealth Avenue and Beacon Street elevations feature a single, wide window opening subdivided by mill-finished aluminum mullions. Addressing Kenmore Square, the entry bay occupies the apex of the site; while its glazing modules are larger and more vertical in proportion, the opening itself is detailed similarly. Low granite benches integral with the building's base flank the central door.

6.2 Historic Resources in the vicinity

Numerous properties and districts included in the State and National Registers of Historic Places are within proximity to the Project Area. In the vicinity is the National Register-listed Fenway Park, Back Bay Fens, Charles River Esplanade and Charles River Basin Historic District, Olmsted Park System, and the Commonwealth Avenue Mall (which is also a locally designated landmark). The locally designated Bay State Road/Back Bay West Architectural Conservation District is within this radius as well.

Table 6-1 identifies the resources within one-quarter mile of the Project Area and corresponds to resources depicted in Figure 6-1.

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



One Kenmore Square **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 6-1
Historic Resources

Table 6-1 State and National Register-Listed Properties in the Vicinity of the Project Area

Historic Resource	Address	Designation
1. Fenway Park	4 Jersey Street	NR
2. Fenway Park Rooftop Structures	4 Jersey Street	NR
3. John B. Smith Building	64-78 Brookline Avenue	NR
A. Commonwealth Avenue Mall	Commonwealth Avenue between Arlington Street and Charlesgate West	NR, LL
B. Back Bay Fens	The Fenway, Park Drive, Boylston Street	NRDIS
C. Charles River Esplanade	The south bank of the Charles River from Route 28 to the Boston University Bridge	NRDIS
D. Charles River Basin Historic District	Charles River Dam southwesterly to Longfellow Bridge, then westerly to Eliot Bridge, then crossing river and continuing westerly to western edge of Memorial Drive Extension then northeasterly along western edge of Memorial Drive	NRDIS
E. Olmsted Park System	The parklands of the Riverway, Olmsted Park and Jamaica Pond, and their associated parkways	NRDIS
F. Bay State Road/Back Bay West Architectural Conservation District	Bay State Road between Raleigh & Granby streets; Commonwealth Avenue between Charlesgate West and Kenmore Street; Newbury Street between Charlesgate West and Kenmore Street	LHD

Designation Legend

NR	Individually listed in the National Register of Historic Places
NRDIS	National Register of Historic Places Historic District
LHD	Local Historic District
LL	Local Landmark

6.2.1 Urban Design and Visual Impacts

The proposed Project reorients the local streets to promote safety for pedestrians, cyclists and motorists, as well as aims to redefine the heart of the historic Kenmore neighborhood. The Project will help Kenmore Square to become a more active participant in the city's cultural life. At the same time, it will serve as a more distinctive visual gateway to the Back Bay and downtown as approached from Greater Boston's western reaches. Integrally designed in concert with the proposed roadway modifications intended to improve both the pedestrian environment and vehicular travel within Kenmore Square, the proposed hotel's slender footprint is configured to maximize the area of the grade-level plaza. Carved away at the base to engage with the public realm, its upper floors expand gracefully with the locally familiar geometry of the bay window.

A typical feature of traditional Boston buildings, bay windows give the tower's interior spaces added area, interest, daylight, and broadened views of the city beyond. Superimposed tier upon tier, they also allow the building's exterior to "step out" as it rises, giving the tower a dynamic appearance that still feels welcoming and at the human scale (see Figure 5-4). This visually and functionally rich form allows the building to serve as an entrance to the historic Kenmore and Back Bay neighborhoods and take its place on the growing Boston skyline.

6.2.2 Shadow Impacts

Fourteen time periods were studied to determine the extent of new shadow cast by the Project. The shadow study shows that new shadow will mainly be cast across nearby streets and sidewalks. New shadow will also be cast for limited periods onto certain historic resources. On March 21 and September 21 at 3:00 p.m., and on December 21 at 12:00 p.m., there will be shadow on the buildings on the east side of Deerfield Street. At 6:00 p.m. on September 21, shadow will be cast along the north side of Commonwealth Avenue from Beacon Street to Charlesgate East. On December 21 at 9:00 a.m., shadow will be cast diagonally to the northwest on Bay State Road from Deerfield to Sherborn streets and at 3:00 p.m., diagonally to the northeast from Deerfield to Raleigh streets. Limited open areas of the Charles River Esplanade immediately adjacent to the Storrow Drive roadway will also experience shadow on December 21 at 9:00 a.m. and 3:00 p.m. No other historic resources will experience any shadow impacts as a result of the Project.

6.2.3 Wind Impacts

Wind conditions with appropriate mitigation beyond the Project Area are anticipated to be suitable for walking, standing or sitting and are not expected to impact any historic resources.

6.3 Archaeological Resources Within the Project Area

A review of the Inventory of Historic and Archaeological Assets of the Commonwealth and the State and National Registers revealed no known archaeological resources. Due to previous site disturbance activities, the Project Area is unlikely to yield significant archaeological potential.

6.4 Consistency with Other Historic Reviews

6.4.1 Boston Landmarks Commission Article 85 Review

The existing building within the Project Area, 560-574 Commonwealth Avenue, is greater than 50 years old, and its proposed demolition will be subject to review by the BLC under Article 85 of the Boston Zoning Code. An Article 85 Application will be submitted to the BLC at the appropriate time.

6.4.2 Massachusetts Historical Commission State Register Review

The Massachusetts Historical Commission (MHC) has review authority over projects requiring state funding, licensing, permitting, and/or approvals that may have direct or indirect impacts to properties listed in the State Register of Historic Places. The Project does not require state action that triggers MHC review under Sections 27-27c of Chapter 9 of the Massachusetts General Laws, as amended by Chapter 254 of the Acts of 1988.

Chapter 7.0

Infrastructure

7.0 INFRASTRUCTURE

7.1 Overview of Utility Services

The existing infrastructure in and around the Project is anticipated to be of adequate capacity to service the needs of the Project. There is existing sanitary sewer, storm drainage, water, gas, electric, and telecommunications infrastructure in the Project vicinity. Given the Project location, substantial relocation of existing utility infrastructure will be required to accommodate the proposed building. This relocation will occur in close coordination with the utility providers as further detailed in this section.

Approval of Site Plans and a General Service Application are required from Boston Water and Sewer Commission (BWSC) for construction and activation of sewer, water, and storm drainage service connections, in addition to the relocation of existing water, sewer and drain infrastructure. The final sewer and water connections, as well as the Project's stormwater management system, will be designed in conformance with BWSC's design standards, *Requirements for Site Plans, Regulations Governing the Use of Sanitary and Combined Sewers and Storm Drains, and Regulations Governing the Use of the Water Distribution Facilities of the Boston Water and Sewer Commission*. A Drainage Discharge Permit Application will be submitted to BWSC for any required construction dewatering. The required work orders for relocation of private utilities will also be submitted to obtain approval for the proposed work.

Prior to demolition, the Proponent will cut and cap the existing storm drain, sanitary sewer and water services that are associated with the existing building. A Termination Verification Approval Form for a Demolition Permit will be completed and submitted to the City of Boston Inspectional Services Department (ISD) as required.

7.2 Wastewater

7.2.1 Existing Sewer System

BWSC owns, operates, and maintains the sanitary sewer mains in the vicinity of the Project Area.

Per BWSC record mapping and as identified on the survey (See Figure 7-1), there is a 24-inch x 31-inch separated main within Brookline Avenue, a 12-inch main along the southern side of Beacon Street, a 20-inch main along the northern side of Beacon Street, a 32-inch x 42-inch main along the southern side of Commonwealth Avenue and an 18-inch main running along the northern side of Commonwealth Avenue.

The existing sanitary sewer services to the building being razed will be cut and capped prior to demolition, as required by BWSC.

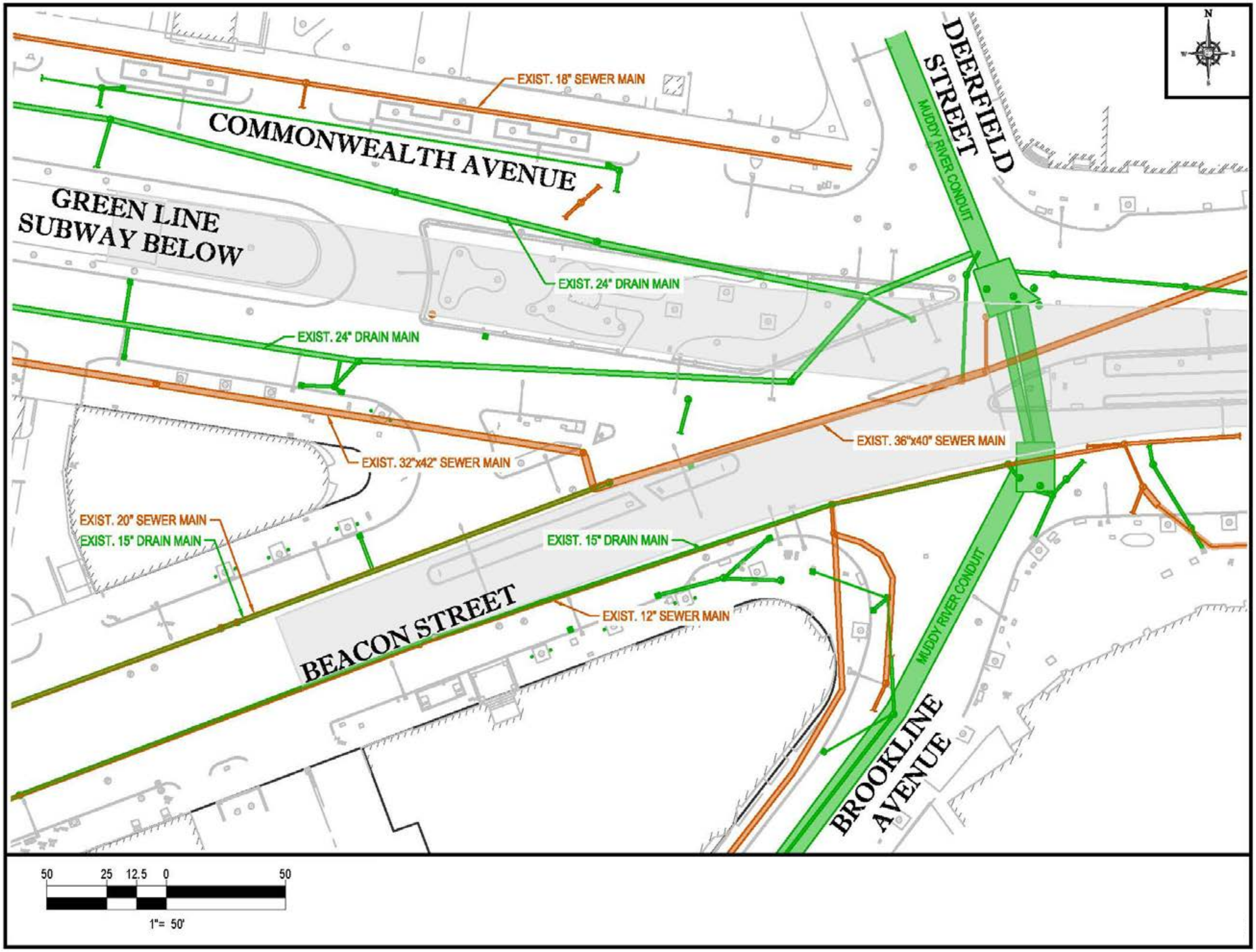


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Figure 7-1
Existing Sewer and Drain System

7.2.2 Project Generated Sanitary Sewer Flow

The Massachusetts Department of Environmental Protection (MassDEP) establishes sewer generation rates for various types of establishments in a section of the State Environmental Code Title 5 (Title 5), 310 CMR 15.203. Based on an estimate of the Project's building program, Table 7-1 provides the estimated proposed sanitary sewer flows expected to be generated by the proposed Project. Using Title 5 sewer generation rates, the Project is expected to produce approximately 50,830-gallons/day. The proposed sewer generation calculation will be refined as the building tenants are confirmed and final sewer generation flows will be coordinated with BWSC.

Table 7-1 Proposed Building – 560 Commonwealth Avenue Sewer Generation

Use Type	Program	Sewer Generation Rate	Sewer Flow (gpd)
Hotel	389 rooms	110 gallons/day/room	42,790
Retail / Hotel Lobby / Amenity Space	20,800 sq. ft.	50 gallons/day/1,000 sf	1,040
Restaurant	200 seats	35 gallons/day/seat	7,000
Total Sewer Generation			**50,830**

Based on preliminary calculations and discussions with BWSC, there are no sewer capacity problems in the vicinity of the Project Area. The Project's engineer will coordinate final, proposed sewer flows and available capacity with BWSC during the Site Plan review process to ensure the Project needs are met without disruption of service to the surrounding area.

7.2.3 Sanitary Sewer Connection

The existing sewer 32-inch x 42-inch sewer main located on the southern side of Commonwealth Avenue will require relocation around the proposed building footprint. In order to accommodate the building, a 36-inch PVC sewer pipe is proposed west of the building to connect the existing 32-inch x 42-inch main directly to the existing sewer main on the northern side of Beacon Street (see Figure 7-2). The remaining portion of the existing sewer main, from the new proposed main to Beacon Street, will be removed as part of the Project.

Based on initial discussion with BWSC, the Proponent expects that the Project will likely connect to the new 36-inch sewer main that will be installed for the sewer relocation and located within the newly created side street. As such, it is expected that the connection will minimize effects on adjacent street, sidewalks, and other areas within Commonwealth Avenue and Beacon Street.

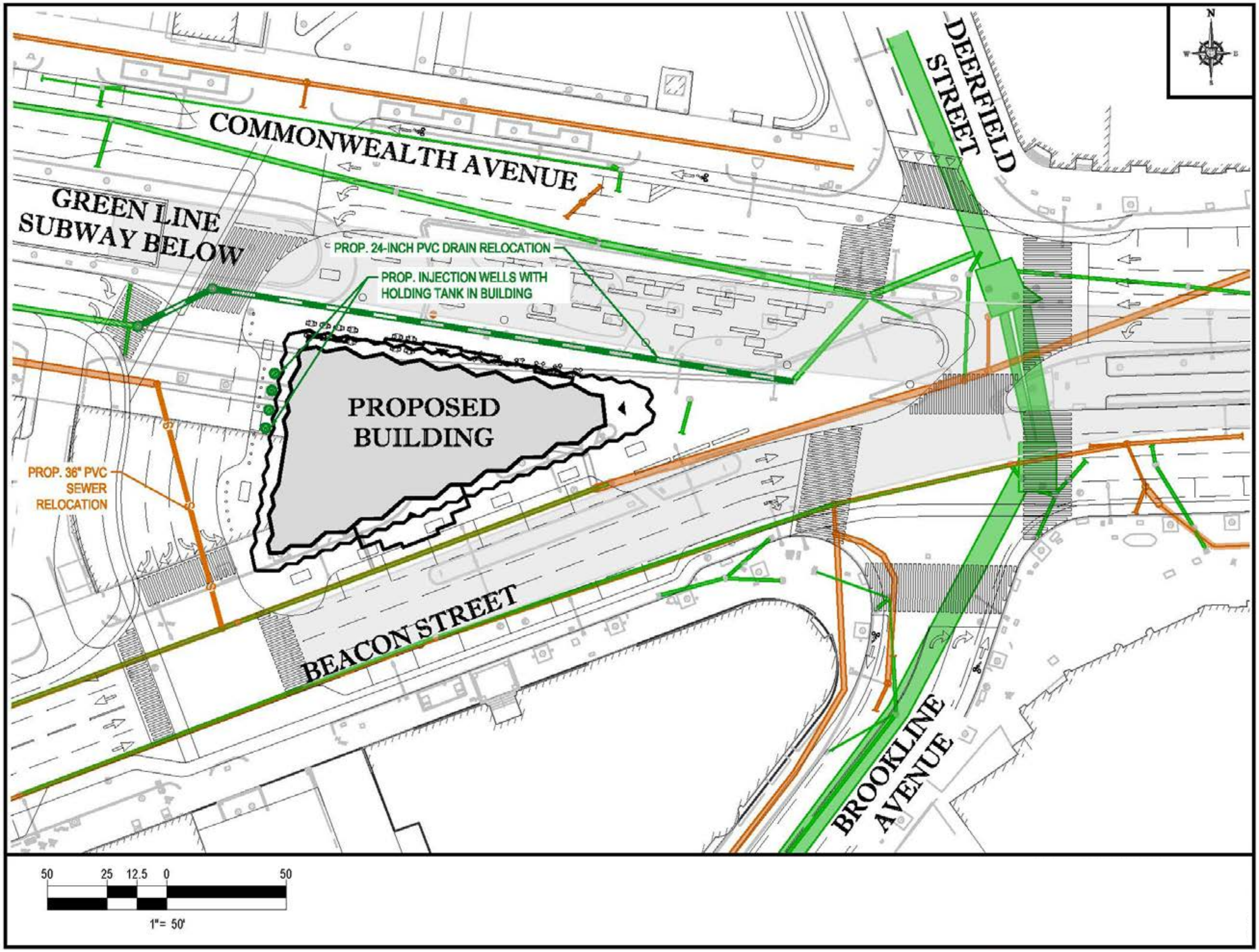

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Figure 7-2

Proposed Sewer and Drain System

All sewer service connections will be kept separate from storm drain connections in accordance with BWSC requirements. Per current BWSC records and the initial discussion with BWSC, it appears that all storm and sewer drains within Brookline Avenue, Beacon Street and Commonwealth Avenue are separated.

7.2.4 Sanitary Sewer Mitigation

The sanitary sewer connections are subject to approval by the municipal sewer system owner, BWSC, as part of the Site Plan approval process. Based on the proposed sanitary system flow, which is greater than 15,000 gpd, the Project will be required to mitigate inflow and infiltration (I/I) into the BWSC sewer system, and ultimately the MWRA regional wastewater system, at a rate of four-gallons for every one-gallon of new sewer flow. Currently, the BWSC calculates the monetary amount required to fulfill the 4:1 Inflow Reduction requirement by multiplying the estimated wastewater flow by 4 and then by $2.41. The Proponent will continue to work with BWSC as the building program is finalized to identify the I/I payment to be made.

Additionally, as further discussed in the Water Supply Conservation and Mitigation Section, various measures for water use reduction, which translates directly into wastewater reduction, are being implemented into the design which will also benefit the overall goal of reducing the volume of flows being sent to the MWRA wastewater treatment facility.

7.3 Water System

7.3.1 Existing Water Service

BWSC owns, operates, and maintains the water distribution systems in the vicinity of the Project Area. Per BWSC record mapping (See Figure 7-3) there is an existing, 48-inch water transmission main, built in 1935 and improved in the 1980s, located within Beacon Street, a 12-inch ductile iron, cement-lined (DICL) low service main built in 2008 located in Beacon Street, and a 12-inch DICL low service main built in 2008 in Commonwealth Avenue.

The vicinity is well served by fire hydrants located on Commonwealth Avenue and on the north and south sides of Beacon Street.

The existing water services to the building will be razed will be cut and capped prior to demolition, as required by BWSC. It is currently anticipated that two existing hydrants will be removed and relocated in coordination with Boston Fire Department (BFD) service needs.

7.3.2 Anticipated Water Consumption

The estimated water demand for the Project is based on the estimated sanitary sewer flow (see Table 7-1), with a factor of 1.1 applied to account for consumption and other losses.

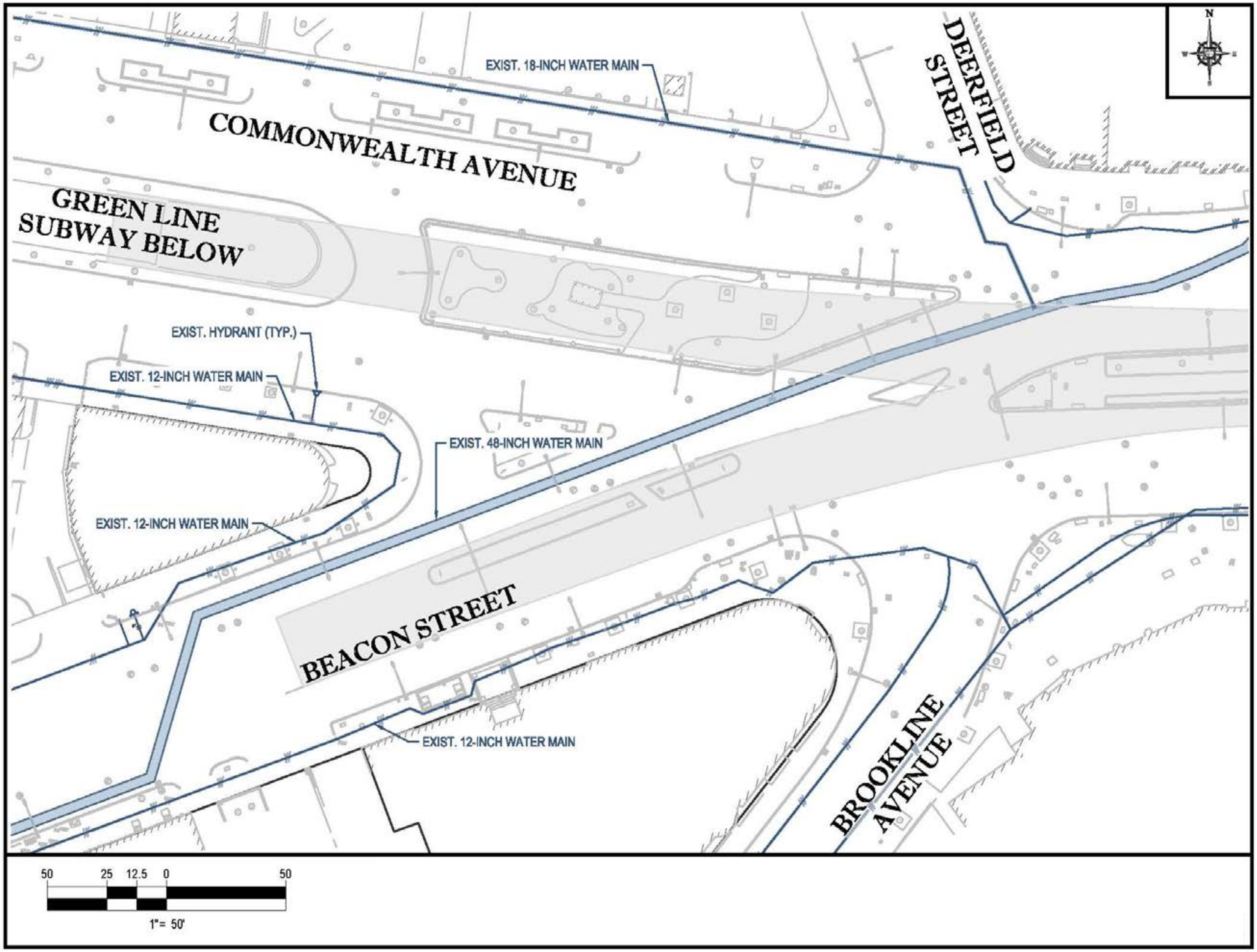

Figure 7-3

Existing Water System

Based on this formula, the estimated peak water demand for domestic uses is 55,913 gallons per day. The domestic and fire protection water services will be supplied by the BWSC water system. More detailed water use and meter sizing calculations will be provided as a part of the Site Plan approval process.

Based on an initial discussion with BWSC, there are no expected water capacity issues in the vicinity of the Project Area. Prior to full design, this will be confirmed by hydrant flow testing performed for each main to be connected to by BWSC. The Project's engineer will coordinate water demand and availability with BWSC during Project design to ensure the Project needs are met while maintaining adequate water flows to the surrounding neighborhood.

7.3.3 Proposed Water Service

The Project will require the relocation of the existing, 12-inch water main that runs along the southern side of Commonwealth Avenue and northern side of Beacon Street, in order to accommodate the proposed building footprint (see Figure 7-4). The 12-inch water main connection between both rights-of-way will be located further to the west, within the proposed right-of-way, referred to elsewhere as "New Road".

Based on initial discussion with BWSC, the Proponent expects the proposed Project will likely be serviced via this new 12-inch DICL water main, located west of the proposed Project in the public way. Separate domestic water and redundant fire protection services will be required. At this time, it is assumed that the building will include internal booster pumps to ensure adequate water pressure to all standpipes and sprinkler systems. However, as previously noted, hydrant flow tests will be performed on the mains in the Project vicinity as the design progresses.

Metering will be conducted in accordance with BWSC requirements including the installation of meter transmission units (MTU's) to comply with BWSC's automatic meter reading system. Appropriate gate valves and backflow prevention devices will also be installed on each domestic and fire protection service to allow individual services to be shut off and to prevent potential backflow of non-potable water or other contaminants into the public water supply.

The Project will likely require the relocation of two fire hydrants to accommodate the Project. At this point in the design it is not anticipated that additional fire hydrants will need to be proposed as the vicinity is well served by fire hydrants. A site plan will be submitted to the Boston Fire Department to confirm the Project has adequate fire protection access and coverage.

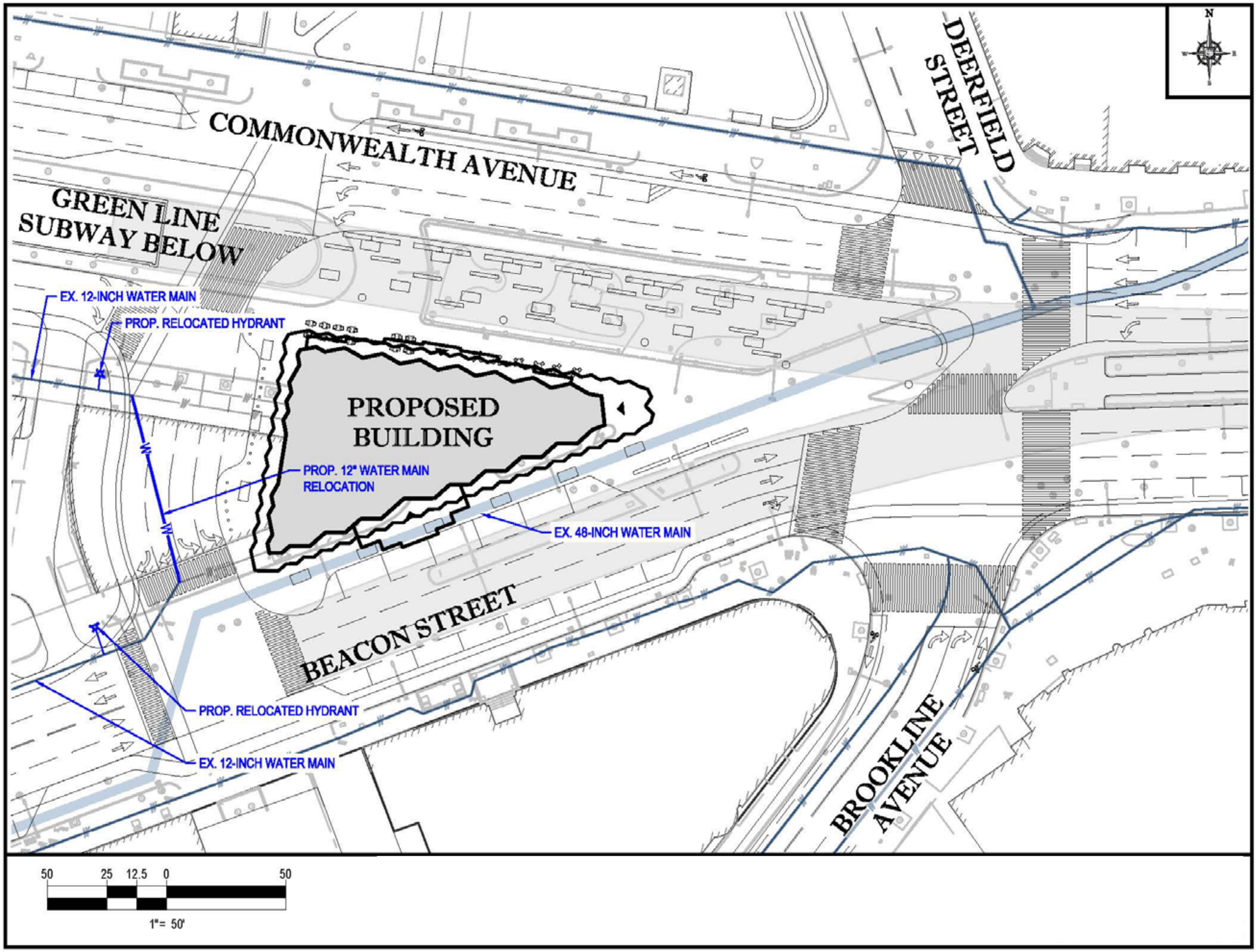

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Figure 7-4
Proposed Water System

7.3.4 Water Supply Conservation and Mitigation

The Project will be LEED certifiable in accordance with the BPDA's Article 37 Green Building program. Accordingly, various water conservation measures will be investigated as the design progresses such as low-flow toilets and urinals, restricted flow faucets, and sensor operated sinks, toilets, and urinals. Specific water conservation measures to be included in the Project will be more fully described as the building designs develop.

7.4 Storm Drainage System

7.4.1 Existing Storm Drainage System

BWSC owns, operates, and maintains the storm drainage mains in the vicinity of the Project Area.

It appears that the existing building to be demolished at 560 Commonwealth Avenue collects storm water through a roof drain system and discharges directly into BWSC's existing drainage infrastructure in the surrounding streets. Stormwater runoff from the sidewalks and adjacent roadways also discharge directly to BWSC's systems as well.

The existing storm drainage services for the building to be razed will be cut and capped prior to demolition, as required by BWSC.

7.4.2 Proposed Storm Drainage System

The proposed stormwater management system will be designed to comply with BWSC requirements. Stormwater runoff will be collected from the roof area, routed to a holding tank inside of the building, and infiltrated in injection wells within the Project Area, to the maximum extent practicable per BWSC requirements. At a minimum, on-site systems will be designed with a capacity of 1.25-inches over the building area. Overflow connections from the stormwater management system will be designed to handle larger, less frequent storm events and will discharge to the BWSC drain system. An existing 24-inch drain line will also require relocation slightly to the north in order to accommodate the new hotel building. The Project will not impact the water quality of nearby water bodies.

A stormwater pollution prevention plan (SWPPP) will be prepared for use during demolition and construction specifying appropriate erosion and sedimentation (E&S) controls to be installed to prevent sediment-laden stormwater runoff from leaving the Site and entering the BWSC drainage system. E&S controls may include structural methods such as catch basin inlet controls, silt fence, and silt socks as well as non-structural methods such as minimizing the extent and duration of exposed soils. The contractor will be responsible for controlling dust using street sweeping and watering as necessary.

E&S controls will be maintained as necessary until all disturbed areas have been stabilized through the placement of pavement, structure, or established vegetative cover and will conform to the Water Quality section of the City of Boston Environment Department Guidelines for Construction. A long-term operations and maintenance plan will be used to assist the Property Manager in maintaining the stormwater BMP's in appropriate operational condition.

7.4.3 Groundwater Conservation Overlay District

Per the City of Boston Zoning maps, the Project is not located within the City of Boston Groundwater Conservation Overlay District (GCOD).

7.4.4 State Stormwater Standards

This section reviews the Project's compliance with the MassDEP Stormwater Management Standards (the Standards). The below summary is specific to the footprint of the new hotel building, as well as any projections or overhangs, which is being designed in compliance with the State Stormwater Standards. The remainder of the Project Area, which includes public roadways, sidewalks, and open space, will be designed in conjunction with BWSC and Public Works and will comply with applicable requirements and roadway standards. The Public Improvement Commission must approve all such work.

Standard 1 - New Stormwater Conveyances

The Project will comply with this Standard. Per Massachusetts Stormwater Management Standard #1, no new outfalls may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. No new outfalls are proposed.

Standard 2 – Stormwater Runoff Rates

The Project will comply with this Standard. Post development peak discharge rates from the Project site will be at or below existing peak discharge rates for each of the analyzed storm events.

Standard 3 – Groundwater Recharge

The Project will comply with this Standard to the maximum extent practicable. The site does not fall within the City's defined Groundwater Conservation Overlay District; therefore, the proposed stormwater management system will be designed to comply with BWSC design requirements.

Standard 4 – Water Quality

The Project will comply with this Standard. Stormwater runoff from the building roof and overhangs will be captured and directed to the proposed stormwater system.

Roof runoff is not subject to water quality standards. Off-site roadwork and drainage will be constructed in accordance with BWSC and Public Work requirements and specifications.

Standard 5 – Land Uses With Higher Potential Pollutant Loads (LUHPPL)

It is not anticipated that the Project will be subject to Standard 5.

Standard 6 – Stormwater Discharges to a Critical Area

The Project is not subject to Standard 6. There are no discharges to any Critical Areas as defined by DEP's Massachusetts Stormwater Handbook.

Standard 7 – Redevelopment Project

It is not anticipated that the Project will be subject to Standard 7.

Standard 8 – Sedimentation and Erosion Control Plan

The Project will comply with this Standard. Site-appropriate sedimentation and erosion controls will be included in the final design documents and implemented during construction. Because the Project will involve the disturbance of more than one acre of land, a National Pollution Discharge Elimination System (NPDES) General Permit for Construction consistent with the requirements of U.S. Environmental Protection Agency, the Massachusetts Department of Environmental Protection and BWSC will be obtained. Accordingly, as noted above, a Stormwater Pollution Prevention Plan (SWPPP) will be prepared and implemented prior to commencing construction. A copy of the SWPPP can also be provided to the BPDA.

Standard 9 – Long Term Operation and Maintenance Plan

The Project will comply with this Standard. A long-term operation and maintenance plan will be prepared as part of the final design documents.

Standard 10 –Illicit Discharges to the Stormwater Management System are prohibited

The Project will comply with this Standard. There are no known illicit discharges to the proposed Stormwater Management System and none are proposed.

7.5 Electrical & Telecommunication Systems

Eversource owns and maintains the electrical infrastructure and Verizon, Comcast and RCN provide cable and telephone services within the Project's general vicinity (see Figure 7-5).

All electrical and telecommunications connections will be coordinated with the appropriate utility companies and the City of Boston. Final service and appropriate connection points will be coordinated with the private utility providers as the Project design progresses.

The Project will also require relocations of electrical and telecommunication infrastructure located within the vicinity of the Project. All utility main relocations will be within existing or proposed right-of-ways. Based on initial coordination with Eversource, existing electrical vaults and duct banks will need to be relocated to accommodate the building (see Figure 7-6). In addition, Eversource owns two transmission cooling lines that are located within the building footprint and will require relocation. Lastly, an existing telecommunications duct bank will need to be relocated slightly to the south of the new hotel building. The Proponent will continue to coordinate closely with Eversource and the telecommunication providers to refine the details of the existing infrastructure relocations as the Project evolves.

7.6 Gas Systems

National Grid provides natural gas service in the Project Area. The Project will require relocation of an existing gas line in order to accommodate the new hotel building. The gas line will be relocated within New Road, to connect the existing mains in Beacon Street and Commonwealth Avenue, just west of the building. Final service, appropriate connection points and infrastructure relocation will be coordinated with National Grid as the Project design progresses.

7.7 Utility Protection During Construction

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

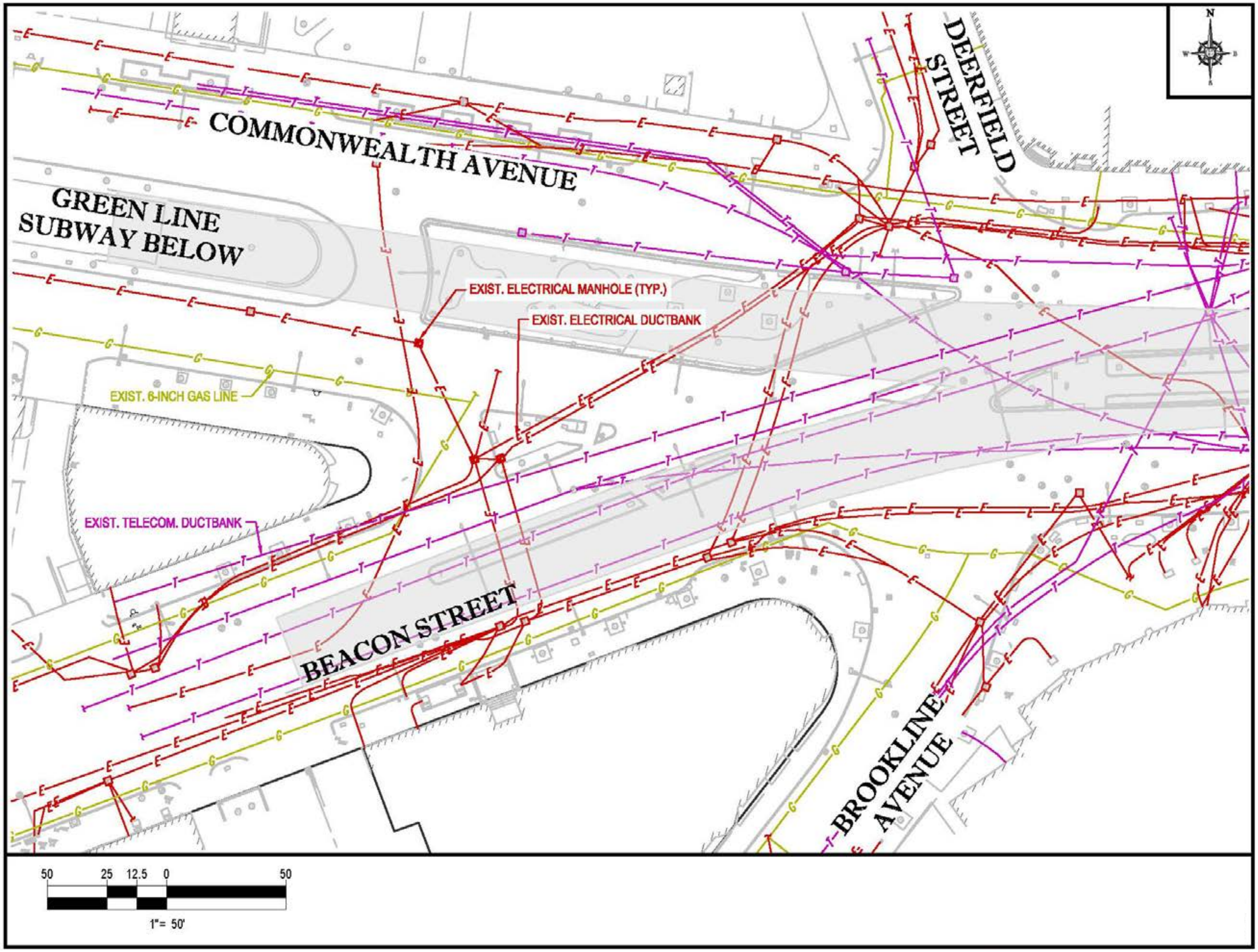

Figure 7-5

Existing Private Utility

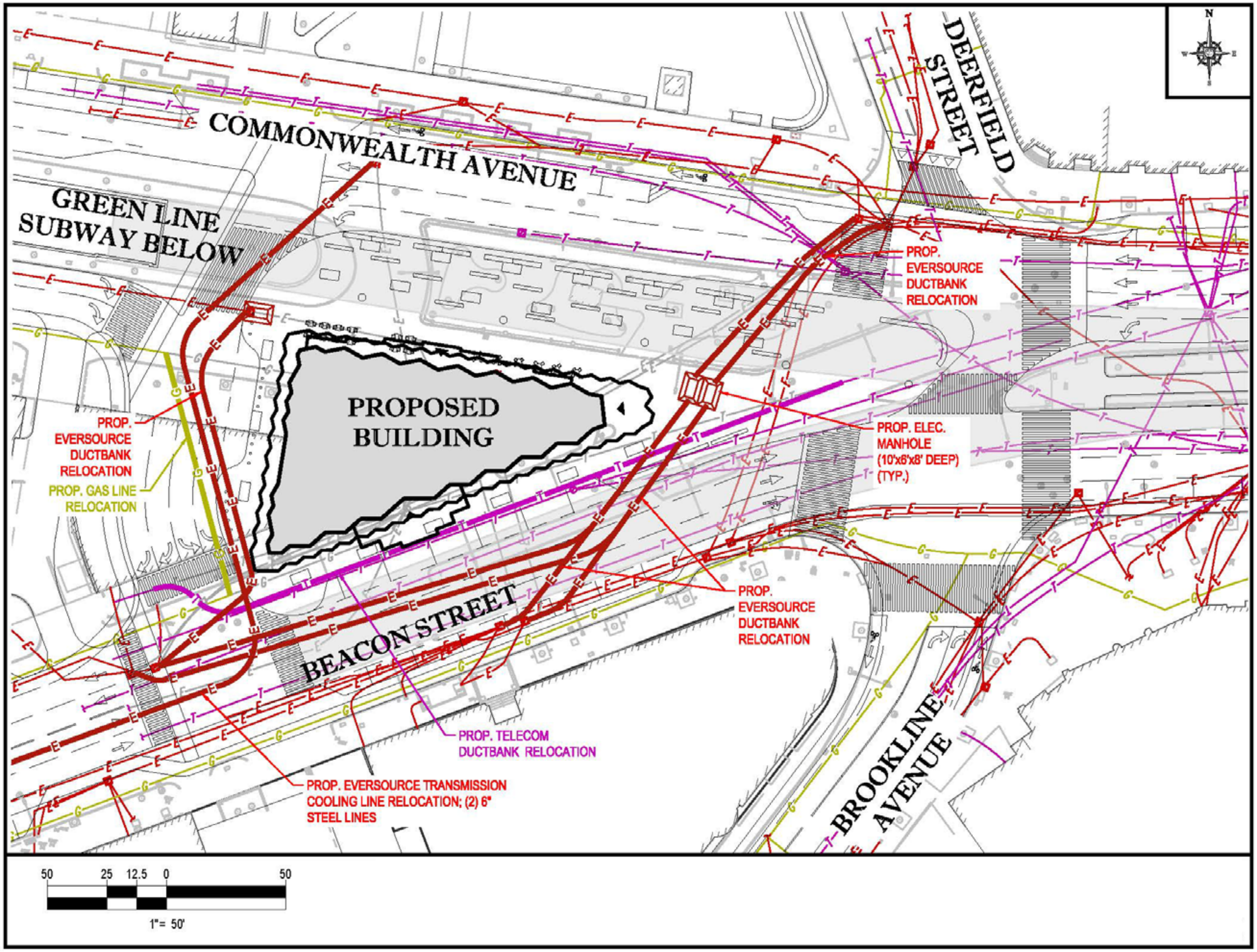

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Figure 7-6
Proposed Private Utility

Chapter 8.0

Coordination with other Governmental Agencies

8.0 COORDINATION WITH OTHER GOVERNMENTAL AGENCIES

8.1 Architectural Access Board Requirements

The Project will comply with the requirements of the Massachusetts Architectural Access Board (MAAB) and the standards of the Americans with Disabilities Act. An Accessibility Checklist for the building is included in Appendix I.

8.2 Massachusetts Environmental Policy Act (MEPA)

The Project does not appear to be subject to review under the Massachusetts Environmental Policy Act (MEPA), which is codified at Sections 62 through 62I of Massachusetts General Laws (MGL) Chapter 30, and implemented under the "MEPA Regulations" at Section 11 of Chapter 301 of the Code of Massachusetts Regulations (CMR). MEPA and the MEPA Regulations apply to: (a) projects undertaken by a state agency; (b) those aspects of a project that are within the subject matter of any required state permit; (c) projects involving state financial assistance; and (d) those aspects of a project within the area of any real property acquired from a state agency (301 CMR 11.01(2)(a). MEPA review is triggered when one or more of the reasons set forth above apply, and when the proposed project exceeds one or more review thresholds set forth in the MEPA Regulations (301 CMR 11.03). As noted above, the Project does not appear to require state action.

8.3 Massachusetts Historical Commission State Register Review

The Massachusetts Historical Commission (MHC) has review authority over projects requiring state funding, licensing, permitting, and/or approvals that may have direct or indirect impacts to properties listed in the State Register of Historic Places. The Project does not require state action that triggers MHC review under Sections 27-27c of Chapter 9 of the Massachusetts General Laws, as amended by Chapter 254 of the Acts of 1988. Should this change, MHC's review of the Project under the State Register Review process would be initiated through the filing of an MHC Project Notification Form.

8.4 Other Permits and Approvals

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

Chapter 9.0

Response to Comments

9.0 RESPONSE TO COMMENTS

9.1 Introduction

This Chapter provides responses to the BPDA Scoping Determination and the associated comment letters that were received on the PNF filed with the BPDA on March 12, 2018.

Many of the public's comment letters focused on several main themes, which have been addressed in Section 9.2. Section 9.2.11 provides a list of public comment letters, not including Impact Advisory Group (IAG) and Advocacy Groups, and the themes that are brought up in them, which match the headings of Sections 9.2.1 to 9.2.10. Section 9.3 provides responses to comment letters received from City of Boston agencies, and Section 9.4 provides responses to comment letters received from the IAG. Section 9.5 includes responses to Advocacy Groups and Section 9.6 provides a list of letters of support for the Project.

9.2 Responses to the Main Concerns Raised in the Public's Comment Letters

Most of the public's letters focused on several main themes. In the interest of conciseness, the Proponent has prepared summary responses addressing these topics.

9.2.1 Traffic Impacts

Many commenters expressed concerns regarding the increase of traffic congestion as a result of the Project.

Rather than developing the hotel where the current Citizen's Bank sits as previously proposed, the 389-room hotel will be moved eastward to allow for the creation of a new public roadway ("New Road") connecting Commonwealth Avenue south to Beacon Street. This "New Road" will become the western edge of a new one-way vehicular circulation through Kenmore Square, eliminating the need for the eastbound half of Commonwealth Avenue and the westbound half of Beacon Street, east of New Road.

By removing surplus portions of these two streets, a new public plaza in the heart of Kenmore Square can form, surrounding the hotel. Vehicles will flow one-way—much like they do in the eastern half of Kenmore Square around the MBTA station—effectively forming a one-way "square-about." This design greatly reduces crossing distances for pedestrians (up to 40-percent for some crossings), creates new protected routes for bicyclists, and helps remove vehicle conflicts that cause delays today, such that all modes of transportation will experience more efficient and safe operations—while creating significant public realm. A summary of the Transportation Improvements and Findings is included as Section 2.1.2 in the DPIR.

In addition, the upgraded signal system will be completed per the most current BTD standards and guidelines and will include emergency vehicle and transit signal priority capability as determined.

9.2.2 *Transit Capacity*

The Project's impact on the transit network and capacity in Kenmore Square is minimal. Using BTD's Development Review Guidelines for Zone 4, 749 daily trips are expected to use public transportation when arriving and departing the Project, including 77 in the a.m. peak hour and 101 in the p.m. peak hour. In the a.m. peak hour, these trips will be distributed across the robust transit services in Kenmore Square, including the Green Line, Lansdowne Station and multiple bus routes in the area.

The Project makes numerous improvements to pedestrian access to transit in and around Kenmore Square by greatly improving the pedestrian environment. Added crossings, improved pedestrian timing, and shortened crosswalks all result in greater access. In addition, the Proponent has reviewed the recommendations from the Better Bus Project and has met with the MBTA to review the proposed network and discuss MBTA operations. As discussed, the simplification of the main intersection generates potential time savings (through reduced delay and improved phasing) on several approaches. The Proponent will continue to incorporate MBTA comments through the design process and will include design and signal improvements as determined in conjunction with the MBTA and BTD, including the most current transit signal priority capability.

9.2.3 *Parking, Loading and Drop-off*

Thanks to the central urban location of the Project, it is anticipated that a significant portion of hotel guests will arrive and depart by transit. Many others can be anticipated to arrive by taxi or TNC. Fortunately, by converting the end of Beacon Street adjacent to the Project to one-way flow, space for a curbside pick-up and drop-off lane is created. This lane will be actively managed by on-site valets 24-hours/day to accommodate these guests as well as to valet any guest cars for those who arrive by private automobile. No on-site parking is provided as a disincentive to drive. Those who do arrive by car will pay valet parking fees, unless they self-park at a nearby commercial facility.

The curb lane will feature five spaces, with three dedicated to guest valet, pick-up and drop-off. Two spaces will serve taxis and TNCs. Based on mode share calculations and average dwell times applied to hourly parking demand curves, the probability that all five spaces will be occupied at the same time is under four percent, with nearly zero probability of a sixth vehicle waiting.

Goods delivery will mostly be handled by a second curb lane on New Road, which will be used by box trucks for regular trash, laundry, and food and beverage service. A pre-determined delivery schedule and active management by the valet operation will ensure that deliveries do not overlap, though the curb cut could accommodate two box trucks if necessary. For the occasional tractor-trailer delivery, the Beacon Street curb lane will be used, with deliveries timed and managed to occur when guest demand is lower—generally in the mid-morning or overnight.

9.2.4 Wind, Shadow, Daylight, Glare, Noise, Sustainability, Air quality and Geotechnical Analyses

Wind, shadow, daylight, solar glare, noise, air quality, and geotechnical analyses are provided in Chapter 3.0. Sustainable design is addressed in Chapter 4.0.

9.2.5 Construction Impacts

Construction impacts are discussed in Section 3.11. In addition, a Construction Management Plan (CMP) in compliance with the City's Construction Management Program will be submitted to the Boston Transportation Department (BTD) once final plans are developed and the construction schedule is fixed. Construction methodologies, which ensure public safety and protect nearby residences and businesses, will be employed.

9.2.6 Building Scale/Height/Open Space/Design

As described in Section 1.3.3, the revised Project includes significant public realm improvements, including the reconfiguration of roadways in and around the Project Area, and the creation of a new, approximately 0.5-acre public plaza. The Proponent is undertaking the expense to construct not only the hotel, but the creation of the public plaza, construction of New Road, and the bike lanes and signals along Commonwealth Avenue westbound, New Road, and Beacon Street. These public improvements would not be feasible with a hotel building of a smaller scale. The public benefits associated with the Project are described in Section 1.4.

9.2.7 PDA Development Plan

Commenters stated that the PDA development plan proposed in the PNF was not appropriate because the Beacon Street and Commonwealth Avenue parcels were separated by Beacon Street, a public way. The revised Planned Development Area does not include the Beacon Street parcels, and instead contains approximately 1.1 acres, made up of land owned by the Proponent, and right of way owned in fee by the City of Boston.

The entirety of the proposed Planned Development Area will be improved as a result of the Project, through the reconfiguration of the roadways and creation of a new, approximately 0.5-acre public plaza described in Section 1.3.3.

9.2.8 Community Benefits

The Project serves as a unique opportunity to redefine the heart of Kenmore Square. It will activate a critical flashpoint for the city's cultural life and will form a more distinctive gateway to the Back Bay and downtown from Greater Boston's western reaches. By reorganizing the street system, pedestrian and bicyclist safety will be improved without worsening traffic congestion. The new public plaza will provide a new public gathering space in Kenmore Square, and accommodate the crowds that pass through the square on days of events at

Fenway Park. In addition to these public realm improvements, the Project will create new construction and permanent jobs, and increased tax revenues to the City of Boston. The Project's public benefits are described in Section 1.4.

9.2.9 Setbacks and Views

Residents of the 566 Commonwealth Avenue building expressed concerns about the adjacently of the PNF Project to their building. The Proponent has redesigned the Project to maximize the distance between the existing 566 Commonwealth Avenue building and its new hotel building, by shifting its footprint approximately 88 feet easterly. The resulting distance between the two buildings will be approximately 102 to 108 feet, thereby mitigating shadow and air-circulation impacts as sought through the comment. In between the two buildings, the Project proposes to dedicate a new public way (New Street) and a public plaza, making it highly unlikely that any future buildings could be built there.

9.2.10 Hotel Use

The high concentration of nearby restaurants, bars, and stores, combined with the number of pedestrians, makes Kenmore Square one of the most highly visited and dense parts of the city. This vibrancy, as well as the Square's proximity to the Longwood Medical and Academic Area, local universities, sports and cultural options and downtown Boston, make the Project Area an ideal location for a hotel.

9.2.11 Comment Letters Received

The table below provides a list of all comment letters and the themes that are brought up in them, which match the headings of Sections 9.2.1 to 9.2.11.

Name	Concerns
Diane Lapkin	Daylight to adjacent building, construction impacts, safety, geotechnical impacts, scale
Brian Gula	Daylight to adjacent building, wind, scale
Milt Lapkin	Traffic, construction impacts, PDA
Linda Dreier	Daylight to adjacent building, energy efficiency, setback, wind, construction impacts
Larry Babine	Traffic, parking, pedestrian safety, open space, height
George Zimmerman	PDA, height, construction impacts, traffic
Sam Wertheimer	Bicycle and pedestrian safety, traffic, retail tenants, public spaces
Posternak Blankstein & Lund LLP	PDA, shadows, community benefits, traffic, noise, parking, construction impacts
Rob Knight	Traffic, parking, safety, shadow, wind, PDA, community benefits, green space, transit capacity, traffic, height
Conrad Ciszek	Daylight to adjacent building, traffic, wind, construction impacts, community benefits
Bridget Basilico	Scale, daylight to adjacent building, traffic, vents, transit capacity, construction impacts, green space
Rob Folan-Johnson	Hotel use
B. Tabrizi	PDA, traffic, parking, construction impacts, scale
Robert Case	PDA
Lida Tabrizi	Construction impacts, shadows, wind, traffic,
George Zimmerman	Scale, PDA, community benefits
Audubon Circle Neighborhood Association	PDA, traffic, transit capacity, affordable housing
Dolores Boogdanian	PDA, height and density, traffic, transit capacity, shadows, housing
Fenway CDC	Height, density, PDA, daylight to adjacent building, traffic
Kathy Greenough	Community benefits, housing, traffic, shadows, PDA, daylight to adjacent building, wind
Margaret Morrill	Construction impacts, PDA, housing
Alexandra Gross	Traffic, safety, construction impacts, public benefits
Erin Young	Construction impacts, shadows, height, hotel use
Susan Wrynn	Light to adjacent building, height, shadow, traffic, transit capacity
Lisa Buyuk	Scale, traffic, safety
Dan Au	Height, traffic
Jack Abbot	Traffic, pedestrian safety
Cory DiBenedetto	Construction impacts, daylight to adjacent building, traffic, wind, safety, PDA, community benefit, height
Shira Limmer	Safety, height, shadow
Christian Alexander	Height
Martha Miller	Traffic
Linda Gula	Daylight to adjacent building, setback, wind, energy use, construction impacts, scale
Chad O'Connor	Height
Joseph Cheney	Height, safety, shadows, glare, traffic
Minzheng Shi	Daylight to adjacent building,

Name	Concerns
Gerry Ross	Construction impacts
Anastasia Kaloyanides	Construction impacts, traffic, height
Julie Pesta	Traffic, parking, pedestrian safety, transit capacity, wind, shadow, design, views of Citgo sign
Gerald Ross	Traffic, shadow, noise, PDA, construction impacts, daylight to adjacent building, hotel drop-off location, parking,
Mark DiBenedetto	Foot traffic, noise, hotel use
Andrew Buyuk	Shadows, height, hotel use, safety, traffic, transit capacity
Sandra Buyuk	Hotel use, traffic, pollution,
Randall Albright	Height, traffic, Fenway Center
Mia Jean-Sciard	Hotel use
Richard Forman	Bicycle safety, drop-off, loading
John LaBella	Scale, traffic, safety, accessibility, jaywalkers, hotel use, views from adjacent building, shadows, construction impacts,
Albert Golden	Neighborhood charm, open space
Wendy Cramer	Parking, traffic, construction traffic, emergency vehicles, Red Sox traffic, pedestrian safety, shadow to adjacent building, construction impacts
Richard Scheife	Construction traffic, traffic, emergency vehicles, parking, shadows to adjacent building, height, pedestrian safety, construction impacts
Erik Daniel	Scale, traffic, PDA, public benefits, drop-off, shadow, wind,
Felipe Molina	Construction impacts, traffic
Janie Knight	Transit capacity, public safety, emergency vehicles, neighborhood character, Citgo sign views, views from adjacent building, shadows, public space, construction impacts, PDA
Margaret Morrill	Height, security, safety, shadows, wind, hotel use, construction impacts
Francesco Insolia	Height, safety
Kathleen Conley	Pedestrian connector, construction impacts, drop-off, parking, shadow, emergency vehicles
Jason Boltz	Scale, hotel use
Emily Cheney	Height, scale, privacy at adjacent building
Colleen Pietrusewicz	Scale, safety, parking
Suzanne Thompson	Citgo sign
Caroline Barry	Scale
James Kaloyanides	Scale, parking, traffic
Kieran Jones	Density
Jean-Francois Louis	Scale, traffic, drop-off
Sherri Geller	Traffic, drop-off, parking, safety, noise, construction traffic, shadow, PDA area
Radostin Pachamanov	Community benefits, height and scale, construction impacts, shadows to adjacent building, wind, traffic, parking, security
Brian MacKenzie	Bike lanes
Marguerite Insolia	Density
Kevin Hart	Density, traffic
George Apanel	Parking, traffic, construction impacts, PDA, hotel use
Rinat Sergeev	PDA, public benefits, traffic, parking, construction impacts, shadows
Philip Ross	Hotel use, construction impacts, traffic
Stephen Sullivan	Safety, traffic, parking
Christian Alexander	Height
Makarand Mody	Scale, traffic, noise, garbage, hotel use

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

SCOPING DETERMINATION
560-574 COMMONWEALTH AVENUE / 645-665 BEACON STREET (KENMORE HOTELS)

SUBMISSION REQUIREMENTS
FOR DRAFT PROJECT IMPACT REPORT ("DPIR")

PROPOSED PROJECT:	560-574 COMMONWEALTH AVENUE / 645-665 BEACON STREET (KENMORE HOTELS)
PROJECT SITE:	1.07 ACRE AREA BOUNDED BY COMMONWEALTH AVENUE TO THE NORTH, BROOKLINE AVENUE TO THE SOUTHEAST, AND THE MASSACHUSETTS TURNPIKE TO THE SOUTH
PROPONENT:	MARK KENMORE LLC AND BUCKMINSTER ANNEX CORPORATION
DATE:	JUNE 20, 2018

The Boston Redevelopment Authority ("BRA"), d/b/a the Boston Planning & Development Agency ("BPDA") is issuing this Scoping Determination pursuant to Section 80B-5 of the Boston Zoning Code ("Code"), in response to a Project Notification Form ("PNF"), which Mark Kenmore, LLC, and Buckminster Annex Corporation (the "Proponents") filed on March 12, 2018 for the proposed 560-574 Commonwealth Avenue/645-665 Beacon Street project (the "Proposed Project"). Notice of the receipt by the BPDA of the PNF was published in the Boston Herald on March 12, 2018, which initiated a public comment period with a closing date of April 18, 2018. Pursuant to Section 80A-2 of the Code, the PNF was sent to the City's public agencies/departments and elected officials on March 13, 2018. Hard copies of the PNF were also sent to all of the Impact Advisory Group ("IAG") members. The initial public comment period was subsequently extended until May 1, 2018, through mutual consent between the BPDA and the Proponent to allow more time for the general public to provide comments and feedback.

On May 30, 2017, in accordance with the BRA's policy on mitigation as outlined in the Mayor's Executive Order Relative to the Provision of Mitigation by Development Projects in Boston, Mark Development and Buckminster Annex Corporation submitted a Letter of

Intent to redevelop properties at 560-574 Commonwealth Avenue and 645-665 Beacon Street.

On May 31, 2017, letters soliciting nominations to the IAG for the proposed project were delivered to City Councilor Josh Zakim, State Senator William Brownsberger, and State Representative Byron Rushing. Additional letters seeking recommendations were delivered to the Office of Neighborhood Services and the City Councilors at large.

The letters sought nominations or recommendations to the IAG by June 7, 2017. City Councilor Zakim responded with two (2); City Councilor Annissa Essaibi-George responded with one (1); Senator Brownsberger responded with two (2); the Office of Neighborhood Services responded with two (2), although one had already been nominated; and the BPDA Planning Department provided one (1) recommendation. On June 8, 2017 letters were sent confirming that the remaining elected officials declined the opportunity to make nominations.

The following is a list of the IAG members:

Pam Beale
Kelly Brilliant
H. Parker James
Elizabeth Leary
Terri North
Sam Wertheimer
Isa Zimmerman

The BPDA appreciates the efforts of the IAG and the members should be applauded for their commitment to the review of the Proposed Project.

Pursuant to Section 80B5.3 of the Code, a Scoping Session was held on March 28, 2018 with the City of Boston's public agencies/departments at which time the Proposed Project was reviewed and discussed. IAG members were also invited to attend the Scoping Session.

A BPDA-sponsored publicly advertised meeting was held on April 23, 2018 in room 106 of the Kenmore Classroom Building at Boston University. An IAG meeting was held on March 28, 2018 in a conference room at the Hotel Buckminster.

Included in the Scoping Determination are written comments that were received by the BPDA in response to the PNF, from BPDA staff, public agencies/departments, elected officials, and the general public. All of which are included in **Appendices A and B and must be answered in their entirety.**

Appendix A includes written comments from BPDA staff, public agencies/departments, and elected officials.

Specifically, they are:

- BPDA Urban Design, Climate Change & Environmental Planning, and Transportation & Infrastructure Planning departments
- Zach Wassmouth, City of Boston Public Works Department
- John P. Sullivan: Boston Water and Sewer Commission
- Christian Simonelli, Boston Groundwater Trust

Public comments received by the BPDA during the comment period are included in **Appendix B.**

The Scoping Determination requests information that the BPDA requires for its review of the Proposed Project in connection with Article 80 of the Code, Development Review and Approval, and other applicable sections of the Code.

In addition to the specific submission requirements outlined in the sections below, the following points are highlighted for additional emphasis and consideration:

- Throughout this initial phase of review, and prior to it, the Proponent has taken steps to meet with many community members and groups, elected officials, abutters, and various City agencies/departments. Regular conversations and meetings with all interested parties must continue through the duration of the public review process, ensuring that what is presented in the DPIR is beneficial to the respective neighborhood and the City of Boston as a whole. **BPDA 01**

- The Proposed Project, especially the Commonwealth Avenue component, will have significant impacts on the existing residential building at 566 Commonwealth Avenue. Residents and neighbors raised a number of concerns laid out in the public comment letters. To mitigate shadow and air circulation impacts, the Proponent should explore ways to provide the maximum amount of distance between the Commonwealth Avenue component and the existing residential building. Comments from BPDA Urban Design staff in Appendix A include more detailed requests. **BPDA 02**

- Through the public review process, some residents have expressed security concerns stemming from proposed tall buildings in close proximity to Fenway Park. The BPDA encourages the Proponent to work with the Boston Police Department ("BPD") and Boston Fire Department ("BFD") to review and address the impacts that this proposal will have on the existing capacity of these departments' facilities and staff, should a project move forward. **BPDA 03**

- The Proponent must work with the Boston Transportation Department ("BTD") to address concerns regarding site access, circulation of traffic in and around the Proposed Project site, potential traffic impacts, and appropriate mitigation throughout the neighborhood. Of particular concern to many residents is the impact of any increased traffic in Kenmore Square on the ability of emergency vehicles to access the Longwood Medical Area. Comments from BPDA Transportation & Infrastructure Planning staff in Appendix A include more detailed requests. **BPDA 04** **BPDA 05**

- All development projects have construction impacts. As with any urban development, there needs to be a balance of construction-related inconveniences with the daily activities that will continue to occur adjacent to the Proposed Project site. A detailed approach to the construction management must be included in the DPIR, including strategies for construction management over the Proposed Project's multiple phases and community involvement in developing construction management plans. **BPDA 06**

- The Proponent must take into account all BPDA approved and under review proposals in the Kenmore and Fenway neighborhoods, scheduled infrastructure improvements in the general area, and nearby large scale developments in the City of Boston while conducting the DPIR's required studies (transportation, infrastructure, open space, etc.). **BPDA 07**

- The Proponent must clearly describe the overall demolition and phasing of the Proposed Project. The buildings to be demolished and constructed in each phase of the Proposed Project should be specified along with an anticipated timeline for each phase. The BPDA acknowledges that project timelines are subject to change due to market conditions and other factors. **BPDA 08**

I. PROJECT SITE

The site of the Proposed Project is an approximately 1.07 acre site, composed of four parcels at 645 Beacon Street, 651 Beacon Street, 655-665 Beacon Street (the Beacon Street Site, together 40,411 square feet), and 560-574 Commonwealth Avenue (the Commonwealth Avenue Site, 6,030 square feet). The site is bounded by Commonwealth Avenue to the north, a residential building at 566 Commonwealth Avenue and a building owned by Boston University on the west, Brookline Avenue to the southeast, and the Massachusetts Turnpike to the south (the "Project Site"). The Project Site is bisected by Beacon Street. The Commonwealth Avenue Site currently houses a Citizens Bank. The Beacon Street Site currently houses the existing Hotel Buckminster, a parking garage, and a professional building.

II. PROJECT DESCRIPTION

The Proposed Project, as described in the PNF, consists of two components.

The Commonwealth Avenue component includes the demolition of the existing Citizens Bank and the construction of a new, approximately 161,000 square foot, 24-story (260 feet) tall, 382-room micro hotel with ground floor retail and rooftop amenity space.

The Beacon Street component includes the demolition of the existing parking garage and professional building, and the construction of a new, approximately 186,000 square foot, 19-story (210 feet) tall, 295-room hotel with meeting space, a café/lounge, and public rooftop amenity space. The building will also include a pedestrian connection between Brookline Avenue and Beacon Street, and approximately 145 below-grade valet parking spaces.

III. PREAMBLE

The Proposed Project is being reviewed pursuant to Article 80, Development Review and Approval, which sets forth a comprehensive procedure for project review of the following components: transportation, environmental protection, urban design, historic resources, infrastructure systems, site plan, tidelands, and Development Impact Project applicability. The Proponent is required to prepare and submit to the BPDA a Draft Project Impact Report ("DPIR") that meets the requirements of the Scoping Determination by detailing the Proposed Project's impacts and proposed measures to mitigate, limit or minimize such impacts. The DPIR shall contain the information necessary to meet the specifications of Section 80B-3 (Scope of Large Project Review; Content of Reports) and Section 80B-4 (Standards for Large Project Review Approval), as required by the Scoping Determination. After submitting the DPIR, the Proponent shall publish notice of such submittal as required by Section 80A-2. Pursuant to Section 80B-4(c) (i) (2), the BPDA shall issue a written Preliminary Adequacy Determination ("PAD") within sixty (60) days. Public comments, including the comments of public agencies, shall be transmitted in writing to the BPDA no later than fifteen (15) days prior to the date by which the BPDA must issue its PAD. The PAD shall indicate the additional steps, if any, necessary for the Proponent to satisfy the requirements of the Scoping Determination. If the BPDA determines that the DPIR adequately describes the Proposed Project's impacts and, if appropriate, propose measures to mitigate, limit or minimize such impacts, the PAD will announce such a determination and that the requirements of further review are waived pursuant to Section 80B-5.4(c) (iv). Section 80B-6 requires the Director of the BPDA to issue a Certification of Compliance indicating the successful completion of the Article 80 development review requirements before the Commissioner of Inspectional Services can issue any building permit for the Proposed Project.

IV. REVIEW/SUBMISSION REQUIREMENTS

In addition to full-size scale drawings, ten (10) copies of a bound booklet and an electronic copy (PDF format) containing all submission materials reduced to size 8-1/2” x 11”, except where otherwise specified, are required. The booklet should be printed on both sides of the page. Bound booklets should be mailed directly to all of the IAG members. A copy of this Scoping Determination should be included in the booklet for reference. The electronic copy should be submitted to the BPDA via the following website: https://developer.bostonplans.org/

A. General Information

1. Applicant/Proponent Information

   a. Development Team **BPDA 09**
      - (1) Names
        - (a) Proponent (including description of development entity and type of corporation, and the principals thereof)
        - (b) Attorney
        - (c) Project consultants and architect(s)
      - (2) Business address, telephone number, FAX number and e-mail, where available for each
      - (3) Designated contact person for each

   b. Legal Information **BPDA 10**
      - (1) Legal judgements or actions pending concerning the Proposed Project
      - (2) History of tax arrears on property owned in Boston by Applicant
      - (3) Evidence of site control over project area, including current ownership and purchase options, if any, for all parcels in the Proposed Project, all restrictive covenants and contractual restrictions affecting the Proponent’s right or ability to accomplish the Proposed Project, and the nature of the agreements for securing parcels not owned by the Applicant.
      - (4) Nature and extent of any and all public easements into, through, or surrounding the site.

2. Project Area **BPDA 11**

   a. An area map identifying the location of the Proposed Project

b. Description of metes and bounds of project area or certified survey of the project area.
c. Current zoning

3. Project Description and Alternatives **BPDA 12**

a. The DPIR shall contain a full description of the Proposed Project and its components, including its size, physical characteristics, development schedule, costs, and proposed uses. This section of the DPIR shall also present analysis of the development context of the Proposed Project. Appropriate site and building plans to clearly illustrate the Proposed Project shall be required.
b. A description of alternatives to the Proposed Project that were considered shall be presented and primary differences among the alternatives, particularly as they may affect environmental and traffic/transportation conditions, shall be discussed.

4. Public Benefits **BPDA 13**

a. Anticipated employment levels including the following:
   (1) Estimated number of construction jobs
   (2) Estimated number of permanent jobs
b. Current and/or future activities and programs which benefit the host neighborhood, adjacent neighborhoods of Boston and the city at large, such as; child care programs, scholarships, internships, elderly services, education and job training programs, public realm/infrastructure improvements, grant programs, etc.
c. Other public benefits, if any, to be provided.

5. Community Process **BPDA 14**

a. A list of meetings held and proposed with interested parties, including public agencies, abutters, elected officials, businesses, and community groups.
b. Names and addresses of project area owners, abutters, and any community or business groups which, in the opinion of the applicant, may be substantially interested in or affected by the Proposed Project.

B. REGULATORY CONTROLS AND PERMITS

An updated listing of all anticipated permits or approvals required from other municipal, state or federal agencies, including a proposed application schedule shall be included in the DPIR. BPDA 15

A statement on the applicability of the Massachusetts Environmental Policy Act ("MEPA") should be provided. If the Proposed Project is subject to MEPA, all required documentation should be provided to the BPDA, including, but not limited to, a copy of the Environmental Notification Form, decisions of the Secretary of Environmental Affairs, and the proposed schedule for coordination with BPDA procedures. BPDA 16

C. TRANSPORTATION COMPONENT BPDA 17

In addition to the information required to meet the specifications of Section 80B-3 and Section 80B-4 of the Code, the Proponent must also refer to the BTD "Transportation Access Plan Guidelines" in preparing its studies.

The Proponent must address the comments outlined by BPDA's Infrastructure and Transportation Planning Department, included in **Appendix A**.

Proposed transportation network and infrastructure improvements/mitigation in the impacted area should also be listed and explained in this component.

D. ENVIRONMENTAL PROTECTION COMPONENT BPDA 18

The DPIR must address the comments of the BPDA Climate Change and Environmental Planning Department, included in **Appendix A** and must include the most up to date documents required by the Article 37/ Interagency Green Building Committee ("IGBC").

The DPIR should include the most up to date Article 37 Interagency Green Building Committee ("IGBC") documentation.

E. URBAN DESIGN COMPONENT BPDA 19

In addition to the information required to meet the specifications of Section 80B-3 and Section 80B-4 of the Code, the Proponent must address the comments outlined by the BPDA's Planning and Urban Design departments, included in **Appendix A**.

F. INFRASTRUCTURE SYSTEMS COMPONENT

BPDA 20

An infrastructure impact analysis must be performed. The Proponent should continue to work with the City of Boston Public Works Department ("PWD"), Boston Water and Sewer

Commission ("BWSC"), and the Boston Groundwater Trust ("BGWT") on infrastructure impacts.

The standard scope for infrastructure analysis is outlined in the comment letter submitted by John P. Sullivan, Chief Engineer and Operations Officer, BWSC, submitted to the BPDA on January 4, 2018, included in **Appendix A**.

Any proposed or anticipated infrastructure improvements/mitigation in and around the Project Site should also be listed and explained in this component.

G. PUBLIC NOTICE

BPDA 21

The Proponent will be responsible for preparing and publishing in one or more newspapers of general circulation in the City of Boston a public notice of the submission of the DPIR to the BPDA as required by Section 80A-2. This notice shall be published within five (5) days of the receipt of the DPIR by the BPDA. Therefore, public comments shall be transmitted to the BPDA within seventy five (75) days of the publication of the notice. A draft of the public notice must be submitted to the BPDA for review prior to publication. A sample of the public notice is attached as **Appendix C**.

Following publication of the public notice, the Proponent shall submit to the BPDA a copy of the published notice together with the date of publication.

H. ACCESSIBILITY CHECKLIST

BPDA 22

An Accessibility Checklist was included in the PNF. As part of the DPIR, the Proponent must include an up to date and completed Article 80 Accessibility Checklist for the Proposed Project. An Accessibility Checklist is attached as **Appendix D**.

I. CLIMATE RESILIENCY REPORT

BPDA 23

A Climate Resiliency Report was included in the PNF. As part of the DPIR, the Proponent must include an up to date and completed Climate Resiliency Report for the Proposed Project. The online reporting tool can be found here: http://www.bostonplans.org/planning/planning-initiatives/article-37-green-building-guidelines

J. BROADBAND READY BUILDINGS QUESTIONNAIRE

BPDA 24

As part of the DPIR, the Proponent must include a completed Article 80 Broadband Ready Buildings Questionnaire, attached as **Appendix E**. The information that is shared through the Broadband Ready Buildings Questionnaire will help the BPDA and the City understand how developers currently integrate telecommunications planning in their work and how this integration can be most responsive to a changing technological landscape. The Proponent should fill out the questionnaire at the URL below, and include the results in the DPIR: http://www.bostonplans.org/projects/development-review/article-80-design-review-broadband-ready-buildings

9.3 BPDA and City of Boston Agency Comments

BOSTON PLANNING AND DEVELOPMENT AGENCY SCOPING DETERMINATION

BPDA 01 **Throughout this initial phase of review, and prior to it, the Proponent has taken steps to meet with many community members and groups, elected officials, abutters, and various City agencies/departments. Regular conversations and meetings with all interested parties must continue through the duration of the public review process, ensuring that what is presented in the DPIR is beneficial to the respective neighborhood and the City of Boston as a whole.**

Since the filing of the PNF, the Proponent has continued to engage with interested parties and changed the Project substantially in direct response to public input, as presented in this DPIR. A description of the public process since the PNF is provided in Section 1.8.

BPDA 02 **The Proposed Project, especially the Commonwealth Avenue component, will have significant impacts on the existing residential building at 566 Commonwealth Avenue. Residents and neighbors raised a number of concerns laid out in the public comment letters. To mitigate shadow and air circulation impacts, the Proponent should explore ways to provide the maximum amount of distance between the Commonwealth Avenue component and the existing residential building. Comments from BPDA Urban Design staff in Appendix A include more detailed requests.**

The Proponent has redesigned the Project to maximize the distance between the existing 566 Commonwealth Avenue building and its new hotel building, by shifting its footprint approximately 88 feet easterly. The resulting distance between the two buildings will be approximately 102 to 108 feet, thereby mitigating shadow and air-circulation impacts as sought through the comment. In between the two buildings, the Project proposes to dedicate a new public way and a public plaza, making it highly unlikely that any future buildings could be built there.

BPDA 03 **Through the public review process, some residents have expressed security concerns stemming from proposed tall buildings in close proximity to Fenway Park. The BPDA encourages the Proponent to work with the Boston Police Department ("BPD") and Boston Fire Department ("BFD") to review and address the impacts that this proposal will have on the existing capacity of these departments' facilities and staff, should a project move forward.**

The Proponent has contacted the BPD and BFD to work on this issue, together.

BPDA 04 **The Proponent must work with the Boston Transportation Department ("BTD") to address concerns regarding site access, circulation of traffic in and around the Proposed Project site, potential traffic impacts, and appropriate mitigation throughout the neighborhood.**

The Project now entails a reconfiguration of public ways in and around the Project Area, which will improve access to the new hotel building proposed, minimize impacts upon traffic circulation in and around the Project Area, and, possibly improve existing traffic conditions in the neighborhood. The Proponent's traffic consultant has met with BTD staff on numerous occasions, including in their traffic operations center (meeting dates include May 1, 2018, August 27, 2018, September 5, 2018, September 19, 2018, September 27, 2018, October 19, 2018, October 31, 2018, and February 21, 2019). Please see Chapter 2.0 for a fuller analysis of the traffic impacts.

BPDA 05 **Of particular concern to many residents is the impact of any increased traffic in Kenmore Square on the ability of emergency vehicles to access the Longwood Medical Area. Comments from BPDA Transportation & Infrastructure Planning staff in Appendix A include more detailed requests.**

As noted above, the Project simplifies overall signal operations and minimizes conflicting movements at the main Kenmore Square intersection. The analysis shows that this results in improved operations and minimized delays on most approaches as compared to the current network in all scenarios. In addition, the upgraded signal system will be completed per the most current BTD standards and guidelines and will include emergency vehicle and transit signal priority capability as determined.

BPDA 06 **All development projects have construction impacts. As with any urban development, there needs to be a balance of construction-related inconveniences with the daily activities that will continue to occur adjacent to the Proposed Project site. A detailed approach to the construction management must be included in the DPIR, including strategies for construction management over the Proposed Project's multiple phases and community involvement in developing construction management plans.**

Construction management has been eased by changing the Project to construct the new hotel building within a large public plaza. Construction impacts are described in detail in Section 3.11.

BPDA 07 **The Proponent must take into account all BPDA approved and under review proposals in the Kenmore and Fenway neighborhoods, scheduled infrastructure improvements in the general area, and nearby large scale developments in the City of Boston while conducting the DPIR's required studies (transportation, infrastructure, open space, etc.).**

All BPDA-approved and under review proposals in the area have been incorporated into the studies in this DPIR.

BPDA 08 **The Proponent must clearly describe the overall demolition and phasing of the Proposed Project. The buildings to be demolished and constructed in each phase of the Proposed Project should be specified along with an anticipated timeline for each phase. The BPDA acknowledges that project timelines are subject to change due to market conditions and other factors.**

The Proponent is working with all interested City agencies and officials regarding the overall demolition and phasing of the Project. A description of the anticipated construction timeline is provided in Section 1.9.

BPDA 09 **Development Team**

Please see Section 1.2.

BPDA 10 **Legal Information**

Please see Section 1.6.

BPDA 11 **Project Area**

An area map is presented in Figure 1-2, and a site survey is provided in Appendix B. Current zoning is described in Section 1.5.

BPDA 12 **Project Description and Alternatives**

A project description and discussion of alternatives is provided in Section 1.3.

BPDA 13 **Public Benefits**

The public benefits of the Project are described in Section 1.4.

BPDA 14 **Community Process**

A description of the community process is provided in Section 1.8.

BPDA 15 **An updated listing of all anticipated permits or approvals required from other municipal, state or federal agencies, including a proposed application schedule shall be included in the DPIR.**

An updated list of all anticipated permits or approvals is provided in Section 1.7.

BPDA 16 **A statement on the applicability of the Massachusetts Environmental Policy Act ("MEPA") should be provided. If the Proposed Project is subject to MEPA, all required documentation should be provided to the BPDA, including, but not limited to, a copy of the Environmental Notification Form, decisions of the Secretary of Environmental Affairs, and the proposed schedule for coordination with BPDA procedures.**

The Project does not appear to be subject to review under the Massachusetts Environmental Policy Act (MEPA), which is codified at Sections 62 through 62I of Massachusetts General Laws (MGL) Chapter 30 and implemented under the "MEPA Regulations" at Section 11 of Chapter 301 of the Code of Massachusetts Regulations (CMR). MEPA and the MEPA Regulations apply to: (a) projects undertaken by a state agency; (b) those aspects of a project that are within the subject matter of any required state permit; (c) projects involving state financial assistance; and (d) those aspects of a project within the area of any real property acquired from a state agency. (301 CMR 11.01(2)(a).) MEPA review is triggered when one or more of the reasons set forth above apply, and when the proposed project exceeds one or more review thresholds set forth in the MEPA Regulations. (301 CMR 11.03.) As noted above, the Project does not appear to require state action.

BPDA 17 **Transportation Component**

A transportation component that meets the specifications of BTD's Transportation Access Plan Guidelines and addresses comments outlined by BPDA's Infrastructure and Transportation Planning Department is provided in Chapter 2.0.

BPDA 18 **Environmental Protection Component**

Updated documents required by the Article 37/Interagency Green Building Committee are provided in Chapter 4.0. Comments on the BPDA Climate Change and Environmental Planning Department are addressed in Chapter 4.0 and in this Chapter.

BPDA 19 **Urban Design Component**

An urban design component that addresses the comments outlined by the BPDA's Planning and Urban Design departments is provided in Chapter 5.0.

BPDA 20 **Infrastructure Systems Component**

An infrastructure impact analysis that follows the scope outlined by BWSC is provided in Chapter 7.0.

BPDA 21 **Public Notice**

A public notice was published in the Boston Herald on April 23, 2019.

BPDA 22 **Accessibility Checklist**

An updated Accessibility Checklist is provided in Appendix I.

BPDA 23 **Climate Resiliency Report**

An updated Climate Resiliency Report is provided in Appendix H.

BPDA 24 **Broadband Ready Buildings Questionnaire**

A Completed Broadband Ready Buildings Questionnaire is provided in Appendix J.

APPENDIX A

COMMENTS FROM BPDA STAFF, PUBLIC AGENCIES/DEPARTMENTS AND ELECTED OFFICIALS

MEMORANDUM

TO: Tim Czerwienski, Project Manager
FROM: Corey Zehngebot, Senior Architect/Urban Designer, BPDA Urban Design Department
Jill Zick, Landscape Architect, BPDA Urban Design Department
John Dalzell, Senior Architect, BPDA Climate Change & Environmental Planning Department
Kathleen Pedersen, Senior Land Use Planner, Sustainability Specialist & Environmental Review, BPDA Climate Change & Environmental Planning Department
James Fitzgerald, Senior Transportation Management Planner, BPDA Transportation & Infrastructure Planning Department
DATE: May 18, 2018
SUBJECT: **560-574 COMMONWEALTH AVENUE / 645-665 BEACON STREET (KENMORE HOTELS)**

URBAN DESIGN

General Comments

- *"As it stands today, there is no actual 'square' in Kenmore Square, no place to gather other than sidewalks and no vibrant street-level retail that can capture crowds and re-energize the neighborhood."* Given the Proponents' desire to bundle these two projects as a PDA, extraordinary public realm benefits must be manifest. Are there opportunities beyond the bounds of the current PDA boundary that facilitates the creation of a new "square"? As currently proposed, the project includes additional public realm that is "attractive and safe," but does not yet meet the stated aspiration to create a new public square. **UD 01**
- The project team demonstrated expansive thinking very early on in the process, exploring ways to expand the public realm throughout Kenmore through strategic closing of vehicular travel lanes. Though those suggestions may not all come to fruition, the spirit of holistic thinking was appreciated. Are there opportunities to preserve certain parcels to create a spectacular open space unique and specific to Kenmore Square through adjacent development opportunities, and through partnerships with entities other or in addition to the Buckminster Hotel? Have companion development opportunities on the northern side of 560 Commonwealth Avenue been explored? **UD 02**
- Is there a scheme that moves the height and density to either side of the 560 Commonwealth Avenue parcel? A central open space framed by two architecturally significant buildings could create the missing public realm that Kenmore lacks and is currently taken up by necessary transportation infrastructure. The Brookline-to-Beacon Buckminster steps create a pleasant side eddy for public gathering and provide a welcome pedestrian connection, but also an unrequited desire line that **UD 03**

currently terminates in the building lobby of 560 Commonwealth Avenue. A new open space opposite these steps could provide the natural punctuation mark to this urban staircase.

- Public Realm: Use Boston Complete Streets as a guide to determining appropriately sized furnishing (5-6 feet in width) and pedestrian (minimum clear path of travel should be 8'-0" in width) zones based on street hierarchy. **UD 04**
- Height: Based on preliminary community feedback and BPDA internal studies, it is recommended that the Proponent explore alternative height scenarios. Internal UD studies studied a range of heights from 170'0" to 230'0" for the two parcels (with the greater of the height located on the Commonwealth Avenue parcel), and with different podia/tower orientations on the Beacon Street parcel. As proposed, the project proposes significantly greater height: 560 Commonwealth Avenue (24 stories/260 feet) and Beacon Street (19 stories/210 feet) **UD 05**

Beacon Street Component **UD 06**

- Buckminster steps: simplify the steps and landing configurations to create more usable space. The grade differential between Boylston and Beacon is significant, but rather than having multiple mezzanine landings, the proponent should explore a stair (with accessible route) configuration that is more direct and enlarges the space available for programming along Beacon Street. This will maximize the impacts of the creation of new public realm, while also making more of it immediately accessible.
- Explore strategies for improving the perceived or actual dimension of staircase entry off of Brookline Avenue. The close proximity of Parcel 7 Phase II and the corner edge of the building should be considered. While the aforementioned is an unbuilt development and there may be opportunities for subtle adjustments, the Proponent should explore opportunities to highlight the top of the urban staircase through design, lighting, and other streetscape amenities as part of the proposed project.
- Ground level and staircase lighting should be a key consideration of the new Buckminster tower, creating a safe and pleasurable evening shortcut to/from Brookline Ave, during Red Sox games and during quieter summertime evenings. In the winter months, lighting and maintaining stairs that are free of ice and snow will be essential for the many diverse populations that circulate through the block. The Proponents should explore the implications of partially enclosing the passageway.
- Top of building lighting is not appropriate at this location.
- Buckminster Facade Improvements
    - Facade of the Beacon Street Component should be studied relative to Parcel 7 Phase II, the existing Buckminster Hotel, and the proposed tower on 560 Commonwealth Avenue. In particular, distinguishing the podium from the tower may be productive, but a variety of options should be studied. The

podium will strongly influence the character and experience of the Buckminster steps, which is framed by the existing Buckminster Hotel on the other side. Above the roofline of the existing Buckminster, the new hotel becomes more of a wayfinding beacon for the square, visible from a variety of locations including Fenway Park.

  - The existing canopy for the Buckminster Hotel fully extends across the sidewalk to the curb. This condition is not allowed, unless documentation can be provided that the canopy is original to the hotel architecture.

Commonwealth Avenue Component

- Explore slight shift of 560 Commonwealth Avenue to the east, made possible through the elimination of the slip lane to accommodate two-way traffic between the development and the adjacent residential building. The shift should not be so pronounced as to reduce the potential for open space at the nose of the building, but sufficient to provide 2-way vehicular traffic and pedestrian cut-through behind building. **UD 07**
- Explore a variety of design strategies and associated enhanced north-south pedestrian crossings related to a new open space made possible through the existing slip lane closure. Study how this relates to the lobby and potential ground floor uses and/or retail. Are there other programmatic possibilities for the ground floor of the nose other than a Citizens Bank? **UD 08**
- Given the very limited real estate available on the ground floor, we recommend thoughtful care and attention to not only programming, but also design. We expect high quality architectural materials and innovative design strategies, particularly as this is a building footprint that may be experienced on all four sides by heavy pedestrian traffic. **UD 09**
- The triangular footprint is challenging architecturally and evokes the obvious comparison of the Flatiron building. Nevertheless, it is important to underscore the importance of this corner site as an opportunity for place-making through architectural boldness. **UD 10**
- The project proponent needs to provide appropriate documentation of professed ownership/rights over the public right-of-way (sidewalk) on Commonwealth Avenue for the proposed building on the Commonwealth Avenue site.
  - The current design proposal implies a discontinuance of air rights will be needed for the portions of the building that cantilever over the Commonwealth Avenue right-of-way (sidewalk). The Proponents should be prepared to provide a title opinion from a registered title examiner to determine/confirm ownership of the underlying fee for the areas of the public right-of-way (PROW) in question. In order to advance the project, the developer will be required to pay fair market value (as determined through an independent appraisal) to buy back the needed volume out of the PROW. **UD 11**

BOSTON PLANNING AND DEVELOPMENT AGENCY – URBAN DESIGN

UD 01 **"As it stands today, there is no actual 'square' in Kenmore Square, no place to gather other than sidewalks and no vibrant street-level retail that can capture crowds and re-energize the neighborhood." Given the Proponents' desire to bundle these two projects as a PDA, extraordinary public realm benefits must be manifest. Are there opportunities beyond the bounds of the current PDA boundary that facilitates the creation of a new "square"? As currently proposed, the project includes additional public realm that is "attractive and safe," but does not yet meet the stated aspiration to create a new public square.**

The Proponent has revised the Project to create a veritable "square" in Kenmore Square, measuring approximately 21,000 sf (0.5 acres), which will serve as a place to gather, and is activated by street-level retail within the new hotel building built within it. Please see the Project Description and Urban Design Chapters for additional information.

UD 02 **Are there opportunities to preserve certain parcels to create a spectacular open space unique and specific to Kenmore Square through adjacent development opportunities, and through partnerships with entities other or in addition to the Buckminster Hotel? Have companion development opportunities on the northern side of 560 Commonwealth Avenue been explored?**

To create the new, approximately half-acre public plaza, the Proponent will, in a sense, partner with the City of Boston itself, which owns fee title to most of the land and all of the surface rights. The Proponent is undertaking the expense to construct not only the hotel, but the creation of the public plaza, construction of New Road, and the bike lanes and signals along Commonwealth Avenue westbound, New Road, and Beacon Street. The Buckminster Hotel is no longer involved in the Project.

UD 03 **Is there a scheme that moves the height and density to either side of the 560 Commonwealth Avenue parcel? A central open space framed by two architecturally significant buildings could create the missing public realm that Kenmore lacks and is currently taken up by necessary transportation infrastructure. The Brookline-to-Beacon Buckminster steps create a pleasant side eddy for public gathering and provide a welcome pedestrian connection, but also an unrequited desire line that currently terminates in the building lobby of 560 Commonwealth Avenue. A new open space opposite these steps could provide the natural punctuation mark to this urban staircase.**

The height and density of the new hotel building has been shifted far to the east of the 560 Commonwealth Avenue parcel, which the Proponent will grant to the City for use as a new public way. The Buckminster Hotel is no longer involved in the

Project. The Proponent will construct and dedicate to the City the central open space suggested by the comment in the form of a new plaza of approximately 21,000 sf, which will surround the new hotel building.

UD 04 **Public Realm: Use Boston Complete Streets as a guide to determining appropriately sized furnishing (5-6 feet in width) and pedestrian (minimum clear path of travel should be 8'-0" in width) zones based on street hierarchy.**

Beacon Street, Commonwealth Avenue and Brookline Avenue are all considered Urban Principal Arterials by MassDOT's Road Inventory Map. This is equivalent to a Boulevard street type in the Complete Streets Guidelines.

Design elements including curbs, urban braille, sonar detection, landscaping, wide and separated walking and bike facilities are incorporated into the plans.

UD 05 **Height: Based on preliminary community feedback and BPDA internal studies, it is recommended that the Proponent explore alternative height scenarios. Internal UD studies studied a range of heights from 170'0" to 230'0" for the two parcels (with the greater of the height located on the Commonwealth Avenue parcel), and with different podia/tower orientations on the Beacon Street parcel. As proposed, the project proposes significantly greater height: 560 Commonwealth Avenue (24 stories/260 feet) and Beacon Street (19 stories/210 feet).**

The Buckminster Hotel is no longer involved in the Project. Instead of two new buildings, the Project will include a single, new hotel building located approximately 88 feet farther east from the existing building at 566 Commonwealth Avenue, and surrounded by a new, approximately half-acre public plaza. The new hotel building would have a building height of approximately 299 feet.

UD 06 **Beacon Street Component**

The Beacon Street Component, to be undertaken by the Buckminster Hotel, is no longer proposed as part of the Project.

UD 07 **Explore slight shift of 560 Commonwealth Avenue to the east, made possible through the elimination of the slip lane to accommodate two-way traffic between the development and the adjacent residential building. The shift should not be so pronounced as to reduce the potential for open space at the nose of the building, but sufficient to provide 2-way vehicular traffic and pedestrian cut-through behind building.**

The Proponent has redesigned the Project to maximize the distance between the existing 566 Commonwealth Avenue building and its new hotel building, by shifting its footprint approximately 88 feet easterly. The resulting distance between the two buildings will be approximately 102 to 108 feet. In between the two buildings, the

Project proposes to dedicate a new public way (New Road). The new public way extends from north to south and ranges in length from approximately 80 feet on the westerly side to approximately 40 feet on the easterly side. This public way also ranges in width from approximately 75 feet on the southern end, along Beacon Street, to approximately 85 feet on the northern end, along Commonwealth Avenue. The Project also entails construction at the Proponent's cost of a new approximately half-acre public plaza, that would surround the new hotel building.

UD 08 **Explore a variety of design strategies and associated enhanced north-south pedestrian crossings related to a new open space made possible through the existing slip lane closure. Study how this relates to the lobby and potential ground floor uses and/or retail. Are there other programmatic possibilities for the ground floor of the nose other than a Citizens Bank?**

In consultations with interested parties, especially City staff with knowledge of and responsibility over pedestrian circulation in Kenmore Square, the Proponent studied a variety of design strategies. The Project has been changed to include a comprehensive reconfiguration of pedestrian crossings at the westerly end of Kenmore Square. As described in Section 1.3.3.1, the new configuration will greatly improve pedestrian convenience and safety. The new, approximately half-acre public plaza within which the Proponent will build its hotel building is, literally, central to this reconfiguration, and will enable a broad range of programmatic possibilities at the ground level.

UD 09 **Given the very limited real estate available on the ground floor, we recommend thoughtful care and attention to not only programming, but also design. We expect high quality architectural materials and innovative design strategies, particularly as this is a building footprint that may be experienced on all four sides by heavy pedestrian traffic.**

The Proponent has revamped the architecture of its new hotel building, mindful that it will be experienced on all four sides, in one of the busiest intersections of Boston. Please see Chapter 5.0 for more information about the architecture of the hotel.

UD 10 **The triangular footprint is challenging architecturally and evokes the obvious comparison of the Flatiron building. Nevertheless, it is important to underscore the importance of this corner site as an opportunity for place-making through architectural boldness.**

In order to help the new public plaza at the heart of Kenmore Square to become a well-used and well-loved public space, the proposed hotel is shaped to maximize the area of the plaza and minimize the building's footprint, and its interior spaces are programmed to complement existing amenities and activities in the surrounding neighborhood. At ground level, the building is carved away, providing additional plaza space while becoming fully transparent to reinforce connections with the public realm. The plaza and tower are designed in concert to become a Boston destination. There will be plenty of space for crowds of baseball fans before and after games at Fenway Park, Marathon watchers cheering the final mile, and Boston University students and others mingling under the trees. The amenity levels will overlook the plaza and hotel guests will have views out over the cityscape.

The key to the tower's striking yet harmonious urban presence is the unit of the bay window. A typical feature of traditional Boston buildings, bay windows give the tower's interior spaces added area, interest, daylight, and expanded views. They also allow the building to "step out" as it rises in a gradual way that blends large steps into a continuous gradient of bays—giving the tower a dynamic appearance that still feels welcoming and at the human scale. This functionally rich form allows the tower to both serve as an entrance to the historic Back Bay neighborhood and take its place on the growing Boston skyline.

UD 11 **The current design proposal implies a discontinuance of air rights will be needed for the portions of the building that cantilever over the Commonwealth Avenue right-of-way (sidewalk). The Proponents should be prepared to provide a title opinion from a registered title examiner to determine/confirm ownership of the underlying fee for the areas of the public right-of-way (PROW) in question. In order to advance the project, the developer will be required to pay fair market value (as determined through an independent appraisal) to buy back the needed volume out of the PROW.**

The Project has been changed such that air rights are no longer sought over Commonwealth Avenue. Instead, the Proponent will exchange its current fee interests in its parcel at 560 Commonwealth Avenue and the abutting, 30-foot wide portion of Commonwealth Avenue, a total of approximately 9,501 sf, in exchange for an approximately 7,547 sf portion of public way to the east, currently owned by the City, where the new hotel tower will be located. The areas of the Proponent's current and proposed fee interests overlap to some extent. The Proponent will also acquire from the City air rights for those portions of the hotel's upper stories that extend over the 0.5-acre public plaza that it will construct through the Project. The Proponent has provided a title opinion from a registered title examiner regarding all affected land, and appraisals will determine fair-market values.

GREEN BUILDINGS / RESILIENT DEVELOPMENT

- The Proponents should correct Table 2-1 to include "Inter-agency Green Building Committee" and "Boston Zoning Article 37 Green Building" approval. GB 01
- The Climate Resiliency Report is incomplete in numerous areas and should be completed prior to submitting any further project filings. GB 02
- Both hotel buildings should be targeting LEED Platinum with a minimum outcome of LEED Gold. GB 03
- Preliminary building energy modeling should be undertaken prior to further development of the proposed buildings envelope. Building design review, including by the Boston Civic Design Commission, should be coordinated with building performance review. GB 04
- Building designs should prioritize passive building envelope strategies to minimize GHG emissions. Strategies should include reduced window-to-wall ratios, high performance windows with solar tuned glazing, increased wall and roof exterior insulation, and greater air tightness. Active building systems, equipment, and appliances should be highly efficient and "EnergySTAR" rated. GB 05
- The Proponents should contact the utility and state (DOE and MassCEC) energy efficiency providers to maximize technical and financial assistance to the project, including energy modeling, as soon as possible. Please provide information on all utility and state assistance provided or in consideration for the project. GB 06
- The building design should include integrated on-site solar PV. Both roof top and building integrated (facade/window technology) solar PV should be considered. Off-site locations can be considered in addition to on-site opportunities or entirely off-site if a substantially larger system is provided. GB 07
- The proposed hotel uses make the buildings good candidates for combined heat and power (DHP) systems. The project team should investigate CHP and building battery storage systems. GB 08

ENVIRONMENTAL PROTECTION

<u>Wind</u> EP 01

The Proposed Project includes the construction of two buildings, ranging in height from 210 feet to 260 feet, thus the Proponent shall be required to conduct a quantitative (wind tunnel) analysis of the potential pedestrian level wind impact. The analysis shall be conducted to determine the potential pedestrian level winds adjacent to and in the vicinity of the Proposed Project and to identify wind velocities that are expected to exceed acceptable levels, including the Boston Planning and Development Agency's (the "BPDA") guideline of an effective gust velocity of 31 miles per hour (mph) not to be exceeded more than 1% of the time.

BOSTON PLANNING AND DEVELOPMENT AGENCY – GREEN BUILDINGS/RESILIENT DEVELOPMENT

GB 01 **The Proponents should correct Table 2-1 to include "Inter-agency Green Building Committee" and "Boston Zoning Article 37 Green Building" approval.**

This has been added to the list of permits and approvals.

GB 02 **The Climate Resiliency Report is incomplete in numerous areas and should be completed prior to submitting any further project filings.**

An updated Climate Resiliency Report is provided in Appendix H.

GB 03 **Both hotel buildings should be targeting LEED Platinum with a minimum outcome of LEED Gold.**

The Proponent has targeted LEED Platinum, but has been unable to attain it. The Proponent will continue to look for ways to add additional points. The LEED checklist and narrative is provided in Chapter 4.0.

GB 04 **Preliminary building energy modeling should be undertaken prior to further development of the proposed buildings envelope. Building design review, including by the Boston Civic Design Commission, should be coordinated with building performance review.**

Appendix G includes a Conceptual Design Energy Model.

GB 05 **Building designs should prioritize passive building envelope strategies to minimize GHG emissions. Strategies should include reduced window-to-wall ratios, high performance windows with solar tuned glazing, increased wall and roof exterior insulation, and greater air tightness. Active building systems, equipment, and appliances should be highly efficient and "EnergySTAR" rated.**

The proposed envelope carried in the preliminary energy model is utilizing glazing that is 20% better than ASHRAE-90.1-2013 and a wall assembly that is 25% better. The design team will continue to evaluate the envelope parameters and construction to further improve the energy savings of the proposed facility and reduce GHG emissions. The building mechanical systems have been selected with high efficiency ratings as well and the Proponent will pursue Energy Star rated appliances where possible.

GB 06 **The Proponents should contact the utility and state (DOE and MassCEC) energy efficiency providers to maximize technical and financial assistance to the project, including energy modeling, as soon as possible. Please provide information on all utility and state assistance provided or in consideration for the project.**

The building conceptual plans and programs have been submitted to Eversource and National Grid. A conference call was held to review the Project with the Energy Efficiency Group at Eversource. It was determined that the Project has access to the full Large Building program. A DD-stage and then CD-stage model would be completed on the Project, with the incentives based on the CD model's savings.

GB 07 **The building design should include integrated on-site solar PV. Both roof top and building integrated (facade/window technology) solar PV should be considered. Off-site locations can be considered in addition to on-site opportunities or entirely off-site if a substantially larger system is provided.**

This Project is challenging being in an urban location with a tight site, where rooftop space is very limited (with a proposed skylight, cooling towers, emergency generator, etc) and would not yield a considerable offset. Building/glazing integrated PV typically generates much less per SF than a typical rooftop/garage installation and costs significantly more to install. The Project could implement the electrical conduit and infrastructure needed for rooftop PV in the future to be PV ready - but the offset would be very minimal.

GB 08 **The proposed hotel uses make the buildings good candidates for combined heat and power (CHP) systems. The project team should investigate CHP and building battery storage systems.**

The design team will further evaluate potential CHP and battery storage systems during the schematic design of the Project, after further reviewing project loads and performing life cycle cost analyses on each system.

Particular attention shall be given to public and other areas of pedestrian use, including, but not limited to, entrances to the Proposed Project and existing and proposed buildings in the vicinity of the Proposed Project, the existing and proposed sidewalks and walkways within and adjacent to the Proposed Project and existing and proposed plazas, park areas and other open space areas within and in the vicinity of the Proposed Project.

The wind impact analysis shall evaluate the following conditions:

1. No-Build - the existing condition of the Proposed Project site and environs to establish the baseline condition.

2. Future Preferred Build Condition - the Proposed Project as described in the Project Notification Form.

3. Alternative Build Condition(s) - any alternative development concept(s) to the Preferred Build Condition required to be studied.

Wind speeds shall be measured in miles per hour (mph) and for areas where wind speeds are projected to be dangerous or to exceed acceptable levels, measures to reduce wind speeds and to mitigate potential adverse impact(s) shall be identified and, if appropriate, tested.

A proposed wind sensor plan shall be submitted to the BPDA in advance for review and approval.

Shadow

EP 02

The PNF includes the results of a shadow analysis for the months of March, June, September and December and the hours of 9:00 a.m., 12:00 p.m. and 3:00 p.m. however, not for particular days and thus the Proponent shall be required to conduct a shadow analysis for the existing (no-build) and build conditions for the hours of 9:00 a.m., 12:00 p.m. and 3:00 p.m. for the vernal equinox, summer solstice, autumnal equinox, and winter solstice and for 6:00 p.m. in the summer and fall.

The shadow impact analysis shall examine the existing shadows and the incremental effects of the Proposed Project on existing and proposed public open spaces as well as sidewalks and pedestrian walkways adjacent to and in the vicinity of the Proposed Project site.

The shadow impact analysis shall evaluate the following conditions:

1. No-Build - the existing condition of the Proposed Project site and environs to establish the baseline condition.

2. Future Preferred Build Condition - the Proposed Project as described in the Project Notification Form.

3. Alternative Build Condition(s) - any alternative development concept(s) to the Preferred Build Condition required to be studied.

The shadow analysis results shall be provided in both animation and graphic representations, so as to best understand the extent to which shadows from the Proposed Project are anticipated to affect the overall shadow conditions within the surrounding area.

Solar Glare

EP 03

The Proponent shall be required to conduct a solar glare analysis. The analysis shall measure potential reflective glare from the Proposed Project onto potentially affected streets and public open spaces as well as the sidewalk areas in order to determine the likelihood of visual impairment or discomfort due to reflective spot glare. Mitigation measures to eliminate any adverse reflective glare shall be identified.

Daylight

(Please refer to Urban Design's comments)

Air Quality

EP 04

The Proponent shall be required to perform a microscale analysis, which shall predict localized carbon monoxide concentrations, including identification of any locations projected to exceed the National and/or Massachusetts Ambient Air Quality Standards. The analysis is required for projects for which:

1) Project traffic would impact intersections or roadway links currently operating at Level of Service ("LOS") D, E, or F or would cause LOS to decline to D, E, or F;

2) Project traffic would increase traffic volumes on nearby roadways by 10% or more (unless the increase in traffic volume is less than 100 vehicles per hour); or,

3) The project will generate 3,000 or more new average daily trips on roadways providing access to a single location.

Emissions from the Proposed Project parking garage and from the Proposed Project's heating and mechanical systems shall be estimated. In addition, carbon monoxide monitors shall be installed in the parking garage and a description of the proposed ventilation system shall be provided. Building/garage air intake and exhaust systems and specifications and an analysis of the impact of exhausts on pedestrians and any sensitive receptors shall be identified and. Finally, if deemed necessary, mitigation measures to minimize or avoid any violation of state or federal ambient air quality standards shall be included and a description provided.

Noise **EP 05**

Noise impacts from the Proposed Project shall be analyzed, including rooftop mechanical equipment and other noise sources (e.g., emergency generators), demonstrating compliance with the City of Boston noise regulations and applicable state and federal regulations and guidelines. Due to the close proximity to residential buildings, the Proponent shall be required to evaluate and demonstrate compliance with the Interior Design Noise Level (not to exceed day night average sound level of 45 decibels) established by the U.S. Department of Housing and Urban Development (Subpart B Noise Abatement and Control of 24 CFR Part 51). If deemed necessary, mitigation measures designed to reduce excessive noise levels to acceptable limits shall be included and a description provided.

TRANSPORTATION

- Moving the Commonwealth Avenue building to the east has urban design benefits as mentioned above. This shift could allow 2-way vehicular access between Commonwealth Avenue and Beacon Street, but at a minimum it should provide right turn access to the site and the abutting site's garage access from Commonwealth Avenue. A more generous dimension here would also allow for an improved pedestrian connection. **TR 01**
    - Cantilevered upper floors over this widened access could preserve building dimension, but the Proponents should keep in mind concerns about light and air access for the eastern face of the 566 Commonwealth Avenue building. **TR 02**
    - Providing this connection behind the building would help with the goal of eliminating the right turn slip lane from Commonwealth Avenue to Beacon Street. **TR 03**
- Is there excess width on Beacon Street that could be better utilized? **TR 04**
- As noted in the Urban Design comments, the Proponents should address the "unrequited desire line" from new plaza across Beacon Street **TR 05**
    - This should include improving/reconfiguring pedestrian crossings
- In depth analysis of removing this slip lane should be completed including restricting altogether the right turn move from Commonwealth Avenue to Beacon Street. **TR 06**
    - Determining and considering how many trucks are using the Commonwealth Avenue right turn slip lane will be important
    - What are the minimum turning radii implications?

- Bike lane safety conflicts with pickup, drop-off and loading should be analyzed **TR 07**
    - Sidewalk grade bike accommodations should be explored
    - At a minimum the pending parking protected bike lanes designed for Beacon Street should be accommodated in the site/streetscape design
- Reliance on transit for this project is critical to its success. A robust Transportation Demand Management (TDM) program with a robust transit pass subsidy program for employees and hotel guests is a must. **TR 08**
- Additional off-site transportation mitigation will need to be determined going forward and based on the project's transportation impact analysis. **TR 09**

BOSTON PLANNING AND DEVELOPMENT AGENCY – ENVIRONMENTAL PROTECTION

EP 01 Wind

A pedestrian level wind analysis is provided in Section 3.1.

EP 02 Shadow

A shadow analysis is provided in Section 3.2.

EP 03 Solar Glare

A solar glare analysis is provided in Section 3.4.

EP 04 Air Quality

Both microscale and stationary source analyses are provided in Section 3.5.

EP 05 Noise

Noise impacts are analyzed in Section 3.10.

TR 01 **Moving the Commonwealth Avenue building to the east has urban design benefits as mentioned above. This shift could allow 2-way vehicular access between Commonwealth Avenue and Beacon Street, but at a minimum it should provide right turn access to the site and the abutting site's garage access from Commonwealth Avenue. A more generous dimension here would also allow for an improved pedestrian connection.**

The Proponent has redesigned the Project to maximize the distance between the existing residential building at 566 Commonwealth Avenue and the new hotel building, by shifting its footprint approximately 88 feet easterly. The resulting distance between the two buildings will be approximately 102 to 108 feet. To maintain minimum acceptable sidewalk width along Beacon, any further eastward movement would reduce the size of the public plaza with no traffic circulation benefit. Providing two-way flow along New Road would severely complicate intersection operations (with or without discontinuing the block of Beacon Street between Brookline Avenue and New Road) as the congestion-causing crossing movement between Commonwealth Avenue and Beacon Street is re-introduced in close proximity, counter to the beneficial effect of decompressing these moves out of the main intersection, as occurs in the proposed design. While adding more width to the New Road sidewalk is welcome, it is already nearly as wide as the Beacon Street sidewalk but does not serve a hotel entrance nor a primary desire line, since those walking to and from the Square will be more oriented through the plaza and not along New Road. Finally, the New Road frontage is too short for the hotel to benefit from right-turn access to the site, and the proposed design does not change access to the abutting site's garage.

TR 02 **Cantilevered upper floors over this widened access could preserve building dimension, but the Proponents should keep in mind concerns about light and air access for the eastern face of the 566 Commonwealth Avenue building.**

Light and air for the existing, 566 Commonwealth Avenue building has been addressed by shifting the new hotel building approximately 88 feet easterly, creating a separation of approximately 102 to 108 feet.

TR 03 **Providing this connection behind the building would help with the goal of eliminating the right turn slip lane from Commonwealth Avenue to Beacon Street.**

The Project includes the dedication and construction of a new public way (New Road) between the existing building at 566 Commonwealth Avenue and the new, half-acre public plaza, with the new hotel building within it.

TR 04 **Is there excess width on Beacon Street that could be better utilized?**

As proposed, Beacon Street is narrower than it is today, with one lane of travel removed and replaced by sidewalk. In addition, proposed travel lanes conform to the City's Complete Streets Guidelines with narrower lanes, as well as a parking-protected buffered bike lane. The removal of an additional travel lane was explored—reducing Beacon Street to only two travel lanes—however queues from the signal at Brookline Avenue / Commonwealth Avenue would spill through the signal at New Road and Beacon Street. While advanced signalization and queue detection loops could mitigate this, BTD preferred an approach which accommodates the entire theoretical queue in the block between New Road and Brookline Avenue, so the third lane was retained.

TR 05 **As noted in the Urban Design comments, the Proponents should address the "unrequited desire line" from new plaza across Beacon Street. This should include improving/reconfiguring pedestrian crossings.**

The Buckminster Hotel is no longer involved in the Project, and no public plaza is proposed across Beacon Street.

TR 06 **In depth analysis of removing this slip lane should be completed including restricting altogether the right turn move from Commonwealth Avenue to Beacon Street.**

- **Determining and considering how many trucks are using the Commonwealth Avenue right turn slip lane will be important.**
- **What are the minimum turning radii implications?**

The movement from Commonwealth Avenue eastbound to Beacon Street westbound—which this slip-lane accommodates—has been reconfigured as a right turn onto New Road and then a right turn onto Beacon Street. Each turn onto and off-of New Road has ample turning radii for large trucks.

TR 07 **Bike lane safety conflicts with pickup, drop-off and loading should be analyzed**

- **Sidewalk grade bike accommodations should be explored**
- **At a minimum the pending parking protected bike lanes designed for Beacon Street should be accommodated in the site/streetscape design**

The proposed design has no bike lane conflicts with the hotel. Instead, new parking-protected bike lanes ring the new public plaza, with those on Commonwealth Avenue westbound and New Road southbound raised to sidewalk level, and their turns are signalized. The existing Beacon Street eastbound bike lane is moved to the curb and protected by on-street parking, which includes loading for the Hotel Buckminster. This placement is preferred by BTD to minimize pick-up and drop-off traffic crossing a bike lane.

TR 08 **Reliance on transit for this project is critical to its success. A robust Transportation Demand Management (TDM) program with a robust transit pass subsidy program for employees and hotel guests is a must.**

The Proponent is committed to implementing TDM strategies, which may include transit pass subsidies, bike share subsidies, valet parking fees, travel information programs, and other features. The TDM program is described in Section 2.8.

TR 09 **Additional off-site transportation mitigation will need to be determined going forward and based on the project's transportation impact analysis.**

The substantive roadway and transportation improvements included as part of the Project serve as the Project's mitigation, and the analysis performed for the DPIR finds that traffic in the area will be improved even with the addition of the Project-generated trips.

CITY of BOSTON
Martin J. Walsh, Mayor

To: Tim Czerwienski, BPDA

From: Zach Wassmouth, PWD

Date: April 11, 2018

Subject: 560-574 Commonwealth Avenue/ 645-665 Beacon Street PNF - Boston Public Works Department Comments

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Included here are Boston Public Works Department comments for the 560-574 Commonwealth Avenue/645-665 Beacon Street PNF.

Site Plan:
Developer must provide an engineer's site plan at an appropriate engineering scale that shows curb functionality on both sides of all streets that abut the property. **DPW 01**

Construction Within The Public Way:
All work within the public way shall conform to Boston Public Works Department (PWD) standards. Any non-standard materials proposed within the public way will require approval through the Public Improvement Commission (PIC) process and a fully executed License, Maintenance and Indemnification (LM&I) Agreement with the PIC. **DPW 02**

Sidewalks:
Developer is responsible for the reconstruction of the sidewalks abutting the project and, wherever possible, to extend the limits to the nearest intersection to encourage and compliment pedestrian improvements and travel along all sidewalks within the Public Right of Way (ROW) within and beyond the project limits. The reconstruction effort also must meet current ADA/AAB guidelines, including the installation of new or reconstruction of existing pedestrian ramps at all corners of all intersections. Plans showing the extents of the proposed sidewalk improvements associated with this project must be submitted to the Public Works Department (PWD) Engineering Division for review and approval. **DPW 03**

The developer is encouraged to contact the City's Disabilities Commission to confirm compliant accessibility within the public right-of-way. **DPW 04**

Discontinuances:
Any and all discontinuances (sub-surface, surface or above surface) within the Public ROW must be processed through the PIC. **DPW 05**

Easements:
Any and all easements associated with this project must be processed through the PIC. **DPW 06**

Landscaping:
Developer must seek approval from the Chief Landscape Architect with the Parks and Recreation Department for all landscape elements within the Public ROW. Program must accompany a LM&I with the PIC. **DPW 07**

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PUBLIC WORKS DEPARTMENT
Boston City Hall • 1 City Hall Sq Rm 714 • Boston MA 02201-2024
CHRIS OSGOOD • Chief of Streets, Transportation, and Sanitation
Phone (617) 635-2854 • Fax (617) 635-7499

Street Lighting:
Developer must seek approval from the PWD Street Lighting Division, where needed, for all proposed street lighting to be installed by the developer, and must be consistent with the area lighting to provide a consistent urban design. The developer should coordinate with the PWD Street Lighting Division for an assessment of any street lighting upgrades that can be considered in conjunction with this project. **DPW 08**

Roadway:
Based on the extent of construction activity, including utility connections and taps, the Developer will be responsible for the full restoration of the roadway sections that immediately abut the property and, in some cases, to extend the limits of roadway restoration to the nearest intersection.A plan showing the extents and methods for roadway restoration shall be submitted to the PWD Engineering Division for review and approval. **DPW 09**

Project Coordination:
All projects must be entered into the City of Boston Utility Coordination Software (COBUCS) to review for any conflicts with other proposed projects within the public right-of-way. The Developer must coordinate with any existing projects within the same limits and receive clearance from PWD before commencing work. **DPW 10**

Green Infrastructure:
The Developer shall work with PWD and the Boston Water and Sewer Commission (BWSC) to determine appropriate methods of green infrastructure and/or stormwater management systems within the public right-of-way. The ongoing maintenance of such systems shall require an LM&I Agreement with the PIC. **DPW 11**

Please note thatthese are the general standard and somewhat specific BPWD requirements applicable to every project, more detailed comments may follow and will be addressed during the PIC review process.

If you have any questions, please feel free to contact me at zachary.wassmouth@boston.gov or at 617-635-4953.

Sincerely,

Zach Wassmouth
Chief Design Engineer
Boston Public Works Department
Engineering Division

CC: Para Jayasinghe, PWD

BOSTON PUBLIC WORKS DEPARTMENT

DPW 01 **Developer must provide an engineer's site plan at an appropriate engineering scale that shows curb functionality on both sides of all streets that abut the property.**

See Figure 1-5 for a site plan.

DPW 02 **All work within the public way shall conform to Boston Public Works Department standards. Any non-standard materials proposed within the public way will require approval through the PIC process and a fully executed License, Maintenance and Indemnification Agreement with the PIC.**

All work within the public way will conform to Boston Public Works Department standards and will be reviewed and approved by the PIC.

DPW 03 **Developer is responsible for the reconstruction of the sidewalks abutting the project and, wherever possible, to extend the limits to the nearest intersection to encourage and complement pedestrian improvements and travel along all sidewalks within the ROW within and beyond the project limits. The reconstruction effort also must meet current ADA/AAB guidelines, including the installation of new or reconstruction of existing pedestrian ramps at all corners of all intersections. Plans showing the extents of the proposed sidewalk improvements associated with this project must be submitted to the PWD Engineering Division for review and approval.**

The Proponent will reconstruct sidewalks within the Project Area.

DPW 04 **The developer is encouraged to contact the City's Disabilities Commission to confirm compliant accessibility within the public right-of-way.**

The Proponent has contacted the Disabilities Commission to work on this issue, together.

DPW 05 **Any and all discontinuances within the Public ROW must be processed through the PIC.**

All discontinuances within the Public ROW, as well as the dedication of new right of way to the City, will be processed through the PIC

DPW 06 **Any and all easements associated with this project must be processed through the PIC.**

Any easements benefiting the public that are associated with the Project will be processed through the PIC.

DPW 07 **Developer must seek approval from the Chief Landscape Architect within the Parks and Recreation Department for all landscape elements within the Public ROW. Program must accompany a LM&I with the PIC.**

The Proponent will seek approval from the Parks and Recreation Department for landscape elements within the Public ROW, as directed by the PIC.

DPW 08 **Developer must seek approval from the PWD Street Lighting Division, where needed, for all proposed street lighting to be installed by the developer, and must be consistent with the area lighting to provide a consistent urban design. The developer should coordinate with the PWD Street Lighting Division for an assessment of any street lighting upgrades that can be considered in conjunction with this project.**

Approval will be obtained from the PWD Street Lighting Division as necessary.

DPW 09 **Based on the extent of construction activity, including utility connections and taps, the Developer will be responsible for the full restoration of the roadway sections that immediately abut the property and, in some cases, to extend the limits of roadway restoration to the nearest intersection. A plan showing the extents and methods for roadway restoration shall be submitted to the PWD Engineering Division for review and approval.**

A plan showing the extents and methods for roadway restoration will be submitted to the PWD Engineering Division for review and approval.

DPW 10 **All projects must be entered into the City of Boston Utility Coordination Software (COBUCS) to review for any conflicts with other proposed projects within the public right-of-way. The Developer must coordinate with any existing projects within the same limits and receive clearance from PWD before commencing work.**

The Proponent will coordinate with existing projects and receive clearance from PWD before commencing work.

DPW 11 **The Developer shall work with PWD and the Boston Water and Sewer Commission (BWSC) to determine appropriate methods of green infrastructure and/or stormwater management systems within the public right-of-way. The ongoing maintenance of such systems shall require an LM&I Agreement with the PIC.**

The Proponent will work with PWD and BWSC.

Boston Water and
Sewer Commission

980 Harrison Avenue
Boston, MA 02119-2540
617-989-7000

April 10, 2018

Mr. Tim Czerwienski
Boston Planning & Development Agency
One City Hall Square
Boston, MA 02201

Re: Kenmore Square Hotels, Project Notification Form

Dear Mr. Czerwienski:

The Boston Water and Sewer Commission (the "Commission") has reviewed the Project Notification Form ("PNF") for the proposed Kenmore Square Hotels Project (the "Project"). For this Project Mark Kenmore, LLC and Buckminster Annex Corporation (together the "Proponents") jointly propose to redevelop their respective properties located directly across Beacon Street from one another, at 560-574 Commonwealth Avenue (the "Commonwealth Avenue site"), and 645, 651, and 655 – 665 Beacon Street (the "Beacon Street Site") in the Kenmore Square neighborhood of Boston. The Project Area is bounded by Commonwealth Avenue to the north, Brookline Avenue to the southeast, and the Massachusetts Turnpike to the south. Beacon Street runs between the Beacon Street Site and the Commonwealth Avenue Site. Three existing structures on the Project Site will be demolished to accommodate the Project.

The Project will have two components. The Commonwealth Avenue Component is located at the intersection of Beacon Street and Commonwealth Avenue and currently contains a one-story building occupied by Citizens Bank. The existing building will be demolished in order to construct a new, approximately 161,000 square foot, 382-room micro-hotel with ground floor retail space and rooftop amenity space which will be open to the public. The Citizens Bank will be relocated to a smaller, street-level location within the new building. No parking will be provided on the Commonwealth Avenue site. Instead, the relatively small number of guests expected to require parking nearby will be accommodated by off-site valet parking.

The Beacon Street Component is located on three parcels at the intersection of Beacon Street and Brookline Avenue. Development will be limited to the parcels at 655 and 665 Beacon Street, and the existing Buckminster Hotel will be retained. The existing two-level parking structure and adjacent commercial building will be demolished and replaced with a new, approximately 186,000 square foot, 295-room hotel containing meeting space, a café/lounge, approximately 145 below-grade parking spaces, and rooftop amenity space open to the public.

Water, sewer, and storm drain service for the site is provided by the Boston Water and Sewer Commission. Existing water, sewer and drain service connections to existing buildings to be demolished will be cut and capped prior to demolition.

For water service the Commonwealth Avenue Component is served on Commonwealth Avenue by a 12-inch low ductile iron cement lined water main which was installed in 2008; on Beacon Street by an existing 12-inch low pit cast iron water main which was installed in 1895; and also on Beacon Street by a

42-inch low ductile iron cement line water main installed in 1976 and rehabilitated in 1983. For water service the Beacon Street Component is served on Beacon Street by a 42-inch low ductile iron cement lined water main installed in 1976 and rehabilitated in 1983; also on Beacon Street by an existing 12-inch low ductile iron cement line water main installed in 2008; and on Brookline Avenue by an existing 12-inch low ductile iron cement lined water main installed in 2008. The PNF states that based on discussions with the Commission, it is anticipated that the Commonwealth Avenue Component will be served via the 12-inch water main on Commonwealth Avenue, and the Beacon Street Component will be served by the 12-inch water main on Beacon Street.

Estimated water demand for the Project is based on the estimated sanitary sewer flow with a factor of 1.1 applied to account for consumption and other losses. Based on this formula, the Project's total estimated peak water demand for domestic use, including both components together, is 96,740 gallons per day (gpd).

For sewer service the Commonwealth Avenue Component is served on Commonwealth Avenue by an existing 32-inch by 42-inch sewer, and on Beacon Street by an existing 20-inch sewer and an existing 12-inch sewer. For sewer service the Beacon Street Component is served on Beacon Street by an existing 20-inch sewer and an existing 12-inch sewer, and on Brookline Avenue by an existing 24-inch by 31-inch sewer. The PNF states that based on discussions with the Commission it is anticipated that the Commonwealth Avenue Component will connect to the Commission's sanitary sewer on Commonwealth Avenue, and the Beacon Street Component will connect to the Commission's sewer on the south side of Beacon Street.

Total sewage generation for both components of the Project together is estimated at 87,945 gpd based on 310 CMR 15.203.

For drainage the Commonwealth Avenue Component is served on Commonwealth Avenue by an existing 24-inch storm drain, and on Beacon Street by an existing 15-inch storm drain. For drainage the Beacon Street Component is served on Beacon Street by an existing 15-inch storm drain and on Brookline Avenue by an existing 108-inch by 132-inch storm drain. Drains serving the two Project Sites ultimately discharge to the Charles River.

The Commission has the following comments regarding the proposed Project:

General

1. The Proponent must submit a site plan and General Service Application to the Commission for the proposed Project. Prior to the initial phase of the site plan development, the Proponent should meet with the Commission's Design and Engineering Customer Services to review water main, sewer and storm drainage system availability and potential upgrades that could impact the Project's development. **BWSC 01**

2. The site plan must show the location of the water mains, sewers and drains serving the Project site, as well as the locations of existing and proposed service connections. **BWSC 02**

3. Any new or relocated water mains, sewers and storm drains must be designed and constructed at the Proponent's expense. They must be designed and constructed in conformance with the Commission's design standards, Water Distribution System and Sewer Use Regulations, and Requirements for Site Plans. **BWSC 03**

4. With the site plan the Proponent must provide detailed estimates for water demand (including water required for landscape irrigation), wastewater generation, and stormwater runoff for the Project. The Proponent should provide separate estimates of peak and continuous maximum water demand for hotel, retail, irrigation and air-conditioning make-up water for the Project. Separate estimates should be provided for each of the two Project Components. **BWSC 04**

5. It is the Proponent's responsibility to evaluate the capacity of the water and sewer system serving the Project sites to determine if the systems are adequate to meet future Project demands. With the site plan, the Proponent must include a detailed capacity analysis for the water and sewer systems serving the Project site, as well as an analysis of the impact the Project will have on the Commission's systems and the MWRA's systems overall. The analysis should identify specific measures that will be implemented to offset the impacts of the anticipated flows on the Commission and MWRA sewer systems. **BWSC 05**

6. Developers of projects involving disturbances of land of one acre or more are required to obtain an NPDES General Permit for Construction from the Environmental Protection Agency. The Proponent is responsible for determining if such a permit is required and for obtaining the permit. If such a permit is required for the proposed Project, a copy of the Notice of Intent and any pollution prevention plan submitted to EPA pursuant to the permit must be provided to the Commission's Engineering Services Department prior to the commencement of construction. **BWSC 06**

7. A Total Maximum Daily Load (TMDL) for Nutrients has been established for the Lower Charles River Watershed by the Massachusetts Department of Environmental Protection (DEP). In order to achieve the reductions in phosphorus loadings required by the TMDL phosphorus concentrations in stormwater discharges to the lower Charles River from Boston must be reduced by 64%. To accomplish the necessary reductions in phosphorus the Commission requires developers of projects in the lower Charles River watershed to infiltrate stormwater discharging from impervious areas in accordance with DEP requirements. With the site plan the Proponent must submit a phosphorus reduction plan for the Project. **BWSC 07**

8. The design of the project must comply with the City of Boston's Complete Streets Initiative, which requires incorporation of "green infrastructure" into street designs. Green infrastructure includes greenscapes, such as trees, shrubs, grasses and other landscape plantings, as well as rain gardens and vegetative swales, infiltration basins, and paving materials and permeable surfaces. The proponent must develop a maintenance plan for the proposed green infrastructure. For more information on the Complete Streets Initiative see the City's website at http://bostoncompletestreets.org/ **BWSC 08**

9. Before the Proponent demolishes any existing structures the existing water, sewer and drain connections that won't be re-used must be cut and capped in accordance with Commission standards. The Proponent must complete a Termination Verification Approval Form for a Demolition Permit, available from the Commission. The completed form must be submitted to the City of Boston's Inspectional Services Department before a Demolition Permit will be issued. **BWSC 09**

Sewage/Drainage

10. The Department of Environmental Protection (DEP), in cooperation with the Massachusetts Water Resources Authority (MWRA) and its member communities are implementing a coordinated approach to flow control in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g., infiltration/ inflow ("I/I")) in the system. Pursuant to the policy new developments with design flow exceeding 15,000 gpd of wastewater are subject to the Department of **BWSC 10**

Environmental Protection's regulation 314 CMR 12.00, section 12.04(2)(d). This regulation requires all new sewer connections with design flows exceeding 15,000 gpd to mitigate the impacts of the development by removing four gallons of infiltration and inflow (I/I) for each new gallon of wastewater flow added. The Commission will require the Proponent to develop an inflow reduction plan consistent with the regulation. The 4:1 reduction should be addressed at least 90 days prior to activation of water service, and will be based on the estimated sewage generation provided with the Project site plan.

11. Oil traps are required on drainage systems discharging from enclosed parking garages. Discharges from the oil traps must be directed to a building sewer and must not be mixed with roof or other surface runoff. The requirements for oil traps are provided in the Commission's Requirements for Site Plans. **BWSC 11**

12. Grease traps will be required in any food service facility in the new development in accordance with the Commission's Sewer Use Regulations. The proponent is advised to consult with the Commission before preparing plans for food service facilities. **BWSC 12**

13. The discharge of dewatering drainage to a sanitary sewer is prohibited by the Commission and the MWRA. The discharge of any dewatering drainage to the storm drainage system requires a Drainage Discharge Permit from the Commission. If the dewatering drainage is contaminated with petroleum products for example, the Proponent will be required to obtain a Remediation General Permit from the EPA for the discharge. **BWSC 13**

14. The proponent must fully investigate methods for retaining stormwater on-site before the Commission will consider a request to discharge stormwater to the Commission's drainage system. **BWSC 14**

15. The site plan must show in detail how drainage from the building's roof top and from other impervious areas will be managed. Roof runoff and other stormwater runoff must be conveyed separately from sanitary waste at all times. **BWSC 15**

16. The Massachusetts Department of Environmental Protection (MassDEP) has established Performance Standards for Stormwater Management. The Standards address stormwater quality, quantity and recharge. In addition to Commission standards, the proposed Project will be required to meet MassDEP's Stormwater Management Standards. **BWSC 16**

17. In conjunction with the site plan and General Service Application the Proponent will be required to submit a Stormwater Pollution Prevention Plan. The plan must: **BWSC 17**

    - Specifically identify how the Project will comply with the Department of Environmental Protection's Performance Standards for Stormwater Management both during construction and after construction is complete.

    - Identify specific best management measures for controlling erosion and preventing the discharge of sediment, contaminated stormwater or construction debris to the Commission's drainage system when construction is underway.

    - Include a site map which shows, at a minimum, existing drainage patterns and areas used for storage or treatment of contaminated soils, groundwater or stormwater, and the location of major control or treatment structures to be utilized during construction.

18. The Commission requests that the Proponent install a permanent casting stating: "Don't Dump: Drains to Charles River" next to any new catch basin installed as part of the Project. The Proponent may contact the Commission's Operations Division for information regarding the purchase of the castings. BWSC 18

19. The Commission encourages the Proponent to explore additional opportunities for protecting stormwater quality by minimizing sanding and the use of deicing chemicals, pesticides and fertilizers. BWSC 19

Water

20. The Proponent is required to obtain a Hydrant Permit for use of any hydrant during construction of the Project. The water used from the hydrant must be metered. The Proponent should contact the Commission's Operations Department for information on obtaining a Hydrant Permit. BWSC 20

21. The Commission utilizes a Fixed Radio Meter Reading System to obtain water meter readings. Where a new water meter is needed, the Commission will provide a Meter Transmitter Unit (MTU) and connect the device to the meter. For information regarding the installation of MTUs, the Proponent should contact the Commission's Meter Installation Department. BWSC 21

22. The Proponent should explore opportunities for implementing water conservation measures in addition to those required by the State Plumbing Code. In particular the Proponent should consider indoor and outdoor landscaping which requires minimal use of water to maintain. If the Proponent plans to install in-ground sprinkler systems, the Commission recommends that timers, soil moisture indicators and rainfall sensors be installed. The use of sensor-operated faucets and toilets in common areas of buildings should also be considered. BWSC 22

Thank you for the opportunity to comment on this Project.

Yours truly,

John P. Sullivan, P.E.
Chief Engineer and Operations Officer

JPS/as

cc: Damien Chaviano, Mark Kenmore, LLC
Jackson Slomiak, Buckminster Annex Corp.
Katherine Ronan, Mass. Water Resources Authority
Maura Zlody, Boston Environment Department
Mike Nelson, Boston Water and Sewer Commission
Phil Larocque, Boston Water and Sewer Commission

BOSTON WATER AND SEWER COMMISSION

BWSC 01 **The Proponent must submit a site plan and General Service Application to the Commission for the proposed Project. Prior to the initial phase of the site plan development, the Proponent should meet with the Commission's Design and Engineering Customer Services to review water main, sewer and storm drainage system availability and potential upgrades that could impact the Project's development.**

The Proponent has had initial meetings with the Commission's Design and Engineering Customer Services to review the proposed Project and review initial impacts and will continue to coordinate with the Commission as the project moves forward and a site plan and General Service Application (GSA) is submitted.

BWSC 02 **The site plan must show the location of the water mains, sewers, and drains serving the Project site, as well as the locations of existing and proposed service connections.**

The site plan will show the location of all existing and proposed water mains, sewers, drains, and service connections.

BWSC 03 **Any new or relocated water mains, sewers and storm drains must be designed and constructed at the Proponent's expense. They must be designed and constructed in conformance with the Commission's design standards, Water Distribution System and Sewer Use Regulations, and Requirements for Site Plans.**

The Proponent agrees to design, construct and finance all relocated water mains, sanitary sewers and storm drains.

BWSC 04 **With the site plan the Proponent must provide detailed estimates for water demand, wastewater generation, and stormwater runoff for the Project. The Proponent should provide separate estimates of peak and continuous maximum water demand for hotel, retail, irrigation and air-conditioning make-up water for the Project. Separate estimates should be provided for each of the two Project Components.**

The initial estimates for water demand and wastewater generation runoff are included in Chapter 7.0 of the DPIR. The site plan and GSA will include detailed estimates for water, wastewater, and stormwater, which will include peak and continuous water demand.

BWSC 05 **It is the Proponent's responsibility to evaluate the capacity of the water and sewer system serving the Project sites to determine if the systems are adequate to meet future Project demands. With the site plan, the Proponent must include a detailed capacity analysis for the water and sewer systems serving the Project site, as well as an analysis of the impact the Project will have on the Commission's systems and the MWRA's**

systems overall. The analysis should identify specific measures that will be implemented to offset the impacts of the anticipated flows on the Commission and MWRA systems.

Based on an initial discussion with BWSC, there are no expected water capacity issues in the vicinity of the Project Area. Prior to full design, this will be confirmed by hydrant flow testing performed for each main to be connected to by BWSC. The Project's engineer will coordinate water demand and availability with BWSC during Project design to ensure the Project needs are met while maintaining adequate water flows to the surrounding neighborhood.

In addition, based on preliminary calculations and discussions with BWSC, there are no sewer capacity problems in the vicinity of the Project Area. The Project's engineer will coordinate final, proposed sewer flows and available capacity with BWSC during the Site Plan review process to ensure the Project needs are met without disruption of service to the surrounding area.

BWSC 06 **Developers of projects involving disturbances of land of one acre or more are required to obtain an NPDES General Permit for Construction from the Environmental Protection Agency. The Proponent is responsible for determining if such a permit is required and for obtaining the permit. If such a permit is required for the proposed Project, a copy of the Notice of Intent and any pollution prevention plan submitted to the EPA pursuant to the permit must be provided to the Commission's Engineering Services Department prior to the commencement of construction.**

The Project's construction activities will disturb greater than one acre and thus will require a NPDES General Permit for Construction under the EPA 2017 Construction General Permit. The Proponent will prepare a site-specific Stormwater Pollution Prevention Plan (SWPPP) for the Project and apply for a NPDES General Permit for Construction prior to the commencement of construction activities. This plan will also be submitted to BWSC for their review and approval.

BWSC 07 **A Total Maximum Daily Load (TMDL) for Nutrients has been established for the Lower Charles River Watershed by the MassDEP. In order to achieve the reductions on phosphorus loadings required by the TMDL phosphorus concentrations in stormwater discharges to the lower Charles River from Boston must be reduced by 64%. To accomplish necessary reductions in phosphorus the Commission requires developers of projects in the lower Charles River watershed to infiltrate stormwater discharging from impervious areas in accordance with DEP requirements. With the site plan the Proponent must submit a phosphorus reduction plan for the Project.**

As part of the Site Plan process, the Proponent will submit a phosphorus reduction plan to the BWSC for review and approval.

The Project will direct the runoff from the Project Area to separated storm sewer systems owned and operated by BWSC. Prior to discharge, stormwater runoff from the roof area will be collected on-site and will be routed to injection wells sized in accordance with BWSC regulations in an effort to reduce the impact on the BWSC drainage system. Figure 7-2 details the proposed stormwater infrastructure for the Project Area.

BWSC 08 **The design of the project must comply with the City of Boston's Complete Streets Initiative, which requires incorporation of green infrastructure into street designs. Green infrastructure includes greenscapes, such as trees, shrubs, grasses and other landscape plantings, as well as rain gardens and vegetative swales, infiltration basins, and paving materials and permeable surfaces. The proponent must develop a maintenance plan for the proposed green infrastructure.**

The Project will comply with the Complete Streets Initiative in the design of New Road, Beacon Street and Commonwealth Avenue, along the Project frontage.

BWSC 09 **Before the Proponent demolishes any existing structures the existing water, sewer and drain connections that won't be re-used must be cut and capped in accordance with Commission standards. The Proponent must complete a Termination Verification Approval Form for a Demolition Permit, available from the Commission. The completed form must be submitted to the City of Boston's inspectional Services Department before a Demolition Permit will be issued.**

Prior to demolition of any structures, the Proponent will obtain a General Service Application (GSA) from Boston Water and Sewer Commission (BWSC) and upon issuance of GSA, will cap all existing water, sewer and drain connections that will not be reused. The Proponent will complete a Termination Verification Approval Form and submit it to the City of Boston's Inspectional Services Department in order to receive a Demolition Permit.

BWSC 10 **The Department of Environmental Protection (DEP), in cooperation with the Massachusetts Water Resources Authority (MWRA) and its member communities are implementing a coordinated approach to flow control in the MWRA regional wastewater system, particularly the removal of extraneous clean water (e.g., infiltration/ inflow) in the system. Pursuant to the policy new developments with design flow exceeding 15,000 gpd of wastewater are subject to the Department of Environmental Protection's regulation 314 CMR 12.00, section 12.04(2)(d). This regulation requires all new sewer connections with design flows exceeding 15,000 gpd to mitigate the impacts of the development by removing four gallons of infiltration and inflow for each new gallon of wastewater flow added. The Commission will**

require the Proponent to develop an inflow reduction plan consistent with the regulation. The 4: I reduction should be addressed at least 90 days prior to activation of water service, and will be based on the estimated sewage generation provided with the Project site plan.

The Proponent will continue to work with BWSC as the design progresses to determine the final sewer flow and fee that will be paid to BWSC in lieu of identifying and constructing I/I improvements. Please refer to Section 7.2.4 for discussion on I/I removal and Section 7.2.3 for discussion of proposed sewer connections.

BWSC 11 **Oil traps are required on drainage systems discharging from enclosed parking garages. Discharges from the oil traps must be directed to a building sewer and must not be mixed with roof or other surface runoff. The requirements for oil traps are provided in the Commission's Requirements for Site Plans.**

Although not anticipated, the Proponent will provide an oil and grease separator for any enclosed parking garage connection prior to connection into the municipal sanitary sewer system. See Section 7.2.3 for additional information on proposed sanitary sewer connections.

BWSC 12 **Grease traps will be required in any food service facility in the new development in accordance with the Commission's Sewer Use Regulations. The proponent is advised to consult with the Commission before preparing plans for food service facilities.**

The Proponent will install grease traps for all Project uses that include food service.

BWSC 13 **The discharge of dewatering drainage to a sanitary sewer is prohibited by the Commission and the MWRA. The discharge of any dewatering drainage to the storm drainage system requires a Drainage Discharge Permit from the Commission. If the dewatering drainage is contaminated with petroleum products for example, the Proponent will be required to obtain a Remediation General Permit from the EPA for the discharge.**

All dewatering discharges will be properly permitted and managed in compliance with BWSC and MWRA requirements as well as other state and federal requirements.

BWSC 14 **The proponent must fully investigate methods for retaining stormwater on-site before the Commission will consider a request to discharge stormwater to the Commission's drainage system.**

See Section 7.4.2 for additional information on proposed storm drainage system.

BWSC 15 **The site plan must show in detail how drainage from the building's rooftop and from other impervious areas will be managed. Roof runoff and other stormwater runoff must be conveyed separately from sanitary waste at all times.**

The Project maintains separate utility infrastructure systems for sanitary sewage collection and stormwater collection. See Section 7.2.3 for additional information on proposed sanitary sewer connections and Section 7.2.4 for mitigation measures. Refer to Section 7.4.2 for more information on the proposed storm drainage system design. The Proponent will conduct dye testing on all existing sanitary sewer and stormwater service connections that are proposed for reuse in redevelopment.

BWSC 16 **The Massachusetts Department of Environmental Protection (MassDEP) has established Performance Standards for Stormwater Management. The Standards address stormwater quality, quantity and recharge. In addition to Commission standards, the proposed Project will be required to meet MassDEP's Stormwater Management Standards.**

The Project will be designed in compliance with MassDEP Stormwater Management Standards. See Section 7.4.2 for additional details on the proposed stormwater management system.

BWSC 17 **In conjunction with the site plan and General Service Application the Proponent will be required to submit a Stormwater Pollution Prevention Plan.**

See Section 7.4.2 for further discussion on mitigating construction period impacts. The Proponent will prepare a site-specific Stormwater Pollution Prevention Plan (SWPPP) for the Project prior to construction which will identify BMP's for managing sediment, groundwater and stormwater discharge during the construction period.

BWSC 18 **The Commission requests that the Proponent install a permanent casting stating "Don't Dump: Drains to Charles River" next to any catch basin installed as part of the Project. The Proponent may contact the Commission's Operations Division for information regarding the purchase of the castings.**

The Proponent will obtain "Do Not Dump: Drains to Charles River" plaques from BWSC for installation adjacent to all proposed catch basin inlets.

BWSC 19 **The Commission encourages the Proponent to explore additional opportunities for protecting stormwater quality by minimizing sanding and the use of deicing chemicals, pesticides and fertilizers.**

The Proponent is committed to minimizing use of pesticides and fertilizers. The Proponent will also explore additional opportunities to minimize sanding and deicing on Project roadways and pedestrian areas.

BWSC 20 **The Proponent is required to obtain a Hydrant Permit for use of any hydrant during construction of the Project. The water used from the hydrant must be metered. The Proponent should contact the Commission's Operations Department for information on obtaining a Hydrant Permit.**

The Proponent will obtain a hydrant permit from BWSC prior to the commencement of construction activities.

BWSC 21 **The Commission utilizes a Fixed Radio Meter System to obtain water meter readings. Where a new water meter is needed, the Commission will provide a Meter Transmitter Unit (MTU) and connect the device to the meter.**

The Proponent will contact the BWSC's Meter Department during the design process to determine MTU configurations.

BWSC 22 **The Proponent should explore opportunities for implementing water conservation measures in addition to those required by the State Plumbing Code. In particular, the Proponent should consider indoor and outdoor landscaping which requires minimal use of water to maintain. If the Proponent plans to install in-ground sprinkler systems, the Commission recommends that timers, soil moisture indicators and rainfall sensors be installed. The use of sensor-operated faucets and toilets in common areas of buildings should also be considered.**

Water Supply Conservation and Mitigation is described in Section 7.3.4. The Project will be LEED certifiable in accordance with the BPDA's Article 37 Green Building program, as such various water conservation measures such as low-flow toilets and urinals, restricted flow faucets, and sensor operated sinks, toilets, and urinals and low-impact landscaping may be incorporated in order to meet the LEED water conservation requirements. Specific water conservation measures to be included in the Project will be more fully described as the building designs develop.

Boston
Groundwater Trust

229 Berkeley St, Fourth Floor, Boston, MA 02116
617.859.8439
www.bostongroundwater.org

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Executive Director

Christian Simonelli

April 6th, 2018

Tim Czerwienski, Project Manager
Boston Planning & Development Agency
One City Hall Square
Boston, MA 02201-1007

Subject: Kenmore Square Hotels Project Notification Form (PNF) Comments

Dear Mr. Czerwienski:

Thank you for the opportunity to comment on the Kenmore Square Hotels Project Notification Form (PNF) located in the Fenway. The Boston Groundwater Trust was established by the Boston City Council to monitor groundwater levels in sections of Boston where the integrity of building foundations is threatened by low groundwater levels and to make recommendations for solving the problem. Therefore my comments are limited to groundwater related issues.

Although the project is not located in the Groundwater Conservation Overlay District (GCOD) established under Article 32 of the Zoning Code, the document states that the Project will be required to provide stormwater recharge in keeping with current Boston Water and Sewer Commission (BWSC) water quality policies. The document also states that with both projects abutting the GCOD, the inclusion of stormwater recharge should benefit the abutting GCOD area.

Compliance with the GCOD requires both the installation of a recharge system and a demonstration that the project cannot cause a reduction in groundwater levels on site or on adjoining lots. As stated in the document the Project Area is not located within the GCOD, it is immediately adjacent to the GCOD boundary. There are piling supported buildings in the immediate vicinity of this boundary.

The PNF states that 651 Beacon Street parcel will have approximately 145 below grade spaces. This will extend many feet below the existing street grade. In addition, it is expected that the proposed structures will have deep foundations extending approximately 150-200 feet down to the bedrock layer. The foundation should be designed and **BGWT 01** constructed to not cause a reduction in groundwater levels on site or on adjoining lots pre and post construction as if it were in the GCOD.

Before the zoning approval can be put in place, the proponent should provide the BPDA and the Trust a letter stamped by a professional **BGWT 02** engineer registered in Massachusetts that details how it will accomplish and meet the GCOD requirement for no reduction in groundwater levels on site or on adjoining lots.

I look forward to continuing to work with the proponent and the Agency to assure that this project can have only positive impacts on area groundwater levels.

Very truly yours,

Christian S. Simonelli

Christian Simonelli
Executive Director

CC: Kathleen Pederson, BPDA
Maura Zlody, EEOS

BOSTON GROUNDWATER TRUST

BGWT 01 **The foundation should be designed and constructed to not cause a reduction in groundwater levels on site or on adjoining lots pre and post construction as if it were in the GCOD.**

It is anticipated that the foundation will be designed to not cause a reduction in groundwater levels on site or on adjoining lots. Groundwater inspection wells will be included.

BGWT 02 **Before the zoning approval can be put in place, the proponent should provide the BPDA and the Trust a letter stamped by a professional engineer registered in Massachusetts that details how it will accomplish and meet the GCOD requirement for no reduction in groundwater levels on site or on adjoining lots.**

The Proponent will provide the BPDA and the Trust a letter detailing how it will accomplish and meet the GCOD requirements, if required.

9.4 Impact Advisory Group Comment Letters

Dear Tim,
I am excited about plans for new development in Kenmore Square. The Kenmore/Fenway neighborhood is overdue for improvement and I believe new private development can help by spurring economic growth and by investing in outdated and neglected public spaces. Nevertheless, I have several concerns about the proposed project's impact. These arise from my various roles in the community and I look forward to learning more about the developers' approaches to minimizing these concerns (listed below in order of relative priority).
Thanks for your consideration.
Sincerely,
Sam Wertheimer

1. Bicycle and pedestrian safety

As a regular Hubway user and owner of a dog who needs frequent walks, I spend a significant amount of time recreating on the pedestrian and bicycle paths that crisscross my neighborhood. I will also soon become a father and look forward to strolls and bike rides with my daughter and hope she will one day feel safe enough to enjoy these neighborhood resources independently. My current and planned use of pedestrian and bicycle resources causes concern about traffic in the area. Specifically, I am worried about dangers to walkers and SW 01
bikers caused by exacerbation of the following issues:

- Overall traffic volume in the neighborhood;
- Taxis and ridesharing service cars as a percent of overall traffic; and
- Limited traffic calming measures, poor signage and dim street lighting.

Development in Kenmore Square will bring more visitors to the area. This will be a boon for economic vitality if these visitors are able to move through the neighborhood efficiently. Unfortunately, movement is already limited during times of peak traffic and this leads drivers to dangerous shortcuts, such as Bay State Road and Back Street, that avoid traffic on Commonwealth Avenue (see Figure 1 for details). More visitors mean more cars looking for shortcuts, which will likely worsen dangers for pedestrians and cyclists.

Visitors to the Hotel Commonwealth frequently use taxis and ridesharing services like Lyft and Uber. More of this type of car traffic will likely drive through the area if hotel capacity increases. Although most of these drivers are safe, some portion behave more erratically than neighborhood residents who know the idiosyncrasies of the local streets and do not navigate by frequently checking written or digital directions. Further, taxi and ridesharing drivers do not always conscientiously obey existing street signs and often stop in the middle of bike lanes to pick up or drop off passengers. For example, these drivers often use the bike lane as a travel lane on westbound Beacon Street near Charlesgate W. A potential increase in unpredictable drivers who ignore public safety markings makes me nervous.

Lastly, an existing dearth of traffic calming, signage and lighting in the area may compound the SW 02
issues above. Cars already speed down Bay State Rd. and ignore the dimly-lit stop sign at Raleigh and Bay State Rd. They also crash into the fences in Kenmore Square (the wrought iron fence where Beacon splits from Comm. Ave. has been hit at least twice in the last two years) and accelerate dangerously into pedestrian walkways (the eastbound Comm. Ave. crossing in

front of the Buckminster Hotel is particularly dangerous as cars get a green light for a left or U-turn at the same time that pedestrians get a "walk" sign). These traffic safety limitations already compromise the feeling of safety in Kenmore Square for pedestrians and cyclists and more traffic and a higher percentage of taxi and ridesharing drivers may only worsen the existing issues.

2. Shopping and recreation for me

As a homeowner on Bay State Road, I frequent several local businesses, including restaurants like Island Creek Oyster Bar, Eastern Standard, and Cornwall's and stores like Wine Gallery and City Convenience. I also often refer friends to the Hotel Commonwealth. All of these businesses feature high-quality products at various price points, accompanied by warm, unpretentious service. Similar businesses in neighborhoods where I also considered homes, including the Back Bay and the South End, offer more luxurious experiences but I prefer those in my neighborhood.

I hope that new retailers in the area maintain the standards set by my favorite local establishments and do not try to replicate those offered elsewhere. However, I also hope they avoid emulating some local businesses, such as 7-Eleven and Qdoba, that appear to extract significantly more value from local residents and visitors than they reinvest in the community. As such, I would appreciate further information about the Kenmore Hotel project developers' plans for securing restaurant, retail, hotel contractor and other tenants for the planned new properties that offer high-value goods and services while avoiding those focused on trendy market segments and short-term returns that ignore community interests. I would also appreciate learning more about how planned development will improve existing offerings, including those at the Hotel Buckminster, to match the best of Kenmore Square.

3. Shopping and recreation for others

As an active member of the Charlesgate Alliance, a neighborhood group dedicated to bringing positive change to the Charlesgate Neighborhood, I am committed to restoring the historic "Charlesgate" area and to reuniting a neighborhood marred by too-long neglected public space.

This commitment is partly driven by an interest in serving vulnerable populations with limited resources. In particular, the Kenmore-Fenway area is home to several vulnerable groups and adjoins several others. Specifically, the median income in 2012 for census tracts 010104 and 010103 was between $10,446 - $30K, compared to an overall median of $53,136 for the City of Boston.[1] Nearby, the median income for census tracts 010203 and 000803 was between $30,000.01 - $53,136 in 2012. Also, there are high proportions of older adults and of residents with limited English proficiency in my neighborhood.[2] And anecdotally, many students traverse my neighborhood to classes or dorms at the nearby schools, and there is a large community of seniors and disabled people living right in Kenmore Square.[3]

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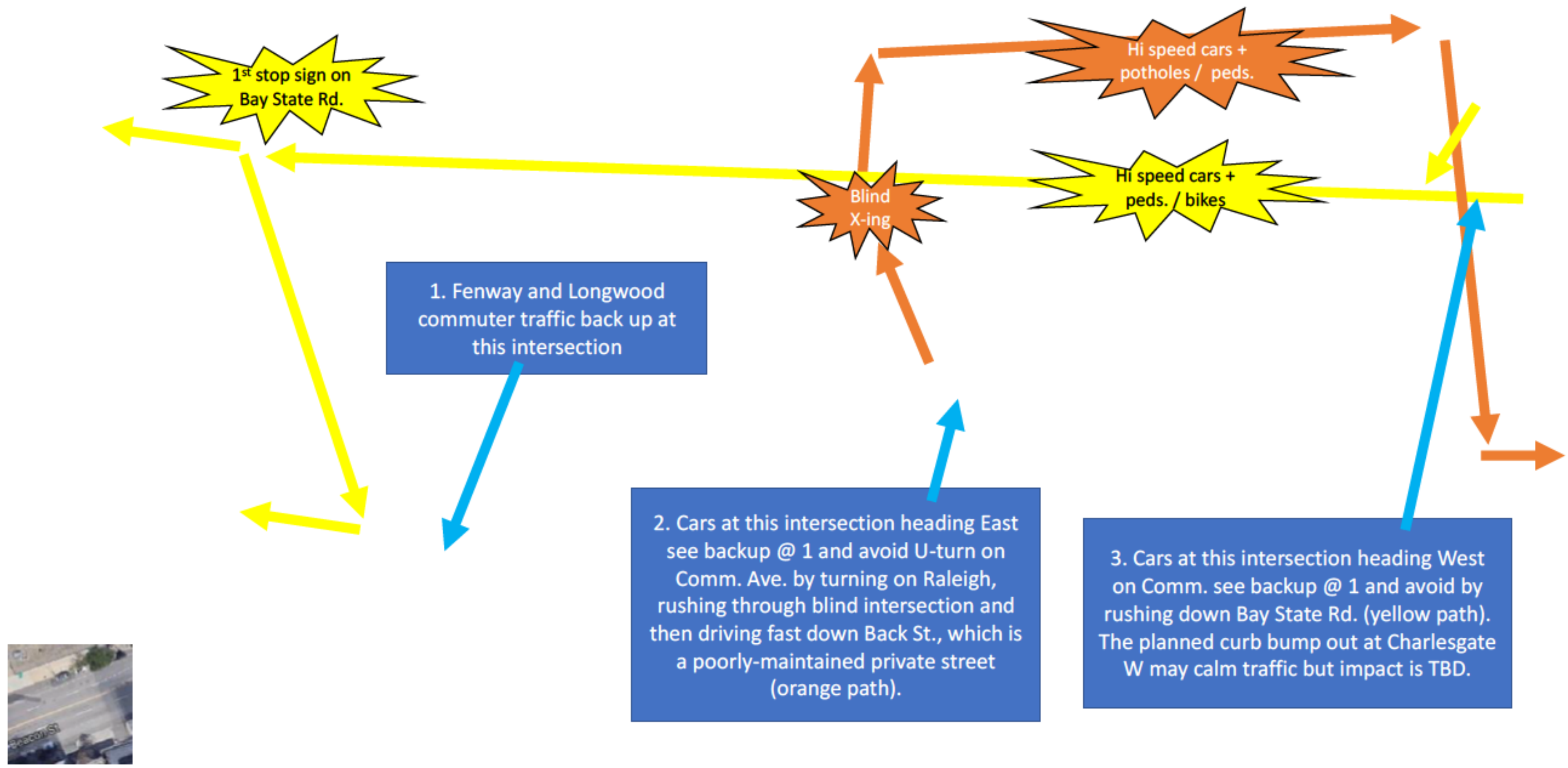
[1] http://www.bostonplans.org/getattachment/36c03693-2a54-4fec-8b64-b130c8a509e3/
[2] https://www.boston.gov/departments/environment/climate-ready-boston-map-explorer
[3] http://www.kenmoreabbey-apts.com/

While these groups may lack time or resources to directly contribute to neighborhood organizations like the Charlesgate Alliance, they may nevertheless appreciate improvements to local public spaces. By working to solicit their input and incorporating their interests in the Charlesgate Alliance's activities, I hope to encourage positive interactions among the diverse residents of our frequently overlooked community.

I have similar goals for improvements in Kenmore Square and hope that the Kenmore Hotels developers share my interest in vibrant, inclusive public spaces. These spaces, along with the retailers and programming in the spaces, should welcome all of the groups who live in and around the Square. Although it may be difficult to define and manifest an "inclusive" space, I will nevertheless keep this interest in mind as I review the Kenmore Hotels project and would appreciate further information about how the developers and their partners will honor our area's diversity. SW 03

Figure 1. Current Traffic Issues in Kenmore Square



SAM WERTHEIMER

SW 01 **I am worried about dangers to walkers and bikers caused by exacerbation of the following issues: Overall traffic volume in the neighborhood; Taxis and ridesharing service cars as a percent of overall traffic; and Limited traffic calming measures, poor signage and dim street lighting.**

The proposed roadway and transportation network changes introduce substantial safety improvements for those walking and biking in Kenmore Square, even with increased traffic from the Project and nearby approved developments. Traffic volume—including taxi and TNC trips—increases, but delays are reduced in Kenmore Square as a result of the Project's roadway reconfiguration and signalization updates. The reconfiguration also is expected to naturally calm traffic due to narrower lanes and many new curb extensions associated with added crosswalks. The new public plaza is expected to be well-lit with pedestrian-scale lighting.

SW 02 **Lastly, an existing dearth of traffic calming, signage and lighting in the area may compound the issues above. Cars already speed down Bay State Rd. and ignore the dimly-lit stop sign at Raleigh and Bay State Rd. They also crash into the fences in Kenmore Square (the wrought iron fence where Beacon splits from Comm. Ave. has been hit at least twice in the last two years) and accelerate dangerously into pedestrian walkways (the eastbound Comm. Ave. crossing in front of the Buckminster Hotel is particularly dangerous as cars get a green light for a left or U-turn at the same time that pedestrians get a "walk" sign). These traffic safety limitations already compromise the feeling of safety in Kenmore Square for pedestrians and cyclists and more traffic and a higher percentage of taxi and ridesharing drivers may only worsen the existing issues.**

See above response.

SW 03 **I would appreciate further information about the Kenmore Hotel project developers' plans for securing restaurant, retail, hotel contractor and other tenants for the planned new properties that offer high-value goods and services while avoiding those focused on trendy market segments and short-term returns that ignore community interests. I would also appreciate learning more about how planned development will improve existing offerings, including those at the Hotel Buckminster, to match the best of Kenmore Square.**

The Proponent continues to identify potential tenants for the Project.

SW 04 **I have similar goals for improvements in Kenmore Square and hope that the Kenmore Hotels developers share my interest in vibrant, inclusive public spaces. These spaces, along with the retailers and programming in the spaces, should welcome all of the groups who live in and around the Square. Although it may be difficult to define and manifest an "inclusive" space, I will nevertheless keep this interest in mind as I review the Kenmore Hotels project and would appreciate further information about how the developers and their partners will honor our area's diversity.**

Kenmore Square has long held an incongruous position in the civic life of Boston. It is a major crossroads for people coming in and out of the city, and a center of diverse pedestrian activity. At the same time, because its spaces accessible to the pedestrian public consist of small, irregular islands in the crisscrossing flows of vehicular traffic, there is very little opportunity for residents or visitors to enjoy the site rather than simply pass through it.

The proposed redevelopment of Kenmore Square is designed to leverage its civic potential. Safely and efficiently altering the traffic flow through the site allows for the creation of a generous public plaza and a new, hotel tower that embraces public life and expresses Kenmore Square's significance.

With plaza-level zones of circulation and respite as well as activity and calm, and the anchoring presence of the hotel tower, the new Kenmore Square can truly become a heart of civic and community life—giving BU students a place to gather between classes, baseball fans a meet-up spot before games at Fenway, and Kenmore and Back Bay residents a place to meet for coffee and outdoor yoga.

9.5 Advocacy Group Comment Letters

BOSTON PRESERVATION ALLIANCE

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Executive Director
Gregory J. Galer, Ph.D.

The Otis House
141 Cambridge Street
Boston, MA 02114
617.367.2458
bostonpreservation.org

May 1, 2018

Mr. Tim Czerwienski
Boston Planning and Development Agency
One City Hall Square
Boston, MA 02201
Via Email: Tim.Czerwienski@Boston.gov
Re: 560-574 Commonwealth Avenue/645-665 Beacon Street, Kenmore

Dear Mr. Czerwienski,

The Boston Preservation Alliance is Boston's primary, non-profit advocacy organization that protects and promotes the use of historic buildings and landscapes in all of the city's neighborhoods. With 35 Organizational Members, 103 Corporate Members, and a reach of 35,000 friends and supporters we represent a diverse constituency advocating for the thoughtful evolution of the city and celebration of its unique character. We appreciate the opportunity to offer comments on projects that impact the historic character of the city.

The Alliance has had the opportunity to meet with the project team for a preliminary discussion about the proposal. We are not opposed to the construction of two hotel buildings on these sites nor do we feel the buildings and spaces that will be lost are historically significant or important contributors to the character of Kenmore Square. However, we do have concerns about the introduction of a dramatic new building scale to the square and its impacts to surrounding historic resources, especially without a plan to manage and appropriately shape this evolution of the neighborhood.

Kenmore Square is a unique neighborhood in the heart of Boston. Visitors and locals alike frequent the neighborhood as students, residents, baseball fans, sight-seers, and marathon runners. It is a place of celebration, nostalgia, and vibrant activity. For everything the neighborhood gains with the continuing wave of new development, it loses in grit, authenticity, and history. Part of what makes Kenmore Square and the Fenway neighborhood so special is that they feel like quintessential Boston. As the older buildings come down and the dynamic of the neighborhood continues to change, it becomes less like Boston and more like any other urban city. These new BPA 01
proposed buildings contribute to this wave of change and while we welcome the vibrancy they will bring, in light of the full scope of change in this neighborhood we are cautious about embracing the shift in the scale and sense of place so unique to Kenmore Square.

With those concerns in mind we request additional renderings and/or massing drawings of what the proposed buildings will look like from several different perspectives. We still feel we do not fully understand the implications of the

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Regan Shields Ives AIA

Catharine Sullivan

Anthony Ursillo

Peter Vanderwarker

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Gregory J. Galer, Ph.D.

May 1, 2018

Mr. Tim Czerwienski
Boston Planning and Development Agency
One City Hall Square
Boston, MA 02201
Via Email: Tim.Czerwienski@Boston.gov

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The Alliance has had the opportunity to meet with the project team for a preliminary discussion about the proposal. We are not opposed to the construction of two hotel buildings on these sites nor do we feel the buildings and spaces that will be lost are historically significant or important contributors to the character of Kenmore Square. However, we do have concerns about the introduction of a dramatic new building scale to the square and its impacts to surrounding historic resources, especially without a plan to manage and appropriately shape this evolution of the neighborhood.

Kenmore Square is a unique neighborhood in the heart of Boston. Visitors and locals alike frequent the neighborhood as students, residents, baseball fans, sight-seers, and marathon runners. It is a place of celebration, nostalgia, and vibrant activity. For everything the neighborhood gains with the continuing wave of new development, it loses in grit, authenticity, and history. Part of what makes Kenmore Square and the Fenway neighborhood so special is that they feel like quintessential Boston. As the older buildings come down and the dynamic of the neighborhood continues to change, it becomes less like Boston and more like any other urban city. These new BPA 01
proposed buildings contribute to this wave of change and while we welcome the vibrancy they will bring, in light of the full scope of change in this neighborhood we are cautious about embracing the shift in the scale and sense of place so unique to Kenmore Square.

With those concerns in mind we request additional renderings and/or massing drawings of what the proposed buildings will look like from several different perspectives. We still feel we do not fully understand the implications of the

The Otis House
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proposals. We think it essential to understand and consider the pedestrian experience from Kenmore Square, especially as baseball fans head to and from Fenway Park, and views from inside Fenway Park. These perspectives will be how millions of people will experience these buildings and it is important that we are carefully considering the view sheds and character that define the neighborhood including the nearby Bay State Road and Back Bay Landmark Districts, historic Fenway Park, and the iconic and pending Landmark Citgo Sign. We ask the proponent to provide additional renderings from several perspectives including: approaching the site from the southern end of Beacon Street with views of the Citgo Sign; views including Related Beal's proposal for the Citgo Sign site if possible; from within Fenway Park; from Charlesgate Park or closer to downtown to understand how the proposed buildings enhance or detract from the skyline and the pedestrian experience. The views coming into Kenmore Square are so defining for the city: the Citgo Sign, the light towers of Fenway Park, and even the glow of Fenway Park at night, visible even across the Charles River. We feel the impact of the proposal must be understood within that entire context. BPA 02

We hope examination of additional views will allow us to fully support this proposal. Because of its proximity to public transit and the wide, open avenues where several streets converge, we feel this area can successfully support more density. This proposal attempts to form a well-defined edge for Kenmore Square and could help create a more intimate "outdoor room" experience for pedestrians. If this project is approved at this height, though, it could set precedent for future buildings of similar height nearby which has the potential to overwhelm the scale of the neighborhood. We need to better understand all of the planned and potential developments to assess their collective impact on the character and historic resources that remain.

BPA 03

The Alliance would also like to be clear that while substantial changes to the Buckminster Hotel are not part of this proposal, we do feel that the building has a significant presence on the square and should be carefully restored, optimally as a part of this project, but if not, then support of this project should require a commitment to such a restoration in the near future. We encourage the BPDA to make the Buckminster restoration a part of the PDA approval. We currently have no concerns regarding the proposal to add openings to the back of the building to engage the proposed pedestrian area, but look forward to understanding more about these interventions and how the proposal will provide benefits to enhance the historic building.

Additionally we would like to better understand the use of a Planned Development Area across two noncontiguous sites, across a large, public street, and with two owners. While we understand this situation or something similar has occurred before, although rarely, we want to be sure that there are no precedents set that will facilitate inappropriate future development using this mechanism. We recognize the PDA as a powerful development tool that can lead to more collaborative work and enhanced public benefits. We also recognize that it is a tool that can limit the community voice in outcomes which residents typically find unsatisfactory, particularly as it weakens existing zoning, and by extension weakens zoning broadly across the entire city. We believe that it is necessary to balance that ability to subvert base zoning without a standard zoning appeals process and PDA usage across multiple owners to provide unique opportunities with the planning goals of neighborhoods, as specified in Article 80. We urge the BPDA to use such a structure judiciously.

We look forward to further engagement with the project team and the BPDA, in particular with additional views from various perspectives, to allow us to more fully assess the proposal as the process continues.

Thank you,

Greg Galer
Executive Director

CC

Brona Simon, Massachusetts Historical Commission
Josh Zakim, Boston City Councilor
Rosanne Foley, Boston Landmarks Commission
Damien Chaviano, Mark Kenmore, LLC
Jackson Slomiak, Buckminster Annex Corporation

BOSTON PRESERVATION ALLIANCE

BPA 01 **These new proposed buildings contribute to the wave of change and while we welcome the vibrancy they will bring, in light of the full scope of change in this neighborhood we are cautious about embracing the shift in the scale and sense of place so unique to Kenmore Square.**

While the extension of Beacon Street and Commonwealth Avenue beyond Charlesgate in the latter part of the 19th century predicted a new growth pattern for Boston and Brookline, their awkward intersection at Kenmore Square acquired neither the spatial quality nor the cultural identity of a great urban square. Fast-moving lanes of commuter traffic have dominated the space for more than 100 years. The Project redefines the heart of the neighborhood. It will activate a critical flashpoint for the city's cultural life and will form a more distinctive gateway to the Back Bay and downtown from Greater Boston's western reaches.

The public plaza achieves, for the first time in Kenmore Square, consistently shaded sidewalks and a strong canopy of well-adapted tree species on the plaza that recalls the plantings of Commonwealth Avenue to the east and the west. Paving and seating arise from the detailed geometries of the site while bringing a high level of logic and clarity to safe pedestrian and protected bicycle navigation. Custom-designed 30-foot tall light towers will bring a unique character of nighttime liveliness to the scene, marking the square with a monumental, tunable light display that can enunciate seasonal and special programmed events for the entire Kenmore area.

BPA 02 **We ask the proponent to provide additional renderings from several perspectives including: approaching the site from the southern end of Beacon Street with views of the Citgo Sign; views including Related Beal's proposal for the Citgo Sign site if possible; from within Fenway Park; from Charlesgate Park or closer to downtown to understand how the proposed buildings enhance or detract from the skyline and the pedestrian experience. The views coming into Kenmore Square are so defining for the city: the Citgo Sign, the light towers of Fenway Park, and even the glow of Fenway Park at night, visible even across the Charles River. We feel the impact of the proposal must be understood within that entire context.**

Additional viewpoints are provided in Figures 9-1 to 9-8, below.

One Kenmore Square **Boston, Massachusetts**

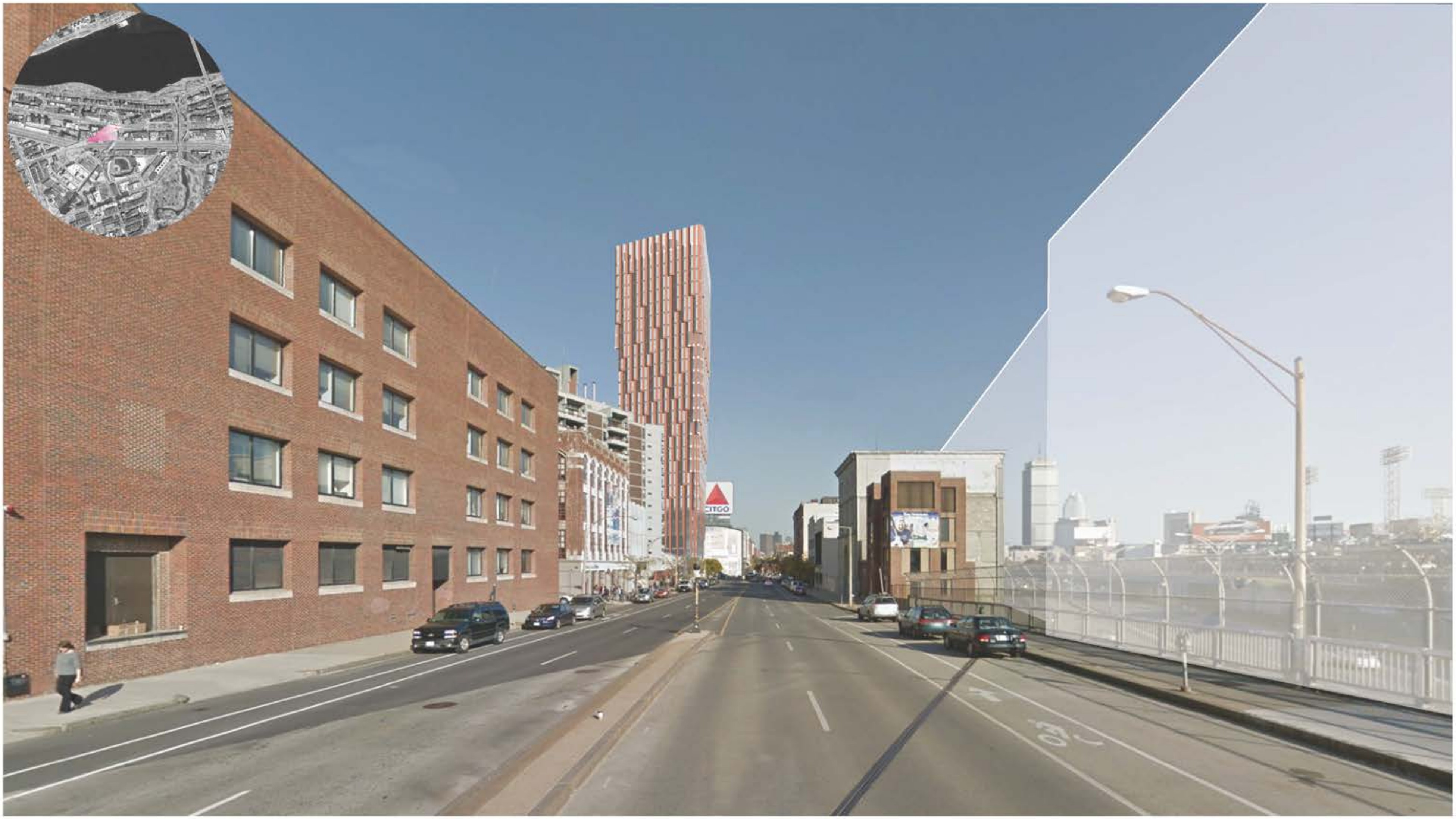
STUDIO/
GANG
/ARCHITECTS

Figure 9-1
View South on Massachusetts Avenue

One Kenmore Square   Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Figure 9-2
View East on Commonwealth Avenue



One Kenmore Square   Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Figure 9-3

View East on Beacon Street

One Kenmore Square   Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Figure 9-4
View West on Beacon Street

One Kenmore Square   Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Figure 9-5
View West on Commonwealth Avenue

One Kenmore Square Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Figure 9-6
View East from the BU Bridge

One Kenmore Square   Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Figure 9-7
View North on Brookline Avenue

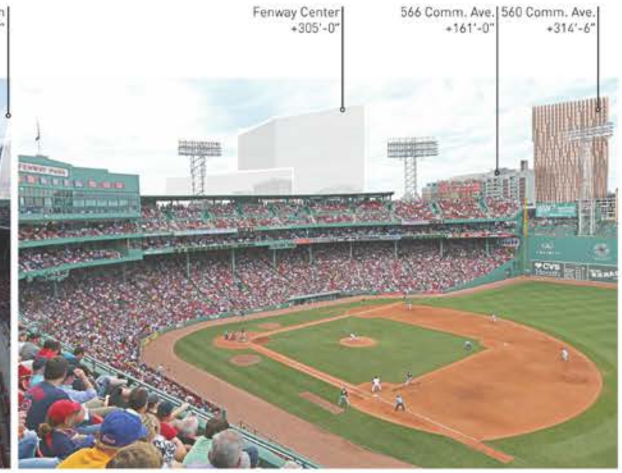


Figure 9-8
Views from Fenway Park

BPA 03 **The Alliance would also like to be clear that while substantial changes to the Buckminster Hotel are not part of this proposal, we do feel that the building has a significant presence on the square and should be carefully restored, optimally as a part of this project, but if not, then support of this project should require a commitment to such a restoration in the near future.**

The Buckminster Hotel is no longer participating in the Project.

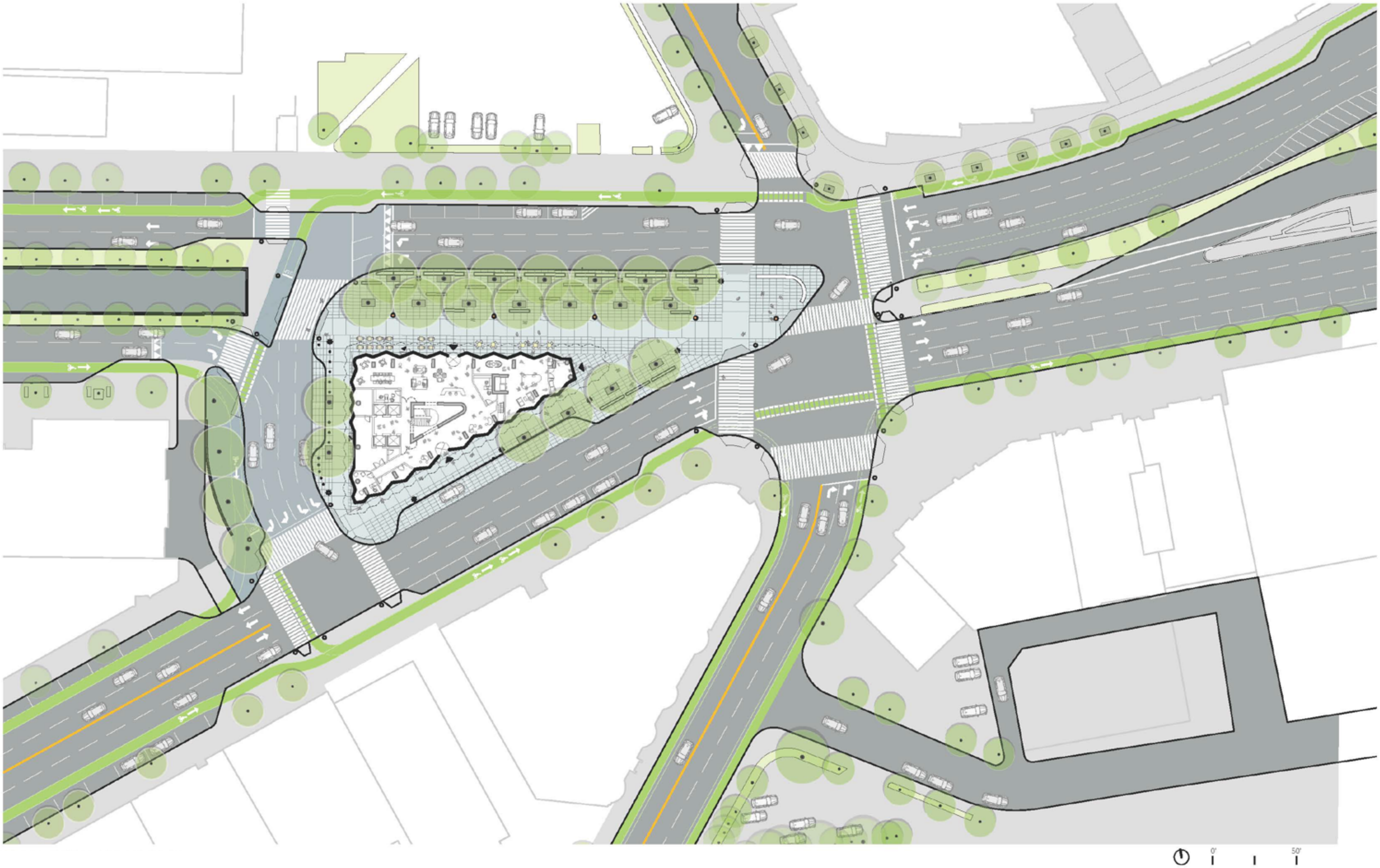
9.6 Letters of Support

The BPDA received twelve comments in support of the Project.

Alexander Castrichini	John Flaherty
Louisa Kasdon	Rina and Oded Rencus
P.T. Vineburgh	Mansher Singh
Evert Fowle	Diane Blum
Marc Waterfall	Jacob Oppenheim
Tim Lawrence	Cyrus Tehrani

Appendix A

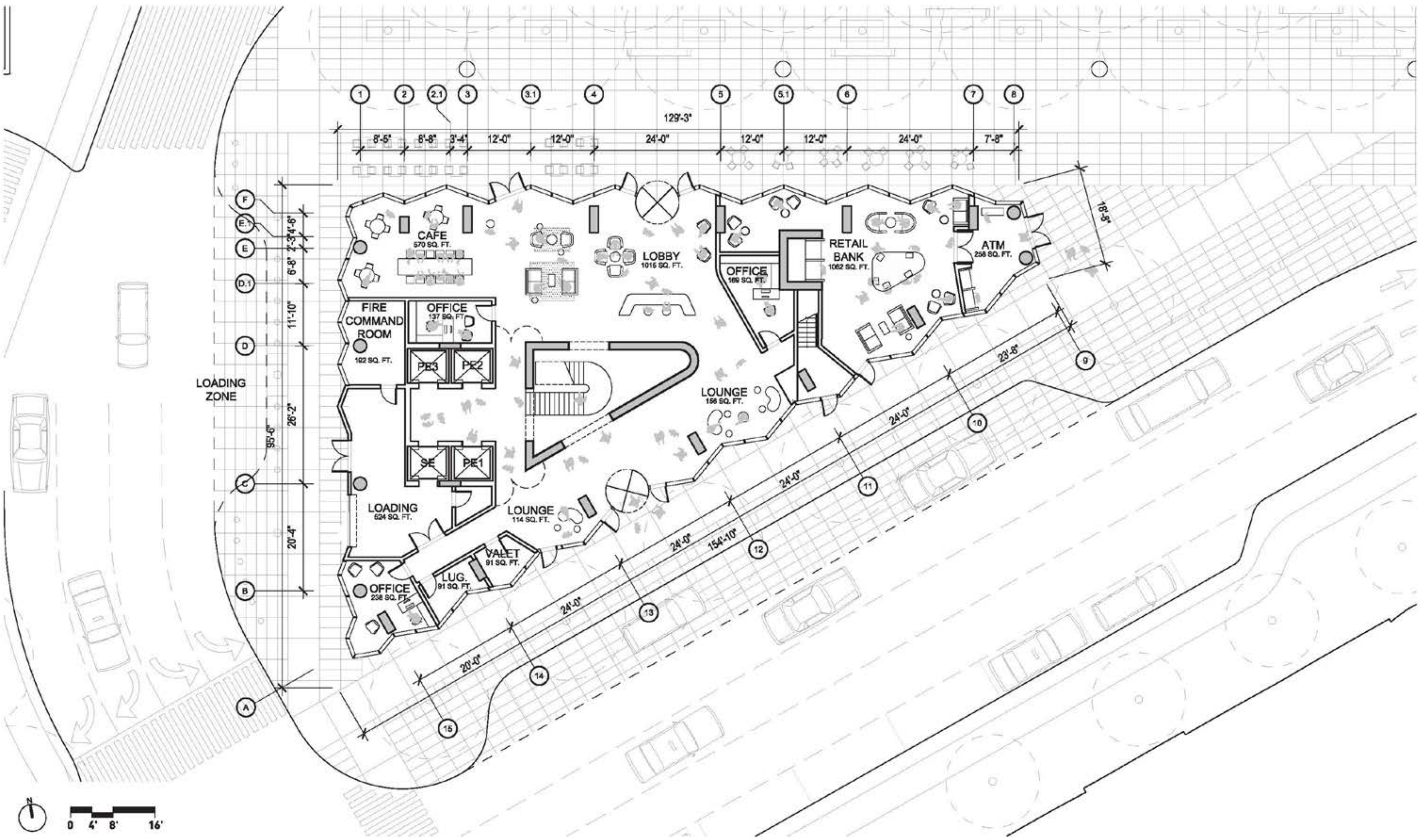
Floor Plans, Elevations, and Sections



One Kenmore Square **Boston, Massachusetts**

REED HILDERBRAND

Site Plan



One Kenmore Square Boston, Massachusetts

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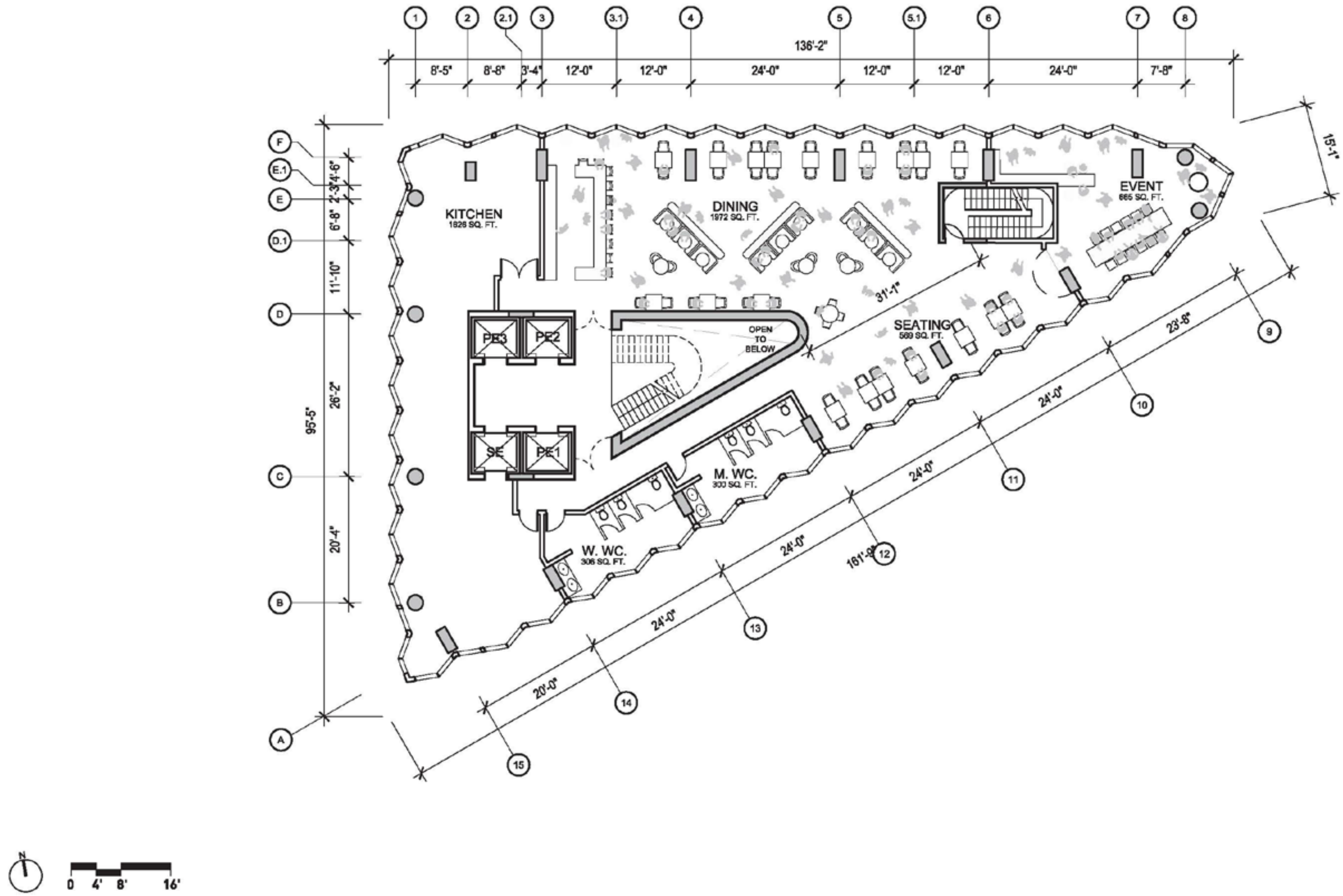
Level 1 Plan


KITCHEN
1826 SQ. FT.
DINING
1972 SQ. FT.
EVENT
665 SQ. FT.
SEATING
589 SQ. FT.
OPEN
TO
BELOW
M. WC.
300 SQ. FT.
W. WC.
306 SQ. FT.
PE3
PE2
SE
PE1
136'-2"
8'-5"
8'-8"
3'-4"
12'-0"
12'-0"
24'-0"
12'-0"
12'-0"
24'-0"
7'-8"
15'-1"
95'-5"
31'-1"
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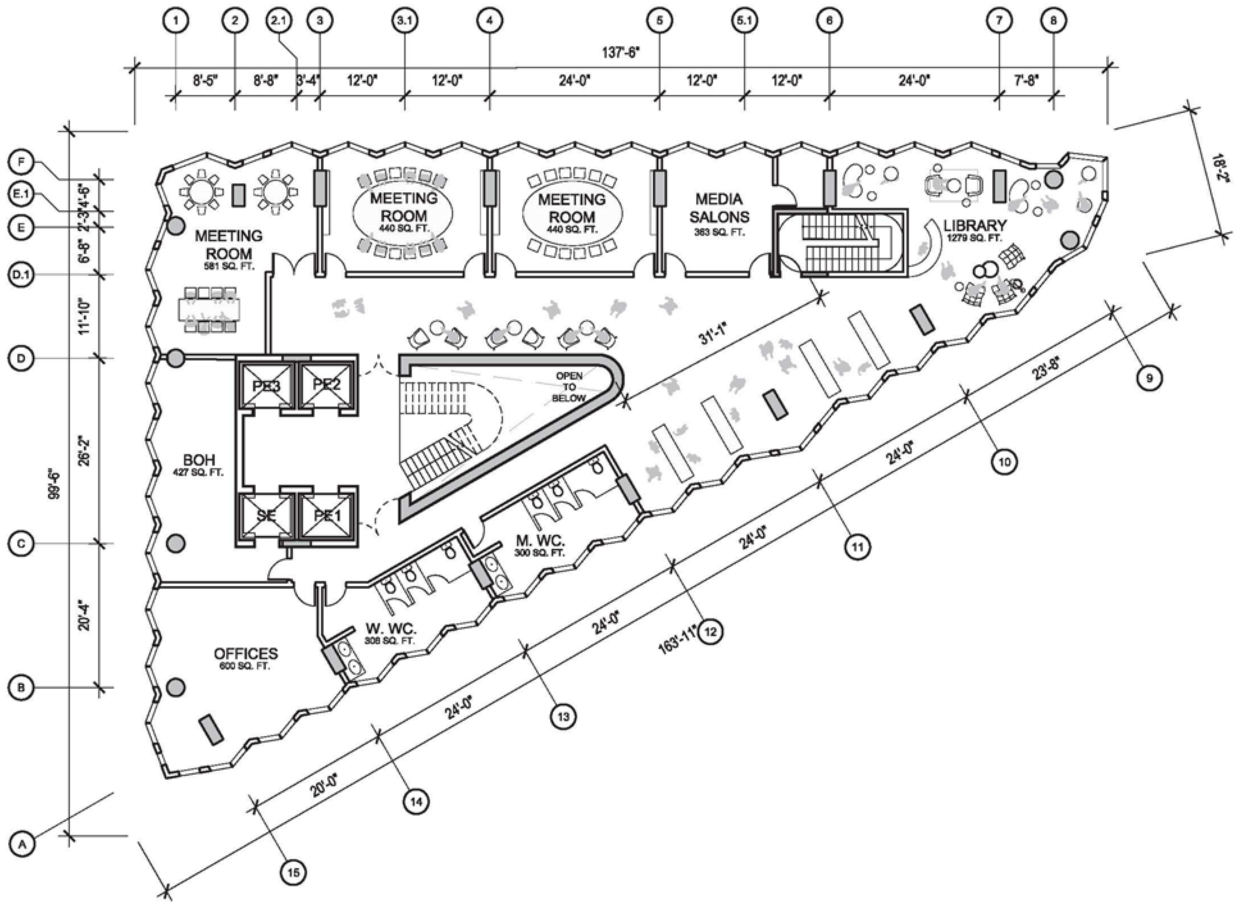
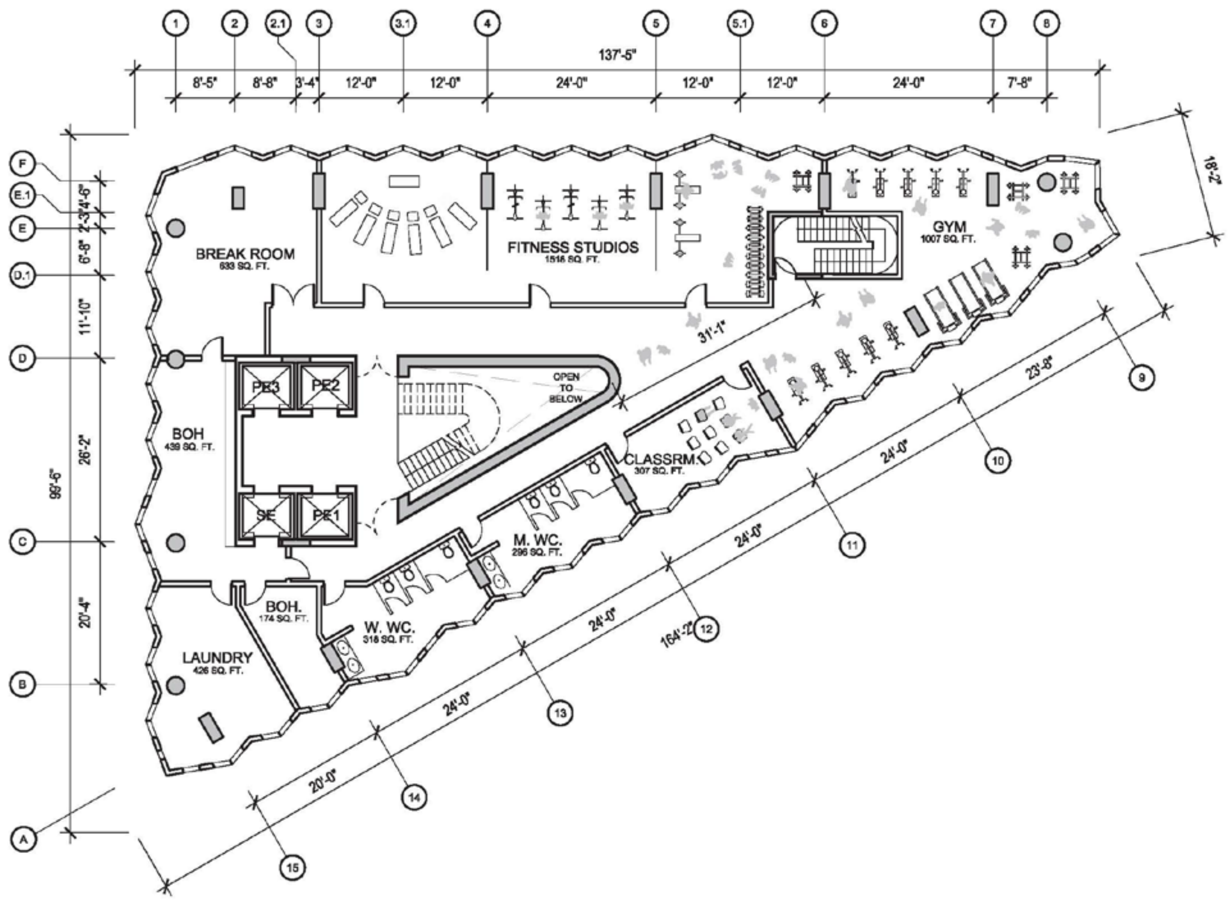
24'-0"
24'-0"
24'-0"
24'-0"
20'-0"
0
4'
8'
16'
N



One Kenmore Square Boston, Massachusetts

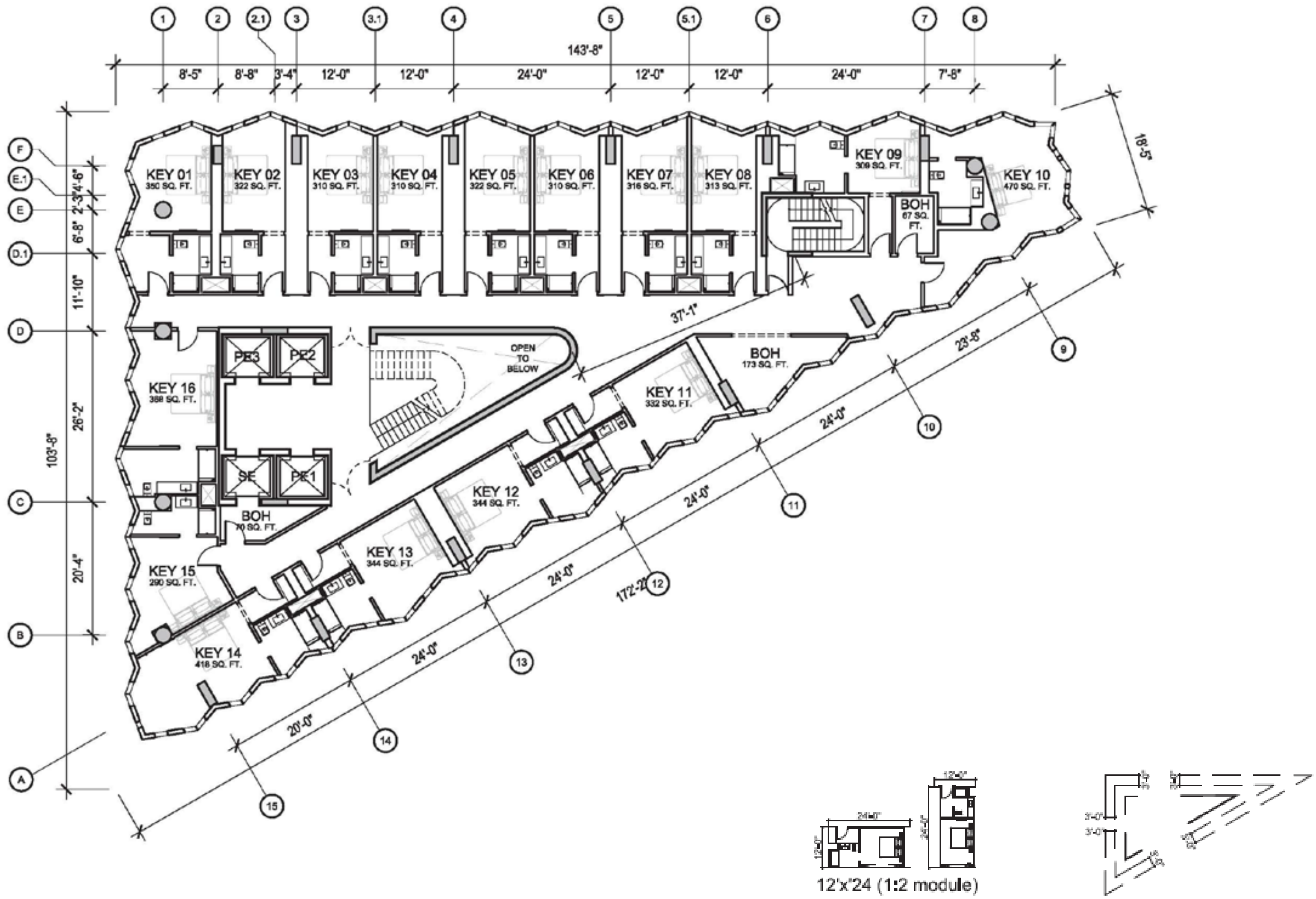
Level 3 Amenity Plan – Meeting and Business Center



One Kenmore Square Boston, Massachusetts

STUDIO/ GANG /ARCHITECTS

Level 4 Amenity Plan – Gym and Hotel Service



One Kenmore Square   Boston, Massachusetts

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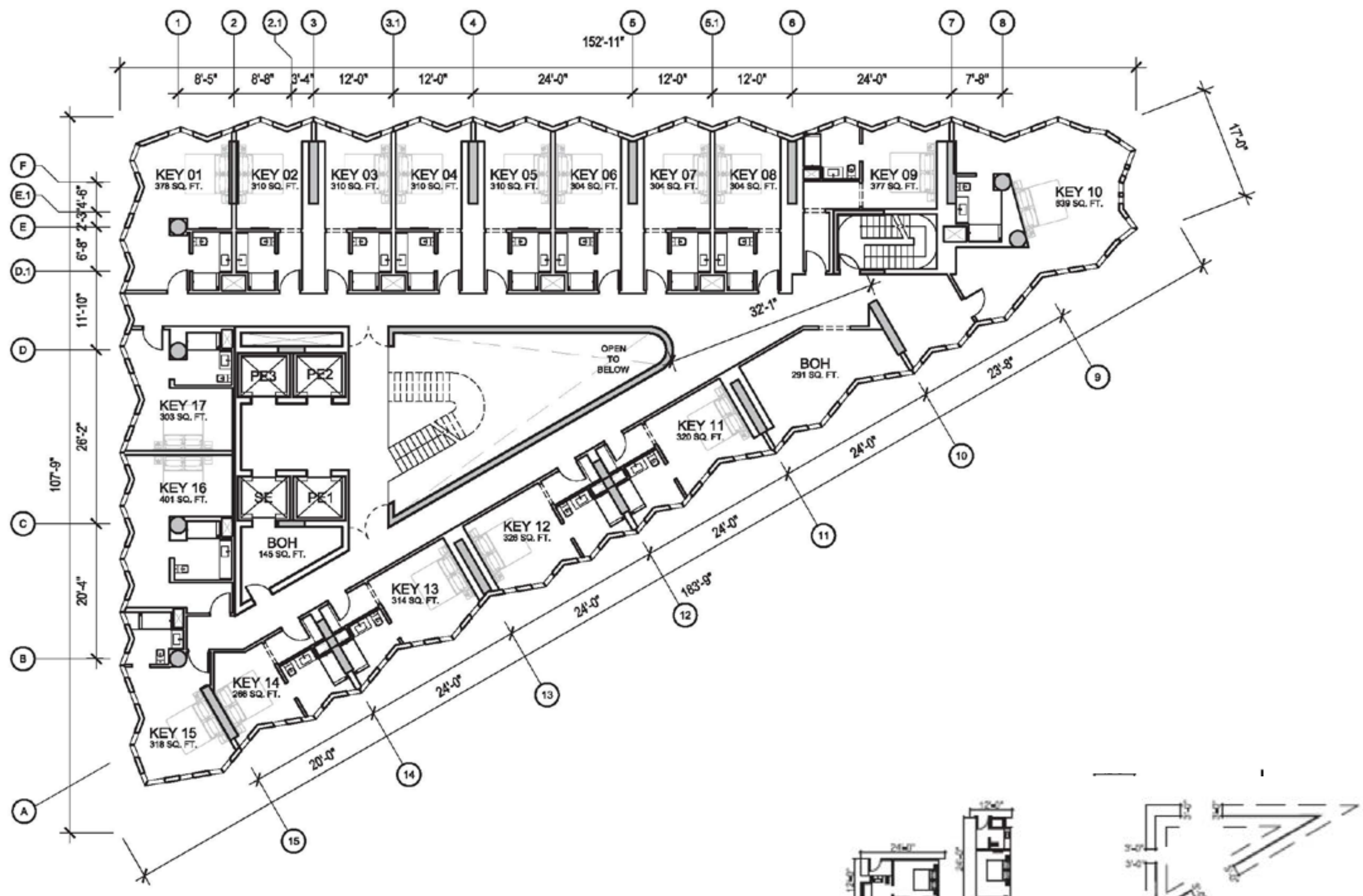
/ARCHITECTS

Levels 5-14 Plan


12'x24 (1:2 module)

One Kenmore Square   Boston, Massachusetts

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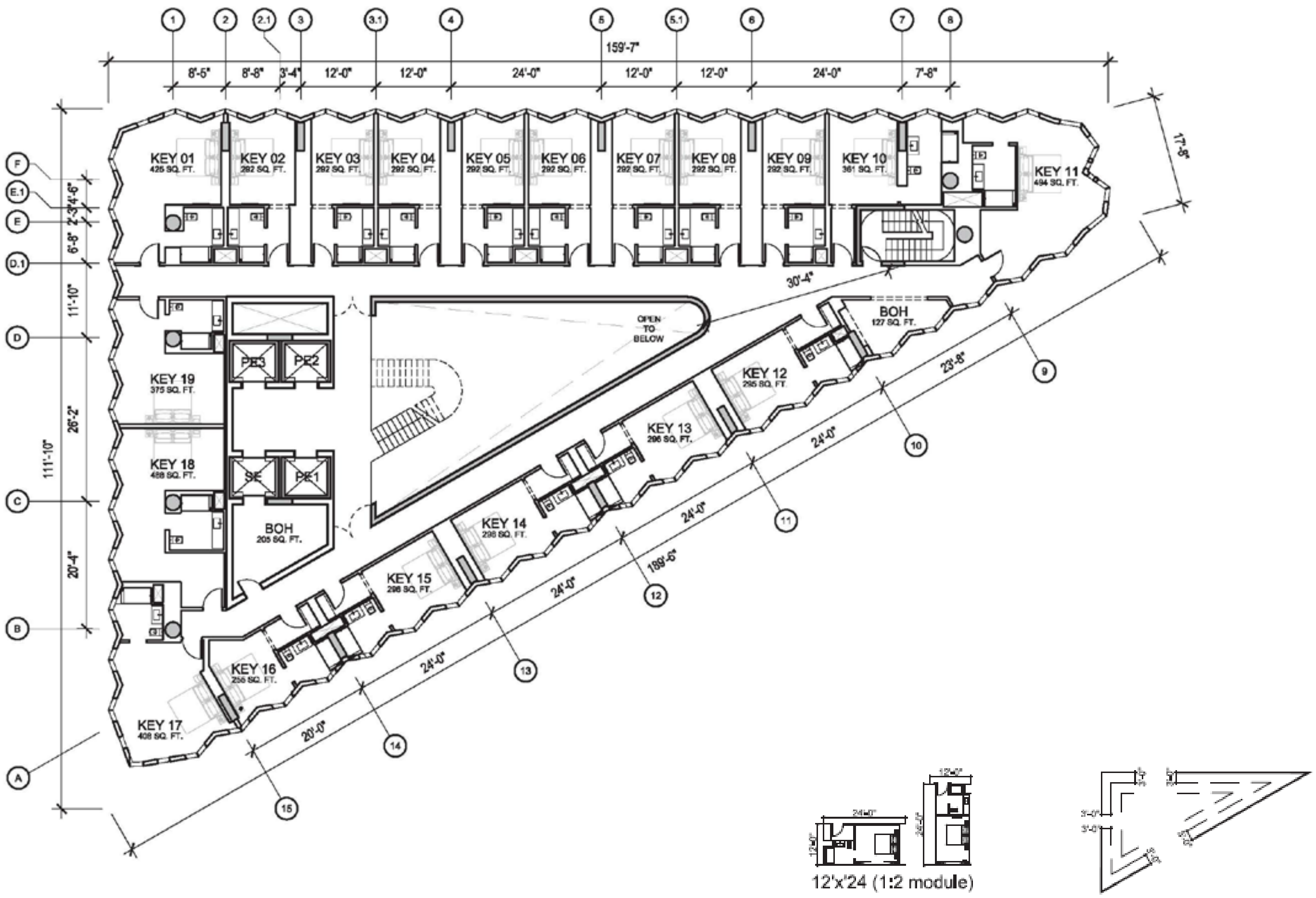
Levels 15-23 Plan



0 4' 8' 16'

One Kenmore Square   Boston, Massachusetts

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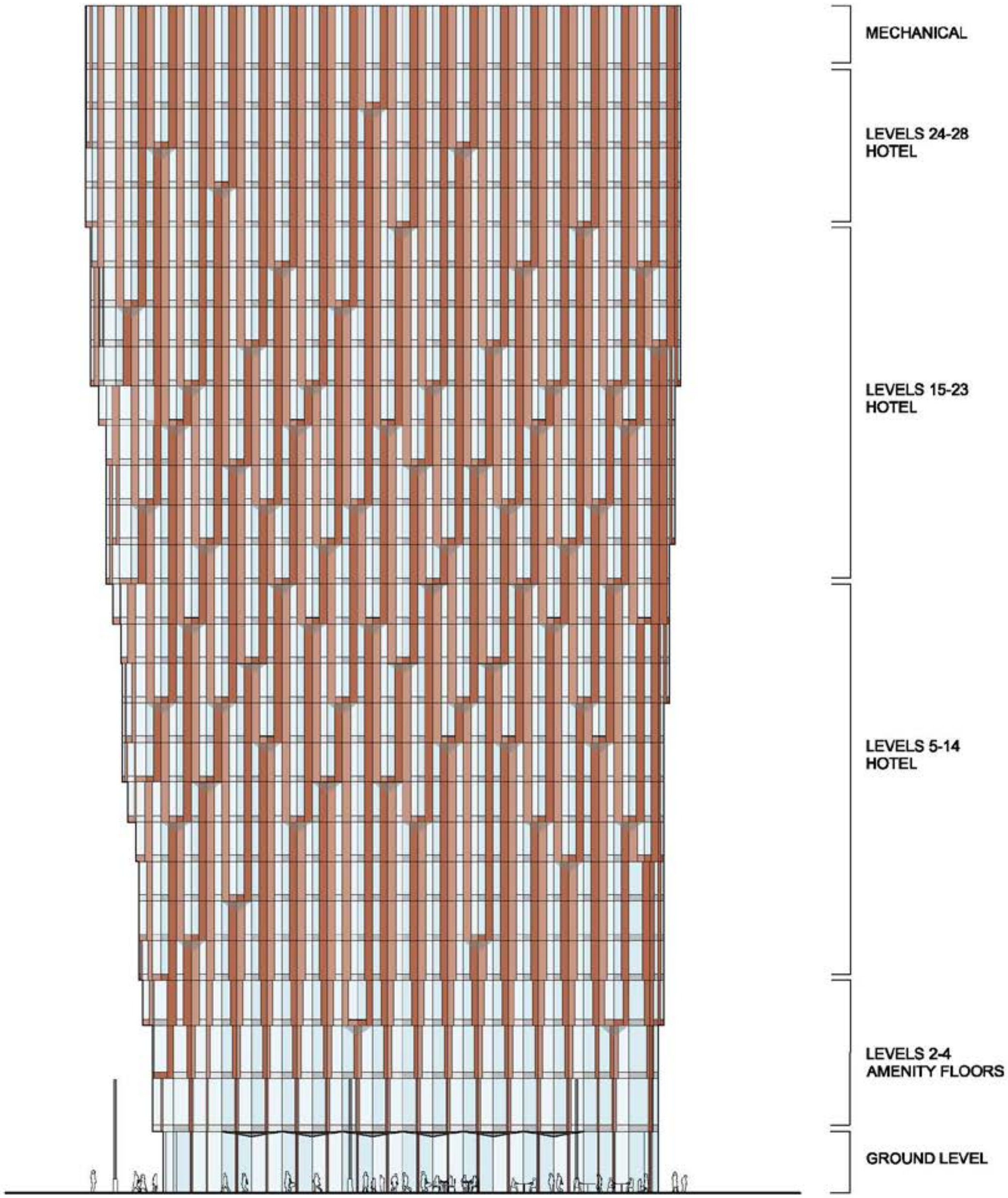
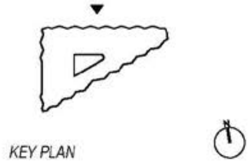
Levels 24-27 Plan





1/32" = 1'-0"

One Kenmore Square Boston, Massachusetts

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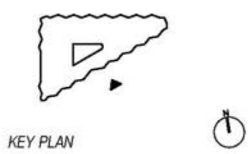
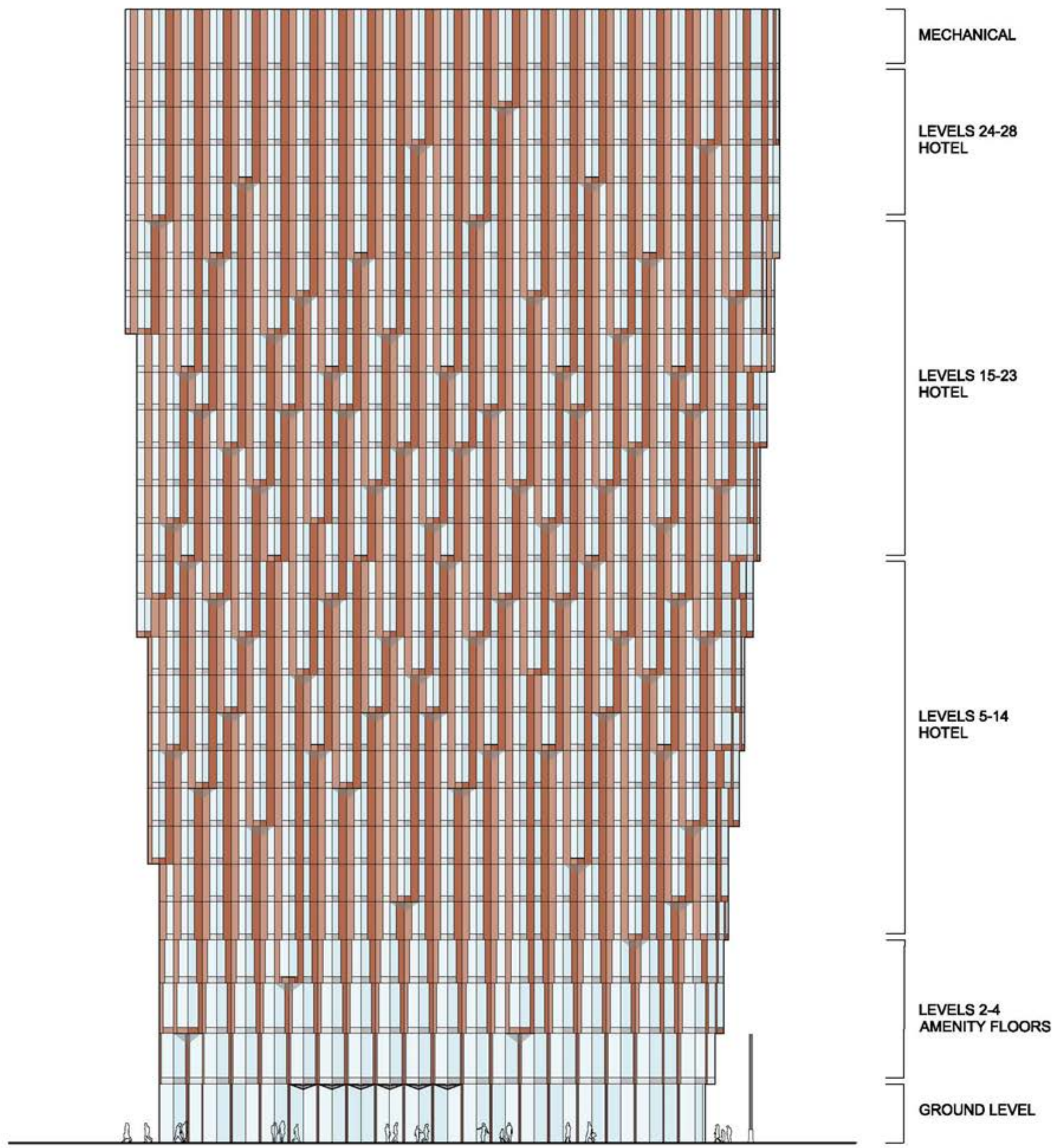
North Elevation



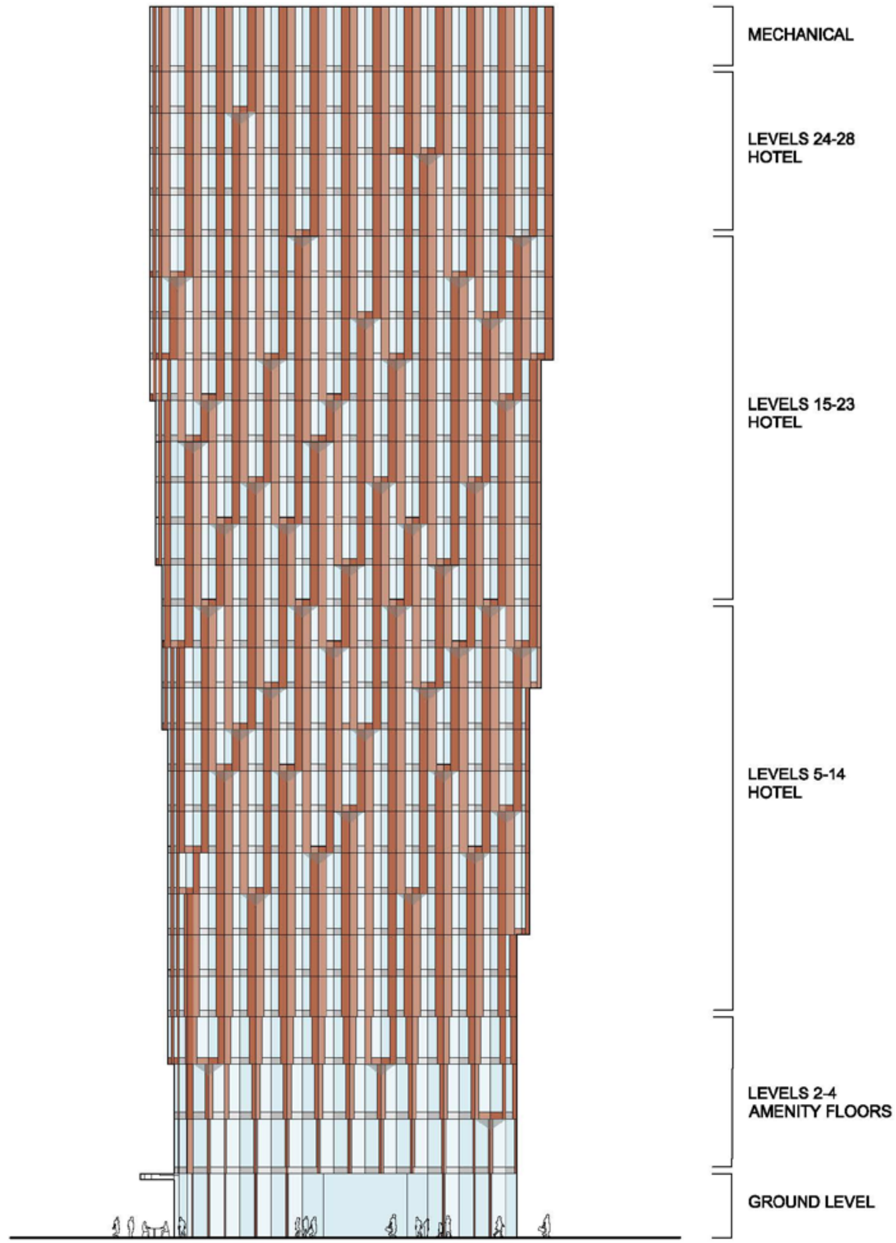


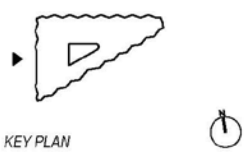
1/32" = 1'-0"

One Kenmore Square Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

South Elevation

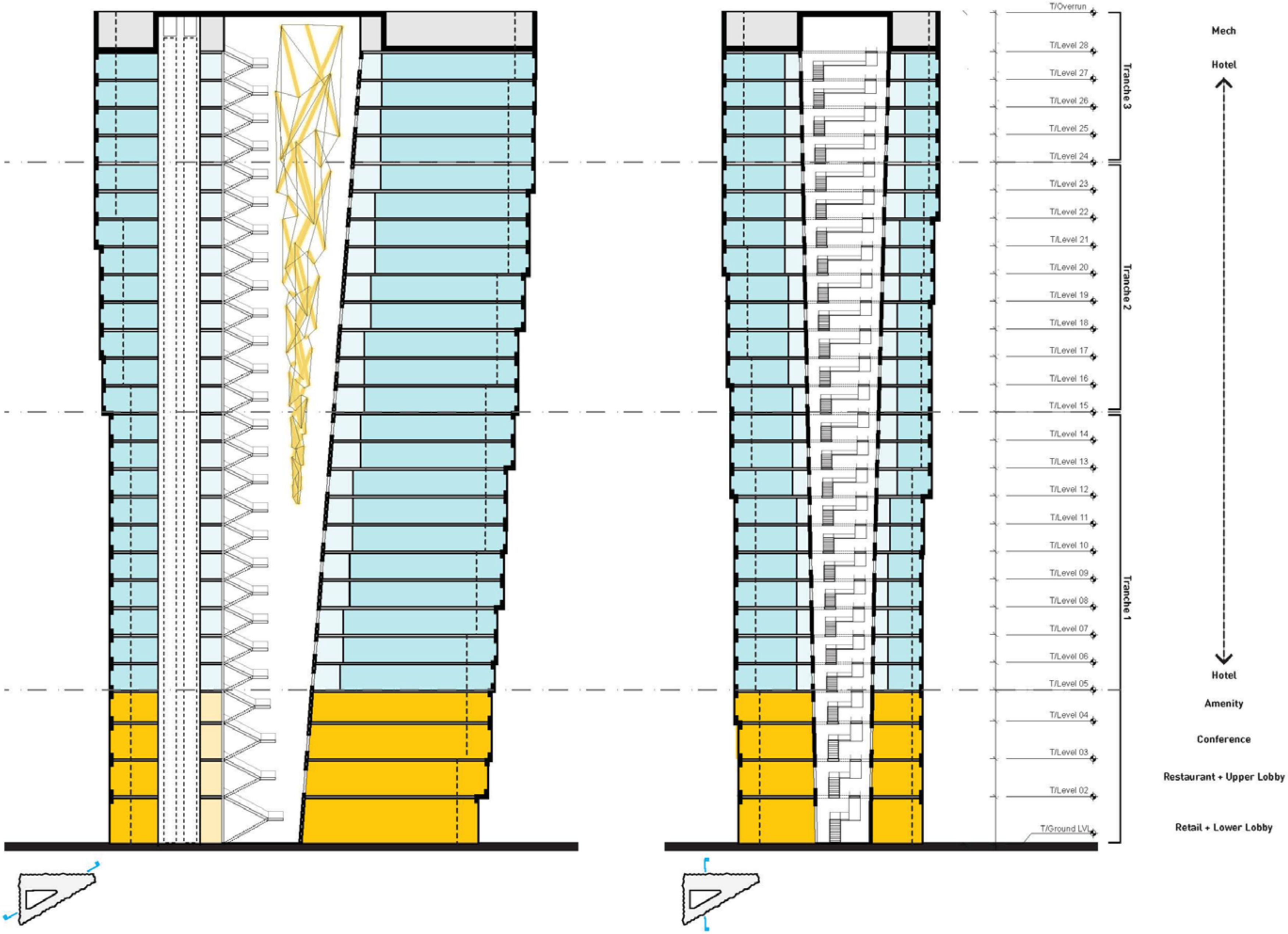




KEY PLAN

1/32" = 1'-0"

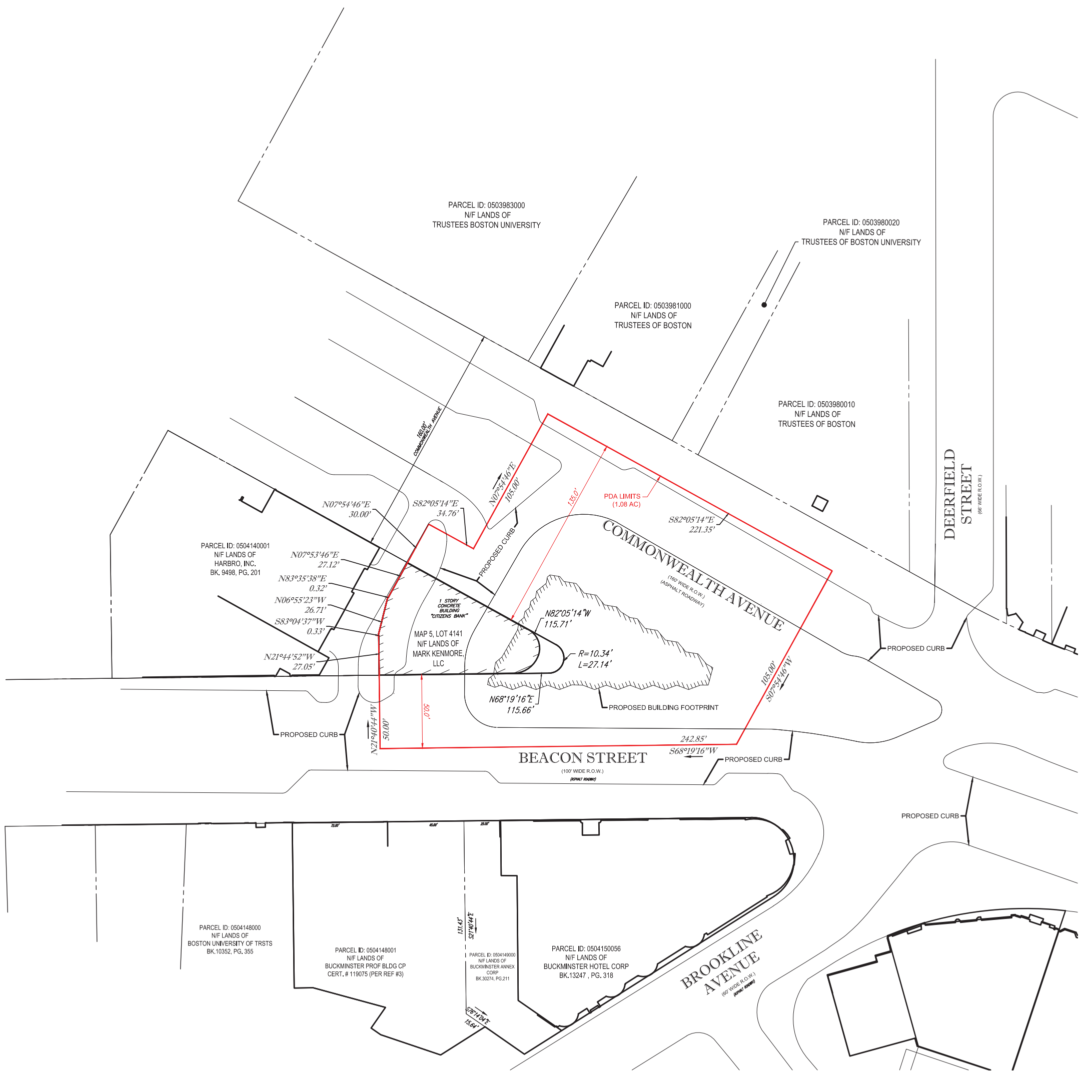
One Kenmore Square   Boston, Massachusetts

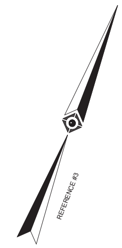


One Kenmore Square   Boston, Massachusetts

Appendix B

Project Area Survey





LOCUS MAP
©2013 ESRI WORLD STREET MAPS

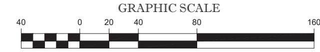
NOTES:

1. THIS PLAN IS BASED ON INFORMATION PROVIDED BY A SURVEY PREPARED IN THE FIELD BY CONTROL POINT ASSOCIATES, INC. AND OTHER REFERENCE MATERIAL AS LISTED HEREON.
2. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND IS SUBJECT TO THE RESTRICTIONS, COVENANTS AND/OR EASEMENTS THAT MAY BE CONTAINED THEREIN.
3. THE PURPOSE OF THIS PLAN IS TO SHOW THE PROPOSED PLANNED DEVELOPMENT AREA.

REFERENCES:

1. THE TAX ASSESSOR'S MAP OF BOSTON, SUFFOLK COUNTY, PARCEL VIEWER.
2. MAP ENTITLED "NATIONAL FLOOD INSURANCE PROGRAM, FIRM, FLOOD INSURANCE RATE MAP, SUFFOLK COUNTY, MASSACHUSETTS (ALL JURISDICTIONS) PANEL 76 OF 151," MAP NUMBER 25025C0076G , EFFECTIVE DATE: SEPTEMBER 25, 2009.
3. MAP ENTITLED "EXISTING CONDITIONS PLAN 651-665 BEACON STREET BOSTON, MASS.," PREPARED BY FELDMAN LAND SURVEYORS" DATED MARCH 6, 20014
4. MAP ENTITLED "CITY OF BOSTON, ASSESSORS PLAN WARD 5032 SEC. 11 BLK. 7, SEC. 11 BLK. 8, SECTION 11 PT. BLK. A5A, SECTION 11 PT. BLK. 5," PREPARED BY E. CORSANO C.E., DATED OCTOBER 1974.
5. MAP ENTITLED "ASSESSORS PLAN WARD 5033 SEC. 10 BLOCK 5 PART 6 & 7, SEC. 11 BLOCKS 3 & 4 PART BLOCK 5 & 6," PREPARED BY T. B. KENNEY C.E., DATED OCTOBER 1930.
6. MAP ENTITLED "CITY OF BOSTON ASSESSORS PLAN WARD 5039 SECTION 9 BLOCK G1A, SEC. 9 PT. BLK. G3, SEC. 10 PT. BLK. 7-8, SEC. 11 PT. BLK. E," PREPARED BY E. CORSANO C.E., DATED OCTOBER 1974.
7. MAP ENTITLED "CITY OF BOSTON ASSESSORS PLAN WARD 5211 SECTION 11 BLOCK D3, SECTION 11 PART BLOCK E, WARD 21 SEC. 12 PT. BLK. 8 SEC. 13 PT. BLK 1, 2, 3, 4 & 5" PREPARED BY E. CORSANO C.E., DATED AUGUST 1974.
8. MAP ENTITLED "PLAN OF LAND IN BOSTON-MASS.," PREPARED BY WILLIAM S. CROCKER, INC., DATED FEBRUARY 20, 1963.
9. MAP ENTITLED "PLAN OF LAND 560 COMMONWEALTH AVENUE BOSTON, MASS.," PREPARED BY FELDMAN LAND SURVEYORS, DATED JULY 30, 2014.
10. MAP SHOWING "MASSACHUSETTS TURNPIKE AUTHORITY BOSTON EXTENSION SECTION NO. C-4 PROFILE 42" WATER LINE AT BEACON STREET," PREPARED BY HOWARD, NEEDLES, TAMMEN & BERGENDOFF CONSULTING ENGINEERS.

GRAPHIC SCALE



(IN FEET)
1 inch = 40 ft.

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GERRY L. HOLDRIGHT, PLS — DATE
MASSACHUSETTS PROFESSIONAL LAND SURVEYOR #49211

FIELD DATE	FIELD BOOK NO.	FIELD BOOK PG.	FIELD CREW	DRAWN:
9-7-17	17-11MA	24	J.A.	E.LOC

PLANNED DEVELOPMENT AREA PLAN
MARK KENMORE, LLC
560-574 COMMONWEALTH AVE
PARCEL: 0504141000
CITY OF BOSTON, SUFFOLK COUNTY
COMMONWEALTH OF MASSACHUSETTS

CONTROL POINT ASSOCIATES, INC.
352 TURNPIKE ROAD
SOUTHBOROUGH, MA 01772
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CHALFONT, PA 2157129800
MANHATTAN, NY 6467800411
MT LAUREL, NJ 6098572099
WARREN, NJ 9086680099

REVIEWED:	APPROVED:	DATE	SCALE	FILE NO.	DWG. NO.
G.L.H.	G.L.H.	3-20-19	1"=40'	06-170057	1 OF 1

Appendix C

Transportation

Transportation Appendix is Available Upon Request

Appendix D

Shadow Animations

Shadow Animation Appendix is Available Upon Request

Appendix E

Solar Glare

REPORT

KENMORE SQUARE

DETAILED SOLAR REFLECTION ANALYSIS

MARCH 29, 2019
PROJECT #1902393

SUBMITTED TO
Bryan Scheib, RA
Project Leader
bshelb@studiogang.com

Studio Gang
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SUBMITTED BY
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EXECUTIVE SUMMARY

RWDI was retained to investigate the impact that solar reflections emanating from the proposed Kenmore Square redevelopment will have on the surrounding urban realm.

Overall Impact of Reflections

As with any contemporary building, the proposed Project naturally created reflections within its surroundings, the majority of which are minor in nature. Overall, we would consider the impacts of this project on its surrounds are typical of any modern building of this size.

Thermal Impacts on People

The planar and convex nature of the facades of the proposed Project ensure that reflected sunlight will not focus (multiply) in any particular area. Therefore, RWDI does not expect any significant thermal impacts (i.e. risks to human safety or property damage) to occur either on the site or in the surrounding neighborhood.

Visual Glare Impact on Drivers

As with the addition of any glazed building, drivers travelling in the vicinity of the buildings are expected to experience an increased level of visual glare impact. Drivers along Commonwealth Avenue approaching the proposed Project are predicted to experience reflections from the buildings which can cause a high level of impact. However, these impacts are possible in less than 0.7% of the daytime annually, and occur for very short durations.

Visual Glare Impact on Pedestrians and Facades

Typical levels of visual glare are possible for pedestrians and building occupants in the vicinity of the project. These types of reflections represent at worst a visual nuisance, as viewers can safely look away or close blinds. For many buildings, these impacts have the potential to occur in a very small fraction of the year (less than 1.5% of the daytime annually). For 566 Commonwealth the reflections can be more frequent (between 5% and 8% of the daytime annually). The Hotel Buckminster is expected to receive reflections up to 25% of the daytime annually, which is not unexpected given its location relative to the proposed Project.

Thermal Impact on Facades

At all studied facade areas, reflections are of low intensity and short duration. Hence, we would not expect these reflections to lead to a significant additional cooling load for a building. Should an individual choose to expose themselves to the reflected energy, they may feel warm, however this would be a temporary experience and one which would easily be remedied by closing window treatments.

TABLE OF CONTENTS

INTRODUCTION

This report provides the computer modeling results of reflected sunlight from the proposed redevelopment at 560 Commonwealth Avenue in Boston, MA. The proposed Project is located at the intersection of Commonwealth Avenue and Beacon Street (as shown in Figure 1). It is our understanding that the project will be surrounded by typical urban spaces such as busy roadways and other buildings.

RWDI was retained to investigate the impact that solar reflections emanating from the proposed Project will have on the surrounding urban terrain.

A preliminary set of simulations was conducted to determine peak reflection intensities and the frequency of occurrence of reflections for a broad area around the project. This served to identify areas which may experience high intensity or very frequent reflections. This information informed the selection of 32 points for a more detailed analysis.

These receptor points represent drivers, pedestrians, and building facades and the detailed results allow us to quantify the frequency, intensity and duration of glare events at the receptors as well as the sources of those reflections.

Figure 1: Approximate Location of the Proposed Project (Orange Outline) (Map Credit: Google Earth)

Urban Reflections

While a common occurrence, solar reflections from buildings can lead to numerous visual and thermal issues.

Visual glare can:

- Impair the vision of motorists and others who cannot easily look away from the source;
- Cause nuisance to pedestrians or occupants of nearby buildings; and,
- Create undesirable patterns of light throughout the urban fabric.

Heat gain can:

- Affect human thermal comfort;
- Be a safety concern for people and materials, particularly if multiple reflections are focused in the same area; and
- Create increased cooling needs in conditioned spaces affected by the reflections.

The most significant safety concerns with solar reflections occur with concave facades (Figure 2) which act to focus the reflected light in a single area. This project does not feature any concave elements, thus we do not anticipate solar focusing to be an issue for this project.

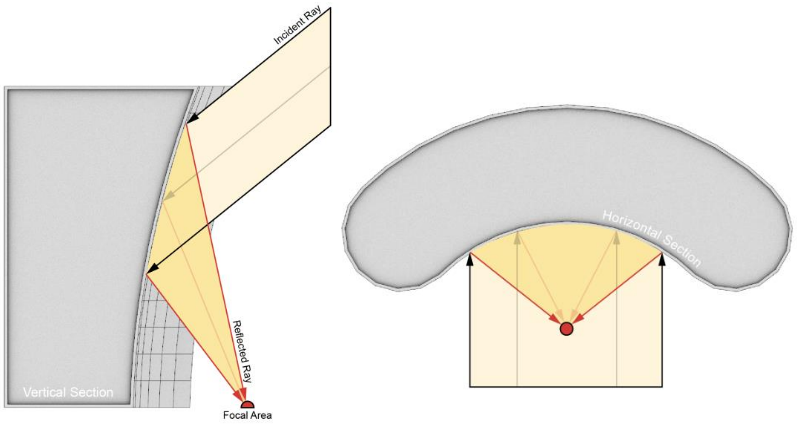


Figure 2: Illustration of Reflection Focusing Due to a Concave Facade

Methodology

RWDI assessed the potential reflection issues using RWDI's in-house proprietary *Eclipse* software, in two phases as per the steps outlined below:

- The Phase 1 "Screening" assessment began with the development of a 3D model of the area of interest (as shown in Figure 3). This was then subdivided into many smaller triangular patches (see Figure 4).
- For each hour in a year, the expected solar position was determined, and "virtual rays" were drawn from the sun to each triangular patch of the 3D model. Each ray that was considered to be "unobstructed" was reflected from the building surface and tracked through the surrounding area. The study domain included the entire pedestrian realm within 1000 feet of the proposed building.
- The total reflected energy at that hour from all of the patches was computed and its potential for visual and thermal impacts was assessed.
- Finally, a statistical analysis was performed to assess the frequency, and intensity of the glare events occurring throughout the year within the nearby airspace. The criteria used to assess the level of impact can be found in Appendix B of this report.

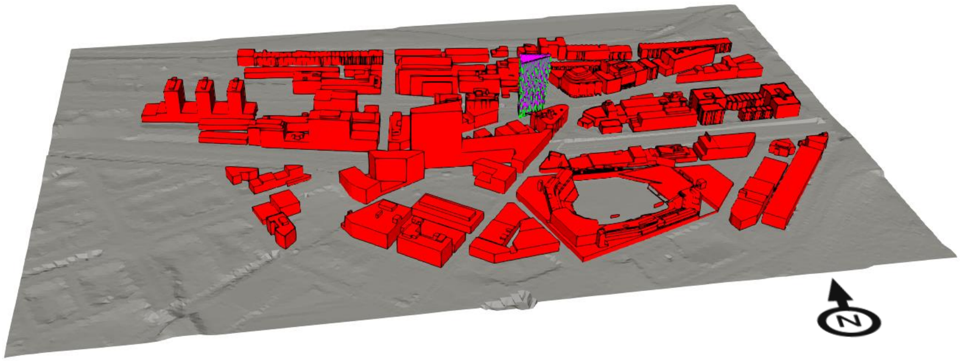


Figure 3: 3D Computer Model of the Proposed Project and Surrounding Context

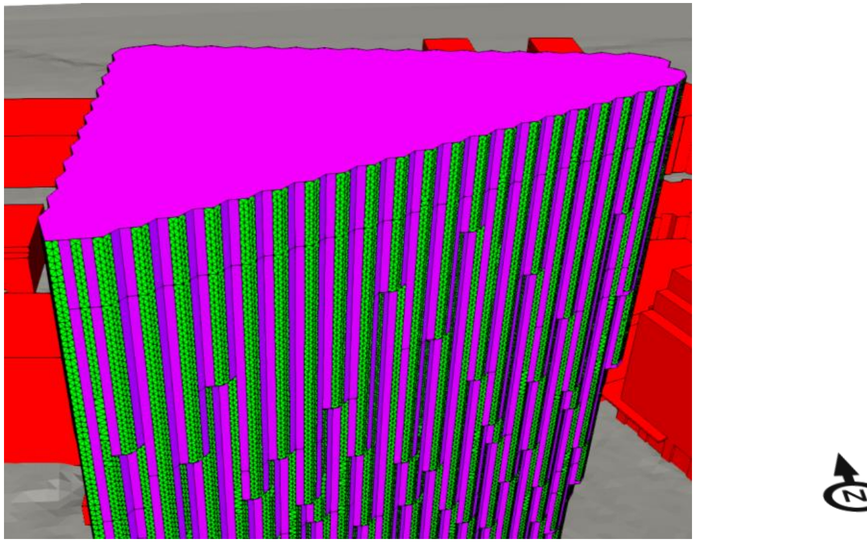


Figure 4: Close-up View of the Model, Showing Surface Subdivisions

Methodology (cont'd)

- Based on the findings of the Screening analysis, 32 representative 'receptor points' were selected to undergo the more detailed, Phase 2 analysis.

- The points were chosen to understand in greater detail how reflections from the building will impact drivers, pedestrians and other buildings. These points are discussed further in the detailed analysis section this report.

- The detailed analysis process is similar in the detailed phase of work, except reflections are analyzed at 1 minute increments for the entire year.

- In addition to the frequency and duration of reflection impacts, the more detailed analysis allows for the prediction of when those impacts will occur, how long they occur for and which building element is the cause.

Assumptions and Limitations

Meteorological Data

This analysis used 'clear sky' solar data computed at the location of Boston Logan International Airport. This approach uses mathematical algorithms to derive solar intensity values for a given location, ignoring local effects such as cloud cover. This provides a 'worst case' scenario showing the full extent of when and where glare could ever occur.

Radiation Model

RWDI's analysis is only applicable to the thermal and visual impacts of solar radiation (i.e. ultraviolet, visible and infrared wavelengths) on people and property in the vicinity of the project. It does not consider the impact of the building related to any other forms of radiation, such as cellular telephone signals, RADAR arrays, etc.

Potential reductions of solar reflections due to the presence of Vegetation or other non-architectural obstructions were not included, nor are reflections from other buildings. Light that has reflected off several surfaces is assumed to have a negligible impact. As such, only a single reflection from the project was included in the analysis.

Study Building and Surrounds Models

The analysis was conducted based on a 3D model of the proposed Project provided by Studio Gang Architects to RWDI on March 4, 2019.

The proposed Project also includes alterations to the adjacent road network. For the purposes of this study, these alterations are assumed to be fully implemented as per the site plan provided by Studio Gang on March 4, 2019.

The surroundings model was developed based on data made available by the City of Boston. The surrounds model includes all buildings which currently exist or are approved for construction by the BPDA.

The ground surface and the surrounding buildings were topographically corrected based on a high-resolution LiDAR survey conducted by the National Oceanic and Atmospheric Administration (NOAA) in 2013-2014. NOAA states that the horizontal accuracy of this data set is 16.5 inches at a 95% confidence level. Its vertical accuracy is stated as 4.8 inches at a 95% confidence level.

Assumptions and Limitations (cont'd)

Facade Material Reflectance

The exact glazing units to be used in the proposed Project are still under consideration by the design team. For the purposes of this analysis, RWDI has assumed reflectivity characteristics for the glazing which we would consider typical of those used in the Boston area. This corresponds to a nominal visible reflectance of 30% and a nominal full spectrum reflectance of 38%.

Should the design team ultimately choose glazing which is less reflective than this value, we would expect the frequency and durations of any reflections to be reduced compared to what is predicted herein.

It is RWDI's understanding that all other facade elements will be matte in finish and thus have not been included as potential sources of reflections.

The reflectance properties of the reflective elements are summarized in Table 1. Figure 5 illustrates the location of the reflective materials on the facades.

Applicability of Results

The results presented in this report are highly dependent on the form and materiality of the facade as well as the assumed flow of traffic. Should there be any substantial changes to the design of the building or surrounding road network, it is recommended that RWDI be contacted and requested to review their potential effects on the findings of this report.

This report has endeavored to provide a robust and suitably conservative analysis of the potential effects of reflected sunlight, contextualized based on current industry and academic research, and common best practices. Regulation and enforcement of performance requirements is the responsibility of the relevant regional regulatory authority.

Assumptions and Limitations (cont'd)

Figure 5: Locations of Reflective Building Elements (Surrounding Context removed for Clarity)

Table 1: Nominal Visible and Full Spectrum Reflectance Values of the Reflective Building Elements

Material Location	Material Specified	Visible Reflectance	Full Spectrum Reflectance
All Glazed Areas	Generic 1" IGU	30%	38%

Presentation of Results

This section presents the screening results pertaining to the solar impacts of the project on the surrounding urban area. The following three plots are presented :

Peak Annual Reflected Irradiance
This plot displays the annual peak intensity of all reflections emanating from the project at a typical pedestrian height (5 feet) above local grade.

Two versions of this plot are included:

- **Visible Reflectance (Visual Glare):** This plot (Figure 6a) displays the intensity of reflected visible light only. Depending on the ambient conditions, reflection intensities as low as 50 W/m² could be visible to people outdoors.

- **Full Spectrum Reflectance (Heat Gain):** This plot (Figure 6b) presents the total intensity of a reflection, including both visible light and thermal energy which relates to the risk of excessive heat gain. For full spectrum reflectance, RWDI considers 1500 W/m² as a short term thermal comfort threshold and reflections above 2500 W/m² as a human safety threshold (refer to Appendix B).

- **Frequency of Significant Visual Reflections:** This plot (Figure 6c) identifies the locations of the most frequent significant reflections emanating from the facades. In this context a 'significant' reflection is one that is at least 50% as intense as one that would cause after imaging on a viewer (refer to Appendix B).
  As this criteria is visually based, the visible reflectance of the facades was used.

In order to attain a complete understanding of the impact that reflections may have on drivers, other factors must be considered, including the duration of the reflections and when they occur. The following plots serve to illustrate the general characteristics of reflections from the project and inform the locations of the receptor points used in the detailed phase of work which will analyze these factors in greater detail.

SCREENING ANALYSIS RESULTS

Peak Annual Reflected Irradiance - Visible Reflectance (Visual Glare)

Reflections as low as 50 W/m² may be visible to people, depending on outdoor lighting levels.

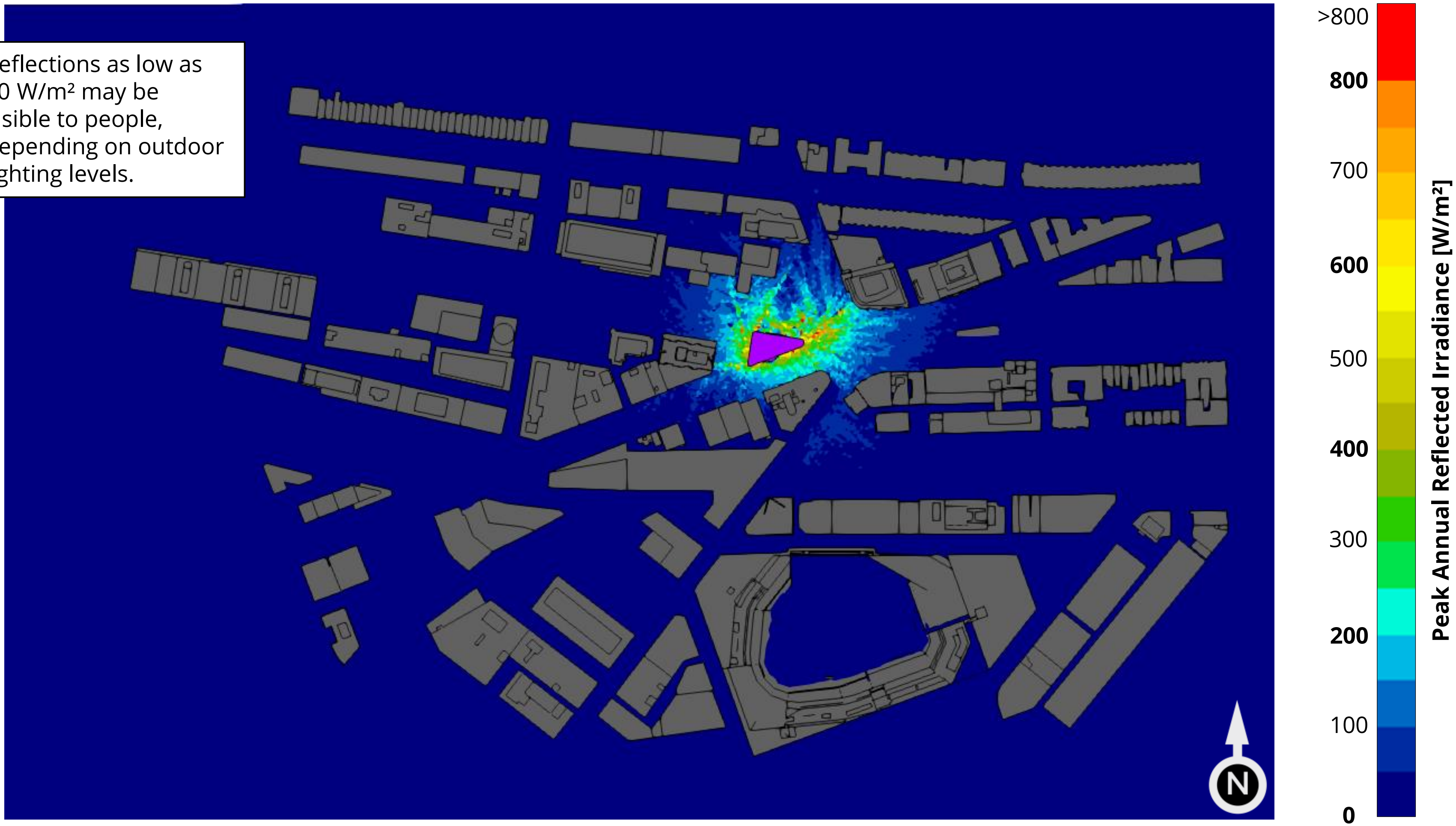


Figure 6a: Maximum Annual Intensity of Visible Reflections at Pedestrian Height

Peak Annual Reflected Irradiance - Full Spectrum Reflectance (Heat Gain)

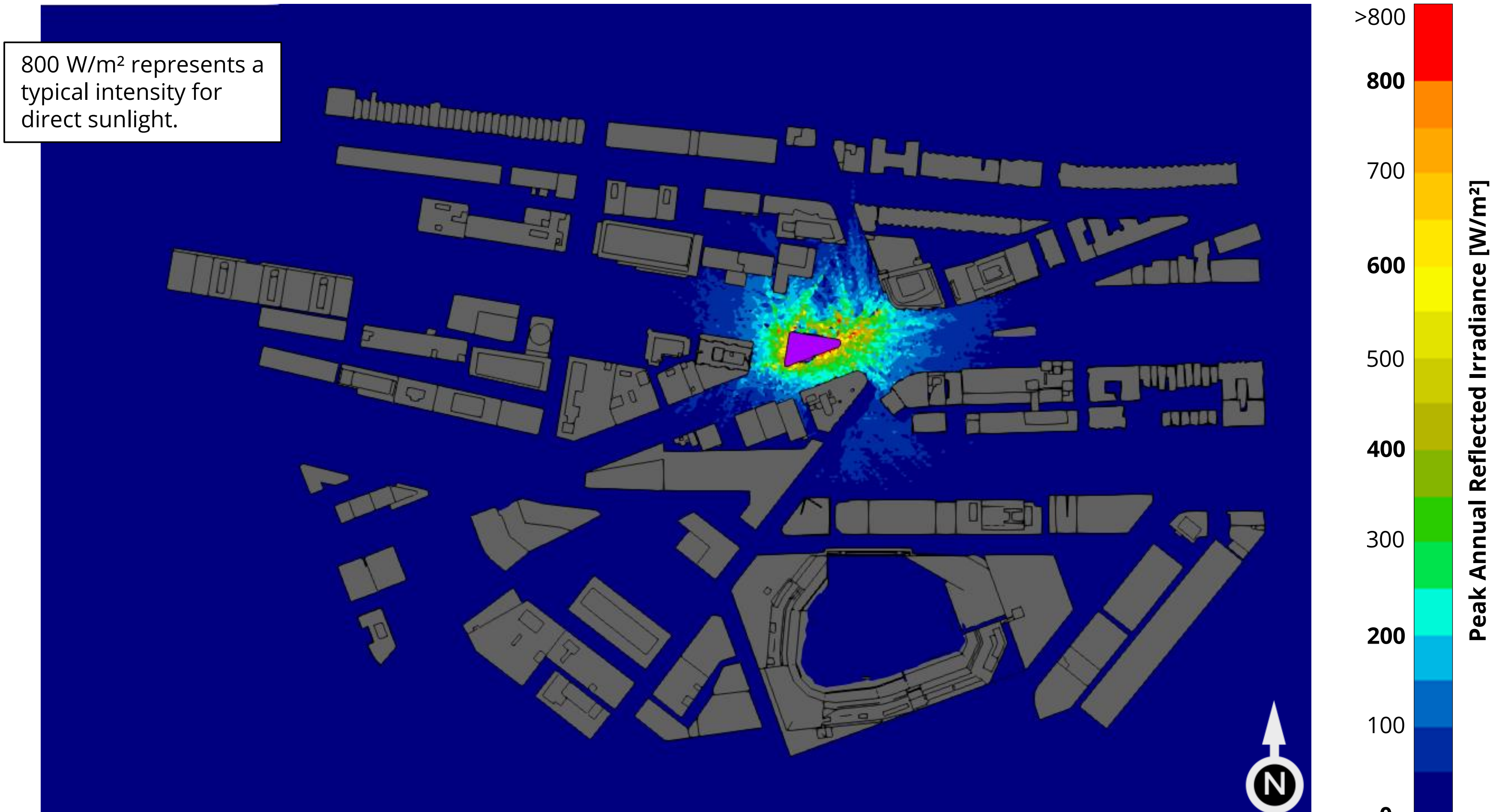


Figure 6b: Maximum Annual Intensity of Full Spectrum Reflections at Pedestrian Height

Frequency of Significant Visible Reflections

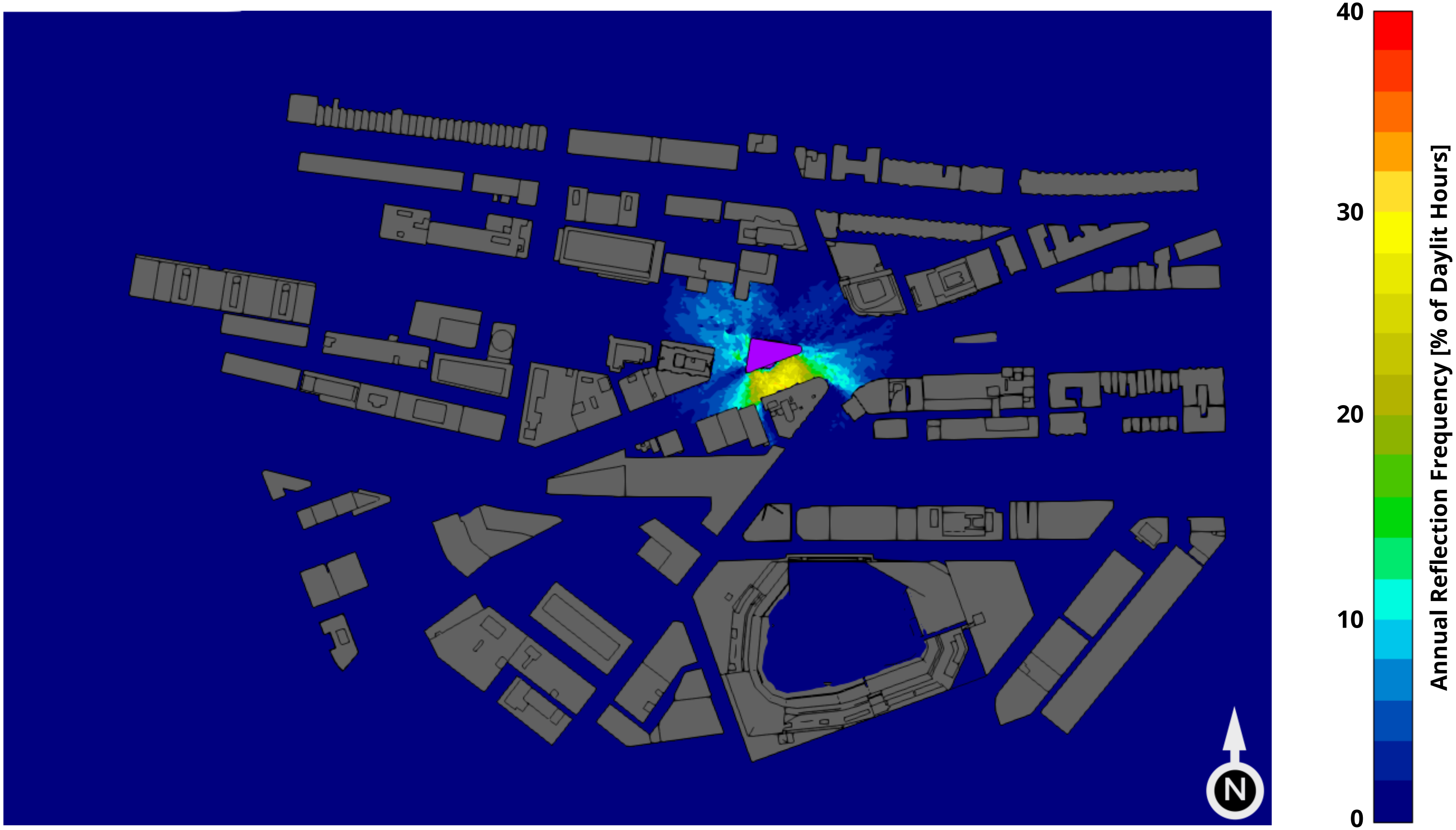


Figure 6c: Frequency (% of Daylit Hours) Where Significant Visible Reflections Can Occur

SCREENING ANALYSIS OBSERVATIONS

1. Like any contemporary building, the reflective surfaces of the proposed Project are naturally causing solar reflections in the surrounding neighborhood.

2. The articulated nature of the facades of the proposed Project acts to scatter reflected solar energy, preventing them from focusing (concentrating) in any particular area. Thus, RWDI does not anticipate any heat gain issues on people or property.

3. At pedestrian level, reflections are predicted to fall most frequently onto the area immediately south of the proposed Project and to a lesser extent, immediately west of it. The maximum frequency of glare occurrence found at pedestrian level is approximately 29% of daytime hours, which is typical of many projects we have studied in Boston. The exact durations and frequencies of these impacts are explored in the detailed analysis section of this report.

4. Reflections from the project are generally confined to the area within 700 feet of the proposed Project and may impact drivers along Beacon Street and Commonwealth Avenue. The risk associated with these reflections and their exact durations and a frequencies are explored in the detailed analysis section of this report.

5. The occupants of the buildings located close to the project are expected to experience visible reflections from the project. That being said, they do not pose a risk to safety, and are likely a nuisance at worst, as the occupants can look away or close blinds. The exact durations and frequencies of these impacts are explored in the detailed analysis section of this report.

6. Pedestrians in Kenmore Square and in the boulevard of Commonwealth Avenue may also experience intermittent reflections. This condition is common in many urban centers and is unlikely to present a significant safety risk. The exact durations and frequencies of these impacts are explored in the detailed analysis section of this report.

7. We do not anticipate significant impacts due to reflections from the proposed Project on the Massachusetts Turnpike, nor at Fenway Park.

8. Given the reflection patterns, we would expect that any future development which increases massing in the southwest of Kenmore Square will serve to reduce the frequency of reflections compared to what was indicated here.

DETAILED ANALYSIS RESULTS

Based on the findings of the Screening Analysis and the risk levels associated with reflections effecting specific areas, 32 representative points were selected for the Detailed Analysis. These points are described in Table 2 and illustrated in Figure 7.

Note that the grade level area in the white box in Figure 7 illustrates the proposed changes to traffic flow around the proposed Project and has been assumed to be fully implemented as shown for the detailed analysis.

Table 2: Receptor Descriptions

Receptor Number	Receptor Description
D1-D5	Eastbound drivers on Beacon Street
D6	Northbound drivers on Brookline Avenue at Beacon Street
D7	Westbound drivers on Newbury Street at Brookline Avenue
D8-D11	Westbound drivers on Commonwealth Avenue
D12-D13	Southbound drivers on Deerfield Street
D14-D16	Eastbound drivers on Commonwealth Street
F17	Occupants of the Boston University Dormitory (Approximately 4rd floor)
F18	Occupants of 543 Commonwealth Avenue (Approximately 4th floor)
F19	Occupants of 540 Commonwealth Avenue (Approximately 2nd floor)
F20-21	Occupants of the Boston Hotel Buckminster (Approximately 4th floor)
F22-F27	Occupants of 566 Commonwealth Avenue (Approximately the 4th, 8th and 12th floors)
P28	Pool area of 566 Commonwealth Avenue
P29-P32	Pedestrians in Kenmore Square greenspaces

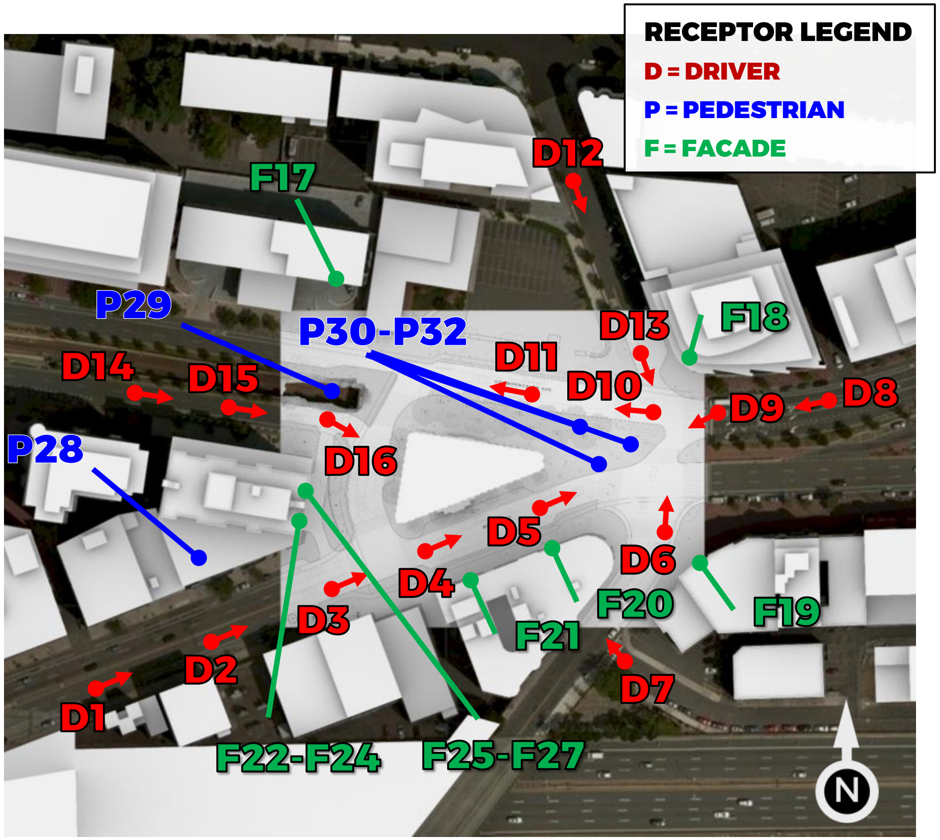


Figure 7: Receptor Locations (Map Underlay Credit: Microsoft Bing Maps)

DETAILED ANALYSIS RESULTS

Table 3 summarizes the level of visual and thermal impact from the project's reflections at each of the studied points. For each category (visual impact, thermal impacts on people, thermal impacts on facades/property) the point is defined as experiencing one of three impact levels:

- **Low** impacts indicate that either no reflections reach the point, or that reflections which do reach the location are unlikely to lead to visual or thermal concerns.

- **Moderate** impacts indicate the potential for visual nuisance, minor thermal discomfort to people, or heating of materials. Moderate impacts do not indicate a significant safety risk and are common in urban areas. They represent effects such as intermittent visual glare on pedestrians or occupants of adjacent buildings which can be safely self-mitigated.

- **High** impacts indicate the potential for risks to safety, either through impairing the visual acuity of a vehicle operator or through reflection intensities high enough to cause injury or property damage. When the sun is also in a driver's field of view, we would expect that brightness of the sun to dominate over the less intense reflected light, likely reducing the perceived effect of high impact reflections. This situation is noted in Table 3 where applicable, as are notes on high impact reflection frequencies and durations.

The minute-by-minute results for each point are presented as "Annual Impact Diagrams" which distill an entire years worth of data into a single diagram. The diagrams for each of the receptor points as well as an explanation for how to read the diagrams are provided in Appendix A.

For further detail on RWDI's criteria refer to Appendix B.

The level of mitigation required (discussed further in the Overall Observations & Conclusions section), is determined based on a combination of factors including the predicted level of impact, the frequency and duration of the impacts, and the risk level associated with activities likely to be engaged in at the location.

DETAILED ANALYSIS RESULTS

Table 3: Summary of Overall Predicted Impacts on Receptors

Receptor Number	Receptor Type	Assumed Activity Risk Level	Assumed Ability to Self-Mitigate	Peak Reflected Light Visual Impact	Sun in Field of View During High Impact Reflection	Duration / Number of Days with High Impact Reflection	Peak Reflected Solar Thermal Impact on People	Peak Reflected Solar Thermal Impact on Facade
D1	Driver	High	Low	***Low***	N/A	N/A	***Low***	N/A
D2-D6	Driver	High	Low	***Moderate***	N/A	N/A	***Low***	N/A
D7-D8	Driver	High	Low	***Low***	N/A	N/A	***Low***	N/A
D9	Driver	High	Low	***High****	***No***	Longest Duration: **9 minutes** Average Duration: **4 minutes** No. of days: **86**	***Low***	N/A
D10-D11	Driver	High	Low	***Moderate***	N/A	N/A	***Low***	N/A
D12	Driver	High	Low	***Low***	N/A	N/A	***Low***	N/A
D13	Driver	High	Low	***Moderate***	N/A	N/A	***Low***	N/A
D14	Driver	High	Low	***Low***	N/A	N/A	***Low***	N/A
D15	Driver	High	Low	***Moderate***	N/A	N/A	***Low***	N/A
D16	Driver	High	Low	***High****	***No***	Longest Duration: **13 minutes** Average Duration: **6 minutes** No. of days: **102**	***Low***	N/A
F17-F27	Facade	Low	High	***Moderate***	N/A	N/A	N/A	***Low***
P28-P32	Pedestrian	Low	High	***Moderate***	N/A	N/A	***Low***	N/A

***** The high impact reflections are infrequent and short in duration.

OVERALL OBSERVATIONS & CONCLUSIONS

Thermal Impacts on People

1. The articulated nature of the facades of the proposed Project ensure that reflected sunlight will not focus (multiply) in any particular area. Therefore, RWDI does not expect any significant thermal impacts (i.e. risks to human safety or property damage) to occur either on the site of the project or in the surrounding neighborhood.

Visual Glare Impact on Drivers

2. As with the addition of any glazed building, drivers travelling in the vicinity of the proposed Project are expected to experience an increased level of visual glare impact. Some reflections with a high visual impact potential were noted. These impacts can alter a driver's experience since the glare occurs at times when the sun would not be within a driver's field-of-view. However we note that these high impact reflections can only occur in a small fraction of the daytime. In particular, a driver's experience could be altered when:
   - Travelling west on Commonwealth Avenue approaching Deerfield Street (receptor D9); and
   - Travelling east on Commonwealth Avenue approaching the new passthrough from Commonwealth to Beacon (receptor D16)
3. At D9 the high impacts are predicted be short in duration and quite infrequent. They can persist at this location for up to 9 minutes at a time, but on average last 4 minutes. They are possible 86 days per year during early January (occurring between 2:00 pm and 2:30 pm EST), early February (occurring between 8:30 am and 8:45 am EST), early November (occurring at approximately 8:00 am EST), mid-to-late November (occurring between 1:30pm and 2:15 EST), and December (occurring at approximately 10:00 am EST and again between 1:30pm and 2:15 EST). **This equates to high impacts being possible in 0.24% of the daytime annually.**
4. At D16, the high impact reflections can last up to 13 minutes but on average last 6 minutes per instance. They can occur between approximately 1:30 pm and 2:30 pm EST from late November to mid January, and also between 5:00 pm and 6:30 pm EST from mid-May to mid-July. **This equates to high impacts being possible in 0.7% of the daytime annually.**
5. For the remainder of the driver receptors, visual glare impacts are predicted to be moderate at worst, and therefore are not expected to pose a safety concern to drivers. For further details refer to the visual impact diagrams for all driver receptors (D1-D16) illustrated in Appendix A.

OVERALL OBSERVATIONS & CONCLUSIONS

Visual Glare Impacts on Pedestrians and Facades

6. Moderate levels of visual impact are predicted to fall on all of the pedestrian and facade receptors studied in this analysis. This kind of impact does not present a safety risk, but rather a temporary nuisance at worst which can be mitigated by briefly closing blinds or looking away from the glare source.

7. Reflections reaching the BU dormitory (F17), 543 Commonwealth Avenue (F18), and 540 Commonwealth Avenue (F19) are all short in duration and infrequent. The moderate impact reflections can reach these buildings in less than 1.5% of the daytime annually.

8. The Boston Hotel Buckminster (F20 and F21) will be reflected upon throughout the year. These reflections can occur intermittently from approximately 1 hour after sunrise to 3:30 pm EST. This represents between 21% and 25% of the daytime annually.

9. The east elevation of 566 Commonwealth Avenue is predicted to experience intermittent reflections from March through September between the hours of 2:00 pm and 5:30 pm EST on the south end (F22 to F24), and from February through October from approximately 1:00 pm to 5:00 pm EST on the north end (F25 to F27). This represents between 5% and 8% of the daytime annually.

Thermal Impacts on Facades

10. The majority of reflected solar energy at the studied facade areas are of a low intensity (<100 W/m^2) and short duration. Hence, we would not expect these reflections to lead to a significant additional cooling load for a building. Should an individual choose to expose themselves to the reflected energy, they may feel warm however this would be a temporary experience and once which would easily be remedied by closing window treatments.

MITIGATION SUGGESTIONS

Overall, we would consider the reflections emanating from the proposed building onto the surrounding neighborhood to be comparable to what occurs in any urban area. If however, there are concerns about the predicted reflections, some commonly used mitigation techniques include:

1. **Surface Modification:** Modifying the exterior surface of a reflecting surface to either diffuse reflected light (i.e. by “frosting” or roughening the exterior surface).

2. **Glazing Change-out:** Choosing a glazing unit with a lower visible spectrum reflectance.

It should be noted that for a given reflection source, some of these options may not be appropriate and also that some of the suggested measures can create secondary effects on the building.

Should the design team wish to pursue any of the options described herein, RWDI would be happy to provide further consultation on the specific requirements and any challenges associated with a given approach or approaches.

APPENDIX A

ANNUAL REFLECTION IMPACT DIAGRAMS

Presentation of Results

The frequency, duration, and intensity of glare events throughout the year is illustrated using “annual impact diagrams” (see Figure A1 below for the general layout of these plots). The color of the plot for a given combination of date and time indicates the relative impact of any glare sources found. The horizontal axis of the diagram indicates the date, and the vertical axis indicates the hour of the day.

We note that the referenced times are in local standard time, so in jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

The following pages present the impact categories for three types of Annual Impact Diagrams: Visual Impact, Thermal Impact on People, and Thermal Impact on Property. More information on RWDI’s criteria is available in Appendix B.

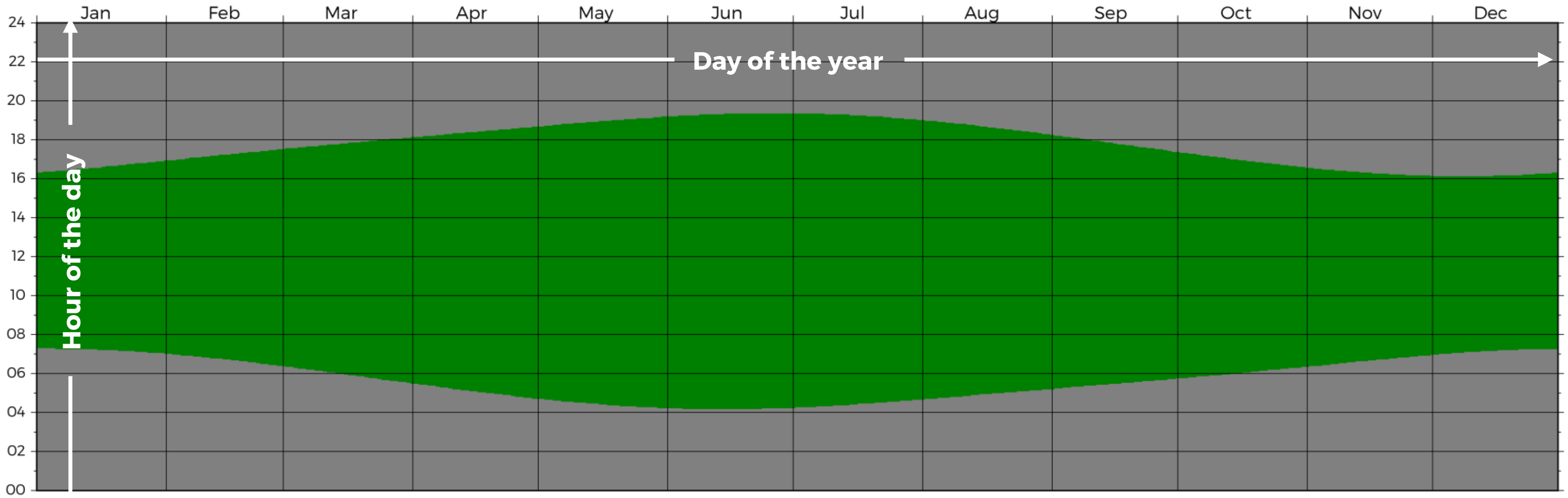


Figure A1: Layout of Annual Impact Diagram

Visual Impact Categories

Low: Either no significant reflections occur or the reflections will have a minimal effect on a viewer, even when looking directly at the source.

Moderate: The reflections can cause some visual nuisance only to viewers looking directly at the source.

High: The reflections can reduce visual acuity for viewers operating vehicles or performing other high-risk tasks who are unable to look away from the source, posing a significant risk of distraction.

Damaging: The brightest glare source is bright enough to permanently damage the eye for a viewer looking directly at the source.

Hatched areas indicate times and dates when the sun would also be in a driver's field of view.

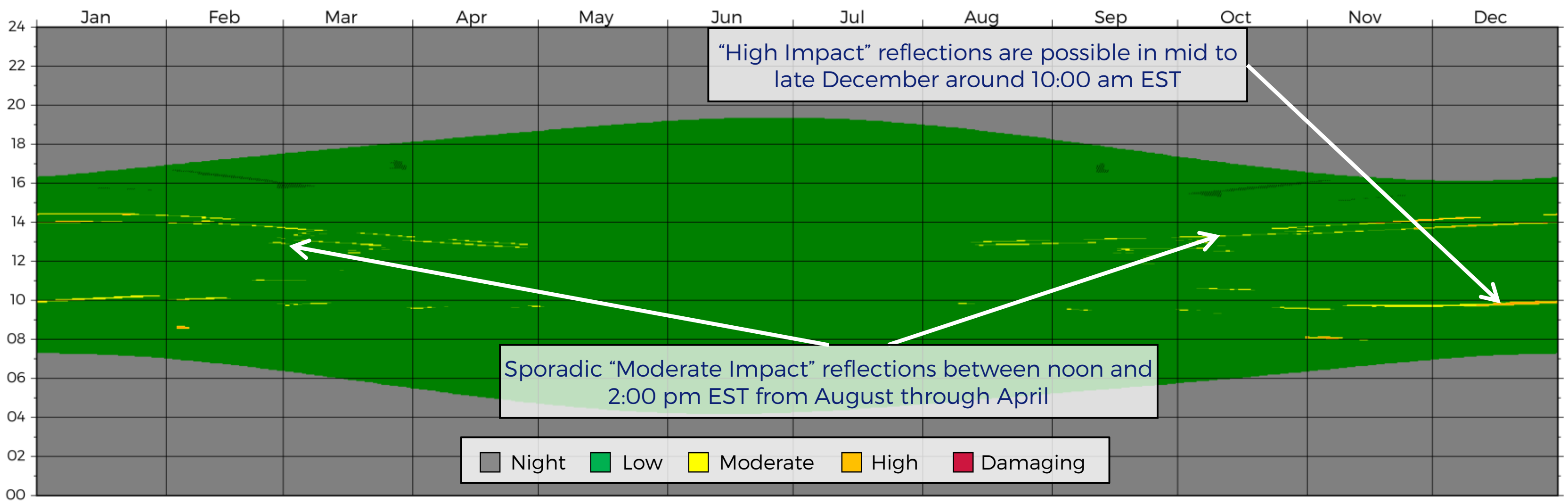


Figure A2: Example of Annual Visual Glare Impact Diagram – Receptor D9

Thermal Impact Categories for People

Low: Either no significant reflections occur or the reflection intensity is below the short-term exposure threshold of 1500 W/m².

Moderate: The reflection intensity is above the short-term exposure threshold of 1500 W/m² but below the safety threshold of 2500 W/m². Such reflections would quickly cause thermal discomfort in people.

High: The reflection intensity is above the safety threshold of 2500 W/m² but below 3500 W/m². This level of exposure to bare skin would lead to the onset of pain within 30 seconds.

Very High: Reflection intensity exceeds 3500 W/m². This level of exposure leads to second degree burns on bare skin within 1 minute.

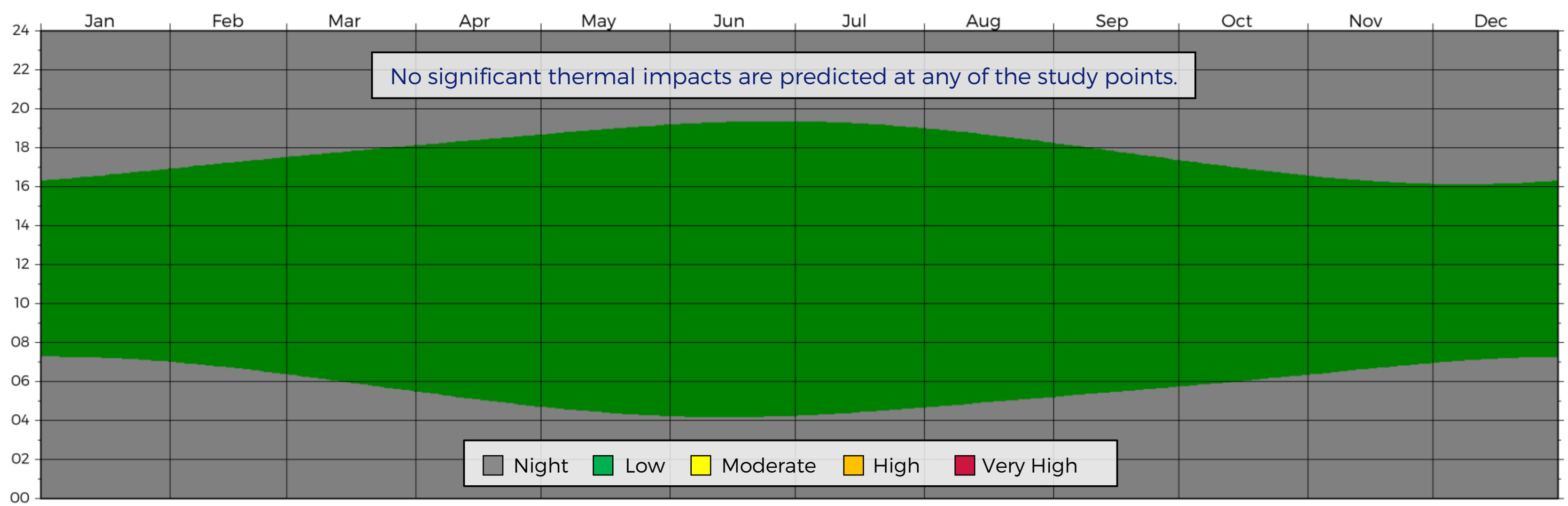


Figure A3: Example of Annual Pedestrian Thermal Impact Diagram – Receptor P28

Thermal Impact Categories for Property

A different scale is used to illustrate the reflected thermal energy on facades in order to provide further clarity on the potential for heat gain issues. The diagrams illustrate the irradiance levels of all predicted reflection events along with their frequency and duration.

The format of the diagram is similar to the diagrams described in the previous pages. The color of the plot for a given combination of date and time indicates the intensity of the reflected light at that point in time.

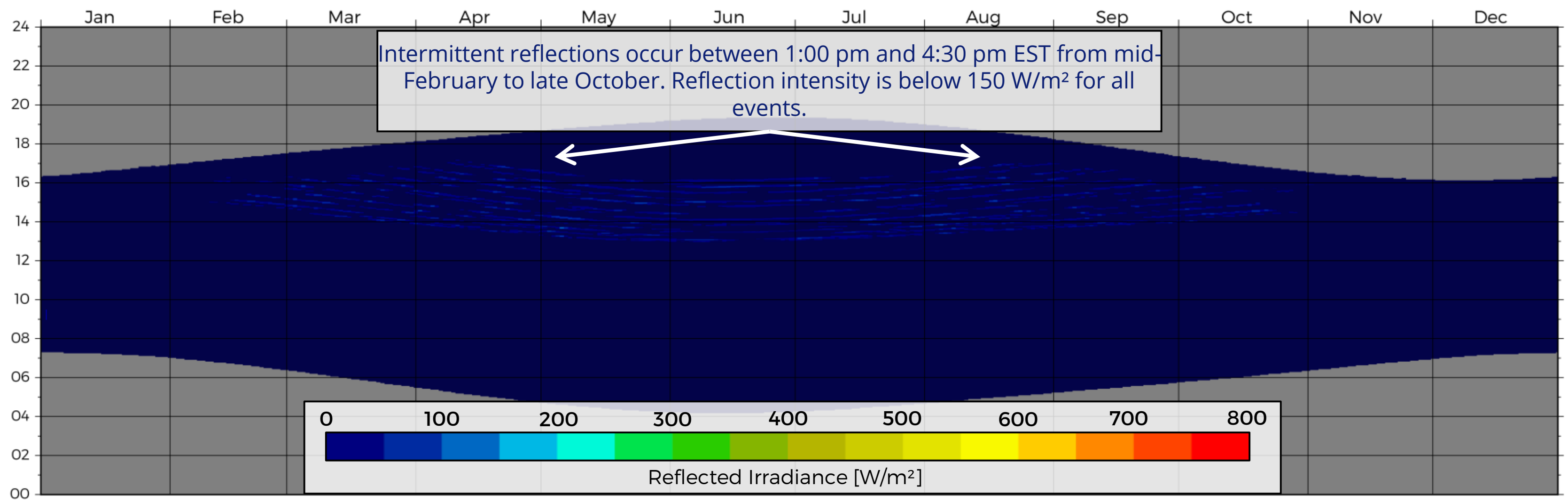


Figure A4: Example of Annual Property Thermal Impact Diagram – Receptor F26

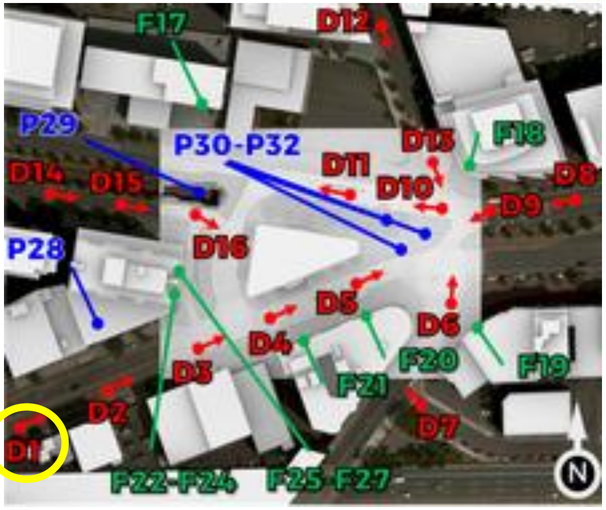
ANNUAL VISUAL IMPACT

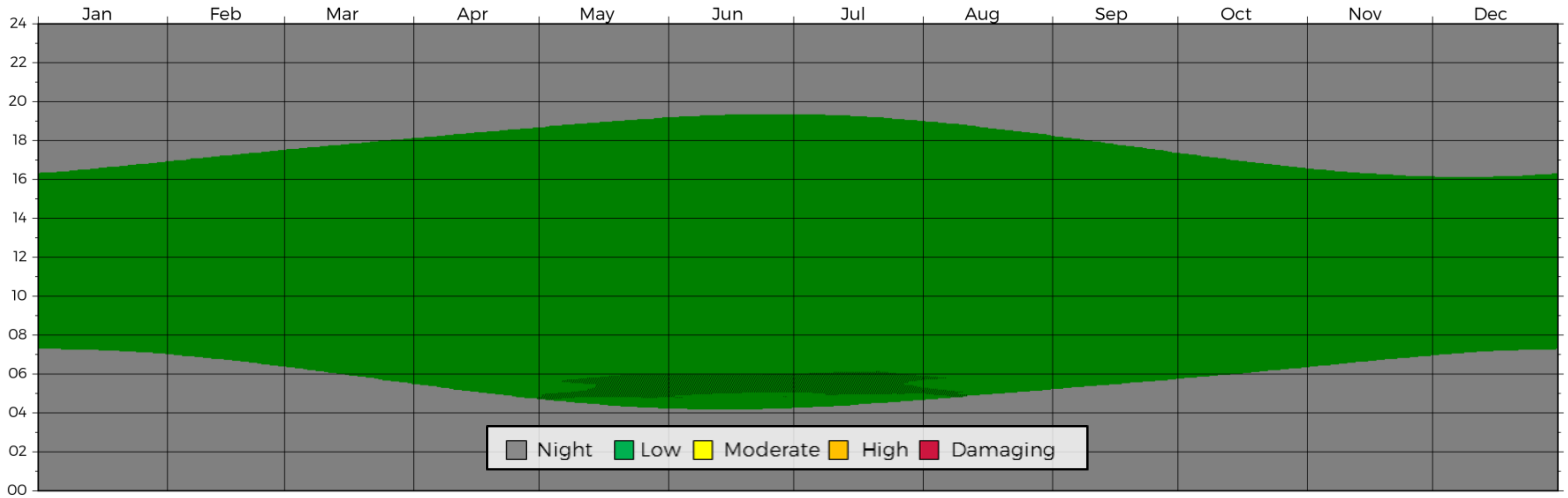
Driver Receptor D1

Receptor D1 was chosen to assess the visual impact assocated with solar reflections affecting eastbound drivers on Beacon Street.

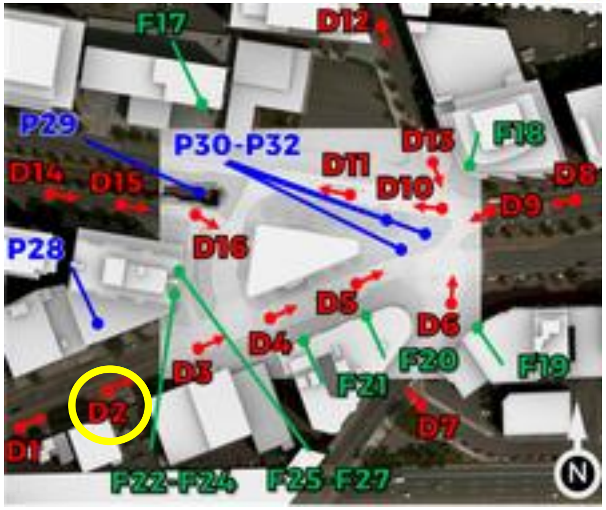
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.





ANNUAL VISUAL IMPACT

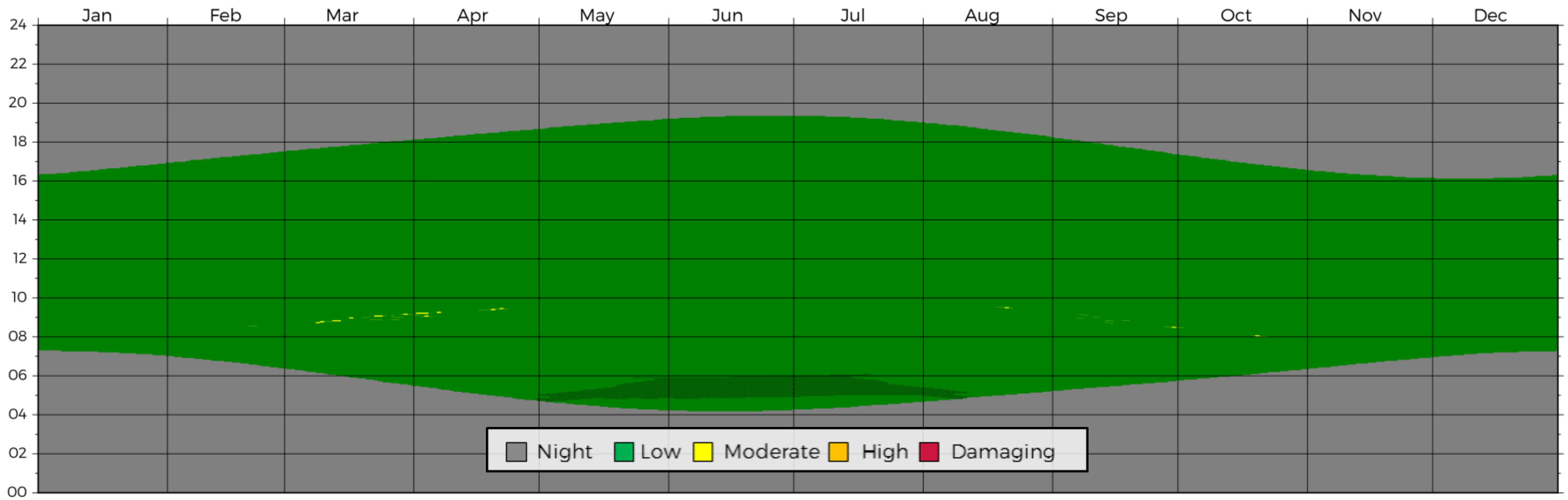


Driver Receptor D2

Receptor D2 was chosen to assess the visual impact assocated with solar reflections affecting eastbound drivers on Beacon Street.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.



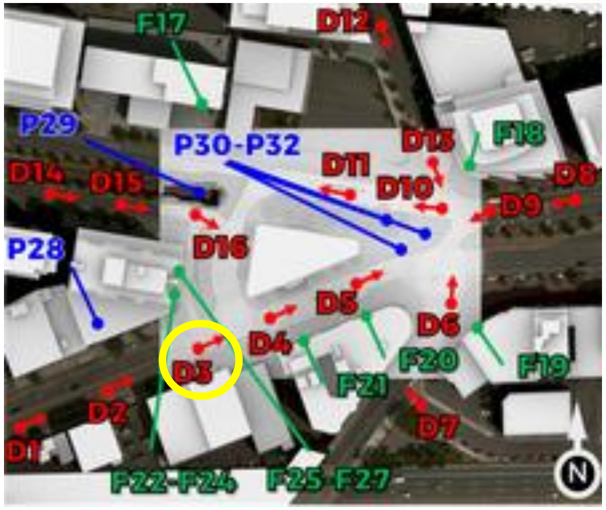
ANNUAL VISUAL IMPACT

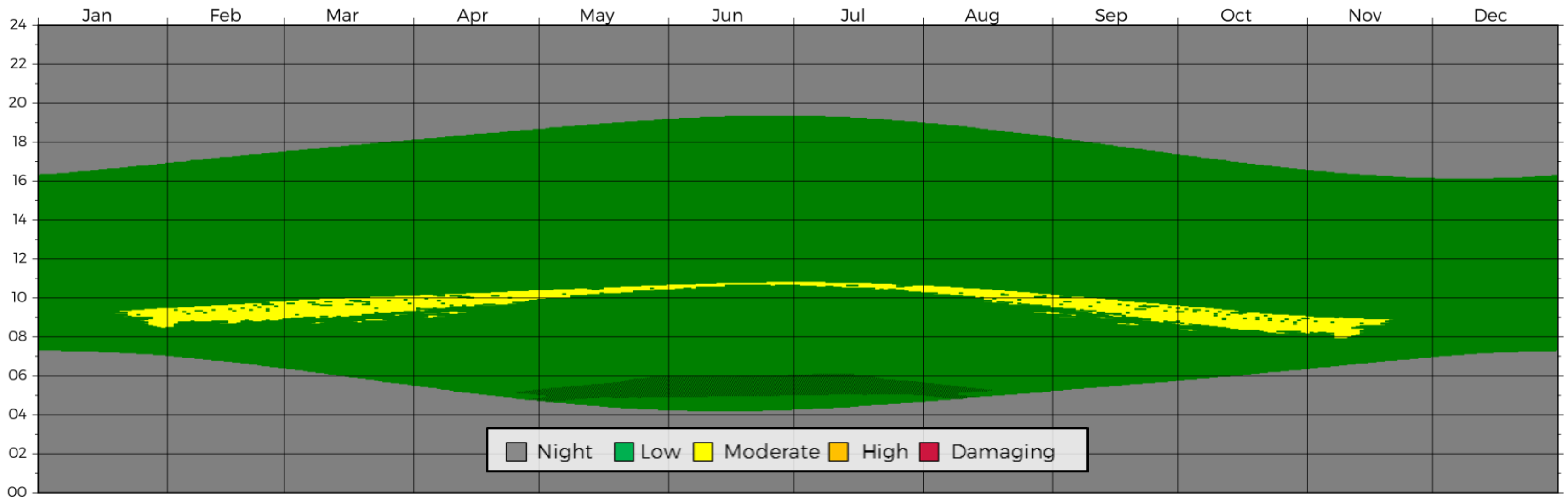
Driver Receptor D3

Receptor D3 was chosen to assess the visual impact assocated with solar reflections affecting eastbound drivers on Beacon Street.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.



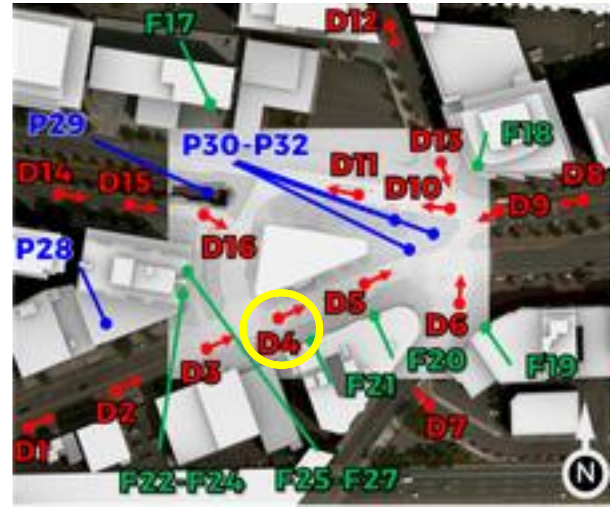


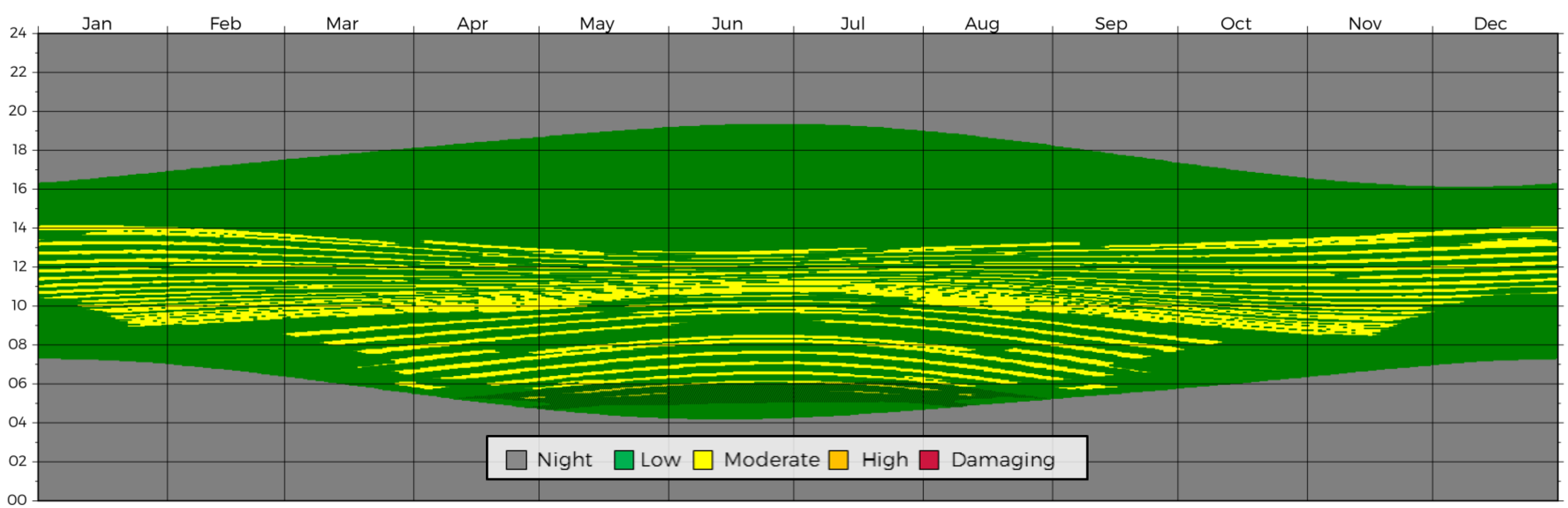
Driver Receptor D4

Receptor D4 was chosen to assess the visual impact assocated with solar reflections affecting eastbound drivers on Beacon Street.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.





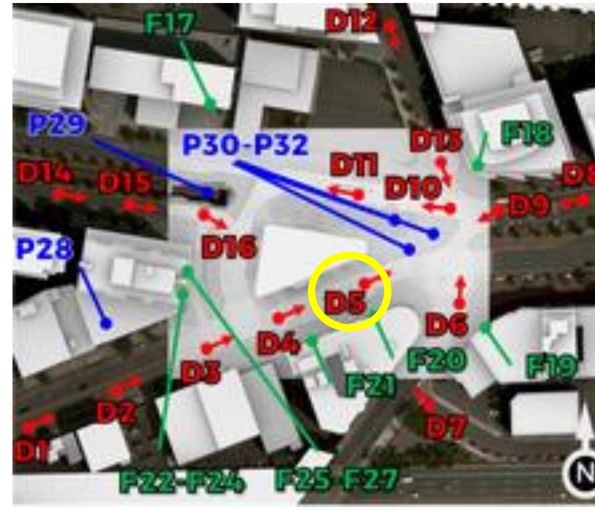
ANNUAL VISUAL IMPACT

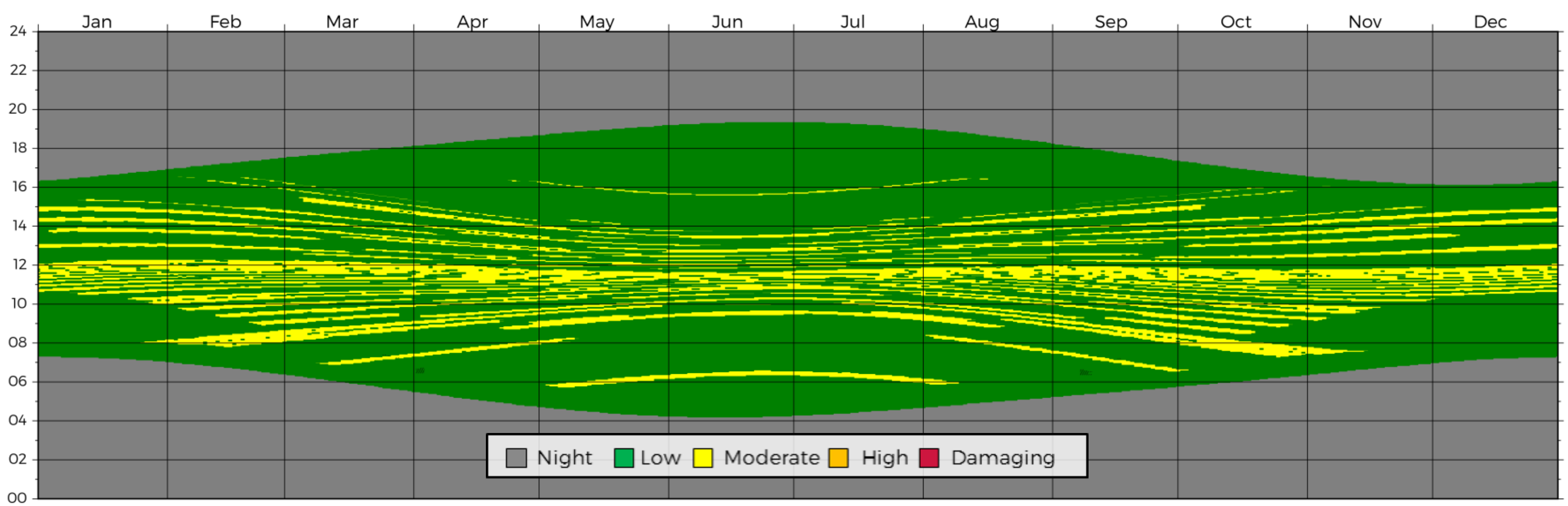
Driver Receptor D5

Receptor D5 was chosen to assess the visual impact assocated with solar reflections affecting eastbound drivers on Beacon Street.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.



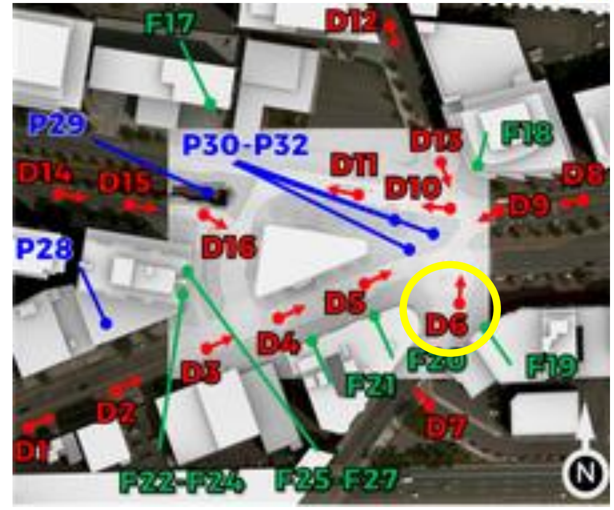


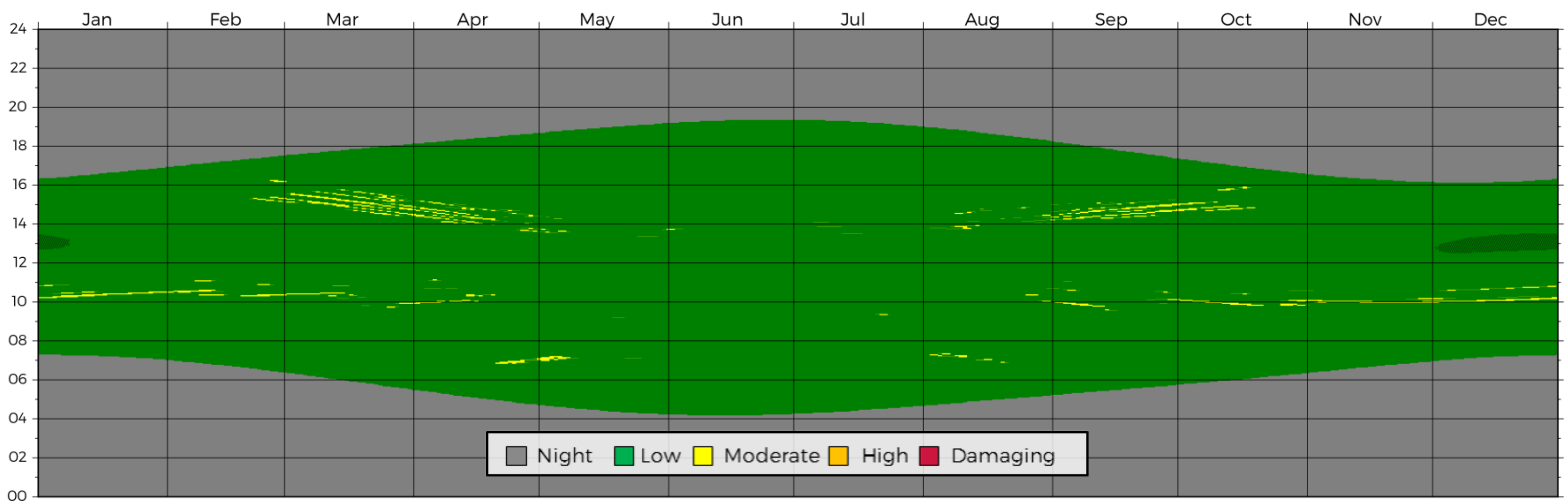
Driver Receptor D6

Receptor D6 was chosen to assess the visual impact assocated with solar reflections affecting northbound drivers on Brookline Avenue at Beacon Street.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

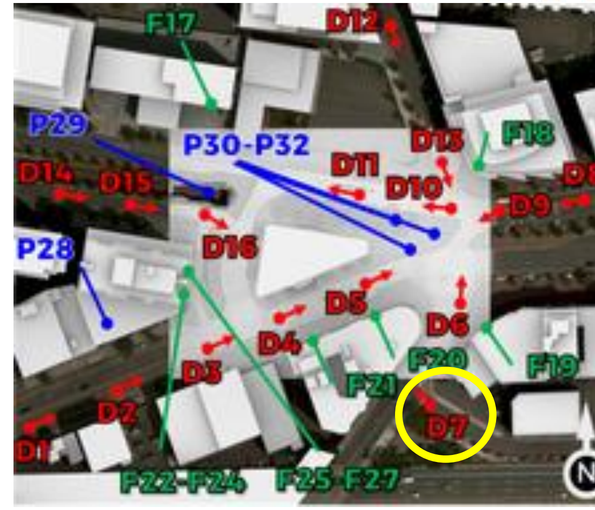
Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.





ANNUAL VISUAL IMPACT

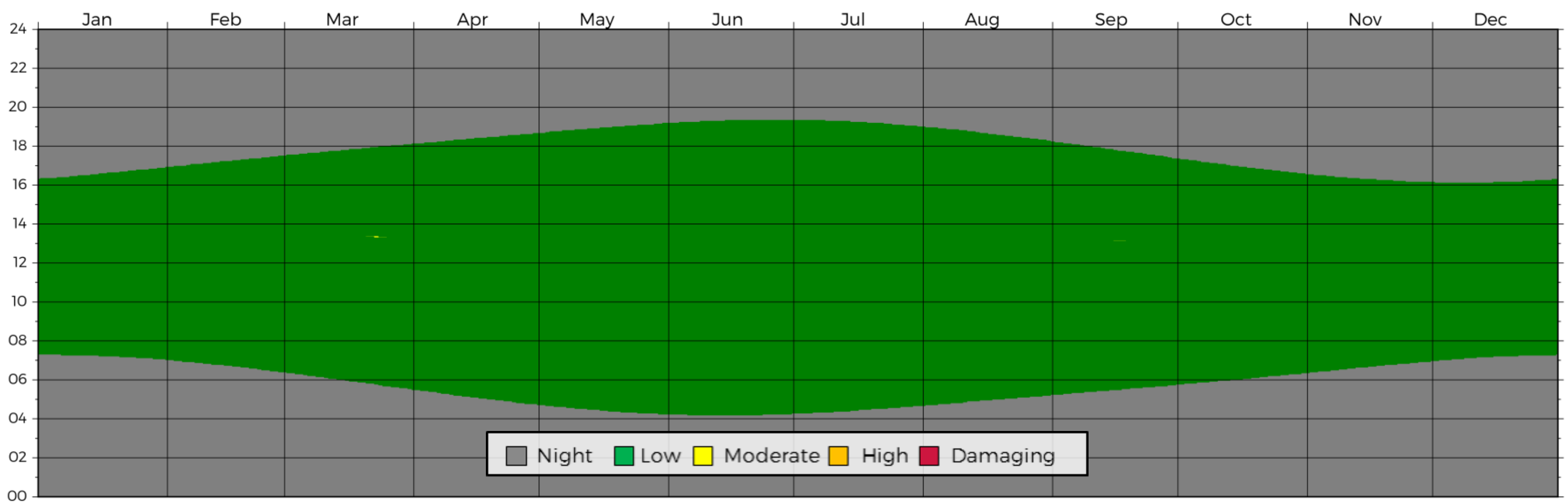
Driver Receptor D7



Receptor D7 was chosen to assess the visual impact assocated with solar reflections affecting westbound drivers on Newbury Street at Brookline Avenue.

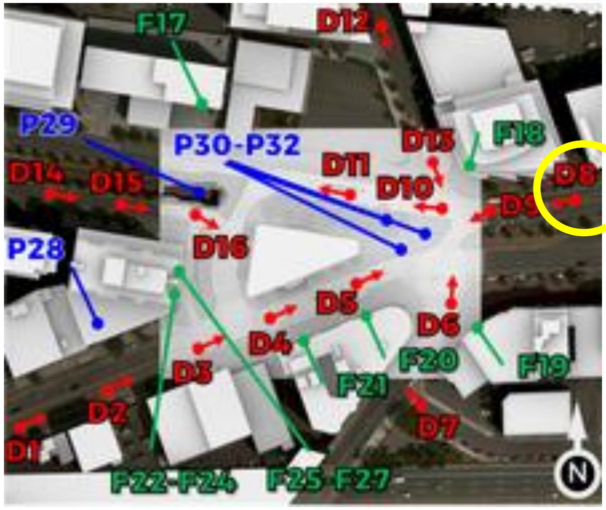
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.



ANNUAL VISUAL IMPACT

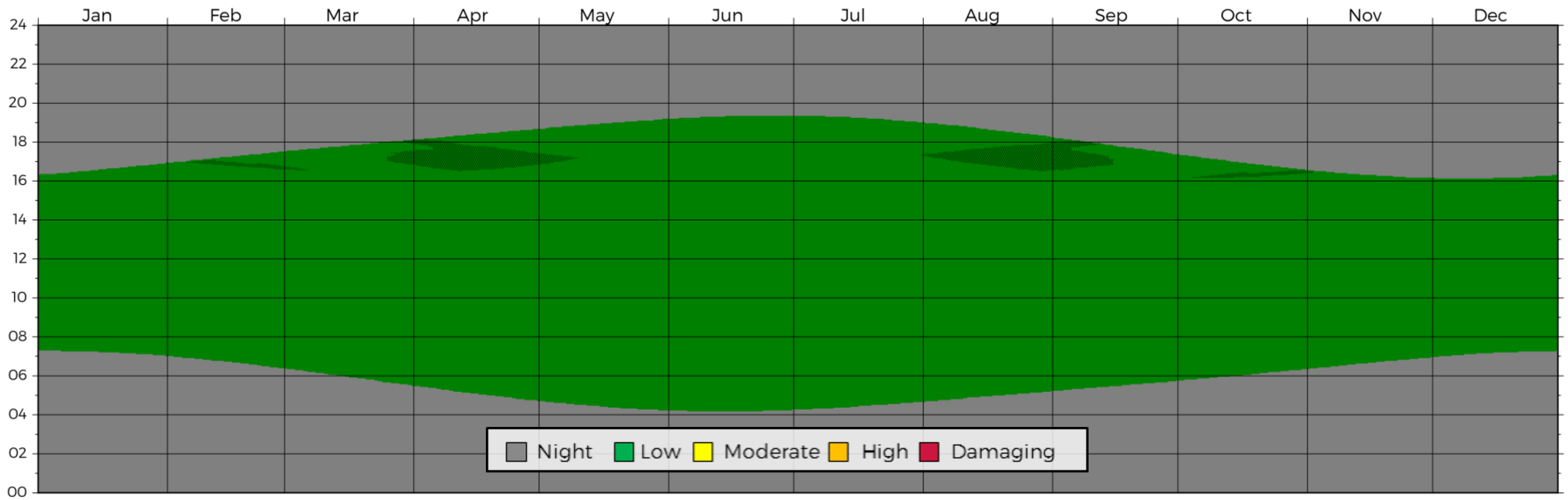
Driver Receptor D8



Receptor D8 was chosen to assess the visual impact assocated with solar reflections affecting westbound drivers on Commonwealth Avenue.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.



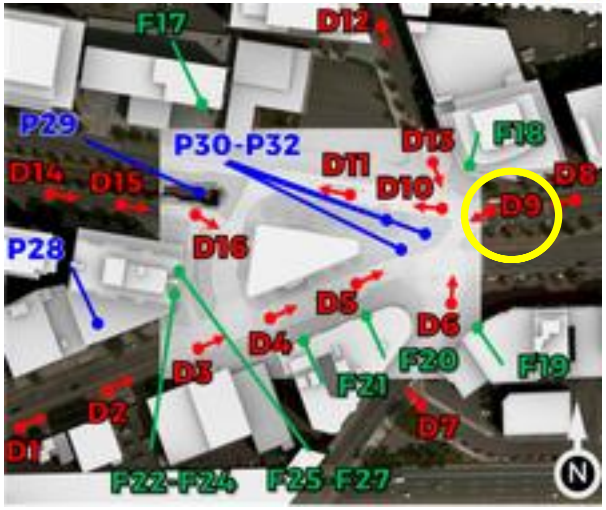
ANNUAL VISUAL IMPACT

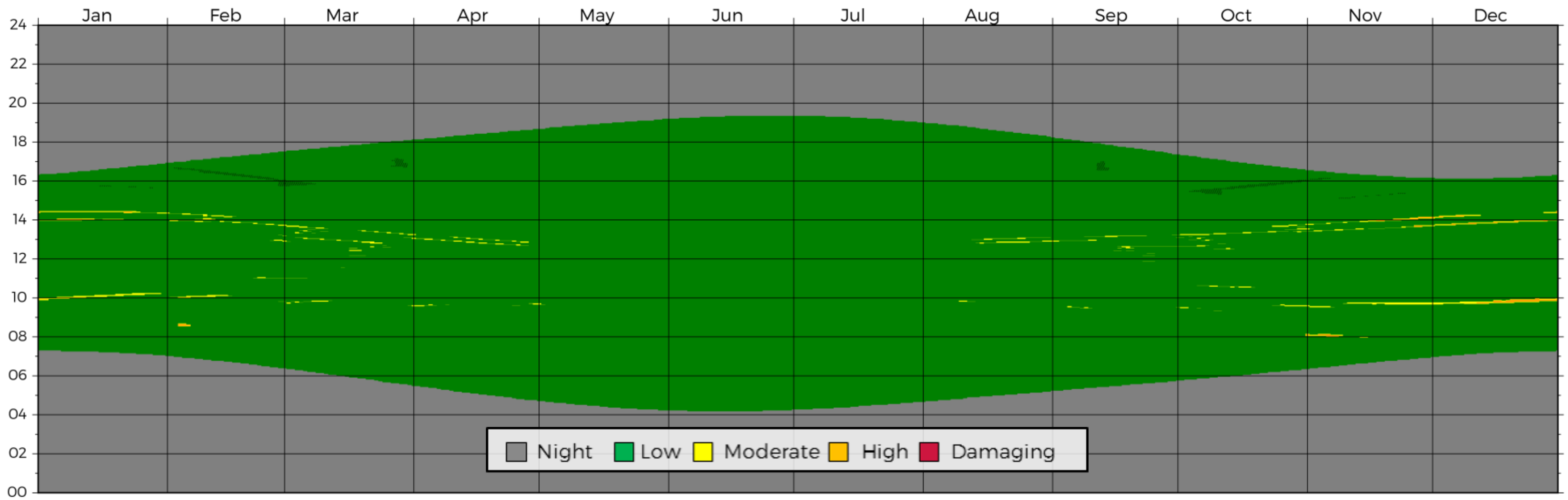
Driver Receptor D9

Receptor D9 was chosen to assess the visual impact assocated with solar reflections affecting westbound drivers on Commonwealth Avenue.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.





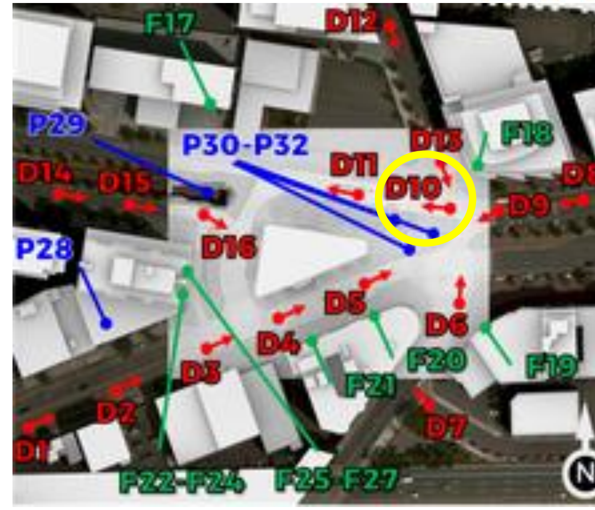
ANNUAL VISUAL IMPACT

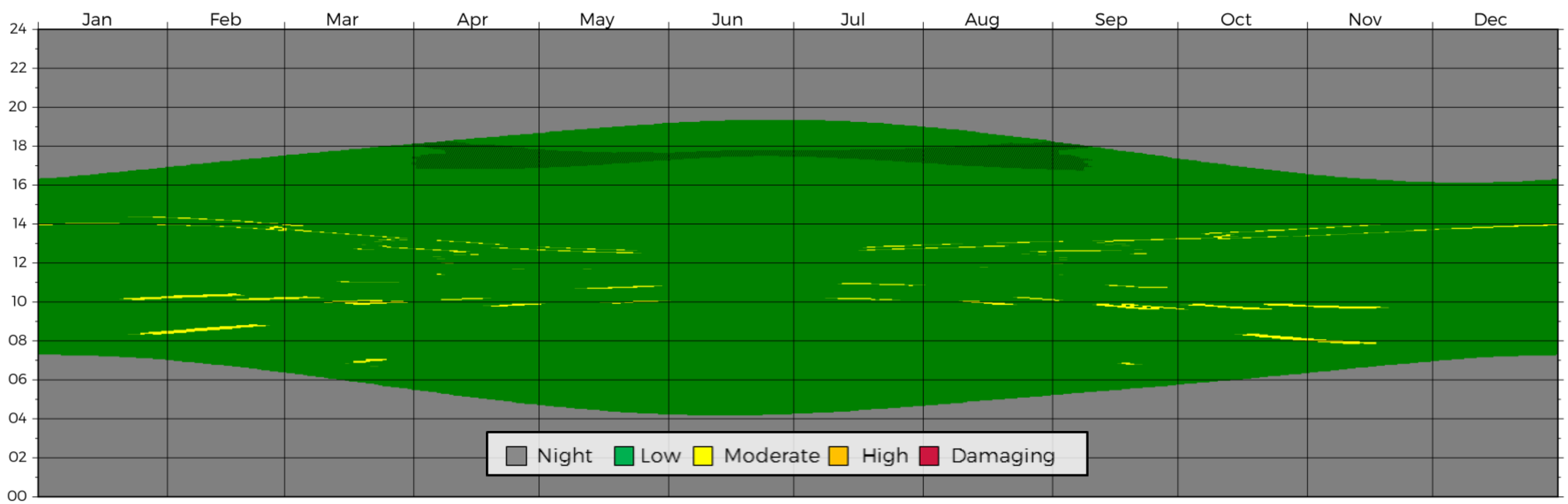
Driver Receptor D10

Receptor D10 was chosen to assess the visual impact assocated with solar reflections affecting westbound drivers on Commonwealth Avenue.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.



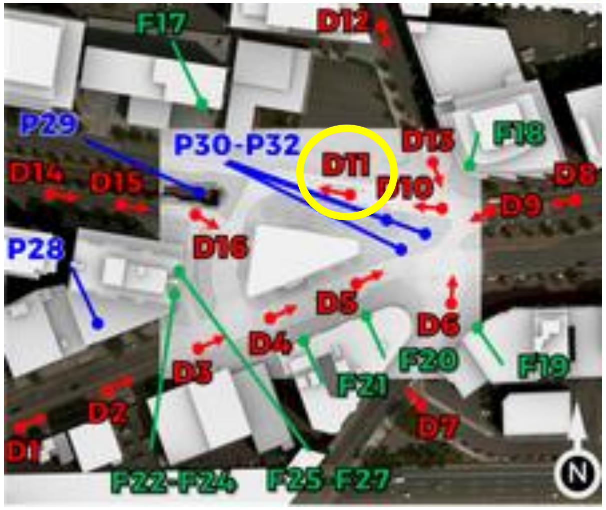


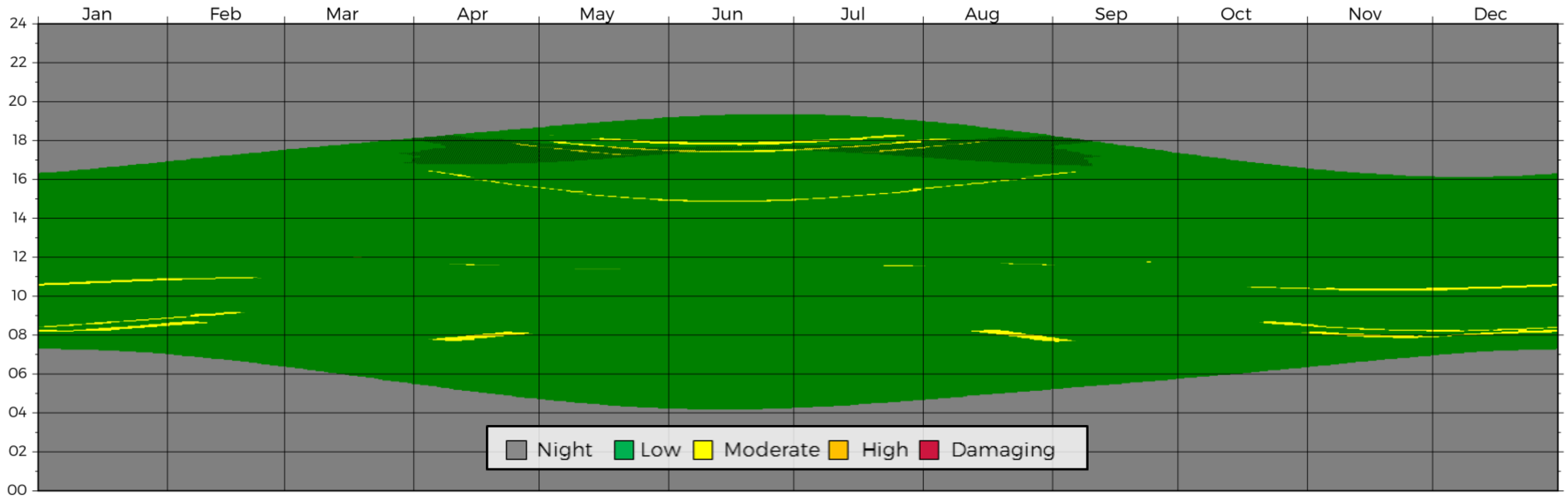
Driver Receptor D11

Receptor D11 was chosen to assess the visual impact assocated with solar reflections affecting westbound drivers on Commonwealth Avenue.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.



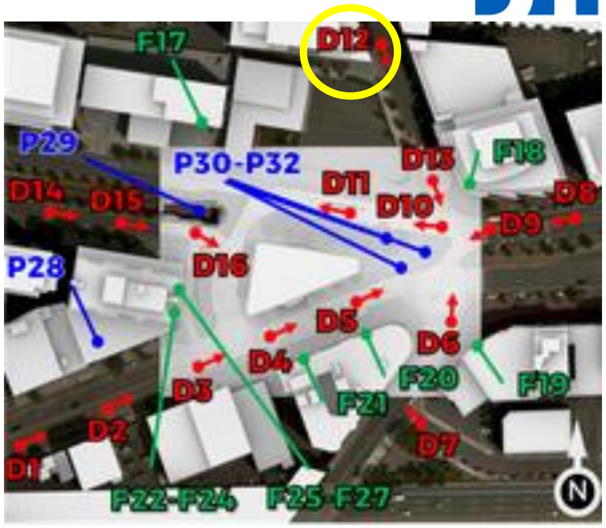


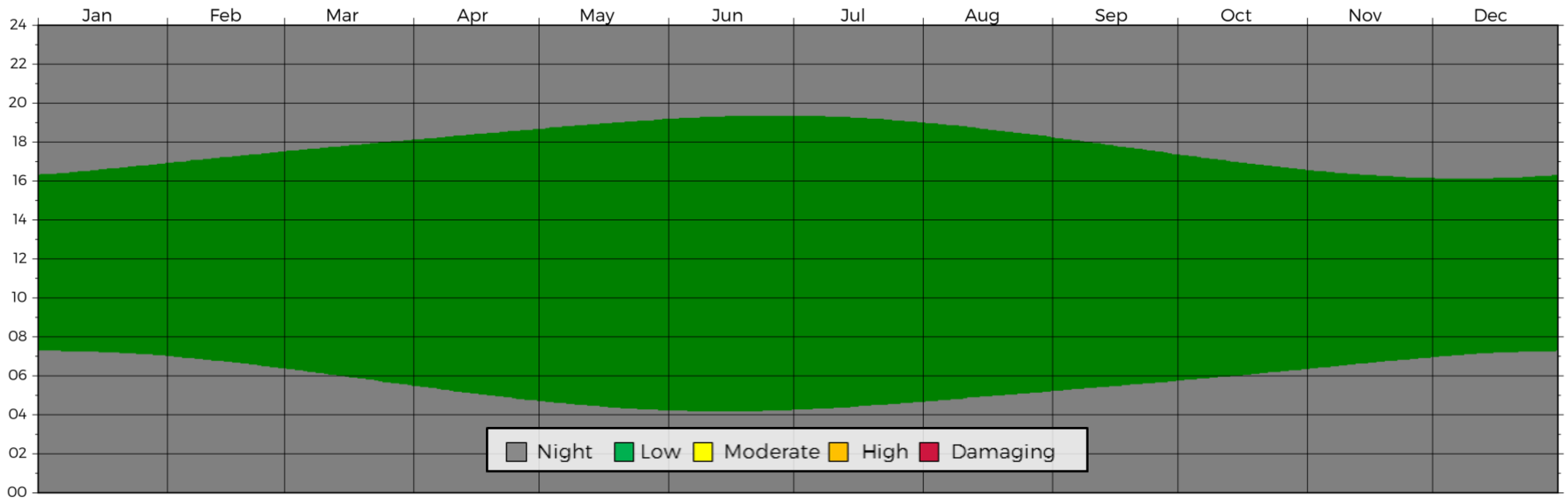
Driver Receptor D12

Receptor D12 was chosen to assess the visual impact assocated with solar reflections affecting southbound drivers on Deerfield Street.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.





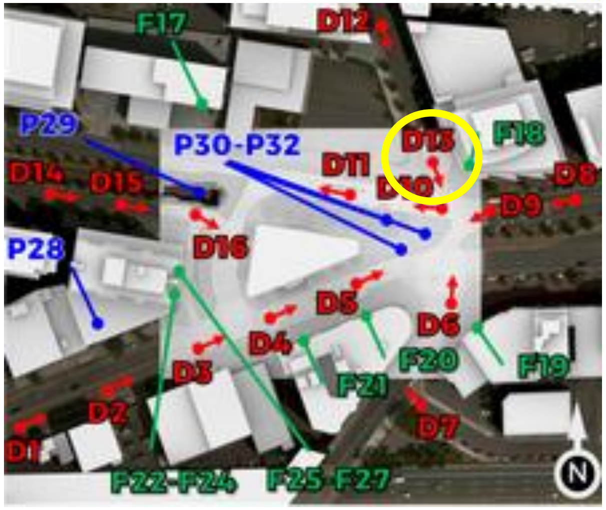
ANNUAL VISUAL IMPACT

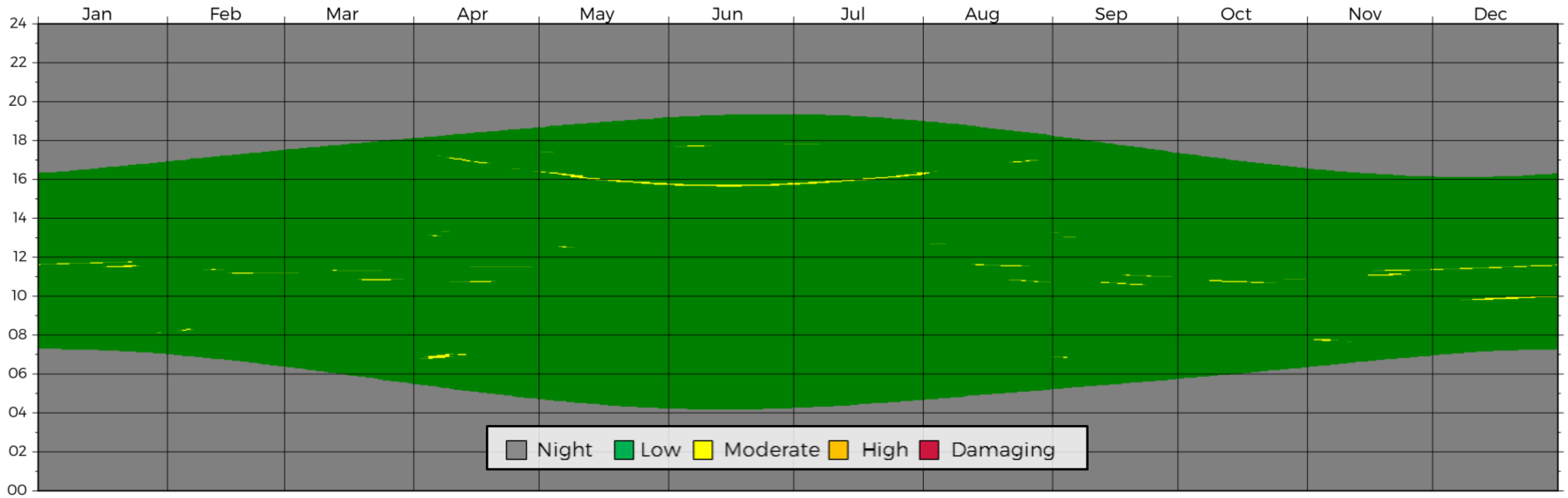
Driver Receptor D13

Receptor D13 was chosen to assess the visual impact assocated with solar reflections affecting southbound drivers on Deerfield Street.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.





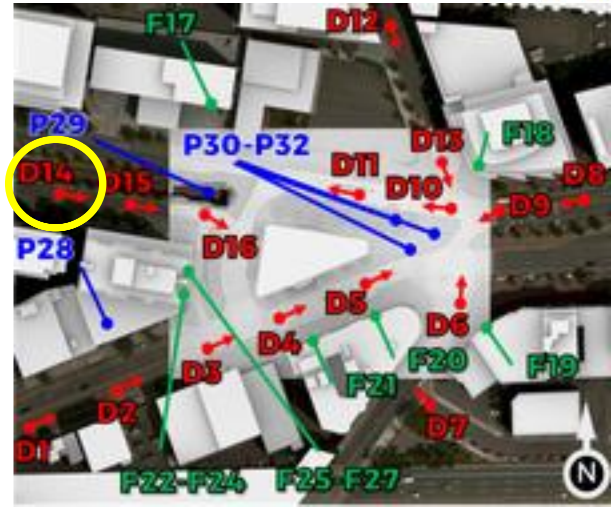
ANNUAL VISUAL IMPACT

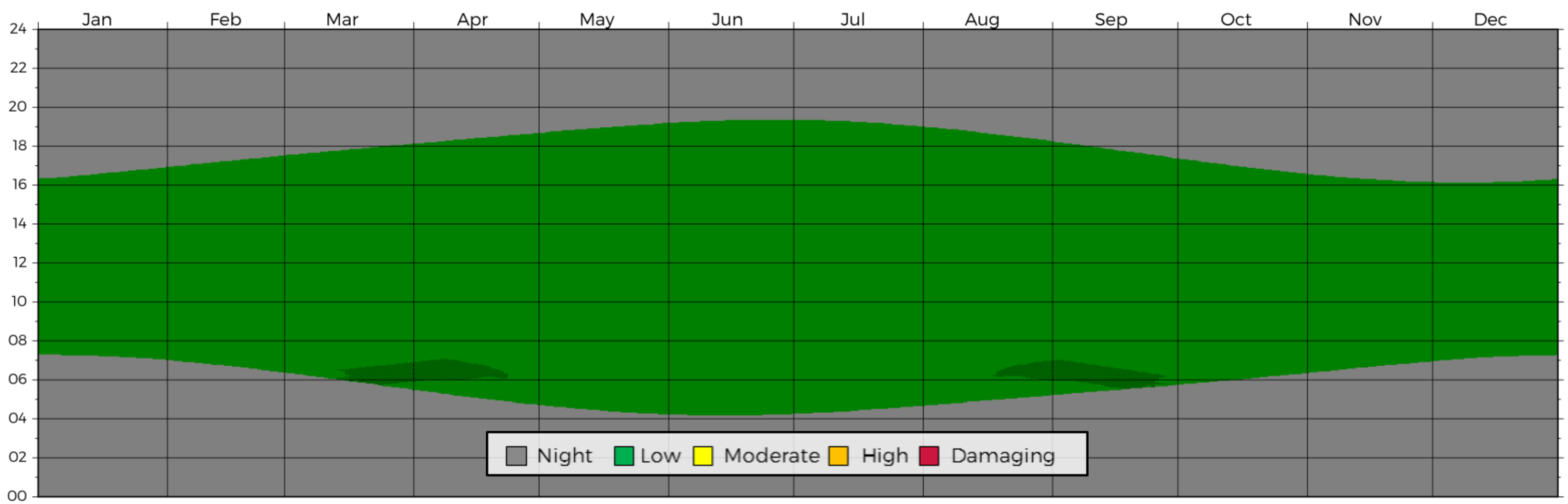
Driver Receptor D14

Receptor D14 was chosen to assess the visual impact assocated with solar reflections affecting eastbound drivers on Commonwealth Avenue.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.





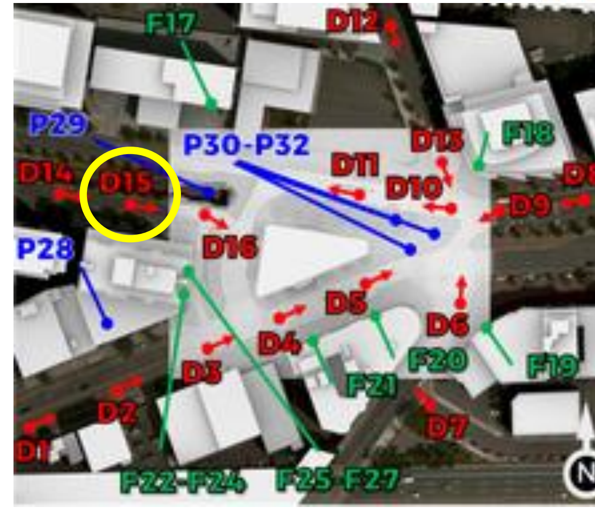
ANNUAL VISUAL IMPACT

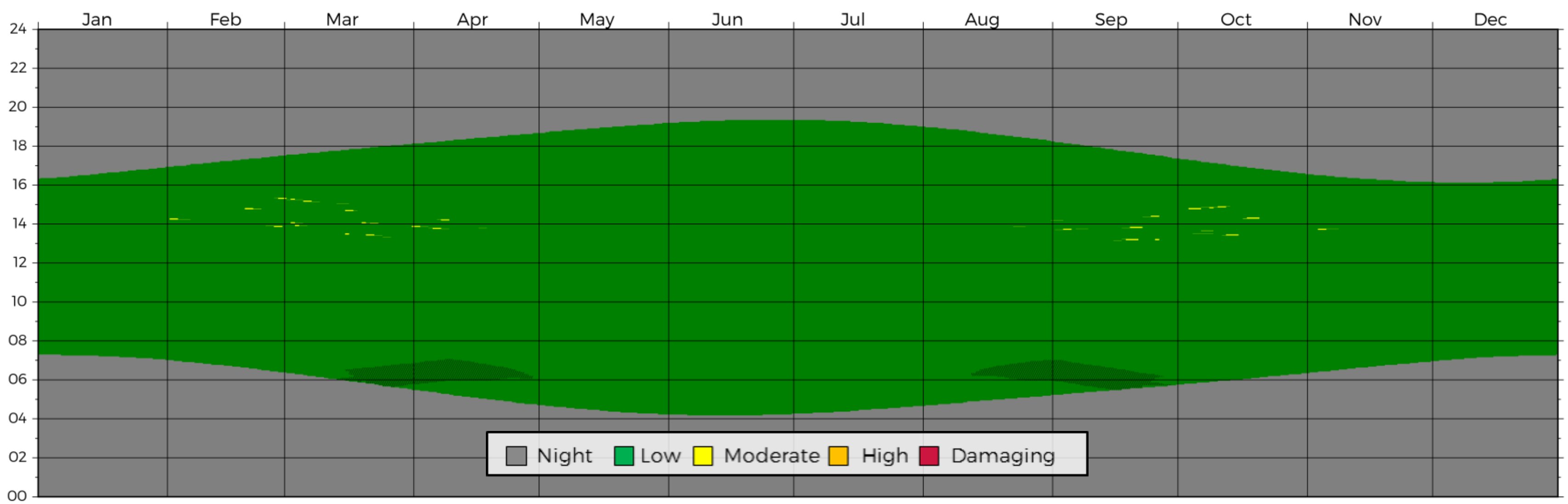
Driver Receptor D15

Receptor D15 was chosen to assess the visual impact assocated with solar reflections affecting eastbound drivers on Commonwealth Avenue.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.





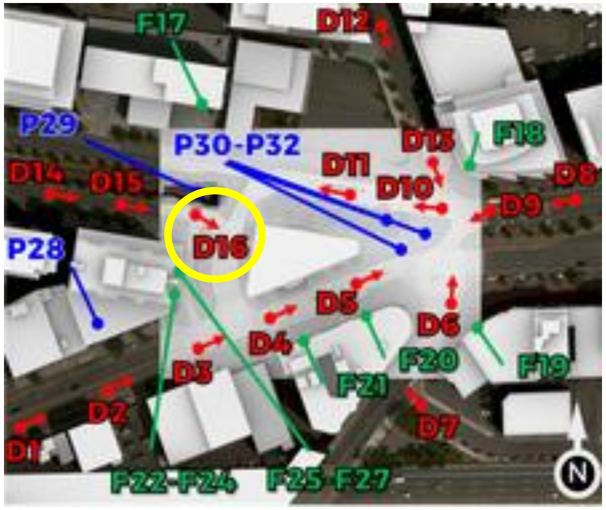
ANNUAL VISUAL IMPACT

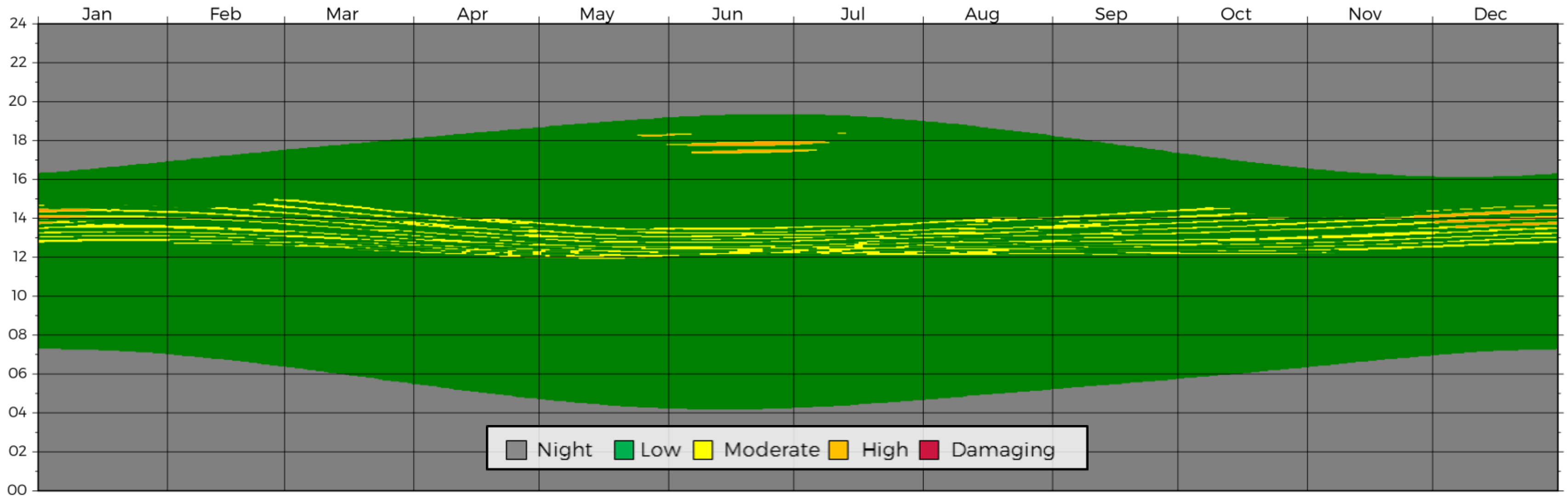
Driver Receptor D16

Receptor D16 was chosen to assess the visual impact assocated with solar reflections affecting eastbound drivers on Commonwealth Avenue.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

Hatched areas on the plot indicate times when the sun is within a driver's field-of-view.



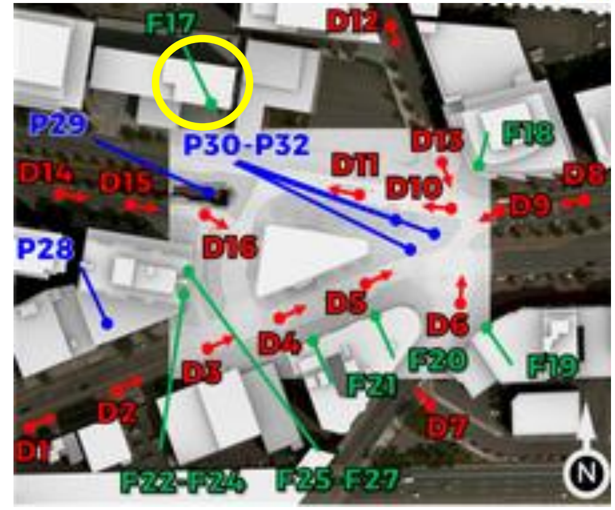


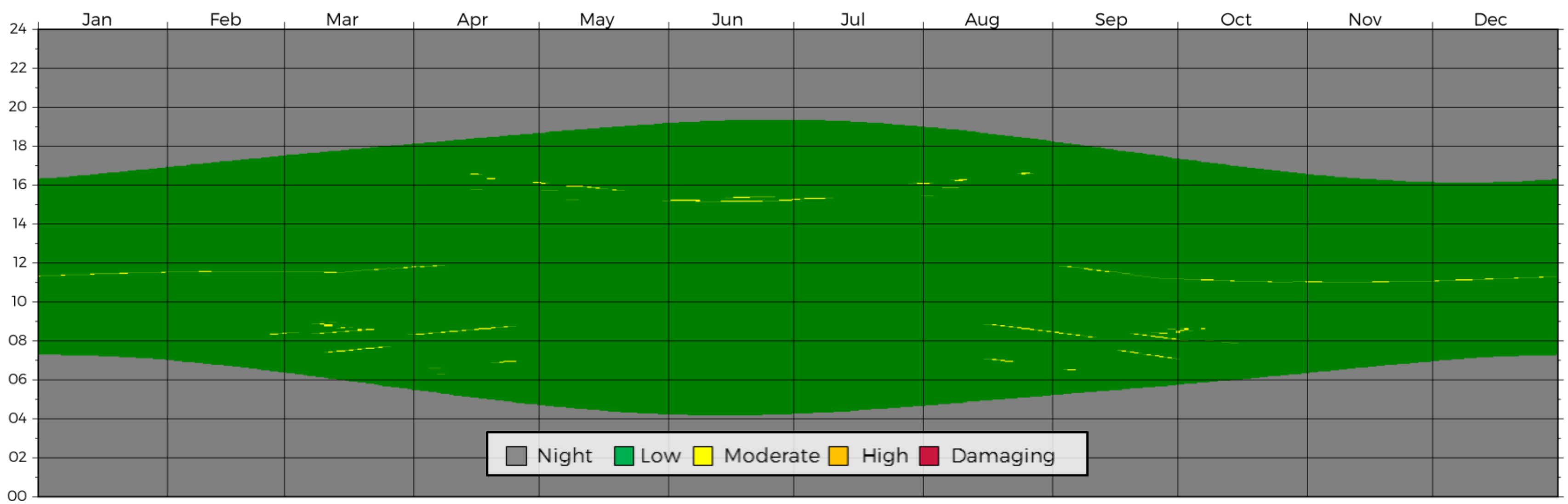
ANNUAL VISUAL IMPACT

Facade Receptor F17

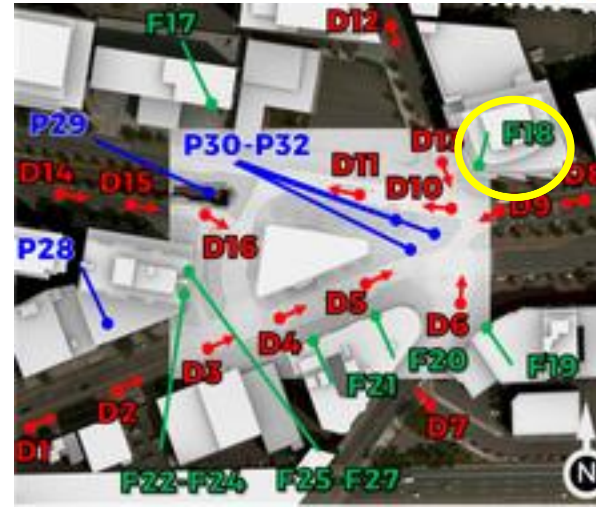
Receptor F17 was chosen to assess the visual impact assocated with solar reflections affecting occupants of the Boston University Dormitory (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



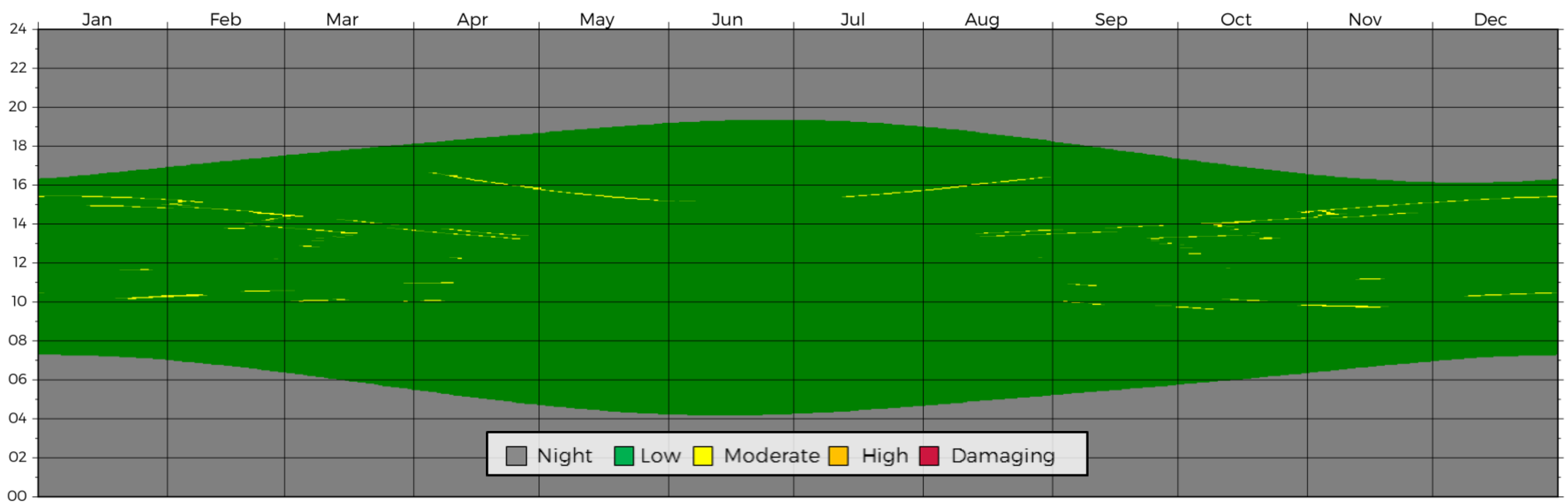


Facade Receptor F18



Receptor F18 was chosen to assess the visual impact assocated with solar reflections affecting occupants of 543 Commonwealth Avenue (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

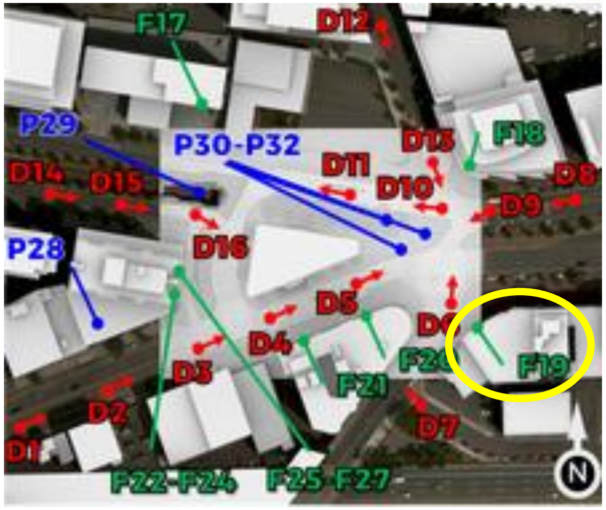


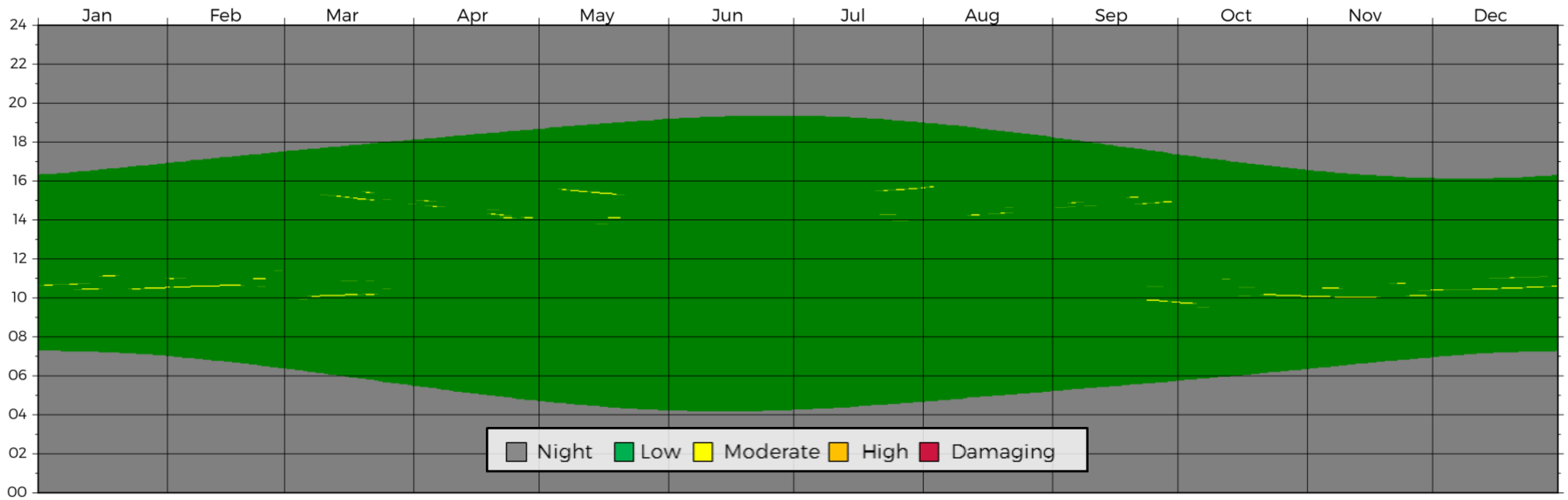
ANNUAL VISUAL IMPACT

Facade Receptor F19

Receptor F19 was chosen to assess the visual impact assocated with solar reflections affecting occupants of 540 Commonwealth Avenue (Approximately the 2nd floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

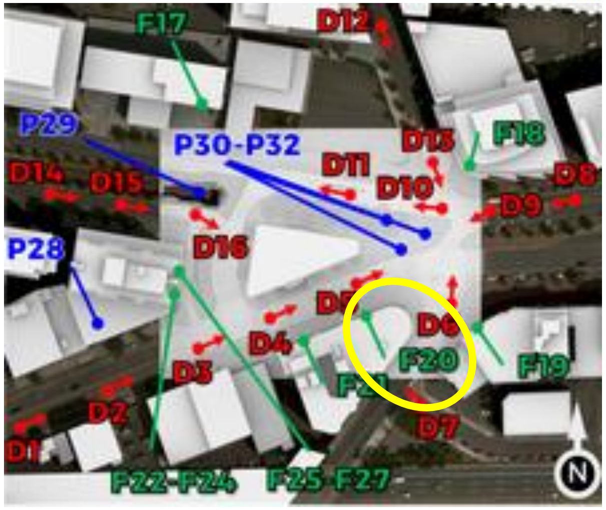


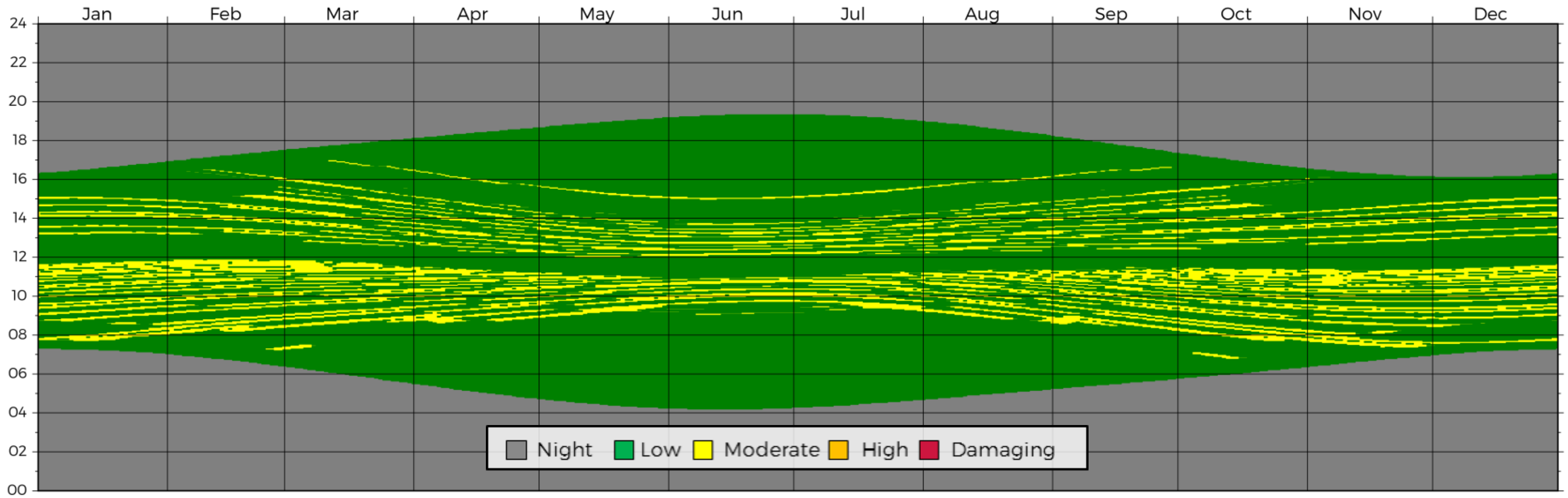


Facade Receptor F20

Receptor F20 was chosen to assess the visual impact assocated with solar reflections affecting occupants of the Boston Hotel Buckminster (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



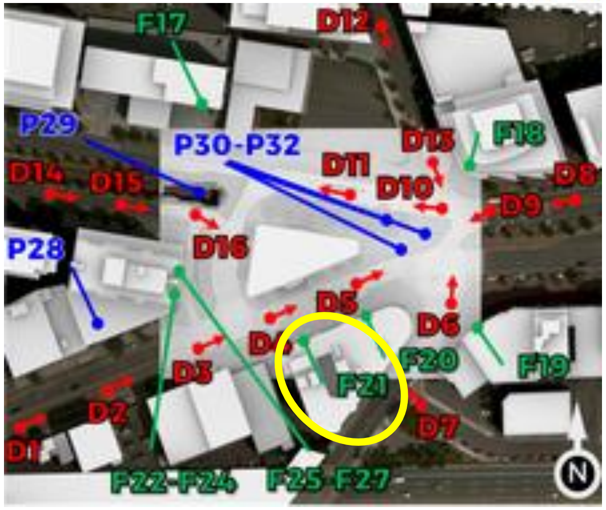


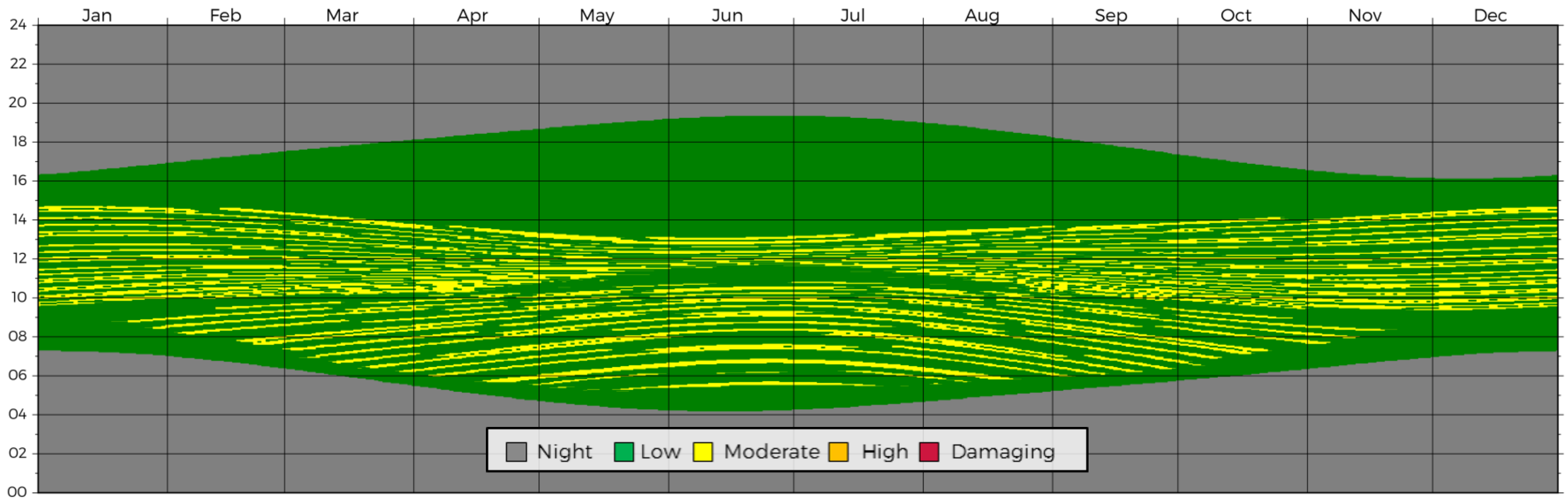
ANNUAL VISUAL IMPACT

Facade Receptor F21

Receptor F21 was chosen to assess the visual impact assocated with solar reflections affecting occupants of the Boston Hotel Buckminster (Approximately the 4th floor).

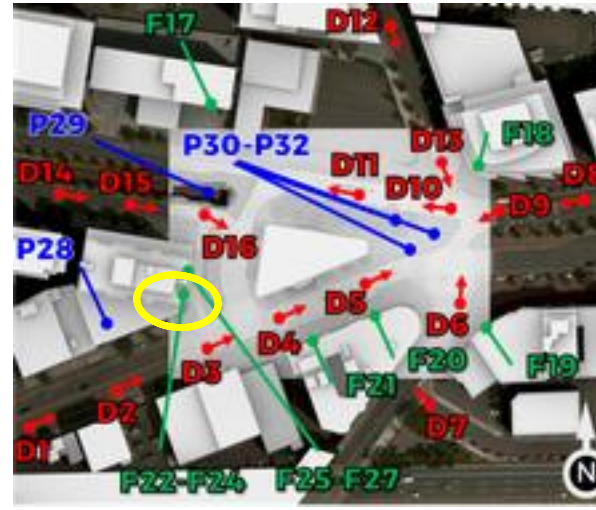
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.





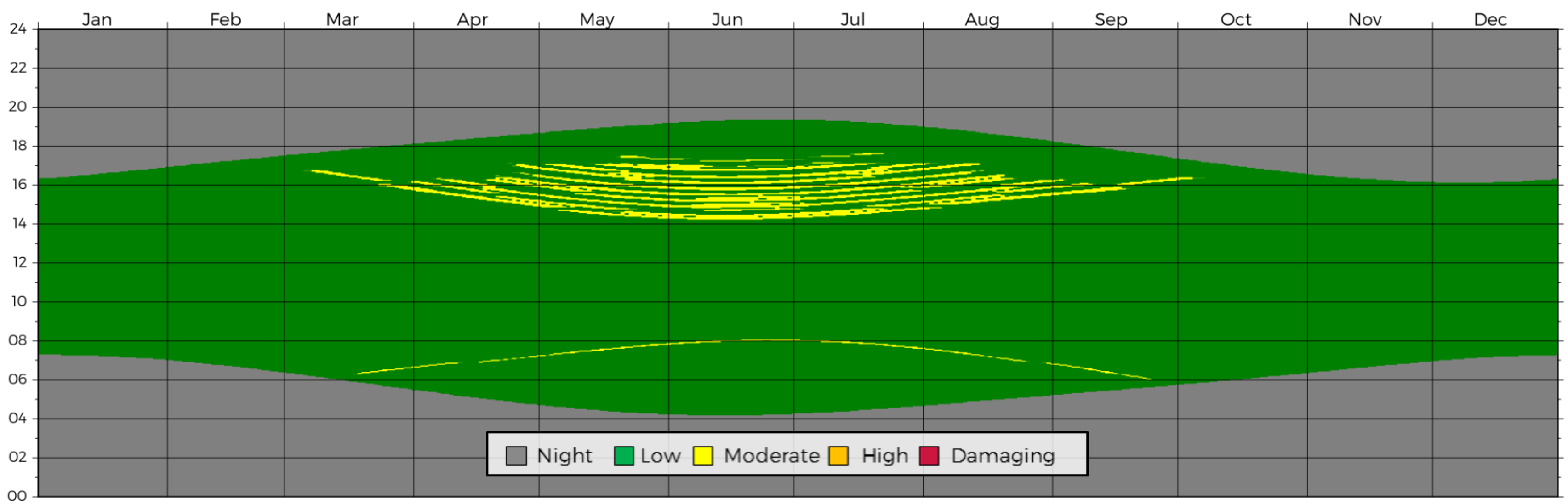
ANNUAL VISUAL IMPACT

Facade Receptor F22



Receptor F22 was chosen to assess the visual impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

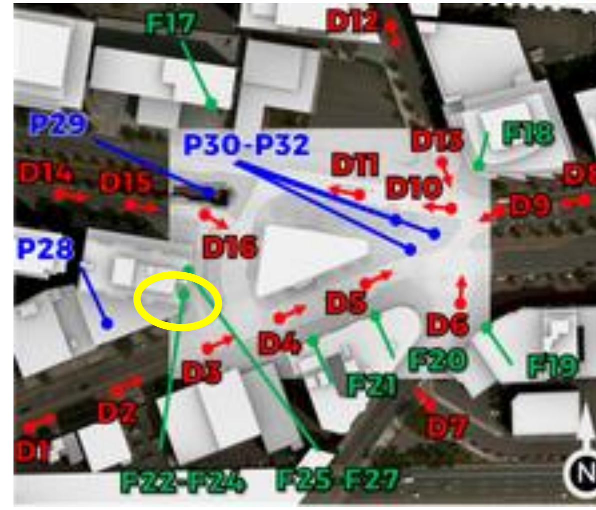


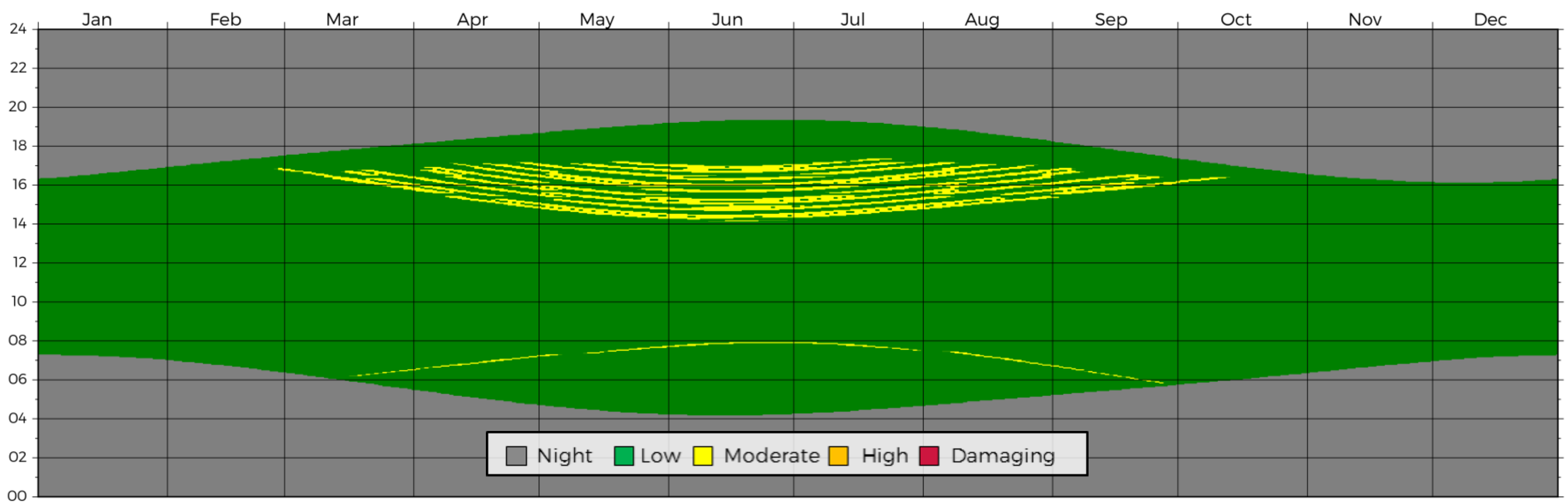
ANNUAL VISUAL IMPACT

Facade Receptor F23

Receptor F23 was chosen to assess the visual impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 8th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



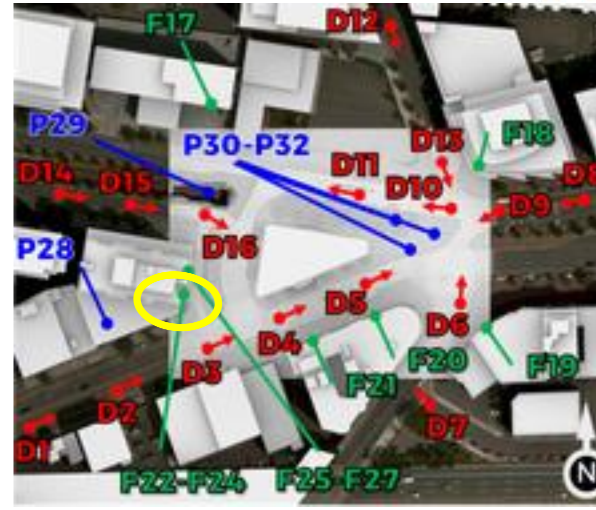


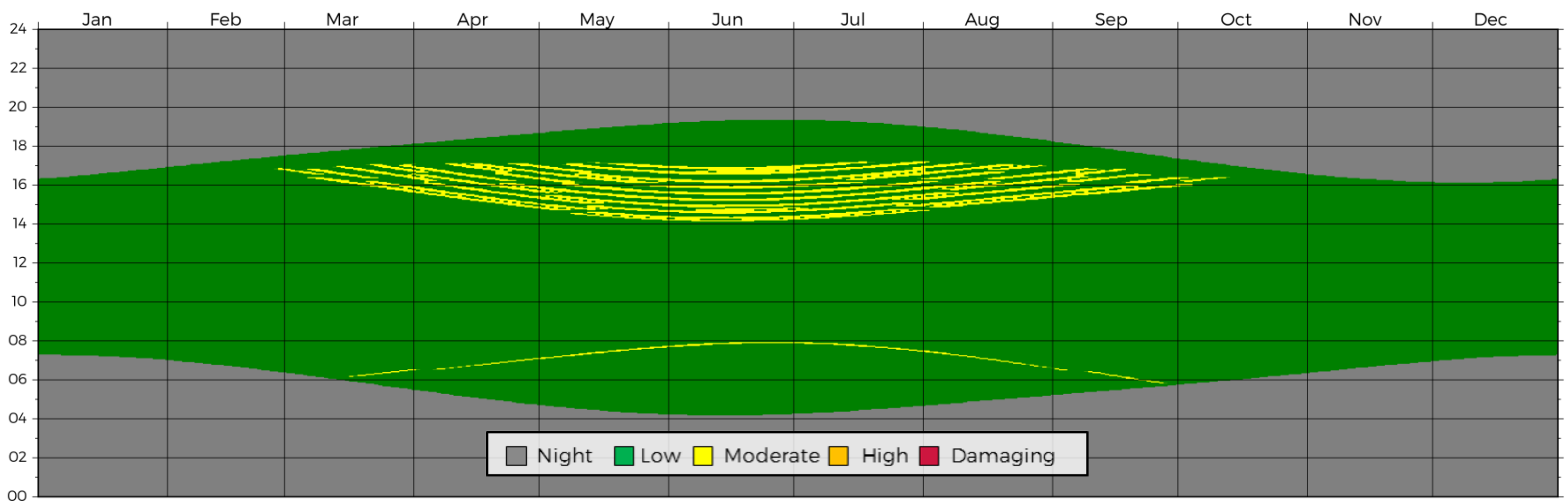
ANNUAL VISUAL IMPACT

Facade Receptor F24

Receptor F24 was chosen to assess the visual impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 12th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

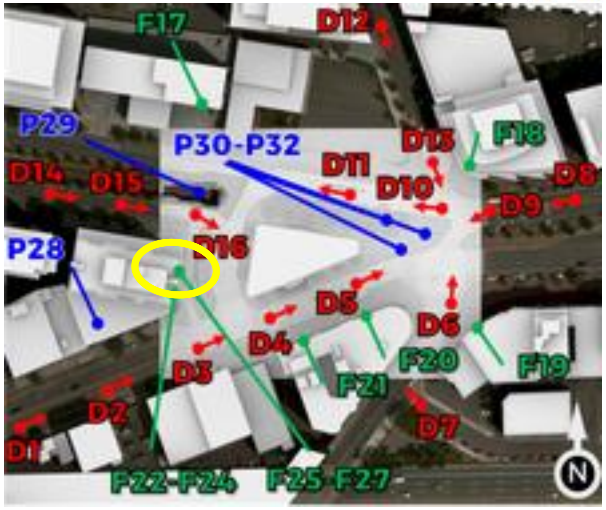


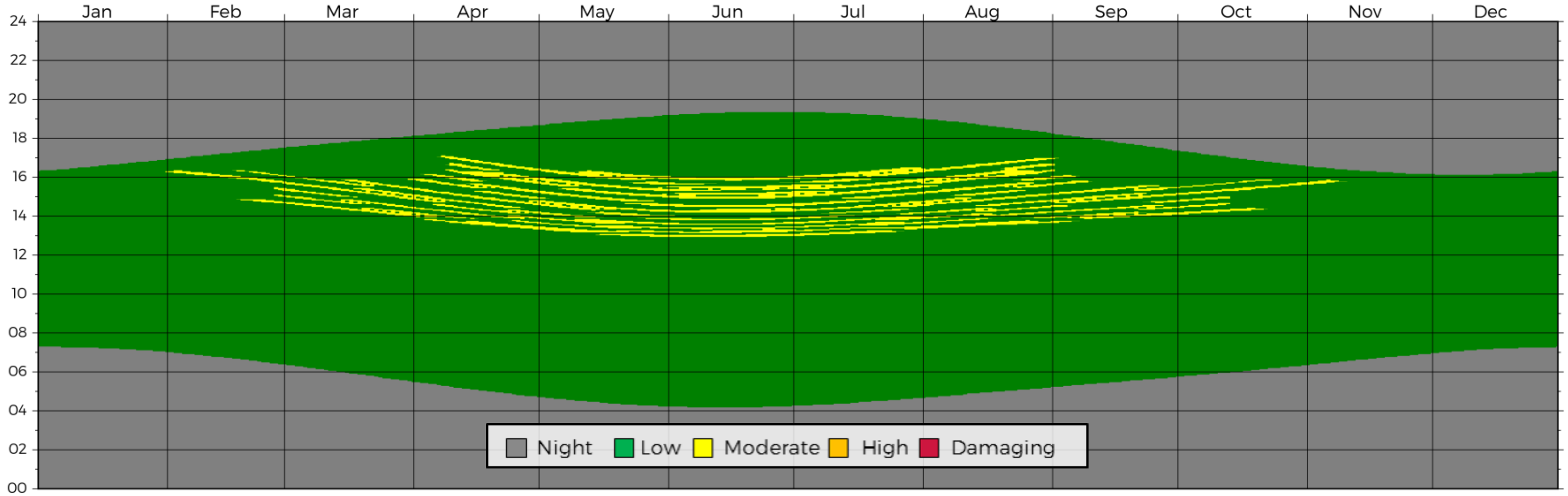


Facade Receptor F25

Receptor F25 was chosen to assess the visual impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



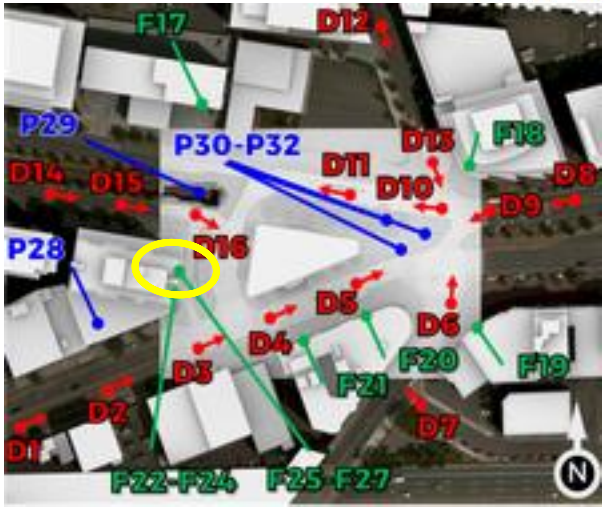


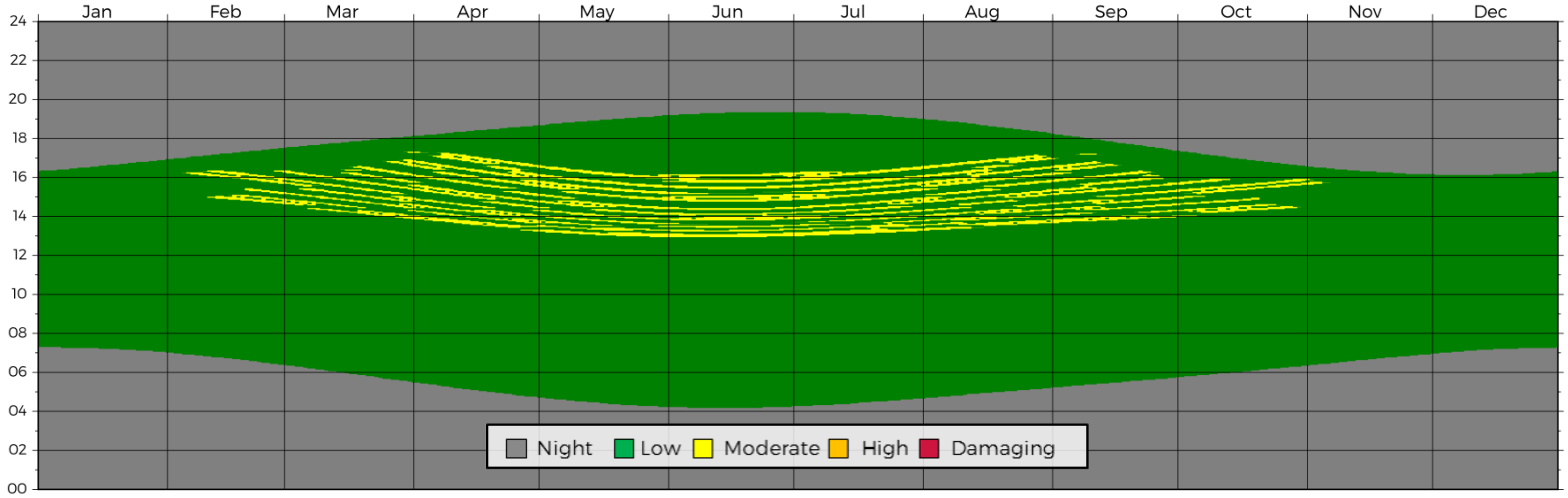
ANNUAL VISUAL IMPACT

Facade Receptor F26

Receptor F26 was chosen to assess the visual impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 8th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



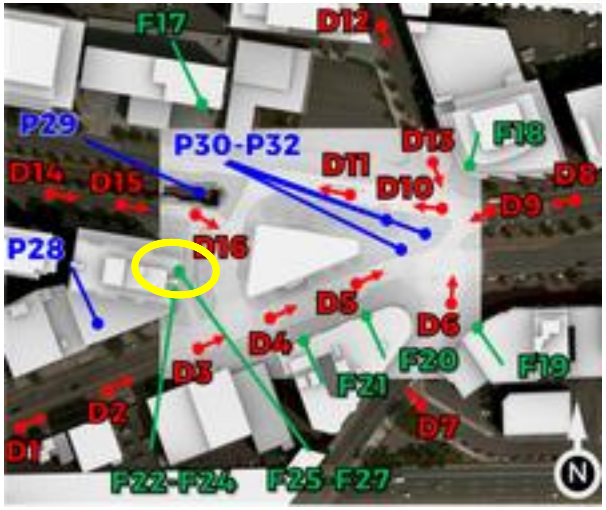


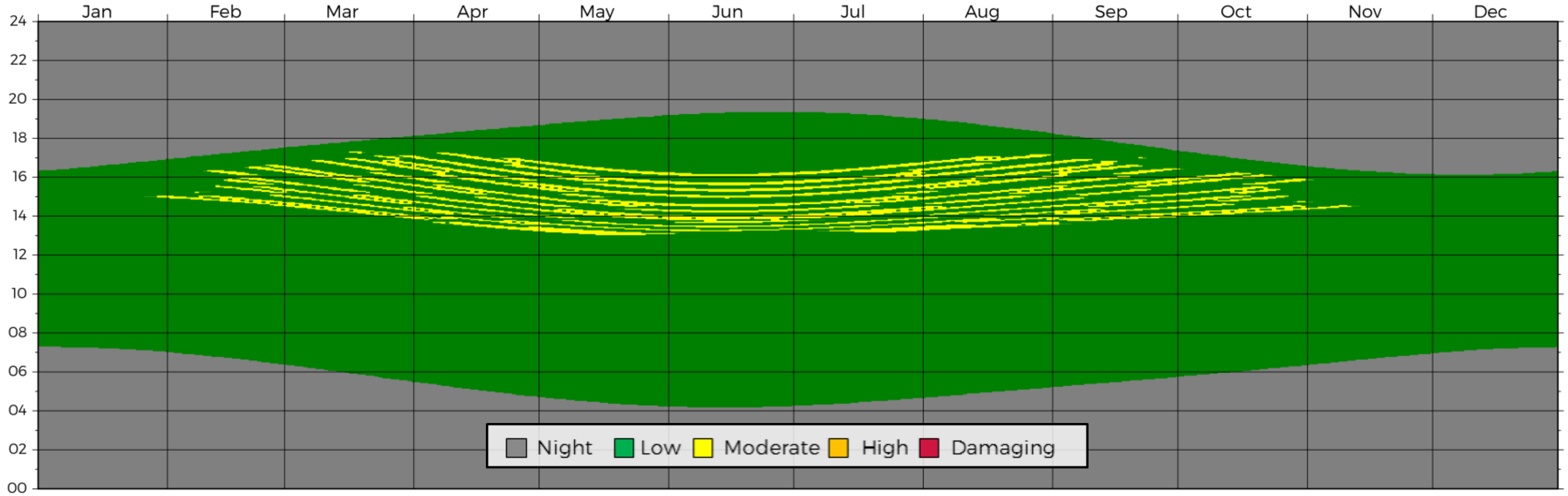
ANNUAL VISUAL IMPACT

Facade Receptor F27

Receptor F27 was chosen to assess the visual impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 12th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

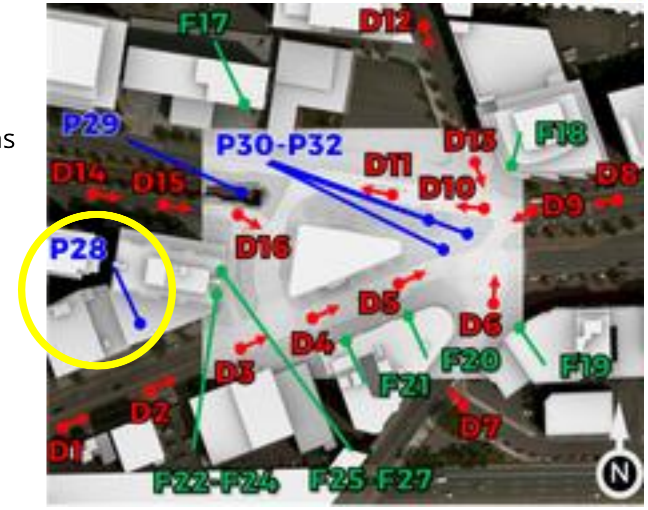


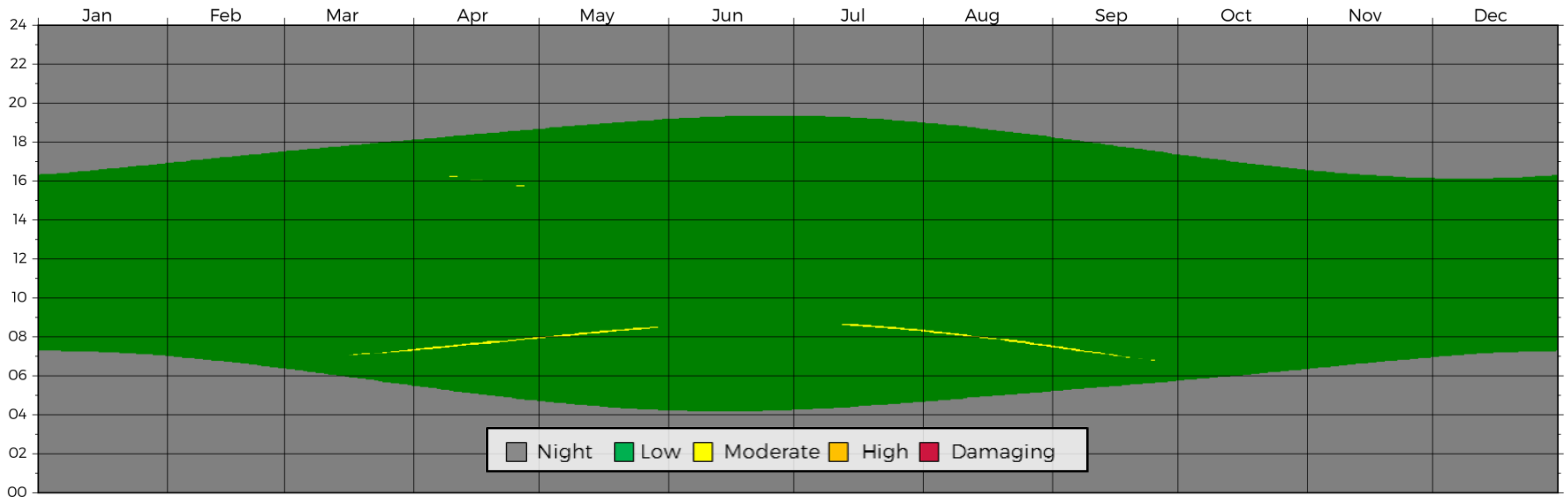


Pedestrian Receptor P28

Receptor P28 was chosen to assess the visual impact assocated with solar reflections affecting the pool area of 566 Commonwealth Avenue.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

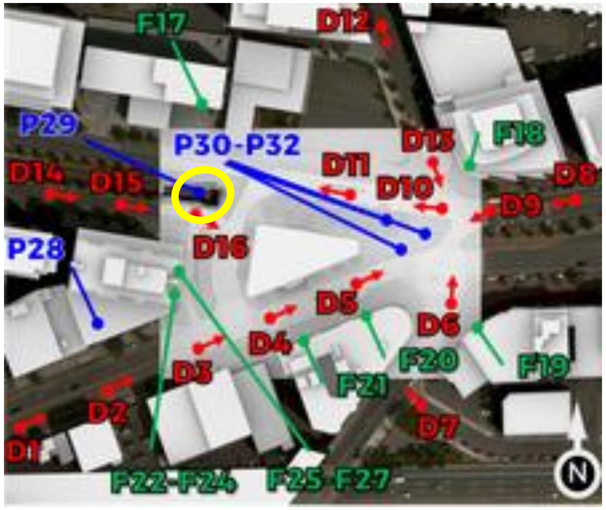


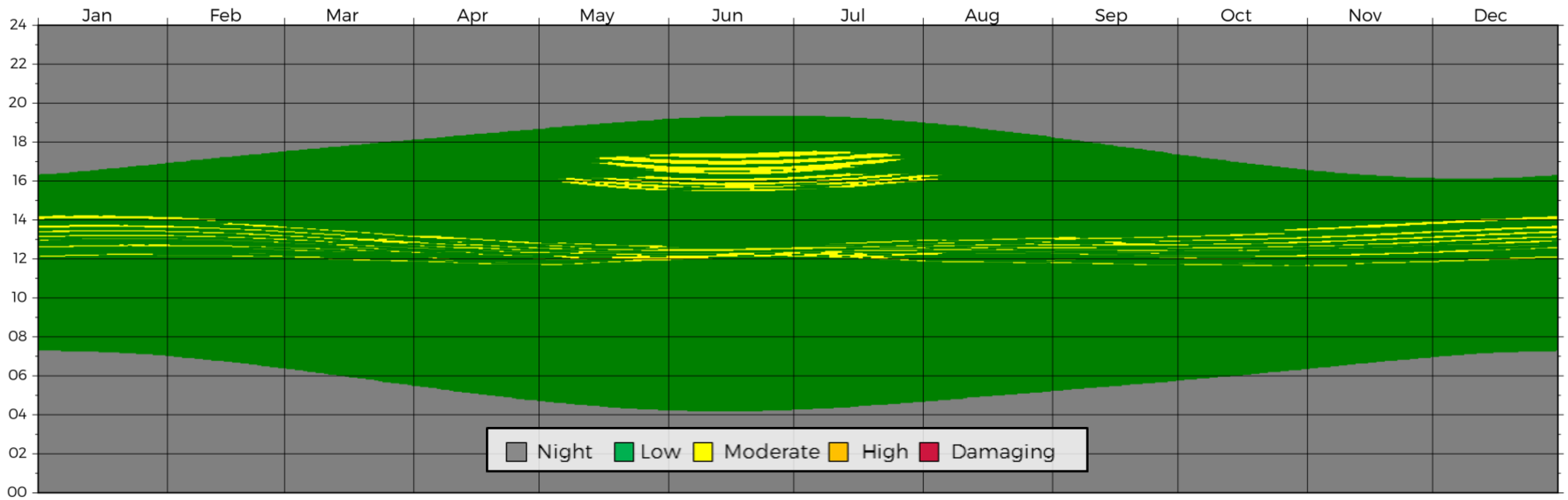


Pedestrian Receptor P29

Receptor P29 was chosen to assess the visual impact assocated with solar reflections affecting pedestrians in the Kenmore Square greenspaces.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



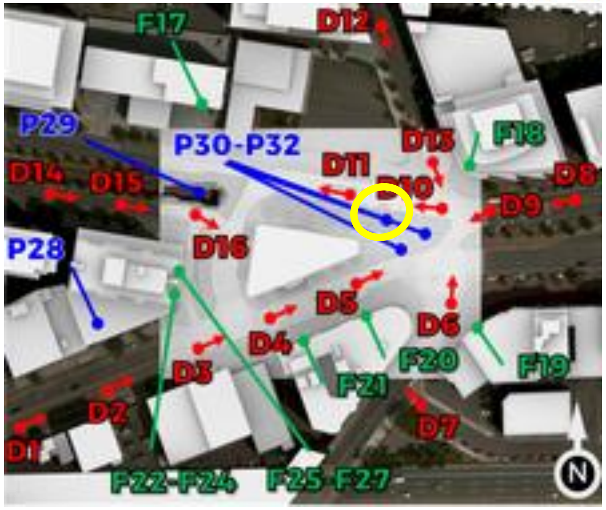


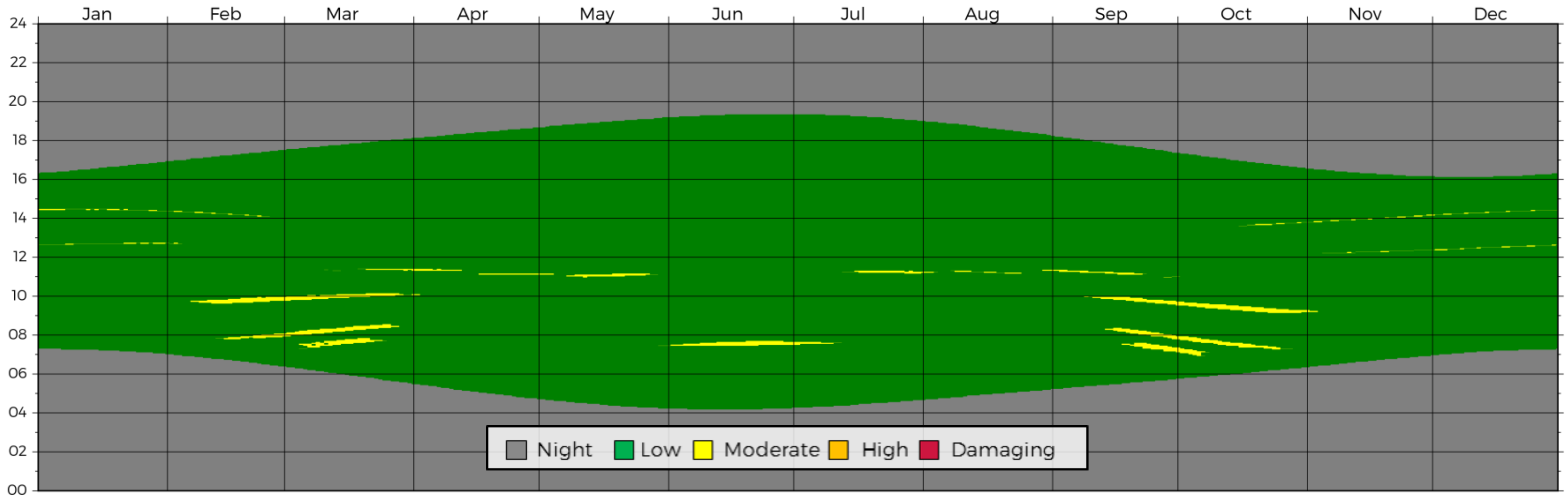
ANNUAL VISUAL IMPACT

Pedestrian Receptor P30

Receptor P30 was chosen to assess the visual impact assocated with solar reflections affecting pedestrians in the Kenmore Square greenspaces.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



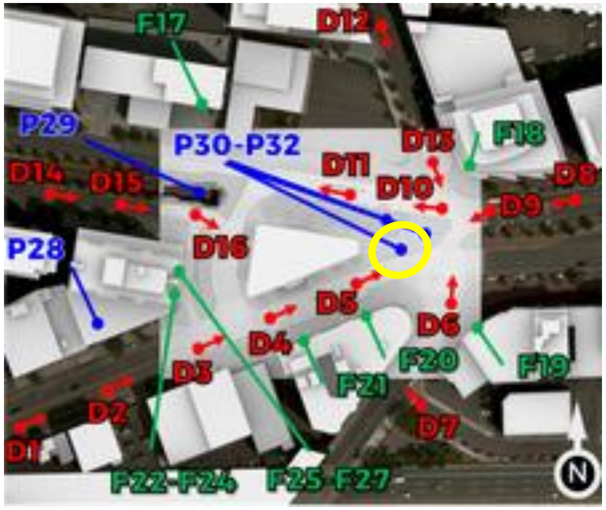


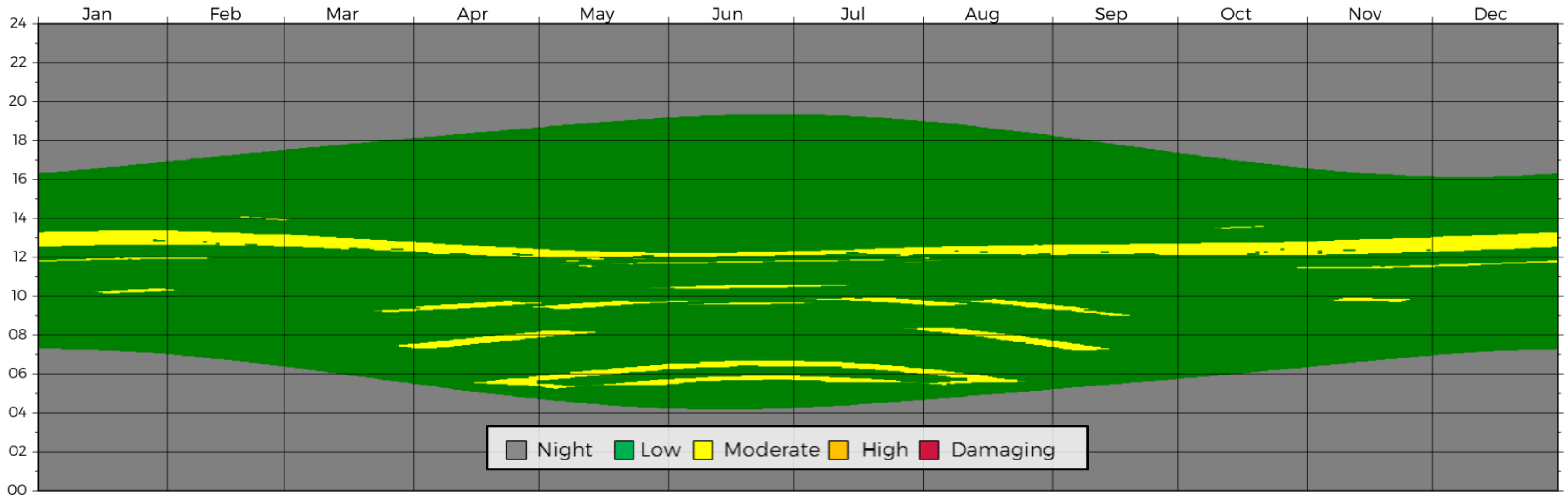
ANNUAL VISUAL IMPACT

Pedestrian Receptor P31

Receptor P31 was chosen to assess the visual impact assocated with solar reflections affecting pedestrians in the Kenmore Square greenspaces.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



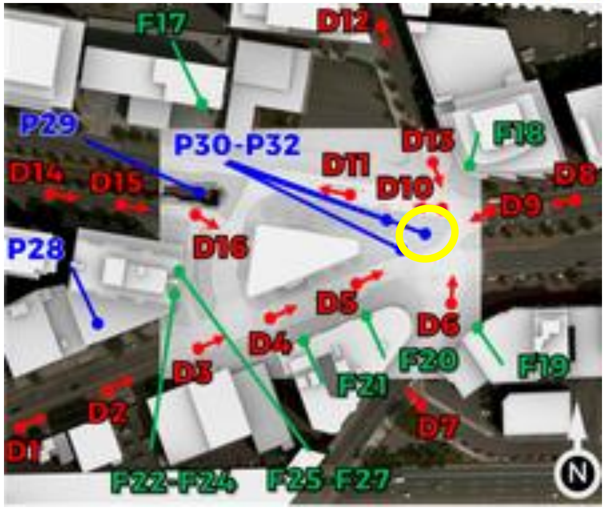


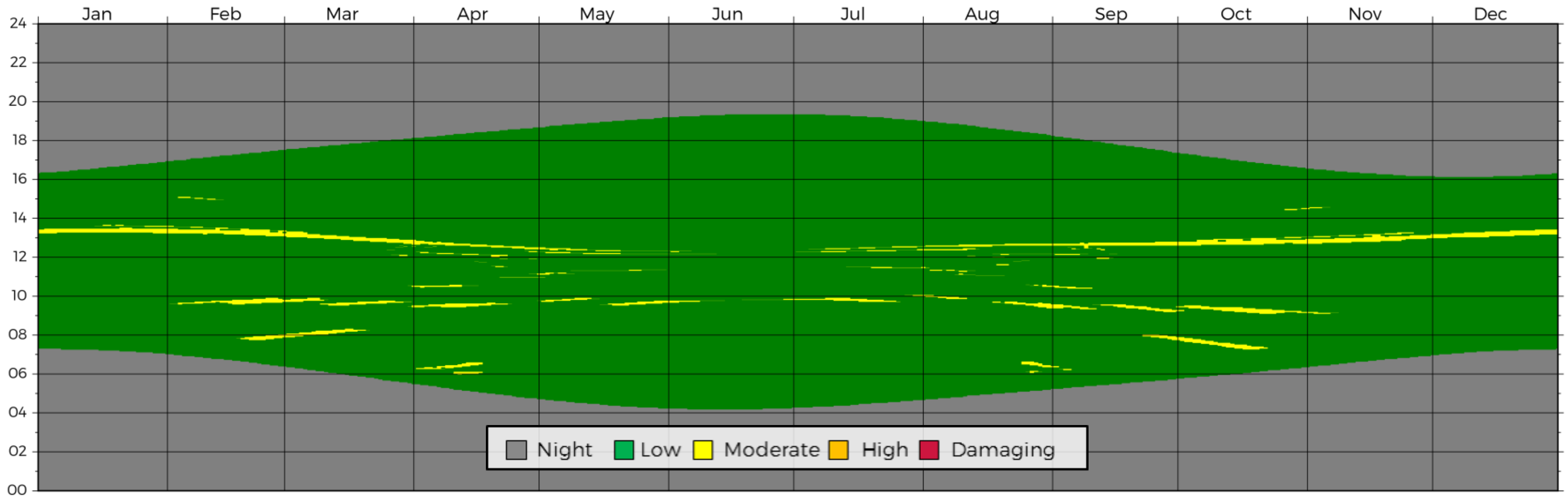
ANNUAL VISUAL IMPACT

Pedestrian Receptor P32

Receptor P32 was chosen to assess the visual impact assocated with solar reflections affecting pedestrians in the Kenmore Square greenspaces.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

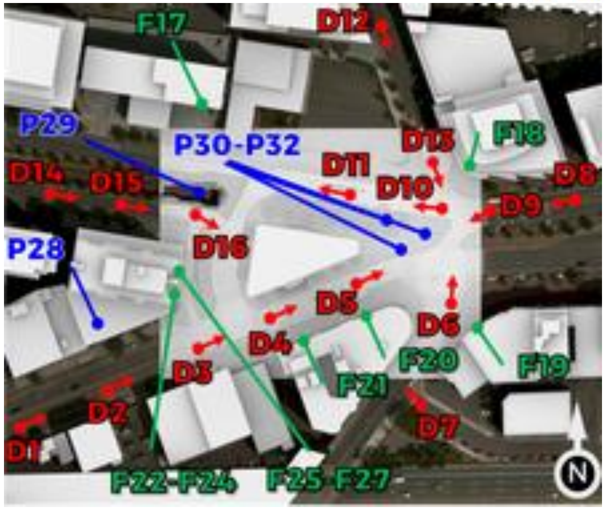


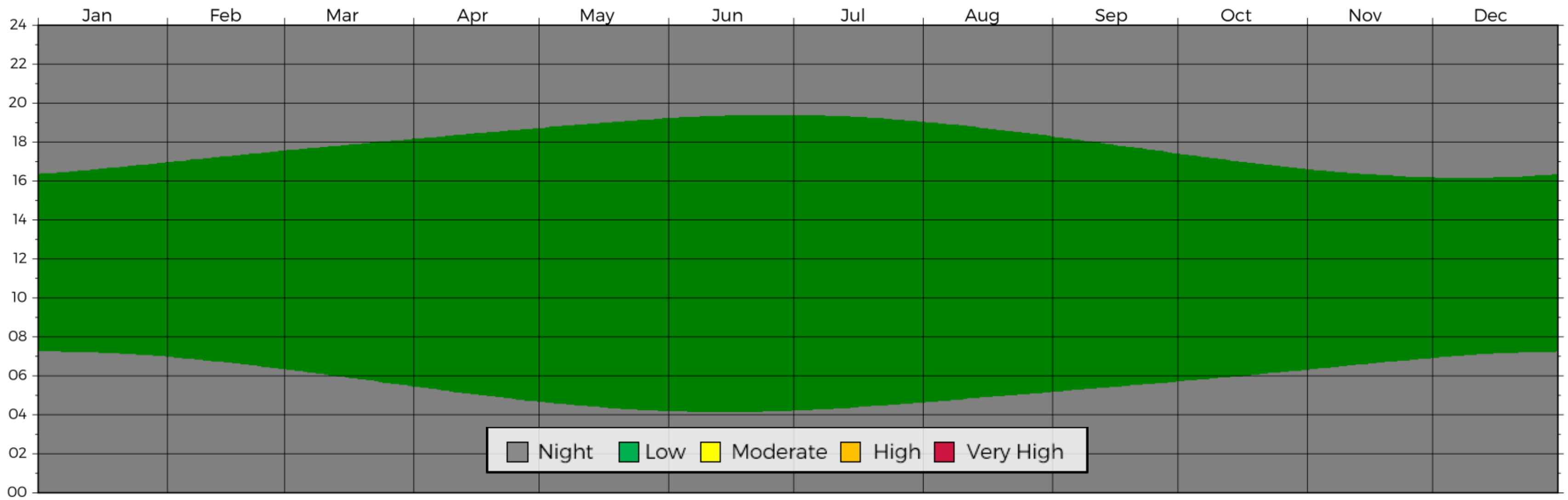


All Receptors

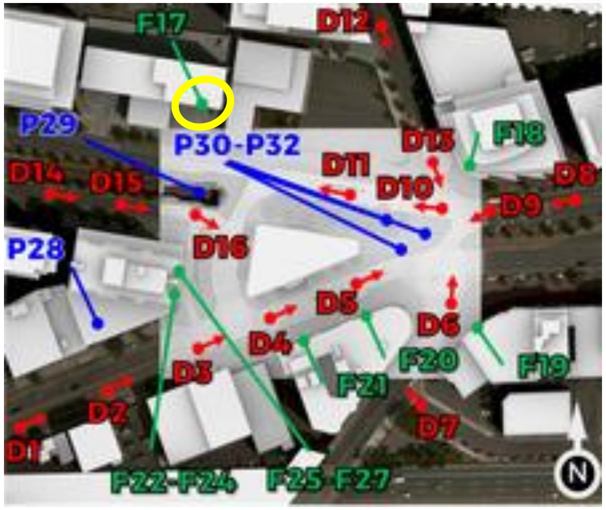
All reflection impacts at all receptors were found to have intensities below RWDI's short-term and human safety threshold values.

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



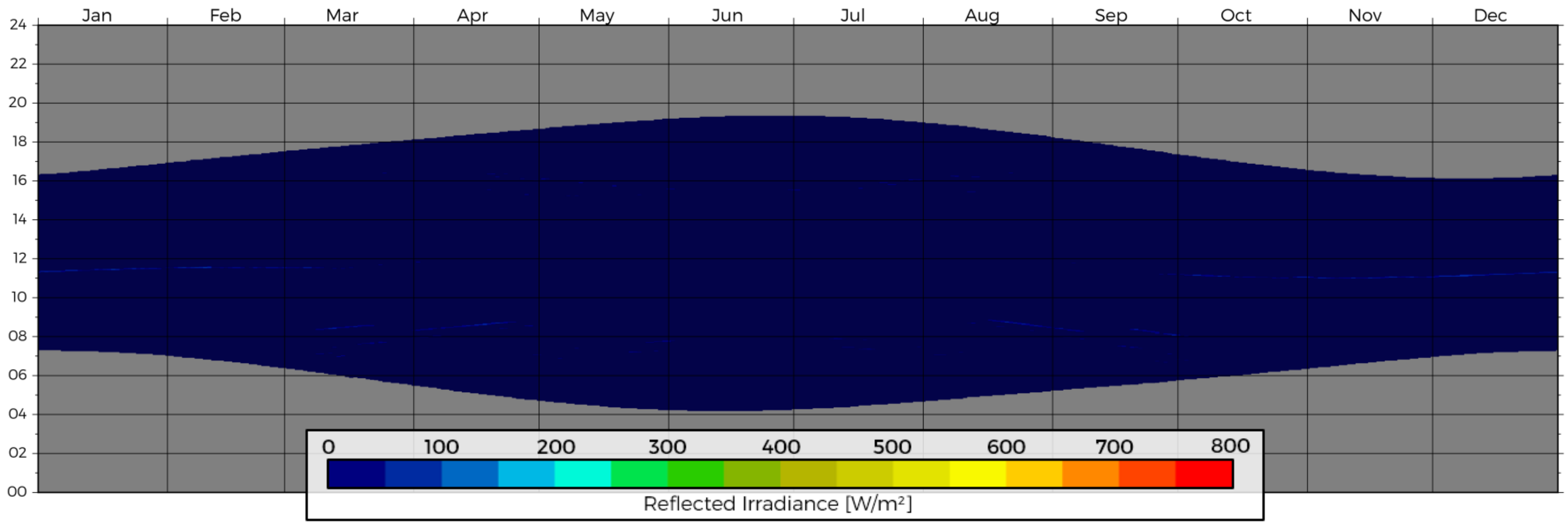


Facade Receptor F17



Receptor F17 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of the Boston University Dormitory (Approximately the 4th floor).

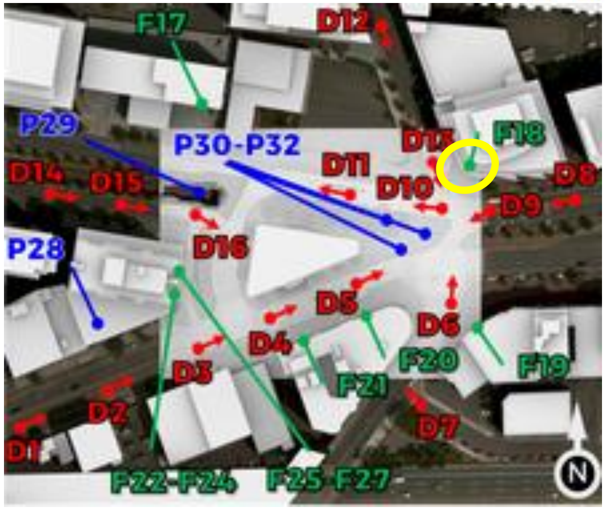
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

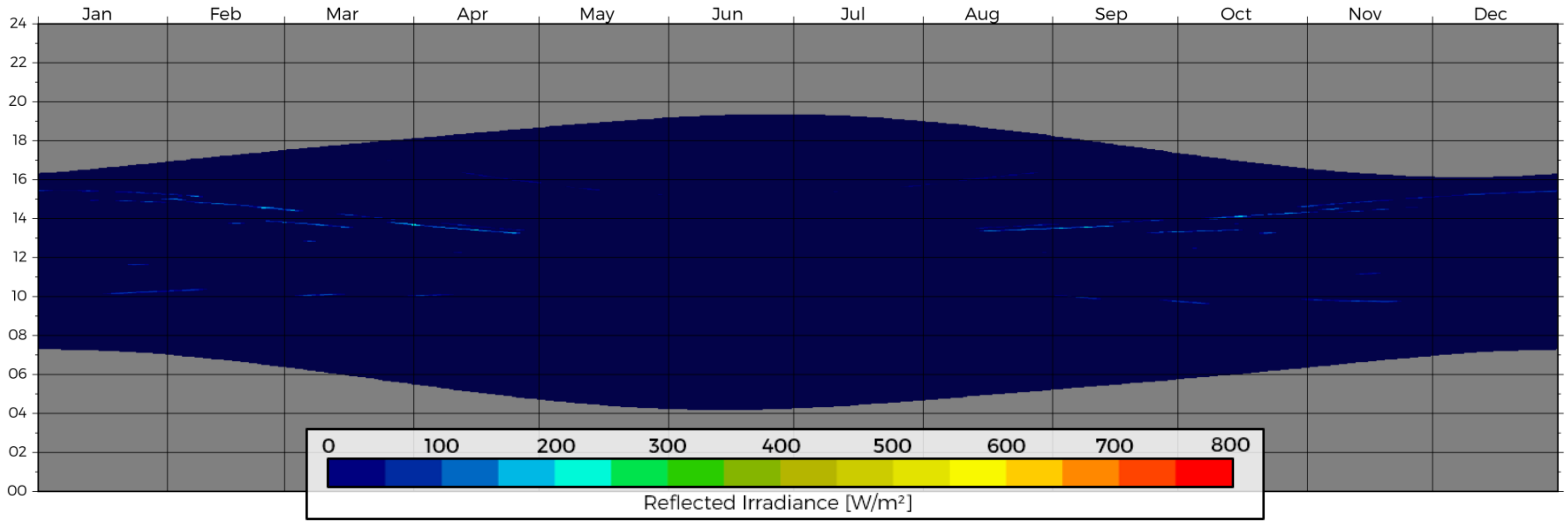


Facade Receptor F18

Receptor F18 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of 543 Commonwealth Avenue (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

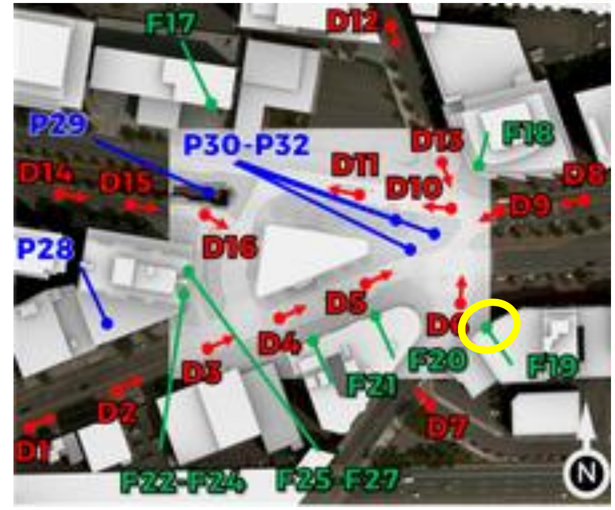


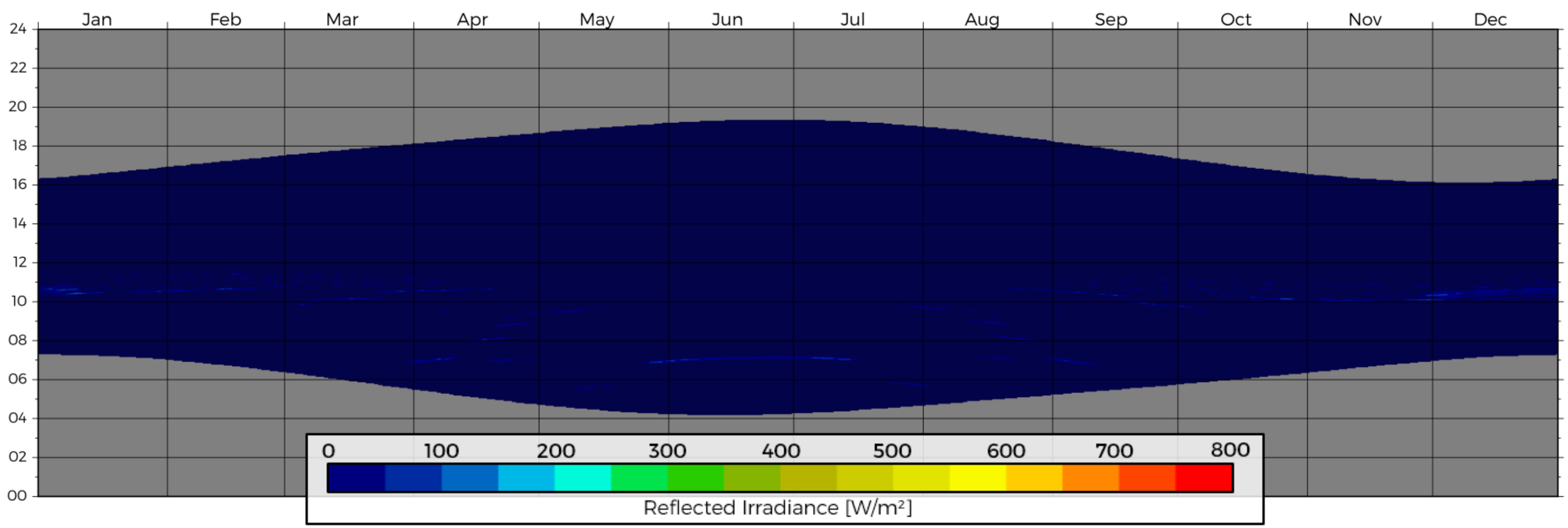


Facade Receptor F19

Receptor F19 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of 540 Commonwealth Avenue (Approximately the 2nd floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

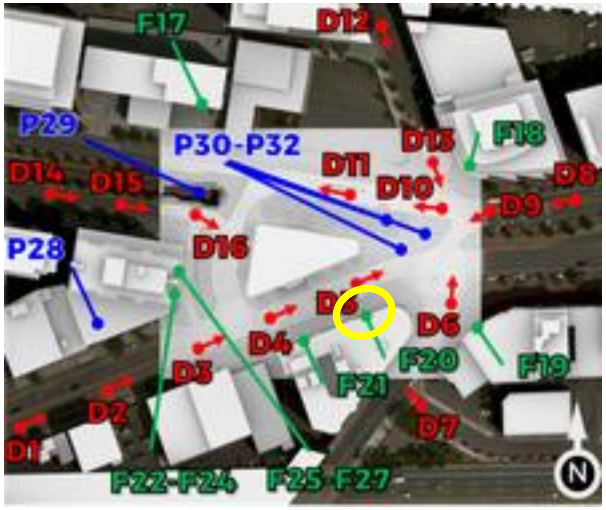


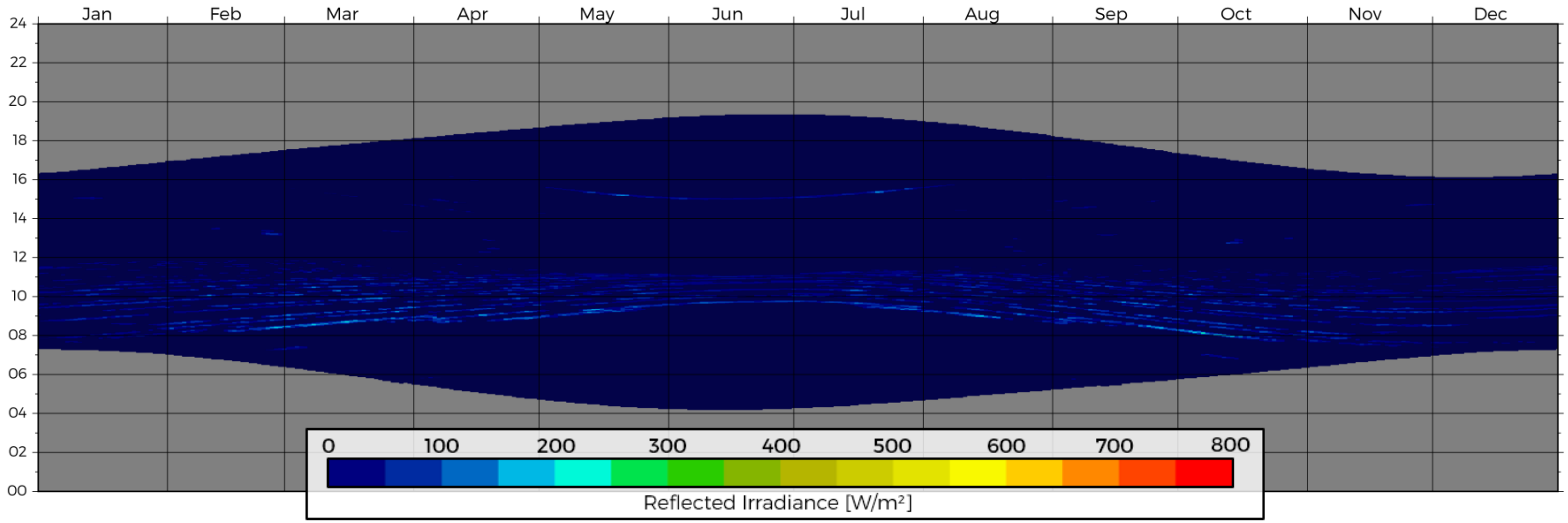


Facade Receptor F20

Receptor F20 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of the Boston Hotel Buckminster (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



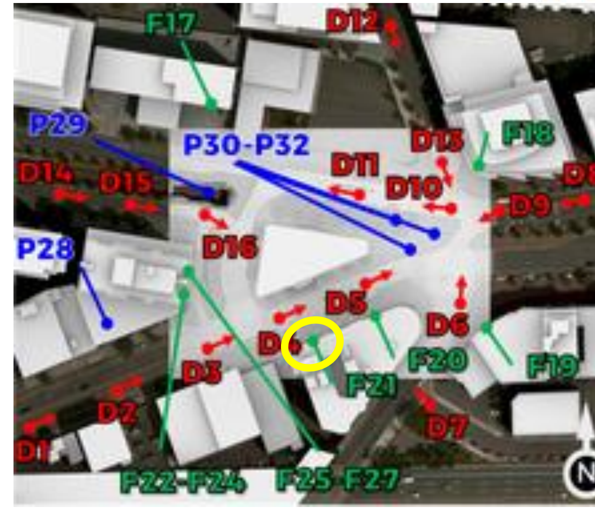


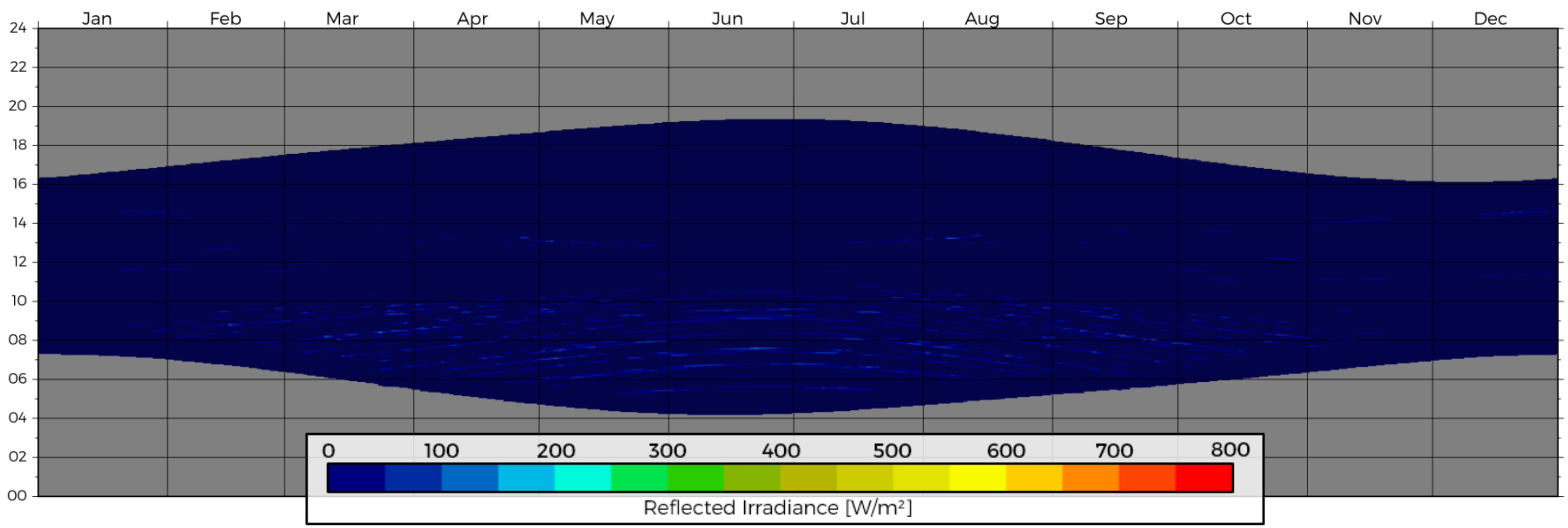
ANNUAL THERMAL IMPACT - PROPERTY

Facade Receptor F21

Receptor F21 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of the Boston Hotel Buckminster (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



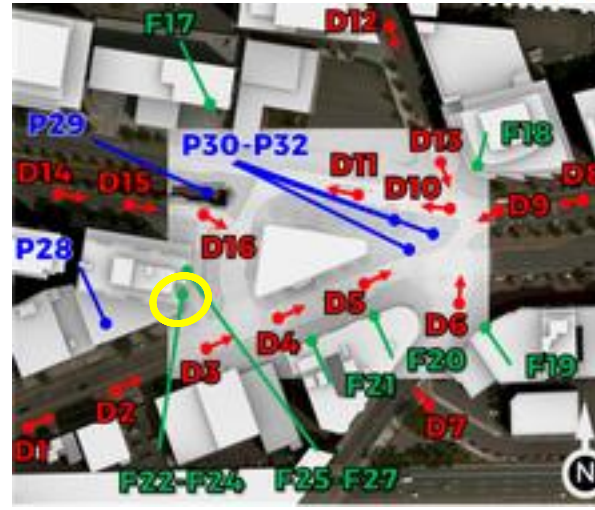


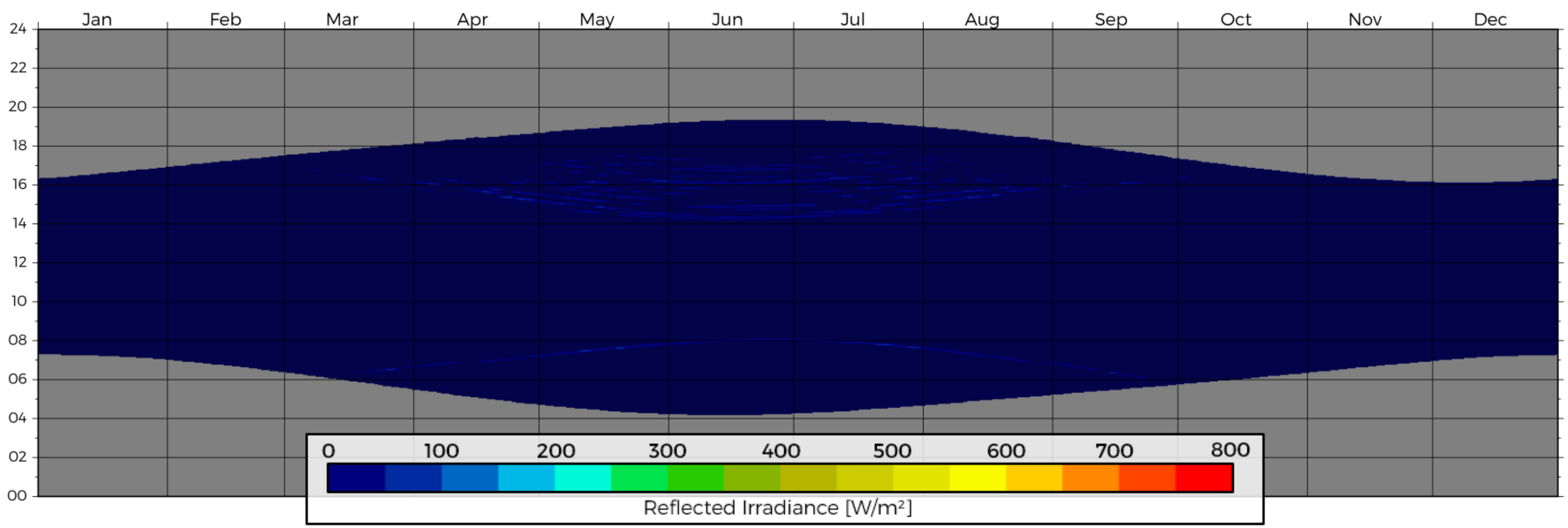
ANNUAL THERMAL IMPACT - PROPERTY

Facade Receptor F22

Receptor F22 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 4th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



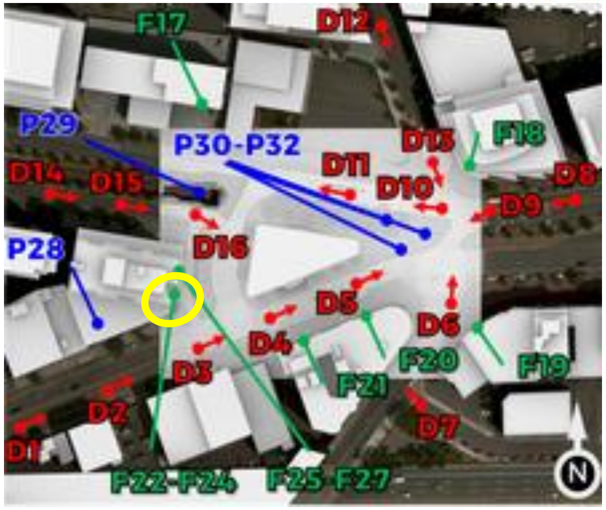


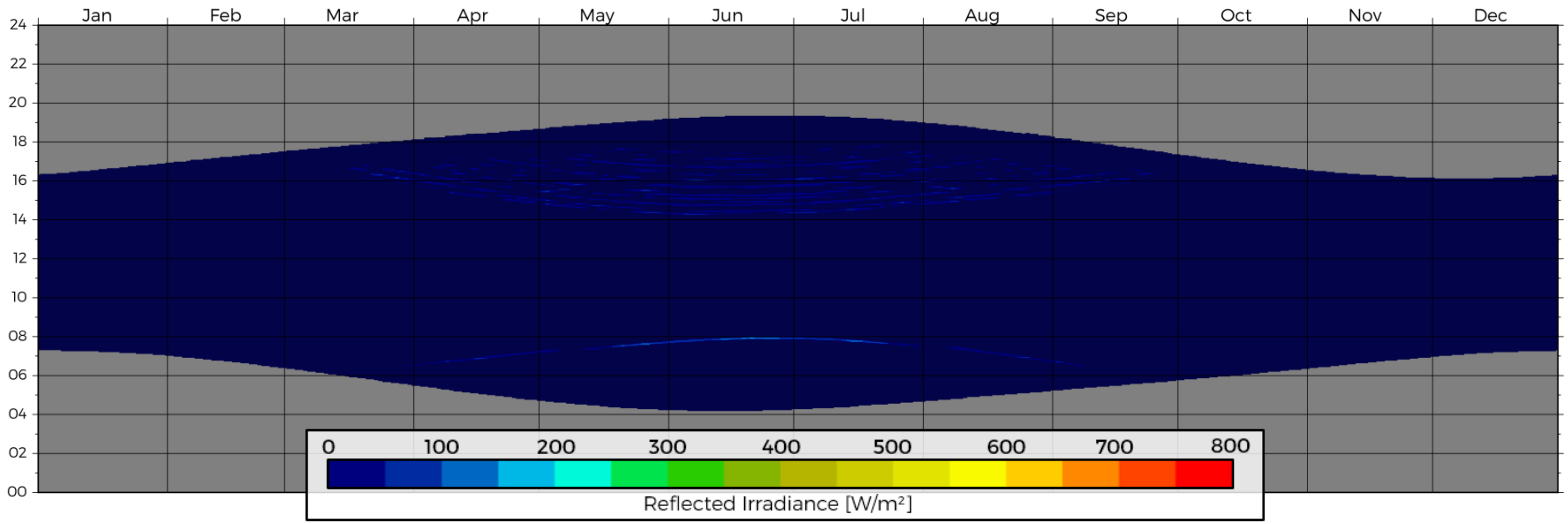
ANNUAL THERMAL IMPACT - PROPERTY

Facade Receptor F23

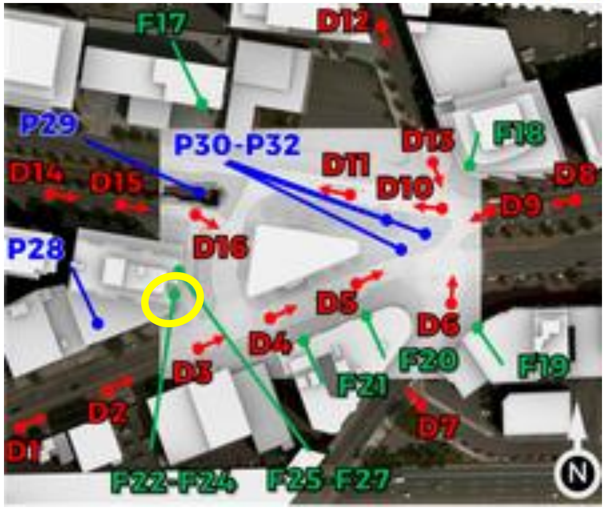
Receptor F23 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 8th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.



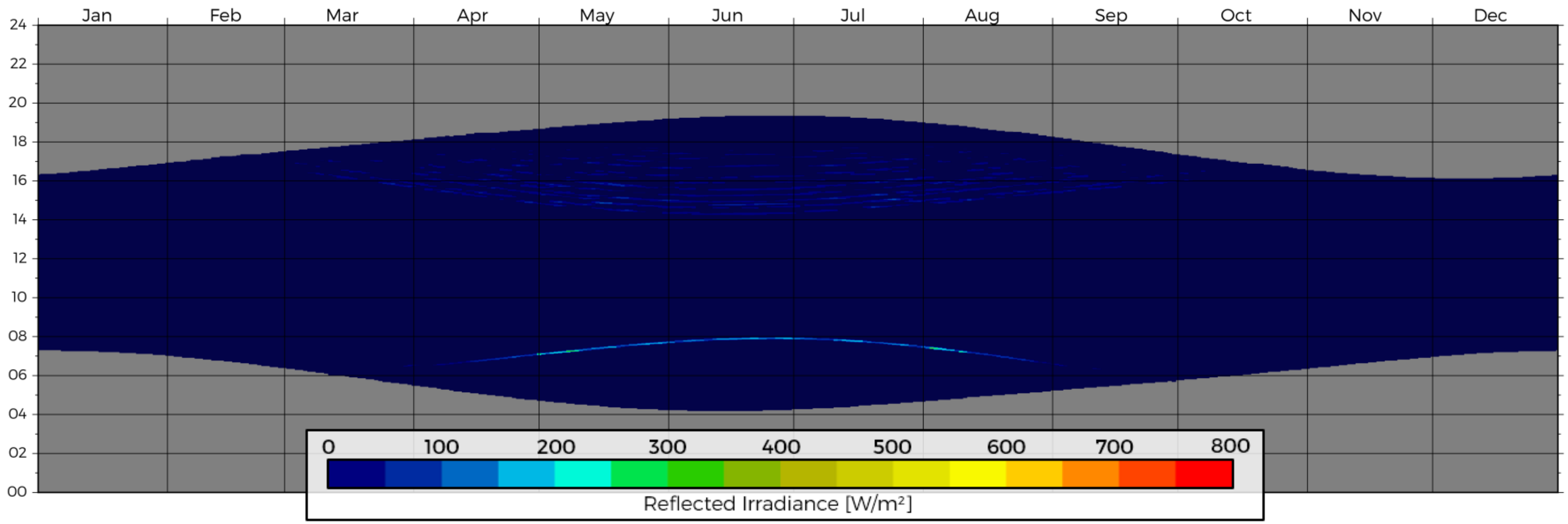


Facade Receptor F24



Receptor F24 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 12th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

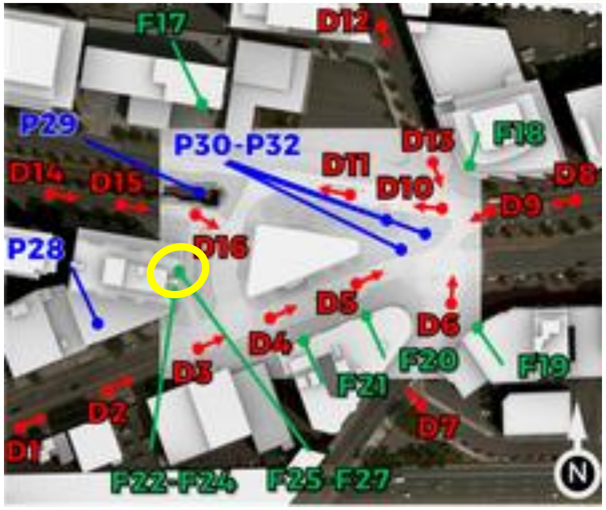


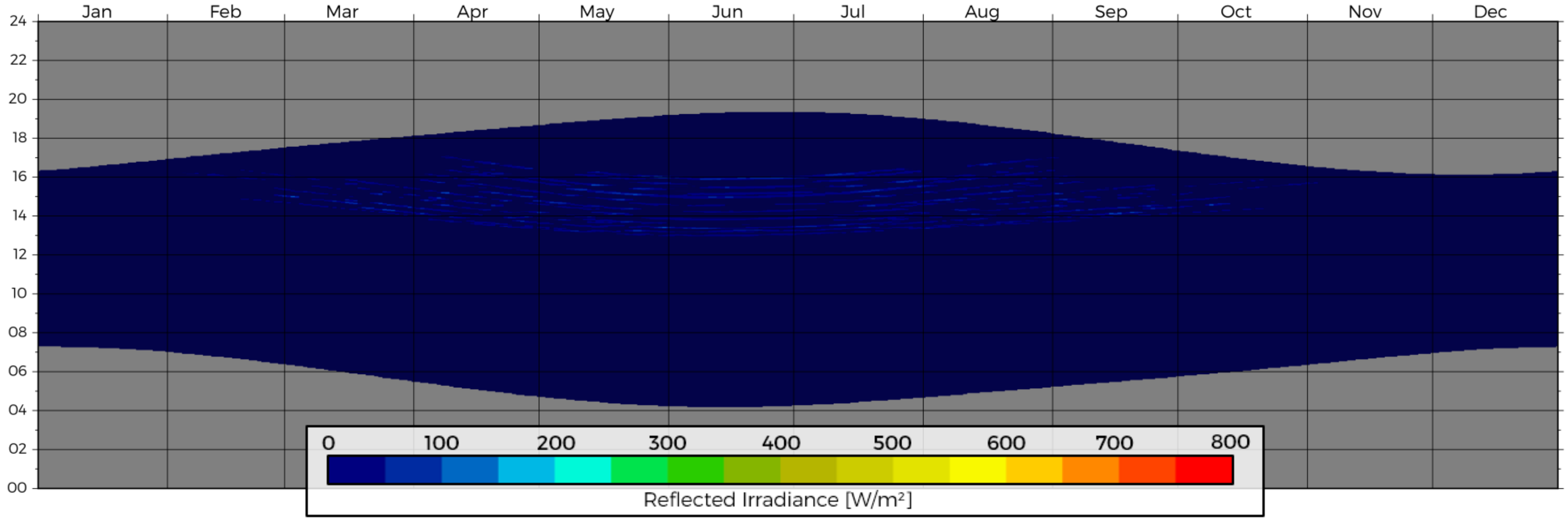
ANNUAL THERMAL IMPACT - PROPERTY

Facade Receptor F25

Receptor F25 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 4th floor).

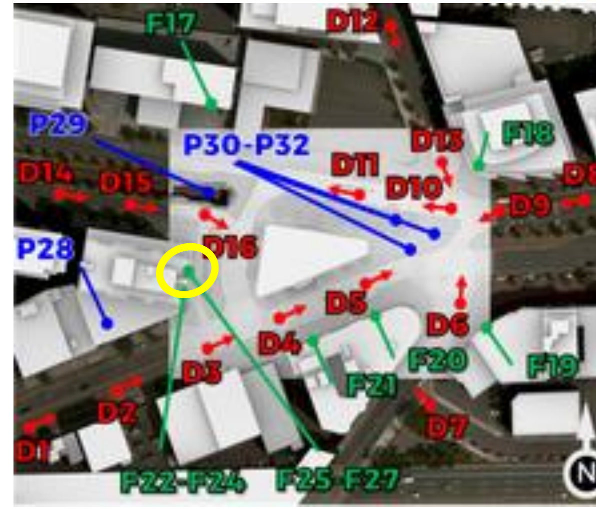
Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.





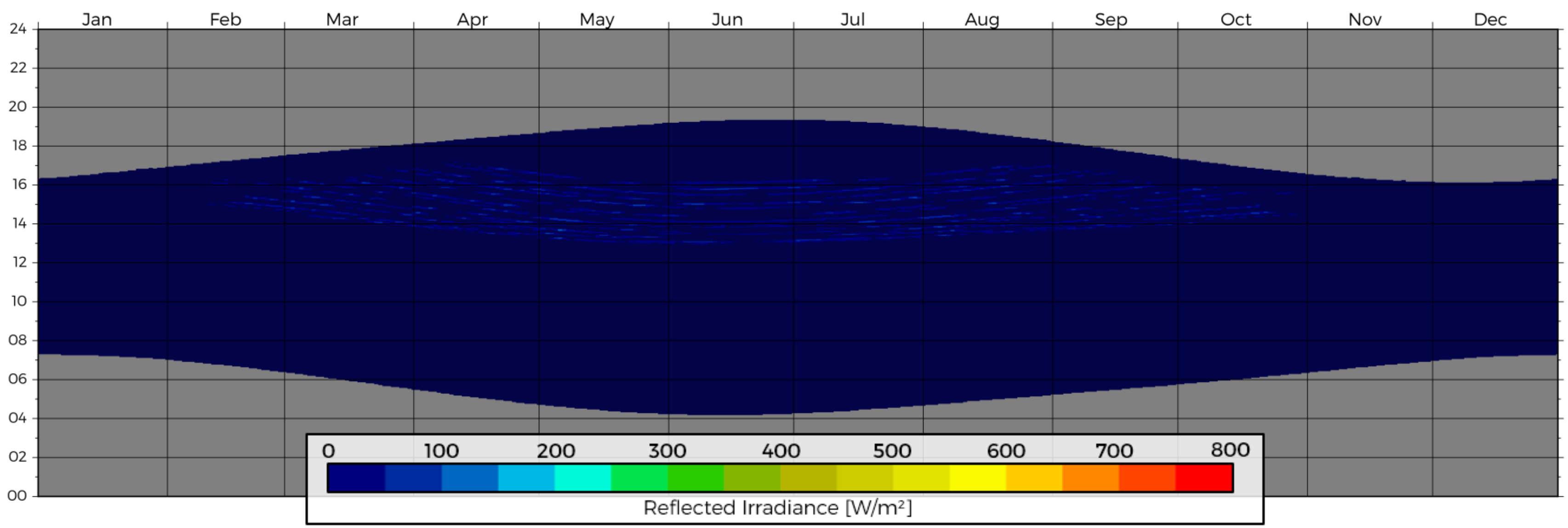
ANNUAL THERMAL IMPACT - PROPERTY

Facade Receptor F26



Receptor F26 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 8th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.

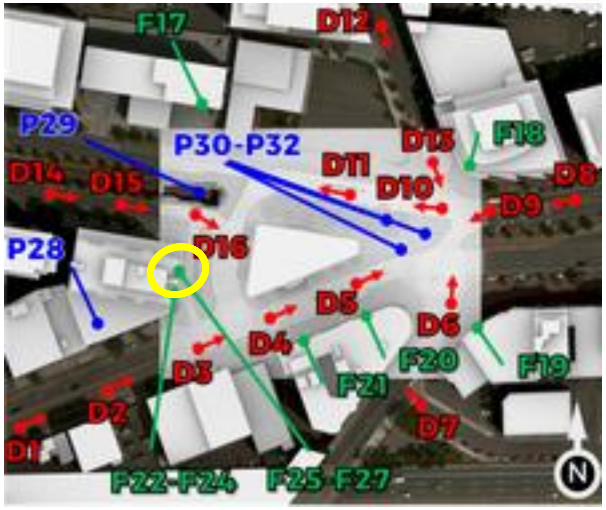


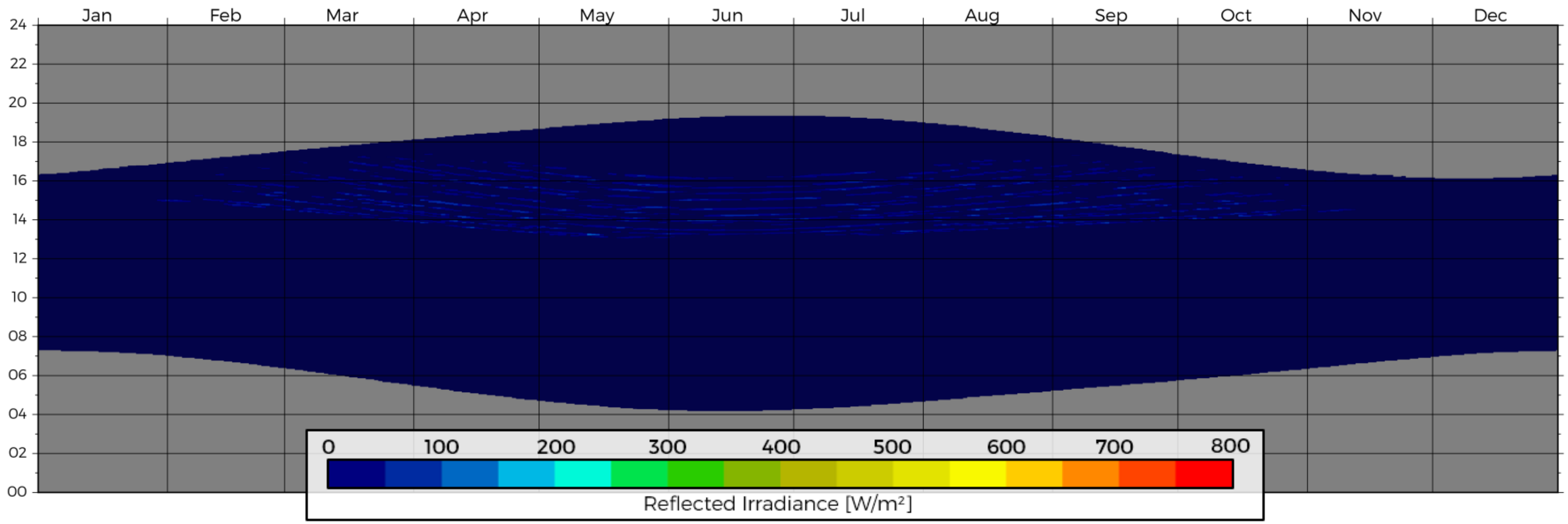
ANNUAL THERMAL IMPACT - PROPERTY

Facade Receptor F27

Receptor F27 was chosen to assess the thermal impact assocated with solar reflections affecting occupants of 566 Commonwealth Avenue (Approximately the 12th floor).

Please note that the referenced times are in local standard time. In jurisdictions where Daylight Savings Time is used, the time should be shifted by an hour when appropriate.





APPENDIX B

RWDI REFLECTION CRITERIA

Visual Glare

There are currently no existing criteria or standards that define an "acceptable" level of reflected solar radiation from buildings. RWDI has conducted a literature review of available scientific sources[1] to determine levels of solar radiation that could be considered acceptable to individuals from a visual standpoint.

Many glare metrics are designed for interior use and have been found to not correlate well with the glare impact humans perceive from direct sun or in outdoor environments. RWDI uses the methodology of Ho et al[2], which defines glare impact based on a physical reaction rather than on a preference based correlation.

Based on the intensity of the glare source and the size of the source in the field of view (Figure B1), the risk of that source causing temporary flash blindness (i.e. the after images visible after one is exposed to a camera flash in a dark room) faster than a person can reflexively close their eyes can be determined.

If this 'after-imaging' can occur faster than the human blink reflex, it presents an unavoidable effect on a person based on physiology rather than preference. This forms the basis of how we determine if a reflection is 'significant'.

This methodology has also been adopted by the United States Federal Aviation Administration (FAA) for determining the risk of glare to pilots and other airport staff under FAA Interim Policy 78 FR 63276.

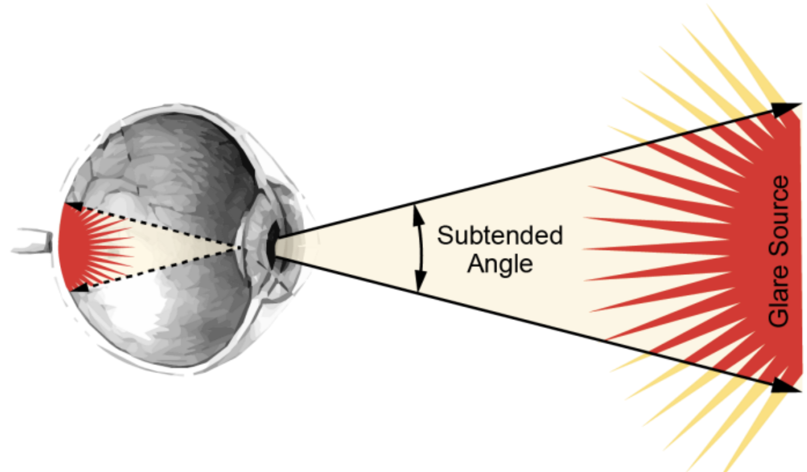


Figure B1: Schematic Illustrating the Subtended Angle of a Glare Source

Visual Glare (cont'd)

At the screening level, we conservatively take any reflections at least 50% of the intensity required to cause after-images as a "significant" reflection to be counted in the frequency analysis. In the detailed phase of work, we use the typical threshold level.

As a reference, point 1 on Figure B2 illustrates where looking directly at the sun falls in terms of irradiance on the retina (the back of the eye) and the size of the angle that the sun subtends in the sky. This puts it just at the border of causing serious damage before the blink reflex can close the eye.

The other points in Figure B2 correspond to the following:

2. Direct viewing of high-intensity car headlamp from 50 feet / 15 m
3. Direct viewing of typical camera flash from 7 feet / 2 m
4. Direct viewing of high-intensity car headlamp from 5 feet / 1.5 m
5. Direct viewing of frosted 60W light bulb from 5 feet / 1.5 m
6. Direct viewing of average computer monitor from 2 feet / 0.6 m

Note that the retinal irradiances described on this page are significantly higher than the irradiance levels discussed elsewhere in this report. This is because the human eye focuses the energy on to the retina. The magnitude of the increase is dependent on the geometry of the human eye and the source of the glare, both of which are computed per the Ho et al methodology.

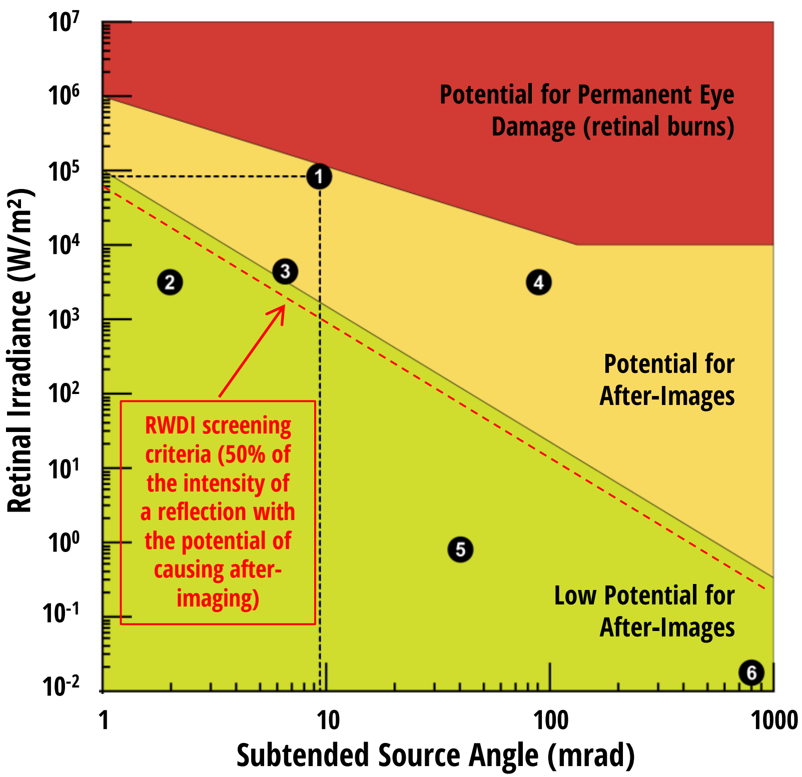


Figure B2: After-Imaging Potential From Various Glare Sources

Visual Glare (cont'd)

Significant glare impacts on the operators of vehicles or heavy equipment pose a particular risk to public safety due to operator distraction or reduction in their visual acuity. Thus, in the detailed analysis, RWDI assigns an assumed view direction to those engaged in "high-risk" activities (e.g. driving a car or flying a plane) as well as an assumed field of view.

The assigned directions and fields of view acknowledge that an operator is particularly sensitive to reflections emanating from the direction in which they are travelling (and therefore cannot safely look away from) and also that the opaque elements of the vehicle will act to obstruct reflections beyond a given angle.

For drivers the critical angle is taken to be 20° away from the direction of view[3]. Thus, any reflections emanating from within this 20° field of view are considered 'high' impacts, whereas reflections emanating from outside this cone are classified as 'moderate' impacts. This angle is adjusted as needed for impacts on other vehicles such as aircraft[4], trains[5], and other heavy equipment[6].

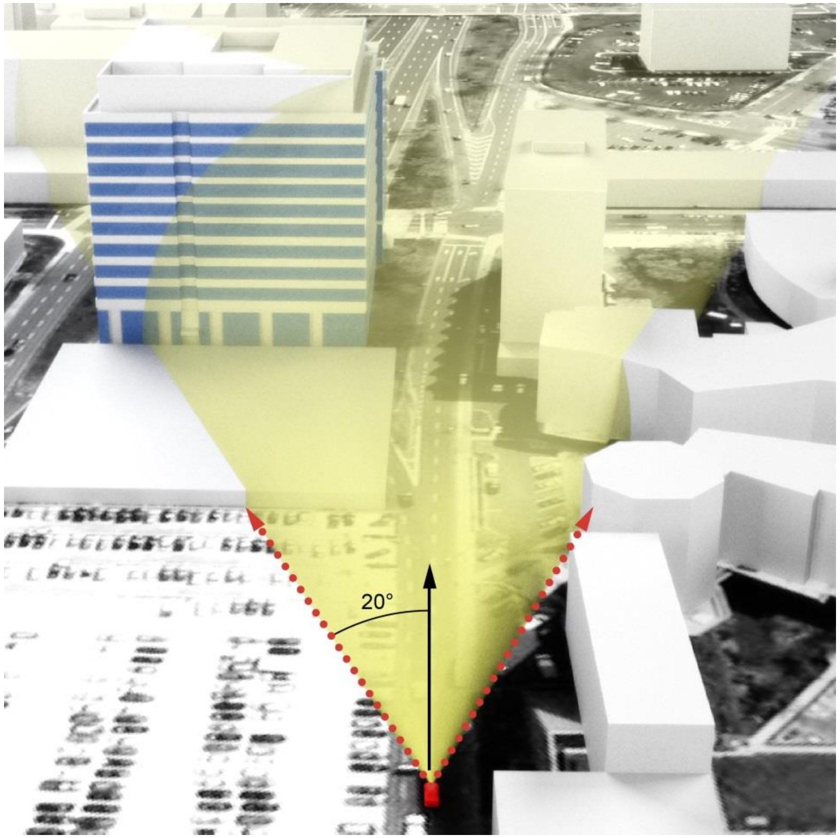


Figure B3: Illustration of a Driver's 20° Field of View

Thermal Impact (Heat Gain) on People

The primary sources for exposure limits to thermal radiation come from fire protection literature. The U.S. National Fire Protection Association (NFPA) defines 2,500 W/m² as an upper limit for a tenable egress environment[7]. That being said, while an individual could move through such an environment, they would not necessarily emerge unscathed. Both the British Standards Institution[8] and the U.S. Federal Energy Management Agency[9] indicate that individuals are likely to feel pain within 30 seconds at such exposure levels on bare skin. With second degree burns possible within minutes of exposure. Additionally, this level of additional heat flux can lead to rapid heating of exposed objects which could present a further risk to human safety.

It should be noted that these numbers are guideline values only, and that in reality many factors (skin color, age, clothing choice, etc.) influence how a person reacts to thermal radiation. **For our work RWDI has established 2,500 W/m² as a ceiling exposure limit which reflection intensity should not exceed for any length of time.**

Lower reflection intensities, while not posing as serious of a risk to human safety, can still negatively impact human comfort. There are no definitive guidelines or criteria with respect to this issue. We know this criterion should be less than 2,500 W/m² and greater than typical peak solar noon levels of 1,000 W/m² which people commonly experience. RWDI's opinion at this time is that a reasonable criterion is to limit reflected irradiance exposure to 1,500 W/m² or less. Based on our assessment, we believe at this level of irradiance most people would be able to tolerate it for several minutes before the onset of discomfort. Additionally reflections at this intensity level will heat surfaces more slowly.

Thus we feel reflections below 1,500 W/m² pose a reduced risk to people and should therefore be considered a short term exposure limit. We would conservatively define "short term" as 10 minutes or less which is slightly shorter than the standard 15 minute definition of short term used in the occupational safety context.

Thermal Impact (Heat Gain) on Property

The impact of solar irradiance on different materials is primarily based on the temperature gains to the material which can cause softening, deformation, melting, or in extreme cases, combustion. These temperature gains are difficult to predict as they are highly dependent on the convective heat transfer from air movement around the object and long-wave radiative heat transfer to the surroundings.

Generally, irradiance levels at or above 10,000 W/m² for more than 10 minutes are required to ignite common building and automotive materials in the presence of a pilot flame. That value increases to 25,000 W/m² when no pilot flame is present[10,11,12.] However, some materials like plastics and even some asphalts may begin to soften and deform at lower temperatures. For example, some plastics can deform at a temperature of 140°F (60°C), or lower if force is applied. The applied force typically comes from the thermal expansion of the material, the force of gravity acting on the material or an external mechanical force (i.e. someone or something pushing or pulling on it).

Aside from the risk of damage to the material itself, a hot surface poses a safety risk to any person who may come into contact with it. This is particularly important in an urban context as the individual may not expect the object to be heated. NASA[13] defines an upper limit of 111°F (44°C) for surfaces that require extended contact time with bare skin. Surface temperatures below this limit can be handled for any length of time without causing pain.

Because of the difficult nature of determining material temperatures, RWDI takes a conservative approach and uses a **threshold value of 1,000 W/m² which is approximately the peak intensity of natural sunlight that could be expected to occur over the course of a year**. Intensities beyond this value exceed the levels of irradiance that common exterior building materials are presumably designed for, and depending on the duration, may lead to deformation or damage. Though, as noted this would depend heavily on environmental conditions and the material properties of the exposed object or assembly.

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13. E Ungar, K Stroud 'A New Approach to Defining Human Touch Temperature Standards' National Aeronautics and Space Agency , 2010

Appendix F

Air Quality

560-574 COMMONWEALTH AVENUE / 645-665 BEACON STREET (KENMORE HOTELS)

Heating Boilers

				Notes
Source Name		B-1,2	DWH-1,2	
Make		Fulton	Power VT Plus	From client
Model		EDR+4000	180LX 300A-PVIF	From client
Qty.		2	2	From client
Boiler Heat Input	MMBTU/hr (ea.):	4.000	1.800	From client (BELOW ERP THRESHOLDS)
Boiler Emission Rates	lb/MMBTU	g/s		
NOx	0.035	0.0176	0.0079	ERP
CO	0.080	0.0403	0.0181	ERP
VOC	0.030	0.0151	0.0068	ERP
PM-2.5	0.010	0.0050	0.0023	ERP
PM-10	0.010	0.0050	0.0023	ERP
SO2	0.0006	0.0003	0.0001	AP42 Table 1.4-2 (assuming 1040 Btu/scf)
CO2	115.385	58.1526	26.1687	AP42 Table 1.4-2 (assuming 1040 Btu/scf)
Gas Exit Temp	°F	170	170	assumed
Gas Exit Temp	°K	349.8	349.8	calculated
Exhaust air (CFM)	CFM	1672.89	752.80	assumed (1400 cfm/100hp)
Gas Exit Velocity	fps	51.12	63.90	calculated, should be 40 fps minimum per DEP
Gas Exit Velocity	mps	15.58	19.48	calculated
Roof Height	feet	299.50	299.50	from site plans
Stack height	feet above roofline	10	10	assumed
Stack height	feet	309.5	309.5	calculated
Stack height	meters	94.336	94.336	calculated
Stack Diameter	feet	0.833	0.500	assumed
Stack Diameter	meters	0.254	0.152	calculated

Cooling Towers

			Notes
Designation		CT-1,2	
Make		Marley	From client
Model		NC840NLS2	From client
Cooling Tower Rate	tons	625.00	from mfg
Tower Overall Dimensions	Length feet	8.4	from mfg
	Width feet	18.2	from mfg
	Height feet	16.5	from mfg
CT Stack Height (above roofline)	feet	16.479	from mfg
Primary Building Height (ft)	feet	299.50	from site plans
CT Stack Height	feet	316.0	calculated
CT Stack Height	meters	96.31	calculated
Number of fans (per tower)	#	1	from mfg
Cooling Tower Specs			
Cooling Tower Exhaust Flow	CFM	160,790	mfg
Cooling Tower Cell Exhaust Flow	CFM	160790.0	calculated (per cell)
Cooling Tower Cell Exhaust Flow	kg/s	84.6	calculated
Cooling Tower Exhaust Temp	°F	90.26	mfg sheet (wet bulb temp out)
Cooling Tower Exhaust Temp	K	305.5	calculated
Cooling Tower Cell Diameter	feet	7.0	Fan diameter
Cooling Tower Cell Diameter	meters	2.13	calculated
Cooling Tower Stack Velocity	fps	69.63	calculated
Cooling Tower Stack Velocity	mps	21.22	calculated
Cooling Tower Drift			
Drift Rate	% of circ water	0.001	assumed
Circulating Water Rate	gpm	9,000	from mfg
Circulating Water Rate	gph	540,000	calculated
TDS+TSS concentration in drift	mg/L	1,500	assumed
PM emission rate in drift (per cell)	lb/hr	0.068	calculated
PM emission rate in drift (per cell)	g/s	0.00854	calculated

560-574 COMMONWEALTH AVENUE / 645-665 BEACON STREET (KENMORE HOTELS)

Emergency Generator

			Notes
Designation		EG1	
Description		CAT C15	
Number		1	From client
Electrical output	kilowatts	500	From client
Make		Caterpillar	From client
model		C15	Tier 2
Engine Horsepower	BHP	762	from CAT Performance Data Sheet C15DECF
Engine power	kilowatts	568	calculated
Fuel consumption @full load	gph	36.20	from CAT Performance Data Sheet C15DECF
Heat Input	MMBTU/hr:	5.00	calculated
Stack Parameters			
Exhaust Temperature	°F	988	from CAT Performance Data Sheet C15DECF
Exhaust Temperature	°K	804.3	calculated
Total Exhaust Flow	ACFM	3605.5	from CAT Performance Data Sheet C15DECF
Flange Diameter	in.	N/A	
Maximum Backpressure	in. H2O	40	From CAT TSS-DM8155-04GS-EPG-8174557.pdf
Maximum velocity	fpm	18186.16	calculated
Exhaust area required	sq. ft	0.198	calculated
Number of exhausts (typ. 1 or 2)	# each	1	assumed
Selected exhaust diameter	in	8	assumed
Actual exhaust opening area	sq. ft each	0.349	calculated
Actual velocity	fpm each	10328.997	calculated
Actual velocity	fps each	172.150	calculated
Single Stack Effective Diameter	ft	0.667	calculated
Single Stack Effective Diameter	m	0.203	calculated
Single Stack Effective Velocity	fps	172.150	calculated
Single Stack Effective Velocity	mps	52.471	calculated
Primary Building Height	ft	299.50	Plan Z-000
Stack Height (above roofline)	ft	10.00	Required by MassDEP
Stack height (above ground)	ft	*309.50*	calculated
Stack Height	m	*94.34*	calculated

Pollutant	Emission factor unit	Emission factor	Higher of MFG NTE or Tier Limit x 1.25
NOx	g/BHP-hr	5.97	Tier 2 x 1.25
CO	g/BHP-hr	3.26	Tier 2 x 1.25
VOC	g/BHP-hr	0.04	N/A
PM10	g/BHP-hr	0.19	Tier 2 x 1.25
PM2.5	g/BHP-hr	0.19	Tier 2 x 1.25
SO2	g/BHP-hr	4.5749E-03	15 ppm S mass conserved
HAPs	lb/MMBTU	0.00149198	AP42 Table 3.4-4 & 3.3-2
CO2	lb/MMBTU	165	AP42 Table 3.4-1 & 3.3-1

Short Term Emission Rate			
NOx	g/s	0.0721	uses EPA intermittent factor (500 hrs/yr)
CO	g/s	0.6900	calculated
VOC	g/s	0.0085	calculated
PM10	g/s	0.0402	calculated
PM2.5	g/s	0.0402	calculated
SO2	g/s	9.68E-04	calculated

Long TermEmission Rate	500	hrs/yr	
NOx	g/s	0.0721	calculated
CO	g/s	0.0394	calculated
VOC	g/s	0.0005	calculated
PM10	g/s	0.0023	calculated
PM2.5	g/s	0.0023	calculated
SO2	g/s	5.53E-05	calculated

560-574 COMMONWEALTH AVENUE / 645-665 BEACON STREET (KENMORE HOTELS)
AERMOD Dispersion Modeling Analysis
NAAQS Results

POLLUTANT	AVERAGING TIME	MAXIMUM MODELED CONCENTRATION ($\mu g/m^3$)	PERIOD of MODELED MAX (Year or YYMMDDHH)	Location (UTME, UTMN, Elev., Hill, Flag)	BACKGROUND CONCENTRATION ($\mu g/m^3$)	TOTAL CONCENTRATION ($\mu g/m^3$)	STANDARD ($\mu g/m^3$)	% of Standard
SO_2	1 HOUR (1)	0.24116	2013-2017	327214.48, 4690660.43, 4.18, 4.18, 0.00	10.8	11.1	195	6%
	3 HOUR (2)	0.20473	14092809	327194.48, 4690660.43, 4.18, 4.18, 0.00	11.5	11.7	1300	1%
	24 HOUR (2)	0.10078	14011024	327214.48, 4690660.43, 4.18, 4.18, 0.00	7.6	7.7	365	2%
	ANNUAL (3)	0.02377	2015	327214.48, 4690640.43, 4.49, 4.49, 0.00	1.4	1.4	80	2%
PM_{10}	24 HOUR (4)	3.24494	13063024	327214.48, 4690660.43, 4.18, 4.18, 0.00	30.0	33.2	150	22%
	ANNUAL (3)	0.57993	2015	327214.48, 4690640.43, 4.49, 4.49, 0.00	14.2	14.8	50	30%
$PM_{2.5}$	24 HOUR (5)	2.79300	2013-2017	327214.48, 4690660.43, 4.18, 4.18, 0.00	13.2	16.0	35	46%
	ANNUAL (6)	0.55570	2013-2017	327214.48, 4690640.43, 4.49, 4.49, 0.00	6.3	6.8	15	45%
NO_2	1 HOUR (7)	13.06748	2013-2017	327214.48, 4690660.43, 4.18, 4.18, 0.00	93.4	106.4	188	57%
	ANNUAL (3)	2.48616	2015	327214.48, 4690640.43, 4.49, 4.49, 0.00	32.6	35.1	100	35%
CO	1 HOUR (2)	121.21907	13103015	327234.48, 4690660.43, 4.03, 4.03, 0.00	2750.4	2871.6	40000	7%
	8 HOUR (2)	57.09501	13043008	327214.48, 4690660.43, 4.18, 4.18, 0.00	1439.4	1496.5	10000	15%

Notes:

(1) Maximum 4th-Highest Maximum Daily 1-Hr Concentration Averaged Over 5 Years
(2) Highest 2nd-High Concentration Over 5 Years
(3) Highest Annual Concentration Over 5 Years
(4) Highest 6th-High Concentration Over 5 Years
(5) Maximum 8th-Highest 24-Hour Concentration Averaged Over 5 Years
(6) Maximum Annual Concentration Averaged Over 5 Years
(7) Maximum 8th-Highest Maximum Daily 1-Hour Concentration Averaged Over 5 Years

560-574 COMMONWEALTH AVENUE / 645-665 BEACON STREET (KENMORE HOTELS)

Ambient Montor Data

POLLUTANT	AVERAGING TIME	Form	2015	2016	2017	Units	ppm/ppb to $\mu g/m^3$ Conversion Factor	2015-2017 Background Concentration ($\mu g/m^3$)	Location
SO_2 (1)(5)(7)	1-Hour (4)	99th %	5.5	4.1	2.8	ppb	2.62	10.8	Kenmore Sq., Boston
	3-Hour	H2H	4.4	3.8	3.2	ppb	2.62	11.5	Kenmore Sq., Boston
	24-Hour	H2H	2.9	2.0	1.5	ppb	2.62	7.6	Kenmore Sq., Boston
	Annual	H	0.53	0.43	0.50	ppb	2.62	1.4	Kenmore Sq., Boston
PM-10 (6)	24-Hour	H2H	30	30	27	$\mu g/m^3$	1	30	Kenmore Sq., Boston
	Annual	H	14.2	14.1	11.2	$\mu g/m^3$	1	14.2	Kenmore Sq., Boston
PM-2.5	24-Hour (4)	98th %	14.5	13	12.2	$\mu g/m^3$	1	13.2	Kenmore Sq., Boston (FRM)
	Annual (4)	H	6.5	6.2	6.1	$\mu g/m^3$	1	6.3	Kenmore Sq., Boston (FRM)
NO_2 (3)	1-Hour (4)	98th %	56	47	46	ppb	1.88	93.4	Kenmore Sq., Boston
	Annual	H	17.3	15.0	13.2	ppb	1.88	32.6	Kenmore Sq., Boston
CO (2)	1-Hour	H2H	1.4	2.4	1.3	ppm	1146	2750.4	Harrison Ave., Boston
	8-Hour	H2H	0.9	1.2	1.3	ppm	1146	1439.4	Harrison Ave., Boston

Notes:

From 2015-2017 MassDEP Air Quality Monitor reports or EPA's AirData Website

(1) SO_2 reported ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 2.62 $\mu g/m^3$.

(2) CO reported in ppm. Converted to $\mu g/m^3$ using factor of 1 ppm = 1146 $\mu g/m^3$.

(3) NO_2 reported in ppb. Converted to $\mu g/m^3$ using factor of 1 ppm = 1.88 $\mu g/m^3$.

(4) Background level is the average concentration of the three years.

(5) The 24-hour and Annual standards were revoked by EPA on June 22, 2010, Federal Register 75-119, p. 35520.

(6) PM10 monitor at Kenmore Square was deactivated in 2016. Harrison Avenue monitor used for 2016 and 2017.

Due to excessive size CAL3QHC, MOVES, and AERMOD input and output files are available on digital media upon request.

Appendix G

Preliminary Energy Model Results

ENERGY MODEL REPORT: CONCEPTUAL DESIGN

Kenmore Square Hotel | Boston, MA

An Energy Evaluation by R. G. Vanderweil's Building Performance Group

4/12/2019

VANDERWEIL

PROJECT OVERVIEW

Kenmore Square Hotel is a new construction high rise hotel project located in Kenmore Square, Boston, MA. The building includes retail space and hotel lobby on the first floor; restaurant and bar on the second floor; media and library on the third floor; fitness studio and hotel back-of-house spaces on the fourth floor; 389 hotel keys along with supporting spaces located from the fifth floor to the twenty-seventh floor; and a mechanical penthouse on the twenty-eighth floor. The building is anticipated to be approximately 215,000 GSF.

Kenmore Square Hotel uses Water Source Heat Pump System as the primary mode of conditioning the building. Heating and Cooling are provided by these units, which draw heat from or reject heat to a common condenser water loop, as the units call for heating or cooling. This common condenser water system enables heat recovery when simultaneous heating and cooling are present in the building. Cooling towers provide heat rejection, and condensing boilers provide heat addition to the loop. Energy recovery units (ERU) are used to meet indoor space ventilation requirements. The ERUs use air-cooled direct expansion (Dx) cooling and direct natural gas furnace heating to temper outside air to room-neutral condition before delivering it to indoor spaces. The ERUs are equipped with an energy recovery wheel to recover both sensible and latent heat.

For the Kenmore Square Hotel, two separate baseline models were considered. Massachusetts Stretch Code dictates that the building must perform 10% better than a building with ASHRAE 90.1-2013 Appendix G construction. The evaluation of energy performance is presented in units of energy savings in kBTU.

The Kenmore Square Hotel project is also complying with Article 80/Article 37 which requires buildings to be "LEED Certifiable." The United States Green Building Council (USGBC) requires all buildings pursuing LEED® Certification to be 5% more energy cost efficient than an equivalent ASHRAE 90.1-2010 Appendix G building. Evaluating a building's performance based on energy cost can result in savings that are significantly different than the actual energy savings in kBTU, depending on local utility rates.

This report evaluates the energy performance of the 02/22/2019 Conceptual Design, analyzes code compliance, and tracks progress toward LEED certification. The purpose of this energy model is to evaluate anticipated energy and energy cost savings relative to the LEED Baseline and the Massachusetts Stretch Code baseline, not to predict actual energy use.

PROJECT PHASE	Conceptual Design
BUILDING TYPE	Retail, Restaurant, Office, and Hospitality
PROJECT AREA	215,000 GSF
ENERGY CODE	IMC 2015 (ASHRAE 90.1-2013)

LEED RATING SYSTEM	LEEDv4-NC
LEED BASELINE	ASHRAE 90.1-2010 Appendix G
CODE BASELINE	ASHRAE 90.1-2013 Appendix G

Energy Code Evaluation

31.3% Energy Savings
10% Required

Article 37/80 LEED Evaluation

36.3% GHG Emission Reduction
16% Energy Cost Savings
5% Energy Cost Savings Required

CODE BASELINE EUI	59 kBTU/ft^2-yr
LEED BASELINE EUI	70 kBTU/ft^2-yr
DESIGN PEUI	41 kBTU/ft^2-yr

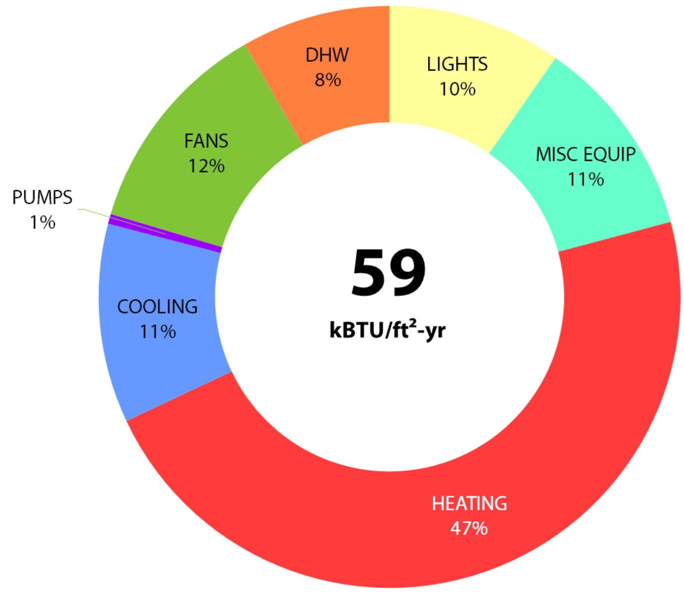
BASELINE MODELS

To evaluate the current energy performance of the Kenmore Square Hotel, two different baselines were created. For code compliance analysis, MA Stretch Code requires the baseline to be created in accordance to the requirements of ASHRAE 90.1-2013 Appendix G. For LEED analysis, the requirements of ASHRAE 90.1-2010 Appendix G were followed to create the LEEDv4-NC baseline per the requirement of LEEDv4-NC Energy and Atmosphere Prerequisite 2 (EAp2) – Minimum Energy Performance. Specific baseline building parameters are itemized in the Appendix. Highlights of the Baseline Models include:

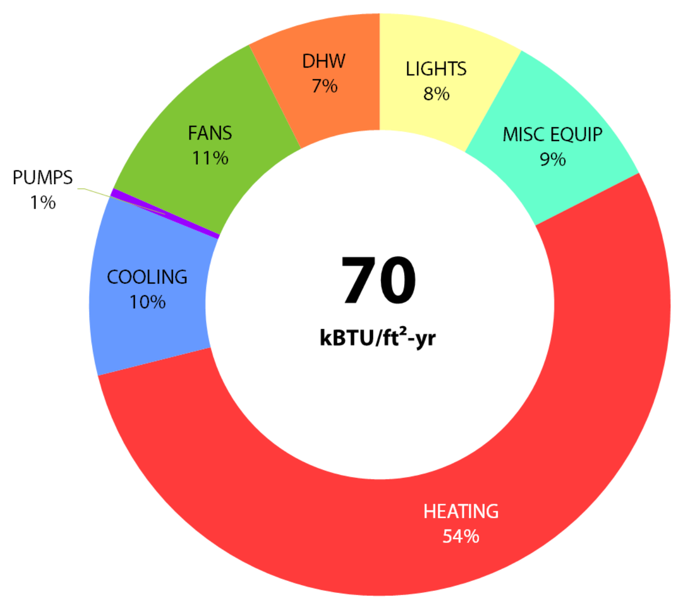
ASHRAE 90.1 BUILDING TYPE (FOR BOTH CODE AND LEED BASELINES)	Floor 1 to 4: Nonresidential and 5 Floors or fewer and 25,000 SF to 150,000 SF Floor 5 to 27: Hotel rooms
ASHRAE 90.1 HVAC SYSTEM TYPE (FOR BOTH CODE AND LEED BASELINES)	Floor 1 to 4: System 5 - Packaged VAV with Reheat (PVAV) Floor 5 to 27: System 1 - Packaged Terminal Air Conditioner (PTAC)
ASHRAE 90.1 COOLING TYPE (FOR BOTH CODE AND LEED BASELINES)	Both systems: Direct Expansion
ASHRAE 90.1 HEATING TYPE (FOR BOTH CODE AND LEED BASELINES)	Both systems: Standard Efficiency Fossil Fuel Boilers (Natural Gas)
ASHRAE 90.1 ENERGY RECOVERY (FOR BOTH CODE AND LEED BASELINES)	System 5: Enthalpy Wheel (50% total effectiveness) where required by ASHRAE 90.1-2010/2013 Section 6.5.6 System 1: N/A
ASHRAE 90.1 WINDOW/WALL RATIO	LEED (ASHRAE 90.1-2010): 40% MA Stretch Code (ASRHAE 90.1-2013): • Retail stand-alone (LVL01): 11% • Restaurant full service (LVL02): 24% • Office 5,000 to 50,000 SF (LVL03): 31% • General (LVL04): 40% • Hotel >75 rooms (LVL05-27): 34%

To further understand how the design decisions are impacting the energy performance of the building, it is useful to view the Baseline models' annual energy consumptions (kBTU) broken down by major end-use components:

CODE BASELINE MODEL ENERGY CONSUMPTION BY END USE



LEED BASELINE MODEL ENERGY CONSUMPTION BY END USE



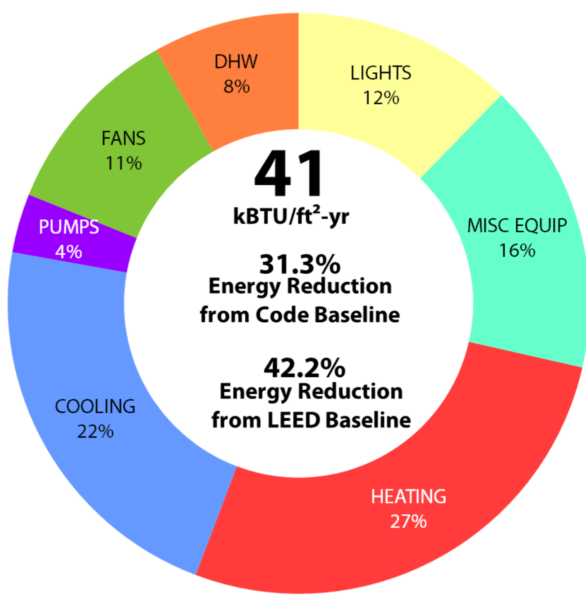
The end uses that consume the greatest amount of energy on an annual basis in the Baseline model are (Space) Heating, (Space) Cooling, and Fans. This profile is consistent with high-rise hotel projects located in cold climate such as Boston, MA. With almost half of the baseline's annual energy consumption being used for (space) heating, ECMs that reduce heating demands of the building can result in respectable energy reduction and energy cost savings for the Proposed Design.

DESIGN MODEL

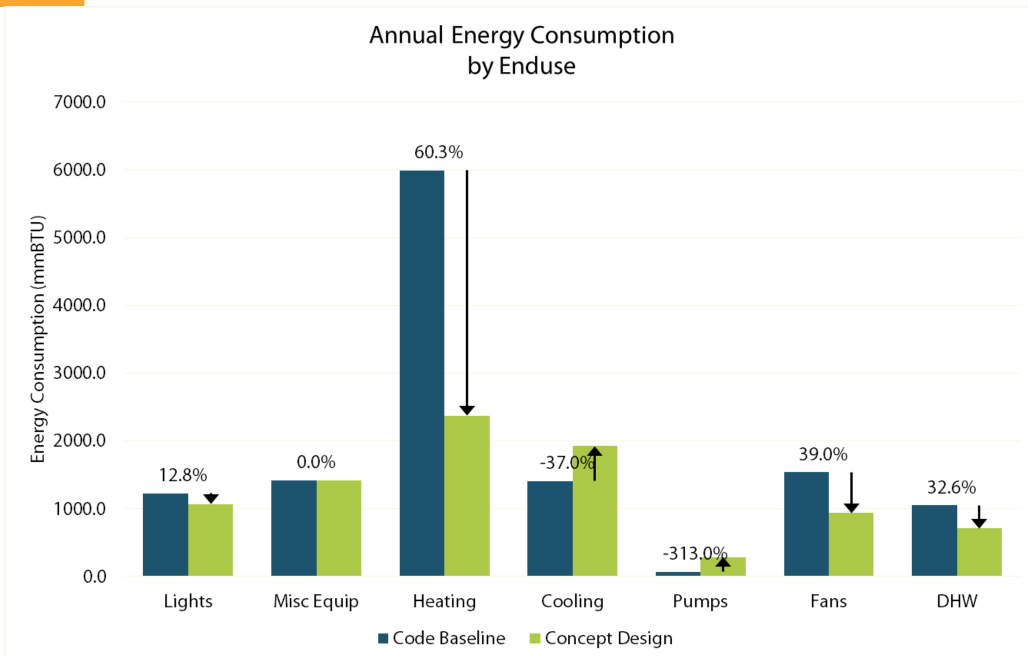
The Kenmore Square Hotel Conceptual Proposed Design Model was created based on Conceptual preliminary design details that are available as of March of 2019, and the discussions with the engineering project team. Code minimum (ASHRAE 90.1-2013) values were assumed for any missing design parameters. Specific building parameters are itemized in the Appendix. Highlights of the Design Model include:

BOD HVAC SYSTEM TYPE	Water Loop Heat Pump
BOD COOLING TYPE	Heat Pump
BOD HEATING TYPE	Heat Pump/High Efficiency Condensing Gas Boilers
BOD ENERGY RECOVERY	Energy Recovery Wheel 70% Sensible Heat Recovery Effectiveness 70% Latent Heat Recovery Effectiveness
BOD WINDOW/WALL RATIO	46%

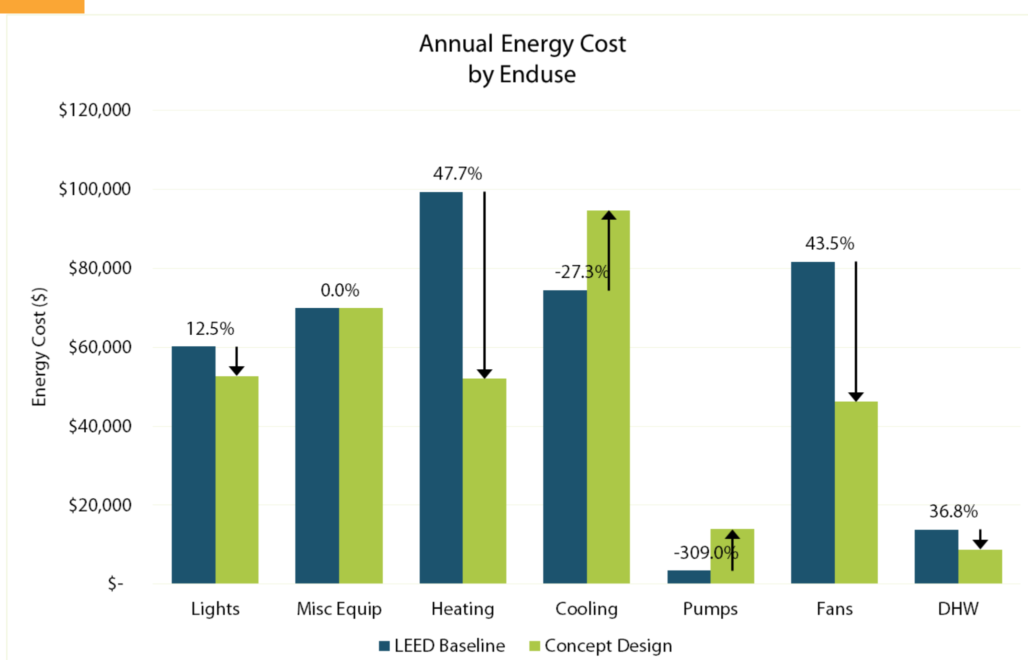
DESIGN MODEL ENERGY CONSUMPTION BY END USE



DESIGN MODEL ENERGY SAVINGS BY END USE COMPARED TO CODE BASELINE



DESIGN MODEL ENERGY COST SAVINGS BY END USE COMPARED TO LEED BASELINE



ENERGY CONSERVATION MEASURES

Energy conservation measures (ECMs) associated with energy savings for this project currently include:

- **Improved Envelope:**
  Improving wall assembly's thermal performance reduces the effect of outdoor conditions due to conduction of heat through the building envelope.
  - Wall assembly: 25% improved assembly U-value
- **Improved Glazing:**
  Improving the glazing's thermal performance reduces the rate of heat transfer through the glazing and minimizes the solar heat gain. The Concept Design model uses glazing that has 20% lower U-value and 20% lower solar heat gain coefficient compared to ASHRAE 90.1-2013's glazing.
  - Center of glass U-value: 0.228
  - Solar Heat Gain Coefficient: 0.32
- **Improved Lighting:**
  Lighting Power Density (LPD) is reduced by 30% compared to ASHRAE 90.1-2013 prescribed values due to the design featuring LED lights. This LPD will need to be validated once the lighting design is complete.
- **Improved energy recovery wheel effectiveness:**
  Energy recovery units with improved heat recovery effectiveness allows more heating and cooling energy to be recovered.
  - 70% sensible heat recovery effectiveness, 70% latent heat recovery effectiveness
- **Higher cooling efficiency for Energy Recovery Units:**
  High Dx cooling efficiency allows the ERU to consume less energy to temper outside air. The ERU has a cooling EER of 12.5.
- **High Efficiency Condensing Boilers:**
  Condensing boilers (94.6% efficiency) are more efficient than traditional boilers (80% efficiency), resulting in lower space heating energy consumption.
- **Water Loop Heat Pump System (WLHP):**
  Heating and Cooling are provided by WLHP units, which draw heat from or reject heat to a common condenser water loop, as the units call for heating or cooling. This common condenser water system allows the system to recover heating/cooling energy when there are coincident heating and cooling demands in the building.
- **High efficiency heat pump units:**
  Heat pump units with high efficiency condition the building using less energy compared to standard efficiency heat pumps. The heat pumps used for the Concept Design model has 4.27 Cooling COP, and 5.88 Heating COP on average.
- **Low-flow fixtures and High Efficiency DHW Heater:**
  High efficiency hot water heater reduces the energy consumed for heating domestic hot water. Low flow fixtures result in 20% less domestic hot water consumption, which also contribute to domestic hot water heating savings.
- **Electronically Commutated (EC) Motors:**
  EC Motors can adjust their RPM to provide the programmed CFM of supply air, making them more efficient than traditional motors.

ENERGY PERFORMANCE MATRICES (CODE BASELINE VS DESIGN)

MA Stretch Code Baseline (ASHRAE 90.1-2013 Appendix G)

End Use	ELEC (kWh)	NAT GAS (therms)	STEAM (MBTU)	CHW (MBTU)	Total Energy (kBTU)	% of Total
Lights	359,830				1,228,100	10%
Misc. Equipment	416,496				1,421,501	11%
Space Heating		59,920			5,991,950	47%
Space Cooling	412,029				1,406,255	11%
Heat Rejection						0%
Pumps & Aux	20,380				69,555	1%
Ventilation & Fans	451,150				1,539,774	12%
Domestic Hot Water		10,532			1,053,200	8%
Total Energy by Type	1,659,884	70,452	-	-	12,710,335	100%
Total Cost by Type	$ 278,529	$ 86,536	$ -	$ -		
Total Energy Cost	$					365,064
Site EUI (kBTU/SF)						59.12

Conceptual Design

End Use	ELEC (kWh)	NAT GAS (therms)	STEAM (MBTU)	CHW (MBTU)	Total Energy (kBTU)	% of Total
Lights	313,853				1,071,180	12%
Misc. Equipment	416,496				1,421,501	16%
Space Heating	181,294	17,571			2,375,856	27%
Space Cooling	560,835				1,914,130	22%
Heat Rejection	3,785				12,918	0%
Pumps & Aux	82,284	64			287,235	3%
Ventilation & Fans	275,207				939,281	11%
Domestic Hot Water		7,097			709,700	8%
Total Energy by Type	1,833,754	24,732	-	-	8,731,802	100%
Total Cost by Type	$ 307,704	$ 30,378	$ -	$ -		
Total Energy Cost	$					338,082
Site EUI (kBTU/SF)						40.61

Savings by Enduse

	Energy			Energy Cost		
End Use	kBTU	Enduse Savings %	Enduse Savings % of Total	$	Enduse Savings %	Enduse Savings % of Total
Lights	156,920	13%	3.9%	$ 7,715	13%	29%
Misc. Equipment		0%	0.0%	$ -	0%	0%
Space Heating	3,616,094	60%	90.9%	$ 21,596	29%	80%
Space Cooling	(507,875)	-36%	-12.8%	$ (24,970)	-36%	-93%
Heat Rejection	(12,918)		-0.3%	$ (635)		-2%
Pumps & Aux	(217,680)	-313%	-5.5%	$ (10,466)	-306%	-39%
Ventilation & Fans	600,493	39%	15.1%	$ 29,523	39%	109%
Domestic Hot Water	343,500	33%	8.6%	$ 4,219	33%	16%
Total	3,978,533		100.0%	$ 26,982		100%
			Total Site Energy Savings 31.30%			Total Site Cost Savings 7.39%

*Positive values indicate energy savings. Negative values indicate energy penalties.

ENERGY PERFORMANCE MATRICES (LEED BASELINE VS DESIGN)

LEEDv4-NC Baseline (ASHRAE 90.1-2010 Appendix G)						
End Use	ELEC (kWh)	NAT GAS (therms)	STEAM (MBTU)	CHW (MBTU)	Total Energy (kBTU)	% of Total
Lights	358,708				1,224,269	8%
Misc. Equipment	416,496				1,421,501	9%
Space Heating		80,889			8,088,850	54%
Space Cooling	443,501				1,513,668	10%
Heat Rejection						0%
Pumps & Aux	20,234				69,059	0%
Ventilation & Fans	486,706				1,661,128	11%
Domestic Hot Water		11,231			1,123,100	7%
Total Energy by Type	1,725,645	92,120	-	-	15,101,575	100%
Total Cost by Type	$ 289,563	$ 113,150	$ -	$ -		
Total Energy Cost	$					402,714
Site EUI (kBTU/SF)						70.24

Conceptual Design						
End Use	ELEC (kWh)	NAT GAS (therms)	STEAM (MBTU)	CHW (MBTU)	Total Energy (kBTU)	% of Total
Lights	313,853				1,071,180	12%
Misc. Equipment	416,496				1,421,501	16%
Space Heating	181,294	17,571			2,375,856	27%
Space Cooling	560,835				1,914,130	22%
Heat Rejection	3,785				12,918	0%
Pumps & Aux	82,284	64			287,235	3%
Ventilation & Fans	275,207				939,281	11%
Domestic Hot Water		7,097			709,700	8%
Total Energy by Type	1,833,754	24,732	-	-	8,731,802	100%
Total Cost by Type	$ 307,704	$ 30,378	$ -	$ -		
Total Energy Cost	$					338,082
Site EUI (kBTU/SF)						40.61

Savings by Enduse						
	Energy			Energy Cost		
End Use	kBTU	Enduse Savings %	Enduse Savings % of Total	$	Enduse Savings %	Enduse Savings % of Total
Lights	153,088	13%	2.4%	$ 7,527	13%	12%
Misc. Equipment		0%	0.0%	$ -	0%	0%
Space Heating	5,712,994	71%	89.7%	$ 47,352	48%	73%
Space Cooling	(400,462)	-26%	-6.3%	$ (19,689)	-26%	-30%
Heat Rejection	(12,918)		-0.2%	$ (635)		-1%
Pumps & Aux	(218,176)	-316%	-3.4%	$ (10,491)	-309%	-16%
Ventilation & Fans	721,846	43%	11.3%	$ 35,490	43%	55%
Domestic Hot Water	413,400	37%	6.5%	$ 5,078	37%	8%
Total	6,369,772		100.0%	$ 64,631		100%
	Total Site Energy Savings 42.18%			Total Site Cost Savings 16.05%		

*Positive values indicate energy savings. Negative values indicate energy penalties

DESIGN MODEL METRICS

Annual Building Metrics	
kWh / ft²	8.5
Heating kbtu / ft²	11.1
Total kbtu / ft²	40.6
$ / ft²	1.6

Peak Demand Metrics	
kW	6329.0
Lighting W/ft²	0.5
Heating kbtu/hr	2282.0
Cooling kbtu/hr	835.9
Equipment W/ft²	0.5

Utility	By Cost	By Energy
Electricity	91%	72%
Natural Gas	9%	28%
Steam	0%	0%
CHW	0%	0%

ENERGY MODEL INPUT TABLE

INPUT PARAMETER	LEED BASELINE 90.1-2010	CODE BASELINE 90.1-2013	CONCEPTUAL DESIGN	INPUT SOURCES
GENERAL INFORMATION				
CLIMATE ZONE	5A			ASHRAE 90.1-2013
WEATHER STATION	Boston Logan International Airport, MA			ASHRAE 90.1-2013
BUILDING ORIENTATION	9° East of North			02/22/2019 floor plans
OUTDOOR DESIGN CONDITIONS	7 °F HDD 87°F CDD Dry-Bulb 71°F CDD Wet-Bulb Range 16			ASHRAE Weather Data
INDOOR DESIGN CONDITIONS	Summer 75°F (65% RH max) / Winter 70°F			Initial assumptions
PEAK OCCUPANT DENSITY	Back-of-house, support spaces: 300 ft^2/person Dining area: 14.3 ft^2/person Kitchen: 50 ft^2/person Lobby: 33.3 ft^2/person Office: 200 ft^2/person Hotel rooms: 175 ft^2/person (2 people/key)			ASHRAE 62.1 Initial assumptions
UTILITY RATES				
ELECTRICITY UTILITY RATE	16.78¢/kWh			EIA Dec. 2018 commercial average for MA
NATURAL GAS UTILITY RATE	$1.2283/therm			EIA Dec. 2018 commercial average for MA
SUMMARY OF CONSTRUCTION MATERIALS				
ROOF CONSTRUCTION	Insulation Entirely Above Deck U-0.048	Insulation Entirely Above Deck U-0.032	Design Roof U-0.039	ASHRAE 90.1-2010 ASHRAE 90.1-2013 Table 5.5-2 Initial assumptions
WALL CONSTRUCTION	Steel-Framed U-0.064	Steel-Framed U-0.055	Design Wall U-0.042	
SLAB CONSTRUCTION	Uninsulated Slab F-0.730	Uninsulated Slab F-0.520	Same as Code	
INFILTRATION	Same as Proposed Design	Same as Proposed Design	0.03 cfm/ft^2	Initial assumptions
GLAZING DESCRIPTION (ASSEMBLY)	Metal framing (All others) U-0.55 SHGC-0.40	Metal framing (Fixed) U-0.42 SHGC-0.40	COG U-Value: 0.228 SHGC-0.32	ASHRAE 90.1-2010 ASHRAE 90.1-2013 Initial assumptions

INPUT PARAMETER	LEED BASELINE 90.1-2010	CODE BASELINE 90.1-2013	CONCEPTUAL DESIGN	INPUT SOURCES
WINDOW-TO-WALL RATIO	40%	Retail (LVL01): 11% Restaurant (LVL02): 24% Office (LVL03): 31% General (LVL04): 40% Hotel (LVL05-27): 34%	Overall: 46%	ASHRAE 90.1-2010 ASHRAE 90.1-2013 02/22/2019 Conceptual Design
PLUG LOADS & LIGHTING				
EQUIPMENT POWER DENSITY	Same as Proposed Design	Same as Proposed Design	BOH: 0.5 W/ft^2 Dinning: 0.5 W/ft^2 Kitchen: 10 W/ft^2 Lobby: 0.5 W/ft^2 Office: 1 W/sf Hotel rooms: 0.5 W/ft^2	Initial assumptions
LIGHTING POWER DENSITY	BOH: 0.66 W/ft^2 Dinning: 1.31 W/ft^2 Kitchen: 0.99 W/ft^2 Lobby: 0.9 W/ft^2 Office: 1.11 W/sf Hotel rooms: 0.66 W/ft^2	BOH: 0.66 W/ft^2 Dinning: 1.07 W/ft^2 Kitchen: 1.21 W/ft^2 Lobby: 1.06 W/ft^2 Office: 1.11 W/sf Hotel rooms: 0.66 W/ft^2	BOH: 0.46 W/ft^2 Dinning: 0.75 W/ft^2 Kitchen: 0.85 W/ft^2 Lobby: 0.74 W/ft^2 Office: 0.78 W/sf Hotel rooms: 0.66 W/ft^2	ASHRAE 90.1-2010 ASHRAE 90.1-2013 Table 9.6.1 (assumed 30% LPD Reduction from code due to LED lighting, except Hotel rooms)
LIGHTING CONTROLS	Daylighting sensors	Daylighting sensors	Daylighting sensors	ASHRAE 90.1-2010 ASRHAE 90.1-2013 9.4.1.2 9.4.1.4
HVAC AIR SIDE SYSTEM SUMMARY				
HVAC SYSTEM	Retail and office spaces: PVAV with hot-water reheat (System 5) Hotel rooms: PTAC (System 1)	Retail and office spaces: PVAV with hot-water reheat (System 5) Hotel rooms: PTAC (System 1)	Retail and office spaces: Water loop heat pump Hotel rooms: Water loop heat pump DOAS for ventilation	ASHRAE 90.1-2010 ASHRAE 90.1-2013 Table G3.1.1A, Conceptual HVAC Design
DEMAND CONTROLLED VENTILATION	DCV for Lobbies and Dinning areas	DCV for Lobbies and Dinning areas	DCV for Lobbies and Dinning areas	ASHRAE 90.1-2010 ASHRAE 90.1-2013
SUPPLY FAN POWER	LVL01-PVAV: 12.060 kW LVL02- PVAV: 16.309 kW LVL03- PVAV: 8.502 kW LVL04- PVAV: 6.793 kW PTAC: 1.764 kW	LVL01-PVAV: 4.923 kW LVL02- PVAV: 11.196 kW LVL03- PVAV: 7.223 kW LVL04- PVAV: 7.615 kW PTAC: 1.707 kW	LVL1~4-WLHP: 7.772 Kw LVL5~27-WLHP: 46.7 kW DOAS: 17.625 kW	ASHRAE 90.1-2010 ASHRAE 90.1-2013 02/22/2019 Conceptual

INPUT PARAMETER	LEED BASELINE 90.1-2010	CODE BASELINE 90.1-2013	CONCEPTUAL DESIGN	INPUT SOURCES
RETURN FAN POWER	LVL01-PVAV: 4.016 kW LVL02- PVAV: 5.431 kW LVL03- PVAV: 2.837 kW LVL04- PVAV: 2.267 kW PTAC: N/A	LVL01-PVAV: 1.643 kW LVL02- PVAV: 3.732 kW LVL03- PVAV: 2.408 kW LVL04- PVAV: 2.538 kW PTAC: N/A	Heat pump: N/A DOAS: 9.633 kW	ASHRAE 90.1-2010 ASHRAE 90.1-2013 02/22/2019 Conceptual
FAN CONTROL	Variable speed	Variable speed	Constant volume	ASHRAE 90.1-2010 ASHRAE 90.1-2013 G3.1.3.15 02/22/2019 Conceptual
MINIMUM FLOW	30% of zone peak flow	30% of zone peak flow	N/A (Constant volume)	ASHRAE 90.1-2010 G3.1.3.13, 02/22/2019 Conceptual
VENTILATION	Same as proposed	Same as proposed	Minimum Combined ventilation: BOH: 5 CFM/person Dinning: 10 CFM/person Kitchen: 14 CFM/person Lobby: 10 CFM/person Office: 17 CFM/person Hotel rooms: 11 CFM/person Whole building: 23,100 CFM	ASHRAE 62.1 02/22/2019 Conceptual HVAC Design
AIR-SIDE ECONOMIZER	Fixed dry bulb, 70°F high limit	Fixed dry bulb, 70°F high limit	Fixed dry bulb, 70°F high limit	ASHRAE 90.1-2010 ASHRAE 90.1-2013
ENERGY RECOVERY (TYPE AND EFFECTIVENESS)	Enthalpy wheels for LVL02-PVAV (50% sensible and 50% latent effectiveness)	Enthalpy wheels for all PVAV systems (50% sensible and 50% latent effectiveness)	Enthalpy wheels for DOAS 70% sensible recovery effectiveness 70% latent recovery effectiveness	ASHRAE 90.1-2010 ASHRAE 90.1-2013 02/22/2019 Conceptual HVAC Design
HVAC WATER SIDE SYSTEM SUMMARY				
COOLING TYPE	PVAV: Direct expansion (9.8 EER) PTAC: Direct expansion (10.35 EER)	PVAV: Direct expansion (LVL01-10.8 EER; Others: 9.8 EER) PTAC: Direct expansion (10.805 EER)	Heat pump (4.27 COP_C; 5.88 COP_H) Dx for ERU ventilation air (12.5 EER)	ASHRAE 90.1-2010 ASHRAE 90.1-2013 02/22/2019 Conceptual HVAC Design
HP LOOP PUMP CONTROLS	N/A	N/A	Variable speed	02/22/2019 Conceptual HVAC Design
NUMER OF HP LOOP PUMPS	N/A	N/A	2 pumps at N+1	
HP LOOP PUMP POWER	N/A	N/A	33.598 kW	

INPUT PARAMETER	LEED BASELINE 90.1-2010	CODE BASELINE 90.1-2013	CONCEPTUAL DESIGN	INPUT SOURCES
HP HEAT REJECTION	N/A	N/A	Open tower Variable speed fan	02/22/2019 Conceptual HVAC Design
HP COOLING SETPOINT	N/A	N/A	70°F	
HP COOLING SETPOINT CONTROLS	N/A	N/A	Fixed setpoint	
HP HEAT REJECTION PUMP	N/A	N/A	Variable speed pump	
NUMBER OF HP HEAT REJECTION PUMP	N/A	N/A	2 pumps at N+1	
HP HEAT REJECTION PUMP POWER	N/A	N/A	13.234 kW	
HP HEAT ADDITION	N/A	N/A	(2) Gas-fired condensing boiler (94.6% efficient)	
HP HEATING SETPOINT	N/A	N/A	75°F	
HP HEATING SETPOINT CONTROLS	N/A	N/A	Fixed setpoint	
HP HEAT ADDITION PUMP	N/A	N/A	Variable speed pump	
NUMBER OF HP HEAT ADDITION PUMP	N/A	N/A	2 pumps at N+1	
HP HEAT ADDITION PUMP POWER	N/A	N/A	3.432 kW	
HEATING TYPE	Hot water	Hot water	Heat pump ERUs: Direct Gas Furnace	ASHRAE 90.1-2010 ASHRAE 90.1-2013 02/22/2019 Conceptual HVAC Design
HHW BOILER TYPE	(2) Gas-fired conventional boiler	(2) Gas-fired conventional boiler	N/A	ASHRAE 90.1-2010 ASHRAE 90.1-2013
HHW BOILER EFFICIENCY	80%	80%	N/A	
HEATING HOT WATER (HHW) SUPPLY TEMP (°F)	180°F	180°F	N/A	
HHW LOOP DELTA T	50°F	50°F	N/A	

INPUT PARAMETER	LEED BASELINE 90.1-2010	CODE BASELINE 90.1-2013	CONCEPTUAL DESIGN	INPUT SOURCES
HHW SETPOINT CONTROL	Reset based on OA DB DB <=20°F: 180°F DB>=50°F: 150°F 20°F<DB<50°F: Ramped	Reset based on OA DB DB <=20°F: 180°F DB>=50°F: 150°F 20°F<DB<50°F: Ramped	N/A	ASHRAE 90.1-2010 ASHRAE 90.1-2013
PRIMARY HHW PUMP SPEED CONTROL	Variable primary only	Variable primary only	N/A	
NUMBER OF HHW PUMPS	1 primary pump	1 primary pump	N/A	
PRIMARY HHW PUMP POWER	19 W/gpm	19 W/gpm	N/A	

MODELING HISTORY

DATE	MODEL REPORT	SUMMARY OF CHANGES	DESIGN EUI	ENERGY COST SAVINGS*	ENERGY SAVINGS*	MODELER	CHECK
03/21/2019	MA Stretch Code; 90.1-2013	Original run	47 kBtu/ft²-yr	-	20%	NH	DL/PM
	Article 37 (LEEDv4-NC; 90.1-2010)	Original run	47 kBtu/ft²-yr	5.7%	32.7%	NH	DL/PM
04/09/2019	MA Stretch Code; 90.1-2013	Improved glazing Improved HP Improved ERU Improved ERU Cooling	41 kBtu/ft²-yr	7.4%	31.3%	NH	DL/PM
	Article 37 (LEEDv4-NC; 90.1-2010)	Improved glazing Improved HP Improved ERU Improved ERU Cooling	41 kBtu/ft²-yr	16%	42.2%	NH	DL/PM

*Positive values indicate energy savings. Negative values indicate energy penalties.

File Path:

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METHODOLOGY

Vanderweil models energy performance using eQUEST 3.64, a software program that utilizes DOE-2.2 to simulate the hourly energy consumption and demand load shapes for a given building. To develop a model, a graphic representation of the building is created using floor plans, floor heights, and window configurations. Mechanical systems and building envelope are defined, and operating parameters such as lighting power density, airflow rates, and occupancy schedules are included. The simulation uses 30-year average hourly weather data to estimate the energy consumption of the building for each hour of the year.

LIMITATIONS

In order to estimate energy consumption profiles, Vanderweil utilizes traditional computer based simulation programs such as Trane Trace®, DOE-2, and/or our own in-house calculations and/or programs based on industry standard methods. Vanderweil neither has control of nor assumes control of the actual building, occupant behavior, equipment operation/maintenance, or climatic conditions. Accordingly, Vanderweil does not expressly or implicitly warrant or represent that Vanderweil's energy and associated cost estimates of the building or equipment operation will be the actual operation energy and cost. Rather, the purpose of this energy model is only to compare design options against a baseline to inform design decisions.

CODES & INDUSTRY STANDARDS

U.S. Green Building Council LEED for New Construction (LEED-NC) v4

ASHRAE Standard 90.1-2013 Energy Standard for Buildings Except Low-Rise Residential Buildings

ASHRAE Standard 62.1 Ventilation for Acceptable Indoor Air Quality

Appendix H

Climate Resiliency Checklist

Boston Planning & Development Agency
Climate Resiliency Report Summary

Submitted: 04/22/2019 13:02:42

A.1 - Project Information

Project Name:	One Kenmore Square			
Project Address:	560-574 Commonwealth Avenue			
Filing Type:	Initial (PNF, EPNF, NPC or other substantial filing)			
Filing Contact:	Talya Moked	Epsilon Associates	tmoked@epsilonassociates.com	9784616223
Is MEPA approval required?	No	MEPA date:		

A.2 - Project Team

Owner / Developer:	Mark Kenmore, LLC
Architect:	Studio Gang
Engineer:	Vanderweil Engineers
Sustainability / LEED:	Epsilon Associates, Inc.
Permitting:	Epsilon Associates, Inc.
Construction Management:	

A.3 - Project Description and Design Conditions

List the principal Building Uses:	Hotel
List the First Floor Uses:	Hotel, lobby, bank branch
List any Critical Site Infrastructure and or Building Uses:	None

Site and Building:

Site Area (SF):	7547	Building Area (SF):	231000
Building Height (Ft):	299	Building Height (Stories):	27
Existing Site Elevation – Low (Ft BCB):	22	Existing Site Elevation – High (Ft BCB):	22
Proposed Site Elevation – Low (Ft BCB):	22	Proposed Site Elevation – High (Ft BCB):	22
Proposed First Floor Elevation (Ft BCB):	22	Below grade spaces/levels (#):	1

Article 37 Green Building:

LEED Version - Rating System:	LEED v4 for BD+C	LEED Certification:	Yes
Proposed LEED rating:	Silver	Proposed LEED point score (Pts.):	52

Boston Planning & Development Agency

Climate Resiliency Report Summary

boston planning & development agency

Building Envelope:

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

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

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

Area of Opaque Curtain Wall & Spandrel Assembly:	0	Wall & Spandrel Assembly Value:	0.042
Area of Framed & Insulated / Standard Wall:	53	Wall Value:	23.8
Area of Vision Window:	46	Window Glazing Assembly Value:	0.228
		Window Glazing SHGC:	0.32
Area of Doors:	1	Door Assembly Value :	

Energy Loads and Performance

For this filing – describe how energy loads & performance were determined	Vanderweil models energy performance using eQUEST 3.64, a software program that utilizes DOE-2.2 to simulate the hourly energy consumption and demand load shapes for a given building. To develop a model, a graphic representation of the building is created using floor plans, floor heights, and window configurations. Mechanical systems and building envelope are defined, and operating parameters such as lighting power density, airflow rates, and occupancy schedules are included. The simulation uses 30-year average hourly weather data to estimate the energy consumption of the building for each hour of the year

Annual Electric (kWh):	1833754	Peak Electric (kW):	1742
Annual Heating (MMbtu/hr):	2376	Peak Heating (MMbtu):	1850
Annual Cooling (Tons/hr):	160583	Peak Cooling (Tons):	616
Energy Use - Below ASHRAE 90.1 - 2013 (%):	31.3	Have the local utilities reviewed the building energy performance?:	No
Energy Use - Below Mass. Code (%):	31.3	Energy Use Intensity (kBtu/SF):	47

Back-up / Emergency Power System

Electrical Generation Output (kW):	500	Number of Power Units:	1
System Type (kW):	Combustion Engine	Fuel Source:	Diesel

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

Electric (kW):	408	Heating (MMbtu/hr):	

Cooling (Tons/hr):

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

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

B.1 – GHG Emissions - Design Conditions

For this filing - Annual Building GHG Emissions (Tons): 580.7

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

The team has had a meeting to discuss performance targets for the building and supporting analysis will be completed as the design progresses.

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

The building is proposed to utilize high efficiency glazing that is 20% better than code requirements.

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

The building will include high performance: building envelope, HVAC equipment, lighting and controls, and domestic hot water systems. It will also include energy recovery ventilation and EnergyStar equipment.

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

The use of rooftop PV systems will be limited on this facility due to the very limited roof area compared to the size of the facility, and the amount of equipment on the roof along with the proposed skylight, however the building can be prepped to support PV on the roof in the future. Use of energy storage systems will be further evaluated during schematic design. Potential battery storage systems and cogeneration systems will also be further evaluated with life cycle cost analyses to confirm if they are appropriate for the Project.

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

No district energy systems are available at the site.

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

The program and architectural plans have been provided to National Grid and Eversource for input on what incentives will be available for the Project.

B.2 - GHG Reduction - Adaptation Strategies

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

It is anticipated that the power grid will become more sustainable and less carbon intensive over time, and as the building requires system upgrades, the building could migrate to all electric systems.

C - Extreme Heat Events

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

C.1 – Extreme Heat - Design Conditions

Temperature Range - Low (Deg.):	8	Temperature Range - High (Deg.):	91
Annual Heating Degree Days:	5521	Annual Cooling Degree Days	776

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

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

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

The building will use high reflective paving materials.

C.2 - Extreme Heat – Adaptation Strategies

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

The building will include high performance HVAC equipment, energy recovery ventilation systems, and new landscaping to reduce the heat island effect.

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

The building will include a generator for life safety systems.

D - Extreme Precipitation Events

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

D.1 – Extreme Precipitation - Design Conditions

What is the project design precipitation level? (In. / 24 Hours)	6

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

The building will include an infiltration system for the first 1.25 inches of run-off.

D.2 - Extreme Precipitation - Adaptation Strategies

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

By creating a new approximately 0.5-acre public plaza lined with new landscaping, the Project will reduce the amount of impervious area within the Project Area. In addition, on-site systems will be designed with a capacity of 1.25 inches over the building area.

E – Sea Level Rise and Storms

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

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

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

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

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

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

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

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

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

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

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

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

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

Thank you for completing the Boston Climate Change Checklist!

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

Appendix I

Accessibility Checklist

Appendix J

Broadband Ready Checklist

9Article 80 – Accessibility Checklist

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

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

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

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

Accessibility Analysis Information Sources:

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

Glossary of Terms:

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

1. Project Information: *If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.*			
Project Name:	One Kenmore Square		
Primary Project Address:	560-574 Commonwealth Ave		
Total Number of Phases/Buildings:	1		
Primary Contact (Name / Title / Company / Email / Phone):	Owner: Robert Korff Mark Kenmore LLC 57 River Street Suite 106 Wellesley, MA 02481 rkorff@markdevllc.com (617) 614-9144		
Owner / Developer:	Mark Kenmore LLC 57 River Street Suite 106 Wellesley, MA 02481		
Architect:	Studio Gang Architects		
Civil Engineer:	Bohler Engineering		
Landscape Architect:	Reed Hilderbrand		
Permitting:	Epsilon Associates, Inc.		
Construction Management:	TBD		
At what stage is the project at time of this questionnaire? Select below:			
	PNF / Expanded PNF Submitted	☑Draft / Final Project Impact Report Submitted	BPDA Board Approved
	BPDA Design Approved	Under Construction	Construction Completed:
Do you anticipate filing for any variances with the Massachusetts Architectural Access Board (MAAB)? ***If yes,*** identify and explain.	No variances with the MAAB are anticipated to be required for the exterior of the building.		
2. Building Classification and Description:			

This section identifies preliminary construction information about the project including size and uses.				
What are the dimensions of the project?				
Site Area:	*19,250 SF (building excluded)*	Building Area:		*6,947 GSF at grade*
Building Height:	*314'-6"*	Number of Stories:		*27 Flrs. + Mech*
First Floor Elevation:	At sidewalk level	Is there below grade space:		*Yes*
What is the Construction Type? (Select most appropriate type)				
	Wood Frame	Masonry	Steel Frame	☑Concrete
What are the principal building uses? (IBC definitions are below – select all appropriate that apply)				
	Residential – One - Three Unit	Residential - Multi-unit, Four +	Institutional	Educational
	☑Business	☑Mercantile	Factory	☑Hospitality
	Laboratory / Medical	☑Storage, Utility and Other		
List street-level uses of the building:				

3. Assessment of Existing Infrastructure for Accessibility: *This section explores the proximity to accessible transit lines and institutions, such as (but not limited to) hospitals, elderly & disabled housing, and general neighborhood resources. Identify how the area surrounding the development is accessible for people with mobility impairments and analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.*	
Provide a description of the neighborhood where this development is located and its identifying topographical characteristics:	The Project is located in Kenmore Square; an active neighborhood located a short walk from two subway stops and Fenway Park. The topography at the site is generally flat and ranges from elevations 19 to 24.
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	The subway's green line runs parallel to Commonwealth Avenue and has two (2) stops within walking distance of the site. The Kenmore stop is 250' to the east and the Blandford Street stop is 500' to the west. The Yawkey stop of the Framingham/Worcester line is 400' to the southwest of the site. The Kenmore bus station is 250' to the east as well.
List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others:	The site is at the eastern edge of Boston University including several housing blocks. Beth Israel Hospital and Kenmore-Harvard Vanguard Hospital are within 750' south of the site. West Fenway elderly housing is ¼" south.

List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	Fenway park is 250' south of the site. The Back bay Fens park and Charlesgate Park are 500' east of the site. The City of Boston Fire Department is on the eastern edge of the Back Bay Fens park ¼" mile from the site. United States Postal Service building is 100' north of the site.
4. Surrounding Site Conditions – Existing: *This section identifies current condition of the sidewalks and pedestrian ramps at the development site.*	
Is the development site within a historic district? ***If yes,*** identify which district:	No
Are there sidewalks and pedestrian ramps existing at the development site? ***If yes***, list the existing sidewalk and pedestrian ramp dimensions, slopes, materials, and physical condition at the development site:	Yes, sidewalks exist; however, the Project will fundamentally alter the road design and the proposed road network will significantly improve the conditions for people walking and cycling. Design elements including curbs, urban braille, sonar detection, landscaping, wide and separated walking and bike facilities are incorporated into plans. These plans will go through a separate design review and approval process with Boston Transportation Department, and as such, there will be compliance with the Boston Complete Streets Design Guidelines and the Americans with Disabilities Act Design requirements.
Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? ***If yes,*** provide description and photos:	No, all sidewalks will be reconstructed in different configurations. As noted above, the Project will fundamentally alter the road design and the proposed road network will significantly improvs the conditions for people walking and cycling.
5. Surrounding Site Conditions – Proposed *This section identifies the proposed condition of the walkways and pedestrian ramps around the development site. Sidewalk width contributes to the degree of comfort walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Wider sidewalks allow people to walk side by side and pass each other comfortably walking alone, walking in pairs, or using a wheelchair.*	
Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? ***If yes***, choose which Street Type was applied: Downtown Commercial, Downtown	Beacon Street/Commonwealth Avenue/Brookline Ave are all considered Urban Principal Arterials by MassDOT's Road Inventory Map. This is equivalent to a Boulevard street type in the Complete Streets Guidelines. Design elements including curbs, urban braille, sonar detection, landscaping,

Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard.	wide and separated walking and bike facilities are incorporated into plans. These plans will go through a separate design review and approval process with Boston Transportation Department, and as such, there will be compliance with the Boston Complete Streets Design Guidelines and the Americans with Disabilities Act Design requirements.
What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:	Design elements including curbs, urban braille, sonar detection, landscaping, wide and separated walking and bike facilities are incorporated into plans. These plans will go through a separate design review and approval process with Boston Transportation Department, and as such, there will be compliance with the Boston Complete Streets Design Guidelines and the Americans with Disabilities Act Design requirements.
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?	Based on the concept plan, the proposed materials will extend into the City of Boston right-of-way. The appropriate easement and maintenance agreements will be entered into as part of a separate design review process. Pedestrian Zone: CIP Concrete Furnishing Zone + Café/Frontage Zone: Granite
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	The public realm consists of Building frontage zone (F&B + Café) + Pedestrian Zone + Furnishing Zone (Seating + Planting + Lighting) Comm Ave is 10’+10’+29.5’+0.5’curb Beacon is 0.75’+8’+5’+0.5’curb
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	The pedestrian right-of-way will not be on private property
Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details.	The Project will be going through the PIC for Vertical Discontinuances (cantilevered levels), Grant of Location (utility equipment), Projection License (canopies), Specific Repairs (streets and sidewalks), and License, Maintenance, and Indemnification Agreement
6. Accessible Parking: *See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability – Disabled Parking Regulations*.	
What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage?	0 (drop off only)

What is the total number of accessible spaces provided at the development site? How many of these are "Van Accessible" spaces with an 8 foot access aisle?	0 (drop off only)
Will any on-street accessible parking spaces be required? ***If yes,*** has the proponent contacted the Commission for Persons with Disabilities regarding this need?	No
Where is the accessible visitor parking located?	NA
Has a drop-off area been identified? ***If yes,*** will it be accessible?	Yes. The drop off area will be designed to comply with design guideline in the American Disabilities Act.
7. Circulation and Accessible Routes: *The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability with neighbors.*	
Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	Flush condition at al entry points
Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe.* ***If no***, what is the reason?	Yes, all doors (with exception of revolving doors) will meet ADA accessibility widths
If project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package.	NA
8. Accessible Units (Group 2) and Guestrooms: (If applicable) *In order to facilitate access to housing and hospitality, this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing and hotel rooms.*	
What is the total number of proposed housing units or hotel rooms for the development?	389

If a residential development, how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP (Inclusionary Development Policy) units?	NA
If a residential development, how many accessible Group 2 units are being proposed?	NA
If a residential development, how many accessible Group 2 units will also be IDP units? *If none*, describe reason.	NA
If a hospitality development, how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? *If yes,* provide amount and location of equipment.	5% of the rooms will be accessible.
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. *If yes*, provide reason.	No
Are there interior elevators, ramps or lifts located in the development for access around architectural barriers and/or to separate floors? *If yes*, describe:	No
9. Community Impact: *Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community.*	
Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives?	The project will add roughly 21,000 SF of public realm to the development area. This will include outdoor seating areas, new tree plantings, bike lanes, safer pedestrian pathways, and public gathering space.

What inclusion elements does this development provide for persons with disabilities in common social and open spaces? Example: Indoor seating and TVs in common rooms; outdoor seating and barbeque grills in yard. Will all of these spaces and features provide accessibility?	All areas of the public realm and the amenity spaces open to the public at the interior will be ADA compliant. Interior spaces include a bank, café, and accessible bar and restaurant at the second level.
Are any restrooms planned in common public spaces? ***If yes,*** will any be single-stall, ADA compliant and designated as "Family"/ "Companion" restrooms? ***If no***, explain why not.	Yes, ADA compliant stall will be provided.
Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? ***If yes,*** did they approve? ***If no,*** what were their comments?	The Proponent will work with the Mayor's Commission for Persons with Disabilities.
Has the proponent presented the proposed plan to the Disability Advisory Board at one of their monthly meetings? Did the Advisory Board vote to support this project? ***If no,*** what recommendations did the Advisory Board give to make this project more accessible?	The Proponent plans to meet with the Advisory Board.

10. Attachments

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

Provide a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations, including route distances. N/A – No parking will be provided on-site. Instead, the relatively small number of guests of this type and at this location who are expected to require parking nearby will be accommodated by off-site valet parking.
Provide a diagram of the accessible route connections through the site, including distances. See the attached graphics.

Provide a diagram the accessible route to any roof decks or outdoor courtyard space? (if applicable) N/A
Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry. See attached graphics.
Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project. • • • •

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

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

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

Architectural Access staff can be reached at:

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

One Kenmore Square Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Level 1 Plan


KITCHEN
1626 SQ. FT.
DINING
1994 SQ. FT.
EVENT
665 SQ. FT.
SEATING
569 SQ. FT.
OPEN TO BELOW
M. WC.
300 SQ. FT.
W. WC.
306 SQ. FT.
Legend
HOTEL
RETAIL
MECH/SERVICE
CIRC. BY ELEVATOR
ACCESSIBLE ROUTE
Floors Served
PASSENGER ELEVATOR 0-Roof
PASSENGER/SERVICE ELEVATOR 0-Roof
L2
AMENITY
EVENT: 665 sf
DINING: 1,994 sf
SEATING: 569 sf
W.C.: 606 sf
KITCHEN: 1,626 sf
TOTAL: 5,438 sf
PERIMETER: 7,183 sf
GSF: 6,909 sf
1 LEVEL 2 PLAN
SCALE: 1/8" = 1'-0"
N
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One Kenmore Square Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Level 3 Plan

One Kenmore Square Boston, Massachusetts

STUDIO/
GANG
/ARCHITECTS

Level 4 Plan

Legend

- HOTEL
- RETAIL
- MECH/SERVICE
- CIRC. BY ELEVATOR
- ACCESSIBLE ROUTE

	Floors Served
PASSENGER ELEVATOR	0-Roof
PASSENGER/SERVICE ELEVATOR	0-Roof

L12	
HOTEL	
KEY 01:	350 sf
KEY 02:	322 sf
KEY 03:	310 sf
KEY 04:	310 sf
KEY 05:	322 sf
KEY 06:	310 sf
KEY 07:	316 sf
KEY 08:	313 sf
KEY 09:	328 sf
KEY 10:	480 sf
KEY 11:	332 sf
KEY 12:	344 sf
KEY 13:	344 sf
KEY 14:	418 sf
KEY 15:	290 sf
KEY 16:	368 sf
B.O.H.:	336 sf
TOTAL:	5,793 sf
PERIMETER:	8,150 sf
GSF:	7,618 sf

1 LEVEL 12 PLAN
SCALE: 1/8" = 1'-0"

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Legend

HOTEL		
RETAIL		
MECH/SERVICE		
CIRC. BY ELEVATOR		
ACCESSIBLE ROUTE		
	Floors Served	
PASSENGER ELEVATOR	0-Roof	
PASSENGER/SERVICE ELEVATOR	0-Roof	

L18

HOTEL

KEY 01:	378 sf
KEY 02:	310 sf
KEY 03:	310 sf
KEY 04:	310 sf
KEY 05:	310 sf
KEY 06:	304 sf
KEY 07:	304 sf
KEY 08:	304 sf
KEY 09:	377 sf
KEY 10:	650 sf
KEY 11:	320 sf
KEY 12:	326 sf
KEY 13:	314 sf
KEY 14:	266 sf
KEY 15:	318 sf
KEY 16:	401 sf
KEY 17:	303 sf
B.O.H.:	556 sf
TOTAL:	6,361 sf
PERIMETER:	9,131 sf
GSF:	8,440 sf

1 LEVEL 18 PLAN
SCALE: 1/8" = 1'-0"

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Legend

- HOTEL
- RETAIL
- MECH/SERVICE
- CIRC. BY ELEVATOR
- ACCESSIBLE ROUTE

	Floors Served
PASSENGER ELEVATOR	0-Roof
PASSENGER/SERVICE ELEVATOR	0-Roof

L27

HOTEL

KEY 01:	425 sf
KEY 02:	292 sf
KEY 03:	292 sf
KEY 04:	292 sf
KEY 05:	292 sf
KEY 06:	292 sf
KEY 07:	292 sf
KEY 08:	292 sf
KEY 09:	292 sf
KEY 10:	359 sf
KEY 11:	494 sf
KEY 12:	295 sf
KEY 13:	296 sf
KEY 14:	296 sf
KEY 15:	296 sf
KEY 16:	255 sf
KEY 17:	408 sf
KEY 18:	488 sf
KEY 19:	375 sf
B.O.H.:	332 sf
TOTAL:	6,655 sf
PERIMETER:	10,068 sf
GSF:	9,104 sf

1 LEVEL 27 PLAN
SCALE: 1/8" = 1'-0"

N

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Appendix J

Broadband Ready Checklist

10				*04/22/2019 13:34:51*
		Form Publisher Template		
04/22/2019				

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

FormPublisher

Questions list:				
Project Name::				
Project Address Primary: :				
Project Address Additional: :				
Project Contact (name / Title / Company / email / phone): :				
Expected completion date:				
Owner / Developer:	Mark Kenmore LLC			
Architect:	Studio Gang			
Engineer (building systems)::	Vanderweil Engineers			
Permitting::	Epsilon Associates, Inc			
Construction Management:				
Number of Points of Entry:	Specific design details are unknown at this time.			
Locations of Points of Entry:	The design intention is to provide two geographically diverse entrance points for communications.			
Quantity and size of conduits:				
Location where conduits connect (e.g. building-owned manhole, carrier-specific manhole or stubbed at property line) :				
Other information/comments:				
Do you plan to conduct a utility site assessment to identify where cabling is located within the street? This information can be helpful in determining the locations of POEs and telco rooms. Please enter 'unknown' if these decisions have not yet been made or you are presently unsure.:	Yes			
Number of risers:	Specific design details are unknown at this time.			
Distance between risers (if more than one):	The design intention is to provide centrally located risers will reach all floors with a minimum of four 4" sleeves through each level.			
Dimensions of riser closets:				
Riser or conduit will reach to top floor :				
Number and size of conduits or sleeves within each riser:				
Proximity to other utilities (e.g. electrical, heating):				
Other information/comments:				
What is the size of the telecom room?:	Unknown - will be determined in Schematic Design			

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

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